

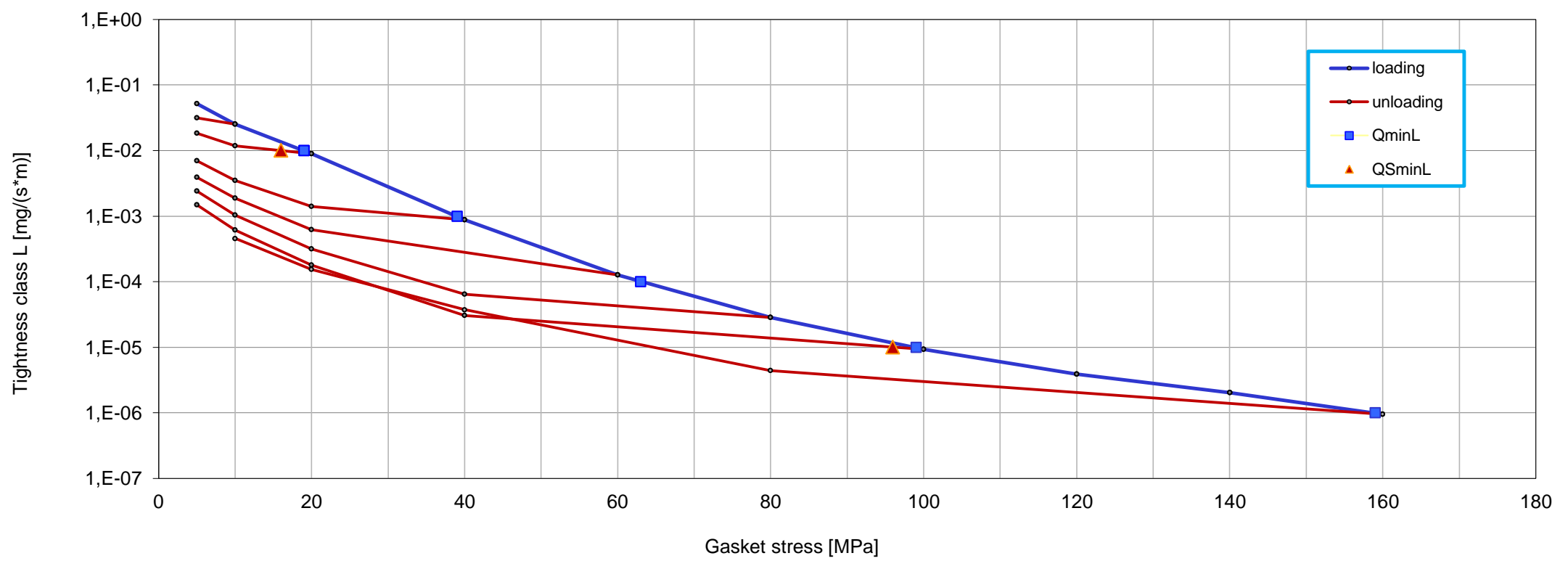
Company	SPETECH sp. z o.o.
Gasket Type	SPETOGRAF® GUS® 31
Dimensions [mm]	92 x 49 x 2
Calculation type EN 1591-1	a) flat gasket; EN 1514-1

