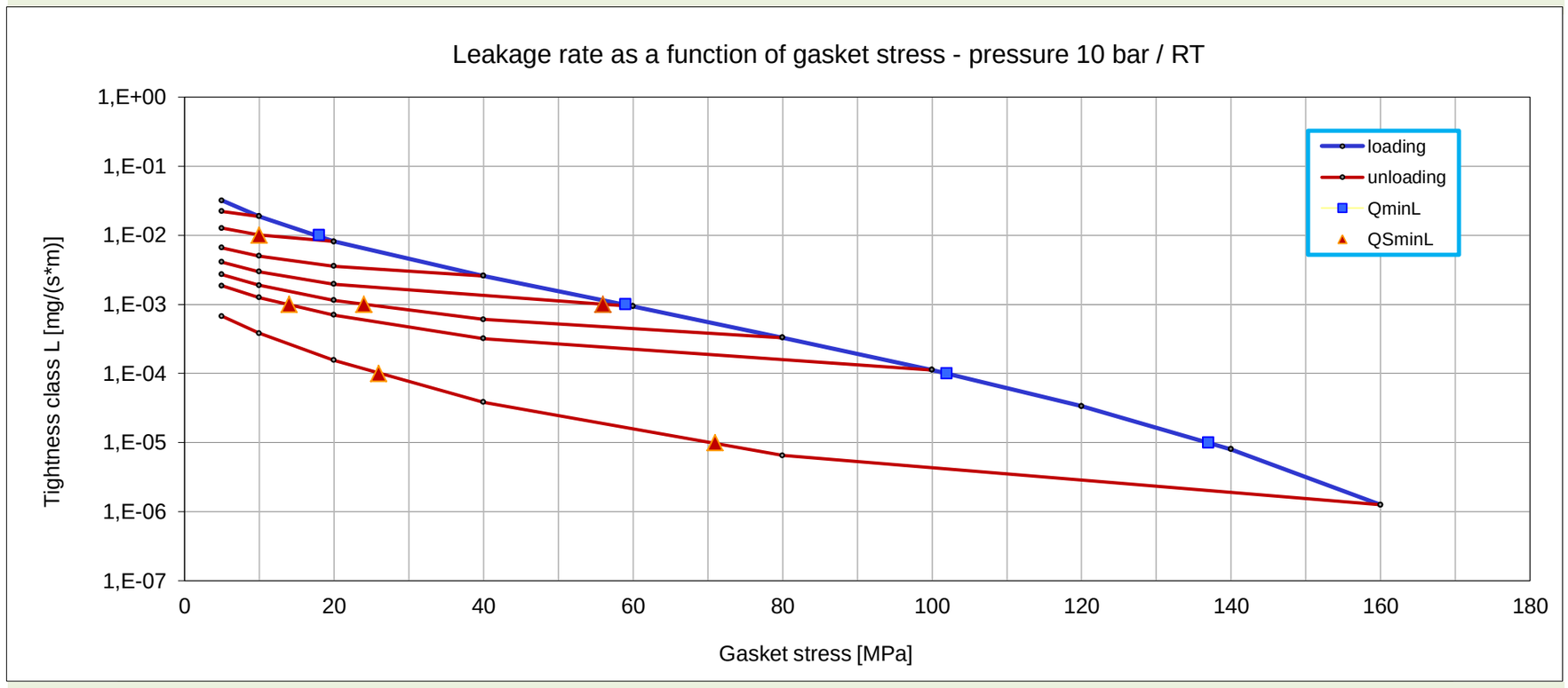
SPETECH LBMU	**Laboratorium Badań Materiałów Uszczelnieniowych** 43-382 Bielsko-Biała, ul. Szyprów 19 tel. +48 33 8184133 e-mail: lbmu@spetech.com.pl www.spetech.com.pl
Company	**SPETECH sp. z o.o.**
Gasket Type	**SPETOGRAF® GUS 40I 316L**
Dimensions [mm]	**92 x 49 x 5**
Calculation type EN 1591-1	**a) flat gasket; EN 1514-1**

