

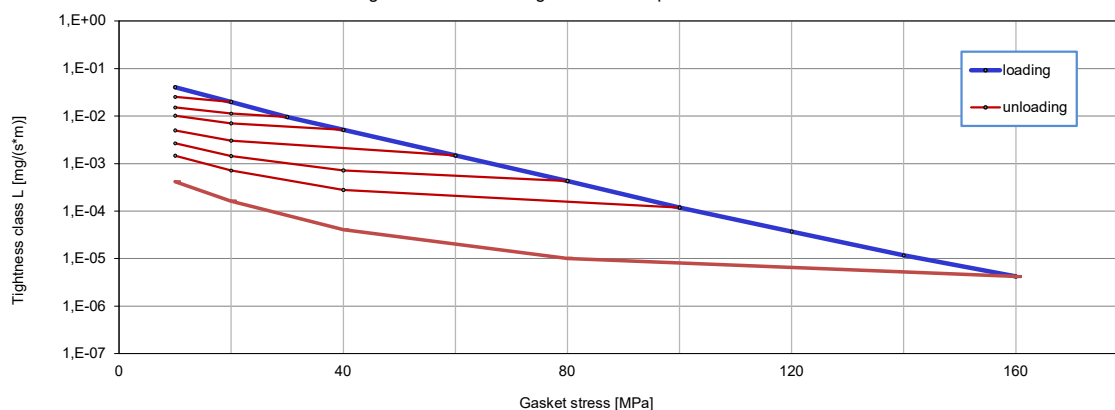
	LABORATORY OF SEALING MATERIALS 43-382 Bielsko-Biała, ul. Szyprów 17 tel. +48 33 8184133 e-mail: lbmu@spetech.com.pl www.laboratory.spetech.eu			 www.tuv.com 210/AL11/5952
Company	SPETECH sp. z o.o.			 LB - 12402
Gasket Type	SPETOGRAPH® GUS 140			
Dimensions [mm]	92 x 49 x 2			
Stiffness (kN/mm)	500			
Calculation type EN 1591-1	a) flat gasket;		EN 1514-1	

Factors acc. to EN 13555 to use in calculation standard EN 1591-1:2009/ :2013

Minimum level of surface pressure required for leakage rate class L on assembly Q_{min/L} and after off-loading Q_{Smin/L} at room temperature (RT)

Internal pressure [bar]	40											
L [mg/(s*m)]	Q _{min/L} [MPa]	Q _{Smin/L} [MPa] for effective gasket stress										
		Q _A = 20 [MPa]	Q _A = 30 [MPa]	Q _A = 40 [MPa]	Q _A = 60 [MPa]	Q _A = 80 [MPa]	Q _A = 100 [MPa]	Q _A = 120 [MPa]	Q _A = 140 [MPa]	Q _A = 160 [MPa]		
10 ⁻⁰	10	10	10	10	10	10	10			10		
10 ⁻¹	10	10	10	10	10	10	10			10		
10 ⁻²	29		27	11	10	10	10			10		
10 ⁻³	66					31	16			10		
10 ⁻⁴	103									27		
10 ⁻⁵	143									80		
10 ⁻⁶												
10 ⁻⁷												

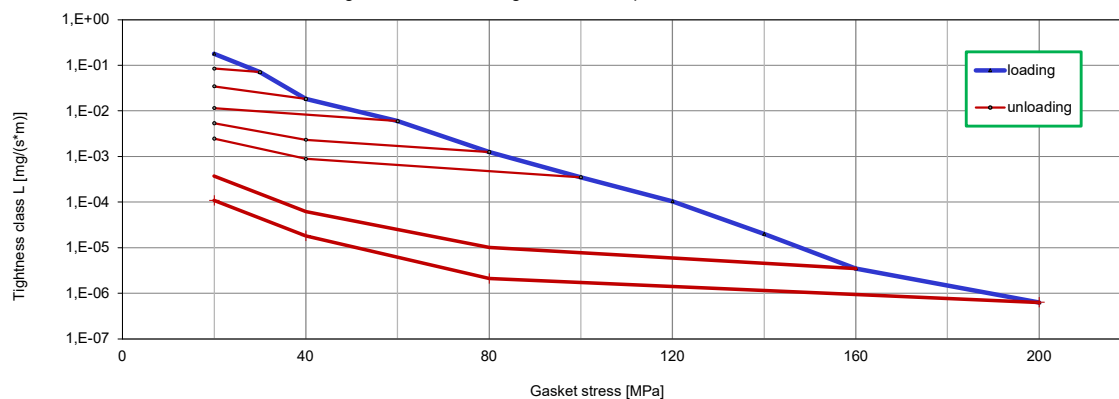
Leakage rate in function of gasket stress - pressure 40 bar / RT



