

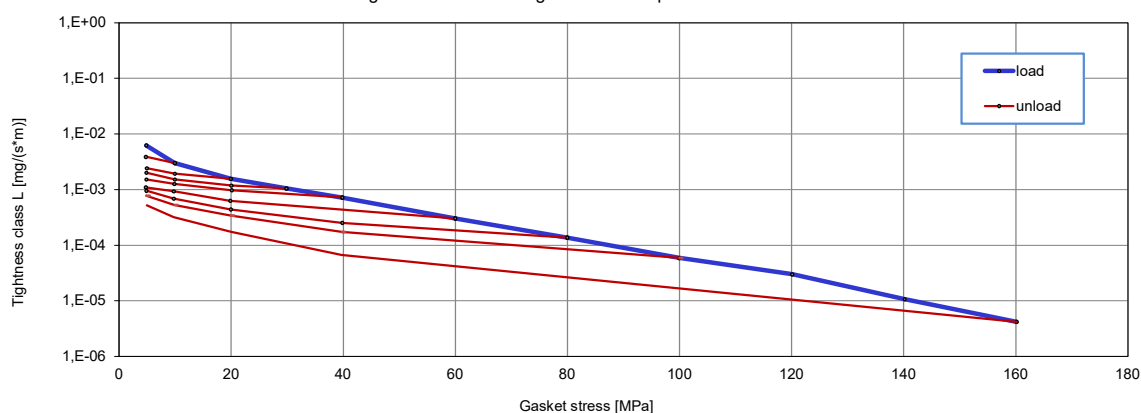
		LABORATORY OF SEALING MATERIALS 43-382 Bielsko-Biała, ul. Szyprów 17 tel. +48 33 8184133 e-mail: lbmu@spetech.com.pl www.laboratory.spetech.eu			 www.tuv.com 210/AL/5952
Company		SPETECH sp. z o.o.			
Gasket Type		SPETOGRAPH® GUS® 20			 LB - 12402
Dimensions [mm]		92 x 49 x 0,55 (DN40 PN40)			
Calculation type EN 1591-1		a) flat gasket;		EN 1514-1	
Notes:	Rev.0 (04-03-2021)				

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									
		$Q_A = 10$ [MPa]	$Q_A = 20$ [MPa]	$Q_A = 30$ [MPa]	$Q_A = 40$ [MPa]	$Q_A = 60$ [MPa]	$Q_A = 80$ [MPa]	$Q_A = 100$ [MPa]	$Q_A = 160$ [MPa]		
10^{-0}	5	5	5	5	5	5	5	5	5		
10^{-1}	5	5	5	5	5	5	5	5	5		
10^{-2}	5	5	5	5	5	5	5	5	5		
10^{-3}	31				20	8	5	5	5		
10^{-4}	87							71	32		
10^{-5}	142								71		
10^{-6}											
10^{-7}											

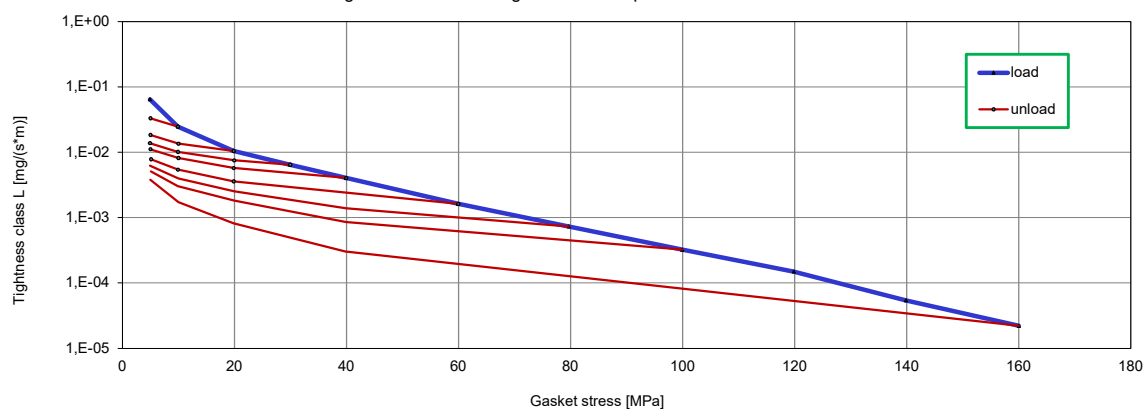
Leakage rate in function of gasket stress - pressure 10 bar / RT



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									
		$Q_A = 10$ [MPa]	$Q_A = 20$ [MPa]	$Q_A = 30$ [MPa]	$Q_A = 40$ [MPa]	$Q_A = 60$ [MPa]	$Q_A = 80$ [MPa]	$Q_A = 100$ [MPa]	$Q_A = 160$ [MPa]		
10^{-0}	5	5	5	5	5	5	5	5	5		
10^{-1}	5	5	5	5	5	5	5	5	5		
10^{-2}	20			11	7	5	5	5	5		
10^{-3}	72						61	36	17		
10^{-4}	128								91		
10^{-5}											
10^{-6}											
10^{-7}											
10^{-8}											

