Industrie Service

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Mehr Wert.

Technical Report

IS-DDB-MAN-10-097

Fire-Safe-Test according to DIN EN ISO 10497, 11.2004 resp. API 607, fifth edition, 06.2005 at 1 gasket of the type "KLINGERSIL C-4439"

Datum: 28.06.2010

Unsere Zeichen:
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Das Dokument besteht aus 5 Seiten.
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Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

Applicant: Rich. Klinger Dichtungstechnik GmbH & Co.KG
Am Kanal 8-10

A – 2352 Gumpoldskirchen

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1. Order

Company Rich. Klinger Dichtungstechnik GmbH & Co.KG applied at TÜV SÜD Industrie Service GmbH the accomplishment of a Fire-Safe-Test according to DIN EN ISO 10497 resp. API 607, fifth edition at 1 gasket of the type „KLINGERSIL C-4439", which was flanged to a ball valve with a nominal size of DN 50, PN 40.

The test was done on the 23.06.2010 in Graben-Neudorf with presence of an authorised expert of TÜV SÜD Industrie Service GmbH.

2. Accomplishment of the test

The test assembly and the accomplishment was carried out in accordance with DIN EN ISO 10497 (see installation scheme).

3. Test result

The test results mentioned in the attachment show that the requirements according DIN EN ISO 10497 resp. API 607, fifth edition have been achieved by the gasket

KLINGERSIL C-4439, DN 50, nominal pressure PN 40, thickness 1,5 mm, see data sheet in the attachment

in combination with a ball valve INTEC 112-FS.

The gasket was tightened with a torque of 150 Nm which is equal to a surface pressure of 38 N/mm^2.

4. Area of application

According to the testing of a gasket DN 50 simultaneously the requirements for gaskets of the same type are valid for nominal size DN 50 and below, DN 65, DN 80 and DN 100.

According to the testing of the gasket for a nominal pressure PN 40, gaskets of the same type for nominal pressures PN 40, PN 63 and PN 100 are also covered.

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Test protocol

1. **Date of the test** June, 23., 2010

2. **Location of the test** KLINGER SCHÖNEBERG GmbH
Heidelberger Straße 3
76676 Graben-Neudorf

3. **Test specifications** DIN EN ISO 10497, 11.2004 resp. API 607, fifth edition, 6.2005

4. **Gasket manufacturer** Rich. Klinger Dichtungstechnik GmbH & Co. KG
Am Kanal 8-10
A – 2352 Gumpoldskirchen

5. **Tested gasket (in combination with 1 ball valve)**

Gasket KLINGERSIL C-4439; DN50, PN40
Thickness 1,5 mm; Torque 150 Nm;
Surface pressure 38 N/mm^2
Limits of use: see data sheet as attachment

6. **Test ball valve** INTEC 112-FS, DN50, PN40
Material valve body/flange: 1.0619

7. **Test conditions**

Test fluid:	Water
Test fuel:	Liquid gas acc. DIN 51622
Burn period:	30 minutes
Thermocouples:	The temperature of the flames after 2 minutes should be 750 ºC; the average temperature at the flame area should be between 750 ºC and 1000 ºC and should not fall below 700 ºC.
Calorimeter cubes:	The average temperature after 15 minutes should be 650 ºC. This temperature should be held during the burn period and should not fall below 560 ºC.
Test pressure:	
(Low-pressure)	2 bar
(High-pressure)	30 bar

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8. Test procedure

8.1 Preliminary test: Tightness test of the valve with water (1,4 x PN)

Test pressure: 56 bar

Result: Ball valve was tight

8.2 Burn period

Temperatures of the Calorimetercubes

Temperature after 15 min		Average temperature after 15 min till end of the burn period	
		K1	K2
Ball valve	Temperature 667 °C	660 °C	677 °C

Temperatures of the thermocouples

Temperature after 2 min		Average temperature	
		T1	T2
Ball valve	Temperature 1024 °C	977 °C	940 °C

8.3 Cooling-down period of the ball valve to 100°C

Ball valve 5 Min

8.4 Through-seat leakage during burn period

max. permissible Leakage during the burn period: 200 ml/min

determined leakage: Ball valve 194 ml

Result: passed

8.5 Closing of the fuel supply and cooling down to 100 °C

Cooling down with air blast cooling and water.

