



| | | | |
|---------------------|----------------------------------|-----------------------------|---|
| Project No.: 157001 | | MATERIAL REQUISITION |  |
| Req. No.: 1000/1 | | | |
| Rev. No.: 00 | | | |
| Preliminary | <input type="radio"/> | Code No.: QF-TE-02 | ENGINEERING DEPARTMENT |
| Final | <input checked="" type="radio"/> | Date & Rev.: 1393/09/10 - 4 | ERP : 151877 |
| | | | SRD : 2023.04.04 |
| | | | PAGE 1 OF 6 |

MATERIAL REQUISITION FOR SILENCER

| | | | | | |
|------|-------------|-----------------------|----------------|-------------|--------------|
| | | | | | |
| 00 | 05.Mar.2023 | ISSUE FOR PROCUREMENT | M.Mobinimanesh | V.Ranjbaran | P.Karimzadeh |
| Rev. | Date | Description | Prepared | Checked | Approved |

| | | | |
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| | | | SRD : 2023.04.04 |
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| Page | Revisions | | | | | | | Remarks | Page | Revisions | | | | | | | Remarks |
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| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | |
| 1 | X | | | | | | | | 35 | | | | | | | | |
| 2 | X | | | | | | | | 36 | | | | | | | | |
| 3 | X | | | | | | | | 37 | | | | | | | | |
| 4 | X | | | | | | | | 38 | | | | | | | | |
| 5 | X | | | | | | | | 39 | | | | | | | | |
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1- PURPOSE

The purpose of this document is to define vendor's scope of supply of **Silencer** for "Esfahan Oil Refinery PSA Package (EPC)".

2- DEFINITION

For the purpose of this material requisition, the following definitions shall apply:

Contractor: ABAN AIR COOLER (AAC)

Vendor: (to be defined)

3- LIST OF EQUIPMENT INQUIRED


| ITEM NO. | TAG NUMBER | QTY. | DESCRIPTION | LOCATION |
|----------|------------|------|-------------|----------|
| 1 | E-8761 | 1 | Silencer | Esfahan |

4- APPLICABLE CODES & STANDARD

ASME sec. II part A & B , TEMA

5- REQUIRED DOCUMENTAION

- Mechanical design and guarantee
- Manufacturing guarantee
- Hydrotest & all NDT teste required
- Packing procedure
- Fabrication procedure
- Technical drawings (assembly, exploding, cross section, specification etc.)
- Reference list
- MTC certification
- Quality documentation

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6- SCOPE OF WORK , SUPPLY & SERVICES

| Item | Description | Qty | Material of Construction | | Remark |
|--------|-------------|-----|--------------------------|-------------|------------|
| | | | Flange | Plate | |
| V-8761 | Silencer | 1 | SA-105 N | SA-516 70 N | Acc to DWG |

7- 2 YEARS SPARE PARTS

Not Applicable


8- DEVIATIONS/EXCEPTION/ALTERNATION FROM MATRIAL REQUISITION'S REQUIREMENTS

If any, shall be mentioned by vendor

9- TECHNICAL NOTES

SA-516 Gr. 70N

- Plates shall be produced in accordance to ASME Sec. II, latest edition. The material specification shall conform to specification **A20/A20 M**.
- The steel shall be **killed** and shall conform to the **fine austenitic grain size** requirement of Specification A 20/A 20M.
- The plates shall be supplied in **normalized** condition.
- Plates shall have a maximum carbon content of 0.23%.
- The required test reports shall be submitted in accordance to the code.
- Relevant marking position shall be done on plates.
- Negative cutting tolerances will not be accepted.
- The surface of the plate shall be free from oxide inclusion or corrosion damage & defects such as pitting.
- Required material test certification: **DIN 50049-3.1** or **EN 10204-3.1**.
- Language for material test report: **ENGLISH**.

| | | | |
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SA105N

1. The Material Certificate including chemical analysis and mechanical properties shall be submitted.
2. Material shall be produced in accordance to ASME Sec II, latest edition.
3. The steel shall be **fully killed** & the material shall be forged as close as practicable to specified shape & size. Cold work or machining from bars is not permitted.
5. Heat treatment shall be **normalizing** according to SA105.
6. Forgings shall have a maximum carbon content of 0.23%.
7. Hardness test is required & shall be 137 to 187 HB.
8. Required material test certification: DIN 50049-3.1. or/EN 10204-3.1.
9. Language for material test report: ENGLISH.




