



Ship/Shore Compatibility Checklist (bunkering)

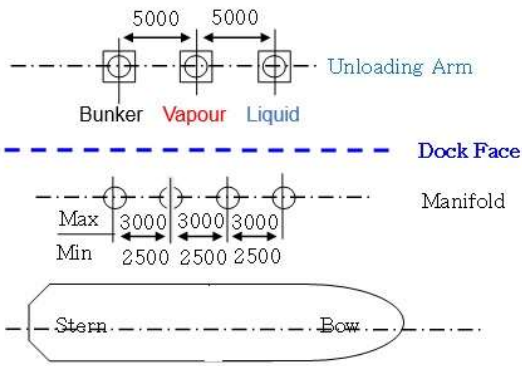
HAMINA LNG LTD.

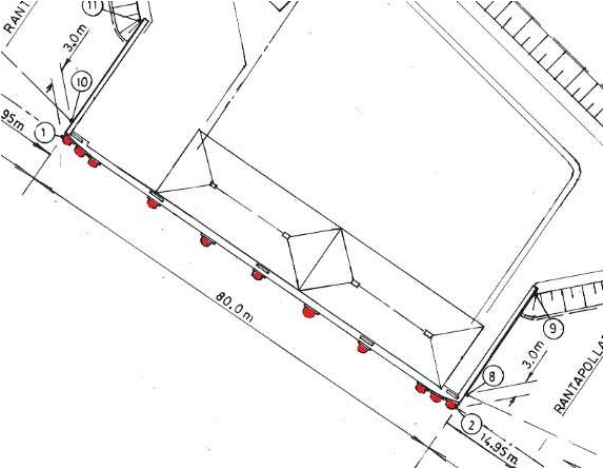
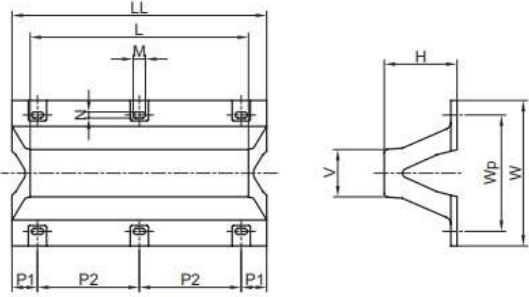
Table of contents

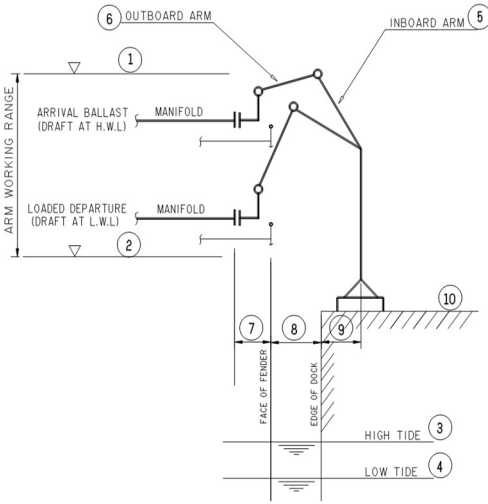
Ship/Shore Compatibility Study. Name of ship: _____	- 2 -
1. General Port Information	- 2 -
1.1. General	- 2 -
1.2. Weather Limits	- 2 -
1.3. Port Water Level	- 2 -
2. Vessel Limitations	- 3 -
3. Manifold Arrangement	- 3 -
4. Fender / Flat Body	- 4 -
4.1 Fender Arrangement	- 4 -
4.2 Maximum Design	- 4 -
4.3 Mooring Arrangement	- 5 -
4.4 Optimooring	- 5 -
5 Bunkering Arm L481	- 6 -
6. ESD / Communication System	- 8 -
6.1 Optical Fiber System	- 8 -
6.2 Electric System	- 8 -
6.3 Pneumatic System	- 8 -
6.4 Pendant System	- 9 -
7. Gangway	- 9 -
7.1 Position of gangway	- 9 -
8. Support Craft	- 10 -
9. Other	- 10 -
Attachments:	- 11 -

Ship/Shore Compatibility Study. Name of ship: _____

Items	Shore Specification	Ship Specification	Remarks
<p>1. General Port Information</p> <p>1.1. General</p> <p>1.2. Weather Limits</p> <p>(1) Max Wind Speed</p> <p>(2) SVT vendors wind limits</p> <p>(3) Thunder</p> <p>1.3. Port Water Level</p> <p>(1) Tide Level</p>	<p>▪ Port name: Port of HaminaKotka</p> <p>-Tel: + 358 20 790 8800</p> <p>-Address: Satamantie 4, 49460 HAMINA</p> <p>-E-mail: office@haminakotka.fi</p> <p>▪ Name of operating company: Hamina LNG Ltd</p> <p>-24/7 Control Room Tel: + 358 75 003 1240</p> <p>-Address: Terminaaliranta 5, 49460 HAMINA</p> <p>60° 51' N, 27° 16' E</p> <p>▪ Person to contact regarding terminal information</p> <p>-Name: Loading Masters / LNG Terminal Plant</p> <p>-Tel: + 358 40 351 0878</p> <p>-E-mail: loadingmaster@haminalng.fi</p> <p>Note! Berth Ö3 is shared with other local operators</p> <p>(1) Berthing (TBA m/sec) / Stop cargo (17m/sec)</p> <p>(2) Maneuvering / connected (17m/sec)</p> <p>(3) Hold loading if electrical activity</p> <p>(1) Tide Level: Unit (m)</p> <p>High : EL + 0,05 m</p> <p>Low : EL - 0,05 m</p>		<p><u>Weather information from terminal</u></p>

