

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Pipe Couplings, Bite and Compression Type

with type designation(s)

SS40-P, SS40-T, SS-3300-P, SS-3300-T, MAS-3000, MAS-3000-RCPL, CN-200, CN-700, CN-3300

Issued to

Lokring Technology LLC
Willoughby, OH, USA

is found to comply with

DNV GL rules for classification – Ships Pt.4 Ch.6 Piping systems
DNVGL-OS-D101 – Marine and machinery systems and equipment, Edition January 2018
DNV GL class programme DNVGL-CP-0185 – Type approval – Mechanical joints

Application :

Product(s) approved by this certificate is/are accepted for installation on vessels classed by DNV.

Type:	Temperature range:	Max. working press.:	Sizes:
SS40-P	-320°F (-196°C) to 800°F (426°C)	3300 psi (227 bar)	1/4" to 3"
SS40-T	-320°F (-196°C) to 800°F (426°C)	3300 psi (227 bar)	1/4" to 2-1/2"
SS-3300-P	-320°F (-196°C) to 800°F (426°C)	3300 PSI (227 bar)	1/4" to 1-1/2"
SS-3300-T	-320°F (-196°C) to 800°F (426°C)	3300 psi (227 bar)	1/4" to 3/4"
MAS-3000	-20°F (-29°C) to 572°F (300°C)	3300 PSI (227 bar)	1/4" to 3"
MAS-3000-RCPL	-20°F (-29°C) to 572°F (300°C)	3300 PSI (227 bar)	1/4" to 3"
CN-200	-58°F (-50°C) to 425°F (218°C)	290 PSI (20 bar)	1/4" to 2"
CN-700	-58°F (-50°C) to 425°F (218°C)	700 PSI (48 bar)	1/4" to 2"
CN-3300	-58°F (-50°C) to 425°F (218°C)	3300 PSI (227 bar)	1/4"

Issued at **Høvik** on **2021-03-16**

for **DNV**

This Certificate is valid until **2026-03-15**.

DNV local station: **Certification & Inspection Services**

Approval Engineer: **Andreas Hansen**

Zeinab Sharifi
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 AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") 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.



Product description

Swage type compression fittings manufactured from the following materials:

Type	Material designation		
	Body	Drive Ring	Pipe / Tube
SS-40 SS-3300	ASTM A276 316L ASTM A479 316L	ASTM A276 316L ASTM A479 316L	ASTM A312 304/304L/316/316L
MAS-3000	ASTM A675/A513	ASTM A675/A513	ASTM A106/A53/A53S ASTM A53E/A106/A587
MAS-3000- RCPL	ASTM A312 TP316/316L	ASTM A675/A513	ASTM A106/A53/A53S/A53E/A587
CN-200	ASTM B466 C70600	ASTM B466 C70600	ASTM B466 C70600 ASTM B111 NES 779 Part 3
CN-700	ASTM B151 C71500	ASTM B151 C70600	ASTM B151 C71500 ASTM B466 C70600
CN-3300	ASTM B151 C71500	ASTM B151 C71500	ASTM B151 C71500

Manufacturing location:

38376
 Apollo Parkway
 Willoughby, OH USA
 44094

Application/Limitation

Maximum working pressure at room temperature:

SS40-P				
Size		OD	Sch / Thck	MAWP [psi (bar)]
NPS	DASH			
¼	04	0.540	10/40/80	3300 (227)
3/8	06	0.675	10/40/80	3300 (227)
½	08	0.840	10/40/80	3300 (227)
¾	12	1.050	10/40/80	3300 (227)
1	16	1.315	10/40/80	3300 (227)
1 ¼	20	1.660	10/40/80	2500 (172)
1 ½	24	1.900	10/40/80	1900 (131)
2	32	2.375	10/40/80	1500 (103)
3	48	3.500	10/40/80	920 (63)
SS40-T				
Size		OD	Sch / Thck	MAWP [psi (bar)]
NPS	DASH			
¼	04	0.250	0.035/0.049/0.065	3300 (227)
3/8	06	0.375	0.035/0.049/0.065	3102 (227)
½	08	0.500	0.035/0.049/0.065	2444 (168)
5/8	10	0.625	0.035/0.049/0.065	1974 (136)
¾	12	0.750	0.035/0.049/0.065	1598(110)
2	32	2.000	0.065/0.083	1034 (71)
2 ½	40	2.500	0.065/0.083	846 (58)
SS-3300-P				
Size		OD	Schedule	MAWP [psi(bar)]
NPS	DASH			
¼	04	0.540	10/40/80	3300 (227)
3/8	06	0.675	10/40/80	3300 (227)
½	08	0.840	10/40/80	3300 (227)
¾	12	1.050	10/40/80	3300 (227)
1	16	1.315	10/40/80	3300 (227)
1 ¼	20	1.660	10/40/80	2500 (172)
1 ½	24	1.900	10/40/80	1900 (131)

