Purchase Order Specification
of
Ball Valves
(NO.: 23010-30PTA-001)

for

6,300 Semi-ref. LPG/NH_3 Carrier
(Hull No.: N1213)

Purchaser: **Shanghai UPRO Marine System Co., LTD.**

Signature:

Supplier:

Signature:

00	2024.04.25	First Issued	ZWG	FYH	YWB
Rev.	Date	Subject of revision	Author	Checked	Validated

CONTENT

1. General

1) Project information

Shipyard	COSCO Shipping Heavy Industry (Dalian) Co.,Ltd.
Class	CCS ★CSA, Liquefied Gas Carrier; Type 2G: Type C independent Tank; Max. Cargo Density 0.68 t/m3; Max. Vapour Pressure 0.5 MPa (g); Min. Cargo Temperature -48°C; Ice Class B; In-Water Survey; Loading Computer (S,I, D), PSPC(B); G-ECO(BWM(T)); G-EP(AFS,SC); ★CSM, BRC, SCM, PMS, AFD Ready 1;
Flag	China, the Five-starred Red Flag
Tanks	Cargo tanks: 2x3,150 m^3@5.0 barg, -48°C Deck tanks: 1x40 m^3@18.0 barg, -48°C

2) Equipment and material shall be according to the latest standards of classification society and relative regulations at the time when the contract is executed. The rules and regulations to be fulfilled refer to chapter 4 rules and regulations.
3) Guarantee of quality according to contract.
4) 30 days prior to shop delivery test for the equipment, seller should inform buyer to attend the test and submit the FAT plan, procedure, inspection and test information at the same time.
5) This technical agreement shall become effective on the date when the contract has been duly executed.
6) The manufacturer shall guarantee that the equipment it supplies the buyer shall conform to the working drawings (modified according to comments). In case any modification is necessary during the process of manufacture, the manufacturer shall contract and obtain consent from the buyer and send the buyer the marking of modifications and the explanations.
7) During the manufacture and maintenance of the vessel, if the equipment appear the question of quality or others, seller shall provide a scheme within 2 working days when the seller receive the information by buyer.
8) Each set of equipment is to be fitted with a name plate in notable place with equipment name, model NO. and the maker's name, etc. The name plate to be stainless steel for machinery and valves, name plate of PVC maybe used for electrical equipment / cabinet indoor.
9) The seller must fill and provide "Supplier's Declaration of Conformity form (SDoC)" and "Material Declaration form (MD)" according to the Hong Kong International Convention for the safe and Environmentally Sound Recycling of Ships.
10) The seller must provide the asbestos free statement or certificate (according to the requirement of class).

2. General Technical Specification

1) Temperature of environment:
Ambient temperature: -20~ +35˚C
Maximum / non-condensing relative humidity: 70%
Minimum outside temperature -25°C for electric equipment
Maximum outside temperature 45°C for electric equipment
Inside consoles or fitted on combustion engines or similar 0°C~ 55°C for electric equipment
Engine room temperature max 45°C
Maximum sea water temperature 32°C
Minimum sea water temperature 0°C

2) Measuring unit:
Power: kW;
Pressure: Bar;
Thermometers: °C;
Dimensions and others: Metric units

3) Numbering system

Starboard side to port side	Starboard: NO.1 Port: NO.2
Forward to aft	Forward: NO.1 Aft: NO.2
Upper to lower	Upper: NO.1 Lower: NO.2

4) Pressure Gauges and Thermometers
The pressure gauges and thermometers shall be in accordance with the International Standard or equivalent for marine use and shall be provided at accessible position as required for the machinery operation.
The gauges attached to the machinery and equipment shall be in accordance with manufacturer's standard unless otherwise specified in this Technical Agreement. Minimum and maximum pressure range should be marked on scale.

Pressure gauge

Scale	Approx. 150% of operating range
Type	Liquid filled type
Unit	Bar
Color	Black figures (red figures for vacuum pressure gauge) on the white face
Diameter	Builder's normal practice and manufacturer's standard

Each pressure gauge shall have the root valve on the piping or equipment for the maintenance without disturbing the machinery operation. The root valves or cocks for local

pressure gauges shall be commonly used for the pressure switch or remote reading pressure gauges as far as practicable. All L.O. pressure gauges shall be fitted with a stop valve (not cock), and pipes for L.O. pressure gauges shall be of seamless steel or stainless steel.