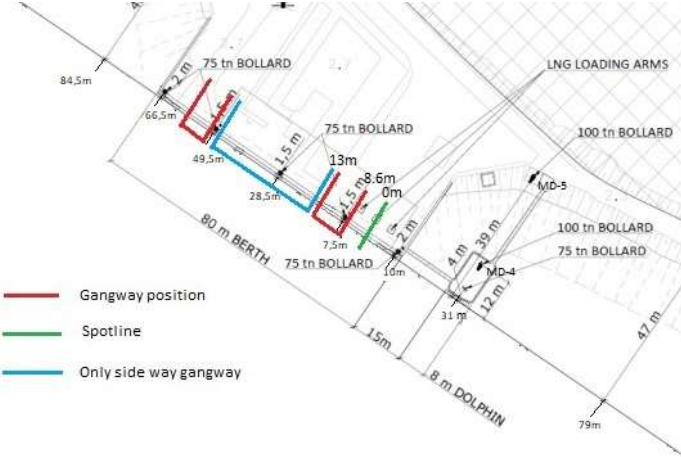
Items	Shore Specification	Ship Specification	Remarks
<p>2. Vessel Limitations</p> <p>(1) Type of Vessel</p> <p>(2) Breadth</p> <p>(3) Tank Capacity (Min/Max)</p> <p>(4) Draught (Design)</p> <p>(5) LOA (Length Overall)</p> <p>(6) DWT(Deadweight)</p> <p>(7) DT(Displacement)</p> <p>(8) ~ (11) Ship Side</p>	<p>Investigation objective vessel result of port capacity</p> <p>(1) Membrane or Moss</p> <p>(2) 30 m</p> <p>(3) 5,000 m³ (Min) / 25,000 m³ (Max)</p> <p>(4) 12 m (Membrane) / 12 m (Moss)</p> <p>(5) 180 m</p> <p>(6) N/A</p> <p>(7) N/A</p> <p>(8) Name of Operator</p> <p>(9) Cargo Arrival Date (dd/mm/yy)</p> <p>(10) Cargo Port of Loading (Port/Nationality)</p> <p>(11) Expected Unloading Volume (m³)</p> <p>(12) Ship using vapour return line: yes/no</p>	<p>2. Vessel Limitations</p> <p>1.</p> <p>2.</p> <p>3.</p> <p>4.</p> <p>5.</p> <p>6.</p> <p>7.</p> <p>8.</p> <p>9.</p> <p>10.</p> <p>11.</p> <p>12.</p>	<p><u>If Breadth over 32m, contact pilot for more information.</u></p> <p>If LOA 181m – 220m, contact Loading Master for more information.</p>
<p>3. Manifold Arrangement</p>	<p>3. Manifold arrangement (Unit: mm)</p>  <p>The diagram illustrates the manifold arrangement on a ship's deck. It shows a longitudinal view from the Stern to the Bow. A dashed line represents the Dock Face. Above it, an Unloading Arm is shown with three connection points: Bunker, Vapour, and Liquid. The distance between the Bunker and Vapour connections is 5000 mm, and between the Vapour and Liquid connections is 5000 mm. Below the Dock Face, a Manifold is shown with three connection points. The maximum distance between these manifold connections is 3000 mm, and the minimum distance is 2500 mm. The ship's hull is shown below the manifold, with Stern and Bow labels.</p> <p>a. Berthing: Portside alongside (Main)</p> <p>b. Distance between manifold deck and SDP: more than 1 m</p>	<p>3. Manifold Arrangement</p> <p>a)</p> <p>b)</p>	

Items	Shore Specification	Ship Specification	Remarks
<p>4. Fender / Flat Body</p> <p>4.1 Fender Arrangement</p> <p>4.2 Maximum Design</p>	<p>4.1 Fender Arrangement</p>  <p>4.2 Maximum Design</p>  <p>Type: Lambda LMD (CL1)</p> <ul style="list-style-type: none">- Fender size: H = 800 mm, L = 2000 mm- Effective area: 1,04 m², total: 3,12 m²- Distance between fenders: 11.0 m- Reaction force: 52,5%: 589 kN / 55%: 645 kN- Energy absorption: 52,5%: 198 kN/m, 55%: 210 kN/m	<p>4. Fender / Flat Body</p>	<p>See attach file 1</p> <p><u>Vessel responsible to berth safely</u></p>

