

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Miscellaneous**

with type designation(s)

4027.72 - Weld, Support Arch, 24 in MBR, C-stl,

4028.72 - Weld, Support Arch, 30 in MBR, C-stl,

4032.72 - Weld, Support Arch, 24 in MBR, SS,

4033.72 - Weld, Support Arch, 30 in MBR, SS

Issued to

ABCO Subsea

Houston TX, USA

is found to comply with

DNVGL-OS-E101 – Drilling plant, Edition July 2015

DNVGL-SI-0166 – Verification for compliance with Norwegian shelf regulations, Edition July 2015

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.

This Certificate is valid until **2022-12-18**.

Issued at **Houston** on **2017-12-19**

DNV GL local station: **Certification & Inspection Services**

for **DNV GL**

Approval Engineer: **Kairy Otero**

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Nick Prokopuk
Team Lead

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

Job Id: **262.1-023467-1**
Certificate No: **TAD00000FX**

Product description

Family of Support Arch for the handling of control umbilical hoses.

Application/Limitation

<u>Design Parameter</u>	<u>Value</u>	<u>(Equivalent)</u>
Max Line Tension	:907 kg	(1 ton)
Installation Lift Pad Eye Load Rating for 2 Pad Eye (Arch)	: 1270 kg	(1.27 ton)
Maximum Sling Angle to Vertical	: 15°	
Minimum Design Temperature	: -20°C.	(-4°F.)

Type Approval documentation

NOTE: Other part numbers or revisions may be acceptable under this Type Approval Certificate provided that critical aspects of the design remain the same. Changes shall be documented and approved, via Engineering Change Notice or similar, by the manufacturer's engineering and/or quality department. DNV GL's local surveyor shall verify the modification before issuance of Product Certificate.

The following drawings are type approved :

Drawings:

<u>Dwg. No.</u>	<u>Rev.</u>	<u>Title</u>
4027.72	3	Weld, Support Arch 24-in MBR, C-stl
4032.72	4	Weld, Support Arch 24-in MBR, SS
4028.72	1	Weld, Support Arch 30-in MBR, C-stl
4033.72	1	Weld, Support Arch 30-in MBR, SS

Calculations:

<u>Doc. No.</u>	<u>Rev.</u>	<u>Title</u>
2014-ABCO-X00189-223-DR-02	00	Design Report, 24-in MBR Support Arch Family Det Norske Veritas (DNV) Type Approval
2014-ABCO-X00189-223-DR-03	00	Design Report, 30-in MBR Support Arch Family Det Norske Veritas (DNV) Type Approval

Materials:

<u>Component</u>	<u>Material</u>	<u>Mim Yield Strength</u>	<u>Avg. Charpy Value</u>
<u>Stainless Steel Models</u>			
Plate	Duplex 2205, ASTM A240	65,000 psi	31 ft-lbf @ -4°F.
Tube	Duplex 2205, ASTM A276	65,000 psi	31 ft-lbf @ -4°F.
<u>Carbon Steel Models</u>			
Plate	API 2H-50 (Preferred) A572-50 (Optional) ABS-EH36 (Optional)	50,000 psi	31 ft-lbf @ -4°F.
Pipe	A106 Gr B/C	35,000 psi	20 ft-lbf @ -4°F.
Inst. Padeye	ASTM A572-55	55,000 psi	31 ft-lbf @ -4°F.
Plate & Insert			

Fabrication Procedures

Procedures related to testing, welding, NDT, etc. are to be reviewed/approved by DNV GL's local Surveyor

Prototype Testing



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Reference DNV GL stamped test reports from customer - Qualification Test Report (QTR) Stamped by DNV GL Reference 04/24/2015 & A0347683 – 10/17/2016

Marking of product

For traceability the following marking is to be carried out on each product:

1. Serial No.
2. Manufacturer's name or trademark
3. Additional marking at manufacturer's option

Certificate retention survey

For retention of the Type Approval, DNV GL's surveyor shall perform a survey every second year in accordance with DNV GL type approval scheme DNVGL-CP-0338 Edition October 2015, Section 4

END OF CERTIFICATE