Thermometer

Scale	Approx. 150% of operating range
Type	Bar or Dial type
Unit	°C
Color	Black figures on the white face
Diameter	Builder's normal practice and manufacturer's standard

The thermometer shall be installed with brass or stainless steel thermowell. The thread size of thermometer shall be minimized as far as practicable so as to allow the interchange ability. The thermometer shall be located as near as possible to the sensing point for temperature control and monitoring, if installed.

Sensor and switch

Pressure switch and sensor are to be equipped with three-way test valves, temperature sensors equipped with instrument pockets and level switch with test handle.

5) Certificates should be submitted as 1 original and 4 copy. Certificates will be submitted by maker acc. to the requirement of TA, Class and flag state.
6) Counter flanges / counter-union including gasket, bolts and nuts (if applicable) to be supplied by vendor.
7) Tools and spare parts to be supplied by vendor according to the contract and the technical agreement, rules of classification society, IACS recommendations, and the National Authority for unlimited range of service and supplier’s standard scope of delivery, if not otherwise specified, for unrestricted trade.
8) Level switch shall be supplied with test device. Pressure gauge and transmitter shall be provided with root valve and 3-way valve. Temperature gauge and transmitter shall be provided with protection tube. Instrument to be marine type and provided with red mark for rate value.
9) Heat exchanger cleanness factor: 90% for plate type; 85% for shell and tube type.
10) Nameplate to be in English and Chinese, black text with white background and material of stainless steel.
11) Power source: AC440V, 60Hz, 3P / AC220V, 60Hz, 1P / DC24V
12) In general, insulation resistance of each A.C. electrical equipment shall be no less than 100 MΩ at cold condition (before running). The FAT procedural which including the insulation test shall be provided at the approval stage.
13) All emergency stop buttons provided with protection cover.

14) Electrical motor to be marine type and its insulation grade to be B generally. IP56 or higher for open deck motors, and IP44 for indoor motors. All open deck motor and motor of 15kW or larger to be provided with anti-condensate heater.
15) All motor starter to be provided with low-voltage protection or release device. Motor running indicator, running hour meter, space heater on indicator and ammeter to be provided on the starter.
16) Equipment mounted in the hazardous area shall be Explosive protection type, Ex grade shall be IIBT4 at least. Motors mounted in the hazardous area shall be fitted with winding temperature RTDs and PTC.
17) In general, starting method of motors to be DOL, the starting method of motors power from 30 ~ 75kW to be Y-D, from 75kW and above to be soft start or VFD.
18) Motors shall be equipped with earth bolt in compliance with IEC & IEEE requirement. Lighting equipment shall also be equipped with protection earth bolt or protection earth wire terminal. Connection box which used for connecting instrument communication wire shall provide isolation earth terminal or bar.
19) Cable glands to be provided by maker, size to be confirmed at approval drawing. Specific cable as can-bus, profibus+power, fiber optical, etc. with patch panels and necessary junction box to be maker's supply.
20) Centre of gravity should be identified at drawing and shipped box.
21) The surface color of the equipment shall be confirmed at approval drawing stage.

3. Electric Requirement

1) Bus bar or power line shall be noted by tags or equivalent clear marks as per the following patterns and arrangement sort order of each phase shall be from Left to Right or from Top to Bottom or from fore side to after side:

For AC system:			For DC system:	
Primary Side:	Load Side:	Color:	Pole	Color:
R	U	Red	Positive +	Red
S	V	White		
T	W	Blue	Negative -	Blue

2) Equipment or rotating machinery which is mounted at open deck shall be fitted with stainless steel nameplate. Other equipment's nameplate material shall be plastic and flame retardant. Caution plate shall be red text with white background.
3) Color of equipment surface to be confirmed during plan approval stage.
4) Visual and Sound alarm device with other related equipment shall be in compliance with IMO Resolution A.1021(26).
5) Insulation resistance of each A.C. electrical equipment shall be not less than 1 M Ohm at hot condition.

4. Rules and Regulations

The Vessel shall be built in compliance with the following Rules and Regulations with its amendments entering into force up to the date of signing the Building Contract or have been issued before the Building Contract is signed and become effective within 12 months of the delivery of the vessel.