8.6 External leakage during the burn period and the cooling-down period

max. permissible leakage during the burn period and cooling down period: 50 ml/min

determined leakage: Ball valve 0 ml

Result: passed

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8.7 For valves PN 100 and below the test pressure should be held constant at 2 bar and the leakage through the seat should be measured over a period of 5 minutes.

8.8 Through-seat Leakage after cooling-down

max. permissible leakage:		80 ml/min
determined leakage:	Ball valve:	0 ml
Result:	passed	

8.9 Operability

Increase the test pressure to high pressure, close the shut-off valve (Nr. 15) and open the ball valve against the upcoming pressure.

Holding of the high test pressure and measuring of the outer leakage over a period of 5 minutes.

8.10 External leakage following operational test

max. permissible Leakage:		50 ml/min
determined Leakage:	Ball valve:	0 ml
Result:	passed	

8.11 Optical appearance of the gasket after completion of the Fire-Safe-test

The gasket was in one piece and slightly sticked on the flange.

Mannheim, 28th June, 2010
IS-DDB-MAN/jo

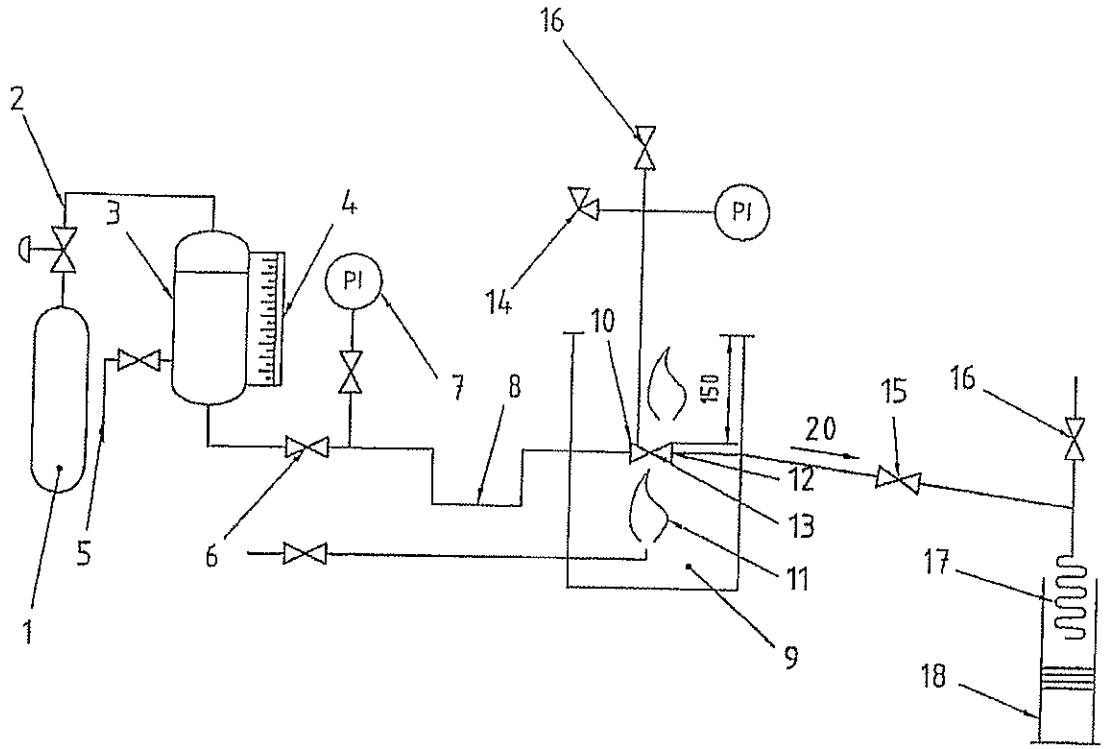
TÜV SÜD Industrie Service GmbH
Abteilung Druckbehälter
The expert