SS-3300-T				
Size		OD	Thickness [Inch]	MAWP [psi(bar)]
NPS	DASH			
¼	04	0.250	0.035/0.049/0.065	3300 (277)
3/8	06	0.375	0.035/0.049/0.065	3102 (227)
½	08	0.500	0.035/0.049/0.065	2444 (168)
5/8	10	0.625	0.035/0.049/0.065	1974 (136)
¾	12	0.750	0.035/0.049/0.065	1598(110)

MAS-3000				
Size		OD	Schedule	MAWP [psi(bar)]
NPS	DASH			
¼	04	0.540	40/80	3300 (227)
3/8	06	0.675	40/80	3300 (227)
½	08	0.840	40/80/160	3300 (227)
¾	12	1.050	40/80/160	3300 (227)
1	16	1.315	40/80/160	3300 (227)
1 ¼	20	1.660	40/80	2480 (170)
1 ½	24	1.900	40/80	2200 (151)
2	32	2.375	40/80	1790 (103)
2 ½	40	2.875	40/80	2300 (158)
M76.1	76.1	76.1	40/80	2300 (158)
3	48	3.500	40/80	1700 (117)

MAS-3000-RCPL				
Size		OD	Schedule	MAWP [psi(bar)]
NPS	DASH			
¼	04	0.540	40/80	3300 (227)
3/8	06	0.675	40/80	3300 (227)
½	08	0.840	40/80	3300 (227)
¾	12	1.050	40/80	3300 (227)
1	16	1.315	40/80	2475 (170)
1 ¼	20	1.660	40/80	1875 (129)
1 ½	24	1.900	40/80	1695 (116)
2	32	2.375	40/80	1125 (77)
3	48	3.500	40/80	920 (63)

CN-200 / CN-700 / CN-3300-T										
Size		OD			Thickness [Inch]			MAWP [psi(bar)]		
NPS	DASH	200	700	3300	200	700	3300	CN-200	CN-700	CN-3300
¼	04	0.540	0.540	0.250	0.065	0.065	0.035	290 (20)	700 (48)	3300
3/8	06	0.675	0.675	-	0.065	0.072	-	290 (20)	700 (48)	-
½	08	0.840	0.840	-	0.065	0.072	-	290 (20)	700 (48)	-
¾	12	1.050	1.050	-	0.065	0.083	-	290 (20)	700 (48)	-
1	16	1.315	1.315	-	0.065	0.095	-	290 (20)	700 (48)	-
1 ¼	20	1.660	1.660	-	0.072	0.095	-	290 (20)	700 (48)	-
1 ½	24	1.900	1.900	-	0.072	0.109	-	290 (20)	700 (48)	-
2	32	2.375	2.375	-	0.083	0.120	-	290 (20)	700 (48)	-

For couplings at elevated temperatures, the maximum working pressure shall be reduced with the following factors:

Factor	Temperature [°C]	≤20	50	100	150	200	218	250	300	350	400	426
	Temperature [°F]	≤70	120	210	300	390	420	480	570	660	750	800
	Stainless steel	1	0,95	0,85	0,77	0,71	0,68	0,67	0,63	0,60	0,58	0,57
Low alloyed steel	1	1	1	0,93	0,87	0,83	0,81	0,75	0,69	0,63	0,60	
Copper-nickel alloy	1	1	1	0,89	0,81	0,75	0,72	-	-	-	-	

Traditional stainless steels, including type 316 or 316L, are not considered suitable for use in seawater systems.