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

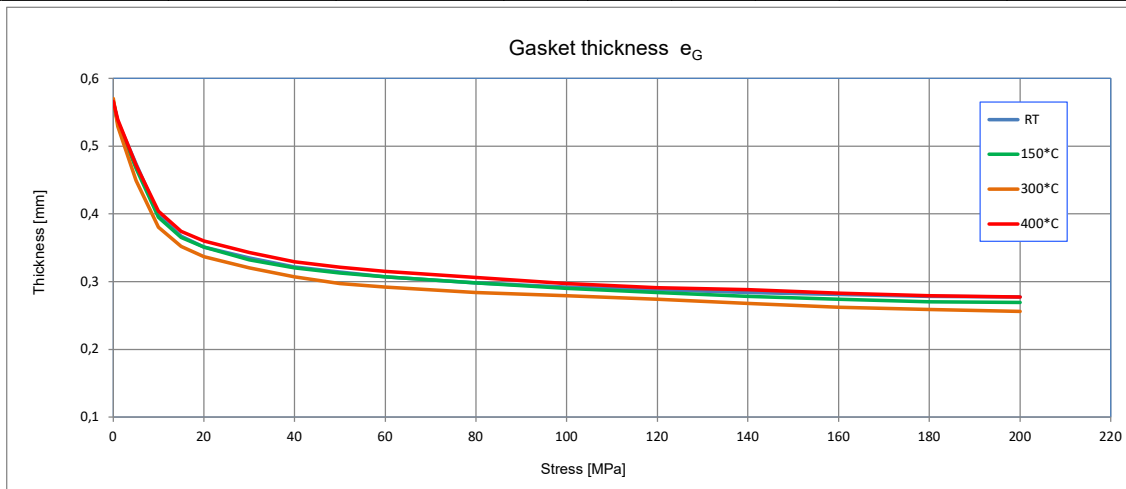


Temperature	RT							
Gasket stress	E _G	eG	C=500 kN/mm		C=1500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}	P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[-]	[mm]	[MPa]	[-]
0		0,564					200	0,10
1		0,536						
5	88	0,474						
10	374	0,399						
15	259	0,367						
20	507	0,351						
30	1206	0,335	1,00	0,000				
40	1020	0,322						
50	1611	0,314	1,00	0,000				
60	1983	0,307						
80	3266	0,298						
100	4348	0,292						
120	5485	0,288						
140	7103	0,284						
160	8050	0,281						
180	7814	0,278						
200	7801	0,277	1,00	0,000				

Temperature	150°C							
Gasket stress	E _G	eG	C=500 kN/mm		C=1500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}	P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[-]	[mm]	[MPa]	[-]
0		0,566					200	0,10
1		0,534						
5	191	0,467						
10	460	0,395						
15	402	0,365						
20	801	0,351						
30	1056	0,332	0,97	0,008				
40	1667	0,320						
50	3964	0,313	0,98	0,008				
60	3004	0,307						
80	4887	0,298						
100	7228	0,290						
120	8470	0,284						
140	8988	0,278						
160	10567	0,274						
180	10488	0,270						
200	10119	0,269	0,99	0,017				

Temperature	300°C							
Gasket stress	E _G	e _G	C=500 kN/mm		C=1500 kN/mm		Q _{smax}	μ _G
			P _{QR}	Δe _{Gc}	P _{QR}	Δe _{Gc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[-]	[mm]	[MPa]	[-]
0		0,570					200	0,10
1		0,529						
5	152	0,449						
10	453	0,380						
15	395	0,352						
20	643	0,337						
30	1396	0,320	0,96	0,010				
40	1334	0,307						
50	1516	0,297	0,97	0,013				
60	3176	0,292						
80	3112	0,284						
100	6001	0,279						
120	6915	0,274						
140	9188	0,268						
160	8737	0,262						
180	7902	0,259						
200	6398	0,256	0,99	0,017				

Temperature	400°C						
Gasket stress	E _G	e _G	C=500 kN/mm		C=1500 kN/mm		Q _{smax}
[MPa]	[MPa]	[mm]	P _{QR}	Δe _{Gc}	P _{QR}	Δe _{Gc}	
			[-]	[mm]	[-]	[mm]	[MPa]
0		0,566					200
1		0,539					
5	227	0,472					
10	389	0,404					
15	404	0,374					
20	614	0,360					
30	2755	0,343	0,96	0,010			
40	2057	0,329					
50	2176	0,321	0,98	0,008			
60	2603	0,315					
80	3704	0,306					
100	3489	0,297					
120	5044	0,291					
140	7352	0,288					
160	5762	0,283					
180	5266	0,279					
200	5664	0,277	0,99	0,017			
							0,10



Description:	E _G	Modulus of elasticity	Q _{smax}	Maximum surface pressure
	e _G	Gasket or sealing element thickness	μ _G	Static friction factor (based on EN1591-1:2014 Annex E)
	P _{QR}	Creep relaxation factor	C	Stiffness
	Δe _{Gc}	Gasket thickness change due to creep		

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 _i /P	g _c	c ₁
20	10	100	1	28	1,3	1,0	
100		90	1	28	1,3	1,0	
200		80	1	28	1,3	1,0	
300		70	1	28	1,3	1,0	
400							
bGref [mm]		19,5		eGref [mm]		0,5	

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]
2,52	2500	17,2

σ_{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 ₀ [N/mm]	k ₁ [mm]	k ₀ k ₀ [N/mm]
7,0*b ₀	2,0*b ₀	*b ₀

σ_{max} - see maximal applicable gasket stress Q_{smax} 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	300°C	400°C
17,5	5,0·p ₀	1,0	1,1	1,1	1,1	1,2

σ_{max} - see maximal applicable gasket stress Q_{smax} 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	[Ωm]		NDA