

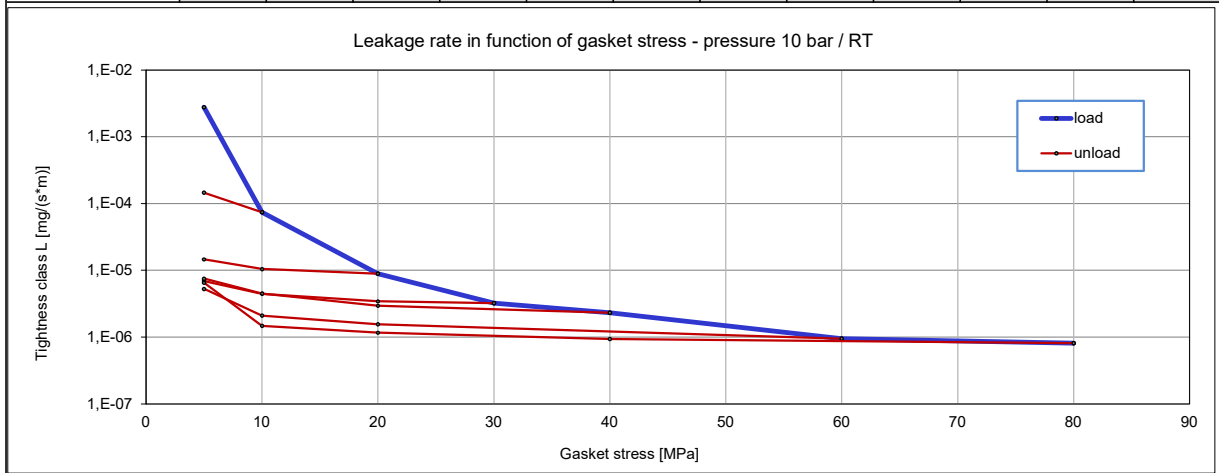
	<b>LABORATORY OF SEALING MATERIALS</b> 43-382 Bielsko-Biala, ul. Szyprów 17 tel. +48 33 8184133 e-mail: lbmu@spetech.com.pl www.laboratory.spetech.eu			 www.tuv.com 210/11/5952  LB - 12402
	Company	SPETECH sp. z o.o.		
Gasket Type	SPETOFLON® FL 160			
Dimensions [mm]	92 x 49 x 3 (DN40 PN40)			
Calculation type EN 1591-1	a) flat gasket;	EN 1514-1	IBC	
Notes:	Rev.1 (17-02-2021)			

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

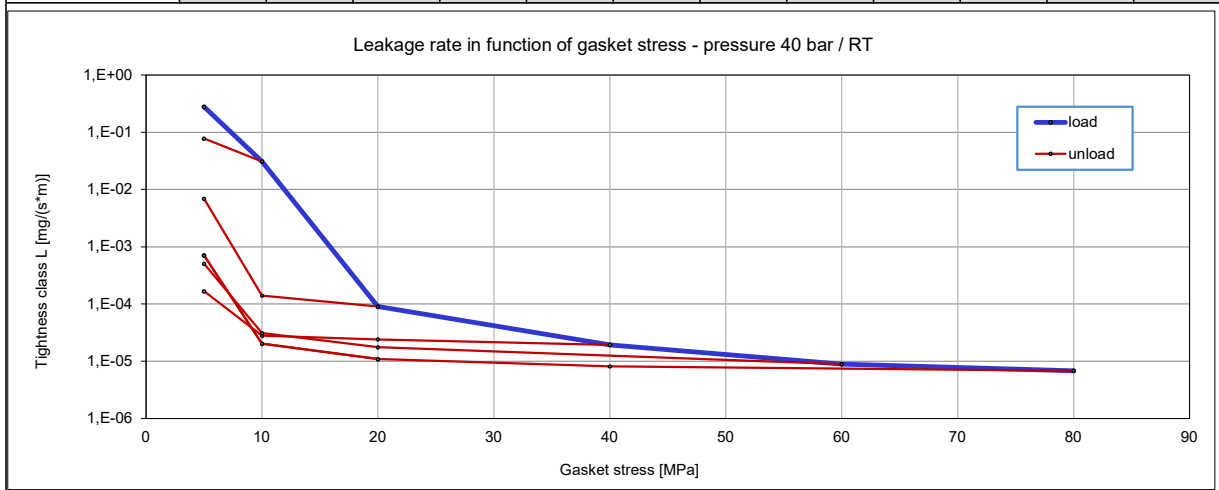
Minimum level of surface pressure required for leakage rate class L on assembly Q<sub>min/L</sub> and after off-loading Q<sub>Smin/L</sub> at room temperature (RT)