1) MSA of China "Statutory Inspection Rules for Ships and Marine Equipment and Facilities" Statutory Inspection Technical Rules for International sailing seagoing ships and amendment Notice.
2) MSA of China "Statutory Inspection Rules for Ships and Marine Equipment and Facilities" Statutory inspection technical rules for domestic seagoing vessels.
3) CCS Rules and Regulations for the Construction and Classification of Sea-going Steel Ships.
4) CCS Rules for Materials and Welding.
5) CCS Rules for Construction and Equipment of Ships Carrying Liquefied Gases in Bulk.
6) CCS Rules for Construction of Sea-going Ships Engaged on Domestic Voyages.

Note: The above CCS on international navigation and domestic navigation rules if there is a conflict, according to the principle of high not low.

7) SOLAS-International Convention for the Safety of Life at Sea, 1974, and its Protocol of 1988 consolidated edition 2009 and the relevant IMO Amendments as applicable (hereinafter called as "SOLAS")
8) Load Lines, 1966/1988-International Convention on Load Lines, 1966, as Amended by the Protocol of 1988, edition 2005 and the relevant IMO Amendments as applicable (hereinafter called as “ICLL")
9) MARPOL-International Convention for the Prevention of Pollution from Ships, 1973 with Protocol of 1978, including Annexes I, II, IV, V & VI as applicable and consolidated edition 2011 and the relevant IMO Amendments (hereinafter called as “MARPOL”) including the latest MEPC Resolution for EEDI as applicable, where the NOx emission Tier III for M/E, and use low-sulfur diesel, SOX emission for MARPOL Emission Control area.
10) GB 15097-2016 limits and measurement methods for exhaust pollutants from marine engines (China I, II)
11) IMO IGC Code.
12) BWM - International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (D-2)
13) Tonnage-International Convention on Tonnage Measurement of Ships, 1969
14) COLREGS - International Convention for Preventing Collisions at Sea,1972,amended by IMO Resolution A.1004(25) and IMO Resolution A.1085(28)
15) AFS - International Convention on the Control of Harmful Anti-Fouling Systems on Ships, 2001
16) Radio Regulation of International Tele-Communication Convention (GMDSS), 1982
17) MLC2006 TITLE3, Reg.3.1 Accommodation, recreational facilities (except swimming

pool)

18) Hong Kong International Convention For The Safe And Environmentally Sound Recycling of Ships, 2009
19) 2014 IGC Code - IMO MSC.370(93) - Amendments to the International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk
20) 2008 IS Code - International Code on Intact Stability, 2008
21) LSA Code - International Life-Saving Appliance Code - IMO Resolution MSC.48(66)
22) FSS Code - Fire Safety Systems - IMO Resolution MSC.98(73)
23) IMO Resolution MSC.337(91), Code on Noise Level on board Ships 2012
24) IMO Resolution MSC.137(76) - Standards for Ship Maneuverability
25) IMO Resolution A.1045(27) - Pilot Transfer Arrangements as well as IMPA -International marine pilot association Recommendation for Pilot Ladder
26) IMO Resolution A.708(17) – Navigation Bridge Visibility and Functions.
27) IMO RESOLUTION MSC.215(82) - Performance Standard for Protective Coatings for Dedicated Seawater Ballast Tanks in All Types of Ships and Double-Side Skin Spaces of Bulk Carriers (PSPC)
28) IMO Res. MEPC.231(65) - Guidelines for calculation of reference lines for use with the energy efficiency design index (EEDI)
29) IMO Res. MEPC.364 (79) - 2014 Guidelines on the method of calculation of the attained energy efficiency design index (EEDI) for new ships and amendments by Res.MEPC.263 (68) and Res.MEPC.281 (70).
30) IMO Res. MEPC.346 (78) - 2016 Guidelines for the Development of a Ship Energy Efficiency Management Plan (SEEMP)" and Amendments. (to be prepared by the Buyer)
31) IMO Res. MEPC.365 (79) - 2014 Guidelines on survey and certification of the energy efficiency design index (EEDI).
32) SIGTTO/OCIMF - Manifold Recommendations for Liquefied Gas Carriers, Second Edition 2018, Ch.3
33) SIGTTO Recommendations and Guidelines for linked Ship/Shore Emergency Shutdown of Liquefied Gas Cargo Transfer
34) SIGTTO Guidelines only for Automatic Cargo tank Overfill Protection aboard Gas Carriers
35) SIGTTO Recommendations for cargo sampling system
36) OCIME SIRE
37) CDI (only for the part applicable to the vessel)
38) OCIMF - Mooring Equipment Guidelines 4th Edition, 2018 (MEG4) (for fixed mooring fitting only)
39) ExxonMobil Marine Environmental, Safety and Quality Assurance Criteria (MESQAC) 2017 Edition. (only for "MUST" items plus expressly provided otherwise in the Specification), with following exceptions:
    - E29 - independent means of communication between citadel and operator's Security Officer (to be supplied by the Buyer).

