



Marine & Offshore

Certificate number: 36873/B0 BV

File number: ACM135/2726/1

Product code: 73461

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

COMPONENT OF SHIP TO SHIP OR SHORE TO SHIP LIQUEFIED FUEL GAS TRANSFER

Dry Cryogenic Coupling DCC

Requirements:

NR 467 Bureau Veritas Rules for the Classification of Steel Ships

NR 542 Classification of Floating Gas Units

NR 620 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: 27 Nov 2025

For Bureau Veritas Marine & Offshore,

At BV GOTHENBURG, on 27 Nov 2020,

Magne MOLLER



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 4 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION :

Dry Cryogenic Coupling (DCCoupling) is a dry break coupling intended to be used as connecting device on cryogenic transfer systems.

The DCCoupling consists in two parts, one is installed on a fixed piping system ("tank" side) and the other one at the end of a transfer hose ("hose" side).

Each part comprises a non-return valve that is opened when the two parts are connected. A push and turn action from the operator ensures locking and sealing of the coupling and further rotation opens the internal valves. When the DCCoupling is disconnected, the valves fully close before the two parts of the coupling separate.

This approval is valid for the following sizes: DN 50, DN 65, DN 80, DN 100 and DN 150

Service temperature range: -196°C to +55°C

Maximum service pressure: 25 bar

Maximum allowable bending loads:

Size	Maximum allowable bending loads
DN 50 (2")	300 Nm
DN 65 (2 1/2")	500 Nm
DN 80 (3")	900 Nm
DN 100 (4")	1600 Nm
DN 150 (6")	2400 Nm

2. DOCUMENTS AND DRAWINGS :

2.1 - Mann Teknik AB specification:

Technical description - DCCouplings® (Dry Cryo Couplings) issue 4 (May 2013)

2.3 - Calculation report:

Calculation Design Method DCCouplings for pressure purpose dated 23/12/2013

2.3 - Operating manual:

DCCouplings Operating Manual PR-050823-0121 version 2015-12-22

2.4 - Drawings:

Reference	Date	Name
MC2XXC44	20/09/2018	Hose Unit 2" DCC all connection
MC211C44	NONE	Component list of Unit 2"DCC
LC211A44	10/08/2012	Tank unit 2" DCC Thread 2" NPT female
LC211A44_1	10/08/2012	Tank unit 2" DCC Thread 2" NPT female
LC211A44_COM	NONE	Component list of tank unit 2" DCC Thread 2" NPT female
MC3XXC44	10/01/2019	Hose Unit 2½" DCC any connection
MC3XXC44_COM	NONE	Component list of Hose Unit 2½" DCC any connection
LC333A44-1	12/09/2012	Tank unit 2½" DCC Flange DN 65 PN10/16
LC333A44_COM	NONE	Components list of Tank unit 2½" DCC Flange DN 65 PN10/16
MC4XXC44	27/09/2018	Hose unit 3" DCC All connections
MC415C4_COM	NONE	Component list of Hose unit 3" DCC All connections
LC415A44_1	04/04/2013	Tank unit 3" DCC with cap Thread 3" NPT female
LC415A44_COM	NONE	Components list of Tank unit 3" DCC with cap Thread 3" NPT female
MC5XXC44	24/09/2018	Hose unit 4" DCC All connections
MC539C44_COM	NONE	Components list of Hose unit 4" DCC All connections
LC539A44	22/08/2012	Tank Unit 4" DCC Flange DN100 PN16
LC539A44-1	22/08/2012	Tank Unit 4" DCC Flange DN100 PN16
LC539A44_COM	NONE	Components list of tank Unit 4" DCC Flange DN100 PN16
MC6xxxC44	24/09/2018	6" DCC HU - Any Connection
MC6100C44	NONE	Components list of 6" DCC HU - Any Connection
LC645A44	29/03/2012	6" Tank Unit LNG Flange DN150 PN16
LC645A44_COM	NONE	Components list of 6" Tank Unit LNG Flange DN150 PN16

3. TEST REPORTS :

3.1 - Type approval test report "Mariestad, 2012-11-01 / Motala, 2012-11-02" dated 02/11/2020 and witnessed by DNVGL:

- External tightness test at ambient temperature (DN50 and DN150)
- Internal tightness test at ambient temperature (DN50 and DN150)
- Strength tests at ambient temperature (DN50 and DN150)
- Burst test at minimum working temperature (DN50 and DN150).

3.2 - Production test report "2013-01-04 Nynäshamn DNV" dated 01/04/2013 and witnessed by DNVGL:

- Operating test at minimum working temperature (DN50, DN65 and DN150).

3.3 - Type approval and factory test TR BV-TA 180216-01 (BV Attestation number: 070GTB18B) dated the 16/02/2018 and witnessed by BV:

- Bending and tightness test at ambient temperature (DN150)
- Bending and tightness test under cryogenic conditions (DN150)
- Strength test at ambient temperature (DN150).

3.4 - Factory Acceptance Test Report "L016 FAT Report witnessed by BV 2nd July 2020" of test carried out in Mariestad, Sweden (MannTeknik facility) on 02 July 2020.

3.5 - Verification report NV GOT 140022 dated 17/01/2014 of tests witnessed by DVNGLiin Mariestad, Sweden (MannTeknik facility) on 02 July 2020

- Hydrostatic (and high pressure leak tightness) test at ambient temperature (DN50)
- Leak test low pressure at ambient temperature (DN50)
- Seat leakage and operational test at -196°C (DN50)
- Endurance test 10000 cycles at -196°C with emission test (DN50)
- Pull force and momentum load test (assembly) (DN50).

4. APPLICATION / LIMITATION :

4.1 - The **DCCouplings** may be used on cargo handling systems for liquefied gases (LNG, LPG) transfers between a gas fuelled ship and a bunkering facility. 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 couplings are to be installed according to the manufacturer's instructions.

4.3 - Verification or replacement of the seals must be carried out according to Manufacturer's instructions.

4.4 - The loads on the DCCoupling due to the forces exerted by the transfer system shall not exceed the Manufacturer's limitations.

5. PRODUCTION SURVEY REQUIREMENTS :

5.1 - The DCCouplings are to be supplied by **MANN Teknik 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 - For information, **MANN Teknik AB** has declared to Bureau Veritas the following production site(s):

MANN Teknik AB
Strandvägen 16
SE 54231 Mariestad
SWEDEN

5.5 - Charpy impact test of the pressure containing parts to be carried out in accordance with IGC and IGF Codes requirements.

5.6 - All the DCCouplings have to undergo manufacturing tests as per ISO16904.

6. MARKING OF PRODUCT :

Each coupling is to be marked with:

- Manufacturer's name or trade mark
- Type designation
- Size, Design Pressure and
- Society's brand as relevant

7. OTHERS :

7.1 - It is **MANN Teknik 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.

7.2 - This certificate supersedes Type Approval Certificate n° 36873/A2 BV issued on 26 Oct 2017 by the Society.

*** END OF CERTIFICATE ***