DNV·GL

Certificate No:
TAS00000TF

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Lifting set for Offshore containers and Portable Offshore Units

with type designation(s)
Wire Rope Offshore Lifting Set

Issued to
Rope and Sling Specialists Ltd
Bridgend Mid Glamorgan, United Kingdom

is found to comply with
DNV 2.7-1 Offshore Containers (2013)
EN 12079-2 Offshore containers and associated lifting sets – Part 2: Lifting sets Design, manufacture and marking
EN 13414-1 Wire rope slings
IMO/MSC Circular 860

Application :

1-, 2-, -3- & 4-Part Lifting Sets for Lifting of Offshore Containers with Maximum Gross Mass 0 - 25000 kg.

This Certificate is valid until **2020-11-24**.
Issued at **Aberdeen** on **2016-11-25**

DNV GL local station: **Aberdeen Verification**

Approval Engineer: **William Lines**

for **DNV GL**
for DNV GL UK Ltd.
This document has been digitally signed and w
therefore not have handwritten signatures
Doig, Alex
Head of Section

Alex Doig
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

The Type Approval Certificate covers wire rope slings described in appendix 1, assembled by Rope and Sling Specialists Ltd according to DNV 2.7-1 Offshore Containers.

Those wire rope slings assembled by Rope and Sling Specialists Ltd consist of components from the following sub suppliers:

Component	**Sub supplier** *(DNV to be informed and review new sub suppliers)*	**DNV TA Certificate number[5]**
Master link & quad assembly	- SCAW South Africa (Pty) Limited – William Hackett - Kito Chain Italia Srl (Acciaierie Valcanale Srl) (G. Taylor) - Crosby Group	S-7732 S-8072 TAS000001V
Wire rope [1)]	- Hendrik Veder - Usha Martin - Latch and Batchelor	NA
Shackles [2)]	- Crosby Group, Inc. - Van Beest B.V (Green Pin)	S-8357 TAS00000HA S-7593, S-7649
Ferrules [3)]	- Talurit - Sahm Splice	NA
Thimbles [4)]	- Talurit - George Taylor	NA

1) Wire ropes used in bottom legs of lifting slings to be 6 x 19 or 6 x 36, Independent Wire Rope Core (IWRC) or Fibre Core (FC) with wire rope grades 1770 or 1960 N/mm^2, in accordance to EN 12385-4 or equivalent
2) Shackles are only considered part of sling if captive (i.e. cannot be removed after assembly of sling).
3) Ferrules / sleeves: According to EN 13411-3 or equivalent.
4) Thimbles: Federal Specification FF-T-276b, Type III, EN 13411-1 or equivalent.
5) Certificate number current at the time of issuance of this type approval certificate. The current certificate can be obtained at https://approvalfinder.dnvgl.com/

Components should be delivered with the following certificates:

- Master Links, Quad assemblies and Shackles:	Certificates based on DNV GL Type Approval.
- Wire Ropes:	To be supplied with traceable product certificates according to EN 10204, inspection certificate, type 3.1.
- Thimbles and ferrules:	To be supplied with a material certificate to EN 10204, test report, type 2.2.

Application/Limitation

For each delivered drum of wire rope, a test leg with one eye in each end to be prepared and tested to breaking. A reference should be made to the wire drum test report in each sling set certificate where that wire is used.

All production testing should be done according Rope and Sling Specialists Ltd's internal procedures and to be agreed with local DNV GL office.
The manufacturer shall issue product certificate according to Sec. 8.5 in DNV 2.7-1, using Rope and Sling Specialists Ltd. Form No. QMF 15 Issue 1 for wire rope slings.
This certificate form is only to be used for slings certified according to this Type Approval Certificate.
For slings manufactured according to DNV 2.7-1 Offshore Containers

Lifting sets shall be assembled according to the strength requirements for lifting sets on Offshore Containers as described in DNV 2.7-1 Offshore Containers, Section 8. The angle of the sling legs from vertical should be taken into account when choosing slings. This angle should normally be 45°, but smaller angles can be used.

Special slings, assembled according to the principles described in DNV 2.7-1 Offshore Containers, Section 8 and Appendix E, are also covered by this Type Approval. However, if unsymmetrical slings are to be assembled, local DNV GL office has to be contacted for reviewing in each case, unless otherwise is agreed with local DNV office.

> *Note: The sling leg is not necessarily the weakest part of the lifting set. Master link assemblies selected for slings with legs at 45° may not be suitable for slings with a smaller angle.*

The WLL to be used in certificates and marked on lifting sets shall be the maximum rating of an offshore container on which the sling can be used, at the given sling leg angle.

