DNV·GL

Certificate No:
TAP00001K1

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Gaskets and Sealings

with type designation(s)
Flat Gasket - KLINGERSIL® C-4300, KLINGERSIL® C-4324, KLINGERSIL® C-4400, KLINGERSIL® C-4408, KLINGERSIL® C-4409, KLINGERSIL® C-4430, KLINGERSIL® C-4500, KLINGERSIL® C-4509, KLINGERSIL® C-8200,

Issued to
Rich. Klinger Dichtungstechnik GmbH & Co. KG
Gumpoldskirchen, NÖ, Austria

is found to comply with
ASTM F36
DIN 28090

Application :

Refer to section Application in the certificate.

Temperature range:	**Refer to certificate and manufacturer's instruction.**
Max. working press.:	**Refer to certificate and manufacturer's instruction.**
Design:	**Plate material**
Sizes:	**Refer to Certificate and manufacturer's instruction.**

Issued at **Hamburg** on **2019-08-27**
This Certificate is valid until **2024-08-26**.
DNV GL local station: **Augsburg**

Approval Engineer: **Hagen Markus**

for **DNV GL**

Olaf Drews
Head of Section

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.

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PRODUCT DESCRIPTION

KLINGERSIL® C-Series are Asbestos Free flat gaskets.
The following products are included:
KLINGERSIL® C-4300, KLINGERSIL® C-4324, KLINGERSIL® C-4400, KLINGERSIL® C-4408
KLINGERSIL® C-4409, KLINGERSIL® C-4430
KLINGERSIL® C-4500, KLINGERSIL® C-4509
KLINGERSIL® C-8200

Dimensions of plate material:
(valid for all products, except KLINGERSIL® C-4409 and KLINGERSIL® C-4509)**:**

- Sizes: 1000 x 1500 mm, 2000 x 1500 mm
- Thicknesses: 0.5 mm, 1.0 mm, 1.5 mm, 2.0 mm, 3.0 mm
- Tolerances: Thickness acc. DIN 28091-1
  Length ± 50 mm, width ± 50 mm

KLINGERSIL® C-4300 - Aramid fibres bonded with NBR

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.6	g/cm³
Compressibility	ASTM F36J	--	14	%
Recovery	ASTM F36J	--	50	%
Tightness	DIN 28090-2	--	0.03	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	22	%

KLINGERSIL® C-4324 - Combination of synthetic high performance fibres bonded with NBR

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.85	g/cm³
Compressibility	ASTM F36J	--	10	%
Recovery	ASTM F36J	--	55	%
Tightness	DIN 28090-2	--	0.03	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	25	%

KLINGERSIL® C-4400 - Aramid fibres bonded with NBR. Fire safe acc. API 607.

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.6	g/cm³
Compressibility	ASTM F36J	--	11	%
Recovery	ASTM F36J	--	55	%
Tightness	DIN 28090-2	--	0.02	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	20	%

KLINGERSIL® C-4408 - Aramid fibres bonded with NBR

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.9	g/cm³
Compressibility	ASTM F36J	--	8	%
Recovery	ASTM F36J	--	50	%
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	18	%

KLINGERSIL® C-4409 - Synthetic fibres bonded with NBR

Values for 1.5 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	2.0	g/cm³
Compressibility	ASTM F36J	--	7	%
Recovery	ASTM F36J	--	50	%
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	10	%

- Sizes: 1000 x 1500 mm, 2000 x 1500 mm
  (KLINGERSIL® C-4409L: 1000 x 1230, 2000 x 1230)
- Thicknesses: 1.0 mm, 1.5 mm
- Tolerances: Thickness acc. DIN 28091-1
  Length ± 50 mm, width ± 50 mm

KLINGERSIL® C-4430 - Synthetic fibres bonded with NBR. Fire safe acc. API 607

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.8	g/cm³
Compressibility	ASTM F36J	--	9	%
Recovery	ASTM F36J	--	55	%
Tightness	DIN 28090-2	--	0.05	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C	8	%
Klinger hot compression	Klinger	50 MPa / 300°C	11	%

KLINGERSIL® C-4500 - Carbon fibres bonded with NBR. Fire safe acc. API 607.

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.6	g/cm³
Compressibility	ASTM F36J	--	11	%
Recovery	ASTM F36J	--	60	%
Tightness	DIN 28090-2	--	0.05	mg/s x m
Klinger cold compression	Klinger	50 MPa / 23°C	10	%
Klinger hot compression	Klinger	50 MPa / 300°C	15	%

KLINGERSIL® C-4509 - Carbon fibres bonded with NBR

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	2.0	g/cm³
Compressibility	ASTM F36J	--	12	%
Recovery	ASTM F36J	--	65	%
Klinger cold compression	Klinger	50 MPa / 23°C	9	%
Klinger hot compression	Klinger	50 MPa / 300°C	7	%

- Sizes: 1000 x 1500 mm, 2000 x 1500 mm
  (KLINGERSIL® C-4509L: 1000 x 1230, 2000 x 1230)
- Thicknesses: 1.0 mm, 1.5 mm
- Tolerances: Thickness acc. DIN 28091-1
  Length ± 50 mm, width ± 50 mm

KLINGERSIL® C-8200 - Glass fibres bonded with special acid resistant elastomers

Values for 2.0 mm thickness[1]:

Technical data	Standard	Conditions	Value	Unit
Density	DIN 28090-2	--	1.7	g/cm³
Compressibility	ASTM F36J	--	9	%
Recovery	ASTM F36J	--	55	%
Klinger cold compression	Klinger	25 MPa / 23°C	7	%
Klinger hot compression	Klinger	25 MPa / 200°C	15	%

Note [1] : Reference "Declaration of conformity acc. to DIN EN ISO 17050-1" issued by KLINGER Dichtungstechnik GmbH & Co. KG, 2019-05-27

APPLICATION

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 GL as follows:
  Ship's piping systems as specified in DNV GL Rules Pt.4, Ch.6 Piping systems and cargo lines on oil tankers.
  Excluding cargo lines on chemical and gas tankers, carrying flammable and/or noxious media, propylene oxide and mixtures of ethylene and propylene oxide.
  Excluding pipe lines for LNG, flammable gas systems and cryogenic fluids.

- The selection of the gaskets for the corresponding application and appropriate installation has to be in accordance with the instructions of the manufacturer.

TYPE APPROVAL DOCUMENTATION

TESTS CARRIED OUT

Documentation of tests performed and referenced in the list above are the basis for this type approval.

MARKING OF PRODUCT

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

- Manufacturer's name / label
- Product type / name

Marking sample: EU
KLINGERSIL®
C-4300

PERIODICAL ASSESSMENT

A condition for retention of the type approval certificate in its validity period is that periodical assessments are successfully carried out. The objective of the periodical assessment is to verify that the conditions for the type approval have not been altered. Regulations for the periodical assessment of the type approval certificate are to be find in the DNVGL Class Programme CP-0338.

It is further to be noted that the Society shall be informed of any:

- Modifications to the product which are liable to affect its characteristics and functions, as originally specified and tested;
- Shifting of the production site and additional production site.

If such notifications are not made, the validity of the type approval certificate terminates.

END OF CERTIFICATE