DNV·GL

Certificate No:
TAP00001B3

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Couplings for LNG/LPG

with type designation(s)
Cryogenic Break-away Couplings (CBC) and Powered Emergency Release Couplings (PERC)

Issued to
Mann Teknik AB
MARIESTAD, Sweden

is found to comply with
DNV GL rules for classification – Ships Pt.5 Ch.7 Liquefied gas tankers

Application :

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

Max. working temp.:	**-196°C to 65°C**
Max. working press.:	**PN10/PN16/ASME Class 150**
Sizes:	**See certificate**

Issued at **Høvik** on **2018-03-15**

This Certificate is valid until **2022-05-30**.

for **DNV GL**

DNV GL local station: **Gothenburg**

Approval Engineer: **Mehdi Rowshan**

Marianne Spæren Marveng
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.

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Job Id: **262.1-025490-4**
Certificate No: **TAP00001B3**

Product description

- Cable Release - Cryogenic Break-away Couplings (CBC)
- Pneumatic release - Powered Emergency Release Couplings (PERC).

End connections: Flanges PN10/PN16 acc. to EN 1092-1
Flanges Class 150 acc. to ASME B16.5

Sizes: CBC : 2" (DN50), 2½" (DN65), 3" (DN80), 4" (DN100), 8''(DN200)
PERC : 3" (DN80), 4" (DN100), 6" (DN150), 8''(DN200)

Materials:

Housing	1.4401/1.4404+AT EN 10272
Disc	1.4401/1.4404+AT EN 10272
Spring	1.4401 EN 10272

Application/Limitation

Components covered by this certificate may be used under the following design conditions:

Service	:	Transfer of LNG/LPG into tanks
Temperature range	:	-196 °C to +65 °C
Max. working pressure	:	As per pressure-temperature ratings of end connection flange (refer to EN 1092-1 Tables G.4.1-3 and G.4.1-4; and ASME B16.5 Tables 2-2.2 and 2-2.3)
Sizes and types	:	As given in Product Description

Components covered by this certificate (except size DN150) may be considered fire safe.

The couplings shall always be installed according to the manufacturer's instructions.

The couplings shall not be installed in systems where vibration may occur.

Each coupling is before delivery to be hydraulic pressure tested to 1.5 times the maximum working pressure. In addition, seat leakage test at a pressure equal to 1.1 times the maximum working pressure on each component shall be performed before each delivery.

In addition to the above tests, cryogenic testing consisting of functionality and leakage verification (to BS6364) for a minimum 10% of each type and size of coupling intended to be used at working temperature below -55°C shall be undertaken. (Refrence is made DNV GL ship rules Pt.5 ch.7 Sec.5 [13.1.1])

Type Approval documentation

Cable Release - Cryogenic Break-away Couplings (CBC):

Drawing/Document No.	*Rev.*	*Date*	*Title*
OC230D44-1	-	2017-05-09	Break Away 2" – CBC Cable Release - DN50 PN10/16
OC230D44	-	2017-05-09	Break Away 2" – CBC Cable Release - DN50 PN10/16 (cross section)
OC230D44	-	2017-05-09	Break Away 2" – CBC Cable Release – component list
OC257D44-1	-	2017-02-16	Break Away 2" – CBC Cable Release - 2" ANSI Class 150
OC257D44	-	2017-02-17	Break Away 2" – CBC Cable Release - 2" ANSI Class 150 (cross section)
OC257D44	-	2017-03-02	Break Away 2" – CBC Cable Release - component list
3415	3	2012-08-27	Kolv 2" Break Away SBCC / Piston 2" Break Away
3838	1	2013-07-03	2" CBC Body Ind.- raised - Flange DN 50 PN 10/16
3839	2	2013-07-03	2" CBC Body Ind.- recessed - Flange DN 50 PN 10/16