Internal pressure [bar]		10								
L [mg/(s*m)]	Q <sub>min/L</sub> [MPa]	Q <sub>Smin/L</sub> [MPa] for effective gasket stress								
		Q <sub>A</sub> = 10 [MPa]	Q <sub>A</sub> = 20 [MPa]	Q <sub>A</sub> = 30 [MPa]	Q <sub>A</sub> = 40 [MPa]	Q <sub>A</sub> = 60 [MPa]	Q <sub>A</sub> = 80 [MPa]			
10 <sup>0</sup>	5	5	5	5	5	5	5			
10 <sup>-1</sup>	5	5	5	5	5	5	5			
10 <sup>-2</sup>	5	5	5	5	5	5	5			
10 <sup>-3</sup>	7	5	5	5	5	5	5			
10 <sup>-4</sup>	10	8	5	5	5	5	5			
10 <sup>-5</sup>	20		14	5	5	5	5			
10 <sup>-6</sup>	59					56	34			
10 <sup>-7</sup>										



Minimum level of surface pressure required for leakage rate class L on assembly Q<sub>min/L</sub> and after off-loading Q<sub>Smin/L</sub> at room temperature (RT)

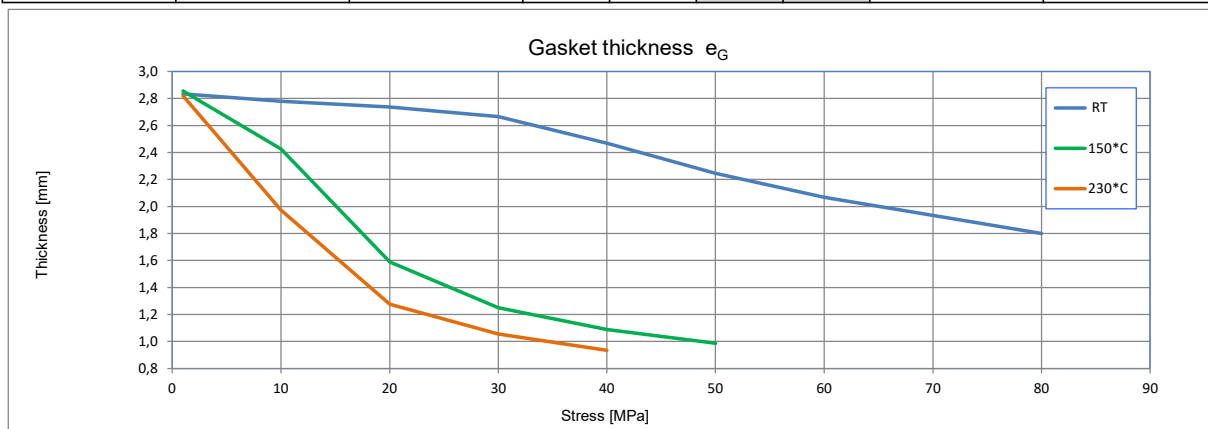
Internal pressure [bar]		40								
L [mg/(s*m)]	Q <sub>min/L</sub> [MPa]	Q <sub>Smin/L</sub> [MPa] for effective gasket stress								
		QA = 10 [MPa]	QA = 20 [MPa]	QA = 40 [MPa]	QA = 60 [MPa]	QA = 80 [MPa]				
10 <sup>0</sup>	5	5	5	5	5	5				
10 <sup>-1</sup>	7	5	5	5	5	5				
10 <sup>-2</sup>	12		5	5	5	5				
10 <sup>-3</sup>	16		8	5	5	5				
10 <sup>-4</sup>	20		18	7	8	8				
10 <sup>-5</sup>	57				53	28				
10 <sup>-6</sup>										



Temperature		RT						Q <sub>smax</sub>	μ <sub>G</sub>
Gasket stress	E <sub>G</sub>	e <sub>G</sub>	C=500 kN/mm		C=1500 kN/mm				
			P <sub>QR</sub>	Δe <sub>Gc</sub>	P <sub>QR</sub>	Δe <sub>Gc</sub>			
[MPa]	[MPa]	[mm]	[ - ]	[mm]	[ - ]	[mm]	[MPa]	[ - ]	
1		2,835					80	0,09	
10	1616	2,782							
20	2408	2,737							
30	3101	2,665	0,81	0,048					
40	3738	2,468							
50	4094	2,246	0,72	0,115					
60	4546	2,069							
80	5539	1,799	0,71	0,191					

Temperature		150°C						Q <sub>smax</sub>	μ <sub>G</sub>
Gasket stress	E <sub>G</sub>	e <sub>G</sub>	C=500 kN/mm		C=1500 kN/mm				
			P <sub>QR</sub>	Δe <sub>Gc</sub>	P <sub>QR</sub>	Δe <sub>Gc</sub>			
[MPa]	[MPa]	[mm]	[ - ]	[mm]	[ - ]	[mm]	[MPa]	[ - ]	
1		2,857					50	0,07	
10	555	2,426							
20	919	1,588							
30	1278	1,251	0,27	0,183					
40	1593	1,088							
50	1979	0,986	0,22	0,323					

