



LABORATORY OF SEALING MATERIALS

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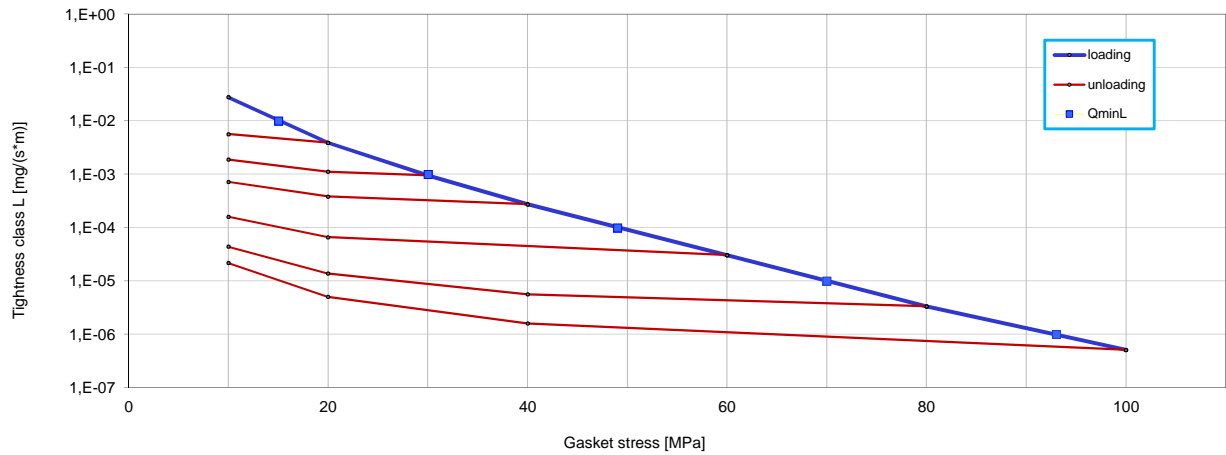
Company	SPETECH sp. z o.o.	
Gasket Type	SPETEBAR® BAS 370	
Dimensions [mm]	92 x 49 x 3	
Calculation type EN 1591-1	a) flat gasket;	EN 1514-1

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]		10											
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]	$Q_A = 180$ [MPa]	$Q_A = 200$ [MPa]	
10^0	10	10	10	10	10	10	10	10					
10^{-1}	10	10	10	10	10	10	10	10					
10^{-2}	15	10	10	10	10	10	10	10					
10^{-3}	30		27	10	10	10	10	10					
10^{-4}	49				15	10	10	10					
10^{-5}	70					27	15	10					
10^{-6}	93						64	10					

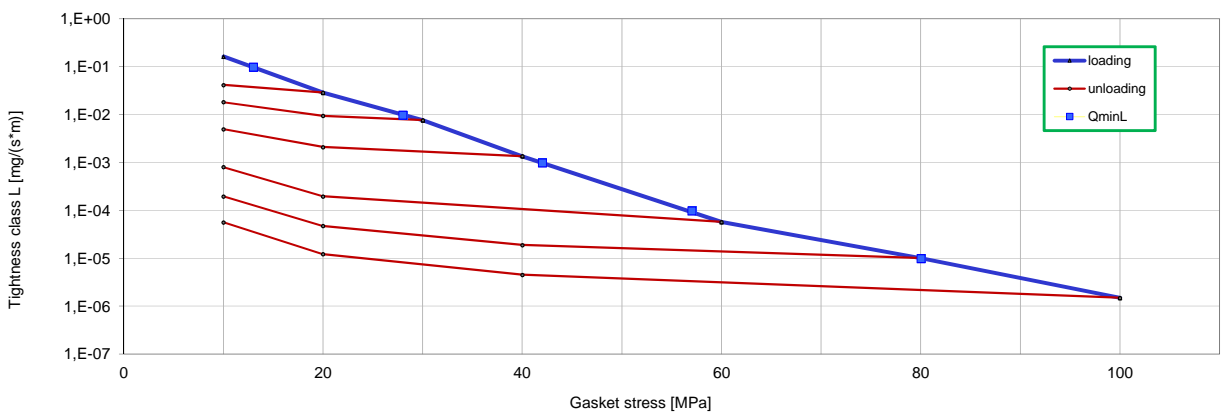
Leakage rate as a function of gasket stress - pressure 10 bar / RT



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]		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]	$Q_A = 180$ [MPa]	$Q_A = 200$ [MPa]	
10^0	10	10	10	10	10	10	10	10					
10^{-1}	13	10	10	10	10	10	10	10					
10^{-2}	28		19	10	10	10	10	10					
10^{-3}	42				10	10	10	10					
10^{-4}	57				42	15	10	10					
10^{-5}	80						24	10					
10^{-6}													

