



المؤسسة العامة القطرية للكهرباء والماء
Qatar General Electricity & Water Corporation

CONTRACT No GTC 626/2014A

**CONSTRUCTION OF MEGA RESERVOIR PRPSs
(PACKAGE A - UMM BIRKA)**

**CONTRACT DOCUMENTS
(VOLUME 11 OF 19)**



**CONSOLIDATED CONTRACTORS GROUP S.A.L. (OFFSHORE) (CCC) &
TEYSEER CONTRACTING COMPANY W.L.L.
JOINT VENTURE**

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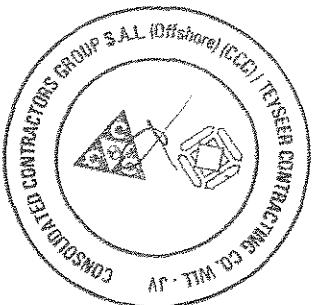
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Appendix I

Materials Supplied by the Contractor





Appendix - I

MATERIALS SUPPLIED BY CONTRACTOR

1 MATERIALS SUPPLY

The Contractor shall provide all materials required to complete the Works unless otherwise stated elsewhere in the Contract. All materials must be supplied from one of the alternatives proposed in the Contractor's technical offer on the relevant form of Appendix E. All Suppliers must be taken from Kahramaa's most recent approved Vendor list for the Mega Reservoir, (Appendix I-4) and where not referenced in Appendix I-4, Kahramaa's standard vendor list (Appendix I-5) must be used.

Materials provided shall be new, fit for their intended purpose, of best quality, and workmanship and in accordance with the Contract Specifications, the "General Specifications for Main laying Materials of Water Works" and clause 6 of the General Terms and Conditions.

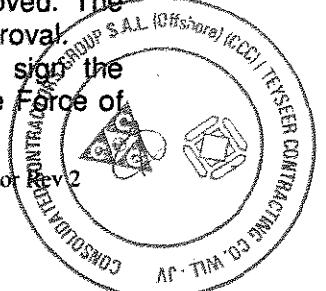
All orders for Major Equipment shall be finalized within 12 months of the Effective Date of Contract, to suit the required schedules set out in the contract. Unpriced copies of the Letters of Credit and the purchase orders shall be submitted to Kahramaa.

As instructed by Kahramaa the Contractor shall submit guarantees from the approved Suppliers that they can meet the programme for delivery. The Contractor shall provide samples and third party test certificates of the materials at the request of Kahramaa.

Notwithstanding the above and the provisions of sub Clause 1 b below, Kahramaa reserves the right to independently assess the ability of any supplier to meet the Contract programme and to instruct the Contractor to propose alternative suppliers.

Contractor to note the following:

- a) Delivery of materials should be to a store allocated at the site of the works. The location shall be decided with the agreement of the Engineer. The costs involved in acquiring the store and keeping the supplied materials shall have been accounted for in pricing.
- b) The supplied materials shall be inspected by KAHRAMAA'S Engineers representative. Any damage or defect occurring to the materials shall be the sole responsibility of the CONTRACTOR, and he shall remain responsible for any damage to the materials supplied until final receipt is acknowledged.
- c) Final receipt shall be acknowledged after the supplied materials, having been inspected by the Engineer for this purpose, are approved. The Engineer shall advise the CONTRACTOR in writing of such approval. The CONTRACTOR or whoever represents him shall also sign the inspection report, the Engineer, in this respect, shall have the Force of

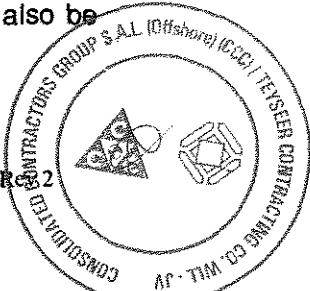




Law on the CONTRACTOR even if he were absent, after being notified or if he refused to sign the report.

After inspection and final acceptance, the CONTRACTOR shall rearrange the supplied items in their final position in the store as directed by the Engineer and in accordance with manufacturer's specifications for storage.

- d) The CONTRACTOR shall be responsible for any defects that may appear in the materials after final receipt. Should the Engineer discover that these defects were deliberately concealed by the Supplier, Kahramaa reserves the right to reject the Supplier.
- e) The Engineer reserves the right to accept or reject the whole supplied materials or part thereof if after inspection they are found to be incompatible with the tender Specification and approved samples submitted by the Supplier.
- f) The CONTRACTOR shall take back any rejected materials within a period not exceeding 15 days from the Inspection date mentioned above in (c).
- g) In the event of failure to supply the materials (by the CONTRACTOR) within the time set in this Contract, or after the expiry of the additional period granted, the Engineer shall have the right to purchase the materials which the Supplier failed to supply from another source and on his account. Any extra costs shall be claimed from the Bond deposited by the Supplier or deducted from monies due from KAHRAMAA to the CONTRACTOR. Furthermore, the liquidated damages for the delay will also be realized from the CONTRACTOR.
- h) The CONTRACTOR shall implement the CONTRACT himself and shall not abandon all or part thereof or delegate another Supplier to implement all CONTRACT or part thereof on his behalf without having the Engineer's approval.
- i) The CONTRACTOR shall have no right to cease fulfilment of the commitments mentioned in the CONTRACT on the pretext that the Engineer failed to fulfil his commitments.
- j) In the event of failure to supply certain items which the Tenderer quoted during the tendering stage, the CONTRACTOR shall be allowed to supply a KAHRAMAA approved alternative item after obtaining the Engineer's approval.
- k) Material supplied under this contract shall be provided with the certification of origin for all materials and their components, including pumps, motors, VFDs, pipes, fittings, valves, control valves, flow meters, generators, control and chlorination equipment and their composite parts, in accordance with EN10204 Type 3.1 or equivalent certificates for the countries referenced in Appendix A1, item 1.20 or the Vendor List in Appendix I-4. Certificates confirming material grade used shall also be provided.





2. CARE OF MATERIAL

From the commencement of the manufacturing to the delivery of the plant, the **CONTRACTOR** shall take full responsibility for the care thereof. Strict supervision shall be maintained by the Contractor at all stages during the manufacturing, coating, transporting and delivery of the plant to ensure that it is correctly handled and not in any way damaged. The **CONTRACTOR** shall immediately inform the Engineer, if damage takes place to the plant, giving full details of the incident and the extent of the Damage.

3. PROGRAMME, REPORTS OF MANUFACTURE AND DELIVERY

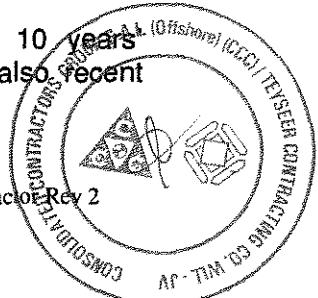
- For the purpose of the tender submission the **CONTRACTOR** shall complete and submit for the Engineer's approval the Programme of Manufacturing and Delivery forms for the applicable material shown hereafter as Appendix-I-3-1 to 14, to demonstrate assumptions made.
- Within fourteen (14) days of receipt of the written acceptance of his Tender the **CONTRACTOR** shall complete and submit for the Engineer's approval the Programme of Manufacturing and Delivery forms shown hereafter as Appendix-I-3-1 to 14, for his final proposal. These data shall be incorporated in the "Material Delivery Status Report" enclosed in this Appendix I-6 which, will be used as a basis for the Execution Programme of Works of the CONTRACT required on Appendix H.
- At the end of each month, or other period agreed with the Engineer, the **CONTRACTOR** shall furnish the Engineer with update on the "Material Delivery Status Report" and this should state whether it is in accordance with the Programme. If for any reason the material delivery was delayed, the **CONTRACTOR** will be required to increase the rate of production to enable the delivery to be completed on time and reflect the same in the updates of the "Material Delivery Status Report" form.

4. APPROVAL

The Contractor shall submit for Kahramaa approval the details for each material prior to placing order for that material. All suppliers proposed must demonstrate local presence available in respect of after sales service and for provision of technical support. All materials request submitted shall be compliant with the technical specification. Kahramaa reserves the right to reject any materials that do not comply.

All loss prevention material and equipment shall, in addition to Kahramaa approval, have Qatar Civil Defence approval and shall be listed by at least 2 internationally recognised testing laboratories such as UL/FM/ULC/LPCB etc.

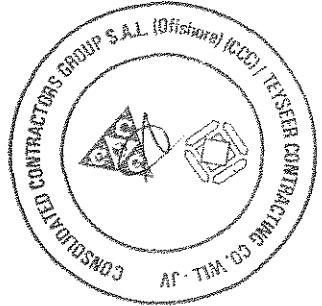
All suppliers of HVAC materials shall have a minimum of 10 years experience of supplying such materials within the GCC and also recent experience within Qatar.





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All telecommunications equipment shall be approved by the Qatar Ministry of Interior. (QCD)





5. INSPECTION AT THE MANUFACTURER'S WORKS

Kahramaa and the Engineer shall, if they so wish inspect the materials at the manufacturer's workshop, and the **CONTRACTOR** shall clearly indicate in his submitted Programme, the times when the materials will be manufactured. Factory Acceptance Tests shall be completed for all major materials and equipment. For all other materials and equipment, Kahramaa reserves the right to attend at their own discretion. Regardless of whether Kahramaa wish to attend or not, Third Party Witness Testing must be completed for all materials and equipment. Should Kahramaa wish to attend, these tests, mutually acceptable dates shall be agreed.

6. SUITABILITY OF MATERIALS

The Contractor shall satisfy himself that the specified materials shall be suitable for conveying any of the water as detailed in Table I-1 and shall not deteriorate or be attacked in any way by the water. Alternatives to the specified materials shall be agreed by the Engineer prior to signing the Contract. Anything proposed shall be compliant with WHO standards for potable water..

Table 'I-2' gives an analysis of the environmental condition. The **CONTRACTOR** must satisfy himself that the specified (or other) coating and lining shall not deteriorate in any way when subjected to such conditions for periods of time exceeding ten years.

7. PREFERRED SUPPLIERS FOR MAIN PUMPS AND MOTORS

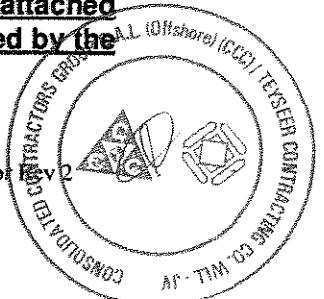
Kahramaa has the right to choose their preferred supplier for pumps and motors from any of the pump suppliers in the attached Vendor list, irrespective of which preferred supplier is presented by the Contractor. This decision shall be at Kahramaa discretion.

8. PREFERRED SUPPLIERS FOR MASTER PLC AND SCADA HMI

Kahramaa has the right to choose their preferred supplier for the Master PLC and the SCADA HMI from any of the suppliers in the attached Vendor list, irrespective of which preferred supplier is presented by the Contractor. This decision shall be at Kahramaa discretion.

9. PREFERRED SUPPLIERS FOR CARBON STEEL PIPEWORK

Kahramaa has the right to choose their preferred supplier for the Carbon Steel Pipework supply from any of the suppliers in the attached Vendor list, irrespective of which preferred supplier is presented by the Contractor. This decision shall be at Kahramaa discretion.





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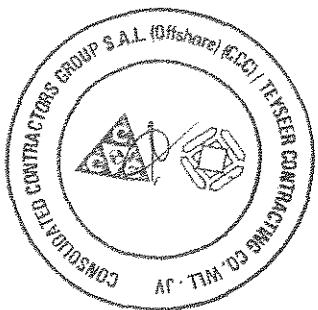




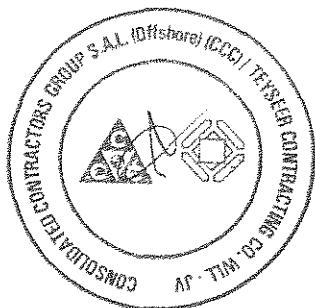
Table 'I-1'

TYPICAL DRINKING WATER QUALITY

(All Units are in PPM)

W.H.O International

Parameter	Highest Desirable Level	Max. Permissible Level	Treated Water
1. pH	7.0 – 8.5	6.5-8.5	9.5
2. Total Dissolved Solid (TDS)	500	1500	150
3. Alkalinity as CaCO ₃	-	-	-
4. Calcium Hardness as Ca	75	200	32
5. Magnesium as Mg	30	150	5
6. Sodium As Na	-	185	20
7. Copper as Cu	.05	1.5	.01
8. Iron as Fe	0.03	1.0	.01
9. Chloride as Cl	200	600	45
10. Fluoride as F	0.5-1.0	1.5	0.4
11. Phosphorous as P ₂ O ₅	0.4	5.0	0.4
12. Sulfate as SO ₄	200	400	4
13. Chlorine as Cl ₂	0.2	.05	0.8-1.0





APPENDIX "I - 2" SITE ENVIRONMENTAL CONDITIONS

State of Qatar is classified as being among the worlds most arid and desert regions. The rainfall is concentrated in the Winter and Spring period (December to March) with an average of 50-80 mm per annum. No. discernible pattern in rainfall occurrence is apparent, but there is a tendency for rainfall to occur more often during February and March. Rainfall can be heavy with poor natural drainage resulting in surface flooding.

Month	Temperature Degree C		% Humidity	
	Mean Max.	Mean Min.	Mean Daily Mean Max.	Mean Min.
January	22.3	13.1	17.5	90.7
February	22.7	12.7	17.5	82.8
March	27.5	16.8	21.8	85.3
April	31.3	20.0	25.3	80.9
May	37.6	24.3	30.7	67.6
June	41.0	26.0	33.6	64.2
July	41.5	28.3	34.6	71.0
August	40.7	28.3	34.1	77.7
September	38.3	25.9	32.0	86.5
October	35.2	23.0	29.0	83.7
November	29.8	19.5	24.5	89.9
December	24.8	14.5	19.4	86.1
				46.5

Maximum-recorded relative humidity is 100%

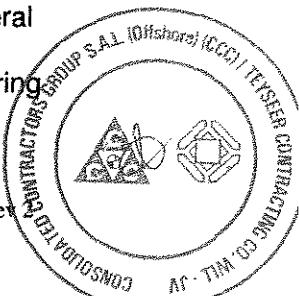
Maximum-recorded direct sunlight temperature is 75 degree C

Maximum-recorded ambient shade temperature is 51 degree C

Minimum recorded ambient shade temperature is 0 degree C

Site elevation is 2 – 20m QND

Prevailing winds are mainly northerly occasionally with South-easterly gusts up to 140 km/h. Sand storms, though not severe, do occur and can persist for several days. The site is not subject to industrial pollution, but due to being near the coast the air can be salt laden, with occasional fog. During the winter and spring periods severe electrical storms with sheet and forked lightning can occur.





Appendix – I-3-1

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Pumps and Motors

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

2. Start of Manufacturing:

3. Completion of Manufacturing:

4. 1st Shipment:

5. Final Shipment:

6. Shipping from the Port of:

7. 1st Delivery:

8. Final Delivery:

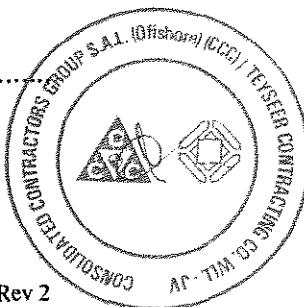
9. Technical Catalogue of the Proposed material:

10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):

11. Proposed Item Model No.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Appendix – I-3-2

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

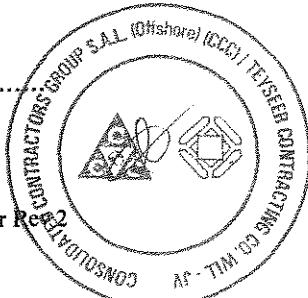
Material Concerned: Ductile Iron Pipe and Fittings (Where these are to be procured from separate Suppliers, please complete 2 forms accordingly. Where a supplier is permitted to supply both pipe and fittings, these must be procured from the same supplier)

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:
2. Start of Manufacturing:
3. Completion of Manufacturing:
4. 1st Shipment:
5. Final Shipment:
6. Shipping from the Port of:
7. 1st Delivery:
8. Final Delivery:
9. Technical Catalogue of the Proposed material:
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):
11. The D.I. pipe will be manufactured in our works at:
12. The D.I. pipes will be cement mortar lined in our works at:
13. The D.I. fittings will be manufactured in our works at:
14. The D.I. fittings will be cement mortar lined in our works at:

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Appendix – I-3-3

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Carbon Steel Pipes and Fittings

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:-
.....

2. Start of Manufacturing:-
.....

3. Completion of Manufacturing:-
.....

4. 1st Shipment:-
.....

5. Final Shipment: -
.....

6. Shipping from the Port of: -
.....

7. 1st Delivery: -
.....

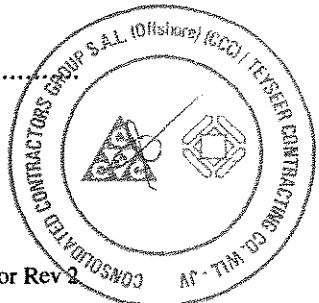
8. Final Delivery:-
.....

9. Technical Catalogue of the Proposed material:
.....

10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):
.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Appendix I-3-4

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - **Gate Valves**

Programme in weeks after acceptance of Tender

1. Manufacturer /Location:

.....

2. Start of Manufacturing:

3. Completion of Manufacturing:

4. 1st Shipment:

5. Final Shipment:

6. Shipping from the Port of:

7. 1st Delivery:

8. Final Delivery:

9. Technical Catalogue of the Proposed material:

.....

.....

10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):

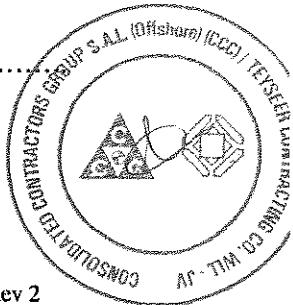
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11. Proposed Item Model No.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

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Sign & Stamp





Appendix -I-3-5

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

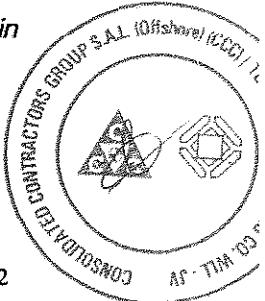
Material Concerned: - Butterfly Valves

Programme in weeks after acceptance of Tender

1. Manufacturer /Location:
2. Start of Manufacturing:
3. Completion of Manufacturing:
4. 1st Shipment:
5. Final Shipment:
6. Shipping from the Port of:
7. 1st Delivery:
8. Final Delivery:
9. Technical Catalogue of the Proposed material:
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):
11. Proposed Item Model No.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

.....
Sign & Stamp





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Appendix – I-3-6

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - **Non-return Valves**

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:-
.....

2. Start of Manufacturing:-
.....

3. Completion of Manufacturing:-
.....

4. 1st Shipment :-
.....

5. Final Shipment :-
.....

6. Shipping from the Port of :-
.....

7. 1st Delivery :-
.....

8. Final Delivery :-
.....

9. Technical Catalogue of the Proposed material
.....

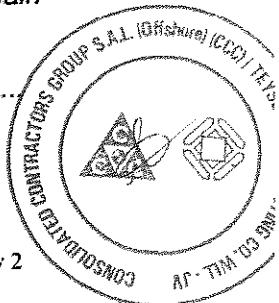
10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA, etc):-.....

11. Proposed Item Model No
.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





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Appendix -I-3-7

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - **Couplings and adaptors**

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:-
.....

2. Start of Manufacturing:-
.....

3. Completion of Manufacturing:-
.....

4. 1st Shipment: -
.....

5. Final Shipment: -
.....

6. Shipping from the Port of :-
.....

7. 1st Delivery :-
.....

8. Final Delivery :-
.....

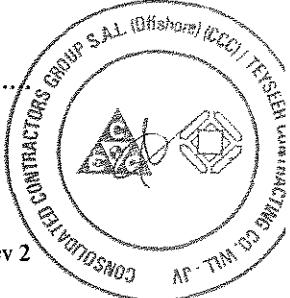
9. Technical Catalogue of the proposed material
:.....

10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):-.....

11. Proposed Item Model No
.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





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Appendix – I-3-8

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - **Electrical Switchgear**

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

2. Start of Manufacturing:

3. Completion of Manufacturing:

4. 1st Shipment:

5. Final Shipment:

6. Shipping from the Port of:

7. 1st Delivery:

8. Final Delivery

:

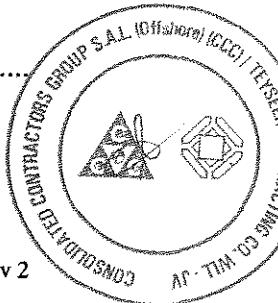
9. Technical Catalogue of the Proposed material

10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA, etc):-

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

.....
Sign & Stamp





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Appendix – I-3-9

Programme of Manufacturing and Delivery

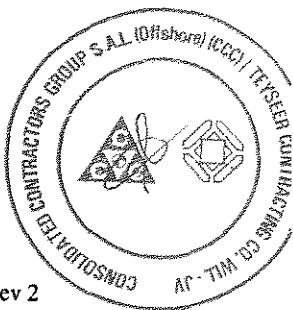
The Tenderer shall confirm the following
Material Concerned: - **Motor Control Centres**

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:-
.....
2. Start of Manufacturing:-
.....
3. Completion of Manufacturing:-
.....
4. 1st Shipment :-
.....
5. Final Shipment . :-
.....
6. Shipping from the Port of :-
7. 1st Delivery . :-
8. Final Delivery :-.....
9. Technical Catalogue of the Proposed material:.....
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):-.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Appendix – I-3-10

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - Variable Speed Drives

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

.....

2. Start of Manufacturing:

.....

3. Completion of Manufacturing:

.....

4. 1st Shipment:

.....

.....

5. Final Shipment:

.....

6. Shipping from the Port of:

.....

7. 1st Delivery:

.....

8. Final Delivery:

.....

9. Technical Catalogue of the Proposed Material

.....

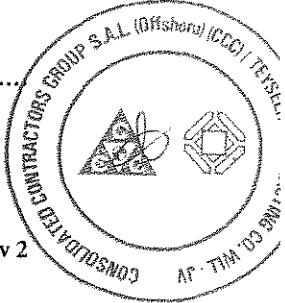
10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA, etc)

.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





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Appendix – I-3-11

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - Transformers

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

.....

2. Start of Manufacturing:

.....

3. Completion of Manufacturing:

.....

4. 1st Shipment:

.....

5. Final Shipment:

.....

6. Shipping from the Port of:

.....

7. 1st Delivery:

.....

8. Final Delivery:

.....

9. Technical Catalogue of the Proposed Material

.....

10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA, etc):-

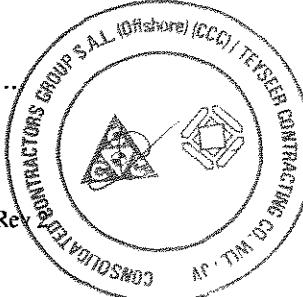
.....

11. Proposed Item Model No

.....

The above items will be manufactured in accordance with Kahramaa General Main Laying Materials Specification:

Sign & Stamp





Appendix – I-3-12

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - **Generators and fuel system**

Programme In weeks after acceptance of Tender

1. Manufacturer / Location:

.....

2. Start of Manufacturing:

.....

3. Completion of Manufacturing:

.....

4. 1st Shipment:

.....

5. Final Shipment:

.....

6. Shipping from the Port of:

.....

7. 1st Delivery:

.....

8. Final Delivery:

.....

9. Technical Catalogue of the Proposed
material:.....

10. Technical Code of the Manufacturer product

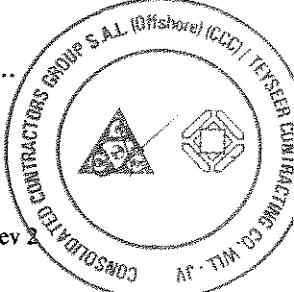
(i.e. BS , ISO , AWWA, etc):-

11. Proposed Item Model

No.....

*The above items will be manufactured in accordance with Kahramaa General Main
laying Materials Specification:*

Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix – I-3-13

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - Chlorination equipment

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

.....

2. Start of Manufacturing:

.....

3. Completion of Manufacturing:

.....

4. 1st Shipment:

.....

5. Final Shipment:

.....

6. Shipping from the Port of:

.....

7. 1st Delivery:

.....

8. Final Delivery:

.....

9. Technical Catalogue of the Proposed
material:.....

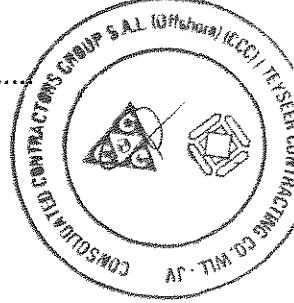
10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA, etc):-

.....

*The above items will be manufactured in accordance with Kahramaa General Main
laying Materials Specification:*

Sign & Stamp





Appendix – I-3-14

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: **Control System Equipment**

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

2. Start of Manufacturing:

3. Completion of Manufacturing:

4. 1st Shipment:

5. Final Shipment:

6. Shipping from the Port of:

7. 1st Delivery:

8. Final Delivery:

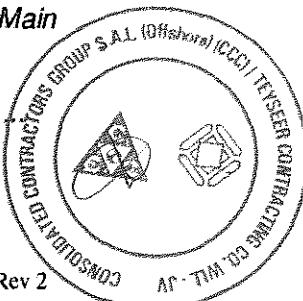
9. Technical Catalogue of the Proposed
material:

10. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA,
etc):

*The above items will be manufactured in accordance with Kahramaa General Main
laying Materials Specification:*

.....
Sign & Stamp





Appendix – I-3-15

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: Ready mixed Concrete

1. Manufacturer / Location:

.....

2. Proposed Mix designs:

.....

3. Travel time to site:

.....

4. Production capacity:

.....

5. :

.....

6. Technical Catalogue of the Proposed material:

.....

7. Technical Code of the Manufacturer product

(i.e. BS , ISO , AWWA,
etc):.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

.....
Sign & Stamp

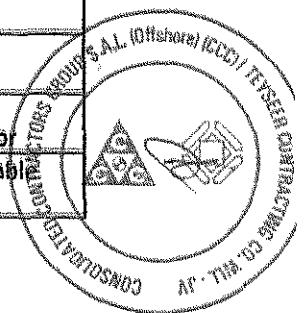




Appendix I-7 – Technical Data Sheets

Tenderers shall complete the following data sheets relating to key equipment supplies. The detailed sheets to be completed shall be issued to the contractors during the tender period.

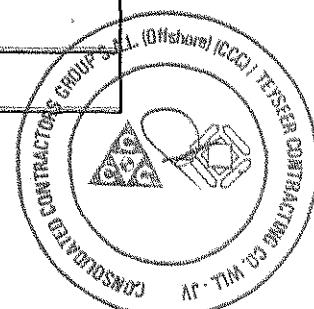
S/N	Package A - PRPS 1	Package B - PRPS 2	Package C - PRPS 5	Package D - PRPS 3	Package E - PRPS 4
001	Chlorine Analyzer				
002	Magnetic Flow Meter				
003	Magnetic Level Gauge				
004	ORP Analyzer				
005	PH Analyzer				
006	Pressure Gauge				
007	Pressure Switch				
008	Pressure Transmitter				
009	Radar Level Transmitter				
010	Temperature Transmitter				
011	Turbidity Analyzer				
012	Not used				
013	Medium Voltage Motor				
014	Medium Voltage Variable Speed Drive				





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(Packages A, B, C, D & E)

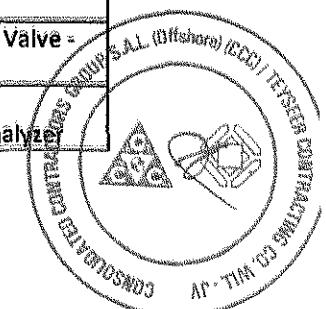
015	Main Pumps				
015-1	Subsystem 1A	Subsystem 2A	Subsystem 5A	Subsystem 3A	Subsystem 4A
015-2	Subsystem 1B	Subsystem 2B	Subsystem 5B	Subsystem 3B	Subsystem 4B
015-3		CPS -1			CPS-2
016	Circulation Pumps				
017	Scour Pumps				
018	Drain Down Pumps				
019	Drain Flood Pumps				
020	Emergency Tanker Filling Pumps				
021	Lifting Equipment (Gantry Crane)				
022	Lifting Equipment (Monorail Crane)				
023	Surge Vessels				
024	N/A	Surge Vessels (CPS-1)	N/A	N/A	Surge Vessels (CPS-2)
025	Air Release Valves				
026	Butterfly Valves				
027	Gate Valves				

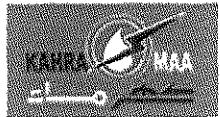




Qatar General Electricity & Water Corporation
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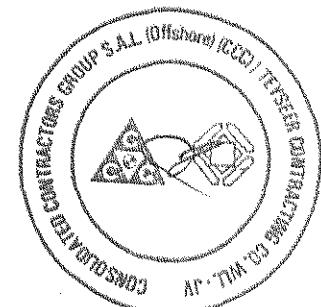
028	Check / Non-Return Valves				
029	Flow Control Valve				
030	Bypass Flow Control Valve				
031	Quick Closing Valve				
032	Not used				
033	Not used				
034	Not used				
035	LV Switchgear				
036	MV Switchgear				
037	11-0.415 kV Transformers - Dry Type				
038	11-0.415 kV Transformers - Oil Filled				
039	Generators	Generators	Generators	Generators	Generators
040	Gantry Crane (Outdoor)				
041	Reservoir Inlet FCV				
042	Pressure Sustaining Valve - TFS				
043	Chlorine Dioxide Analyzer				





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(Packages A, B, C, D & E)

044	CON Analyser flow cell type				
045	Float Switch				
046	Not used				
047	Analogue Instrument Cable				
048	Digital Signal				
049	Converter Transformer of VSD				
I-08-01	Automation	Automation	Automation	Automation	Automation



Appendix I-3 – Delivery Schedules

I-3-2 – D.I. Pipe & Fittings





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix – I-3-2

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: **Ductile Iron Pipe and Fittings** (Where these are to be procured from separate Suppliers, please complete 2 forms accordingly. Where a supplier is permitted to supply both pipe and fittings, these must be procured from the same supplier))

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

DUKER GmbH, LAUTRACH - GERMANY

2. Start of Manufacturing:

AFTER TECHNICAL CLEAR ORDER & WORKABLE LC

3. Completion of Manufacturing:

.....

4. 1st Shipment:

..... Y TO BE ARRANGED

5. Final Shipment:

.....

6. Shipping from the Port of:

..... EUROPEAN NORTH SEAPORT

7. 1st Delivery:

..... Y TO BE ARRANGED

8. Final Delivery:

.....

9. Technical Catalogue of the Proposed material:

.....

10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):

..... EN 545 OR ISO 2531

11. The D.I. pipe will be manufactured in our works at:

.....

12. The D.I. pipes will be cement mortar lined in our works at:

.....

13. The D.I. fittings will be manufactured in our works at:

..... DUKEr GmbH, LAUTRACH - GERMANY





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

14. The D.I. fittings will be cement mortar lined in our works at:
DUKER... Emb. H... LEUFACH... - GERMANY

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:



M. Alyase
Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix – I-3-2

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: Ductile Iron Pipe and Fittings (Where these are to be procured from separate Suppliers, please complete 2 forms accordingly. Where a supplier is permitted to supply both pipe and fittings, these must be procured from the same supplier))

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:

Saint-Gobain PAM France

Ductile iron pipes: Plant of Pont-à-Mousson, France

Ductile iron fittings: Foundry of Foug, France and/or any approved manufacturing plants

2. Start of Manufacturing:

Subject to correct and timely receipt of Contract signing + letter of credit (L/C) in France

3. Completion of Manufacturing:

Delivery periods shall be subject to the number of packages awarded, correct and timely receipt of deliverable

4. 1st Shipment:

Within 3 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding.

5. Final Shipment:

Within 23 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding.

6. Shipping from the Port of:

Antwerp, Belgium

7. 1st Delivery:

Within 4 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.

8. Final Delivery:

Within 24 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.

9. Technical Catalogue of the Proposed material:

As per technical submittal attached to our commercial offer

10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):

European Standard BS EN 545

11. The D.I. pipe will be manufactured in our works at:

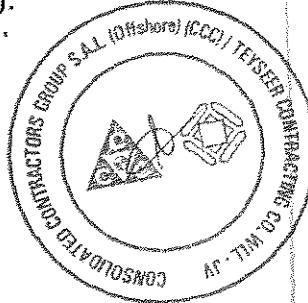
Pont-à-Mousson, France

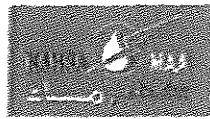
12. The D.I. pipes will be cement mortar lined in our works at:

Pont-à-Mousson, France

13. The D.I. fittings will be manufactured in our works at:

Foug, France and/or any approved manufacturing plants





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

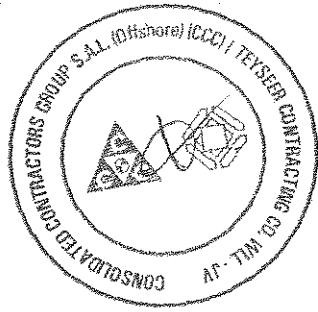
14. The D.I. fittings will be cement mortar lined in our works at:

Epoxy coated in Foug, France and/or any approved manufacturing plants

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:



Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-3 – Carbon Steel Pipe





Appendix – I-3-3

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Carbon Steel Pipes and Fittings

Programme in weeks after acceptance of Tender

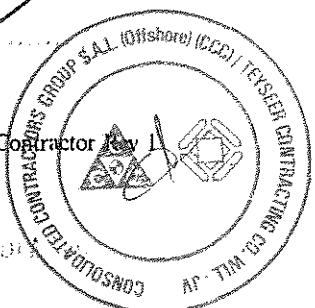
1. Manufacturer / Location:- Pipes : SEAH Corp. Korea
Fittings : SK Bell Korea
Flanges : W.M.A.S, Germany India / STET Corp. Korea
2. Start of Manufacturing:- Pipes : Within 30 days of a technically cleared order
Fitting : Within 120 days of a technically cleared order
3. Completion of Manufacturing:- Flanges : Within 360 days of technically cleared order
4. 1st Shipment:- Within 210 days
5. Final Shipment:- Within 420 days
6. Shipping from the Port of: - Korea / Germany / India / KSA
7. 1st Delivery:- Within 260 days
8. Final Delivery:- Within 480 days
9. Technical Catalogue of the Proposed material:
Furnished along with our offer
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):
As detailed for our offer

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Pls. refer to the compliance deviation list

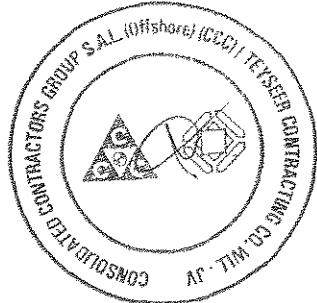
Sign & Stamp

Rajesh Kumar
Sr. Manager - piping



Appendix I-3 – Delivery Schedules

I-3-4 – Gate Valves





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mesa Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix -4-3-4

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

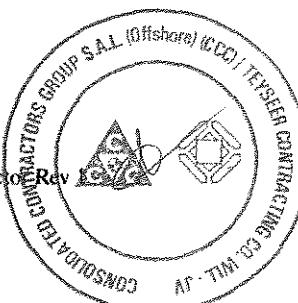
Material Concerned: - **Gate Valves**

Programme in weeks after acceptance of Tender

1. Manufacturer /Location: VAG Armaturen GmbH, Germany
2. Start of Manufacturing: Immediately after approval
3. Completion of Manufacturing: 12 weeks after getting final approval / date of opening L/C,
4. 1st Shipment: whichever is later
5. Final Shipment: 12 weeks after getting final approval / date of opening L/C,
6. Shipping from the Port of: Hamburg
7. 1st Delivery: 4-5 weeks from the date of first shipment
8. Final Delivery: 6-7 weeks from the date of first shipment
9. Technical Catalogue of the Proposed material: KAT 1030-A
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc): EN 1074, DIN 3352 – 4A, EN558-1 Row 14, DIN 3202 F4
11. Proposed Item Model No.

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Appendix -4-3-4

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Gate Valves

Programme in weeks after acceptance of Tender

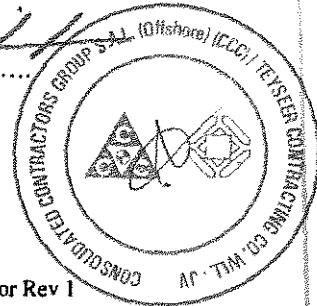
1. Manufacturer /Location:
Saint-Gobain PAM France
Ductile iron resilient seated gate valves: Plant of Toul, France
2. Start of Manufacturing: Subject to correct and timely receipt of Contract signing + letter of credit (L/C) in France
3. Completion of Manufacturing: Delivery periods shall be subject to the number of packages awarded, correct and timely receipt of deliverables
4. 1st Shipment: Within 3 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding
5. Final Shipment: Within 23 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding.
6. Shipping from the Port of: Antwerp, Belgium
7. 1st Delivery: Within 4 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.
8. Final Delivery: Within 24 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.
9. Technical Catalogue of the Proposed material:

As per technical submittal attached to our commercial offer
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):

European Standard BS EN 1074-1&2
11. Proposed Item Model No. Euro 20 type 23 resilient seated gate valves

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

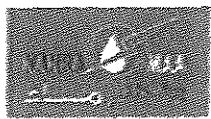
Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-5 – Butterfly Valves





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix -I-3-5

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Butterfly Valves

Programme in weeks after acceptance of Tender

1. **Manufacturer /Location:** Saint-Gobain PAM Italia
Ductile iron double eccentric butterfly valves: Plant of Lavis, Trento (TN), Italy
2. **Start of Manufacturing:**
Subject to correct and timely receipt of Contract signing + letter of credit (L/C) in France
3. **Completion of Manufacturing:**
Delivery periods shall be subject to the number of packages awarded, correct and timely receipt of deliverables
4. **1st Shipment:**
Within 3 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding.
5. **Final Shipment:**
Within 23 months Ex-Works. Any such indications of delivery dates shall hereby be non-binding.
6. **Shipping from the Port of:**
Antwerp, Belgium
7. **1st Delivery:**
Within 4 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.
8. **Final Delivery:**
Within 24 months Bill of Lading (B/L) date. Any such indications of delivery dates shall hereby be non-binding.
9. **Technical Catalogue of the Proposed material:**
As per technical submittal attached to our commercial offer
10. **Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):**
European Standard BS EN 1074-1&2 – Series 14
11. **Proposed Item Model No.** Eurostop double eccentric butterfly valves

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix -I-3-5

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - **Butterfly Valves**

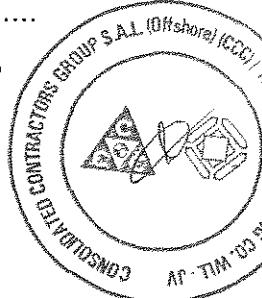
Programme in weeks after acceptance of Tender

1. Manufacturer /Location:
DÜKER GmbH, LANZACH - GERMANY
2. Start of Manufacturing:
AFTER TECHNICAL CLEAR ORDER & WORKABLE L/C
3. Completion of Manufacturing:
.....
4. 1st Shipment:
..... TO BE ARRANGED
5. Final Shipment:
.....
6. Shipping from the Port of:
EUROPEAN NORTH SEAPORT
7. 1st Delivery:
..... TO BE ARRANGED
8. Final Delivery:
.....
9. Technical Catalogue of the Proposed material:
.....
10. Technical Code of the Manufacturer product (i.e. BS , ISO ,
AWWA, etc):
ACC EN
11. Proposed Item Model No.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:



J. Al-Khalifa
Signature & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix -I-3-5

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

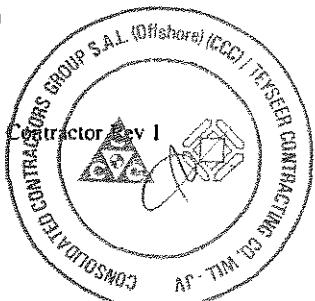
Material Concerned: - Butterfly Valves

Programme in weeks after acceptance of Tender

1. Manufacturer /Location: VAG Armaturen GmbH, Germany
2. Start of Manufacturing: Immediately after approval
3. Completion of Manufacturing: 24 weeks after getting final approval / date of opening L/C, whichever is later
4. 1st Shipment: 17 weeks after production start
5. Final Shipment: Shipment will be completed after 32 weeks
6. Shipping from the Port of: Hamburg
7. 1st Delivery: 4-5 weeks from the date of first shipment
8. Final Delivery: 4-5 weeks from the date of final shipment
9. Technical Catalogue of the Proposed material: KAT 1310-A
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc): EN 593
11. Proposed Item Model No.....

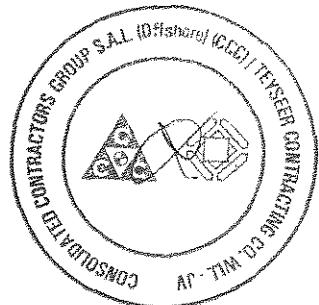
The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-6 – Non-Return Valves





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix – I-3-6

Programme of Manufacturing and Delivery

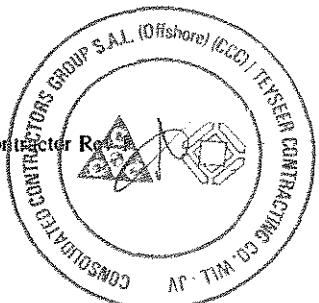
The Tenderer shall confirm the following
Material Concerned: - Non-return Valves

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:- VAG Armaturen GmbH, Germany
2. Start of Manufacturing:- Immediately after approval
3. Completion of Manufacturing:- 12 weeks after getting final approval / date of opening L/C, whichever is later
4. 1st Shipment :- 12 weeks after getting final approval / date of opening L/C, whichever is later
5. Final Shipment :- Shipment will be completed after 2 weeks
6. Shipping from the Port of :- Hamburg
7. 1st Delivery :- 4-5 weeks from the date of first shipment
8. Final Delivery :- 6-7 weeks from the date of first shipment
9. Technical Catalogue of the Proposed material KAT 1510-A
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):- EN 12334 – 3, EN 558-1, DIN 3202 F4, EN 1092-2
11. Proposed Item Model No

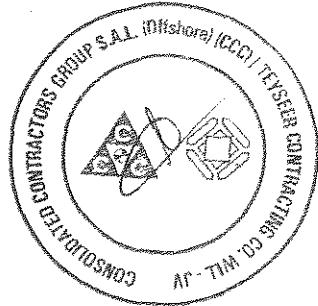
The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-7 – Couplings & Adaptors





Appendix -I-3-7

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - **Couplings and adaptors**

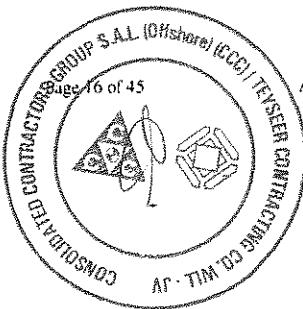
Programme in weeks after acceptance of Tender

1. Manufacturer / Location:- *KLAMELEX , R.S.A*
2. Start of Manufacturing:- *Within one week from receipt of PO.*
3. Completion of Manufacturing:- *20 weeks*
4. 1st Shipment:- *12 weeks*
5. Final Shipment:- *22 weeks*
6. Shipping from the Port of :- *Any port in RSA*
7. 1st Delivery :- *14 to 16 weeks*
8. Final Delivery :- *24 to 26 weeks*
9. Technical Catalogue of the proposed material
Attached
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):- *As per attached catalogue*
11. Proposed Item Model No
As per attached catalogue

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

*M.Kumar
03/06/14*

Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix -I-3-7

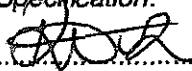
Programme of Manufacturing and Delivery

The Tenderer shall confirm the following
Material Concerned: - Couplings and adaptors

Programme in weeks after acceptance of Tender

1. Manufacturer / Location:- VIKING JOHNSON UK
2. Start of Manufacturing:- 2 Weeks
3. Completion of Manufacturing:- 10 Weeks
4. 1st Shipment:- 4 Weeks
5. Final Shipment:- 12 Weeks
6. Shipping from the Port of :- Any UK Port
7. 1st Delivery :- Approx 8 weeks to QATAR
8. Final Delivery :- Approx 16 weeks to QATAR
9. Technical Catalogue of the proposed material
..... Drawings submitted with catalogues.
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc):- AWWA C219
11. Proposed Item Model No As Submitted in technical Submittal.

*The above items will be manufactured in accordance with Kahramaa General Main
Laying Materials Specification:*

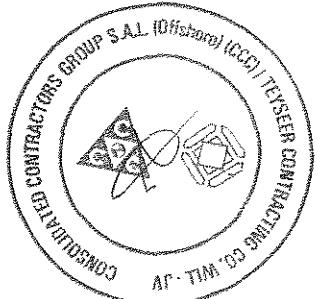
 Roger Tuckce.

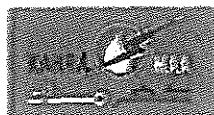
Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-10 – Variable Speed Drives





**Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)**

Appendix – I-3-10

Programme of Manufacturing and Delivery

**The Tenderer shall confirm the following
Material Concerned: - Variable Speed Drives**

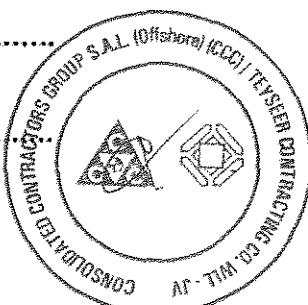
Programme in weeks after acceptance of Tender

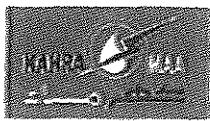
1. Manufacturer / Location: ABB Ltd. / Switzerland
 2. Start of Manufacturing: 2 ~ 4 weeks from manufacturing clearance
 3. Completion of Manufacturing: 32 weeks from manufacturing clearance
 4. 1st Shipment: 2 ~ 3 weeks from FAT
 5. Final Shipment: 3 ~ 4 weeks from FAT
 6. Shipping from the Port of: Rotterdam, Hamburg
 7. 1st Delivery: 5 ~ 6 weeks from 1st Shipment
 8. Final Delivery: 5 ~ 6 weeks from Final shipment
 9. Technical Catalogue of the Proposed Material: ACS 1000 EN brochure
 10. Technical Code of the Manufacturer product
(i.e. BS, ISO, AWWA, etc)
..... ISO 9001 : 2008 / ISO 14001 : 2004

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

GTC 626-2014-App A5-PRPS-El e - spec_Rev2

Sign & Stamp





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Appendix – I-3-10

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: - Variable Speed Drives

Programme in weeks after acceptance of Tender

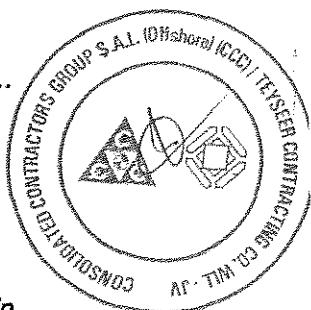
SIEMENS NUREMBERG GERMANY MV/LV Drives ,

1. Manufacturer / Location: MV Convertor Phase shift from Siemens Austria
.....
On Receipt of Approved Drawing: Drawings
2. Start of Manufacturing: will be given by 6 weeks from Technically & commercially clear P.O.
3. Completion of Manufacturing: 9 Months Ex works from Approved Drawing for MV Drives & MV Trafo, LV Drives 4 Months Ex works
4. 1st Shipment: 10 Months FCA German Port from Approved Drawing for MV drives/Trafo. 5 Months FCA German Sea Port for LV VFD's
.....
5. Final Shipment: Same as Point 4
6. Shipping from the Port of: Hamburg German Sea Port
7. 1st Delivery: Contractor to comment on CIF basis
8. Final Delivery: Contractor to comment on CIF basis
9. Technical Catalogue of the Proposed Material Attached
10. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, etc) IEC
.....

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:

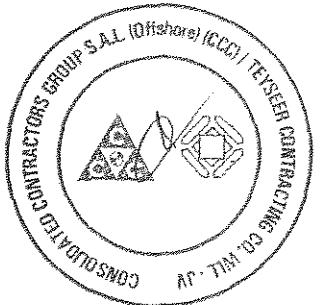
Items will be manufactured as per our Offer/comments & deviations

Sign & Stamp



Appendix I-3 – Delivery Schedules

I-3-13 – Control System Equipment





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Appendix – I-3-14

Programme of Manufacturing and Delivery

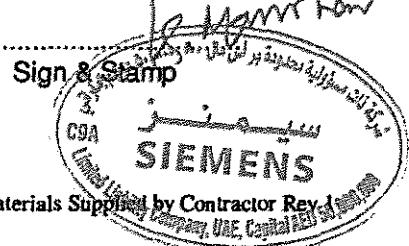
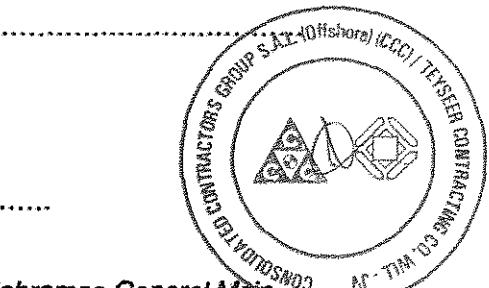
The Tenderer shall confirm the following
Material Concerned: Control System Equipment

Programme in weeks after acceptance of Tender

Siemens AG, Germany,

1. Manufacturer / Location: Cabinet Assembly from UAE / Qatar
2. Start of Manufacturing: On receipt of approved drawing. Drawings will be submitted in 8 week after Purchase Order.
3. Completion of Manufacturing: 8 Months from Approved Drawing.
4. 1st Shipment: 1 Months from completion of Factory Acceptance Test.
5. Final Shipment: 2 Months After 1st Shipment
6. Shipping from the Port of: UAE (After Cabinet Assembly)
7. 1st Delivery: CIF (Qatar) Delivery - 1 Month from 1st Shipment
8. Final Delivery: CIF (Qatar) Delivery - 2 Month from 1st Shipment
9. Technical Catalogue of the Proposed material: 4 Weeks from Purchase Order.
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc): IEC, ISO 9001

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:



Appendix – I-3-14

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: Process Instrumentation

Programme in weeks after acceptance of Tender

1. Manufacturer / Location: *Instruments will be manufactured in Siemens France, Canada. The panel assembly for the Analyzer System will be done by Siemens authorized Panel assemblers in the ME region.*

2. Start of Manufacturing: After formal approval of technical submittals by Kahramaa.

3. Completion of Manufacturing: 8 months

4. 1st Shipment: Within 4-5 weeks from FAT (Subject to completion of manufacturing)

5. Final Shipment: 4 months after first shipment

6. Shipping from the Port of: Germany

7. 1st Delivery 10 - 12 weeks

8. Final Delivery 30 - 32 weeks after shipment

9. Technical Catalogue of the Proposed material: enclosed

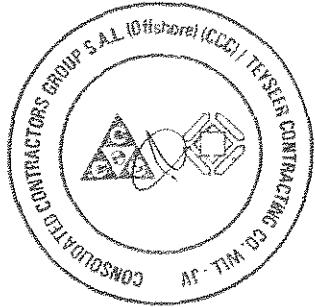
10. Technical Code of the Manufacturer product (i.e. BS , ISO , AWWA, etc):
..... IEC

The above items will be manufactured in accordance with Kahramaa General Main laying Materials Specification:



Appendix I-3 – Delivery Schedules

I-3-14 – Concrete





Appendix – I-3-15

Programme of Manufacturing and Delivery

The Tenderer shall confirm the following

Material Concerned: Ready mixed Concrete

1. Manufacturer / Location: Mesaieed, Lusail & Al Rayan Plants
2. Proposed Mix designs: According to our offer BET/KKL/9399/14 E 4992
3. Travel time to site: 30 to 60 minutes
4. Production capacity: 250m³ for each facility
5. :
6. Technical Catalogue of the Proposed material:
7. Technical Code of the Manufacturer product
(i.e. BS , ISO , AWWA, ISO 9001-2008 (ISO 14001-2004, OHSAS 18001-2007 Under Process etc):.....

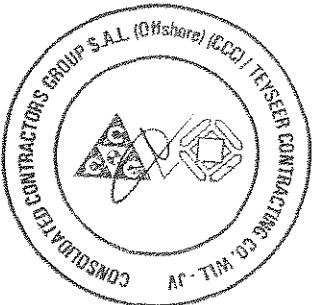
The above items will be manufactured in accordance with Kahramaa General Manufacturing Materials Specification:

Sign & Stamp



Appendix I-7 – Technical Data Sheets

001 – Chlorine Analyzer

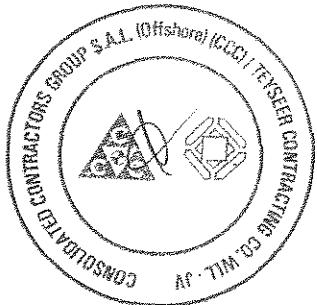




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-001

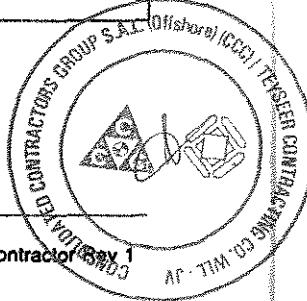
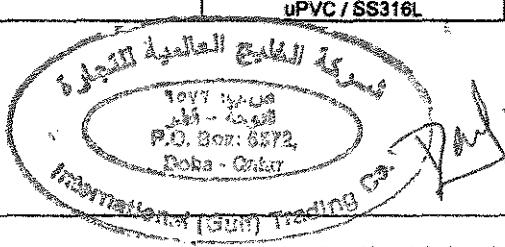
CHLORINE ANALYZER





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	SL. No	Description		
IDENTIFICATION	1	Meter Tag Number	As per Instrument List	CLF10
	2	Service	As per Instrument List	-
	3	Location	As per Instrument List	COMPLY
	4	Line Size /Schedule	As per Instrument List	YES
	5	P&I Number	As per Instrument List	YES
SERVICE CONDITION	1	Ambient Temperature	55 °C	45°C
	2	Relative Humidity	100 %	90%
	3	Installation (Indoor/Outdoor)	Indoor	INDOOR
	4	Fluid / Pressure	Kahrama Potable Water / PN 16	YES
	5	Process Connection Type / Size	½" NPT	YES
	6	Measuring Range mg/l	0.1 - 2 mg/l	0.1 TO 10 MG/L
	7	Temp. Min/Max °C	5 / 55	0-50
	8	Flow Switch	Required	YES
PROCESS CONDITION	1	Fluid	Kahrama Potable Water	YES
	2	Temp. Min/Max °C	5 / 70	45
	3	Process Fluid conductivity	145µS/cm – 400µS/cm	YES
	4	Chlorine Minimum / Maximum mg/l	0.1 – 2 mg/l	YES
SENSOR	1	Measuring Principle/Type	Amperometric/non-reagent Type	YES
	2	Wetted parts	PVC	YES
	3	Ingress Protection	IP 67	IP65 (NEMA 4X)
	4	Temperature Compensation	Yes	YES
	5	pH Compensation	Yes	YES
	6	Sample Flow Rate	5 l/h – 10 l/h	YES
	7	Cleaning	Manufacture Std	YES
	8	Installation	Flow Through/Flow Cell	FLOW THROUGH
	9	Process connection	Manufacture Std	YES
	10	Average Accuracy	± 5% of Measurement	YES
	11	Sensor Cable/connection	Manufacture Std,quick connect, non-contact metal type	YES
	12	Signal Cable between Sensor and transmitter	Min 5m	N/A
	13	Model Number/Order Code for Sensor	*	-
	14	Model Number /Order Code for Cable	*	-
	15	Electrode Type and Material	Amperometric / Measuring Electrode: Gold Reference Electrode: Silver Counter Electrode: Stainless Steel	YES
	16	Type of Mounting	Flow Cell, Sample piping & Sensor	FLOWCELL
	17	Sample piping material	uPVC / SS316L	YES





Qatar General Electricity & Water Corporation
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TRANSMITTER	1	Output	Profibus	YES
	2	Power Supply	240 VAC	YES
	3	Power Consumption	*	-
	4	Fuse Protection	Yes	YES
	5	Electrical Connection	M20 x 1.5	YES
	6	Ingress Protection	IP 67	IP65
	7	Enclosure Material	Manufacture Std	YES
	8	Accuracy	±0.5%	±5%
	9	Measuring Range	0-2 mg/l	0-10 MG/L
	10	Calibrated Range	0-2 mg/l	0-10 MG/L
	11	Relay output	2 nos.	YES
	12	Enclosure class	IP67	IP65
	13	Display Type	Alpha numeric Digital	YES
	14	Drift	Less than 1.5% per month	YES
	15	Linearity	±0.2%	±0.1%
	16	Response Time	Less than 2 min.	0.5 SECOND
	17	Mounting	Analyser Rack Mounting	YES
	18	Model Number/Order Code for Transmitter	*	LXV454.98.23022
ACCESORIES	1	Flow Cell	*	YES
	2	Rotameter with Flow regulator	Yes	YES
	3	Pressure Regulator cum Pressure Indicator	Yes	YES
	4	Sampling System	Yes	YES
	5	Cooling system	Yes	N/A
	6	Tag Plate	Yes	YES
DOCUMENTATION	1	Calibration Certificate for Each Tag	Yes	YES
	2	Catalogue (Data Sheet, IMS)	Yes	YES
	3	As Build Drawings (Electrical, Mechanical)	Yes	YES
PURCHASE	1	Manufacturer / Country of Origin	*	HACH-LANGE USA/GERMANY
	2	Model No / Complete Order Code	*	SC200
	3	Local Agent	*	IGTC
	4	Country of Origin	*	QATAR
	5	Weight	*	5.5 KG
	6	P.O. Number	*	-

Note:

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

002 – Magnetic Flow Meter





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-002

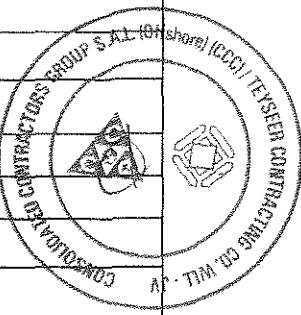
MAGNETIC FLOW METER





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

IDENTIFICATION	1	Meter Tag Number	As per Instrument List
	2	Service	As per Instrument List
	3	Location	As per Instrument List
	4	P & I Number	As per Instrument List
	5	Transmitter model Number	*
	6	Portable configurator	Yes
	7	Sensor model Number	*
SERVICE CONDITIONS	1	Pressure Normal/maximum	As per Instrument List
	2	Relative Humidity	100%
	3	Ambient Temperature	70 °C
GENERAL INFORMATION	1	Name of Manufacturer	*
	2	Place of Manuf. (City / Country)	Hagenau, France
	3	Name of Local Agent	Siemens WLL, Qatar
	4	Phone/Fax No. of Agent	+974 4456 0222
	5	P.O Number	P.O. Box 21757
	6	Applicable Standard	BS EN ISO 6817
FLUID PIPELINE	1	Line Size / Schedule	As per P&IDs
	2	Line Material	Ductile Iron
	3	Process connection	Flange
	4	Connection Materials	Stainless steel / Carbon Steel
	5	Fluid	Kahrama Potable Water
	6	Min. velocity range	m/sec
	7	Max. Flow	As per Instrument List
	8	Max. Temperature	70 °C
	9	Max. Pressure	5 barg
	10	Min. Fluid Conductivity	uS/cm
METERING ELEMENT SENSOR	1	Type	Electromagnetic
	2	Tube Material	Stainless Steel
	3	Gasket Material	EPDM
	4	Case Material	N/A
	5	Liner Material	To be suitable for Cl2 / ClO2 injected water. To be approved by WRAS
	6	WRAS-UK Certification for liner material	Required
	7	Electrode Types	Self cleaning
	8	Electrode Material	SS 316L
	9	No. of Electrodes	2 with built-in reference (Minimum three electrode)
	10	Empty Pipe Detection	Yes





Qatar General Electricity & Water Corporation
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(Packages A, B, C, D & E)

TRANSMITTER	11	Grounding, Type & Material	Via reference electrode or 2 Nos. ground ring	
	12	Enclosure Class	IP68	
	13	Integral Cable	20 METERS, Manufacturer's Standard armoured cable (based on approved installation layout)	
	14	Sensor Size	*	As per P&IDs
	15	Sensor Flow Range	*	0.25 to 10 m/s
	1	Type	Electronic	
	2	Instrument Tag Number	As per Instrument List	
	3	Function	Field Indication, totalised flow, sensor programming	
	4	Mounting	Remote	
	5	Enclosure Materials	POWERED-COATED DIECAST ALUMINUM	
	6	Cable Glands	M20 x 1.5	
	7	Power Supply	240V AC	
	8	Power Consumption	*	9.6 W
DISPLAY	9	Transmitter Output	HART 4-20mA	
	10	Enclosure Class	IP67	
	11	Length of Signal Cable	Min. 10m	
	12	Cable type	Screened and Armoured	
	13	Accuracy	±0.2%	
	14	Repeatability	±0.1%	
	15	Galvanic isolation	Yes	
	16	Calibration and measuring range	Measuring range upto 10 m/s	
	17	Infrared Service Port	Required	
	18	Display Type	Alpha numeric HMI Type intuitive navigation with Backlit Graphical Display	
	19	No. of lines	4	
	20	Data protection	Yes	
	21	Relay		
ALARM & CONTROL	a	-Rating	24 V DC	
	b	-Type of contact	Volt-free	
	c	- No. of contacts	Min. 3	
	22	All weather protective enclosure for transmitter (Double enclosure type)	Where required	

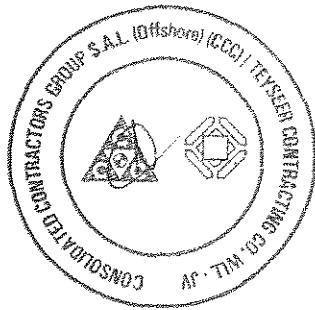


Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

23	Tag Plate	Yes	
24	O&M Manual	Yes	
25	As Built Drawing	Yes	
26	Calibration Certificates	Yes	

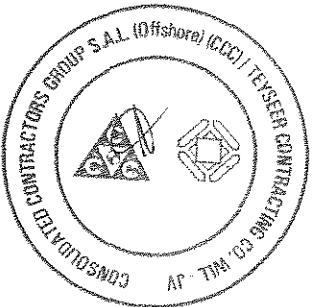
Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

003 – Magnetic Level Gauge

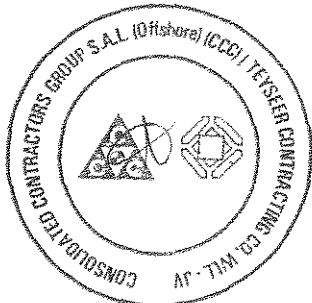




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-003

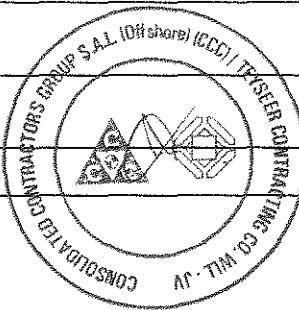
MAGNETIC LEVEL GAUGE





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

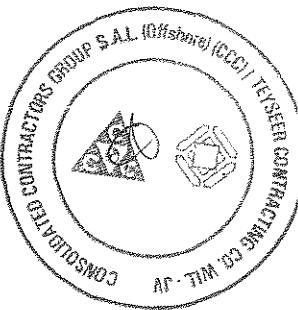
	SI. No	Description		
IDENTIFICATION	1	Meter Tag. Number	As per Instrument List	Comply
	2	Service	As per Instrument List	Comply
	3	Location	As per Instrument List	Comply
	4	Vessel No.	As per Instrument List	Comply
	5	P & I Number	As per Instrument List	Comply
	6	Transmitter model Number	*	
	7	Sensor model Number	*	
SERVICE CONDITION	1	Fluid	Kahrama Potable Water	Comply
	2	Measuring Range	As per Instrument List	Comply
	3	Mounting	Via flange connection	Comply
	4	Temp. Min/Max °C	5 / 55	Comply
	5	Relative Humidity	100%	Comply
MEASURING ASSEMBLY	1	Tube material	SS316L	Comply
	2	Process Connection Type / Pressure Rating / Size	FF FLANGE / ASME B16.5 CLASS 150 / 4"	2" Class 150
	3	Scale material	SS316L	Comply
	4	Scale graduation	1 cm	Comply
	5	Flaps colour	White and Black OR Red and Green	Red / White
	6	Illumination Type	Coloured LED	
	7	Float type	Concentric magnet	
	8	Float material	Stainless steel	Comply
	9	Overlap	100mm	
SWITCH MECHANISM	1	Type	Snap acting micro switch	Comply
	2	Number of switches	5	5
	3	Contact – volt/rating	240VAC, 5A / 24VDC, 30A	Comply
	4	Enclosure class	IP67	Comply
	5	Cable Gland	M20 x 1.5	Comply
GENERAL INFORMATION	1	Power Supply	24 V DC	
	2	Manufacturer	*	KSR- Kuebler
	3	Local Agent	*	Abdulla Bin Hamid Trading LLC
	4	Weight	*	
	5	Country of Origin	*	Germany
	6	P.O Number	*	





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ACCESORIES	1	Tag Plate	Yes	Tag No's to be provided
	2	Tag Plate	Yes	Tag No's to be provided
	3	O&M Manual	Yes	Comply
	4	As Built Drawing	Yes	Comply
	5	Calibration Certificates	Yes	Functional Test Reports
	Notes :			
1) * These variables to be filled in by Vendor/Contractor.				



Appendix I-7 – Technical Data Sheets

004 – ORP Analyzer

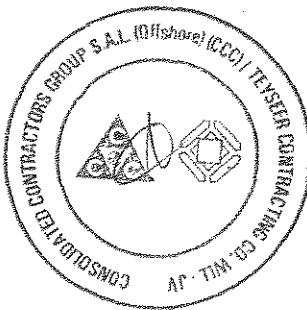




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-004

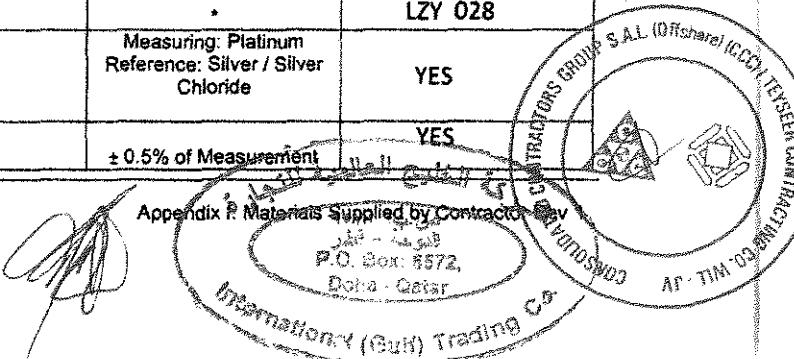
ORP ANALYZER (FLOW CELL TYPE)

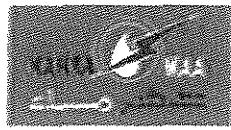




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description		
IDENTIFICATION	1	Meter Tag Number	As per Instrument List	LZY 028
	2	Service	As per Instrument List	COMPLY
	3	Location	As per Instrument List	COMPLY
	4	Line Size / Schedule	As per Instrument List	-
	5	P&I Number	As per Instrument List	-
SERVICE CONDITION	1	Ambient Temperature	55 °C	COMPLY
	2	Relative Humidity	100 %	90%
	3	Installation (Indoor/Outdoor)	Indoor	INDOOR
	4	Fluid / Pressure	Kahrama Potable Water / PN 16	COMPLY
	5	Process Connection Type / Size	½" NPT -1500 to +1500	1/8" / 1/8"
	6	Measuring Range mV		COMPLY
	7	Temp. Min/Max °C	5 / 55	COMPLY
PROCESS CONDITION	1	Fluid	Kahrama Potable Water	YES
	2	Temp. Min/Max °C	5 / 70 145µS/cm – 400µS/cm	0 TO 80
	3	Process Fluid conductivity		COMPLY
	4	ORP Minimum / Maximum mV	-1500 to +1500	YES
SENSOR	1	Measuring Principle /Type	Double Junction	YES
	2	Wetted parts	PVC	YES
	3	Ingress Protection	IP67	IP66
	4	Temperature Compensation	Yes	YES
	5	Sample Flow Rate	5 l/h – 10 l/h	YES
	6	Cleaning	Manufacture Std	YES
	7	Installation	Flow Through/Flow Cell	FLOW CELL
	8	Process connection	Manufacture Std	YES
	9	Sensor Cable/connection	Manufacture Std, quick connect, non-contact metal type	YES
	10	Signal cable between Sensor and transmitter	Min. 5m	10 METER
	11	Model Number/Order Code for Sensor	*	LZY 028
	12	Model Number/Order Code for Cable	*	LZY 028
	13	Electrode Material	Measuring: Platinum Reference: Silver / Silver Chloride	YES
	14	Accuracy	± 0.5% of Measurement	YES



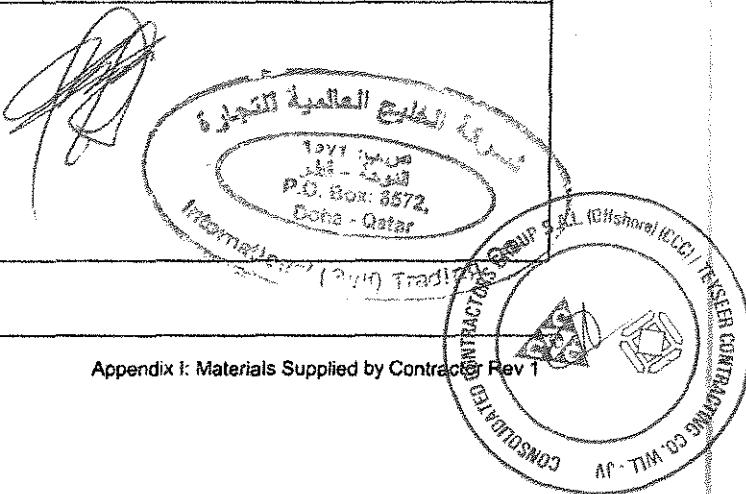


Qatar General Electricity & Water Corporation
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TRANSMITTER	1	Output	Profibus	COMPLY
	2	Power Supply	240 VAC	COMPLY
	3	Power Consumption	*	YES
	4	Fuse Protection	Yes	YES
	5	Electrical Connection	M20 x 1.5	YES
	6	Ingress Protection	IP67	IP66
	7	Enclosure Material	Manufacture Std	YES
	8	Accuracy	±0.5%	YES
	9	Measuring Range mV	-1500 to + 1500	COMPLY
	10	Calibrated Range mV	-1500 to + 1500	COMPLY
	11	Relay output	Yes 2 nos.	YES
	12	Enclosure class	IP67	IP66
	13	Display Type	Alpha numeric Digital	DIGITAL
	14	Mounting	Analyser Rack	YES
	15	Model Number/Order Code for Transmitter	*	SC 200
ACCESSORIES	1	Flow Cell	Yes	YES
	2	Rotameter with Flow regulator Pressure Regulator cum Pressure Indicator	Yes	YES
	3		Yes	YES
	4	Sampling System	Yes	YES
	5	Cooling System	Yes	NO
	6	Tag Plate	Yes	YES
DOCUMENTATION	1	Calibration Certificate for Each Tag	Yes	YES
	2	Catalogue (Data Sheet, IMS)	Yes	YES
	3	As Built Drawings (Electrical, Mechanical)	Yes	YES
PURCHASE	1	Manufacturer	*	LZY 028/ 037
	2	Model No / Complete Order Code	*	LZY 028/ 037
	3	Local Agent	*	IGTC
	4	Country of Origin	*	USA / GERMANY
	5	Weight	*	1 KG
	6	P.O Number	*	-

Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

005 – PH Analyzer





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-005

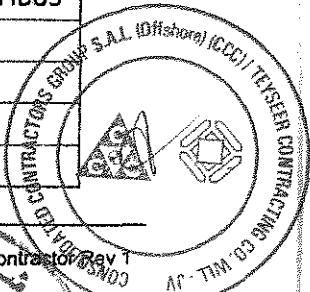
pH ANALYZER (FLOW CELL TYPE)

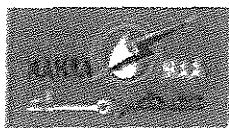




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description		
IDENTIFICATION	1	Meter Tag / Number	As per Instrument List	8362SC
	2	Service	As per Instrument List	-
	3	Location	As per Instrument List	-
	4	Line Size / Schedule	As per Instrument List	-
	5	P&I Number	As per Instrument List	8362SC
SERVICE CONDITION	1	Ambient Temperature	55 °C	COMPLY
	2	Relative Humidity	100 %	90%
	3	Installation (Indoor/Outdoor)	Indoor	COMPLY
	4	Fluid / Pressure	Kahrama Potable Water / PN 16	YES
	5	Process Connection Type / Size	½" NPT	1/8" NPT
	6	Measuring Range pH	0 to 14	YES
	7	Temp. Min/Max °C	5 / 55	COMPLY
PROCESS CONDITION	1	Fluid	Kahrama Potable Water	YES
	2	Temp. Min/Max °C	5 / 70	5/80
	3	Process Fluid conductivity	145µS/cm – 400µS/cm	YES
	4	pH Minimum / Maximum	0 to 14	YES
SENSOR	1	Measure Principle/Type	Double Junction	YES
	2	Wetted parts	PVC	PVC
	3	Ingress Protection	IP 67	IP66
	4	Temperature Compensation	Yes	YES
	5	Sample Flow Rate	5 l/h – 10 l/h	150ML/MIN.
	6	Cleaning	Manufacture Std	YES
	7	Installation	Flow Through/Flow Cell	FLOWCELL
	8	Process connection	Manufacture Std	YES
	9	Electrode Material	Measuring: Platinum Reference: Silver / Silver Chloride	YES
	10	Accuracy	± 0.5% of Measurement	0.05 PH
	11	Sensor Cable/connection	Manufacture Std, quick connect, non-contact metal type	COMPLY
	12	Signal Cable between Sensor and transmitter	Min. 5m	10 METER
	13	Model Number/Order Code for Sensor	*	LZY 027-1
	14	Model Number/Order Code for Cable	*	LZY 021
TRANSMITTER	1	Output	Profibus	PROFIBUS
	2	Power Supply	240 VAC	YES
	3	Power Consumption	*	-
	4	Fuse Protection	Yes	YES
	5	Electrical Connection	M20x1.5	YES



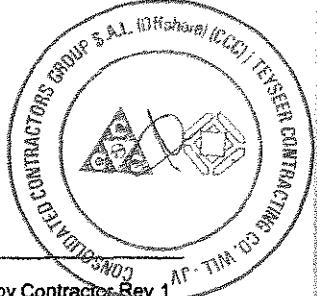


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

6	Ingress Protection	IP 67	YES
7	Enclosure Material	Manufacture Std	-
8	Accuracy	±0.5%	0.5%
9	Measuring Range	0-14	YES
10	Calibrated Range	0 - 14	YES
11	Relay Output	Yes, 2 nos.	YES
12	Enclosure class	IP67	IP66
13	Display Type	Alpha numeric Digital	YES
14	Mounting	Analyser Rack	YES
15	Model Number/Order Code for Transmittal	*	-
ACCESSORIES	1 Flow Cell	Yes	YES
	2 Rotameter with Flow regulator	Yes	YES
	3 Pressure Regulator cum Pressure Indicator	Yes	YES
	4 Sampling System	Yes	NO
	5 Cooling system	Yes	NO
DOCUMENTATION	1 Tag Plate	Yes	YES
	2 Calibration Certificate for each Tag	Yes	YES
	3 Catalogue (Data Sheet, IMs)	Yes	YES
	4 As Built Drawings (Electrical, Mechanical)	Yes	YES
PURCHASE	1 Manufacturer /Country of Origin	*	HACH-LANGE US/GERMANY
	2 Model No / Complete Order Code	*	LZY 027-1
	3 Local Agent	*	IGTC
	4 Country of Origin	*	-
	5 Weight	*	3.6 KGS.
	6 P.O. Number	*	-

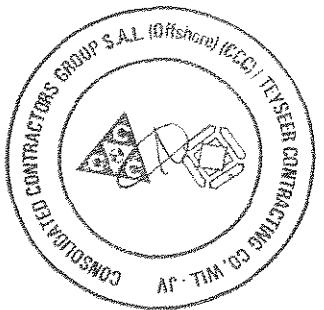
Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

006 – Pressure Gauge





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-006

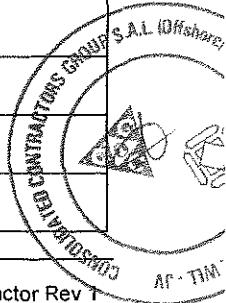
PRESSURE GAUGE





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	SI. No	Description	Minimum Requirement	Proposed
IDENTIFICATION	1	Meter Tag Number	As per Instrument List	Comply
	2	Service	As per Instrument List	Comply
	3	Location	As per Instrument List	Comply
	4	P&I Number	As per Instrument List	Comply
	5	Model Number	*	233.30.160
GENERAL INFORMATION	1	Name of Manufacturer	*	Wika
	2	Weight (kg)	*	2.3 Kg
	3	Place of Manuf. (City / Country)	*	Germany
	4	Name of Local Agent	*	Abdulla Bin Hamid Trading LLC
	5	Phone/Fax No. of Agent	*	042241464/043411723
	6	Applicable Codes and Standards	BS EN 837-1	Comply
	7	P.O Number	*	
SERVICE CONDITION	1	Line Size / Schedule	As per P&IDs	Comply
	2	Line Material	Carbon Steel / Ductile Iron	Comply
	3	Process connection	1/2' NPT (M)	Comply
	4	Connection Materials	SS316L	Comply
	5	Pressure min./max.	barg	Comply
	6	Temp. min./max.	°C 5 / 55	Comply
PRESSURE GAUGE	1	Type	Bourdon tube	Comply
	2	Range	As per Instrument List	Comply
	3	Over range protection (% of full scale)	150%	Comply
	4	Element -type	Stainless Steel bourdon tube	Comply
	5	-Max deflection scale	Max range should be at 60% of full scale	Comply
	6	Case - nom. size	150mm Dia	Comply
	7	-liquid fill	Glycerine	Comply
	8	Snubber	For discharge side of pumps	Comply
GENERAL	1	Diaphragm seal (for Chlorine service)	Ceramic	Not part of this offer
	2	Blow-out protection	Yes	Comply
	3	Nominal Accuracy	1% of Full Scale Deflection	Comply
	4	Dial Colour:	White	Comply
	5	Colour of figures :	Black	Comply
ACCESSORIES	1	IP Rating	IP 67	Comply
	2	Zero Adjustment:	Yes (External)	Comply
	3	Mounting bracket	Yes	N.A
	4	Material, mounting bracket	SS316L	N.A



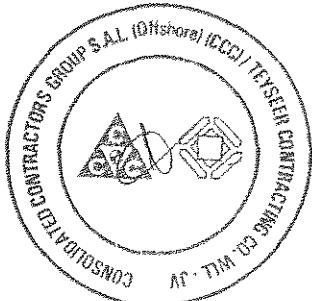


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

5	Over pressure protection valve	As required	Not part of this offer
6	Material, over pressure protection valve	SS316L	Not part of this offer
7	Manifold	3-way, SS316L	Comply
8	Material, pulsation damper	SS316L	Comply
9	Tag Plate	Yes	Tag No's to be provided
10	O&M Manual	Yes	Comply
11	As Built Drawing	Yes	Comply
12	Calibration Certificates	Yes	Comply

Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

007 – Pressure Switch





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-007

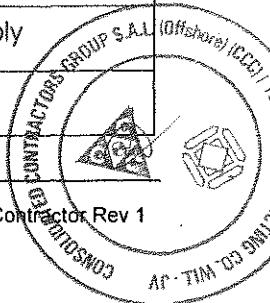
PRESSURE SWITCH





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Minimum Requirement	Proposed
IDENTIFICATION	1	Meter Tag Number	As per Instrument List	Comply
	2	Service	As per Instrument List	Comply
	3	Location	As per Instrument List	Comply
	4	P&I Number	As per Instrument List	Comply
	5	Model Number	*	PCS- Diaphragm Switch
SERVICE CONDITION	1	Line Material	Ductile Iron	Comply
	2	Process connection	1/2' NPT (M)	Comply
	3	Connection Materials	SS316L	Comply
	4	Line size / Schedule	As per P&IDs	Comply
	5	Pressure min./max.	As per Instrument List	Comply
	6	Temp. min./max.	5 / 55	Comply
	7	Over-range	1.3 X Max scale	Comply
SENSOR AND SWITCH	1	Sensor Type	Bourdon tube	Diaphragm
	2	Burst Pressure	*	
	3	Sensor Material of Construction	SS316L	Comply
	4	Contact Type	Snap Acting	
	5	Contact Quantity	Dual	Comply
	6	Calibrated range	As per Instrument List	Comply
	7	Contact Material of Construction	Hermetically sealed gold plated stainless steel	Hermetically Sealed Silver Plated
	8	Contact Form	DPDT	Comply
	9	Contact Life cycle	*	
	10	Contact Load	Inductive	Resistive
	11	Contact rating	5A at 240V AC or 1A at 30V DC	5A at 220VAC
	12	Contact Setting	Adjustable throughout range	Comply
	13	Dead band	Adjustable	Fixed
	14	Electrical connection	M20 x 1.5	Comply
	15	Enclosure class	IP67	IP65
	16	Connection	Bottom	Comply
ACCESSORIES	1	Blow-out protection	Yes	
	2	Manifold	Three way Valve	Comply
	3	Manifold Material	SS316L	Comply
GENERAL	1	Manufacturing / Origin	*	Germany
	2	Tag Plate	Yes	Tag No's to be provided
	3	O&M Manual	Yes	Comply
	4	As Built Drawing	Yes	





Qatar General Electricity & Water Corporation
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(Packages A, B, C, D & E)

5	Calibration Certificates	Yes	Comply
6	Local Agent	*	Abdulla Bin Hamid Trading LLC
7	P.O Number	*	

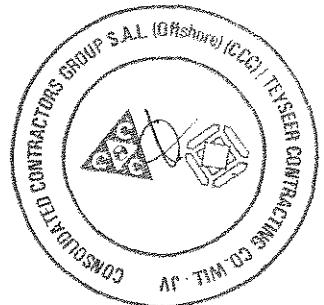
Notes :

1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

008 – Pressure Transmitter





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-008

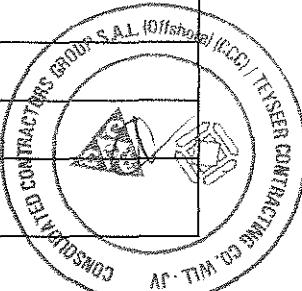
PRESSURE TRANSMITTER





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description		Minimum Requirement	
IDENTIFICATION	1	Meter Tag Number		As per Instrument List	
	2	Service		As per Instrument List	
	3	Location		As per Instrument List	
	4	P&I Number		As per Instrument List	
	5	Model Number		*	SITRANS P DSIII
GENERAL INFORMATION	1	Name of Manufacturer		*	SIEMENS
	2	Model No.		*	SITRANS P DSIII
	3	Place of Manuf. (City / Country)		*	Hagenau, France
	4	Name of Local Agent		*	Siemens WLL, Qatar
	5	Phone/Fax No. of Agent		*	+974 4456 0222
PIPE LINE	6	P.O Number		*	P.O. Box 21757
	1	Line Size / Schedule		As per P&IDs	
	2	Line Material		Carbon Steel / Ductile Iron	
	3	Process connection		1/2" NPT (M)	
	4	Connection Materials		SS316L	
FLUID	1	Fluid		Kahrama Potable Water	
	2	Max. Temperature	Min. Temp.	°C	70 5
	3	Max. Pressure	Min. Press.	Barg	As per Instrument List
TRANSMITTER	1	Type		Head Mounted	
	2	Sensing element		Capacitive Diaphragm	
	3	Body material		Stainless steel or Die cast Aluminium	
	4	Wetted parts		SS316L	
	5	Body rating		*	4 bar span: Upto 10 bar 16 bar span: Upto 32 bar
	6	Filling fluid		Silicone oil	
	7	O - Rings		PTFE	
	8	Output		HART 4-20mA	
	9	Power supply		24 V DC	
	10	Enclosure Class		IP67	
	11	Display Type		Alpha numeric Digital	
	12	Accuracy		±0.1%	
	13	Over range		33% of Max. range	
	14	Repeatability		±0.1%	
	15	Electrical Connection		M20 X 1.5	





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	16	Bolt & Nut Material	SS316L	
ACCESSORIES	1	3 - valve manifold	Yes	
	2	Manifold material	SS316L	
	3	Mounting bracket	SS316L	
	4	Tag Plate	Yes	
	5	O&M Manual	Yes	
	6	As Built Drawing	Yes	
	7	Calibration Certificates	Yes	
Notes :				
1) * These variables to be filled in by Vendor/Contractor.				