TÜV SÜD Industrie Service GmbH 00 36 Prüfstelle

Dipl.-Ing. John

Attachments: Installation scheme of the test rig
Data sheet

Maße in Millimeter



b) Druckgas als Druckerzeuger

Legende

1 Druckerzeuger
2 Druckregel- und -entlastungseinrichtung
3 Wasserbehälter
4 Kalibrierter Sichtmessstab
5 Wasserzuleitung
6 Absperrarmatur
7 Druckmessgerät
8 Rohrleitung, die so angeordnet ist, dass eine Dampfsperre entsteht (siehe 5.3.2)
9 Gehäuse für die Prüfung
10 Prüfarmatur, horizontal eingebaut, Spindel in horizontaler Lage (siehe 5.6.1)
11 Brenngaszufuhr und Brenner
12 Kalorimeter-Würfel (siehe 5.3.2)
13 Thermopaare, flammengeeignet, und Thermopaare für Gehäuse (siehe 5.3.2)
14 Druckmessgerät und Druckentlastungsarmatur (siehe 5.3.2)
15 Absperrarmatur
16 Entlüftungsarmatur
17 Kondensator
18 Behälter (siehe 5.3.2)
19 Rückflussverhinderer
20 Neigung
21 Lichter Abstand 150 mm

Bild 1 — Empfohlenes System (*fortgesetzt*)

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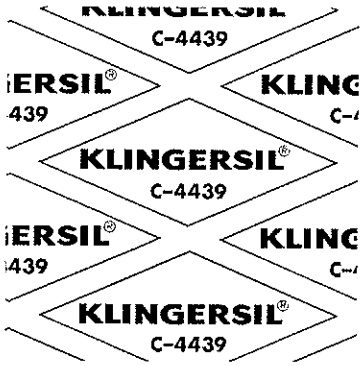
KLINGERSIL® C-4439
Technical data



Typical values for 2 mm thickness			
Compressibility ASTM F 36 J		%	6
Recovery ASTM F 36 J	min	%	55
Stress relaxation DIN 52913	50 MPa, 16 h/300 °C	MPa	35
Klinger cold/hot compression, 50 MPa	thickness decrease at 23°C	%	7
	thickness decrease at 300°C	%	6
Thickness increase ASTM F 146	oil IRM 903: 5 h/150 °C	%	5
	fuel B: 5 h/23 °C	%	8
Density		g/cm³	2.1

Important points to be observed

The selection of gaskets requires expertise and know-how since ever greater reliability coupled with the lowest possible leakage rates are demanded of gasket materials.

The exacting demands made on the tightness of gasket materials (e.g. Tightness class $L_{0.01}$) mean that with increasing internal pressure higher surface pressures must be applied to the gasket.

It must be shown that the flange joint will tolerate the demands made on it without being mechanically overloaded. Furthermore, the surface pressure applied to create the seal should never fall below the required minimum value since this will reduce the life of the gasket. Highly stressed, but not overstressed gaskets have a longer service life than understressed gaskets.

If the gasket fitted will be subjected to non-static loading, or will suffer stress fluctuations during discontinuous operation, it is advisable to choose a gasket which is not prone to embrittlement with increasing temperature (e.g. KLINGERgraphite laminate, KLINGERtop-chem, KLINGERtop-sil or KLINGER® Quantum), especially for steam and/or water applications.

For discontinuous operation in water and/or steam applications, we recommend as a general guide a surface pressure of 30 MPa at least. In such cases the gasket should be as thin as technical possible.

For reasons of safety, we do not recommend the re-use of gaskets.

Due to the metal reinforcement the already good stress relaxation is improved and a high strength against mechanical loads in the flange connection (elongation because of temperature changes) is achieved.

Dimensions of the standard sheets

Sizes:
1,000 x 1,500 mm, 2,000 x 1,500 mm.
Thicknesses:
1.0 mm, 1.5 mm, 2.0 mm, 3.0 mm; other thicknesses on request.
Tolerances:
thickness ± 10%, length ± 50 mm, width ± 50 mm

Surfaces

The standard surface finish of the material is such that the surface has an extremely low adhesion. On request, graphite facings and other surface finishes on one or both sides are also available.

Function and durability

The performance and life of KLINGER gaskets depend in large measure on proper storage and fitting, factors beyond the manufacturer's control. We can, however, vouch for the excellent quality of our products.

With this in mind, please also observe our installation instructions.

KLINGER EXPERT®
Powerful sealing calculation with online help on CD-ROM

Subject to technical alterations.
Status: June 2010

Certified according to DIN EN ISO 9001:2000

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