



Type Approval Certificate

This is to certify that the undernoted product(s) has/have been tested with satisfactory results in accordance with the relevant requirements of the Lloyd's Register Type Approval System.

Manufacturer	Teddington Engineered Solutions Limited
Address	Dafen Park, Unit 14, Heol Cropin, Llaneli, SA14 8QW, United Kingdom
Type	Expansion Bellows
Description	Bellows Type Expansion Joints for LNG and LPG carriers

TYPE:

- M52571 (Single Bellows - Reinforced)
- M52574 (Single Bellows - Reinforced)
- M52586 (Single Bellows - Reinforced)
- M52600 (Single Bellows - Unreinforced)
- M52601 (Single Bellows - Unreinforced)
- M52602 (Single Bellows - Unreinforced)
- M52603 (Single Bellows - Unreinforced)
- M52609 (Universal Bellows - Reinforced)
- M52612 (Universal Bellows - Reinforced)
- M52578 (Universal Bellows - Unreinforced)
- M52588 (Universal Bellows - Unreinforced)
- M52590 (Universal Bellows - Unreinforced)
- M52617 (Universal Bellows - Unreinforced)
- M52624 (Universal Bellows - Unreinforced)
- M53063 (Universal Bellows - Unreinforced)
- M53067 (Universal Bellows - Unreinforced)
- M53068 (Universal Bellows - Unreinforced)
- M53069 (Universal Bellows - Unreinforced)

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Vahid Saremi Shahab

Lead Offshore Piping Specialist to Lloyd's Register EMEA
A member of the Lloyd's Register group

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Type Approval Certificate

Trade Name	Multi Ply Expansion Joints
Application	Marine use for cargo and associated piping systems in ships constructed for the carriage of liquified gases in bulk
Specified Standard	Rules and Regulations for the Classification of Ships, July 2021 Rules and Regulations for the Construction and Classification of Ships for the Carriage of Liquefied Gases in Bulk, July 2021 2014 IGC Code - International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk Standards of the Expansion Joint Manufacturer's Association, Inc. Tenth Edition
Ratings	Design Pressure (bar) : 1.0~10.0 Design Temperature (C) : Minus(-)163~Plus(+)80 Nominal Pipe Diameter (mm) : 75 A~750 A Number of Plies : Multiple Plies Inner Ply Material : ASTM A240 TP316L/Equivalent Outer Ply Material : ASTM A240 TP316L/Equivalent Or Inconel 625 / Equivalent
Other Conditions	Where the expansion joints are intended to be installed on a ship classed with Lloyd's Register (LR), the following comments are applicable: <ol style="list-style-type: none">1. Expansion Bellows should be tested under normal operation conditions not later than at the first loading operation in accordance with the Rules and Regulations for the Construction of Ships for the carriage of Liquified Gases in Bulks 2016, Chapter 5, Section 5.13.2.5. To be verified by the attending LR Surveyor.2. Expansion pieces are to be protected against over extension and compression and joining pipes are to be suitably supported and

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Type Approval Certificate

anchored. Bellows expansion pieces are to be protected against mechanical damage. The Rules and Regulations for the Construction of Ships for the carriage of Liquified Gases in Bulks 2016, Chapter 5, L.R. 5.7-01 refers. To be verified by the attending surveyor.

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 EMEA of any modification or changes to the equipment in order to obtain a valid Certificate.

Previous Version: 16/00358

The Design Appraisal Document LR23143095TA and its supplementary Type Approval Terms and Conditions form part of this Certificate.

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LLOYD'S REGISTER TYPE APPROVAL – DESIGN APPRAISAL DOCUMENT

Issue by: UK&I Technical Support Office
Issued to: Teddington Engineered Solutions Limited
For: Metallic Multi Ply Expansion Joints

The undernoted documents have been reviewed for compliance with the requirements of the Lloyd's Register Type Approval System Procedure TA14 Version 04 (September 2020) and this Design Appraisal Document forms part of the Certificate.

APPROVAL DOCUMENTATION

Application Checklist – Appendix to Form 2502TA Signed	09-Dec-2022
Request for Marine Services- Type Approval	07-Dec-2022
Production Quality Assessment Form	01-March-2023
Plans, documentation and information listed in previous Design Appraisal document 16/00358	09-Nov-2017
ISO 9001:2015 Quality Management System Certificate no GB05/64014 Valid until 2026-01-27	11-Jan-2021

Vahid Saremi Shahab

Lead offshore Piping Engineer
Technical Support Office
UK&I TSO, Marine & Offshore, Lloyd's Register EMEA

Supplementary Type Approval Terms and Conditions

Type Approval certifies that a representative sample of the product(s) referred to herein has/have been found to meet the applicable design criteria for the use specified herein. It does not mean or imply approval for any other use, nor approval of any product(s) designed or manufactured otherwise than in strict conformity with the said representative sample.

Type Approval is based on the understanding that the manufacturer's recommendations and instructions and any relevant requirements of the Rules and Regulations are complied with.

Type Approval does not eliminate the need for normal inspection and survey procedures required by the Rules and Regulations.

Lloyd's Register EMEA reserves the right to cancel or withdraw this Type Approval Certificate in accordance with the Lloyd's Register Type Approval System Procedure.