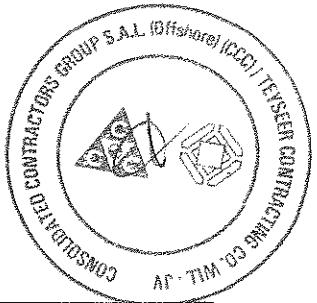




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-008

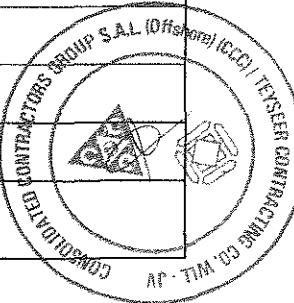
PRESSURE TRANSMITTER





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Minimum Requirement		
IDENTIFICATION	1	Meter Tag Number	As per Instrument List		
	2	Service	As per Instrument List		
	3	Location	As per Instrument List		
	4	P& I Number	As per Instrument List		
	5	Model Number	*	SITRANS P DSIII	
GENERAL INFORMATION	1	Name of Manufacturer	*	SIEMENS	
	2	Model No.	*	SITRANS P DSIII	
	3	Place of Manuf. (City / Country)	*	Hagenau, France	
	4	Name of Local Agent	*	Siemens WLL, Qatar	
	5	Phone/Fax No. of Agent	*	+974 4456 0222	
	6	P.O Number	*	P.O. Box 21757	
PIPE LINE	1	Line Size / Schedule	As per P&IDs		
	2	Line Material	Carbon Steel / Ductile Iron		
	3	Process connection	1/2" NPT (M)		
	4	Connection Materials	SS316L		
FLUID	1	Fluid	Kahrama Potable Water		
	2	Max. Temperature	Min. Temp. °C	70	5
	3	Max. Pressure	Min. Press. Barg	As per Instrument List	
TRANSMITTER	1	Type	Head Mounted		
	2	Sensing element	Capacitive Diaphragm		
	3	Body material	Stainless steel or Die cast Aluminium		
	4	Wetted parts	SS316L	4 bar span: Upto 10 bar 16 bar span: Upto 32 bar	
	5	Body rating	*		
	6	Filling fluid	Silicone oil		
	7	O - Rings	PTFE		
	8	Output	HART 4-20mA		
	9	Power supply	24 V DC		
	10	Enclosure Class	IP67		
	11	Display Type	Alpha numeric Digital		
	12	Accuracy	±0.1%		
	13	Over range	33% of Max. range		
	14	Repeatability	±0.1%		
	15	Electrical Connection	M20 X 1.5		





Qatar General Electricity & Water Corporation
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(Packages A, B, C, D & E)

	16	Bolt & Nut Material	SS316L	
ACCESSORIES	1	3 - valve manifold	Yes	
	2	Manifold material	SS316L	
	3	Mounting bracket	SS316L	
	4	Tag Plate	Yes	
	5	O&M Manual	Yes	
	6	As Built Drawing	Yes	
	7	Calibration Certificates	Yes	

Notes :

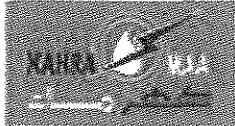
1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

010 – Temperature Transmitter





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-10

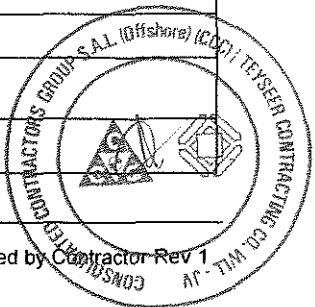
TEMPERATURE TRANSMITTER





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Description			
IDENTIFICATION	1	Meter Tag. Number	As per Instrument List
	2	Service	As per Instrument List
	3	Location	As per Instrument List
	4	P&I Number	As per Instrument List
	5	Sensor model Number	* SITRANS TS500
SERVICE CONDITION	1	Fluid	Kahrama Potable Water
	2	Pressure max. barg	PN 16
	3	Temp. min./max.	°C 5 / 55
SENSOR/ELEMENTS	1	Type	PT 100
	2	No of elements	2 (duplex)
	3	Range	°C 5 / 55
	4	Resistance in ohm at 0 °C	100 Ohms
	5	Number of wires per element	min 3 Wires
	6	Insulation material	Compacted ceramic
	7	Element Diameter	Max. 1.2 mm
	8	Insertion Length (Extension flange to be provided if required)	10mm 1000 mm offered
HOUSING	1	Type	Flange
	2	Material	Die cast aluminium
	3	Enclosure class	IP67 IP68
	4	Dimension	*
	5	Cable connection	Screw Terminal
	6	Cable entry	M20 x 1.5
TRANSMITTER	1	Transmitter - Type	Head Mounted
	2	Output	HART 4-20mA
	3	Accuracy	±0.1°C
	4	Calibrated Range	0 – 100 °C
	5	Indication	Yes, Digital
	6	Supply voltage	24V DC
	7	Relay output	4 nos. Not Applicable
	8	Accuracy	±0.1 °C
GENERAL	1	Manufacturer	* SIEMENS
	2	Model No.	* SITRANS TS500 with head-mounted SITRANS TH300
	3	Local Agent	* Siemens WLL, Qatar
	4	Country of Origin	* Hagenau, France
	5	Tag Plate	Yes
	6	PO Number	*
	7	O&M Manual	Yes
	8	As Built Drawing	Yes





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

9	Calibration Certificates	Yes	
Note:			
1) * These variables to be filled in by Vendor/Contractor.			



Appendix I-7 – Technical Data Sheets

011 – Turbidity Analyzer

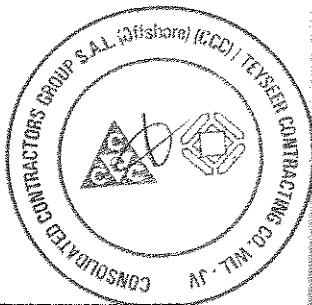




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-011

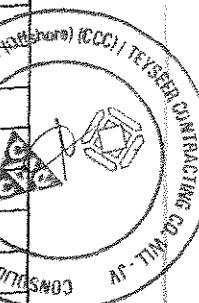
TURBIDITY ANALYZER (FLOW CELL TYPE)





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description		
IDENTIFICATION	1	Meter Tag. Number	As per Instrument List	1720E
	2	Service	As per Instrument List	AS PER THE NORMAL
	3	Location	As per Instrument List	AS PER THE NORMAL
	4	Line Size / Schedule	As per Instrument List	AS PER THE NORMAL
	5	P&i Number	As per Instrument List	1720E
SERVICE CONDITION	1	Ambient temperature	52 °C	
	2	Relative humidity	100 %	90%
	3	Process Connection Type / Size	½" NPT	1/4 NPT
	4	Installation (Indoor/Outdoor)	Indoor	INDOOR
	5	Fluid / Pressure	Kahrama Potable Water / PN 16	COMPLY
	6	Measuring Range NTU	0.01 – 5 NTU	0.0001 TO 100 NTU
	7	Temp. Min/Max °C	5 / 55	5 / 52
PROCESS CONDITION	1	Fluid	Kahrama Potable Water	YES
	2	Temp. Min/Max °C	5 / 70	5 / 70
	3	Process Fluid conductivity	145µS/cm – 400µS/cm	COMPLY
	4	NTU Minimum / Maximum	0.01 – 5 NTU	COMPLY
SENSOR	1	Measuring Principle /Type	90 ° Scattered light	COMPLY
	2	Wetted parts	PVC	COMPLY
	3	Ingress Protection	IP 67	NEMA IP66
	4	Temperature Compensation	Yes	YES
	5	Sample Flow Rate	5 l/h – 10 l/h	0.25 L/MIN 0.75 L/MIN
	6	Cleaning	Manufacture Std	COMPLY
	7	Installation	Flow Through / Flow Cell	COMPLY
	8	Process connection	Manufacture Std	COMPLY
	9	Accuracy	± 1% of Measurement	+ - 2%
	10	Sensor Cable/connection	Manufacture Std,quick connect, non-contact metal type	NOT SENSOR IT IS FLOWCELL
	11	Signal Cable between Sensor and transmitter	Min. 5m	COMPLY
	12	Model Number/ Order Code for Sensor	-	1720E
	13	Model Number/ Order Code for Cable	- 7M	58659-00
TRANSMITTER	1	Output	PROFIBUS	COMPLY
	2	Power Supply	240 VAC	COMPLY
	3	Power Consumption	-	-
	4	Fuse Protection	Yes	YES
	5	Electrical Connection	M20 x 1.5	YES
	6	Ingress Protection	IP 67	IP66 NEMA
	7	Enclosure Material	Manufacture Std	COMPLY
	8	Accuracy	± 0.5%	+ - 0.5%



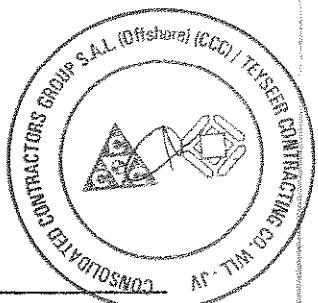


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	9	Drift	Less than 1.5% per month	0.03%
	10	Linearity	±0.2%	COMPLY
	11	Response time	Less than 2 min.	1 SECOND
	12	Measuring Range	0.001 - 10 NTU	COMPLY
	13	Calibrated Range	0.001 - 10 NTU	COMPLY
	14	Relay output	Yes 2 incs.	COMPLY
	15	Enclosure class	IP67	COMPLY
	16	Display Type	Alpha numeric Digital	COMPLY
	17	Mounting	Analyser Rack Mounting	COMPLY
	18	Model Number /Order Code for Transmitter	*	LXV404.99.23551
ACCESSORIES	1	Flow Cell	Yes	YES
	2	Rotameter with Flow regulator	Yes	YES
	3	Pressure Regulator cum Pressure Indicator	Yes	YES
	4	Sampling System	Yes	YES
	5	Tag Plate	Yes	YES
DOCUMENTATION	1	Calibration Certificate for Each Tag	Yes	YES
	2	Catalogue (Data Sheet, IMS)	Yes	YES
	3	As Built Drawings (Electrical, Mechanical)	Yes	YES
PURCHASE	1	Manufacturer	*	HACH-LANGE
	2	Model No / Complete Order Code	*	1720E
	3	Local Agent	*	IGTC
	4	Country of Origin	*	USA/GERMANY
	5	Weight	*	4.54 KGS
	6	P.O Number	*	-

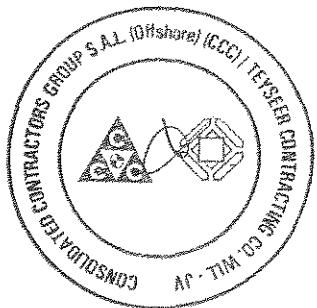
Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

013 – Medium Voltage Motor

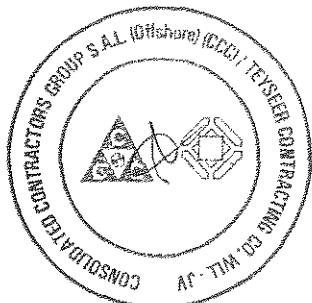




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-013

MEDIUM VOLTAGE MOTOR DATA SHEET



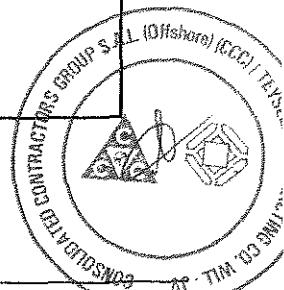


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer: - Name - Country Local Agent - Address - Telephone - Fax - Email			* Siemens * Germany No Agent in * Qatar * *
2.	Model No.			* HCompact Plus
2a	Additional special configurations			As per the Offer
3.	Standard/Code Applicable	IEC		Comply
4.	Local Conditions			
4.1	Location			*
4.2	Climate - Tropical/Arctic/Temperate - Ambient Temperature - Relative Humidity	50° C 50° C 100%		* Comply * Comply *Comply.During off condition heater
4.3	Design temperature (indoor/outdoor) Operation temperature Storage temperature Temperature De-rating factor			to be kept ON 50 deg C 50 Deg C On Post Order
4.4	Languages - Labels - Rating Plates - Documentation	English English English		Comply Comply Comply



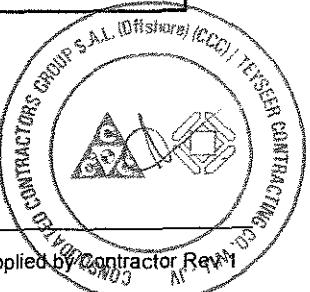


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
4.5	Installation - Indoor/Outdoor - Under Sunshade/Without Sunshade - Area Classification		Indoor Under sunshade No hazardous	Comply Comply Comply
5.0	Design			IEC
5.1	Rated power - At 50° C - At specified ambient temperature	kW		* 1050kW * 1050 kW
5.2	System - 3 phase - Unearthed - Impedance Earthed - Solidly Earthed			* 3 Phase * Not Comply * Comply * Comply
5.3	Rated Voltages: - Line to line - Line to neutral	kV	As per SLD	3.3 kV
		kV	As per SLD	1.9 kV
5.4	Rated frequency	Hz	50	Comply
5.5	Rated Current - full load current - Maximum starting current - starting pf	A		* 230 Amps * Programmable thru VFD * 0.15
5.6	Started Method - DOL/star-delta/auto transformer/ frequency controller/soft starter	%	VFD	VFD
5.7	Rated Speed - Full Load - Synchronous	rpm		* 990 * 1000



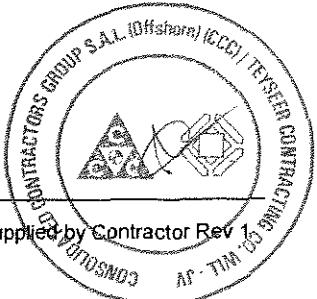


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.8	Rated Torques - Full Load - Starting % F.L. - Maximum % F.L.			* 10028 Nm * Programmable thru VFD * 2.8 times Full load Torque
5.9	Duty - Starts per hour			*Not applicable as driven thru VFD
5.10	Direction of rotation facing non-driven end - clockwise/anti-clockwise			* Unidirectional. Can be Configured on Post order
5.11	Starting times from : - Ambient temperature - Running temperature - Max. allowable (ambient temperature) - Max. allowable (running temperature)	Sec Sec Sec Sec		*Not Applicable *as driven thru VFD *
5.12	Performance (guaranteed minimum) - At 50% load : Slip P.F. Efficiency	%		* On Post order Engg. * 0.7 * 95.1
	- At 75% load : Slip P.F. Efficiency	%		* On Post order Engg. * 0.79 * 95.7
	- At 100% load : Slip P.F. Efficiency	%		*On Post order Engg. * 0.83 * 95.7
5.13	Noise level	dB(A)	82 dB(A) at 1.0 M (Motor only) 85 dB(A) at 1.0 M (Motor and Pump)	*Motor 82dB A without tolerance on 50 Hz sinusoidal supply





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.14	Driven equipment : - Fan/pump/compressor		pump	Pump
5.15	Coupling : - Direct/belt/chain/gear box/ electromagnet/hydraulic			* Direct
5.16	Duty : - Continuous/Intermittent	S1/ S9		* S1
5.17	Starting device : - Fused contactor/Circuit breaker/VFD	VFD		VFD
6.0	Construction			IMB3
6.1	Windings : - 3 phase Star/Delta			* Star
6.2	Insulation class : Temperature rise according to :	Class F limited to class B		* Comply
6.3	Bearings : - Ball/Roller/Sleeve	ball/ roller bearing		* Ball/Roller
6.4	Lubrication : - Grease/Oil forced - Type			* Grease *
6.5	Mounting : - Foot/Flange - Horizontal/Vertical			* Foot * Horizontal
6.6	Vertical Thrust : Up Down			* No external Radial * and Axial Thrust considered



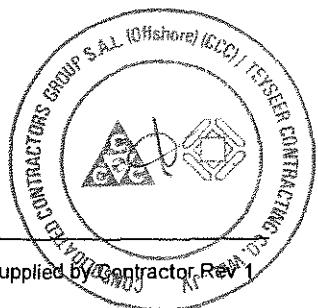


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.7	Cooling : - CACA/CAWA		As per specification	* CACA <2 MW and CAWA > 2 MW
6.8	Enclosure - Open fan cooled/TEFC - Protection class - Type - Gas group - Temp. Group	IP e/d/n/p IIA/IIB/IIC T1/T2/T3	54 indoor , 55 out door	* * IP54, Comply * Safe Area * *
6.9	Temperature protection : - Thermistors (for winding, 3 phases) - RTDs (for winding, 3 phases) - RTDs (for bearing DE & NDE)	No. No. No.	As per specification As per specification As per specification	* Comply * Comply * comply
	Recommended trip values - Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing)	No.	As per specification	* Not applicable as it is not specified in the specs
6.10	Anti-condensation Heater	W Volts Hz		* 720 Watts MAX * 230 V * 50 Hz
6.11	Cable Box(es) : Motor - Cable type / Size Heater - Cable type / Size Sensors - Cable type / Size			XLPE/1Run3C240SqmmMax * 4 Sq mm Max * 4 Sq mm Max



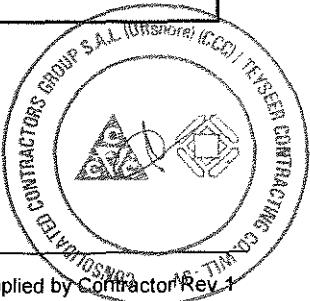


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.12	Cooling fans : - No/Shaft Driven/Elect. Motor - Fan motor Power Phase Voltage Frequency Material	W V Hz		*Shaft Driven Fan *Not Applicable * * *
6.13	Mass : - Total - Rotor	kg kg		* Approx 5400 * Approx 1800
6.14	Moment of Inertia (Rotor)	Kgm ²		* 43kgm ²
6.15	Paint finish : - Manufacturer's standard - Required paint finish		Anti-corrosion painting	* Comply
6.16	Earthing bolt : - In cable box / Outside			* Outside
7.0	Inspection			
7.1	Inspection - During manufacturing			To be agreed on Post Order
7.2	Routine tests - All required - Certificate - Witnessed/not witnessed		Yes Yes/ Witnessed/	Comply as per Specs
7.3	Type tests - All required - Certificate - Witnessed/not witnessed		Yes Yes not witnessed	Comply as per Specs





Qatar General Electricity & Water Corporation

Tender NO. GTC 626/2014

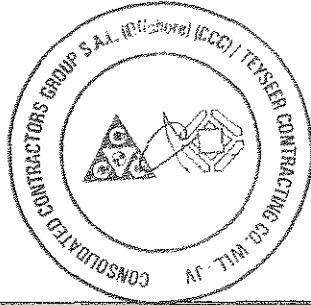
Construction of Mega Reservoir PRPSs

(Packages A, B, C, D & E)

Item	Description	Unit	Data	
			Required	Offered
7.4	Special tests - Witnessed/not witnessed		Witnessed	Comply as per specs and comments/deviation
7.5	- site installation		Witnessed	By Contractor
7.6	- testing and commissioning		Witnessed	By Contractor.
8.0	PACKING (Requirement as per specification)			Comply & as per Comments /deviation
9.0	DOCUMENTATION (Requirement as per specification)			Comply & as per Comments /deviation



Chapter 2.2
Datasheet –
1200KW MV Motor

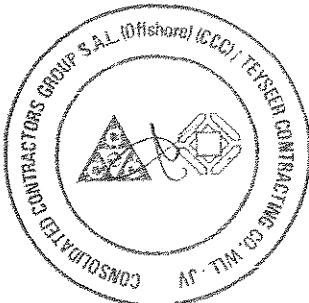




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-013

MEDIUM VOLTAGE MOTOR DATA SHEET



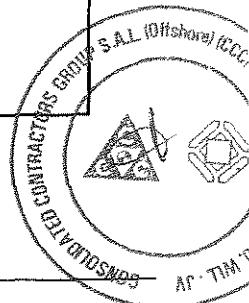


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer: - Name - Country Local Agent - Address - Telephone - Fax - Email			* Siemens * Germany * No Agent in * Qatar * *
2.	Model No.			* HCompact Plus
2a	Additional special configurations			As per the Offer
3.	Standard/Code Applicable	IEC		Comply
4.	Local Conditions			
4.1	Location			*
4.2	Climate - Tropical/Arctic/Temperate - Ambient Temperature - Relative Humidity	50° C 50° C 100%		* Comply * Comply *Comply. During off condition heater
4.3	Design temperature (indoor/outdoor) Operation temperature Storage temperature Temperature De-rating factor			to be kept ON 50 deg C 50 Deg C On Post Order
4.4	Languages - Labels - Rating Plates - Documentation	English English English		Comply Comply Comply



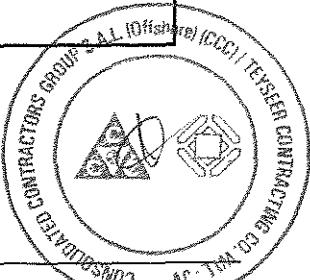


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
4.5	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under Sunshade/Without Sunshade- Area Classification		Indoor Under sunshade No hazardous	Comply Comply Comply
5.0	Design			IEC
5.1	Rated power <ul style="list-style-type: none">- At 50° C- At specified ambient temperature	kW	kW	* 1200 kW * 1200 kW
5.2	System <ul style="list-style-type: none">- 3 phase- Unearthed- Impedance Earthed- Solidly Earthed			* 3 Phase * Not Comply * Comply * Comply
5.3	Rated Voltages: <ul style="list-style-type: none">- Line to line- Line to neutral	kV	As per SLD kV As per SLD	3.3 kV 1.9 kV
5.4	Rated frequency	Hz	50	Comply
5.5	Rated Current <ul style="list-style-type: none">- full load current- Maximum starting current- starting pf	A	%	* 255 Amps * Programmable thru VFD * 0.17
5.6	Started Method <ul style="list-style-type: none">- DOL/star-delta/auto transformer/frequency controller/soft starter		VFD	VFD
5.7	Rated Speed <ul style="list-style-type: none">- Full Load- Synchronous	rpm	rpm	* 990 * 1000



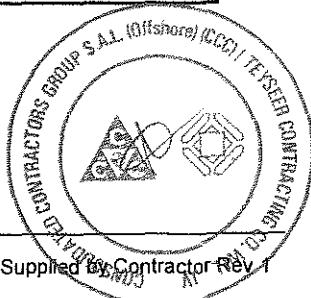


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.8	Rated Torques - Full Load - Starting % F.L. - Maximum % F.L.			* 11460 Nm * Programmable thru VFD * 2.5 times Full load Torque
5.9	Duty - Starts per hour			* Not applicable as driven thru VFD
5.10	Direction of rotation facing non-driven end - clockwise/anti-clockwise			* Unidirectional. Can be Configured on Post order
5.11	Starting times from : - Ambient temperature - Running temperature - Max. allowable (ambient temperature) - Max. allowable (running temperature)	Sec Sec Sec Sec		* Not Applicable * as driven thru VFD *
5.12	Performance (guaranteed minimum) - At 50% load : Slip P.F. Efficiency	%		* On Post order Engg. * 0.79 * 95.4
	- At 75% load : Slip P.F. Efficiency	%		* On Post order Engg. * 0.85 * 95.9
	- At 100% load : Slip P.F. Efficiency	%		* On Post order Engg. * 0.86 * 95.7
5.13	Noise level	dB(A)	82 dB(A) at 1.0 M (Motor only) 85 dB(A) at 1.0 M (Motor and Pump)	* Motor 82dB A without tolerance on 50 Hz sinusoidal supply





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.14	Driven equipment : - Fan/pump/compressor	pump		Pump
5.15	Coupling : - Direct/belt/chain/gear box/ electromagnet/hydraulic			* Direct
5.16	Duty : - Continuous/Intermittent	S1/ S9		* S1
5.17	Starting device : - Fused contactor/Circuit breaker/VFD	VFD		VFD
6.0	Construction			IMB.3
6.1	Windings : - 3 phase Star/Delta			* Star
6.2	Insulation class : Temperature rise according to :	Class F limited to class B		* Comply
6.3	Bearings : - Ball/Roller/Sleeve	ball/ roller bearing		* Ball/Roller
6.4	Lubrication : - Grease/Oil forced - Type			* Grease *
6.5	Mounting : - Foot/Flange - Horizontal/Vertical			* Foot * Horizontal
6.6	Vertical Thrust : Up Down			* No external Radial * and Axial Thrust considered



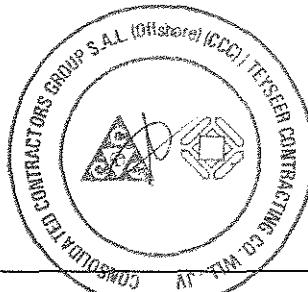


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.7	Cooling : - CACA/CAWA		As per specification	* CACA <2 MW and CAWA > 2 MW
6.8	Enclosure - Open fan cooled/TEFC - Protection class - Type - Gas group - Temp. Group	IP e/d/n/p IIA/IIB/IIC T1/T2/T3	54 indoor , 55 out door	* IP54, Comply * Safe Area *
6.9	Temperature protection : - Thermistors (for winding, 3 phases) - RTDs (for winding, 3 phases) - RTDs (for bearing DE & NDE)	No. No. No.	As per specification As per specification As per specification	* Comply * Comply * comply
	Recommended trip values - Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing)	No.	As per specification	* Not applicable as it is not specified in the specs
6.10	Anti-condensation Heater	W Volts Hz		* 720 Watts Max * 230 V * 50 Hz
6.11	Cable Box(es) : Motor - Cable type / Size Heater - Cable type / Size Sensors - Cable type / Size			XLPE/1Run3C240SqmmMax * 4 Sq mm Max * 4 Sq mm Max



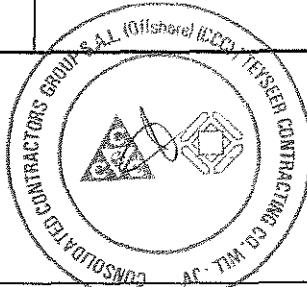


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

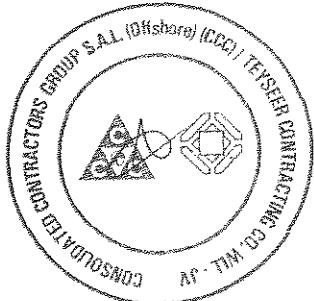
Item	Description	Unit	Data	
			Required	Offered
6.12	Cooling fans : - No/Shaft Driven/Elect. Motor - Fan motor Power Phase Voltage Frequency Material	W V Hz		*Shaft Driven Fan *Not Applicable * * *
6.13	Mass : - Total - Rotor	kg kg		* Approx 6000 * Approx 2000
6.14	Moment of Inertia (Rotor)	Kgm ²		* 62kgm ²
6.15	Paint finish : - Manufacturer's standard - Required paint finish		Anti-corrosion painting	* Comply
6.16	Earthing bolt : - In cable box / Outside			* Outside
7.0	Inspection			
7.1	Inspection - During manufacturing			To be agreed on Post Order
7.2	Routine tests - All required - Certificate - Witnessed/not witnessed		Yes Yes/ Witnessed/	Comply as per Specs
7.3	Type tests - All required - Certificate - Witnessed/not witnessed		Yes Yes not witnessed	Comply as per Specs



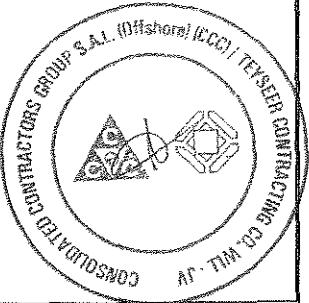


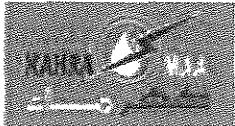
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item	Description	Unit	Data	
			Required	Offered
7.4	Special tests - Witnessed/not witnessed		Witnessed	Comply as per specs and comments/deviation
7.5	- site installation		Witnessed	By Contractor
7.6	- testing and commissioning		Witnessed	By Contractor.
8.0	PACKING (Requirement as per specification)			Comply & as per Comments /deviation
9.0	DOCUMENTATION (Requirement as per specification)			Comply & as per Comments /deviation



Chapter 2.3
Datasheet -
1400KW MV Motor

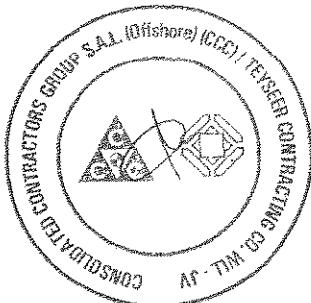




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-013

MEDIUM VOLTAGE MOTOR DATA SHEET



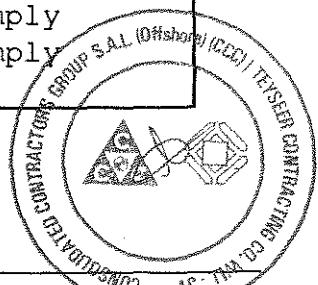


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer: - Name - Country Local Agent - Address - Telephone - Fax - Email			* Siemens * Germany * No Agent in * Qatar * *
2.	Model No.			* HCompact Plus
2a	Additional special configurations			As per the Offer
3.	Standard/Code Applicable	IEC		Comply
4.	Local Conditions			
4.1	Location			*
4.2	Climate - Tropical/Arctic/Temperate - Ambient Temperature - Relative Humidity	50° C 50° C 100%		* Comply * Comply *Comply. During off condition heater
4.3	Design temperature (indoor/outdoor) Operation temperature Storage temperature Temperature De-rating factor			to be kept ON 50 deg C 50 Deg C On Post Order
4.4	Languages - Labels - Rating Plates - Documentation	English English English		Comply Comply Comply



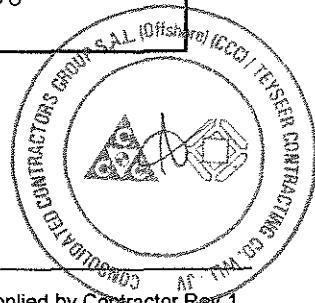


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
4.5	Installation - Indoor/Outdoor - Under Sunshade/Without Sunshade - Area Classification		Indoor Under sunshade No hazardous	Comply Comply Comply IEC
5.0	Design			
5.1	Rated power - At 50° C - At specified ambient temperature	kW		* 1400kW * 1400 kW
5.2	System - 3 phase - Unearthed - Impedance Earthed - Solidly Earthed			* 3 Phase * Not Comply * Comply * Comply
5.3	Rated Voltages: - Line to line - Line to neutral	kV	As per SLD As per SLD	3.3 kV 1.9 kV
5.4	Rated frequency	Hz	50	Comply
5.5	Rated Current - full load current - Maximum starting current - starting pf	A	%	* 295 Amps * Programmable thru VFD * 0.16
5.6	Started Method - DOL/star-delta/auto transformer/ frequency controller/soft starter		VFD	VFD
5.7	Rated Speed - Full Load - Synchronous	rpm		* 990 * 1000





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.8	Rated Torques - Full Load - Starting % F.L. - Maximum % F.L.			* 13370 Nm * Programmable thru VFD * 2.8 times Full load Torque
5.9	Duty - Starts per hour			*Not applicable as driven thru VFD
5.10	Direction of rotation facing non-driven end - clockwise/anti-clockwise			* Unidirectional. Can be Configured on Post order
5.11	Starting times from : - Ambient temperature - Running temperature - Max. allowable (ambient temperature) - Max. allowable (running temperature)	Sec Sec Sec Sec		*Not Applicable *as driven thru VFD *
5.12	Performance (guaranteed minimum) - At 50% load : Slip P.F. Efficiency - At 75% load : Slip P.F. Efficiency - At 100% load : Slip P.F. Efficiency	% % % % %		* On Post order Engg. * 0.77 * 95.6 * On Post order Engg. * 0.83 * 96.1 *On Post order Engg. * 0.86 * 96.1
5.13	Noise level	dB(A)	82 dB(A) at 1.0 M (Motor only) 85 dB(A) at 1.0 M (Motor and Pump)	*Motor 82dB A without tolerance on 50 Hz sinusoidal supply





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.14	Driven equipment : - Fan/pump/compressor		pump	Pump
5.15	Coupling : - Direct/belt/chain/gear box/ electromagnet/hydraulic			* Direct
5.16	Duty : - Continuous/Intermittent	S1/ S9		* S1
5.17	Starting device : - Fused contactor/Circuit breaker/VFD	VFD		VFD
6.0	Construction			IMB3
6.1	Windings : - 3 phase Star/Delta			* Star
6.2	Insulation class : Temperature rise according to :	Class F limited to class B		* Comply
6.3	Bearings : - Ball/Roller/Sleeve	ball/ roller bearing		* Ball/Roller
6.4	Lubrication : - Grease/Oil forced - Type			* Grease *
6.5	Mounting : - Foot/Flange - Horizontal/Vertical			* Foot * Horizontal
6.6	Vertical Thrust : Up Down			* No external Radial * and Axial Thrust considered



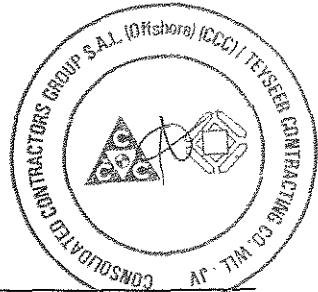


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.7	Cooling : - CACA/CAWA		As per specification	* CACA < 2 MW and CAWA > 2 MW
6.8	Enclosure - Open fan cooled/TEFC - Protection class - Type - Gas group - Temp. Group	IP e/d/n/p IIA/IIB/IIC T1/T2/T3	54 indoor , 55 out door	* IP54, Comply * Safe Area * *
6.9	Temperature protection : - Thermistors (for winding, 3 phases) - RTDs (for winding, 3 phases) - RTDs (for bearing DE & NDE)	No. No. No.	As per specification As per specification As per specification	* Comply * Comply * comply
	Recommended trip values - Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing)	No.	As per specification	* Not applicable as it is not specified in the specs
6.10	Anti-condensation Heater	W Volts Hz		* 720 Watts Max * 230 V * 50 Hz
6.11	Cable Box(es) : Motor - Cable type / Size Heater - Cable type / Size Sensors - Cable type / Size			XLPE/1Run3C240 SqmmMax * 4 Sq mm Max * 4 Sq mm Max



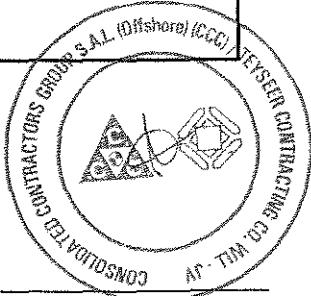


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.12	Cooling fans : - No/Shaft Driven/Elect. Motor - Fan motor Power Phase Voltage Frequency Material	W V Hz		*Shaft Driven Fan *Not Applicable * * *
6.13	Mass : - Total - Rotor	kg kg		* Approx 6000 * Approx 2000
6.14	Moment of Inertia (Rotor)	Kgm ²		* 70kgm ²
6.15	Paint finish : - Manufacturer's standard - Required paint finish		Anti-corrosion painting	* Comply
6.16	Earthing bolt : - In cable box / Outside			* Outside
7.0	Inspection			
7.1	Inspection - During manufacturing			To be agreed on Post Order
7.2	Routine tests - All required - Certificate - Witnessed/not witnessed		Yes Yes/ Witnessed/	Comply as per Specs
7.3	Type tests - All required - Certificate - Witnessed/not witnessed		Yes Yes not witnessed	Comply as per Specs



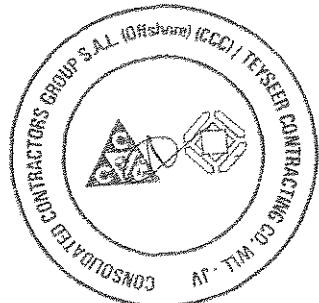
**Qatar General Electricity & Water Corporation**

Tender NO. GTC 626/2014

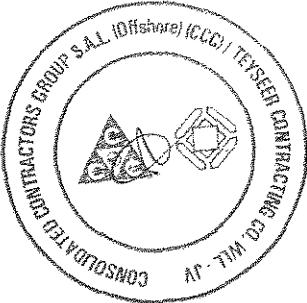
Construction of Mega Reservoir PRPSs

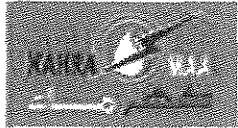
(Packages A, B, C, D & E)

Item	Description	Unit	Data	
			Required	Offered
7.4	Special tests - Witnessed/not witnessed		Witnessed	Comply as per specs and comments/deviation
7.5	- site installation		Witnessed	By Contractor
7.6	- testing and commissioning		Witnessed	By Contractor.
8.0	PACKING (Requirement as per specification)			Comply & as per Comments /deviation
9.0	DOCUMENTATION (Requirement as per specification)			Comply & as per Comments /deviation



Chapter 2.4
Datasheet -
2200KW MV Motor

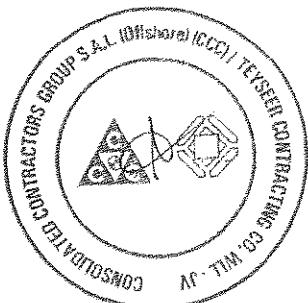




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Construction of Mega Reservoir PRPSs
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APPENDIX I-7-013

MEDIUM VOLTAGE MOTOR DATA SHEET



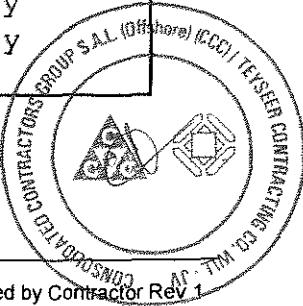


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer: - Name - Country Local Agent - Address - Telephone - Fax - Email			* Siemens * Germany * No Agent in * Qatar * *
2.	Model No.			* HCompact Plus
2a	Additional special configurations			As per the Offer
3.	Standard/Code Applicable	IEC		Comply
4.	Local Conditions			*
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate - Ambient Temperature - Relative Humidity	50° C 50° C 100%		* Comply * Comply *Comply.During off condition to be kept ON 50 deg C 50 Deg C On Post Order
4.3	Design temperature (indoor/outdoor) Operation temperature Storage temperature Temperature De-rating factor			heater
4.4	Languages - Labels - Rating Plates - Documentation	English English English		Comply Comply Comply



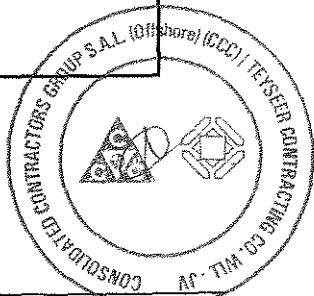


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
4.5	Installation - Indoor/Outdoor - Under Sunshade/Without Sunshade - Area Classification		Indoor Under sunshade No hazardous	Comply Comply Comply
5.0	Design			IEC
5.1	Rated power - At 50° C - At specified ambient temperature	kW		* 2200 kW * 2200 kW
5.2	System - 3 phase - Unearthed - Impedance Earthed - Solidly Earthed	kW		* 3 Phase * Not Comply * Comply * Comply
5.3	Rated Voltages: - Line to line - Line to neutral	kV	As per SLD	3.3 kV
		kV	As per SLD	1.9 kV
5.4	Rated frequency	Hz	50	Comply
5.5	Rated Current - full load current - Maximum starting current - starting pf	A		* 475 Amps * Programmable thru VFD * 0.15
5.6	Started Method - DOL/star-delta/auto transformer/frequency controller/soft starter	%	VFD	VFD
5.7	Rated Speed - Full Load - Synchronous	rpm		* 744 * 750



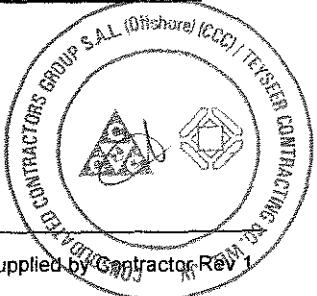


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.8	Rated Torques - Full Load - Starting % F.L. - Maximum % F.L.			* 28013 Nm * Programmable thru VFD * 2.6 times Full load Torque
5.9	Duty - Starts per hour			*Not applicable as driven thru VFD
5.10	Direction of rotation facing non-driven end - clockwise/anti-clockwise			* Unidirectional. Can be Configured on Post order
5.11	Starting times from : - Ambient temperature - Running temperature - Max. allowable (ambient temperature) - Max. allowable (running temperature)	Sec Sec Sec Sec		*Not Applicable *as driven thru VFD *
5.12	Performance (guaranteed minimum) - At 50% load : Slip P.F. Efficiency - At 75% load : Slip P.F. Efficiency - At 100% load : Slip P.F. Efficiency	% % % % %		* On Post order Engg. * 0.76 * 96.6 *On Post order Engg. * 0.82 * 96.7 *On Post order Engg. * 0.84 * 96.6
5.13	Noise level	dB(A)	82 dB(A) at 1.0 M (Motor only) 85 dB(A) at 1.0 M (Motor and Pump)	*Motor 78dB A without tolerance on 50 Hz sinusoidal supply without cooling unit





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
5.14	Driven equipment : - Fan/pump/compressor	pump		Pump
5.15	Coupling : - Direct/belt/chain/gear box/ electromagnet/hydraulic			* Direct
5.16	Duty : - Continuous/Intermittent	S1/ S9		* S1
5.17	Starting device : - Fused contactor/Circuit breaker/VFD	VFD		VFD
6.0	Construction			IMB3
6.1	Windings : - 3 phase Star/Delta			* Star
6.2	Insulation class : Temperature rise according to :	Class F limited to class B		* Comply
6.3	Bearings : - Ball/Roller/Sleeve	ball/ roller bearing		* Ball/Roller
6.4	Lubrication : - Grease/Oil forced - Type			* Grease *
6.5	Mounting : - Foot/Flange - Horizontal/Vertical			* Foot * Horizontal
6.6	Vertical Thrust : Up Down			* No external Radial * and Axial Thrust considered



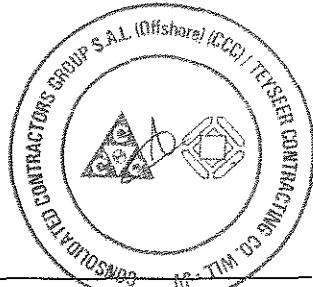


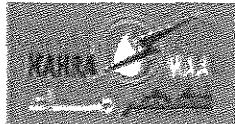
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.7	Cooling : - CACA/CAWA		As per specification	* CACA < 2 MW and CAWA > 2 MW
6.8	Enclosure - Open fan cooled/TEFC - Protection class - Type - Gas group - Temp. Group	IP e/d/n/p IIA/IIB/IIC T1/T2/T3	54 indoor , 55 out door	* IP54, Comply * Safe Area *
6.9	Temperature protection : - Thermistors (for winding, 3 phases) - RTDs (for winding, 3 phases) - RTDs (for bearing DE & NDE)	No. No. No.	As per specification As per specification As per specification	* Comply * Comply * comply
	Recommended trip values - Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing) Thermo couples (for bearing)	No.	As per specification	* Not applicable as it is not specified in the specs
6.10	Anti-condensation Heater	W Volts Hz		* 720 Watts Max * 230 V * 50 Hz
6.11	Cable Box(es) : Motor - Cable type / Size Heater - Cable type / Size Sensors - Cable type / Size			XLPE/1Run3C240 SqmmMax * 4 Sq mm Max * 4 Sq mm Max



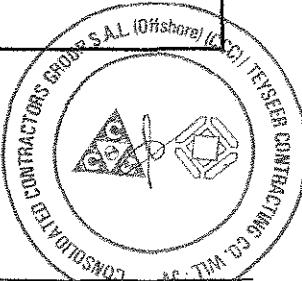


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Item : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Tag Nos. :

Item	Description	Unit	Data	
			Required	Offered
6.12	Cooling fans : - No/Shaft Driven/Elect. Motor - Fan motor Power Phase Voltage Frequency Material	W V Hz		*Shaft Driven Fan *Not Applicable * * *
6.13	Mass : - Total - Rotor	kg kg		* Approx 8850 * Approx 2950
6.14	Moment of Inertia (Rotor)	Kgm ²		* 158kgm ²
6.15	Paint finish : - Manufacturer's standard - Required paint finish		Anti-corrosion painting	* Comply
6.16	Earthing bolt : - In cable box / Outside			* Outside
7.0	Inspection			
7.1	Inspection - During manufacturing			To be agreed on Post Order
7.2	Routine tests - All required - Certificate - Witnessed/not witnessed		Yes Yes/ Witnessed/	Comply as per Specs
7.3	Type tests - All required - Certificate - Witnessed/not witnessed		Yes Yes not witnessed	Comply as per Specs





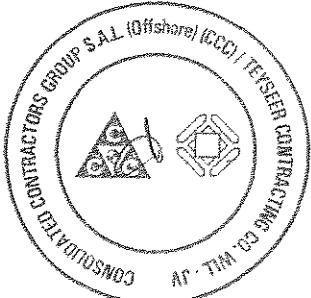
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

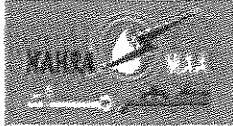
Item	Description	Unit	Data	
			Required	Offered
7.4	Special tests - Witnessed/not witnessed		Witnessed	Comply as per specs and comments/deviation
7.5	- site installation		Witnessed	By Contractor
7.6	- testing and commissioning		Witnessed	By Contractor.
8.0	PACKING (Requirement as per specification)			Comply & as per Comments /deviation
9.0	DOCUMENTATION (Requirement as per specification)			Comply & as per Comments /deviation



Appendix I-7 – Technical Data Sheets

014 – Medium Voltage Variable Speed Drive





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country Local Agent - Address - Telephone - Fax - Email			ABB Finland Finland
2.	Model No.			ABB LLC PO Box: 8688 +974 44253888 +974 44312630 ahmed.saeed@qa.abb.com
2a	Additional special configurations			ACS800-37
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude Design temperature (indoor/ outdoor) Operation temperature Storage temperature		50 c 98% 100m 50c 50c	Tropical Complied Complied Complied Complied
4.3	Temperature De-rating factor - Labels - Rating plates - Documentation		English English English	Complied

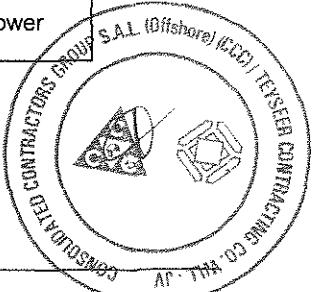




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under sunshade/without sunshade- Area classification		Indoor Under sunshade No hazard	Complied
5.	Design			
5.1	System <ul style="list-style-type: none">- (3 phase + Neutral/1 phase + Neutral)- Unearthed/Impedance earthed/Solidly earthed)- Voltage- Frequency		3 phase + Neutral Solidly earthed AS PER SLD 50 Hz	Complied
5.2	MOTOR			Complied. Refer data sheet
5.2.1	3 phase star/ 3 phase delta		3 phase delta	
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	
5.2.4	Rated Frequency <ul style="list-style-type: none">- Overload capacity of 15%- Speed accuracy with/without encoder- Resolution- DC ground switch in compartment door	Hz	50 Hz 0.01Hz Required	
5.3	FREQUENCY CONVERTER			
5.3.1	Function <ul style="list-style-type: none">- (Voltage inverter/ Current inverter)		*	VSI
5.3.2	Input rectifier system <ul style="list-style-type: none">- number of Pulse- module redundancy		minimum 18 Pulse required	Active Front End Reduced Power

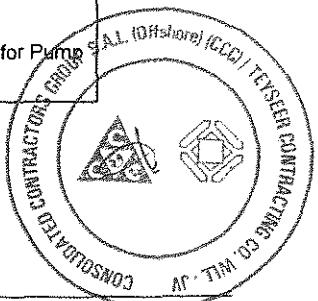




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)		*	Common
5.3.4	Bypass switch - (Required / Not required)		Required	Complied
5.3.5	Output frequency range		*	0... ± 120 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)		*	Built-in harmonic filter
5.3.6a	Built-in harmonic filter			
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)		*	
5.3.8	Power factor		*	0.99
5.3.9	Efficiency		*	97%
5.3.10	Memory for fault diagnostics - (Required / Not required)		Required	Complied
5.3.11	Flying restart facility - (Required / Not required)		Required	Complied
5.3.11a	Motor stall protection		Required	Complied
5.3.11b	Nuisance trip protection		Required	Complied
5.3.12	PI – Controller - (Required / Not required)		Required	Complied
5.3.13	Tachogenerator signal - (Required / Not required)		Required	Not Applicable for Pump application

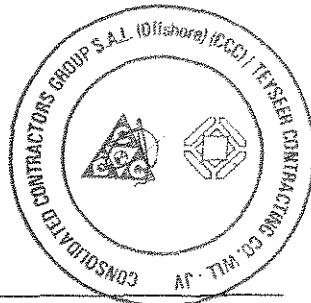




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time		*	Programmable
5.3.15	Starting time		*	Programmable
5.3.16	Deceleration time		*	Programmable
5.3.16	Braking module - (Required / Not required)		*	Not required
5.3.17	Control input signals : Converter on/off - (Local / Remote / Both)	Both		Programmable
	Speed setting - (Local / Remote / Both)	Both		Programmable
	Digital port - (Parallel / Serial)	Both		Programmable
	Signals - (4-20 mA / 0-10 V)	Both		Programmable
5.3.19	Control output signals required : Alarms - (NO / NC)		*	Programmable
	Bypass closed - (NO / NC)		*	Not Applicable
	Converter running - (NO / NC)		*	Programmable

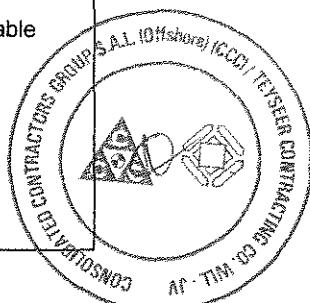




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
	Converter standby - (NO / NC)		*	Programmable
	Frequency transmission - (4-20 mA / 0-10 V)		*	Programmable
5.3.20	Harmonic contents (% of fundamental) - (Detailed table to be provided)		*	During detailed engineering
5.3.21	Reliability date of system elements - (Detailed table to be provided)		*	During detailed engineering
5.3.22	Energy optimization feature			Complied
5.2.23	Common mode filter (bearing protection)			Complied
5.2.23	Mean Time between Failure (MTBF)			36.4 years
5.2.24	Availability of the VSD	%		99%
5.2.25	Design life			Above 20 years
5.2.26	Input transformer data sheet			Complied
5.2.27	Output voltage requirement			Refer VFD technical Data Sheet
5.2.28	Auxiliary supply requirement		Redundancy	Not Applicable
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.		Required	Not Applicable





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			Four typically 0.1% of nominal speed
5.2.31	Static speed error			Complied
5.2.32	Power loss ride-through function for supply voltage dips			Complied
5.2.33	Control of spinning load			Complied
5.2.34	Soft Start function		Required	Complied
5.2.35	Start/stop command and speed reference (local/remote)		Required	Complied
5.2.36	Operator control panel		Required	Complied
5.2.37	Operator control panel Run/Stop command		Required	Complied
5.2.38	Operator control panel Local/Remote command		Required	Complied
5.2.39	Operator control panel Speed Increase/Decrease command		Required	Complied
5.2.40	Operator control panel menu navigation and parameter selection		Required	Complied
5.2.41	Normal operation parameters display		Required	Complied
5.2.42	Motor Speed, current and power display		Required	Complied
5.2.43	Output frequency, voltage and torque display		Required	Complied
5.2.44	DC bus voltage display		Required	Complied
5.2.45	Communication interface module		Required	Complied with Modbus

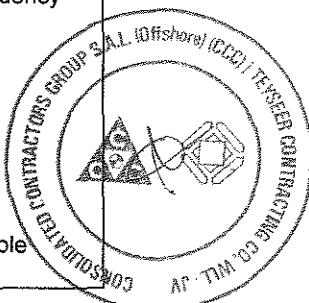




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters		*	Complied with Drive Window PC based software
5.2.47	Fault log with first-in indication and time/date stamping			Complied
5.2.48	Event sequence recording			Complied
5.2.49	Diagnostic log			Complied
5.2.50	An "Emergency-off" (E-off) provided on the VSD door		*	Complied
5.2.51	A discrete (binary) input for 'Process-stop'		*	Complied
5.2.52	An automatic restart function after a line under voltage fault		*	Complied
5.2.53	Motor winding or motor lead phase-to-phase short protection.		*	Complied
5.2.54	Motor ground fault protection.		*	Complied
5.2.55	Motor phase loss protection		*	Complied
5.2.56	Stall protection		*	Complied
5.2.57	Motor overload (over current) protection, programmable		*	Complied
5.2.58	Underload protection, programmable		*	Complied
5.2.59	Number of programmable critical frequency lockout ranges		*	3 - skip frequency ranges
5.2.60	Internal fault detection function		*	Complied
5.2.61	Pump/Cooling fan failure protection		*	Complied
5.2.62	Air/Water pressure supervision		*	Not applicable

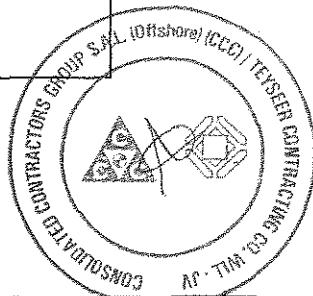




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection		*	Not Applicable
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers		*	Not Applicable
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch		*	Not Applicable
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Complied
5.2.67	Automatic switch-over for cooling functions.			Not Applicable
5.2.68	Output filter			Not Applicable
5.2.69	THD/TDD at input			Harmonics level as per IEEE519 standards
5.2.70	THD/TDD at output			

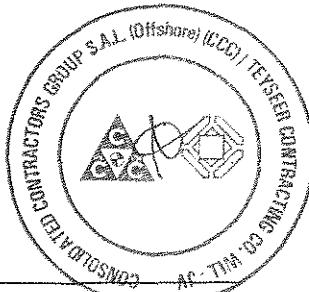




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			Refer VFD technical data sheet for details for each ratings
6.1	Converter Panel			
6.1.1	Height x Width x Depth	*		
6.1.2	Mass	*		
6.1.3	Noise level at 1m	*		
6.1.4	Cable entry - (Bottom / Top)	Bottom Entry	Bottom Entry	
6.1.5	Cable size and length - Incoming - Outgoing	*	During detailed engineering	
6.1.6	Ingress protection - Open - Closed	N/A IP 42	IP 42	
6.1.7	Ventilator in converter panel - details	*	Converter space heater for tropicalized version	
6.1.8	Anti-condensation heater in panel - details	*		
6.1.9	Cooling of the converter - details	Water cooled	Air cooled	Refer VFD technical data sheet for details for each ratings
6.1.10	Panel heat load	*		

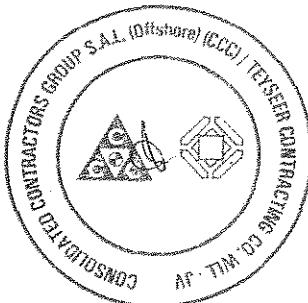




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	Not witnessed
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Complied
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	ABB - Type Test Certificate shall be provided Not witnesses
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Not Applicable
7.5	Testing equipments details		*	Not Applicable
8.	Packing - Requirement as specified			Complied
9.	Documentation - Requirement as specified			Complied





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APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET

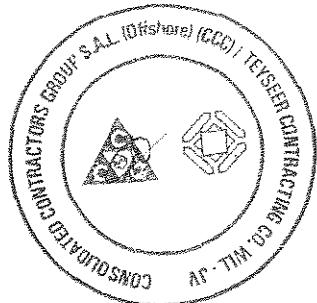


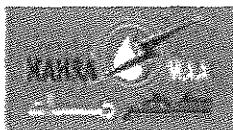


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country Local Agent - Address - Telephone - Fax - Email			ABB Switzerland Switzerland ABB LLC PO Box: 8688 +974 44253888 +974 44312630 ahmed.saeed@qa.abb.com
2.	Model No.			ACS1123-W1
2a	Additional special configurations			
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude Design temperature (indoor/outdoor) Operation temperature		50 c 98% 100m 50c 50c	Tropical Complied Complied Complied
4.3	Storage temperature Temperature De-rating factor - Labels - Rating plates - Documentation			Complied English English English

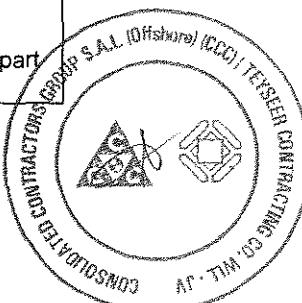




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation - Indoor/Outdoor - Under sunshade/without sunshade - Area classification		Indoor Under sunshade No hazard	Complied
5.	Design			
5.1	System - (3 phase + Neutral/1 phase + Neutral) - Unearthed/Impedance earthed/Solidly earthed) - Voltage - Frequency		3 phase + Neutral Solidly earthed AS PER SLD 50 Hz	Complied
5.2	MOTOR			Complied. Refer data sheet
5.2.1	3 phase star/ 3 phase delta		3 phase delta	
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	
5.2.4	Rated Frequency - Overload capacity of 15% - Speed accuracy with/without encoder - Resolution - DC ground switch in compartment door	Hz	50 Hz 0.01Hz Required	
5.3	FREQUENCY CONVERTER			
5.3.1	Function - (Voltage inverter/ Current inverter)		*	VSI
5.3.2	Input rectifier system - number of Pulse - module redundancy		minimum 18 Pulse required	24 - Pulse NA, being low part count design

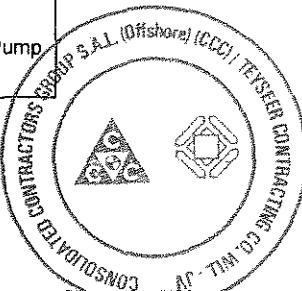




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)		*	Common
5.3.4	Bypass switch - (Required / Not required)		Required	Not Applicable for MV VFD
5.3.5	Output frequency range		*	0... ± 66 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)		*	Special 5-winding transformer
5.3.6a	Built-in harmonic filter			Not Applicable
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)		*	
5.3.8	Power factor		*	> 0.95 (for 20 ... 100% load)
5.3.9	Efficiency		*	> 98.3% (including auxiliaries and output sine filter no additional motor losses from harmonic heating to be expected)
5.3.10	Memory for fault diagnostics - (Required / Not required)		Required	Complied
5.3.11	Flying restart facility - (Required / Not required)		Required	Complied
5.3.11a	Motor stall protection		Required	Complied
5.3.11b	Nuisance trip protection		Required	Complied
5.3.12	PI – Controller - (Required / Not required)		Required	Complied
5.3.13	Tachogenerator signal - (Required / Not required)		Required	Not Applicable for Pump application

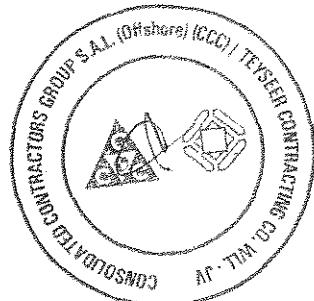




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time		*	Programmable
5.3.15	Starting time		*	Programmable
5.3.16	Deceleration time		*	Programmable
5.3.16	Braking module - (Required / Not required)		*	Not required
5.3.17	Control input signals : Converter on/off - (Local / Remote / Both)	Both		Programmable
	Speed setting - (Local / Remote / Both)	Both		Programmable
	Digital port - (Parallel / Serial)	Both		Programmable
	Signals - (4-20 mA / 0-10 V)	Both		Programmable
5.3.19	Control output signals required : Alarms - (NO / NC)		*	Programmable
	Bypass closed - (NO / NC)		*	Not Applicable
	Converter running - (NO / NC)		*	Programmable

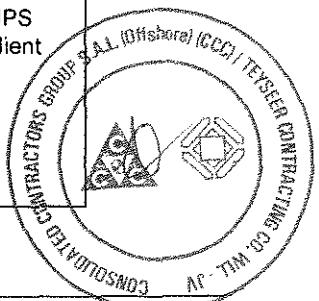


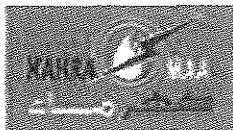


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Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
	Converter standby - (NO / NC)		*	Programmable
	Frequency transmission - (4-20 mA / 0-10 V)		*	Programmable
5.3.20	Harmonic contents (% of fundamental) - (Detailed table to be provided)		*	During detailed engineering
5.3.21	Reliability date of system elements - (Detailed table to be provided)		*	During detailed engineering
5.3.22	Energy optimization feature			Complied
5.2.23	Common mode filter (bearing protection)			Complied
5.2.23	Mean Time between Failure (MTBF)			105120 hours / 12 years
5.2.24	Availability of the VSD	%		99.99619%
5.2.25	Design life			Above 12 years
5.2.26	Input transformer data sheet			Complied
5.2.27	Output voltage requirement			Refer VFD technical Data Sheet
5.2.28	Auxiliary supply requirement		Redundancy	415V is in contractor scope
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.		Required	Not Required considering UPS supply from client

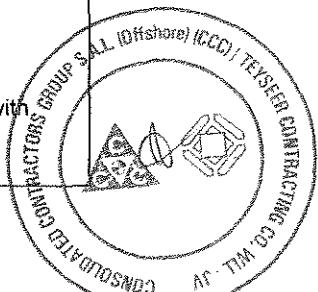


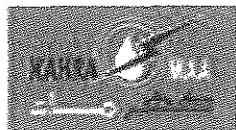


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Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			Single
5.2.31	Static speed error			typically 0.1% of nominal speed
5.2.32	Power loss ride-through function for supply voltage dips			Complied
5.2.33	Control of spinning load			Complied
5.2.34	Soft Start function		Required	Complied
5.2.35	Start/stop command and speed reference (local/remote)		Required	Complied
5.2.36	Operator control panel		Required	Complied
5.2.37	Operator control panel Run/Stop command		Required	Complied
5.2.38	Operator control panel Local/Remote command		Required	Complied
5.2.39	Operator control panel Speed Increase/Decrease command		Required	Complied
5.2.40	Operator control panel menu navigation and parameter selection		Required	Complied
5.2.41	Normal operation parameters display		Required	Complied
5.2.42	Motor Speed, current and power display		Required	Complied
5.2.43	Output frequency, voltage and torque display		Required	Complied
5.2.44	DC bus voltage display		Required	Complied
5.2.45	Communication interface module		Required	Complied with Modbus

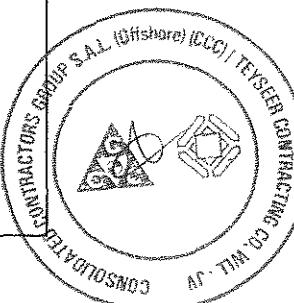




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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters	*		Complied with Drive Window PC based software
5.2.47	Fault log with first-in indication and time/date stamping			Complied
5.2.48	Event sequence recording			Complied
5.2.49	Diagnostic log			Complied
5.2.50	An "Emergency-off" (E-off) provided on the VSD door	*		Complied
5.2.51	A discrete (binary) input for 'Process-stop'	*		Complied
5.2.52	An automatic restart function after a line under voltage fault	*		Complied
5.2.53	Motor winding or motor lead phase-to-phase short protection.	*		Complied
5.2.54	Motor ground fault protection.	*		Complied
5.2.55	Motor phase loss protection	*		Complied
5.2.56	Stall protection	*		Complied
5.2.57	Motor overload (over current) protection, programmable	*		Complied
5.2.58	Underload protection, programmable	*		Complied
5.2.59	Number of programmable critical frequency lockout ranges	*		3 - skip frequency ranges
5.2.60	Internal fault detection function	*		Complied
5.2.61	Pump/Cooling fan failure protection	*		Complied
5.2.62	Air/Water pressure supervision	*		Complied





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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection	*		Complied
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers	*		Complied
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch	*		Complied
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Complied
5.2.67	Automatic switch-over for cooling functions.			Complied
5.2.68	Output filter			Complied
5.2.69	THD/TDD at input			Harmonics level as per IEEE519 standards
5.2.70	THD/TDD at output			

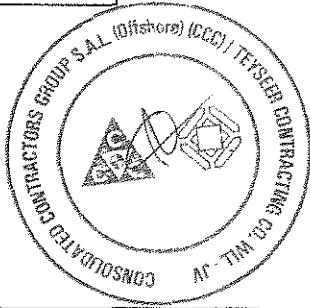




Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			Refer VFD technical data sheet for details for each ratings
6.1	Converter Panel			
6.1.1	Height x Width x Depth	*		
6.1.2	Mass	*		
6.1.3	Noise level at 1m	*		
6.1.4	Cable entry - (Bottom / Top)	Bottom Entry	Bottom Entry	
6.1.5	Cable size and length - Incoming - Outgoing	*	During detailed engineering	
6.1.6	Ingress protection - Open - Closed	N/A IP 42	IP 54	
6.1.7	Ventilator in converter panel - details	*	Converter space heater for tropicalized version	
6.1.8	Anti-condensation heater in panel - details	*		
6.1.9	Cooling of the converter - details	Water cooled	Water cooled	Refer VFD technical data sheet for details for each ratings
6.1.10	Panel heat load	*		





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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	Not witnessed
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Complied
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	Type Test Certificate shall be provided as per IEC60146 Not witnesses
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Not Applicable
7.5	Testing equipments details		*	Not Applicable
8.	Packing - Requirement as specified			Complied
9.	Documentation - Requirement as specified			Complied





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET

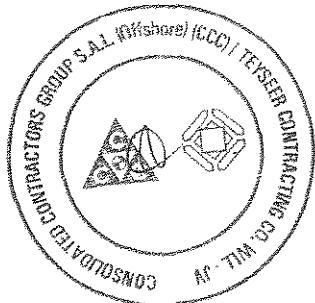




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country Local Agent - Address - Telephone - Fax - Email			Siemens Germany No Agent in Qatar
2.	Model No.			Simanics GM150
2a	Additional special configurations			
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude		50 c 98% 100m	Comply 85% Non Condensing Comply comply comply
	Design temperature (indoor/outdoor)		50c	
	Operation temperature		50c	
4.3	Storage temperature			
	Temperature De-rating factor - Labels - Rating plates - Documentation		English English English	Comply Comply Comply

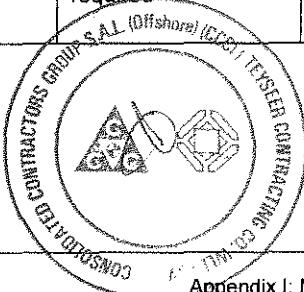




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Construction of Mega Reservoir PRPSs
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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under sunshade/without sunshade- Area classification		Indoor Under sunshade No hazard	Comply Comply Comply
5.	Design			
5.1	System <ul style="list-style-type: none">- (3 phase + Neutral/1 phase + Neutral)- Unearthed/Impedance earthed/Solidly earthed)- Voltage- Frequency		3 phase + Neutral Solidly earthed	Comply Comply
5.2	MOTOR		AS PER SLD 50 Hz	11kV Input / 3.3kV Output thru Phase shift Trafo. VFD Input 3.3kV Water Cooled , 50 Hz
5.2.1	3 phase star/ 3 phase delta		3 phase delta	Star
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	3.3 kV
5.2.4	Rated Frequency <ul style="list-style-type: none">- Overload capacity of 15%- Speed accuracy with/without encoder- Resolution- DC ground switch in compartment door	Hz	50 Hz VFD selected in line w/o encoder +/- 0.2% 0.01Hz Required	Comply with Motor rated current with Encoder +/- 0.01% Comply Yes. Standard
5.3	FREQUENCY CONVERTER			
5.3.1	Function <ul style="list-style-type: none">- (Voltage inverter/ Current inverter)		*	Voltage Source
5.3.2	Input rectifier system <ul style="list-style-type: none">- number of Pulse- module redundancy		minimum 18 Pulse required	24 Pulse Not Applicable

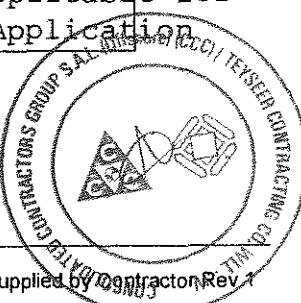




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)	*		Separate, Integrated in each VFD Panel
5.3.4	Bypass switch - (Required / Not required)	Required		Not Applicable as not called for in Specs
5.3.5	Output frequency range	*		250 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)	*		Phase Shift Trafo
5.3.6a	Built-in harmonic filter			Not Applicable
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)	*		Acc to VDE 0160 T103
5.3.8	Power factor	*		> 0.96
5.3.9	Efficiency	*		Approx 98.5 w/o Cooling system
5.3.10	Memory for fault diagnostics - (Required / Not required)	Required		Comply
5.3.11	Flying restart facility - (Required / Not required)	Required		Comply
5.3.11a	Motor stall protection	Required		Comply
5.3.11b	Nuisance trip protection	Required		Comply
5.3.12	PI – Controller - (Required / Not required)	Required		Comply
5.3.13	Tachogenerator signal - (Required / Not required)	Required		Not Applicable for Pump Application

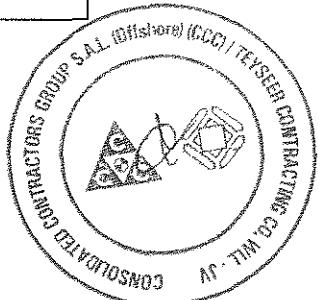




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time	*		Programmable as per Process requirement
5.3.15	Starting time	*		Programmable as per Process requirement
5.3.16	Deceleration time	*		-do-
5.3.16	Braking module - (Required / Not required)	*		Not Required
5.3.17	Control input signals: Converter on/off - (Local / Remote / Both)	Both		Comply
	Speed setting - (Local / Remote / Both)	Both		Comply
	Digital port - (Parallel / Serial)	Both		Comply
	Signals - (4-20 mA / 0-10 V)	Both		Comply
5.3.19	Control output signals required: Alarms - (NO / NC)	*		Comply
	Bypass closed - (NO / NC)	*		Comply
	Converter running - (NO / NC)	*		Comply

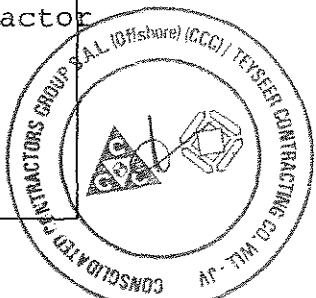




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.20	Converter standby - (NO / NC)	*	*	Comply
	Frequency transmission - (4-20 mA / 0-10 V)		*	Comply
	Harmonic contents (% of fundamental) - (Detailed table to be provided)		*	Meets IEEE519 . Details can be provided on Post Order based on Network datas and PCC
5.3.21	Reliability date of system elements - (Detailed table to be provided)	*	*	Not Clear
5.3.22	Energy optimization feature			Comply
5.2.23	Common mode filter (bearing protection)			Not Applicable
5.2.23	Mean Time between Failure (MTBF)			6.3 Years/55200 Hrs
5.2.24	Availability of the VSD	%		>99.98
5.2.25	Design life			20 Yrs
5.2.26	Input transformer data sheet			As attached
5.2.27	Output voltage requirement			2 X 1.7 kV
5.2.28	Auxiliary supply requirement	Redundancy		yes, UPS not in our scope
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.		Required	By Contractor

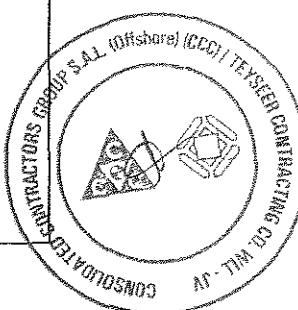




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			2 Comply
5.2.31	Static speed error			Comply
5.2.32	Power loss ride-through function for supply voltage dips			Comply
5.2.33	Control of spinning load			Comply
5.2.34	Soft Start function	Required		Comply
5.2.35	Start/stop command and speed reference (local/remote)	Required		Comply
5.2.36	Operator control panel	Required		Comply
5.2.37	Operator control panel Run/Stop command	Required		Comply
5.2.38	Operator control panel Local/Remote command	Required		Comply
5.2.39	Operator control panel Speed Increase/Decrease command	Required		Comply
5.2.40	Operator control panel menu navigation and parameter selection	Required		Comply
5.2.41	Normal operation parameters display	Required		Comply
5.2.42	Motor Speed, current and power display	Required		Comply
5.2.43	Output frequency, voltage and torque display	Required		Comply
5.2.44	DC bus voltage display	Required		Comply
5.2.45	Communication interface module	Required		Comply

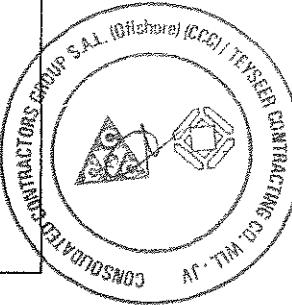




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(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters	*		Comply thru PC (PC not in our scope)
5.2.47	Fault log with first-in indication and time/date stamping			Comply
5.2.48	Event sequence recording			Comply
5.2.49	Diagnostic log			Comply
5.2.50	An "Emergency-off" (E-off) provided on the VSD door	*		Comply
5.2.51	A discrete (binary) input for 'Process-stop'	*		Comply
5.2.52	An automatic restart function after a line under voltage fault	*		Comply
5.2.53	Motor winding or motor lead phase-to-phase short protection.	*		Comply
5.2.54	Motor ground fault protection.	*		Comply
5.2.55	Motor phase loss protection	*		Comply
5.2.56	Stall protection	*		Comply
5.2.57	Motor overload (over current) protection, programmable	*		Comply
5.2.58	Underload protection, programmable	*		Comply
5.2.59	Number of programmable critical frequency lockout ranges	*		Comply
5.2.60	Internal fault detection function	*		Comply
5.2.61	Pump/Cooling fan failure protection	*		Comply
5.2.62	Air/Water pressure supervision	*		Comply

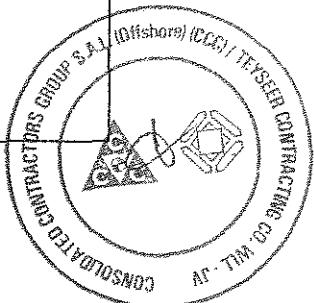




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection	*		Comply
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers	*		Comply
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch	*		Comply with DC Grounding Switch
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Tin Plated
5.2.67	Automatic switch-over for cooling functions.			Redundant Water Cooling Pumps Provided
5.2.68	Output filter			Not Applicable
5.2.69	THD/TDD at input			On Post Order
5.2.70	THD/TDD at output			On Post Order

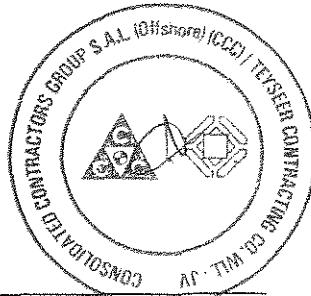




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			
6.1	Converter Panel			GM150
6.1.1	Height x Width x Depth	*	Approx	2280mm Height 3620mm Width 1275 mm Depth
6.1.2	Mass	*		Approx 3000KG
6.1.3	Noise level at 1m	*		73 dB w/o Cooling unit
6.1.4	Cable entry - (Bottom / Top)		Bottom Entry	Comply
6.1.5	Cable size and length - Incoming - Outgoing		*	3 x 240 Sq mm
			*	3 x 240 Sq mm
6.1.6	Ingress protection - Open - Closed	N/A	IP 42	IP43
6.1.7	Ventilator in converter panel - details		*	
6.1.8	Anti-condensation heater in panel - details		*	Approx 2.5 kW
6.1.9	Cooling of the converter - details	Water cooled		Comply
6.1.10	Panel heat load	*		28 KW w/o Cooling unit





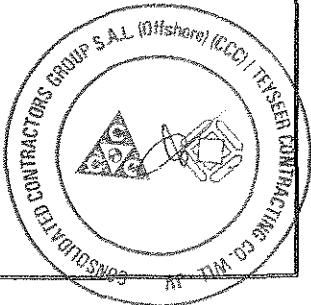
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	To be discussed on Post Order
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Comply as per Comments and Deviation & Specs
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	Comply as per Comments and Devotion & Specs
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Noted
7.5	Testing equipments details		*	To be discussed on Post Order
8.	Packing - Requirement as specified			Comply as per Comments and Deviation & Specs
9.	Documentation - Requirement as specified			Comply as per Comments and Deviation & Specs



Chapter 1.2
Datasheet -
1200KW MV VFD

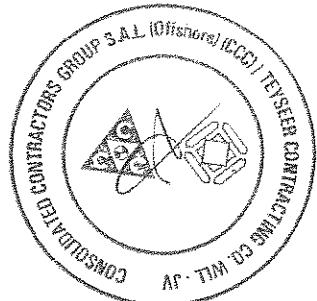




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APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET

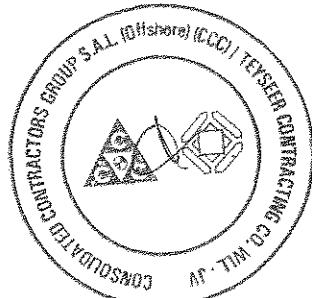




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country Local Agent - Address - Telephone - Fax - Email			Siemens Germany No Agent in Qatar
2.	Model No.			Simanics GM150
2a	Additional special configurations			IEC
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude Design temperature (indoor/outdoor) Operation temperature Storage temperature Temperature De-rating factor - Labels - Rating plates - Documentation	50 c 98% 100m 50c 50c English English English	Comply 85% Non Condensing Comply comply comply Comply Comply Comply	
4.3				

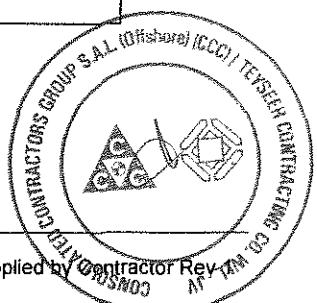




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Construction of Mega Reservoir PRPSSs
(Packages A, B, C, D & E)

MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Ref.	Description	Unit	Data	
			Required	Offered
1.1	Installation		Indoor Under sunshade No hazard	Comply Comply Comply
1.2	Design			
1.3	System		3 phase + Neutral Solidly earthed	Comply Comply
1.4	- (3 phase + Neutral/1 phase + Neutral) - Unearthed/Impedance earthed/Solidly earthed) - Voltage - Frequency		AS PER SLD 50 Hz	11kV Input / 3.3kV Output thru Phase shift Trafo. VFD Input 3.3kV Water Cooled , 50 Hz
1.5	MOTOR			
1.5.1	3 phase star/ 3 phase delta	kW	3 phase delta	Star
1.5.2	Rated Power	kW	Based on pump selection	
1.5.3	Rated Voltage	V	AS PER SLD	3.3 kV
1.5.4	Rated Frequency	Hz	50 Hz	Comply
	- Overload capacity of 15% - Speed accuracy with/without encoder - Resolution - DC ground switch in compartment door		VFD selected in line w/o encoder +/- 0.2%, 0.01Hz Required	with Motor rated current +/- 0.01%, with Encoder +/- 0.01% Comply Yes. Standard
1.6	FREQUENCY CONVERTER			
1.6.1	Function		*	Voltage Source
1.6.2	(Voltage inverter/ Current inverter) Input rectifier system			
	- number of Pulse - module redundancy		minimum 18 Pulse required	24 Pulse Not Applicable

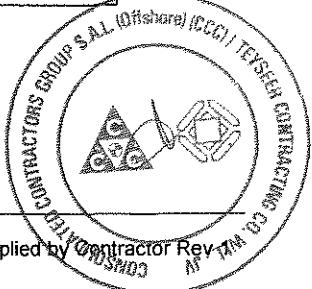




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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under sunshade/without sunshade- Area classification		Indoor Under sunshade No hazard	Comply Comply Comply
5.	Design			
5.1	System <ul style="list-style-type: none">- (3 phase + Neutral/1 phase + Neutral)- Unearthed/Impedance earthed/Solidly earthed)- Voltage- Frequency		3 phase + Neutral Solidly earthed	Comply Comply
5.2	MOTOR		AS PER SLD 50 Hz	11kV Input / 3.3kV Output thru Phase shift Trafo. VFD Input 3.3kV Water Cooled , 50 Hz
5.2.1	3 phase star/ 3 phase delta	kW	3 phase delta	Star
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	3.3 kV
5.2.4	Rated Frequency <ul style="list-style-type: none">- Overload capacity of 15%- Speed accuracy with/without encoder- Resolution- DC ground switch in compartment door	Hz	50 Hz VFD selected in line w/o encoder +/- 0.2% 0.01Hz Required	Comply with Motor rated current with Encoder +/- 0.01% Comply Yes. Standard
5.3	FREQUENCY CONVERTER			
5.3.1	Function <ul style="list-style-type: none">- (Voltage inverter/ Current inverter)		*	Voltage Source
5.3.2	Input rectifier system <ul style="list-style-type: none">- number of Pulse- module redundancy		minimum 18 Pulse required	24 Pulse Not Applicable





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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)	*		Separate, Integrated in each VFD Panel
5.3.4	Bypass switch - (Required / Not required)	Required		Not Applicable as not called for in Specs
5.3.5	Output frequency range	*		250 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)	*		Phase Shift Trafo
5.3.6a	Built-in harmonic filter			Not Applicable
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)	*		Acc to VDE 0160 T103
5.3.8	Power factor	*		> 0.96
5.3.9	Efficiency	*		Approx 98.5 w/o Cooling system
5.3.10	Memory for fault diagnostics - (Required / Not required)	Required		Comply
5.3.11	Flying restart facility - (Required / Not required)	Required		Comply
5.3.11a	Motor stall protection	Required		Comply
5.3.11b	Nuisance trip protection	Required		Comply
5.3.12	PI – Controller - (Required / Not required)	Required		Comply
5.3.13	Tachogenerator signal - (Required / Not required)	Required		Not Applicable for Pump Application





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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time	*		Programmable as per Process requirement
5.3.15	Starting time	*		Programmable as per Process requirement
5.3.16	Deceleration time	*		-do-
5.3.16	Braking module - (Required / Not required)	*		Not Required
5.3.17	Control input signals : Converter on/off - (Local / Remote / Both)	Both		Comply
	Speed setting - (Local / Remote / Both)	Both		Comply
	Digital port - (Parallel / Serial)	Both		Comply
	Signals - (4-20 mA / 0-10 V)	Both		Comply
5.3.19	Control output signals required : Alarms - (NO / NC)	*		Comply
	Bypass closed - (NO / NC)	*		Comply
	Converter running - (NO / NC)	*		Comply

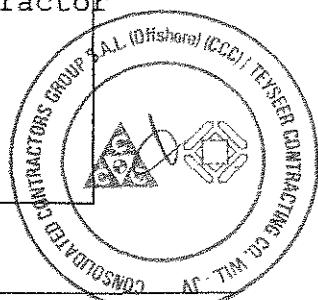


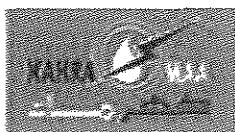


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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.20	Converter standby - (NO / NC)		*	Comply
	Frequency transmission - (4-20 mA / 0-10 V)		*	Comply
	Harmonic contents (% of fundamental) - (Detailed table to be provided)		*	Meets IEEE519 . Details can be provided on Post Order based on Network datas and PCC
5.3.21	Reliability date of system elements - (Detailed table to be provided)		*	Not Clear
5.3.22	Energy optimization feature			Comply
5.2.23	Common mode filter (bearing protection)			Not Applicable
5.2.23	Mean Time between Failure (MTBF)			6.3 Years/55200 Hrs
5.2.24	Availability of the VSD	%		>99.98
5.2.25	Design life			20 Yrs
5.2.26	Input transformer data sheet			As attached
5.2.27	Output voltage requirement			2 X 1.7 kV
5.2.28	Auxiliary supply requirement		Redundancy	yes, UPS not in our scope
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.		Required	By Contractor

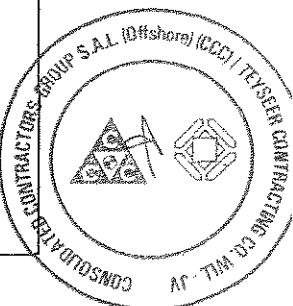




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(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			2 Comply
5.2.31	Static speed error			Comply
5.2.32	Power loss ride-through function for supply voltage dips			Comply
5.2.33	Control of spinning load			Comply
5.2.34	Soft Start function		Required	Comply
5.2.35	Start/stop command and speed reference (local/remote)		Required	Comply
5.2.36	Operator control panel		Required	Comply
5.2.37	Operator control panel Run/Stop command		Required	Comply
5.2.38	Operator control panel Local/Remote command		Required	Comply
5.2.39	Operator control panel Speed Increase/Decrease command		Required	Comply
5.2.40	Operator control panel menu navigation and parameter selection		Required	Comply
5.2.41	Normal operation parameters display		Required	Comply
5.2.42	Motor Speed, current and power display		Required	Comply
5.2.43	Output frequency, voltage and torque display		Required	Comply
5.2.44	DC bus voltage display		Required	Comply
5.2.45	Communication interface module		Required	Comply

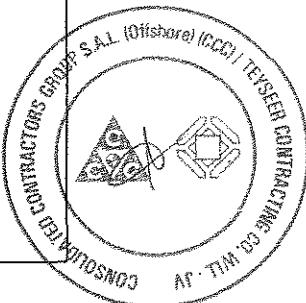




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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters	*		Comply thru PC (PC not in our scope)
5.2.47	Fault log with first-in indication and time/date stamping	*		Comply
5.2.48	Event sequence recording			Comply
5.2.49	Diagnostic log			Comply
5.2.50	An "Emergency-off" (E-off) provided on the VSD door	*		Comply
5.2.51	A discrete (binary) input for 'Process-stop'	*		Comply
5.2.52	An automatic restart function after a line under voltage fault	*		Comply
5.2.53	Motor winding or motor lead phase-to-phase short protection.	*		Comply
5.2.54	Motor ground fault protection.	*		Comply
5.2.55	Motor phase loss protection	*		Comply
5.2.56	Stall protection	*		Comply
5.2.57	Motor overload (over current) protection, programmable	*		Comply
5.2.58	Underload protection, programmable	*		Comply
5.2.59	Number of programmable critical frequency lockout ranges	*		Comply
5.2.60	Internal fault detection function	*		Comply
5.2.61	Pump/Cooling fan failure protection	*		Comply
5.2.62	Air/Water pressure supervision	*		Comply

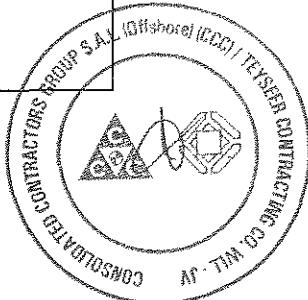




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ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection		*	Comply
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers		*	Comply
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch		*	Comply with DC Grounding Switch
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Tin Plated
5.2.67	Automatic switch-over for cooling functions.			Redundant Water Cooling Pumps Provided
5.2.68	Output filter			Not Applicable
5.2.69	THD/TDD at input			On Post Order
5.2.70	THD/TDD at output			On Post Order

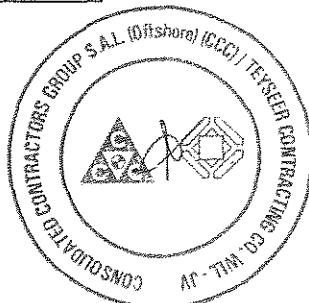




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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			
6.1	Converter Panel			GM150
6.1.1	Height x Width x Depth	*	Approx	2280mm Height 3620mm Width 1275 mm Depth
6.1.2	Mass	*		Approx 3000KG
6.1.3	Noise level at 1m	*		73 dB w/o Cooling unit
6.1.4	Cable entry - (Bottom / Top)		Bottom Entry	Comply
6.1.5	Cable size and length - Incoming - Outgoing		*	3 x 240 Sq mm
6.1.5			*	3 x 240 Sq mm
6.1.6	Ingress protection - Open - Closed		N/A IP 42	IP43
6.1.7	Ventilator in converter panel - details		*	
6.1.8	Anti-condensation heater in panel - details		*	Approx 2.5 kW
6.1.9	Cooling of the converter - details		Water cooled	Comply
6.1.10	Panel heat load	*		28 KW w/o Cooling unit

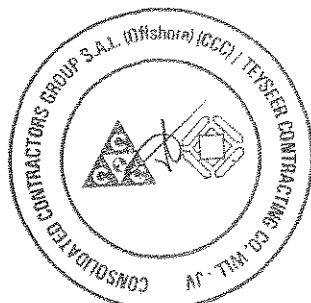




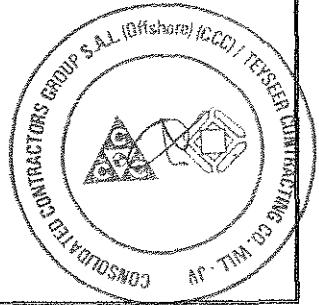
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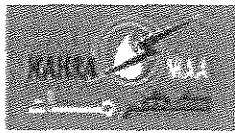
ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	To be discussed on Post Order
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Comply as per Comments and Deviation & Specs
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	Comply as per Comments and Devotion & Specs
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Noted
7.5	Testing equipments details		*	To be discussed on Post Order
8.	Packing - Requirement as specified			Comply as per Comments and Deviation & Specs
9.	Documentation - Requirement as specified			Comply as per Comments and Deviation & Specs



Chapter 1.3
Datasheet -
1400KW MV VFD





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country			Siemens Germany
	Local Agent - Address - Telephone - Fax - Email			No Agent in Qatar
2.	Model No.			Simanics GM150
2a	Additional special configurations			
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude		50 c 98% 100m	Comply 85% Non Condensing Comply
	Design temperature (indoor/outdoor)		50c	comply
	Operation temperature		50c	comply
4.3	Storage temperature			
	Temperature De-rating factor - Labels - Rating plates - Documentation		English English English	Comply Comply Comply

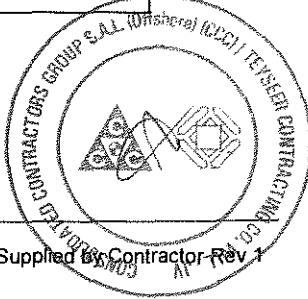




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under sunshade/without sunshade- Area classification		Indoor Under sunshade No hazard	Comply Comply Comply
5.	Design			
5.1	System <ul style="list-style-type: none">- (3 phase + Neutral/1 phase + Neutral)- Unearthed/Impedance earthed/Solidly earthed)- Voltage- Frequency		3 phase + Neutral Solidly earthed	Comply Comply
5.2	MOTOR		AS PER SLD 50 Hz	11kV Input / 3.3kV Output thru Phase shift Trafo. VFD Input 3.3kV Water Cooled , 50 Hz
5.2.1	3 phase star/ 3 phase delta		3 phase delta	Star
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	3.3 kV
5.2.4	Rated Frequency <ul style="list-style-type: none">- Overload capacity of 15%- Speed accuracy with/without encoder- Resolution- DC ground switch in compartment door	Hz	50 Hz VFD selected in line w/o encoder +/- 0.2% 0.01Hz Required	Comply with Motor rated current +/- 0.01% Comply Yes.Standard
5.3	FREQUENCY CONVERTER			
5.3.1	Function <ul style="list-style-type: none">- (Voltage inverter/ Current inverter)		*	Voltage Source
5.3.2	Input rectifier system <ul style="list-style-type: none">- number of Pulse- module redundancy		minimum 18 Pulse required	24 Pulse Not Applicable

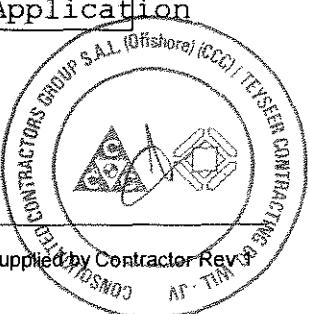




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)	*		Separate, Integrated in each VFD Panel
5.3.4	Bypass switch - (Required / Not required)	Required		Not Applicable as not called for in Specs
5.3.5	Output frequency range	*		250 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)	*		Phase Shift Trafo
5.3.6a	Built-in harmonic filter			Not Applicable
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)	*		Acc to VDE 0160 T103
5.3.8	Power factor	*		> 0.96
5.3.9	Efficiency	*		Approx 98.5 w/o Cooling system
5.3.10	Memory for fault diagnostics - (Required / Not required)	Required		Comply
5.3.11	Flying restart facility - (Required / Not required)	Required		Comply
5.3.11a	Motor stall protection	Required		Comply
5.3.11b	Nuisance trip protection	Required		Comply
5.3.12	PI – Controller - (Required / Not required)	Required		Comply
5.3.13	Tachogenerator signal - (Required / Not required)	Required		Not Applicable for Pump Application

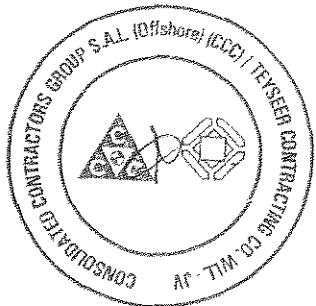




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time		*	Programmable as per Process requirement
5.3.15	Starting time		*	Programmable as per Process requirement
5.3.16	Deceleration time		*	-do-
5.3.16	Braking module - (Required / Not required)		*	Not Required
5.3.17	Control input signals : Converter on/off - (Local / Remote / Both)	Both		Comply
	Speed setting - (Local / Remote / Both)	Both		Comply
	Digital port - (Parallel / Serial)	Both		Comply
	Signals - (4-20 mA / 0-10 V)	Both		Comply
5.3.19	Control output signals required : Alarms - (NO / NC)		*	Comply
	Bypass closed - (NO / NC)		*	Comply
	Converter running - (NO / NC)		*	Comply

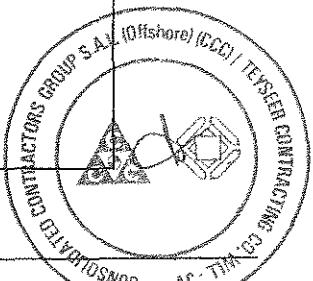




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.20	Converter standby - (NO / NC)		*	Comply
	Frequency transmission - (4-20 mA / 0-10 V)		*	Comply
	Harmonic contents (% of fundamental) - (Detailed table to be provided)		*	Meets IEEE519 . Details can be provided on Post Order based on Network datas and PCC
5.3.21	Reliability date of system elements - (Detailed table to be provided)		*	Not Clear
5.3.22	Energy optimization feature			Comply
5.2.23	Common mode filter (bearing protection)			Not Applicable
5.2.23	Mean Time between Failure (MTBF)			6.3 Years/55200 Hrs
5.2.24	Availability of the VSD	%		>99.98
5.2.25	Design life			20 Yrs
5.2.26	Input transformer data sheet			As attatched
5.2.27	Output voltage requirement			2 X 1.7 kV
5.2.28	Auxiliary supply requirement		Redundancy	yes, UPS not in our scope
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.		Required	By Contractor

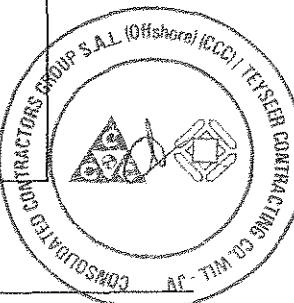




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			2 Comply
5.2.31	Static speed error			Comply
5.2.32	Power loss ride-through function for supply voltage dips			Comply
5.2.33	Control of spinning load			Comply
5.2.34	Soft Start function		Required	Comply
5.2.35	Start/stop command and speed reference (local/remote)		Required	Comply
5.2.36	Operator control panel		Required	Comply
5.2.37	Operator control panel Run/Stop command		Required	Comply
5.2.38	Operator control panel Local/Remote command		Required	Comply
5.2.39	Operator control panel Speed Increase/Decrease command		Required	Comply
5.2.40	Operator control panel menu navigation and parameter selection		Required	Comply
5.2.41	Normal operation parameters display		Required	Comply
5.2.42	Motor Speed, current and power display		Required	Comply
5.2.43	Output frequency, voltage and torque display		Required	Comply
5.2.44	DC bus voltage display		Required	Comply
5.2.45	Communication interface module		Required	Comply

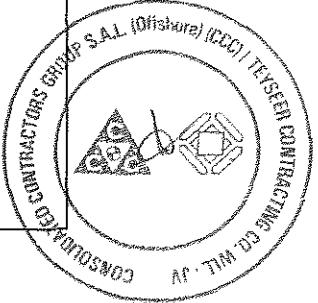




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters	*		Comply thru PC (PC not in our scope)
5.2.47	Fault log with first-in indication and time/date stamping			Comply
5.2.48	Event sequence recording			Comply
5.2.49	Diagnostic log			Comply
5.2.50	An "Emergency-off" (E-off) provided on the VSD door	*		Comply
5.2.51	A discrete (binary) input for 'Process-stop'	*		Comply
5.2.52	An automatic restart function after a line under voltage fault	*		Comply
5.2.53	Motor winding or motor lead phase-to-phase short protection.	*		Comply
5.2.54	Motor ground fault protection.	*		Comply
5.2.55	Motor phase loss protection	*		Comply
5.2.56	Stall protection	*		Comply
5.2.57	Motor overload (over current) protection, programmable	*		Comply
5.2.58	Underload protection, programmable	*		Comply
5.2.59	Number of programmable critical frequency lockout ranges	*		Comply
5.2.60	Internal fault detection function	*		Comply
5.2.61	Pump/Cooling fan failure protection	*		Comply
5.2.62	Air/Water pressure supervision	*		Comply

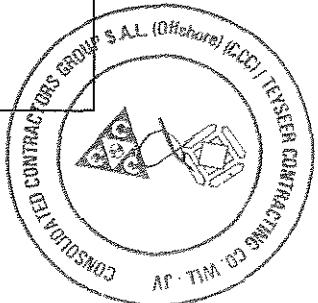




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection		*	Comply
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers		*	Comply
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch		*	Comply with DC Grounding Switch
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Tin Plated
5.2.67	Automatic switch-over for cooling functions.			Redundant Water Cooling Pumps Provided
5.2.68	Output filter			Not Applicable
5.2.69	THD/TDD at input			On Post Order
5.2.70	THD/TDD at output			On Post Order

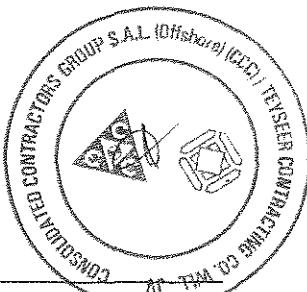




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			
6.1	Converter Panel			GM150
6.1.1	Height x Width x Depth	*	Approx	2280mm Height 3620mm Width 1275 mm Depth
6.1.2	Mass	*		Approx 3000KG
6.1.3	Noise level at 1m	*		73 dB w/o Cooling unit
6.1.4	Cable entry - (Bottom / Top)		Bottom Entry	Comply
6.1.5	Cable size and length - Incoming - Outgoing	*		3 x 240 Sq mm
6.1.5		*		3 x 240 Sq mm
6.1.6	Ingress protection - Open - Closed	N/A		IP43
6.1.7	Ventilator in converter panel - details	*		
6.1.8	Anti-condensation heater in panel - details	*		Approx 2.5 kW
6.1.9	Cooling of the converter - details	Water cooled		Comply
6.1.10	Panel heat load	*		28 KW w/o Cooling unit





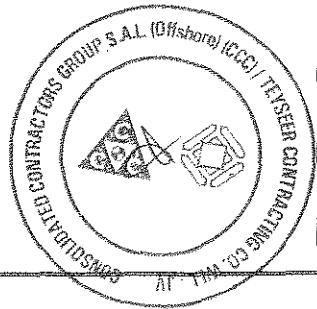
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	To be discussed on Post Order
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Comply as per Comments and Deviation & Specs
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	Comply as per Comments and Devotion & Specs
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Noted
7.5	Testing equipments details		*	To be discussed on Post Order
8.	Packing - Requirement as specified			Comply as per Comments and Deviation & Specs
9.	Documentation - Requirement as specified			Comply as per Comments and Deviation & Specs



Chapter 1.4
Datasheet -
2200KW MV VFD

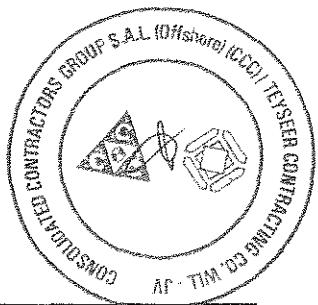




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I-7-014

MEDIUM VOLTAGE VARIABLE SPEED DRIVE DATA SHEET





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
1.	Manufacturer - Name - Country Local Agent - Address - Telephone - Fax - Email			Siemens Germany No Agent in Qatar
2.	Model No.			Simanics GM150
2a	Additional special configurations			
3.	Standard/Code Applicable	IEC		IEC
4.	Local Conditions			
4.1	Location			
4.2	Climate - Tropical/Arctic/Temperate/Coastal desert - Ambient temperature - Relative humidity - Altitude Design temperature (indoor/outdoor) Operation temperature Storage temperature		50 c 98% 100m 50c 50c	Comply 85% Non Condensing Comply comply comply
4.3	Temperature De-rating factor - Labels - Rating plates - Documentation		English English English	Comply Comply Comply

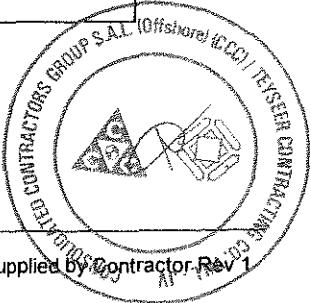




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
4.4	Installation <ul style="list-style-type: none">- Indoor/Outdoor- Under sunshade/without sunshade- Area classification		Indoor Under sunshade No hazard	Comply Comply Comply
5.	Design			
5.1	System <ul style="list-style-type: none">- (3 phase + Neutral/1 phase + Neutral)- Unearthed/Impedance earthed/Solidly earthed)- Voltage- Frequency		3 phase + Neutral Solidly earthed	Comply Comply
5.2	MOTOR		AS PER SLD 50 Hz	11kV Input / 3.3kV Output thru Phase shift Trafo. VFD Input 3.3kV Water Cooled , 50 Hz
5.2.1	3 phase star/ 3 phase delta	kW	3 phase delta	Star
5.2.2	Rated Power	kW	Based on pump selection	
5.2.3	Rated Voltage	V	AS PER SLD	3.3 kV
5.2.4	Rated Frequency <ul style="list-style-type: none">- Overload capacity of 15%- Speed accuracy with/without encoder- Resolution- DC ground switch in compartment door	Hz	50 Hz VFD selected in line w/o encoder +/- 0.2%, 0.01Hz Required	Comply with Motor rated current, with Encoder +/- 0.01% Comply Yes.Standard
5.3	FREQUENCY CONVERTER			
5.3.1	Function <ul style="list-style-type: none">- (Voltage inverter/ Current inverter)		*	Voltage Source
5.3.2	Input rectifier system <ul style="list-style-type: none">- number of Pulse- module redundancy		minimum 18 Pulse required	24 Pulse Not Applicable

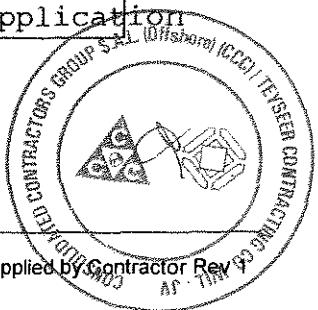


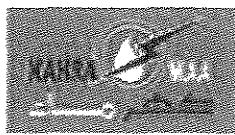


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.3	DC busbar - (Common / Separate)	*		Separate, Integrated in each VFD Panel
5.3.4	Bypass switch - (Required / Not required)	Required		Not Applicable as not called for in Specs
5.3.5	Output frequency range	*		250 Hz
5.3.6	Harmonic current distortion compensation by: - (choke filter / Mains filter / Special transformer)	*		Phase Shift Trafo
5.3.6a	Built-in harmonic filter			Not Applicable
5.3.7	Radio interference protection according to VDE 0875 - (Grade N / Grade K)	*		Acc to VDE 0160 T103
5.3.8	Power factor	*		> 0.96
5.3.9	Efficiency	*		Approx 98.5 w/o Cooling system
5.3.10	Memory for fault diagnostics - (Required / Not required)	Required		Comply
5.3.11	Flying restart facility - (Required / Not required)	Required		Comply
5.3.11a	Motor stall protection	Required		Comply
5.3.11b	Nuisance trip protection	Required		Comply
5.3.12	PI – Controller - (Required / Not required)	Required		Comply
5.3.13	Tachogenerator signal - (Required / Not required)	Required		Not Applicable for Pump Application

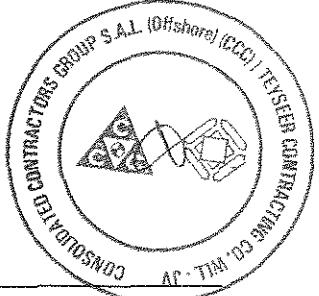




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.3.14	Acceleration time	*		Programmable as per Process requirement
5.3.15	Starting time	*		Programmable as per Process requirement
5.3.16	Deceleration time	*		-do-
5.3.16	Braking module - (Required / Not required)	*		Not Required
5.3.17	Control input signals : Converter on/off - (Local / Remote / Both)	Both		Comply
	Speed setting - (Local / Remote / Both)	Both		Comply
	Digital port - (Parallel / Serial)	Both		Comply
	Signals - (4-20 mA / 0-10 V)	Both		Comply
5.3.19	Control output signals required : Alarms - (NO / NC)	*		Comply
	Bypass closed - (NO / NC)	*		Comply
	Converter running - (NO / NC)	*		Comply

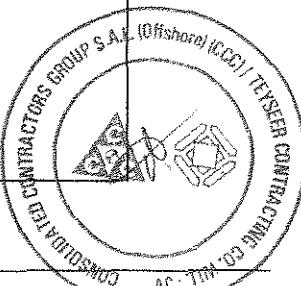




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
	Converter standby - (NO / NC)	*		Comply
	Frequency transmission - (4-20 mA / 0-10 V)	*		Comply
5.3.20	Harmonic contents (% of fundamental) - (Detailed table to be provided)	*		Meets IEEE519 . Details can be provided on Post Order based on Network datas and PCC
5.3.21	Reliability date of system elements - (Detailed table to be provided)	*		Not Clear
5.3.22	Energy optimization feature			Comply
5.2.23	Common mode filter (bearing protection)			Not Applicable
5.2.23	Mean Time between Failure (MTBF)			6.3 Years/55200 Hrs
5.2.24	Availability of the VSD	%		>99.98
5.2.25	Design life			20 Yrs
5.2.26	Input transformer data sheet			As attached
5.2.27	Output voltage requirement			2 X 1.7 kV
5.2.28	Auxiliary supply requirement	Redundancy		yes, UPS not in our scope
5.2.29	Internal batteries for essential functions are required in case no external emergency supply exists.	Required		By Contractor

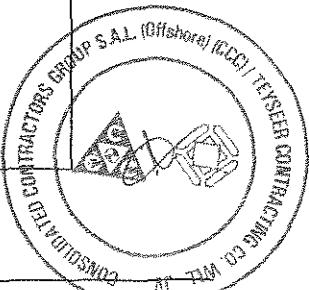




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.30	Working quadrants			2
5.2.31	Static speed error			Comply
5.2.32	Power loss ride-through function for supply voltage dips			Comply
5.2.33	Control of spinning load			Comply
5.2.34	Soft Start function		Required	Comply
5.2.35	Start/stop command and speed reference (local/remote)		Required	Comply
5.2.36	Operator control panel		Required	Comply
5.2.37	Operator control panel Run/Stop command		Required	Comply
5.2.38	Operator control panel Local/Remote command		Required	Comply
5.2.39	Operator control panel Speed Increase/Decrease command		Required	Comply
5.2.40	Operator control panel menu navigation and parameter selection		Required	Comply
5.2.41	Normal operation parameters display		Required	Comply
5.2.42	Motor Speed, current and power display		Required	Comply
5.2.43	Output frequency, voltage and torque display		Required	Comply
5.2.44	DC bus voltage display		Required	Comply
5.2.45	Communication interface module		Required	Comply

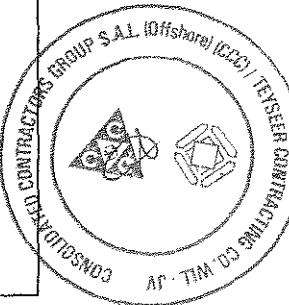




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.46	Trending of parameters	*		Comply thru PC (PC not in our scope)
5.2.47	Fault log with first-in indication and time/date stamping	*		Comply
5.2.48	Event sequence recording	*		Comply
5.2.49	Diagnostic log	*		Comply
5.2.50	An "Emergency-off" (E-off) provided on the VSD door	*		Comply
5.2.51	A discrete (binary) input for 'Process-stop'	*		Comply
5.2.52	An automatic restart function after a line under voltage fault	*		Comply
5.2.53	Motor winding or motor lead phase-to-phase short protection.	*		Comply
5.2.54	Motor ground fault protection.	*		Comply
5.2.55	Motor phase loss protection	*		Comply
5.2.56	Stall protection	*		Comply
5.2.57	Motor overload (over current) protection, programmable	*		Comply
5.2.58	Underload protection, programmable	*		Comply
5.2.59	Number of programmable critical frequency lockout ranges	*		Comply
5.2.60	Internal fault detection function	*		Comply
5.2.61	Pump/Cooling fan failure protection	*		Comply
5.2.62	Air/Water pressure supervision	*		Comply

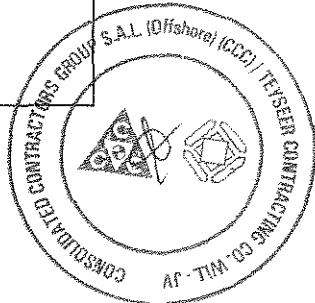




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
5.2.63	Water over- and under -temperature protection	*		Comply
5.2.64	Transformer oil pressure, temperature and level for oil transformer or transformer temperature for dry type transformers	*		Comply
5.2.65	VSD enclosure doors electromechanical interlocking with a safety grounding switch	*		Comply with DC Grounding Switch
5.2.66	Corrosion protection for bus bars (galvanic, tin plated or other). Please specify the requirement			Tin Plated
5.2.67	Automatic switch-over for cooling functions.			Redundant Water Cooling Pumps Provided
5.2.68	Output filter			Not Applicable
5.2.69	THD/TDD at input			On Post Order
5.2.70	THD/TDD at output			On Post Order

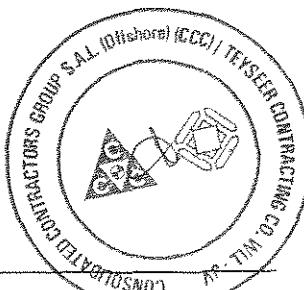




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE VARIABLE SPEED DRIVE

Item	Description	Unit	Data	
			Required	Offered
6.0	CONSTRUCTION			
6.1	Converter Panel			GM150
6.1.1	Height x Width x Depth	*	Approx	2280mm Height 3620mm Width 1275 mm Depth
6.1.2	Mass	*		Approx 3000KG
6.1.3	Noise level at 1m	*		73 dB w/o Cooling unit
6.1.4	Cable entry - (Bottom / Top)		Bottom Entry	Comply
6.1.5	Cable size and length - Incoming - Outgoing		*	3 x 240 Sq mm
			*	3 x 240 Sq mm
6.1.6	Ingress protection - Open - Closed		N/A IP 42	IP43
6.1.7	Ventilator in converter panel - details		*	
6.1.8	Anti-condensation heater in panel - details		*	Approx 2.5 kW
6.1.9	Cooling of the converter - details		Water cooled	Comply
6.1.10	Panel heat load	*		40 KW w/o Cooling unit

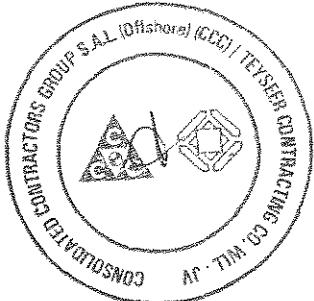




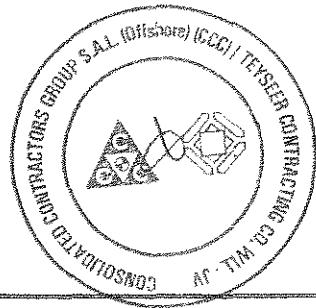
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

ITEM : MEDIUM VOLTAGE SQUIRREL CAGE INDUCTION MOTOR

Item	Description	Unit	Data	
			Required	Offered
7.	Inspection and Testing			
7.1	Inspection during manufacturing - Witnessed / Not witnessed		**	To be discussed on Post Order
7.2	Routine Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Witnessed	Comply as per Comments and Deviation & Specs
7.3	Type Tests - All required - Certificate - Witnessed/Not witnesses		Yes Yes Not witnesses	Comply as per Comments and Devotion & Specs
7.4	Special Tests - Witnessed/Not witnessed		Not witnesses	Noted
7.5	Testing equipments details		*	To be discussed on Post Order
8.	Packing - Requirement as specified			Comply as per Comments and Deviation & Specs
9.	Documentation - Requirement as specified			Comply as per Comments and Deviation & Specs



Chapter 1.5
Datasheet -
Converter Transformer





TECHNICAL DATA SHEET – Pos.1

Three-Phase-Oil-immersed-Transformer with conservator for indoor and outdoor installation.