Items	Shore Specification	Ship Specification	Remarks																																										
5 Bunkering Arm L481	<p>5 Bunker Arm Working Range L481 (Liquid & Vapour)</p> <table border="1" data-bbox="533 212 1232 906"> <thead> <tr> <th>Item</th> <th></th> <th></th> <th>(m)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Working range of unloading arm (From sea level)</td> <td>High</td> <td>1</td> <td>18,4</td> </tr> <tr> <td>Low</td> <td>2</td> <td>2,4</td> </tr> <tr> <td rowspan="2">Tide level</td> <td>High</td> <td>3</td> <td>+ 0,05</td> </tr> <tr> <td>Low</td> <td>4</td> <td>-0,05</td> </tr> <tr> <td>Heave & List</td> <td></td> <td></td> <td></td> </tr> <tr> <td rowspan="2">Unloading arm length</td> <td>Inboard arm</td> <td>5</td> <td>8,3</td> </tr> <tr> <td>Outboard arm</td> <td>6</td> <td>9,6</td> </tr> <tr> <td rowspan="4">Distance</td> <td></td> <td>7</td> <td>5,125</td> </tr> <tr> <td></td> <td>8</td> <td>1,0</td> </tr> <tr> <td></td> <td>9</td> <td>5,0</td> </tr> <tr> <td>Above datum</td> <td>10</td> <td>9,0</td> </tr> </tbody> </table> 	Item			(m)	Working range of unloading arm (From sea level)	High	1	18,4	Low	2	2,4	Tide level	High	3	+ 0,05	Low	4	-0,05	Heave & List				Unloading arm length	Inboard arm	5	8,3	Outboard arm	6	9,6	Distance		7	5,125		8	1,0		9	5,0	Above datum	10	9,0		<p>See attach file 5</p> <p>Normal sea level from jetty surface -2,4m (Working range of unloading arm 16,0m from jetty surface)</p>
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<p>(1) Flow rate (max)</p> <p>(2) Number</p> <p>(3) Size</p> <p>(4) Quick Release Coupler</p> <p>(5) Design Pressure</p> <p>(6) Flange Specification</p> <p> a. Flange</p> <p> b. Connection Type</p> <p> c. Gasket</p> <p>(7) Condition of Manifold</p>	<p>(1) Bunker: 1000 m³/h / 1 arm</p> <p>(2) Liquid: 1 arm, Vapour: 1 arm, Bunker: 1 arm</p> <p>(3) Bunker arm: 8" (≈200mm), Vapour return hose 6" (≈150mm)</p> <p>(4) Type: ERS (Emergency Release System) Double Ball Valve with PERC (Powered Emergency Release Coupler)</p> <p>(5) Design Pressure</p> <p> a. Liquid / bunker: 19 bar</p> <p> b. NG Vapour Return (Free flow): 19 bar</p> <p>(6) Flange Specification</p> <p> a. Bunker: 8" 150 lbs RF</p> <p> b. Manual QC/DC</p> <p> c. Not required. Double seal fitted on flange face.</p> <p>(7) Shiny and undamaged / Ra=3,2-12,5µm (EN 1092-1:2001 (E))</p> <div data-bbox="539 863 1023 1299" data-label="Image"> </div> <p><i>Picture of manifold and arm connection</i></p>	<p>(1)</p> <p>(2)</p> <p>(3)</p> <p>(4)</p> <p>(5)</p> <p>(6)</p> <p>a.</p> <p>b.</p> <p>c.</p> <p>(7)</p>	

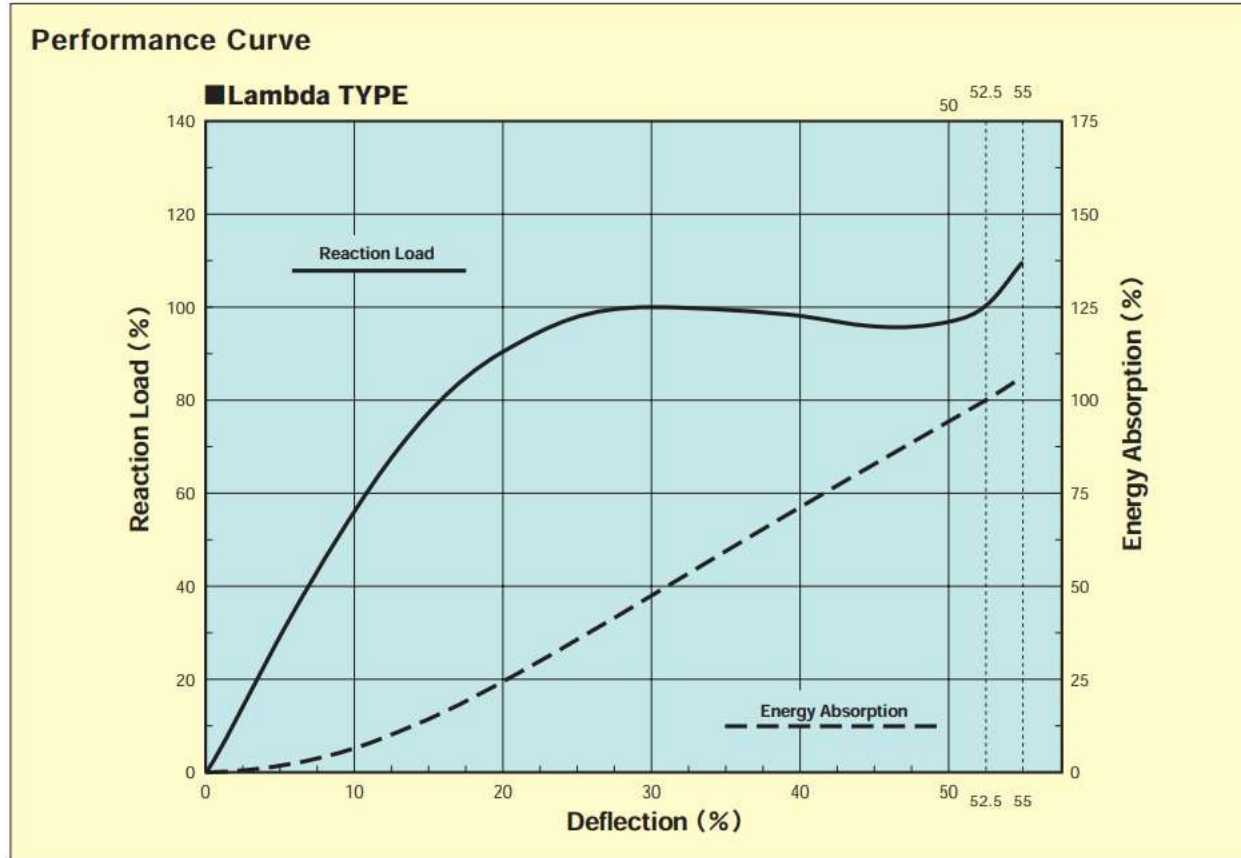
Items	Shore Specification	Ship Specification	Remarks
<p>6. ESD / Communication System</p> <p>6.1 Optical Fiber System</p> <p>a. Manufacturer</p> <p>b. Connector Type</p> <p>c. Connection Box Position</p> <p>d. Cable Length</p> <p>e. Pin Allocation</p> <p>f. Connection</p> <p>6.2 Electric System</p> <p>a. Manufacturer</p> <p>b. Connector type</p> <p>c. Connector Position</p> <p>d. Cable Length</p> <p>e. Pin Allocation</p> <p>f. Connection</p> <p>6.3 Pneumatic System</p> <p>a. Manufacturer</p> <p>b. Connector Type</p> <p>c. Connector Position</p> <p>d. Hose Length</p> <p>e. Air Pressure</p> <p>f. Connection</p>	<p>6.1 Optical Fiber System</p> <p>a. TRELLEBORG (USL-8815-V3)</p> <p>b. 2-way Expanded-Beam Hermaphroditic Fibre Connector</p> <p>c. Infront Loading Arm L102 (USL-8812-V3-801)</p> <p>d. 50 m</p> <p>e. Optical System (Attachment)</p> <p>f. Are you able to connect? YES / NO</p> <p>6.2 Electric System</p> <p>a. TRELLEBORG (USL-8817-V2)</p> <p>b. 5-way SeaTechnik SIGTTO Type Female Connector</p> <p>c. Infront Loading Arm L102 (USL-8812-V3-801)</p> <p>d. 50 m</p> <p>e. Electrical System (Attachment)</p> <p>f. Are you able to connect? YES / NO</p> <p>6.3 Pneumatic Hose</p> <p>a. TRELLEBORG (USL-8823-V0)</p> <p>b. SNAP-TITE PHC8-8H 1/2"</p> <p>c. Infront Loading Arm L102 (USL-8812-V3-801)</p> <p>d. 50 m</p> <p>e. Air Pressure</p> <p style="padding-left: 20px;">* Normal Pressure: 6.0 - 10.0 bar</p> <p style="padding-left: 20px;">* Trip Pressure: 3,0 bar</p> <p>f. Are you able to connect? YES / NO</p>	<p>6.1 Optical Fiber System</p> <p>a.</p> <p>b.</p> <p>c.</p> <p>d.</p> <p>e.</p> <p>f.</p> <p>6.2 Electric System</p> <p>a.</p> <p>b.</p> <p>c.</p> <p>d.</p> <p>e.</p> <p>f.</p> <p>6.3 Pneumatic System</p> <p>a.</p> <p>b.</p> <p>c.</p> <p>d.</p> <p>e.</p> <p>f.</p>	<p><u>See attach file 6</u></p> <p><u>f. See attach file 6</u></p> <p><u>f. See attach file 6</u></p> <p><u>f. See attach file 6</u></p>

