

TYPE APPROVAL CERTIFICATE**This is to certify:****That the CRX-P 2", CRX-P 2½", CRX-P 3", CRX-P 3½" and CRX-P 4" Swivels**

with type designation(s)

014-0041, 014-0024, 014-0025, 014-0026 and 014-0027

Issued to

**De Haan Special Equipment B.V.
Stadskanaal, Groningen, Netherlands**

is found to comply with

DNVGL-OS-E302 – Offshore mooring chain, Edition July 2018**Application :****To be used for Temporary and Mobile Mooring as defined in DNVGL-OS-E301 "Position Mooring" July 2018**Issued at **Høvik** on **2019-11-08**for **DNV GL**This Certificate is valid until **2024-11-07**.DNV GL local station: **Rotterdam**Approval Engineer: **Pierre-Eric Moulia**

**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.



Certificate TAS000023U replaces expired S-8542.

Product description

Swivel CRX-P 2": Material grade R3, R4 and R5 swivels, to used for nominal diameter chain 52 mm of equal grade.

Swivel CRX-P 2½": Material grade R3, R4 and R5 swivels, to used for nominal diameter chain 64 mm of equal grade.

Swivel CRX-P 3": Material grade R3, R4 and R5 swivels, to used for nominal diameter chain 76 mm of equal grade.

Swivel CRX-P 3½": Material grade R3, R4 and R5 swivels, to used for nominal diameter chain 89 mm of equal grade.

Swivel CRX-P 4": Material grade R3, R4 and R5 swivels, to used for nominal diameter chain 102 mm of equal grade.

	R3		R4		R5	
	MBL (kN)	PL (kN)	MBL (kN)	PL (kN)	MBL (kN)	PL (kN)
CRX-P 2"	2402	1681	2952	2327	3447	2704
CRX-P 2½"	3551	2484	4364	3440	5096	3997
CRX-P 3"	4884	3417	6001	4731	7009	5498
CRX-P 3½"	6514	4557	8004	6310	9348	7332
CRX-P 4"	8315	5817	10217	8054	11932	9359

Load bearing materials are to be R grade

Application/Limitation

The swivels are to be used as torque built up absorber in chains for Temporary and Mobile Mooring as defined in Offshore Standard DNVGL-OS-E301 'Position Mooring' July 2018. The chain shall be of equal grade and size as the swivel.

The swivels are not permitted in long term mooring systems that are designed according to DNVGL-OS-E301 'Position Mooring'. Ref DNVGL-OS-E301 July 2018 Ch2 sec 4 §8.1.7.

The swivels shall be manufactured and tested in accordance with Offshore Standard DNVGL-OS-E302 'Mooring Chain' July 2018.

The approval is conditional that manufacturer is holding an Approval of Manufacturer Certificate, and is approved by DNVGL for making R3, R4 and R5 grade material of designation given the type approval drawings.

Individual Product Certificate is to be issued for each size/delivery.

Type Approval documentation

Swivel drawings for size 2" or 52 mm:

Drawing No.	Rev.	Date	Title
014-0041	A	27-08-2019	CRX-P 2" OS-E302 DNV-GL
014-00412	A	27-08-2019	Body 2" assembly
014-004121	A	27-08-2019	Body dia. 219x216
014-004122	A	28-08-2019	Bronze bushing dia. 140/110x30, GBr12
014-00411	A	27-08-2019	Swivel eye 2" assembly
014-004111	A	27-08-2019	Swivel eye 2"
014-004112	A	27-08-2019	Ring dia. 208/160,5x5, Hemi ax 3
014-004114	A	27-08-2019	Ring dia. 208/126,4x4, Hemi ax 3
014-004113	A	27-08-2019	Bronze ring dia. 167/111x6, Hemi ax 3
02-363	A	28-08-2019	Nut dia. 165x71,5 M110x4
18-123	-	30-09-2014	Locking-plate 30x10x137 Hardox 400

Drawing No.	Rev.	Date	Title
014-00413	A	28-08-2019	Fixed eye 2" assembly
014-004131	A	28-08-2019	Fixed eye 2"
014-004132	-	30-09-2014	Bronze bushing dia. 150/140x55, GBr12
18-186	A	04-10-2016	Secure plate 32x55x12 M10, Toolox33

Swivel drawings for size 2,5" or 64 mm:

Drawing No.	Rev.	Date	Title
02-362	-	23-09-2014	Nut dia. 215x82 M130x4
014-00241	-	23-09-2014	Swivel eye 2½" assembly
014-00243	-	23-09-2014	Fixed eye 2½" assembly
014-00242	-	23-09-2014	Body 2½" assembly
014-002411	-	23-09-2014	Swivel eye 2½"
014-002412	-	23-09-2014	Ring dia. 263/185x5, Hemiax 3
014-002413	-	23-09-2014	Bronze ring dia. 215/131x8, Hemiax 3
014-002414	-	23-09-2014	Bronze ring dia. 263/185x3, Hemiax 3
014-002422	-	23-09-2014	Bronze bushing dia. 160/130,4x35, GBr12
014-002431	-	23-09-2014	Fixed eye 2½"
014-002432	-	23-09-2014	Bronze bushing dia. 185/170x60, GBr12
014-002421	-	24-06-2014	Body dia. 275x245
014-0024	-	04-06-2019	CRX-P 2½" OS-E302 DNV-GL
18-122	-	23-09-2014	Locking-plate 40x10x167 Hardox 400/16MnCr5
18-186	A	04-10-2016	Secure plate 32x55x12 M10, Toolox33