Routine tests, design and tolerances according to EN60076, IEC76 and EN50464 without type and special tests

Type: TGQ-153F01S1K-99

Purpose: Converter Transformer

Rated power	1500 (750/750)	kVA
Rated no-load voltage on HV-side	11000	V
Rated no-load voltage on LV-side	2x1700	V
Off-circuit tap-changer on HV-side for	± 2x2,5	%

Frequency	50	Hz
Vector Group	D(+ or -7,5%)y5d0	
Cooling	ONAN	

No load losses P0	1600	W +15% Tol.
Load losses Pk at 75°C	11500	W +15% Tol.
Impedance voltage uk75	Total ca. 6	% ±10% Tol.

Insulation level	HV-winding	LI75/AC28
	LV-winding	LI60/AC20

Insulation Class	A	
Average winding temperature rise	55	K
Max. oil temperature rise	50	K
Ambient temperature	50	°C

Altitude above NN	1000	M
Winding material		
HV-winding	copper	
LV-winding	copper	

Dimensions L/W/H approx.	2000 / 1250 / 2305	mm
Roller center distance	820	mm

Total weight approx.	4500	kg
Weight of oil approx.	910	kg

Tank: Corrugated tank with bolted cover

Tank Accessories:

- Filling and venting nipples
- Oil draining screw
- Thermometer pocket
- Rating plate
- Two (2) earthing screws (one on the cover and one near the tank base)
- Two (2) lifting eyes on the cover
- Four (4) traction eyes on the undercarriage
- Four (4) flat turnable rollers

Terminal connections:

HV-side: Porcelain bushings acc. EN50180

LV-side: Porcelain bushings acc. EN50386

Protection devices:

- Buchholz Relay BF25/6 with 2 contacts
- Breather with Silicagel Filling
- Oil thermometer with 2 contacts
- Oil level indicator with 2 contacts
- Winding temperature indicator with 2 contacts
- Terminal box for protection wiring

Insulation liquid: Nynas Nytra Taurus acc. EN60296, non inhibited

Painting: Final paintwork RAL7033 in acc. to C5-M, total layer thickness 240 µm

Remarks:

The indicated and guaranteed values in respect of losses are only valid for sine shaped current.

The transformer is designed for Siemens Sinamics GM150 converter load (Design according D12 T Version 4.1 2008, chapter 8.4).





TECHNICAL DATA SHEET – Pos.2

Three-Phase-Oil-immersed-Transformer with conservator for indoor and outdoor installation.

Routine tests, design and tolerances according to EN60076, IEC76 and EN50464 without type and special tests

Type: TGQ-103F01S1K-99

Purpose: Converter Transformer

Rated power 1000 (500/500) kVA

Rated no-load voltage on HV-side 11000 V

Rated no-load voltage on LV-side 2x1700 V

Off-circuit tap-changer on HV-side for ± 2x2,5 %

Frequency 50 Hz

Vector Group D(+ or -7,5%)y5d0

Cooling ONAN

No load losses P0 1200 W +15% Tol.

Load losses Pk at 75°C 8000 W +15% Tol.

Impedance voltage uk75 Total ca. 6 % ±10% Tol.

Insulation level

HV- winding LI75/AC28

LV- winding LI60/AC20

Insulation Class A

Average winding temperature rise 55 K

Max. oil temperature rise 50 K

Ambient temperature 50 °C

Altitude above NN 1000 M

Winding material copper

HV- winding copper

LV- winding copper

Dimensions L/W/H approx. 2000 / 1000 / 2105 mm

Roller center distance 820 mm

Total weight approx. 3500 kg

Weight of oil approx. 670 kg

Tank: Corrugated tank with bolted cover

Tank Accessories:

Filling and venting nipples

Oil draining screw

Thermometer pocket

Rating plate

Two (2) earthing screws (one on the cover and one near the tank base)

Two (2) lifting eyes on the cover

Four (4) traction eyes on the undercarriage

Four (4) flat turnable rollers

Terminal connections:

HV- side: Porcelain bushings acc. EN50180

LV- side: Porcelain bushings acc. EN50386

Protection devices:

Buchholz Relay BF25/6 with 2 contacts

Breather with Silicagel Filling

Oil thermometer with 2 contacts

Oil level indicator with 2 contacts

Winding temperature indicator with 2 contacts

Terminal box for protection wiring

Insulation liquid:

Nynas Nytro Taurus acc. EN60296, non inhibited

Painting:

Final paintwork RAL 7033 in acc. to C5-M, total layer thickness 240 µm

Remarks:

The indicated and guaranteed values in respect of losses are only valid for sine shaped current.

The transformer is designed for Siemens Sinamics GM150 converter load (Design according D12 T Version 4.1 2008, chapter 8.4).





TECHNICAL DATA SHEET – Pos.3

Three-Phase-Oil-immersed-Transformer with conservator for indoor and outdoor installation.

Routine tests, design and tolerances according to EN60076, IEC76 and EN50464 without type and special tests

Type: TGQ-802F01S1K-99

Purpose: Converter Transformer

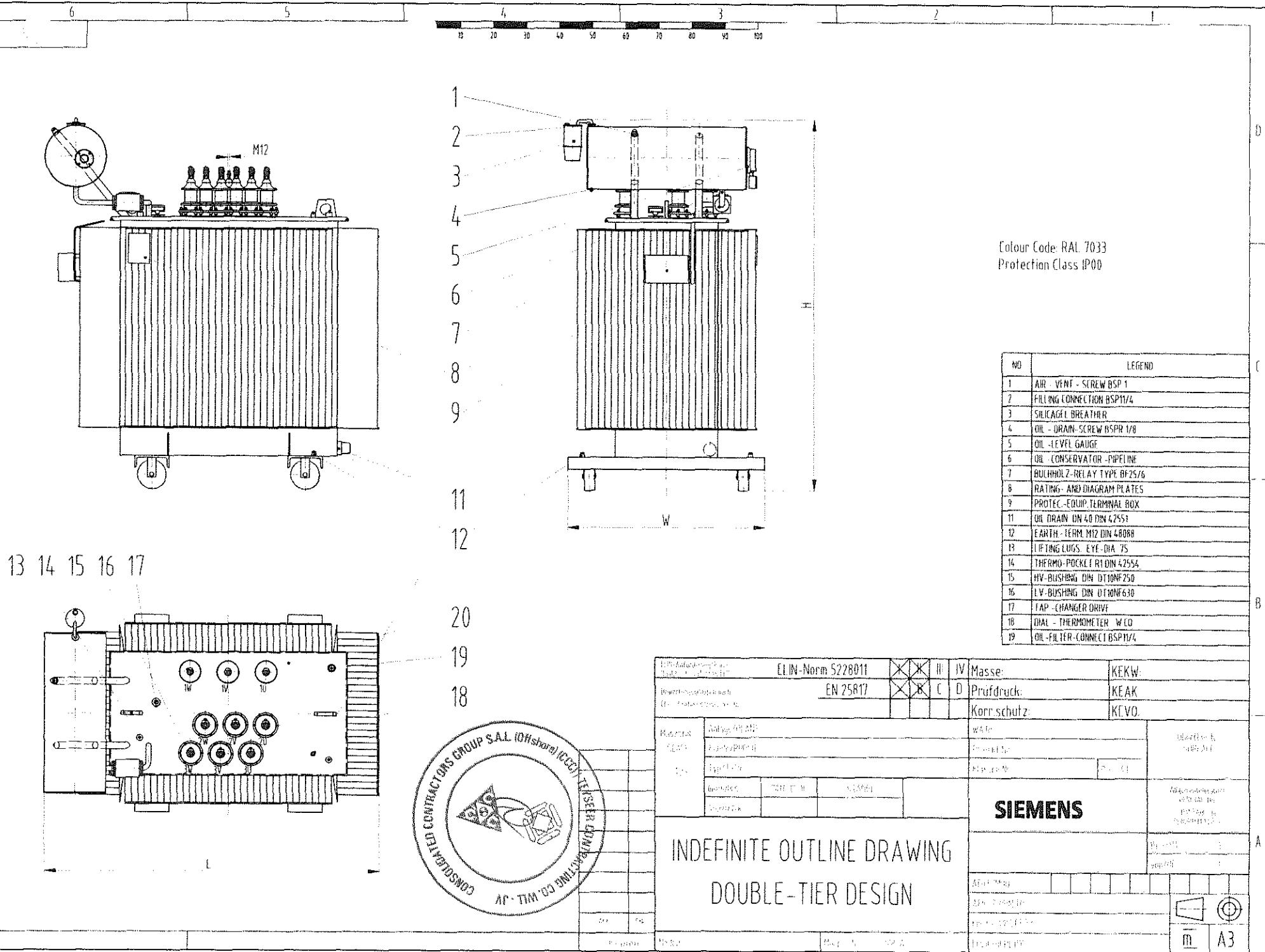
Rated power	800 (400/400)	kVA
Rated no-load voltage on HV-side	11000	V
Rated no-load voltage on LV-side	2x1700	V
Off-circuit tap-changer on HV-side for	± 2x2,5	%
Frequency	50	Hz
Vector Group	D(+ or -7,5%)y5d0	
Cooling	ONAN	
No load losses P0	1000	W +15% Tol.
Load losses Pk at 75°C	6500	W +15% Tol.
Impedance voltage uk75	Total ca. 6	% ±10% Tol.
Insulation level		
HV- winding	LI75/AC28	
LV- winding	LI60/AC20	
Insulation Class	A	
Average winding temperature rise	55	K
Max. oil temperature rise	50	K
Ambient temperature	50	°C
Altitude above NN	1000	M
Winding material		
HV- winding	copper	
LV- winding	copper	
Dimensions L/W/H approx.	1800 / 920 / 2145	mm
Roller center distance	670	mm
Total weight approx.	3000	kg
Weight of oil approx.	630	kg
Tank:	Corrugated tank with bolted cover	
Tank Accessories:		
	Filling and venting nipples	
	Oil draining screw	
	Thermometer pocket	
	Rating plate	
	Two (2) earthing screws (one on the cover and one near the tank base)	
	Two (2) lifting eyes on the cover	
	Four (4) traction eyes on the undercarriage	
	Four (4) flat turnable rollers	
Terminal connections:		
HV- side:	Porcelain bushings acc. EN50180	
LV- side:	Porcelain bushings acc. EN50386	
Protection devices:		
	Buchholz Relay BF25/6 with 2 contacts	
	Breather with Silicagel Filling	
	Oil thermometer with 2 contacts	
	Oil level indicator with 2 contacts	
	Winding temperature indicator with 2 contacts	
	Terminal box for protection wiring	
Insulation liquid:	Nynas Nydro Taurus acc. EN60296, non inhibited	
Painting:	Final paintwork RAL7033 in acc. to C5-M, total layer thickness 240 µm	

Remarks:

The indicated and guaranteed values in respect of losses are only valid for sine shaped current.

The transformer is designed for Siemens Sinamics GM150 converter load (Design according D12 T Version 4.1 2008, chapter 8.4).





Colour Code: RAL 7033
Protection Class IP00

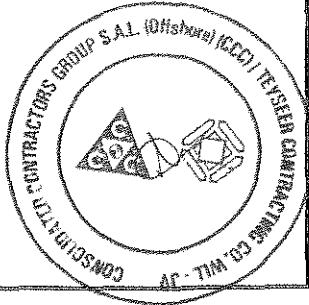
NO	LEGEND
1	AIR - VENF - SCREW BSP 1
2	FILLING CONNECTION BSP1/4
3	SILICAGEL BREATHER
4	OIL - DRAIN - SCREW BSPR 1/8
5	OIL - LEVEL GAUGE
6	OIL CONSERVATOR - PIPELINE
7	BULWINKELZ-RELAY TYPE BF25/6
8	RATING- AND DIAGRAM PLATES
9	PROTEC-EQUIP TERMINAL BOX
11	OIL DRAIN DN 40 DIN 42551
12	EARTH - ERM. M12 DIN 40808
13	LIFTING LUGS. EYE - DIA 75
14	THERMO - POCKET RI DIN 42554
15	HV-BUSHING DIN DTI01F250
16	LV-BUSHING DIN DTI01F630
17	FAP - CHANGER DRIVE
18	DIAL - INDICATOR WCD
19	OIL-FILTER CONNECT BSP1/4

Dokumentations-Nr. Blatt-Nr. 1 von 1		ELIN-Norm 5228011		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NE
Bewilligungsbehörde nach (§ 14 Absatz 1 Nr. 1)		EN 25811		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	C
Maßstab	Zeichnung 1:1000					
	Zeichnung 1:1000					
	Zeichnung 1:1000					
	Zeichnung 1:1000					
	Zeichnung 1:1000					
Längenmaß	Grundriss	SE	E	M	S	A
	Querschnitt					

INDEFINITE OUTLINE DRAWING
DOUBLE-TIER DESIGN

Chapter 2

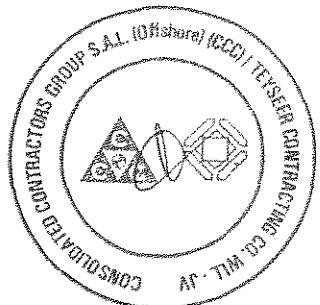
Datasheets for Motor



Appendix I-7 – Technical Data Sheets

015 – Main Pumps to

020 – Emergency Tanker Filling Pumps



> Our technology. Your success.

Pumps • Valves • Service



**Kahramaa Mega Reservoir - Package A - PRPS 1 at Umm Birka
KSB reference number 4002140658**

Technical Package is including following:

- KSB Pump Data Sheets
- KSB Curves
- KSB Preliminary Drawings
- Siemens Motor Data Sheets
- Altern. ABB Motor Data sheets
- Kahramaa Data Sheets
- KSB Clarification List
- Siemens Clarification List
- General Product Details RDLO
- General Product Details Omega
- General Product Details KRT Wet Installation
- General Product Details KRT Dry Installation

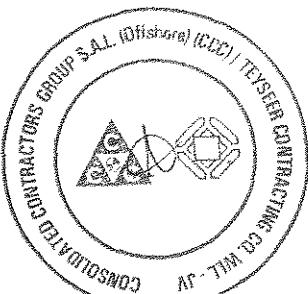
In case of questions, please do not hesitate to contact us. Mr. Geoji Thomas (Geoji.Thomas@KSB.com) or Mr. Michael Otto (Michael1.Otto@KSB.com) will be able to answer your questions at any time.

Yours sincerely

KSB Aktiengesellschaft
S-EA1331-U

Michael Otto

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KSB Aktiengesellschaft, Postfach/P. O. Box 200743, 06008 Halle (Saale) · Sitz/Registered Office: Frankenthal (Pfalz) · Registergericht/Register of Companies:
Ludwigshafen/Rhein HRB 21016
Vorsitzender des Aufsichtsrates/Chairman of the Supervisory Board: Klaus Kühborth
Vorstand/Board of Management: Dr. Wolfgang Schmitt (Sprecher/Chairman), Dr.-Ing. Peter Buthmann, Werner Stegmüller



Data sheet



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

Page: 1 / 9

Omega 300-435 A GC G F

Version no.: 2

Operating data

Requested flow rate	566 l/s	Actual flow rate	566 l/s
Requested developed head	49 m	Actual developed head	49 m
Pumped medium	Water	Efficiency	86.0 %
	Clean water	Power absorbed	316 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	1490 rpm
Ambient air temperature	50.0 °C	NPSH required	7.5 m
Fluid temperature	20.0 °C	NPSH 3%	6.9 m
Fluid density	998 kg/m³	Discharge press.	4.80 bar.g
Fluid viscosity	1.00 mm²/s	Shut off head	75 m
Suction pressure max.	0.00 bar.g	Max. allow. flow	675 l/s
Max. power on curve	330 kW	Design	Single system 1 x 100 %
Min. allow. flow for continuous stable operation	140 l/s	Performance test	Yes

Design

Pump standard	KSB axially split volute casing pump	Impeller diameter	443 mm
Design	Pump and motor on common Base frame (3E)	Minimum impeller diameter	354.0 mm
Orientation	Horizontal	Full impeller diameter	465 mm
Suction flange (AS) drilling+seal face according to	EN 1092-2 / DN 400 / PN 16	Free passage size	45.0 mm
Discharge flange (AD) drilling+seal face according to	21B / RF	Direction of rotation from drive	Clockwise
Shaft seal	EN 1092-2 / DN 300 / PN 16	Bearing seal driver side	Lip seal
Manufacturer	21B / RF	Bearing type driver side	Anti-friction bearings
Type	Single acting mechanical seal	Lubrication type driver side	Grease
Mechanical Seal Form	Burgmann	Bearing sealing end side	Lip seal
Material code	HJ92N	Bearing type end side	Anti-friction bearings
Sealing plan	Balanced	Bearing lubrication end side	Grease
Dirty water operation: Pumped liquid with max 100 mg/l solids.	EC Single acting mechanical (external circulation with cyclone separator)	Temperature measurement tapping	with
Wear ring	Casing/impeller wear ring	Temperature indicator, local pump/non-drive side	with
Wear ring type	Standard design	Temperature indicator, local motor side	with
		Temperature signal processing without	
		Vibration measurement tapping with	
		Vibration measurement accessory	Vibration sensor and monitoring driver and end sides



Data sheet



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

Page: 2 / 9

Omega 300-435 A GC G F

Version no.: 2

Driver, accessories

Manufacturer	Siemens Flender	Driver type	Electric motor, suitable for speed regulation
Coupling type	Arpex JUN	IEC	
Nominal size	210-6	Siemens or equiv.	
Spacer length	280.0 mm, insulated	Motor supplied by KSB	
Coupling guard type	Heavy duty ZN3230 solid sheet, 1.5 mm	B3	
Guard size	SA 4	Motor speed	1490-1023 rpm
Guard material	Steel	Frequency	50 - 34 Hz
Base plate type	Pump and motor on common base frame (3E) – light execution with drip pan	Rated voltage	415 V
Base plate size	special	Rated power P2	460kW
		Number of poles	4
		Starting mode	by variabel speed drive
		Motor cooling method	Surface cooling
		Motor material	Grey cast iron GG/CAST IRON

Scope of mounting parts : Base frame for pump set incl. foundation bolts,

Features : Base frame not suitable for pump set transport / With drip pan and piping from went, leakage and drain to drip pan,

Instrumentation panel for manometer gauges and vibration monitoring , locally mounted on base frame,

Special name plate acc. Specif.

Delivery : Pump, Motor and base frame separately

Materials GC

Notes

general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg. chlorine (Cl2) <=0.6 mg/kg.

Ammonium (NH4+) <= 2 mg/kg, free of H2S; Chlorine (Cl2) <=0.6 mg/kg.

Volute casing (102)	Grey cast iron EN-GJL-250	Shaft seal housing (441)	Grey cast iron EN-GJL-250
Pump shaft (211)	Chrome steel 1.4021+QT800	Neck ring (457.2)	Tin Bronze CC493K
Double-entry impeller (234)	GX2CRNIMOCUN25-6-3-3	Casing wear ring (502)	1.4021 (AISI 420) hardened
Bearing housing (350.1)	Duplex 1.4517	Impeller wear ring (503)	Duplex 1.4470

	Shaft protecting sleeve (524.1)	1.4571 AISI 316
	Spacer sleeve required (525.2)	Duplex stainl. steel 1.4462



Data sheet



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

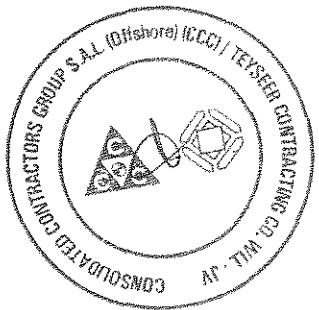
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Omega 300-435 A GC G F

Version no.: 2

Auxiliary connections

1M.1 Pressure gauge connection	G 1/2, Prepared for pressure gauge delivered separately	6B.1 Pumped liquid drain	G 1/2, Hand operated valve without further piping
1M.1 Pressure gauge material	1.4571	6B.1 Material	Stainless steel 1.4408
1M.1 Pressure range	-1 to +1.5 bar	6B.2 Pumped liquid drain	G 1/2, Hand operated valve with further piping to drip pan
1M.1 Damping	With damping	6B.2 Material	Stainless steel 1.4408
1M.1 Pressure gauge dial size	NG 150	6D Pumped medium - filling / venting	Rigid pipe with four way connector and venting valve with further piping to drip pan
1M.2 Pressure gauge connection	G 1/2, Prepared for pressure gauge delivered separately	6D Material	Stainless steel 1.4408
1M.2 Pressure gauge material	1.4571	6D Material sealing pipe	Stainless steel 1.4571
1M.2 Pressure range	0 - 10 bar	8A Leakage drain	G 3/4, Drilled, with further piping to drip pan
1M.2 Damping	With damping	26M.1 SPM sensor connection (driver side)	M 8, Vibration sensor and monitoring, 2 axis
1M.2 Pressure gauge dial size	NG 150	26M.2 SPM sensor connection (non-driver side)	M 8, Vibration sensor and monitoring, 3 axis
4M.1 Temperature gauge connection (Suction side)	G 1/2, Prepared for temperature gauge delivered separately		
4M.2 Temperature gauge connection (Pressure side)	G 1/2, Prepared for temperature gauge delivered separately		



Data sheet



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

Page: 4 / 9

Omega 300-435 A GC G F

Version no.: 2

Certifications

Tests acc. to QCP-Plan

Hydraulic performance test

Acceptance standard	ISO 9906 class 1U	Dimension check	
Quantity meas. points Q-H	7	Certificate	Inspection cert. 3.2 to EN 10204
Certificate	Inspection cert. 3.2 to EN 10204	Test participation	Witnessed
Test participation	Witnessed	Quantity, non-witnessed	0
Quantity, non-witnessed	3	Quantity, witnessed	4
Quantity, witnessed	1		
NPSH test	Yes		
Quantity meas. points NPSH	3		

String test

Acoustic test ISO 20361	3 speeds with job motor	Final visual and painting thickness inspection(ISO 2178)
Vibration test ISO 10816	All units with one job VSD	Certificate
Bearing temperature test	Yes	With

Balancing test

Balancing grade ISO 1940	G 6,3	Material certificates: Pump shaft (211)
Part	Impeller	Certificate for analysis
Certificate	Inspection cert. 3.1 to EN 10204	Test report 3.1 to EN 10204
Test participation	Non- witnessed	
Quantity, non-witnessed	4	Material certificates: Double-entry impeller (234)
Quantity, witnessed	0	Certificate for analysis

Hydrostatic test (room temp.)

Range	Complete pump with shaft seal	Material certificates: Casing wear ring (502)
Test pressure	11 bar.g	Certificate for analysis
Test time	30 min	Test report 3.1 to EN 10204
Certificate	Inspection cert. 3.2 to EN 10204	Material certificates: Impeller wear ring (503)
Test participation	Witnessed	Certificate for analysis
Quantity, non-witnessed	3	Test report 3.1 to EN 10204
Quantity, witnessed	1	Material certificates: Shaft sleeve (524)

Exterior coating

KSB coating code	R1 TO AA 0080-06-01	Intermediate/ Final coating	2-pack epoxy
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Color	Ultramarine blue (RAL 5002)
Primer	2-component epoxy-zinc dust	Total film thickness approx.	KSB-blue 300 µm



Data sheet



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

Page: 5 / 9

Omega 300-435 A GC G F

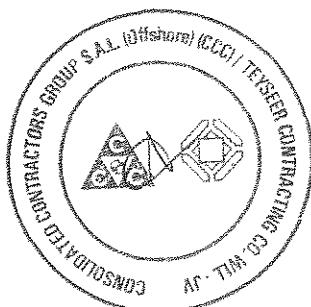
Version no.: 2

Interior coating

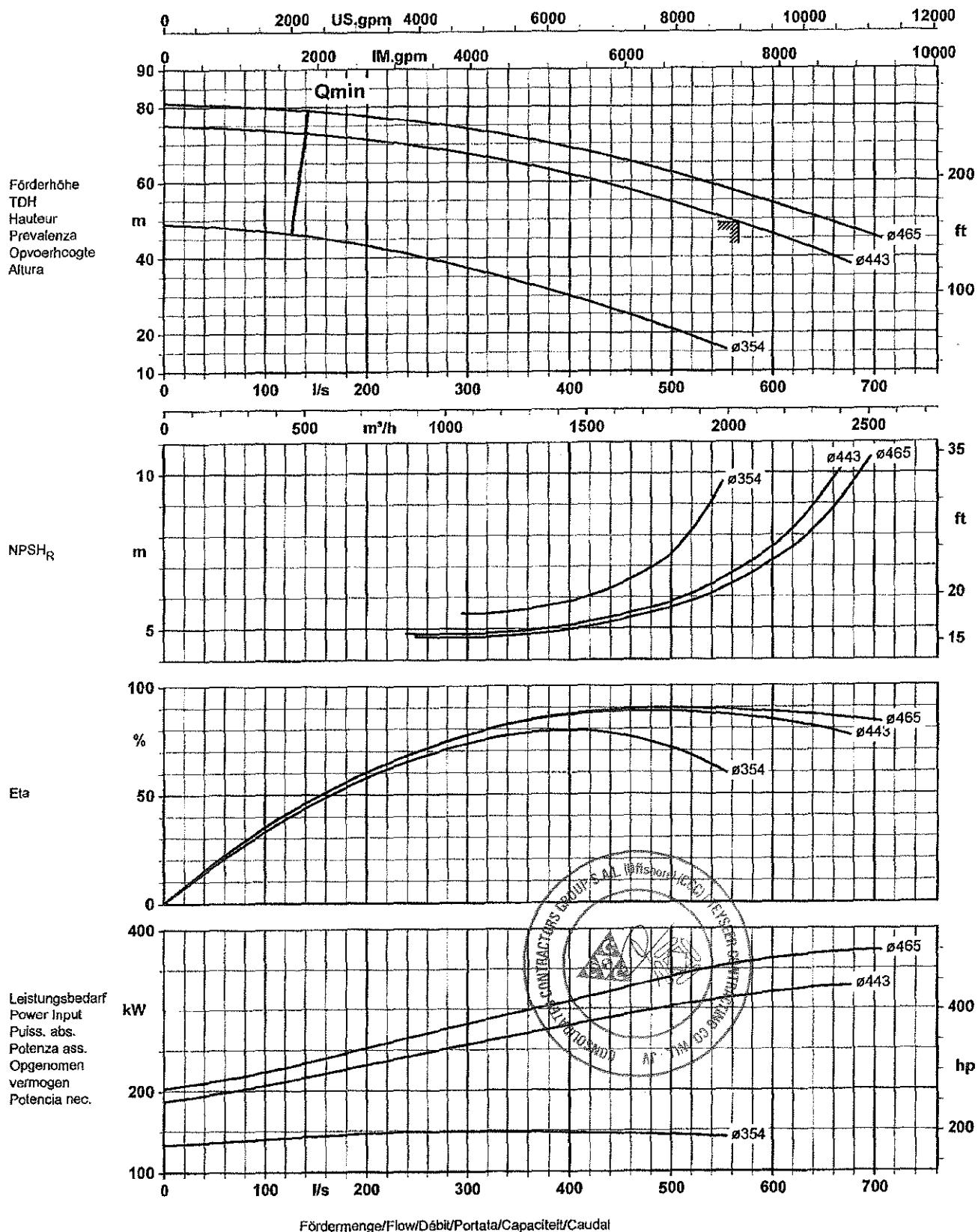
KSB coating code	Sika Permacor 136 TW (suitable for drinking water)	Color	KSB's choice
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Total film thickness approx.	300 µm
Intermediate / Final coating	2-component epoxy resin	Interior coatings for pumps are subjected to high loads and thus gradual, unavoidable wear, even when the plant is being operated in compliance with the specification. Signs of wear, including cracks, flaking, and similar, are to be viewed as part of the natural wear of the pump (regardless of how long it has been in operation) and do not qualify as defects. KSB shall not be held liable for wear or damage to interior coatings, including consequential damage to other pump components. Interior coatings must be checked, touched up, and repaired by the customer on a regular basis respective of the media pumped to avoid further damage to the coating and/or consequential damage to other pump components caused by corrosion and abrasion.	

Base frame

KSB coating code	R1 TO AA 0080-06-01	Final coating	2-component epoxy resin high solid
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Color	Ultramarine blue (RAL 5002)
Primer	2-component epoxy-zinc dust	Total film thickness approx.	KSB-blue 150 µm



Baureihe-Größe Type-Size Modèle	Tipo Serie Tipo	Nenndrehzahl Nom. speed Vitesse nom.	Velocità di rotazione nom. Nominal toerental Revuciones nom.	Laufrad-ø Impeller dia. Diamètre de roue	ø girante Waaijer ø ø rodete	
Omega 300-435A		1490 1/min				
Projekt Project Projet	Progetto Projekt Proyecto	Angebots-Nr. Quotation No. N° de l'offre	Nº offerta Offertanr. Nº oferta	Pos.-Nr. Item No. Nº de pos.	Nº pos Pos. nr. Nº de art	KSB
SS 1-A + SS 4-B		Design point		566 l/s - 49 m		Aktiengesellschaft 67225 Frankenthal Johann-Klein-Straße 9 67227 Frankenthal



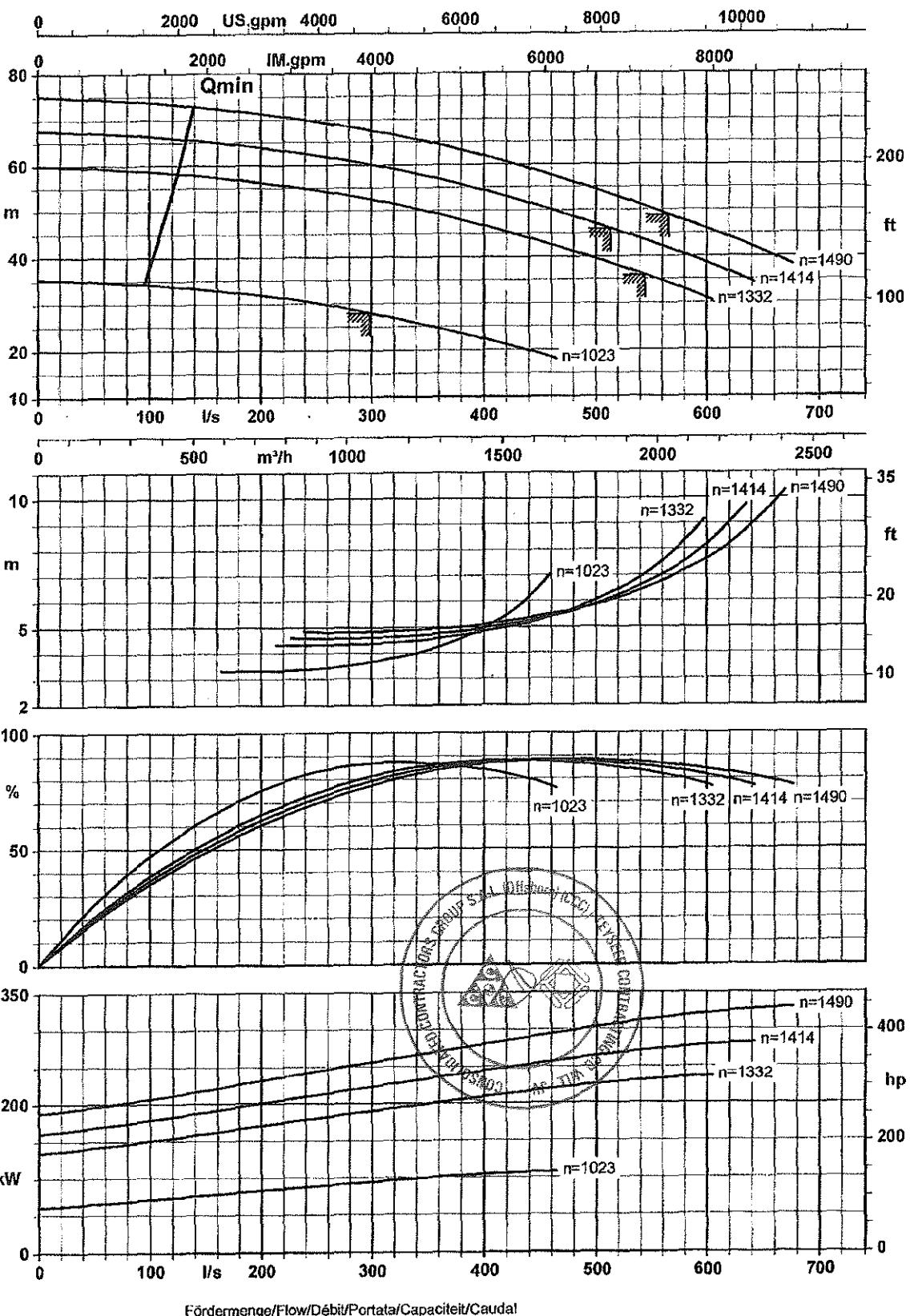
**Laufradaustrittsbreite/Impeller outlet width/Largeur à la sortie de la roue
Luce della girante/Waaijer uitbreedte/Anchura de salida rodete** 81 mm
81 mm

Aus Kurve K42798 +15/4* gerechnet
T145-Ft, Schmölzer Johannes, 2014-05-23

Baureihe-Größe Type-Size Modèle	Tipo Serie Tipo	Nenndrehzahl Nom. speed Vitesse nom.	Velocità di rotazione nom. Nominaal toerental Revvoluzioni nom.	Laufrad-Ø Impeller dia. Diamètre de roue	Ø girante Waaijer Ø Ø rodele	
Omega 300-435A				443 mm		
Projekt Project Projet	Progetto Projekt Proyecto	Angebots-Nr. Quotation No. N° de l'offre	N° offerta Offerlenn. N° oferta	Pos.-Nr. Item No. N° de pos.	N° pos Pos. nr. N° de art	KSB Aktiengesellschaft 67225 Frankenthal Johann-Klein-Straße 9 67227 Frankenthal
SS 1-A			Speed curves			



Förderhöhe
TDH
Hauteur
Prevalenza
Opvoerhoogte
Altura



Laufraustrittsbreite/Impeller outlet width/Largeur à la sortie de la roue 81 mm
Luce della girante/Waaijer uitstredebreedte/Anchura de salida rodele 81 mm

Aus Kurve K42798 +15/4° gerechnet
T145-Ft, Schmöller Johannes, 2014-05-23

Installation plan



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

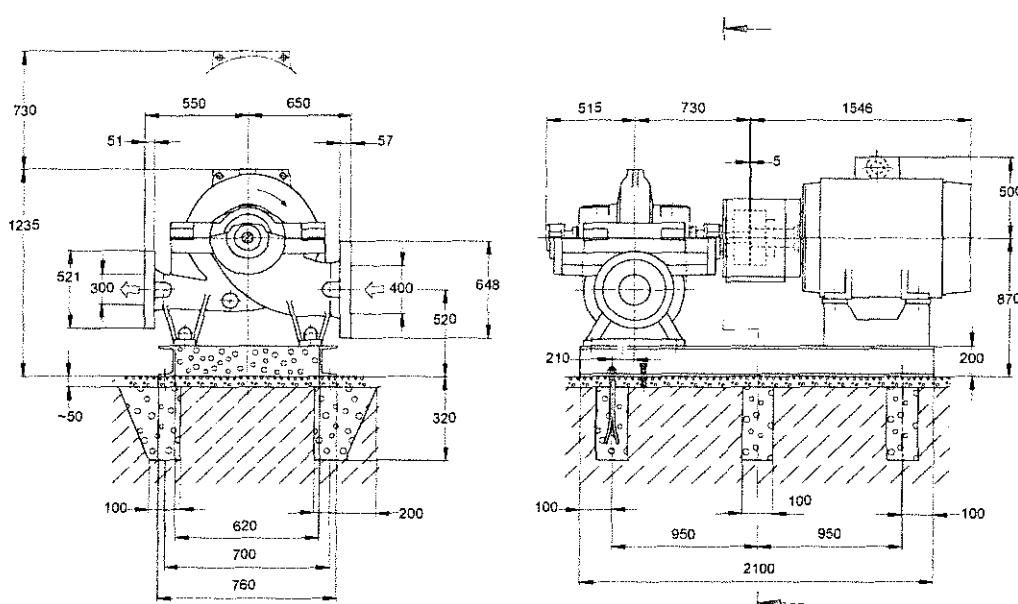
Item no.: 100

Date: 08/07/2014

Page: 7 / 9

Omega 300-435 A GC G F

Version no.: 2



Drawing is not to scale

Dimensions in mm

Motor

Motor manufacturer	Siemens or equiv.
Motor size	
Motor power	460 kW
Number of poles	4
Speed of rotation	1490 rpm, speed regulated

Connections

Suction flange (AS) drilling+seal EN 1092-2 / DN 400 / PN 10 face according to	21B / RF
Discharge flange (AD) drilling+seal face according to	EN 1092-2 / DN 300 / PN 10 21B / RF

Base plate

Design	Pump and motor on common base frame (3E) – light execution with drip pan
Size	
Material	S235JR
Leakage drain on drip pan (base plate)	G1
Foundation bolts	M20x320

Coupling

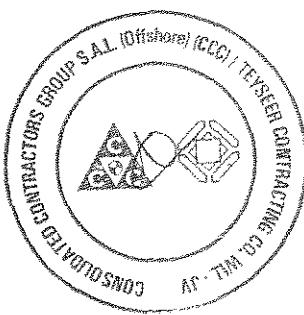
Coupling manufacturer	Siemens Flender
Coupling type	Apex JUN
Coupling size	210-6

Spacer
280.0 mm, insulated

Weight net

Pump	905 kg
Base plate	280 kg
Coupling	22 kg
Coupling guard	8 kg
Motor	See sep. motor data sheet

For auxiliary connections see separate drawing.



Installation plan



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 100

Date: 08/07/2014

Page: 8 / 9

Omega 300-435 A GC G F

Version no.: 2

Connect pipes without stress or strain!

Notes for dimensions:

Drawing is not to scale.

Admissible tolerances for shaft height: DIN 747

Dimensions without tolerance indication: ISO 2768 CK

Dimensions without tolerance indication – Welded parts: ISO 13920 – B/F

Dimensions without tolerance indication – Cast parts: ISO 8062 – CT13 – RMA(H)

General notes:

Piping must be connected free of stress. The pump must not be used as support for the piping (The pump is not an anchor point for the piping). The piping must be fixed in such a way that no forces, vibrations or the weight of the piping is transferred to the pump. Restrictions for forces and moments on suction and pressure nozzle must be considered. Connection by means of unrestrained expansion joints is not permitted!!



Connection plan



Customer item no.: 1.1.1 SS-1A

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

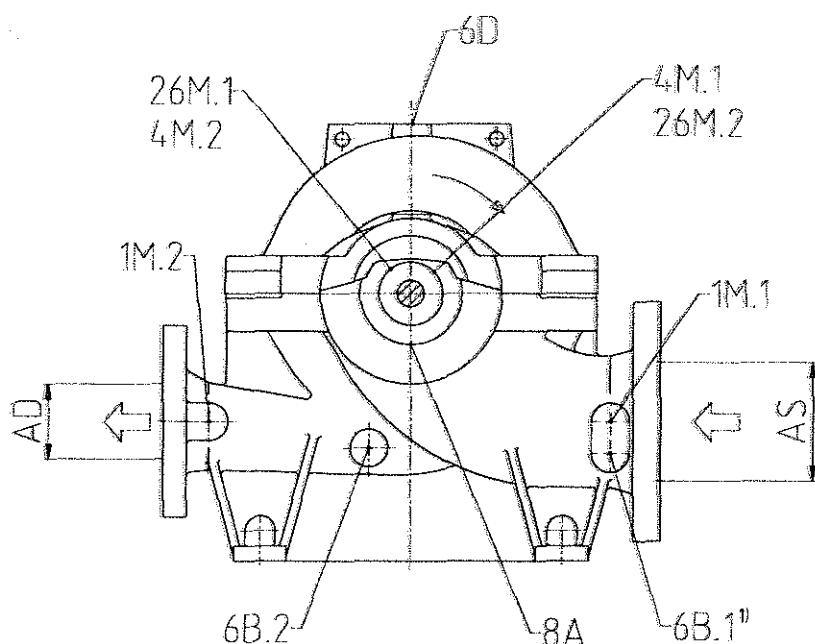
Item no.: 100

Date: 08/07/2014

Page: 9 / 9

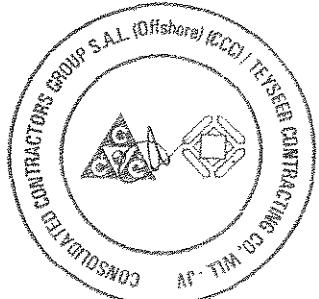
Omega 300-435 A GC G F

Version no.: 2



Connections

1M.1 Pressure gauge connection	G 1/2	Prepared for pressure gauge delivered separately
1M.2 Pressure gauge connection	G 1/2	Prepared for pressure gauge delivered separately
4M.1 Temperature gauge connection (Suction side)	G 1/2	Prepared for temperature gauge delivered separately
4M.2 Temperature gauge connection (Pressure side)	G 1/2	Prepared for temperature gauge delivered separately
6B.1 Pumped liquid drain	G 1/2	Hand operated valve without further piping
6B.2 Pumped liquid drain	G 1/2	Hand operated valve with further piping to drip pan
6D Pumped medium - filling / venting		Rigid pipe with four way connector and venting valve with further piping to drip pan
8A Leakage drain	G 3/4	Drilled and piped to drip pan
26M.1 Vibration sensor connection (driver side, 2 axis)	M 8	Drilled and plugged
26M.2 vibration sensor connection (non-driver side, 3 axis)	M 8	Drilled and plugged



Datenblatt für Drehstrommotoren

Data sheet for three-phase motors



Bestelldaten

Ordering data:

1LA8357-4PB90-Z

A12+A80+B02+B31+B32+D12+F03+F29+F83+G50+K45+L1Y+L97+M50+Q80

Kunden-Auftrags-Nr. / Client order no.:

Siemens-Auftrags-Nr. / Order no.:

Angebots-Nr. / Offer no.:

Bemerkung / Remarks:

Item-Nr. / Item no.:

Komm.-Nr. / Consignment no.:

Projekt / Project:

Elektrische Daten / Electrical data:

Typdaten / Type data:

Leistung P	500 kW
Motor power P	
Wärmeklasse / Ausnutzung	155(F) to 155(F) VSD only
Thermal class / utilisation	(155(F) to 130(B) DOL)
Spannung U D/Y	anormale Spannung
Rated motor voltage U D/Y	415 VD / - / - VY
Frequenz f	50 Hz
Frequency f	
Drehzahl n	1488 1/min
Speed n	
Drehmoment M	3209 Nm
Motor torque M	
Strom I	VD
Current I	830 A

Allgemeine Daten / General data:

Baugröße	355
Frame size	
Kühlart	IC411 - Eigenbelüftet Oberflächengekühlt
Method of cooling	IC411 - self ventilated open-circuit cooled
Betriebsart	Umrichter ohne Filter
Duty type	Converter without filter
Bauform	IM B3
Type of construction	
Schutzart	IP55
Degree of protection	
Gesamtgewicht	2200 kg
Total weight	
Anstrich	Normalanstrich
Coating	Standard paint finish
Farbe	RAL 7030
Color	
Zündschutzart	keine
Type of protection	none
Vorschrift/Ausführung	IEC, DIN, ISO, VDE, EN
Standards/specifications	

Bemessungsdaten / Ratings:

Bemessungsleistung P _n	460 kW
Rated motor power P _n	
Wärmeklasse / Ausnutzung	155(F) to 155(F) VSD only
Thermal class / utilisation	(155(F) to 130(B) DOL)
Servicefaktor	1.00
Service factor	
Bemessungsdrehzahl n _n	1488 1/min
Rated motor speed n _n	
Bemessungsmoment M _n	2952 Nm
Rated motor torque M _n	
Bemessungsstrom I _n	VD
Rated motor current I _n	764 A
Anzugs-/Bemessungsstrom	
Starting / rated motor current	N/A
Kipp-/Bemessungsmoment M _{Mn}	2.70
Breakdown-rated motor torque M _{Mn}	
Anzugs-/Bemessungsmoment	
Starting / rated motor torque	N/A
IE Wirkungsgradklassif. nach IEC 60034-30	keine
IE Efficiency class in acc. to 60034-30	none
Teillast P/P _n	
Partial load P/P _n	5/4 4/4 3/4 2/4
Wirkungsgrad η in % nach IEC 60034-2-1	96,0 % 96,2 % 96,3 % 96,0 %
Efficiency η in % in acc. to IEC 60034-2-1	
Leistungsfaktor cos φ	0,88 0,87 0,83 0,76
Power factor cos φ	

Anschlusskasten / Terminal box:

Klemmenkastentyp	1XB1 631
Type of terminal box	
Max. Leiterquerschnitt	240 mm ²
Conductor cross section, max. (IEC)	
Gewinde Kontaktschraube	M16
Contact screw thread	
Kabeldurchmesser von ... bis ...	56,0 ... 68,5
Cable diameter from ... to ...	
Kableinführung	4 x M80x2 + 2 x M25x1,5
Cable entry	

Sonderausführung / Special design:

A12	Motorschutz durch Kaltleiter mit 6 eingebauten Temperaturfühlern für Warnung und Abschaltung PTC thermistor motor protection using 6 integrated temperature sensors for alarm and shutdown	
A80	2 Doppel-Widerstandsthermometer PT100 for 3-Leiterschaltung ab Hilfsklemmenkasten bei Wälzlagierung 2x PT100 double resistance thermometers for a 3-wire connection from the auxiliary terminal box for roller bearings Abnahmeprüfzeugnis 3.1 nach EN 10204 Acceptance test certificate 3.1 acc. to EN 10204	
B02	Dokument Elektrisches Datenblatt Electrical data sheet document	
B31	Dokument Auftragsmaßbild Order dimension drawing document Kuhlufttemperatur 50 °C Cooling air temperature 50 °C	
B32	Geräuschmessung im Leerlauf, ohne Geräuschanalyse, mit Abnahme Noise measurement under no-load conditions without noise analysis, with acceptance	
D12	F29	
F83	Typ-Prüfung mit Warmelauf für horizontale Motoren, mit Abnahme Type test with heat run for horizontal motors, with acceptance	
G50	Messnippel für SPM-Stoßimpulsmessung Measuring nipple for SPM shock pulse measurement	
K45	Stillstandsheizung 230V Anti-condensation heating, 230V	
L1Y	anomale Spannung / anomale Wicklung L1Y 415VD 50 Hz Non-standard voltage/non-standard winding L1Y 415VD 50 Hz	
L97	Hilfschlüsselkasten 1XB3 020 Auxiliary terminal box 1XB3 020	
M50	Hilfsklemmenkasten 1XB9 016 (Grauguss) 1XB9 016 auxiliary terminal box (cast iron) Verlängerung der Mängelhaftung um 12 Monate auf insgesamt 24 Monate (2 Jahre) ab Auslieferung Liability for defect period extended by 12 months up to a total of 24 months (2 years) from initial shipment	
Q80		

Mechanische Daten / Mechanical data:

Trägheitsmoment J _{rot}	8.5 kg*m ²
Moment of inertia J _{rot}	
Läuferwicklungsmaterial	Al
Rotor winding material	
Lagerausführung	Wälzlager
Bearing design	Roller bearing
Lagertyp AS/BS	6220 C3 / 6220 C3 *
DE/NDE bearing design	
Drehrichtung	beide
Direction of rotation	Both
Nachschriftermittl./menge	3000 h / 20 g
Relubrication interval/quantity	

Umgebungsbedingungen / Environmental conditions:

Kühlmitteltemperatur K	50 °C
Coolant temperature K	

Aufstellungshöhe

1,000 m

* Standard: isoliertes Lager auf BS - VL0241
Standard: insulated bearing at NDE - VL0241

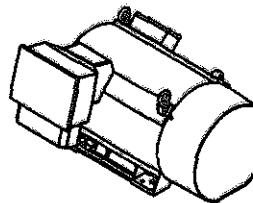
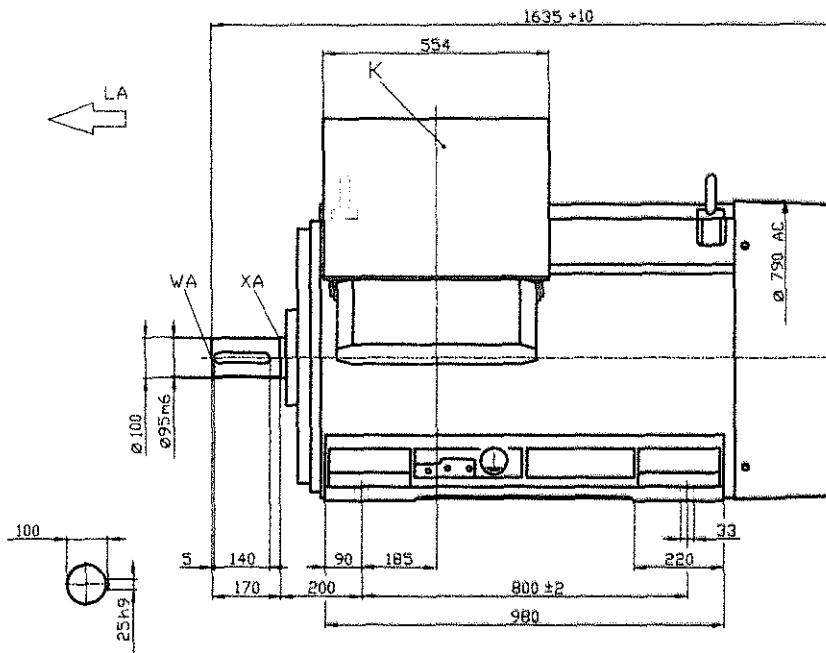
Technische Änderungen vorbehalten! Es könnte Unterschiede zwischen Datenblatt und Leistungsschild geben
Technical data are subject to change! There may be discrepancies between calculated and rating plate values



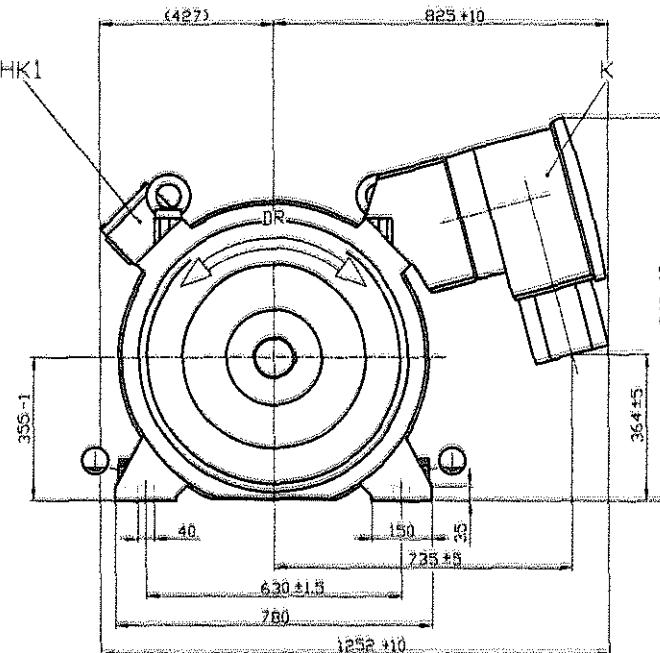
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Massbild unverbindlich. Änderungen konstruktiver Einzelheiten vorbehalten.

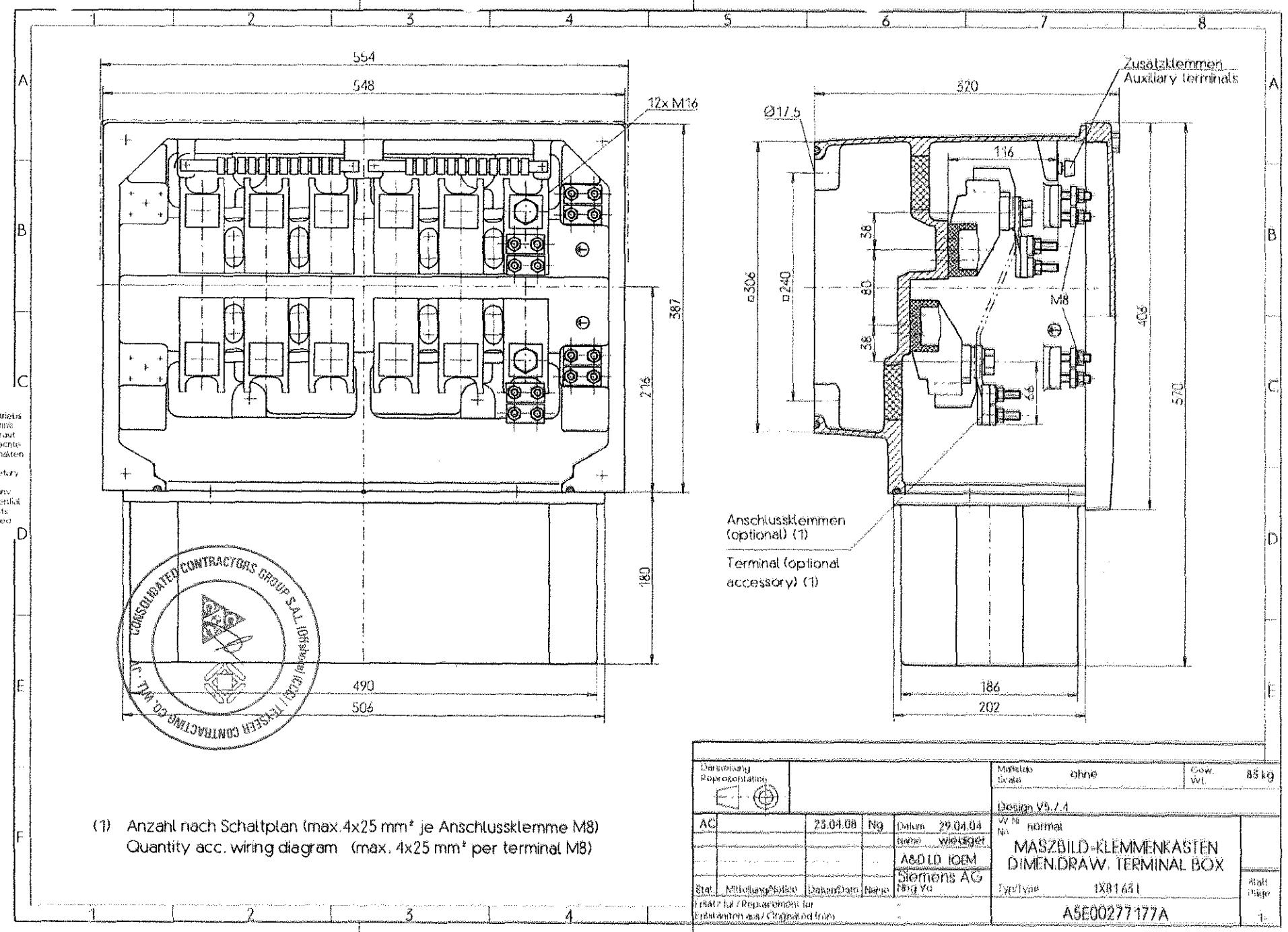
Dimension Drawing subject to change. We reserve the right to change constructional details.



- WA Shaft extension acc. to / Wellenende nach DIN 748
 with tapped centre hole acc. to / mit Zentralebohrung nach DIN 332
 XA Relief groove acc. to / Freistich nach DIN 509
 WB Shaft extension acc. to / Wellenende nach DIN 748 (optional)
 XB Relief groove acc. to / Freistich nach DIN 509 (optional)
 ML Minimum distance for air in / Mindestmaß fuer Luftteintritt
 AC Dimension includes the screw heads / Maß einschließlich Schraubenkopfe
 MD Minimum distance for dismantling / Mindestabstand für Demontage (optional)
 K Terminal box / Klemmenkasten
 HK1 Auxiliary terminal box 1 / Hilfsklemmenkasten 1 (optional)
 HK2 Auxiliary terminal box 2 / Hilfsklemmenkasten 2 (optional)
 HK3 Auxiliary terminal box 3 / Hilfsklemmenkasten 3 (optional)
 HKF Terminal box for separate driven fan / Terminal box for separate driven
 HKI Terminal box for pulse generator / Klemmenkasten für Impulsgeber (optional)



Notes:	Class:							
Next assembly:	First project							
Usable form:								
VERSION: BT	Gen. tolerance:	Release:						
		Date:						
	Scale:	01189		kg/item				
Rev. Description	Date of creation	Created by	Title, Supplementary title:		A64+A80+B02+B31+B32+B12+F03+F29+FB3+G50+K45+L1+L97+M50+O80			
			Machine Dimension Drawing Maschinen-Massblöd					
07/25/14		Designer: Nguyen-Tran						
		Technical Reference: Nguyen-Tran						
		Approved by: Verantwortliche						
		Date of issue: 27/05/14						
		Responsible engt.: 18-01-1044 EH						
SIEMENS AG 1 BT LD Werk Nürnberg Vo			Type/Type: ILA8357-4PB90-Z		Document type:		Sheet:	
DRAFT			DRAFT		DRAFT		DRAFT	



Motor Technical Data Sheet

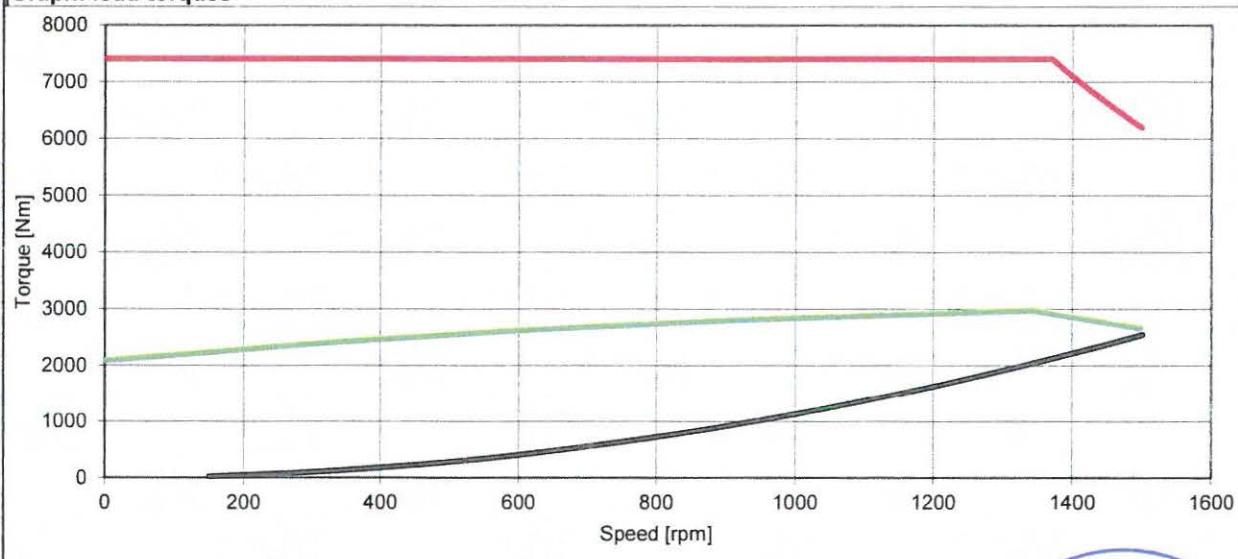
Item No. 1.1.1

M3BP 355 LKA 4

Specifications		DOL Catalogue data	
Name	[undefined]	Product code	3GBP 352 810-ADG (FI)
No.of motors	1	Voltage [V]	415
Motor type	IEC 34 catalog	Frequency [Hz]	50
FrameMaterial	Cast iron	Power [kW]	500
Family	M3BP	Poles	4
Polenumber	4	Speed [rpm]	1491
Efficiency	Not specified	Max mech.speed [rpm]	2000
Design	CENELEC	Current [A]	843
Connection	Not specified	Torque [Nm]	3204
IP class	IP55	Tmax/Tn	3,3
IC class	IC411 self ventilated	Power factor	0,85
IM class	IM1001, B3(foot)	Efficiency [%]	97
Max. speed rule	Standard	Temperature rise class	B
Temp. rise	B (<80 K)	Insulation class	F

Tmax margin **43%** **Calculations**

Load type	Pump/fan load	Required	Result	Margin
Overload Type	Simple	Torque [Nm]		
n min [rpm]	1500	n base	2546	2666
n base [rpm]	1500	Power [kW]		
n max [rpm]	1500	n base	400	419
Pbase [kW]	400	Overload [Nm]		
Olbase [%]	100	n base	2546	6189
Olmax [%]	100			143 %
Temperature [°C]	50			
Altitude [m]	1000			
Ol definition:	RMS 10min			
1500-1500 rpm / 100 %	590s			
1500-1500 rpm / 100 %	10s			

Graph: load torques


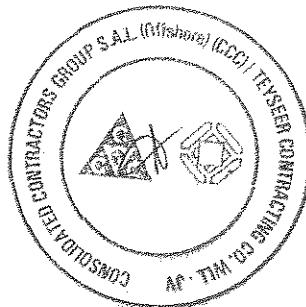


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I . 7 . 015A.1

MAIN PUMPS

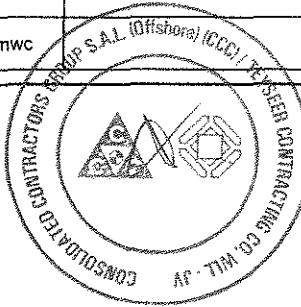
SS 1A





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
IDENTIFICATION	1	Location		PRPS-1	PRPS-1
	2	Pumping System		SS 1A	SS-1A
	3	Service		Potable Water	Potable Water
	4	No. of Pumps		4 (2 Duty + 1 Standby + 1 Maintenance)	4
	5	Type of Pump sets		Horizontal Split Case Double Suction	Horizontal Split Case
MANUFACTURER	6	Name of Manufacturer			KSB
	7	Place of Manuf. (City / Country)			Halle/Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
EQUIPMENT INCLUDED	9	Pump		Required	Omega
	10	Motor		Required	Siemens or equ.
	11	Type of Drive		Variable Speed Drive	Noted, supplied by others
	12	Motor support structure		Required	Baseplate
TECHNICAL DATA	13	Rated duty point	l/s	566	566
	14	Rated head @ duty point	m	49	49
	15	NPSH r	m		6,9
	16	NPSH a	m	8.8	noted
	17	Design Temperature:	"	50	50
	18	Impeller size	mm		443
	19	Maximum Impeller size	mm		465
	20	Nozzles size/rating:			
	i.	Suction side	DN/PN	*16	400/16
	ii.	Delivery side	DN/PN	*16	300/16
	21	Min. motor rating required	Kw	400	400
	22	Pump Efficiency at rated output (min.)	(%)	85	noted
	23	Guaranteed Pump Efficiency at rated output (min.)	(%)		86
	24	NPSH(R) at rated output	mwc		6,9
	25	Maximum allowable pump speed	rpm	1500	noted
	26	Speed at rated output	rpm		1398
	27	End of curve output at rated speed	l/s		680
	28	End of curve head at rated speed	mwc		37,5

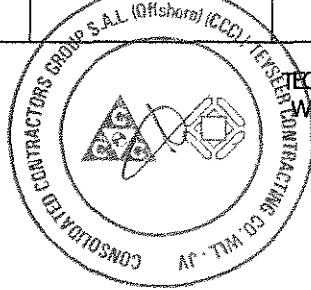


TECHNICAL AFFAIRS



Qatar General Electricity & Water Corporation
 Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
PUMP MATERIALS	29	Min. continuous flow at rated speed	l/s		140
	30	Head at min. continuous flow	mwc		74
	31	Shut-off head at rated speed	mwc		75
	32	Critical speed	rpm		n.a.
	33	Specific speed (impeller)	rpm		51
TESTS	34	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	35	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	36	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	Chrome Steel
	37	Shaft protection sleeves		stainless steel 1.4571 or other proper equivalent material	1.4571
	38	Wearing rings		Stainless steel EN 1.4571 (316Ti).	1.4021/1.4470
	39	Bearings			Grease Lubric.
	40	Seal			
	41	Seal Type		Mechanical	Mechanical
FAT	42	Pump Coating		Plastic enamel paint (epoxy resin) inside and outside applied by electrostatic spray process.	2-component epoxy resin
	43	Motor test at factory		Witnessed by Client/ Engineer	1 motor per item
	44	Combined pump & motor test at factory		Witnessed by Client/ Engineer	See #45
	45	Combined pump, variable speed drive & motor test at factory		Witnessed by Client/ Engineer	1 string test per item
	46	Site tests		Required	KSB Supervisor as per KSB offer
SAT	47	Manufacturer			Siemens or equ.
	48	Motor Type		squirrel cage, induction	Squirrel cage, induction
	49	Degree of protection		IP55	IP55
	50	Rated output (at 50 deg.C)	kW		460
	51	Rated output (at 40 deg.C)	kW		500
	52	Rating factor			1,08
	53	Rated voltage	Kv	0.415	0,415
	54	Frequency	Hz	50	50
	55	Rated full load current (FLC)	A		Will follow





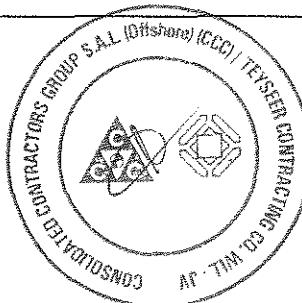
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
	56	Rated nominal current	A		764
	57	Starting current	A		Will follow
	58	Number of poles			4
	59	Nominal max. speed	rpm		1490
	60	Efficiency at full load and rated voltage	%		96,2
	61	Power factor at full load	%		0,87
	62	Power factor at starting			Will follow
	63	Maximum permissible temperature rise to that of class		B	B
	64	Noise level (not exceeding 85 dB(A) combined with pump & drive)			noted
	65	Windings temp. alarm		Yes	Yes
	66	Winding temp. protection		Yes	Yes
	67	Plus 3 PT 100 elements reserve		Yes	Yes
	68	Bearing temp. protection (per bearing)		Yes	Yes
	69	Vibration protection (per bearing)		Yes	Yes
	70	Form of enclosure protection			IP55
	71	Form of mounting			IM B3
	72	Cast steel frame for motor support		Included	Included
	73	Form of cooling		Air	Air
	74	Electrical standard		IEC-60034	noted
	75	Dimension standard		IEC 60072	n.a.
	76	Design temperature and humidity	°C/ %	50/ 100	noted
	77	Anti-condensation heater (at 240 V)		Yes	Yes
	78	Net weight	Kg		2200
	79	Delivery time	Weeks		As per KSB offer

Notes :

1) Bidder to provide proposed pump curve for the following:-

- > HEAD (m) versus FLOW (OUTPUT) covering all the OPERATING RANGE
- > For 100% SPEED and REDUCED SPEED
- > NPSH (m) versus FLOW.
- > POWER (kW) versus FLOW. Together with EFFICIENCY versus FLOW.





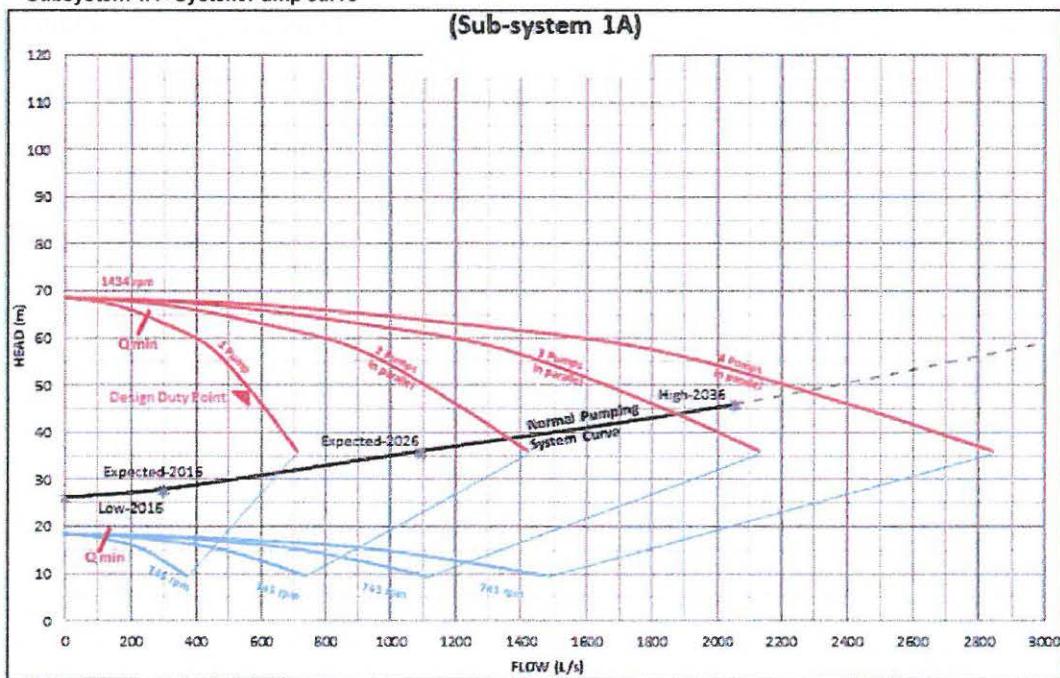
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Transmission Pumping Station SS-1A (Hydraulic Flow & Head Requirements)							
No.	Scenario	Year	Q Total (l/s)	Operating Reservoir Level	No. of Pumps	Q (l/s)	H (m)
1	Normal Pumping	2016	299	BWL	1	299	28
				TWL			18
2	Normal Pumping	2026	1089	BWL	2	545	36
				TWL			25
3	Normal Pumping	2036	2056	BWL	4	514	46
				TWL			33
4	Normal Pumping	2036+10%	2262	BWL	4	566	49
				TWL			35

Notes:

1. The no of pumps to be provided under this tender is limited to meet 2016 - 2026 operational requirements. The operational scenarios for 2036 are provided to enable the tenderer to select the optimum pump meeting 2036 requirement together with pumps to be installed in future.
2. The pump curves shown on the system curve are indicative and for illustrative purpose only.

Subsystem 1A . System/Pump curve



Data sheet



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

Item no.: 200

Date: 08/07/2014

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RDLO 600-705 A1 SC G F

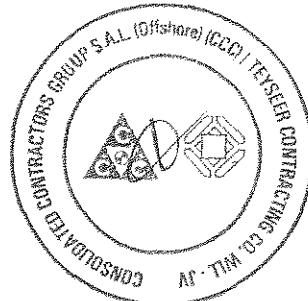
Version no.: 2

Operating data

Requested flow rate	1679 l/s	Actual flow rate	1679 l/s
Requested developed head	58 m	Actual developed head	58 m
Pumped medium	Water	Efficiency	88.2 %
	Clean water	Power absorbed	1083 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	992 rpm
Ambient air temperature	50.0 °C	NPSH required	8.4 m
Fluid temperature	20.0 °C	NPSH 3%	7.0 m
Fluid density	998 kg/m³	Discharge press.	5.68 bar.g
Fluid viscosity	1.00 mm²/s	Min. allow. flow for continuous stable operation	990 l/s
Suction pressure max.	0.00 bar.g	Shut off head	87 m
Max. power on curve	1100 kW	Max. allow. flow	2050 l/s
		Design	Single system 1 x 100 %
		Performance test	Yes

Design

Pump standard	KSB axially split volute casing pump	Impeller diameter	726.0 mm
Design	Pump and motor on common base frame (3E) with drip pan	Minimum impeller diameter	620.0 mm
Orientation	Horizontal	Full impeller diameter	770.0 mm
Suction flange (AS) according to	EN 1092-2 / DN 700 / PN 16 21B / RF	Direction of rotation from drive	Clockwise
Discharge flange (AD) according to	EN 1092-2 / DN 600 / PN 16 21B / RF	Bearing seal driver side	V ring
Shaft seal	Single acting mechanical seal	Bearing type driver side	Anti-friction bearings
Manufacturer	Burgmann	Lubrication type driver side	Grease
Type	H75S2	Bearing sealing end side	V ring
Mechanical Seal Form	Balanced	Bearing type end side	Anti-friction bearings
Material code	BQ1EGG	Bearing lubrication end side	Grease
Sealing plan	E Single acting mechanical (external circulation with cyclone separator)	Temperature measurement tapping	with
Clean water operation: Pumped liquid with max. 100 mg/l solids.		Temperature indicator, local pump/non-drive side	with
Wear ring	Casing/impeller wear ring	Temperature indicator, local motor side	with
Wear ring type	Standard design	Temperature signal processing without vibration	
		Vibration measurement tapping	with
		Vibration measurement accessory	Vibration sensor and monitoring driver and end sides



Data sheet



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

Item no.: 200

Date: 08/07/2014

Page: 2 / 8

RDLO 600-705 A1 SC G F

Version no.: 2

Driver, accessories

Coupling manufacturer	KTR	Base plate size	special
Coupling type	Radex-N	Motor side drill	with
Nominal size	138 NANA 3,	Scope of mounting parts :	Base frame for pump set incl.
Spacer length	300 mm, insulated	foundation bolts	
Coupling guard type	Heavy duty (ZN3230) Solid sheet 1.5 mm	Driver type	Electric motor, suitable for speed regulation
Guard size	SA 6	Drive standard mech.	IEC
Guard material	C-steel	Model (make)	Siemens or equiv.
Base plate type	Pump and motor on common base frame (3E) – light execution with drip pan	Drive supplied by Motor const. type	Motor supplied by KSB B3
		Motor speed	992-732 rpm
		Frequency	50 - 37 Hz
		Rated voltage	3300 V
		Rated power P2	1300 kW
		Number of poles	6
		Starting mode	by variabel speed drive
		Motor cooling method	Water Cooling
		Motor material	Grey cast iron GG/CAST IRON

Materials SC

Notes

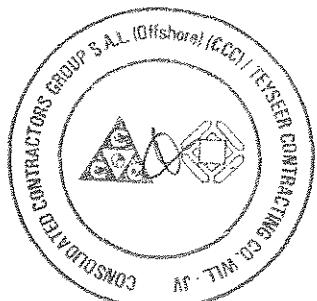
Ammonium (NH_4^+) $\leq 2 \text{ mg/kg}$, free of H_2S ; Chlorine (Cl_2)

$\leq 0.6 \text{ mg/kg}$.

general criteria for a water analysis: pH-value ≥ 7 ; chloride content (Cl^-) $\leq 250 \text{ mg/kg}$, chlorine (Cl_2) $\leq 0.6 \text{ mg/kg}$.

Volute casing (102)	Ductile cast iron EN-GJS-400-15	Bearing housing (350.1) Bearing housing (350.2)	Grey cast iron EN-GJL-250 Grey cast iron EN-GJL-250
Pump shaft (211)	Chrome steel 1.4021+QT800	Shaft seal housing (441)	Grey cast iron EN-GJL-250
Double-entry impeller (234)	Duplex 1.4517	Casing wear ring (502) Impeller wear ring (503)	1.4021 (AISI420) hardened Duplex 1.4470

Shaft protecting sleeve (524.2) 1.4571 (AISI 316)



Data sheet



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

Item no.: 200

Date: 08/07/2014

Page: 3 / 8

RDLO 600-705 A1 SC G F

Version no.: 2

Auxiliary connections

1M.1 Pressure gauge connection	G 1/2, Prepared for pressure gauge delivered separately	6B.1 Pumped liquid drain	G 1, Hand operated valve without further piping
1M.1 Pressure gauge material	1.4571	6B.1 Material	Stainless steel 1.4408
1M.1 Pressure range	-1 to +1.5 bar	6B.2 Pumped liquid drain	G 1, Hand operated valve with further piping to drip pan
1M.1 Damping	With damping	6B.2 Material	Stainless steel 1.4408
1M.1 Pressure gauge dial size	NG 150	6D Pumped medium - filling / venting	Rigid pipe with four way connector and venting valve with further piping to drip pan
1M.2 Pressure gauge connection	G 1/2, Prepared for pressure gauge delivered separately	6D Material	Stainless steel 1.4408
1M.2 Pressure gauge material	1.4571	6D Material sealing pipe	Stainless steel 1.4571
1M.2 Pressure range	0 - 16 bar	8A Leakage drain	G 3/4, Drilled, with further piping to drip pan
1M.2 Damping	With damping	26M.1 SPM sensor connection (driver side)	M 8, Vibration sensor and monitoring, 2 axis
1M.2 Pressure gauge dial size	NG 150	26M.2 SPM sensor connection (non-driver side)	M 8, Vibration sensor and monitoring, 3 axis
4M.1 Temperature gauge connection (Suction side)	G 1/2, Prepared for temperature gauge delivered separately		
4M.2 Temperature gauge connection (Pressure side)	G 1/2, Prepared for temperature gauge delivered separately		

Certifications

Tests acc. to QCP-Plan

Hydraulic performance test

Acceptance standard	ISO 9906 class 1U
Quantity meas. points Q-H	7
Certificate	Inspection cert. 3.2 to EN 10204
Test participation	Witnessed
Quantity, non-witnessed	4
Quantity, witnessed	1
NPSH test	Yes
Quantity meas. points NPSH	3

Hydrostatic test (room temp.)

Range	Complete pump with shaft seal
Test pressure	13 bar.g
Test time	30.0 min
Certificate	Inspection cert. 3.2 to EN 10204
Test participation	Witnessed
Quantity, non-witnessed	4
Quantity, witnessed	1
Final visual inspection	
Certificate	Report
Test participation	Witnessed
Quantity, non-witnessed	0
Quantity, witnessed	5

String test

Acoustic test ISO 20361	3 speeds with job motor one unit with one job VSD
Vibration test ISO 10816	Yes
Bearing temperature test	Yes
Quantity, witnessed	1

Material certificates: Volute casing (102)

Certificate for analysis + NDT Inspection cert. 3.1 to EN 10204

Balancing test

Balancing grade	G 6.3
Part	Impeller
Certificate	Inspection cert. 3.1 to EN 10204
Test participation	Non-Witnessed
Quantity, non-witnessed	4
Quantity, witnessed	1

Material certificates: Pump shaft (211)

Certificate for analysis Inspection cert. 3.1 to EN 10204

Material certificates: Double-entry impeller (234)

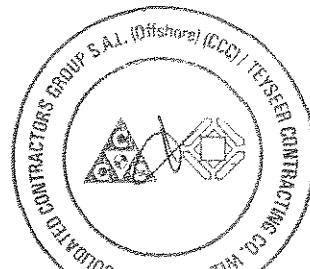
Certificate for analysis + NDT Inspection cert. 3.1 to EN 10204

Material certificates: Casing wear ring (502)

Certificate for analysis Inspection cert. 3.1 to EN 10204

Material certificates: Impeller wear ring (503)

Certificate for analysis Inspection cert. 3.1 to EN 10204



Data sheet



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

Item no.: 200

Date: 08/07/2014

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RDLO 600-705 A1 SC G F

Version no.: 2

Material certificates: Shaft sleeve (524)

Certificate for analysis

Inspection cert. 3.1 to
EN10204

Coating

Exterior coating

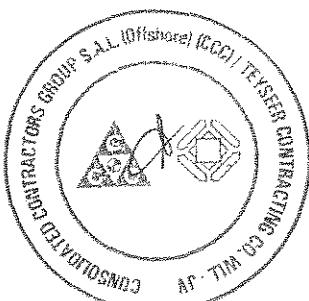
KSB coating code	R1 TO AA 0080-06-01	Intermediate/Final coating	2-pack epoxy
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Color	Ultramarine blue (RAL 5002) KSB-blue
Primer	2-component epoxy-zinc dust	Total film thickness approx.	300 µm

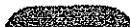
Interior coating

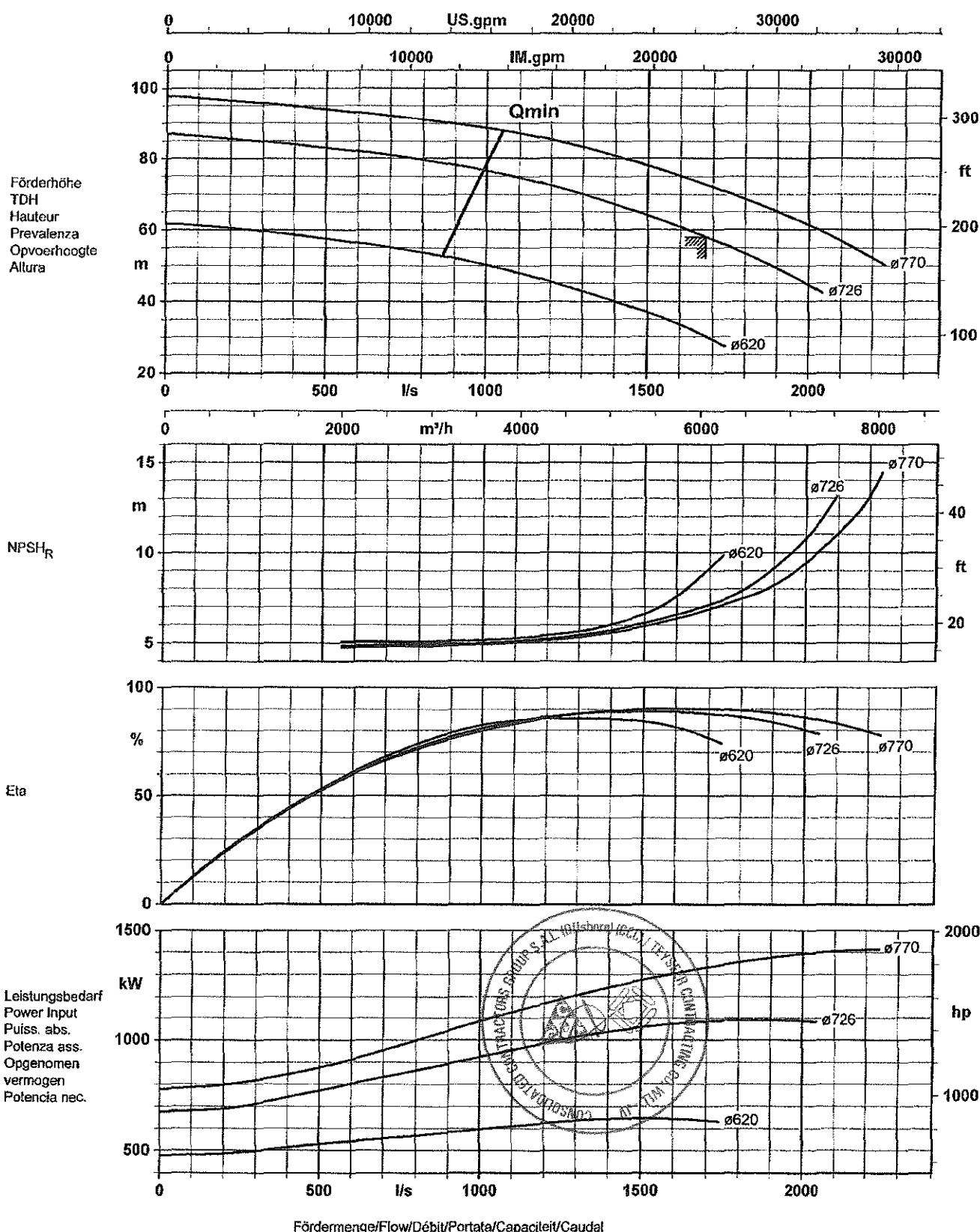
KSB coating code	Sika Permacor 136 TW (suitable for drinking water)	Color	KSB's choice
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Total film thickness approx.	300 µm
Intermediate/Final coating	2-component epoxy resin	Interior coatings for pumps are subjected to high loads and thus gradual, unavoidable wear, even when the plant is being operated in compliance with the specification. Signs of wear, including cracks, flaking, and similar, are to be viewed as part of the natural wear of the pump (regardless of how long it has been in operation) and do not qualify as defects. KSB shall not be held liable for wear or damage to interior coatings, including consequential damage to other pump components. Interior coatings must be checked, touched up, and repaired by the customer on a regular basis respective of the media pumped to avoid further damage to the coating and/or consequential damage to other pump components caused by corrosion and abrasion.	

Base frame

KSB coating code	R1 TO AA 0080-06-01	Final coating	2-component epoxy resin high solid
Surface preparation	Blasting, surface treatment quality SA 2 1/2	Color	Ultramarine blue (RAL 5002) KSB-blue
Primer	2-component epoxy-zinc dust	Total film thickness approx.	150 µm



Baureihe-Größe Type-Size Modèle	Tipo Serie Tipo	Nenndrehzahl Nom. speed Vitesse nom.	Velocità di rotazione nom. Nominal toerenital Revvoluzioni nom.	Laufrad-Ø Impeller dia. Diamètre de roue	Ø girante Waaiier Ø Ø rodete	
RDLO 600- 705 A1		992 1/min				
Projekt Project Projet	Progetto Projekt Proyecto	Angebots-Nr. Quotation No. N° de l'offre	N° offerta Offerterm. N° de oferta	Pos. Nr. Item No. N° de pos.	N° pos. Pos. nr. N° de art	KSB Aktiengesellschaft 67225 Frankenthal Johann-Klein-Straße 9 67227 Frankenthal
SS 1-B + SS 3-B		Design point		1679 l/s - 58 m		



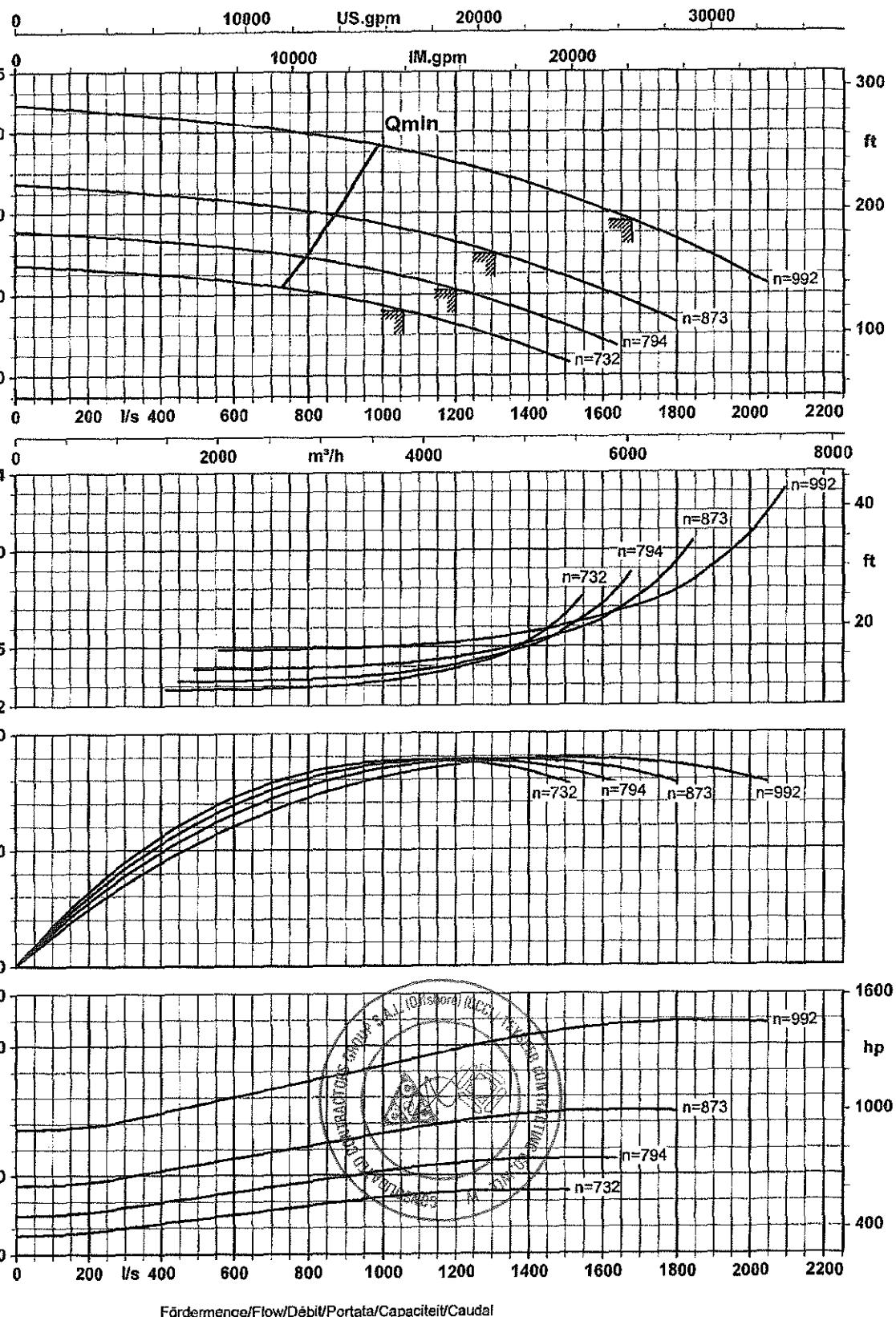
Baureihe-Größe Type-Size Modèle	Tipo Serie Tipo	Nenndrehzahl Nom. speed Vitesse nom.	Velocità di rotazione nom. Normaal toerental Revvoluzioni nom.	Laufrad-Ø Impeller dia. Diamètre de roue	Ø girante Waifer Ø Ø rolete	
RDLO 600- 705 A1				726 mm		KSB 
Projekt Project Projet	Progetto Projekt Proyecto	Angebots-Nr. Quotation No. N° de l'offre	N° offerta Offerentn. N° oferta	Pos.-Nr. Item No. N° de pos.	N° pos Pos. nr. N° de art	KSB Aktiengesellschaft 67225 Frankenthal Johann-Klein-Straße 9 67227 Frankenthal
SS 1-B	Speed curves					

Förderhöhe
TDH
Hauteur
Prevalenza
Opvoerhoogte
Altura

NPSH_R

Eta

Leistungsbedarf
Power Input
Puiss. abs.
Potenza ass.
Opgenomen
vermogen
Potencia nec.



Fördermenge/Flow/Débit/Portata/Capaciteit/Caudal

Installation plan



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

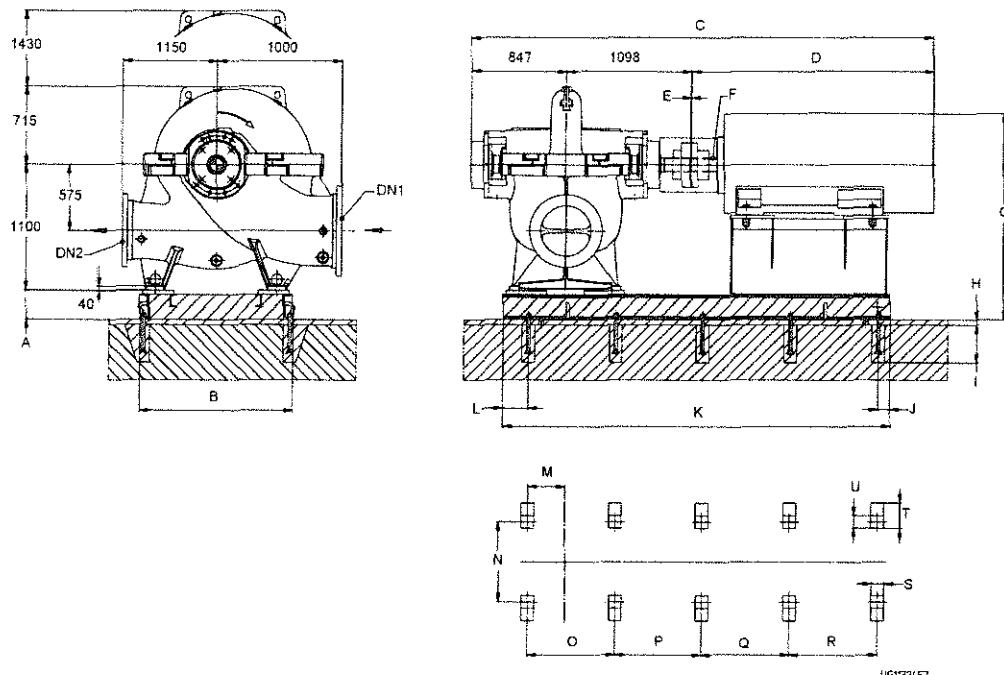
Item no.: 200

Date: 08/07/2014

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RDLO 600-705 A1 SC G F

Version no.: 2



Drawing is not to scale

Dimensions in mm

Motor

Motor manufacturer	Siemens or equiv.
Motor size	
Motor power	1300 kW
Number of poles	6
Speed of rotation	992 rpm, speed regulated

Connections

Suction flange (AS) according to	EN 1092-2 / DN 700 / PN 10
Discharge flange (AD) according to	EN 1092-2 / DN 600 / PN 10

21B / RF

21B / RF

Baseplate

Design	Pump and motor on common base frame (3E) – light execution with drip pan
Size	special
Material	Welded Steel ST
Leakage drain (8B) on drip pan (base plate)	G1
Foundation bolts	M24x320

Coupling

Coupling manufacturer	KTR
Coupling type	Radex N
Coupling size	138 NANA 3
Spacer	300 mm

Weight net

Pump	5150 kg
Base plate	1000 kg
Coupling	115 kg
Coupling guard	10 kg
Motor	See sep. motor data sheet

For auxiliary connections see separate drawing.