Items	Shore Specification	Ship Specification	Remarks
<p>6.4 Pendant System</p> <p>a. Manufacturer</p> <p>b. Connector Type</p> <p>c. Connector Position</p> <p>d. Cable Length</p> <p>7. Gangway</p> <p>7.1 Position of gangway</p> <p>a. Connector Position</p> <p>b. Specification</p>	<p>6.4 Pendant System</p> <p>a. TRELLEBORG (USL-8818)</p> <p>b. 5-way SeaTechnik SIGTTO Type Female Connector</p> <p>c. Infront Loading Arm L102 (USL-8812-V3-801)</p> <p>d. 25 m</p> <p>7.1 Gangway Position</p>  <p>a. Location: ~8,6-13 m or 49,5-66,5 m from spotting line. Side way gangway 13-49,5 m from spotting line.</p> <p>b. Specification (Using vessel own gangway)</p>	<p>6.4 Pendant System</p> <p>a.</p> <p>b.</p> <p>c.</p> <p>d.</p> <p>7.1 Position of gangway</p>	

Items	Shore Specification	Ship Specification	Remarks
<p>8. Support Craft</p> <p>(1) Tugboats</p> <p>(2) Zone management</p>	<p>(1) Found more information: https://www.haminakotka.com/</p> <ul style="list-style-type: none"> • Suggestion to use tug, wind min. 8 m/s • Recommendation to use tug, wind min. 13 m/s • Order to use tug, wind min. 17 m/s <p>(2) Moving at LNG jetty/process area are forbidden. Zone security area is 30m around ship based on SFS 3355 standard.</p>		<p><u>See attach file 7</u></p>
<p>9. Other</p>	<p>(1) Vessel should inform the Terminal about need of Vapour arm before berthing.</p>	<p>9. Others</p>	

Attachments:

