

## Material characteristics sealing rings, sealing inserts

Material abbreviation	Unit	CR/NBR	NBR	NBR	SBR	SBR/NBR	VMQ	EPDM	FKM	TPE	PE	Centellen
Elastomer basis		Polychloroprene-nitrile rubber	Acrylonitrile butadiene rubber	Acrylonitrile butadiene rubber	Styrene butadiene rubber	Styrene butadiene rubber with nitrile	Silicone rubber	Ethylene Propylene Terpolymere rubber	Fluorinated rubber		Polyethylene	
For article series (examples)												
Sealing rings for PERFECT cable glands		•							•			
Multiple sealing inserts for PERFECT cable glands		•	•							•		
Sealing inserts for WADI cable glands												
Sealing inserts for UNI Dicht cable glands												
Multiple sealing rings					•	•	•					
Simple and flat cable sealing rings					•							
Flat sealing rings on external threads		• (only CR)									•	•
O-rings				•					•			
Rubber bushings		• (only CR)										
Sealing grommets		• (only CR)										
<b>Details to ingredients</b>												
Halogene-free		no	n.i.	yes	n.i.	n.i.	n.i.	n.i.	no	yes	n.i.	n.i.
Phosphorus-free		n.i.	n.i.	yes	n.i.	n.i.	n.i.	n.i.	yes	yes	n.i.	n.i.
Silicone-free		n.i.	n.i.	yes	n.i.	n.i.	n.i.	n.i.	yes	yes	n.i.	n.i.
<b>Thermal properties</b>												
UL test number		n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.
Combustibility		extinguishes	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.
Flame resistance		very good	unstatifactory	n.i.	unstatifactory	unstatifactory	unstatifactory	n.i.	very good	n.i.	n.i.	n.i.
min. temporary application temperature	°C	-40	-40	-35	-40	-40	-80	-60	-25	-40	-40	n.i.
min. sustained application temperature	°C	-20	-30	-30	-30	-30	-50	-50	-20	-30	-30	-200
max. sustained application temperature	°C	100	110	80	100	100	175	120	200	140	80	200
max. temporary application temperature	°C	130	130	100	110	110 / 120	230	130	220	n.i.	100	350
<b>Mechanical characteristics</b>												
Hardness	Shore A	30...90	70...80	70...80	30...90	50...60	20...80	25...90	65...75	61	15,7 (H10)	n.i.
Tensile strength	N/mm <sup>2</sup>	7...25	7...12	>=10	7...30	5...10	4...9	7...20	9...11	10,0	5	11
Notched impact strength		good	good	n.i.	good	good	unstatifactory	n.i.	mediocre	n.i.	n.i.	n.i.
Abrasion resistance		very good / good	very good / good	n.i.	very good / good	good / mediocre	mediocre	n.i.	good	n.i.	n.i.	n.i.
Gas permeability (Diffusion)		mediocre permeable	mediocre permeable	n.i.	good permeable	mediocre permeable	very good permable	very good permable	mediocre impermable	n.i.	very good	imperable
<b>Electrical characteristics</b>												
Dielectric strength		mediocre	mediocre	poor	very good	mediocre	very good	good	good	n.i.	> 25 kV/mm	n.i.
<b>Resistance</b>												
Weather		1 - 2	3	3	X	3	1	n.i.	1	n.i.	2	1
UV		1 - 2	2	2	3	2 - 3	1	n.i.	1	1 (for black)	n.i.	2
Ozone		2	3 - x	X	X	3 - X	1	2	1	no cracks	n.i.	2