3863	-	2013-06-20	2" CBC Body Ind.- raised - Flange 2" ANSI Class 150
3864	1	2013-06-20	2" CBC Body Ind.- recessed - Flange 2" ANSI Class 150
4814	-	2015-10-07	Coupling flange 2" CBC Cable release
OC333D44-1	-	2017-03-01	Break Away 2 1/2" – CBC Cable Release – DN65 PN10/16
OC333D44	-	2017-03-01	Break Away 2 1/2" – CBC Cable Release – DN65 PN10/16 (cross section)
OC333D44	-	2017-03-02	Break Away 2 1/2" – CBC Cable Release – component list
OC359D44-1	-	2017-05-09	Break Away 2 1/2" – CBC Cable Release - 2 1/2" ANSI Class 150
OC359D44	-	2017-05-09	Break Away 2 1/2" – CBC Cable Release - 2 1/2" ANSI Class 150 (cross section)
OC359D44	-	2017-05-09	Break Away 2 1/2" – CBC Cable Release - component list
3423	-	2012-08-27	Kolv 2½" Break Away SBCC / Piston 2½" Break Away
3803	1	2013-12-13	2½" CBC Body Ind.- raised - Flange DN 65 PN10/16
3804	1	2013-12-13	2½" CBC Body Ind.- recessed - Flange DN 65 PN10/16
5337	2	2016-12-20	Flange 2½" for Break-Away - Cable
5338	2	2016-12-20	Flange 2½" for Break-Away - Cable
5340	1	2016-12-21	Ring 2½" for Break-Away - Cable
5341	-	2016-12-20	Clamp 2½" for Break-Away - Cable
5407	-	2017-02-28	2½" CBC Body Ind.- raised - Flange 2½" ANSI Cl. 150
5408	-	2017-02-28	2½" CBC Body Ind.- recessed - Flange 2½" ANSI Cl. 150
OC436D44-1	-	2017-05-09	Brake Away 3" – CBC Cable Release - DN80 PN10/16
OC436D44	-	2017-05-09	Brake Away 3" – CBC Cable Release - DN80 PN10/16 (cross section)
OC436D44	-	2017-05-09	Brake Away 3" – CBC Cable Release – component list
OC461D44-1	-	2017-02-16	Break Away 3" – CBC Cable Release - 3" ANSi Class 150
OC461D44	-	2017-02-17	Break Away 3" – CBC Cable Release - 3" ANSi Class 150 (cross section)
OC461D44	-	2017-03-02	Brake Away 3" – CBC Cable Release – component list
3734	-	2013-03-18	Kolv 3" Break Away CBC / Piston 3" Break Away
3831	1	2013-04-02	3" CBC Body Ind.- raised - Flange DN 80 PN10/16
3832	1	2013-04-03	3" CBC Body Ind.- recessed - Flange DN 80 PN10/16
3978	1	2013-11-18	3" CBC Body Ind.- raised - Flange 3" ANSI Class 150
3979	1	2013-11-18	3" CBC Body Ind.- recessed - Flange 3" ANSI Class 150
5301	-	2016-11-11	Flange 3" for Break-Away - Cryo Cable
5302	-	2016-11-11	Flange 3" for Break-Away - Cryo Cable
5303	2	2016-11-14	Ring 3" for Break-Away - Cryo cable
5304	-	2016-11-11	Clamp 3" for Break-Away - Cryo Cable
OC539D44-1	-	2017-05-10	Break Away 4" – CBC Cable Release - DN100 PN 10/16
OC539D44	-	2017-05-10	Break Away 4" – CBC Cable Release - DN100 PN 10/16 (cross section)
OC539D44	-	2017-05-10	Break Away 4" – CBC Cable Release – component list
OC563D44-1	-	2017-03-01	Break Away 4" – CBC Cable Release - 4" ANSI Class 150
OC563D44	-	2017-03-01	Break Away 4" – CBC Cable Release - 4" ANSI Class 150 (cross section)
OC563D44	-	2017-03-02	Break Away 4" – CBC Cable Release - component list
3435	-	2012-08-27	Kolv 4" Break Away SBCC / Piston 4" Break Away
3807	3	2013-07-10	4" CBC Body Ind.-raised - Flange DN 100 PN10/16
3808	3	2013-07-10	4" CBC Body Ind.-recessed - Flange DN 100 PN10/16
4160	2	2014-03-05	4" CBC Body Ind.-raised - Flange 4" ANSI Class 150
4161	2	2014-03-05	4" CBC Body Ind.-recessed - Flange 4" ANSI Class 150
5428	4	2017-04-03	Piston 8" Break-away, Tankdelskolv 8" CBC
5433	4	2017-03-28	8" CBC Body Ind.-raised, Flange 8" ANSI Class 150
5434	4	2017-03-28	8" CBC Body Ind.-recessed, Flange 8" ANSI Class 150
NC8103D44-1	-	2016-12-12	8" Industry Breakaway CBC, Flange DN 200 PN 16
NC8105D44-1	-	2016-06-02	8" Industry Breakaway CBC, Flange 8" ANSI Cl. 150

5259	-	2017-04-13	Coupling flange 8" CBC PERC for raised Break Away
5260	-	2017-04-13	Coupling flange 8" CBC PERC for recessed Break Away
NCP8105D44-1	-	2016-11-16	8" Industrial CBC, PERC Flange 8" ANSI Class 150

Pneumatic release - Powered Emergency Release Couplings (PERC):

