

Crosby Group LLC  
Att.: David Boyle  
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TULSA OK 74101

DNV GL USA, INC.  
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<b>Date:</b>	<b>Our reference:</b>	<b>Your reference:</b>
2020-03-25	S-8357	M-1804675

**Sub: CROSBY GROUP LLC; CROSBY GROUP INC. - RENEWAL OF TAC S-8357**

Dear Mr. Boyle,

Renewal of Type Approval Certificate No. S-8357 (2130-OC, 2140-OC) is in progress. As previously noted, 209-OC screw pin shackles will not be renewed. This letter does not extend the type approval for the 209-OC product line. Please note that Certificate No. S-8357 remains valid for 2130-OC and 2140-OC shackles until 2020-07-31.

Thanking You,

YOURS FAITHFULLY  
FOR DNV GL USA, INC.



Ron Quiballo  
Approval Engineer/Surveyor

## TYPE APPROVAL CERTIFICATE

### This is to certify:

**That the Lifting Set for Offshore Containers and Portable Offshore Units**

with type designation(s)  
**Offshore Container Shackle Types 209-OC, 2130-OC, 2140-OC**

Issued to  
**Crosby Group LLC**  
**Tulsa OK, United States**

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**  
**IMO/MSC Circular 860**  
**EN 13889 Forged steel shackles for general lifting purposes - Dee shackles and Bow shackles - Grade 6 - Safety**

### Application :

**Shackles for use on offshore containers.**  
**See next page.**

This Certificate is valid until **2018-06-30**.

Issued at **Houston** on **2014-03-27**

DNV GL local station: **Houston - Systems & Components**

Approval Engineer: **Krista Bennett**



for **DNV GL**  
Digitally Signed By: Prokopuk, Nick  
Location: DNV Houston, USA  
Signing Date: 10/1/2014

**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. If any person suffers loss or damage which is proven to have been caused by any negligent act or omission of the Society, then the Society shall pay compensation to such person for his proven direct loss or damage. However, the compensation shall not exceed an amount equal to ten times the fee charged for the service in question. The maximum compensation shall never exceed USD 2 million. In this provision the "Society" shall mean DNV GL AS as well as all its direct and indirect owners, affiliates, subsidiaries, directors, officers, employees, agents and any other person or entity acting on behalf of DNV GL AS.

Certificate No: **S-8357**  
File No: **911.53**  
Job Id: **262.1-007556-2**

## Manufactured at

Shackles to be manufactured at one of the following plants in the Crosby Group:

### Place of manufacture

Lebus Manufacturing, Longview, Texas, USA  
McKissick Products, Tulsa, Oklahoma, USA  
Crosby Canada Ltd., Brampton, Ontario, Canada  
Crosby Europe NV, Putte (Mechelen), Belgium

### Local DNV Office

DNV Houston  
DNV Houston  
DNV Houston  
DNV Antwerp

## Responsibility

The manufacturer, Crosby Group LLC, takes responsibility that production at all places of manufacture are in compliance with the Rules, Standards and/or Regulations listed on page 1 of this Type Approval Certificate.

## Product description

Shackles for use in Lifting Sets for Offshore Containers certified to DNV 2.7-1 Offshore Containers.

Shackle type 209: Screw pin omega shackle

Shackle types 2130 and 2140: Omega anchor shackles secured by nut and split pin

Material and shackle design complies with US Federal Specification RR-C-271F and EN 13889 as specified in Crosby Quality procedure 1340 Rev.8 and drawing G 1262200 Rev. 4

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 2.7-1 Offshore Containers, Chapter 8.


Shackles shall be of bolt type with hexagon nut and split pin. Screw pin shackles shall not be used. However, on existing containers where location and design of pad eyes are such that it is not possible to use shackles with nut and split pins, screw pin shackles may be used. They should be secured to prevent unintentional withdrawal.

Tests to be carried out:

- Production testing: According to Crosby Quality Control Procedure No. 1340, Rev. 8, DNV 2.7-1 Offshore Containers and EN standard EN 13889 "Forged steel shackles for general lifting purposes - Dee shackles and Bow shackles - Grade 6 - Safety" in agreement with the DNV surveyor.
- Material to be impact tested by Charpy impact method according to DNV 2.7-1 Offshore Containers, Chapter 8.4.

The manufacturer shall issue product certificates according to Sec. 8.5 in DNV 2.7-1, using the certificate form listed below.

For replacing and repair of lifting sets on Offshore Containers certified according to the 1989 and 1995 editions of DNV 2.7-1 Offshore Containers, please follow the procedure as given in Appendix 2 of this Type Approval Certificate.



