



Marine & Offshore

Certificate number: 61372/A0 BV

File number: ACM135/2726/002

Product code: 7345I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Mann Teknik AB

Mariestad - SWEDEN

for the type of product

EMERGENCY RELEASE COUPLING FOR LIQUEFIED GAS TRANSFER

SIZES 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200) and 10" (DN250)

Requirements:

Bureau Veritas Rules for the Classification of Steel Ships

Bureau Veritas Rules for the Classification of Floating Gas Units

Bureau Veritas Rules for the Classification of LNG Bunkering Ship

IMO IGC Code

IMO IGF Code

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 04 May 2026

For Bureau Veritas Marine & Offshore,

At BV GOTHENBURG, on 04 May 2021,

Torbjorn Ygesjo



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 7 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

The **PERC** (Powered Emergency Release Coupling) is a release type breakaway coupling including a self-closing valve mechanism, with main characteristics as follows:

- Two halves fastened with three breaking bolts comprising each a housing with a non-return spring-release valve.
- A valve which allows to hydraulically operate the release of the two housing halves with N2 gas pressure.
- With either flanged end or threaded end connections.

Design parameters:

Material	Stainless Steel
End connections	Flange EN 1092, ANSI B16.5 or NPT - Thread ANSI B1.20.1
Design pressure	16 bar for the sizes 3", 4" and 25 bar for the sizes 6", 8" and 10"
Design temperature	- 196 °C +55°C
Maximum allowable flow speed of LNG	12 m/s
Break bolt release pressure	80 bar (Standard), 120 bar (Max recommended)

2. DOCUMENTS AND DRAWINGS:

Drawing / document N°	Title
Version 5 - 191023	PERC Operating Manual
Technical Description PERC, March 2015 Page 2 Issue 4 (December 2019)	Technical Description PERC
PERC 3 service instructions 20201202 Version 201202	PERC service instructions 3"
PERC 4 service instructions 20180219 EN Version 180219	PERC service instructions 4"
PERC 6 service instructions 20180427 EN Version 180427	PERC service instructions 6"
PERC 8 service instructions 20180529 EN Version 180529	PERC service instructions 8"
PERC 10 service instructions 20191122 EN Version 191122	PERC service instructions 10"
3447	Piston 6" Break Away
6827	Coupling flange 6" CBC PERC

Drawing / document N°	Title
6828	Coupling flange 6" CBC PERC
6829	6" CBC Body Ind.-raised
6830	6" CBC Body Ind.-recessed
6839	6" CBC Body Ind.-raised
6840	6" CBC Body Ind.-recessed
6841	6" CBC Body Ind.-raised
6842	6" CBC Body Ind.-recessed
7193	6" BA Body - PERC
7194	6" BA Body PERC
7195	Piston 6" Break-Away
NCP6xxxD44	6" Industrial CBC, PERC
NCP6100E44 Comp List	NCP6100E44 Comp List
NCP6100E44	6" Industrial CBC, PERC Flange: ANSI CL150
NCP6100E44-1	6" Industrial CBC, PERC
NCP6101D44-1	6" Industrial CBC, PERC Flange 6" ANSI Cl. 300
NCP6101D44 COMPONENT LIST	NCP6101D44 COMPONENT LIST
Break-Away PERC 6 inch calculation 2020-05-18 Version 1.0	Break-Away PERC 6 inch calculation
NCP8xxxD44	8" Industrial CBC, PERC
NCP8105E44	8" Industrial CBC, PERC Flange: ANSI CL150
NCP8105E44-1	8" Industrial CBC, PERC
NCP8105E44 Comp. list	NCP8105E44 Comp. list
NCP8106D44 COMPONENT LIST	NCP8106D44 COMPONENT LIST
NCP8106D44-1	8" Industrial CBC, PERC Flange 8" ANSI Class 300

Drawing / document N°	Title
5259	Coupling flange 8" CBC PERC
5260	Coupling flange 8" CBC PERC
5428	Piston 8" Break-away
5433	8" CBC Body Ind.-raised
5434	8" CBC Body Ind.-recessed
5801	8" CBC Body Ind.-raised
5802	8" CBC Body Ind.-recessed
7133	8" BA Body - PERC
7134	8" BA Body PERC
7135	Kolv 8" Break-Away
Break-Away PERC 8 inch calculation 2020-05-18 Version 1.0	Break-Away PERC 8 inch calculation
NCP4xxD44	3" Industrial CBC, PERC any connection
NCP415D44-1	3" Industrial CBC, PERC 3" NPT
NCP415D44 COMPONENT LIST	NCP415D44 COMPONENT LIST
NCP436D44-1	Industrial Break-Away 3" - CBC Flange DN 80 PN 10/16
NCP436D44 COMPONENT LIST	NCP436D44 COMPONENT LIST
NCP437D44-1	3" Industrial CBC, PERC Flange DN 80 PN 25/40
NCP461D44-1	3" Industrial CBC, PERC Flange: 3" ANSI Class 150
NCP461D44 COMPONENT LIST	NCP461D44 COMPONENT LIST
3734	Piston 3" Break Away CBC
3805	3" CBC Body Ind.- raised Thread 3" NPT
3806	3" CBC Body Ind.- recessed
3831	3" CBC Body Ind.- raised

