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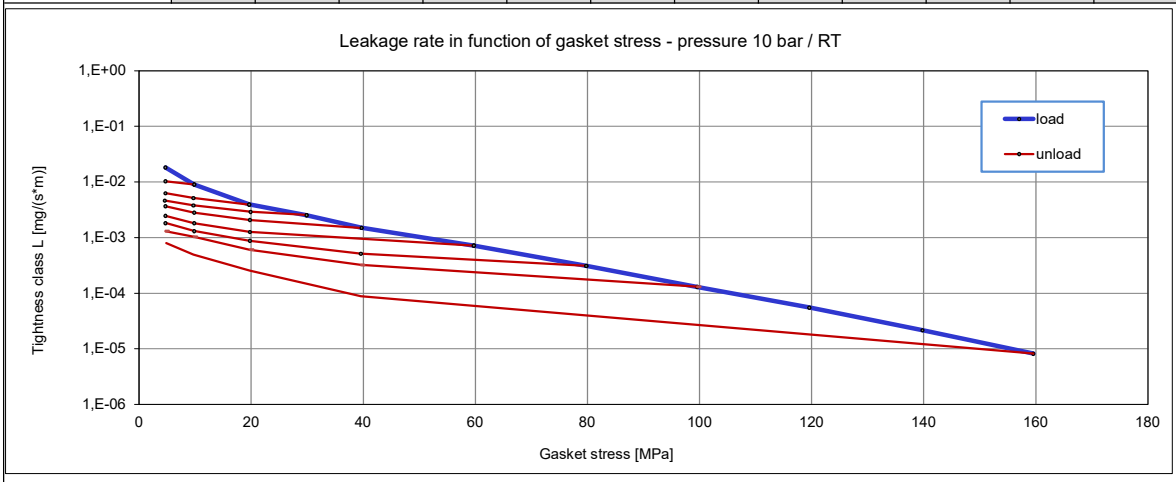
Company	**SPETECH sp. z o.o.**		
Gasket Type	**SPETOGRAF® GUS® 20**		
Dimensions [mm]	**92 x 49 x 1 (DN40 PN40)**		
Calculation type EN 1591-1	**a) flat gasket;**	**EN 1514-1**	**IBC**
Notes:	Rev.0 (04-03-2021)		

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

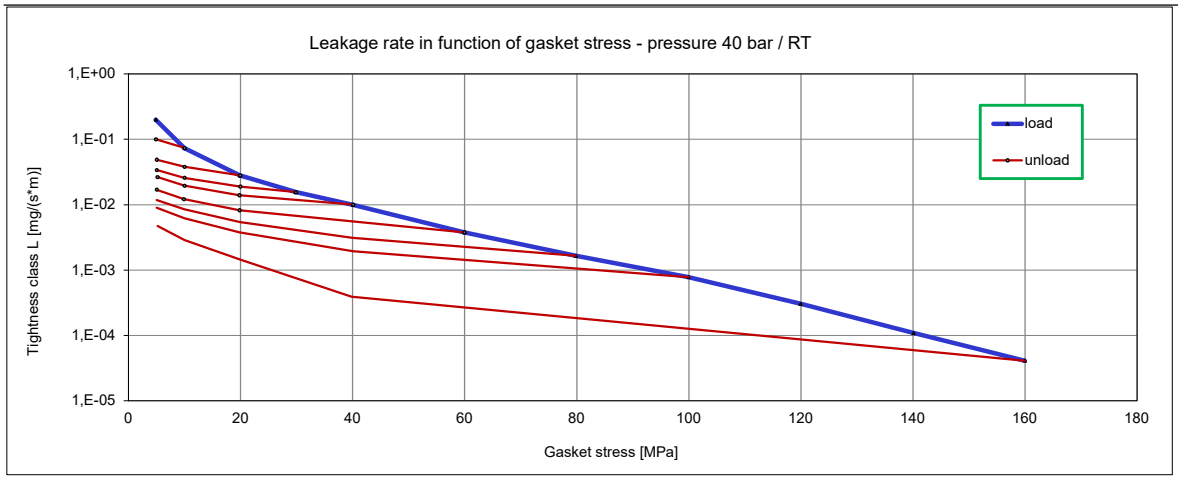
Minimum level of surface pressure required for leakage rate class L on assembly Qmin/L and after off-loading QSmin/L at room temperature (RT)

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}	9	6	5	5	5	5	5	5	5			
10^{-3}	50					35	16	10	5			
10^{-4}	106								37			
10^{-5}	155								149			
10^{-6}												
10^{-7}												



Minimum level of surface pressure required for leakage rate class L on assembly Qmin/L and after off-loading QSmin/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}	8	5	5	5	5	5	5	5	5			
10^{-2}	39				38	15	8	5	5			
10^{-3}	92							82	25			
10^{-4}	142								112			
10^{-5}												
10^{-6}												
10^{-7}												
10^{-8}												

