

General technical informations

The way to the right enclosure

Various criteria must be taken into account when selecting an enclosure:

- the fitting location (internal or external use, explosion zone, sea-water use etc.)
- the size (depends on the contents)
- the protective functions (ingress protection, EMC toughness, Ex)

The listings below should help you to select the right enclosure to match your special requirements.

I. Enclosure material specifications

Aluminium enclosures (Pilot 50, EMC)

- light-weight, robust metal enclosures
- good resistance to chemicals (see chart)
- can be used in a wide temperature range
- basic EMC screening (full screening optional)
- machining operations easy to carry out
- application areas: suitable for indoor and outdoor use

Polyester enclosures (Pilot 30)

- plastic enclosures for hostile atmospheres
- good resistance to chemicals (see chart)
- can be used in a wide temperature range
- good insulating properties
- VO design (to UL)
- application areas: suitable for indoor and outdoor use

PVC enclosures

- light-weight plastic enclosures
- good resistance to chemicals (see chart)
- machining operations easy to carry out
- application areas: suitable for indoor and outdoor use

ABS enclosures (Taguan)

- light-weight plastic enclosure
- good resistance to chemicals (see chart)
- used within a normal temperature range
- application areas: hand-held operating enclosures for data acquisition and measurement

Polyamide enclosures (Beluga, Pilot 10 / 20, Pilot 110 / 150)

- light-weight plastic enclosure
- good insulating properties
- high impact resistance
- application areas: hand-held operating enclosures for machine control

II. Temperature range

The definition of temperature resistance for enclosures is based on the maximum continuous temperature at which the enclosure remains dimensionally stable and the ingress protection remains guaranteed. Admissible short term peak temperatures are often considerably higher. The definition of temperature resistance in the case of the components of the process automation is based to the maximum continuous temperature, provided that the factory-installed (electronic) components are functioning correctly and the enclosure rating is maintained. Further classifications apply to storage and transport, and are listed in the respective product descriptions.

III. Corrosion resistance

We offer the following for critical external areas:

SWB version (seawater-resistant):
 Purified - chromated - powder-coated
 Standard colour RAL 5009, other colours on request.

For application areas with extreme UV radiation we recommend coating with a special Polyester powder.

SBG/SBGL version only for wet painting processes

SBG = washed - chromated - priming

SBGL = washed - chromated - priming - painting

Stainless steel socket inserts available on request.

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IV. Ingress protection

ROSE enclosures are classified in ingress protection to the generally applicable guidelines contained in EN 60529 and IEC 144.

The ingress protection is indicated by an abbreviation, which is always composed of the two letters IP and two digits relating to the protection level.

Protection class for contact and foreign body protection

First digit	Designation
0	No protection
1	Protection against large foreign bodies
2	Protection against medium-sized foreign bodies
3	Protection against small foreign bodies
4	Protection against grain-shaped foreign bodies
5	Protection against dust deposits
6	Protection against dust entry

Protection class for water protection

Second digit	Designation
0	No protection
1	Protection against vertical falling drip water
2	Protection against obliquely falling drip water
3	Protection against water spray
4	Protection against splashing water
5	Protection against water jets
6	Protection when flooded
7	Protection when immersed
8	Protection when submerged

Note: The ingress protection indicated for the enclosures is based on non-processed enclosures as supplied. Aging and temperature fluctuations can lead to a diminution of the ingress protection.

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V. Chemical resistance

Enclosure material chemical resistance

Chemicals	Aluminium	Stainless steel	Polycarbonate	Polyester	Polystyrene	Polyamide
Acetone	+	+	-	-	-	•
Formic acid	•	+	30 %	10 %	•	-
Ammonia	+	+	-	-	+	20 %
Petrol	+	+	•	+	•	+
Benzene	+	+	-	+	-	-
Brake fluid	/	/	-	+	/	60°
Butane	+	/	+	/	-	+
Butanol	/	/	/	+	/	+
Calcium chloride	+	+	+	+	+	+
Chloral benzene	+	/	-	+	-	•
Diesel oil	/	/	•	+	•	/
Acetic acid	+	+	10 %	40 %	+ max. 50 %	-
Formaldehyde	+	+	/	30 %	+ max. 40 %	+
Freon 113	/	/	+	+	/	/
Fruit juice	/	+	+	+	/	+
Glycerine	+	+	•	+	+	+
Fuel oil	+	+	•	+	•	+
Hydraulic oil	/	/	+	+	•	+
Caustic potash solution	/	+	-	-	+ max. 50 %	-
Potassium chloride	•	+	+	+	+	+
Potassium hydroxide	-	+	/	-	+	/
Linseed oil	+	+	+	+	+	+
Methane	+	+	-	-	+	•
Methylene chloride	+	+	-	-	-	-
Lactic acid	+	+	10 %	+	+ max. 80 %	10 %
Mineral oils	/	/	+	+	+	+
Motor oils	/	/	+	+	+	+
Sodium carbonate	•	+	+	+	+	+
Sodium chloride	•	•	+	+	+	10 %
Sodium hydroxide	+	+	/	-	/	/
Soda lye	/	+	-	40 %	+ max. 50 %	10 %
Nitric acid	+	+	10 %	10 %	+ max. 25 %	-
Hydrochloric acid	/	+	20 %	+	+ max. 10 %	-
Lubricating oil	+	+	+	+	/	+
Carbon bisulphide	+	+	-	-	-	•
Sulphuric acid	•	+	50 %	70 %	+ max. 50 %	-
Suds	/	+	•	+	/	+
Cleansing agent	/	+	+	/	/	/
Terpentine oil	/	/	/	+	-	+
Carbon tetrachloride	+	/	/	+	-	•
Toluene	+	/	-	+	-	+
Trichlorethylene	+	/	/	-	-	-
Water (dest. water, river, tap or seawater)	/	+	+	+	+	+
Tartaric acid	/	/	10 %	+	+	+
Xylene	+	/	-	+	-	+
Zinc sulfate	•	/	+	+	+	/
Citric acid	+	/	10 %	+	+	10 %