Drawing / document N°	Title
3832	3" CBC Body Ind.- recessed Flange DN 80 PN10/16
3978	3" CBC Body Ind.- raised Flange 3" ANSI Class 150
3979	3" CBC Body Ind.- recessed Flange 3" ANSI Class 150
4645	3" CBC Body Ind.- raised Flange DN 80 PN25/40
4646	3" CBC Body Ind.- recessed Flange DN 80 PN25/40
4984	Flange 3" CBC PERC raised
4985	Flange 3" CBC PERC recessed
NCP5xxD44	4" Industrial CBC, PERC
NCP517M44-1	4" Industrial CBC, PERC 4"NPT
NCP517M44 COMPONENT LIST	NCP517M44 COMPONENT LIST
NCP539D44-1	4" Industrial CBC, PERC Flange DN100 PN10/16
NCP539D44 COMPONENT LIST	NCP539D44 COMPONENT LIST
NCP563D44-1	4" Industrial CBC, PERC Flange 4" ANSI Cl. 150
NCP563D44 COMPONENT LIST	NCP563D44 COMPONENT LIST
3435	Piston 4" Break Away
4462-B	4" CBC Body Marine -recessed, 4"NPT
4463	4" CBC Body Marine-recessed, 4"NPT
6831	Flange 4" PERC raised
6832	Flange 4" PERC recessed
6833	4" CBC Body Ind.-raised, Flange 4" ANSI Class 150
6834	4" CBC Body Ind.-recessed, Flange 4" ANSI Class 150
6843	4" CBC Body Ind.-raised, Flange 4" DN 100 PN 10/16

Drawing / document N°	Title
6844	4" CBC Body Ind.-recessed, Flange 4" DN 100 PN 10/16
6845	4" CBC Body Ind.-raised, Connection - 4" NPT
6846	4" CBC Body Ind.-recessed, Connection - 4" NPT
NCP10162D44	10" Industrial CBC, PERC, Flange: ANSI CL150
NCP10162D44-1	10" Industrial CBC, PERC, Flange: ANSI CL150
6293	10" BA Body - PERC, ANSI CL. 150, Raised
6294	10" BA Body PERC, ANSI CL. 150, Recessed
6295	Piston 10" Break-away
Marine Loading arms DN50-DN250 - ISO 16904 calculation 2020-03-16	Marine Loading arms DN50-DN250 - ISO 16904 calculation 2020-03-16

3. **TEST REPORTS:**

3.1 – Data report of flow test "118USPON-1_1-19C11S9_CT Sgnd Phase 2" carried out at Spadeadam Testing and research Centre, UK from 04/05/2018.

3.2 – Type approval test report "160620 Cryo Breakaway Coupling DNV type approval stamped" of test carried out on 20/06/2020:

- External tightness test under cryogenic conditions
- External max test pressure due to breaking bolts with water at ambient temperature
- External burst pressure
- Burst test at minimum working temperature
- Internal burst pressure at ambient temperature.

3.3 – Type approval test report "DNV Production test report 2013 Nynashamn- verified" of test carried out on 04/01/2013:

- External tightness test at minimum working temperature
- Internal tightness test at minimum working temperature
- Operational test.

3.4 – Factory Acceptance Test Report "L1016 FAT Report witnessed by BV 2nd July 2020" of test carried out in Mariestad, Sweden (MannTeknik facility) on the 02 July 2020.

3.5 – "Films of ice test on PERC carried out by MannTeknik at its facility" and submitted in July 2020.

4. **APPLICATION / LIMITATION:**

- 4.1 – The PERC may be used for LNG transfer for bunkering operations. Concerning the Shore-to-Ship application, the conformity to any specific territorial regulation is excluded a priori; this approval does not preclude any additional requirement from National Authorities.
- 4.2 – The PERC may be used with marine loading arms as well as flexible marine hoses, provided that the loads remain within the design envelope defined in Owner specifications and agreed by Manufacturer.
- 4.3 – The PERC is to be installed and maintained according to manufacturer's instructions - MannTeknik AB.
- 4.4 – The handling/installation devices and accessories should be as per manufacturer's specification and are not covered by the present certificate. Design, construction and testing of these to be documented in accordance with recognized standards.
- 4.5 – The coupling release forces are to be designed according to the application criteria.
- 4.6 – Verification or replacement of the parts must be carried out after each release of the PERC according to manufacturer's instructions - MannTeknik AB.
- 4.7 – The fitting aboard to be the same as used for the test.
- 4.8 – This approval is valid for the following sizes: 3" (DN80), 4" (DN100), 6" (DN150), 8" (DN200) and 10" (DN250).

5. **PRODUCTION SURVEY REQUIREMENTS:**

- 5.1 – The PERC are to be supplied by MannTeknik AB in compliance with the type and the requirements described in this certificate.
- 5.2 – This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
- 5.3 – BV product certificate is required.
- 5.4 - Each PERC is to be hydraulically pressure tested to 1.5 times the design pressure.
- 5.5 - Factory acceptance test given in rules BUREAU VERITAS RULES for the classification of LNG Bunkering Ships and Floating Gas Units shall be carried out as appropriate.
- 5.6 – Charpy impact test of the pressure containing parts to be carried out in accordance with IGC and IGF Codes requirements.
- 5.7 – For information, MannTeknik AB has declared to Bureau Veritas the following production site(s):

**Strandvägen 16
SE 54231 Mariestad
SWEDEN**

6. **MARKING OF PRODUCT:**

The PERC is to be permanently marked with the following information:

- Trade name and Serial number,
- Nominal Diameter, Design pressure and Design temperature
- Society's brand, as relevant.

7. **OTHERS:**

- 7.1 – It is **MannTeknik AB's** responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

*** END OF CERTIFICATE ***