Installation plan



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

Item no.: 200

Date: 08/07/2014

Page: 7 / 8

RDLO 600-705 A1 SC G F

Version no.: 2

Connect pipes without stress or strain!

Notes for dimensions:

Drawing is not to scale and only exemplary. Weights and dimensions shown are not binding. Binding arrangement drawing only on request and with submittal of binding motor dimension sheet.

Admissible tolerances for shaft height: DIN 747

Dimensions without tolerance indication: ISO 2768 CK

Dimensions without tolerance indication – Welded parts: ISO 13920 – B/F

Dimensions without tolerance indication – Cast parts: ISO 8062 – CT13 – RMA(H)

General notes:

Piping must be connected free of stress. The pump must not be used as support for the piping (The pump is not an anchor point for the piping). The piping must be fixed in such a way that no forces, vibrations or the weight of the piping is transferred to the pump. Restrictions for forces and moments on suction and pressure nozzle must be considered. Connection by means of unrestrained expansion joints is not permitted!!



Connection plan



Customer item no.: 1.1.2 SS 1-B

Communication dated:

Doc. no.: Mega Reservoir - Package A

Quantity: 5

Number: 4002140658

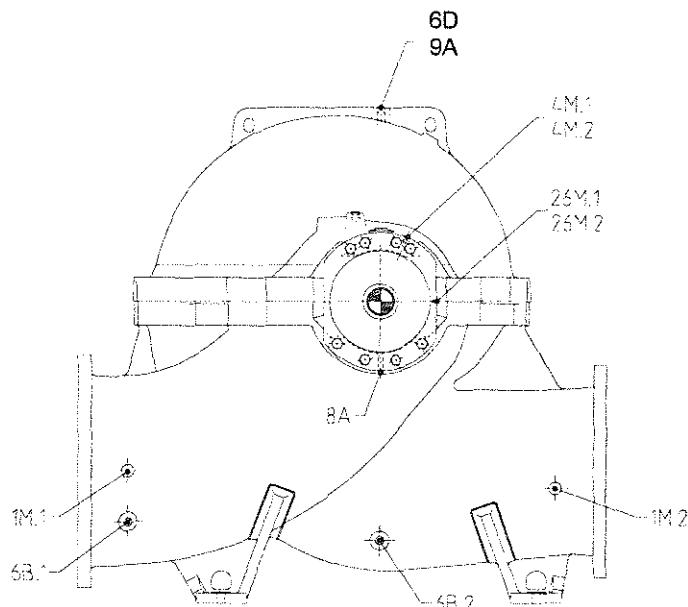
Item no.: 200

Date: 08/07/2014

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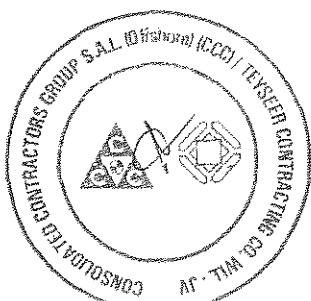
RDLO 600-705 A1 SC G F

Version no.: 2

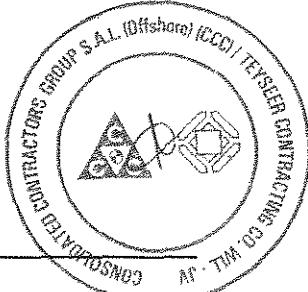


Connections

1M.1 Pressure gauge connection	G 1/2	Prepared for pressure gauge delivered separately.
1M.2 Pressure gauge connection	G 1/2	Prepared for pressure gauge delivered separately.
6B.1 Pumped liquid drain	G 1	Hand operated valve without further piping.
6B.2 Pumped liquid drain	G 1	Hand operated valve with further piping to drip pan.
6D Pumped liquid vent	G 1	Hand operated valve with further piping to drip pan.
8A Leakage drain	G 3/4	Drilled and piped to drip pan
9A Sealing liquid outlet		Rigid pipe supplied with 'four way connector' for valve connection
26M.1 SPM sensor connection M 8 (driver side, 2 axis)		Drilled and plugged.
26M.2 SPM sensor connection M 8 (non-driver side, 3 axis)		Drilled and plugged.
4M.1 Temperature gauge connection (Suction side)	G 1/2	Prepared for temperature gauge delivered separately.
4M.2 Temperature gauge connection (Pressure side)	G 1/2	Prepared for temperature gauge delivered separately.



Item no	1.1.2 SS1B-AH				
Number	5				
Type of motor	1RN45026HV90-Z				
Rotor design					
Accessoires	A65+D12+E82+G50+K09+L18+L6B+L81+M13+M52+Q82				
Rated output	KW	1,300			
Rated voltage Un	kV	3.3			
Rated speed	min-1	990			
Number of poles		6			
Voltage fluctuation	%	± 5 % (IEC)			
Rated frequency	Hz	50			
Frequency fluctuation	%	+/-2			
Rated torque	Nm	16,200			
Rated current In		353			
Service factor					
Standards/specification	Acc. IEC/EN/ISO				
Degree of protection(motor)		IP55			
Type of protection		without			
Cooling method		IC 81 W			
Type of construction		IM B3			
Coolant temperature	°C	35			
Altitude above sea level	m	1000			
Insulation class (design/util.)stator		155(F) utilised insulation class 130(B)			
Stalling time cold/hot	sec.	13/11			
Efficiency eta	%	5/4	4/4	3/4	2/4
Power factor		95.7	96.2	96.4	95.9
Starting torque	M _A /M _N	0.9			
Starting current	I _A /I _N	5.8			
Breakdown torque	M _K /M _N	2.3			
Stator connection		Y			
Rotor winding		Squirrel cage			
Perm. no. of consecutive starts					
cold		3			
warm		2			
Moment of inertia (rotor)	kgm ²	65			
Weight					
total	kg	20			
rotor	kg	1,600			
Number of terminal boxes		1			
Dynamic foundation load,					
pressure	kN	215			
tension	kN	155			
Bearing design		Rolling bearings			
Bearing type					
DS		NU 1034 + 6034 C3			
NDS		NU 1028			
Direction of rotation		CW			
Painting		Factory standard			
Color		RAL 7030			
Noise, 1m-Measuring surface	dB(A)	70			
sound-press. level					
(tolerance + 3dB(A))					
Level of measuring surface		18			
Further design options:					



A65	6 embedded resistance thermometers PT 100 without lightning arresters.
D12	Ambient temperature 50 °C
E82	Outdoor use with moderate salinity (corrosivity grade C4)
G50	Shock pulse measuring (SPM), measuring nipple at DE and NDE
K09	System connection on right-hand side at drive end
L18	Drive end bearing insulation (insulation is bridged)
L6B	Rated voltage 3,4 to 6,6 kV, 50 Hz
L81	Vibration severity grade B according to IEC/ EN 60034-14
M13	Anti-condensation heating 220-240V (min. 200V, max. 264V)
M52	Separate auxiliary terminal box for heating
Q82	Extension of liability for defects of 24 months to 36 months (3 years) after delivery

Other technical options per item

smaller fan, 780mm instead of 880mm

reinforced fan K99V

Shaft earthing device Huebner ME11 (non Ex!)

Stator winding PT100 in 3-wire connection from sensor (construction!)

Other technical options per unit**Witness and Unwitness tests**

For detailed comments to spec please see attached separate document.

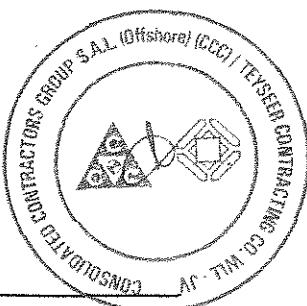
Speed range 400 ... 1000 rpm M~n²

Measuring surface sound pressure level (load, sinusoidal supply): 78 dB(A), without tolerance

Cooling Water

Inlet temperature: 35°C

Outlet Temperature: 42°C

Flow rate: 8,5m³/h

Customer: KSB Aktiengesellschaft
Project: Kahramaa Megareservoir Qatar
Your Ref: 4002140658
Our Ref: 246658 154 797 N6 (Package A)



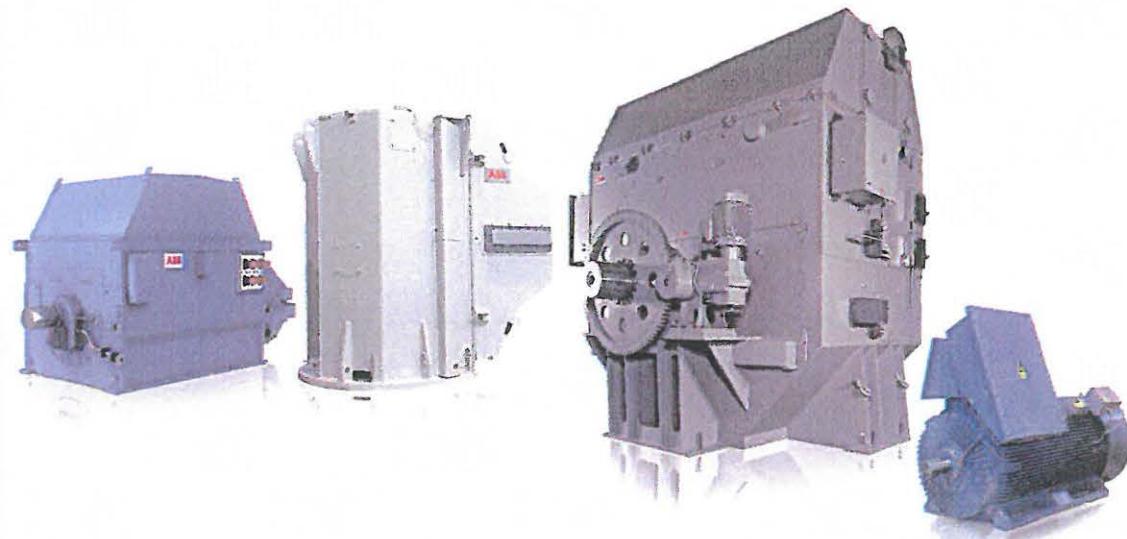
PRELIMINARY DATA OF MACHINE
Page 9(14)

4)

Technical Specification

Motor data

Performance curves



Date: 28.07.2014
Prepared by: Tilman Fuerst
Telephone: +49 931 6607939 0

ABB Automation Products GmbH



Technical Specification

Position	2.) 1300 kW @ 1000 rpm, 3,3 kV (1.1.2 SS-1B) IC81W
Description	AC Induction Machine
Type	AMI 450L6L BAFH
Machine Category	Process Performance
Quantity of identical units	5
Manufacturing location	FIDRI
Standards	IEC
Marine Standard	No
Potentially Hazardous Atmosphere	No
Max. Ambient Temperature	50 °C
Max. Altitude	1.000 m a.s.l.
Supply Type	ACS1000
Output	1.300 kW
Speed	1.000 rpm
Supply	3.300 V / 3 ph / 50,5 Hz
Temperature Rise Class	B-class
Duty Type	S1
Mounting / Protection / Cooling	IM 1001 / IP 55 / IC 81W
Insulation Class	F, vacuum pressure impregnated
Direction of Rotation	Clockwise
Bearings	Standard ball bearings
Bearing Insulation	Insulated NDE only
Terminal Box	Standard air insulated IEC main terminal box
Quality Assurance	ISO 9001 and ISO 14001
Color	Standard blue Munsell 8B 4.5/3,25

Documentation

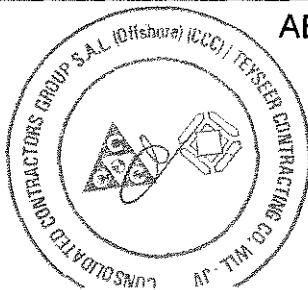
- Connection diagram (main and auxiliaries circuit) (one covering all identical units)
- Dimension drawing of machine (one covering all identical units)
- Documentation in English language
- Machine Performance data sheet (one covering all identical units)
- Maintenance and instruction manual (one covering all identical units)
- Maintenance instructions of water cooler
- Only final version of documents in defined language
- Order acknowledgement (OA) (one covering all identical units)
- Rating and Lubrication plates in English
- Safety instructions and warning labels in English
- Test procedure (one covering all identical units)
- Test report

Tests and Certificates

- Routine test according to ABB standard procedure

Date: 28.07.2014
Prepared by: Tilman Fuerst
Telephone: +49 931 6607939 0

ABB Automation Products GmbH



Customer: KSB Aktiengesellschaft
Project: Kahramaa Megareservoir Qatar
Your Ref: 4002140658
Our Ref: 246658 154 797 N6 (Package A)



PRELIMINARY DATA OF MACHINE
Page: 11(14)

Painting and corrosion protection

- Surface treatment C3 - Standard industrial environment

Accessories

- Design for ACS1000 converter drive
- Reduced vibration acc. to 3AAM100002
- Air-to-water single-tube cooler, Cu90/Ni10
- Hot rolled shaft material (42CrMo4 or similar)
- Insulated antifriction bearing construction, NDE only
- Standard air insulated IEC main terminal box
- RTD's (Pt-100) in stator windings, 12 pcs, 3-wire, unshielded, safe and hazardous areas
- RTD's (Pt-100) in antifriction bearings, 1 pc / bearing, 3-wire, shielded, safe areas
- Space heater for stator winding, 1 ph ()
- SPM nipple for shock pulse measuring in each antifriction bearing
- Temperature transmitters for Pt-100s in stator winding (3 pcs), safe areas
- Temperature transmitters for Pt-100s in bearings (1 pc / bearing), safe areas
- Location of ATB for instrumentation: Acc. To MDD
- Terminal box for accessories 1
- Terminal box for space heater
- Fabricated copper rotor
- Terms of delivery (Incoterms 2010): DAP
- Slide packing - horizontal

Date: 28.07.2014
Prepared by: Tilman Fuerst
Telephone: +49 931 6607939 0

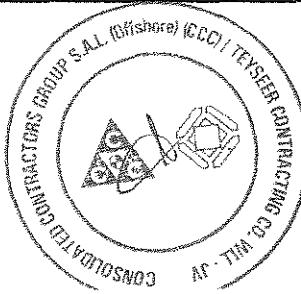


ABB Automation Products GmbH

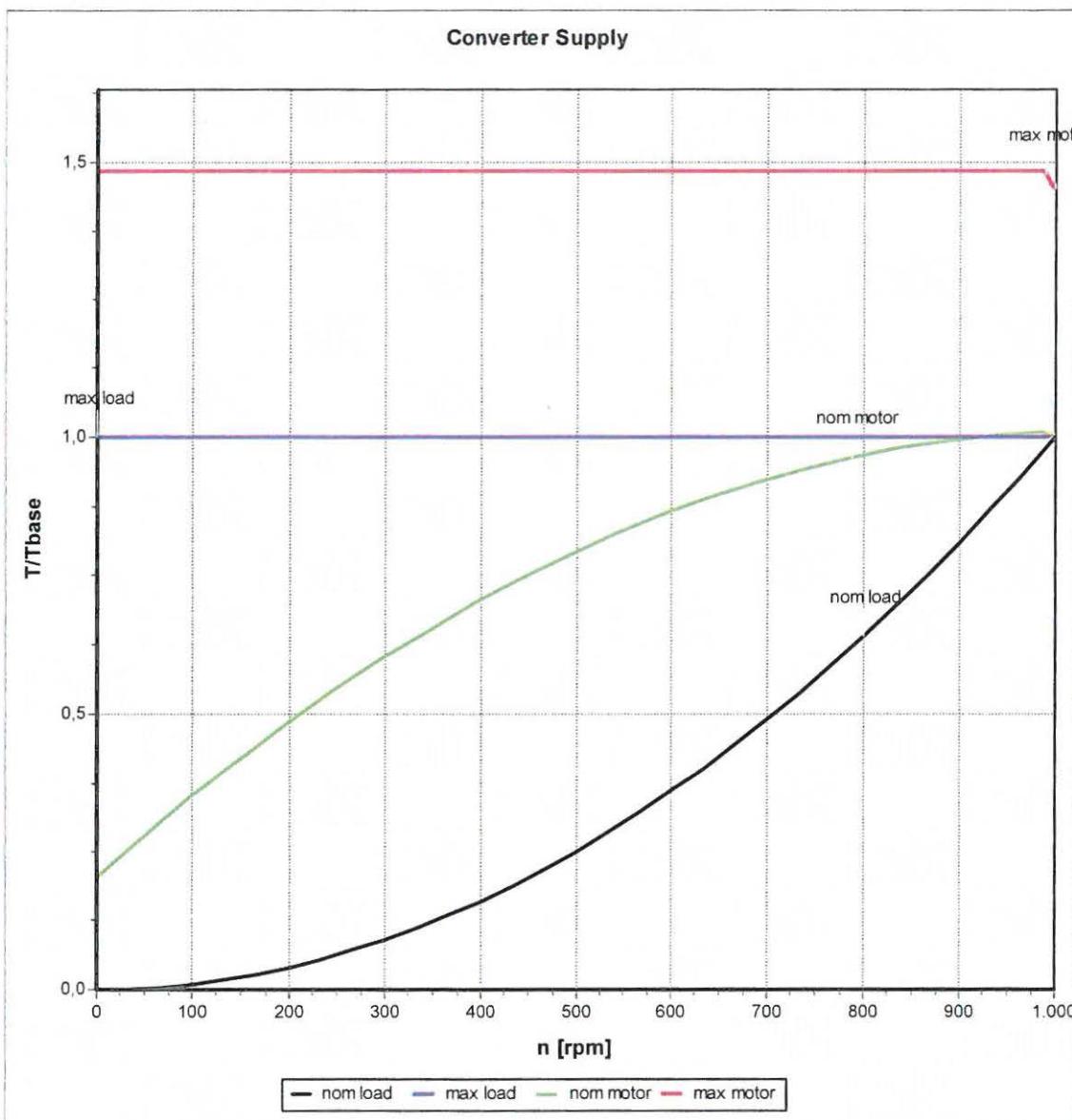
Driven equipment: 010 Pump

Motor type code	AMI 450L6L BAFH
Motor type	Squirrel cage Motor
Mounting designation	IM 1001
Protected by enclosure	IP 55
Method of cooling	IC 81W
Insulation	Class F
Standards	IEC
Ambient temperature, max.	50 °C
Cooling water temp	25 °C
Altitude, max.	1000 m.a.s.l.
Converter supply	ACS 1000
Duty type	S1
Temp. rise	Class B (RES)
Connection of stator winding	Delta
Rated output	1300 kW
Voltage	3300 V
Frequency	50,5 Hz
Speed	999,9 rpm
Current	284 A
Power Factor	0,83
Efficiency	96,0 %
Relat. maximum torque	1,9
Rated torque	12415 Nm
Weight of rotor	1150 kg
Total weight of Motor	4200 kg
Inertia rotor	Approx. 40 kgm ²

All Motor data is subject to tolerances in accordance with IEC.

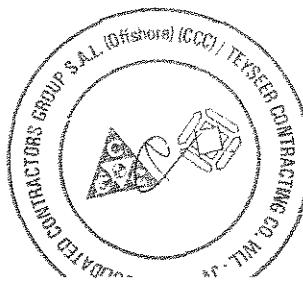
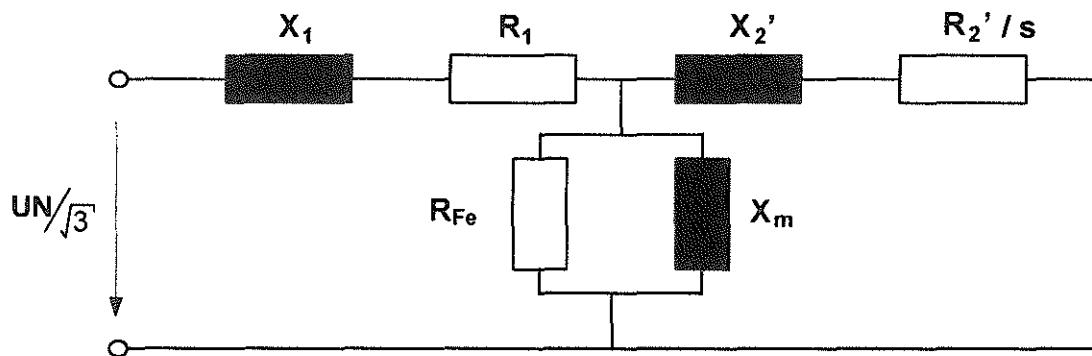
Efficiency based on typical additional load losses acc. measurements.





Equivalent circuit between phase and neutral (equivalent star)

Running			
Stator resistance R_1 (130 °C)	0,07921 Ω	Rotor resistance R_2' (120 °C)	0,07531 Ω
Stator reactance X_1	1,1443 Ω	Rotor reactance X_2'	0,7302 Ω
Magnetizing reactance X_m	18,53 Ω	Iron loss resistance R_{Fe}	0,9 kΩ



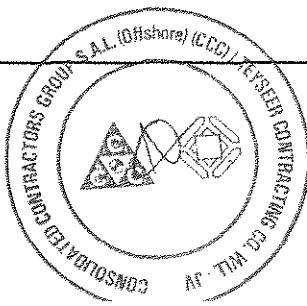


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I.7 015A.2

MAIN PUMPS

SS 1B

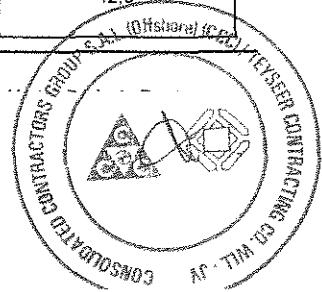




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
IDENTIFICATION	1	Location		PRPS-1	PRPS-1
	2	Pumping System		SS 1B	SS-1B
	3	Service		Potable Water	Potable Water
	4	No. of Pumps		5 (3 Duty + 1 Standby + 1 Maintenance)	5
	5	Type of Pump sets		Horizontal Split Case Double Suction	Horizontal Split Case
MANUFACTURER	6	Name of Manufacturer			KSB
	7	Place of Manuf. (City / Country)			Halle/Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
EQUIPMENT INCLUDED	9	Pump		Required	RDLO
	10	Motor		Required	Siemens or equ.
	11	Type of Drive		Variable Speed Drive	noted
	12	Motor support structure		Required	Baseplate
TECHNICAL DATA	13	Rated duty point	l/s	1679	1679
	14	Rated head @ duty point	m	58	58
	15	NPSH r	m		7
	16	NPSH a	m	8.8	noted
	17	Design Temperature:		50	50
	18	Impeller size	mm		726
	19	Maximum Impeller size	mm		770
	20	Nozzles size/rating:			
	i.	Suction side	DN/PN	*/16	700/16
	ii.	Delivery side	DN/PN	*/16	600/16
	21	Min. motor rating required	Kw	1400	1265
	22	Pump Efficiency at rated output (min.)	(%)	85	
	23	Guaranteed Pump Efficiency at rated output (min.)	(%)		88,2
	24	NPSH(R) at rated output	mwc		7
	25	Maximum allowable pump speed	rpm	1500	noted
	26	Speed at rated output	rpm		992
	27	End of curve output at rated speed	l/s		2050
	28	End of curve head at rated speed	mwc		42.5

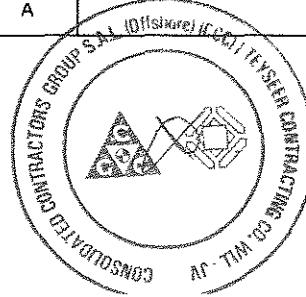
015A2 PRPS1_MAIN PUMPS_SS 1B - TDS_R01 TECHNICAL AFFAIRS





Qatar General Electricity & Water Corporation
 Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
PUMP MATERIALS	29	Min. continuous flow at rated speed	l/s		1000
	30	Head at min. continuous flow	mwc		76
	31	Shut-off head at rated speed	mwc		87
	32	Critical speed	rpm		Will follow
	33	Specific speed (impeller)	rpm		53.7
TESTS	34	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJS-400-15
	35	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	36	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	Chrome steel 1.4021
	37	Shaft protection sleeves		stainless steel 1.4571 or other proper equivalent material	1.4571
	38	Wearing rings		Stainless steel EN 1.4571 (316Ti).	1.4021/1.4470
	39	Bearings			Grease Lubric.
	40	Seal			
	41	Seal Type		Mechanical	Mechanical
	42	Pump Coating		Plastic enamel paint (epoxy resin) inside and outside applied by electrostatic spray process.	2-component epoxy resin
	43	Motor test at factory		Witnessed by Client/ Engineer	Yes. 1 motor per item
	44	Combined pump & motor test at factory		Witnessed by Client/ Engineer	See #45
	45	Combined pump, variable speed drive & motor test at factory		Witnessed by Client/ Engineer	Yes. 1 string test per item
DRIVE MOTOR	46	Site tests		Required	KSB Supervisor as per KSB offer
	47	Manufacturer			Siemens or equ.
	48	Motor Type		squirrel cage, induction	Squirrel cage, induction
	49	Degree of protection		IP55	IP55
	50	Rated output (at 50 deg.C)	kW		1300
	51	Rated output (at 40 deg.C)	kW		n.a.
	52	Rating factor			n.a.
	53	Rated voltage	kV	3.3	3.3
	54	Frequency	Hz	50	50
	55	Rated full load current (FLC)	A		Will follow





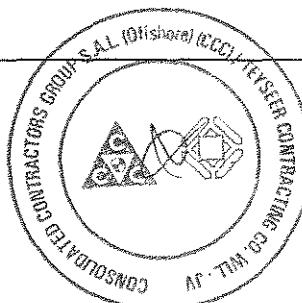
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Unit	Required	Offered
	56	Rated nominal current	A		353
	57	Starting current	A		2047,4
	58	Number of poles			6
	59	Nominal max. speed	rpm		990
	60	Efficiency at full load and rated voltage	%		96,2
	61	Power factor at full load			0,86
	62	Power factor at starting			Will follow
	63	Maximum permissible temperature rise to that of class		B	B
	64	Noise level (not exceeding 85 dB(A) combined with pump & drive)			Yes with noise enclosures
	65	Windings temp. alarm		Yes	Yes
	66	Winding temp. protection		Yes	Yes
	67	Plus 3 PT 100 elements reserve		Yes	Yes
	68	Bearing temp. protection (per bearing)		Yes	Yes
	69	Vibration protection (per bearing)		Yes	Yes
	70	Form of enclosure protection			IP55
	71	Form of mounting			IM B3
	72	Cast steel frame for motor support		Included	Included
	73	Form of cooling		Water	Water
	74	Electrical standard		IEC-60034	noted
	75	Dimension standard		IEC 60072	n.a.
	76	Design temperature and humidity	°C / %	50/ 100	noted
	77	Anti-condensation heater (at 240 V)		Yes	Yes
	78	Net weight	Kg		20003
	79	Delivery time	Weeks		As per KSB offer

Notes :

1) Bidder to provide proposed pump curve for the following:-

- > HEAD (m) versus FLOW (OUTPUT) covering all the OPERATING RANGE
- > For 100% SPEED and REDUCED SPEED
- > NPSH (m) versus FLOW.
- > POWER (kW) versus FLOW. Together with EFFICIENCY versus FLOW





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Transmission Pumping Station SS-1B (Hydraulic Flow & Head Requirements)							
No.	Scenario	Year	Q Total (l/s)	Operating Reservoir Level	No. of Pumps	Q (l/s)	H (m)
-	Normal Pumping	2016-Low	1694	BWL	2	847	35
				TWL			24
-	Normal Pumping	2016	2118	BWL	2	1059	36
				TWL			25
-	Normal Pumping	2026	3612	BWL	3	1204	41
				TWL			30
-	Normal Pumping	2036	5238	BWL	4	1310	50
				TWL			39
-	Normal Pumping	2036+10%	5762	BWL	4	1441	54
				TWL			41
1	Abnormal Umm Slal - 2A is off	2026	3891	BWL	3	1297	42
				TWL			32
2	Abnormal Duhail - 2A is off	2026	4354	BWL	3	1451	46
				TWL			36
3	Emergency SS-2A is out of operation	2026	4630	BWL	3	1543	48
				TWL			38
4	Abnormal Umm Slal - 2A is off	2036	5675	BWL	4	1419	54
				TWL			44
5	Abnormal Duhail - 2A is off	2036	5863	BWL	4	1466	60
				TWL			50
6	Emergency SS-2A is out of operation	2036	6716	BWL	4	1679	58
				TWL			48

Notes:

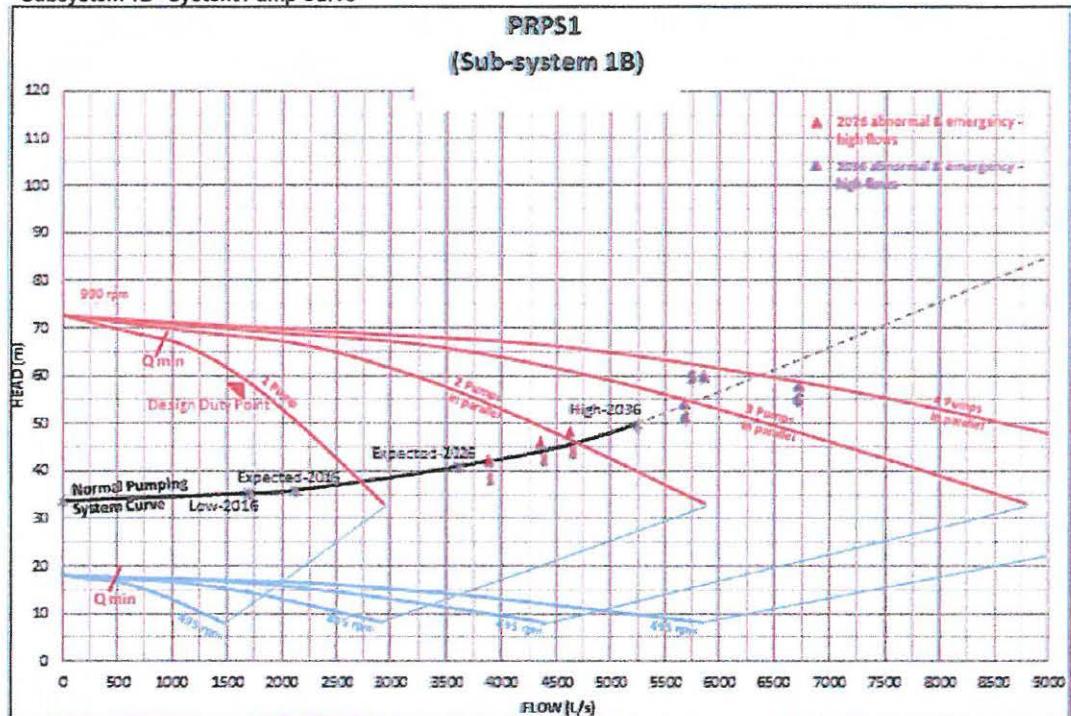
1. The no of pumps to be provided under this tender is limited to meet 2016 - 2026 operational requirements. The operational scenarios for 2036 are provided to enable the tenderer to select the optimum pump meeting 2036 requirement together with pumps to be installed in future.
2. The pump curves shown on the system curve are indicative and for illustrative purpose only.





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Subsystem 1B . System/Pump Curve



Data sheet



Customer item no.: 5.2.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 500
 Date: 21/07/2014
 Page: 1 / 6

KRTK 300-400/406UG1-S

Version no.: 1

Operating data

Requested flow rate	242.100 l/s	Actual flow rate	242.100 l/s
Requested developed head	10.50 m	Actual developed head	10.50 m
Pumped medium	Water, rainwater with strainer	Efficiency	80.3 %
	Not containing chemical and mechanical substances which affect the materials	Power absorbed	30.98 kW
Ambient air temperature	50.0 °C	Pump speed of rotation	985 rpm
Fluid temperature	20.0 °C	Max. power on curve	31.08 kW
Fluid density	998 kg/m³	Shutoff head	16.40 m
Fluid viscosity	1.00 mm²/s	Design	Single system 1 x 100 %

Design

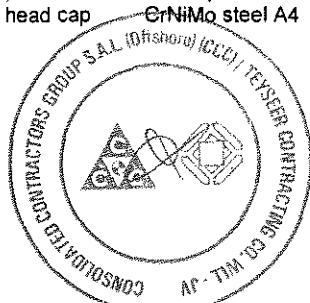
Design	Close-coupled submersible	Material code	SIC/SIC/NBR
Orientation	Vertical	Impeller type	Multivane radial flow impeller (K)
Suction flange pump according to(DN1)	unmachined	Wear ring	Casing/impeller wear ring
Discharge flange pump according to(DN2)	DN 300 / PN 10 / Drilled according to EN 1092-2	Impeller diameter	350.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size	100.0 mm
Manufacturer	KSB	Direction of rotation from drive	Clockwise
Type	MG		

Driver, accessories

Driver type	Electric motor	Number of poles	6
Model (make)	KSB	Starting mode	Direct/Star-delta possible
Motor const. type	KSB Sub. motor	Connection mode	Delta
Frequency	50 Hz	Motor cooling method	Surface cooling
Rated voltage	415 V	Motor version	U
Rated power P2	40.00 kW	Cable design	Rubber hose
Available reserve	28.71 %	Cable entry	Sealed along entire length
Rated current	81.9 A	Power cable	S1BN8-F 4G6
Starting current ratio	4.1	Number of power cables	2
Insulation class	F to IEC 34-1	Control cable	S1BN8-F 12G1.5
Motor enclosure	IP68	Number of control cables	1
Cos phi at 4/4 load	0.77	Moisture sensor	with
Motor efficiency at 4/4 load	89.1 %	Cable length	10.00 m
Temperature sensor	Bimetallic switch 2x		
Motor winding	415 / 720 V		

Materials G1

Notes	O-Ring (412)	Nitrile rubber NBR
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg. chlorine (Cl2) <=0.6 mg/kg.	Casing wear ring (502.1)	CrNi steel VG434
Pump casing (101)	Impeller wear ring (503)	CrNi steel VG434
Discharge cover (163)	Motor housing (811)	Grey cast iron EN-GJL-250
Shaft (210)	Motor cable (824)	Chloroprene rubber
Impeller (230)	Hexagon socket head cap screw (914)	CrNiMo steel A4



Data sheet



Customer item no.: 5.2.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 500
Date: 21/07/2014
Page: 2 / 6

KRTK 300-400/406UG1-S

Version no.: 1

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage	Indoor Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.
Packaging for transport IPPC Standard ISPM 15	Ship Yes		

Nameplates

Nameplates language	International	Duplicate nameplate	with
---------------------	---------------	---------------------	------

Certifications

Hydraulic performance test

Acceptance standard	ISO 9906 class 1B	Hydrostatic test (room temp.)	Complete pump with shaft seal
Quantity meas. points Q-H	5	Range	4.50 bar.g
Certificate	Inspection cert. 3.2 to EN 10204	Test pressure	10.0 min
Test participation	Witnessed	Certificate	Inspection cert. 3.1 to EN 10204
Quantity, non-witnessed	1	Test participation	Non-witnessed
Quantity, witnessed	1		
Vibration test	Yes		

Balancing test

Balancing grade	G 6,3	Final visual inspection	Without
Part	Impeller	Certificate	Witnessed
Certificate	Inspection cert. 3.1 to EN 10204	Test participation	
Test participation	Non-witnessed		Test report 2.2 to EN 10204

Tests acc. to QCP-Plan (WBP)

QCP No.

Order documentation

The following documents will be supplied with the order:

Manufacturer's or conformity declaration

General arrangement drawing

Material certificates

Operating manual

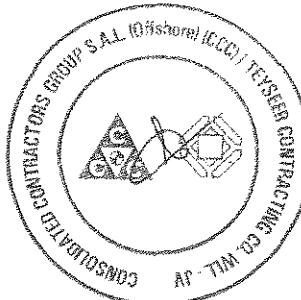
WBP (Material and product test plan)

Performance curve

Technical data sheet

Languages

English



Data sheet



Customer item no.: 5.2.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 500
Date: 21/07/2014
Page: 3 / 6

KRTK 300-400/406UG1-S

Version no.: 1

Installation parts

Installation type	stationary 2 guide rail	Type	Chain
Scope of supply	Pump with installation parts For guide rail arrangements, the guide rails are not included in KSB's scope of supply.	Material	CrNiMo steel 1.4404
		Length	5.00 m

Installation depth	4.50 m
Material concept	G

Max. load

1250 kg

Duckfoot bend

Size	DN 300
Flange design	drilled acc. EN1092-2/RF/PN16
Duckfoot bend size (DN2 / DN3)	DN 300 Drilled according to EN
Material	Grey cast iron EN-GJL-250
Mounting type	Composite anchor bolts
Foundation rail	Without

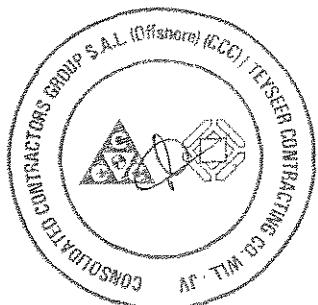
Claw

Design	straight
Size	DN 300

Lifting chain / -rope

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Total film thickness approx.	KSB-blue
Intermediate coating	2-component epoxy resin high solid		300 µm



Performance curve

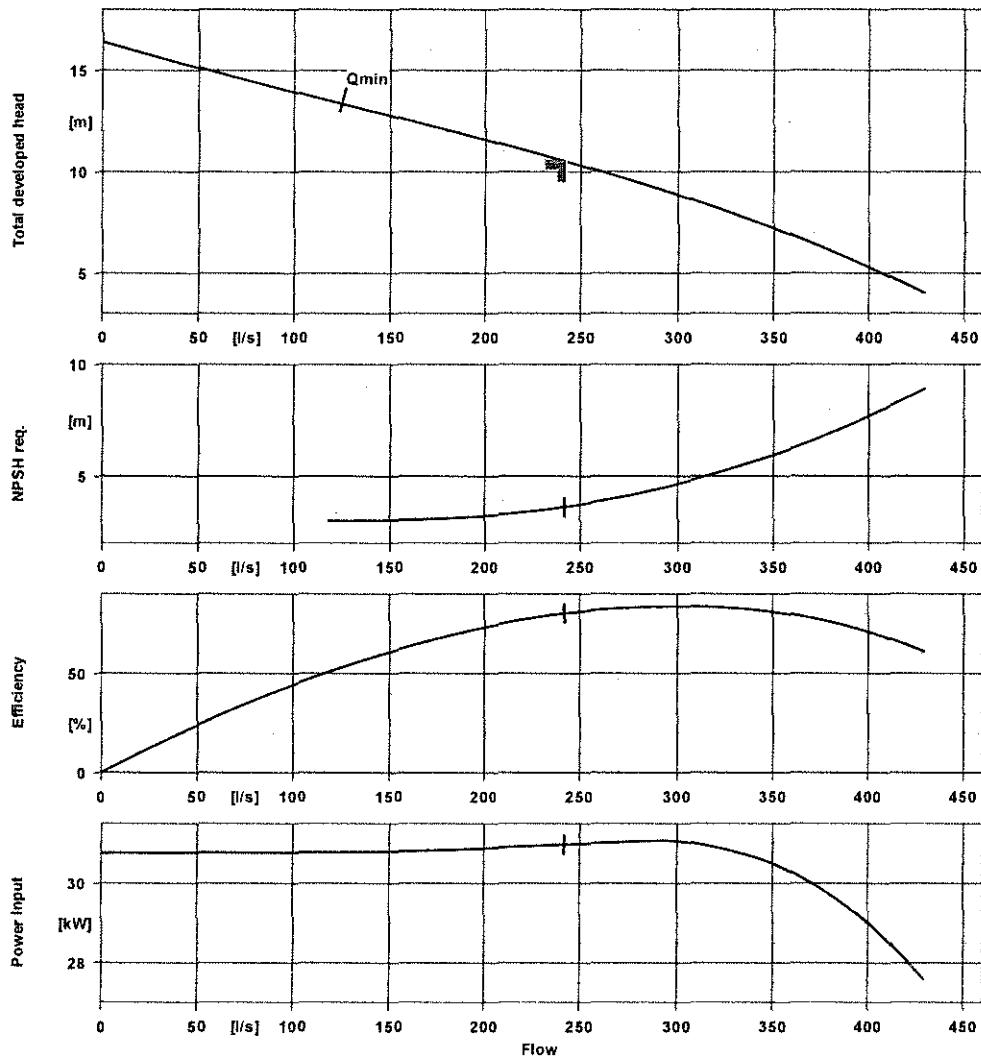


Customer item no.: 5.2.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 500
 Date: 21/07/2014
 Page: 4 / 6

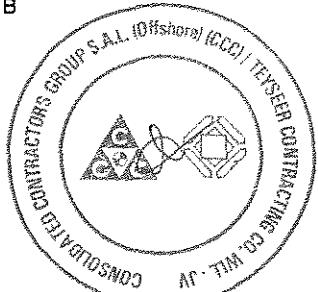
KRTK 300-400/406UG1-S

Version no.: 1



Curve data

Speed of rotation	985 rpm	Efficiency	80.3 %
Fluid density	998 kg/m ³	Power absorbed	30.98 kW
Viscosity	1.00 mm ² /s	NPSH required	3.63 m
Flow rate	242.100 l/s	Curve number	K41819s
Requested flow rate	242.100 l/s	Effective impeller diameter	350.0 mm
Total developed head	10.50 m	Acceptance standard	ISO 9906 class 1B
Requested developed head	10.50 m		



Installation plan

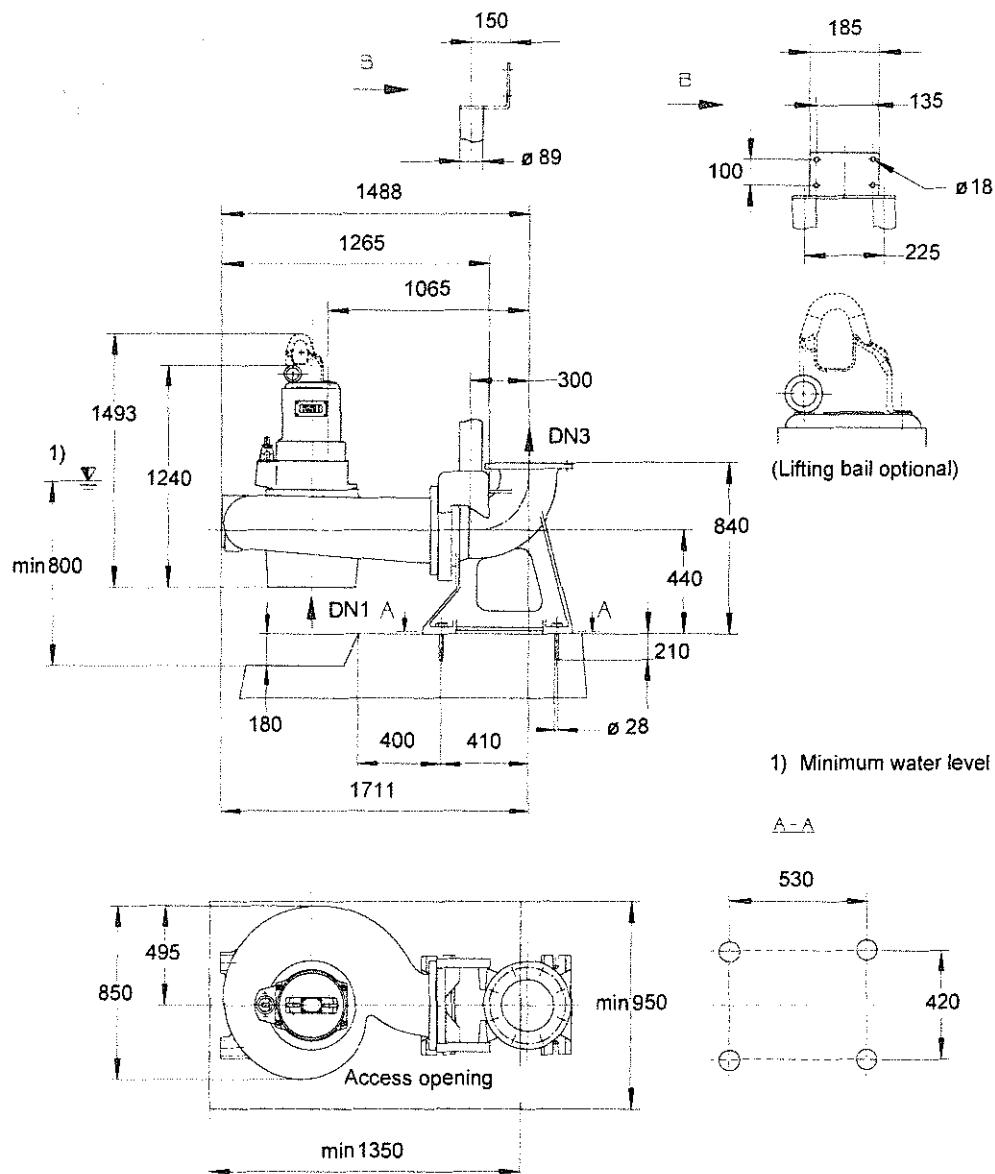


Customer item no.:5.2.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.:500
Date: 21/07/2014
Page: 5 / 6

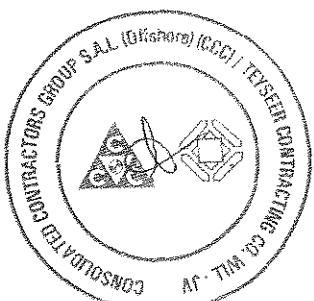
KRTK 300-400/406UG1-S

Version no.: 1



Drawing is not to scale

Dimensions in mm



Installation plan



Customer item no.: 5.2.1.1

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 500

Date: 21/07/2014

Page: 6 / 6

KRTK 300-400/406UG1-S

Version no.: 1

Motor

Motor manufacturer	KSB
Motor size	40
Motor power	40.00 kW
Number of poles	6
Speed of rotation	980 rpm

Connections

Suction flange pump according unmachined
to(DN1)
Duckfoot bend size (DN2 / DN3)DN 300 Drilled according to
EN

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:

Dimensions without tolerances, middle tolerances to:

Connection dimensions for pumps:

Dimensions without tolerances - welded parts:

Dimensions without tolerances - gray cast iron parts:

Weight net

Pump, Motor, Cable	881 kg
Claw / Foot	110 kg
Total	991 kg

For auxiliary connections see
separate drawing.

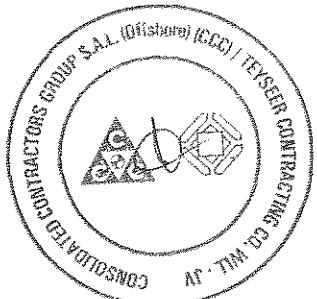
DIN 747

ISO 2768-m

EN735

ISO 13920-B

ISO 8062-CT9

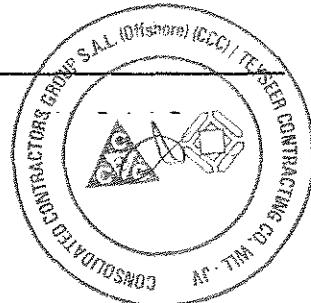




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I . 7 . 019A

DRAIN FLOOD PUMPS

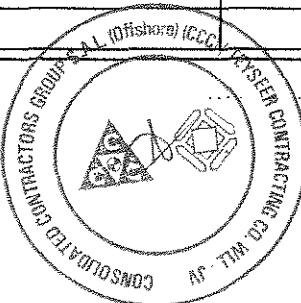




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Pump Tag/Model Number			KRTK 300-400/406UG1-S
	2	Service		Potable water	Potable Water
	3	Location		PRPS-1	PRPS-1
	4	No. of Pump sets		2 x 2 (1D + 1S)	2
	5	Type of Pump sets		Wet Submersible	Wet Submersible
GENERAL	6	Name of Manufacturer			KSB
	7	Place of Manufacture (City & Country)			Halle/Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
TECHNICAL DATA	9	Operational points			
	10	Duty Point Q_s H	m	242.1	10.5
	11	Efficiency at rated output (min.)	(%)	77	80,3
	12	NPSH(R) at rated output	mwc		3,63
	13	NPSH(A) at rated output	mwc	10	
	14	Speed at rated output	rpm		985
	15	Rated Power Consumption	Kw		31
	16	Rated power to be provided (elec. motor) at 55°C	Kw		n.a.
	17	Delivery rate variable (from-to)	m^3/h		450 - 1548
	18	Minimum continuous capacity	m^3/h		450
	19	Head at min. capacity	mwc		13,2
	20	Head at max. capacity (end of curve)	mwc		1548 m^3/h
	21	Critical speed	Rpm		4
	22	Flange rating		PN16	Drilled PN16
	23	Diameter of impeller	mm		349
PUMP MATERIALS	24	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	25	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	26	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	1.4462
	27	Bolts & Nuts		SS316	SS316Ti
	28	Duck foot bend			EN-GJL-250
TESTS	29	Motor test at factory		Required	See below
	30	Combined pump & motor tests		Required	ISO 9906/1E
	31	Site tests		Required	By others
DRIVE MOTOR	32	Manufacturer			KSB
	33	Motor Type		Submersible	Submersible
	34	Degree of protection		IP68	IP68
	35	Rated output (at 55 deg.C)	kW		n.a.
	36	Rated output (at 40 deg.C)	kW		40

019A PRPS1_DRAIN FLOOD PUMPS - TDS_R01 TECHNICAL AFFAIRS





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
37	Rated voltage	Kv	0.415	0.415
38	Frequency	Hz	50	50
39	Rated full load current (FLC)	A		Will follow
40	Rated nominal current	A		81,9
41	Starting current	A		336
42	Number of poles			6
43	Nominal max. speed	rpm		960
44	Type of starting		Star-Delta	Star-Delta
45	Starting torque	%FLT		Will follow
46	Maximum torque	%FLT		Will follow
47	Efficiency at full load and rated voltage	%		89,1
48	Power factor at full load	%		0,77
49	at starting			
50	Insulation class		F	F
51	Maximum permissible temperature rise to that of class		B	
52	Number of successive starts per hour		10	10
53	Motor protection			IP68
54	Thermal			Yes
55	Moisture sensor			Yes
56	Form of enclosure protection			IP68
57	Form of mounting			Vertical
58	Electrical standard		IEC-60034	n.a. for IP68 motor
59	Dimension standard		IEC 60072	n.a. for IP68 motor
60	Design temperature and humidity	° C / %	50/ 100	50/100
61	Net weight	Kg		991
62	Delivery time	Weeks		As per KSB offer

Notes :

1) Bidder provide proposed pump curve for rated duty point which should show the following:-

- > HEAD (m) versus FLOW (OUTPUT).
- > NPSH (m) versus FLOW
- > POWER (kW) versus FLOW
- > EFFICIENCY versus FLOW



Data sheet



Customer item no.: 5.2.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 600

Date: 21/07/2014

Page: 1 / 6

KRTF 80-250/74UG1-S

Version no.: 1

Operating data

Requested flow rate	9.720 l/s	Actual flow rate	10.326 l/s
Requested developed head	16.40 m	Actual developed head	18.51 m
Pumped medium	Water	Efficiency	44.9 %
	Clean water	Power absorbed	4.17 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	1468 rpm
Ambient air temperature	50.0 °C	Max. power on curve	7.07 kW
Fluid temperature	20.0 °C	Shutoff head	21.22 m
Fluid density	998 kg/m³	Design	Single system 1 x 100 %
Fluid viscosity	1.00 mm²/s	Performance test	Yes

Design

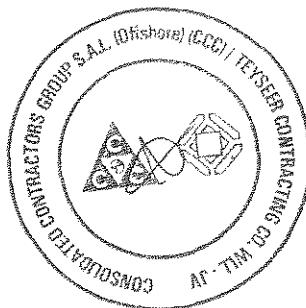
Design	Close-coupled submersible	Type	MG
Orientation	Vertical	Material code	SIC/SIC/NBR
Suction flange pump according to(DN1)	unmachined	Impeller type	Free flow (vortex) impeller (F)
Discharge flange pump according to(DN2)	DN 80 / PN 16 / Drilled according to EN 1092-2	Impeller diameter	249.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size	76.0 mm
Manufacturer	KSB	Direction of rotation from drive	Clockwise

Driver, accessories

Driver type	Electric motor	Motor winding	415 / 720 V
Model (make)	KSB	Number of poles	4
Motor const. type	KSB Sub. motor	Starting mode	Direct/Star-delta possible
Frequency	50 Hz	Connection mode	Delta
Rated voltage	415 V	Motor cooling method	Surface cooling
Rated power P2	7.50 kW	Motor version	U
Available reserve	6.01 %	Cable design	Rubber hose
Rated current	14.7 A	Cable entry	Sealed along entire length
Starting current ratio	4.8	Power cable	S1BN8-F 12G1.5
Insulation class	F to IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	with
Cos phi at 4/4 load	0.85	Cable length	10.00 m
Motor efficiency at 4/4 load	83.5 %		
Temperature sensor	Bimetallic switch 2x		

Materials G1

Notes	Impeller (230)	GX2CRNIMOCUN25-6-3-3
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg. chlorine (Cl2) <=0.6 mg/kg.	1.4517	Nitrile rubber NBR
Pump casing (101)	O-Ring (412)	Grey cast iron EN-GJL-250
Discharge cover (163)	Motor housing (811)	Chloroprene rubber
Shaft (210)	Motor cable (824)	CrNiMo steel A4
	Hexagon socket head cap screw (914)	



Data sheet



Customer item no.: 5.2.1.2
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 600
Date: 21/07/2014
Page: 2 / 6

KRTF 80-250/74UG1-S

Version no.: 1

Packaging

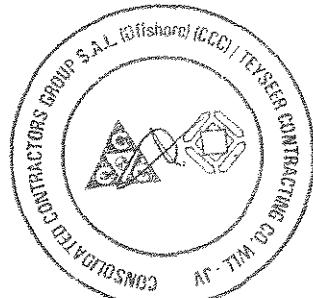
Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage	Indoor
Packaging for transport IPPC Standard ISPM 15	Ship Yes	Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.	

Nameplates

Nameplates language	International	Duplicate nameplate	with
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Certifications

Hydraulic performance test		Certificate	Inspection cert. 3.1 to EN 10204
Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2	Test participation	Non-witnessed
Quantity meas. points Q-H	5	Hydrostatic test (room temp.)	
Certificate	Inspection cert. 3.2 to EN 10204	Range	Complete pump with shaft seal
Test participation	Witnessed	Test pressure	3.50 bar.g
Quantity, non-witnessed	1	Test time	10.0 min
Quantity, witnessed	1	Certificate	Inspection cert. 3.1 to EN 10204
Vibration test	Yes	Test participation	Non-witnessed
Strip test		Final visual inspection	
Certificate	Inspection cert. 3.1 to EN 10204	Certificate	Without
Test participation	Non-witnessed	Test participation	Non-witnessed
Balancing test		Material certificates: Pump casing, intermediate casing , shaft, impeller, motor housing (101, 113, 210, 230, 811)	
Balancing grade	G 6.3	Certificate	Test report 2.2 to EN 10204
Part	Impeller		



Data sheet



Customer item no.: 5.2.1.2
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 600
Date: 21/07/2014
Page: 3 / 6

KRTF 80-250/74UG1-S

Version no.: 1

Installation parts

Installation type	stationary 2 guide rail	Type	Chain
Scope of supply	Pump with installation parts For guide rail arrangements, the guide rails are not included in KSB's scope of supply.	Material	CrNiMo steel 1.4404
		Length	5.00 m
		Max. load	160 kg
Installation depth	4.50 m		
Material concept	G		

Duckfoot bend

Size	DN 80
Flange design	drilled acc. EN1092-2/RF/PN16
Duckfoot bend size (DN2 / DN3)	DN 80 Drilled according to EN
Material	Grey cast iron EN-GJL-250
Mounting type	Composite anchor bolts
Foundation rail	Without

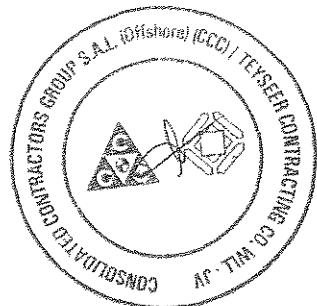
Claw

Design	straight
Size	DN 80

Lifting chain / -rope

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Total film thickness approx.	KSB-blue
Intermediate coating	2-component epoxy resin high solid		300 µm



Performance curve

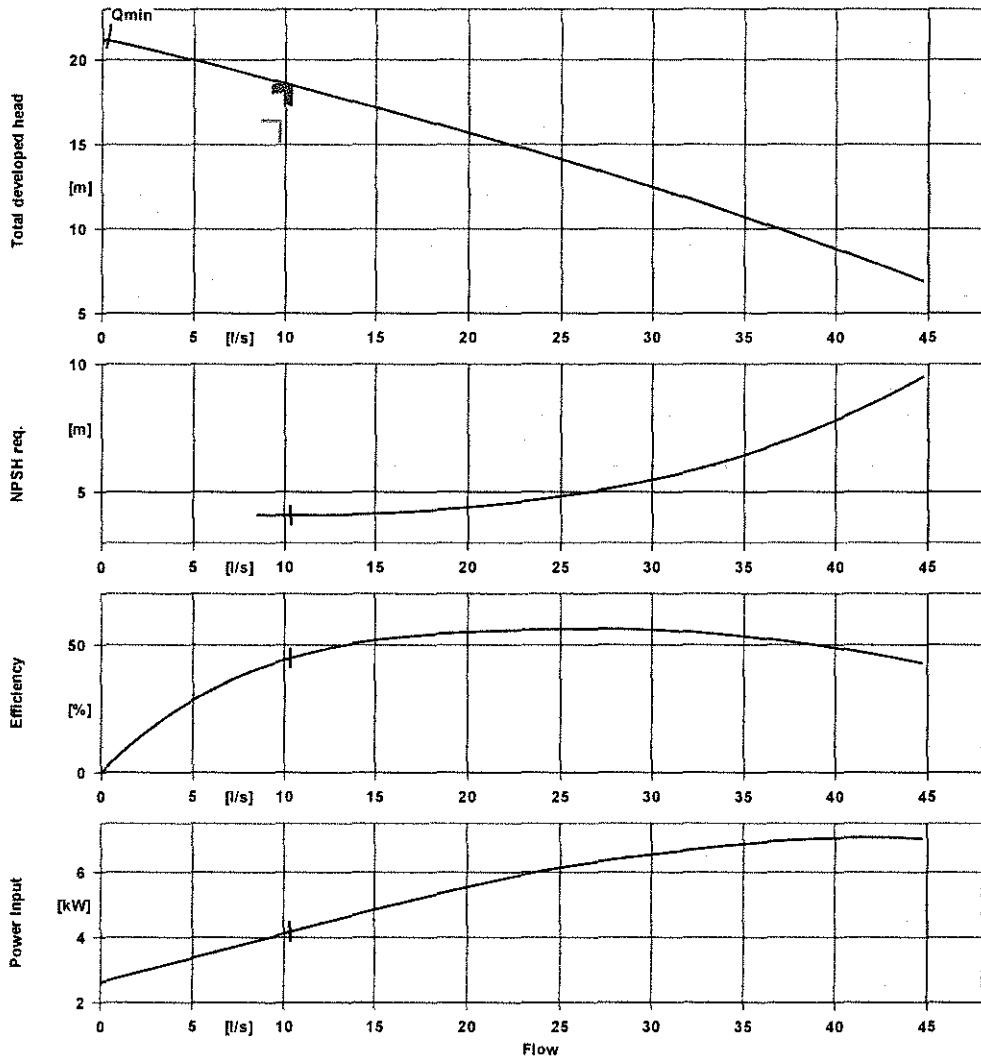


Customer item no.:5.2.1.2
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 600
 Date: 21/07/2014
 Page: 4 / 6

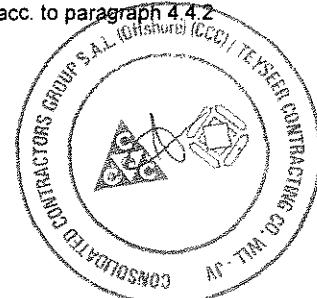
KRTF 80-250/74UG1-S

Version no.: 1



Curve data

Speed of rotation	1468 rpm	Efficiency	44.9 %
Fluid density	998 kg/m ³	Power absorbed	4.17 kW
Viscosity	1.00 mm ² /s	NPSH required	4.09 m
Flow rate	10.326 l/s	Curve number	K42873s
Requested flow rate	9.720 l/s	Effective impeller diameter	249.0 mm
Total developed head	18.51 m	Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2
Requested developed head	16.40 m		



Installation plan



Customer item no.: 5.2.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

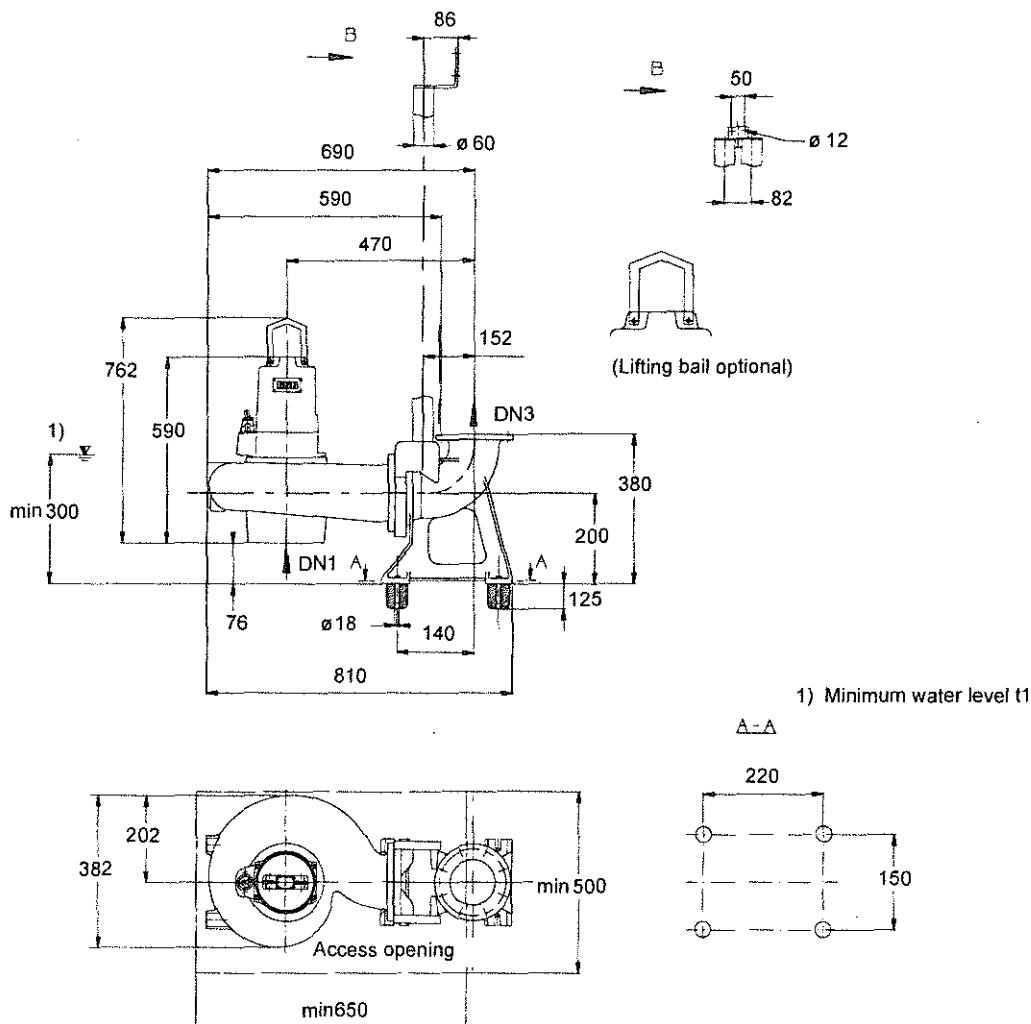
Item no.: 600

Date: 21/07/2014

Page: 5 / 6

KRTF 80-250/74UG1-S

Version no.: 1



Drawing is not to scale

Dimensions in mm



Installation plan



Customer item no.: 5.2.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 600

Date: 21/07/2014

Page: 6 / 6

KRTF 80-250/74UG1-S

Version no.: 1

Motor

Motor manufacturer	KSB
Motor size	7
Motor power	7.50 kW
Number of poles	4
Speed of rotation	1441 rpm

Connections

Suction flange pump according unmachined
to(DN1)
Duckfoot bend size (DN2 / DN3)DN 80 Drilled according to EN

Weight net

Pump, Motor, Cable	147 kg
Claw / Foot	10 kg
Total	157 kg

For auxiliary connections see
separate drawing.

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:

Dimensions without tolerances, middle tolerances to:

Connection dimensions for pumps:

Dimensions without tolerances - welded parts:

Dimensions without tolerances - gray cast iron parts:

DIN 747

ISO 2768-m

EN735

ISO 13920-B

ISO 8062-CT9



Data sheet



Customer item no.: 5.3.1.1

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 4

Number: 4002140658

Item no.: 700

Date: 21/07/2014

Page: 1 / 5

KRTK 700-900/A19512UNG1-D

Version no.: 1

Operating data

Requested flow rate	1280.000 l/s	Actual flow rate	1280.000 l/s
Requested developed head	8.06 m	Actual developed head	8.06 m
Pumped medium	Water	Efficiency	77.0 %
	Clean water	Power absorbed	133.68 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	496 rpm
Ambient air temperature	50.0 °C	NPSH required	4.69 m
Fluid temperature	20.0 °C	Permissible operating pressure	6.00 bar.g
Fluid density	998 kg/m³	Discharge press.	0.79 bar.g
Fluid viscosity	1.00 mm²/s	Shutoff head	13.89 m
Suction pressure max.	0.00 bar.g	Design	Single system 1 x 100 %
Max. power on curve	133.68 kW	Performance test	Yes

Design

Design	Close-coupled submersible	Impeller type	Multivane radial flow impeller (K)
Orientation	Vertical	Wear ring	Casing/impeller wear ring
Suction flange pump according to(DN1)	DN 700 / Drilled according PN16 to EN 1092-2	Impeller diameter	687.0 mm
Discharge flange pump according to(DN2)	DN 700 / Drilled according PN16 to EN 1092-2	Free passage size	190.0 mm
Suction nozzle drilled acc. to DIN2501 with tapped blind holes		Direction of rotation from drive	Clockwise
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Temperature sensor PT100	with
Manufacturer	Burgmann	inboard	
Type (MS inboard)	CARTEX	Temperature sensor PT100 mtswith	
Material code (MS inboard)	SIC/SIC/FPM	Vibration sensor	with

Driver, accessories

Driver type	Electric motor	Number of poles	12
Model (make)	KSB	Starting mode	Direct/Star-delta possible
Motor const. type	KSB Sub. motor	Connection mode	Delta
Operating mode	S1, non submerged operation	Motor cooling method	closed-circuit jacket cooling
Designed for operation with frequency inverter	Yes	Motor cooling jacket	with
Frequency	50 Hz	Motor version	U
Rated voltage	415 V	Cable design	Shielded control cable
Rated power P2	170.00 kW	Cable entry	Sealed along entire length
Rated current	368.0 A	Power cable	S1BN8-F 4G35
Starting current ratio	5.5	Number of power cables	4
Insulation class	H according IEC 34-1	Control cable	S07RC4N8-F 12G1.5
Motor enclosure	IP68	Number of control cables	1
Cos phi at 4/4 load	0.70	Moisture sensor	with
Motor efficiency at 4/4 load	92.3 %	Cable length	10.00 m
Temperature sensor	PTC resistor		
Motor winding	415 / 720 V		



Data sheet



Customer item no.: 5.3.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 700
 Date: 21/07/2014
 Page: 2 / 5

KRTK 700-900/A19512UNG1-D

Version no.: 1

Materials G1

Notes	Casing wear ring (502.1)	CrNi steel VG434
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.	Impeller wear ring (503)	CrNi steel VG434
Pump casing (101)	Shaft protecting sleeve (524)	Chrome steel 1.4021+QT800
Discharge cover (163)	Cooling jacket (66-2)	Stainless steel 1.4571
Shaft (210)	Motor housing (811)	Grey cast iron EN-GJL-250
Impeller (230)	Motor cable (824)	Chloroprene rubber
Bearing bracket (330)	Hexagon socket head cap screw (914)	CrNiMo steel A4
O-Ring (412)	Nitrile rubber NBR	

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.	Indoor
Packaging for transport IPPC Standard ISPM 15	Ship Yes		

Nameplates

Nameplates language	International	Duplicate nameplate	with
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Certifications

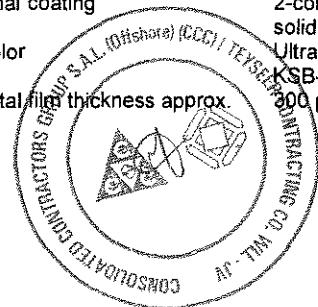
Hydraulic performance test		Certificate Test participation	Inspection cert. 3.1 to EN 10204 Non-witnessed
Acceptance standard	ISO 9906 class 1B		
Quantity meas. points Q-H	5	Hydrostatic test (room temp.)	
Certificate	Inspection cert. 3.2 to EN 10204	Range	Complete pump with shaft seal
Test participation	Witnessed	Test pressure	3.00 bar.g
Quantity, non-witnessed	3	Test time	10.0 min
Quantity, witnessed	1	Certificate	Inspection cert. 3.1 to EN 10204
NPSH test	Yes	Test participation	Non-witnessed
Quantity meas. points NPSH	1		
Vibration test	Yes	Final visual inspection	Inspection cert. 3.1 to EN 10204
		Certificate Test participation	Witnessed
Balancing test			
Balancing grade	G 6.3	Material certificates: Pump casing, intermediate casing , shaft, impeller, motor housing (101, 113, 210, 230, 811)	
Part	Impeller	Certificate	Test report 2.2 to EN 10204

Installation parts

Installation type	Dry installation	Foundation rails	Yes
Scope of supply	Pump with installation parts	Inlet elbow size / DNO	DN 700 / 900
Installation variant	Dry	Lifting Bail	with
Material concept	G		

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Total film thickness approx.	KSB-blue
Intermediate coating	2-component epoxy resin high solid		300 µm



Performance curve

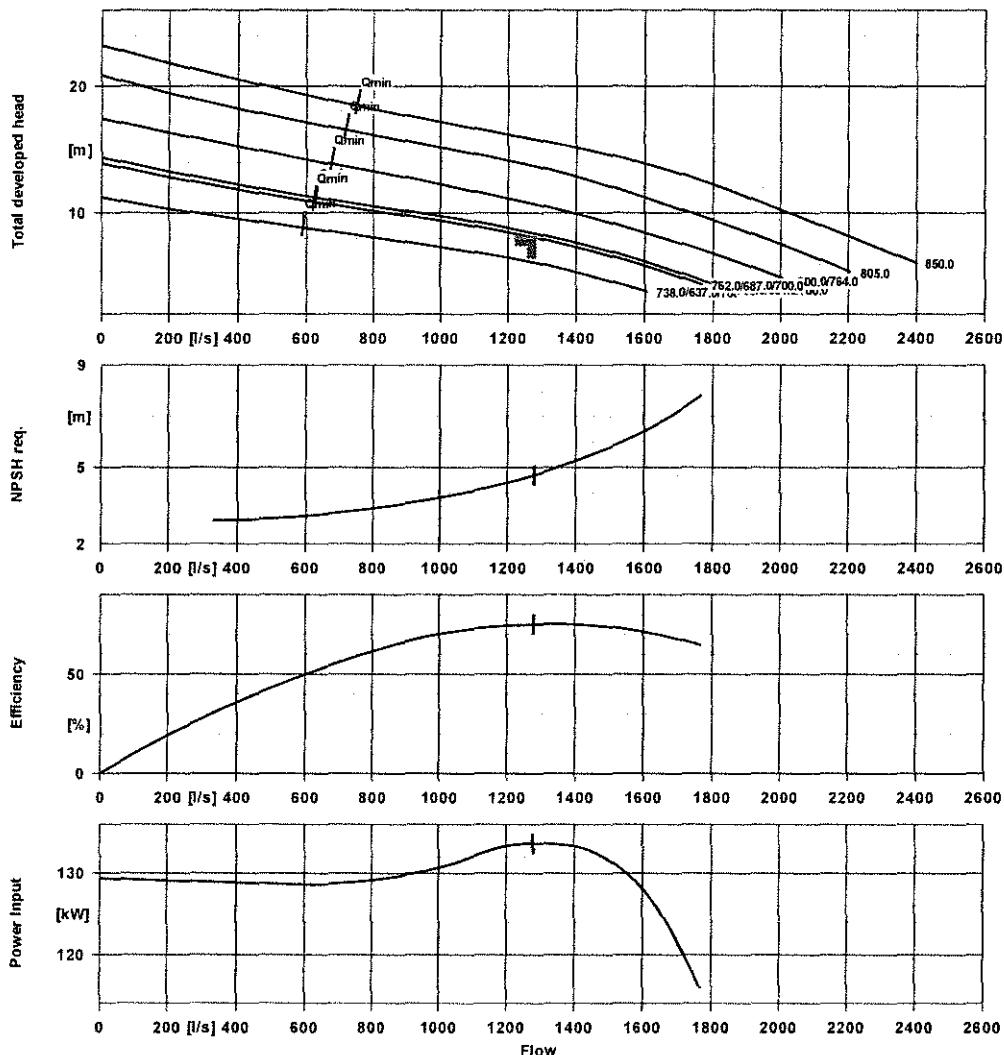


Customer item no.:5.3.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 700
 Date: 21/07/2014
 Page: 3 / 5

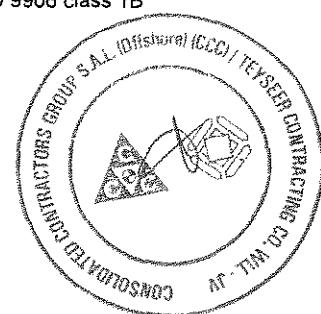
KRTK 700-900/A19512UNG1-D

Version no.: 1



Curve data

Speed of rotation	496 rpm	Efficiency	75.3 %
Fluid density	998 kg/m ³	Power absorbed	133.68 kW
Viscosity	1.00 mm ² /s	NPSH required	4.69 m
Flow rate	1280.000 l/s	Curve number	K42884s
Requested flow rate	1280.000 l/s	Effective impeller diameter	687.0 mm
Total developed head	8.06 m	Acceptance standard	ISO 9906 class 1B
Requested developed head	8.06 m		



Installation plan

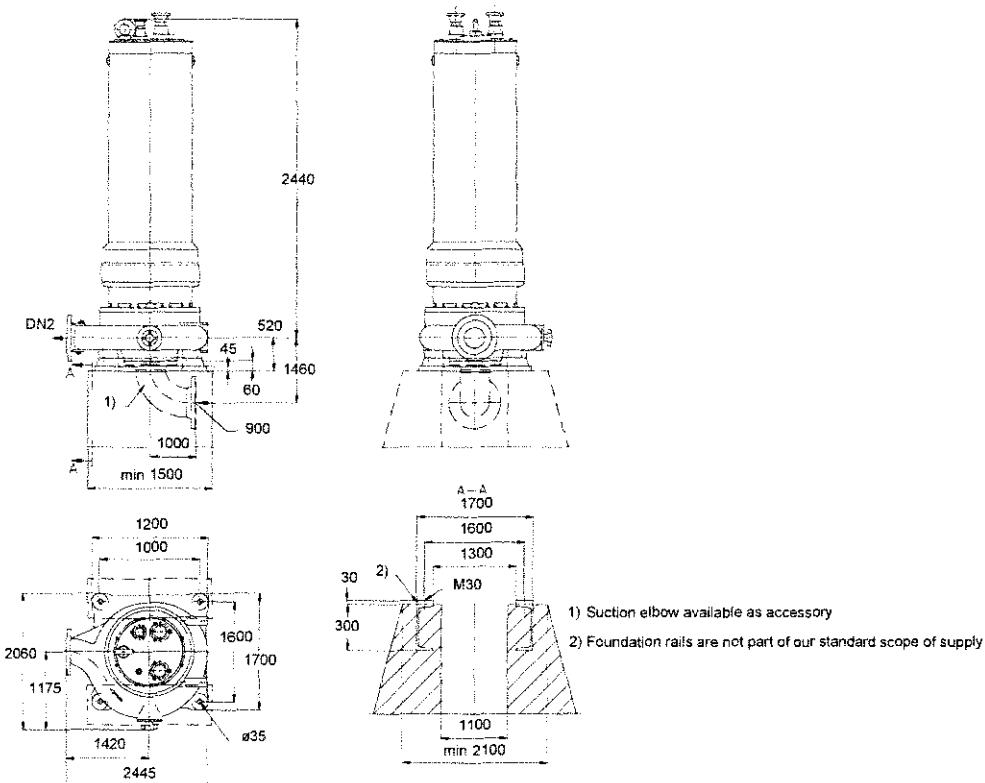


Customer item no.: 5.3.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 700
 Date: 21/07/2014
 Page: 4 / 5

KRTK 700-900/A19512UNG1-D

Version no.: 1



Drawing is not to scale

Dimensions in mm

Motor

Motor manufacturer	KSB
Motor size	A195N
Motor power	170.00 kW
Number of poles	12
Speed of rotation	494 rpm

Connections

Inlet elbow size / DN0	DN 700 / 900
Suction flange pump according to(DN1)	EN 1092-2 / DN 700 / drilled DIN 2501 / ISO 7005
Discharge flange pump according to(DN2)	DN 700 / Drilled according PN16 to EN 1092-2
Suction nozzle drilled acc. to DIN2501	with tapped blind holes

Weight net

Pump, Motor, Cable

Total

6604 kg

6604 kg

For auxiliary connections see separate drawing.

Connect pipes without stress or strain!
 Dimensional tolerances for shaft axis height:
 Dimensions without tolerances, middle tolerances to:
 Connection dimensions for pumps:
 Dimensions without tolerances - welded parts:

DIN 747

ISO 2768-m

EN735

ISO 13920-B



Installation plan



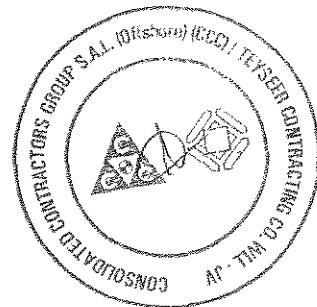
Customer item no.: 5.3.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 4

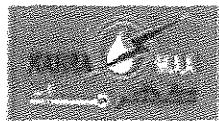
Number: 4002140658
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KRTK 700-900/A19512UNG1-D

Version no.: 1

Dimensions without tolerances - gray cast iron parts: ISO 8062-CT9

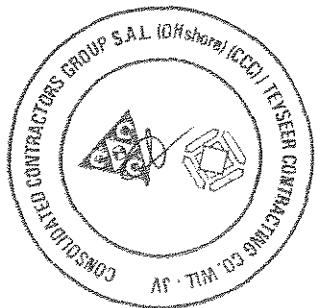




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

APPENDIX I 7 016A

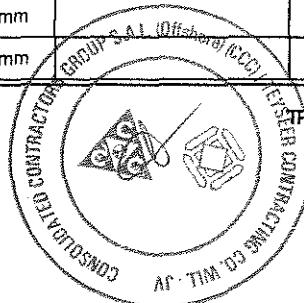
RECIRCULATION PUMPS



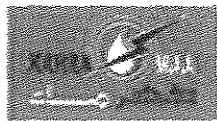


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Location		PRPS-1 Auxiliary Pumping Station	PRPS-1 Auxiliary Pumping Station
	2	Pumping System		Recirculation	Recirculation
	3	Service		Potable Water	Potable Water
	4	No. of Pump sets		2 Groups of 2 Pumps (1 D + 1 S.)	4
	5	Type of Pump sets		Dry Submersible	Dry Submersible
GENERAL INFORMATION	6	Name of Manufacturer			KSB
	7	Place of Manuf. (City / Country)			Halle / Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
EQUIPMENT INCLUDED	9	Pump		Required	KRTK 700-900/A19512UNG1-D
	10	Motor		Required	included
	11	Type of starting		Soft starter	Soft starter supplied by others
	12	Motor support structure		Required	included
TECHNICAL DATA	13	Operational points			
	14	Duty Point Is Head	m	1,260	8.06
	15	NPSH r	m		4.69
	16	NPSH a	m	12	noted
	17	Design Temperature:	°C	50	noted
	18	Nozzles size/rating:			
	i.	Suction side		PN16	Drilled PN 16
	ii.	Delivery side		PN16	Drilled PN 16
	19	Min. motor rating required	Kw		154
	20	Pump Efficiency at rated output (min.)	(%)	77	
	21	Guaranteed Pump Efficiency at rated output (min.)	(%)		77
	22	NPSH® at rated output	mwc		4.7
	23	Maximum allowable pump speed	rpm	1500	
	24	Speed at rated output	rpm		496
	25	End of curve output at rated speed	m³/h		6300
	26	End of curve head at rated speed	mwc		4
	27	Min. continuous flow at rated speed	m³/h		2250
	28	Head at min. continuous flow	mwc		11
	29	Shut-off head at rated speed	mwc		14
	30	Critical speed	rpm		n.a.
	31	Specific speed (impeller)	rpm		125,7
	32	Diameter of impeller	mm		686
	33	Max. possible diameter of impeller	mm		850
		Min. possible diameter of impeller	mm		738

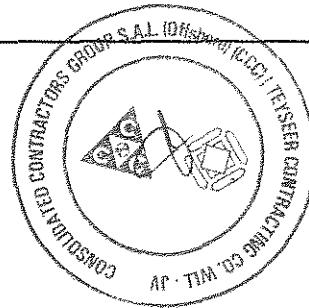


TECHNICAL AFFAIRS



Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
PUMP MATERIALS	34	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	35	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	36	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	1.4462
	37	Shaft protection sleeves		stainless steel 1.4571 or other proper equivalent material	1.4021
	38	Wearing rings		Stainless steel EN 1.4571 (316Ti)	CrNi steel VG434
	39	Bearings			Grease lubricated
	40	Seal material & Type			SIC/SIC/FPM
	41	Pump Coating		Plastic enamel paint (epoxy resin) inside and outside applied by electrostatic spray process	2-component epoxy resin
	42	Motor test at factory		Accordance with ISO 9906 Grade 1	ISO 9906 Grade 1E
	43	Combined pump & motor test at factory		Accordance with ISO 9906 Grade 1	ISO 9906 Grade 1E
	44	Site tests		Required	KSB Supervisor as per KSB offer
TESTS	45	Manufacturer			KSB
	46	Motor Type		Dry submersible	Dry submersible
	47	Degree of protection		IP68	IP68
	48	Rated output (at 55 deg.C)	kW		170
	49	Rated output (at 40 deg.C)	kW		170
	50	Rated voltage	kV	0.415	0.415
	51	Frequency	Hz	50	50
	52	Rated full load current (FLC)	A		Will follow
	53	Rated nominal current	A		368
	54	Starting current	A		2024
	55	Number of poles			12
	58	Nominal max. speed	rpm		480
	59	Efficiency at full load and rated voltage	%		92,3
	60	Power factor at full load	%		0,70
	61	Power factor at starting			
	62	Maximum permissible temperature rise to that of class		B	
	63	Insulation class		F	H
	64	Noise level (not exceeding 85 dB(A) combined with pump & drive)			85
	65	Windings temp. alarm		Yes	yes
	66	Winding temp. protection		Yes	yes
	67	Lube oil level		Yes	n.a.



TECHNICAL AFFAIRS

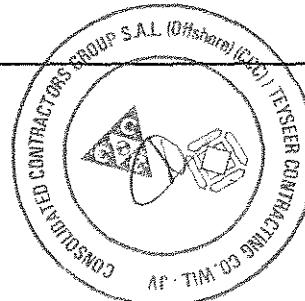


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
68	Bearing temp. protection (per bearing)		Yes	yes
69	Vibration protection (per bearing)			yes
70	Form of enclosure protection			IP 68
71	Form of mounting			vertical
72	Cast steel frame for motor support above pump		Included	included
73	Form of cooling			Closed cooling jacket
74	Electrical standard		IEC-60034	n.a. for IP68 motors
75	Dimension standard		IEC 60072	n.a. for IP68 motors
76	Design temperature and humidity	°C / %	50/ 100	50°C/100
77	Anti-condensation heater (at 240 V)	W		n.a.
78	Net weight	Kg		~6604kg
79	Delivery time	Weeks		As per KSB offer

Notes :

- 1) Bidder to provide proposed pump curve for the proposed impeller which should show the following:-
 - > HEAD (m) versus FLOW (OUTPUT).
 - > NPSH (m) versus FLOW
 - > POWER (kW) versus FLOW
 - > EFFICIENCY versus FLOW
- 2) Bidder to provide curves for the maximum and minimum impeller sizes.



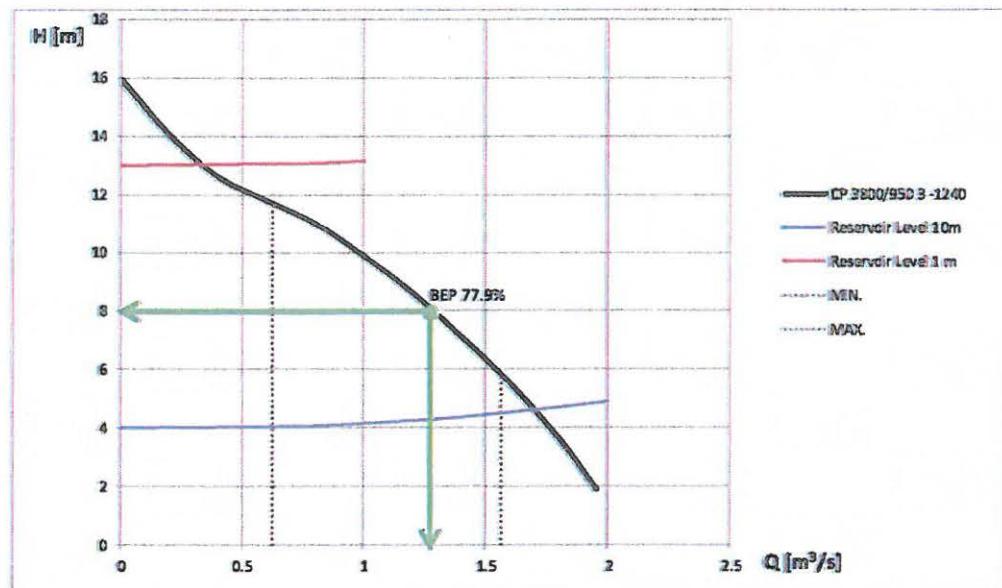
TECHNICAL AFFAIRS



Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

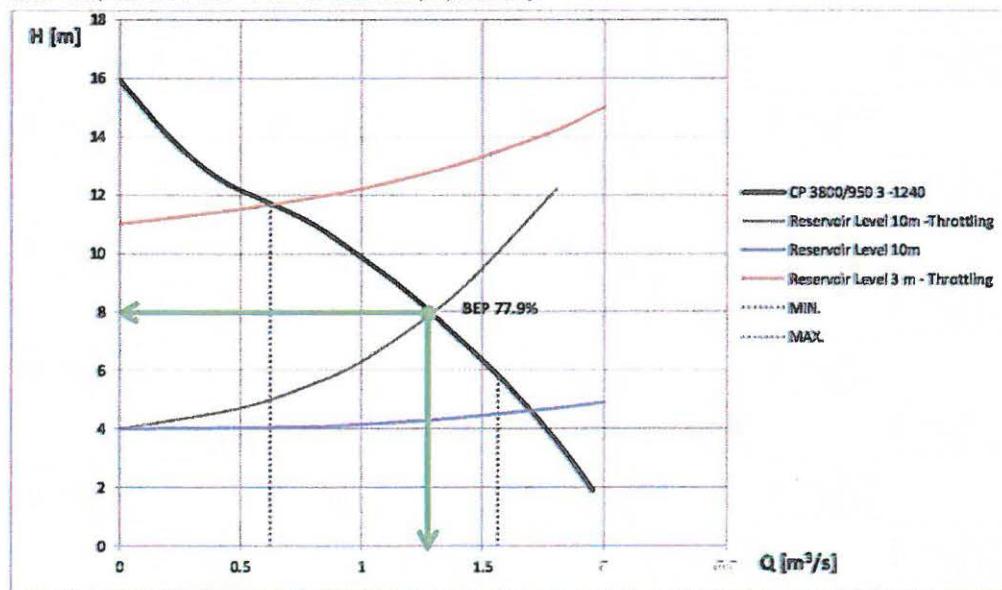
System Curve for Recirculation Pump

a. Single Pump Operation Point



b. Single Pump Operation Point during throttling

Note: Pump curve is indicative and for illustrative purposes only.



Data sheet



Customer item no.: 5.3.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 800

Date: 23/07/2014

Page: 1 / 5

KRTK 500-630/A1508UNG1-D

Version no.: 1

Operating data

Requested flow rate	900.000 l/s	Actual flow rate	900.000 l/s
Requested developed head	10.00 m	Actual developed head	10.00 m
Pumped medium	Water	Efficiency	79.5 %
	Clean water	Power absorbed	111.75 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	746 rpm
Ambient air temperature	50.0 °C	NPSH required	6.11 m
Fluid temperature	20.0 °C	Permissible operating pressure	6.00 bar.g
Fluid density	998 kg/m³	Discharge press.	0.98 bar.g
Fluid viscosity	1.00 mm²/s	Shutoff head	23.68 m
Suction pressure max.	0.00 bar.g	Design	Single system 1 x 100 %
Max. power on curve	119.24 kW	Performance test	Yes

Design

Design	Close-coupled submersible	Impeller type	Multivane radial flow impeller (K)
Orientation	Vertical	Wear ring	Casing/impeller wear ring
Suction flange pump according to(DN1)	EN 1092-2 / DN 500 / drilled DIN 2501 / ISO 7005	Impeller diameter	551.0 mm
Discharge flange pump according to(DN2)	DN 500 / Drilled according to EN 1092-2	Free passage size	133.0 mm
Suction nozzle drilled acc. to DIN2501 with tapped blind holes		Direction of rotation from drive	Clockwise
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Temperature sensor PT100	with
Manufacturer	KSB	inboard	
Type	MG	Temperature sensor PT100 mt	with
Material code	SIC/SIC/NBR	Vibration sensor	with

Driver, accessories

Driver type	Electric motor	Number of poles	8
Model (make)	KSB	Starting mode	Direct/Star-delta possible
Motor const. type	KSB Sub. motor	Connection mode	Delta
Operating mode	S1, non submerged operation	Motor cooling method	closed-circuit jacket cooling
Frequency	50 Hz	Motor cooling jacket	with
Rated voltage	415 V	Motor version	U
Rated power P2	130.00 kW	Cable design	Shielded control cable
Rated current	258.0 A	Cable entry	Sealed along entire length
Starting current ratio	6.5	Power cable	S1BN8-F 3x70/35
Insulation class	H according IEC 34-1	Number of power cables	2
Motor enclosure	IP68	Control cable	S1BN4N8-F 10G1.5
Cos phi at 4/4 load	0.75	Number of control cables	1
Motor efficiency at 4/4 load	92.9 %	Moisture sensor	with
Temperature sensor	PTC resistor	Cable length	10.00 m
Motor winding	415 / 720 V		



Data sheet



Customer item no.: 5.3.1.2
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 800
 Date: 23/07/2014
 Page: 2 / 5

KRTK 500-630/A1508UNG1-D

Version no.: 1

Materials G1

Notes	Casing wear ring (502.1)	CrNi steel VG434
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.	Impeller wear ring (503)	CrNi steel VG434
Pump casing (101)	Shaft protecting sleeve (524)	Chrome steel 1.4021+QT800
Discharge cover (163)	Cooling jacket (66-2)	Stainless steel 1.4571
Shaft (210)	Motor housing (811)	Grey cast iron EN-GJL-250
Impeller (230)	Motor cable (824)	Chloroprene rubber
Bearing bracket (330)	Hexagon socket head cap screw (914)	CrNiMo steel A4
O-Ring (412)	Grey cast iron EN-GJL-250	
	Nitrile rubber NBR	

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.	Indoor
Packaging for transport	Ship		

Nameplates

Nameplates language	International	Duplicate nameplate	with
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Certifications

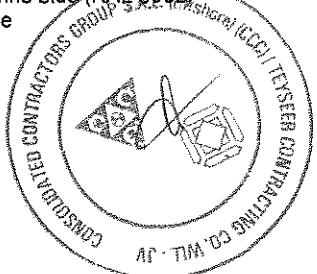
Hydraulic performance test		Certificate	Inspection cert. 3.1 to EN 10204
Acceptance standard	ISO 9906 class 1B	Test participation	Non-witnessed
Quantity meas. points Q-H	5		
Certificate	Inspection cert. 3.2 to EN 10204	Hydrostatic test (room temp.)	
Test participation	Witnessed	Range	Complete pump with shaft seal
Quantity, non-witnessed	1	Test pressure	3.00 bar.g
Quantity, witnessed	1	Test time	10.0 min
NPSH test	Yes	Certificate	Inspection cert. 3.1 to EN 10204
Quantity meas. points NPSH	1	Test participation	Non-witnessed
Vibration test	Yes		
Balancing test		Final visual inspection	
Balancing grade	G 6.3	Certificate	Inspection cert. 3.1 to EN 10204
Part	Impeller	Test participation	Witnessed
		Material certificates: Pump casing, intermediate casing , shaft, impeller, motor housing (101, 113, 210, 230, 811)	
		Certificate	Test report 2.2 to EN 10204

Installation parts

Installation type	Dry installation	Foundation rails	Yes
Scope of supply	Pump with installation parts	Inlet elbow size / DN0	DN 500 / 700
Installation variant	Dry	Lifting Bail	with
Material concept	G		

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust		Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Color	KSB-blue
Intermediate coating	2-component epoxy resin high solid	Total film thickness approx.	300 µm



Performance curve



Customer item no.: 5.3.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

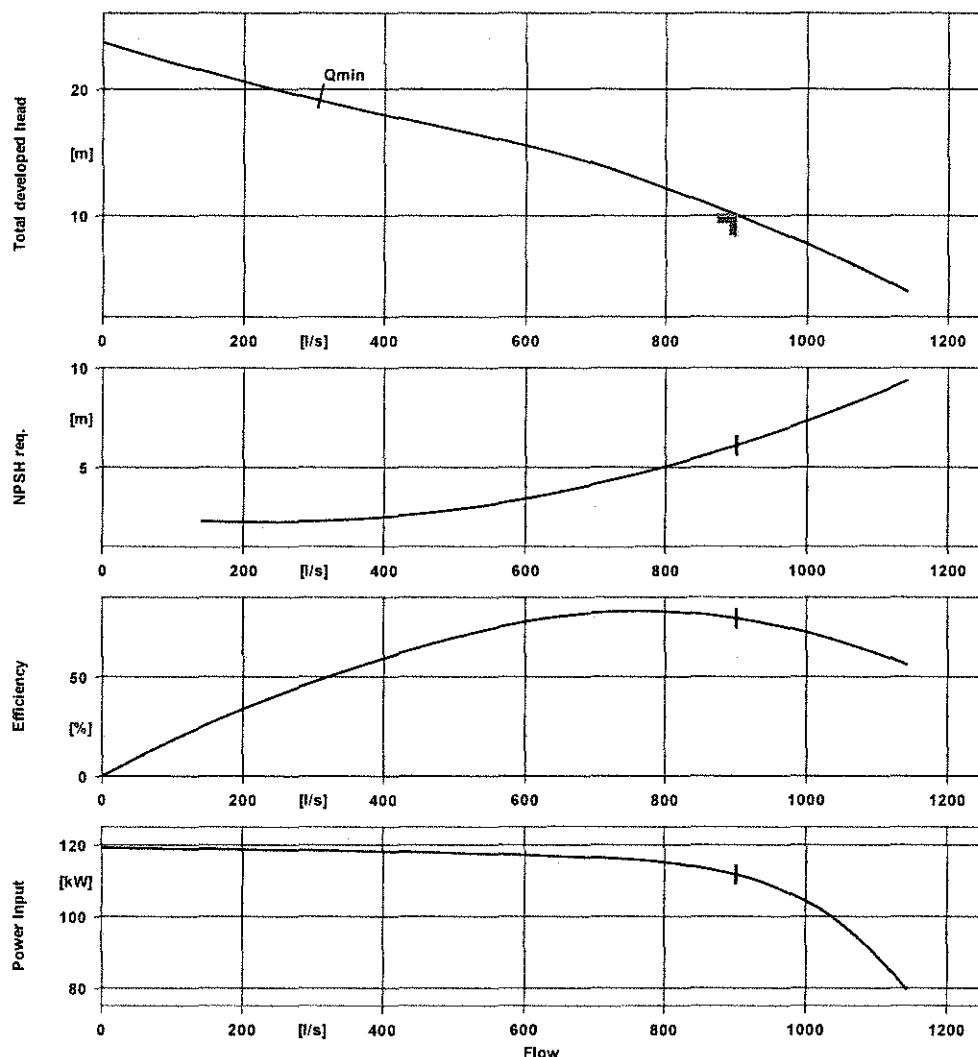
Item no.: 800

Date: 23/07/2014

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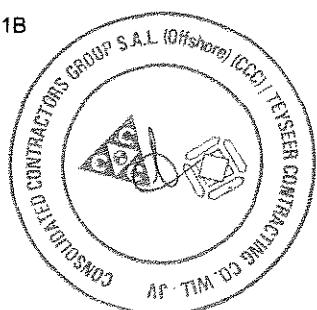
KRTK 500-630/A1508UNG1-D

Version no.: 1



Curve data

Speed of rotation	746 rpm	Efficiency	79.5 %
Fluid density	998 kg/m³	Power absorbed	111.75 kW
Viscosity	1.00 mm²/s	NPSH required	6.11 m
Flow rate	900.000 l/s	Curve number	K43080s
Requested flow rate	900.000 l/s	Effective impeller diameter	551.0 mm
Total developed head	10.00 m	Acceptance standard	ISO 9906 class 1B
Requested developed head	10.00 m		



Installation plan



Customer item no.: 5.3.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

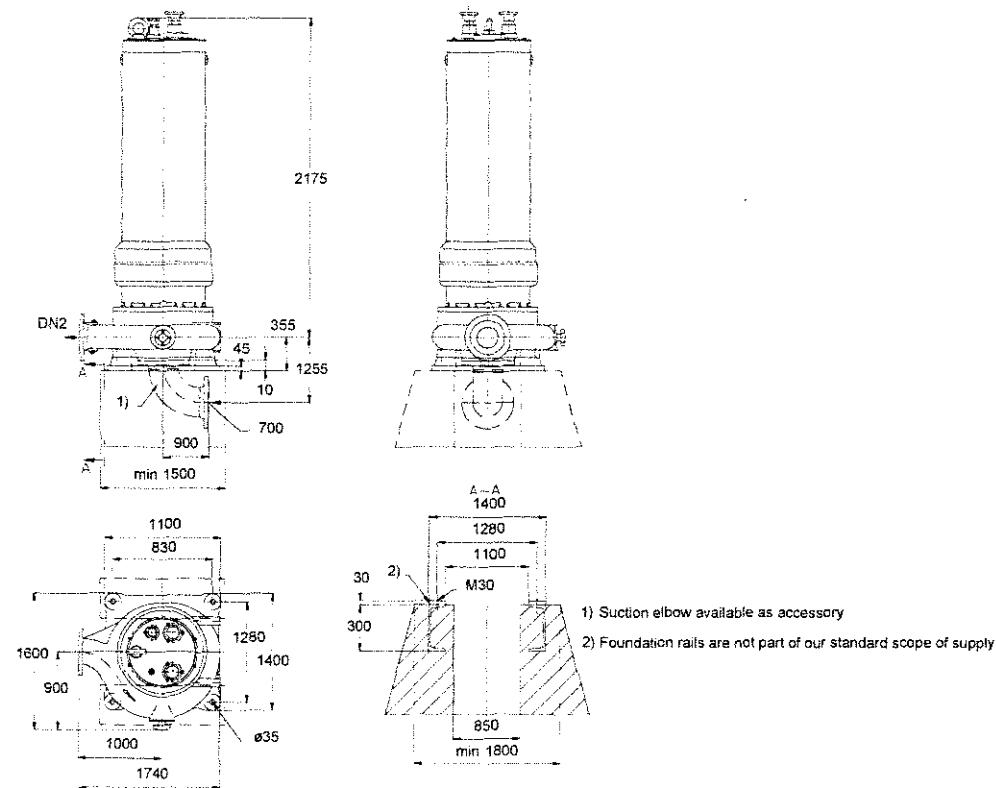
Item no.: 800

Date: 23/07/2014

Page: 4 / 5

KRTK 500-630/A1508UNG1-D

Version no.: 1



Drawing is not to scale

Dimensions in mm

Motor

Motor manufacturer

KSB

Motor size

A150N

Motor power

130.00 kW

Number of poles

8

Speed of rotation

745 rpm

Connections

Inlet elbow size / DN0 DN 500 / 700

Suction flange pump according to(DN1) EN 1092-2 / DN 500 / drilled DIN 2501 / ISO 7005

Discharge flange pump according to(DN2) DN 500 drilled according to EN 1092-2

Suction nozzle drilled acc. to DIN2501 with tapped blind holes

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:

Dimensions without tolerances, middle tolerances to:

Connection dimensions for pumps:

Dimensions without tolerances - welded parts:

Weight net

Pump, Motor, Cable

Total

3392 kg

3392 kg

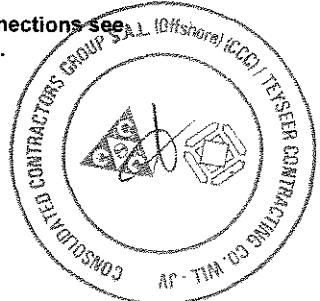
For auxiliary connections see separate drawing.