Minimum level of surface pressure required for leakage rate class L on assembly Q_{min/L} and after off-loading Q_{Smin/L} at room temperature (RT)

Internal pressure [bar]	80											
L [mg/(s*m)]	Q _{min/L} [MPa]	Q _{Smin/L} [MPa] for effective gasket stress										
		Q _A = 20 [MPa]	Q _A = 30 [MPa]	Q _A = 40 [MPa]	Q _A = 60 [MPa]	Q _A = 80 [MPa]	Q _A = 100 [MPa]	Q _A = 120 [MPa]	Q _A = 140 [MPa]	Q _A = 160 [MPa]	Q _A = 200 [MPa]	
10 ⁻⁰	20		20	20	20	20	20			20	20	
10 ⁻¹	27		20	20	20	20	20			20	20	
10 ⁻²	51				30	20	20			20	20	
10 ⁻³	83						38			20	20	
10 ⁻⁴	121									35	21	
10 ⁻⁵	148									83	52	
10 ⁻⁶	190										155	
10 ⁻⁷												
10 ⁻⁸												

Leakage rate in function of gasket stress - pressure 80 bar / RT



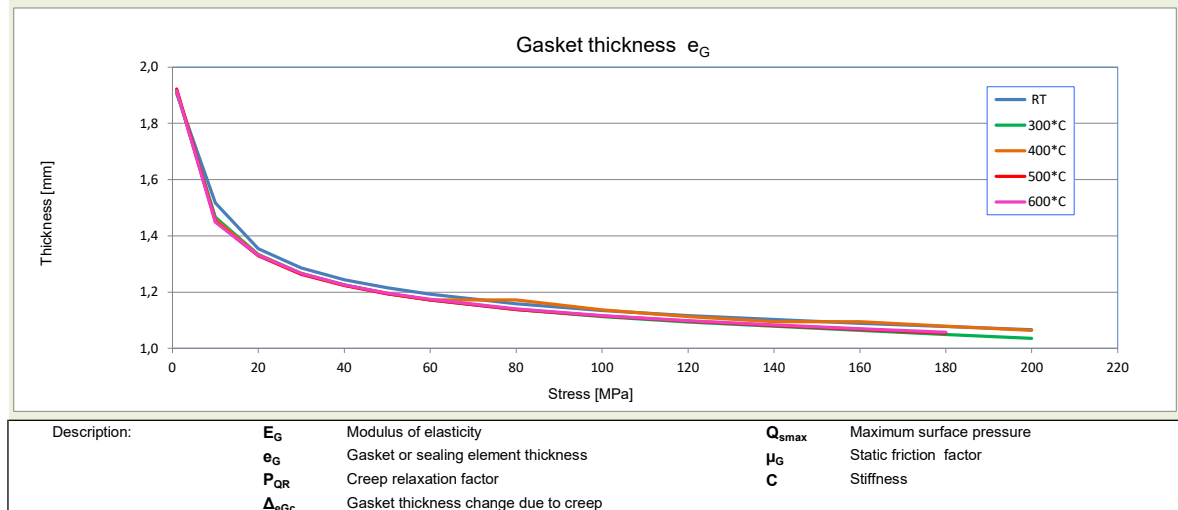
Temperature	RT					
Gasket stress	E _G	e _G	C=500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		1,907			200	0,13
10	188	1,517				
20	434	1,355				
30	717	1,286	0,98	0,005		
40	1045	1,244				
50	1426	1,215	0,99	0,004		
60	1821	1,193				
80	2620	1,159				
100	3415	1,135				
120	4199	1,117				
140	5079	1,102				
160	5779	1,089				
180	6540	1,077				
200	7287	1,067	1,00	0,004		

Temperature	300°C					
Gasket stress	E _G	e _G	C= 500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		1,914			200	0,27
10	207	1,466				
20	437	1,333				
30	716	1,266	0,88	0,031		
40	1038	1,225				
50	1382	1,196	0,92	0,032		
60	1729	1,173				
80	2507	1,138				
100	3287	1,113				
120	4083	1,094				
140	4902	1,079				
160	5709	1,064				
180	6370	1,050				
200	6988	1,035	0,98	0,039		

Temperature	400°C					
Gasket stress	E _G	e _G	C= 500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		1,918			200	0,25
10	216	1,458				
20	441	1,333				
30	722	1,266	0,87	0,033		
40	1033	1,224				
50	1370	1,195	0,92	0,036		
60	1715	1,172				
80	2513	1,172				
100	3314	1,137				
120	4168	1,113				
140	5023	1,095				
160	5836	1,095				
180	6505	1,080				
200	7371	1,064	0,97	0,044		

