



Marine & Offshore

Certificate number: 39486/B1 BV

File number: ACM 188/2534/01

Product code: 7311I

This certificate is not valid when presented without the full attached schedule composed of 7 sections

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TYPE APPROVAL CERTIFICATE

This certificate is issued to

Al Mufaddal Engineering & Marine Services Co. LLC
DUBAI - UNITED ARAB EMIRATES

for the type of product

**METALLIC EXPANSION JOINTS / BELLOWS FOR LIQUEFIED GAS PIPING
SYSTEMS**

FLEXIBEL - DN 100 to 400

Requirements:

- BUREAU VERITAS Rules for the Classification of Steel Ships
- IGC Code as amended by IMO Resolution MSC.370(93)

This certificate is issued to attest that Bureau Veritas Marine & Offshore did undertake the relevant approval procedures for the product identified above which was found to comply with the relevant requirements mentioned above.

This certificate will expire on: 01 Apr 2025

For Bureau Veritas Marine & Offshore,

At BV DUBAI, on 07 Oct 2020,

Ashok Singh

Ashok Kumar Singh



This certificate remains valid until the date stated above, unless cancelled or revoked, provided the conditions indicated in the subsequent page(s) are complied with and the product remains satisfactory in service. This certificate will not be valid if the applicant makes any changes or modifications to the approved product, which have not been notified to, and agreed in writing with Bureau Veritas Marine & Offshore. Should the specified regulations or standards be amended during the validity of this certificate, the product(s) is/are to be re-approved prior to it/they being placed on board vessels to which the amended regulations or standards apply. This certificate is issued within the scope of the General Conditions of Bureau Veritas Marine & Offshore available on the internet site www.veristar.com. Any Person not a party to the contract pursuant to which this document is delivered may not assert a claim against Bureau Veritas Marine & Offshore for any liability arising out of errors or omissions which may be contained in said document, or for errors of judgement, fault or negligence committed by personnel of the Society or of its Agents in establishment or issuance of this document, and in connection with any activities for which it may provide.

The electronic version is available at: <http://www.veristarnb.com/veristarnb/jsp/viewPublicPdfTypepec.jsp?id=xe2vnn72qb>

BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION

FLEXIBEL Metallic Expansion Joints for liquefied gas

1.1 Technical data

Nominal Size	DN 100 to 400
Design Pressure	20 bar
Design Temperature	-165 / 125 °C
Number of Convolutions	up to 12

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.

1.2 Material specifications

Bellows	AISI 304/304L/321/316/316 L/347
Welded Flange	AISI 304/304L/321/316/316L/347

When other choices of materials are used per manufacturer's instructions, the BV agreement is to be obtained.

2. DOCUMENTS AND DRAWINGS

- Drawing N° AMG/2014/363 Rev.0 dated 30/11/2014
- Calculation Sheets according to EJMA Code

No departure from the above documents shall be made without the prior consent of the Society. The manufacturer must inform the Society of any modification or changes to these documents and drawings.

3. TEST REPORTS

- Type Tests carried out in presence of a BV Surveyor: cycle fatigue test, pressure test at twice the design pressure & burst test at 5 times the design pressure performed on representative bellows of sizes DN 100 & DN 400.
- Test report dated 17/09/2014
- Pressure test performed at -165°C as per test report N° EV-CRY-196006 dated 29/12/2019

4. APPLICATION / LIMITATION

- 4.1 - The expansion joint may be used on cargo and process piping on board liquefied gas carriers.
- 4.2 - In all cases, the associated pipelines are to be suitably aligned, supported and anchored. The joints are to be at any time accessible, well visible and protected against over extension and compression and against mechanical damage.
- 4.3 - Piping system drawings and calculation notes are to be submitted for review whenever expansion bellows are fitted on board BV-classed ships.
- 4.4 - The calculated maximum values of axial and lateral movements at design full cycles are not to be exceeded.
- 4.5 - The joints are to be installed according to manufacturer's instructions and Bureau Veritas Rules requirements.
- 4.6 - The welding of the bellows is to be performed by qualified welders and satisfactorily tested.

5. PRODUCTION SURVEY REQUIREMENTS

- 5.1 - The products are to be supplied by **Al Mufaddal Engineering & Marine Services Co. LLC** in compliance with the type and the requirements described in this certificate.
- 5.2 - This type of product is within the category IBV of Bureau Veritas Rule Note NR320.
- 5.3 - BV product certificate is required.
- 5.4 - Each expansion bellow with assemblies is to be hydraulically pressure tested to 1,5 times the maximum working pressure and provided with the manufacturer's pressure test report and conformity of production.

5.5 - For information, **Al Mufaddal Engineering & Marine Services Co. LLC** has declared to Bureau Veritas the following production site:

Al Mufaddal Engineering & Marine Services Co. LLC:
PO Box: 181440
Al Jadaf, AMG Workshop Shed No:01
DUBAI
UNITED ARAB EMIRATES

6. MARKING OF PRODUCT

Each expansion joint shall be clearly marked with at least:

- Manufacturer name or logo
- Type designation
- Maximum working pressure
- Society's brand as relevant

7. OTHERS

It is **Al Mufaddal Engineering & Marine Services Co. LLC**'s responsibility to inform shipbuilders or their sub-contractors of the proper methods of fitting, use and general maintenance of the approved equipment and the conditions of this approval.

This certificate supersedes the Type Approval Certificate N° 39486/B0 BV issued by the Society.

***** END OF CERTIFICATE *****