Aging		1 - 2	1	1	2 - 3	2 - 3	1	n.i.	1	n.i.	n.i.	n.i.
Acetone		1	X	X	3	2 - 3	2	1	X	n.i.	2 - 3	2
Ethanol		1	1	1	1	1 - 2	2	1	1	2	1	2
Ammonia (non aqueous)		2	1 - 2	1 - 2	2	1 - 2	2	1	X	n.i.	1	2
Benzole		X	3 - X	X	X	X	X	X	2	n.i.	X	2
Petrol Normal / Super fuel to DIN		3-X	2	2 - 3	X	X	X	X	1	n.i.	3	2
Brake fluid		3	3	Z.e.	X	3 - X	X	X	Z.e.	3	2	n.i.
Steam		X	up to 100°C	up to 80°C	X	3 - X	X	up to 130°C	up to 80°C	n.i.	X	up to 175°C
Diesel fuel to DIN		3	1	1	X	2	3	n.i.	X	n.i.	2	2
Crude oil		3	1	1 - 2	X	X	3	n.i.	X	n.i.	2	2
Faeces fluid		1	1	n.i.	1	1	1	1	1	Z.e. (1)	1	1
Fuel oil		3	1	1	X	3 - X	3	X	1	n.i.	2	2
Hydraulic oil (mineral based)		3	1	1	X	3 - X	2	X	1	n.i.	3	2
Potassium hydroxide solution		1	1	2	1	1 - 2	3	1	3	n.i.	1	n.i.
Kerosene		3 - X	2	2	X	3 - X	3	X	1	n.i.	X	2
Carbon dioxide		1	1	1	1	1	1	1	1	n.i.	1	n.i.
Paints		Z.e.	Z.e.	Z.e.	Z.e.	Z.e.	Z.e.	Z.e.	Z.e.	n.i.	Z.e.	n.i.
Glue		1	1	1	2	2	1	3	1	n.i.	Z.e.	n.i.
Air, atmospheric, oil-free		up to 90°C	up to 90°C	up to 80°C	up to 70°C	70°C	up to 230°C	up to 120°C	up to 200°C	n.i.	up to 90°C	n.i.
Air containing oil vapour		up to 90°C	up to 100°C	up to 80°C	X	3 - X/ Z.e.	up to 150°C	X	up to 200°C	n.i.	up to 90°C	n.i.
Solvents for paints		Z.e.	Z.e.	Z.e.	Z.e.	3 - X/ Z.e.	Z.e.	Z.e.	Z.e.	n.i.	Z.e.	n.i.
Seawater		1	1	1	3	2	3	1	1	2	1	n.i.
Methanol		1	1	1 (up to 20°C)	2	1 - 2	2	1	1 - 2	3	1	2
Mineral oil		2 - 3	1	1	X	3 - X	3	X	1	n.i.	2	2
Sodium chloride (aqueous)		1	1	1	1	1	1	1	1	n.i.	1	2
Oil (vegetable, etheric)		2	1	n.i.	3 - X	3 - X	2	2 - 3	Z.e.	n.i.	2 - 3	2
Petroleum		3	1	1	X	3 - X	X	X	1	n.i.	2 - 3	n.i.
Phosphoric acid (50%)		1 - 2	2	X	2 - 3	2 - 3	1	1	1	n.i.	1	2
Nitric acid (40%)		X	X	X	X	X	X	2	2	X	X	X
Hydrochloric acid (38%)		3	3	X	2 - 3	3	X	1	1 - 2	2 - 3	1	3
Sulphuric acid (30%)		2	2	3	2 - 3	3	3	1	1	1	1	3
Soap solution		1	1	1	1	1	2	1	1	n.i.	1	n.i.
Silicone oils and greases		1	1	1	n.i.	1 - 2	1	1	1	n.i.	1	n.i.
Terpentine (oil)		X	1	3 (up to 60°C)	X	X	3	X	1	n.i.	3	2
Transformer oil (Pyranole)		X	1	1	X	X	3	X	1	n.i.	3	2
Drinking water		2 (up to 70°C)	1 (up to 100°C)	1 (up to 100°C)	1 (up to 70°C)	1 (up to 70°C)	2	1 (up to 120°C)	1 (up to 80°C)	2	1	1
Detergent solution		2	1	1	1	1	2	1	n.i.	n.i.	1	n.i.
Sugar (aqueous)		1	1	1	1	1	1	1	1	n.i.	1	n.i.

**Key for resistance ratings:**

- 1 = very good resistance
- 2 = good resistance
- = material used for article
- 3 = mean/ conditional resistance
- X = not resistant
- n.i. = no information
- Z.e. = determine precise composition

The values provided here are guideline values only, based on our current state of knowledge and cannot be used as the basis for any legally binding assurance of certain characteristics or concrete cases of application. To ascertain the concrete suitability of a particular product, a test of the finished part under the specific application conditions is necessary.