10-ATTACHMENTS




Attached For information ☐

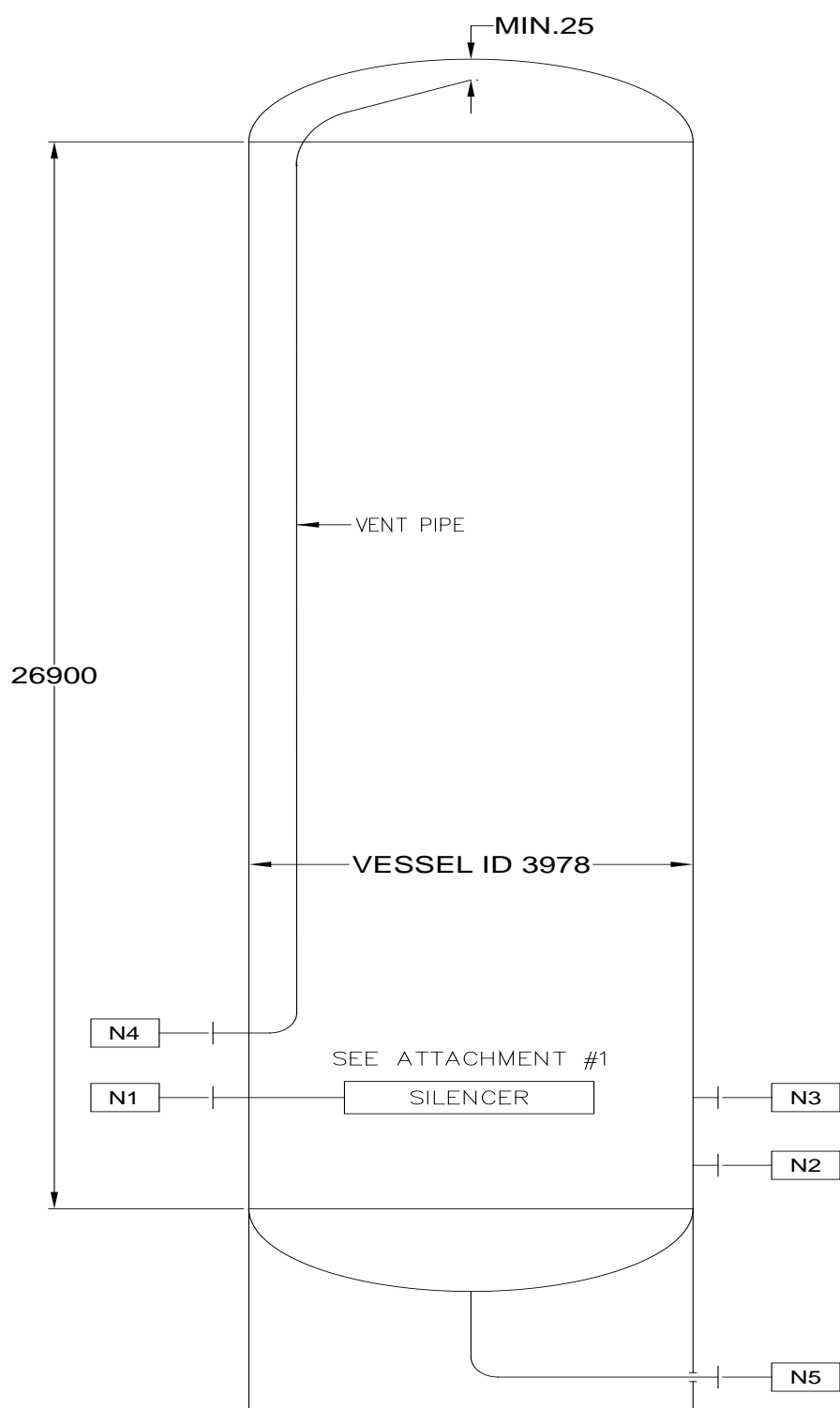
Attached is necessary ☒




11-ITP

Attached.