- H14 - no pressure/vacuum valves on cargo tanks (n.a. for type C tanks)
- J-IG plant is considered as non-essential service on gas carriers
- J8 -no wet seal for IG main on deck, back flow prevention is done in accordance with IGC-Code / VIQ
- M20 - Water content meter (to be supplied by the Buyer)
- Appendix A-Additional Criteria for Term Chartered Tonnage:
- H2a - Number of grades as per specification chapter 1.3
- H4a - Manifold arrangement will follow SIGTTO recommendations, as far as applicable, except sizing.
- H6a-Remote valve operation only as per specification H9a-Gas detection points as per specification only
- J1a - no pressure/vacuum valves on cargo tanks (n.a. for type C tanks)
- F.3a - Double hull for cargo tanks and other tanks and spaces containing any type of pollutants (MARPOL Annex 1 and 2 in its form or if mixed with water)

40) ISO 6954-2000E - Guidelines for the measurement, reporting and evaluation of vibration with regard to habitability on passenger and merchant ships
41) International Electrotechnical Commission (IEC) 60079 series "Explosive atmospheres"
42) IEC No.60092 - Electrical installations in ships (including Part 502: Tankers - Special features)

Note:
Items which are not mentioned in the Technical Agreement, but required for the satisfactory operation of the machinery / equipment and /or system, or required by applicable Rules and Regulations shall be furnished and / or modified by Maker without extra cost.

5. Standard

The following standards shall be applied to the construction of the Vessel:

- Chinese Industrial Standard (GB)
- Chinese Shipbuilding Standard (CB, CBM)
- China Shipbuilding Quality Standard (CSQS)
- Chinese Metallurgical Standard (YB)
- International Organization for Standardization (ISO)
- International Electrotechnical Commission Standard (IEC)

The connection dimension of flanges shall be in accordance with ISO standard.

6. Commissioning Service and Sea Trial / Gas Trial

The Seller shall provided the requirement for storage and installation of the machinery, equipment, motor and electrical equipments in approval and working drawings.

The Seller shall assist Buyer in developing trial procedures and shall supply all necessary information such as sub-contractor document references, prerequisites, precautions and limits, detailed test procedures, inspection lists and lists of special equipment.

At Buyer's request, the seller shall ensure that all necessary experienced and qualified personnel are available to carry out the commissioning tests.

The "Check list before commission" for shipyard finished condition before notice service engineer must be included in the approval drawing & working drawing.

7. Certificate

1) The manufacturer is to provide certificates and other necessary certificates in accordance with the requirements of the classification society and the rules or regulations of the relevant flag state.
2) If the certificate delivered is required by the classification society and/or the flag state, it must meet the requirements of the classification society and/or the flag state.
3) In no event shall the Seller be released from liability for certification requirements not mentioned in this Agreement but by classification societies and/or flag states and/or general industry standards and/or regulations.
4) Vendor shall supply all necessary certificates as following, including but not limited to:
   - Factory certificate
   - Class certificate (one original and three copies with seal；one E-certificate)
   - Calibration certificates for all thermometers and pressure gauges issued by recognized institute.
   - In any case, the seller must provide the manufacturer's certificate/declaration/report to the buyer as a quality certificate to show that the "finished product" has met the requirements of the classification society and/or flag state and/or general rules and/or standards. This certificate shall be provided with the delivery of the equipment or to the buyer at the time requested by the buyer.