DIN 747

ISO 2768-m

EN735

ISO 13920-B



Installation plan



Customer item no.: 5.3.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 800

Date: 23/07/2014

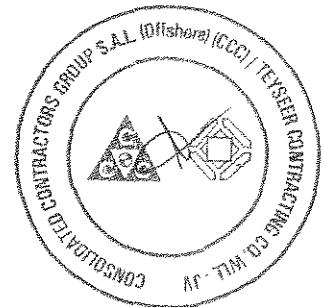
Page: 5 / 5

KRTK 500-630/A1508UNG1-D

Version no.: 1

Dimensions without tolerances - gray cast iron parts:

ISO 8062-CT9

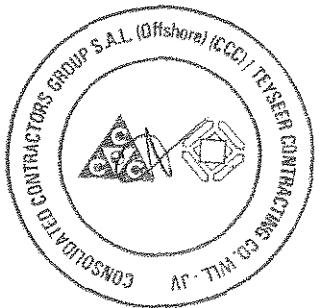




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I . 7 . 018A

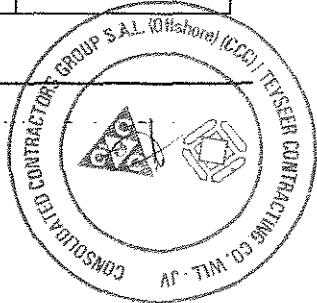
DRAIN DOWN RETURN PUMPS





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Pump Tag/Model Number			KRTK 500-630/A1508UNG1-D
	2	Service		Potable water	Potable Water
	3	Location		PRPS-1 Auxiliary Pumping Station	PRPS-1 Auxiliary Pumping Station
	4	No. of Pump sets		2 (1D + 1S)	2
	5	Type of Pump sets		Dry Submersible	Dry Submersible
GENERAL	6	Name of Manufacturer			KSB
	7	Place of Manufacture (City & Country)			Halle/Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
TECHNICAL DATA	9	Operational points			KRTK 500-630/A1508UNG1-D
	i	Duty Point Is H	m	900 10	900l/s @ 10m
	10	Efficiency at rated output (min.)	(%)	77	79.5
	11	NPSH(R) at rated output	mwc		6.11
	12	NPSH(A) at rated output	mwc	9	
	13	Maximum allowable pump speed	rpm	1500	
	14	Speed at rated output	rpm		746
	15	Rated Power Consumption	Kw		150
	16	Rated power to be provided (elec. motor) at 55 °C	Kw		Will follow
	17	Minimum continuous capacity	m³/h		1080
	18	Head at min. capacity	mwc		19
	19	Maximum capacity (end of curve)	mwc		1140
	20	Head at max. capacity (end of curve)	mwc		2.5
	21	Critical speed	Rpm		n.a.
	22	Flange rating		PN16	Drilled PN16
	23	Diameter of impeller	mm		551
TESTS PUMP MATERIALS	24	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	25	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	26	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	1.4462
	27	Bolts & Nuts		SS316	SS316Ti
	28	Motor test at factory		Required	See below
	29	Combined pump & motor tests		Required	ISO9906/1E
	30	Site tests		Required	KSB Supervisor as per KSB offer
DRIVE MOTOR	31	Manufacturer			KSB
	32	Motor Type		Dry submersible	Dry submersible
	33	Degree of protection		IP68	IP68
	34	Rated output (at 50 deg.C)	kW		130





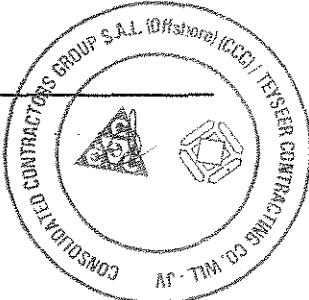
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
35	Rated output (at 40 deg C)	kW		150
36	Rated voltage	Kv	0.415	0.415
37	Frequency	Hz	50	50
38	Rated full load current (FLC)	A		Will follow
39	Rated nominal current	A		258
40	Starting current	A		1677
41	Number of poles			8
42	Nominal max. speed	rpm		725
43	Type of starting		Soft starter	noted
44	Starting torque	%FLT		Will follow
45	Maximum torque	%FLT		Will follow
46	Efficiency at full load and rated voltage	%		92,9
47	Power factor at full load	%		0,75
48	Power at starting			
49	Insulation class		F	H
50	Maximum permissible temperature rise to that of class		B	
51	Number of successive starts per hour		10	10
52	Motor protection			IP68
53	Thermal		Yes	Yes
54	Moisture sensor		Yes	Yes
55	Form of enclosure protection			IP68
56	Form of mounting			vertical
57	Electrical standard		IEC-60034	n.a. for IP68 motors
58	Dimension standard		IEC 60072	n.a. for IP68 motors
59	Design temperature and humidity	°C / %	50/ 100	50/100
60	Net weight	Kg		3392
61	Delivery time	Weeks		As per KSB offer

Notes :

1) Bidder to provide proposed pump curve for rated duty point which should show the following:-

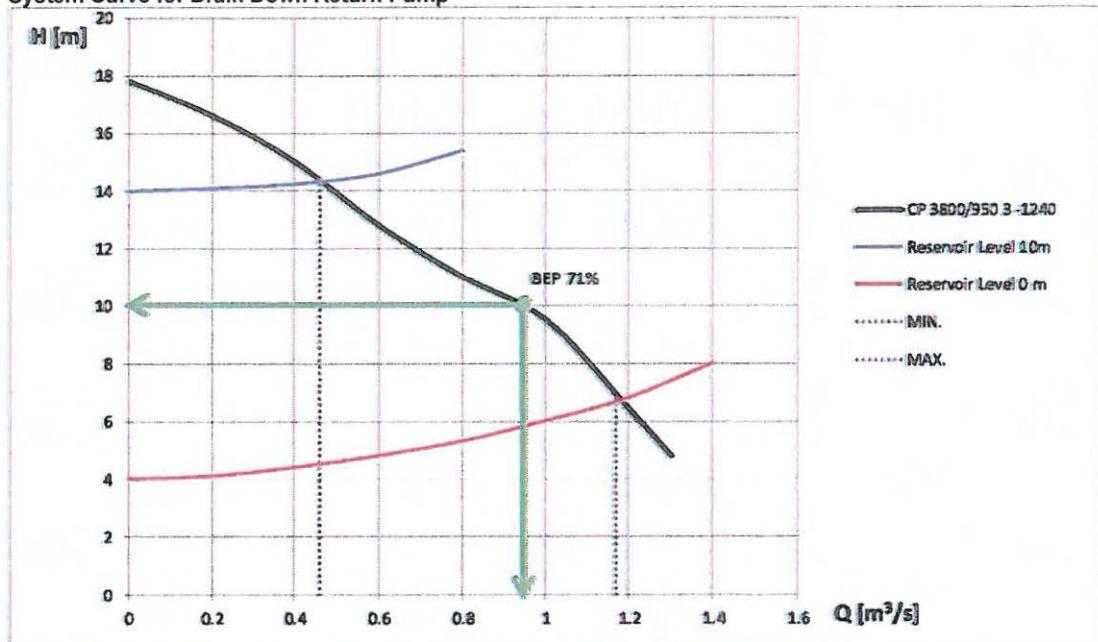
- > HEAD (m) versus FLOW (OUTPUT).
- > NPSH (m) versus FLOW
- > POWER (kW) versus FLOW
- > EFFICIENCY versus FLOW





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

System Curve for Drain Down Return Pump



Note: Pump curve is indicative and for illustrative purposes only.

Data sheet



Customer item no.: 5.3.1.3
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 900
 Date: 21/06/2014
 Page: 1 / 7

KRTD 100-251/R74UKG1-D IE3

Version no.: 1

Operating data

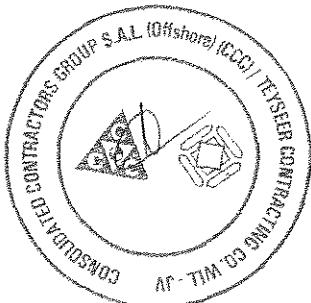
Requested flow rate	54.000 l/s	Actual flow rate	54.679 l/s
Requested developed head	7.00 m	Actual developed head	7.18 m
Pumped medium	Water	Efficiency	71.5 %
	Clean water	Power absorbed	5.37 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	1486 rpm
Ambient air temperature	50.0 °C	NPSH required	1.86 m
Fluid temperature	20.0 °C	Permissible operating pressure	6.00 bar.g
Fluid density	998 kg/m³	Discharge press.	0.70 bar.g
Fluid viscosity	1.00 mm²/s	Shutoff head	18.02 m
Suction pressure max.	0.00 bar.g	Design	Single system 1 x 100 %
Max. power on curve	5.57 kW	Performance test	Yes

Design

Design	Close-coupled submersible	Type	MG
Orientation	Vertical	Material code	SIC/SIC/NBR
Suction flange pump according to(DN1)	EN 1092-2 / DN 150 / drilled DIN 2501 / ISO 7005	Impeller type	Single vane mixed flow (D)
Discharge flange pump according to(DN2)	DN 100 / PN 16 / Drilled according to EN 1092-2	Wear ring	Wear plate
Suction nozzle drilled acc. to DIN2501 with tapped blind holes		Impeller diameter	234.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size	76.0 mm
Manufacturer	KSB	Direction of rotation from drive	Clockwise

Driver, accessories

Driver type	Electric motor	Temperature sensor	PTC resistor
Model (make)	KSB	Motor winding	415 / 720 V
Motor const. type	KSB Sub. motor	Number of poles	4
Operating mode	S1, non submerged operation	Starting mode	Direct/Star-delta possible
Efficiency class	Efficiency class IE3 acc. to IEC60034-30-1	Connection mode	Delta
Frequency	50 Hz	Motor cooling method	Surface cooling
Rated voltage	415 V	Motor version	U
Rated power P2	6.50 kW	Cable design	Rubber hose
Rated current	12.2 A	Cable entry	Sealed along entire length
Starting current ratio	8.3	Power cable	S1BN8-F 12G1.5
Insulation class	H according IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	with
Cos phi at 4/4 load	0.82	Cable length	20.00 m
Motor efficiency at 4/4 load	90.1 %		



Data sheet



Customer item no.: 5.3.1.3
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 900
 Date: 21/06/2014
 Page: 2 / 7

KRTD 100-251/R74UKG1-D IE3

Version no.: 1

Materials G1

Notes		
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.		
Pump casing (101)	Grey cast iron EN-GJL-250	
Wear Plate (135)	High Chrome white iron EN-GJN-HB555(CR14)	
Discharge cover (163)	Grey cast iron EN-GJL-250	
Shaft (210)	1.4462	
Impeller (230)		GX2CRNIMOCUN25-6-3-3
O-Ring (412)		1.4517
Motor housing (811)		Nitrile rubber NBR
Motor cable (824)		Grey cast iron EN-GJL-250
Hexagon socket head cap screw (914)		Chloroprene rubber
		CrNiMo steel A4

Packaging

Packaging category	B2 With desiccants in PE-plastic sheeting, heat-sealed water-proof, in wooden/plywood case, outdoor storage up to 12 months	Packaging for storage	Indoor
	Ship	Outdoor storage at -40°C to +50°C, up to 12 months. Packet must be covered.	

Nameplates

Nameplates language	International	Duplicate nameplate	with
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Auxiliary connections

1M.2 Pressure gauge connection	Drilled and plugged.	6D Pumped medium - filling / venting	G 1 1/4, Drilled and plugged.
6B Pumped liquid drain	Drilled and plugged.		

Certifications

Hydraulic performance test

Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2
Quantity meas. points Q-H	5
Certificate	Inspection cert. 3.2 to EN 10204
Test participation	Witnessed
Quantity, non-witnessed	1
Quantity, witnessed	1
NPSH test	Yes
Quantity meas. points NPSH	3
Vibration test	Yes

Certificate
 Test participation

Inspection cert. 3.1 to EN 10204
 Non-witnessed

Hydrostatic test (room temp.)

Range	Complete pump with shaft seal
Test pressure	3.00 bar.g
Test time	10.0 min
Certificate	Inspection cert. 3.1 to EN 10204
Test participation	Non-witnessed

Final visual inspection

Certificate	Inspection cert. 3.1 to EN 10204
Test participation	Witnessed

Material certificates: Pump casing, intermediate casing, shaft, impeller, motor housing (101, 113, 210, 230, 811)
 Certificate

Test report 2.2 to EN 10204

Order documentation

The following documents will be supplied with the order:
 Manufacturer's or conformity declaration
 Motor data sheet
 General arrangement drawing
 Operating manual

Material certificates
 Performance curve
 Technical data sheet
 Languages

English



Data sheet



Customer item no.: 5.3.1.3
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 900
Date: 21/06/2014
Page: 3 / 7

KRTD 100-251/R74UKG1-D IE3

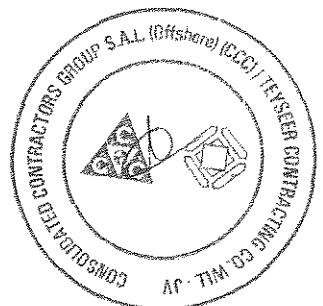
Version no.: 1

Installation parts

Installation type	Dry installation	Material concept	G
Scope of supply	Pump with installation parts	Inlet elbow size / DN0	DN 150 / 150
Installation variant	Dry		

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust		Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Color	KSB-blue
Intermediate coating	2-component epoxy resin high solid	Total film thickness approx.	300 µm



Performance curve



Customer item no.: 5.3.1.3

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

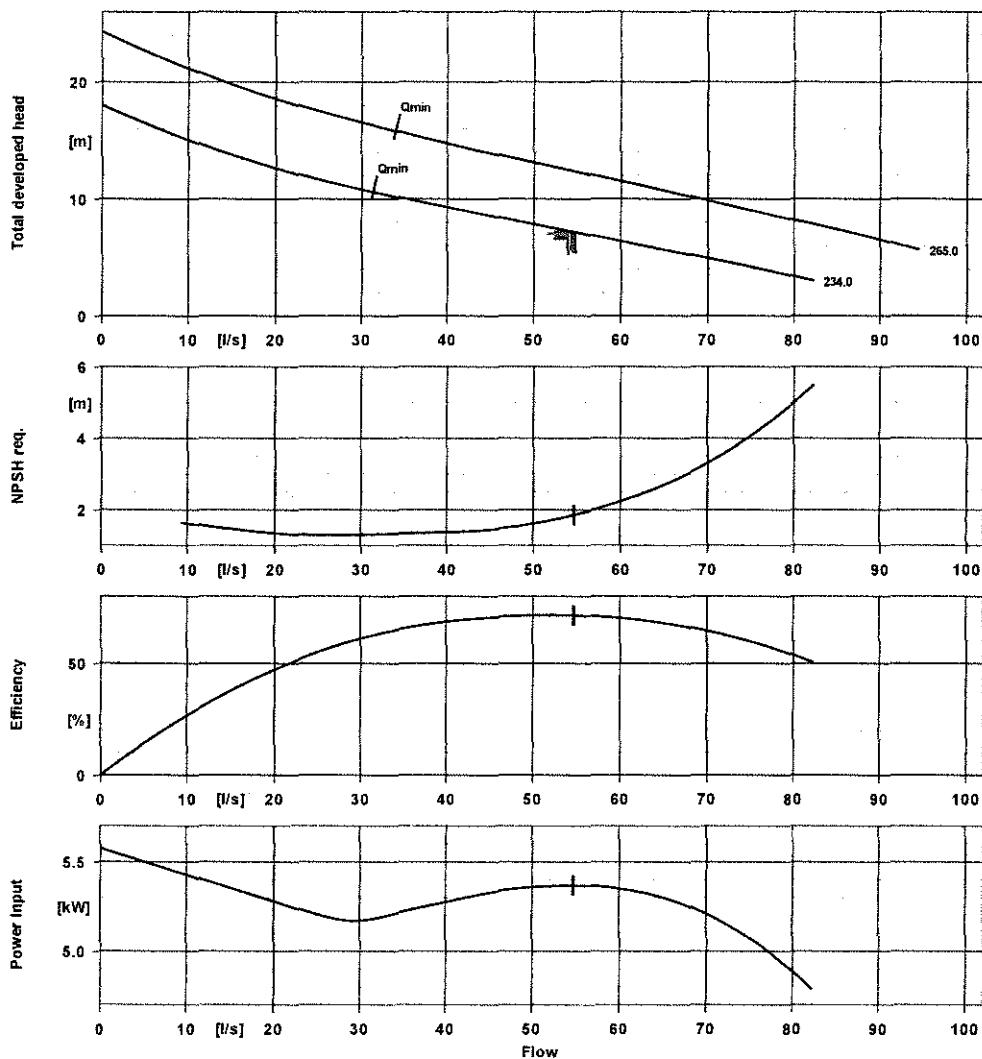
Item no.: 900

Date: 21/06/2014

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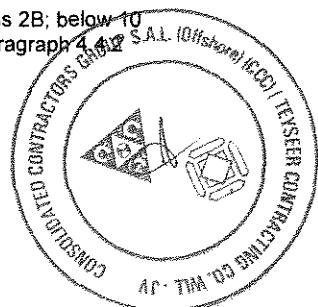
KRTD 100-251/R74UKG1-D IE3

Version no.: 1



Curve data

Speed of rotation	1486 rpm	Efficiency	71.5 %
Fluid density	998 kg/m³	Power absorbed	5.37 kW
Viscosity	1.00 mm²/s	NPSH required	1.86 m
Flow rate	54.679 l/s	Curve number	K43118s
Requested flow rate	54.000 l/s	Effective impeller diameter	234.0 mm
Total developed head	7.18 m	Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2 S.A.L. (Offshore) IEC60034
Requested developed head	7.00 m		



Motor data

KRT Trocken - Installation types: K/D/H



Motor type	:	R74UKG
Efficiency class	:	IE3
Material version	:	G [cast iron] also for motors -G1,-G2,-GH,-H
Nominal voltage	:	415/720 [V]
Frequency	:	50 [Hz]
Rated power	:	6.5 [kW]
Rated current	:	12.2/7.0 [A]
Nominal Speed	:	1483 [rpm]
Starting/full load current	:	8.3
Max. water temperature	:	40 [°C]
Max. air temperature at the cable	:	50 [°C]

Load	n [rpm]	P1 [kW]	P2 [kW]	eta [%]	cos phi	I [A]
4/4	1483	7.22	6.500	90.1	0.82	12.2/7.0
3/4	1487	5.48	4.875	89.0	0.77	9.89/5.7
2/4	1491	3.77	3.250	86.3	0.65	8.11/4.7
1/4	1496	2.09	1.625	77.8	0.42	6.86/4.0

Maximum 10 starts per hour

starting mode: direct or Y/D

Cable norm/ Cable selection according to:

VDE

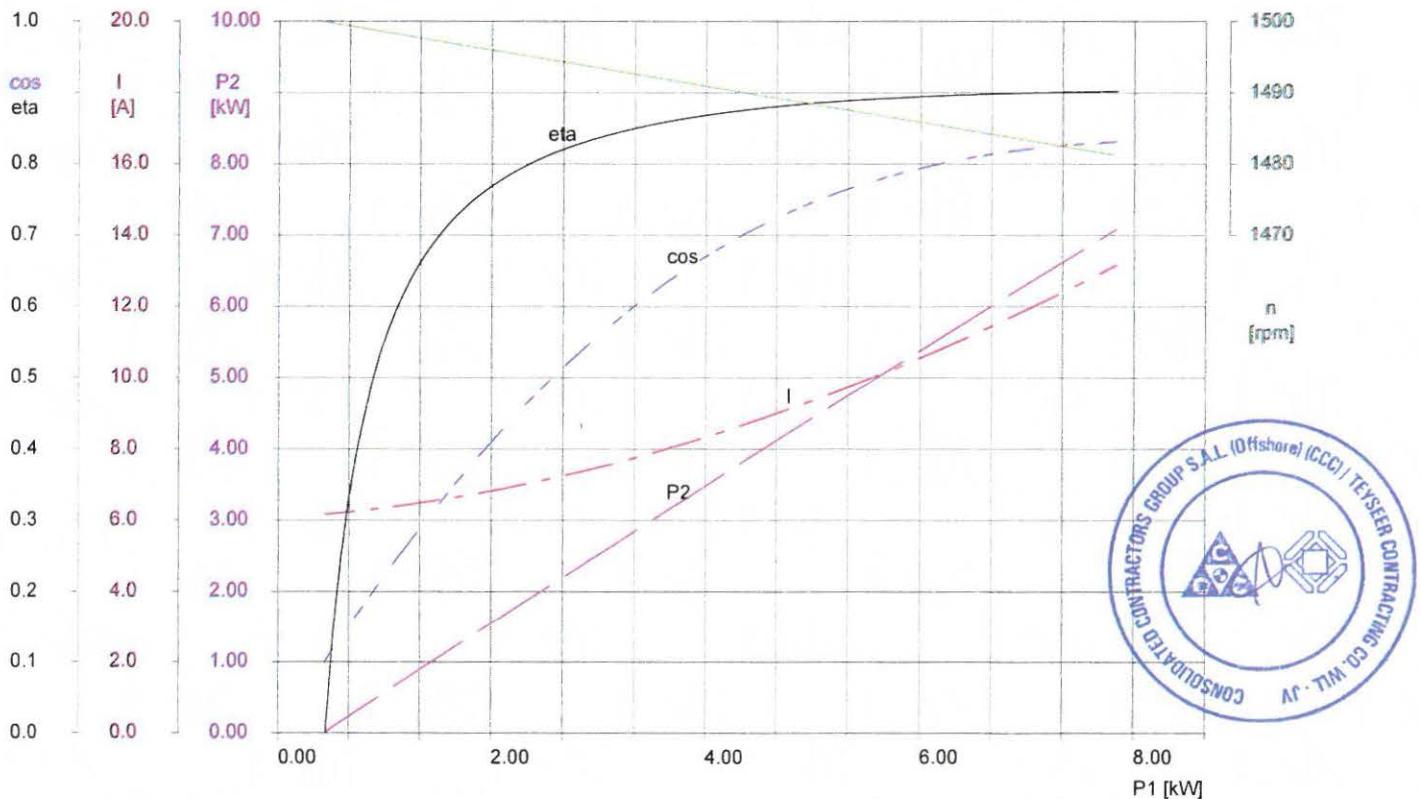
1 Cable

S1BN8-F 12G1.5

Ø 16.6-17.6 mm

Descriptions : P1 [kW]..... electric power
 eta [%]..... Efficiency
 I [A]..... Current

P2 [kW]..... mechanical power
 cos phi..... Power factor
 n [rpm]..... Speed



Tolerances of the electrical parameters according to IEC 60034-1.

Installation plan

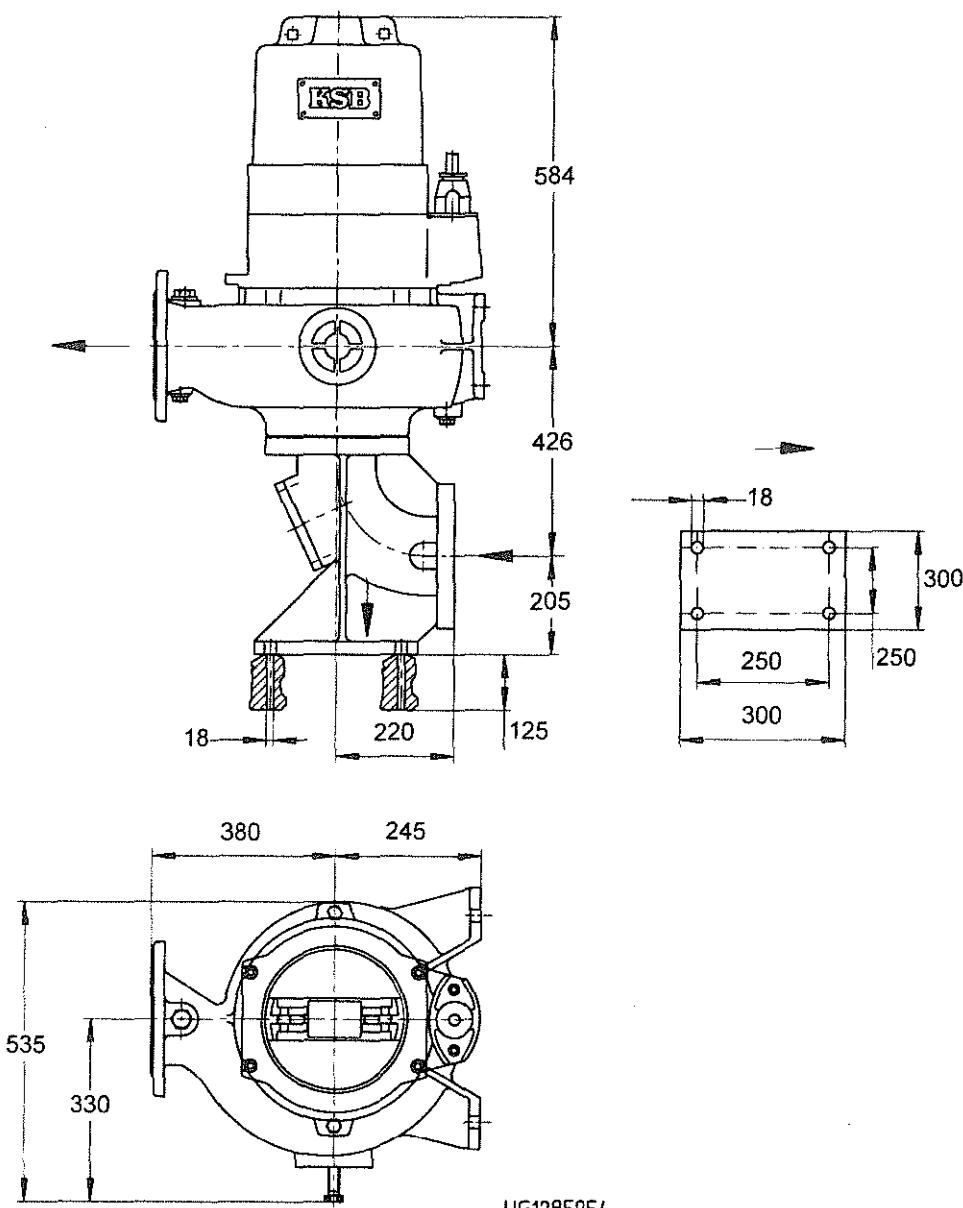


Customer item no.: 5.3.1.3
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 900
Date: 21/06/2014
Page: 6 / 7

KRTD 100-251/R74UKG1-D IE3

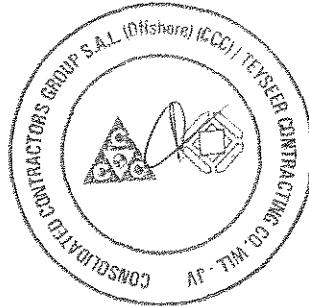
Version no.: 1



UG1285954

Drawing is not to scale

Dimensions in mm



Installation plan



Customer item no.: 5.3.1.3
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 900
Date: 21/06/2014
Page: 7 / 7

KRTD 100-251/R74UKG1-D IE3

Version no.: 1

Motor

Motor manufacturer : KSB
Motor size : 7K
Motor power : 6.50 kW
Number of poles : 4
Speed of rotation : 1480 rpm

Connections

Inlet elbow size / DN0 DN 150 / 150
Suction flange pump according EN 1092-2 / DN 150 / drilled
to(DN1) DIN 2501 / ISO 7005
Discharge flange pump DN 100 / PN 16 / Drilled
according to(DN2) according to EN 1092-2
Suction nozzle drilled acc. to DIN2501 with tapped blind holes

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:
Dimensions without tolerances, middle tolerances to:
Connection dimensions for pumps:
Dimensions without tolerances - welded parts:
Dimensions without tolerances - gray cast iron parts:

Weight net

Pump, Motor, Cable 290 kg
Total 290 kg
DIN 747
ISO 2768-m
EN735
ISO 13920-B
ISO 8062-CT9

For auxiliary connections see
separate drawing.

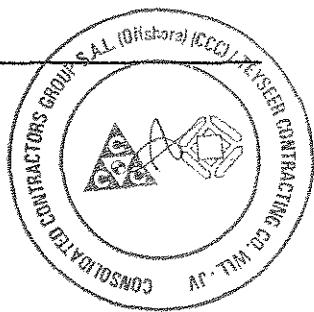


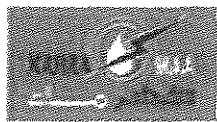


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I 7 017A

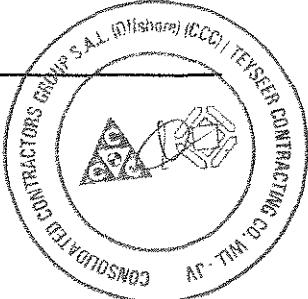
SCOUR PUMPS





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

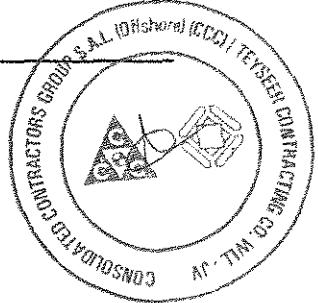
	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Pump Tag/Model Number			KRTD 100-251/R74UKG1-D IE3
	2	Service		Potable water	Potable water
	3	Location		PRPS-1 Auxiliary Pumping Station	PRPS-1 Auxiliary Pumping Station
	4	No. of Pump sets		2	2
	5	Type of Pump sets		Dry submersible	Dry submersible
GENERAL	6	Name of Manufacturer			KSB
	7	Place of Manufacture (City & Country)			Halle/Germany
	8	Name of Local Agent			M/s A.A. Engineering Services
EQUIPMENTS INCLUDED	9	Pump		Required	KRTD 100-251/R74UKG1-D IE3
	10	Motor		Required	included
	11	Coupling & other accessories		Required	included
	12	Rated duty point	l/s	54	54
	13	Rated head @ duty point	m	7	7
	14	NPSHr	Meters		1,86
	15	NPSHa	Meters	8	noted
	16	Design Temperature	Deg.C	50	noted
	17	Nozzles size/rating			
	i.	Suction side	NB (mm)	PN16	Drilled PN16
	ii.	Delivery side	NB (mm)	PN16	Drilled PN16
	18	Min. motor rating required	Kw		6,4
	19	Guaranteed Pump Efficiency at rated output (min.)	(%)	77	71,5
	20	NPSH(R) at rated output	mwc		1,86
	21	Maximum allowable pump speed	rpm	1500	
	22	Speed at rated output	rpm		1486
	23	End of curve output at rated speed	m ³ /h		295,2
	24	End of curve head at rated speed	mwc		3
	25	Min. continuous flow at rated speed	m ³ /h		115,2
	26	Head at min. continuous flow	mwc		10,5

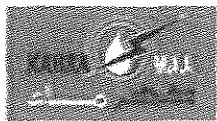




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
PUMP MATERIALS	27	Shut-off head at rated speed	mwc		18
	28	Critical speed	rpm		n.a.
	29	Specific speed (impeller)	rpm		71.2
	30	Diameter of impeller	mm		234
	31	Weight			290
	I	Pump	Kg		See #I
	II	Motor	Kg		Will follow
	III	Total package	Kg		
	32	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	33	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
TESTS	34	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	1.4462
	35	Shaft protection sleeves		Stainless steel 1.4571 or other proper equivalent material	1.4021
	36	Wearing rings		Stainless steel EN 1.4571 (316Ti).	CrNi steel VG434
	37	Bolts & Nuts		SS316	SS 316 Ti
	38	Bearings			Grease lubricated
	39	Seal Type & Material			Mechn. Seal SIC/SIC
	40	Motor test at factory		Required	See below
	41	Combined pump & motor tests		Required	ISO 9906 Grade 1E
	42	Site tests		Required	KSB Supervisor as per KSB offer
DRIVE MOTOR	43	Manufacturer			KSB
	44	Motor Type			Dry submersible
	45	Degree of protection		IP68	
	46	Rated output (at 55 deg C)	kW		Will follow
	47	Rated output (at 40 deg C)	kW		6.5
	48	Rated voltage	Kv	0.415	0.415





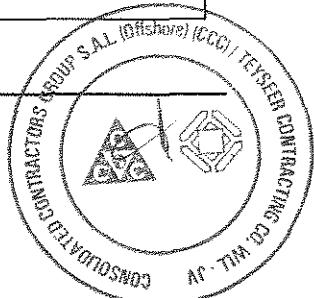
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
49	Frequency	Hz	50	50
50	Rated full load current (FLC)	A		Will follow
51	Rated nominal current	A		12.2
52a	Type of starting		DOL	DOL
52b	Starting current (DOL)	A		101.26
53	Number of poles			4
54	Nominal max. speed	rpm		1490
55	Efficiency at full load and rated voltage	%.		90.1
56	Power factor at full load			0.82
57	Power factor at starting DOL			
58	Insulation class	F		H
59	Maximum permissible temperature rise to that of class	B		
60	Noise level (not exceeding 85 dB(A) combined with pump & drive)			85
61	Windings temp. alarm		Yes	Yes
62	Winding temp. protection		Yes	Yes
63	Lube oil level		Yes	n.a.
64	Form of enclosure protection			IP68
65	Form of mounting			vertical
66	Cast steel frame for motor support above pump			included
67	Form of cooling			Convectional cooling
68	Electrical standard		IEC-60034	n.a. for IP68 motors
69	Anti-condensation heater (at 240 V)	W		n.a. for IP68 motors
70	Dimension standard		IEC 60072	n.a. for IP68 motors
71	Design temperature and humidity	° C / %	50/ 100	50°C/100
72	Delivery time	Weeks		As per KSB offer

Notes :

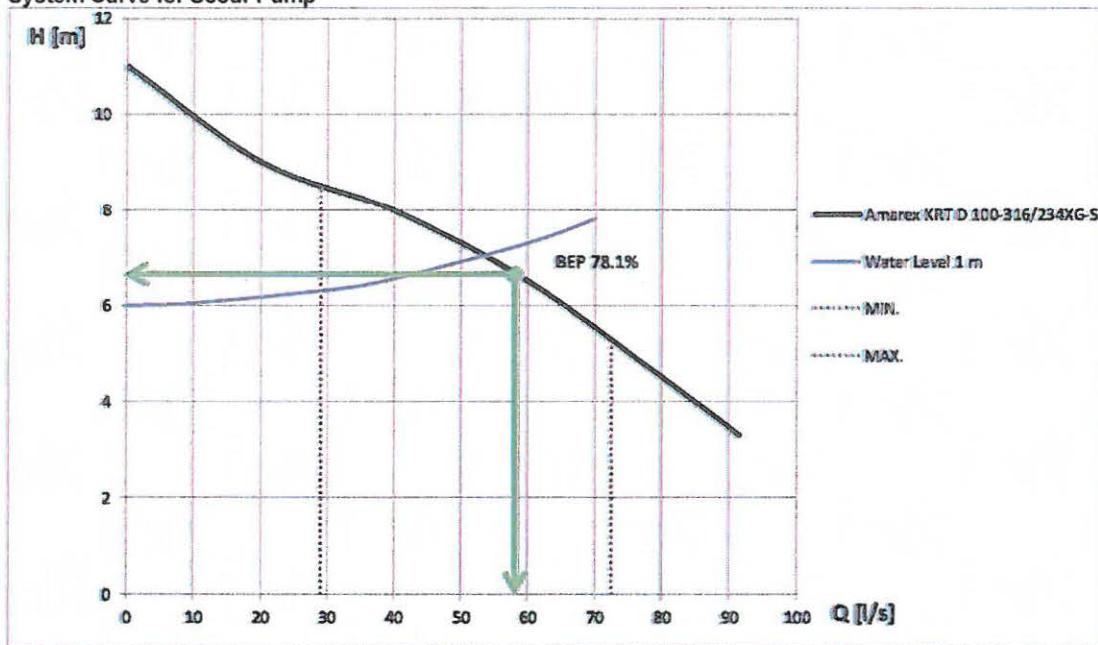
1) Bidder to provide proposed pump curve for rated duty point which should show the following:-

- > HEAD (m) versus FLOW (OUTPUT).
- > NPSH (m) versus FLOW
- > POWER (kW) versus FLOW
- > EFFICIENCY versus FLOW





System Curve for Scour Pump



Note: Pump curve is indicative and for illustrative purposes only.

Data sheet



Customer item no.: 5.3.1.4
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1000
 Date: 22/07/2014
 Page: 1 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Operating data

Requested flow rate	10.000 l/s	Actual flow rate	10.398 l/s
Requested developed head	11.70 m	Actual developed head	12.65 m
Pumped medium	Water	Efficiency	49.1 %
	Clean water	Power absorbed	2.63 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	1468 rpm
Ambient air temperature	50.0 °C	Max. power on curve	4.24 kW
Fluid temperature	20.0 °C	Shutoff head	15.23 m
Fluid density	998 kg/m³	Design	Single system 1 x 100 %
Fluid viscosity	1.00 mm²/s	Performance test	Yes

Design

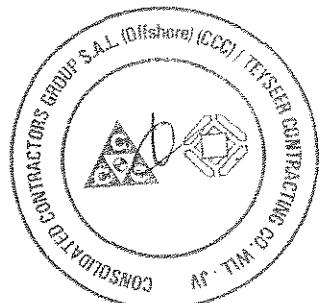
Design	Close-coupled submersible	Type	MG
Orientation	Vertical	Material code	SIC/SIC/NBR
Suction flange pump according to(DN1)	unmachined	Impeller type	Free flow (vortex) impeller (F)
Discharge flange pump according to(DN2)	DN 80 / PN 16 / Drilled according to EN 1092-2	Impeller diameter	210.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size	76.0 mm
Manufacturer	KSB	Direction of rotation from drive	Clockwise

Driver, accessories

Driver type	Electric motor	Motor winding	415 / 720 V
Model (make)	KSB	Number of poles	4
Motor const. type	KSB Sub. motor	Starting mode	Direct/Star-delta possible
Frequency	50 Hz	Connection mode	Delta
Rated voltage	415 V	Motor cooling method	Surface cooling
Rated power P2	5.50 kW	Motor version	U
Available reserve	29.69 %	Cable design	Rubber hose
Rated current	11.4 A	Cable entry	Sealed along entire length
Starting current ratio	4.8	Power cable	S1BN8-F 12G1.5
Insulation class	F to IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	with
Cos phi at 4/4 load	0.82	Cable length	10.00 m
Motor efficiency at 4/4 load	82.0 %		
Temperature sensor	Bimetallic switch 2x		

Materials G1

Notes	Impeller (230)	GX2CRNIMOCUN25-6-3-3
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.	1.4517	
Pump casing (101)	O-Ring (412)	Nitrile rubber NBR
Discharge cover (163)	Motor housing (811)	Grey cast iron EN-GJL-250
Shaft (210)	Motor cable (824)	Chloroprene rubber
	Hexagon socket head cap screw (914)	CrNiMo steel A4



Data sheet



Customer item no.: 5.3.1.4
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1000
 Date: 22/07/2014
 Page: 2 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage	Indoor Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.
Packaging for transport IPPC Standard ISPM 15	Ship Yes		

Nameplates

Nameplates language	International	Duplicate nameplate	with
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Certifications

Hydraulic performance test		Test participation	Non-witnessed
Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2	Hydrostatic test (room temp.)	
Quantity meas. points Q-H	5	Range	Complete pump with shaft seal
Certificate	Inspection cert. 3.2 to EN 10204	Test pressure	2.50 bar.g
Test participation	Witnessed	Test time	10.0 min
Quantity, non-witnessed	1	Certificate	Inspection cert. 3.1 to EN 10204
Quantity, witnessed	1	Test participation	Non-witnessed
Vibration test	Yes	Final visual inspection	
Balancing test		Certificate	Inspection cert. 3.1 to EN 10204
Balancing grade	G 6,3	Test participation	Witnessed
Part	Impeller	Material certificates: Pump casing, intermediate casing , shaft, impeller, motor housing (101, 113, 210, 230, 811)	
Certificate	Inspection cert. 3.1 to EN 10204	Certificate	Test report 2.2 to EN 10204

Installation parts

Installation type	stationary 2 guide rail	Type	Chain
Scope of supply	Pump with installation parts	Material	CrNiMo steel 1.4404
	For guide rail arrangements, the guide rails are not included in KSB's scope of supply.	Length	5.00 m
		Max. load	160 kg
Installation depth	4.50 m		
Material concept	G		

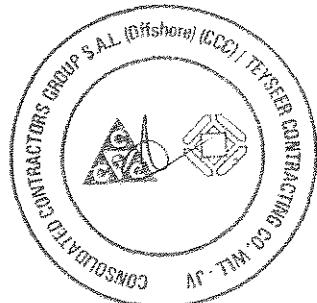
Duckfoot bend

Size	DN 80
Flange design	EN
Duckfoot bend size (DN2 / DN3)	DN 80 Drilled according to EN
Material	Grey cast iron EN-GJL-250
Mounting type	Composite anchor bolts
Foundation rail	Without

Claw

Design	straight
Size	DN 80

Lifting chain / -rope



Data sheet



Customer item no.: 5.3.1.4
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

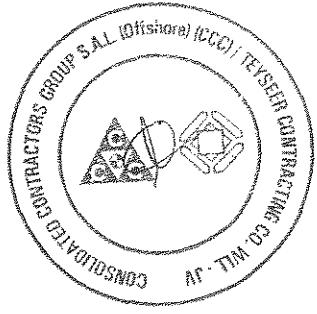
Number: 4002140658
Item no.: 1000
Date: 22/07/2014
Page: 3 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin	Total film thickness approx.	KSB-blue
Intermediate coating	2-component epoxy resin high solid		300 µm



Performance curve

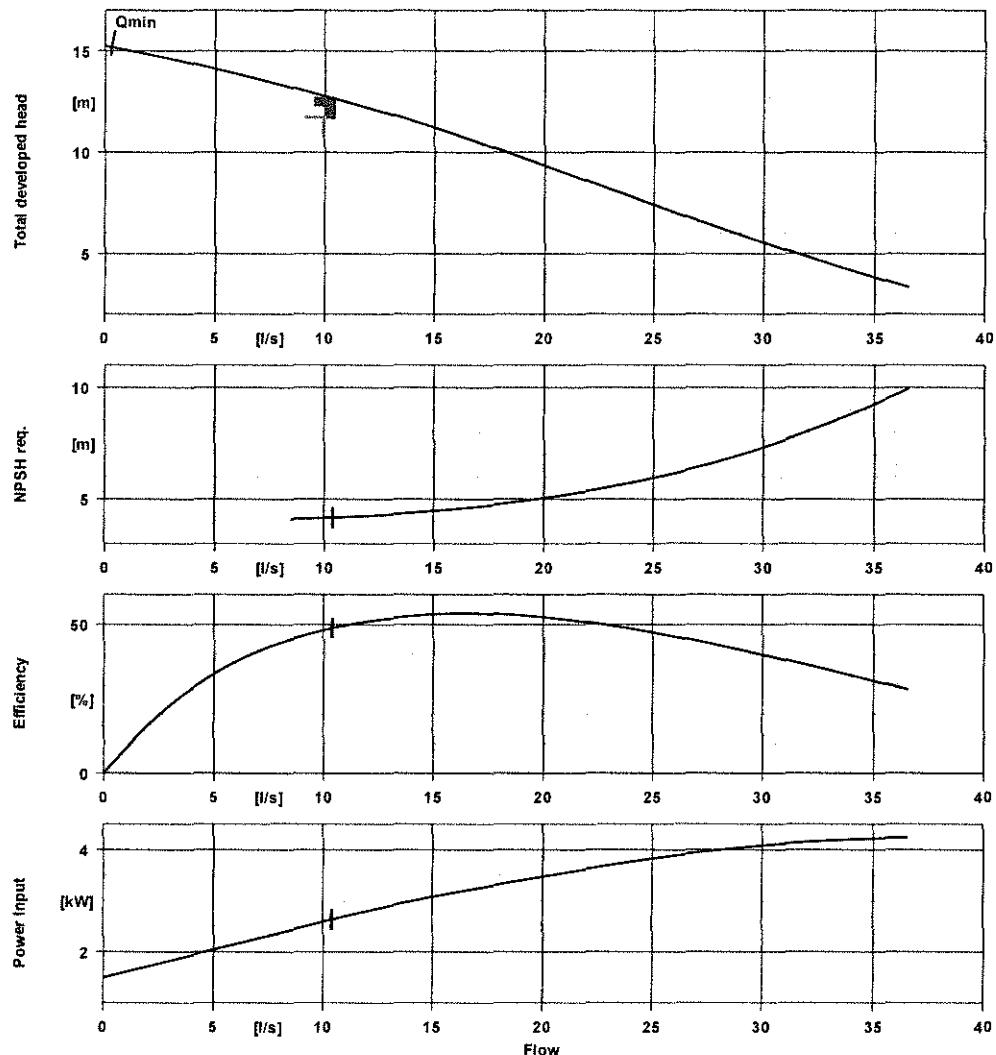


Customer item no.:5.3.1.4
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1000
 Date: 22/07/2014
 Page: 4 / 6

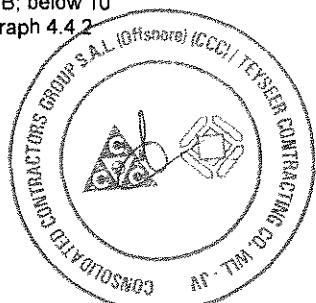
KRTF 80-250/54UG1-S

Version no.: 1



Curve data

Speed of rotation	1468 rpm	Efficiency	49.1 %
Fluid density	998 kg/m ³	Power absorbed	2.63 kW
Viscosity	1.00 mm ² /s	NPSH required	4.18 m
Flow rate	10.398 l/s	Curve number	K42873s
Requested flow rate	10.000 l/s	Effective impeller diameter	210.0 mm
Total developed head	12.65 m	Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2
Requested developed head	11.70 m		



Installation plan

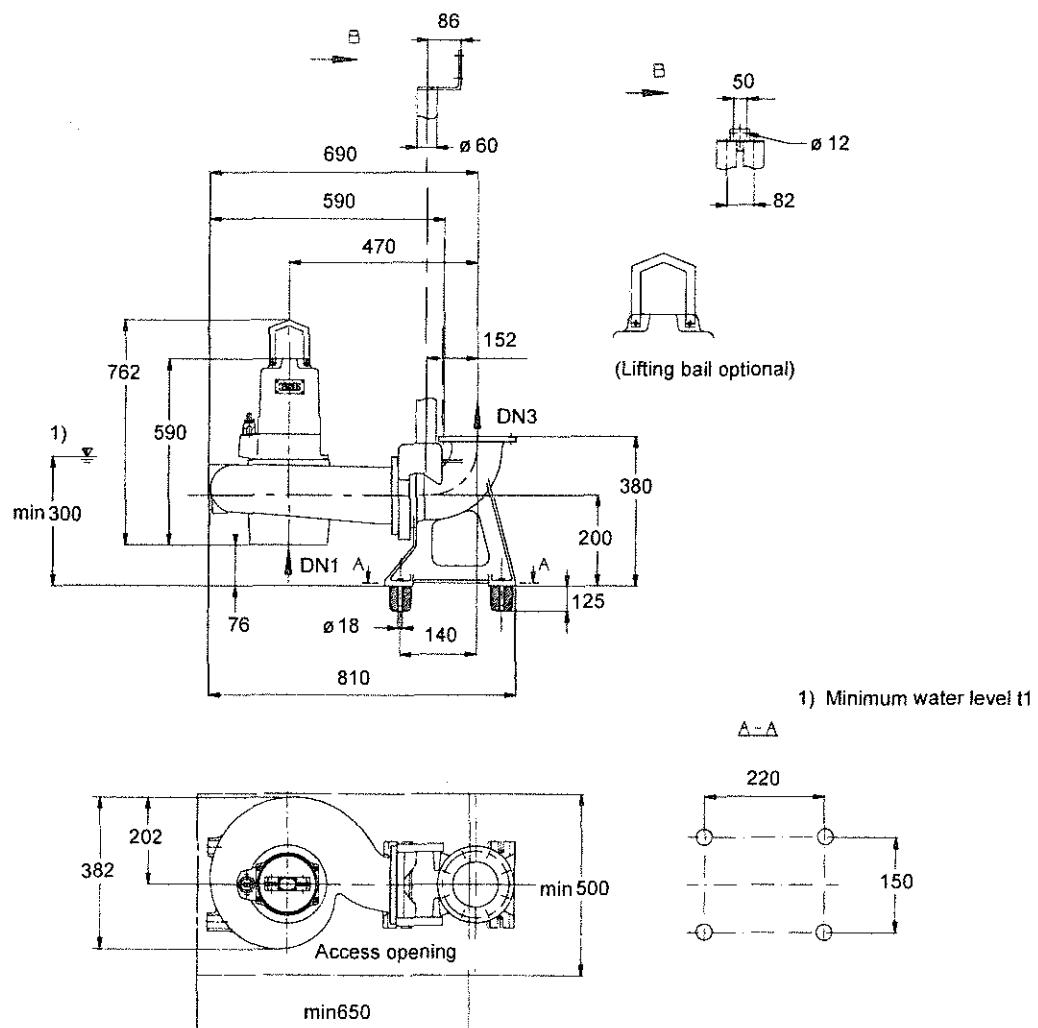


Customer item no.: 5.3.1.4
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1000
 Date: 22/07/2014
 Page: 5 / 6

KRTF 80-250/54UG1-S

Version no.: 1



Drawing is not to scale

Dimensions in mm



Installation plan



Customer item no.: 5.3.1.4
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 1000
Date: 22/07/2014
Page: 6 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Motor

Motor manufacturer KSB
Motor size 5
Motor power 5.50 kW
Number of poles 4
Speed of rotation 1433 rpm

Connections

Suction flange pump according unmachined
to(DN1)
Duckfoot bend size (DN2 / DN3)DN 80 Drilled according to EN

Weight net

Pump, Motor, Cable	139 kg
Claw / Foot	10 kg
Total	149 kg

For auxiliary connections see
separate drawing.

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:
Dimensions without tolerances, middle tolerances to:
Connection dimensions for pumps:
Dimensions without tolerances - welded parts:
Dimensions without tolerances - gray cast iron parts:

DIN 747
ISO 2768-m
EN735
ISO 13920-B
ISO 8062-CT9



Data sheet



Customer item no.: 5.4.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 1100
 Date: 22/07/2014
 Page: 1 / 8

KRTK 200-401/A326UNG1-D

Version no.: 1

Operating data

Requested flow rate	100.000 l/s	Actual flow rate	100.000 l/s
Requested developed head	9.96 m	Actual developed head	9.96 m
Pumped medium	Water	Efficiency	77.0 %
	Clean water	Power absorbed	12.76 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	989 rpm
Ambient air temperature	50.0 °C	NPSH required	2.01 m
Fluid temperature	20.0 °C	Permissible operating pressure	10.00 bar.g
Fluid density	998 kg/m³	Discharge press.	0.98 bar.g
Fluid viscosity	1.00 mm²/s	Shutoff head	15.69 m
Suction pressure max.	0.00 bar.g	Design	Single system 1 x 100 %
Max. power on curve	13.99 kW	Performance test	Yes

Design

Design	Close-coupled submersible	Impeller type	Multivane radial flow impeller (K)
Orientation	Vertical		
Suction flange pump according to(DN1)	EN 1092-2 / DN 200 / drilled DIN 2501 / ISO 7005	Wear ring	Casing/impeller wear ring
Discharge flange pump according to(DN2)	DN 200 / Drilled according to EN 1092-2	Impeller diameter	305.0 mm
Suction nozzle drilled acc. to DIN2501 with tapped blind holes		Free passage size	80.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Direction of rotation from drive	Clockwise
Manufacturer	KSB	Temperature sensor PT100	with
Type	MG	inboard	
Material code	SIC/SIC/NBR	Temperature sensor PT100 mtswith	
		Vibration sensor	with

Driver, accessories

Driver type	Electric motor	Number of poles	6
Model (make)	KSB	Starting mode	Direct/Star-delta possible
Motor const. type	KSB Sub. motor	Connection mode	Delta
Operating mode	S1, non submerged operation	Motor cooling method	closed-circuit jacket cooling
Frequency	50 Hz	Motor cooling jacket	with
Rated voltage	415 V	Motor version	U
Rated power P2	20.00 kW	Cable design	Shielded control cable
Rated current	41.3 A	Cable entry	Sealed along entire length
Starting current ratio	6.2	Power cable	S1BN8-F 4G4
Insulation class	H according IEC 34-1	Number of power cables	2
Motor enclosure	IP68	Control cable	S07RC4N8-F 12G1.5
Cos phi at 4/4 load	0.76	Number of control cables	1
Motor efficiency at 4/4 load	88.1 %	Moisture sensor	with
Temperature sensor	PTC resistor	Cable length	10.00 m
Motor winding	415 / 720 V		



Data sheet



Customer item no.: 5.4.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 1100
 Date: 22/07/2014
 Page: 2 / 8

KRTK 200-401/A326UNG1-D

Version no.: 1

Materials G1

Notes	Casing wear ring (502.1)	Grey cast iron EN-GJL-250
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.	Impeller wear ring (503)	CrNi steel VG434
Pump casing (101)	Shaft protecting sleeve (524)	Chrome steel 1.4021+QT800
Discharge cover (163)	Cooling jacket (66-2)	Stainless steel 1.4571
Shaft (210)	Motor housing (811)	Grey cast iron EN-GJL-250
Impeller (230)	Motor cable (824)	Chloroprene rubber
Bearing bracket (330)	Hexagon socket head cap screw (914)	CrNiMo steel A4
O-Ring (412)		

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage	Indoor
Packaging for transport IPPC Standard ISPM 15	Ship Yes	Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.	

Nameplates

Nameplates language	International	Duplicate nameplate	with
---------------------	---------------	---------------------	------

Auxiliary connections

1M.2 Pressure gauge connection	G 1/2, Drilled and plugged.	6D Pumped medium - filling / venting	G 1 1/4, Drilled and plugged.
6B Pumped liquid drain	G 1, Drilled and plugged.		

Certifications

Hydraulic performance test		Certificate	Inspection cert. 3.1 to EN 10204
Acceptance standard	ISO 9906 class 1B	Test participation	Non-witnessed
Quantity meas. points Q-H	5		
Certificate	Inspection cert. 3.2 to EN 10204		
Test participation	Witnessed	Hydrostatic test (room temp.)	
Quantity, non-witnessed	3	Range	Complete pump with shaft seal
Quantity, witnessed	1	Test pressure	3.00 bar.g
NPSH test	Yes	Test time	10.0 min
Quantity meas. points NPSH	3	Certificate	Inspection cert. 3.1 to EN 10204
Vibration test	Yes	Test participation	Non-witnessed

Balancing test

Balancing grade	G 6.3	Certificate	Without
Part	Impeller	Test participation	Non-witnessed

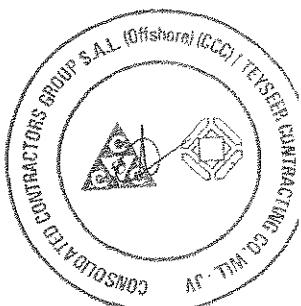
Material certificates: Pump casing, intermediate casing, shaft, impeller, motor housing (101, 113, 210, 230, 811)
 Certificate Test report 2.2 to EN 10204

Order documentation

The following documents will be supplied with the order:
 Manufacturer's or conformity declaration
 Motor data sheet
 General arrangement drawing
 Operating manual

Material certificates
 Performance curve
 Technical data sheet
 Languages

English



Data sheet



Customer item no.: 5.4.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 4

Number: 4002140658
Item no.: 1100
Date: 22/07/2014
Page: 3 / 8

KRTK 200-401/A326UNG1-D

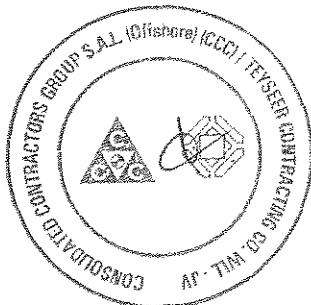
Version no.: 1

Installation parts

Installation type	Dry installation	Foundation rails	Yes
Scope of supply	Pump with installation parts	Inlet elbow size / DN0	DN 200 / 300
Installation variant	Dry	Lifting Bail	with
Material concept	G		

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin		KSB-blue
Intermediate coating	2-component epoxy resin high solid	Total film thickness approx.	300 µm



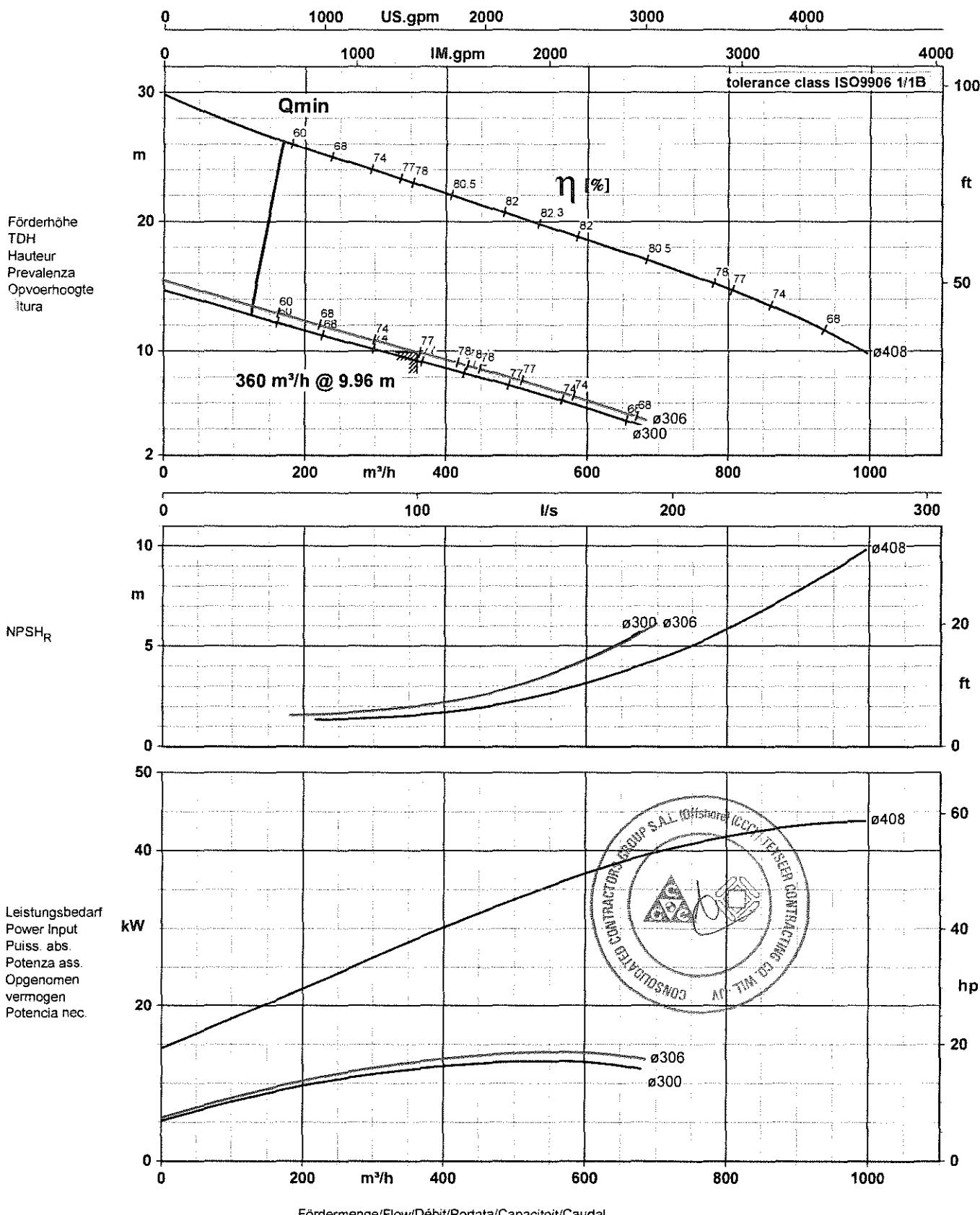
Baureihe-Größe Type-Size Modèle	Tipo Serie Tipo	Nenndrehzahl Nom. speed Vitesse nom.	Velocità di rotazione nom. Nominaal toerental Revvoluciones nom.	Laufrad-Ø Impeller dia. Diamètre de roue	Ø girante Waaiier Ø Ø rodete
---------------------------------------	-----------------------	--	--	--	------------------------------------

KRT K200-401/326UNG1-D

985 1/min



Projekt Project Projet	Progetto Projekt Proyecto	Angebots-Nr. Quotation No. Nº de offre	Nº offerta Offertennr. Nº ofertas	Pos.-Nr. Item No. Nº de pos	Nº pos Pos. nr. Nº de art
Mega Reservoir - Pac		4002140658		H-14-0634	



Motor data

Amarex KRT - Installation types: K/D



Motor type
Material version

: A326UNG
: G [cast iron]
also for motors -G1,-G2,-G3,-H

Nominal voltage	:	415/720	[V]
Frequency	:	50	[Hz]
Rated power	:	20.0	[kW]
Rated current	:	41.3/23.8	[A]
Nominal Speed	:	983	[rpm]
Starting/full load current	:	6.2	
Max. water temperature	:	40	[°C]
Max. air temperature at the cable	:	50	[°C]

Load	n [rpm]	P1 [kW]	P2 [kW]	eta [%]	cos phi	I [A]
4/4	983	22.7	20.00	88.1	0.76	41.3/23.8
3/4	987	17.2	15.00	87.1	0.70	34.2/19.7
2/4	992	11.9	10.00	83.8	0.58	28.5/16.4
1/4	996	6.8	5.00	73.2	0.39	24.2/14.0

Maximum 10 starts per hour

starting mode: direct or Y/D

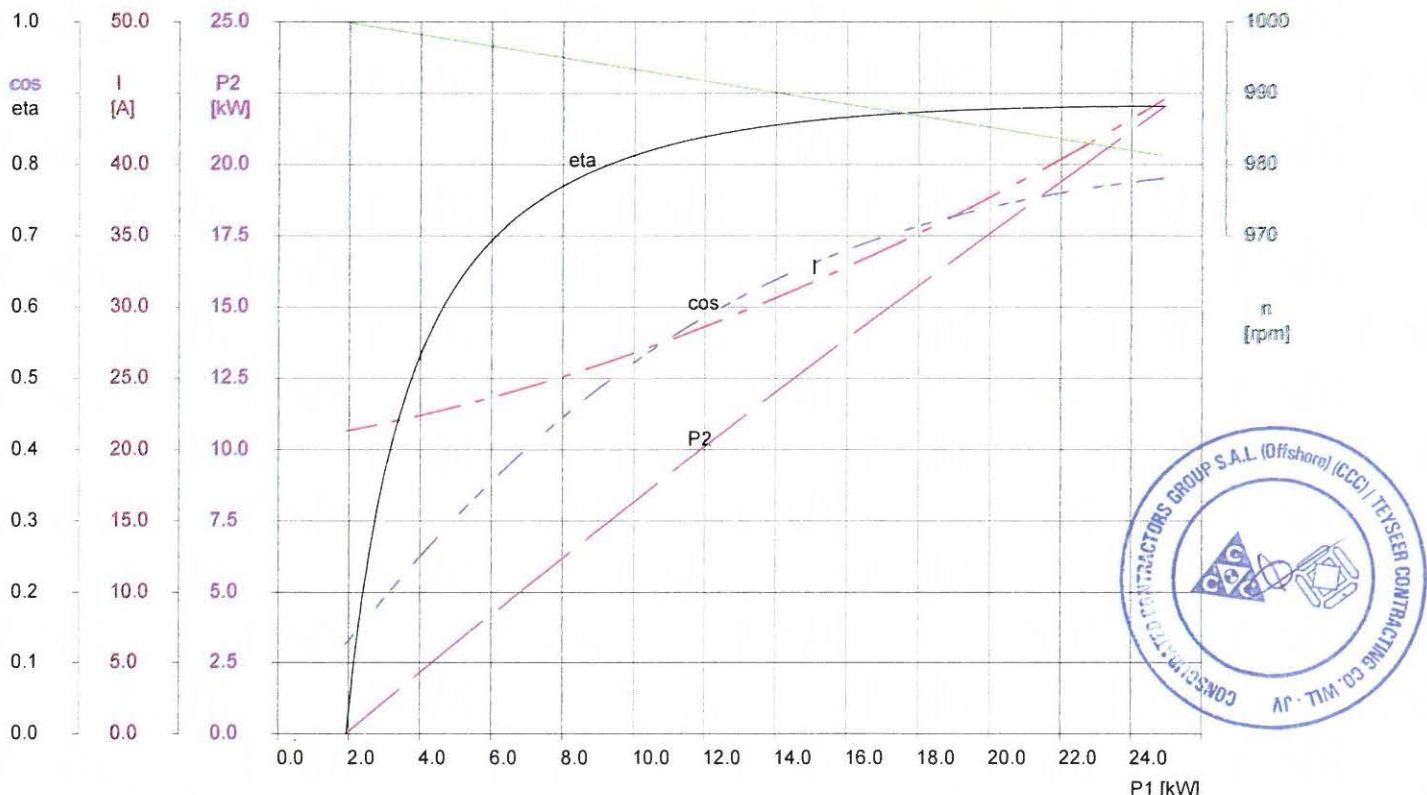
Cable norm/ Cable selection according to:

VDE

2 Cables S1BN8-F 4G4 Ø 12.4-13.4 mm
1 Control cable S1BN8-F 10G1.5 Ø 15.9-16.9 mm

Descriptions : P1 [kW]..... electric power
eta [%]..... Efficiency
I [A]..... Current

P2 [kW]..... mechanical power
cos phi..... Power factor
n [rpm]..... Speed



Tolerances of the electrical parameters according to IEC 60034-1.

Installation plan

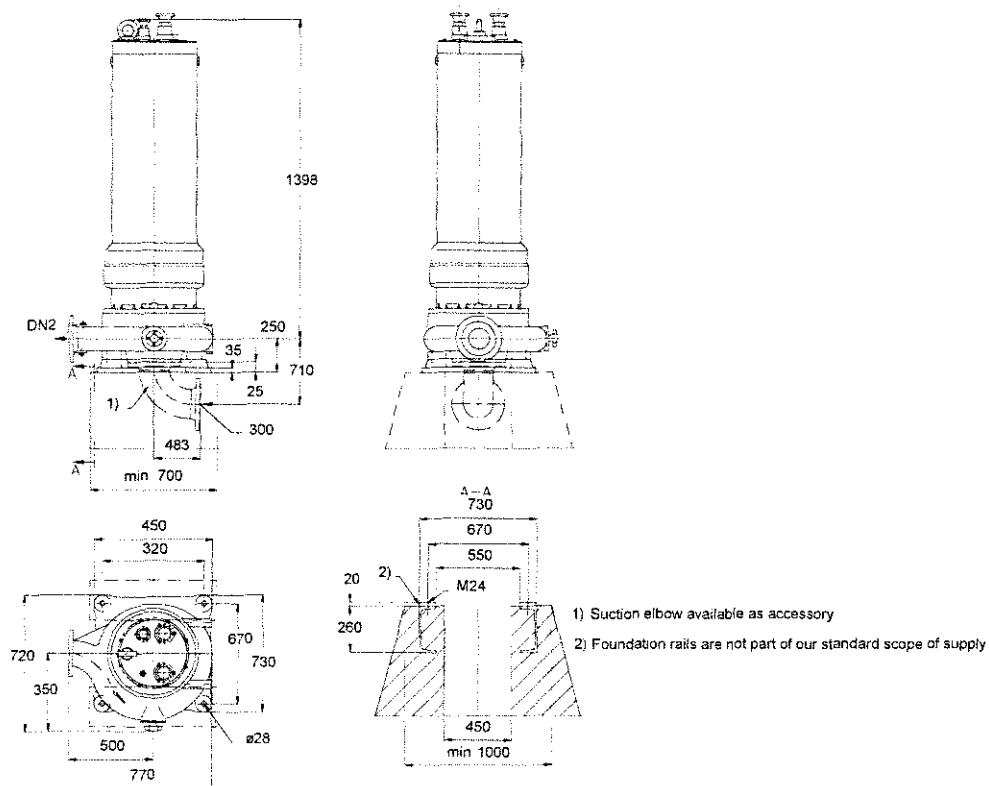


Customer item no.: 5.4.1.1
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 4

Number: 4002140658
 Item no.: 1100
 Date: 22/07/2014
 Page: 7 / 8

KRTK 200-401/A326UNG1-D

Version no.: 1



Drawing is not to scale

Dimensions in mm

Motor

Motor manufacturer	KSB
Motor size	A32N
Motor power	20.00 kW
Number of poles	6
Speed of rotation	979 rpm

Connections

Inlet elbow size / DN0	DN 200 / 300
Suction flange pump according to(DN1)	EN 1092-2 / DN 200 / drilled DIN 2501 / ISO 7005
Discharge flange pump according to(DN2)	DN 200 / PN 10 / Drilled according to EN 1092-2
Suction nozzle drilled acc. to DIN2501 with tapped blind holes	

Weight net

Pump, Motor, Cable
 Total

1062 kg
 1062 kg

For auxiliary connections see separate drawing.

Connect pipes without stress or strain!

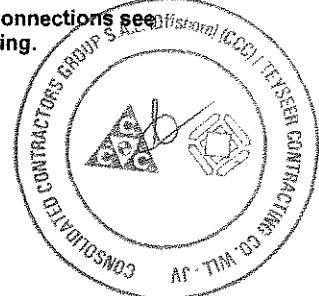
Dimensional tolerances for shaft axis height:

Dimensions without tolerances, middle tolerances to:

Connection dimensions for pumps:

Dimensions without tolerances - welded parts:

DIN 747
 ISO 2768-m
 EN735
 ISO 13920-B



Installation plan



Customer item no.: 5.4.1.1
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 4

Number: 4002140658
Item no.: 1100
Date: 22/07/2014
Page: 8 / 8

KRTK 200-401/A326UNG1-D

Version no.: 1

Dimensions without tolerances - gray cast iron parts: ISO 8062-CT9

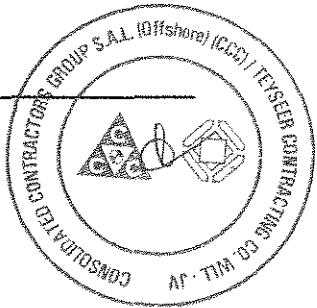


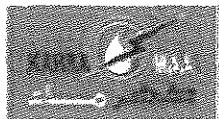


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I 7 020A

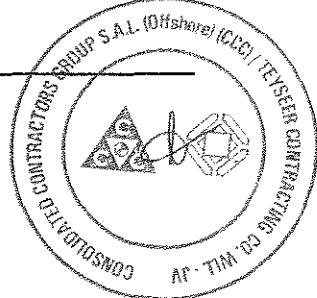
EMERGENCY TANKER FILLING PUMPS

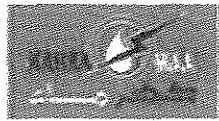




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Location		PRPS-1	PRPS-1
	2	Pumping System		Emergency Tanker Filling	Emergency Tanker Filling
	3	Service		Potable Water	Potable Water
	4	No. of Pump sets		4 (1 D + 1 A + 1 S + 1 Spare)	4
	5	Type of Pump sets		Dry Submersible	Dry Submersible
GENERAL INFORMATION	6	Name of Manufacturer			KSB
	7	Place of Manuf. (City / Country)			Halle/Germany
	8	Name of Local Agent			KSB Middle East
EQUIPMENT INCLUDED	9	Pump		Required	KRTK 200-401/A326UNG1-S
	10	Motor		Required	A326UNG1-S
	11	Type of Starting		Star-Delta	Star-Delta
	12	Motor support structure		Required	included
TECHNICAL DATA	13	Operational points			
	14	Duty Point Δ s Head	m	100 9.96	100l/s @ 9,96m
	15	NPSH r			2,01
	16	NPSH a		7	
	17	Design Temperature:		50	50
	18	Nozzles size/rating:			
	i.	Suction side		PN16	Drilled PN16
	ii.	Delivery side		PN16	Drilled PN16
	19	Min. motor rating required	Kw		16,1
	20	Pump Efficiency at rated output (min.)	(%)	77	
	21	Guaranteed Pump Efficiency at rated output (min.)	(%)		77
	22	NPSH@ at rated output	mwc		2,01
	23	Speed at rated output	rpm		989
	24	End of curve output at rated speed	m ³ /h		684
	25	End of curve head at rated speed	mwc		2.8
	26	Min. continuous flow at rated speed	m ³ /h		126
	27	Head at min. continuous flow	mwc		12,5
	28	Shut-off head at rated speed	mwc		16
	29	Critical speed	rpm		n.a.
	30	Specific speed (impeller)	rpm		67
	31	Rated diameter of impeller	mm		305
	32	Max. possible diameter of impeller	mm		408
		Min. possible diameter of impeller	mm		300





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
PUMP MATERIALS	33	Casing		High grade cast iron as per EN BS 1561 or BS 1452	EN-GJL-250
	34	Impeller		Duplex stainless steel 1.4517 or equivalent	Duplex 1.4517
	35	Shaft		High tensile steel to BS 970, forged stainless steel or other approved material	1.4462
	36	Shaft protection sleeves		stainless steel 1.4571 or other proper equivalent material	1.4021
	37	Wearing rings		Stainless steel EN 1.4571 (316Ti)	CrNi Steel VG434
	38	Bearings			Grease lubricated
	39	Seal material & Type			Mechn. Seal SIC/SIC
	40	Pump Coating		Plastic enamel paint (epoxy resin) inside and outside applied by electrostatic spray process.	2-comp. epoxy resin
	41	Motor test at factory		Accordance with ISO 9906 Grade 1	See below
TESTS	42	Combined pump & motor test at factory		Accordance with ISO 9906 Grade 1	ISO 9906/1E
	43	Site tests		Required	By others
	44	Manufacturer			KSB
DRIVE MOTOR	45	Motor Type		Dry submersible	Dry submersible
	46	Degree of protection		IP68	IP68
	47	Rated output (at 55 deg C)	kW		
	48	Rated output (at 40 deg.C)	kW		20
	49	Rated voltage	kV	0.415	0.415
	50	Frequency	Hz	50	50
	51	Rated full load current (FLC)	A		41,3
	52	Rated nominal current	A		
	53	Starting current	A		257
	54	Number of poles			6
	55	Nominal max. speed	rpm		960
	56	Efficiency at full load and rated voltage	%		88,1
	57	Power factor at full load	%		0,76
	58	Power factor at starting			





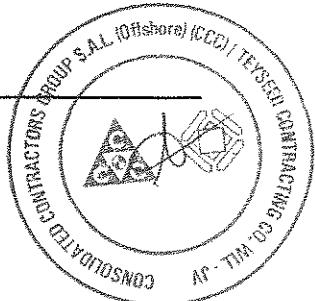
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
59	Maximum permissible temperature rise to that of class		B	
60	Insulation class		F	H
61	Noise level (not exceeding 85 dB(A) combined with pump & drive)			85
62	Windings temp. alarm			Yes
63	Winding temp. protection			Yes
64	Plus 3 PT 100 elements reserve			
65	Bearing temp. protection (per bearing)			yes
66	Vibration protection (per bearing)			yes
67	Form of enclosure protection			IP68
68	Form of mounting			Vertical
69	Cast steel frame for motor support above pump		Included	Included
70	Form of cooling			Closed cooling Jacket
71	Electrical standard		IEC-60034	n.a. for IP68 motors
72	Dimension standard		IEC 60072	n.a. for IP68 motors
73	Design temperature and humidity	° C / %	50/ 100	50/100
74	Anti-condensation heater (at 240 V)	W		n.a. for IP68
75	Net weight	Kg		1074
76	Delivery time	Weeks		As per KSB offer

Notes :

- 1) Bidder to provide proposed pump curve for rated duty point which should show the following:-

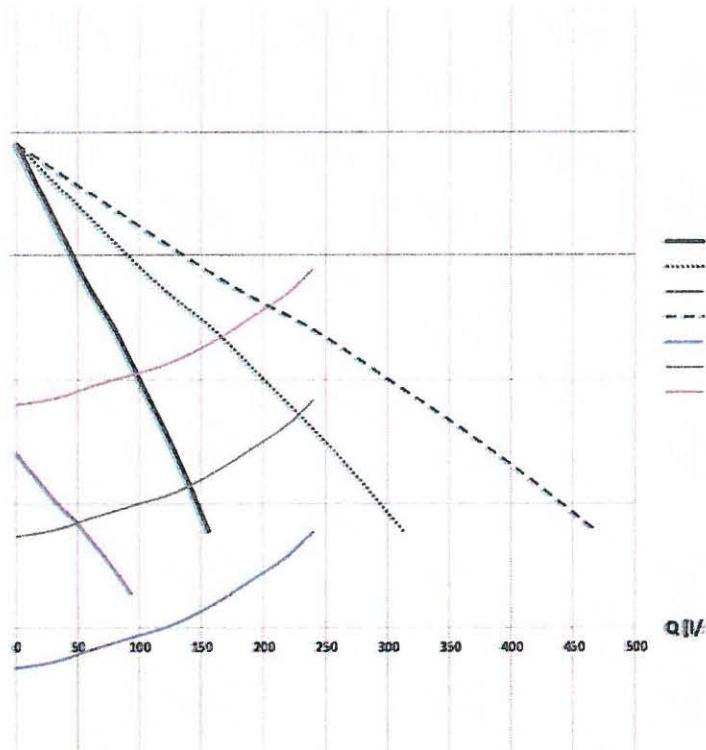
- > HEAD (m) versus FLOW (OUTPUT).
- > NPSH (m) versus FLOW
- > POWER (kW) versus FLOW
- > EFFICIENCY versus FLOW





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

System Curve for Emergency Tanker Filling Pump



Note: Pump curve is indicative and for illustrative purposes only.

Data sheet



Customer item no.: 5.4.1.2
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1200
 Date: 22/07/2014
 Page: 1 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Operating data

Requested flow rate	10.000 l/s	Actual flow rate	10.398 l/s
Requested developed head	11.70 m	Actual developed head	12.65 m
Pumped medium	Water	Efficiency	49.1 %
	Clean water	Power absorbed	2.63 kW
	Not containing chemical and mechanical substances which affect the materials	Pump speed of rotation	1468 rpm
Ambient air temperature	50.0 °C	Max. power on curve	4.24 kW
Fluid temperature	20.0 °C	Shutoff head	15.23 m
Fluid density	998 kg/m³	Design	Single system 1 x 100 %
Fluid viscosity	1.00 mm²/s	Performance test	Yes

Design

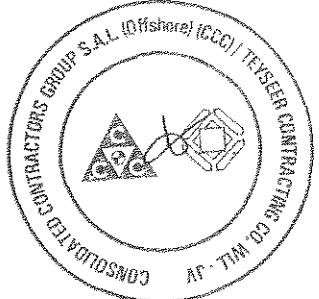
Design	Close-coupled submersible	Type	MG
Orientation	Vertical	Material code	SIC/SIC/NBR
Suction flange pump according to(DN1)	unmachined	Impeller type	Free flow (vortex) impeller (F)
Discharge flange pump according to(DN2)	DN 80 / Drilled according to EN 1092-2	Impeller diameter	210.0 mm
Shaft seal	2 mech. seals in tandem arrangement with oil reservoir	Free passage size	76.0 mm
Manufacturer	KSB	Direction of rotation from drive	Clockwise

Driver, accessories

Driver type	Electric motor	Motor winding	415 / 720 V
Model (make)	KSB	Number of poles	4
Motor const. type	KSB Sub. motor	Starting mode	Direct/Star-delta possible
Frequency	50 Hz	Connection mode	Delta
Rated voltage	415 V	Motor cooling method	Surface cooling
Rated power P2	5.50 kW	Motor version	U
Available reserve	29.69 %	Cable design	Rubber hose
Rated current	11.4 A	Cable entry	Sealed along entire length
Starting current ratio	4.8	Power cable	S1BN8-F 12G1.5
Insulation class	F to IEC 34-1	Number of power cables	1
Motor enclosure	IP68	Moisture sensor	with
Cos phi at 4/4 load	0.82	Cable length	10.00 m
Motor efficiency at 4/4 load	82.0 %		
Temperature sensor	Bimetallic switch 2x		

Materials G1

Notes	Impeller (230)	GX2CRNIMOCUN25-6-3-3
general criteria for a water analysis: pH-value >= 7; chloride content (Cl) <=250 mg/kg, chlorine (Cl2) <=0.6 mg/kg.	1.4517	Nitrile rubber NBR
Pump casing (101)	O-Ring (412)	Grey cast iron EN-GJL-250
Discharge cover (163)	Motor housing (811)	Chloroprene rubber
Shaft (210)	Motor cable (824)	CrNiMo steel A4
	Hexagon socket head cap screw (914)	



Data sheet



Customer item no.: 5.4.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 1200

Date: 22/07/2014

Page: 2 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Packaging

Packaging category	B1 Wooden or plywood case, cover provided with polypropylene cellular sheet, outdoor storage up to 3 months	Packaging for storage	Indoor Outdoor storage at -40°C to +50°C for up to 3 months. Packet must be covered. No corrosion protection, only transport protection.
Packaging for transport IPPC Standard ISPM 15	Ship Yes		

Nameplates

Nameplates language	International	Duplicate nameplate	with
---------------------	---------------	---------------------	------

Certifications

Hydraulic performance test		Test participation	Non-witnessed
Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2	Hydrostatic test (room temp.)	
Quantity meas. points Q-H	5	Range	Complete pump with shaft seal
Certificate	Inspection cert. 3.2 to EN 10204	Test pressure	3.00 bar.g
Test participation	Witnessed	Test time	10.0 min
Quantity, non-witnessed	1	Certificate	Inspection cert. 3.1 to EN 10204
Quantity, witnessed	1	Test participation	Non-witnessed
Vibration test	Yes	Final visual inspection	
Balancing test		Certificate	Inspection cert. 3.1 to EN 10204
Balancing grade	G 6.3	Test participation	Witnessed
Part	Impeller		
Certificate	Inspection cert. 3.1 to EN 10204	Material certificates: Pump casing, intermediate casing , shaft, impeller, motor housing (101, 113, 210, 230, 811)	Test report 2.2 to EN 10204
		Certificate	

Installation parts

Installation type	stationary 2 guide rail	Type	Chain
Scope of supply	Pump with installation parts	Material	CrNiMo steel 1.4404
	For guide rail arrangements, the guide rails are not included in KSB's scope of supply.	Length	5.00 m

Installation depth	4.50 m
Material concept	G

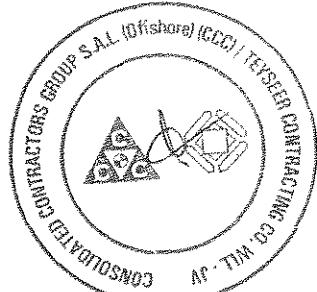
Duckfoot bend

Size	DN 80
Flange design	EN
Duckfoot bend size (DN2 / DN3)	DN 80 Drilled according to EN
Material	Grey cast iron EN-GJL-250
Mounting type	Composite anchor bolts
Foundation rail	Without

Claw

Design	straight
Size	DN 80

Lifting chain / -rope



Data sheet



Customer item no.: 5.4.1.2
Communication dated: 27/05/2014
Doc. no.: Mega Reservoir - Package A
Quantity: 2

Number: 4002140658
Item no.: 1200
Date: 22/07/2014
Page: 3 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Coating

KSB coating code	S2 to AA-0080-06-01 / 2	Final coating	2-component epoxy resin high solid
Surface preparation	Free from dirt, grease, rust	Color	Ultramarine blue (RAL 5002)
Primer	Zinc phosphate synthetic resin		KSB-blue
Intermediate coating	2-component epoxy resin high solid	Total film thickness approx.	300 µm



Performance curve

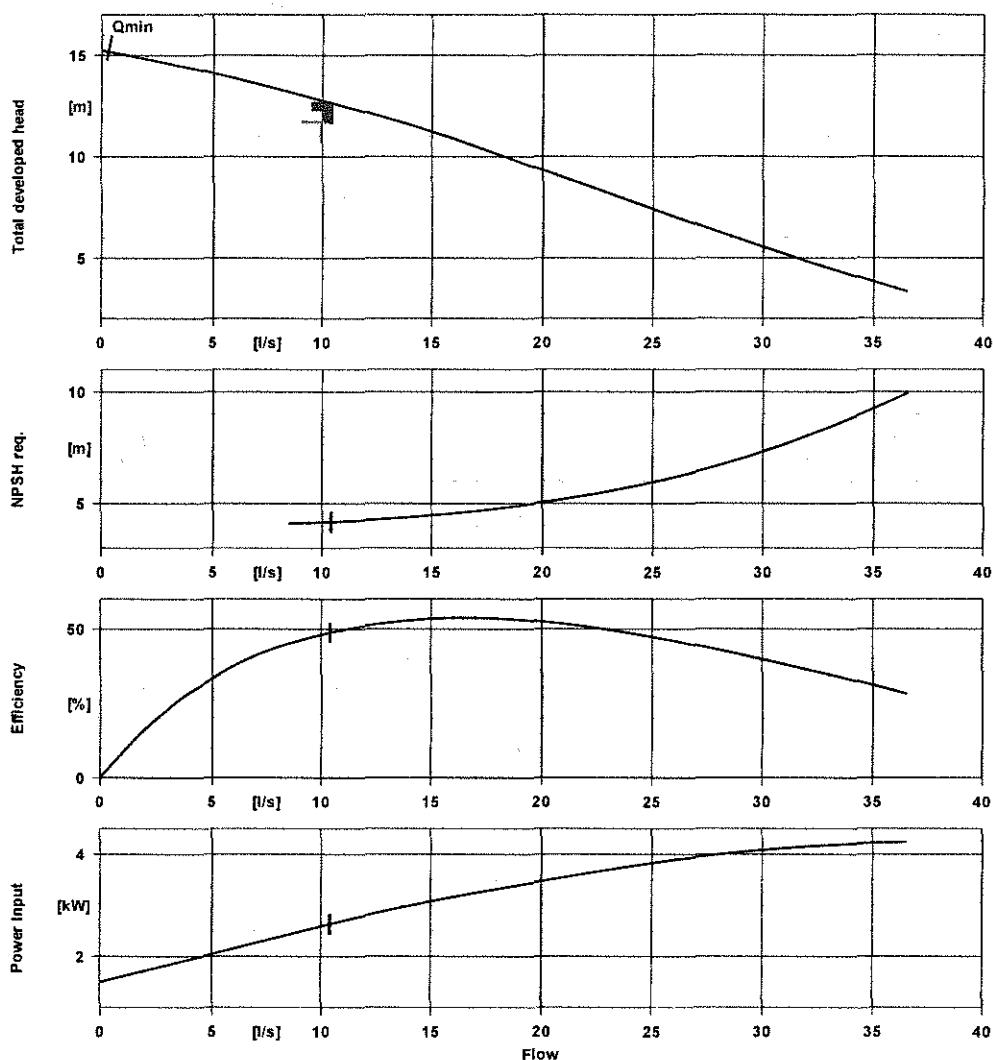


Customer item no.: 5.4.1.2
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1200
 Date: 22/07/2014
 Page: 4 / 6

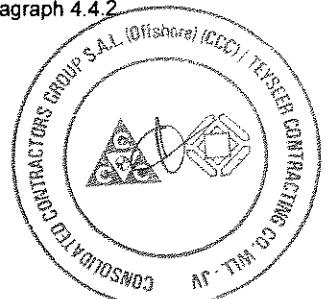
KRTF 80-250/54UG1-S

Version no.: 1



Curve data

Speed of rotation	1468 rpm	Efficiency	49.1 %
Fluid density	998 kg/m ³	Power absorbed	2.63 kW
Viscosity	1.00 mm ² /s	NPSH required	4.18 m
Flow rate	10.398 l/s	Curve number	K42873s
Requested flow rate	10.000 l/s	Effective impeller diameter	210.0 mm
Total developed head	12.65 m	Acceptance standard	ISO 9906 class 2B; below 10 kW acc. to paragraph 4.4.2
Requested developed head	11.70 m		



Installation plan

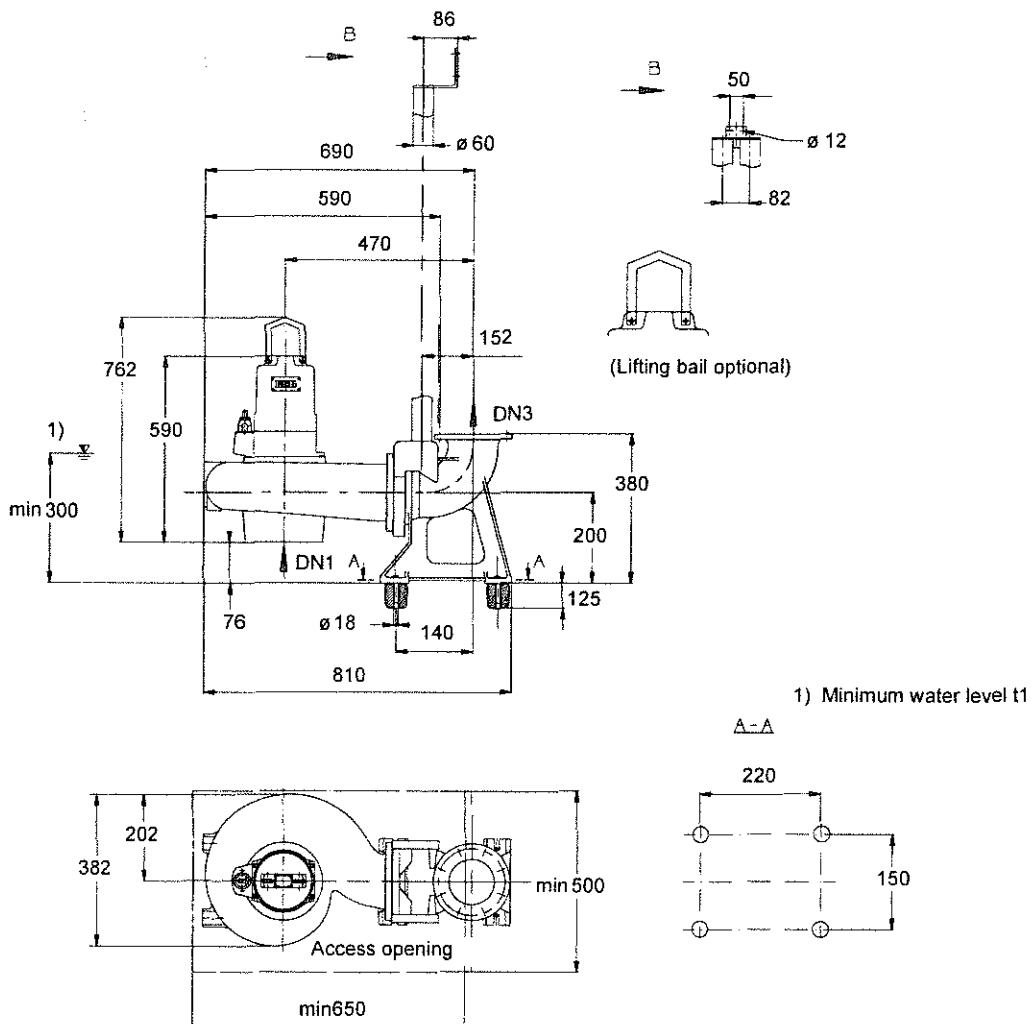


Customer item no.: 5.4.1.2
 Communication dated: 27/05/2014
 Doc. no.: Mega Reservoir - Package A
 Quantity: 2

Number: 4002140658
 Item no.: 1200
 Date: 22/07/2014
 Page: 5 / 6

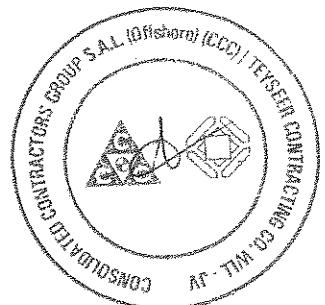
KRTF 80-250/54UG1-S

Version no.: 1



Drawing is not to scale

Dimensions in mm



Installation plan



Customer item no.: 5.4.1.2

Communication dated: 27/05/2014

Doc. no.: Mega Reservoir - Package A

Quantity: 2

Number: 4002140658

Item no.: 1200

Date: 22/07/2014

Page: 6 / 6

KRTF 80-250/54UG1-S

Version no.: 1

Motor

Motor manufacturer:	KSB
Motor size:	5
Motor power:	5.50 kW
Number of poles:	4
Speed of rotation:	1433 rpm

Connections

Suction flange pump according unmachined
to(DN1)
Duckfoot bend size (DN2 / DN3)DN 80 Drilled according to EN

Weight net

Pump, Motor, Cable	139 kg
Claw / Foot	10 kg
Total	149 kg

For auxiliary connections see
separate drawing.