| | | | | | |
|---|--------------------------|---|-------------|------------|------------|
|    | Contract No.: 73-00-1773 | | CLASS | 2 | |
| | SUBJECT | DATA SHEET FOR PURGE GAS DRUM OF PSA PACKAGE, V-8761 | REV NO. | A2 | |
| | | | POI | IFF | |
| ESFAHAN Oil Refinery PSA Package (EPC) | DOC. NO. | 1773-87-ED-PR-DS-V8761 | PAGE | 1 OF 11 | |
| <div>DATA SHEET FOR PURGE GAS DRUM OF PSA PACKAGE, V-8761</div> | | | | | |
| | | | | | |
| | | | | | |
| A2 | 6-DEC-2022 | ISSUE FOR FINAL | M.S. | B.K. | A.A. |
| A1 | 23-SEP-2022 | ISSUE FOR FINAL | M.S. | B.K. | A.A. |
| A0 | 30-JUN-2022 | ISSUE FOR REVIEW | M.S. | B.K. | A.A. |
| REV. | DATE | DESCRIPTION | PREPARED BY | CHECKED BY | CONTRACTOR |

| | | | | |
|--|--------------------------|--|---------|---------|
| <div></div> <div>ESFAHAN Oil Refinery PSA Package (EPC)</div> | Contract No.: 73-00-1773 | | CLASS | 2 |
| | SUBJECT | DATA SHEET FOR PURGE GAS DRUM OF PSA PACKAGE, V-8761 | REV NO. | A2 |
| | | | POI | IFF |
| | DOC. NO. | 1773-87-ED-PR-DS-V8761 | PAGE | 3 OF 11 |

| | | | | | | | |
|--|-----|------------------|-----------------------|--|--|--|--|
| SERVICE: PURGE GAS DRUM | | ITEM NO.: V-8761 | | QUANTITY: 1 | | | |
| PROCESS CONDITIONS | | | | PROCESS PARAMETERS | | | |
| Fluid Hydrogen Rich Gas | | | | Normal Liquid Level NA | | | |
| Operating pressure Max. 6.45 / Min. 0.3 barg | | | | Cyclic operation No | | | |
| Operating temperature Max. 35 / Min. 31 °C | | | | Max. all. Pressure drop 0.02 bar | | | |
| Mass flowrate (Max/Nor/Min) 15,920 / 14,473 / 2,034 kg/hr | | | | NOTES | | | |
| Volume flowrate (Max/Nor/Min) 35,226 / 32,024 / 3,270 Nm3/hr | | | | | | | |
| Mass density 2.89 @34 °C / 0.62 @31 °C kg/m3 | | | | 1) All dimensions are in mm. | | | |
| Specific Gravity 0.35 | | | | 2) Min. distance between vent pipe and top head is 25 mm. | | | |
| This Vessel is in the Following Service(s): | | | | 3) Max. flowrate is based on the high pressure tail gas case 2. | | | |
| Hydrogen NO | | | | 4) Steam heat tracing shall be considered for the bottom of the vessel up to 1 meter above TL. | | | |
| Hydrofluoric (HF) Acid NO | | | | 5) Max. flowrate is normal flowrate plus 10% oversdesign. | | | |
| Hydrofluoric (HF) Acid (with Resid. Elem. Control) NO | | | | DIMENSIONS | | | |
| Wet Hydrogen Sulfide (H2S) NO | | | | | | | |
| Caustic NO | | | | ID 3,978 MM X TL-TL 26,900 MM | | | |
| Carbonate NO | | | | | | | |
| Amine NO | | | | | | | |
| CONSTRUCTION A2 | | | | DRAWING A2 | | | |
| Design pressure 9 barg | | | |  | | | |
| Vacuum pressure @ Ref. Temp FV @ 35 °C barg | | | | | | | |
| Design temperature 85 °C | | | | | | | |
| Corrosion Allowance 3 mm | | | | | | | |
| Shell/Head material K.C.S. | | | | | | | |
| Internal materials | | | | | | | |
| Silencer body K.C.S. | | | | | | | |
| Pipe K.C.S. | | | | | | | |
| Fittings K.C.S. | | | | | | | |
| Flanges K.C.S. | | | | | | | |
| Internal of the silencer S.S. 304L | | | | | | | |
| Type of head Elliptical | | | | | | | |
| Design Code ASME Sec.VIII, Div.1 | | | | | | | |
| PWHT As per code | | | | | | | |
| Radiography As per code | | | | | | | |
| Internal Silencer | | | | | | | |
| Inlet distributor - | | | | | | | |
| Ladders & platform clips NA | | | | | | | |
| Insulation clips and rings NA | | | | | | | |
| NOZZLE DATA A2 | | | | | | | |
| Item | No. | Size (inch) | Flanges Rating/Facing | Service | | | |
| N1 | 1 | 20 | 150# RF | INLET | | | |
| N2 | 1 | 30 | 150# RF | MANWAY | | | |
| N3 | 1 | 24 | 150# RF | OUTLET | | | |
| N4 | 1 | 4 | 150# RF | VENT | | | |
| N5 | 1 | 4 | 150# RF | DRAIN | | | |
| Deleted | | | | | | | |
| Deleted | | | | | | | |