Drawing/Document No.	*Rev.*	*Date*	*Title*
NCP436D44-1	-	2017-05-08	3" Industrial CBC, PERC - Flange DN80 PN10/16
NCP436D44	-	2017-05-08	3" Industrial CBC, PERC - Flange DN80 PN10/16 (cross section)
NCP436D44	-	2017-05-08	3" Industrial CBC, PERC – component list
NCP461D44-1	-	2016-10-25	3" Industrial CBC, PERC - Flange: 3" ANSI Class 150
NCP461D44	-	2017-04-20	3" Industrial CBC, PERC - 3" ANSI Cl. 150
NCP461D44	-	2017-04-28	3" Industrial CBC, PERC – component list
3734	-	2013-03-18	Kolv 3" Break Away CBC / Piston 3" Break Away
3831	1	2013-04-02	3" CBC Body Ind.- raised - Flange DN 80 PN10/16
3832	1	2013-04-03	3" CBC Body Ind.- recessed - Flange DN 80 PN10/16
3978	1	2013-11-18	3" CBC Body Ind.- raised - Flange 3" ANSI Class 150
3979	1	2013-11-18	3" CBC Body Ind.- recessed - Flange 3" ANSI Class 150
4984	1	2016-01-07	Flange 3" CBC PERC - raised
4985	-	2016-01-05	Flange 3" CBC PERC - recessed
NCP539D44-1	-	2017-05-09	4" Industrial CBC, PERC - Flange DN100 PN10/16
NCP539D44	-	2017-05-09	4" Industrial CBC, PERC - Flange DN100 PN10/16 (cross section)
NCP539D44	-	2017-05-08	4" Industrial CBC, PERC - component list
NCP563D44-1	-	2016-06-03	Industrial Break-Away 4" – CBC - Flange 4" ANSI 150 psi
NCP563D44	-	2017-04-28	4" Industrial CBC, PERC - 4" ANSI Cl. 150
NCP563D44	-	2017-04-28	4" Industrial CBC, PERC - component list
3435	-	2012-08-27	Kolv 4" Break Away SBCC / Piston 4" Break Away
3807	3	2013-07-10	4" CBC Body Ind.-raised - Flange DN 100 PN10/16
3808	3	2013-07-10	4" CBC Body Ind.-recessed - Flange DN 100 PN10/16
4160	2	2014-03-05	4" CBC Body Ind.-raised - Flange 4" ANSI Class 150
4161	2	2014-03-05	4" CBC Body Ind.-recessed - Flange 4" ANSI Class 150
4464	2	2014-10-23	Flange 4" PERC raised
4465	1	2014-10-27	Flange 4" PERC recessed - Inlet M24x1
NCP645D44-1	-	2017-05-09	6" Industrial CBC, PERC - Flange DN150 PN10/16
NCP645D44	-	2017-05-09	6" Industrial CBC, PERC - Flange DN150 PN10/16 (cross section)
NCP645D44	-	2017-05-08	6" Industrial CBC, PERC - component list
NCP6100D44-1	-	2015-11-24	6" Industrial CBC, PERC - Flange 6" ANSI Class 150
NCP6100D44	-	2016-01-11	6" Industrial CBC, PERC - Flange 6" ANSI Class 150
NCP6100D44	-	2017-03-02	6" Industrial CBC, PERC - component list
3447	-	2012-08-28	Kolv 6" Break Away SBCC / Piston 6" Break Away
3809	2	2014-03-28	6" CBC Body Ind.-raised / Flange DN150 PN10/16
3810	2	2014-03-28	6" CBC Body Ind.-recessed / Flange DN150 PN10/16
4048	1	2013-09-09	6" CBC Body Ind.-raised / Flange 6" ANSI Class 150
4049	1	2013-09-09	6" CBC Body Ind.-recessed / Flange 6" ANSI Class 150
4659	-	2015-05-06	Coupling flange 6" CBC PERC / for raised Break Away
4660	1	2015-05-06	Coupling flange 6" CBC PERC / for recessed Break Away

Type tests, technical description and instruction manual:

Drawing/Document No.	*Rev.*	*Date*	*Title*
-	-	2012-11-01/02	Type approval test report Mariestad, 2012-11-01 / Motala, 2012-11-02; Mann Tekniks DCCouplings and CBCouplings
-	1	2013-01-04	Production test at AGA LNG terminal in Nynäshamn 2013-01-04
-	1	2016-06-20	Type approval test report CBCouplings 1", 2",2½",3", 4" and 6" 2016-06-20

-	-	2016-06-20	Test record 2016-06-20 for order CA 40340
-	1	2016-08-25	Type approval test report CBCouplings 1", 2",2½",3", 4" and 6" 2016-08-25
-	-	2016-08-25	Test record 2016-08-25 for order CA 40340
3P06390-1	-	2014-08-28	Fire test of Industrial Break-Away 2" 2014-08-28
-	1	2013-05-10	Technical Description CBCouplings 2013-05-10
-	3	2017-03-02	Technical Description PERC 2017-03-02
-	-	2016-10-26	PERC 4" service instructions 2016-10-26

Tests carried out

Tightness test, strength test, burst test, cryogenic test, fire test

Certification

Products covered by this certificate shall be delivered with a product certificate when T_{min}<-55°C or DN≥100.

Marking of product

For traceability to this type approval the valves are to be marked as a minimum with:

- Manufacturer's name or trade mark
- Type designation
- Max. design pressure or pressure class
- Size

Periodical assessment

For retention of the Type Approval, a DNV GL 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.