Connect pipes without stress or strain!

Dimensional tolerances for shaft axis height:

Dimensions without tolerances, middle tolerances to:

Connection dimensions for pumps:

Dimensions without tolerances - welded parts:

Dimensions without tolerances - gray cast iron parts:

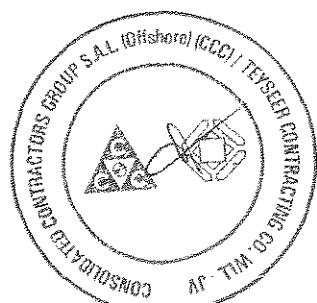
DIN 747

ISO 2768-m

EN735

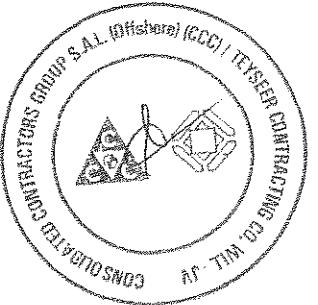
ISO 13920-B

ISO 8062-CT9



Appendix I-7 – Technical Data Sheets

023 – Surge Vessels

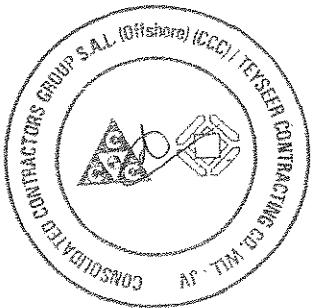




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 023A - 1

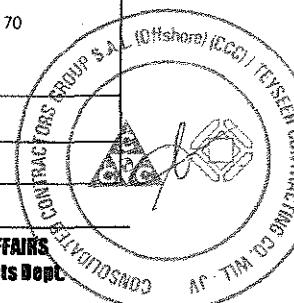
SURGE VESSELS





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Surge Vessel Tag/Model Number		*	
	2	Service		Potable water	Comply
	3	Location		PRPS-1 - SS1A DN1200	
	4	Number & Sizes of surge vessel		3 x 112 m ³ (incl. of End Caps Volume)	
	5	Type of Surge Vessel		Compressed air type	Comply
	6	Type of Support		Horizontal	Comply
GENERAL INFORMATION	7	Name of Manufacturer		*	CHARLATTE RESERVOIRS
	8	Place of Manuf. (City / Country)		*	MIGENNES, FRANCE
	9	Name of Local Agent		*	
	10	Applicable Codes and Standards		BS 5500, ASME section 8 division1	Comply - ASME VIII DIV 1
FLUID	11	Fluid		Desalinated Potable water	Comply
	12	Velocity range	m/sec	0.4 – 4m/s	Noted
	13	Max. Temperature	Min. Temp. °C	50	0
	14	Max. Pressure	Min. Press. barg	20	0
PROTECTION COATING	15	Internal lining			
	i.	Material		Hard vulcanized rubber lined or 325 micron epoxy internal coating	325 - 400 microns epoxy (food quality)
	ii.	Thickness		3mm/ 325 micron	325 - 400 microns
	16	Non-toxicity Certificate		Required	Comply
	17	External Coating		Epoxy	3 - Layer
	i.	Material			Comply
	ii.	Thickness	Micron	325 micron	350 microns
	18	Corrosion protection data sheet included	Y/N	*	No
	19	Corrosion Allowance	mm	*	3 mm
	20	Design Surge Pressure	bar. g	20	16 Bar Service Pressure 24 Bar Test Pressure
SURGE VESSEL	21	Design Temperature	Deg.C	50	60
	22	Working pressure	bar. g	3.6	Comply
	23	Vessel Volume (Min.)	m ³	336	Comply - Total 345 m3
	24	Operating air volume	m ³	100	Noted
	25	Vessel Dimensions	mm	*	D3000 – H3900 – L17600
	26	Wall Thickness [Head/Shell]	mm	*	30 mm / 30 mm
	27	Surge vessel material		-Mild steel pressure parts BS 1501-151-288A. -Mild steel non-pressure parts BS 4360. -Mild steel forgings – BS 1503	Carbon Steel ASTM A516 GRADE 70
	28	Connections		Flanged connection PN16 – BS EN 1092	Comply
	29	Accessories		As per project specification	Noted

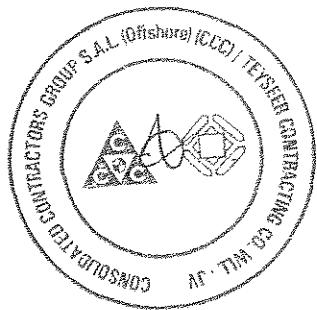




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Notes :

- 1) * These variables to be filled in by Vendor/Contractor.
 - 2) ** The surge vessel volume is provided based on Consultant's Surge Analysis. However the Contractor shall perform final surge analysis based on pump's and equipment's selections.

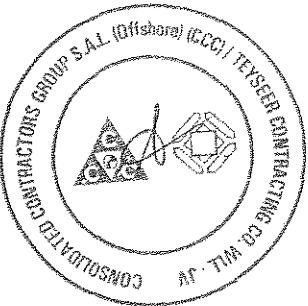




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 023A - 2

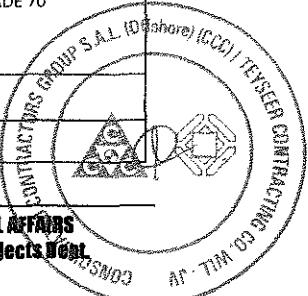
SURGE VESSELS





Qatar General Electricity & Water Corporation
 Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Surge Vessel Tag/Model Number		*	
	2	Service		Potable water	Comply
	3	Location		PRPS-1 - SS1B - 1 DN1600	
	4	Number & Sizes of surge vessel		4 x 135 m ³ (Incl. of End Caps Volume)	
	5	Type of Surge Vessel		Compressed air type	Comply
	6	Type of Support		Horizontal	Comply
GENERAL INFORMATION	7	Name of Manufacturer		*	CHARLATTE RESERVOIRS
	8	Place of Manuf. (City / Country)		*	MIGENNES, FRANCE
	9	Name of Local Agent		*	
	10	Applicable Codes and Standards		BS 5500, ASME section 8 division 1	Comply - ASME VIII DIV 1
FLUID	11	Fluid		Desalinated Potable water	Comply
	12	Velocity range	m/sec	0.4 – 4m/s	Noted
	13	Max. Temperature	Min. Temp.	50 °C	0
	14	Max. Pressure	Min. Press.	20 barg	0
PROTECTION COATING	15	Internal lining			
	i.	Material		Hard vulcanized rubber lined or 325 micron epoxy internal coating	325 - 400 microns epoxy (food quality)
	ii.	Thickness		3mm/ 325 micron	325 - 400 microns
	16	Non-toxicity Certificate		Required	Comply
	17	External Coating			3 - Layer
	i.	Material		Epoxy	Comply
	ii.	Thickness	Micron	325 micron	350 microns
	18	Corrosion protection data sheet included	Y/N	*	No
	19	Corrosion Allowance	mm	*	3 mm
SURGE VESSEL	20	Design Surge Pressure	bar. g	20	16 Bar Service Pressure 24 Bar Test Pressure
	21	Design Temperature	Deg.C	50	60
	22	Working pressure	bar. g	4.8	Comply
	23	Vessel Volume (Min.)	m ³	540	Comply - Total 552 m3
	24	Operating air volume	m ³	140	Noted
	25	Vessel Dimensions	mm	*	D3000 – H3900 – L21000
	26	Wall Thickness [Head/Shell]	mm	*	30 mm / 30 mm
	27	Surge vessel material		-Mild steel pressure parts BS 1501-151-288A. -Mild steel non-pressure parts BS 4360. -Mild steel forgings – BS 1503	Carbon Steel ASTM A516 GRADE 70
	28	Connections		Flanged connection PN16 ~ BS EN 1092	Comply
	29	Accessories		As per project specification	Noted



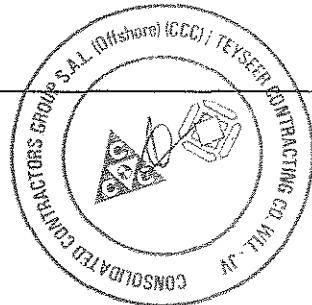


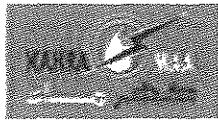
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Notes :

- 1) * These variables to be filled in by Vendor/Contractor.

2) ** The surge vessel volume is provided based on Consultant's Surge Analysis. However the Contractor shall perform final surge analysis based on pump's and equipment's selections.





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 023A - 3

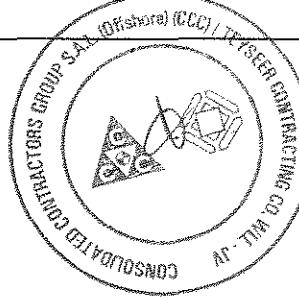
SURGE VESSELS





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered	
IDENTIFICATION	1	Surge Vessel Tag/Model Number		*		
	2	Service		Potable water	Comply	
	3	Location		PRPS-1 - SS1B - 2 DN1600		
	4	Number & Sizes of surge vessel		4 x 135 m ³	4 x 138 m ³ (incl. of End Caps Volume)	
	5	Type of Surge Vessel		Compressed air type	Comply	
	6	Type of Support		Horizontal	Comply	
GENERAL INFORMATION	7	Name of Manufacturer		*	CHARLATTE RESERVOIRS	
	8	Place of Manuf. (City / Country)		*	MIGENNES, FRANCE	
	9	Name of Local Agent		*		
	10	Applicable Codes and Standards		BS 5500, ASME section 8 division1	Comply - ASME VIII DIV 1	
FLUID	11	Fluid		Desalinated Potable water	Comply	
	12	Velocity range	m/sec	0.4 – 4m/s	Noted	
	13	Max. Temperature	Min. Temp.	°C	50	0
	14	Max. Pressure	Min. Press.	barg	20	0
PROTECTION COATING	15	Internal lining				
	i.	Material		Hard vulcanized rubber lined or 325 micron epoxy internal coating	325 - 400 microns epoxy (food quality)	
	ii.	Thickness		3mm/ 325 micron	325 - 400 microns	
	16	Non-toxicity Certificate		Required	Comply	
	17	External Coating			3 - Layer	
	i.	Material		Epoxy	Comply	
	ii.	Thickness	Micron	325 micron	350 microns	
	18	Corrosion protection data sheet included	Y/N	*	No	
	19	Corrosion Allowance	mm	*	3 mm	
SURGE VESSEL	20	Design Surge Pressure	bar. g	20	16 Bar Service Pressure 24 Bar Test Pressure	
	21	Design Temperature	Deg.C	50	60	
	22	Working pressure	bar. g	4.8	Comply	
	23	Vessel Volume (Min.)	m ³	540	Comply - Total 552 m ³	
	24	Operating air volume	m ³	140	Noted	
	25	Vessel Dimensions	mm	*	D3000 – H3900 – L21000	
	26	Wall Thickness [Head/Shell]	mm	*	30 mm / 30 mm	
	27	Surge vessel material		-Mild steel pressure parts BS 1501-151-288A. -Mild steel non-pressure parts BS 4360. -Mild steel forgings – BS 1503	Carbon Steel ASTM A516 GRADE 70	
	28	Connections		Flanged connection PN16 – BS EN 1092	Comply	
	29	Accessories		As per project specification	Noted	





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSS
(Packages A, B, C, D & E)

Notes :

- 1) * These variables to be filled in by Vendor/Contractor.
 - 2) ** The surge vessel volume is provided based on Consultant's Surge Analysis. However the Contractor shall perform final surge analysis based on pump's and equipment's selections.



Appendix I-7 – Technical Data Sheets

025 – Air Release Valves

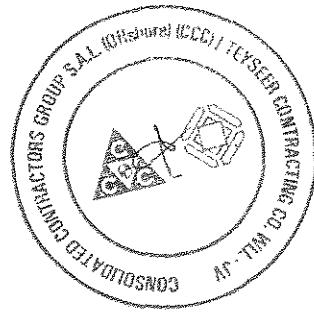




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I - 7 - 025 A

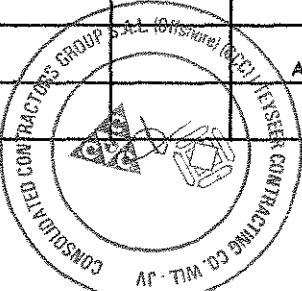
AIR RELEASE VALVES





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag /Model Number			VENTEX TYPE
	2	Service		Potable water	COMPLY
	3	Location		PRPS-1	COMPLY
	4	Number & Sizes of valve		As Per Drawings	COMPLY
	5	Type of Air Release Valve		Double Orifice	COMPLY
GENERAL INFORMATION	6	Name of Manufacturer		*	SAINT-GOBAIN PAM
	7	Place of Manuf. (City / Country)		*	LAVIS, ITALY
	8	Name of Local Agent		*	MANNAI
	9	Phone/Fax No. of Agent		*	9744558888 / 9744558485
	10	Applicable Codes and Standards		BS EN 1074-4	COMPLY
PIPELINE	11	Line Size / Pressure Rating		As Per Drawings	COMPLY
	12	Line Material		DI / Steel	DI
	13	Process connection		Flanged	COMPLY
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	COMPLY
FLUID	15	Fluid		Potable water	COMPLY
	16	Velocity range	m/sec	0.4 – 4.5	COMPLY
	18	Max. Temperature	Min. Temp.	45 °C	0
PROTECTION COATING	21	Surface preparation		Blast cleaned to SA 2.5, ISO 8501	COMPLY
	22	Internal Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	23	Non-toxicity Certificate		Required	WRAS
	24	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	25	Corrosion protection data sheet included	Y/N	Required	Refer Technical proposal
VALVE MATERIALS	26	Valve Body, Cover & Baffle		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563.	COMPLY Baffle in Stainless steel
	27	Floats		Stainless steel 13% chromium or light alloy coated with EPDM or Polypropylene disc.	EPDM encapsulated steel DC3, DC4, DD11 or DD13
	28	Large Orifice		Full Dia.	DN80,100: 60 - DN150:112
	29	Small Orifice	mm	38	2.4
	30	Guides, seats, Bushes		Stainless steel 1.4404	seat : encapsulated DI Bushess: EPDM Van'o fra
	31	Internal bolts & nuts		Stainless steel 316	COMPLY
	32	External bolts & nuts		Stainless steel 316	COMPLY
CONSTRUCTION	33	Type of connection			COMPLY
	34	I. Type		Flanged	COMPLY
	35	ii. Size		As Per Drawings	COMPLY
	36	Overall dimensions(L x W xH)			Refer Technical proposal





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
35	Flange dimensions		BS EN 1092-2	COMPLY
36	Pressure rating	PN	16	COMPLY
37	Hydrostatic Test		Required	Vessel & float : 1.5 x PN Seat : 1.5 x PN
38	Hydrostatic test pressure	bar. g	*	1.5 x PN
39	Additional requirements (if applicable)		*	
40	Delivery Period	Weeks	*	

Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes

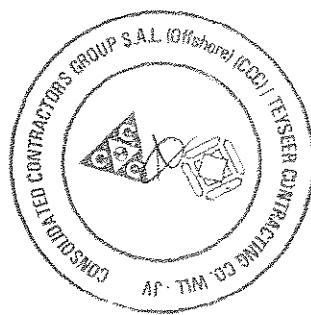




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 025A

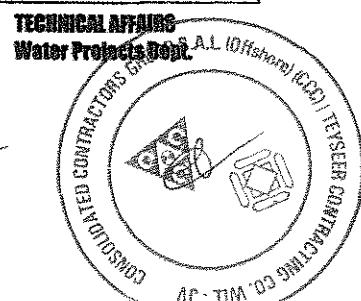
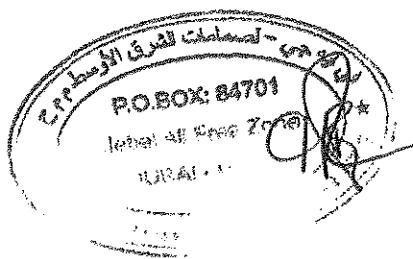
AIR RELEASE VALVES



Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag /Model Number			VAG Duojet
	2	Service		Potable water	Potable water
	3	Location		PRPS-1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		As Per Drawings	DN 50,80,150mm
	5	Type of Air Release Valve		Double Orifice	Double orifice
GENERAL INFORMATION	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
	9	Phone/Fax No. of Agent		*	00974 44478800
	10	Applicable Codes and Standards		BS EN 1074-4	BS EN 1074-4
PIPELINE	11	Line Size / Pressure Rating		As Per Drawings	As per drawings/PN 16
	12	Line Material		DI / Steel	DI / Steel
	13	Process connection		Flanged	Flanged PN 16
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	Not in scope
FLUID	15	Fluid		Potable water	Potable water
	16	Velocity range	m/sec	0.4 – 4.5	0.4-4.5
	18	Max. Temperature	Min. Temp.	45 °C	45 °C
PROTECTION COATING	21	Surface preparation		Blast cleaned to SA 2.5, ISO 8501	Blast cleaned to SA 2.5, ISO 8501
	22	Internal Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	23	Non-toxicity Certificate		Required	Comply
	24	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	25	Corrosion protection data sheet included	Y/N	Required	Will be provided
VALVE MATERIALS	26	Valve Body, Cover & Baffle		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563.	Body Ductile iron GGG40 (as per project specification), cover made of SS
	27	Floats		Stainless steel 13% chromium or light alloy coated with EPDM or Polypropylene disc.	Stainless steel
	28	Large Orifice		Full Dia.	DN 50-80=2" ; DN 100-2.5" ;DN 150-200mm=4"
	29	Small Orifice	mm	38	2-3mm
	30	Guides, seats, Bushes		Stainless steel 1.4404	Sealing EPDM
	31	Internal bolts & nuts		Stainless steel 316	Stainless steel 316
	32	External bolts & nuts		Stainless steel 316	Not in our scope
	33	Type of connection			
CONSTRUCTION	i. Type			Flanged	
	ii. Size			As Per Drawings	As per drawings
	34	Overall dimensions(L x W xH)			Refer attached catalogue

025A PRPS1_AIR VALVES - TDS



TECHNICAL AFFAIRS
Water Projects Dept

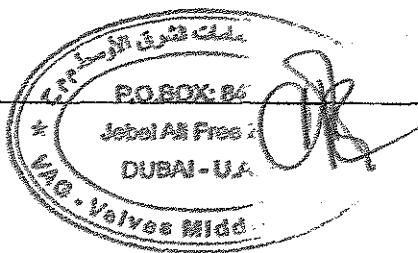


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

Sl. No	Description	Units	Required	Offered
35	Flange dimensions		BS EN 1092-2	
36	Pressure rating	PN	16	PN 16
37	Hydrostatic Test		Required	Comply
38	Hydrostatic test pressure	bar. g	*	1.5 X PN 16 for body
39	Additional requirements (if applicable)		*	
40	Delivery Period	Weeks	*	As per offer

Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes



VAG DUOJET® Automatic Air Valve
Single-chamber type

Water

PN 10/16/25/40 - DN 50...200

KAT-A 1912



Product characteristics and benefits

- Resilient seated
- With flange end acc. to EN 1092-2
- Single chamber air valve in compact design
- Very high discharge capacity up to sonic velocity due to stabilised floater
- Triple function air valve
- Venting function:
 - Large orifice to vent high quantities of air during draining the pipeline
 - Large orifice to release high quantities of air during filling the pipeline
 - Small orifice to release low quantities of air during operation under pressure
- Outlet female threaded acc. to DIN ISO 228
- Minimum operation pressure: 0.3 bar
- With sidewise drainage plug

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Bonnet: Ductile cast iron EN-JS 1030 (GGG-40)
- Bonnet bolts: Stainless steel A4 (DIN EN ISO 3506)
- Inner parts: Stainless steel 1.4571
- Float: Stainless steel 1.4571 (exception: DN 50 synthetic)
- Sealing: EPDM

Corrosion protection

- Inside and outside epoxy coating acc. to GSK guidelines

Versions

- Standard version as described
- For pressures of 0.1...1 bar special seal (with special sealing). Please specify operating pressure when inquiring/ordering.
- For flange dimensions acc. to ANSI
- With insect protection
- DN 50/PN 16 connection with 2" thread available on request

Field of Application

- Chamber installation
- Installation in plants

Tests and approvals

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)

Note

For proper installation and safe operation please follow the installation and operation instructions:

KAT-B 1912

Field of application

Pressure test acc. to EN 12266

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
50...200	40	40	50
50...200	25	25	50
50...200	16	16	50
200	10	10	50

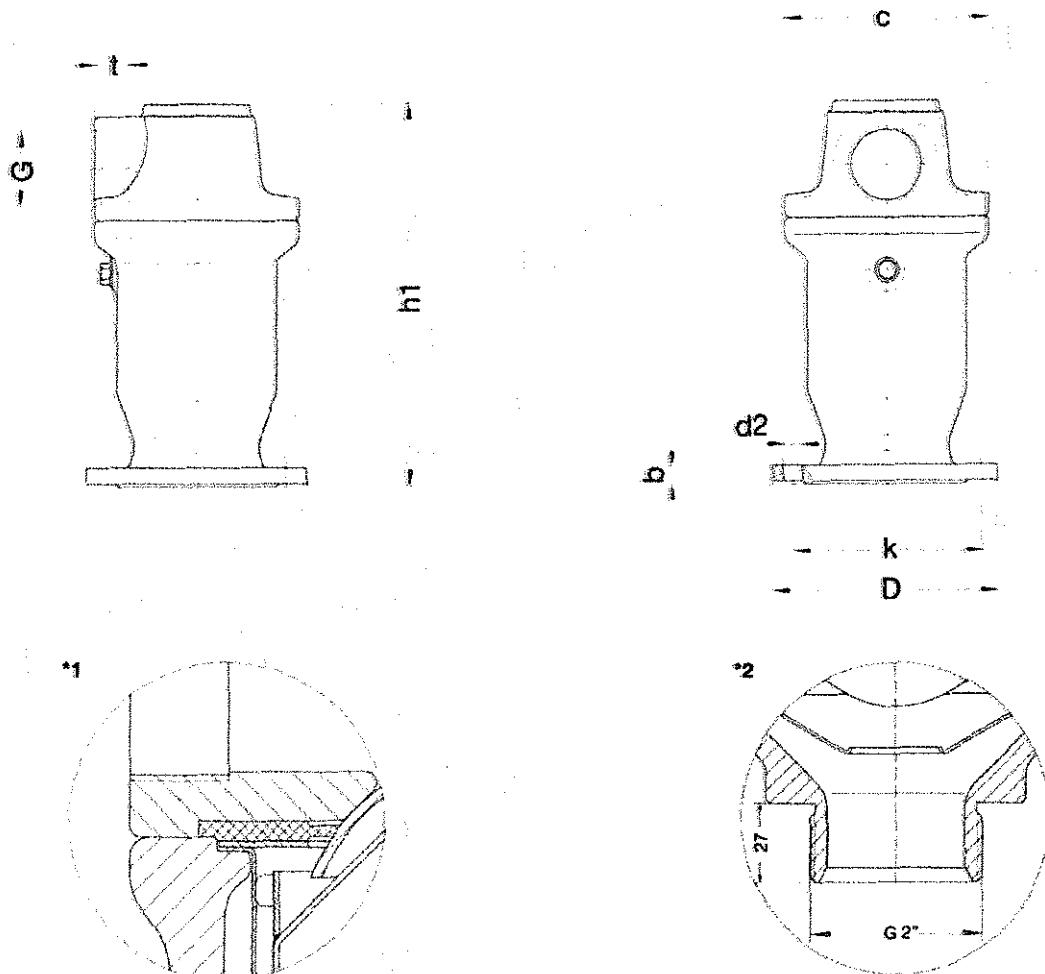
Test pressure body with water [bar]	Test pressure seat with water [bar]
44	44
37.5	37.5
24	24
15	15



Water

VAG DUOJET® Automatic Air Valve
Single-chamber type

Drawing



*1: Special seal for operating pressures of 0.1...1 bar (no standard version)

*2: DN 50 / PN 16 connection with G 2" thread (no standard version)

Technical data

PN 40

DN	50	80	100	150	200
G Screw connection	2"	2"	2 1/2"	4"	4"
D [mm]	165	200	235	300	375
b [mm]	19	19	19	26	30
c [mm]	185	185	205	260	260
d2 [mm]	18	18	22	27	31
h1 [mm]	340	340	380	510	510
k [mm]	125	160	190	250	320
t [mm]	25	25	30	40	40
No. of holes	4	8	8	8	12
Weight approx. [kg]	25.00	25.00	28.00	57.00	58.00
Volume approx. [m³]	0.015	0.015	0.020	0.040	0.040

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. • www.vag-group.com

Air Valves and Control Valves • 2



VAG DUOQUET Automatic Air Valve
Single-chamber type

Water

Technical data

PN 25

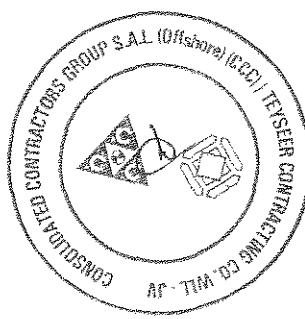
DN	50	80	100	150	200
G Screw connection [inch]	2"	2"	2 1/2"	4"	4"
D [mm]	165	200	235	300	360
b [mm]	19	19	19	20	22
c [mm]	185	185	205	260	260
d2 [mm]	18	18	22	26	26
h1 [mm]	340	340	380	510	510
k [mm]	125	160	190	250	310
t [mm]	25	25	30	40	40
No. of holes	4	8	8	8	12
Weight approx. [kg]	25.00	25.00	28.00	56.00	57.00
Volume approx. [m³]	0.015	0.015	0.020	0.040	0.040

PN 16

DN	50	80	100	150	200
G Screw connection [inch]	1 1/4"	2"	2 1/2"	4"	4"
D [mm]	165	200	220	285	340
b [mm]	19	19	19	19	20
c [mm]	180	185	205	260	260
d2 [mm]	18	18	18	22	22
h1 [mm]	280	340	380	510	510
k [mm]	125	160	180	240	295
t [mm]	20	25	30	40	40
No. of holes	4	8	8	8	12
Weight approx. [kg]	15.00	25.00	28.00	56.00	57.00
Volume approx. [m³]	0.010	0.015	0.020	0.040	0.040

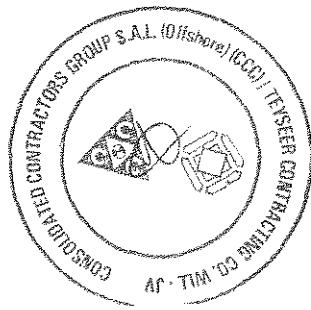
PN 10

DN	200
G Screw connection [inch]	4"
D [mm]	340
b [mm]	20
c [mm]	260
d2 [mm]	22
h1 [mm]	510
k [mm]	295
t [mm]	40
No. of holes	8
Weight approx. [kg]	57.00
Volume approx. [m³]	0.040



Appendix I-7 – Technical Data Sheets

026 – Butterfly Valves



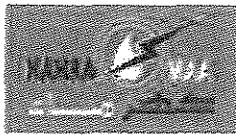


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I - 7 - 026 A

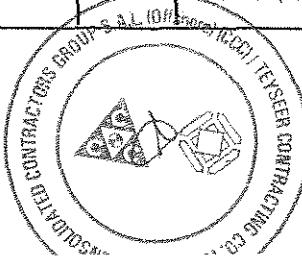
BUTTERFLY VALVES





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	EUROSTOP Butterfly Valve
	2	Service		Potable Water	COMPLY
	3	Location		PRPS-1	COMPLY
	4	Number & Sizes of valve		As Per Drawings	COMPLY
	5	Type of Butterfly Valve		Double / Triple Eccentric	COMPLY Double Eccentric
GENERAL INFORMATION	6	Name of Manufacturer		*	SAINT-GOBAIN PAM
	7	Place of Manuf. (City / Country)		*	LAVIS, ITALY
	8	Name of Local Agent		*	MANNAI
	9	Phone/Fax No. of Agent		*	9744558888 / 9744558485
	10	Applicable Codes and Standards		BS EN 593	COMPLY EN 1074-2 & EN 593
PIPELINE	11	Line Size / Pressure Rating		As Per Drawings	COMPLY
	12	Line Material		DI / Steel	DI
	13	Process connection		Flanged	COMPLY EN 1092-2
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	COMPLY
FLUID	15	Fluid		Desalinated Potable water	COMPLY
	16	Velocity range	m/sec	0.4 - 4.5	COMPLY
	17	Max. Temperature	Min. Temp.	°C	45 0
PROTECTION COATING	18	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	COMPLY
	19	Internal Coating (including disc & sealing surface flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	20	Non-toxicity Certificate		Required	WRAS
	21	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	22	Corrosion protection data sheet included	Y/N	*	Refer Technical proposal
VALVE MATERIALS	23	Valve Body and Flanges		Ductile Iron GGG50 (EN GJS-500-7 as per EN 1563.	COMPLY
	24	Shaft		Stainless Steel 1.4462, 100% dry shaft design	COMPLY
	25	Disc		Ductile Iron GGG50 (EN GJS-500-7 as per EN 1563. it shall be of solid one piece casting (non-hollow))	COMPLY
	26	Retaining Ring		Stainless Steel 1.4571	COMPLY S.S. 1.4404
	27	Shaft Bearing		Self-lubricating PTFE or Zinc free bronze, with EPDM 'O' ring seals	COMPLY EN1982 CuSn12
	28	Seat		High-alloy weld overlay, micro finished	Rolled S.S. 316 L
	29	Shaft seal		Self-lubricating PTFE or zinc free bronze faced bearings with EPDM 'O' rings	COMPLY EN1982 CuSn12
	30	Disc seal		EPDM with stainless steel 1.4571 retaining ring	Profiled EPDM Autolmatic Gasket
	31	Bolts & Nuts		Stainless steel 1.4401	COMPLY S.S. A4
	32	Gasket		Rubber (cotton reinforced)	N/A





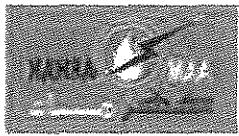
Qatar General Electricity & Water Corporation

Tender NO. GTC 626/2014

Construction of Mega Reservoir PRPSs

(Packages A, B, C, D & E)

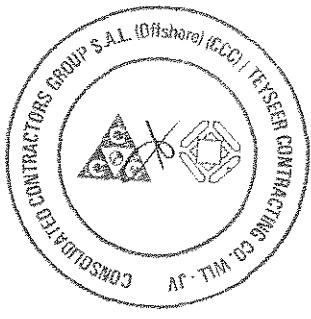
	Sl. No	Description	Units	Required	Offered
CONSTRUCTION	33	Nominal Diameter	mm		According to BOQ
	34	Overall dimensions(Lx W x H)	mm		Refer to Technical Proposal
	35	Hand Wheel Closing(Clockwise or Anti-clockwise)		Clockwise	COMPLY
	36	Working Pressure		16 Bar (PN16)	COMPLY
	37	Flange Dimensions		BS EN 1092-2	COMPLY
	38	Direction of closing marked on Hand Wheel	Y/N	Y	COMPLY
	39	Assisted Closure included	Y/N	Y	COMPLY
	40	Required hand operating force	Kgf	*	According to EN1257
	41	Valve actuator fitted	Y/N	Y	COMPLY
	42	Type of actuator(i. e. electric, pneumatic, hydraulic)	Type	Electric Actuator	COMPLY
	43	Extension spindles fitted	Y/N	Y	COMPLY
	44	Type of spindle (rising or non-rising)		Non-Rising	COMPLY
	45	Hydrostatic test		Required	Vessel : 1.5 x PN Seat : 1.1 x PN
	46	Hydrostatic test pressure range	Bar	*	1.5 x PN
	47	Coating system testing		Required	See QCP
	44	Delivery Period	Weeks		
Notes :					
<ol style="list-style-type: none">1) * These variables to be filled in by Vendor/Bidder.2) Multiple data sheets to be provided by the bidder to cover all the sizes3) For manually operated butterfly valves, bidder to note against the data relevant to electric actuators as 'not applicable'.					



Qatar General Electricity & Water Corporation
Tender NO. GTC 620/2014
Construction of Mega Reservoir PRPSSs
(Packages A, B, C, D & E)

025A PRPS1_AIR VALVES - TDS

TECHNICAL AFFAIRS
Water Projects Dept.

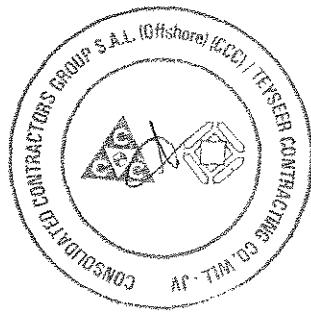




Qatar General Electricity & Water Corporation
Tender NO. GTC/626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 026A

BUTTERFLY VALVES

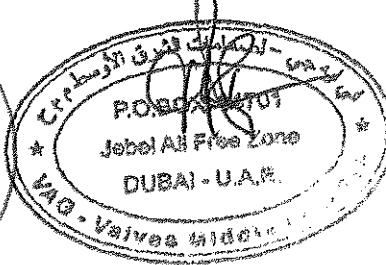
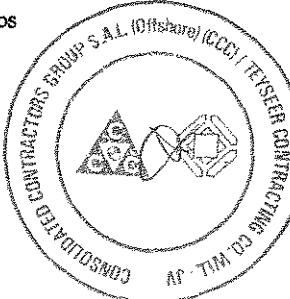




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	SL No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	VAG-EKN
	2	Service		Potable Water	Potable Water
	3	Location		PRPS1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		As Per Drawings	All Sizes DN 100-2200mm
	5	Type of Butterfly Valve		Double / Triple Eccentric	Double/Offset Series 14
GENERAL INFORMATION	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
	9	Phone/Fax No. of Agent		*	+974 44478800
	10	Applicable Codes and Standards		BS EN 593	BS EN 593
PIPELINE	11	Line Size / Pressure Rating		As Per Drawings	As per drawings/PN 16
	12	Line Material		DI / Steel	DI / Steel
	13	Process connection		Flanged	Flanged PN 16
	14	Connection Materials		Mild Steel with hot-dipped zinc galvanized	Not in scope
FLUID	15	Fluid		Desalinated Potable water	Comply
	16	Velocity range	m/sec	0.4 – 4.5	comply
	17	Max. Temperature	Min. Temp.	°C	45 0 Comply Comply
	18	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Comply
PROTECTION COATING	19	Internal Coating (including disc & sealing surface flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Comply
	20	Non-toxicity Certificate		Required	Comply (WRAS)
	21	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Comply
	22	Corrosion protection data sheet included	Y/N	*	Will be provided
VALVE MATERIALS	23	Valve Body and Flanges		Ductile Iron GGC50 (EN GJS-500-7 as per EN 1563)	Ductile iron GGG40 (superior/as per project specification)
	24	Shaft		Stainless Steel 1.4462, 100% dry shaft design	Stainless Steel 1.4462, 100% dry shaft design
	25	Disc		Ductile Iron GGG50 (EN GJS-500-7 as per EN 1563. It shall be of solid one piece casting (non-hollow))	Ductile iron GGG40 (superior/as per project specification)
	26	Retaining Ring		Stainless Steel 1.4571	SS 1.4571
	27	Shaft Bearing		Self-lubricating PTFE or Zinc free bronze, with EPDM 'O' ring seals	Self-lubricating PTFE or Zinc free bronze, with EPDM 'O' ring seals
	28	Seat		High-alloy weld overlay, micro finished	High (Nickel) -alloy weld overlay, micro finished
	29	Shaft seal		Self-lubricating PTFE or zinc free bronze faced bearings with EPDM 'O' rings	Self-lubricating PTFE or zinc free bronze faced bearings with EPDM 'O' rings
	30	Disc seal		EPDM with stainless steel 1.4571 retaining ring	EPDM with stainless steel 1.4571 retaining ring
	31	Bolts & Nuts		Stainless steel 1.4401	Stainless steel 1.4401
	32	Gasket		Rubber (cotton reinforced)	Rubber (cotton reinforced)

026A PRPS1_BUTTERFLY VALVES - TDS



TECHNICAL AFFAIRS
Water Projects Dept.

Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
CONSTRUCTION	33	Nominal Diameter	mm		All Sizes/DN 100-2200mm
	34	Overall dimensions(LxW x H)	mm		Refer attached VAG/EKN catalogue
	35	Hand Wheel Closing(Clockwise or Anti clockwise)		Clockwise	Clockwise
	36	Working Pressure		16 Bar (PN16)	16 Bar (PN16)
	37	Flange Dimensions		BS EN 1092-2	BS EN 1092-2
	38	Direction of closing marked on Hand Wheel	Y/N	Y	Y
	39	Assisted Closure included	Y/N	Y	Y
	40	Required hand operating force	Kgf	*	Refer VAG EKN catalogue
	41	Valve actuator fitted	Y/N	Y	Y
	42	Type of actuator(i.e. electric, pneumatic, hydraulic)	Type	Electric Actuator	Electric Actuator
	43	Extension spindles fitted	Y/N	Y	Yes (will be provide as required)
	44	Type of spindle (rising or non-rising)		Non-Rising	Non-Rising
	45	Hydrostatic test		Required	Comply
	46	Hydrostatic test pressure range	Bar	*	1.5xPN 16 for body ; 1.1xPN 16 for seat
	47	Coating system testing		Required	100% coating testing
	48	Delivery Period	Weeks		As per offer

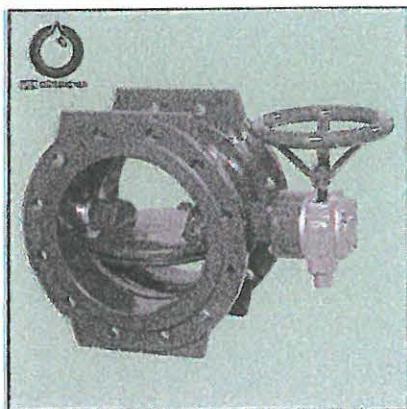
Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes
- 3) For manually operated butterfly valves, bidder to note against the data relevant to electric actuators as 'not applicable'.



PN 6/10/16/25/40 - DN 150...4000

KAT-A 1310-EW



Product characteristics and benefits

- Resilient seated in accordance with EN 593
- Face-to-face length acc. to EN 558-1, basic series 14 (DIN 3202, F4)
- With flange ends on both sides acc. to EN 1092-2
- Double-offset disk bearing mounted in maintenance-free bushing
- Medium free bearing (dry shaft) in body by means of double O-ring sealing and closed disk eyes
- Wear-resistant, corrosion-resistant and undermining-resistant seat
- Possible to replace profile sealing ring without disassembling the disk
- Automatic sealing system with enclosed and pressure-supported profile sealing ring
- Vacuum tight up to 1 Torr
- Tight in both flow directions (see note for excepted sizes)
- Blow-out proof shaft and shaft sealing
- With self-locking, fully enclosed, maintenance-free worm gear including mechanical position indicator

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Disk: Ductile cast iron EN-JS 1030 (GGG-40)
- Valve sealing: EPDM
- O-rings: EPDM
- Butterfly valve stem: Stainless steel 1.4021
- Shaft bearing: Zincfree bronze
- Seat: Chrome-nickel overlay welded, microfinished

Corrosion protection

- Body: Inside and outside epoxy coating acc. to GSK guidelines
- Disk: Epoxy coating according to GSK guidelines

Versions

- Standard version as described
- With handwheel
- With electric actuator
- With pneumatic actuator
- With hydraulic actuator
- Special designs and bigger sizes available on request
- With ceramic coating
- With mechanical blocking of the disk (UVV locking)

Field of Application

- Underground installation
- Chamber installation
- Installation in plants

Tests and approvals

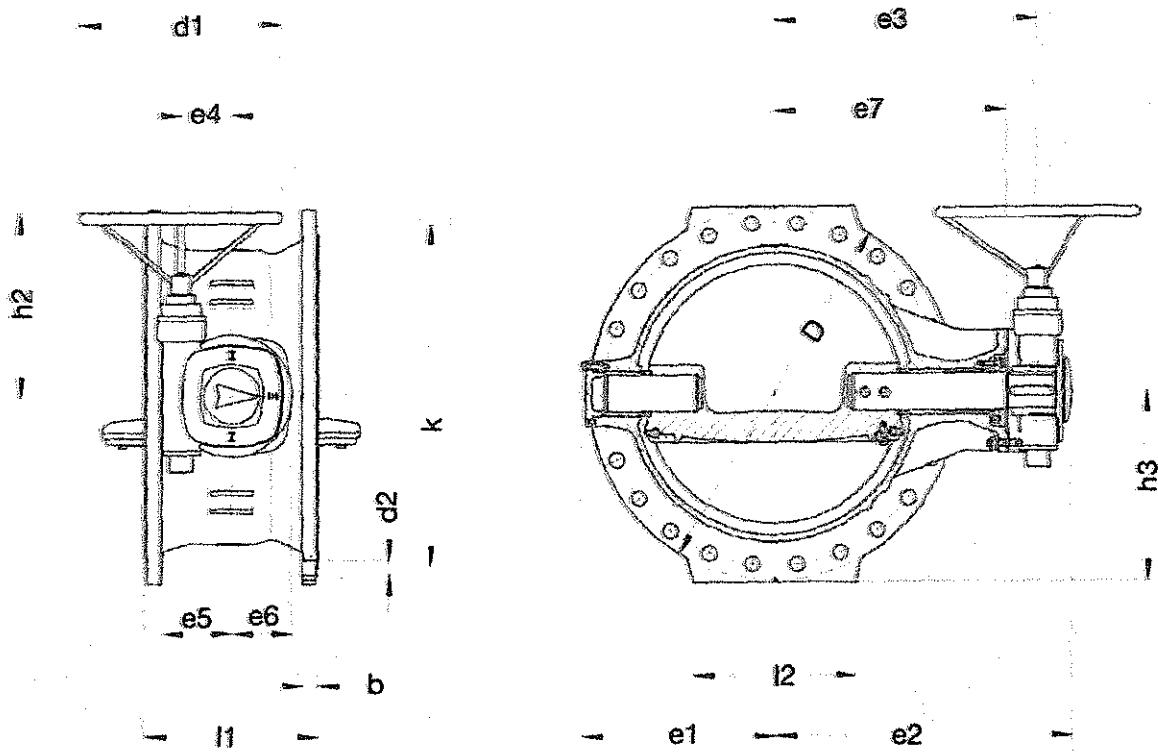
- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)
- DVGW tested and registered (DN 150...1200 - PN 10/16)
- Elastomers approved acc. to W270

Field of application

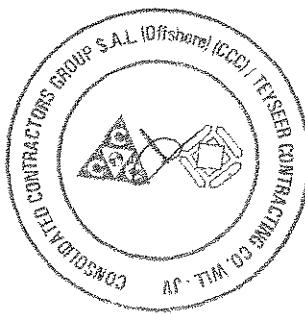
Pressure test acc. to EN 12266

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]	Test pressure body with water [bar]	Test pressure seat with water [bar]
150...1800	40	32	50	60	34.5
150...1800	25	25	50	37.5	27.5
150...2600	16	16	50	24	18
200...2800	10	10	50	15	11
1400...4000	6	6	50	9	6.6



Drawing**Technical data****PN 40**

DN	150	200	250	300	350	400	450	500	600	700	800	900
D [mm]	300	375	450	515	580	660	685	755	890	995	1140	1250
b [mm]	20	30	34	39.5	44	48	49	52	58	64	65	70
d1 [mm]	250	250	250	350	400	400	400	400	500	400	500	500
d2 [mm]	28	31	34	34	37	41	41	44	50	48	56	56
e1 [mm]	133	168	198	235	260	307	307	371	417	487	571	613
e2 [mm]	289	320	363	425	440	555	555	641	715	770	894	954
e3 [mm]	227	258	301	359	384	467	467	553	614	675	797	839
e4 [mm]	63	63	63	80	100	125	125	160	160	200	200	200
e5 [mm]	94	94	94	111	111	173	173	173	218	305	305	305
e6 [mm]	75	75	75	88	88	125	125	150	165	208	208	208
e7 [mm]	185	216	259	312	327	392	392	478	524	585	682	725
h2 [mm]	263	263	263	288	308	332	432	432	537	600	670	670
h3 [mm]	155	195	230	260	295	345	350	395	460	505	580	640
k [mm]	250	320	385	450	510	585	610	670	795	900	1030	1140
j1 [mm]	210	230	250	270	290	310	330	350	390	430	470	510
i2 [mm]	160	200	240	260	285	360	300	390	480	400	450	550
No. of holes	8	12	12	16	16	16	20	20	20	24	24	28
Turns/stroke	12.75	12.75	12.75	13.25	13.25	51	51	51	110.5	218	216	216
Weight approx. [kg]	40.00	65.00	90.00	140.00	185.00	275.00	395.00	450.00	650.00	920.00	1150.00	1830.00
Volume approx. [m³]	0.027	0.042	0.063	0.092	0.118	0.176	0.195	0.267	0.393	0.538	0.785	0.999



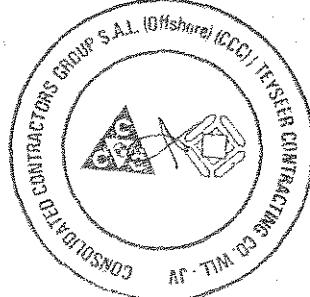
Technical data

PN 25

DN	1000	1200	1400	1500	1600	1800
D [mm]	1320	1530	1755	1865	1975	2195
b [mm]	60	74	76	77.5	84	90
d1 [mm]	500	500	500	500	640	640
d2 [mm]	57	57	62	48	62	70
e1 [mm]	681	813	900	995	1025	1170
e2 [mm]	1051	1175	1325	1425	1505	1620
e3 [mm]	911	1035	1165	1263	1310	1425
e4 [mm]	250	250	315	400	400	560
e5 [mm]	335	335	490	610	610	610
e6 [mm]	258	258	340	430	430	430
e7 [mm]	781	895	1020	1118	1135	1250
h2 [mm]	722	722	870	870	963	963
h3 [mm]	665	780	900	940	1010	1110
k [mm]	1210	1420	1640	1759	1860	2070
l1 [mm]	550	630	710	750	790	870
l2 [mm]	600	700	1000	850	900	670
No. of holes	28	32	36	52	40	44
Turns/stroke	212	212	424	432	432	432
Weight approx. [kg]	1685.00	2400.00	3500.00	4500.00	5200.00	6160.00
Volume approx. [m³]	1.257	1.916	2.772	3.385	3.947	5.328

PN 16

DN	150	200	250	300	350	400	450	500	600	700	800	900
D [mm]	285	340	400	455	520	580	640	715	840	910	1025	1125
b [mm]	19	20	22	24.5	26.5	28	31.5	31.5	36	39.5	43	46.5
d1 [mm]	250	250	250	250	350	400	400	500	500	500	400	500
d2 [mm]	23	23	28	28	28	31	31	34	37	37	41	41
e1 [mm]	134	169	199	236	261	298	306	357	413	470	537	589
e2 [mm]	279	308	351	401	440	483	508	583	673	736	822	865
e3 [mm]	225	256	298	349	378	401	460	499	585	648	721	770
e4 [mm]	50	50	50	50	63	80	100	100	125	125	160	160
e5 [mm]	73	73	73	73	94	94	148	148	173	173	218	218
e6 [mm]	54	54	54	54	75	75	105	105	150	150	175	175
e7 [mm]	185	216	258	308	333	356	385	424	510	573	631	680
h2 [mm]	231	231	231	231	283	308	367	407	395	395	517	537
h3 [mm]	150	175	205	232	265	295	325	362	425	460	520	570
k [mm]	240	295	355	410	470	525	585	650	770	840	950	1050
l1 [mm]	210	230	250	270	290	310	330	350	390	430	470	510
l2 [mm]	150	185	225	260	270	320	250	300	330	400	450	550
No. of holes	8	12	12	12	16	16	20	20	20	24	24	28
Turns/stroke	12.75	12.75	12.75	12.75	12.75	13.25	13	13	13	51	110.5	110.5
Weight approx. [kg]	30.00	44.00	60.00	85.00	116.00	155.00	237.00	300.00	460.00	670.00	775.00	970.00
Volume approx. [m³]	0.026	0.037	0.055	0.078	0.106	0.137	0.172	0.235	0.356	0.472	0.655	0.834



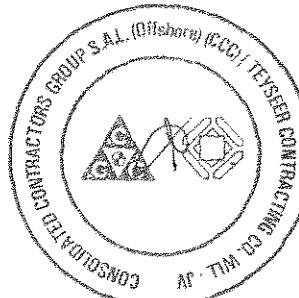
Technical data

PN 16

DN	1000	1200	1400	1500	1600	1800	2000	2500
D [mm]	1255	1485	1685	1820	1930	2130	2345	3048
b [mm]	50	57	64	67	70	70	75	120
d1 [mm]	400	500	400	400	400	640	640	640
d2 [mm]	44	50	50	57	57	62	60	
e1 [mm]	665	784	915	1000	1045	1170	1275	1805
e2 [mm]	1005	1154	1235	1315	1415	1725	1685	2275
e3 [mm]	890	1014	1075	1155	1255	1530	1490	2030
e4 [mm]	200	250	315	315	400	400	500	
e5 [mm]	273	335	555	555	610	610	738	
e6 [mm]	208	258	340	340	430	430	540	
e7 [mm]	774	884	928	1010	1058	1270	1314	1805
h2 [mm]	642	722	865	865	963	1210	1210	
h3 [mm]	835	750	850	920	970	1070	1200	1544
k [mm]	1170	1390	1590	1710	1820	2020	2230	2908
l1 [mm]	550	630	710	750	790	870	950	1190
l2 [mm]	600	700	800	850	900	1000	1100	1900
No. of holes	28	32	36	36	40	44	48	72
Turns/stroke	216	212	424	424	424	432	432	832
Weight approx. [kg]	1320.00	2090.00	2945.00	3755.00	4450.00	5320.00	8300.00	22600.00
Volume approx. [m³]	1.153	1.813	2.572	3.160	3.751	5.365	6.594	14.799

PN 10

DN	200	250	300	350	400	450	500	600	700	800	900	1000
D [mm]	340	400	455	505	565	615	670	780	900	1020	1120	1245
b [mm]	20	22	24.5	24.5	24.5	26.5	26.5	30	32.5	35	37.5	40
d1 [mm]	250	250	250	250	350	400	400	500	500	400	400	400
d2 [mm]	23	23	23	23	28	28	28	31	31	34	34	37
e1 [mm]	169	199	236	261	285	306	345	392	462	512	576	640
e2 [mm]	308	361	401	411	465	508	539	625	722	772	830	915
e3 [mm]	256	299	349	359	403	442	473	541	634	684	750	820
e4 [mm]	50	50	50	50	63	80	80	100	125	125	160	160
e5 [mm]	73	73	73	73	94	111	111	148	173	173	218	218
e6 [mm]	54	54	54	54	75	88	88	105	150	150	175	175
e7 [mm]	216	259	309	319	358	385	416	466	559	613	675	729
h2 [mm]	231	231	231	231	231	308	308	407	395	432	520	520
h3 [mm]	175	205	232	265	288	312	340	395	455	515	565	630
k [mm]	295	350	400	460	515	565	620	725	840	950	1050	1160
l1 [mm]	230	250	270	290	310	330	350	390	430	470	510	550
l2 [mm]	185	225	260	270	300	250	300	330	400	450	550	600
No. of holes	8	12	12	16	16	20	20	20	24	24	28	28
Turns/stroke	12.75	12.75	12.75	12.75	12.75	13.25	13.25	13	13	51	110.5	110.5
Weight approx. [kg]	44.00	60.00	81.00	110.00	135.00	190.00	240.00	320.00	470.00	620.00	800.00	1050.00
Volume approx. [m³]	0.037	0.055	0.078	0.098	0.131	0.165	0.207	0.309	0.458	0.616	0.803	1.065

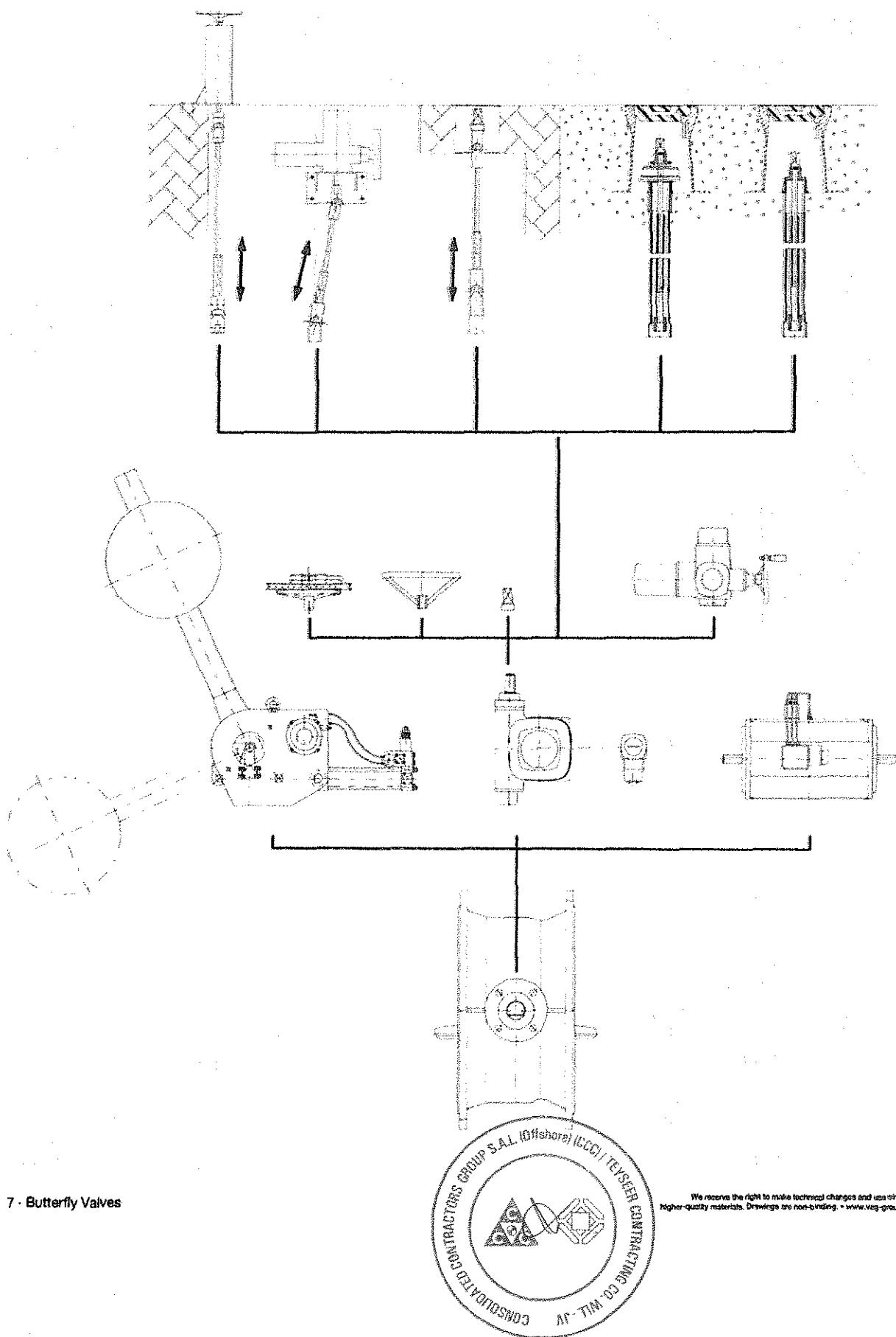


VAC-EKNE® Butterfly Valve

Series

Water

Type of actuator



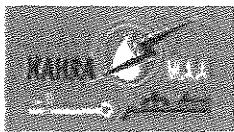


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 026A

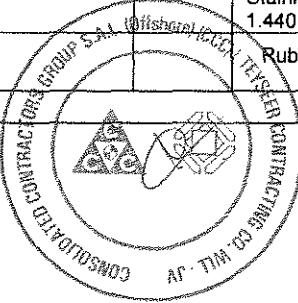
BUTTERFLY VALVES





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	Mammouth 16 or Isoria 16
	2	Service		Potable Water	Noted
	3	Location		PRPS-Package A, B, C, D & E	Noted
	4	Number & Sizes of valve		As Per Drawings	Noted
	5	Type of Butterfly Valve		Double / Triple Eccentric	As per Tender Circular no 13, Series 20 concentric valves offered.
GENERAL INFORMATION	6	Name of Manufacturer		*	KSB AMRI
	7	Place of Manuf. (City / Country)		*	France /Spain
	8	Name of Local Agent		*	AAES
	9	Phone/Fax No. of Agent		*	44600235 / 44600237
	10	Applicable Codes and Standards		BS EN 593	Comply
PIPELINE	11	Line Size / Pressure Rating		As Per Drawings	Noted
	12	Line Material		DI / Steel	Noted
	13	Process connection		Flanged	Noted
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	Noted
FLUID	15	Fluid		Desalinated Potable water	Noted
	16	Velocity range	m/sec	0.4 – 4.5	Noted
	17	Max. Temperature	Min. Temp. °C	45 0	Noted Noted
PROTECTION COATING	18	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Comply
	19	Internal Coating (including disc & sealing surface flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Comply
	20	Non-toxicity Certificate		Required	Comply
	21	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Comply
	22	Corrosion protection data sheet included	Y/N	*	N
VALVE MATERIALS	23	Valve Body and Flanges		Ductile Iron GGG50 (EN GJS-500-7 as per EN 1563)	Comply-
	24	Shaft		Stainless Steel 1.4462, 100% dry shaft design	Comply
	25	Disc		Ductile Iron GGG50 (EN GJS-500-7 as per EN 1563. It shall be of solid one piece casting (non-hollow))	Comply
	26	Retaining Ring		Stainless Steel 1.4571	NA- Series 20 design followed
	27	Shaft Bearing		Self-lubricating PTFE or Zinc free bronze, with EPDM 'O' ring seals	Comply- PTFE
	28	Seat		High-alloy weld overlay, micro finished	NA- Series 20 design followed
	29	Shaft seal		Self-lubricating PTFE or zinc free bronze faced bearings with EPDM 'O' rings	Comply- PTFE
	30	Disc seal		EPDM with stainless steel 1.4571 retaining ring	NA- Series 20 design followed
	31	Bolts & Nuts		Stainless steel 1.4401	No nuts & Bolts in valve
	32	Gasket		Rubber (cotton reinforced)	No gaskets required.





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
CONSTRUCTION	33	Nominal Diameter	mm		Comply
	34	Overall dimensions(Lx W x H)	mm		Pls refer the technical leaflets for the dimensions
	35	Hand Wheel Closing(Clockwise or Anti clockwise)		Clockwise	Comply
	36	Working Pressure		16 Bar (PN16)	Comply
	37	Flange Dimensions		BS EN 1092-2	Comply
	38	Direction of closing marked on Hand Wheel	Y/N	Y	Comply
	39	Assisted Closure included	Y/N	Y	Comply
	40	Required hand operating force	Kgf	*	Less than 25N
	41	Valve actuator fitted	Y/N	Y	Yes
	42	Type of actuator(i.e. electric, pneumatic, hydraulic)	Type	Electric Actuator	Offerd wherever specified
	43	Extension spindles fitted	Y/N	Y	Offerd wherever specified
	44	Type of spindle (rising or non-rising)		Non-Rising	Comply
	45	Hydrostatic test		Required	Noted
	46	Hydrostatic test pressure range	Bar	*	24 bar for body & 18 bar for seat leakage
	47	Coating system testing		Required	Noted
	44	Delivery Period	Weeks		Within 48 weeks

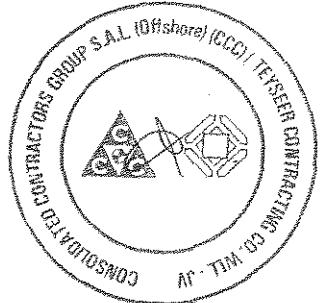
Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
 - 2) Multiple data sheets to be provided by the bidder to cover all the sizes
 - 3) For manually operated butterfly valves, bidder to note against the data relevant to electric actuators as 'not applicable'.



Appendix I-7 – Technical Data Sheets

027 – Gate Valves



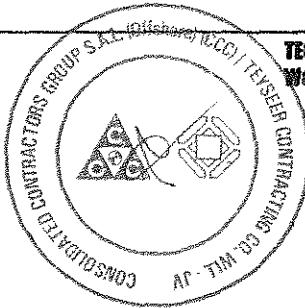


Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I - 7 - 027A - 1

GATE VALVES – METALLIC SEATED

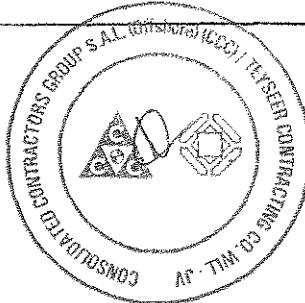
027A-1 PRPS1_GATE VALVES - TDS



TECHNICAL AFFAIRS
Water Projects Dept.

Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	VAG KOS
	2	Service		Portable water	Portable water
	3	Location		PRPS-1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		>350mm and /As Per Drawings	>350mm and /As Per Drawings
	5	Type of Gate Valve		Inside Screw, Solid Wedge, Metallic seated	Inside Screw, Solid Wedge, Metallic seated
GENERAL INFORMATION	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
	9	Phone/Fax No. of Agent		*	00974 44478800
	10	Applicable Codes and Standards		BS 5163 / BS EN 558/ ISO 5752 Series 3	EN 558-1 basic series 15
PIPELINE	11	Line Size / Pressure Rating		As per drawings	As per drawings
	12	Line Material		DI / Steel	DI/Steel
	13	Process connection		Flanged	Flanged
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	Not in scope
FLUID	15	Fluid		Desalinated Potable water	Potable water
	16	Velocity range	m/sec	0.4 – 4.5	Comply
	17	Max. Temperature	Min. Temp.	45 °C 0	50 °
PROTECTION COATING	21	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Blast cleaned to SA 2.5, ISO 8501
	21	Internal Coating (including seating surface of flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	22	Non-toxicity Certificate		Required	Comply
	23	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	25	Corrosion protection data sheet included		Required	Will be provided
VALVE MATERIALS	26	Valve Body		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563	Ductile Iron GGG 40, as per project specification
	27	Valve Gate/disc/plug material		GGG-50 (EN GJS-50-7) as per EN 1563	GGG-40, as per project specification
	28	Valve Spindle		Stainless steel 316	Stainless steel 1.4057
	29	Wedge		GGG-50 (EN GJS-50-7) as per EN 1563	GGG-40 as per project specification
	30	Type of stem sealing		*	EPDM O-rings
	31	Extension spindle material		Stainless steel 316	Offered valves are non-rising stem type with electrical actuator.
	32	Stem		Stainless steel Grade 1.4401	Stainless steel Grade 1.4057
	33	Bolts, Nuts & Washers		Stainless steel 316	Stainless steel 316
	34	Bonnet gasket		*	EPDM
	35	Stem Nut		Replaceable gunmetal BS 1400 LG2	Zinc Free Bronze
	36	Seat/Facing of disc or body		Renewable bronze to BS EN 1982 or Stainless steel Grade 1.4401	Zinc Free Bronze



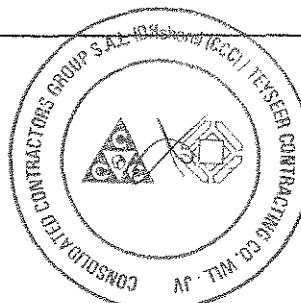


Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	SL No	Description	Units	Required	Offered
CONSTRUCTION	37	Hand wheel		Forged steel or malleable iron	Comply
	42	Nominal Diameter			DN 350-1200mm
	43	Working Pressure		16 Bar (PN16)	PN 16
	44	Hand Wheel Closing(Clockwise or Anti clockwise)		Clockwise	Clockwise
	45	Flange Dimensions		BS/EN 1092-2	EN 1092-2
	46	Velocity of flow at maximum duty			Will be provided
	47	Direction of closing marked on Hand Wheel	Y/N	Y	Yes if applicable
	48	Assisted Closure included	Y/N	Y	Will be clarified
	49	Required hand operating force	Kgf	*	Will be provided
	50	Valve actuator fitted	Y/N	Y	Yes
	51	Type of actuator(i.e. electric, pneumatic, hydraulic)	Type	Electric Actuator	Electric actuator
	52	Type of spindle (rising or non-rising)		Non-Rising	Non -Rising
	53	Extension spindles fitted	Y/N	*	Will be provided wherever required
	54	Hydrostatic test		Required	Comply
	55	Hydrostatic test pressure range	Bar	*	1.5xPN 16 for body ; 1.1xPN 16 for seat
	56	Coating system testing		Required	100% coating test by digital meter
	57	Delivery Period	Weeks	*	Refer offer

Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes
- 3) For manually operated gate valves, bidder to note against the data relevant to electric actuators as 'not applicable'.



Product characteristics and benefits

- Metallic sealing in accordance with EN 1171 (DIN 3352 - Part 2)
- Face-to-face length acc. to EN 558-1, basic series 15 (DIN 3202, F5)
- With flange ends on both sides acc. to EN 1092-2, PN 10 respectively PN 16 < = DN 600
- Stem thread inside
- With electric actuator
- Adjustable stuffing box
- With drain plug

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Bonnet: Ductile cast iron EN-JS 1030 (GGG-40)
- Wedge: Ductile cast iron EN-JS 1030 (GGG-40)
- Bonnet bolts: Stainless steel A4 (DIN EN ISO 3506)
- Body and wedge seat rings: Zinc-free bronze (waste-water resistant)
- Stem: Stainless steel 1.4057
- Stem nut: Zinc-free bronze (waste water resistant)

Corrosion protection

- Inside and outside epoxy coating

Versions

- Standard version as described
- With gearbox
- With mechanical position indicator at electric actuator
- With bypass
- With extended pipe column for underground installation

Field of Application

- Underground installation
- Chamber installation
- Installation in plants

**Tests and approvals**

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)

Accessories

- Extension spindle

Note

For proper installation and safe operation please follow the installation and operation instructions:
"Installation and Operating Instructions for Valves"

Field of application**Pressure test acc. to EN 12266**

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
80...600	16	16	60
80...1200	10	10	60

Test pressure body with water [bar]	Test pressure seat with water [bar]
24	17.6
15	11

Flange connection dimensions PN 10 and/or PN 16

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. • www.vag-group.com

Gate Valves · 1

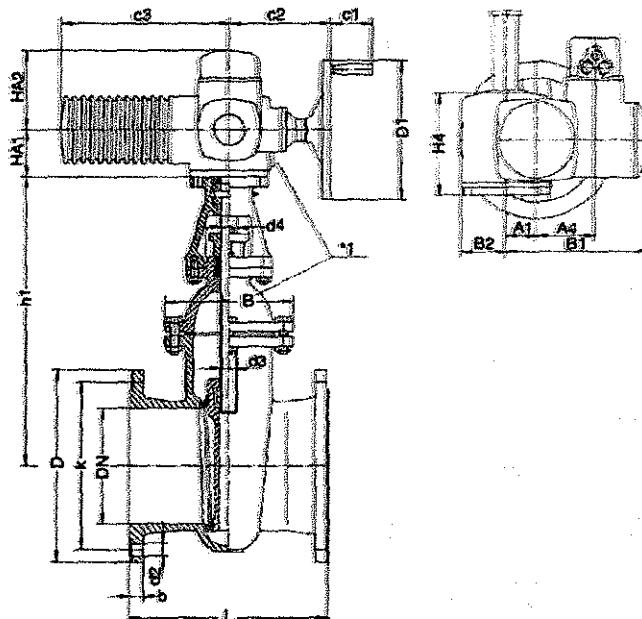


VAG KOS Gate Valve, oval type, with metering stem

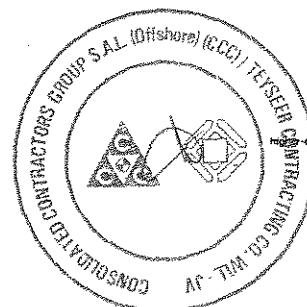
metallic sealing - long face-to-face length - with
electro actuator

water

Drawing

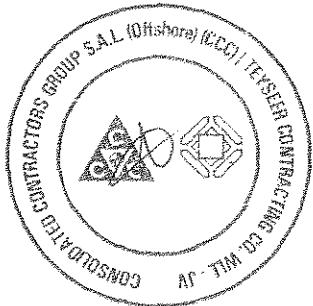


*1: Actuator and dimension "B" shown turned by 90°



Technical data**PN 16**

DN	80	100	125	150	200	250	300	350	400	450	500	600
Actuator	SA 07.5	SA 07.5	SA 10.1	SA 10.1	SA 14.1	SA 14.1	SA 14.5	SA 14.5	SA 16.1	SA 16.1	SA 16.1	SA 16.1
Δp max differential pressure for operation	[bar]	16	16	16	16	16	16	16	16	16	14	9.5
A1	[mm]	40	40	50	50	63	63	63	80	80	60	60
A4	[mm]	103	103	103	103	117	117	117	122	122	122	122
B	[mm]	220	260	295	330	400	460	550	585	670	720	820
B1	[mm]	237	237	247	247	285	285	285	307	307	307	307
B2	[mm]	62	62	65	65	90	90	90	115	115	115	115
C1	[mm]	265	265	282	282	384	384	384	510	510	510	510
C2	[mm]	186	186	191	191	235	235	242	260	260	260	260
C3	[mm]	63	63	63	63	94	94	94	94	94	94	94
D	[mm]	200	220	250	285	340	405	460	520	580	640	715
D1	[mm]	160	160	200	200	315	315	400	400	500	500	500
H4	[mm]	155	155	168	168	213	213	213	253	253	253	253
HA1	[mm]	78	78	80	80	110	110	110	130	130	130	130
HA2	[mm]	195	195	195	195	205	205	205	205	205	205	205
L	[mm]	280	300	325	350	400	450	500	550	600	650	700
b	[mm]	19	19	19	19	20	22	24.5	26.5	28	30	31.5
d2	[mm]	19	19	19	23	23	28	28	28	31	31	34
d3/4	[mm]	24	26	28	28	32	36	36	40	44	44	50
g	[mm]	40	40	50	50	65	65	65	80	80	80	80
h1	[mm]	376	460	502	525	625	722	795	885	1040	1115	1220
k	[mm]	160	180	210	240	295	355	410	470	525	585	650
No. of holes		8	8	8	12	12	12	16	16	20	20	20
Turns/stroke		21	24	30	36	38	47	56	55	62	70	82
Weight with EA	[kg]	60	69	93	115	186	244	307	401	568	721	836
Volume with EA approx.	[m³]	0.250	0.280	0.320	0.350	0.580	0.660	0.750	0.840	1.190	1.350	1.550
												1.940

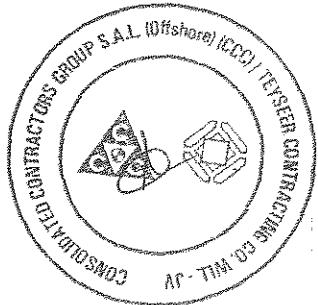




**Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)**

APPENDIX I - 7 - 027A - 2

GATE VALVES – RESILIENT SEATED





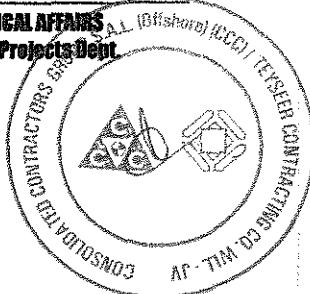
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		**	VAG EXO plus
	2	Service		Potable water	Potable water
	3	Location		PRPS-1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		<350mm and As Per Drawings	DN 50-350mm
	5	Type of Gate Valve		Inside Screw, Solid Wedge, Resilient seated	Inside Screw, solid wedge, resilient seated
GENERAL INFORMATION	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
	9	Phone/Fax No. of Agent		*	00974 44478800
	10	Applicable Codes and Standards		BS EN 1171 / BS EN 558/ ISO 5752 Series 3	BS EN 558
PIPELINE	11	Line Size / Pressure Rating		As per drawings	As per drawings
	12	Line Material		DI / Steel	DI / Steel
	13	Process connection		Flanged	Flanged PN 16
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	Not in scope
FLUID	15	Fluid		Desalinated Potable water	Desalinated Potable water
	16	Velocity range	m/sec	0.4 – 4.5	0.4-4.5
	17	Max. Temperature	Min. Temp. °C	45	50 0
PROTECTION COATING	21	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Blast cleaned to SA 2.5, ISO 8501
	21	Internal Coating (including sealing surface of flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	22	Non-toxicity Certificate		Required	Will be provided
	23	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	25	Corrosion protection data sheet included		Required	Will be provided
VALVE MATERIALS	26	Valve Body		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563	GGG 40, as per project specification
	27	Valve Gate/disc/plug material		GG-50 (EN GJS-50-7) as per EN 1563	GGG 40, as per project specification
	28	Valve Spindle		Stainless steel 316	SS 316
	29	Wedge		GG-50 (EN GJS-50-7) as per EN 1563	GGG 40
	30	Type of stem sealing		*	Maintenance free corrosion resistance stem sealing
	31	Extension spindle material		Stainless steel 316	SS 316
	32	Stem		Stainless steel Grade 1.4401	SS 1.4401
	33	Bolts, Nuts & Washers		Stainless steel 316	SS 316
	34	Bonnet gasket		*	EPDM
	35	Stem Nut		Replaceable gunmetal BS 1400 LG2	Brass
	36	Wedge encapsulating rubber material		EPDM	EPDM
	37	Hand wheel		Forged steel or malleable iron	Comply

027A-2 PRPS1_GATE VALVES - TDS



TECHNICAL AFFAIRS
Water Projects Dept.



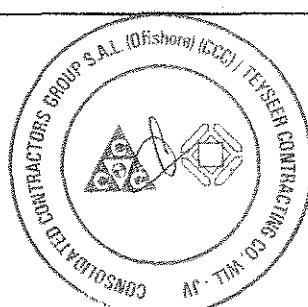
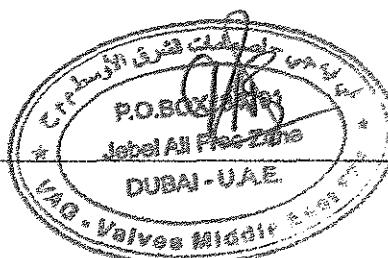


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

CONSTRUCTION	Sl. No	Description	Units	Required	Offered
	42	Nominal Diameter			DN 50-350mm
	43	Working Pressure		16 Bar (PN16)	PN 16
	44	Hand Wheel Closing(Clockwise or Anti-clockwise)		Clockwise	Clockwise
	45	Flange Dimensions		BS EN 1092-2	EN 1092-2
	46	Velocity of flow at maximum duty			Will be provided
	47	Direction of closing marked on Hand Wheel	Y/N	Y	Yes
	48	Assisted Closure included	Y/N	Y	
	49	Required hand operating force	Kgf	*	Will be provided
	50	Valve actuator fitted	Y/N	Y	Yes, wherever required
	51	Type of actuator(i.e. electric, pneumatic, hydraulic)	Type	Electric Actuator	Electric
	52	Type of spindle (rising or non-rising)		Non-Rising	Non -Rising type
	53	Extension spindles fitted	Y/N	*	Yes, wherever required
	54	Hydrostatic test		Required	Will be done
	55	Hydrostatic test pressure range	Bar	*	1.5xPN 16 for body ; 1.1xPN 16 for seat
	56	Coating system testing		Required	100% coating test
	57	Delivery Period	Weeks	*	As per offer

Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes
- 3) For manually operated gate valves, bidder to note against the data relevant to electric actuators as 'not applicable'.



PN 10/16 - DN 40...600

KAT-A 1030-F4-W

Product characteristics and benefits

- Resilient seated in accordance with EN 1074 (DIN 3352 - 4A)
- Face-to-face length acc. to EN 558-1, basic series 14 (DIN 3202, F4)
- With flange ends on both sides acc. to EN 1092-2
- Low torque due to plastic sliding caps on the wedge
- Maintenance-free and corrosion-resistant stem sealing
- With triple O-ring sealing
- Low wear due to wedge guiding and elongated stem bearing
- Suitable for vacuum of up to 90%

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Bonnet: Ductile cast iron EN-JS 1030 (GGG-40)
- Wedge: Ductile cast iron EN-JS 1030 (GGG-40) all around EPDM vulcanized
- Bonnet bolts: Stainless steel A2 (DIN EN ISO 3506)
- Stem: Stainless steel 1.4021
- Stem nut: Brass

Corrosion protection

- Inside and outside epoxy coating acc. to GSK guidelines

Versions

- Standard version as described
- With handwheel
- Prepared for electric actuator
- With electric actuator

Field of Application

- Underground installation
- Chamber installation
- Installation in plants

**Tests and approvals**

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)
- DVGW tested and registered
- Elastomers approved acc. to W270

Accessories

- T-key
- Installation equipment
- Extension spindle
- Surface box cast iron
- Plastic base plate
- SERIO®plus position indicator

Note

For proper installation and safe operation please follow the installation and operation instructions:
"Installation and Operating Instructions for Valves"

Field of application**Pressure test acc. to EN 12266**

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
40...500	16	16	50
200...600	10	10	50

Test pressure body with water [bar]	Test pressure seat with water [bar]
24	17.6
15	11

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. • www.vag-group.com

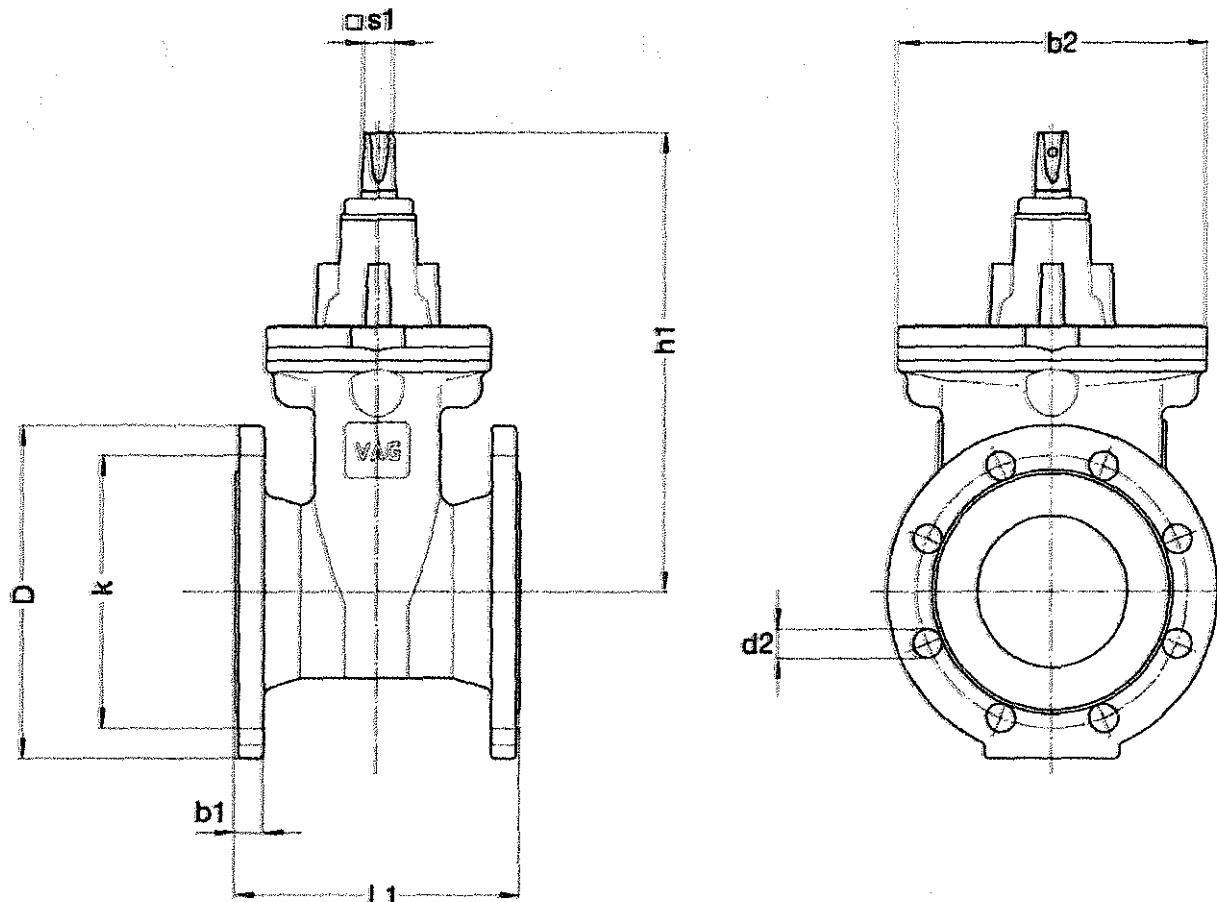
Gate Valves · 1



VAG EKO plus Gate Valve
Bellows-sealed - short face-to-face length

Water

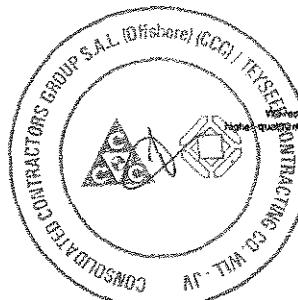
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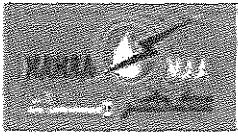


Technical data

PN 16

DN	40	50	65	80	100	125	150	200	250	300	350	400
D [mm]	150	165	185	200	220	250	285	340	400	455	520	580
L1 [mm]	140	150	170	180	190	200	210	230	250	270	290	310
b1 [mm]	19	19	19	19	19	19	19	20	22	24.5	26.5	28.5
b2 [mm]	121	121	206	206	206	228	252	330	413	472	619	619
d2 [mm]	19	19	19	19	19	19	23	23	28	28	28	31
h1 [mm]	226	233	273	278	310	347	386	493	606	670	852	936
k [mm]	110	125	145	160	180	210	240	295	355	410	470	525
s1 [mm]	14	14	17	17	19	19	19	24	27	27	27	32
No. of holes	4	4	4	8	8	8	8	12	12	12	16	16
Turns/stroke	10	12	16	20	20	25	30	34	43	51	59	50
Weight approx. [kg]	8.20	9.20	13.50	15.50	17.90	25.70	32.40	52.00	85.50	114.10	247.00	310.00
Volume approx. [m³]	0.006	0.008	0.013	0.014	0.018	0.024	0.032	0.052	0.084	0.115	0.199	0.235



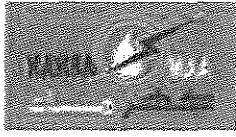


Qatar General Electricity & Water Corporation
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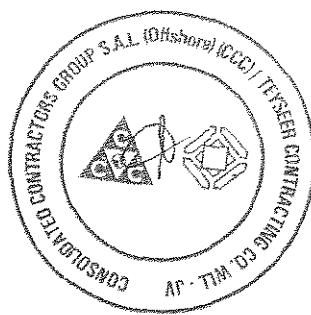
APPENDIX I - 7 - 027 A - 2

GATE VALVES - RESILIENT SEATED





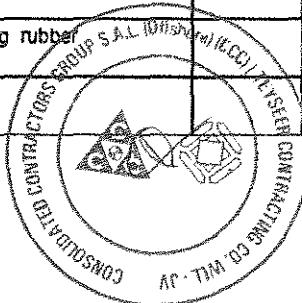
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	S.I. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		**	EURO 23
	2	Service		Portable water	COMPLY
	3	Location		PRPS-1	COMPLY
	4	Number & Sizes of valve		=350mm and As Per Drawings	COMPLY
	5	Type of Gate Valve		Inside Screw, Solid Wedge, Resilient seated	COMPLY Double Eccentric
GENERAL INFORMATION	6	Name of Manufacturer		*	SAINT-GOBAIN PAM
	7	Place of Manuf. (City / Country)		*	TOUL / France
	8	Name of Local Agent		*	MANNAI
	9	Phone/Fax No. of Agent		*	9744558888 / 9744558485
	10	Applicable Codes and Standards		BS EN 1171 / BS EN 558 / ISO 5752 Series 3	COMPLY EN 1074-2 & EN 1171 BS EN 558 ISO 5752 Serie 14
PIPELINE	11	Line Size / Pressure Rating		As per drawings	COMPLY
	12	Line Material		DI / Steel	DI
	13	Process connection		Flanged	COMPLY EN 1092-2
	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	COMPLY
FLUID	15	Fluid		Desalinated Potable water	COMPLY
	16	Velocity range	m/sec	0.4 – 4.5	COMPLY According EN 1074-2
	17	Max. Temperature	Min. Temp.	°C	45 0
PROTECTION COATING	21	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	COMPLY
	21	Internal Coating (including sealing surface of flanges)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	22	Non-toxicity Certificate		Required	WRAS
	23	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	COMPLY see QCP
	25	Corrosion protection data sheet included		Required	Refer Technical proposal
VALVE MATERIALS	26	Valve Body		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563	Ductile Iron GJS 400-15
	27	Valve Gate/disc/plug material		GG-50 (EN GJS-50-7) as per EN 1563	GJS 500-7
	28	Valve Spindle		Stainless steel 316	COMPLY
	29	Wedge		GG-50 (EN GJS-50-7) as per EN 1563	Ductile Iron GJS 400-15
	30	Type of stem sealing		*	GJS 500-7
	31	Extension spindle material		Stainless steel 316	Bush with 2 O'rING
	32	Stem		Stainless steel Grade 1.4401	COMPLY
	33	Bolts, Nuts & Washers		Stainless steel 316	N / A (no bolts)
	34	Bonnet gasket		*	EPDM (WRAS certificate)
	35	Stem Nut		Replaceable gunmetal BS 1400 LG2	COMPLY (Stem Nut in Aluminum Bronze)
	36	Wedge encapsulating rubber material		EPDM	COMPLY
	37	Hand wheel		Forged steel or malleable iron	Forged Steel





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CONSTRUCTION	Sl. No	Description	Units	Required	Offered
	42	Nominal Diameter			According to BOQ
	43	Working Pressure		16 Bar (PN16)	COMPLY
	44	Hand Wheel Closing(Clockwise or Anti clockwise)		Clockwise	COMPLY
	45	Flange Dimensions		BS EN 1092-2	COMPLY
	46	Velocity of flow at maximum duty			4 m/s Maxi
	47	Direction of closing marked on Hand Wheel	Y/N	Y	COMPLY
	48	Assisted Closure included	Y/N	Y	Low operating torque: no need Gearbox
	49	Required hand operating force	Kgf	*	According to EN12570
	50	Valve actuator fitted	Y/N	Y	COMPLY (if motorized valves)
	51	Type of actuator(i.e. electric, pneumatic, hydraulic)	Type	Electric Actuator	COMPLY
	52	Type of spindle (rising or non-rising)		Non-Rising	COMPLY
	53	Extension spindles fitted	Y/N	*	NO
	54	Hydrostatic test		Required	YES (certificate 3.1 delivered)
	55	Hydrostatic test pressure range	Bar	*	Vessel : 1.5 x PN Seat : 1.1 x PN
	56	Coating system testing		Required	See QCP
	57	Delivery Period	Weeks	*	

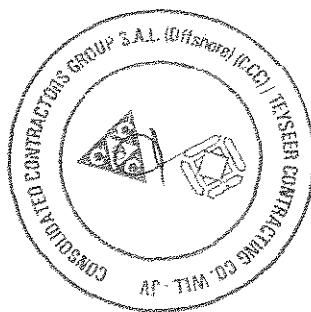
Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes
- 3) For manually operated gate valves, bidder to note against the data relevant to electric actuators as 'not applicable'.



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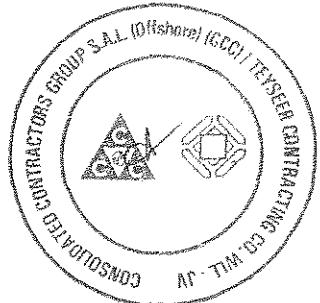
025A PRPS1_AIR VALVES - TDS



**TECHNICAL AFFAIRS
Water Projects Dept.**

Appendix I-7 – Technical Data Sheets

028 – Check/Non-Return Valves





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I - 7 - 028A

CHECK / NON-RETURN VALVES

Axial Check Valves

for

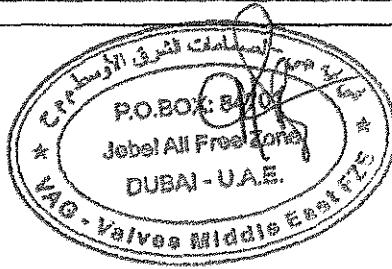
Reservoir Main Ps



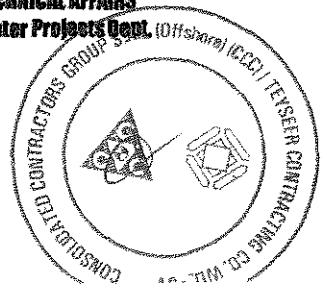
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

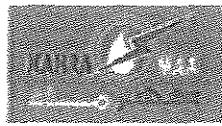
	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	VAG Axial Check Valves
	2	Service		Portable water	Portable water
	3	Location		PRPS-1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		As Per Drawings	As per Drawings
	5	Type of Non-Return Valve			
GENERAL INFORMATION	i.	$\leq 300\text{mm}$		Swing, non slam type	Offered sizes are above DN 400mm, High Dynamic spring loaded non slam type
	ii.	$\geq 350\text{mm}$		High dynamic, spring loaded, non slam type	
	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
PIPELINE	9	Phone/Fax No. of Agent		*	00974 44478800
	10	Applicable Codes and Standards		BS 5153	EN 558-1
	11	Line Size / Rating		As Per Drawings	As per drawings & BOQ
	12	Line Material		DI / Steel	DI/Steel
	13	Process connection		Flanged	Flanged
FLUID	14	Connection Materials		Mild Steel with hot dipped zinc galvanized	Not in scope
	15	Fluid		Desalinated Potable water	Potable water
	16	Velocity range	m/sec	0.4 – 4.5	Comply
	18	Max. Temperature	Min. Temp. °C	45 0	60 0
	20	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Blast cleaned to SA 2.5, ISO 8501
PROTECTION COATING	21	Internal Coating (Body & Disc)		Fusion bonded epoxy coating system to a DFT of 300 μm at any point	Fusion bonded epoxy coating system to a DFT of 300 μm at any point
	22	Non-toxicity Certificate		Required	Will be provided
	23	External Coating		Fusion bonded epoxy coating system to a DFT of 300 μm at any point	Fusion bonded epoxy coating system to a DFT of 300 μm at any point
	24	Corrosion protection data sheet included		Required	Will be provided
	25	Valve Body, Bonnet, Weight & hinge		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563 For DN>300 ASTM A 351 CF 8m	GGG 40 Body, as per project specification ASTM A 351 CF8m is for Axial Check valves
VALVE MATERIALS	26	Flap Disc			
	27	Seat		Carbon Steel	SS 316
	28	Bolts & Nuts		Stainless steel 316	SS 316
	29	Hinge pin/shaft		Stainless steel 1.4404	Will be clarified
	30	Type of connections		Flanged to EN 1092-2, PN 16	
	31	Pressure rating		Flanged to BS EN 1092-2 PN 16	PNB 16
	32	Hydrostatic test		Required	comply
	33	Hydrostatic test pressure range	Bar	*	1.5xPN 16 for body

028A PRPS1_NRV - TDS



TECHNICAL AFFAIRS
Water Projects Dept.





Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

34	Coating system testing		Required	Coating test by digital meter
35	Overall dimensions(L xW xH)		*	Will be provided
36	Delivery period	Weeks	*	Refer offer

Notes:

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes





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(Packages A, B, C, D & E)

APPENDIX I - 7 - 028A

CHECK / NON-RETURN VALVES

for

AUXILIARY PS

8

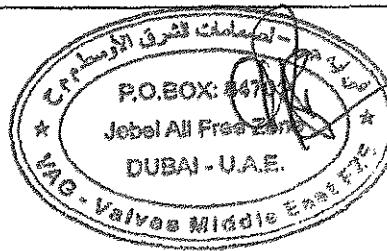
TANKER FILLING STATION



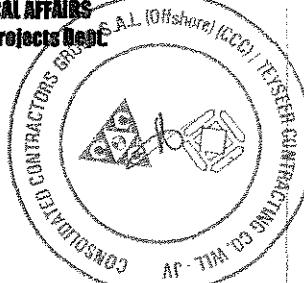
Qatar General Electricity & Water Corporation
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(Packages A, B, C, D & E)

	Sl. No	Description	Units	Required	Offered
IDENTIFICATION	1	Valve Tag/Model Number		*	VAG SKR
	2	Service		Portable water	Portable water
	3	Location		PRPS-1	PRPS 1,2,3,4,5
	4	Number & Sizes of valve		As Per Drawings	As per Drawings
	5	Type of Non-Return Valve i. ≤ 300mm ii. ≥ 350mm		Swing, non-slam type High dynamic, spring loaded, non-slam type	Slanted seat titling disc check valve with internal damping unit for non-slam application
	6	Name of Manufacturer		*	VAG Armaturen
	7	Place of Manuf. (City / Country)		*	Germany
	8	Name of Local Agent		*	Petrofac Qatar
	9	Phone/Fax No. of Agent		*	00974 44478800
	10	Applicable Codes and Standards		BS 5153	EN 558-1
PIPELINE	11	Line Size / Rating		As Per Drawings	As per drawings & BOQ
	12	Line Material		DI / Steel	DI/Steel
	13	Process connection		Flanged	Flanged
	14	Connection Materials		Mild Steel with hot-dipped zinc galvanized	Not in scope
FLUID	15	Fluid		Desalinated Potable water	Potable water
	16	Velocity range	m/sec	0.4 – 4.5	Comply
	18	Max. Temperature	Min. Temp.	45 °C	50 °C
PROTECTION COATING	20	Surface Preparation		Blast cleaned to SA 2.5, ISO 8501	Blast cleaned to SA 2.5, ISO 8501
	21	Internal Coating (Body & Disc)		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	22	Non-toxicity Certificate		Required	Will be provided
	23	External Coating		Fusion bonded epoxy coating system to a DFT of 300 µm at any point	Fusion bonded epoxy coating system to a DFT of 300 µm at any point
	24	Corrosion protection data sheet included		Required	Will be provided
	25	Valve Body, Bonnet, Weight & hinge		Ductile Iron GGG50 (EN GJS-500-7) as per EN 1563 For DN<=300 Ductile Iron GGG50 (EN GJS-500-7-) as per EN 1563 For DN>300 ASTM A 351 CF 8m	GGG 40, as per project specification GGG 40 for slanted seat NRV, ASTM A 351 CF8m is applicable for Axial Check valves
VALVE MATERIALS	26	Flap Disc		Carbon Steel	Chrome Nickel alloy weld overlay seat
	27	Seat		Stainless steel 316	SS 316
	28	Bolts & Nuts		Stainless steel 1.4404	Shaft -1.4462, Pin -1.4404
	29	Hinge pin/shaft			Flanged to EN 1092-2 PN 16
	30	Type of connections		Flanged to BS EN 1092-2	PNB 16
	31	Pressure rating		PN 16	comply
	32	Hydrostatic test		Required	
	33	Hydrostatic test pressure range	Bar	*	1.5xPN 16 for body ; 1.1xPN 16 for seat

028A PRPS1_NRV - TDS



TECHNICAL AFFAIRS
Water Projects Dept.