**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)

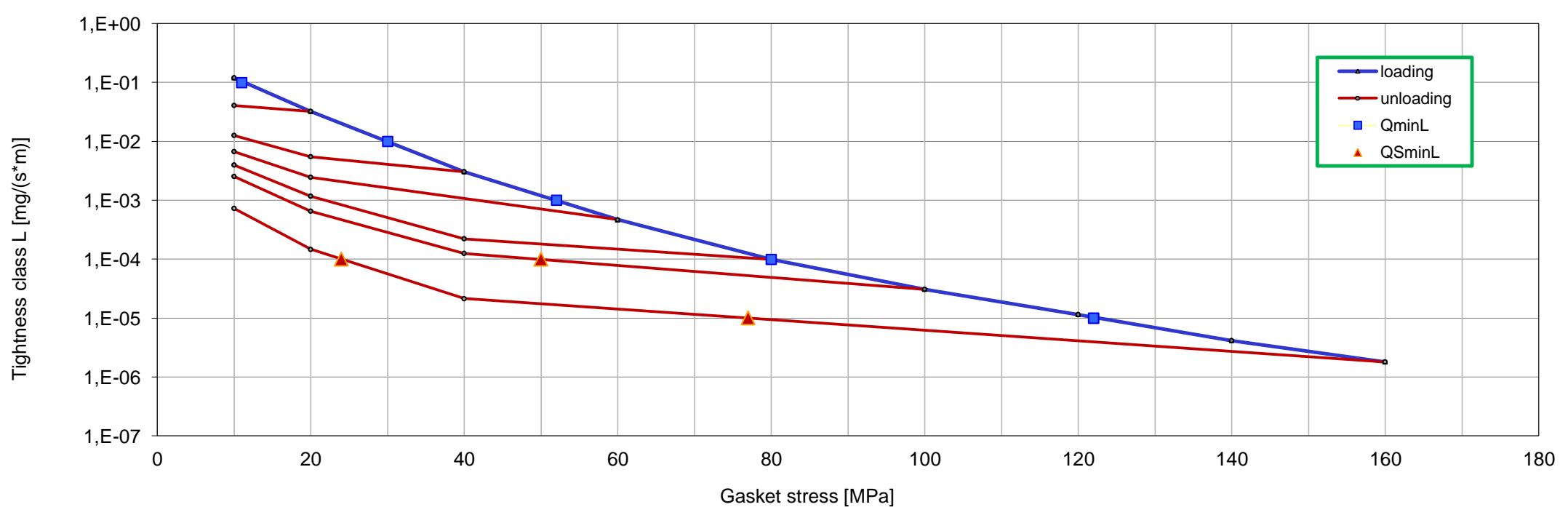
Internal pressure [bar]	10											
L [mg/(s*m)]	$Q_{min/L}$ [MPa]	$Q_{Smin/L}$ [MPa] for effective gasket stress										
		$Q_A = 10$ [MPa]	$Q_A = 20$ [MPa]	$Q_A = 40$ [MPa]	$Q_A = 60$ [MPa]	$Q_A = 80$ [MPa]	$Q_A = 100$ [MPa]	$Q_A = 120$ [MPa]	$Q_A = 140$ [MPa]	$Q_A = 160$ [MPa]		
$10^{-0}$	5	5	5	5	5	5	5			5		
$10^{-1}$	5	5	5	5	5	5	5			5		
$10^{-2}$	19		16	5	5	5	5			5		
$10^{-3}$	39			35	16	10	7			5		
$10^{-4}$	63					35	27			13		
$10^{-5}$	99						96			32		
$10^{-6}$	159									156		

