



TYPE APPROVAL CERTIFICATE

No. MAC035117XG/004

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

<i>Description</i>	Metallic Expansion joints
<i>Type</i>	Axial : AN / AF and AD Universal : AM / AP Lateral : RM Angular : WN
<i>Applicant</i>	HKS GMBH SCHONENFAHRERSTR 1 18057 Rostock GERMANY
<i>Manufacturer</i>	HKS GMBH
<i>Place of manufacture</i>	SCHONENFAHRERSTR 1 18057 Rostock GERMANY
<i>Reference standards</i>	Part C, Chapter 1, Appendix 7 (Gas Fuelled Ship) RINA Rules ; Part E Chapter 9 Section 9 (Liquified Gas Carrier) RINA; Rules; IGF Code as per IMO MSC.391(95), ; IGC Code as last; amended by IMO MSC.377(93), Part C, Chapter 1, Section 10 of; RINA Rules

Issued in **HAMBURG** on **March 7, 2017**. This Certificate is valid until **March 6, 2022**


RINA Services S.p.A.
Giuseppe Russo

This certificate consists of this page and 1 enclosure



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Axial : AN / AF and AD

Universal : AM / AP

Lateral : RM

Angular : WN

Reference documents

- Drawings Approved HMMC-8442, HMMC-8542, HMMC-8525, HMMC-8526 with letter HMMC/2017/00136/CRLVA and HMMC-8777 with letter HMMC/2017/00255/CRLVA
- IMA Dresden Test Report V412/16 comprehensive of : Pressure Test, Over pressure Test, Cyclic Fatigue Test, Cyclic Test.
- HKS Test Record : 19633 , 18838 , 6972
- SVUM Low Cycle Fatigue test Report N° 1530 253

Components/Materials

Stainless Steel (1.4404/316L; 1.4541/321; 1.4571/316Ti) multiple layer expansion joints with or without inner sleeve.

Design Conditions

Design Temperature : -196°C up to +125°C

Design Pressure : 16 bar

Design Cycle : 7000

Nominal Diameter: DN 25 up to DN 400

The allowable movements and design parameters are depending on type and material of expansion joints (see approved drawings above mentioned).

Fields of application

For use in metallic LNG/LPG cargo systems and gas fuel piping system

Alternative Manufacturer

HKS-CZ s.r.o.
Meldkojedska 1994/7
41201 Litomerice
Czech Republic

Acceptance conditions

- The installation on board is to be made in accordance with the Manufacturer's instructions and provisions stated in Part C Chapter 1 Section 10 par. 2,6 of RINA Rules.
- The flanges shall be suitable for the actual design pressure and temperature of on board system
- Expansion Joints are to be marked with type designation manufacturer's name and maximum working pressure.

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

- Material testing in accordance with Table 7.1 – 7.4
- Welding procedure tests in accordance with 16.3.3.4
- Tests on board as per 16.7.3.2 and 16.7.3.5
- Production Test in accordance with Part C Chapter 1 Appendix 7 par. 16.7.3 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
- Welding procedure tests in accordance with 6.3.5
- Production Test in accordance with Part E Chapter 9 Section 5 of RINA Rules.

HAMBURG March 7, 2017