| | | | | |
|--|--------------------------|---|---------|---------|
|    ESFAHAN Oil Refinery PSA Package (EPC) | Contract No.: 73-00-1773 | | CLASS | 2 |
| | SUBJECT | DATA SHEET FOR PURGE GAS DRUM OF PSA PACKAGE, V-8761 | REV NO. | A2 |
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ATTACHMENT #1: OFF-GAS SILENCER SPECIFICATION AND DATA SHEET



OFF-GAS SILENCER SPECIFICATION AND DATA SHEET

Rev.

1

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OFF-GAS SILENCER SPECIFICATION AND DATA SHEET



OFF-GAS SILENCER SPECIFICATION AND DATA SHEET

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LIST OF REVISED PAGES

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|--------------|---|---|--|--|--|--------------|--|--|--|--|--|--------------|--|--|--|--|--|--------------|--|--|--|--|--|
| 1 | x | x | | | | 26 | | | | | | 51 | | | | | | 76 | | | | | |
| 2 | x | x | | | | 27 | | | | | | 52 | | | | | | 77 | | | | | |
| 3 | x | | | | | 28 | | | | | | 53 | | | | | | 78 | | | | | |
| 4 | x | | | | | 29 | | | | | | 54 | | | | | | 79 | | | | | |
| 5 | x | | | | | 30 | | | | | | 55 | | | | | | 80 | | | | | |
| 6 | x | x | | | | 31 | | | | | | 56 | | | | | | 81 | | | | | |
| 7 | x | | | | | 32 | | | | | | 57 | | | | | | 82 | | | | | |
| 8 | | | | | | 33 | | | | | | 58 | | | | | | 83 | | | | | |
| 9 | | | | | | 34 | | | | | | 59 | | | | | | 84 | | | | | |
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| 11 | | | | | | 36 | | | | | | 61 | | | | | | 86 | | | | | |
| 12 | | | | | | 37 | | | | | | 62 | | | | | | 87 | | | | | |
| 13 | | | | | | 38 | | | | | | 63 | | | | | | 88 | | | | | |
| 14 | | | | | | 39 | | | | | | 64 | | | | | | 89 | | | | | |
| 15 | | | | | | 40 | | | | | | 65 | | | | | | 90 | | | | | |
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| 21 | | | | | | 46 | | | | | | 71 | | | | | | 96 | | | | | |
| 22 | | | | | | 47 | | | | | | 72 | | | | | | 97 | | | | | |
| 23 | | | | | | 48 | | | | | | 73 | | | | | | 98 | | | | | |
| 24 | | | | | | 49 | | | | | | 74 | | | | | | 99 | | | | | |
| 25 | | | | | | 50 | | | | | | 75 | | | | | | 100 | | | | | |

| | | | | |
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|  | OFF-GAS SILENCER SPECIFICATION AND DATA SHEET | | Rev. | 1 |
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1. SUBJECT

This specification and its associated data sheets cover the minimum requirements for the supply of blowdown silencers.

2. CONSTRUCTION

Construction will not commence until one set of detailed drawings with the buyer's approval, has been returned to the supplier.

3. DATA SHEETS


Any exception to this specification and its data sheets must be approved in writing by the buyer.

4. SCOPE OF SUPPLY

- a. Blowdown silencer complete
- b. Painting (see next section)

5. PAINTING

- Sandblasting in accordance with Swedish standard SA 2.5
- One primer coat of ethyl silicate, Zinc rich primer with solvent D.F.T. 75 µm

| | | | | |
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6. GUARANTEE

The silencer is guaranteed:

- Free from all defects in material, workmanship, and assembly
- To meet the performance standards referred to in this specification

Note on acoustic guarantee:

25 DB insertion loss in 1000 and 2000 Hz bands.

7. SPECIFICATIONS

The design must take into account the following conditions in addition to those given on the data sheets:

- All noise pressure levels are relative to $2 \times 10^{-5} \text{ N/m}^2$
- Adsorption material must be compatible with the following medium and be adequately supported to prevent settling by gravity. It should not be deteriorated by normal operating conditions, both in terms of acoustic performance and structural properties.

