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Klippon® – enclosure system



Weidmüller 

Enclosure Technology



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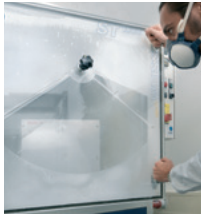
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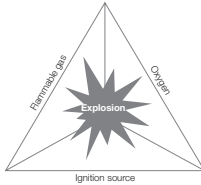
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| Klipper® TB 100 | Klipper® TB 100 |
|---------------------------------------|--|
| | |
| Stainless steel | Stainless steel |
| width 1.4024 (316L) 1.50 mm | Stainless steel 1.4024 (316L) extruded 1.50 mm |
| very good | very good |
| very good | very good |
| IP 65 | IP 65 |
| elektrogeschützt | elektrogeschützt |
| Explosion hazard areas, offshore, oil | Explosion hazard areas, offshore, oil |



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Klippon® – Years of proven reliability

The Klippon® brand has long stood for competence and quality in enclosures – in particular when used in industrial standard applications and for applications placed within harsh or explosive environments. Klippon® is a trademark of the Weidmüller Group, which operates worldwide in 70 countries through its sales offices, production facilities and marketing agents.

Weidmüller has been manufacturing enclosures since the nineteen sixties. We have continually lived up to our good reputation as a reliable and competent partner. The Weidmüller brand is a symbol for innovative products designed to fit the most challenging and demanding applications.

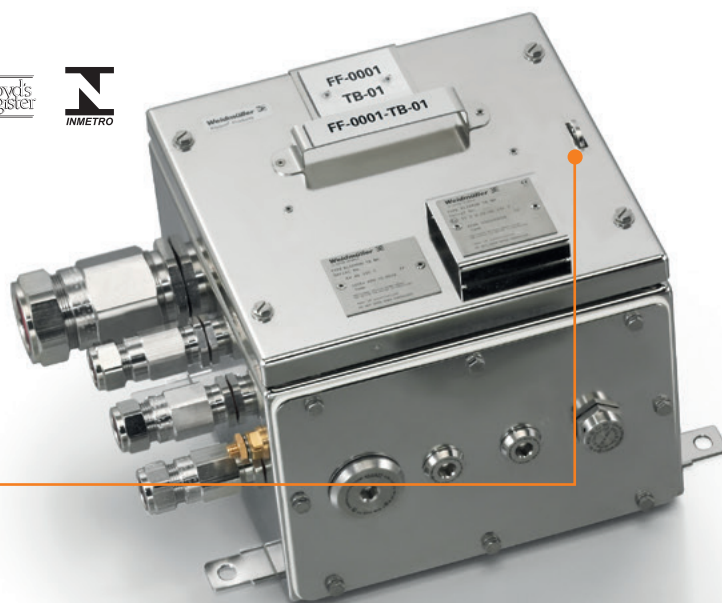
Weidmüller meets these requirements from its broad portfolio of steel enclosures with the Klippon® TB range available in Multi-Hinge (MH), Quarter-Lock (QL), Fixing-Screw (FS) versions, and from the Klippon® TBi range, available in Quarter-Lock (QL) and Fixing-Screw (FS) versions, as well as the Klippon® STB range and the aluminium enclosures of the Klippon® K range. The portfolio is complimented by the polyester enclosures of the Klippon® POK range and polycarbonate enclosures. Furthermore, a wide variety of accessories are also available, including cable glands, sealing plugs, adaptors, and pressure compensating elements. Weidmüller offers many different custom-fit enclosures to match the applications of our users. Our customisation services complement this hardware: turnkeyready enclosures, customised versions with DIN rails, drilled holes, cable glands, cut-outs, special coatings and much more.





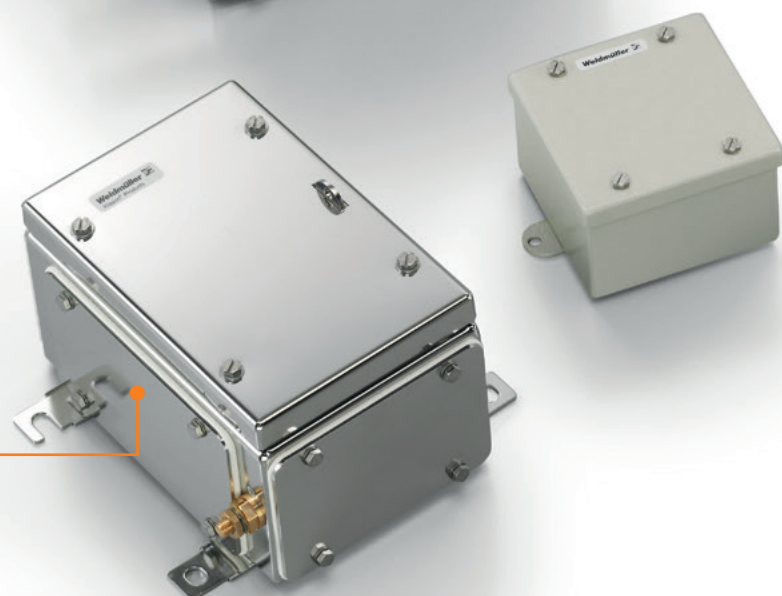
Enclosures made from stainless steel and sheet steel

The Klippon® TB, Klippon® TBi and Klippon® STB steel enclosure ranges provide outstanding high-performance features to satisfy the toughest demands within the harshest environments. In this configuration, the enclosures are certified according to the latest international standards, including EN 62208 and EN 60079.