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

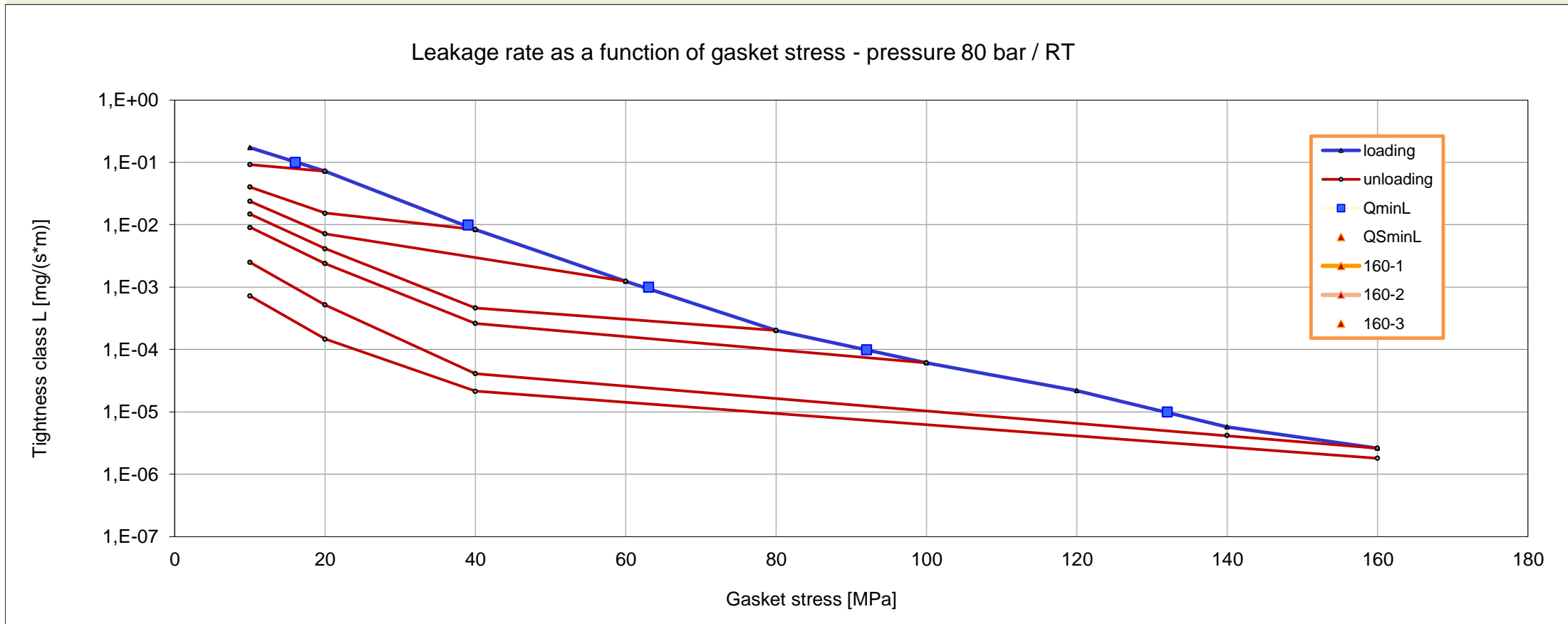

 Minimum level of surface pressure required for leakage rate class L on assembly  $Q_{min/L}$  and after off-loading  $Q_{Smin/L}$  at room temperature (RT)

Internal pressure [bar]	40											
L [mg/(s*m)]	$Q_{min/L}$ [MPa]	$Q_{Smin/L}$ [MPa] for effective gasket stress										
		$Q_A = 10$ [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		
$10^{-1}$	11		10	10	10	10	10			10		
$10^{-2}$	30			13	10	10	10			10		
$10^{-3}$	52				41	22	17			10		
$10^{-4}$	80						50			24		
$10^{-5}$	122									77		
$10^{-6}$												

Leakage rate as a function of gasket stress - pressure 40 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]	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		
$10^{-1}$	16	10	10	10	10	10			10			
$10^{-2}$	39		34	17	13	10			10			
$10^{-3}$	63				33	28			16			
$10^{-4}$	92					80			33			
$10^{-5}$	132								102			
$10^{-6}$												



Parameters at RT						
Gasket stress [MPa]	Unloading modulus of elasticity EG [MPa]	Gasket or sealing element thickness eG [mm]	Creep relaxation factor PQR [-]	Gasket thickness change due to creep ΔeGc [mm]	Maximum surface pressure Qsmax [MPa]	Static friction factor μG [-]
1		2,368			200	0,10
10	196	1,672				
20	464	1,429				
30	760	1,309	0,98	0,006		
40	1061	1,204				
50	1433	1,161	0,99	0,005		
60	1772	1,130				
80	2552	1,086				
100	3241	1,057	1,00	0,002		
120	4194	1,037				
140	5320	1,021				
160	6272	1,009				
180	7272	0,998				
200	8528	0,988	1,00	0,002		

Parameters at 200°C						
Gasket stress [MPa]	Unloading modulus of elasticity EG [MPa]	Gasket or sealing element thickness eG [mm]	Creep relaxation factor PQR [-]	Gasket thickness change due to creep ΔeGc [mm]	Maximum surface pressure Qsmax [MPa]	Static friction factor μG [-]
1		2,461			200	0,10
10	210	1,642				
20	500	1,431				
30	764	1,278	0,86	0,035		
40	1112	1,216				
50	1420	1,177	0,94	0,028		
60	1723	1,147				
80	2476	1,107				
100	3181	1,081	0,97	0,023		
120	4044	1,062				
140	5045	1,048				
160	5774	1,036				
180	6711	1,025				
200	7439	1,016	0,99	0,017		

