TÜV SÜD
Industrie Service

Mehr Sicherheit.
Mehr Wert.

Technical Report

IS-DDB-MAN-10-098

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-4400"

Datum: 28.06.2010

Unsere Zeichen:
IS-DDB-MAN/Jo
Dokument: PB Fire-Safe_klinger-Austria_DIN_EN_ISO_10497-Dichtung-Klingersil-C4400-10-E.docx

Das Dokument besteht aus 5 Seiten.
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Die auszugsweise Wiedergabe des Dokumentes und die Verwendung zu Werbezwecken bedürfen der schriftlichen Genehmigung der TÜV SÜD Industrie Service GmbH.

Die Prüfergebnisse beziehen sich ausschließlich auf die untersuchten Prüfgegenstände.

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

A – 2352 Gumpoldskirchen

Issued on: 2010-06-28 in 2 Copies each 5 pages and 2 Attachements

Issuer: Dipl.-Ing. John

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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-4400", 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-4400, 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-4400; 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 681 °C	700 °C	675 °C

Temperatures of the thermocouples

Temperature after 2 min		Average temperature	
		T1	T2
Ball valve	Temperature 934 °C	953 °C	952 °C

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

Ball valve 9 Min

8.4 Through-seat leakage during burn period

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

determined leakage: Ball valve 240 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 printing on the gasket was still readable. The gasket was in one piece and sticked on the flange.

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

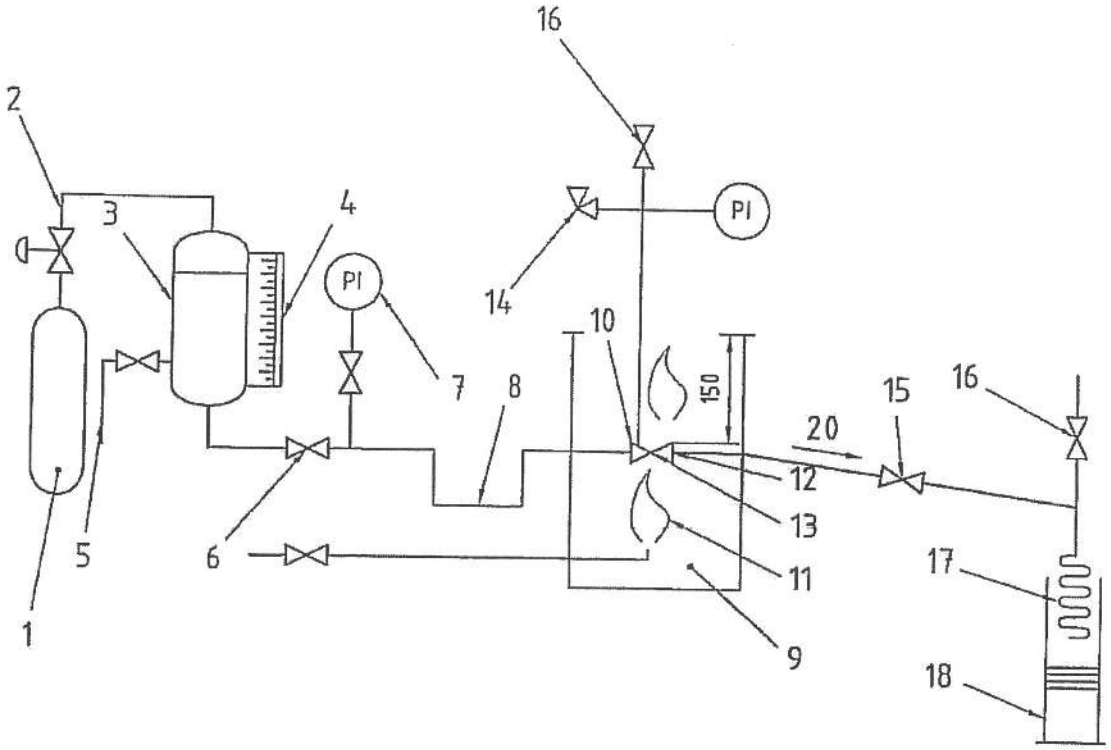
TÜV SÜD Industrie Service GmbH
Abteilung Druckbehälter
The expert

Dipl.-Ing. John

TÜV SÜD Industrie Service GmbH 00 36 Benannte Stelle

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*)

KLINGERSIL® C-4400
Technical data

■ Uses

High pressure gasket for universal applications. Suitable for use with oils, water, steam, gases, salt solutions, fuels, alcohols, moderate organic and inorganic acids, hydrocarbons, lubricants and refrigerants, food industry. Outstanding performance in many applications.

■ Dimensions of the standard sheets

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;
other thicknesses and sizes on request.
Tolerances:
thickness ±10%, length ± 50 mm, width ± 50 mm

■ Surfaces

KLINGERSIL® gasket materials are generally furnished with surfaces of low adhesion. On request, graphite facings and other surface finishes on one or both sides are also available.

A non coloured version for food application with technically identical values is named KLINGERSIL® C-4400L.

■ Function and durability

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

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

■ Tests and approvals

BAM approval in accordance with UVV 28, oxygen (VBG 62) tested up to 100 bar and 80 °C.
Approved for gas supply in accordance with DIN 3535/6.
DIN-DVGW-permit NG-5123AT0251, HTB tested. SVGW-permit, ÖVGW-permit, TÜV-Poland, KTW recommended, food toleration Austria, WRC approval, Germanischer Lloyd, BS 7531 Grade Y. TA-Luft (Clean air) approval, tested in accordance with VDI 2440 at 200°C.

Typical values				
Compressibility ASTM F 36 J			%	11
Recovery ASTM F 36 J	min		%	55
Stress relaxation DIN 52913	50 MPa, 16h/ 175°C		MPa	28
	50 MPa, 16h/ 300°C		MPa	25
Stress relaxation BS 7531	40 MPa, 16h/ 300°C		MPa	23
Klinger cold/hot compression	thickness decrease at 23°C		%	10
50 MPa	thickness decrease at 300°C		%	20
Tightness according DIN 3535/6			mg/s x m	0.02
Tightness class L	DIN 28090-1			0.1
Specific leakrate λ	VDI 2440	mbar x l/s x m		1.64E-08
Cold compression	DIN 28091-2		%	8 -12
Cold recovery	DIN 28091-2		%	3 - 5
Hot compression	DIN 28091-2		%	< 15
Hot recovery	DIN 28091-2		%	1
Spring back R	DIN 28091-2		mm	0.019
Thickness increase after fluid	oil JRM 903: 5 h/150 °C		%	3
immersion ASTM F 146	fuel B: 5 h/23 °C		%	5
Density			g/cm³	1.6
Average surface resistance	R_{OA}		Ω	3.6x10E10
Average specific volume resistance	ρ_D		Ω cm	1.4x10E10
Average dielectric strength			kV/mm	24
Average power factor	1 kHz, ca. 3 mm thickness		tan δ	0.147
Average dielectric coefficient	1 kHz, ca. 3 mm thickness		εr	9.7
Thermal conductivity			W/mK	0.40-0.42
ASME-Code sealing factors				
for gasket thickness 2,0 mm	tightness class 0.1 mg/s x m		MPa	y 20
				m 3.5

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

Certified according to DIN EN ISO 9001:2000

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