1. Performance Curve

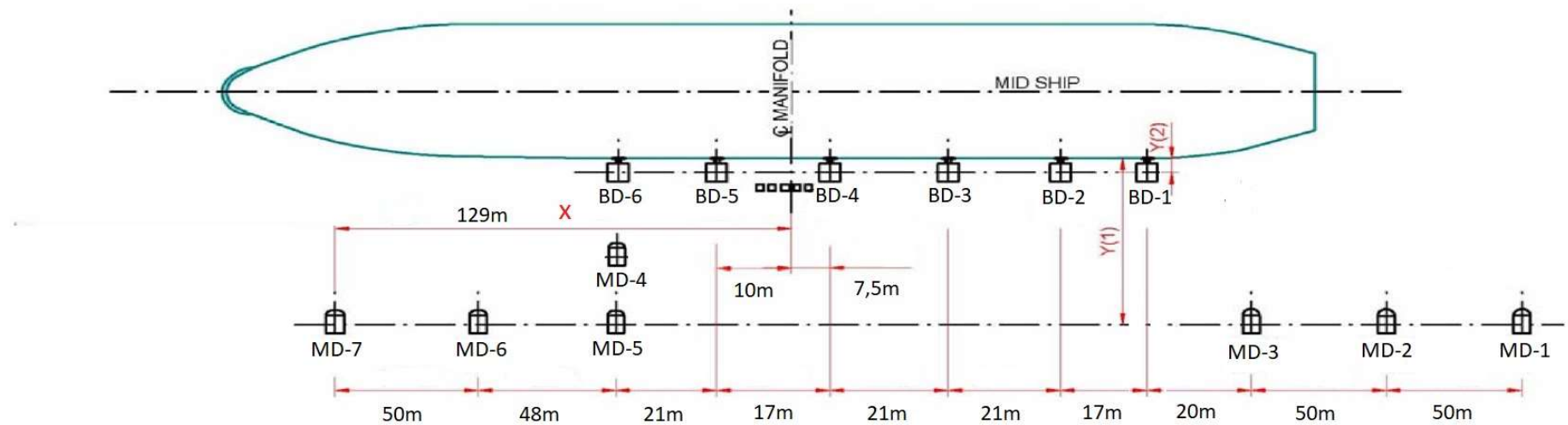


2. Mooring Facilities



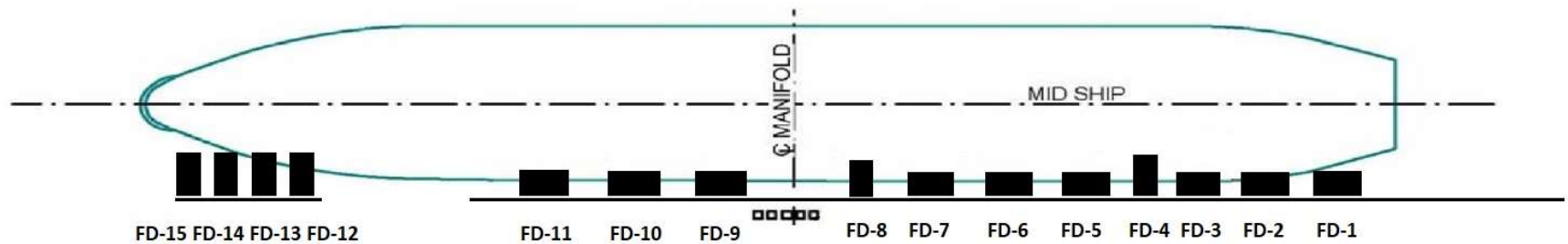
3. Optimoorring (0-point vapour arm), Left to Right of Screen Site Plane Points: **304°**

Optimoor	Terminal	X	Y
A	MD-1	184,5m	57m Y(1)
B	MD-2	134,5m	49m Y(1)
C	MD-3	84,5m	40m Y(1)
D	BD-1	66,5m	2m Y(2)
E	BD-2	49,5m	1,5m Y(2)
F	BD-3	28,5m	1,5m Y(2)
G	BD-4	7,5m	1,5m Y(2)
H	BD-5	-10m	2m Y(2)
I	BD-6	-31m	2m Y(2)
J	MD-4	-31m	12m Y(1)
K	MD-5	-31m	39m Y(1)
L	MD-6	-79m	47m Y(1)
M	MD-7	-129m	55m Y(1)