8. INSPECTION

The material is subject in whole or in part to inspection by the buyer or his agent at any time during manufacturing or before shipment.

9. FINAL DOCUMENTATION

- General outline drawing with bill of material
- Material certificates of main materials (plates, flanges): min. Type 2.2
- WPS/PQR used



OFF-GAS SILENCER SPECIFICATION AND DATA SHEET

Rev.

1

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BLOWDOWN SILENCER INSIDE A PRESSURE VESSEL

DATA SHEET

| 1. PROCESS CONDITIONS | | | | |
|------------------------------|--------|-----------|-------------------|---------------------|
| Item | Purge | For noise | For pressure drop | Unit |
| Max. flowrate | 16,012 | 10,932 | 16,335 | Nm ³ /hr |
| Pressure | 6.45 | 0.3 | 0.3 | barg |
| Temperature | 34.2 | 31.2 | 31.2 | °C |
| Molecular weight | 10.13 | 17.91 | 17.91 | kg/kmol |
| Cp/Cv | 1.3 | 1.23 | 1.23 | - |

| 2. VALVE | | | | |
|--------------------------|-----------|-----------|-----------|-------|
| Type | Butterfly | Butterfly | Butterfly | Unit |
| Size | 10 | 10 | 10 | inch |
| Valve % opening | 100 | 20 | 20 ~ 100 | % |
| Cv (open) | 3,720 | 3,720 | 3,720 | - |
| Pressure upstream | 6.45 | 2.9 | VARIABLE | barg |
| Δp over valve | 0.005 | 2.6 | VARIABLE | bar |
| Unattenuated noise level | VTA | VTA | VTA | dB(A) |

| Octave bands (Hz) | 500 | 1000 | 2000 | 4000 | 8000 | Total |
|-------------------|-----|------|------|------|------|-------|
| Lwi [dB] | VTA | VTA | VTA | VTA | VTA | VTA |
| LnAe [dB(A)] | VTA | VTA | VTA | VTA | VTA | VTA |
| LpAe [dB(A)] | VTA | VTA | VTA | VTA | VTA | VTA |

| 3. SILENCER | | |
|--------------------------|---|-------|
| Item | Value | Unit |
| Max. allowed Δp | 0.02 | bar |
| Inlet flange | 20 | inch |
| Flange rating | 150 | lbs |
| Required noise level | 80 | dBa |
| Noise reduction | VTA | dB(A) |
| Material of construction |  <u>Killed Carbon Steel</u> | - |

Note: Silencer has to enter the off-gas through 30 inch - 150 lbs/WN manway.



OFF-GAS SILENCER SPECIFICATION AND DATA SHEET

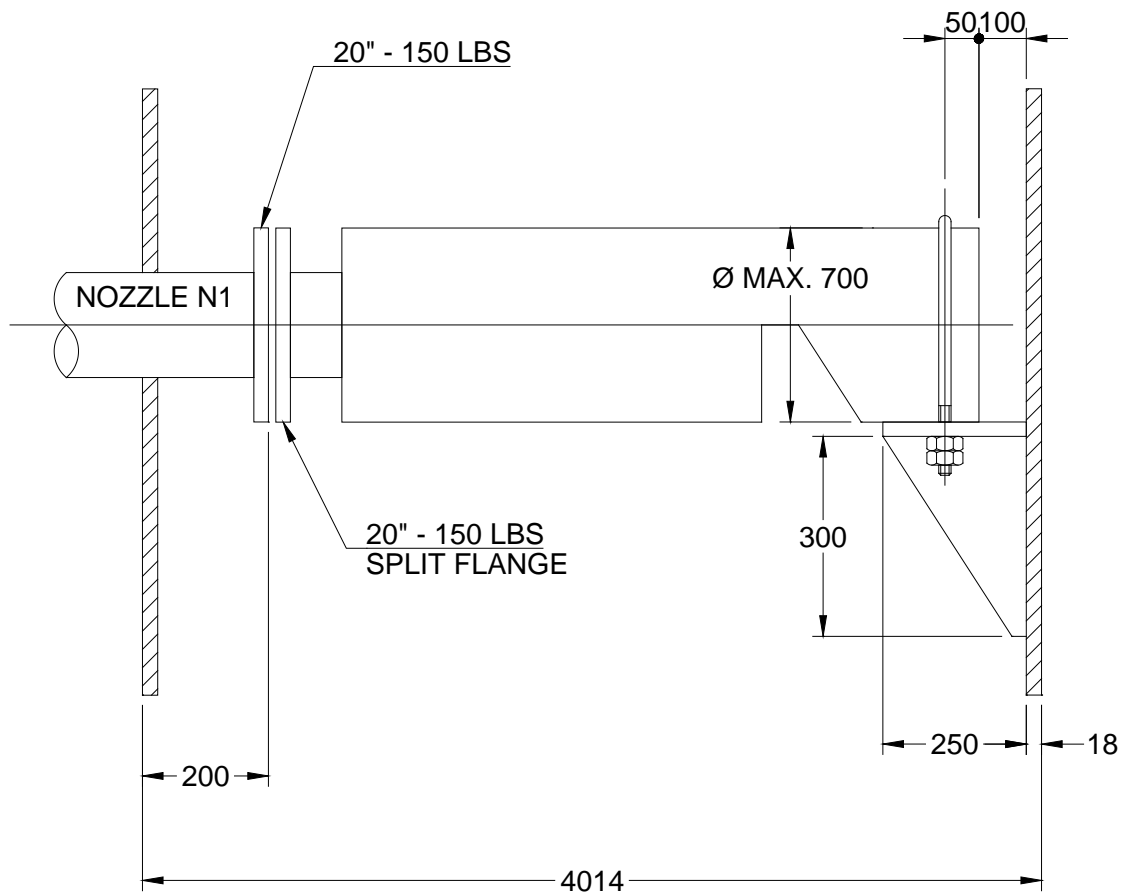
Rev.