8. Drawing and Documents

1) The drawings shall be in English and Chinese.
2) Documents or drawings for class approval according to class' requirement without extra cost.
3) The list of spare parts and tools, list of lubricating oil, grease and chemical must be included in the approval drawing, working drawing and final drawing.

4) Shop test procedure to be included in approval drawing and reports to be included in each final drawing.
5) Check list for first starting the equipment in Shipyard to be included in the working drawing.
6) Operation, maintenance manual, parts/components catalog to be included in the final documents.
7) All documents and drawing shall be filed in folders and / or document racks (including index) according an Owners accepted filing system.
8) The 3D model for the equipment should be supplied to UPRO. The format is STP/STEP、IGS/IGES, the size of 3D model should be less than 2GB.
9) The Maker shall provide a complete list of machinery and equipment (including type and serial numbers, maker data, firm- and software versions), spare parts, consumables and maintenance jobs for all equipment and machinery, in MS Excel format.
10) Documents or drawings for UPRO:
    Approval drawing: 8 sets with 1set CD (DWG & PDF format, content should be same as approval drawing), sent out in 15 days after receiving the vender selection notice. (Kindly remark: The delivery date of approval drawing shall be associated with the terms of payment as defined in the contract).
    Working drawing: 8 sets with 1set CD (DWG & PDF format, sent out in 7 days after approval.
    Final drawing (include instruction Book): 4 sets hard copy with 1 set soft copy CD or U-disk (DWG & PDF format), sent out with the delivery of equipment.
11) The finished drawing is to coincide with the provided equipment. For long-term conservation printed and the maker's name, etc.
12) Approval drawings and working drawings should be sent directly to following address:
    SHANGHAI UPRO MARINE SYSTEM CO., LTD.
    Room 1801,BHC Tower(W), No. 2218 HuNanRoad, Shanghai, China
    Tel: +86 21 6044 2331, +86 136 1163 7185
    E-mail: zhuwenguang@uxgas.com
13) Approval, working and finished drawing are respectively to be bound up into one volume with covers and contents.
14) Any major changes, e.g. equipment upgrade, dimensions etc, to be shown in related drawings and inform UPRO separately.

9. Cargo List

The ship is mainly used to transport liquid ammonia and also transport LPG cargos. The ship will be built in compliance with Rules and Regulations of CCS “Liquefied Gas Carrier”, (-48°C, 5.0 bar gauge, 0.68 t/m³ (98% filling rate), 0.97t/m3 (VCM partial filling)).

The gas handling system will be provided for the transportation of following cargoes:

Cargo	Formula	UN-No.
Ammonia	NH_3	1005
Propene	C_3H_6	1077
Propane	C_3H_8	1978
Commercial Propane (2.5% mol Ethane)	C_3H_8 / C_2H_6	1978
Butane (all isomers)	C_4H_{10}	1011
Butane-propane mixture	C_3H_8 / C_4H_{10}	1978/1011
Butadiene (all isomers)	$CH_2CHCHCH_2$	1010
Butylenes (all isomers)	C_4H_8	1012
Pentane (all isomers)	C_5H_{12}	1265
Pentene (all isomers)	C_5H_{10}	1108
Isoprene	$CH_2C(CH_3)CHCH_2$	1218
VCM	CH_2CHCL	1086

10. Valve list

UPRO Marine System			Drawing Name					Drawing Number			Page / Total	
			VALVE LIST					PE03LST_103				
No.	VALVE No.	NAMEPLATE	VALVE TYPE	ND (inch)	MATERIAL	CONNECTION TYPE	CONNECTION CLASS	D.P. (barg)	D.T. (℃)	LOCATION	ACT. TYPE	REMARK
1	V-1104		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.1 tank dome		
2	V-1106		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	No.1 tank dome		
3	V-1107		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.1 tank dome		
4	V-1108		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.1 tank dome		
5	V-1112		BALL_VALVE	4"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.1 tank dome		
6	V-1113		BALL_VALVE	6"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
7	V-1114		BALL_VALVE	6"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
8	V-1115		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
9	V-1116		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
10	V-1120		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
11	V-1121		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
12	V-1122		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
13	V-1123		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
14	V-1124		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.1 tank dome		
15	V-1204		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.2 tank dome		
16	V-1206		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	No.2 tank dome		
17	V-1207		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.2 tank dome		
18	V-1208		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.2 tank dome		
19	V-1212		BALL_VALVE	4"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	No.2 tank dome		
20	V-1213		BALL_VALVE	6"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
21	V-1214		BALL_VALVE	6"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
22	V-1215		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
23	V-1216		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
24	V-1220		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
25	V-1221		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
26	V-1222		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
27	V-1223		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
28	V-1224		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	No.2 tank dome		
29	V-1501		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
30	V-1502		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
31	V-1504		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
32	V-1505		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
33	V-1506		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
34	V-1507		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		

