Certificate no.:
TAP00002VM

TYPE APPROVAL CERTIFICATE

This is to certify:

that the Gaskets and Sealings

with type designation(s)
Flat Gasket - KLINGER® MLX

issued to
Klinger AG Egliswil
Egliswil, AG, Switzerland

is found to comply with
ASTM F36:15(2021) Standard Test Method for Compressibility and Recovery of Gasket Materials
DIN 28090-2 Static gaskets for flange connections – Gaskets made from sheets – Part 2: Special test procedures for quality assurance
EN 13555:2021 Flanges and their joints – Gasket parameters and test procedures relevant to the design rules for gasketed circular flange connections

Application:

Refer to section Application in the certificate.

Temperature range:	**see Certificate and manufacturer's instructions**
Max. working press.:	**see Certificate and manufacturer's instructions**
Design:	**Plate material**
Sizes:	**1500x1500 mm; Thicknesses [mm]: 1.5; 2.0; 3.0**

Issued at **Hamburg** on **2025-04-23**
This Certificate is valid until **2029-05-05**.
DNV local unit: **Augsburg**

for **DNV**

Approval Engineer: **Thilo Pabst**

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

KLINGER® Graphite Laminate MLX

Asbestos free flat gasket material. Multilayer graphite laminate with impregnated graphite layers and stainless steel inserts bonded without adhesive and fitted with an anti-stick surface.

Stainless steel material types: EN 1.4401 / AISI 316 or EN 1.4404 / AISI 316 L

Graphite Quality: "A" – High purity (according to "Klinger AG Graphite Product Manual")

Dimensions of plate material:

Sizes [mm]:	1500x1500
Thicknesses [mm]:	1.5; 2.0; 3.0
Tolerances:	Thickness ± 5% acc. DIN 28091-1 Length ± 5 mm, Width ± 5 mm

Technical data for **KLINGER® Graphite Laminate MLX**[1] (values for 2 mm thickness):

Technical data	Standard	Value[2]	Unit
Purity of Graphite	DIN 51903	≥ 99.8	%
Density of Graphite	DIN 28090-2	1,0 ± 5%	g/cm^3
Chloride content of graphite layer	EN15408	≤ 20	ppm
Steel insert / thickness	AISI 316 (L)	0.05	mm
Compressibility (20°C)	ASTM F36A	30 - 45	%
Recovery (20°C)	ASTM F36A	10 - 25	%
Maximum gasket stress Q_{Smax} at ambient temperature	EN 13555	> 220	MPa
Minimum required gasket stress in assembly $Q_{min(0,1)}$[3]	EN 13555	15	MPa
Continuous service temperature	./.	≤ 450	°C

Note1: Reference KLINGER® Graphite Laminate MLX: "Declaration of conformity acc. to DIN EN ISO 17050-1" issued by Klinger AG Egliswil
Note2: Values partly depending on thickness and temperature
Note3: Min gasket stress for max. leakage rate 0.1 mg/(m*s) at 40 bar pressure and RT

APPLICATION

This is a Non-Class Type Approval Certificate (TA-NONCL - for products where a Type Approval is not mandatory) on basis of test according to international standards.

The above listed gasket material sheet type may be used under consideration of the mechanical and technical characteristics as well as physical and chemical properties for the following applications:

- On board ships and other structures classed by DNV as follows:
  Ship's piping systems as specified in DNV Rules Pt.4, Ch.6 Piping systems and cargo lines on oil tankers.
- The selection of the gaskets for the corresponding application and appropriate installation has to be in accordance with the instructions of the manufacturer.
- Piping/Gaskets shall be hydrostatically tested: 1.5 times of the system design pressure (DNV Pt.4 Ch.6 – Piping)
- Piping of cargo handling systems on Oil Tanker shall be electrically bonded. (DNV Pt.5 Ch.5 – Oil Tanker)

LIMITATION / EXCLUSIONS

Not approved for following applications:

- Pipelines for LNG and flammable gas systems and cryogenic fluids.
- Cargo lines on chemical and gas tankers carrying flammable and/or noxious media, propylene oxide and mixtures of ethylene and propylene oxide

TYPE APPROVAL DOCUMENTATION

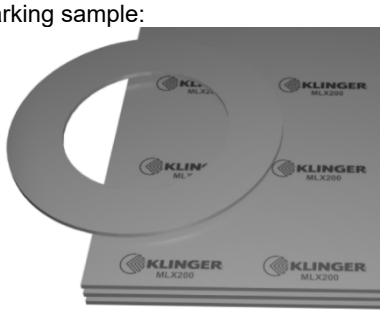
TESTS CARRIED OUT

Documentation of tests performed are the basis for this Type Approval as referenced in the list above and DNV Ref.-Nos. 262.1-03 -041724.

MARKING OF PRODUCT

For traceability of products, marking shall be legible and indelible.
Products are to be marked at least as follows:

Marking sample:

- Manufacturer's name / label - Product type / name* * MLX = product type; Number = Thickness (e.g. 200 = 2.0 mm)	Marking sample: 

PERIODICAL ASSESSMENT

For retention of the Type Approval, a DNV Surveyor shall perform periodical assessment to verify that the conditions for the Type Approval are complied with (refer to the Class Programme DNV-CP-0338, Sec. 4).

To check the validity of this certificate, please look it up in https://approvalfinder.dnv.com

END OF CERTIFICATE