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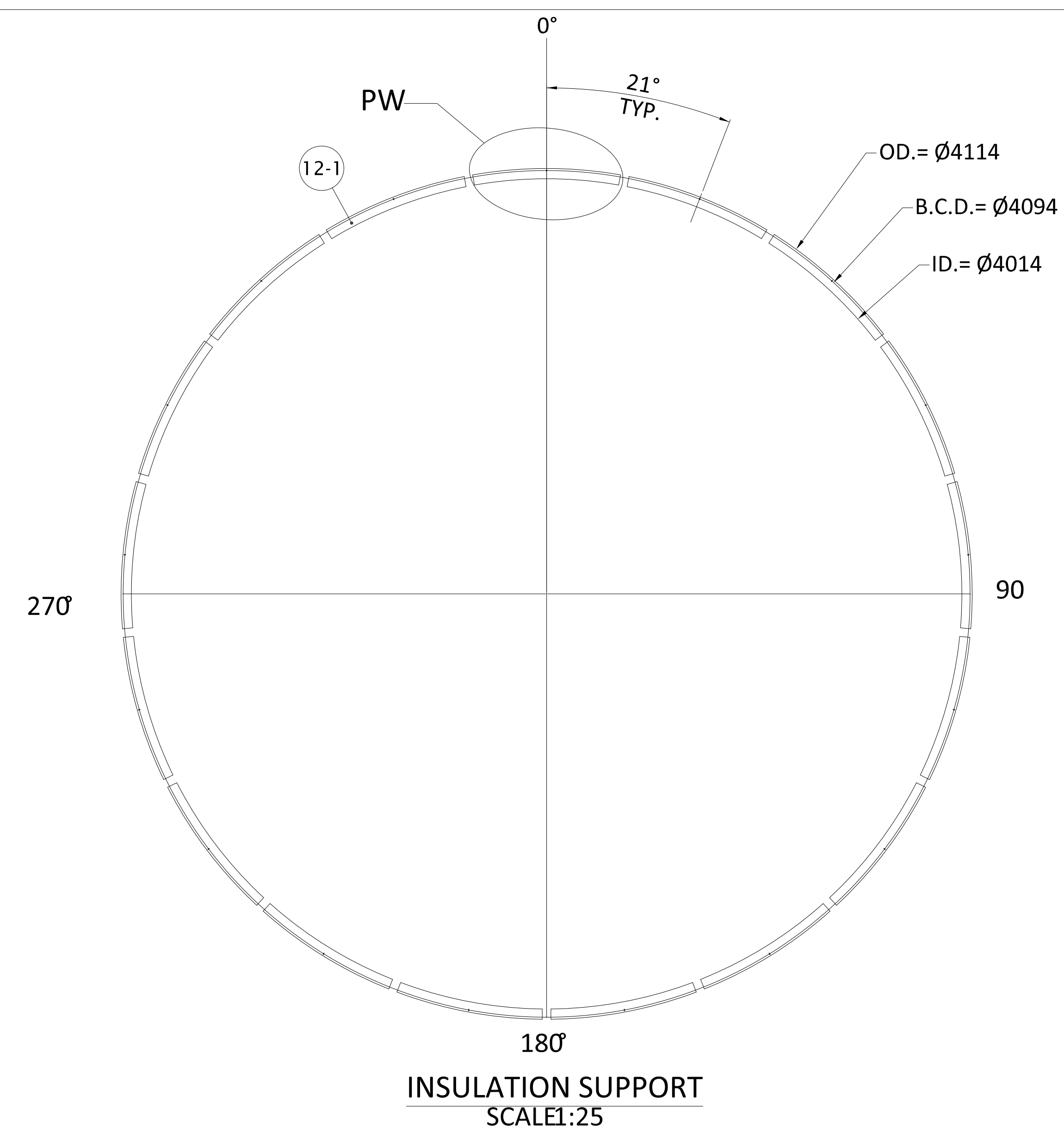
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SILENCER INSTALLATION DETAIL



