

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

with type designation(s)

Master Links, Intermediate Links, Joining Links and Terminal Links Types ENORM A & B

Issued to

J.D. Theile GmbH & Co. KG
Schwerte Nordrhein-Westfalen, Germany

is found to comply with

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****EN 1677-4 Components for slings – Safety – Part 4: Links, Grade 8****EN 12079-2 Offshore containers and associated lifting sets – Part 2: Lifting sets Design, manufacture and marking****IMO/MSC Circular 860****Application :****ENORM Grade 10 Links for Lifting Sets for Offshore Containers and Portable Offshore Units excluding subsea use**Issued at **Høvik** on **2017-12-21**for **DNV GL**This Certificate is valid until **2021-12-17**.DNV GL local station: **Essen**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.



Job Id: **262.1-020101-2**
Certificate No: **TAS0000029**
Revision No: **1**

Product description

This Type Approval Certificate is revision 1 of Type Approval Certificate TAS0000029, and replaces previous revision.

Links for use in Lifting Sets for Offshore Containers certified to standard DNV GL-ST-E271 - 2.7-1 Offshore Containers (DNV GL 2.7-1) or standard DNVGL-ST-E273 - 2.7-3 Portable Offshore Units (DNV GL 2.7-3) according to EN 1677-4 Components for slings - Safety - Part 4: Links, Grade 8 and relevant parts from DIN 5688-3.

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

DNV GL has accepted some components with internal dimension smaller than table 2 in EN 1677-4. These are marked in Appendix 1.

Application/Limitation

All production testing to be according to J.D. Theile's procedure FFE11, DNV GL 2.7-1 and EN 1677-4. Material to be impact tested by Charpy impact method according to DNV GL 2.7-1, Section 8.4.

The manufacturer shall issue product certificates according to Section 8.5 in DNV GL 2.7-1 or Section 7.5 in DNV GL 2.7-3, using the certificate form FQW32 rev. 0. This certificate form is only to be used for links certified according to this Type Approval Certificate.

For application of links the minimum working load limit (WLL) shall be decided according to the strength requirements for lifting sets on offshore containers as given in DNV GL 2.7-1 Offshore Containers, Section 8 or DNV GL 2.7-3 section 7 and J.D. Theile's internal procedure.

For links certified according to DNV GL 2.7-3

Prior to selection of links the minimum required 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 7.3.5. Resulting sling force (RSF) can be found in the Design Verification Report (DVR) issued by DNV GL for the Portable Offshore Unit.

This product is not approved for subsea use.

Type Approval documentation

Document No.	Rev.	Title
FQW32	0	Certificate form - J.D. Theile GmbH & Co. KG product certificate for offshore chain
FFE5	0	Prüfplan Aufhänge- und Endglieder A
FFE7	0	Prüfplan Übergangs- und Zwischenglieder B
DNV TA 001	1	Master Links, Intermediate Master Links, Joining Links & Terminal Links Types ENORM A & B
DNV TA 003	3	Manufacturing process – Offshore slings
DNV TA 004	00	Test equipment for Offshore chain sling
DNV TA 005	00	Manufacturing equipment for Offshore chain slings
FFE 10	3	JDT Offshore material specification
FFE 11	5	Control plan offshore slings and single links acc. To DNV GL 2.7-1
5500-002	04	Wärmebehandlung von Offshore – Gehängen nach DNVGL-ST-E271 (2.7-1)
2700-002	04	Eingangsprüfungen des Vormaterials
2700-004	07	Zwischenprüfungen an Kettenprodukten
2700-005	02	Zwischenprüfung an Einzelkettengliedern
2700-007	01	Rissprüfung nach dem Magnetstreifflussverfahren- Anweisung an die Prüfer

Job Id: **262.1-020101-2**
Certificate No: **TAS0000029**
Revision No: **1**

2700-011	04	Endprüfung an Kettenprodukten
2700-026	02	Position Kerbschlagproben - Offshore
3200-003	00	Fertigungsmaße für widerstandsgeschweißte Ketten
113443-2012-AQ-GER-DAkKS		Management System Certificate - ISO 9001:2008 - by DNV GL
SZMF-ED-PB-2017-0215		Stress corrosion testing using slow strain rate tensile test according to DIN EN ISO 7539-7 on material 1.6795 from heat no. 444751 and heat no. 215132 - by Salzgitter Mannesmann Forschung - dated 2017-08-08 -
08217 (14 pages)		Charpy impact test on different links and chains acc. to DNVGL-ST-371. The test was performed at company "Werkstoffprüfung Berg". Original documents enclosed. - dated 2017-10-26
10617 (15 pages)		Prototype test report of ENORM master links and intermediate links by JDT - witnessed by DNV GL Essen - dated 2017-10-19
09817 (48 pages)		Test report of ENORM master links and intermediate links by JDT - dated 2017-10-12
A0372395		Audit report endorsed by DNV GL Essen dated 2017-04-04

Tests carried out

Prototype strength tested according to standards.

Marking of product

Marking should be according to DNV GL 2.7-1 Offshore Containers, Section 8 or DNV GL 2.7-3 Portable Offshore Units Section 7 and EN 1677-4, but with "Grade 10".

Periodical assessment

For retention of the Type Approval, a DNV GL surveyor shall perform a survey every 6 months and before the expiry date of this certificate to verify that the type approval is complied with.

END OF CERTIFICATE

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Appendix 1

Product description and details:

The values about the working load limit specified below are nominal for each component and the correct selection shall be in accordance to DNV GL 2.7-1 Section 8.

Master links type ENORM A:

Type	Dia. [mm]	WLL [t]	MPF [kN]	Min. BF [kN]
ENORM A13 *	13	2,0	49,0	78,5
ENORM A16 *	16	2,5	61,3	98,1
ENORM A18	18	4,0	98,1	157
ENORM A22	23	6,8	166	265
ENORM A26 **	26	10,2	251	402
ENORM A32 **	32	14,3	352	563
ENORM A36 **	36	21,2	520	832
ENORM A40	40	22,4	550	880
ENORM A45	45	27,3	670	1070
ENORM A50	53	40,0	981	1570
ENORM A56	56	56,1	1370	2200
ENORM A63	63	59,2	1450	2320

*This size is only to be used for Portable Offshore Units.

** Non-standard sizes, see comment under Product Description.

Intermediate links type ENORM B:

Type	Dia. [mm]	WLL [t]	MPF [kN]	Min. BF [kN]
ENORM B10 *	10	2,5	61,3	98,1
ENORM B13	13	4,0	98,1	157
ENORM B16	16	6,8	166	265
ENORM B18	18	8,1	199	318
ENORM B20	20	10,7	260	418
ENORM B22	23	15,9	391	625
ENORM B26	26	20,1	493	788
ENORM B32	32	26,5	650	1040
ENORM B36	36	31,9	780	1250
ENORM B40	40	40,0	980	1570
ENORM B45	45	45,0	1100	1770

*This size is only to be used for Portable Offshore Units.