Explanation of symbols

- + resistant against all concentrations
- + resistant against maximum % concentration
- C° resistant to maximum C°
- limited resistance
- not resistant
- / no information

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Enclosure seal and accessory chemical resistance

Chemicals	Chloroprene	EPDM	NBR	Pocane	Polyurethane	PVC	Silicone
Acetone	+	+	-	+	-	-	•
Formic acid	+	+	-	10 %	/	< 50 %	•
Ammonia	+	+	+	10 %	/	•	+
Petrol	+	•	+	+	+	+	+
Benzene	-	-	-	+	+	-	-
Brake fluid	•	-	/	+	/	/	+
Butane	+	/	+	+	/	50 %	-
Butanol	+	/	-	+	/	•	-
Calcium chloride	/	/	/	10 %	/	+	/
Chloral benzene	-	-	-	-	-	-	-
Diesel oil	•	•	/	+	+	•	•
Acetic acid	-	/	-	10 %	/	25 %	-
Formaldehyde	-	/	+	/	/	40 %	+
Freon 113	+	/	+	+	/	/	/
Fruit juice	+	+	/	+	+	+	+
Glycerine	+	+	+	+	+	+	+
Fuel oil	•	•	+	+	+	•	•
Hydraulic oil	+	/	/	+	/	/	•
Caustic potash solution	+	/	/	10 %	/	+	/
Potassium chloride	+	+	+	10 %	+	+	+
Potassium hydroxide	+	+	+	-	-	/	•
Linseed oil	+	+	+	+	+	+	•
Methane	+	/	•	+	/	/	+
Methylene chloride	-	/	-	-	-	-	-
Lactic acid	+	+	+	/	/	10 %	/
Mineral oils	•	•	+	+	+	+	+
Motor oils	•	•	+	+	+	/	+
Sodium carbonate	/	/	/	10 %	/	/	/
Sodium chloride	+	+	+	10 %	+	+	+
Sodium hydroxide	+	+	•	-	-	•	•
Soda lye	50 %	/	-	/	/	60 %	-
Nitric acid	•	+	•	10 %	-	30 %	-
Hydrochloric acid	+	+	< 65 % •	10 %	-	30 %	/
Lubricating oil	•	•	+	+	+	+	+
Carbon bisulphide	-	/	-	+	/	•	-
Sulphuric acid	50 %	/	25 %	10 %	/	80 %	25 %
Suds	+	/	+	10 %	•	•	+
Cleansing agent	+	•	/	+	•	/	+
Terpentine oil	-	/	+	+	/	+	-
Carbon tetrachloride	-	-	-	+	-	•	-
Toluene	-	-	-	•	-	-	-
Trichlorethylene	-	-	-	•	-	-	-
Water (dest. water, river, tap or seawater)	+	+	80 C°	+	+	40 C°	+
Tartaric acid	+	+	+	/	+	10 %	+
Xylene	-	-	-	•	-	-	-
Zinc sulfate	+	+	+	/	/	40 %	+
Citric acid	+	+	+	10 %	/	10 %	+

Die Untersuchungen sind, wenn nichts Gegenteiliges angegeben ist, bei Raumtemperatur durchgeführt worden. Bei einem Zusammentreffen verschiedener Medien können sich die Beständigkeiten ändern. Daher können wir für die Angaben keine Gewähr übernehmen.

Explanation of symbols

- + resistant against all concentrations
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EMC in enclosure technology

General information

In electrical/electronic engineering, enclosures assume two tasks:

- protection of the installed components from mechanical hazards and adverse radiation from outside
- protection of the surroundings from occurring mechanical and electrical hazards and adverse interference radiation from the components installed

Especially the electromagnetic compatibility (EMC) has an increasing effect on the selection of enclosures because of the ongoing development of the electronic components and the increased equipment density on the PCB's - which increasingly generates „pollution“ by electromagnetic interference radiation in the environment.

Legal regulations

Within the framework of harmonising the European standards, an EC guideline directive (05.89/336/EEC) was passed in May 1989, which took effect in the Federal Republic of Germany on the 9th Nov. 1992 in the EMC law (EMVG).

This law is applicable to all units which might cause electromagnetic interference or the operation of which could be impaired by such interference.

The EMC directive came into effect on 1.1.1996 EC-wide - from which date all new electrical and electronic units brought into circulation within the EC had to fulfil these regulations.

As an external sign that the EC relevant laws (EMC law and further design basics), these units have to show the CE symbol.

Requirements from the enclosure

Enclosures as such are not subjected to the EMC law, as by definition they are not electrical or electronic units.

However, enclosures are to a large extent responsible for the intensity of interference emission (receipt and transmission of interference waves) of a unit.

At this point, the choice of the enclosure material is also decisive for the screening effect which is composed of a reflection and an absorption damping of an enclosure.

Synthetic materials (plastics) alone have no filtering effect on interference radiation. A screening effect can be achieved by additional costly treatment (metal flashing or application of a conductive lacquer).

Metal enclosures, on the other hand, offer a highly effective basic protection against interference radiation. (Here an important factor is a large contact surface of the individual components of the enclosure (cover, enclosure shells).

To meet special protection requirements, the EMC compatibility can be increased by

- conductive seals,
- contact bare front surfaces as well as
- EMC compatible cable screw connections.

