TYPE APPROVAL CERTIFICATE
No. **MAC059220XP**

This is to certify that the product identified below is in compliance with the regulations herewith specified.

Description	**Cryogenic Piping Systems Components**
Type	**Dry Cryogenic Couplings & Cryogenic Break-away Couplings**
Applicant	**Mann Teknik AB** **Strandvägen 16** **542 31 Mariestad** **SWEDEN**
Manufacturer *Place of manufacture*	**Mann Teknik AB** **Strandvägen 16** **542 31 Mariestad** **SWEDEN**
Reference standards	**Part C, Chapter 1, Appendix 7 (Gas Fuelled Ship) of RINA Rules; Part E, Chapter 9, Section 9 (Liquified Gas Carrier) of RINA Rules; IGF Code as per IMO MSC.391(95); IGC Code as last amended by IMO MSC.377(93).**

Issued in **RINA Poland Plan Approval Centre** on **September 7, 2020.** *This Certificate is valid until* **September 6, 2025**

RINA Services S.p.A.
Jaroslaw Kondracki

This certificate consists of this page and 2 enclosures.

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Dry Cryogenic Couplings & Cryogenic Break-away Couplings

Products Description:

Dry Cryogenic Couplings (DCCs) are designed for use wherever it is necessary to connect and disconnect transfer hoses and transfer arms quickly without additional tools. It is carried out by one single action. A straight forward push and a turning motion will connect the coup-lings for a full flow motion. A quick and easy "turn and pull" action will disconnect the couplings and close the valve with no spillage.

Cryogenic Break-away Coupling (CBCs) are designed for installation at fixed points like manifolds, pipelines and depots or hoses. The internal valves will immediately close the flow in both halves of the coupling and therefore prevent accidents and unwanted spillage of product.

Reference documents:

1 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1087
1 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1088
1 inch DCC - Test Reports filed for information under RINA dwg no. PLMC-1089
2 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1090
2 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1091
2 inch DCC - Test Reports filed for information under RINA dwg no. PLMC-1092
2,5 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1093
2,5 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1094
3 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1096
3 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1097
3 inch DCC - Test Reports filed for information under RINA dwg no. PLMC-1098
4 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1099
4 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1100
4 inch DCC - Test Reports filed for information under RINA dwg no. PLMC-1101
6 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1102
6 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1103
8 inch DCC HU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1105
8 inch DCC TU - Assembly Drawing with Components approved under RINA dwg no. PLMC-1106
DCC DDCC - Calculation filed for information under RINA dwg. no. PLMC-1108
DCC - Technical Description filed for information under RINA dwg. no. PLMC-1109
DCC - Fire Test Reports filed for information under RINA dwg. no. PLMC-1110
2,5 inch CBC - Assembly Drawing with Components approved under RINA dwg no. PLMC-1111
2,5 inch CBC - Calculation filed for information under RINA dwg no. PLMC-1112
4 inch CBC - Assembly Drawing with Components approved under RINA dwg no. PLMC-1113
4 inch CBC - Calculation filed for information under RINA dwg no. PLMC-1114
6 inch CBC - Assembly Drawing with Components approved under RINA dwg no. PLMC-1118
6 inch CBC - Calculation filed for information under RINA dwg no. PLMC-1119
8 inch CBC - Assembly Drawing with Components approved under RINA dwg no. PLMC-1120
8 inch CBC - Calculation filed for information under RINA dwg no. PLMC-1121

Technical Characteristics:

Size from 1" (DN 25) to 8" (DN 200)
Minimum/Maximum Design Temperature range -196 ℃ / +85 ℃
Maximum Design Pressure 25 bar
Materials: Stainless steel
Seals: PTFE

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Dry Cryogenic Couplings & Cryogenic Break-away Couplings

Field of Application:

These couplings can be used for LNG application such as cargo lines of liquified gas carriers, gas fuel supply and bunkering system of LNG propelled ships.

Acceptance Conditions:

For gas fuelled ships the following IGF Code (IMO Resolution MSC.391(95)) and RINA Rules requirements are applicable:

- Couplings are to be verified on board as per 18.4.3 of IGF Code.
- Material testing in accordance with Table 7.4 of IGF Code
- Tests on board as per 16.7.3.2 and 16.7.3.5 of IGF Code
- Testing in accordance with Part C Chapter 1 Appendix 7 Article 15.7.1 of RINA Rules

For liquefied gas carrier the following IGC code (as last amended by IMO Resolution MSC.377(93) and RINA Rules requirements are applicable:

- Material testing in accordance with Table 6.4 of IGC Code
- Testing in accordance with Part E Chapter 9 Section 5 Article 3.1. of RINA Rules.

Remarks:

Final acceptance of couplings is subject to satisfactory outcome of testing as per RINA Rules.

RINA Poland Plan Approval Centre

September 7, 2020

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