

TYPE APPROVAL CERTIFICATE

This is to certify:**That the Lifting set for Offshore containers and Portable Offshore Units**

with type designation(s)

3.2T to 25T Type X - Dee and Bow Shackles

Issued to

FISCHER INDUSTRIA MECANICA LTDA
Rio Claro, SP, Brazil

is found to comply with

ABNT NBR 13545 Lifting purposes-Shackle**DNV GL standard DNVGL-ST-E271 – 2.7-1 Offshore containers, August 2017****DNV GL standard DNVGL-ST-E273 – 2.7-3 Portable offshore units, December 2016****Application :****Dee Shackle: Grade 6, Group A-F****Bow Shackle: Grade 6, Group A-F**Issued at **Høvik** on **2018-09-20**This Certificate is valid until **2022-06-29**.for **DNV GL**DNV GL local station: **Rio de Janeiro**Approval Engineer: **Nina Thorvaldsen Moberg**

Inger-Helene Hals
Head of Section

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.



Product description

This Type Approval Certificate replaces Type Approval Certificate S-7398.

The Type Approval Certificate covers 3.2T - 25T Grade 6 Dee and Bow Shackles for use in Lifting Sets certified to DNVGL-ST-E-271 standard 2.7-1 Offshore Containers (DNV GL 2.7-1) or to DNVGL-ST-E273 Standard 2.7-3 Portable Offshore Units (DNV GL 2.7-3).

Dimensions of shackles are in compliance with ABNT NBR 13545.

Detailed product information and range of certified products covered by this Type Approval are listed in Appendix 1 of this Type Approval Certificate.

Application/Limitation

For application of shackles the minimum shackle working load limit (WLL_s) shall be decided according to the strength requirements for lifting sets on offshore containers as given in DNV GL 2.7-1, Section 8.

All production testing to be according to Fischers procedure FI-321-019, DNV GL 2.7-1, DNV GL 2.7-3, ABNT NBR 13545 and in agreement with the DNV GL surveyor. Material to be impact tested by Charpy impact method according to DNV GL 2.7-1, Section 8.4, DNV GL 2.7-3 Section 7.4 or ABNT NBR 13545, whichever is strickter.

The manufacturer shall issue product certificates in accordance with DNV GL 2.7-1 Section 8.5 or DNV GL 2.7-3, Section 7.5.3, using the certificate form 342/FR029-00 Date: 5-Feb-2013. This certificate form is only to be used for shackles certified according to this Type Approval Certificate.

Shackle bolts shall be secured to prevent unwanted opening of the shackle.

For shackles certified in accordance with DNV GL 2.7-3:

Prior to selection of shackles, the minimum required shackle working load limit (WLL) shall be decided according to the strength requirements for lifting sets on portable offshore units as given in DNV GL 2.7-3, section 7.3.3. Resulting sling force (RSF) can be found in the Design Verification Report (DVR) issued by DNV GL for the Portable Offshore Unit. The DVR shall be available for the shackle manufacturer.

If shackle can experience significant out-of-plane loading, then shackle WLL shall be de-rated in accordance with DNV GL 2.7-3, Section 7.3.3.

Type Approval documentation

Tests carried out

Prototype strength and fatigue tested according to DNV GL 2.7-1, DNV GL 2.7-3 and ABNT NBR 13545.

Marking of product

Each item to be marked according to DNV GL 2.7-1 Section 8 or DNV GL 2.7-3 Section 7.6, ABNT NBR 13545 Section 14 and Fischer Industria Mecanica's internal procedure.

Periodical assessment

For retention of the Type Approval, a DNV GL surveyor shall perform an assessment with intervals not exceeding 6 months and before the expiry date of this certificate to verify that the type approval is complied with.



Job Id: **262.1-014620-2**
Certificate No: **TAS000016U**

END OF CERTIFICATE

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Certificate No: **TAS000016U**

Appendix 1

Product description and details

Grade 6 shackles:

Work Load Limit	Breaking Load	Nominal Bow Diameter	Nominal Pin Diameter	Product Code Dee Shackle	Product Code Bow Shackle
3.2 t	16.0 t	16.5 mm	18.5 mm	7265011 03	7266011 03
5.0 t	25.0 t	21.0 mm	23.5 mm	7265014 03	7266014 03
6.3 t	31.5 t	23.0 mm	26.0 mm	7265015 03	7266015 03
8.5 t	42.5 t	26.0 mm	29.0 mm	7265017 03	7266017 03
10.0 t	50.0 t	29.0 mm	32.5 mm	7265019 03	7266019 03
13.5 t	67.5 t	33.0 mm	38.0 mm	7265021 03	7266021 03
17.0 t	85.0 t	38.0 mm	42.0 mm	7265023 03	7266023 03
20.0 t	100.0 t	40.0 mm	45.0 mm	7265024 03	7266024 03
25.0 t	125.0 t	46.0 mm	52.0 mm	7265025 03	7266025 03