



Marine & Offshore

Certificate number: 37255/A2 BV

File number: ACM 204/2355/001

Product code: 7401H

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

L'ISOLANTE K-FLEX SPA
RONCELLO (MB) - ITALY

for the type of product

THERMAL INSULATION MATERIALS FOR LIQUEFIED GAS TANKS
K-FLEX IN CLAD insulation system

Requirements:

BUREAU VERITAS Rules for Classification of Steel Ships, Part D, Chapter 9, Section 4
BUREAU VERITAS Rules for the Classification of Offshore Units
NR542 Classification of Offshore Floating Gas Units
IMO IGC Code

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: 24 Mar 2020

For Bureau Veritas Marine & Offshore,

At BV VENEZIA, on 05 Jul 2017,

Sandro BRUSEGAN



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.

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BV Mod. Ad.E 530 June 2017

This certificate consists of 3 page(s)

THE SCHEDULE OF APPROVAL

1. PRODUCT DESCRIPTION:

K-FLEX IN CLAD insulation system is a multilayer system consisting of K-FLEX ST, closed cells NBR and EPDM type flexible elastomeric foam.

The first layer is always covered with an aluminium/polyester film vapour barrier, K-FLEX ALU.

The insulation system has an outer covering of 1.2 ± 0.2 mm of polymeric sheet cladding K-FLEX IN CLAD providing salt resistance, UV protection and impact resistance.

The insulation system is intended for cold application covering a temperature range from -165°C to $+30^{\circ}\text{C}$

2. DOCUMENTS AND DRAWINGS:

2.1 - K-FLEX IN CLAD system for cold services Manufacturer specification revision 1 dated 17/03/2014

2.2 - Insulation Inspection procedure revision 0001 dated 26/10/05

2.3 - Manufacturer repair specification revision 1 dated 13/05/2014

2.4 - Installation procedure of K-Flex ST flexible elastomeric foam for Exmar Caribbean FLNG project revision 1

3. TEST REPORTS:

3.1 - Tests reports from FIW Munchen, Germany

- Accelerated ageing report n° L2-12a/05 dated 05/12/20
- Expansion coefficient report n° L1.3-17/2002 dated 4/10/2002
- Tensile properties report n° L1.3-8/2002 dated 12/07/2002
- Thermal conductivity report n° F.2-7a/02 dated 30/01/2002
- Determination of physical properties report n° L2-35/13 dated 13/11/13

3.2 - Test report n° E013108 dated 31/01/2004, from LNE, France : Mock-up test type on K-Flex ST

3.3 - Survey report 762-11ZXL7M-4 issued on 2008-03-06K-Flex insulation of the ALLS test bench in Montoir de Bretagne

3.4 - Fire behavior and flame spread tests

- Tests reports from CSI n° 0754/dc/rea/13 rev1 dated 27/11/2013, 0491/dc/rea/11-3 dated 22/07/2011, n° 0806/dc/rea/10-3 dated 14/12/2010, n° 0643/dc/rea/12-1 dated 5/11/2012,
- Tests reports from BRE Global n° 26172 on 09/12/2010, 251501 on 20/03/2009, n° 282638 & 282730 on 30/10/2012
- Tests reports from Warrington Fire n° 179794 dated 27/01/2009, 198574 on 25/11/2010, 308942 on 30/06/2011, 308739 on 21/06/2011

4. APPLICATION / LIMITATION:

4.1 - This product is designed to provide insulation to cargo tank dome of Exmar Caribbean FLNG

4.2 - This product may be used for cold insulation on LNG / LPG piping and process equipment

4.3 - Application on board shall be performed in accordance with the Manufacturer's application manual and the Manufacturer's recommendations

5. PRODUCTION SURVEY REQUIREMENTS:

5.1 - The **K-FLEX IN CLAD** are to be supplied by **L'ISOLANTE K-FLEX SPA** in compliance with the type described in this certificate.

5.2 - This type of product is within the category HBV of Bureau Veritas Rule Note NR320 and as such does not require a BV product certificate.

5.3 - **L'ISOLANTE K-FLEX SPA** has to make the necessary arrangements to have its works recognised by Bureau Veritas in compliance with the requirements of NR320 for HBV products.

5.4 - For information, **L'ISOLANTE K-FLEX SPA** has declared to Bureau Veritas the following production site(s):

L'Isolante K-Flex SpA
Leonardo Da Vinci, 36
20040 RONCELLO (MB)
Italy

K-Flex Polska Sp. Z.o.o.
Wielenin-Kolonia 50B
99210 Uniejów
Poland

6. MARKING OF PRODUCT:

Each batch of item or packing is to be marked for purpose of its traceability.

7. OTHERS:

7.1 - It is **L'ISOLANTE K-FLEX SPA** 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.

7.2 - This Certificate supersedes Type Approval Certificate N° 37255/A1 BV issued on 09/04/2015 by the Society.

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