Swivel drawings for size 3" or 76 mm:

Drawing No.	Rev.	Date	Title
02-317	C	23-11-2015	Nut dia. 265x81,5 M150x4
9-30321	E	04-10-2016	Swivel eye 3" assembly
9-30323	B	25-11-2015	Fixed eye 3" assembly
9-30372	D	04-10-2016	Body 3" assembly
9-303211	D	04-10-2016	Swivel eye 3"
9-303212	E	04-10-2016	Ring dia. 313/215x5, Hemiax 3
9-303213	B	23-11-2015	Bronze ring dia. 267/151x8, Hemiax 3
9-303214	-	15-06-2009	Ring dia. 313/215x3, Hemiax 3
9-303222	C	04-10-2016	Bronze bushing dia. 190/150,4x35, GBr12
9-303231	B	25-11-2015	Fixed eye 3"
9-303232	A	04-07-2012	Bronze bushing dia. 225/210x60, GBr12
9-303721	C	03-10-2016	Body dia. 325x254
014-0025	C	11-10-2016	CRX-P 3" OS-E302 DNV-GL
18-073	A	04-07-2012	Locking plate 50x10x207 HOH165 16MnCr5/Hardox 400
18-186	A	04-10-2016	Secure plate 32x55x12 M10, Toolox33

Swivel drawings for size 3,5" or 89 mm:

Drawing No.	Rev.	Date	Title
02-345	B	12-02-2016	Nut dia. 306x81,5 M170x4
012-01501	D	01-11-2017	Swivel eye 3½" assembly
012-01503	B	02-11-2017	Fixed eye 3½" assembly
012-01552	D	27-12-2016	Body 3½" assembly
012-015011	B	01-11-2017	Swivel eye 3½"
012-015012	A	27-12-2016	Ring dia. 368/251x5, Hemiax 3
012-015013	A	12-02-2016	Bronze ring dia. 308/171x8, Hemiax 3
012-015014	-	27-07-2012	Ring dia. 368/251x3, Hemiax 3
012-015022	C	27-12-2016	Bronze bushing dia. 210/170,4x35, GBr12
012-015031	B	02-11-2017	Fixed eye 3½"

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Drawing No.	Rev.	Date	Title
012-015032	-	04-06-2019	Bronze bushing dia. 270/255x60, GBr12
012-015521	C	27-12-2016	Body dia. 379x256
014-0026	E	02-11-2017	CRX-P 3½" OS-E302 DNV-GL
18-100	-	04-06-2019	Locking plate 50x10x250, 16MnCr5
18-185	A	06-12-2016	Secure plate 53x60x12

Swivel drawings for size 4" or 102 mm:

Drawing No.	Rev.	Date	Title
02-364	A	29-08-2019	Nut dia. 360x91,5 M190x4
014-00271	A	29-08-2019	Swivel eye 4" assembly
014-00273	A	29-08-2019	Fixed eye 4" assembly
014-00272	A	29-08-2019	Body 4" assembly
014-002711	A	29-08-2019	Swivel eye 4"
014-002712	A	29-08-2019	Ring dia. 422/285,5x5, Hemiax 3
014-002713	A	29-08-2019	Bronzen ring dia. 362/191x8, Hemiax 3
014-002714	A	29-08-2019	Ring dia. 422/285,5x3, Hemiax 3
014-002722	A	29-08-2019	Bronze bushing dia. 230/190,4x40, GBr12
014-002731	A	29-08-2019	Fixed eye 4"
014-002732	-	30-09-2014	Bronze Bushing dia. 310/290x70, GBr12
014-002721	A	29-08-2019	Body dia. 433x281
014-0027	A	29-08-2019	CRX-P 4" OS-E302 DNV-GL
18-124	-	30-09-2014	Locking plate 50x10x250 16MnCr5
18-185	A	06-12-2016	Secure plate 53x60x12

Prototype testing and analysis:

Drawing No.	Rev.	Date	Title
R1058-swivelR5	3	01-11-2012	Strength and Fatigue Analysis of a R5 Swivel
R1058-swivelR4	0	25-11-2011	Strength and Fatigue Analysis of a R4 Swivel
R14085_C	0	17-10-2014	Strength and Fatigue Analysis of a 2.0 inch R5 Swivel
R14085_B	0	13-10-2014	Strength and Fatigue Analysis of a 2.5 inch R5 Swivel
R14085_A	0	07-10-2014	Strength and Fatigue Analysis of a 4.0 inch R5 Swivel
DH4051	2	07-02-2014	Fatigue test procedure
TNO 2014 R11032	-	15-07-2014	Measurement report of a series of three 3" swivels, type CRX-Grade 5

Tests carried out

Fatigue prototype testing was carried out in May and June 2014.

Tests are to be carried out for each delivery/order, as described in Offshore Standard DNVGL-OS-E302 'Mooring Chain' July 2018.

Marking of product

Each swivel shall be marked according to Offshore Standard DNVGL-OS-E302 'Mooring Chain' July 2018 Ch2 Sec2 §1.4 & §3.9

Periodical assessment

For retention of this Type Approval, a DNVGL surveyor shall perform a periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days). The objective of the periodical assessment is to verify that the conditions for the Type Approval have not been altered. (Ref DNVGL-CP-0338 Type approval scheme).