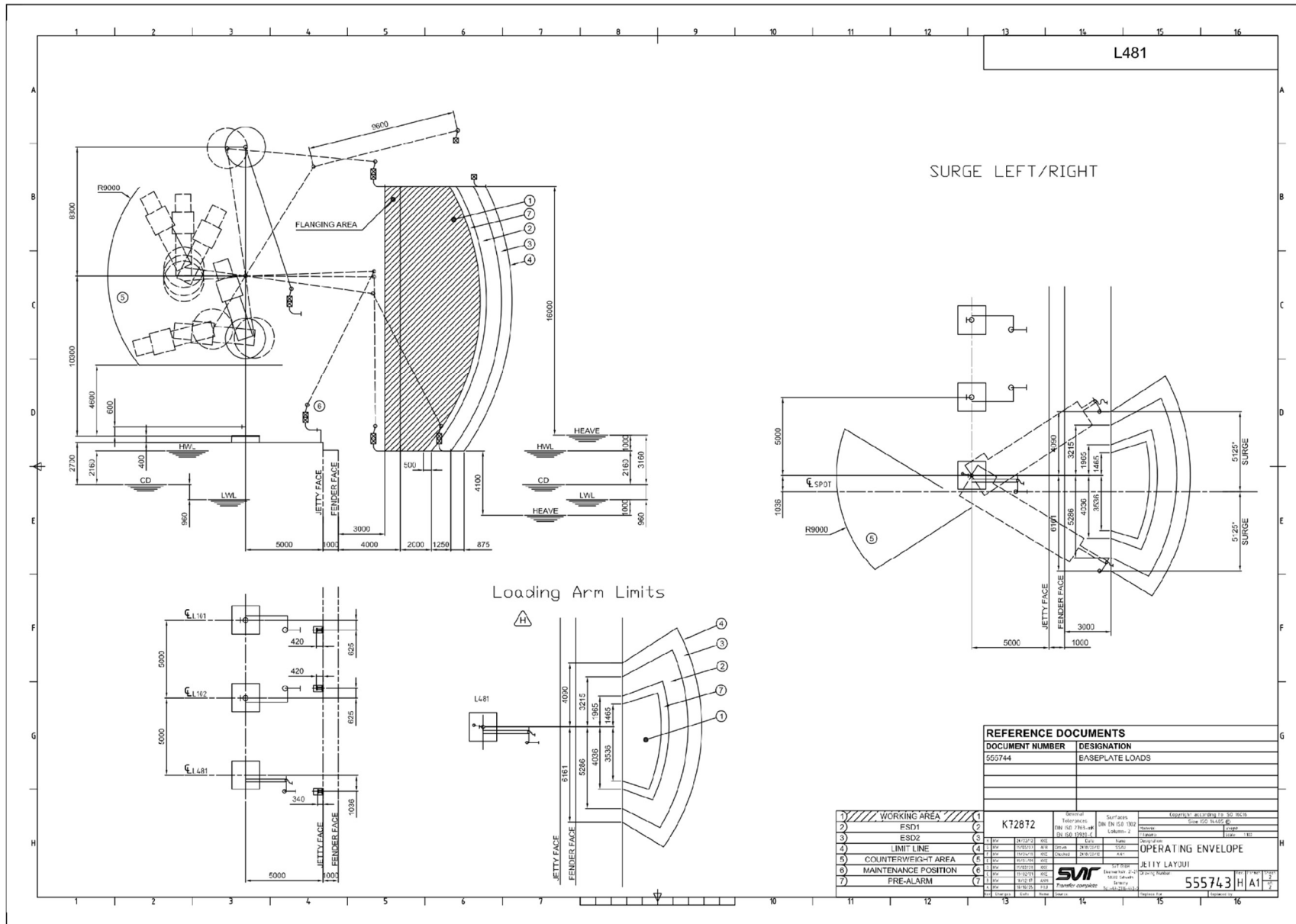


3.1 Fenders position for optimooring

	Terminal	X
A	FD-1	-33,6m
B	FD-2	-31,6m
C	FD-3	-29,6m
D	FD-4	-27,8m
E	FD-5	-10,1m
F	FD-6	-7,7m
G	FD-7	-5,3m
H	FD-8	7,2m
I	FD-9	15,8m
J	FD-10	28,6m
K	FD-11	41,3m
L	FD-12	49,8m
M	FD-13	62,5m
N	FD-14	64,7m
O	FD-15	66,9m