NOTES:

1. INTERNAL FLANGE: 20 INCH, 150 LBS, AS PER ASME B16.5
2. GASKET: REINFORCED GRAPHITE, 3 MM
3. REFERENCE DOCUMENT: 1773-87-ED-ME-DS-V8761




| 12-1 | INSULATION SUPP. | 85 | I.D.=Ø4014, W=50 | T=6 | SA-516 Gr.70 | 144.5 | |
|--------------------------------|-------------------|---------------------------------|------------------|---------|--------------|--------------|-------------|
| 11-4 | NUT | 6 | M12 | | SA-194 2 | 0 | |
| 11-3 | UBOLT | 1 | M12 | L=1923 | SA-193 B7 | 1.7 | |
| 11-2 | RIB PLATE | 2 | SEE DWG | T=10 | SA-283 Gr.C | 0 | |
| 11-1 | SUPPORT PLATE | 1 | PL=850x250 | T=10 | SA-283 Gr.C | 17.4 | |
| PART No. | Description | QTY. | SPEC. | LENTHK. | Material | Total weight | REM. |
| BOM Table(Restructured) | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| BO | 23.12.2022 | APPROVE FOR CONSTRUCTION | | | S.S. | D.D. | A.A. |
| AO | 30.11.2022 | ISSUED FOR APPROVAL | | | P.P. | D.D. | A.A. |
| REV. | DATE | DESCRIPTION | | | PRES. | CHK. | CONTRACTOR |

EPC CONTRACTOR:



CHAGALES
H CONSULTING
ENGINEERS



IPS Process
Technologies




AAC
ABAN AIR COOLER

INTERNAL ATTACHMENT DRAWING FOR PURGE GAS
DRUM OF PSA PACKAGE V-8761

| | |
|--------------|---------|
| DOCUMENT NO. | SIZE:A1 |
|--------------|---------|


| | | |
|-----------------------------------|-------------|--------------------|
| VD-1773-87-PL-PO1131A-ME-DWG-0011 | class 1B | SHEET NO 1 OF 1 |
|-----------------------------------|-------------|--------------------|

| | | | | | |
|-------------|---|------------------------|----------|----------------|---------|
| Sub-Vendor: | Vendor: | | | EP Contractor: | Client: |
| |  <u>Aban Air Cooler Co.</u> | Inspection & Test Plan | | | |
| | | | Rev.: 00 | | |
| | | | | | |

Inspection & test Plan

Project No. : 157001
Description : Carbon steel forging
Material : SA105N
MR No.: 157001-1000-01

| | | | | | | |
|------|-------------|-------------|---------------|---------------|----------------|---------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 00 | 28/Feb/2023 | IFA | M. Abbaszadeh | M. Abbaszadeh | P. Karimizadeh | |
| Rev. | Date | Description | Prepared by | Checked by | Approved by | Authorized by |

