



Certificate no.:
TAK00002NV

TYPE APPROVAL CERTIFICATE

This is to certify:

that the **Insulation Materials for Gas Carriers**

with type designation(s)

Reinforced Polyurethane Foam (R-PUF): N-M-190-09 (180mm, HFO-1233zd, 9 layers of CSM)

issued to

NMG Composites Co., Ltd.
Jiaxing, Zhejiang Province, China

is found to comply with

Gaztransport & Technigaz Specification Nr. M3049, High Density Reinforced Polyurethane Foam 190kg/m3 (HD R-PUF 190), Rev. 01, March 2023

Application:

For the use in Gaztransport & Technigaz (GTT) MARK III Cargo Containment System (CCS) technologies of Liquefied Gas (LG) carriers.

Issued at **Hamburg** on **2026-04-01**

This Certificate is valid until **2031-03-31**.

DNV local unit: **Shanghai**

for **DNV**

Approval Engineer: **Gisle Hersvik**

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid. The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

LEGAL DISCLAIMER: Unless otherwise stated in the applicable contract with the holder of this document, or following from mandatory law, the liability of DNV AS, its parent companies and their subsidiaries as well as their officers, directors and employees ("DNV") arising from or in connection with the services rendered for the purpose of the issuance of this document or reliance thereon, whether in contract or in tort (including negligence), shall be limited to direct losses and under any circumstance be limited to 300,000 USD.

Product description

N-M-190-09, CrioTitan® R-PUF series

Reinforced Polyurethane Foam (R-PUF), which contains 9 layers CSM (Chopped Strand Mat) of 450 g/m² each.

Blowing agent: HFO-1233zd

Nominal density: 190 kg/m³

Board thickness: 180 mm

Place of manufacture

NMG Composites Co., Ltd., 111 XinZhong Road, Chongfu, Tongxiang, Jiaying Zhejiang, 314511, P.R. China

Application/Limitation

For use in MARK III Cargo Containment System (CCS) technologies.

The material is only approved for use in Cargo Containment System (CCS) technologies of Liquefied Gas (LG) carriers built under license from GAZTRANSPORT & TECHNIGAZ SAs (GTT).

Deliveries to actual shipbuilding projects shall be in compliance with the GTT Specification Nr. M3049, "High Density Reinforced Polyurethane Foam 190 kg/m³ (HD R-PUF 190)", Rev. 01 dated March 2023.

The product shall have valid approval from GTT, and the conditions stated in the GTT approval shall be adhered to.

Any significant changes in design and / or quality of the material will render the approval invalid.

Type Approval documentation

Tests carried out

Type Testing carried out in accordance with **Type Approval documentation**.

Marking of product

Product/package shall be marked with the *manufacturer's name*: **NMG Composites Co., Ltd., China**, or *manufacturer's identification letter(s)*, Lot No., *Size*, *Quantity*, and *type designation*.

The marking is to be carried out in such a way that it is visible, legible and indelible. The marking of product is to enable traceability to the DNV Type Approval Certificate.

Periodical assessment

The scope of the Periodical Assessment is to verify that the conditions stipulated for the Type Approval is complied with and that no alterations are made to the product design or choice of materials.

Periodical assessments (for Certificate Retention / Certificate Renewal) shall be performed according to DNV-CP-0338.

This certificate is only valid if required periodical assessments are carried out with satisfactory results. To check the validity of this certificate, please look it up in <https://approvalfinder.dnv.com>

END OF CERTIFICATE