Certificate No: **S-8357**  
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### **Type Approval documentation**

This Type Approval Certificate is a revision of TAC S-8015

Drawing G 1262200 Rev. 4

Crosby Quality Control Procedure No. 1340, Rev. 8

DNV test report No. 410-4-6159 dated 9 Dec. 2003 with additional test data supplied by Crosby

Crosby Group Inc. product certificate for shackles, Form No. Form 271 Product Certificate OC Shackles

### **Tests carried out**

Type Approval Assessment Report A0006453 Dated 2014-02-13

### **Marking of product**

Marking should be according to DNV 2.7-1 Offshore Containers, Chapter 8, EN 13889 "Forged steel shackles for general lifting purposes - Dee shackles and Bow shackles - Grade 6 – Safety" and US Fed.Spec. RR-271F.

### **Periodical assessment**

In order to maintain the validity of this type approval, certificate retention surveys are to be carried out according to DNV 2.7-1.

END OF CERTIFICATE

Certificate No: S-8357  
 File No: 911.53  
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## Appendix 1

Product description and details

Type 209, screw pin shackles: \*)

P/N	Type	Nom. size	SF	WLL <sub>s</sub> [t]	MPF **)		Min. BF**)	
					[kN]	[lbs]	[kN]	[lbs]
1262219	209	5/8"	6	3,25	77	17,200	191	43,000
1262228	209	3/4"	6	4,75	112	25,120	279	62,800
1262237	209	7/8"	6	6,5	153	34,400	383	86,000
1262246	209	1"	6	8,5	200	44,960	500	112,400
1262255	209	1 1/8"	6	9,5	223	50,240	559	125,600
1262264	209	1 1/4"	6	12	282	63,480	706	158,700
1262273	209	1 3/8"	6	13,5	318	71,400	794	178,500
1262282	209	1 1/2"	6	17	400	89,920	1,000	224,800
1262291	209	1 3/4"	6	25	588	132,240	1,471	330,600

Type 2130, omega anchor shackles secured by nut and split pin:

P/N	Type	Nom. size	SF	WLL <sub>s</sub> [t]	MPF **)		Min. BF**)	
					[kN]	[lbs]	[kN]	[lbs]
1262013	2130	5/8"	6	3,25	77	17,200	191	43,000
1262022	2130	3/4"	6	4,75	112	25,120	279	62,800
1262031	2130	7/8"	6	6,5	153	34,400	383	86,000
1262040	2130	1"	6	8,5	200	44,960	500	112,400
1262059	2130	1 1/8"	6	9,5	223	50,240	559	125,600
1262068	2130	1 1/4"	6	12	282	63,480	706	158,700
1262077	2130	1 3/8"	6	13,5	318	71,400	794	178,500
1262086	2130	1 1/2"	6	17	400	89,920	1,000	224,800
1262095	2130	1 3/4"	6	25	588	132,240	1,471	330,600

Type 2140, omega anchor shackles secured by nut and split pin:

P/N	Type	Nom. size	SF	WLL <sub>s</sub> [t]	MPF **)		Min. BF**)	
					[kN]	[lbs]	[kN]	[lbs]
1262407	2140	1 1/2"	5	30	635	142,800	1,588	357,000
1262416	2140	1 3/4"	5	40	847	190,400	2,117	476,000
1262425	2140	2"	5	55	1,165	262,000	2,914	655,000
1262434	2140	2 1/2"	5	85	1,797	404,000	4,493	1,010,000
1262443	2140	3"	5	120	2,544	572,000	6,631	1,430,000
1262452	2140	3 1/2"	5	150	3,185	716,000	7,962	1,790,000
1262461	2140	4"	5	175	3,701	832,000	9,252	2,080,000

\*) Regarding screw pin shackles, see Application/Limitations

\*\*) Manufacturing Proof Force and Minimum Breaking Force to meet or exceed to EN 13889

## 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, BF<sub>min</sub> (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/s<sup>2</sup>)

n = Number of legs

v = The angle of sling leg from vertical

SF = Safety Factor (table 2), between given values the SF can be found by linear interpolation

The shackle should have a BF ≥ BF<sub>min</sub>, where the applicable BF, according to DNV 2.7-1 (1995), can be found in table 1.

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 ≥ WLL<sub>min</sub> as calculated for the leg according to DNV 2.7-1 Offshore Containers, chapter 8, see figure 1.

Table 1

Nom. size	MPF <sup>*)</sup> [kN]	BF <sup>*)</sup> [kN]
5/8"	76,4	191
3/4"	111,6	279
7/8"	153,2	383
1"	200,0	500
1 1/8"	223,6	559
1 1/4"	282,4	706
1 3/8"	317,6	794
1 1/2"	400,0	1000
1 3/4"	588,4	1471

Table 2

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

Figure 1



\*)Tested Breaking Force and Manufacturing Proof Force based on factor of safety of 6 against breaking and 2.4 against proof force, for Crosby shackles Type 209 and 2130.