UPRO Marine System			Drawing Name					Drawing Number			Page / Total	
			VALVE LIST					PE03LST_103				
No.	VALVE No.	NAMEPLATE	VALVE TYPE	ND (inch)	MATERIAL	CONNECTION TYPE	CONNECTION CLASS	D.P. (barg)	D.T. (°C)	LOCATION	ACT. TYPE	REMARK
35	V-1508		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
36	V-1509		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Deck tank		
37	V-1510		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Deck tank		
38	V-1511		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
39	V-1513		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
40	V-1514		BALL_VALVE	1"	ASTM A351 GR CF3M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
41	V-1515		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Deck tank		
42	V-2005		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
43	V-2006		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
44	V-2007		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
45	V-2008		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
46	V-2009		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
47	V-2010		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
48	V-2011		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
49	V-2012		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
50	V-2013		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
51	V-2014		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	40 barg	-48°C~45°C	Cross over		
52	V-2016		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Cross over		
53	V-2019		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	5 barg	-48°C~45°C	Cross over		
54	V-2020		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	5 barg	-48°C~45°C	Cross over		
55	V-3001		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Vent master		
56	V-3002		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Vent master		
57	V-3003		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Vent master		
58	V-3004		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Vent master		
59	V-4201		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
60	V-4203		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
61	V-4204		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
62	V-4206		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
63	V-4207		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Booster pump		
64	V-4208		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
65	V-4209		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
66	V-4210		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
67	V-4216		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
68	V-4217		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		

UPRO Marine System			Drawing Name					Drawing Number			Page / Total	
			VALVE LIST					PE03LST_103				
No.	VALVE No.	NAMEPLATE	VALVE TYPE	ND (inch)	MATERIAL	CONNECTION TYPE	CONNECTION CLASS	D.P. (barg)	D.T. (℃)	LOCATION	ACT. TYPE	REMARK
69	V-4221		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	30 barg	-48°C~45°C	Booster pump		
70	V-5103		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
71	V-5106		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 1		
72	V-5108		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
73	V-5109		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
74	V-5112		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
75	V-5116		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
76	V-5117		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
77	V-5119		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
78	V-5120		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
79	V-5122		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
80	V-5125		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
81	V-5126		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
82	V-5127		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
83	V-5128		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 1		
84	V-5129		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 1		
85	V-5130		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 1		
86	V-5131		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 1		
87	V-5132		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
88	V-5133		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
89	V-5134		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
90	V-5135		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 1		
91	V-5203		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
92	V-5206		BALL_VALVE	3"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 2		
93	V-5208		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
94	V-5209		BALL_VALVE	2"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
95	V-5212		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
96	V-5216		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
97	V-5217		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
98	V-5219		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		
99	V-5220		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
100	V-5222		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
101	V-5225		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
102	V-5226		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		

UPRO Marine System	Drawing Name						Drawing Number			Page / Total	
	VALVE LIST						PE03LST_103				
No.	VALVE No.	NAMEPLATE	VALVE TYPE	ND (inch)	MATERIAL	CONNECTION TYPE	CONNECTION CLASS	D.P. (barg)	D.T. (°C)	LOCATION	ACT. TYPE	REMARK
103	V-5227		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
104	V-5228		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~45°C	Requlification system 2		
105	V-5229		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 2		
106	V-5230		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 2		
107	V-5231		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL300	25 barg	-48°C~150°C	Requlification system 2		
108	V-5232		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		
109	V-5233		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		
110	V-5234		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		
111	V-5235		BALL_VALVE	1"	ASTM A351 GR CF8M	Flanged	CL150	10 barg	-48°C~45°C	Requlification system 2		