

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Lifting set for Offshore containers and Portable Offshore Units

with type designation(s)
Bow shackle SL-362

Issued to

AS Einar Kunsts Eftf.
Oslo, Norway

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 13889 Forged steel shackles for general lifting purposes - Dee shackles and Bow shackles - Grade 6 - Safety

ISO 10855-2:2018 Offshore containers and associated liftings sets – Part 2: Design, manufacture and testing of lifting sets

IMO/MSC Circular 860

Application :

Shackles for Lifting Sets for Offshore Containers and Portable Offshore Units

Issued at **Høvik** on **2020-09-23**

for **DNV GL**

This Certificate is valid until **2025-09-22**.

DNV GL local station: **Oslo**

Approval Engineer: **Igor Antonijevic**

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.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV GL AS, its parent companies and subsidiaries as well as their officers, directors and employees ("DNV GL") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.



Job Id: **262.1-026569-1**
Certificate No: **TAS00002ND**

Manufactured by

Shandong Shenli Rigging Co., Ltd, Shandong, China

AS Einar Kunsts Eftf. LLC takes responsibility that production is in compliance with the Rules, Standards and/or Regulations listed on page 1 of this Type Approval Certificate.

Product description

This type approval certificate covers shackles for use in lifting sets certified according to standard DNVGL-ST-E271 Offshore Containers (DNV GL 2.7-1) or to DNVGL-ST-E271 Standard 2.7-3 Portable Offshore Units (DNV GL 2.7-3).

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

Design temperature: -20°C

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 DNV GL 2.7-1 and EN 13889 in agreement with the DNV GL surveyor. Material to be Charpy impact tested 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, using the certificate form JL-SL-355/B as listed below. This certificate form is only to be used for slings certified according to this type approval certificate.

For shackles manufactured according to DNVGL-ST-E273:

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.

Type Approval documentation

Document No.	Rev.	Title
-	2018-09-08	Total list of DNV certified products
SLR1809362-SMD	D -2019.6.19	Product Instruction - Assembling method
9028 -2JB	B	Processing map of the bolts for bow shackle
202816M-1ZB	B	202816M 16x19 bow shackle manufacturing drawing
202816M-1JB	B	202816M 16x19 bow shackle machining drawing
202816M-1MB	B	202816M 16x19 bow shackle workblank (inspection) drawing
902820M-1MB	B	902820M 19x22 bow shackle workblank (inspection) drawing
902820M-1ZB	B	902820M 19x22 bow shackle machining drawing
902820M-1JB	B	902820M 19x22 bow shackle machining drawing
902822M -1ZB	B	902822M 22x25 bow shackle machining drawing
902822M-1MB	B	902822M 22x25 bow shackle workblank (inspection) drawing
902822M -1JB	B	902822M 22x25 bow shackle machining drawing
902825M -1MB	B	902825M 25x28 bow shackle workblank (inspection) drawing
902825M -1ZB	B	902825M 25x28 bow shackle machining drawing
902825M -1JB	B	902825M 25x28 bow shackle machining drawing
902828M -1MB	B	902828M 28x32 bow shackle workblank (inspection) drawing
902828M -1ZB	B	902828M 28x32 bow shackle machining drawing
902828M -1JB	B	902828M 28x32 bow shackle machining drawing
902832M -1ZB	B	902832M 32x35 bow shackle machining drawing
902832M-1JB	B	902832M 32x35 bow shackle machining drawing

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902832M -1MB	B	902832M 32x35 bow shackle workblank (inspection) drawing
902835M-JB	B	902835M 35x38 bow shackle machining drawing
902835M-MB	B	902835M 35x38 bow shackle workblank (inspection) drawing
902835M -1ZB	B	902835M 35x38 bow shackle machining drawing
902838M -1ZB	B	902838M 38x42 bow shackle machining drawing
902838M-1JB	B	902838M 38x42 bow shackle machining drawing
902838M-1MB	B	902838M 38x42 bow shackle workblank (inspection) drawing
902845M-1MB	B	902845M 45x51 bow shackle workblank (inspection) drawing
902845M-1ZB	B	902845M 45x51 bow shackle machining drawing
902845M-1JB	B	902845M 45x51 bow shackle machining drawing
1887591	-	Mill Test Certificate by Jiangsu Shagang Group Huaigang Special Steel -40Cr
1887622	-	Mill Test Certificate by Jiangsu Shagang Group Huaigang Special Steel -30Mn2
JL-SL-010	2017-10-12	Qualified supplier list
SLR1712362-RB	-	Heat treatment process card- SLR-362 G2130 Bow shackle - 30Mn2
SLR-1904362LS-RC	-	Heat treatment process card- SLR-362 G2130 Bow shackle bolt - 35CrMo
SL1712362-PCB (4 pages)	-	Process card: Blanking, forging, machining and assembly - SLR-362 G2130 Bow shackle
SL1510362LB	-	SLR-362 G2130 Bow shackle- technological process and check point
SL1712362G-B (2 pages)	-	Technical process card - SLR-362 G2130 Bow shackle
SLR1505JRD	-	Hot forging product bar heating operation instruction card
GZ-SL-28-287/E2 (4 pages)	2018-10-30	GENERAL TESTING OUTLINE FOR GRADE 6 SHACKLE TYPE PRODUCTS
JL-SL-355/B	-	Test certificate of the lifting set components
GZ-SL-28/289/E1 (3 pages)	2018-09-16	Introduction of Production Capacity
GZ-SL-28-290/E1 (2 pages)	2017-06-18	Quality Control System Introduction
00218E20210R4M	-	ISO 14001
00218Q10434R4M	-	ISO 9001
-	2019-04-28	Material report 35crmo
SHA/AR-805778	2020-08-03	Assessment report for lifting sets

SHA/80577800/VR-20012020-08-03 endorsed by DNV GL Shanghai

Tests carried out

Prototypes tested according to EN 13889 and DNV GL 2.7-1.

Marking of product

Marking shall be according to DNV GL 2.7-1 Section 8, EN 13889 and Crosby Group LLC internal procedures.

For shackles for Portable Offshore Units, each item has to be marked according to chapter 7.6 in DNV GL 2.7-3.

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

Bow shackles, Type SLR-362:

Variant	Product no.	Nom. size	WLL _s [t]	MPF [kN]	Min. BF [kN]
202816M	902416	5/8"	3,25	63.7	160.0
902820M	902420	3/4"	4,75	93.1	233.0
902822M	902422	7/8"	6,5	128.0	319.0
902825M	902425	1"	8,5	167.0	417.0
902828M	902428	1 1/8"	9,5	187.0	466.0
902832M	902432	1 1/4"	12	236.0	589.0
902835M	902435	1 3/8"	13,5	265.0	662.0
902838M	902438	1 1/2"	17	334.0	834.0
902845M	902445	1 3/4"	25	491.0	1226.0