



Solid particle protection

The first digit indicates the level of protection that the enclosure provides against access to hazardous parts.

Level (1st digit)	Effective against	Description
5	Dust protected	Ingress of dust is not entirely prevented, but it must not enter in sufficient quantity to interfere with the satisfactory operation of the equipment.
6	Dust tight	No ingress of dust; complete protection against contact (dust tight). A vacuum must be applied. Test duration of up to 8 hours based on air flow.

Liquid ingress protection

The second digit indicates the level of protection that the enclosure provides against harmful ingress of water.

Level (2nd digit)	Effective against	Description
4	Splashing of water	Water splashing against the enclosure from any direction shall have no harmful effect, utilizing either: a) an oscillating fixture, or b) A spray nozzle with no shield, Test duration: 10min.
5	Water jets	Water projected by a nozzle (6.3 mm) against enclosure from any direction shall have no harmful effects. Test duration: 1min/m ² for at least 3min, 12.5l/min @30kPa at 3m distance.
6	Powerful water jets	Water projected in powerful jets (12.5 mm nozzle) against the enclosure from any direction shall have no harmful effects. Test duration: 1min/m ² for at least 3min, 100l/min @30kPa at 3m distance.
6K	Powerful water jets with increased pressure	Water projected in powerful jets (6.3 mm nozzle) against the enclosure from any direction, under elevated pressure, shall have no harmful effects (DIN 40050, not IEC 60529). Test duration: 3min, 75l/min@1000kPa at 3m distance.
7	Immersion up to 1m depth	Ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time. Test duration: 30min, 1m below water surface.
8	Immersion 1m or more depth	The equipment is suitable for continuous immersion in water. Water can enter in such a manner that it produces no harmful effects. Manufacturer specified duration and water depth (>IPx7, 3m typical).
9K	Powerful high temperature water jets	Protected against close-range high pressure/temperature spray downs. Test duration: 30s each of four angles, spray nozzle with 80°C water at 8–10 MPa (80–100 bar) and a flow rate of 14–16 L/min.

Note: Lower IP ratings are not automatically included in the higher classes, e.g. IP66 is not part of IP67 and IP68/IP69k do not include any other ratings! Testing time and depth of IP68 is specified by the manufacturer (not unlimited time!). Suitable cables have to be used in combination with the cable glands to fulfil the IP protection class.

Chemical Resistance of Sealing Materials

1= very good chemical resistance, 2 = good resistance, 3-4 limited resistance, 5-6 not resistant

This table has been compiled from several sources, the classification may therefore vary and is a general guideline only!
For critical applications please request sealing material samples from autoVimation for testing!

	NBR	VMQ	FKM	EPDM	TPE	TPEV	PU-foam
	872 70Sh A	(Silicone)	(Viton)				(Poron)
temperature (min., max)	-35 ; +100	-40; +200	-20; +200 (230)	-40; +120 (150)	-40; +130	-40; +135 (150)	-40, +90°C
ageing		1	1	1	1	1	1
ozone	4	1	1	1	1	1	1
gas permeability	1	5	1				
suitable for food appl.		1					
water	3	3	2	1	1	1	1
hot water (100°C)	up to 90°C 2	4	3	1			
sea water	2	3	2	2	1	1	1
steam	5	5	5 -only special mixes durable	1			
chlorine	5	4	3	3			
chlorine (gaseous, 20°C)	5	5	3	3	3	3	
hydrocarbons:	2	4	2	5	2	2	
mineral oil	1	3	2	5	2	2	1
petrol	3	5	2	5	3	3	1
diesel	1	3	2	3			1
alcohol			5			2	
ethanol (20°C)	1	1	5 -only special mixes durable	1	1	1	
ketone			5	2			
acetone (100%, 20°C)	5	5	5		3	3	5
ammonia, diluted (10%, 20 °C)	2	3	5		3	3	n.s
servo steering fluids					5		
break fluids based on Glycol-ether cyclohexane	5	3	5	1	5		n.s
Acids:				2			
acetic acid 30%	4	4	4	3			n.s
acetic acid 50%	5	5	5	3			n.s
acetic acid (100%, 20°C)	5	5	5	5	2	2	n.s
silicic acid, diluted, 60 °C	2	4	2	2			
phosphoric acid, diluted (20°C)	5	up to 85% 2			bis 85% 2	bis 85% 2	
nitric acid, concentrated.	5	5	5	5			5
nitric acid, diluted (50%, 20 °C)	3	bis 10% 3	3	3	up to 30% 2	up to 30% 2	5
hydrochloric acid (20 °C)	5	5	2	2			5
Hydrochloric acid, diluted (30%, 20°C)	3	up to 10% 3	2	2	up to 10% 1	up to 10% 1	5
sulfuric acid, concentrated 50°C	5	5	5	2			n.s
sulfuric acid, diluted (20°C)	5	up to 10% 1	2	2	up to 98% 1	up to 98% 1	n.s
citric acid (up to 10%, 40°C)	up to 20°C 2	5	5 -only special mixes durable	1	2	2	
Bases:				2			
caustic soda, diluted, (10%, 20°C)	3	up to 30% 2	5	2	up to 50% 2	up to 50% 2	n.s
bleaching lye (20 °C)	5	3					
potassium hydroxide, diluted (50%, 20°C)	3	5	5	2	up to 10% 2	up to 10% 2	
soap solution, 20°C	1	4	1	1	1	1	3
suds	up to 90°C 1						3