

TYPE APPROVAL CERTIFICATE

Certificate no.:
TAP00001MJ
Revision No:
2

This is to certify:

that the Gaskets and Sealings

with type designation(s)

Flat Gasket - KLINGER®top-chem 2000, KLINGER®top-chem 2003, KLINGER®top-chem 2005, KLINGER®top-chem 2006

issued to

Rich. Klinger Dichtungstechnik GmbH & Co. KG
Gumpoldskirchen, Niederösterreich, Austria

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
API 607

Application:

Refer to section Application in the certificate.

Temperature range: Refer to certificate.

Max. working press.: Refer to certificate.

Design: Plate material.

Sizes: 1500x1500mm. Thickness 1.0, 1.5, 2.0 and 3.0mm

Issued at **Hamburg** on **2024-09-16**

This Certificate is valid until **2029-08-26**.

for **DNV**

DNV local unit: **Augsburg**

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®top-chem

Asbestos free gasket material from PTFE with various fillers.

Dimensions of plate material:	Sizes:	1500 x 1500 mm
	Thicknesses:	1.0 mm, 1.5 mm, 2.0 mm, 3.0 mm
	Tolerances:	Thickness acc. DIN 28091-1
		Length $\pm$ 50 mm, width $\pm$ 50 mm

KLINGER®top-chem 2000 (grey colour)

Asbestos free, fire safe (API 607, DIN EN ISO 10497) flat gasket material from PTFE, filled with SiC (Silicon Carbide).

Values for 2.0 mm thickness¹:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	2.5	g/cm ³
Compressibility	ASTM F36M	--	4	%
Recovery	ASTM F36M	--	50	%
Tightness	DIN 28090-2	--	0.08	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C ²	5	%
Klinger hot compression	Klinger	50 MPa / 260°C ²	11	%

KLINGER®top-chem 2003 (white colour)

Asbestos free flat gasket material from PTFE, filled with hollow glass-microspheres.

Values for 2.0 mm thickness¹:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.7	g/cm ³
Compressibility	ASTM F36M	--	18	%
Recovery	ASTM F36M	--	35	%
Tightness	DIN 28090-2	--	0.01	mg/s x m
Klinger cold compression	Klinger	25 MPa / 23°C ²	10	%
Klinger hot compression	Klinger	25 MPa / 260°C ²	39	%

KLINGER®top-chem 2005 (red colour)

Asbestos free gasket material from PTFE, filled with inorganic fillers.

Values for 2.0 mm thickness¹:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	2.2	g/cm ³
Compressibility	ASTM F36M	--	4	%
Recovery	ASTM F36M	--	40	%
Tightness	DIN 28090-2	--	0.02	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C ²	5	%
Klinger hot compression	Klinger	50 MPa / 260°C ²	35	%

KLINGER®top-chem 2006 (white colour)

Asbestos free flat gasket material from PTFE, filled with barium sulphate.

Values for 2.0 mm thickness¹:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	3.0	g/cm ³
Compressibility	ASTM F36M	--	4	%
Recovery	ASTM F36M	--	40	%
Tightness	DIN 28090-2	--	0.01	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C ²	12	%
Klinger hot compression	Klinger	50 MPa / 260°C ²	41	%

Note 1: Reference "Declaration of conformity acc. to DIN EN ISO 17050-1" issued by Klinger Dichtungstechnik GmbH & Co. KG, 2024-07-03

Note 2: Test conditions: Seating stress [MPa] / Test temperature [°C]
These conditions may be not equivalent to maximum service conditions (see manufacturer's instruction / PT-diagram).

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-RU-SHIP Pt.4 Ch.6 Piping systems and cargo lines on oil and chemical tankers including cargo oil line carrying propylene oxide and mixtures of ethylene / propylene oxide*
*Gaskets on cargo lines for Chemical Tanker carrying propylene oxide and mixtures of ethylene / propylene oxide must be fire resistant (DNV-RU-SHIP Pt.5 Ch.6 Sec.15_3.7.3)
- 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-RU-SHIP Pt.4 Ch.6 – Piping)
- Piping of cargo handling systems on Oil Tanker shall be electrically bonded. (DNV-RU-SHIP Pt.5 Ch.5 – Oil Tanker)

LIMITATION / EXCLUSIONS

- Pipelines for LNG, flammable gas systems and cryogenic fluids
- KLINGER®top-chem 2003, KLINGER®top-chem 2005, KLINGER®top-chem 2006 (no fire resistance test) are not to be used for cargo lines for Chemical Tanker carrying propylene oxide and mixtures of ethylene / propylene oxide ((DNV-RU-SHIP Pt.5 Ch.6 Sec.15_3.7.3)

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. 262.1-029480.

MARKING OF PRODUCT

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

Marking sample:

<ul style="list-style-type: none"> - Manufacturer's name / label - Product type / name 	<p>Marking sample:</p> 
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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