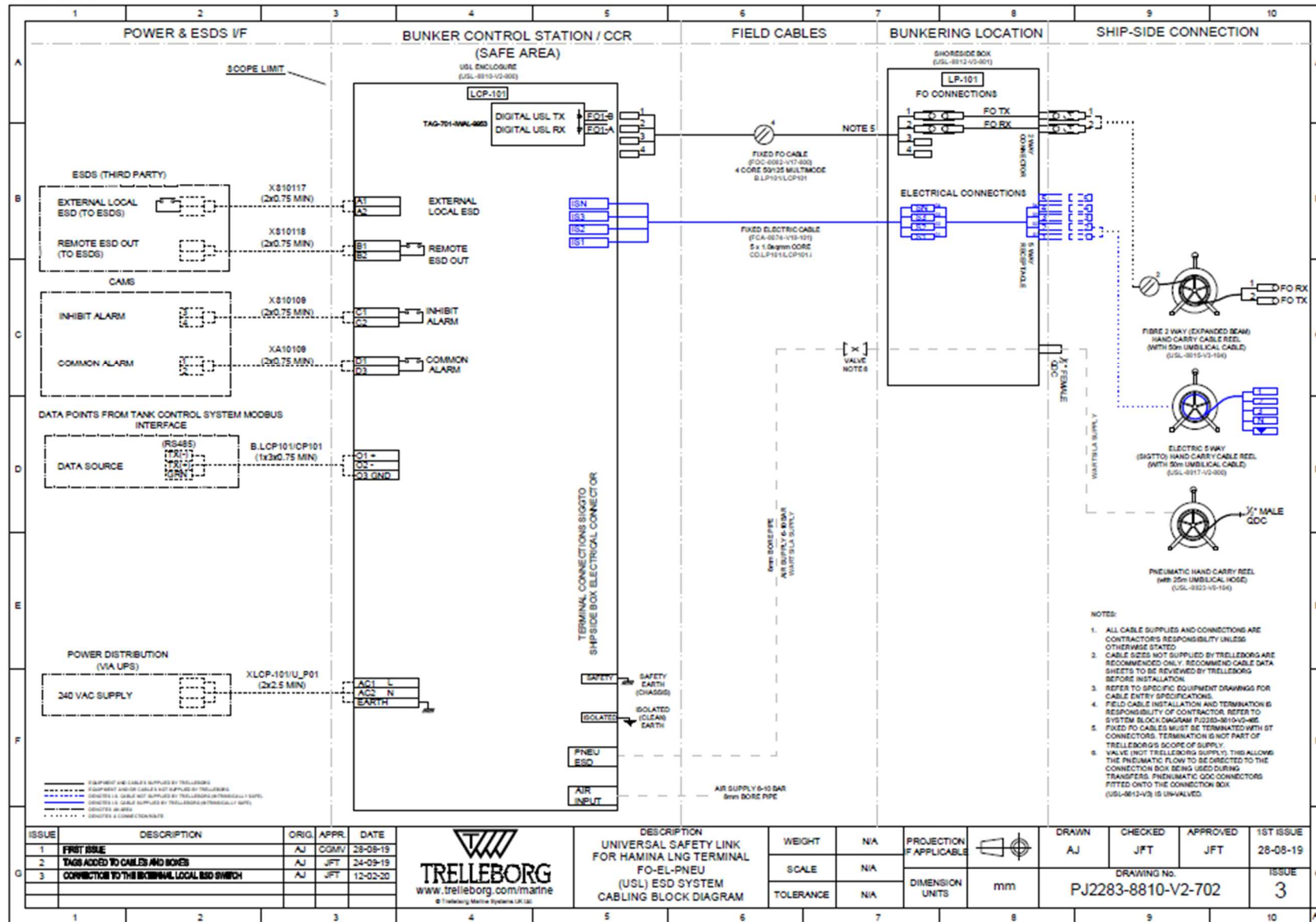


5. Bunker Arm Working Range L481 (Liquid & Vapour)



6. ESD / Communication System

P17952-DEM-1023 rev. 01



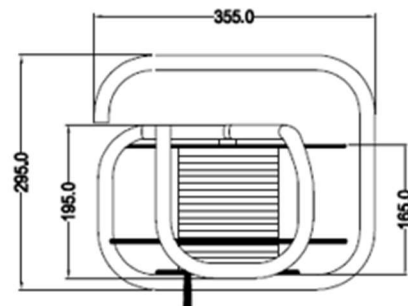
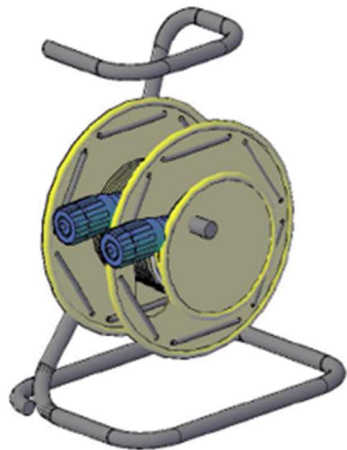
ISSUE	DESCRIPTION	ORIG.	APPR.	DATE
1	FIRST ISSUE	AJ	CGM/V	28-08-19
2	CHGS ADDED TO CABLES AND BOXES	AJ	JFT	24-09-19
3	CONNECTION TO THE EXTERNAL LOCAL ESD SWITCH	AJ	JFT	12-02-20



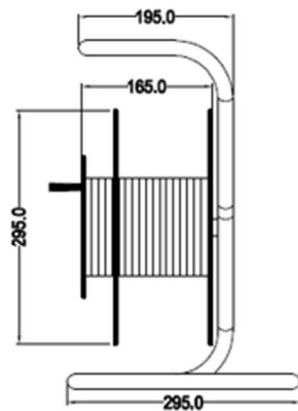
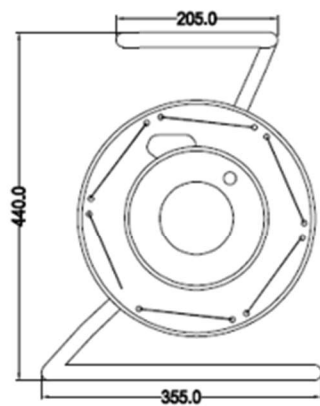
DESCRIPTION
UNIVERSAL SAFETY LINK FOR HAMINA LNG TERMINAL
FO-EL-PNEU
(USL) ESD SYSTEM
CABLING BLOCK DIAGRAM

WEIGHT	N/A	PROJECTION APPLICABLE	
SCALE	N/A	DIMENSION UNITS	mm
TOLERANCE	N/A		

DRAWN	AJ	CHECKED	JFT	APPROVED	JFT	1ST ISSUE	28-08-19
DRAWING No. PJ2283-8810-V2-702						ISSUE	3



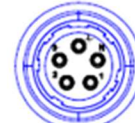
DRAWING No.
USL-8817-V2-800



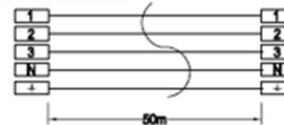
SIGTTO Connector



PIN LAYOUT DIAGRAM:



CONNECTION DIAGRAM:

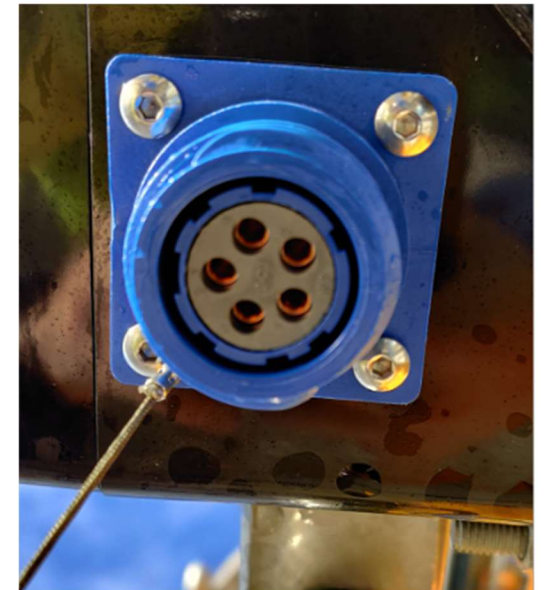


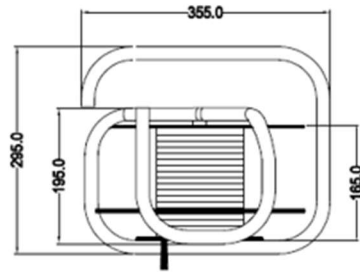
Connector notes:
Connector and Protective cap supplied
IP65 Rated Ingress Protection

PVC Cable notes:
Number of Cores: 5
Conductor size of each core: 1.0mm²
Cable Outer Diam: 7.1mm
Min. Bending Radius: 15 x OD
External Colour: Blue (RAL 5015)

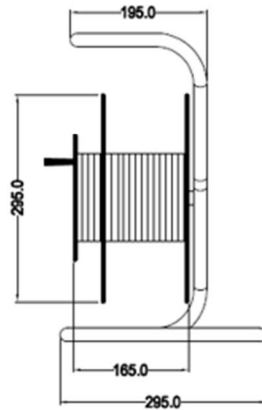
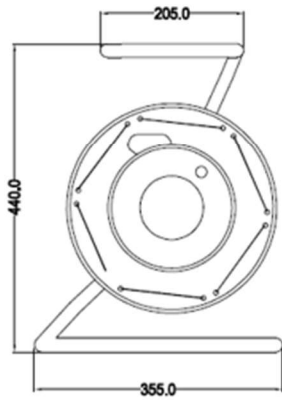
Carry on SIGTTO reel notes:
Material: 316 SS
Finish: Powder coat
Drum Colour :Yellow
Frame Colour : Black
Cable length : 50m