Temperature	500°C					
Gasket stress	E _G	e _G	C= 500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		1,922			180	NDA
10	221	1,451				
20	442	1,329				
30	713	1,264	0,87	0,035		
40	1032	1,223				
50	1414	1,194	0,91	0,039		
60	1723	1,173				
80	2473	1,139				
100	3260	1,115				
120	4082	1,097				
140	4841	1,081				
160	5642	1,068				
180	6327	1,054	0,97	0,043		

Temperature	600°C					
Gasket stress	E _G	e _G	C= 500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gg}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		1,916			180	NDA
10	224	1,449				
20	448	1,331				
30	722	1,267	0,88	0,031		
40	1000	1,225				
50	1310	1,197	0,92	0,034		
60	1649	1,175				
80	2374	1,141				
100	3067	1,117				
120	3752	1,099				
140	4465	1,084				
160	5049	1,070				
180	5786	1,057	0,97	0,040		



Factors acc. to EN 13555 to use in calculation standard EN 1591-1:2001

T [°C]	Q_{min} [MPa]	$Q_{max, ref}$ [MPa]	E_0 [MPa]	K_1	Q_1/P	g_c	c_1
0...20	15	270	1	33	1,3	1,0	0
100		250	1	33	1,3	1,0	0
200		230	1	33	1,3	1,0	0
300		210	1	33	1,3	1,0	0

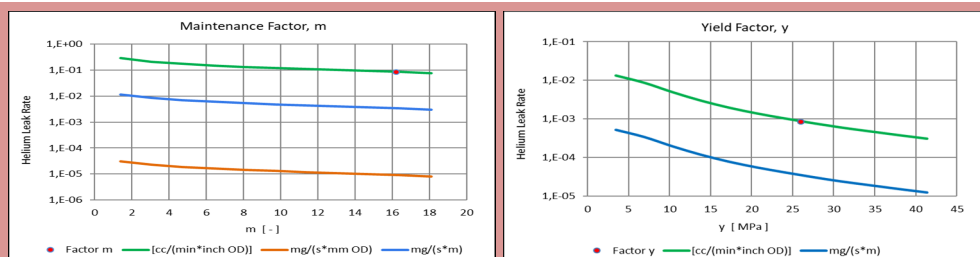
b_{Gref} [mm]	20,0	e_{Gref} [mm]	2,0
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Factors acc. to:

EN 13445-3 : Unfired pressure vessels - Part 3: Design
 EN 13480-3:2002 Metallic industrial piping - Part 3: Design and calculation
 ASME Code s. VIII Boiler & Pressure Vessel Code

Tightness class		ASTM F3149	ASME		EN 13555	
			T2 Class	T3 Class	L0,1	L0,01
Factor m	[-]	16,2	< 1,4	4,3	< 1,4	2,2
Factor y	[MPa]	26,0			< 3,4	15,2
	[psi]	3771				

NOTE: Maintenance values [m] less than 2.0 are typically not used in ASME designs except for elastomeric gaskets (Classification D2000).



Q_{max} - see maximal applicable gasket stress Q_{smax} acc. EN 1591-1:2009/2013

Factors acc. to:

AD 2000-Merkblatt B7 August 2007

$k_0 k_D$ [N/mm]	k_1 [mm]	$k_0 k_3$ [N/mm]
NDA	NDA	NDA

 σ_{max} - see maximal applicable gasket stress Q_{max} acc. EN 1591-1:2009/2013**Factors acc. to:**

WUDT-UC-WO-O/19

σ_m [MPa]	σ_r [MPa]	b [1]				
		20oC	100oC	200oC		
NDA	NDA	NDA	NDA	NDA	NDA	NDA

 σ_{max} - see maximal applicable gasket stress Q_{max} acc. EN 1591-1:2009/2013**Factors acc. to:**ASTM F36-2003 Standard Test Method for Compressibility and Recovery of Gasket Materials
Procedure J

Compressibility [%]	Recovery [%]
NDA	NDA

Factors acc. to:

ASTM F38-00 Standard Test Methods for Creep Relaxation of a Gasket Material (Method B)

Temperature [°C]	Creep Relaxation [%]
20	NDA
100	NDA
200	NDA

Factors acc. to:

EN 61340-2-3 Electrostatics - Part 2-3: Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation

Surface resistance R_s at U=10V	[Ω]		NDA
Volume resistance R_v at U=10V	[Ω]		NDA
Surface resistivity ρ_s at U=10V	[Ω]		NDA
Volume resistivity ρ_v at U=10V	[Qm]		NDA