Type Approval documentation

This Type Approval Certificate was issued based on the following documentation:

Title	Document No.	Issue	Date
DNV 2.7-1 Work Instruction for Wire Rope Lifting Set	N/A	1	15/11/2016
Process Control	PRM 08	1	30/10/2003
Test/Examination/Repair of Lifting Equipment	PRM 12	1	30/10/2003
Identification and Traceability	PRM 13	1	30/10/2003
Inspection, Measuring & Test Equipment	PRM 23	1	30/10/2003

In addition the following documents are used as information for the Type Approval:

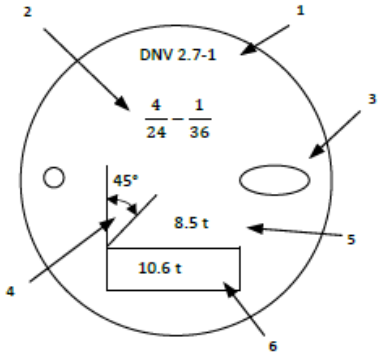
- Test certificates for:
- Wire ropes
- DNV GL Form 90.02a Type Approval Assessment Report dated 2016-11-15
- DNV GL Checklist for Initial Audit of Manufacturers – DNV 2.7-1 – Section 8 and Annex 1, dated 2016-11-25
- DNV GL Endorsed Rope & Sling Specialists Report of Thorough Examination dated 2016-11-14 for proof load and break testing.

Tests carried out

Prototype test to breaking load of assembled wire sling legs (Turnback Eye termination)

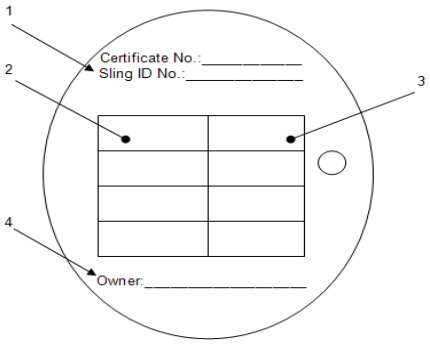
Marking of product

For slings manufactured according to DNV 2.7-1 Offshore Containers
Slings are to be marked with certification tag according to DNV 2.7-1 Offshore Containers, Section 8, as shown below:



Example of identification tag for a wire rope sling – Front

1) CE mark and Reference to DNV 2.7-1 or DNV 2.7-3
2) 4 legs of 24 mm, 1 forerunner of 36 mm (example)
3) Manufacturer's mark
4) Sling angle
5) Shackle size
6) WLL



Example of identification tag for a wire rope sling – Back

1) Certificate number (and unique identification number if applicable)
2) Column 1: inspectors mark, inspection suffix and date of periodic inspections (shall be of format YY-MM-DD)
3) Column 2: shackle ID number
4) The owner's name may optionally be included

Periodical assessment

In order to maintain the validity of the type approval, certificate retention surveys are to be carried out according to DNV 2.7-1. Intervals are not to exceed 12 months.

END OF CERTIFICATE

Appendix 1

Wire rope slings with aluminium ferrules assembled by Rope and Sling Specialists Ltd., covered by this Type Approval Certificate:

Product Name	Applicable Standards	Material Grades	Parameter range (Multi-leg)			
			SIZE(Ø) [mm]	WLL [t]	PL [kN]	BL [kN]
Steel wire rope	EN12385-4	1960 N/mm^2	48 max for forerunner	25.0	580	1610
Link assemblies	EN1677-4	Grade 8	22/20~40/32 or equivalent	~28.1	~71t	~112t
Shackles	EN13889	Grade 6	~35	~13.5	~27t	~67.5t

Appendix 2

On offshore containers certified according to the 1989 and 1995 editions of DNV 2.7-1 the dimensioning of shackles was based on the breaking strength. On some containers both the diameter of the shackle pin hole and the location of the padeye may not allow the use of larger shackles.

Where existing pad eye on the Offshore Container does not fit with the required shackle dimension, application of shackles should be as follows:

Minimum required breaking force, BFmin (kN), for shackles should be calculated according to the following formula:

$$BF_{min} = \frac{R \cdot g}{1000 \cdot (n-1) \cdot \cos(v)} \cdot SF$$

where:

R = Rating
g = Standard acceleration of gravity (~9,81 m/s2)
n = Number of legs
v = The angle of sling leg from vertical
SF = Safety Factor (table 1), between given values the SF can be found by linear interpolation

The shackle should have a BF ≥ BFmin, where the applicable BF, according to DNV 2.7-1 (1995), can be found in Appendix 2 in DNV GL Type Approval Certificates for shackles, where applicable.

DNV GL Type Approval certificates can be found under "Approved Services" on DNV's website: http://www.dnvgl.com

For wire rope lifting sets, if not possible to fit the shackle in the wire leg eye, it is acceptable to fit an intermediate link between the leg and the shackle, with a WLL ≥ WLLmin as calculated for the leg according to DNV 2.7-1 Offshore Containers, chapter 8, see figure 1.

Table 1

Rating, R (kg)	Safety Factor (SF)
≤ 6000	8,0
10000	6,8
15000	5,8
20000	5,2
25000	5,0

Figure 1