



Type Approval Certificate Extension

This is to certify that Certificate No. 98/60070 (E3) for the undernoted products is extended and renumbered as shown.

This certificate is issued to:

PRODUCER Lokring Technology LLC

PLACE OF PRODUCTION 38376 Apollo Parkway
Willoughby, Ohio- 44094
USA

DESCRIPTION Elastic Strain Preload (ESP)
Mechanically attached tube, pipe fittings and Lokring tooling

TYPE Pipe sizes: ¼ NPS to 3 NPS (SS, MAS and CuNi)
Tube sizes: ¼ OD to 2 OD (SS)

APPLICATION Marine, Industrial and Offshore

DESIGN CODE Rules and Regulations for the Classification of Ships 2017
Rules and Regulations for the Classification of Offshore Units 2017
Rules and Regulations for the Classification of Naval Ships 2018
IACS UR P2.11- R4-2016
ASME B31.1- 2016
ASME B31.3 -2016

RATINGS Refer to DAD 98/60070 (E4)

Conditions Certificate No. 98/60070(E4)

Issue Date 14 May 2018

Expiry Date 13 May 2023

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Gopal Nair

Lloyd's Register Quality Assurance, Inc.

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1330 Enclave Parkway, Suite 200, Houston, Texas 77077*

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1. Chemical composition, mechanical properties and certification of the fittings materials used in class I and II piping systems on ships or installations classed or intended for classification with Lloyds Register are to comply with relevant sections of the '*Rules for the Manufacture and Testing and Certification of the Materials*'
2. Lokring fittings do not employ elastomeric seals and are metal to metal seated. Lokring fittings passed fire testing of API 607 and ASTM F 1387. However for marine applications in accordance with *Rules and Regulations for Classification of Ships Part 5, chapter 12 table 12.2.7 –compression couplings are considered metal to metal seated* and fire testing is not a requirement.
3. MAS-3000, MAS-3000 RCPL, SS and CN-3300 fittings have completed combined pressure pulsation and vibration tests in accordance with IACS UR P.2.11. CN 200 & 700 Couplings have not completed combined pressure pulsation and vibration cycle testing in accordance with IACS UR P 2.11. Couplings made out of CN 200 & 700 are not to be used where major pressure pulsation is expected in accordance with table 9 of IACS UR P2.11.5.1 such as diesel injection lines, diesel pump spill lines, or where major pressure pulsation other than water hammer is expected for a particular system.
4. Any tubes and/or pipes connected are to have a minimum burst pressure ratio of 4:1 and suitability of the pipe scantlings is to be advised by the firm. The pipe segments connected are to maintain the minimum recommended cross sectional area, taking also into account the assumed corrosion allowance on case by case basis. Intermediate diameter and/or thickness or metric dimensions consult manufacture's catalogue for published pressure temperature rating.

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5. During installation the Firm's standard procedures and tooling are to be employed by qualified personnel. The fittings are not to be reinstalled after dismantling.
6. Pipe/tubes and the corresponding fittings are to have similar coefficient of linear expansion; i.e, where thermal expansion effects govern inter mixing of different materials are to be avoided for pipes/tubes and fittings.
7. Where the fittings are employed in installation where compliance with Lloyds Register Rules and Regulations for classification of Ships/Mobile Offshore units/fixed or floating installations, ASME B 31.1 and /or ASME B 31.3 is required the relevant ambient maximum design pressure and de-rating factors are to be applied as described in Firm's specifications. Consult manufacturer for the stress intensification factors to be used for pipe stress analysis.
 - 7.1 The fittings are not considered acceptable in applications for lethal, toxic or LNG service where only full butt welded piping systems are required by relevant Lloyds Register Rules, Codes and /or Standards.
 - 7.2 The use of taper male pipe thread adapter is to be limited as per ASME 31.1 and 31.3 codes (Paragraphs 114 and 314 respectively). For code stamped installations use of fittings are to be in agreement with the administration having jurisdiction over the place of installation.

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"This Certificate is not valid for equipment, the design, ratings or operating parameters of which have been varied from the specimen tested. The manufacturer should notify Lloyd's Register Quality Assurance, Inc. of any modification or changes to the equipment in order to obtain a valid certificate."

The Design Appraisal Document No. 98/60070(E4) and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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