All dimensions in mm

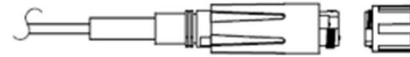




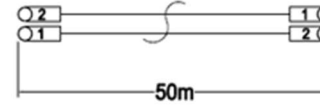
USL-8815-V3-104



2 Way Expanded Beam F.O Connector



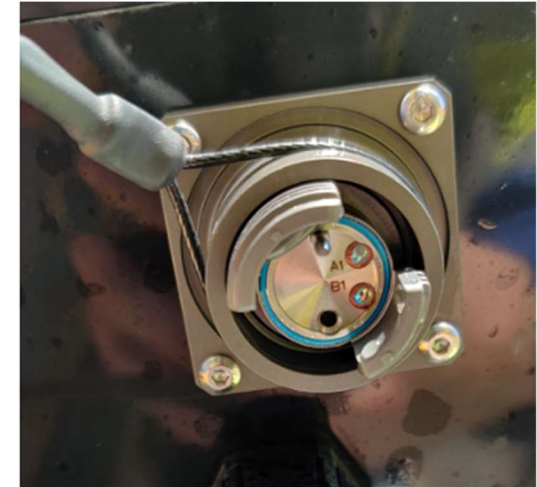
CONNECTION DIAGRAM:

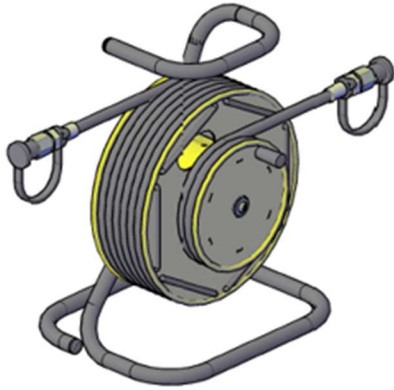


Connector notes:
 Connector and Protective cap supplied
 Cross-over type connector
 Hermaphroditic MIL-DTL-83526 type connector
 IP65 Rated Ingress Protection

Cable notes:
 Multimode 50 / 125 Military Tactical Deployment Cable
 Outer Jacket : Core- Locked Flame Retardant Polyurethane
 Maximum Attenuation 3.5/1.5dB/km @ 800/1300 nm
 Bandwith 500MHz-km @ 800/1300 nm
 Cable Weight: 29kg/km
 Cable Diameter (Nominal) : 5.6mm
 Max Operating Tensile Load :1,800N
 Min Operating Bend Radius : 4.5 cm
 Operating Temperature : -55°C to +71°C

Carry on F.O reel notes:
 Material: 316 S.S
 Finish: Powder coat
 Drum Colour :Yellow
 Frame Colour : Black
 Cable length : 50m





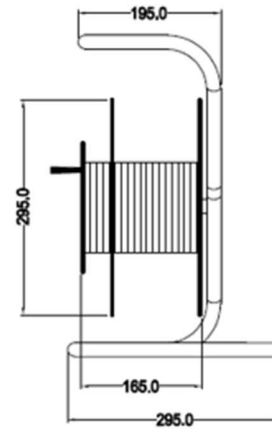
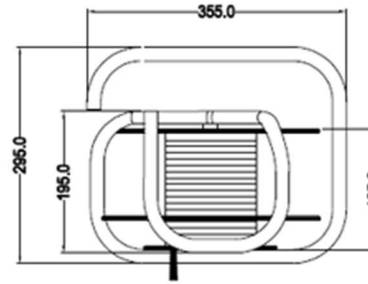
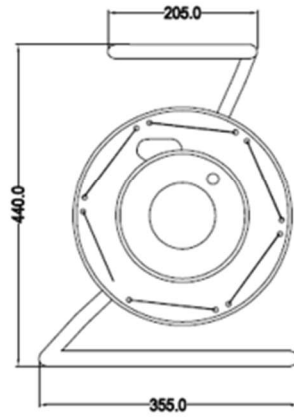
NOTE: ISOMETRIC VIEW NOT TO SCALE

Connector Notes (At Both Ends):
 QDC Nipple Cap (Stockit - 500028)
 QDC Open Male Nipple (Stockit - 500012)
 1/2" Fibre Washer (Stockit 500007)

Hose notes:
 1/4" Antistatic air hose with
 1/2" BSPP S/Steel fittings
 Stockit - 500078

Carry on SIGTTO reel notes:
 Material: 316 SS
 Finish: Powder coat
 Drum Colour :Yellow
 Frame Colour : Black
 Cable length : 25m

USL-8823-V0-104



7. Jetty/Tugboat information

Hamina Ö FG

Berth Information Ö														Port guidelines for the use of tug(s) considering wind direction and speed			
Cargo type:	Berth:	Length m:	Max draught:	Max vessel length:	Safe clearance depth:	Fender type:	Fender size:	Distance betw. Fenders m:	Bollard type:	Bollard design SWL:	Distance betw. Bollards m:	Height above sea level (m):	Heading angle:	Affecting wind directions	Suggestion to use tug	Recommendation to use tug	Order to use tug
Liquid Bulk / Gas	Ö1	35	*	130 m	10.0	Sumitomo lateral rubber cylinder Beta type vertical/lateral	300 H x 2 000 L 600 H x 2 000 L x 1 000 W	6.5	Big-T Vinch hook	750 kN 600 kN	Adequate	2.4	338 degrees	N, NE, E, SE, S, SW, W	10 m/s	15 m/s	20 m/s
	Ö2	75	*	185 m	11.2	Sumitomo lateral rubber cylinder Beta type vertical/lateral	300 H x 2 000 L 600 H x 2 000 L x 1 000 W	9.5	Big-T Vinch hook	750 kN 750 kN	15	2.4	338 degrees	N, NE, E, SE, S, SW, W	10 m/s	15 m/s	20 m/s
	Ö3	80	12.0	260 m	13.2	Sumitomo Lambda type vertical/lateral	800H x 2 000 L x 1 000 W	11.0	Tube Vinch hook	1 000 kN 50	21 50	2.4	304 degrees	NE, E, SE, S, SW, W, NW	8 m/s	13 m/s	17 m/s

* Please see Principles for Depth Practice in Harbour Basins (HaminaKotka 2020)