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|---|---------|------------------------|----------|-------------|---------|
| Sub-Vendor: | Vendor: | | | Contractor: | Client: |
|  | | Inspection & Test Plan | | | |
| | | | Rev.: 00 | | |

| No. | Process | Description | Reference Procedure/ Code | Report/Record | Involved Parties | | | Remarks |
|-----|----------------------------|---|----------------------------------|------------------------------|------------------|-----|-----|--------------------|
| | | | | | Vendor | TPI | AAC | |
| 1 | Raw material | Check of raw material | ASME Sec. II Part A, SA105N | Report, Material Certificate | H | R | RA | |
| | | Heat No. & chemical composition | Material certificate EN10204 3.1 | Report, Material Certificate | H | R | R | Fully killed steel |
| | | Tensile test | Material Certificate EN10204 3.1 | Material Certificates | H | R | R | |
| 2 | Heat Treatment | Normalizing | ASME Sec. II ,PO Req. | Report/ Material Certificate | H | R | R | |
| 3 | Hardness test | SA370, 137 to 187 HB after heat treatment | ASME Sec. II ,PO Req. | Report | H | R | R | |
| 4 | Impact test | NA | ASME Sec. II ,PO Req. | Report | H | R | R | |
| 5 | NDT | UT & PT as per code | ASME Sec. II, ASME B16.34 | Report | H | W | RA | |
| 6 | Marking | Size+ Material grade + Heat No. | Approved drawing | Report | H | H | RA | |
| 7 | Visual & Dimensional check | DWG | Approved drawing, MSS-SP-55 | Report/Record | H | H | RA | |
| 8 | Material certificate | EN 10204-3.1 | PO Req. | Certificate | H | R | RA | |
| 9 | Sampling | Chemical & mechanical tests abovementioned as per SA105 & SA961 | ASME Sec. II ,PO Req. | Report | H | H | RA | As per TPA request |
| 10 | Packing | | PO Req. | Packing list | H | H | RA | |

H: Hold point.
W: Witness.
SW: Spot
witness. **R:**
Review. **A: Approval**

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|-------------|---------|------------------------|----------|----------------|---|
| Sub-Vendor: | Vendor: | | | EP Contractor: | Client: AAC <u>Ahan Air Cooler Co.</u> |
| | | Inspection & Test Plan | | | |
| | | | Rev.: 00 | | |
| | | | | | |

Inspection & test Plan

Project No. : 157001
Description : Carbon steel plate
Material : SA516 Gr. 70N
MR No. : 157001-1000-01

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| 00 | 28/Feb/2023 | IFA | M. Abbaszadeh | M. Abbaszadeh | P. Karimizadeh | |
| Rev. | Date | Description | Prepared by | Checked by | Approved by | Authorized by |

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|---------------------|------------------------|----------|-------------|---|
| Sub-Vendor: Vendor: | | | Contractor: | Client: <u>Aban Air</u> <u>Cooler Co.</u> AAC |
| | | | | |
| | Inspection & Test Plan | | | |
| | | Rev.: 00 | | |

| No. | Process | Description | Reference Procedure/ Code | Report/Record | Involved Parties | | | Remarks |
|-----|----------------------------|--|----------------------------------|------------------------------|------------------|-----|-----|--|
| | | | | | Vendor | TPI | AAC | |
| 1 | Raw material | Check of raw material | ASME Sec. II Part A, SA516-70N | Report, Material Certificate | H | R | RA | Fully killed steel & fine austenitic grain size |
| | | Heat No. & chemical composition | Material certificate EN10204 3.1 | Report, Material Certificate | H | R | R | Chemical composition shall be as per MR requirements |
| | | Tensile test | Material Certificate EN10204 3.1 | Material Certificates | H | R | R | |
| 2 | Heat Treatment | Normalizing | ASME Sec. II ,PO Req. | Report/ Material Certificate | H | R | R | |
| 3 | Hardness test | NA | - | Report | H | R | R | |
| 4 | Impact test | NA | - | Report | H | R | R | |
| 5 | NDT | NA | - | Report | H | R | R | |
| 6 | Marking check | Size+ Material grade + Heat No. + PO No. | .Approved drawing | Report | H | H | RA | |
| 7 | Visual & Dimensional check | | Approved drawing | Report/Record | H | H | RA | |
| 8 | Material certificate | EN 10204 Type 3.1 | PO Req. | Certificate | H | R | RA | |
| 9 | Sampling | Chemical & mechanical tests abovementioned as per SA516 & SA20 | ASME Sec. II ,PO Req. | Report | H | H | RA | As per TPA request |
| 10 | Packing | | PO Req. | Packing list | H | H | RA | |

H: Hold point.
W: Witness.
SW: Spot
witness. **R:**
Review. **A: Approval**