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

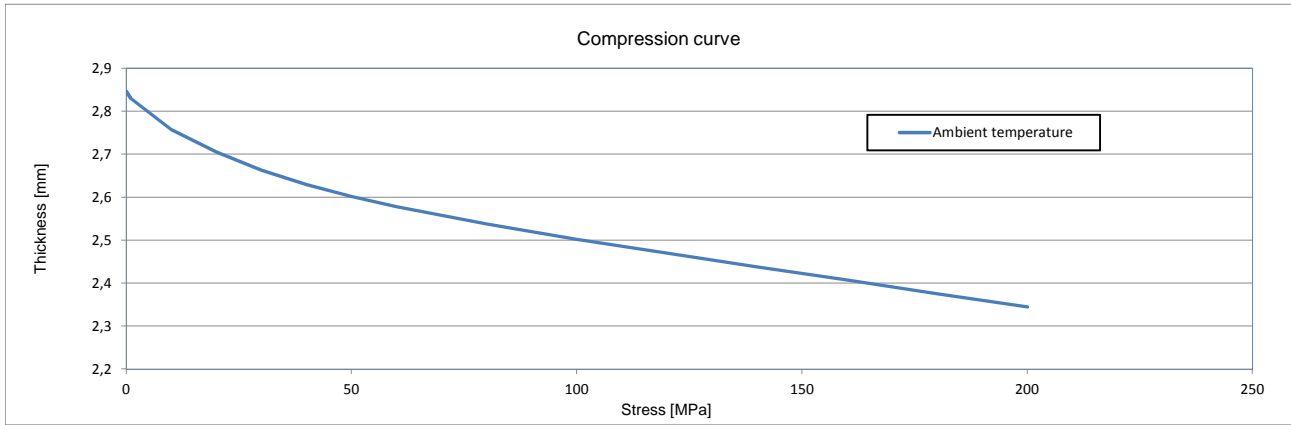


Parameters at RT						
Gasket stress [MPa]	Unloading modulus of elasticity EG	Gasket or sealing element thickness e_G	Creep relaxation factor P_{QR}	Gasket thickness change due to creep Δe_{Gc}	Maximum surface pressure Q_{smax}	Static friction factor μ_G
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
0		2,847			200	0,25
1		2,830				
10	782	2,758				
20	1190	2,705				
30	1651	2,663	0,96	0,010		
40	2165	2,629				
50	2716	2,602	0,97	0,012		
60	3327	2,578				
80	4220	2,537				
100	4967	2,502	0,97	0,030		
120	5548	2,470				
140	6080	2,438				
160	6624	2,407				
180	7087	2,376				
200	7612	2,345	0,96	0,061		

Parameters at 100°C						
Gasket stress [MPa]	Unloading modulus of elasticity EG	Gasket or sealing element thickness e_G	Creep relaxation factor P_{QR}	Gasket thickness change due to creep Δe_{Gc}	Maximum surface pressure Q_{smax}	Static friction factor μ_G
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
0		2,814			200	0,25
1		2,793				
10	690	2,711				
20	1157	2,652				
30	1723	2,605	0,85	0,039		
40	2226	2,564				
50	2706	2,524	0,81	0,081		
60	3093	2,484				
80	3705	2,391				
100	4264	2,285	0,78	0,188		
120	4760	2,177				
140	5336	2,081				
160	5798	1,999				
180	6236	1,932				
200	6720	1,872	0,78	0,375		

Parameters at 150°C						
Gasket stress [MPa]	Unloading modulus of elasticity EG	Gasket or sealing element thickness e_G	Creep relaxation factor P_{QR}	Gasket thickness change due to creep Δe_{Gc}	Maximum surface pressure Q_{smax}	Static friction factor μ_G
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
0		2,819			140	0,25
1		2,802				
10	900	2,708				
20	1331	2,651				
30	1753	2,597	0,76	0,062		
40	2179	2,546				
50	2556	2,496	0,73	0,115		
60	2848	2,443				
80	3491	2,316				
100	3984	2,184	0,66	0,283		
120	4471	2,068				
140	4990	1,969	0,67	0,391		

Parameters at 200°C						
Gasket stress [MPa]	Unloading modulus of elasticity EG	Gasket or sealing element thickness e_G	Creep relaxation factor P_{QR}	Gasket thickness change due to creep Δe_{Gc}	Maximum surface pressure Q_{smax}	Static friction factor μ_G
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
0		2,810			100	0,25
1		2,785				
10	976	2,682				
20	1412	2,627				
30	1866	2,575	0,64	0,090		
40	2264	2,522				
50	2611	2,468	0,65	0,146		
60	2896	2,411				
80	3375	2,259				
100	3860	2,111	0,60	0,340		



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/P	g _c	c ₁
0...20	35	80	500	20	1,6	-	0,05
100	-	70	500	20	1,6	-	0,05
200	-	60	500	20	1,6	-	0,05

bGref [mm]	19,5	eGref [mm]	2,8
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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

m	y [psi]	y [MPa]
2,0	3600	24,8

[σ_{max} - see maximal applicable gasket stress Q_{max} 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 _θ [N/mm]
18,0*b _D	1,4*b _D	*b _D

[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]		
		20°C	100°C	200°C
25,5	4,0*p ₀	1,0	1,4	1,8

[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 [%]
6	69

Factors acc. to:
 ASTM F38-00 Standard Test Methods for Creep Relaxation of a Gasket Material (Method B)

Temperature [°C]	Creep Relaxation [%]
20	21
100	64
200	90

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]	2,66E+09
Volume resistance R _v at U=10V	[Ω]	2,25E+09
Surface resistivity ρ _s at U=10V	[Ω]	2,69E+10
Volume resistivity ρ _v at U=10V	[Ωm]	1,12E+09