



NIPPON KAIJI KYOKAI

## TYPE APPROVAL CERTIFICATE

Certificate No. TA21109M

This is to certify that the undernoted product(s) has been approved in accordance with the relevant requirements of "Rules for the Survey and Construction of Steel Ships", "Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use" as specified below, and that the product(s) is found to comply with "International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk (IGC Code)" as amended by Res.MSC.370(93) and "International Code of Safety for Ships using Gases or other Low-Flashpoint Fuels (IGF Code)" as adopted by Res.MSC.391(95).

This certificate is issued to:

Manufacturer **AL MUFADDAL ENGINEERING & MARINE SERVICES CO. LLC**

Product description **FLEXIBEL Metallic Expansion Joints for Liquefied Gas**

Type designation(s) **As per attached sheet**

Applied requirements

- Chapter 7 Part N Annex 1, Guidance for the Survey and Construction of Steel Ships
- Chapter 7 Part GF Annex 1, Guidance for the Survey and Construction of Steel Ships
- Part 6, Chapter 2, Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use

Approval No. **21LA003B**

This certificate is valid until **21 March 2026**

Issued at Tokyo on **22 March 2021**

See the conditions specified in the attached sheet.

  
(T. Shimada)  
General Manager of  
Machinery Department



**Condition for approval**

## 1. Particulars:

FLEXIBEL Metallic Expansion joints for Liquefied Gas

Model No.	Size Range	Temperature Range(°C)	Pressure Range(barg)	Intended Fluid	Movement
REINFORCED	DN100 ~ DN400	-165~550	0.2~20	LNG LPG	Axial ±20mm

Design pressure, number of convolutions, movement, thickness and depth of convolution to be according to calculation performed by the manufacturer depending on the service conditions of expansion joints

2. Compatibility with other intended fluid is to be otherwise confirmed by the Society.

3. Details of materials and constructions are to be in accordance with the manufacturer's drawings approved as followings.

- DWG. No.: REINFORCED EXPANSION BELLOWS (RE) TYPICAL DN100-DN400,  
approved on 22 March 2021

4. Type tests carried out in the presence of NK Surveyor: Cyclic Thermal test, Cycle Fatigue Test, Pressure test performed at -165°C as per test report No.: EV-CRY-196006 dated 29/12/2019

5. Production inspection is required for each product in the presence of the Society's surveyor.

- The End -