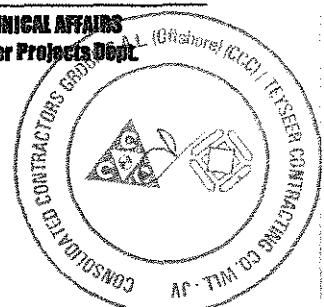


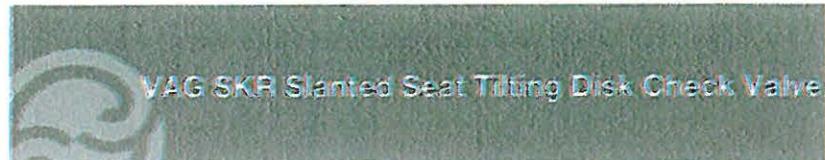
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

34	Coating system testing		Required	Coating test by digital meter
35	Overall dimensions(L xW xH)		*	Refer catalogue
36	Delivery period	Weeks	*	Refer offer

Notes :

- 1) * These variables to be filled in by Vendor/Bidder.
- 2) Multiple data sheets to be provided by the bidder to cover all the sizes





PN 10/16 - DN 200...1200
KAT-A 1510

Product characteristics and benefits

- Metallic sealing in accordance with EN 12334 - Part 3)
- Face-to-face length acc. to EN 558-1, basic series 14 (DIN 3202, F4)
- With flange ends on both sides acc. to EN 1092-2
- Compact design
- Short closing time due to approx. 30% reduced stroke by means of a slanted seat
- Corrosion-resistant and wear-resistant sealing seat
- No moving parts outside of the valve
- Reduced pressure losses due to free running disk

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Check valve disk: Ductile cast iron EN-JS 1030 (GGG-40)
- Check valve shaft: Stainless steel 1.4021
- Shaft bearing: Zincfree bronze
- Seat: Chrome-nickel overlay welded, microfinished

Corrosion protection

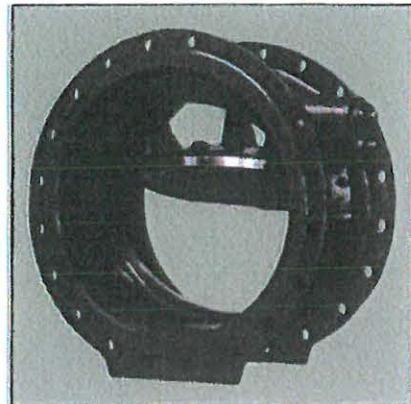
- Inside and outside epoxy coating

Versions

- Standard version as described
- Bigger sizes available on request
- Special designs available on request
- Pressure rating PN 25 available on request
- With internal damping unit
- With blind cover (prepared for internal damping unit)
- With mechanical position indicator
- With limit switch
- With rubber lining
- Welded design
- Forged design

Field of Application

- Chamber installation
- Installation in plants



Tests and approvals

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)

Operation data

- Operating limits of version with damper:
 - DN 200 - 800: max. pressure 16 bar
 - DN 900: max. pressure 10 bar
 - DN 1000: max. pressure 6 bar
 - DN 1200: max. pressure 4 bar
- Minimum flow velocity of the medium > 1.6 m/s
- Minimum distance after pumps with:
 - horizontal shaft: 3 x DN
 - vertical shaft: 5 x DN

Note

The regulations applicable to tilting disk check valves must be followed.
For the safe use of this valve in waste water, the medium must not contain any plait-creating components.

For proper installation and safe operation please follow the installation and operation instructions:
KAT-B 1510

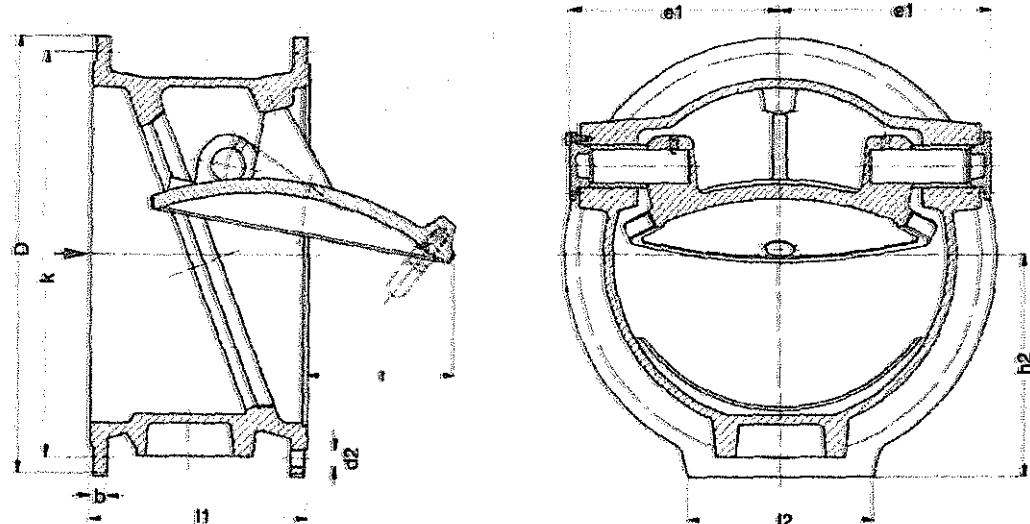
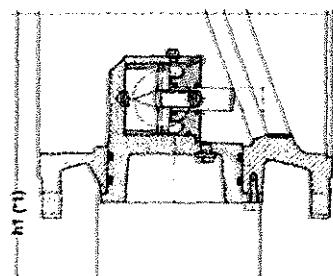
Field of application

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
200...1000	16	16	50
200...1200	10	10	50

Pressure test acc. to EN 12266

Test pressure body with water [bar]	Test pressure seat with water [bar]
24	17.6
15	11.2

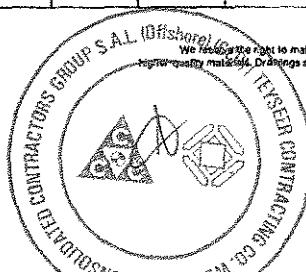


Drawing**With internal damping unit**

*1: Dismantling space h1 up to centre of valve

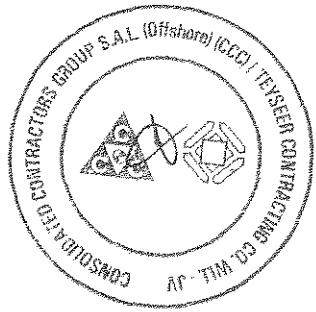
Technical data**PN 16**

DN	200	250	300	350	400	450	500	600	700	800	900	1000
D [mm]	340	400	455	520	575	640	715	840	910	1025	1125	1255
b [mm]	20	22	24.5	26.5	28	31.5	31.5	36	39.5	43	46.5	50
d2 [mm]	23	28	28	28	31	31	34	37	37	40	40	43
e1 [mm]	145	170	200	225	270	300	325	385	450	500	565	630
h1 [mm]	245	270	340	370	420	460	500	585	650	750	855	890
h2 [mm]	175	205	232	265	295	325	362	425	480	520	570	635
k [mm]	295	355	410	470	525	585	650	770	840	950	1050	1170
j1 [mm]	230	250	270	290	310	330	350	390	430	470	510	550
i2 [mm]	160	180	200	225	250	250	300	330	400	450	550	600
t [mm]	55	75	100	136	150	190	210	265	320	380	420	470
No. of holes	12	12	12	16	16	20	20	20	24	24	28	28
Weight approx. [kg]	40.00	65.00	83.00	118.00	145.00	210.00	250.00	365.00	470.00	750.00	980.00	1250.00
Weight with damper [kg]	43.5	68.5	92	127	160	225	274	400	518	814	1054	1335
Volume approx. [m³]	0.030	0.045	0.060	0.080	0.110	0.140	0.190	0.280	0.370	0.520	0.660	0.880



Appendix I-7 – Technical Data Sheets

029 – Flow Control Valve

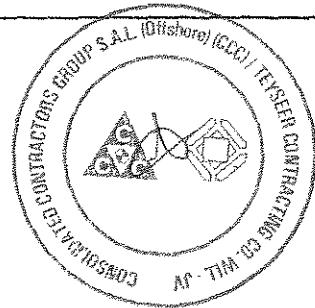




Qatar General Electricity & Water Corporation
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APPENDIX I – 7 - 29A-1

FLOW CONTROL VALVES

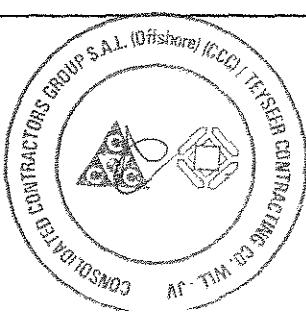


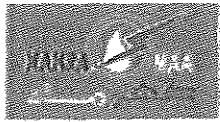


Qatar General Electricity & Water Corporation
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Construction of Mega Reservoir PRPSs
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APPENDIX I – 7 – 41A

RESERVOIR INLET FLOW CONTROL VALVES

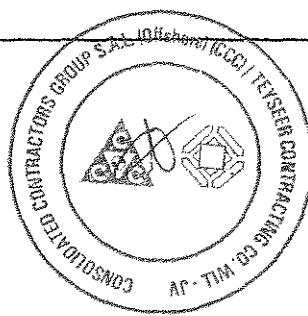


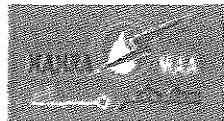


Qatar General Electricity & Water Corporation
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APPENDIX I – 7 - 30A-1

BYPASS FLOW CONTROL VALVES





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl No	Description			Required	Offered
GENERAL	1	Flow Control Valve Dia. mm			-	DN 800,1200,1400,1600
	2	Tag Number			*	To be provided by end user
	3	Location			PRPS1 / RL - A	PRPS 1,2,3,4,5
	4	P&ID No.			*	To be provided by end user
	5	Quantity			1	As per requirement
SERVICE CONDITION	6	Fluid			Potable water	
	7	Flow Condition	Maximum l/s	Minimum l/s	2104	210
	8	Pressure	Max. Upstream pressure, m	Min. Downstream pressure, m	78.20	25
	9	Temperature normal/max °C			35 / 70	85/55
	10	P Max. bar			16	PN 16
	11	Throttling or on-off frequency			Continuous	comply
	12	Line size mm			DN 1200	As required
	13	Cv calculated / required			*	Will be provided
	14	Type			Axial Flow	Axial flow
	15	Max. noise dBA			85	Less than 85db
	16	Body size / rating mm			*	As per requirement/all are PN 16
	17	Material - Body / piston / shaft			Ductile Cast Iron EN 1563, EN-GJS-500-7 / Stainless Steel 316L / Duplex Stainless Steel 1.4462	Ductile Iron GGG40 (as per project specification)/1.4462/1.4462
VALVE	18	Piston guides/ Bearings / Regulating cylinder			Bronze/ Bronze / Stainless Steel 316L	Bronze/Bronze/1.4462
	19	Outside coating			*	FBE 300microns Min.
	20	Connections			Raised flange face PN 16 to EN 1092-2	RF PN 16
	21	Test Pressure - Body / Seat			*	1.5x16 for body/1.1x16 for seat
	22	Closing direction			clockwise	clockwise
	23	Closing by			*	Electrical actuator
	24	Number of turns			*	NA - Electrical actuator
	25	Kc value (1,2,3)			*	Will be provided
	26	Type and details			Electrically modulating actuator	
ACTUATOR	27					
	28	Process time			230s	Refer offer
	29	Integrated positioner	Yes/No	Yes	Yes	Yes
	30	Position indicator transmitter	Yes/No	Yes	Yes	Refer catalogue
	31	Dimensions and weight				
DIMENSIONS	32	-Length / Overall length	mm	*	*	
	33	-Height / Overall height	mm	*	*	
	34	-Flange inner / outer dia.	mm	*	*	

029A-1 PRPS1_FCV - TDS



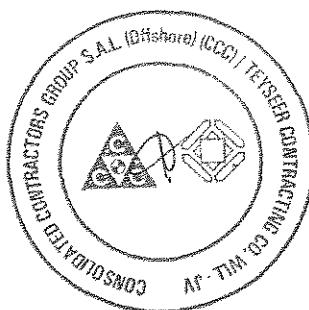


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	35	Weight	Kg	*	
	36	Manufacturer / Country of origin		*	VAG Armaturen-Germany
	37	Model No.		*	VAG RIKO
	38	Local Agent		*	Petrofac Qatar

Notes:

- * To be filled by vendor / bidder



PN 10/16/25/40 - DN 150...2000

KAT-A 2014-EA



Product characteristics and benefits

- Face-to-face length acc. to EN 558-1, basic series 15 - from DN 500 1.5 x DN
- With flange ends on both sides acc. to EN 1092-2
- Control valve in straightway type
- With customized control device depending on operating conditions
- Low actuating torque due to pressure balanced valve piston
- Rotationally symmetrical flow guidance
- Annular flow cross section in each position
- Axial movement of the plunger by means of crank gear mechanism
- With self-locking worm gear unit including position indicator
- With electric actuator
- No blocking due to long piston guide rails
- Elastic profile sealing ring located in the no-flow zone for high durability
- Wear-resistant, corrosion-resistant and infiltration-proof piston guides in the body by micro-finished bronze weld overlay
- Piston sealed by Quad Ring

Tests and approvals

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)

Operation data

- Specify operating pressure when inquiring/ordering:
 - Maximum flow rate and minimum differential pressure
 - Minimum flow rate and maximum differential pressure
 - Static pressure upstream of valve
 - Static pressure downstream of valve
 - Dynamic pressure upstream of valve
 - Dynamic pressure downstream of valve

Note

For proper installation and safe operation please follow the installation and operation instructions:

KAT-B 2014

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Piston guide rails: Bronze overlay welded
- Piston: Stainless steel 1.4301
- Valve sealing: EPDM
- Inner parts: Stainless steel (exception: > DN 600 crank gear from EN-JS 1030 (GGG-40))
- Bolts: Stainless steel A4 (DIN EN ISO 3506)
- Bearing bush: Bronze
- Eye bolts for lifting: Galvanized steel 1.0401 (C15)

Corrosion protection

- Inside and outside epoxy coating

Versions

- Standard version as described
- Special designs available on request
- With slotted cylinder to control high differential pressure for water with suspended solids (Form "SZ")
- With orifice cylinder to control high differential pressure (Form "LH")
- With cut off edge and sudden enlargement of cross sectional area at the seat to control lower differential pressure (Form "E")
- DN 1400 in VAG RKV plunger valve design

Field of Application

- Chamber installation
- Installation in plants

Field of application

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
150...1200	40	40	50
150...1600	25	25	50
150...2000	16	16	50
150...2000	10	10	50

Pressure test acc. to EN 12266

Test pressure body with water [bar]	Test pressure seat with water [bar]
60	44
37.5	28
24	18
15	11

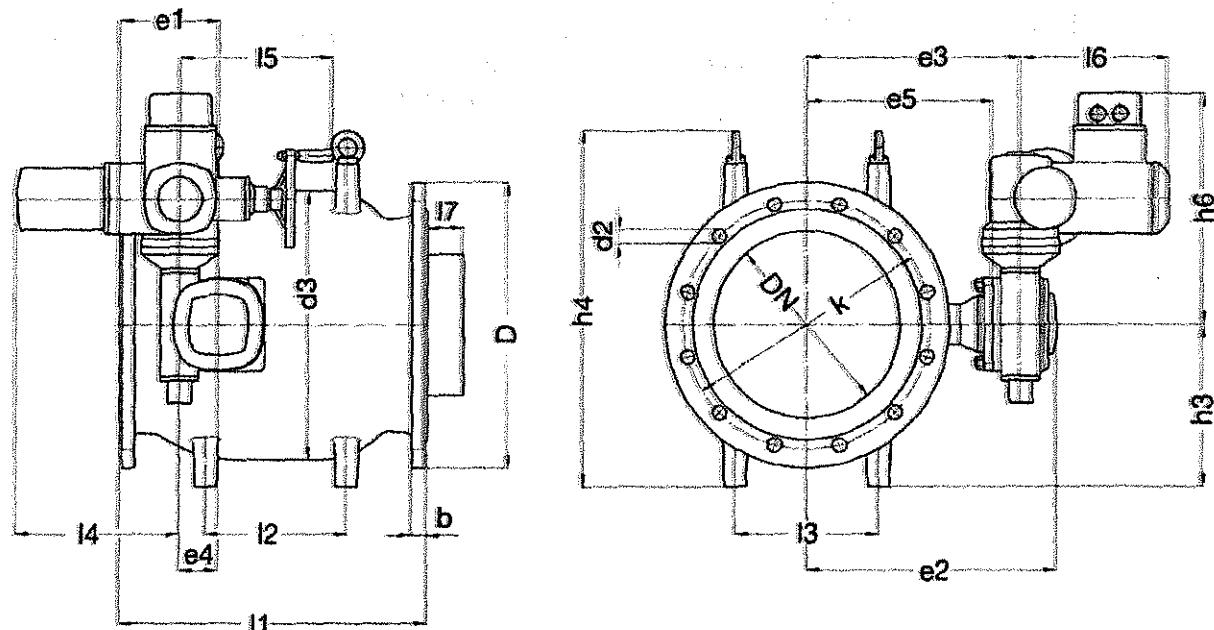


Water

VAG SIKOR Plunger Valve

one-piece body with electric actuator

Drawing



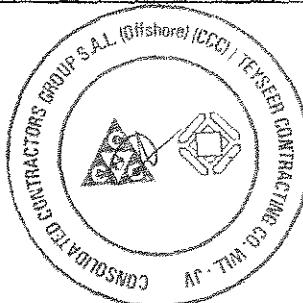
Technical data

PN 40

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	300	375	450	515	660	685	755	890	995	1140	1250	1360
b [mm]	26	30	34.5	39.5	48	49	52	58	64	65	76	80
d2 [mm]	28	31	34	34	41	41	44	50	48	56	56	56
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1253	1360
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	180	160
e5 [mm]	226	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h5 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	250	320	385	450	585	610	670	795	900	1030	1140	1250
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
l4 [mm]	264	264	284	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1	SA 10.1	SA 10.1	SA 10.1							
No. of holes	8	12	12	16	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	140	205	235	420	490	695	1145	1725	2225	2825	4150
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. • www.vag-group.com

Air Valves and Control Valves - 2

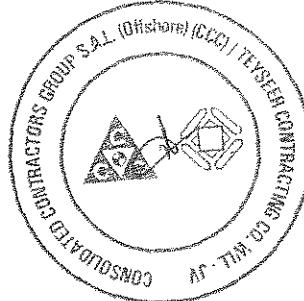


Technical data**PN 25**

DN	1200	1600
D [mm]	1530	1975
b [mm]	69	81
d2 [mm]	57	62
d3 [mm]	1645	2244
e1 [mm]	560	725
e2 [mm]	1136	1609
e3 [mm]	1040	1490
e4 [mm]	200	250
e5 [mm]	950	1350
h3 [mm]	850	1200
h4 [mm]	1828	2608
h6 [mm]	720	945
k [mm]	1420	1860
l1 [mm]	1800	2500
l2 [mm]	800	1200
l3 [mm]	800	1200
l4 [mm]	282	384
l5 [mm]	256	336
l6 [mm]	247	384
l7 [mm]	363	480
Actuator type	SA 10.1	SA 14.5
No. of holes	32	40
Weight without cylinder approx.	5225	17350
Volume with EA approx.	7.000	19.000

PN 16

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	285	340	405	460	580	640	715	840	970	1025	1125	1255
b [mm]	26	22	24.5	24.5	28	30	31.5	36	39.5	43	46.5	50
d2 [mm]	22	23	28	28	31	31	34	37	37	40	41	44
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	240	295	355	410	525	585	650	770	840	950	1050	1170
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	580	600	700	750
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1	SA 10.1	SA 07.5	SA 10.1							
No. of holes	8	12	12	12	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	130	170	195	330	375	575	1015	1525	1975	2575	3665
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600



VAG RIKO® Plunger valve
one piece body with electric actuator

Water

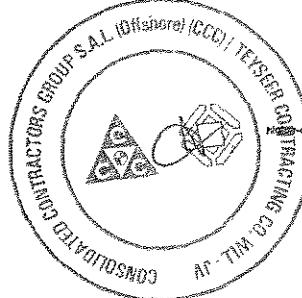
Technical data

PN 16

DN	1200	1600	1800	2000
D [mm]	1485	1930	2130	2345
b [mm]	57	65	70	75
d2 [mm]	50	57	57	62
d3 [mm]	1645	2244	2520	2800
e1 [mm]	560	725	840	900
e2 [mm]	1136	1609	1998	2210
e3 [mm]	1040	1490	1713	1925
e4 [mm]	200	250	315	315
e5 [mm]	950	1350	1500	1700
h3 [mm]	850	1200	1380	1540
h4 [mm]	1828	2608	3058	3410
h6 [mm]	720	945	1178	1178
k [mm]	1390	1820	2020	2230
l1 [mm]	1800	2500	2700	3000
l2 [mm]	800	1200	1500	1600
l3 [mm]	800	1200	1500	1600
l4 [mm]	282	384	384	384
l5 [mm]	256	336	329	329
l6 [mm]	247	384	285	285
l7 [mm]	363	480	590	620
Actuator type	SA 07.5	SA 14.1	SA 14.1	SA 14.1
No. of holes	32	40	44	48
Weight without cylinder approx.	5025	17050	18000	25000
Volume with EA approx.	7.000	19.000	27.000	37.000

PN 10

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	285	340	395	445	565	615	670	780	895	1015	1115	1230
b [mm]	26	22	24.5	24.5	28	30	31.5	36	395	43	46.5	50
d2 [mm]	22	22	23	23	28	28	28	31	31	34	34	37
d3 [mm]	236	302	371	434	575	632	711	840	995	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	80	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	240	295	350	400	515	565	620	725	840	950	1050	1160
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	760
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	194	244	275	292
Actuator type	SA 07.5											
No. of holes	8	8	12	12	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	130	170	195	330	375	565	965	1525	1925	2525	3665
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

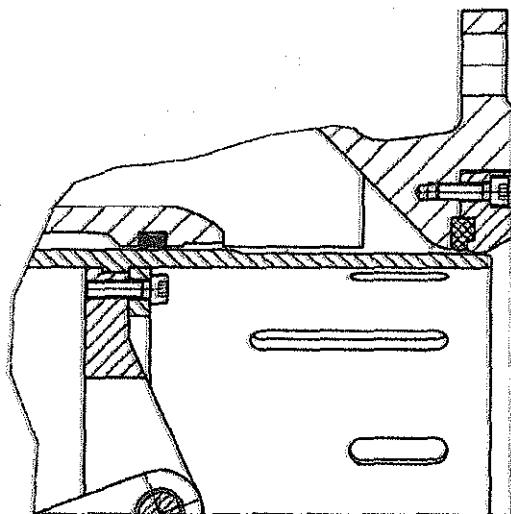


VAG RIKO® Plunger Valve
one-piece body, with electric actuated

Water

Further information

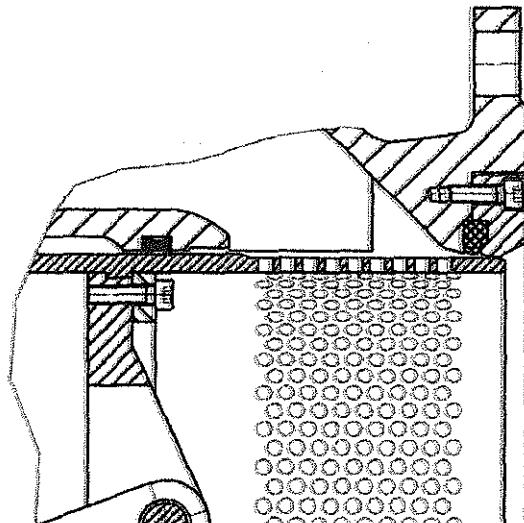
Type "SZ" with slotted cylinder



Application:

- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- To prevent cavitation
- For water containing suspended matter

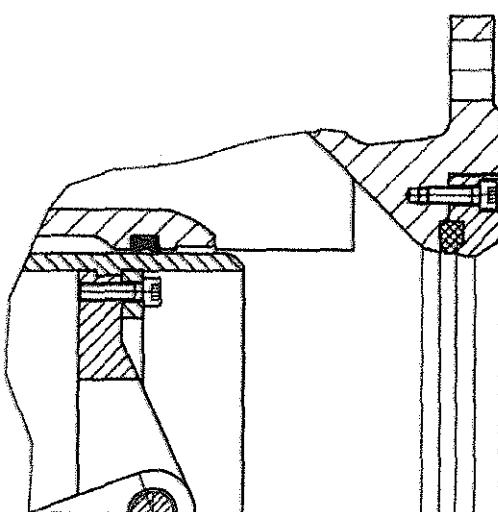
Type "LH" with multiple orifice cylinder



Application:

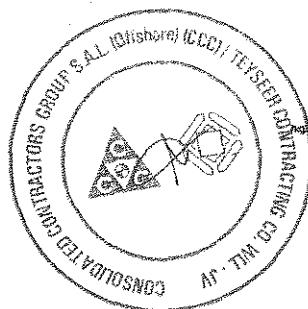
- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- Optimum prevention of cavitation

Type "E" with cut-off edge



Application:

- Preferably as control valve with sufficient back pressure
- As pump start-up valve

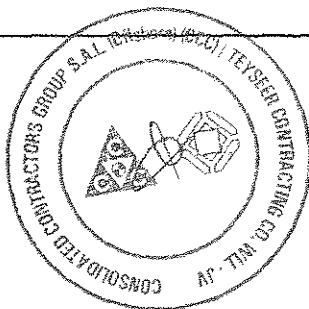




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 - 29A-1

FLOW CONTROL VALVES

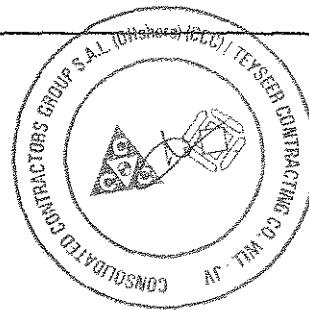




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 41A

RESERVOIR INLET FLOW CONTROL VALVES

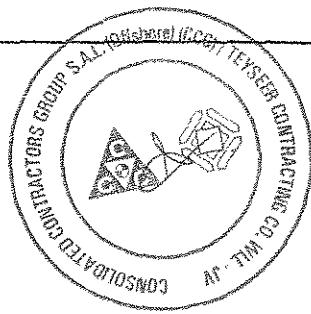




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 - 30A-1

BYPASS FLOW CONTROL VALVES

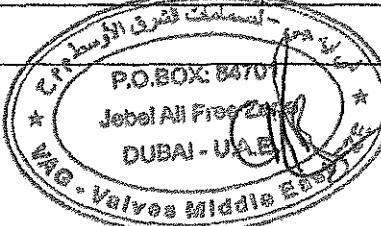
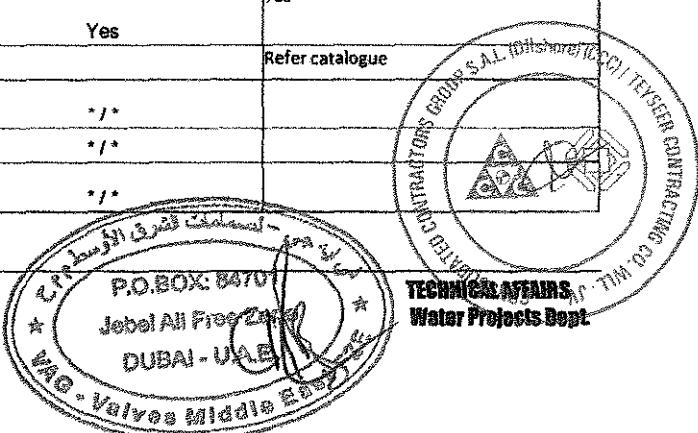




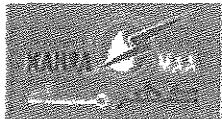
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl.No	Description			Required	Offered
GENERAL	1	Flow Control Valve Dia. mm			*	DN 800,1200,1400,1600
	2	Tag Number			*	To be provided by end user
	3	Location			PRPS1 RL -A	PRPS 1,2,3,4,5
	4	P&ID No.			*	To be provided by end user
	5	Quantity			1	As per requirement
SERVICE CONDITION	6	Fluid			Potable water	
	7	Flow Condition	Maximum Vs	Minimum Vs	2104	210
	8	Pressure	Max. Upstream pressure, m	Min. Downstream pressure, m	78.20	25
	9	Temperature normal/max °C			35 / 70	35/55
	10	P Max.		bar	16	PN 16
	11	Throttling or on-off frequency			Continuous	comply
	12	Line size		mm	DN 1200	As required
	13	Cv calculated / required			*	Will be provided
	14	Type			Axial Flow	Axial flow
	15	Max. noise		dBA	85	Less than 85db
	16	Body size / rating		mm	*	As per requirement/all are PN 16
	17	Material - Body / piston / shaft			Ductile Cast Iron EN 1563, EN-GJS-500-7 / Stainless Steel 316L / Duplex Stainless Steel 1.4462	Ductile Iron GGG40 (as per project specification)/1.4462/1.4462
VALVE	18	Piston guides/ Bearings / Regulating cylinder			Bronze/ Bronze / Stainless Steel 316L	Bronze/Bronze/1.4462
	19	Outside coating			*	FBE 300microns Min.
	20	Connections			Raised flange face PN 16 to EN 1092-2	RF PN 16
	21	Test Pressure - Body / Seat			*	1.5x16 for body/1.1x16 for seat
	22	Closing direction			clockwise	clockwise
	23	Closing by			*	Electrical actuator
	24	Number of turns			*	NA -Electrical actuator
	25	Kc value (1,2,3)			*	Will be provided
	26	Type and details			Electrically modulating actuator	
	27					
ACTUATOR	28	Process time			230s	Refer offer
	29	Integrated positioner	Yes/No		Yes	Yes
	30	Position indicator transmitter	Yes/No		Yes	Yes
	31	Dimensions and weight			Refer catalogue	
	32	-Length / Overall length	mm		*	
DIMENSIONS	33	-Height / Overall height	mm		*	
	34	-Flange inner / outer dia.	mm		*	

029A-1 PRPS1_FCV - TDS



TECHNICAL AFFAIRS
Water Projects Dept.

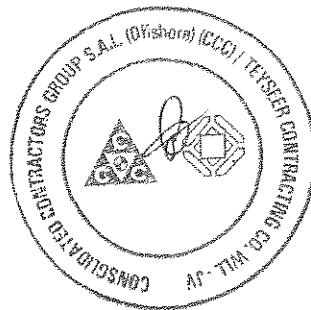


Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	35	Weight	Kg	*	
	36	Manufacturer / Country of origin		* / *	VAG/Armaturen-Germany
	37	Model No.		*	VAG RIKO
	38	Local Agent		*	Petrofac Qatar

Notes :

- * To be filled by vendor / bidder



PN 10/16/25/40 - DN 150...2000

KAT-A 2014-EA



Product characteristics and benefits

- Face-to-face length acc. to EN 558-1, basic series 15 - from DN 500 1.5 x DN
- With flange ends on both sides acc. to EN 1092-2
- Control valve in straightway type
- With customized control device depending on operating conditions
- Low actuating torque due to pressure balanced valve piston
- Rotationally symmetrical flow guidance
- Annular flow cross section in each position
- Axial movement of the plunger by means of crank gear mechanism
- With self-locking worm gear unit including position indicator
- With electric actuator
- No blocking due to long piston guide rails
- Elastic profile sealing ring located in the no-flow zone for high durability
- Wear-resistant, corrosion-resistant and infiltration-proof piston guides in the body by micro-finished bronze weld overlay
- Piston sealed by Quad Ring

Tests and approvals

- Final inspection test acc. to EN 12266 (DIN 3230 Part 4)

Operation data

- Specify operating pressure when inquiring/ordering:
 - Maximum flow rate and minimum differential pressure
 - Minimum flow rate and maximum differential pressure
 - Static pressure upstream of valve
 - Static pressure downstream of valve
 - Dynamic pressure upstream of valve
 - Dynamic pressure downstream of valve

Note

For proper installation and safe operation please follow the installation and operation instructions:

KAT-B 2014

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Piston guide rails: Bronze overlay welded
- Piston: Stainless steel 1.4301
- Valve sealing: EPDM
- Inner parts: Stainless steel (exception: > DN 600 crank gear from EN-JS 1030 (GGG-40))
- Bolts: Stainless steel A4 (DIN EN ISO 3506)
- Bearing bush: Bronze
- Eye bolts for lifting: Galvanized steel 1.0401 (C15)

Corrosion protection

- Inside and outside epoxy coating

Versions

- Standard version as described
- Special designs available on request
- With slotted cylinder to control high differential pressure for water with suspended solids (Form "SZ")
- With orifice cylinder to control high differential pressure (Form "LH")
- With cut off edge and sudden enlargement of cross sectional area at the seat to control lower differential pressure (Form "E")
- DN 1400 in VAG RKV plunger valve design

Field of Application

- Chamber installation
- Installation in plants

Field of application

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
150...1200	40	40	50
150...1600	25	25	50
150...2000	16	16	50
150...2000	10	10	50

Pressure test acc. to EN 12266

Test pressure body with water [bar]	Test pressure seat with water [bar]
60	44
37.5	28
24	18
15	11

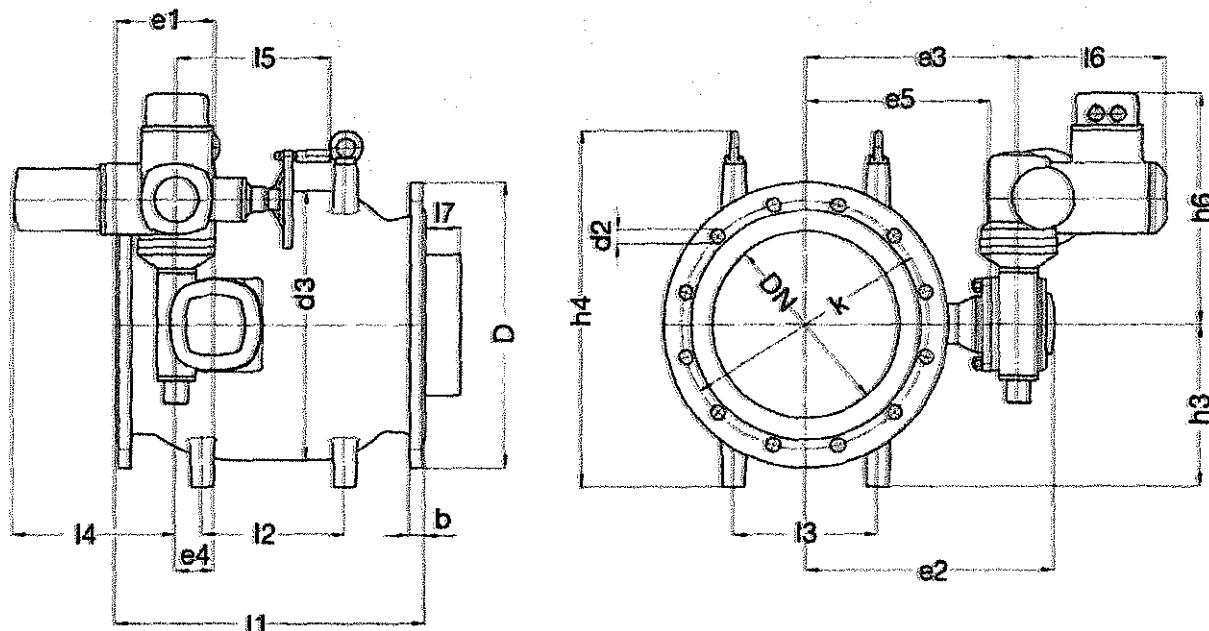


Water

VAG PIKON Plunger Valve

one-piece body with floating cylinder

Drawing

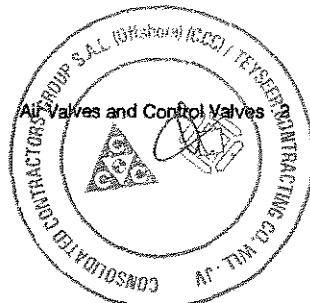


Technical data

PN 40

DN	150	200	250	300	400	450	500	600	700	800	900	1000
d [mm]	300	375	450	515	660	685	755	890	995	1140	1250	1360
b [mm]	26	30	34.5	39.5	48	49	52	58	64	65	76	80
d2 [mm]	28	31	34	34	41	41	44	50	48	56	56	56
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	250	320	385	450	585	610	670	795	900	1030	1140	1250
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1										
No. of holes	8	12	12	16	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	140	205	235	420	490	695	1145	1725	2225	2825	4150
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. • www.vag-group.com



Water

VAG BIROV Plunger Valve

one-piece body with electric actuation

Technical data

PN 25

DN	1200	1600
D [mm]	1530	1975
b [mm]	69	81
d2 [mm]	57	62
d3 [mm]	1645	2244
e1 [mm]	560	725
e2 [mm]	1136	1609
e3 [mm]	1040	1490
e4 [mm]	200	250
e5 [mm]	950	1350
h3 [mm]	850	1200
h4 [mm]	1828	2608
h6 [mm]	720	945
k [mm]	1420	1860
l1 [mm]	1800	2500
l2 [mm]	800	1200
l3 [mm]	800	1200
l4 [mm]	282	384
l5 [mm]	256	336
l6 [mm]	247	384
l7 [mm]	363	480
Actuator type	SA 10.1	SA 14.5
No. of holes	32	40
Weight without cylinder approx.	5225	17350
Volume with EA approx.	7.000	19.000

PN 16

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	285	340	405	460	580	640	715	840	970	1025	1125	1255
b [mm]	26	22	24.5	24.5	28	30	31.5	36	39.5	43	46.5	50
d2 [mm]	22	23	28	28	31	31	34	37	37	40	41	44
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	240	295	355	410	525	585	650	770	840	950	1050	1170
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1	SA 10.1	SA 07.5	SA 10.1							
No. of holes	8	12	12	12	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	130	170	195	330	375	575	1015	1525	1975	2575	3665
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

We reserve the right to make technical changes and use similar or higher-quality materials. Drawings are non-binding. www.vag-group.com

Air Valves and Control Valves · 4



VAG R KO® Plunger Valve
One piece body with electric actuator

Water

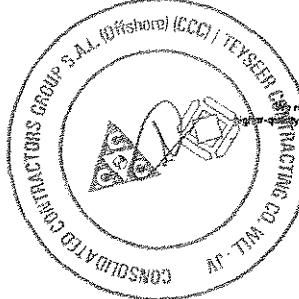
Technical data

PN 16

DN	1200	1600	1800	2000
D [mm]	1485	1930	2130	2345
b [mm]	57	65	70	75
d2 [mm]	50	57	57	62
d3 [mm]	1645	2244	2520	2800
e1 [mm]	560	725	840	900
e2 [mm]	1136	1609	1998	2210
e3 [mm]	1040	1490	1713	1925
e4 [mm]	200	250	315	315
e5 [mm]	950	1350	1500	1700
h3 [mm]	850	1200	1380	1540
h4 [mm]	1828	2608	3058	3410
h6 [mm]	720	945	1178	1178
k [mm]	1390	1820	2020	2230
l1 [mm]	1800	2500	2700	3000
l2 [mm]	800	1200	1500	1600
l3 [mm]	800	1200	1500	1600
l4 [mm]	282	384	384	384
l5 [mm]	256	336	329	329
l6 [mm]	247	384	285	285
l7 [mm]	363	480	598	620
Actuator type	SA 07.5	SA 14.1	SA 14.1	SA 14.1
No. of holes	32	40	44	48
Weight without cylinder approx.	5025	17050	18000	25000
Volume with EA approx.	7.000	19.000	27.000	37.000

PN 10

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	285	340	395	445	565	615	670	780	895	1015	1115	1230
b [mm]	26	22	24.5	24.5	28	30	31.5	36	395	43	46.5	50
d2 [mm]	22	22	23	23	28	28	28	31	31	34	34	37
d3 [mm]	236	302	371	434	575	632	711	840	995	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	80	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	240	295	350	400	515	565	620	725	840	950	1050	1160
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	194	244	275	292
Actuator type	SA 07.5											
No. of holes	8	8	12	12	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	130	170	195	330	375	565	965	1525	1925	2525	3665
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

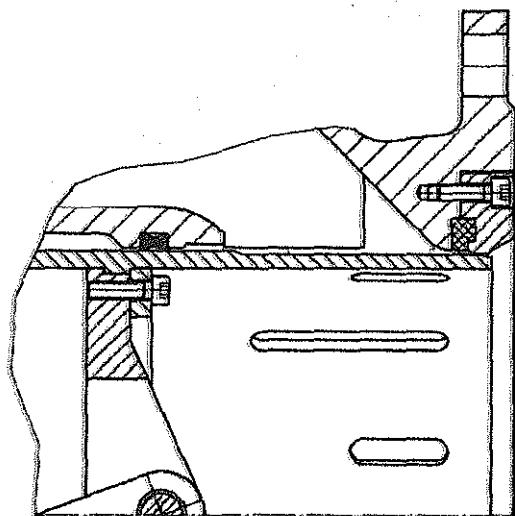


VAG EIKO® Plunger Valve one-piece body, with electric actuator

Water

Further Information

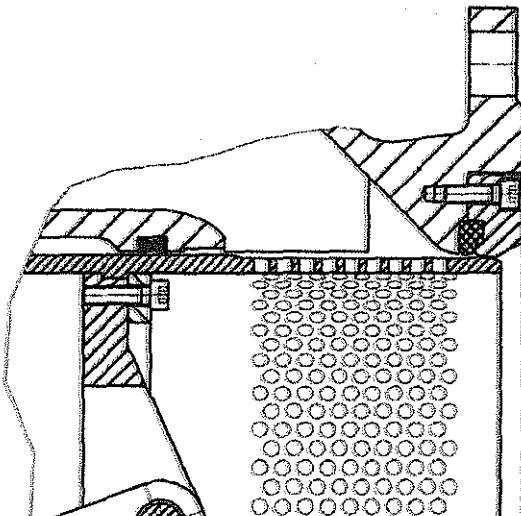
Type "SZ" with slotted cylinder



Application:

- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- To prevent cavitation
- For water containing suspended matter

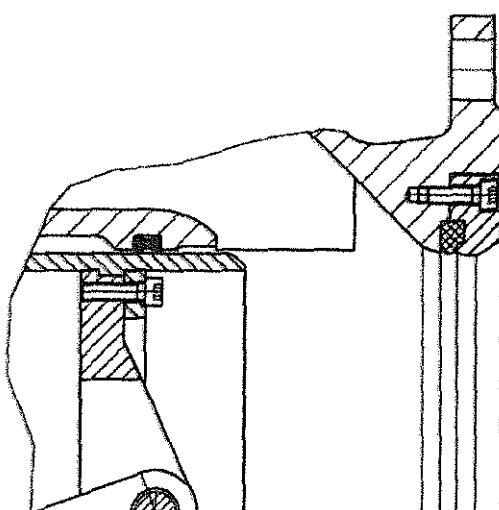
Type "LH" with multiple orifice cylinder



Application:

- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- Optimum prevention of cavitation

Type "E" with cut-off edge



Application:

- Preferably as control valve with sufficient back pressure
- As pump start-up valve



Appendix I-7 – Technical Data Sheets

031 –Quick Closing Valve





Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 031A-1

QUICK CLOSING VALVE

031A-1 PRPS1 QUICK CLOSING VALVE - TDS

TECHNICAL AFFAIRS
Water Projects Dept.

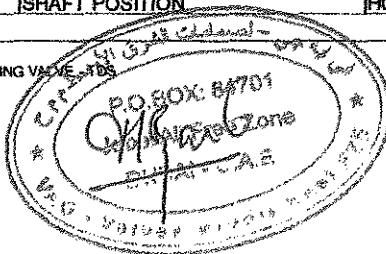




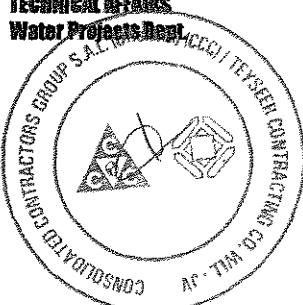
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	Sl. No	Description	Required	Offered
GENERAL	1	LOCATION	PRPS1 - Main Suction	PRPS1,2,3,4,5
	2	NOMINAL SIZE ID	DN 2200	DN1200-2400mm
	3	QUANTITY	2	As per requirement
	4	TAG NO.		To be provided by end user
	5	SERVICE	Potable Water	Potable water
	6	OPERATING PRESSURE	11.42 m	16bar
	7	DESIGN PRESSURE MAX. (bar)	16	16 bar
		MIN. (bar)	N/A	
	8	MAX. SHUT-OFF PRESSURE		
	9	FLOW MAXIMUM	4489 l/s	Noted
		NORMAL	3657 l/s	Noted
VALVE DESIGN	10	DENSITY		
	11	VISCOSITY		
	12	DESIGN STANDARD	BS EN 593	BS EN 558
	13	PRESSURE RATING	PN 16	PN 16
	14	VALVE TYPE	DOUBLE ECCENTRIC BUTTERFLY	Double Eccentric BPV Series 74
	15	FLOW DIRECTION	HORIZONTAL	Horizontal
	16	OPERATOR	HYDRAULIC ACTUATED	Hydraulic Actuated
	17	FREQUENCY OF OPERATION	INTERMITTENT	Noted
	18	SEAT TYPE	TIGHT SHUT-OFF, BI-	Tight Shut off-Bidirectional
	19	VALVE STEM MAX. TORQUE	VENDOR TO ADVISE	Will be provided
	20	MECHANICAL CLOSE STOPPER	REQUIRED	Will be provided
MATERIAL	21	VELOCITY LIMIT	VENDOR TO ADVISE	Max 4m/s
	22	WEIGHT	VENDOR TO ADVISE	Refer catalogue
	23	BODY	DUCTILE IRON GGG50 (EN GJS-500-7) AS PER EN 1563	GGG 40 as per project specification
	24	DISC	DUCTILE IRON GGG50 (EN GJS-500-7 AS PER EN 1563 IT SHALL BE OF SOLID ONE PIECE CASTING (NON-HOLLOW))	GGG 40 as per project specification-Solid one piece non hollow casting
	25	SHAFT	STAINLESS STEEL 1.4462, 100% DRY SHAFT DESIGN 1.4462	Dry Shaft Duplex SS 1.4462
	26	SEAL	EPDM WITH STAINLESS STEEL 1.4571 RETAINING RING	EPDM, Retaining ring made of 1.4571
	27	BOLTS / NUTS	STAINLESS STEEL 316	SS 316
	28	PAINTING	300 MICRONS MIN	FBE 300micron Min.
	29	CERTIFICATION	MILL CERTIFICATE 3.1B AS PER BS EN 10204 3.1 B AS PER BS-EN 10204	Will be provided
END CONNECTION	30	TYPE	DOUBLE FLANGED	Double Flanged
	31	FLANGE OD & DRILLING	PN 16 BS EN 1092-2	EN 1092-2 PN 16
	32	FLANGE FACE	FLAT FACE	Raised face
VALVE OPERATION	33	OPERATION	QUICK CLOSING	Quick Closing
	34	VALVE POSITION	HORIZONTAL	Horizontal
	35	SHAFT POSITION	HORIZONTAL	Horizontal

031A-1 PRPS1 QUICK CLOSING VALVE - QDS



TECHNICAL AFFAIRS
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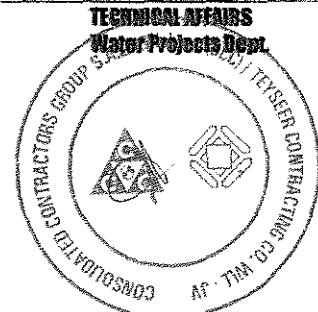




Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

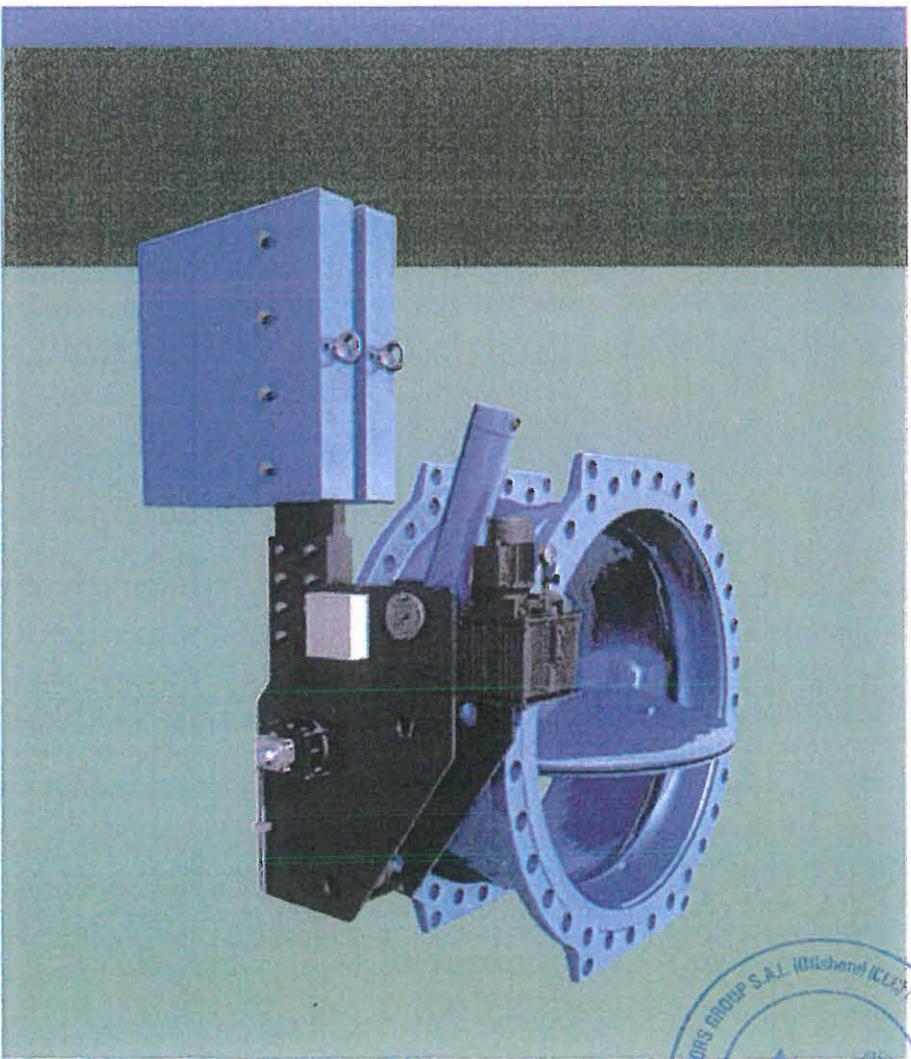
	SI. NO	Description	Required	Offered
HYDRAULIC ACTUATOR	36	HAZARDOUS AREA CLASS	SAFE AREA	Safe AREA
	37	FREQUENCY OF OPERATION	INTERMEDIATE	Noted
	38	TYPE	WEIGHT LOADED HYDRAULIC UNIT	Yes
	39	HYDRAULIC PUMP UNIT	REQUIRED	Provided
	40	HYDRAULIC HAND PUMP	REQUIRED	Provided
	41	CLOSING COUNTER WEIGHT	REQUIRED	Provided
	42	HYDRAULIC CYLINDER	REQUIRED WITH MULTIPLE CLOSING STEP	2 step closing
	43	HYDRAULIC FLUID & SUPPLY	REQUIRED	Provided
	44	OPENING TIME	30 SECS - FULL CLOSE TO FULL OPEN	65 sec with Two pumps
	45	CLOSING TIME	15 SECS - OPEN TO 80% CLOSE 15 SECS - 80% CLOSE TO FULL CLOSE	Noted and confirmed Noted and Confirmed
	46	SOLENOID VALVES	REQUIRED	Provided
	47	ELECTRICAL CONNECTION TYPE	ISO METRIC	ISO Metric
	48	ELECTRICAL CONNECTION SIZE		
	49	ENCLOSURE	IP 68	Submerged Oil Motor
	50	SUNSHADE	REQUIRED	Not in scope (inside PS)
	51	INTER CONN. TUBING & FITTINGS	SS 316 / ARMoured FLEXIBLE HOSE	Armored Flexible Hose
	52	ELECTRICAL SHEMATIC DRAWING	REQUIRED	Will be provided
	53	CONTROL CABINET WITH PLC	REQUIRED	Will be provided
	54	POWER SUPPLY		
	55	POSITION INDICATION	4-20 mA	4-20mA
	56	REMOTE OPEN / CLOSE CONTROL	REQUIRED	Provided in Control cabinet
	57	REMOTE OPEN / CLOSE FEEDBACK	REQUIRED	Provided in Control cabinet
	58	LOCAL / REMOTE SELECTOR SWITCH	REQUIRED	Provided in Control cabinet
	59	LOCAL OPEN / CLOSE / STOP	REQUIRED	Provided in Control cabinet
	60	LOCAL EMERGENCY STOP PB	REQUIRED	Provided in Control cabinet
	61	REMOTE SHUTDOWN (ESD) OVERRIDE	REQUIRED	Provided in Control cabinet
	62	CABLE ENTRY	ISO METRIC	ISO Metric
	63	LOCKING DEVICE (LO+LC) + PAD LOCK	REQUIRED	Provided in Control cabinet
ACCESSORIES	64	LIFTING LUGS	REQUIRED	Provided
	65	LOCKDEVICE FOR OPEN & CLOSE POS.	REQUIRED	Provided
TESTS	66	HYDROSTATIC SHELL TEST	1.5 X PN 16	1.5X PN 16
	67	HYDROSTATIC SEAT TEST	1.1 X PN 16	1.1 x PN 15

031A-1 PRPS1 QUICK CLOSING VALVE - TDS





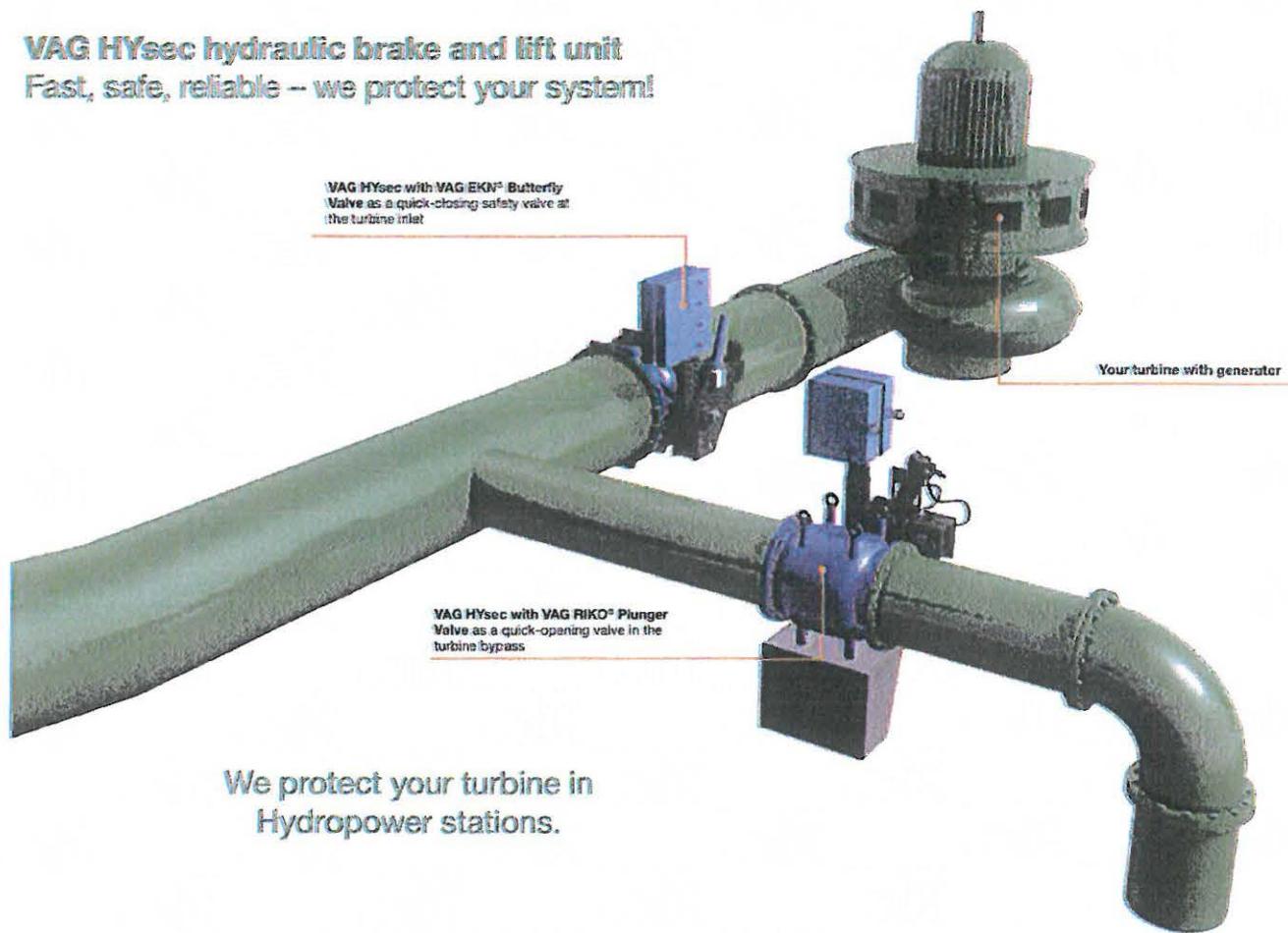
VAG HYsec hydraulic brake and lift unit





VAG HYsec hydraulic brake and lift unit

Fast, safe, reliable – we protect your system!



We protect your turbine in
Hydropower stations.

Fields of application

For the start-up and shut-down of turbines, robust and reliable valves are needed, as parts of the plant could be damaged or even destroyed due to uncontrolled backflow and/or uncontrolled closing. Controlled shut-down is therefore essential. For this purpose, double-offset butterfly valves with hydraulic brake and lift units are normally used.

The VAG HYsec hydraulic brake and lift unit meets all the requirements of safe and reliable operation. Combined with a VAG EKN® Butterfly Valve or a VAG RIKO® Plunger Valve, it serves as a quick-closing safety valve at turbine inlets and in pumping stations, as a pipe-burst safety device with hydro-mechanical activation or as a quick-opening valve in the turbine bypass.

• Quick-closing safety valve

Used as shut-off valves, hydraulic brake and lift units made by VAG protect e.g. the pump in case of a sudden power failure from excessive pump reversal which caused by uncontrolled backflow of water and/or from hydraulic pressure surges where the increase in pressure may exceed the rated pressure and thus could destroy parts of the plant.

• Pipe-burst safety device

Designed as a pipe-burst safety device, VAG HYsec in combination with a VAG EKN® Butterfly Valve prevents reservoirs from draining off and/or the washout of roads and railway tracks in the event of a pipe burst.

• Quick-opening valve in the turbine bypass

In bypass lines the water usually bypasses the turbines and

is discharged to atmosphere. Due to this, the energy which was converted into electricity by the turbine and generator before is reduced or destroyed. This means that in case of a turbine failure, the bypass must be opened quickly to prevent a pressure increase exceeding the rated pressure in the pipeline system.

VAG HYsec hydraulic brake and lift units are suitable for all applications ranging from the very small waterworks up to dams or nuclear power plants. In general, the valve is opened and closed according to the principles described below:

• Closing the valve

The closing operation is either initiated via an electro-magnetic valve in the brake and lift unit or hydro-mechanically, so that the valve is closed via the drop weight. The valve must neither be closed too fast nor too slowly and the closing time must be adapted to the plant conditions.

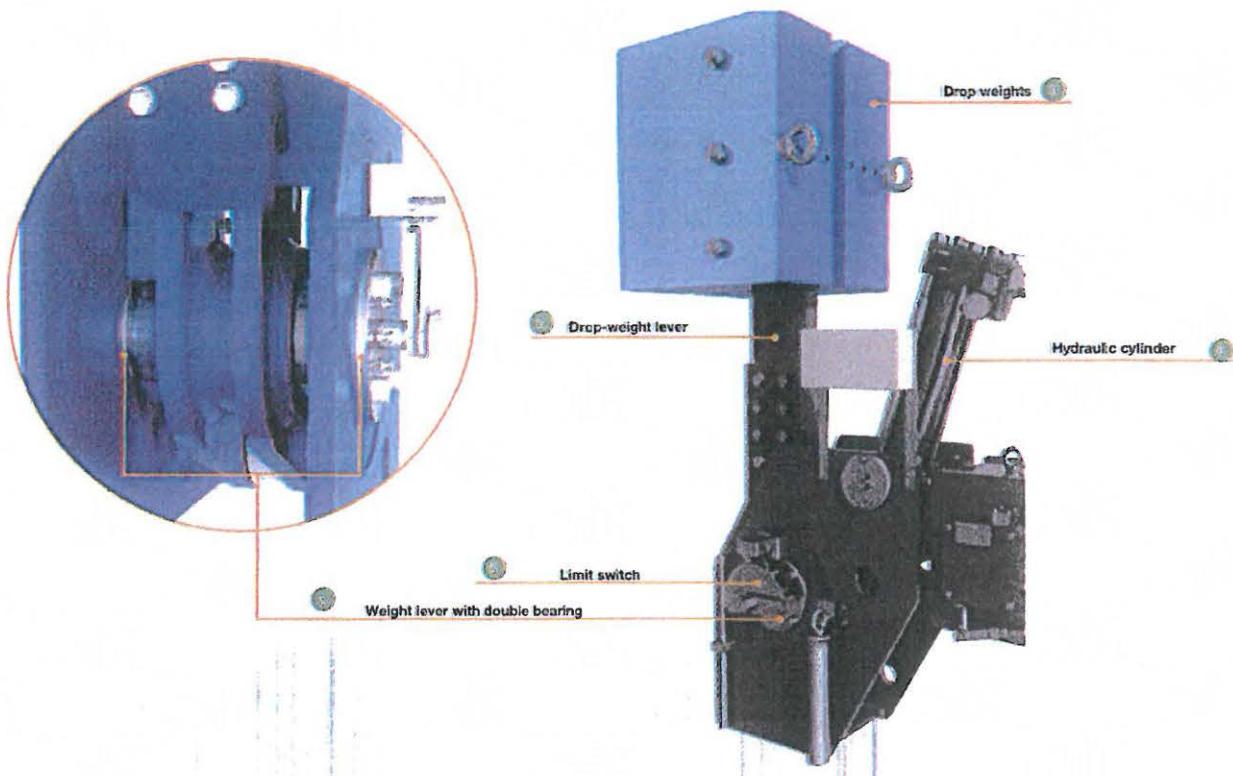
• Opening the valve

The valve is opened via the hydraulic cylinder. The hydraulic cylinder has a positive connection with the valve shaft and the drop-weight lever so that when the cylinder is extended, the closing of the valve is controlled hydraulically. Oil supply is ensured either by the hydraulic system of the brake and lift unit or via the turbine.



VAG HYsec hydraulic brake and lift unit

Innovative details, compact design



Technical details

VAG HYsec hydraulic brake and lift unit

The VAG HYsec is available in compact design with a factory-mounted VAG EKN® Butterfly Valve or a factory-mounted VAG RIKO® Plunger Valve in the following varieties:

- **VAG HYsec F**

With external oil supply from an external hydraulic unit.

- **VAG HYsec E**

With internal oil supply from the integrated hydraulic unit as a completely assembled operational unit.

As an option, it is available with a throttling valve for adjustment of the closing time.

VAG HYsec is available for all fields of application in the following ranges of nominal pressures and diameters:

- **VAG EKN® Butterfly Valves**

- Nominal pressure from PN 6 to PN 40
- Nominal diameters from DN 100 to DN 1400

- **VAG RIKO® Plunger Valves**

- Nominal pressure from PN 10 to PN 40
- Nominal diameters from DN 150 to DN 1200

VAG HYsec PRO hydraulic brake and lift unit

For larger nominal valve diameters, our hydraulic brake and lift unit is available in the HYsec PRO type:

- **VAG EKN® Butterfly Valves** up to DN 4000

- **VAG RIKO® Plunger Valves** up to DN 2000

Customised types with equipment in accordance with customer specifications are no problem with VAG HYsec PRO. Our Professional series offers all possibilities of customisation.

Product features

- No transmission of drop-weight loads to the valve bearing due to the double bearing of the lever and weight - with angular joint on one side and bearing ring made of PTFE gliding sheet on the other.

- Easy transport and assembly due to removable drop-weight lever.

- The modular design of the drop weights allows individual adaptation to the operation conditions.

- VAG HYsec F with hydraulic cylinder with external oil supply for control pressures from 80 to 200 bar.

- Limit switch to indicate the open and closed positions as well as additional safety switch for VAG HYsec E (for keeping the valve open automatically).



Your requirements

VAG HYsec hydraulic brake and lift unit

The right solution for your system.
You can contact our HYsec specialists at
info@vag-group.com
or
Fax: +49 621 748 2153
Phone: +49 621 748 16

1. Valve Butterfly valve Plunger valve

Nominal diameter DN: _____ Fluid: _____

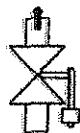
Nominal pressure PN: _____ Operating pressure: _____ bar

Flow rate: normal _____ m³/h max. _____ m³/h

Installation in the pipeline: horizontal vertical limited dimensions (see sketch)

2. Arrangement of actuator

in flow direction on the right standard



weight drops against flow direction



weight drops in flow direction

in flow direction on the left



weight drops in flow direction



weight drops against flow direction

3. Function

- Quick closing valve

Opening time: _____ sec.

- Quick opening valve

Closing time: _____ sec.

- Pipe burst safety device

Flow rate: _____ m³/s
(releasing pipe burst safety device)

- Pump protection valve

3. Hydraulic brake-and-lift cylinder

Standard

Lever and weight with hydraulic cylinder for external oil supply Oil pressure: _____ bar

Limit switch open/closed

mechanical IP 65 inductive IP 68

Standard + Accessories

Like standard type, but with hydraulic unit 400 V/50 Hz 0,37 kW Opening time: _____ sec.

400 V/60 Hz _____ kW Opening time: _____ sec.

Closing time 2-100 sec.

Voltage of solenoid valve: 24VDC / 30W 110VDC / _____ W

4. Comments

Your contact details:

Company:

Name:

Street:

Telephone:

Post code:

Fax:

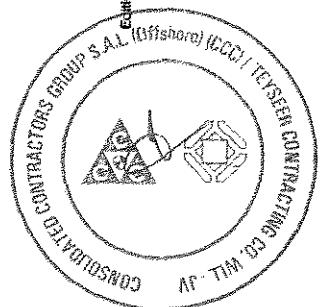
Country:

E-Mail



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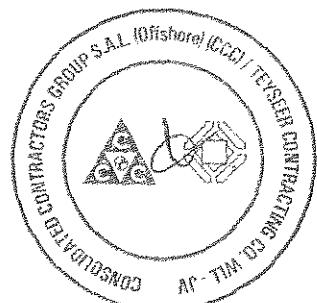
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 031A-1

QUICK CLOSING VALVE

031A-1 PRPS1 QUICK CLOSING VALVE - TDS

TECHNICAL AFFAIRS
Water Projects Dept.





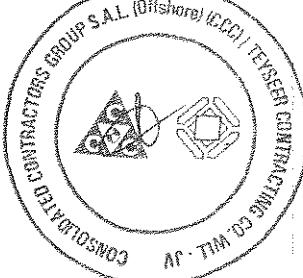
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

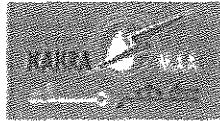
	Sl. No	Description	Required	Offered
GENERAL	1	LOCATION	PRPS1 - Main Suction	PRPS1,2,3,4,5
	2	NOMINAL SIZE ID	DN 2200	DN1200-2400mm
	3	QUANTITY	2	As per requirement
	4	TAG NO.		To be provided by end user
	5	SERVICE	Potable Water	Potable water
	6	OPERATING PRESSURE	11.42 m	16bar
	7	DESIGN PRESSURE MAX. (bar)	16	16 bar
		MIN. (bar)	N/A	
	8	MAX. SHUT-OFF PRESSURE		
	9	FLOW MAXIMUM	4489 l/s	Noted
		NORMAL	3657 l/s	Noted
VALVE DESIGN	10	DENSITY		
	11	VISCOOSITY		
	12	DESIGN STANDARD	BS EN 593	BS EN 558
	13	PRESSURE RATING	PN 16	PN 16
	14	VALVE TYPE	DOUBLE ECCENTRIC BUTTERFLY	Double Eccentric BPV Series 14
	15	FLOW DIRECTION	HORIZONTAL	Horizontal
	16	OPERATOR	HYDRAULIC ACTUATED	Hydraulic Actuated
	17	FREQUENCY OF OPERATION	INTERMITTENT	Noted
	18	SEAT TYPE	TIGHT SHUT-OFF, BI-	Tight Shut off-Bidirectional
	19	VALVE STEM MAX. TORQUE	VENDOR TO ADVISE	Will be provided
	20	MECHANICAL CLOSE STOPPER	REQUIRED	Will be provided
	21	VELOCITY LIMIT	VENDOR TO ADVISE	Max 4m/s
	22	WEIGHT	VENDOR TO ADVISE	Refer catalogue
MATERIAL	23	BODY	DUCTILE IRON GGG50 (EN GJS-500-7) AS PER EN 1563	GGG 40 as per project specification
	24	DISC	DUCTILE IRON GGG50 (EN GJS-500-7 AS PER EN 1563) IT SHALL BE OF SOLID ONE PIECE CASTING (NON-HOLLOW)	GGG 40 as per project specification-Solid one piece non hollow casting
	25	SHAFT	STAINLESS STEEL 1.4462, 100% DRY SHAFT DESIGN 1.4462	Dry Shaft Duplex SS 1.4462
	26	SEAL	EPDM WITH STAINLESS STEEL 1.4571 RETAINING RING	EPDM, Retaining ring made of 1.4571
	27	BOLTS / NUTS	STAINLESS STEEL 316	SS 316
	28	PAINTING	300 MICRONS MIN	FBE 300micron Min.
	29	CERTIFICATION	MILL CERTIFICATE 3.1B AS PER BS EN 10204 3.1 B AS PER BS-EN 10204	Will be provided
END CONNECTION	30	TYPE	DOUBLE FLANGED	Double Flanged
	31	FLANGE OD & DRILLING	PN 16 BS EN 1092-2	EN 1092-2 PN 16
	32	FLANGE FACE	FLAT FACE	Raised face
VALVE OPERATION	33	OPERATION	QUICK CLOSING	Quick Closing
	34	VALVE POSITION	HORIZONTAL	Horizontal
	35	SHAFT POSITION	HORIZONTAL	Horizontal

031A-1 PRPS1 QUICK CLOSING VALVE - TDS



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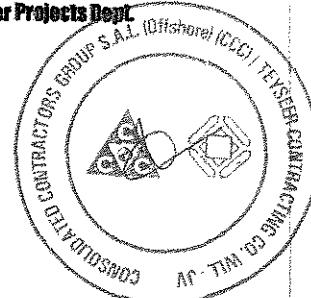


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	Sl. No	Description	Required	Offered
HYDRAULIC ACTUATOR	36	HAZARDOUS AREA CLASS	SAFE AREA	Safe AREA
	37	FREQUENCY OF OPERATION	INTERMEDIATE	Noted
	38	TYPE	WEIGHT LOADED HYDRAULIC UNIT	Yes
	39	HYDRAULIC PUMP UNIT	REQUIRED	Provided
	40	HYDRAULIC HAND PUMP	REQUIRED	Provided
	41	CLOSING COUNTER WEIGHT	REQUIRED	Provided
	42	HYDRAULIC CYLINDER	REQUIRED WITH MULTIPLE CLOSING STEP	2 step closing
	43	HYDRAULIC FLUID & SUPPLY	REQUIRED	Provided
	44	OPENING TIME	30 SECS - FULL CLOSE TO FULL OPEN	Noted
	45	CLOSING TIME	15 SECS - OPEN TO 80% CLOSE 15 SECS - 80% CLOSE TO FULL CLOSE	Noted and confirmed Noted and Confirmed
	46	SOLENOID VALVES	REQUIRED	Provided
	47	ELECTRICAL CONNECTION TYPE	ISO METRIC	ISO Metric
	48	ELECTRICAL CONNECTION SIZE		
	49	ENCLOSURE	IP 68	
	50	SUNSHADE	REQUIRED	Not in scope (Inside PS)
	51	INTER CONN. TUBING & FITTINGS	SS 316 / ARMoured FLEXIBLE HOSE	Armoured Flexible Hose
	52	ELECTRICAL SHEMATIC DRAWING	REQUIRED	Will be provided
	53	CONTROL CABINET WITH PLC	REQUIRED	Will be provided
	54	POWER SUPPLY		
	55	POSITION INDICATION	4-20 mA	4-20mA
	56	REMOTE OPEN / CLOSE CONTROL	REQUIRED	Provided
	57	REMOTE OPEN / CLOSE FEEDBACK	REQUIRED	Provided
	58	LOCAL / REMOTE SELECTOR SWITCH	REQUIRED	Provided
	59	LOCAL OPEN / CLOSE / STOP	REQUIRED	Provided
	60	LOCAL EMERGENCY STOP PB	REQUIRED	Provided
	61	REMOTE SHUTDOWN (ESD) OVERRIDE	REQUIRED	Will be provided
	62	CABLE ENTRY	ISO METRIC	ISO Metric
	63	LOCKING DEVICE (LO+LC) + PAD LOCK	REQUIRED	Will be provided
ACCESSORIES	64	LIFTING LUGS	REQUIRED	Provided
	65	LOCKDEVICE FOR OPEN & CLOSE POS.	REQUIRED	Will be provided
TESTS	66	HYDROSTATIC SHELL TEST	1.5 X PN 16	1.5X PN 16
	67	HYDROSTATIC SEAT TEST	1.1 X PN 16	1.1 x PN 16

031A-1 PRPS1 QUICK CLOSING VALVE - TDS

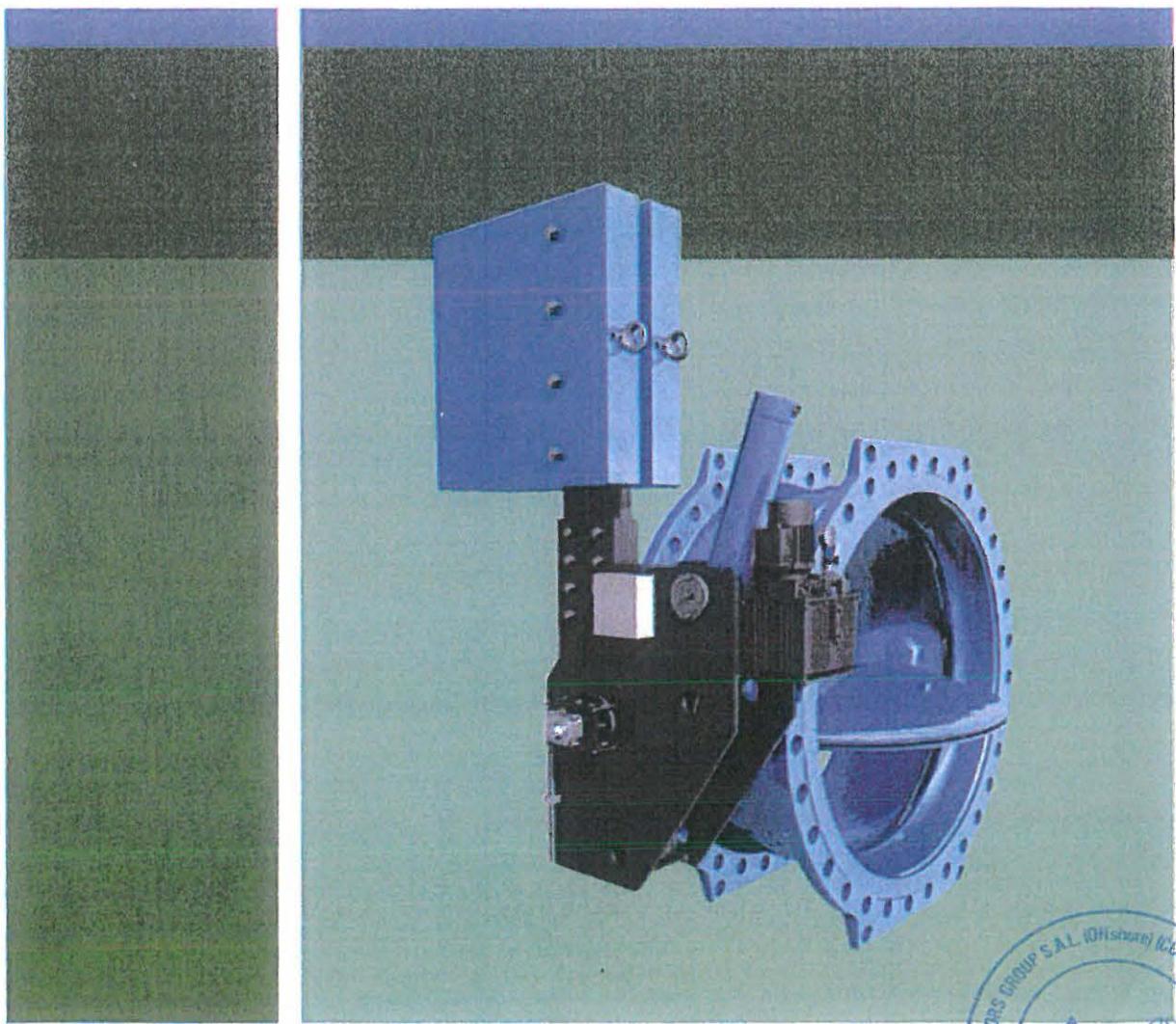
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VAG HYsec

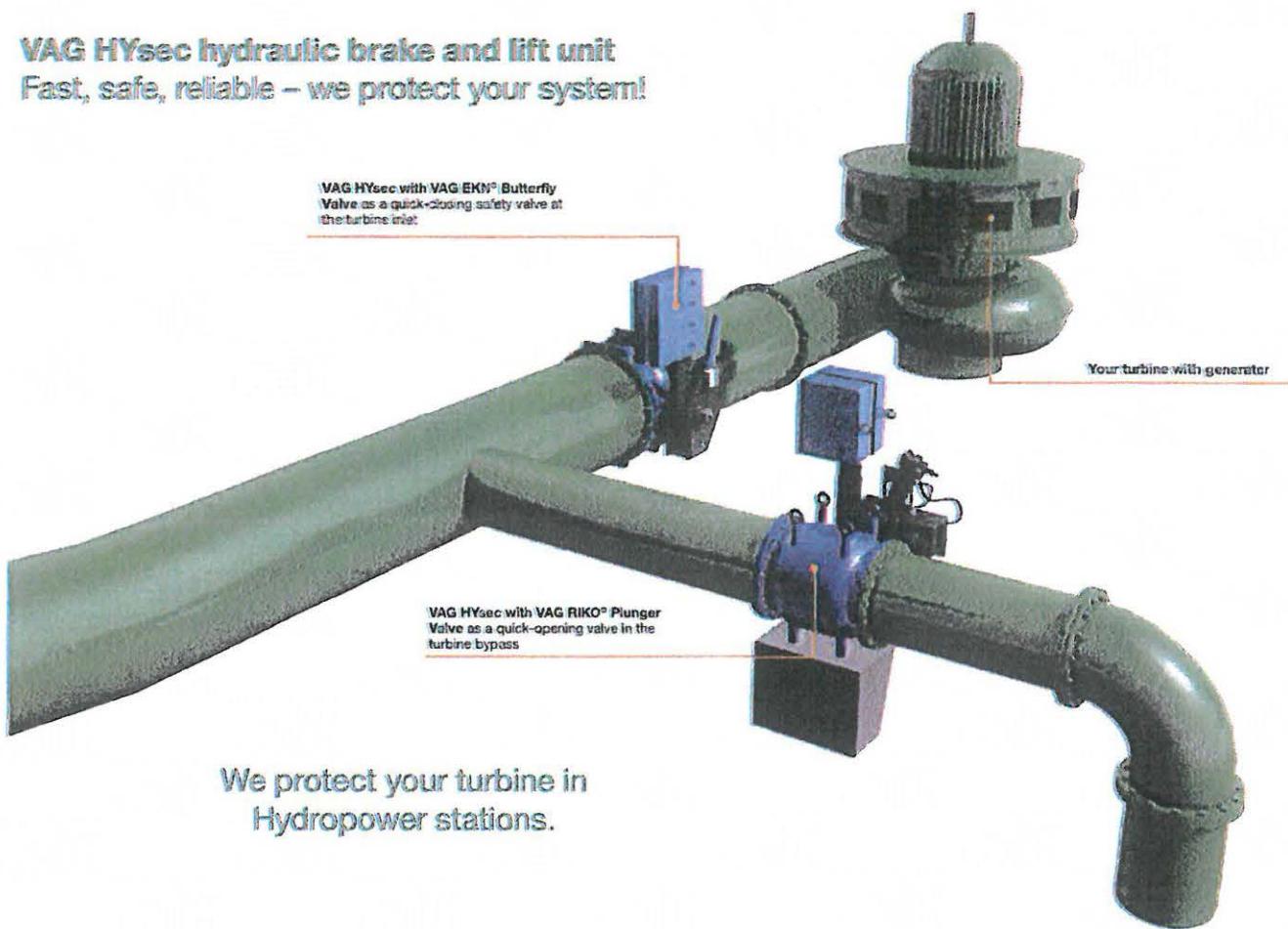
hydraulic brake and lift unit





VAG HYsec hydraulic brake and lift unit

Fast, safe, reliable – we protect your system!



Fields of application

For the start-up and shut-down of turbines, robust and reliable valves are needed, as parts of the plant could be damaged or even destroyed due to uncontrolled backflow and/or uncontrolled closing. Controlled shut-down is therefore essential. For this purpose, double-offset butterfly valves with hydraulic brake and lift units are normally used.

The VAG HYsec hydraulic brake and lift unit meets all the requirements of safe and reliable operation. Combined with a VAG EKN® Butterfly Valve or a VAG RIKO® Plunger Valve, it serves as a quick-closing safety valve at turbine inlets and in pumping stations, as a pipe-burst safety device with hydro-mechanical activation or as a quick-opening valve in the turbine bypass.

• Quick-closing safety valve

Used as shut-off valves, hydraulic brake and lift units made by VAG protect e.g. the pump in case of a sudden power failure from excessive pump reversal which caused by uncontrolled backflow of water and/or from hydraulic pressure surges where the increase in pressure may exceed the rated pressure and thus could destroy parts of the plant.

• Pipe-burst safety device

Designed as a pipe-burst safety device, VAG HYsec in combination with a VAG EKN® Butterfly Valve prevents reservoirs from draining off and/or the washout of roads and railway tracks in the event of a pipe burst.

• Quick-opening valve in the turbine bypass

In bypass lines the water usually bypasses the turbines and

is discharged to atmosphere. Due to this, the energy which was converted into electricity by the turbine and generator before is reduced or destroyed. This means that in case of a turbine failure, the bypass must be opened quickly to prevent a pressure increase exceeding the rated pressure in the pipeline system.

VAG HYsec hydraulic brake and lift units are suitable for all applications ranging from the very small waterworks up to dams or nuclear power plants. In general, the valve is opened and closed according to the principles described below:

• Closing the valve

The closing operation is either initiated via an electro-magnetic valve in the brake and lift unit or hydro-mechanically, so that the valve is closed via the drop weight. The valve must neither be closed too fast nor too slowly and the closing time must be adapted to the plant conditions.

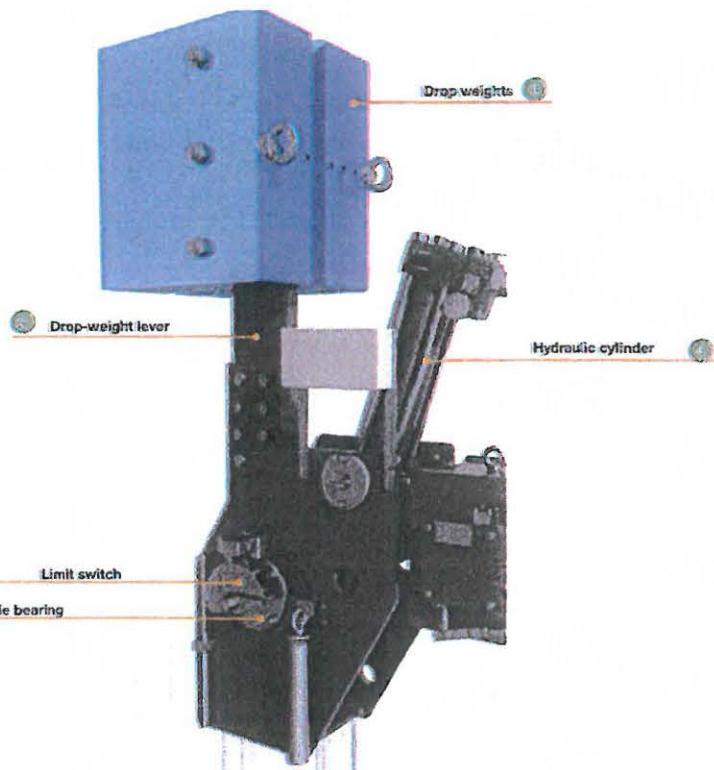
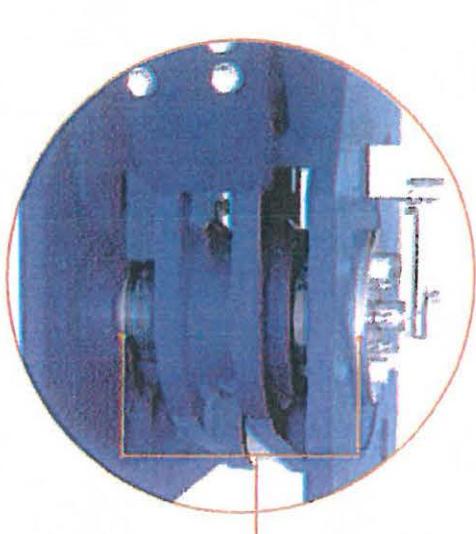
• Opening the valve

The valve is opened via the hydraulic cylinder. The hydraulic cylinder has a positive connection with the valve shaft and the drop-weight lever so that when the cylinder is extended, the closing of the valve is controlled hydraulically. Oil supply is ensured either by the hydraulic system of the brake and lift unit or via the turbine.



VAG HYsec hydraulic brake and lift unit

Innovative details, compact design



Technical details

VAG HYsec hydraulic brake and lift unit

The VAG HYsec is available in compact design with a factory-mounted VAG EKN® Butterfly Valve or a factory-mounted VAG RIKO® Plunger Valve in the following varieties:

- **VAG HYsec F**

With external oil supply from an external hydraulic unit.

- **VAG HYsec E**

With internal oil supply from the integrated hydraulic unit as a completely assembled operational unit.

As an option, it is available with a throttling valve for adjustment of the closing time.

VAG HYsec is available for all fields of application in the following ranges of nominal pressures and diameters:

- **VAG EKN® Butterfly Valves**

- Nominal pressure from PN 6 to PN 40
- Nominal diameters from DN 100 to DN 1400

- **VAG RIKO® Plunger Valves**

- Nominal pressure from PN 10 to PN 40
- Nominal diameters from DN 150 to DN 1200

VAG HYsec PRO hydraulic brake and lift unit

For larger nominal valve diameters, our hydraulic brake and lift unit is available in the HYsec PRO type:

- **VAG EKN® Butterfly Valves** up to DN 4000

- **VAG RIKO® Plunger Valves** up to DN 2000

Customised types with equipment in accordance with customer specifications are no problem with VAG HYsec PRO. Our Professional series offers all possibilities of customisation.

Product features

- No transmission of drop-weight loads to the valve bearing due to the double bearing of the lever and weight - with angular joint on one side and bearing ring made of PTFE gliding sheet on the other.
- Easy transport and assembly due to removable drop-weight lever.
- The modular design of the drop weights allows individual adaptation to the operation conditions.
- VAG HYsec F with hydraulic cylinder with external oil supply for control pressures from 80 to 200 bar.
- Limit switch to indicate the open and closed positions as well as additional safety switch for VAG HYsec E (for keeping the valve open automatically).



VAG HYsec hydraulic brake and lift unit

The right solution for your system.
You can contact our HYsec specialists at
info@vag-group.com
or
Fax: +49 621 746 2183
Phone: +49 621 746 0

1. Valve

Butterfly valve Plunger valve

Nominal diameter DN: _____

Fluid: _____

Nominal pressure PN: _____

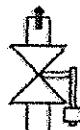
Operating pressure: _____ bar

Flow rate: normal _____ m³/h max. _____ m³/h

Installation in the pipeline: horizontal vertical limited dimensions (see sketch)

2. Arrangement of actuator

in flow direction on the right standard



weight drops
against
flow direction



weight drops
in
flow direction

in flow direction on the left



weight drops
in
flow direction



weight drops
against
flow direction

3. Function

Quick closing valve

Opening time: _____ sec.

Quick opening valve

Closing time: _____ sec.

Pipe burst safety device

Flow rate: _____ m³/s
(releasing pipe burst safety device)

Pump protection valve

3. Hydraulic brake-and-lift cylinder**Standard**

Lever and weight with hydraulic cylinder for external oil supply Oil pressure: _____ bar

Limit switch open/closed

mechanical IP 65 inductive IP 68

Standard + Accessories

Like standard type, but with hydraulic unit 400 V/50 Hz 0,37 kW Opening time : _____ sec.
 400 V/60 Hz _____ kW Opening time : _____ sec.

Closing time 2-100 sec.