Parameters at 400°C						
Gasket stress [MPa]	Unloading modulus of elasticity <b>E<sub>G</sub></b>	Gasket or sealing element thickness <b>e<sub>G</sub></b>	Creep relaxation factor <b>P<sub>QR</sub></b>	Gasket thickness change due to creep <b>Δe<sub>Gc</sub></b>	Maximum surface pressure <b>Q<sub>smax</sub></b>	Static friction factor <b>μ<sub>G</sub></b>
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		2,500			160	0,10
10	239	1,581				
20	506	1,391				
30	786	1,241	0,79	0,053		
40	1078	1,184				
50	1424	1,147	0,91	0,036		
60	1737	1,120				
80	2432	1,082				
100	3129	1,057	0,97	0,027		
120	3829	1,039				
140	4819	1,026				
160	5691	1,014	0,98	0,028		

Parameters at 500°C						
Gasket stress [MPa]	Unloading modulus of elasticity <b>E<sub>G</sub></b>	Gasket or sealing element thickness <b>e<sub>G</sub></b>	Creep relaxation factor <b>P<sub>QR</sub></b>	Gasket thickness change due to creep <b>Δe<sub>Gc</sub></b>	Maximum surface pressure <b>Q<sub>smax</sub></b>	Static friction factor <b>μ<sub>G</sub></b>
	[MPa]	[mm]	[-]	[mm]	[MPa]	[-]
1		2,361			120	0,10
10	264	1,539				
20	529	1,373				
30	785	1,221	0,80	0,051		
40	968	1,166				
50	1206	1,129	0,90	0,044		
60	1532	1,104				
80	2249	1,065				
100	2970	1,041	0,98	0,021		
120	3700	1,023	0,95	0,052		

**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/P	g <sub>c</sub>	c <sub>1</sub>
0...20	15	150	1	31	1,3	1,0	0,00
100	-	145	1	31	1,3	1,0	-
200	-	140	1	31	1,3	1,0	-
300	-	130	1	31	1,3	1,0	-

b <sub>Gref</sub> [mm]	19,5	e <sub>Gref</sub> [mm]	2,0
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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]
2,08	2600	17,9

[σ<sub>max</sub> - see maximal applicable gasket stress Q<sub>smax</sub> acc. EN 1591-1:2009/2013](#)

**Factors acc. to:**  
 AD 2000-Merkblatt B7 August 2007

k <sub>0</sub> k <sub>D</sub> [N/mm]	k <sub>1</sub> [mm]	k <sub>0</sub> k <sub>Ø</sub> [N/mm]
15,0*b <sub>D</sub>	2,0*b <sub>D</sub>	*b <sub>D</sub>

[σ<sub>max</sub> - see maximal applicable gasket stress Q<sub>smax</sub> acc. EN 1591-1:2009/2013](#)

**Factors acc. to:**  
 WUDT-UC-WO-O/19

σ <sub>m</sub> [MPa]	σ <sub>r</sub> [MPa]	b [1]				
		20°C	100°C	200°C	300°C	400°C
18,3	4,2*p <sub>0</sub>	1,0	1,1	1,1	1,1	1,2

[σ<sub>max</sub> - see maximal applicable gasket stress Q<sub>smax</sub> 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 [%]
41	17

**Factors acc. to:**

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

Temperature [°C]	Creep Relaxation [%]
20	6
100	21
200	26

**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	[ $\Omega$ ]	< 1,0E+03
Volume resistance $R_v$ at U=10V	[ $\Omega$ ]	< 1,0E+03
Surface resistivity $\rho_s$ at U=10V	[ $\Omega$ ]	< 1,01+04
Volume resistivity $\rho_v$ at U=10V	[ $\Omega m$ ]	< 7,43E+2