Couplings covered by this certificate are only to be used in piping classes I, II and III in below applications:

<p>1) Flammable fluids (flash point \leq 60°C)</p> <ul style="list-style-type: none"> - Cargo oil lines - Crude oil washing lines - Vent lines <p>2) Inert gas</p> <ul style="list-style-type: none"> - Water seal effluent lines - Scrubber effluent lines - Main lines - Distributions lines <p>3) Flammable fluids (flash point > 60°C)</p> <ul style="list-style-type: none"> - Cargo oil lines - Fuel oil lines - Lubricating oil lines - Hydraulic oil - Thermal oil 	<p>4) Fresh water</p> <ul style="list-style-type: none"> - Cooling water system - Condensate return - Non-essential system <p>5) Sanitary/drains/scuppers</p> <ul style="list-style-type: none"> - Deck drains (internal) ⁽¹⁾ - Sanitary drains <p>6) Sounding/vent</p> <ul style="list-style-type: none"> - Water tanks/dry spaces - Oil tanks (f.p. > 60°C) <p>7) Miscellaneous</p> <ul style="list-style-type: none"> - Starting/control air - Service air (non-essential) - Brine - CO₂ system - Steam
<p>(1) Only above bulkhead deck of passenger ships and freeboard deck of cargo ships</p>	

Threaded connections where pressure-tight joints are made on the threads with parallel or tapered threads shall not be used for piping systems conveying toxic or flammable media or services where fatigue, severe erosion or crevice corrosion is expected to occur. For other applications threaded connections with pressure-tight joints on threads may be used for outside diameters:

- In CO₂ systems shall be allowed only inside protected spaces and in CO₂ cylinder rooms
- Threaded joints with tapered thread shall be allowed for:
 - o class I, outside diameter not more than 33.7 mm
 - o class II and class III, outside diameter not more than 60.3 mm
- Threaded joints with parallel thread shall be allowed for class III, outside diameter not more than 60.3 mm.

The approval is only valid when the couplings are assembled with tubing of correct temper and tolerances as recommended by the manufacturer. These couplings should not be used on tubes in cold fabricated (hard temper) conditions.

Type Approval documentation

Test reports:

- TR 16-011 DNV GL Lokring Marine Cert 073120
- TR 09-007-03-xx Pull out test 050310 Rev. A 012213 CN-200, CN-700, MAS-3000, SS40
- TR 10-017-05-xx Tightness test 120411 SS40/SS-3300, MAS-3000/RCPL, CN-200, CN-700, CN-3300
- TR 10-017-01-xx VibrPressurePulse test 111912 SS40/SS-3300/MAS-3000/RCPL, CN-3300
- TR 10-017-01-xx VibrPressurePulse Test 111912 SS40/SS-3300, MAS-3000/RCPL, CN-3300
- TR 10-017-02-xx Burst Pressure Test 120411 Rev. A 072820, witnessed by DNV Surveyor
- TR 09-007-05-xx Tightness test 032010
- TR 16-011-03-xx Pull out test 073120 MAS-3000-P04, MAS-3000-RCPL-P04
- TR 12-017-xx Pull out test 073120 MAS-3000-RCPL-P04/16/48
- TR 11-014 052511 Tightness test MAS-3000 P64
- TR 08-0017 TSSA Subm 03011 MAS-3000 P64
- TR 97-050 Type tests, dated 1998-02-20
- TR 03-038 Burst test SS40-T40, dated 2004-01-15
- TR 93-027 Type tests, dated 1993-10-04
- TR 02-014 Type tests CN-200 & CN-700, dated 2003-05-15
- TR 16-011-01-xx Burst Test 072920Rev.A, witnessed by DNV Surveyor dated 2021-12-02

Documentation:

- Lokring Technology LLC Catalogue Ref. 90700660 Rev. 7 Edition Jan. 2015
- Design Guide Ref. 6090128R7
- Application Guide Ref. 6090127R5
- Asbestos-free declaration dated 2018-07-12
- LP-105 Installation Procedure 091913



Job Id: **262.1-027020-1**
Certificate No: **TAP0000272**

Tests carried out

Tightness, pull-out, pressure impulse and burst test.

Marking of product

For traceability to this type approval, the products are to be marked with:

- Manufacturer's name or trade mark
- Type designation

Periodical assessment

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment after two years (+/- 90 days) and after 3.5 years (+/- 90 days) to verify that the conditions for the approval are complied with. Reference is made to DNVGL-CP-0338.