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

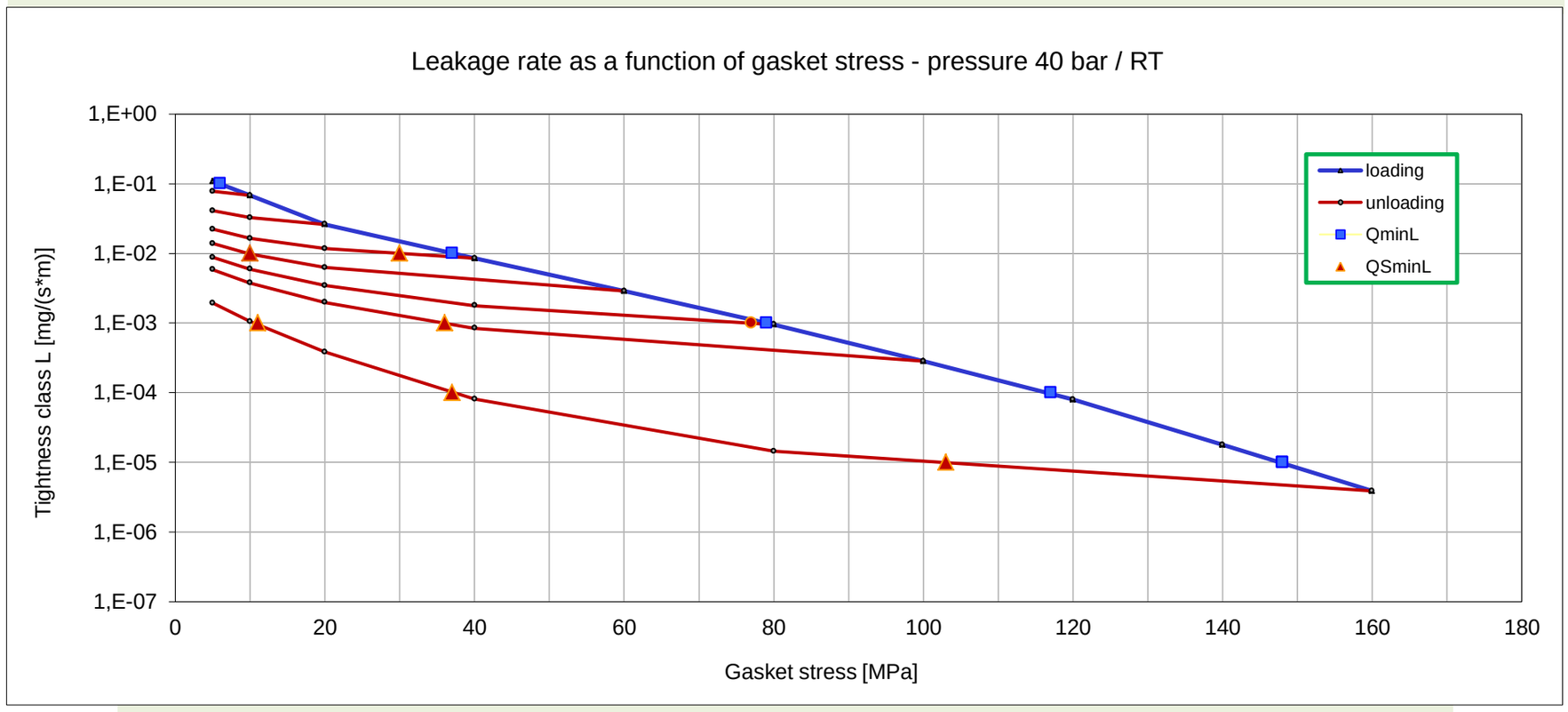
Minimum level of surface pressure required for leakage rate class L on assembly Qmin/L and after off-loading QSmin/L at room temperature (RT)

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 = 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}	5	5	5	5	5	5	5			5		
10^{-1}	5	5	5	5	5	5	5			5		
10^{-2}	**18**		**10**	5	5	5	5			5		
10^{-3}	**59**				**56**	**24**	**14**			5		
10^{-4}	**102**									**26**		
10^{-5}	**137**									**71**		
10^{-6}												