Voltage of solenoid valve: 24VDC / 30W 110VDC / _____ W

4. Comments**Your contact details:**

Company:

Name:

Street:

Telephone:

Post code:

Fax:

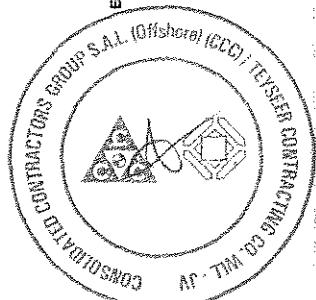
Country:

E-Mail:



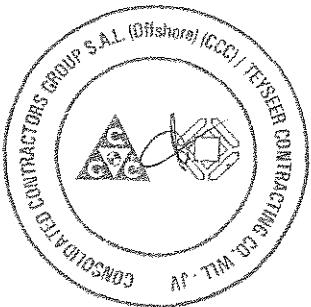
www.vag-group.com
info@vag-group.com

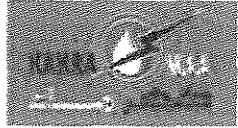
Edition 2 / 10-2013



Appendix I-7 – Technical Data Sheets

036 – MV Switchgear

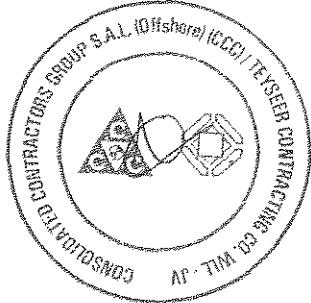




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APPENDIX I – 7 – 036

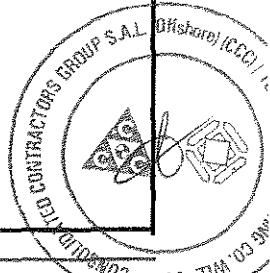
MEDIUM VOLTAGE SWITCHGEAR





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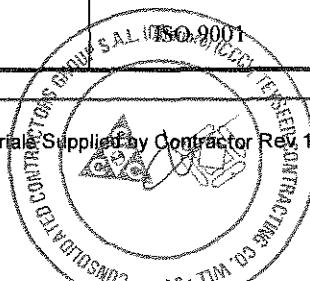
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
1. GENERAL			
1.1. Manufacturer & Place of Manufacturing			Siemens Turkey
1.2. Type designation			NXAIR
1.3. Type of Switchgear		Metal Enclosed- air insulated, indoor switchgear with Vacuum Circuit Breaker- GIS Can be proposed Alternatively	Metal Enclosed-air insulated, indoor switchgear with Vacuum Circuit Breaker
1.4. Standards		IEC 62271-200, 62271-100, 62271-1, 60529	IEC 62271-1, IEC 62271-100, IEC 62271-200, IEC 60529
1.5. Ingress Protection (IP) rating		IP 42	IP42
1.6. Number of years equipment of identical design has been in service	Years		
1.7. Rated voltage	kV	12	12
1.8. Rated normal current -at 40°C	A	4000*, 2500	2500 A
	A	630	630
			Busbar: 2300 A
Note: Preferable value; acceptable 3150A			Incoming & bus section: 2330 A
- Incoming bay, busbar & bus-section bay	A		630A
- Outgoing feeder bay	A		
- Incoming bay, busbar & bus-section bay at 50°C (contractor to provide data by calculation)	A		
- Outgoing bay	A		
1.9. Rated frequency	Hz	50	50
1.10. Rated lightning impulse withstand voltage			
- Phase to earth	kV	75	75
- Across the isolating distance	kV	85	85
1.11. Rated power frequency withstand voltage			
- Phase to earth	kV	28	28
- Across the isolating distance	kV	32	32
1.12. Partial discharge test voltage	kV	IEC 60270, IEC 62271-200	IEC 60270, IEC 62271-200
1.13. Rated short-time withstand current (3 s)	kA	31.5	31.5
1.14. Rated peak withstand current	kA	80	80
1.15. Type of busbars		Single	Single
1.16. Method of earthing - Busbars side		Through earthswitch	yes





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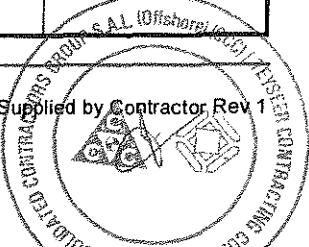
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
1.17. – Line side Minimum subdivision of cubicles at compartments	Through earthswitch Busbar/ CTs/ Circuit Breaker/ Cable/ VTs/Relay compartment.		Yes Busbar for 1 complete section/Switching compartment (CB,VT)/ Cable compartment (CT) / LV compartment
1.18. Are busbars segregated – Between phases – Between cubicles		Yes Yes	Yes Yes
1.19. Material of cover	Metallic		Metallic
1.20. Material of partitions	Metallic		Metallic/Insulator
1.21. Material of shutters	Metallic/Earthing		Yes
1.22. Busbars and joints fully encapsulated		Yes	Insulated
1.23. Busbar and feeder shutters lockable with individual manual and automatic features		Yes	Yes
1.24. Protection class – General – Busbars, cable compartment, internal partitions – Circuit breaker compartment • Door closed • Door open – LV compartment – Shutters and spouts – Pressure relief device/flaps	IP41 IP3XD IP41 IPXX IP41 IP3X IP 5X		IP41 IP3X IP41 IPXX IP41 IP41 IP3X NA
1.25. The way of securing (opening/closing of doors)	Hinged doors		Hinged doors
1.26. Material of HV conductor	Copper		Copper
1.27. Material of contacts	Silver-plated copper		Silver-plated copper
1.28. Type of pressure relief device			Flaps & Arc Absorber
1.29. Method of personnel protection in case of operation of pressure relief device			Pressure release at the top side of switchgear
1.30. Total mass of switchgear (average per bay)	kg		960
1.31. Minimum factors of safety for switchgear (minimum 2.5) – Busbars or other connection based on elastic limit – Complete insulators based on electro-mechanical test – Insulator metal fittings based on elastic limit – Steel structures based on elastic limit of tension members and on crippling loads of compression members – Foundations for structures against overturning or uprooting under maximum simultaneous working loading		2.5 2.5 2.5 2.5 2.5	As per IEC type As per IEC type As per IEC type As per IEC type As per IEC type
1.32. Manufacturer quality assurance according to ISO 9000, 9001, 9002, 9003 and 9004		Yes	





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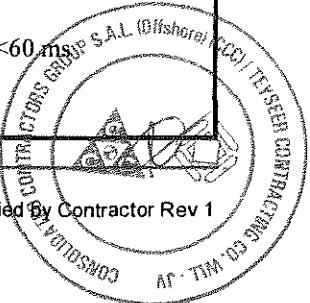
MEDIUM VOLTAGE SWITCHGEAR		UNIT	DATA	
			Required	Offered
1.33	Type test certificate to be issued by Independent laboratory or independently witnessed type test certificate available with report number and date filled by OEM		Yes	As per agreement on GTC571 project between SIEMENS and KAHRAMAA.
1.34	Basic Impulse Voltage Type Test with report number and date to be filled-in by OEM		Yes	yes
1.35	Emergency manual trip facility (during failure of DC supply) Manual closing facility with lockable flap		Yes	Yes
1.36	Loss of service continuity class		LSC2B	LSC2B
1.37	Partition class		PM	PM
1.38	Classification IAC		AFLR	AFLR
1.39	Internal arc fault duration at short-circuit withstand current	sec	1	1
1.40	Arc protection test certificate Design		Yes	
1.41	Temperatures (Indoor) Operating		35°C	Yes
1.42	and Storage Temperature		35°C	Yes
1.43	De-rating of equipment based on ambient temperature		Yes	Yes
2. CIRCUIT BREAKER				
2.1.	Manufacturer & Place of manufacturing			Siemens Germany or Turkey
2.2.	Type designation			3AE-SION
2.3.	Type		Vacuum Interrupter	Vacuum
2.4.	Fully encapsulated		Yes	Partially enclosed
2.5.	Withdrawable		Yes	yes
2.6.	Standards		IEC 60298, 62271-200, 62271-100, 60694, 60427	IEC 62271-1, IEC 62271-100, IEC 62271-200
2.7.	Rated voltage	kV	12	12
2.8.	Rated normal current at 40°C - Incomer/bus section; - Feeder	A	4000*, 2500 630	2500 A 630 A
2.9.	Note: Preferable value; acceptable 3150A Required current at 50°C - (Incomer/bus section) - Feeder (Contractor to confirm by calculation)	> A		Busbar: 2300 A Incoming & bus-section: 2330 A Feeder 630 A
2.10.	Rated frequency	Hz	50	50

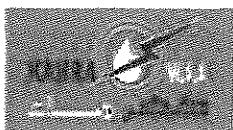




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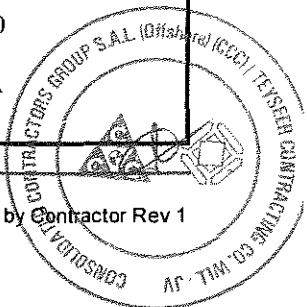
MEDIUM VOLTAGE SWITCHGEAR		UNIT	DATA	
			Required	Offered
2.11.	Rated lightning impulse withstand voltage <ul style="list-style-type: none">- Phase to earth- Across the isolating distance	KV _p KV _p	75 85	75 85
2.12.	Rated power frequency withstand voltage <ul style="list-style-type: none">- Phase to earth	kV	28	28
2.13.	- Across the isolating distance	kV	32	32
2.14.	Rated short-time withstand current (3 s)	kA	31.5	31.5
2.15.	Rated peak withstand current	kA _p	80	80
2.16.	Rated operating sequence		O-0.3 sec - - CO - 3 min - CO	O-0.3 sec - - CO - 3 min - CO
2.17.	Rated making current	kA	80	80
2.18.	Rated breaking current (symmetrical)	kA	31.5	31.5
2.19.	Rated breaking current (asymmetrical)	kA	To IEC 62271-100	44.9
2.20.	Rated breaking current under out of phase conditions	kA	10	NA
2.21.	First pole to clear factor		1.5	1.5
2.22.	Rated line charging breaking current	A	10	25
2.23.	Rated cable charging breaking current	A	25	400
2.24.	Rated small inductive breaking current of <ul style="list-style-type: none">- unloaded transformer- reactor	A		NA NA
2.25.	Maximum overvoltage factor on any switching duty	pu	2.5	NA
2.26.	If the Overvoltage factor above, is in excess of 2.5 pu, then detail steps taken to protect the system from overstressing, by the use of suitable Metal-Oxide surge arresters		MOAs	We will not do power system study, therefore we can not define overvoltage factor at the moment. According to assumption that over voltage factor not exceed 2.5 p.u. we do not propose surge arrester
2.27.	Maximum peak value of switching overvoltage when interrupting capacitive currents	kV		<= 2.5 pu
2.28.	Maximum peak value of switching over-voltage when interrupting low inductive and reactor currents	kV		NA
2.29.	Maximum total break time (trip initiation to final arc extinction)	ms	60	<80 ms
2.30.	Opening time (trip initiation to contact separation) <ul style="list-style-type: none">- Without current- With 100% rated breaking current	ms ms		NA <60 ms
2.31.	Maximum time interval between opening of first and last phase of three phase circuit breakers	ms	3	NA
2.32.	Closing time from energisation of close coil to latching of circuit breaker in fully closed position	ms		<60 ms





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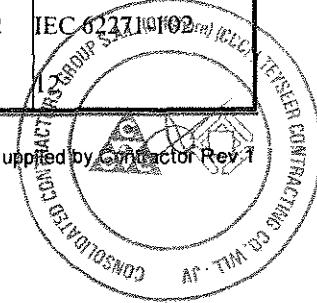
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
2.34. Making time (energisation of close coil to contact touch) – Without current – With 100% rated current	ms		NA
	ms		NA
2.35. Maximum time interval between closure of first and last phase of three phase circuit breaker	ms	3	NA
2.36. Mechanical life of CB and Mechanism in number of operations	min	5000	10000
2.37. Electrical contact life at rated current in No. of operations			NA
2.38. Electrical contact life at 100% fault current in No. of operations		10	>10
2.39. Internal arcing tests in the switchgear enclosure to IEC 60298 – Annex AA		As per IEC 62271-200 Annex A Adjacent compartments are not affected	(As per average experience data) As per IEC 62271-200 IAC AFL 31.5 kA/3sec
2.40. Mechanical means for withdrawal		Applicable for withdrawable type CB but not for fixed CB with GIS	Withdrawable CB
2.41. Type of operating mechanism		3 pole	3 pole
2.42. Manual spring discharge facility		Yes	Yes
2.43. Interlock facilities complying with requirements of specification		Yes	Yes
2.44. Type of power device – For closing – For opening		Motor-Spring	Motor-Spring
2.45. Hand charging facility		Spring	
2.46. Charging time	s	45	<10 s
2.47. Number of trip coils		1	1
2.48. Number of close coils		1	1
2.49. Nominal control and operating voltage	V	110 DC	110 DC
2.50. Nominal heater voltage	V	240	240 VAC
2.51. Rated power of trip coil	W		140
2.52. Rated power of close coil	W		140
2.53. Rated motor power	W		400
2.54. Does earthing of truck remain effective until fully withdrawn		Yes for withdrawable type	NA





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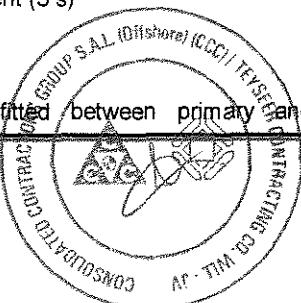
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
2.55. Total load of heaters for circuit breaker	W		50
2.56. Mass of circuit breaker complete (three pole set)	kg		80
2.57. Partial discharge test voltage	kV	IEC 60270, IEC 62271-200	IEC 62271-200
2.58. Manufacturer quality assurance according to ISO 9000, 9001, 9002, 9003 and 9004		Yes	ISO 9001
2.59. Type test certificate to be issued by independent laboratory or independently witnessed type test certificate available		Yes	As per agreement on GTC571 project between SIEMENS and KAHRAMAA.
3. BUSBARS			
3.1. Rated current at 40°C	A	4000*, 2500 (in accordance with associated transformer rating)	2500
<i>Note: Preferable value; acceptable 3150A</i>			
- Manufacturer's Standard	A		2500
- Corresponding site rating at 50 °C (manufacturer to provide data by calculation)	A		2300
3.2. Material of busbar		Copper	Cooper
3.3. Busbar joints		Copper	Cooper
3.4. Maximum temperature rise	°C		115 C at 40 C
3.5. Cross Section	mm ²		2x100x10
3.6. Material of barriers between units			NA
3.7. Insulation of Busbars:			heatshrink type
- Material			55
- Maximum working temperature			Yes
- Insulated sleeves on bus bars			Yes
3.8. Type test certificate to be issued by independent laboratory or independently witnessed type test certificate available			See the comments and deviations list
4. EARTHING SWITCH			
4.1. Manufacturer & Place of Manufacturing			Siemens Germany
- at busbar side			
- at line side			
4.2. Type designation		Earth Switch	Earth Switch
- at busbar side			
- at line side			
4.3. Type of operating mechanism		Manual	Manual
4.4. Standards		IEC 62271-102	IEC 62271-102 (IEC62271-102)
4.5. Rated voltage	kV	12	





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MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
4.6. Rated frequency	Hz	50	50
4.7. Rated lightning impulse withstand voltage phase to earth	kV	75	75
4.8. Rated power frequency withstand voltage phase to earth	kV	28	28
4.9. Rated short-time withstand current (3 s)	kA	31.5	31.5
4.10. Rated peak withstand current	kAp	80	80
4.11. Total mass of three phase complete earthing switch – at busbar side – at line side	kg kg	NA NA	
4.12. Type of contacts – Moving – Fixed		Copper Copper	Copper Copper
4.13. Moving contacts are directly connected to earthing system via copper connectors		Yes	Yes
4.14. Continuous running earth bar has been provided		Yes	Yes
5. CURRENT TRANSFORMER		Pfiffner or ALCE /Turkey	
5.1. Manufacturer & Place of manufacturing			
5.2. Type	Cast-resin multi-core, multi-ratio indoor	Cast-resin multi-core, multi-ratio indoor	
5.3. Type of primary winding (e.g. bar, wound, etc.)		Block type	
5.4. Standards	IEC 60044-1	IEC 60044-1	
5.5. Rated voltage	kV	12	12
5.6. Rated lightning impulse withstand voltage phase to earth	kV	75	75
5.7. Rated power frequency withstand voltage phase to earth	kV	28	28
5.8. Partial discharge test voltage	kV	IEC 60270	IEC 60270
5.9. Rated frequency	Hz	50	50
5.10. Rated continuous thermal current at 50°C		Rated extended primary current	Refer to ratio
5.11. Rated short-time withstand current (3 s)	kA	Same as CB rating	31.5
5.12. Rated dynamic current	kA	Same as CB rating	80
5.13. Are earthed metal screens fitted between primary and secondary windings		NA	

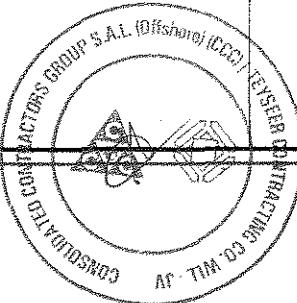




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MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
secondary windings			
5.14 Transformer bays current transformer			
- Type designation		3	
- Number of cores		140%	
- Rated extended primary current in percentage of rated primary current			
- Ratio			
• I core	A	2500/1, 4000/1	
• II core	A	2500/1, 4000/1	
• III core	A	2500/1, 4000/1	
• IV core (only for 66/11 kV transformer feeder s/s/)	A	2500/1, 4000/1 (In accordance with TRF rating)	
- Class			
• I core		CI.PX	
• II core		CI 5P10/1.0	
• III core		CI. PX	
• IV core (only for 66/11 kV transformer feeder s/s/)		CI. PX	
- Knee point voltage (E_k)	V		
• I core	V	Confirm with CT Sizing Calculation	
• II core	V		
• III core	V		
• IV core (only for 66/11 kV transformer feeder s/s/)	V		
- Exciting current (I_E) at E_k	A		
• I core	A	Confirm with CT Sizing Calculation	
• II core	A		
• III core	A		
• IV core (only for 66/11 kV transformer feeder s/s/)	A		
- Rated output (burden to be 25-100% rated burden)	VA		
• I core	VA	Confirm with CT Sizing Calculation	
• II core	VA		
• III core	VA		
• IV core (only for 66/11 kV transformer feeder s/s/)	VA		
- Total mass of three phase current transformer complete	kg		
5.15 Bus section bay current transformer No. 1			
- Type designation		1	
- Number of cores		120%	
- Rated extended primary current in percentage of rated primary current			
- Ratio (TR – turns ratio)			
• I core	A	2500/1 & 4000/1 to match incoming CT's	
- Class			
• I core		CI. PX Confirm	
- Knee point voltage (E_k)	V		
• I core		with CT sizing calculation	
- Exciting current (I_E) at E_k			

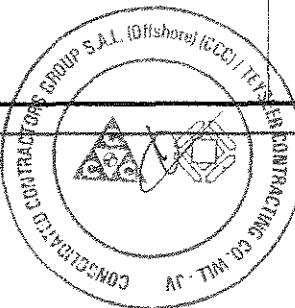
CT's are listed here are not matching CT's that are shown in SLD's. Hence Offered CT's are considered same as GTC 571 project typically. See Material list for provided CT's.





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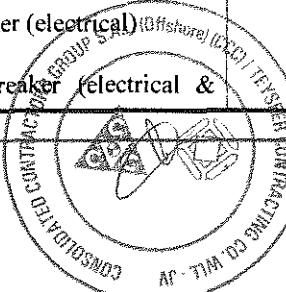
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
5.16 Bus section bay current transformer No. 2 (at the other side of circuit breaker)	A	sizing calculation	CT's are listed here are not matching CT's that are shown in SIB's. Hence Offered CT's are considered same as GTC57 project typicals.
- Rated output (burden to be 25-100% rated burden)	VA	Confirm with CT sizing calculation	
- Total mass of three phase current transformer complete	kg		
- Type designation		2	
- Number of cores		120%	
- Rated extended primary current in percentage of rated primary current			
- Ratio (TR – turns ratio)	A	2500/1 & 4000/1	
• I core	A	2500/1 & 4000/1	
• II core		(To match incomer CT's)	
- Class		CI. 5P20/1.0	
• I core		CI PX	
• II core			
- Knee point voltage (E_k)	V	Confirm with CT sizing calculation	
• I core	V		
• II core	V		
- Exciting current (I_E) at E_k	V	Confirm with CT sizing calculation	
• I core	V		
• II core	V		
- Rated output (burden to be 25-100% rated burden)	VA		
• I core	VA		
• II core	VA		
- Total mass of three phase current transformer complete	kg	Confirm with CT sizing calculation	
5.17 Feeder bay current transformer			
- Number of cores		3	
- Rated extended primary current in percentage of rated primary current		120%	
- Ratio (TR – turns ratio)	A	400-300 /1	
• I core	A	400-300 /1	
• II core	A	2500-4000/1	
3 rd Core required for incorporating 11 KV full bus bar protection. Third CT core ratio shall be equal to the partial Bus bar protection CT core used in 11 KV incomer and 11KV Bus section			
- Class		CI. PX	
• I core		CI 5P10/1.0	
• II core		CI. PX	
• III core	A		
- Knee point voltage (E_k)	V	Confirm with CT sizing calculation	
• I core	V		
• II core	V		
• III core	A		





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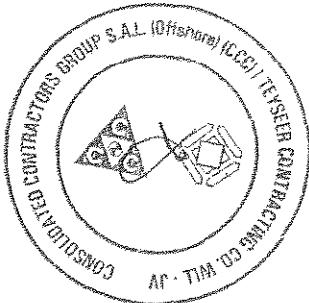
MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
- Exciting current (I_E) at E_k • I core • II core • III core	A	Confirm with CT sizing calculation	
- Rated output (burden to be 25-100% rated burden) • I core • II core • III core	VA	Confirm with CT sizing calculation	
6. VOLTAGE TRANSFORMERS (3-phase sets to be provided)			
6.1. Manufacturer & Place of manufacturing			Pfiffner or ALCE Turkey
6.2. Type designation for - Line transformer - Busbar transformer - Power transformer bay			4MR12 4MR12 4MR12
6.3. Type		Inductive cast - resin single pole insulated	Inductive cast - resin single pole insulated
6.4. Standards		IEC 60186 IEC 60044-2	IEC 60044-2
6.5. Rated voltage	kV	12	12
6.6. Rated frequency	Hz	50	50
6.7. Rated lightning impulse phase to earth	kV	75	75
6.8. Rated power frequency withstand voltage phase to earth	kV	28	28
6.9. Partial discharge test voltage	kV	IEC 60270	IEC 60270
6.10. Type of primary isolation		Fixed type with isolator or draw out type	Withdrawable type with fuse
6.11. Line voltage transformer & Busbar Voltage Transformer - Number of secondaries - Rated transformation ratio - Rated accuracy class - Rated output - Total mass of three phase voltage transformer complete	kV VA kg	1 11/ $\sqrt{3}$ / 0.11/ $\sqrt{3}$ 3P/1.0	1 11/ $\sqrt{3}$ / 0.11/ $\sqrt{3}$ 3P/1.0 50 85
7. EARTHSWITCHES			
7.1. Type of operating mechanism		Manual	Manual
7.2. Facility for interlock with upstream breaker (electrical)		Yes	Yes
7.3. Facility for interlock with incomer breaker (electrical &		Yes	Yes (electrical)





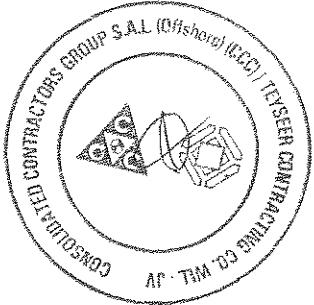
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MEDIUM VOLTAGE SWITCHGEAR	UNIT	DATA	
		Required	Offered
mechanical)			
7.4. Interlock with CVT or/and VT(to ensure novoltage)		Yes	Yes
7.5. Earth switch interlocks with Transformer feeder		Yes	Yes
8. Manufacturer quality system in accordance with ISO 9000, 9001, 9002, 9003 and 9004		Yes	ISO9001
9. Type test certificate to be issued by independent laboratory or independently witnessed type test certificate available.		Yes	As per agreement on GTC571 project between SIEMENS and KAHRAMAA.



Appendix I-7 – Technical Data Sheets

038 – 11-0.415 kV Transformers – Oil Filled

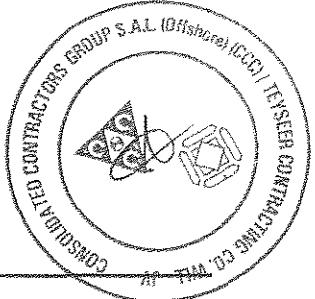




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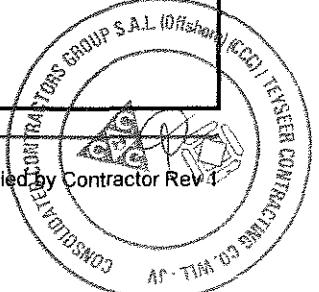
TRANSFORMERS – OIL FILLED





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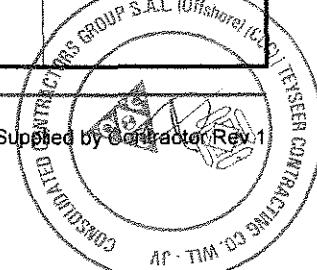
11/0.415kV TRANSFORMERS – OIL FILLED	UNIT	DATA	
		Required	Offered
1. Manufacturer & Place of manufacturing			ABB - Finland
2. Type designation			
3. Type		Three phase, oil immersed, core type	Complied
4. Standards		IEC 60076-1, -2, -3, -5, -10, 60296 NEMA TR1	IEC 60076 IEC 60296
5. Mounting		Outdoor floor	Outdoor floor
6. Rated voltage ratio	kV	11/0.433	11/4x1903
7. Rated frequency	Hz	50	50
8. Vector group		Dyn11	Dd0y1d11:30d0:30
9. Cooling		ONAN	ONAN
10. Method of earthing		NA Solid	Complied
– HV winding			
– LV winding			
11. Type (graded/non-graded) of windings		Non-graded	Complied
– HV winding		Non-graded	
– LV auxiliary winding			
12. Rated voltage of windings	kV	11	11
– HV winding	kV	0.415	4 x 1903
– LV auxiliary winding			
13. Highest voltage for equipment	kV	12	12
– HV winding	kV	0.433	4 x 1903
– LV auxiliary winding			
14. Rated lightning impulse withstand voltage at HV Terminal	kV	75	75
15. Rated power frequency withstand voltage at	kV	28	28
– HV terminal	kV	3	3
– LV terminal	kV	28	28
– HV neutral terminal			
16. Rated power at site conditions (Rated power is subject to review/ approval of sizing calculation submitted by the contractor)	kVA	As per scope	As per scope
17. Maximum temperature rise at rated power at:			Temperature Class A
– Windings	K	55	
– Hot spot of windings	K	68	
– Top oil	K	50	
– Oil at inlet of cooler			
– Oil at outlet of cooler	K		





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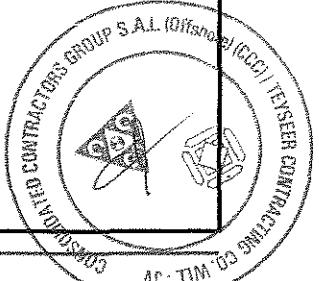
ITEM	UNIT	DATA	
		Required	Offered
11/0.415kV TRANSFORMERS – OIL FILLED			
18. Core and other metallic parts	K		
19. Temperature rise of winding due to short circuit duration of 2 s and HV side short circuit current of 40 kA			During detailed engineering
20. No load losses at rated voltage and rated frequency	kW		Refer Transformer data sheet
21. Load losses at 75°C, and rated frequency, rated power and principal tapping:			
22. Maximum current density at rated power: – HV winding – LV auxiliary winding	A/mm ² A/mm ²		During detailed engineering
23. Symmetrical short circuit withstand current (duration 2 s) at: – HV terminal – LV auxiliary terminal	kA kA	40 50	During detailed engineering
24. Magnetising current (HV winding) – At 90% rated voltage – At 100% rated voltage – At 110% rated voltage	A A A		During detailed engineering
25. Maximum flux density in core at rated voltage, power frequency and principal tapping	T		During detailed engineering
26. Type of tap changing		Off-circuit	Off-circuit
27. Type designation of off-load tap changer			
28. Tapped winding	HV	HV	
29. Tapping range		+5% -5%	+/- 2 x 2.5%
30. Tapping step		2.5%	2.5%
31. Number of steps (positions)		4 (5)	4 (5)
32. Limitation and withstanding of fault current in neutral for 30 s	A	N/A	N/A
33. Impedance voltage range at 75°C and principal tapping: – At principal tapping (negative tolerance in value from the specified value is not acceptable) – At maximum voltage ratio – At minimum voltage ratio		4.75% (500kVA) 5.45% (1000kVA) 6.0% (1600kVA)	1:2-4:6.0 (750kVA)
34. Resistance of winding at 75°C and principal tapping: – HV side – LV auxiliary side	Ω/phase Ω/phase		During detailed engineering
35. Zero phase sequence impedance of inter-star windings at 75°C (LV windings open-circuit)	Ω/phase		During detailed engineering
36. Zero phase sequence impedance of LV windings at 75°C	Ω/phase		





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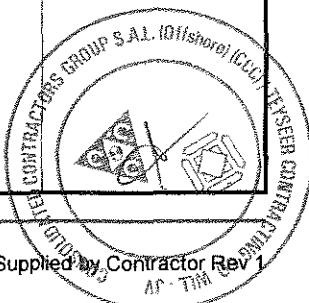
11/0.415kV TRANSFORMERS – OIL FILLED	UNIT	DATA	
		Required	Offered
(inter-star windings open-circuit)			
36. Terminal connection			
– HV terminal	Air-filled cable box	Air-insulated cable termination box common for HV & LV sides, IP55	
– LV terminal	Air-filled cable box		
– LV neutral terminal	Air-filled cable box		
37. Isolating link for test purposes			
– HV terminal	Yes	No	
– LV terminal	No	No	
38. Mounting of current transformer at			
– HV terminal	N/A		
– Neutral terminals	Outside		
39. Current transformers			
HV Line (Only AIS connections)		N/A	
– Number of cores	A		
– Rated extended primary current	A		
– Ratio (TR = turns ratio)	A		
• I core			
• II core			
• III core			
– Class			
• I core			
• II core			
• III core			
– Knee point voltage (E_k)	V		
• I core	V		
• II core	V		
• III core	V		
– Exciting current (I_E) at E_k	mA		
• I core	mA		
• II core	mA		
• III core	mA		
– Rated output (Burden to be 25-100% rated burden)	VA		
• I core	VA		
• II core	VA		
• III core	VA		
LV Neutral		N/A	
– Number of cores	A	1	
– Rated extended primary current		120%	
– Ratio (TR = turns ratio)			
• I core		750/1 (500KVA)	
– Class		1500/1 (1000 KVA)	
• I core		2500/1 (1600 KVA)	
– Knee point voltage (E_k)	V	PX	
• I core	mA		
– Exciting current (I_E) at E_k			
• I core			





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ITEM	UNIT	DATA	
		Required	Offered
11/0.415kV TRANSFORMERS – OIL FILLED			
40.	- Rated output (Burden to be 25-100% rated burden) • I core - All class PX CTs shall have a rated secondary current, I_{SN}	VA A	N/A 1.2
41.	Oil: - Manufacturer - Type designation - Standards - Minimum flash point - Viscosity • At 20°C • At 50°C • At 80°C - Maximum dielectric strength for 1 min - Dielectric factor - Acidity (neutralization value)	°C mm²/s mm²/s mm²/s kV mgKOH/ g	IEC 60296 Nynas Nytro 10XN IEC 60296 During detailed engineering
42.	Type of dehydrating breather (Non-sealed transformers)		Moisture sensor controlled Maintenance free automatic type
43.	Silicagel breather		
42.	Conductor material (e.g. copper, work hardened copper, etc.): - HV windings - LV windings		copper copper
43.	Conductor insulation: - HV winding - LV winding		During detailed engineering
44.	Calculated thermal time constant	min	During detailed engineering
45.	Thickness of transformer tank - Sides - Bottom - Top	mm mm mm	During detailed engineering
46.	Material of transformer tank		During detailed engineering
47.	Thickness of radiator plates	mm	During detailed engineering
48.	Total volume of conservator	litres	
49.	Masses of transformer - Core and coils - Total mass excluded oil - Oil mass • in tank • in radiators • Total - Total mass	kg kg kg kg kg kg	Refer transformer data sheet
50.	Mass of transformer as arranged for transport (heaviest part)	kg	





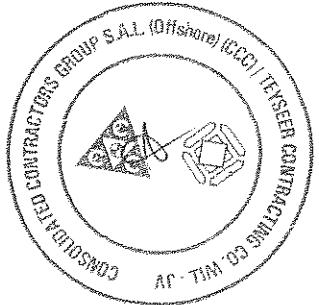
Qatar General Electricity & Water Corporation
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11/0.415kV TRANSFORMERS – OIL FILLED	UNIT	DATA	
		Required	Offered
51. Dimensions of transformer arranged for transport <ul style="list-style-type: none">- Height- Width- Length	m		During detailed engineering
52. Maximum noise level (to NEMA TR1)	dB	56	During detailed engineering
53. Vibration test (Y/N)		N	No
54. Conservator vessel, radiators, fan grilles, control boxes or cubicles and pipework anticorrosion protection		Hot dip galvanized and painted	Hot dip galvanized and painted
55. Tank anticorrosion protection			Hot dip galvanized and painted
56. Control/Protection voltage	V	110 DC	230 V AC
57. Manufacturer quality assurance <ul style="list-style-type: none">- According to ISO 9000, 9001, 9002, 9003 and 9004		Yes	Yes
58. Type test certificates to be issued by: i. Independent Laboratory or independently witnessed type test certificate		Yes	Complied for Temperature rise test and lightning impulse test as per IEC60076
59. Special Tests to be performed: <ul style="list-style-type: none">- Measurement of zero-sequence impedance- Determination of sound levels- Measurement of harmonics of no-load current- Jacking test- Oil leakage test		Yes No No Yes (T) Yes (R)	Yes No No No No



Appendix I-7 – Technical Data Sheets

042 – Pressure Sustaining Valve - TFS



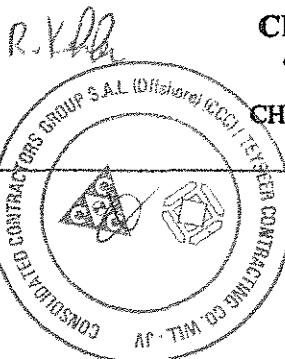


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Sl No	Description			Required	Offered
1	Pressure Sustaining Valve Dia. mm			DN 500	COMPLY
2	Tag Number			*	
3	Location			PRPS1 Emergency Tanker Filling Station	
4	P&ID No.			*	
5	Quantity			5	
6	Fluid			Potable water	COMPLY
7	Flow Condition	Maximum Vs	Minimum Vs	400	20
8	Minimum Sustained Upstream Pressure, bar			1.1	
9	Temperature normal/max °C			35 / 70	
10	P Max. bar			16	COMPLY
11	Line size mm			DN 500	COMPLY
12	Cv calculated / required			*	843 P/s at 1bar
13	Type			Axial Flow	UPGRADED, BALANCE NIGHT CONTROLLED, ACTUATOR
14	Max. noise dBA			85	
15	Body size / rating mm			*	500 mm
16	Material - body			Ductile Iron GGG50 EN GJS 500-7 as per EN 1563	
17	Trim ported guide and seating			Gunmetal to BS 1400 LG 2C	
18	Outside coating			*	Blue RAL 9005 300 microns
19	Connections			Raised flange face to EN 1092-2 PN16	
20	Test Pressure - Body / Seal			*	25 / 48 bar
21	Closing direction			clockwise	top to bottom
22	Closing by			*	N.A.
23	Number of turns			*	N.A.
24	Kc value (1,2,3)			*	N.A.
25	Dimensions and weight				
26	-Length / Overall length mm		*	11*	1250
27	-Height / Overall height mm		*	11*	1400
28	-Flange inner / outer dia. mm		*	11*	N.A.
29	-Weight Kg		*	*	383
30	Manufacturer / Country of origin			*	CLA-VAL Europe / Switzerland
31	Model No.			*	50-01
32	Local Agent authorized dealer			*	EICLO INDUSTRIAL SUPPLIES

Notes :

- * To be filled by vendor / bidder



CLA-VAL Europe Sàrl
automatic control valves
 Chemin des Mésanges 1
 CH-1032 ROMANEL/Lausanne



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APPENDIX I - 7 - 042 A

EMERGENCY TANKER FILLING STATION PRESSURE SUSTAINING VALVE



**TECHNICAL AFFAIRS
Water Projects Dept.**

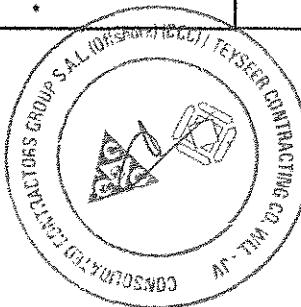


Qatar General Electricity & Water Corporation
 Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

	S/ No	Description		Required		Offered	
GENERAL	1	Pressure Sustaining Valve Dia. mm		DN 500		COMPLY	
	2	Tag Number		*		E 2116 - 00	
	3	Location		PRPS1 Emergency Tanker Filling Station		COMPLY	
	4	P&ID No.		*		Drawing SCHOO 3	
	5	Quantity		5		5	
SERVICE CONDITION	6	Fluid		Potable water		COMPLY	
	7	Flow Condition	Maximum l/s	Minimum l/s	400	20	844 20
	8	Minimum Sustained Upstream Pressure, bar		1.1		1.4	
	9	Temperature normal/max °C		35 / 70		35 / 60	
	10	P Max. bar		16		COMPLY	
	11	Line size mm		DN 500			
	12	Cv calculated / required		*		KV = 2480 (100% opening)	
	13	Type		Axial Flow		GLOBE VALVE	
	14	Max. noise dBA		85			
	15	Body size / rating mm		*		DN 500 - PN 16	
VALVE	16	Material - body		Ductile Iron GGG50 EN GJS 500-7 as per EN 1563		Ductile Iron GJS 400-15 GJS 500-7	
	17	Trim ported guide and seating		Gunmetal to BS 1400 LG 2C		Seat Operator : ss 316 L Stem Spacer : ss 316	
	18	Outside coating		*		EPOXY 300 microns	
	19	Connections		Raised flange face to EN 1092-2 PN16		COMPLY	
	20	Test Pressure - Body / Seat		*		Seat : 1.1 x PN = 17.6 bars Body : 1.5 x PN = 24.5 bars	
	21	Closing direction		clockwise		N / A	
	22	Closing by		*		Hydraulic Energy N / A	
	23	Number of turns		*		10%:992 ; 50%:1612 ; 100% : 2480	
	24	Kc value (1,2,3)		*			
	25	Dimensions and weight				Refer to QCP	
	26	-Length / Overall length mm		* / *		Refer to QCP	
DIMENSIONS	27	-Height / Overall height mm		* / *		Refer to QCP	
	28	-Flange inner / outer dia. mm		* / *		Refer to QCP	
	29	-Weight Kg		*		Refer to QCP	
	30	Manufacturer / Country of origin		* / *		SG-PAM - ITALY	
	31	Model No.		*		E 2116 - 00	
	32	Local Agent		*		MANNAI	

Notes :

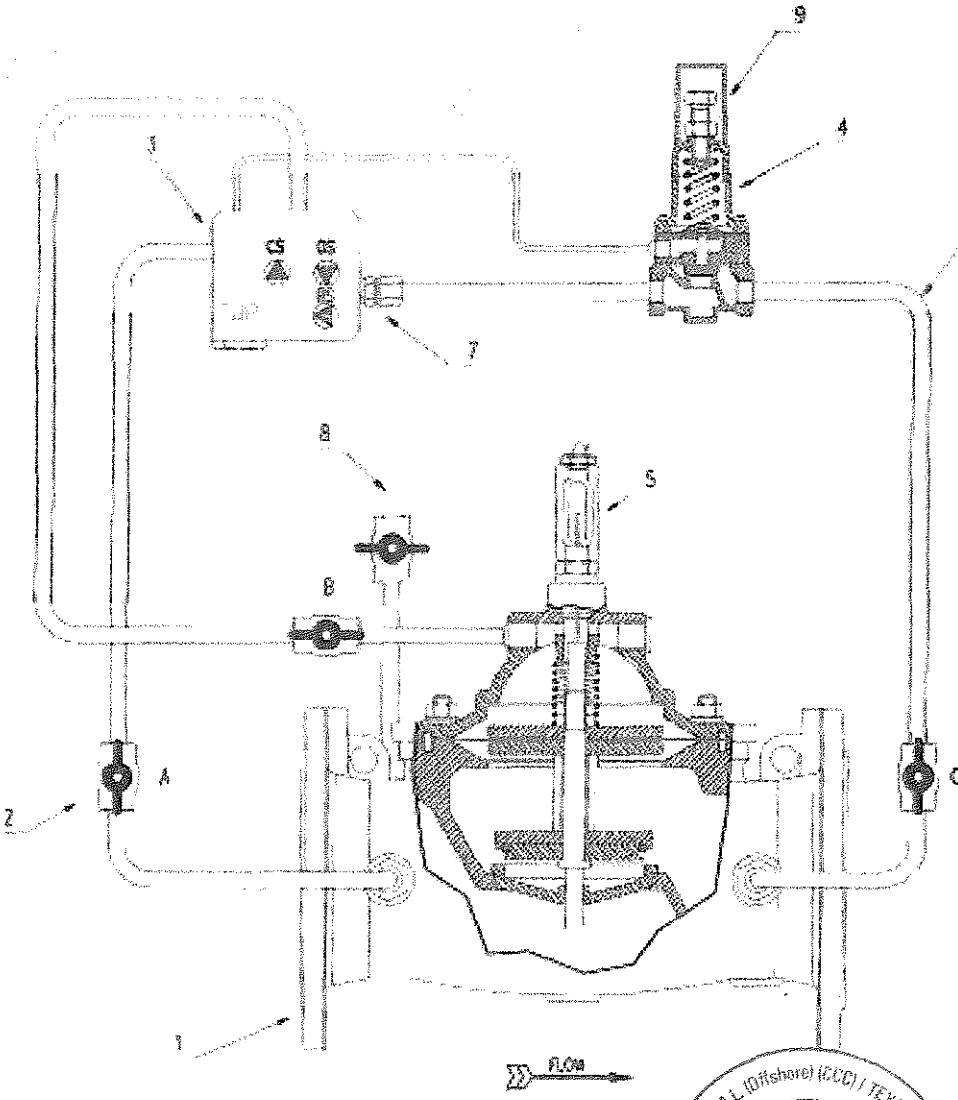
- * To be filled by vendor / bidder

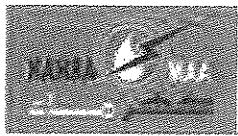




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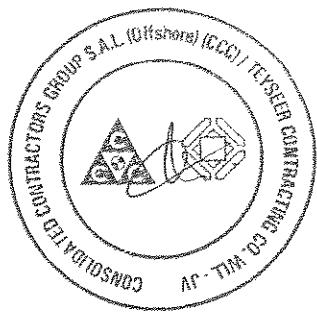
LISI		LAVO (MI) - ITALY INDUSTRIA SARACINESCHE IDRAULICHE	PRESSURE RELIEF / SUSTAINING VALVE E2116-00	SC001 SOH003	N° 00
N°	DESCRIZIONE - DESCRIPTION BESCHREIBUNG	TIPO - TYPE	N°	DESCRIZIONE - DESCRIPTION BESCHREIBUNG	TIPO - TYPE
01	MAIN VALVE	E2001			
02	ISOLATING BALL COCK (A-B-C)	BRASS-N-PLATED TUP-93 PVDF ESD			
03	LOCKABLE CENTRALIZED CONTROL				
04	PRESSURE SUSTAINING RELIEF PILOT				
05	VALVE POSITION INDICATOR (WITH VERTING COCK)				
06	TUBE	SS AISI 304 L			
07	TUBE UNION	BRASS-N-PLATED			
08	GAUGE HOLDER BALL VALVE	BRASS-N-PLATED PVC			
09	CAP				





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025A PRPS1_AIR VALVES - TDS



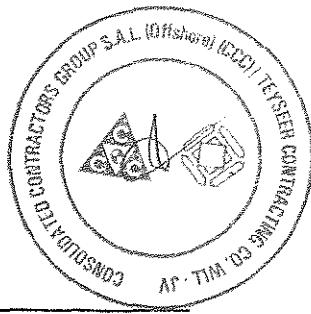
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Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

APPENDIX I – 7 – 42A

EMERGENCY TANKER FILLING STATION PRESSURE SUSTAINING VALVE



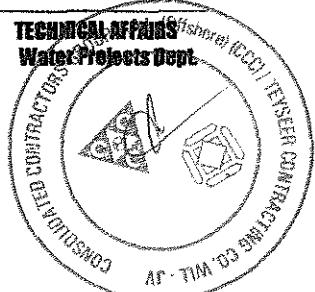


Qatar General Electricity & Water Corporation
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(Packages A, B, C, D & E)

	Sl No	Description			Required		Offered	
GENERAL	1	Pressure Sustaining Valve Dia. mm			DN 500		DN 500	
	2	Tag Number			*		To be provided by contractor/end user	
	3	Location			PRPS1 Emergency Tanker Filling Station		PRPS 1,2,3,4,5 Emergency tanker filling station	
	4	P&I/D No.			*		To be provided by contractor/end user	
	5	Quantity			5		5x5=25 nos	
SERVICE CONDITION	6	Fluid			Potable water			
	7	Flow Condition	Maximum l/s	Minimum l/s	400	20	400	200
	8	Minimum Sustained Upstream Pressure, bar			1.1		1.1	
	9	Temperature normal/max °C			35 / 70		35/55	
	10	P Max. bar			16		PN 16	
	11	Line size mm			DN 500		DN 500	
	12	Cv calculated / required			*		Will be provided	
	13	Type			Axial Flow		Axial flow type	
	14	Max. noise dBA			85		Less than 85db	
	15	Body size / rating mm			*		500mm/PN 16	
VALVE	16	Material - body			Ductile Iron GGG50 EN GJS 500-7 as per EN 1563		GGG 40 as per project specification	
	17	Trim ported guide and sealing			Gunmetal to BS 1400 LG 2C		Bronze Overlay	
	18	Outside coating			*		PFE 300Microns min	
	19	Connections			Raised flange face to EN 1092-2 PN16		RF PN 16	
	20	Test Pressure - Body / Seat			*		PN 16x 1.5	
	21	Closing direction			clockwise		clockwise	
	22	Closing by			*		Electric actuator 146Sec	
	23	Number of turns			*		NA, offered electrical actuated	
	24	Kc value (1,2,3)			*		Will be provided	
	25	Dimensions and weight						
	26	-Length / Overall length	mm	*	750mm			
	27	-Height / Overall height	mm	*	894mm			
	28	-Flange inner / outer dia.	mm	*	500/715mm			
	29	-Weight	Kg	*	600Kg Approx			
DIMENSIONS	30	Manufacturer / Country of origin			*		VAG Armaturen/Germany	
	31	Model No.			*		VAG RIKO	
	32	Local Agent			*		Petrofac Qatar	

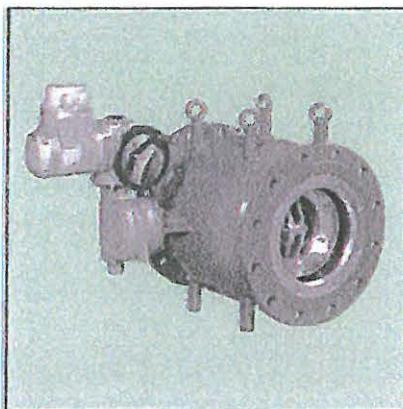
Notes :

* To be filled by vendor / bidder



PN 10/16/25/40 - DN 150...2000

KAT-A 2014-EA



Product characteristics and benefits

- Face-to-face length acc. to EN 558-1, basic series 15 - from DN 500 1.5 x DN
- With flange ends on both sides acc. to EN 1092-2
- Control valve in straightway type
- With customized control device depending on operating conditions
- Low actuating torque due to pressure balanced valve/piston
- Rotationally symmetrical flow guidance
- Annular flow cross section in each position
- Axial movement of the plunger by means of crank gear mechanism
- With self-locking worm gear unit including position indicator
- With electric actuator
- No blocking due to long piston guide rails
- Elastic profile sealing ring located in the no-flow zone for high durability
- Wear-resistant, corrosion-resistant and infiltration-proof piston guides in the body by micro-finished bronze weld overlay
- Piston sealed by Quad Ring

Materials

- Body: Ductile cast iron EN-JS 1030 (GGG-40)
- Piston guide rails: Bronze overlay welded
- Piston: Stainless steel 1.4301
- Valve sealing: EPDM
- Inner parts: Stainless steel (exception: > DN 600 crank gear from EN-JS 1030 (GGG-40))
- Bolts: Stainless steel A4 (DIN EN ISO 3506)
- Bearing bush: Bronze
- Eye bolts for lifting: Galvanized steel 1.0401 (C15)

Corrosion protection

- Inside and outside epoxy coating

Versions

- Standard version as described
- Special designs available on request
- With slotted cylinder to control high differential pressure for water with suspended solids (Form "SZ")
- With orifice cylinder to control high differential pressure (Form "LH")
- With cut off edge and sudden enlargement of cross sectional area at the seat to control lower differential pressure (Form "E")
- DN 1400 in VAG RKV plunger valve design

Field of Application

- Chamber installation
- Installation in plants

Note

For proper installation and safe operation please follow the installation and operation instructions:

KAT-B 2014

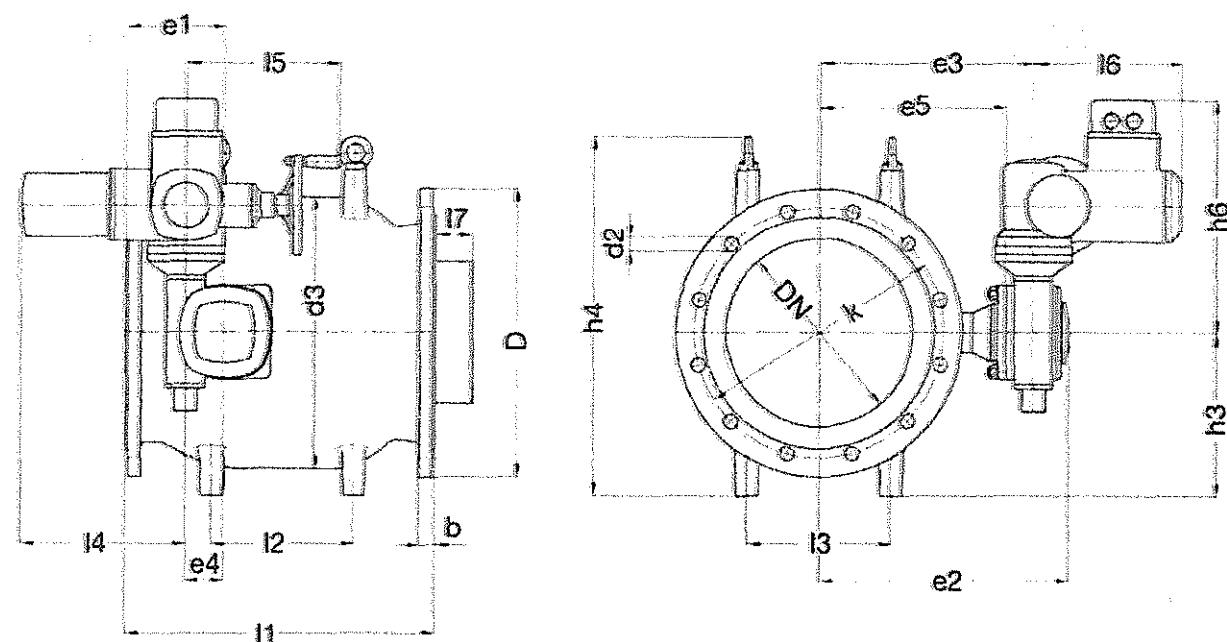
Field of application

DN	PN	Maximum operating pressure [bar]	Maximum operating temperature for neutral liquids [°C]
150...1200	40	40	50
150...1600	25	25	50
150...2000	16	16	50
150...2000	10	10	50

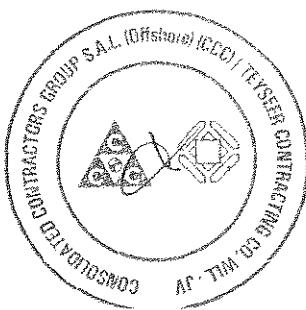
Pressure test acc. to EN 12266

Test pressure body with water [bar]	Test pressure seat with water [bar]
60	44
37.5	28
24	18
15	11



Drawing**Technical data****PN 40**

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	300	375	450	515	660	685	755	890	995	1140	1250	1360
b [mm]	26	30	34.5	39.5	48	49	52	58	64	65	76	80
d2 [mm]	28	31	34	34	41	41	44	50	48	56	56	56
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	250	320	385	450	585	610	670	795	900	1030	1140	1250
i1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
i2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
i3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
i4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
i5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
i6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
i7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1	SA 10.1	SA 10.1	SA 10.1							
No. of holes	8	12	12	16	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	140	205	235	420	490	695	1145	1725	2225	2825	4150
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

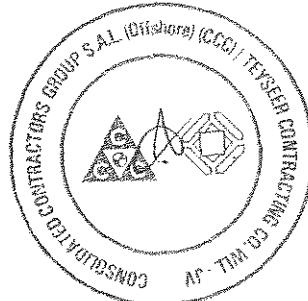


Technical data**PN 25**

DN	1200	1600
D [mm]	1530	1975
b [mm]	69	81
d2 [mm]	57	62
d3 [mm]	1645	2244
e1 [mm]	560	725
e2 [mm]	1136	1609
e3 [mm]	1040	1490
e4 [mm]	200	250
e5 [mm]	950	1350
h3 [mm]	850	1200
h4 [mm]	1828	2608
h6 [mm]	720	945
k [mm]	1420	1860
l1 [mm]	1800	2500
l2 [mm]	800	1200
l3 [mm]	800	1200
l4 [mm]	282	384
l5 [mm]	256	336
l6 [mm]	247	384
l7 [mm]	363	480
Actuator type	SA 10.1	SA 14.5
No. of holes	32	40
Weight without cylinder approx.	5225	17350
Volume with EA approx.	7.000	19.000

PN 16

DN	150	200	250	300	400	450	500	600	700	800	900	1000
D [mm]	285	340	405	460	580	640	715	840	970	1025	1125	1255
b [mm]	26	22	24.5	24.5	28	30	31.5	36	39.5	43	46.5	50
d2 [mm]	22	23	28	28	31	31	34	37	37	40	41	44
d3 [mm]	236	302	371	434	575	632	711	840	998	1127	1258	1380
e1 [mm]	130	150	145	160	170	150	175	280	315	400	420	460
e2 [mm]	328	328	403	403	518	518	629	654	800	797	880	1016
e3 [mm]	270	270	345	345	467	467	550	575	725	725	800	898
e4 [mm]	63	63	63	63	80	80	100	100	125	125	160	160
e5 [mm]	225	225	300	300	410	410	475	500	650	650	725	800
h3 [mm]	155	190	230	260	335	345	385	460	520	600	650	720
h4 [mm]	355	425	513	573	741	761	841	1010	1150	1309	1428	1568
h6 [mm]	373	373	373	373	380	380	509	509	500	509	509	630
k [mm]	240	295	355	410	525	585	650	770	840	950	1050	1170
l1 [mm]	350	400	450	500	600	650	750	900	1050	1200	1350	1500
l2 [mm]	130	130	170	230	300	350	400	500	560	600	700	750
l3 [mm]	140	140	170	230	300	350	400	500	560	600	700	750
l4 [mm]	264	264	264	264	282	282	282	282	282	282	282	384
l5 [mm]	249	249	249	249	256	256	256	256	256	256	256	336
l6 [mm]	237	237	237	237	247	247	247	247	247	247	247	285
l7 [mm]	48	68	83	94	127	144	153	150	195	244	275	292
Actuator type	SA 07.5	SA 10.1	SA 10.1	SA 07.5	SA 10.1							
No. of holes	8	12	12	12	16	20	20	20	24	24	28	28
Weight without cylinder approx.	95	130	170	195	330	375	575	1015	1525	1975	2575	3665
Volume with EA approx.	0.190	0.230	0.310	0.360	0.590	0.660	0.900	1.300	1.500	2.600	3.500	4.600

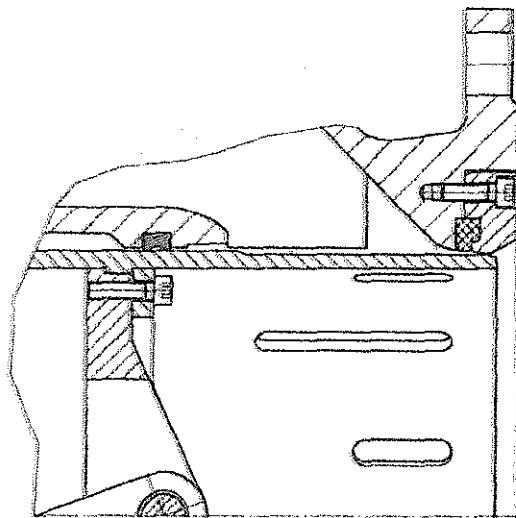


VAG RIKO® Plunger Valve
one-piece body, with electric actuator

Water

Further information

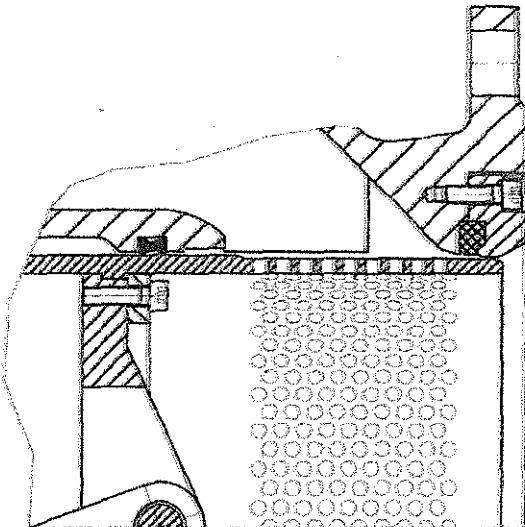
Type "SZ" with slotted cylinder



Application:

- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- To prevent cavitation
- For water containing suspended matter

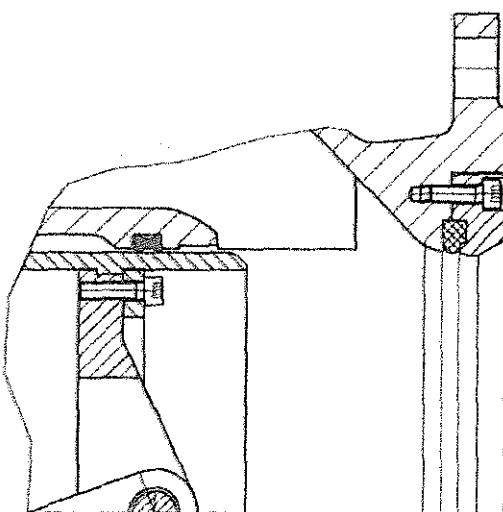
Type "LH" with multiple orifice cylinder



Application:

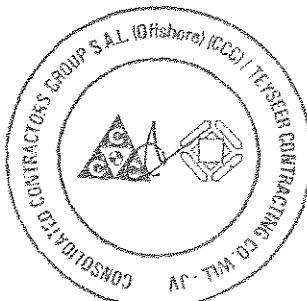
- Preferably as control valve
- In case of considerable pressure differences
- Optimum adjustment to the plant conditions
- Optimum prevention of cavitation

Type "E" with cut-off edge



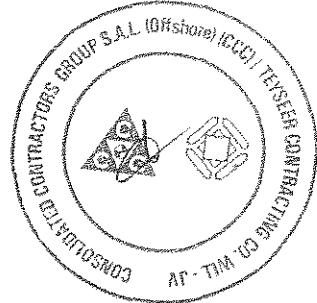
Application:

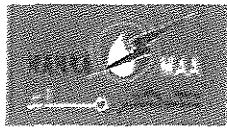
- Preferably as control valve with sufficient back pressure
- As pump start-up valve



Appendix I-7 – Technical Data Sheets

043 – Chlorine Dioxide Analyzer

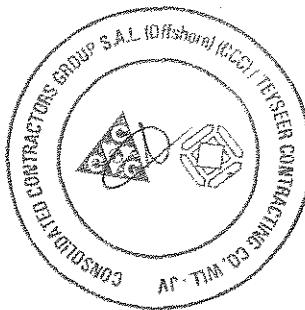




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APPENDIX I-7-043

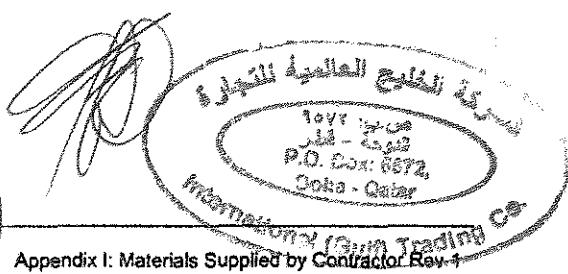
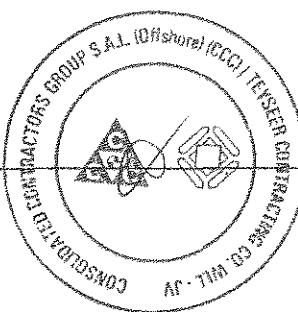
CHLORINE DIOXIDE ANALYZER





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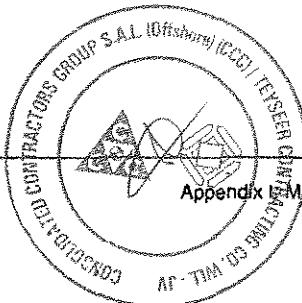
	Sl. No	Description	
IDENTIFICATION	1	Meter Tag Number	9187SC
	2	Service	As per Instrument List
	3	Location	As per Instrument List
	4	Line Size/Schedule	As per Instrument List
	5	P&I Number	9187SC
SERVICE CONDITION	1	Ambient Temperature	55 °C
	2	Relative Humidity	100 %
	3	Installation (Indoor/Outdoor)	Indoor
	4	Fluid / Pressure	Kahrama Potable Water / PN 16
	5	Process Connection Type / Size	¾" NPT
	6	Measuring Range mg/l	0.1 - 1 mg/l
	7	Temp. Min/Max °C	5 / 55
	8	Flow Switch	Required
PROCESS CONDITION	1	Fluid	Kahrama Potable Water
	2	Temp. Min/Max °C	5 / 70
	3	Process Fluid conductivity	145µS/cm – 400µS/cm
	4	Chlorine Dioxide Minimum / Maximum mg/l	0.1 – 0.8 mg/l
SENSOR	1	Measuring Principle/Type	Amperometric,non-reagent Type
	2	Wetted parts	PVC
	3	Ingress Protection	IP 68
	4	Temperature Compensation	Yes
	5	pH Compensation	Yes
	6	Sample Flow Rate	5 l/h – 10 l/h
	7	Cleaning	Manufacture Std
	8	Installation	Flow Through/Flow Cell
	9	Process connection	Manufacture Std
	10	Average Accuracy	± 5% of Measurement
	11	Sensor Cable/connection	Manufacture Std,quick connect, non-contact metal type
	12	Signal Cable between Sensor and transmitter	Min 5m
	13	Model Number/Order Code for Sensor	LXV434.99.00001
	14	Model Number /Order Code for Cable	-
	15	Electrode Type and Material	Amperometric / Measuring Electrode: Gold Reference Electrode: Silver Counter Electrode: Stainless Steel
	17	Sample piping material	SS316L
			SS 316L





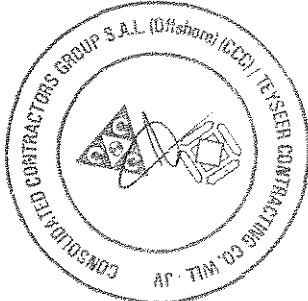
Qatar General Electricity & Water Corporation
Tender NO. GTC 626/2014
Construction of Mega Reservoir PRPSs
(Packages A, B, C, D & E)

TRANSMITTER	1 Output	Profibus	YES
	2 Power Supply	240VAC	YES
	3 Power Consumption	-	-
	4 Fuse Protection	Yes	YES
	5 Electrical Connection	M20 x 1.5	YES
	6 Ingress Protection	IP 67	IP66 4X
	7 Enclosure Material	Manufacture Std	YES
	8 Accuracy	±0.5%	±0.5%
	9 Measuring Range	0 - 2 mg/l	0-2 MG/L
	10 Calibrated Range	0-2 mg/l	0-2 MG/L
	11 Relay output	Yes 2 nos.	YES
	12 Enclosure class	IP67	IP66 4X
	13 Display Type	Alpha numeric Digital	YES
	14 Mounting	Analyser Rack Mounting	YES
	15 Model Number/Order Code for Transmitter	-	LXV404.99.23551
ACCESSORIES	1 Flow Cell	Yes	YES
	2 Rotameter with Flow regulator	Yes	YES
	3 Pressure Regulator cum Pressure Indicator	Yes	YES
	4 Sampling System	Yes	YES
	5 Cooling system	Yes	N/A
	6 Tag Plate	Yes	YES
DOCUMENTATION	1 Calibration Certificate for Each Tag	Yes	YES
	2 Catalogue (Data Sheet, IMS)	Yes	YES
	3 As Build Drawings (Electrical, Mechanical)	Yes	YES
PURCHASE	1 Manufacturer / Country of Origin	-	HACH-LANGE USA/GERMANY
	2 Model No / Complete Order Code	-	SC 200
	3 Local Agent	-	IGTC
	4 Country of Origin	-	QATAR
	5 Weight	-	1.7 KG
	6 P.O. Number	-	-
Notes :			
1) * These variables to be filled in by Vendor/Contractor.			



Appendix I-7 – Technical Data Sheets

044 – CON Analyzer Flow Cell Type

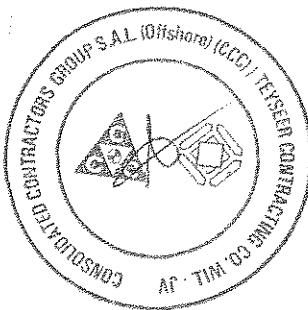




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APPENDIX I-7-044

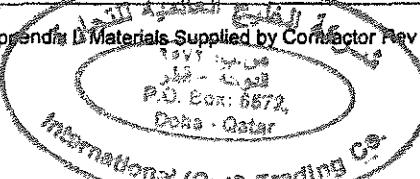
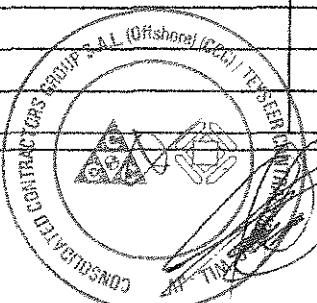
CONDUCTIVITY ANALYZER (FLOW CELL TYPE)





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	Sl. No	Description		
IDENTIFICATION	1	Meter Tag Number	As per Instrument List	3494SC
	2	Service	As per Instrument List	YES
	3	Location	As per Instrument List	YES
	4	Line Size /Schedule	As per Instrument List	YES
	5	P&I Number	As per Instrument List	3494SC
SERVICE CONDITION	1	Ambient Temperature	55 °C	YES
	2	Relative Humidity	100 %	90%
	3	Installation (Indoor/Outdoor)	Indoor	YES
	4	Fluid / Pressure	Kahrama Potable Water / PN 16	YES
	5	Process Connection Type / Size	½" NPT	YES
	6	Measuring Range	145 µS/cm to 400 µS/cm	YES
	7	Temp. Min/Max °C	5 / 55	YES
PROCESS CONDITION	1	Fluid	Kahrama Potable Water	YES
	2	Temp. Min/Max °C	5 / 70	5 / 120
	3	Process Fluid conductivity	145 µS/cm to 400 µS/cm	YES
	4	pH Minimum / Maximum	0 to 14	YES
SENSOR	1	Measuring Principle /Type	Inductive – Conductive (Toroidal)	YES
	2	Wetted parts	PVC	YES
	3	Ingress Protection	IP67	IP66
	4	Temperature Compensation	Yes	YES
	5	Sample Flow Rate	5 l/h – 10 l/h	YES
	6	Cleaning	Manufacture Std	YES
	7	Installation	Flow Through/Flow Cell	YES
	8	Process connection	Manufacture Std	YES
	9	Accuracy	±0.5% of Measurement Manufacture Std, quick connect, non-contact metal type	0.5%
	10	Sensor Cable/connection		YES
	11	Model Number/Order Code for Sensor		3494SC
	12	Model Number/Order Code for Cable		-
	13	Signal Cable between Sensor and transmitter	Min. 5m	YES
TRANSMITTER	1	Output	Profibus	YES
	2	Power Supply	240 VAC	YES
	3	Power Consumption	*	-
	4	Fuse Protection	Yes	YES
	5	Electrical Connection	M20 x 1.5	YES
	6	Ingress Protection	IP67	IP66
	7	Enclosure Material	Manufacture Std	YES
	8	Accuracy	± 0.5%	YES



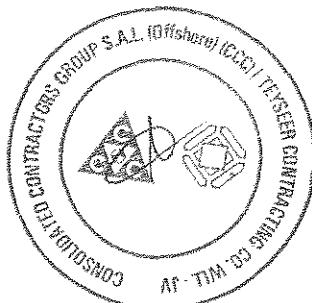


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SPECIFICATIONS	9	Calibrated Range	50 $\mu\text{S}/\text{cm}$ to 500 $\mu\text{S}/\text{cm}$	1-2000 $\mu\text{s}/\text{cm}$
	10	Measuring Range	50 $\mu\text{S}/\text{cm}$ to 500 $\mu\text{S}/\text{cm}$	1-2000 $\mu\text{s}/\text{cm}$
	11	Relay output	Yes 2 nos.	YES
	12	Enclosure class	IP67	IP66
	13	Display Type	Alpha numeric Digital	YES
	14	Mounting	Analyser Rack	YES
	15	Model Number/Order Code for Transmitter	*	-
	1	Flow Cell	Yes	YES
	2	Rotameter with Flow regulator	Yes	YES
	3	Pressure Regulator cum Pressure Indicator	Yes	YES
	4	Sampling System	Yes	YES
	5	Cooling System	Yes	YES
	6	Tag Plate	Yes	YES
	1	Calibration Certificate for Each Tag	Yes	-
DOCUMENTATION	2	Catalogue (Data Sheet, JMS)	Yes	-
	3	As Built Drawings (Electrical, Mechanical)	Yes	-
	1	Manufacturer	*	
PURCHASE	2	Model No / Complete Order Code	*	
	3	Local Agent	*	
	4	Country of Origin	*	
	5	Weight	*	
	6	P.O Number	*	

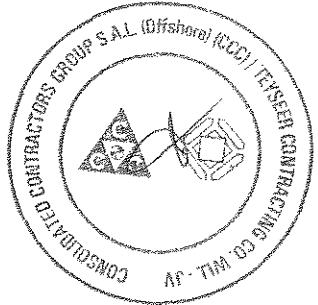
Notes :

- 1) * These variables to be filled in by Vendor/Contractor.



Appendix I-7 – Technical Data Sheets

I-8-001 – Automation





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APPENDIX I – 8 – 001

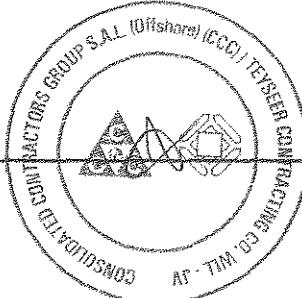
AUTOMATION DATA SHEETS





COMPUTER AND PERIPHERALS

NO	ITEM	DATA	
		Required	Offered
1.0	SCADA HMI OS SERVER		
1.	Processor	3.1GHz/16-core/16MBProcessors (AMD Opteron 6284E or Intel latest version)	Comply
2.	Cache Memory	16MB L3 cache	Comply
3.	Memory	64GB (8 x 8GB) PC3-10600R (DDR3-1333) Registered DIMMs	Comply
4.	Network Controller	Two Dual Port Multifunction Gigabit Server Adapters (four ports total)	Comply
5.	Storage Controller	1GB FBWC Controller	Comply
6.	Internal Storage Standard	8 SFF SAS/SATA HDD Bays	Comply
7.	Optical Drive	SATA DVD-RW Optical Drive	Comply
8.	Power Supply (2)	750W Common Slot Platinum Hot Plug Power Supplies	Comply
9.	Fans	Hot Plug Fully Redundant Fans	Comply
10.	Form Factor	Rack (2U), (3.5-inch	Comply
11.	Operating System	Latest Version of Windows Server	Comply

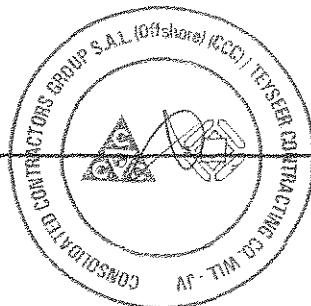




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2.0	LCD MONITOR 24INCH INCH AS TABLETOP UNIT		
1.	Monitor	24inch LCD color monitor, non-reflecting glass screen	Comply
2.	Supply voltage	230 V AC, 47 – 63 Hz, 60 VA	Comply
3.	Degree of protection	IP 20	Comply
4.	Resolution	1280 x 1024 pixels	Comply
5.	Brightness	300 cd/m ²	Comply
6.	Contrast	400:1	Comply
7.	Dot mask	0.28 x 0.28, 16.7 million colors	Comply
8.	Frame frequency	50 – 72 Hz	Comply
9.	Line frequency	30 - 97 kHz	Comply
10.	Other	DVI interface; CE, UL, CSA certification	Comply
11.	Standards	EN 55022, EN 60068-2-6, EN 60068-2-29, EN 60950, EN 61000-4-11, EN 61000-4-2/-4-3/-4-4/-4-5/-4-8	Comply

3.0	LCD-TOUCH-MONITOR 24 INCH AS TABLETOP UNIT		
1.	Monitor	24inch LCD color monitor, Touch function, OSD, non-reflecting glass screen	
2.	Supply voltage	230 V AC, 47 – 63 Hz, 60 VA	
3.	Degree of protection	IP 20	
4.	Resolution	1280 x 1024 pixels	
5.	Brightness	300 cd/m ²	
6.	Contrast	400:1	
7.	Dot mask	0.28 x 0.28, 16.7 million colors	
8.	Other	DVI interface; Touch interface: USB, On Screen keyboard also useable for log in, CE, UL, CSA certification	
9.	Standards	EN 55022, EN 60068-2-6, EN 60068-2-29, EN 60950, EN 61000-4-11, EN 61000-4-2/-4-3/-4-4/-4-5/-4-8	

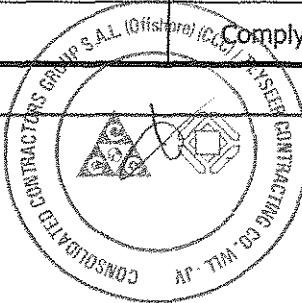




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4.0	DATABASE SERVER (Historian)		
1.	Processors	3.5GHz/16-core/16MB/ (AMD Opteron 6238 or Intel Xeon equivalent)	Comply
2.	Cache Memory	16MB L3 cache	Comply
3.	Memory	16GB (4 x 4GB) PC3-10600R (DDR3-1333) Registered DIMMs	Comply
4.	Network Controller	Two Dual Port Multifunction Gigabit Server Adapters (four ports total)	Comply
5.	Network Storage Adaptor	10GbE iSCSI Adaptor	Comply
		BE3 Controller	Comply
		2 Ports	Comply
		Cat 6/6a Copper	Comply
		PCI Express 2.0 x 8	Comply
		Max Bus Speed 5GT/s	Comply
6.	Storage Controller	Array Controller 512MB Flash Based Write Cached (FBWC) Controller	Comply
7.	Internal Storage	8 SFF SAS/SATA HDD Bays	Comply
8.	Power Supply	Common Slot Platinum Hot Plug Power Supply	Comply
9.	Fans	6 hot plug redundant fans	Comply
10.	Form Factor	Rack (2U),	Comply

5.0	ENGINEERING WORKSTATION		
1.	Processor	2GHz / 6 cores / 16MB, ,Each core supports two threads (Intel Xeon E5-2620 or equivalent)	Comply
2.	Cache Memory	A 32-KB instruction and 32-KB data first-level cache (L1) for each core A 256-KB shared instruction/data mid-level (L2) cache for each core Up to 20 MB last level cache (LLC)	Comply
3.	Hard Drive	Xeon 2 CPU 450GB SAS 15K rpm 6Gb/s	Comply
4.	Capacity	450GB	Comply
5.	Interface	SAS	Comply
6.	Synchronous Transfer Rate	(Maximum)6Gb/s	Comply
7.	Buffer	16MB	Comply
8.	Graphics	512MB 2nd GFX (NVIDIA NVS 310 or equivalent)	Comply

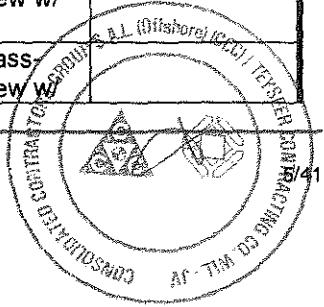




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9.	Rotational Speed	15,000 rpm	Comply
10.	Operating Temperature	50° to 95° F (10° to 35° C)	Comply
11.	SAS	450GB SAS 15K rpm 6Gb/s	Comply
12.	Memory	1TB	Comply
13.	Input Devices	USB Optical Mouse	Comply
14.	Operating System	Latest version of Windows 64bit	Comply
15.	SAS	6Gb/s ROC RAID Card	Comply
16.	IO Bus	Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports Maximum Number of SCSI Devices 32	Comply
17.	RAID Levels	RAID 0, 1, 5, and 6	Comply
18.	RAID spans	10, 50 and 60	Comply
19.	Graphics		
20.	Graphic size	2.7 inches (H) x 5.7 inches (L), Half-Height	Comply
21.	Graphics Controller	(NVIDIA NVS 300 or equivalent)	Comply
22.	Graphics Bus interface	PCI Express x16, Generation 2.0 Bus Type	Comply
23.	Graphics Memory	512 MB GDDR3 SDRAM unified graphics memory	Comply
24.	Graphics Display	DMS-59 to Dual DisplayPort adapter	Comply
		Maximum Resolution DVI: two digital displays up to 1920 x 1200	Comply
		Display Port: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080	Comply
		Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)	Comply

6.0	IP VIDEO WALL CONTROLLER H.264	
1.	Encoder	
2.	Video Input:	HDMI with digital L-PCM audio DVI via DVI-to-HDMI adapter Resolutions up to 1920x1080p60, 1920x1200(60Hz)
3.	Video Output	HDMI with digital L-PCM audio, local pass-through w/o scaling or confidence preview w/ optional scaling DVI via HDMI to DVI-D adapter, local pass-through w/o scaling or confidence preview w/ optional scaling



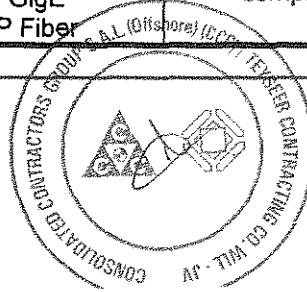


		Standard	
26.	Call Transfer	Call Transfer with/without consultation call	
27.	Call Diversion	Call diversion Unconditional, Busy, No Reply	
28.	Call Hold/Retrieve	Call Hold / Retrieve	
29.	Call Waiting	Call Waiting inclusive Signaling of second Call information	
30.	Message Waiting	Message Waiting Indication	
31.	Calling Name Indication	Name Display	
32.	3 Party Conference	3 Party Conference of internal and /or external Subscriber	
33.	Calling Number Identification	Display of Calling Number	
34.	Multiple Registrations	Up to 6 Registrations	
35.	Telephone Book	Local, Integration of and External Database	
36.	Time/Date	Exact Time and Date Information via Time Server	

TELECOMS

9.0	42U RACK SPECIFICATION		
1.	Static load capacity	Dual rear doors with single latch mechanism, Reversible front door, Removable front and rear doors, Rotating rear casters, Easily accessible levelling feet	
2.	Height:	42u - 78.7" (1998mm), 4220D (Deep)Width: 23.8" (605mm)	
3.	Depth:	47.2" (1200mm)	

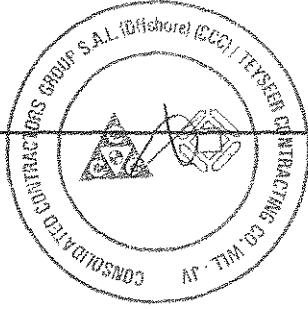
10.0	LAN SWITCHES		
1.	Security	Port security Private VLANs, Community Private Vlans, 802.1x MAC-Auth-Bypass for voice VLAN, NAC-L2 IP, Secure Shell SSH 2 Client, VACLs RACLs	Comply
2.	QoS	Strict Priority Queuing, 802.1p and SRR, Shaping and Sharing,RACL	Comply
3.	Availability	Ring Path Protection Protocol (50ms for 50 Hops),Spanning Tree Protocol enhancements (PVST+), 802.3ad (LACP), OPS Fast Convergence,	Comply without PVST+ CISCO protocol, RSTP and MSTP protocal available.
4.	Routing	Static, Inter-VLAN routing, –Policy Based Routing (PBR), Multicast Routing – PIM (SM, DM, SDM) DVMRP, Tunnelling, Virtualization – VRF Lite, HSRP, IEEE 1588v2 - PTP	Comply without HSRP CISCO protocol.
5.	Software	CIP, Profinet I/O , Port based allocation of configurations,	Comply
6.	Ports	100FX, 1000SX, 100LX, 1000LX, 1000ZX, SFP Fiber Uplinks , 10/100/1000, GigE Copper Uplinks 10/100/1000, SFP Fiber	Comply





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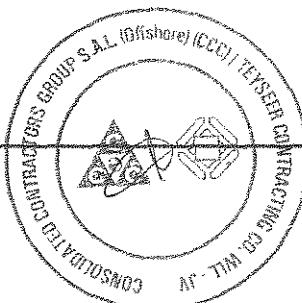
		Transceiver,	
7.	POE support	4 port POE+ 25.5W, POE 15.4W, per module max 8 ports POE+ per 19inch rack connected modules Support surveillance cameras, IP phone, voice, video/ data services etc.	Comply





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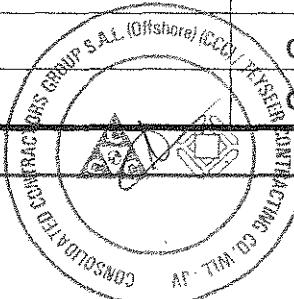
14.0 MULTISERVICES PLATFORM – (DEDICATED I/O & OPC SERVERS)			
16.	General Requirements	2-RU × 19 in., twelve SATA front-loading drive bays	Comply
		Intel E5520 2.26 GHz Xeon quad-core CPU, 4 GB DDR3 RAM	Comply
		Power, hard drive activity, network activity, system overheat/fan fail	Comply
17.	Operating temperature	10° to 35° C	Comply
18.	Non-operating temperature	–40° to 70° C	Comply
19.	Operating relative humidity	8% to 90% (non-condensing)	Comply
20.	Non-operating relative humidity	5% to 95% (non-condensing)	Comply
21.	Connectors	USB2.0—2 ports	Comply
		•10/100/1000M Ethernet—2 ports	Comply
		•Serial (RS-232)—1 port for video surveillance application	Comply
22.	On-board storage options	One or two bundles of six 1 TB or 2 TB hard-disk drives	Comply
23.	On-board storage repositories options	1 in RAID-6 configuration for video surveillance application	Comply
24.	Network Storage Adaptor	10GbE iSCSI Adaptor	Comply
		BE3 Controller	Comply
		2 Ports	Comply
		Cat 6/6a Copper	Comply
		PCI Express 2.0 x 8	Comply





AUTOMATION

18.0	AC UPS SYSTEM (WITHIN EACH RACK)		
1.	Physical Spec	On-line double transformer UPS system	Comply
2.	Invertor Output Power	6000 W	Comply
3.	Input voltage	220– 240 V AC	Comply
1.	Input frequency	50 ±5 % (automatic frequency detection)	Comply
18.1	Battery Invertor		
1.	Type	Closed lead-acid battery leak-proof ,	Comply
2.	Back-up time	2h autonomy	Comply
3.	Battery Volt-Amp-Hour - Capacity-Power	2 x 1900W (3500W)	Comply
4.	Life Expectancy	5 years	Comply
5.	Maintenance Contract	Required	Comply
1 8 .1	Invertor		
1.	Output voltage	single-phase 240 V,	Comply
2.	Input frequency	50	Comply
3.	Voltage setting	set by means of software	Comply
4.	Voltage tolerance	±3 % / ±5 %,	Comply
18.3	Harmonics		
1.	Harmonic distortion	with linear load <4 %	Comply
2.	Overload capacity	130 % for up to 1.5 s, 110% for up to 10 s	Comply
3.	Other	Short-circuit proof, integrated automatic bypass	Comply
4.	MTBF	120,000 hours	Comply
18.4	Environmental		
1.	Ambient temperature	10/50 °C	Comply
2.	Radio interference suppression level	EN 50091-2 Class B	Comply
3.	Degree of protection	IP 20	Comply
4.	Efficiency	>86 %	Comply

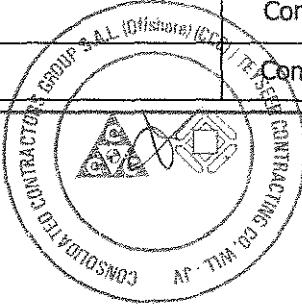




5.	Dimensions	3U	Comply
6.	Operation	Converter can be deactivated during operation, alarm signal in case of supply failure, error, battery nearly empty and overload.	Comply
7.	Connections	Sub-D connections for data and computer interface and USB port type B, 5 status LEDs, with adapter cable with three-way socket (earthing socket), 1.5 m long; mount ready-to-operate and attach electrical connections	Comply

19.0	PLC POWER SUPPLY 24 V DC, 10 A		
1.	Rated input voltage	240 V AC single-phase AC, 50 Hz	Comply
2.	Output voltage	24 V DC ±3 %, idling-proof stabilized direct voltage	Comply
3.	Output current	10 A	Comply
4.	Ambient temperature	0 – 60 °C	Comply
5.	Degree of protection	IP 20, CE, UL, CUL, CSA and C-Tick certification	Comply
6.	Other requirement	Electronic short-circuit protection including suitable back-up fuse	Comply
7.	Standards	Approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 und IEC 61131-2	Comply
8.	Dimension	Rack mount plug in module part of chassis	Comply

20.0	PLC INTERFACE MODULE INDUSTRIAL ETHERNET AND WEB		
1.	Module	Module for connecting the CPU to Industrial Ethernet with extreme pollution, qualified for use in corrosive environments (e.g. H2S, Cl2, NH3), condensation, according to ISA-S71.04 G1, G2, G3, GX and EN 60721-3-3 chemical (-3C4), mechanical (-3S4) and biological (-3B2) active substances.	Comply
2.	Networking	10/100 Mbit/s full/half-duplex connection	Comply
		Gigabit interface with 1x 10/100/1000 Mbit/s	Comply
		Autosensing function	Comply
		RJ 45 connection	Comply
		Multi-protocol operation with TCP and UDP transport protocols	Comply
		Keep-alive function	Comply
		PG/OP communication	Comply

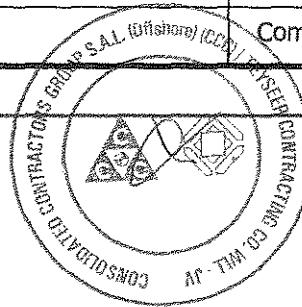




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		Multi-cast with UDP	Comply
3.	Programming	Remote programming and initial start-up over the network, HTTP communication over web browser, FTP communication, e-mail services, IP address specification by means of DHCP, clock synchronization, memory capacity of Flash memory file system 30 MB, SNMP-supported diagnostics, TCP/UDP connections can be operated simultaneously, CE, UL, CUL, CSA and C-Tick certification,	Comply
4.	Standards	EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2, , RJ 45 plug-in connector	Comply

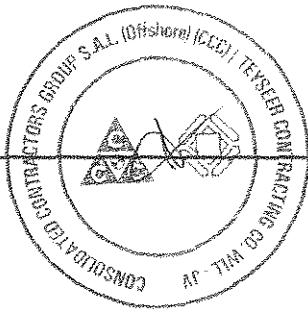
21.0	PLC CPU, PERFORMANCE, PN, DP		
1.	Central Processing	Central processing unit for the medium and upper performance range of the central and decentralized control	Comply
		Integrated Profinet interface	Comply
		Programming by means of FBD, LAD,	Comply
		STL in accordance with IEC 61131-5, SCL, CFC	Comply
		Processing times (bin.) 0.025 µs and (floating point arithmetic) 0.16 µs	Comply
		512 counters	Comply
		1 MB RAM and not less than 128 kB retentive memory	Comply
		Data blocks 2048	Comply
		Address range 8 kB	Comply
		65.536 digital inputs and outputs	Comply
		4096 analog inputs and outputs can be parameterized	Comply
		Can be expanded to up to three module racks	Comply
		Operating hours counter	Comply
		Process diagnostics messages	Comply
2.	Hardware	Start-up function	Comply
		Interfaces MPI, DP master and Profinet	Comply
		Data buffering by means of MMC, PROFINET I DEVICE communication,	Comply
		Hardware clock (real time), CE, UL, CUL, CSA and C-Tick certification,	Comply
		Micro Memory Card 4 MB	Comply





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		Supply and mount ready-to-operate.	Comply
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Qatar General Electricity & Water Corporation

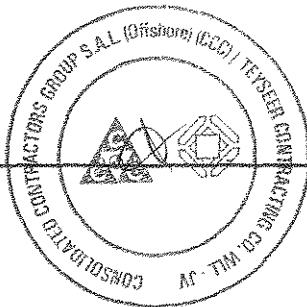
Tender No. GTC 626/2014

Construction of Mega Reservoir PRPSS

(Packages A, B, C, D & E)

22.0	PLC ANALOG INPUT MODULE 8 AI U, I, PT		
1.	Module	Analog input module for connection to CPUs or distributed connection with extreme pollution, qualified for use in corrosive environments (e.g. H2S, Cl2, NH3), condensation, ice formation allowed, aggressive atmosphere according to ISA-S71.04 G1, G2, G3, GX and EN 60721-3-3 chemical (-3C4), mechanical (-3S4) and biological (-3B2) active substances	Comply
2.	Inputs	8 analog inputs, input ranges -0 – +10 V, -1 – +5 V, -1 – +1 V, -10 – +10 V, -5 – +5 V, -50 – +50 mV, -500 – +500 mV, 0 – 20 mA, -20 – +20 mA, 4 – 20 mA Pt 100 standard Minimum resolution 14 bit Operational limit ±0.5 % with current and 0.6 % with voltage	Comply Comply Comply
3.	Standards	CE, UL, CUL, CSA and C-Tick certification Approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2	Comply

23.0	PLC ANALOG OUTPUT MODULE 8 AO, U, I		
1.	Module	Analog Output module for connection to CPUs or distributed connection, 8 analog outputs, load voltage 24 V DC,	Comply
2.	Outputs	output current 25 mA, output voltage 18 V, output ranges 0 – 10 V, 1 – 5 V, -10 – +10 V, 0 – 20 mA, -20 – +20 mA, 4 – 20 mA, voltage load 1 kohm, load current output 500 ohm,	Comply
3.		Resolution 14 bit,	Comply
4.		operational limit ±0.6 % with current and ±0.5 % with voltage, diagnostics alarm, CE, UL, CUL, CSA and C-Tick certification,	Comply
5.	Standards	approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2,	Comply

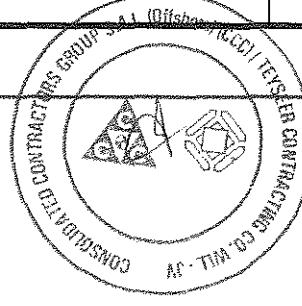




24.0	DIGITAL INPUT MODULE 32 DI, 24 V DC		
1.	Module	Digital input module for connection to large CPU by means of module rack	Comply
		Input voltage 24 V DC	Comply
		32 digital inputs	Comply
		Input current 7 mA per channel (6W)	Comply
		Galvanic isolation from backplane bus and between the channels	Comply
		CE, UL, CUL, CSA and C-Tick certification	Comply
2.	Standards	Approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2	Comply

25.0	DIGITAL INPUT MODULE 32 DO, 24 V DC		
1.	Module	Digital output module for connection to CPUs or distributed connection,	Comply
		load voltage 24 V DC, lamp load 6.6 W,	Comply
		operating frequency with ohmic load 100 Hz,	Comply
		32 digital outputs, output voltage 24 V DC,	Comply
		output current 0.5 A,	Comply
		electrical isolation from backplane bus, CE, UL, CUL, CSA and C-Tick certification,	Comply
2.	Standards	IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 und IEC 61131-2,	Comply

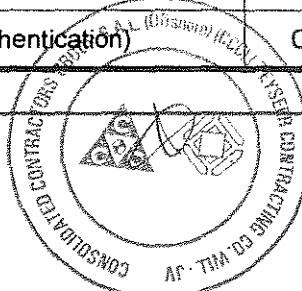
26.0	DIGITAL INPUT/OUTPUT 16 DI, 24 V DC, 16 DO, RELAY		
1.	Module	Digital input module for connection to large CPU by means of module rack	Comply
		input voltage 24 V DC	Comply
		16 DI, 24 V DC, 16 DO, RELAY	Comply
		input current 7 mA	Comply
		galvanic isolation from backplane bus and between the channels	Comply
		CE, UL, CUL, CSA and C-Tick certification	Comply
2.	Standards	Approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2,	Comply





27.0	PROFIBUS DP-PA COUPLER		
Module		PROFIBUS DP-PA coupler for the gateway between PROFIBUS DP and PROFIBUS PA for connecting process devices in Ex zones	Comply
		Output current is limited to 1000 mA	Comply
		Output voltage 31 V DC	Comply
		LED displays for PA and DP bus activity	Comply
		Supply voltage at least in the area of 20,4 – 28,8 V DC	Comply
		Degree of protection IP 20	Comply

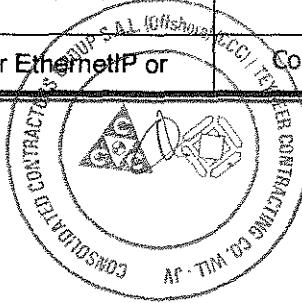
28.0	PIPEWORK & MEP SCADA PLCS		
1.	Modules	Central processing unit for the low and medium performance range of the central and decentralized control, programming by means of FBD, LAD	Comply
		STL in accordance with IEC 61131-5, SCL, CFC	Comply
		Processing times (bin.) 0.1 µs and (floating point arithmetic) 3 µs	Comply
		256 kB RAM	Comply
		16384 digital inputs and outputs as well as 1024 analog inputs and outputs can be parameterized	Comply
		Controller rack can be expanded with up to three expansion racks per station	Comply
		Operating hours counter	Comply
		Process diagnostics messages	Comply
		Start-up function forcing of variables	Comply
		Diagnostics buffer with up to 200 entries	Comply
		Interface RS 485, MPI 187.5 kbit/s	Comply
		Interface RS 485 PROFIBUS DP master and slave, 12 Mbit/s, buffering by MMC, hardware clock (real time), Profinet DP/PN Master Slave 100 Base TX RJ45	Comply
		CE, UL, CUL, CSA and C-Tick certification,	Comply
2.	Standards	Approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-27/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6, IEC 61131-2	Comply
3.	Firewall	Stateful Inspection Firewall	Comply
4.	Encryption	VPN (data encryption and authentication)	Comply





5.	Address Translation	NAT/NAPT	Comply
6.	Web Services	HTTPs(access to Websites with encrypted transfer via SSL)	Comply
7.	File Transfer	FTPs(Secure file transfers)	Comply
8.	Timing	NTP secure (Secure transfer with time synchronisation and authentication)	Comply
9.	Network Management	SNMP V3 (Tap-proof transfer of network analysis information)	Comply

29.0	MASTER PLC CONTROLLER (LOCATED IN COMPUTER ROOMS)	
1.	Modules	Central processing unit for the low and medium performance range of the central and decentralized control, programming by means of FBD, LAD
		STL in accordance with IEC 61131-5, SCL, CFC
		Processing times (bin.) 0.1 µs and (floating point arithmetic) 3 µs
		256 kB RAM
		1 multi-protocol mode for at least 128 connections simultaneously, access protection via configurable IP access list
		RJ 45 connection technology, multi-protocol mode for ISO, TCP/IP, UDP, and RT and IRT real-time properties, two separate interfaces each as Profinet interface with 10/100 Mbit/s full/half duplex connection with autosensing and autocrossover function via integrated switch with at least 4 ports, as well as gigabit interface with 1x 10/100/1000 Mbit/s full/half duplex with autosensing function,
		FTP communication, access to data blocks via FTP server,
		IP address assignment via DHCP, diagnostics function for the communications processor,
		Controller rack can be expanded with up to three expansion racks per station
		Operating hours counter
		Process diagnostics messages
		Start-up function forcing of variables
		Diagnostics buffer with up to 200 entries
		Interface RS 485, MPI 187.5 kbit/s
		Interface RS 485 PROFIBUS DP master and slave, 12 Mbit/s, buffering by MMC, hardware clock (real time), Profinet DP/PN Master Slave 100 Base TX RJ45
		Support for upto 64 PLCs over EthernetIP or

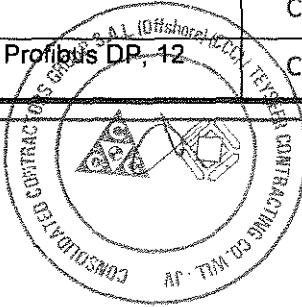




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PROFINET			
1.	Firewall	Stateful Inspection Firewall	Comply
2.	Encryption	VPN (data encryption and authentication)	Comply
3.	Address Translation	NAT/NAPT	Comply
4.	Web Services	HTTPs(access to Websites with encrypted transfer via SSL)	Comply
5.	File Transfer	FTPs(Secure file transfers)	Comply
6.	Timing	NTP secure (Secure transfer with time synchronisation and authentication)	Comply
7.	Network Management	SNMP V3 (Tap-proof transfer of network analysis information)	Comply

30.0 SCADA HMI TOUCH PANEL			
1.	Screen size	15.4 inch (minimum), Touch panel	Comply
2.	Resolution	1280 * 800 pixels, 16 million colors	Comply
3.	Other requirements	Possibility to dim brightness of backlight	Comply
		Data input of numerical and alphanumerical values	Comply
		configurable keys on the touch screen, that are directly connected to the PLC as input	Comply
		At least 4096 variables and 750 pictures configurable	Comply
		At least 400 variables in one picture	Comply
		24 MB memory for user programs	Comply
		Alarm logging system with message display	Comply
		Buffer and acknowledgement function	Comply
		At least 6000 bit and 200 analog messages with message text	Comply
		Retaining message buffer for at least 1024 entries	Comply
		Display of Word-, Excel- and pdf-files, web browser, audio and video playback	Comply
		Archiving system for at least 1 million entries	Comply
		50 different users configurable, speakers, synchronizable hardware clock with buffer battery	Comply
		Connection of external memory media via 2 * slots for MMC- or SD memory card, 3 * USB-port USB 2.0, printer connection possible	Comply
		Printer connection possible	Comply
		Interface RS485/RS422 for Profibus DP, 12 MBit/s	Comply



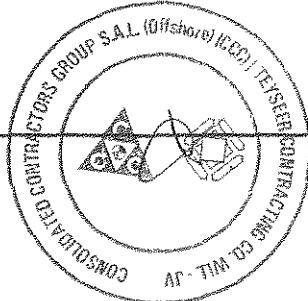


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		Interface RJ45 with two status LEDs each, connected via integrated switch, 10/100 Mbit/s, support of protocols TCP/IP, PROFINET, PROFINET IO, DHCP, SNMP, DCP, LLDP, HTTP	Comply
4.	Supply voltage	24 V DC	Comply
5.	Degree of protection	IP 65 (front)	Comply
6.	Ambient temperature	0 °C - 50 °C, up to 90% rel. humidity	Comply
7.	Approvals	Approval according to CE, cULus, C-Tick, FM Class I Div. 2, EMC according to EN55011 Class A.	Comply

31.0	OPERATOR PANEL FOR MOTOR CONTROL MODULE		NA
1.	General Requirements	Operator panel for controlling the motor feeder by means of a motor control block, for installation in control cabinet door, 5 parameterizable keys for motor control, 10 LEDs for status display, 2 system interfaces, connection to basic device by means of cable, degree of protection IP 54 at front; CE, UL, CSA, CCC, C-Tick,	
2.	Approvals	approvals according to EN 50018, EN 60079-1/-7, EN 50019, EN 61558-2-6, EN 55011, EN 55022, IEC 60947-1/-4-1 and IEC 61000-4-2/-3/-5/-6,	
3.	Connections	connecting cable 10 cm; supply, mount ready-to-operate and attach electrical connections.	

32.0	MODULE RACKS 9 SLOTS – PLC CHASSIS SIZES		
1.	General Requirements	Module rack for large CPU, for setting up central and expansion units, 9 slots, also suitable for setting up fault-tolerant systems, CE, UL, CUL, CSA and C-Tick certification,	Comply
2.	Standards	approvals according to EN 55011, EN 60079-15, EN 61000-6-2/-4, IEC 60068-2-6/-29, IEC 60721-3-2/-3, IEC 61000-4-2/-3/-4/-5/-6 and IEC 61131-2,	Comply





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33.0 ISOLATION AMPLIFIER FOR 2-WIRE TRANSDUCER HART			
34.1	General Requirement	Isolation amplifier for supply of 2-wire transducers, input/output 4 – 20 mA, HART communication bidirectional, galvanic isolation of input and output, auxiliary power display, plastic housing IP 20, mounting rail installation, output load resistance 600 ohm, ambient temperature -20 – +70 °C, noise immunity according to NAMUR NE 21, auxiliary voltage DC 24 V, supply and mount ready-to-operate.	Comply