Temperature		230°C						Q <sub>smax</sub>	μ <sub>G</sub>
Gasket stress	E <sub>G</sub>	e <sub>G</sub>	C=500 kN/mm		C=1500 kN/mm				
			P <sub>QR</sub>	Δe <sub>Gc</sub>	P <sub>QR</sub>	Δe <sub>Gc</sub>			
[MPa]	[MPa]	[mm]	[ - ]	[mm]	[ - ]	[mm]	[MPa]	[ - ]	
1		2,820					40	0,05	
10	441	1,973							
20	678	1,278							
30	902	1,054	0,17	0,206					
40	1127	0,934	0,15	0,284					



Description:	E <sub>G</sub>	Modulus of elasticity	Q <sub>smax</sub>	Maximum surface pressure
	e <sub>G</sub>	Gasket or sealing element thickness	μ <sub>G</sub>	Static friction factor
	P <sub>QR</sub>	Creep relaxation factor	C	Stiffness
	Δe <sub>Gc</sub>	Gasket thickness change due to creep		

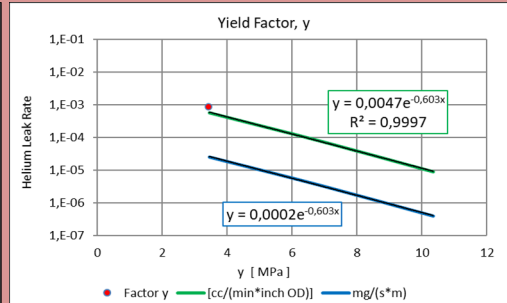
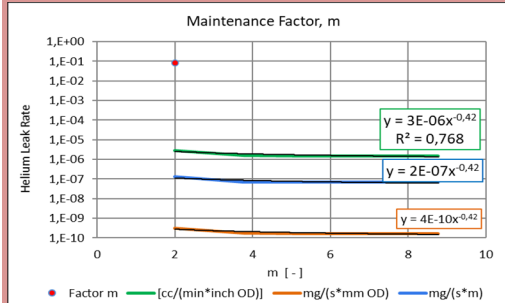
**Factors acc. to EN 13555 to use in calculation standard EN 1591-1:2001**

T [°C]	Q <sub>min</sub> [MPa]	Q <sub>max, ref</sub> [MPa]	E <sub>0</sub> [MPa]	K <sub>1</sub>	Q <sub>1</sub> /P	g <sub>c</sub>	c <sub>1</sub>
20	10	50	600	20	1,3	0,9	0,00
100	-	35	500	20	1,3	0,7	-
200	-	20	400	20	1,3	0,5	-
bGref [mm]		19,5		eGref [mm]		2,9	

**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	PVRC Tightness class		EN 13555	
		T3	T4	L0,01	L0,001
Factor m	[-]	2,0	< 2,0	< 2,0	< 2,0
Factor y	[MPa]	3,4		< 3,4	5,1
	[psi]	500			



NOTE: Maintenance values [m] less than 2.0 are typically not used in ASME designs except for elastomeric gaskets (Classification D2000).  
 Gasket dimensions acc. to EN 1514-1 DN40 PN40  
 The given coefficient values are read from the test curves, not from the trend line.

[omax - see maximal applicable gasket stress Qsmax acc. EN 1591-1:2009/2013](#)

**Factors acc. to:**

AD 2000-Merkblatt B7 August 2007

$k_0 k_D$ [N/mm]	$k_1$ [mm]	$k_0 k_\theta$ [N/mm]
$25,0 \cdot b_D$	$1,5 \cdot b_D$	$\cdot b_D$

[omax - see maximal applicable gasket stress Qsmax acc. EN 1591-1:2009/2013](#)

**Factors acc. to:**

WUDT-UC-WO-O/19

$\sigma_m$ [MPa]	$\sigma_r$ [MPa]	b [1]		
		20°C	100°C	200°C
26,5	$5,5 \cdot p_0$	1,1	1,8	2,6

[omax - see maximal applicable gasket stress Qsmax 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	30

**Factors acc. to:**

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

Temperature [°C]	Creep Relaxation [%]
20	33
100	79
200	95

**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=100V	[Ω]	>	1,00E+12
Volume resistance $R_v$ at U=100V	[Ω]	>	1,00E+12
Surface resistivity $\rho_s$ at U=100V	[Ω]	>	1,10E+13
Volume resistivity $\rho_v$ at U=100V	[Ωm]	>	4,95E+11