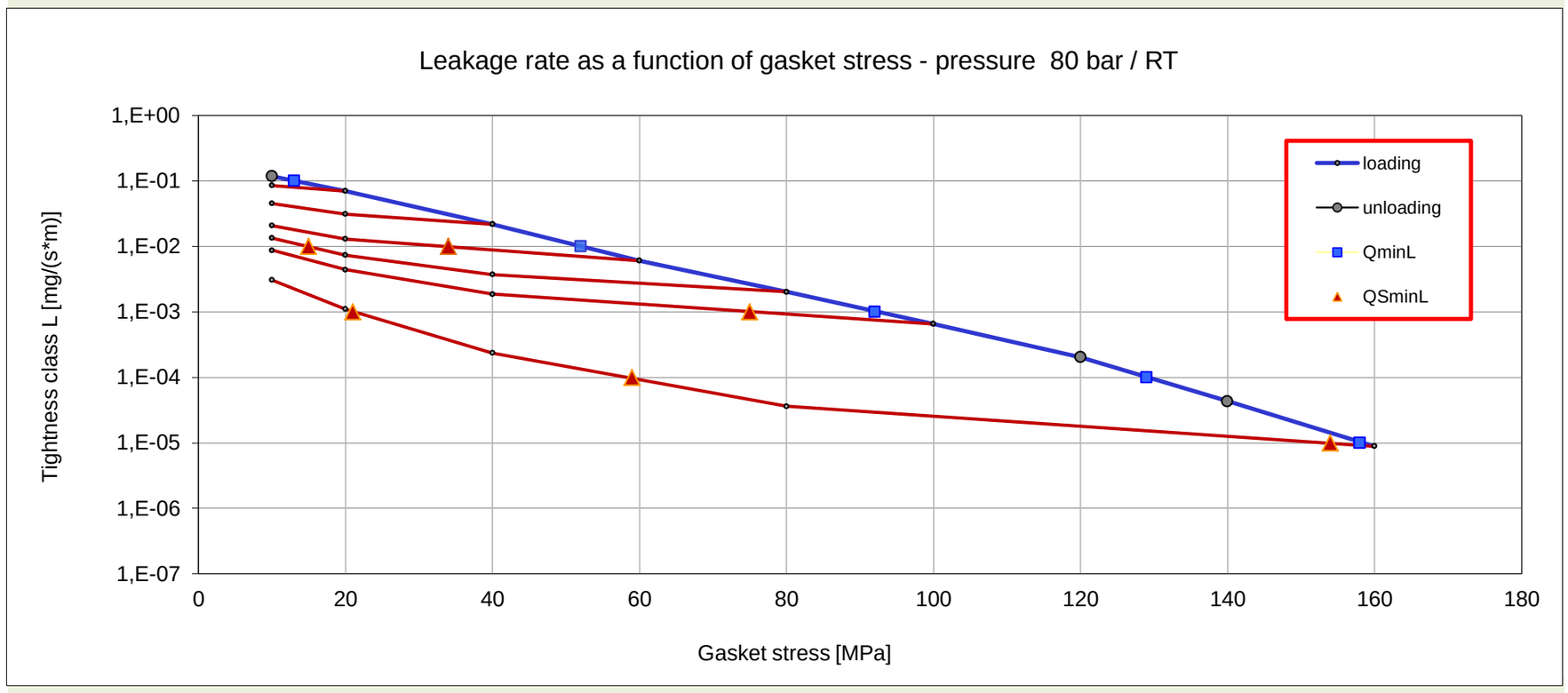


Minimum level of surface pressure required for leakage rate class L on assembly Qmin/L and after off-loading QSmin/L at room temperature (RT)

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 = 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}	5	5	5	5	5	5	5			5		
10^{-1}	**6**	5	5	5	5	5	5			5		
10^{-2}	**37**			**30**	**10**	5	5			5		
10^{-3}	**79**					**77**	**36**			**11**		
10^{-4}	**117**									**37**		
10^{-5}	**148**									**103**		
10^{-6}												



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]	**80**											
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 = 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^{-1}	**13**		10	10	10	10	10			10		
10^{-2}	**52**				**34**	**15**	10			10		
10^{-3}	**92**						**75**			**21**		
10^{-4}	**129**									**59**		
10^{-5}	**158**									**154**		
10^{-6}												



Paremeters 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		5,491				
1		5,177				
10	**210**	4,203				
20	**526**	3,827				
30	**873**	3,671	**0,97**	0,007		
40	**1244**	3,575				
50	**1643**	3,507	**0,99**	0,005		
60	**2049**	3,455			**200**	0,10
80	**2926**	3,377				
100	**3900**	3,323	**0,99**	0,009		
120	**4903**	3,282				
140	**5930**	3,247				
160	**6976**	3,217				
180	**8095**	3,187				
200	**9124**	3,155	**0,99**	0,010		

Paremeters 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		5,427				
1		5,164				
10	**231**	4,105				
20	**538**	3,783				
30	**887**	3,631	**0,85**	0,039		
40	**1256**	3,536				
50	**1659**	3,469	**0,89**	0,045	**160**	0,10
60	**2085**	3,416				
80	**2994**	3,335				
100	**3984**	3,277	**0,94**	0,052		
120	**5007**	3,228				
140	**6052**	3,184				
160	**7136**	3,142	**0,96**	0,057		

Paremeters at **400*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		5,401				
1		5,168				
10	**232**	4,053				
20	**523**	3,761				
30	**858**	3,612	**0,78**	0,055		
40	**1208**	3,520				
50	**1594**	3,454	**0,83**	0,070	**160**	0,10
60	**1987**	3,404				
80	**2857**	3,327				
100	**3769**	3,273	**0,92**	0,067		
120	**4726**	3,228				
140	**5683**	3,183				
160	**6657**	3,136				

Paremeters at **500*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		5,446				
1		5,162				
10	**276**	4,024				
20	**544**	3,764				
30	**876**	3,618	**0,74**	0,066		
40	**1232**	3,527				
50	**1615**	3,462	**0,85**	0,064	**160**	0,10
60	**2015**	3,412				
80	**2876**	3,333				
100	**3772**	3,279				
120	**4690**	3,231				
140	**5617**	3,184				
160	**6548**	3,134	**0,91**	0,122		

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

T [oC]	Q_{min} [MPa]	$Q_{max, ref}$ [MPa]	E_0 [MPa]	K_1	Q_l/P	g_c	c_1
0…20	15	270	1	33	1,3	1,0	-
100	-	250	1	33	1,3	1,0	-
200	-	230	1	33	1,3	1,0	-
300	-	210	1	33	1,3	1,0	-

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

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

m	y [psi]	y [MPa]
2,00	2900	20

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]
$30*b_D$	$1,5*b_D$	$*b_D$

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]				
		20oC	100oC	200oC	300oC	400oC
20,4	$4,0*p_0$	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 [%]
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]	<	1,00E+03
Volume resistance R_v at U=10V	[Ω]	<	1,00E+03
Surface resistivity ρ_s at U=10V	[Ω]	<	1,01E+04
Volume resistivity ρ_v at U=10V	[Ωm]	<	7,43E+02