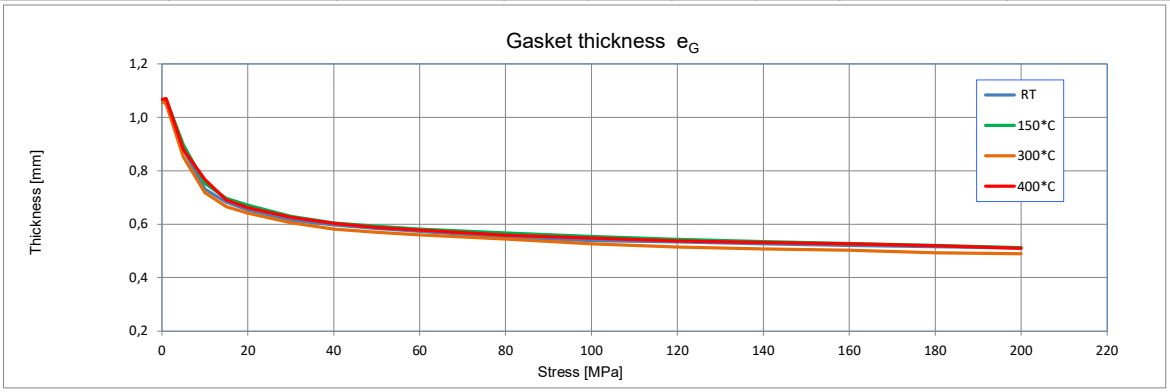


Temperature	RT							
Gasket stress	E_G	eG	C=500 kN/mm		C=1500 kN/mm		Q_{smax}	μ_G
			P_{QR}	Δ_{eGc}	P_{QR}	Δ_{eGc}		
[MPa]	[MPa]	[mm]	[-]	[mm]	[-]	[mm]	[MPa]	[-]
0		1,066						
1		1,057						
5	77	0,879						
10	155	0,732						
15	353	0,683						
20	419	0,653						
30	656	0,615	0,99	0,003				
40	1383	0,597						
50	1766	0,584	0,99	0,004			**200**	0,10
60	1973	0,573						
80	1686	0,551						
100	3749	0,539						
120	8649	0,534						
140	10484	0,527						
160	10445	0,520						
180	12657	0,516						
200	19277	0,511	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		1,056						
1		1,067						
5	87	0,897						
10	213	0,753						
15	323	0,697						
20	603	0,671						
30	838	0,630	0,96	0,011				
40	1186	0,605						
50	2098	0,592	0,97	0,013			**200**	0,10
60	2664	0,582						
80	2698	0,567						
100	3340	0,554						
120	4011	0,543						
140	5391	0,535						
160	7351	0,528						
180	6589	0,520						
200	7241	0,512	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		1,060						
1		1,050						
5	97	0,851						
10	230	0,718						
15	311	0,665						
20	637	0,642						
30	802	0,606	0,95	0,013				
40	1147	0,582						
50	2191	0,569	0,96	0,019			**200**	0,10
60	3210	0,560						
80	3805	0,545						
100	2227	0,527						
120	2249	0,514						
140	4386	0,507						
160	4912	0,502						
180	4697	0,493						
200	5597	0,489	0,99	0,025				

Temperature	400*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		1,067						
1		1,071						
5	118	0,879						
10	767	0,767						
15	406	0,691						
20	540	0,662						
30	908	0,626	0,94	0,016				
40	1151	0,603						
50	1410	0,588	0,95	0,023			200	0,10
60	1809	0,578						
80	3078	0,559						
100	4848	0,548						
120	3986	0,537						
140	6064	0,531						
160	16408	0,527						
180	13225	0,519						
200	6459	0,510	0,98	0,034				



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	
	Δ_{eGc}	Gasket thickness change due to creep			

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

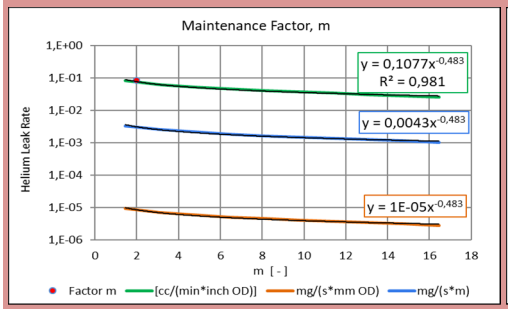
T [°C]	Q_{min} [MPa]	$Q_{max, ref}$ [MPa]	E_0 [MPa]	K_1	Q_f/P	g_c	c_1
20	10	100	1	28	1,3	1.0	
100		90	1	28	1,3	1,0	
200		80	1	28	1,3	1.0	
300		70	1	28	1,3	1,0	
400							

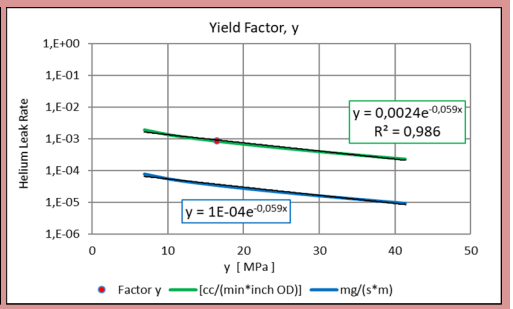
bGref [mm]	19,5	eGref [mm]	1,0

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	
			T2	T3	L0,01	L0,001
Factor m	[-]	2,0	< 1,5	< 1,5	< 1,5	16,7
Factor y	[MPa]	16,5			5,3	40,0
	[psi]	2390				





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 12560-1 NPS 4 Class 300
The given coefficient values are read from the test curves, not from the trend line.

σmax - see maximal applicable gasket stress Qsmax acc. EN 1591-1:2009/:2013

Factors acc. to:

AD 2000-Merkblatt B7 August 2007

k_0k_D [N/mm]	k1 [mm]	$k_0k\vartheta$ [N/mm]
$7,0*b_D$	$2,0*b_D$	$*b_D$

σmax - see maximal applicable gasket stress Qsmax 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

σmax - 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 [%]
44	15

Factors acc. to:

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

Temperature [°C]	Creep Relaxation [%]
20	11,1
100	13,1
200	14,6

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