Reliability and stability

A padlock on the enclosure prevents unauthorised access. Inner-thread sockets have been welded on to ensure that gland plates can be securely attached and to help prevent leaks.



Easy to install

The enclosures are provided with up to four gland plates. This makes it fast and easy for cable glands to be attached and processed on-site.



Reliable protection

An integrated duct for dust and moisture keeps contaminants or moisture from penetrating inside when the enclosure is opened. The outer earthing bolt comes with an IP67-certified seal mechanism and is protected against accidental rotation.



Versatile assembly options

Mounting bolts are attached inside the enclosures so that DIN rails and mounting plates can be installed within. The welded-on mounting feet can be used to facilitate a quick, safe and stable wall mount. The Klippon® STB enclosures also include a welded-on C-shaped rail to which a DIN rail can be mounted.



Temperature and sealing characteristics

The enclosures come as standard with a silicone seal to protect them during use within extreme temperature environments.



Aluminium enclosures

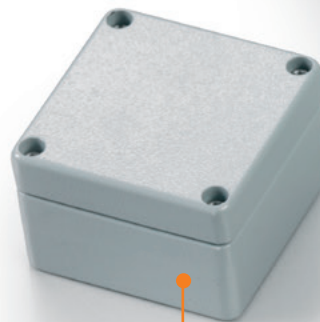
The Klippon® K Series enclosures can be used in a variety of applications for protecting terminals, switches, power supplies, control/display elements or electronic components. Our comprehensive range of enclosures gives you the following advantages:

- Improved flexibility: 19 sizes available
- Available in two different surfaces: powder coated and natural
- Mounting holes not within the sealed area
- Threaded hole for attaching DIN rails and mounting plates
- Closed-form seal (no glued splice)



Standardised lock

The lid is fastened using captive Torx slotted screws. The screws are made from stainless steel and have an organic coating. This provides a highly functional screw connection even when used in a corrosive atmosphere. Only one tool is needed when working with the enclosures because Torx slotted screws are used exclusively.



Versatile installation

The enclosures can be mounted directly using their prepunched mounting holes. You can also choose to install the enclosures externally using the mounting feet which are available as accessories.



High IP protection

The seals are fully closed without adhesive points so that the entire enclosure has a better seal. This seal ensures an IP protection level from IP66 to IP68 (subject to use).



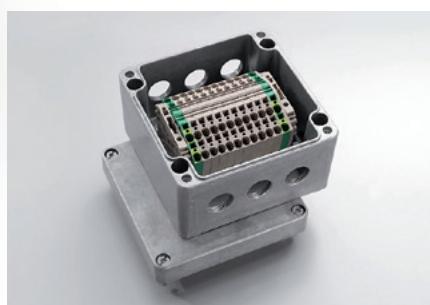
Mounting options

Suitable mounting plates for attaching DIN rails or block terminals are available as options.



Standardised distributor enclosure

The Klippon® K enclosures are already fitted with threaded holes. They come empty or completely filled with suitable terminal strips (with either screw or tension-clamp wire connectivity).



Plastic enclosures

The Klippon® polyester enclosures (the Klippon® POK and TBF ranges) and the polycarbonate enclosures (MPC and FPC ranges) are ideal high-quality solutions for electrical connectivity applications. These enclosures are suitable wherever corrosion resistance, shock resistance and a high class of protection are required. The polycarbonate enclosures from the MPC and FPC ranges are ideal for enclosing electrical, lectro-mechanical and pneumatic devices as well as circuit boards. The enclosures are used in situations with extreme mechanical and chemical conditions. The Klippon® POK polyester enclosures have also been designed and certified for use in harsh environment applications.



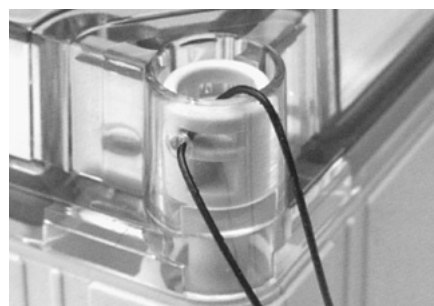
Versatile lid design

The TBF, FPC and MPC enclosures are available with either transparent or grey lids.



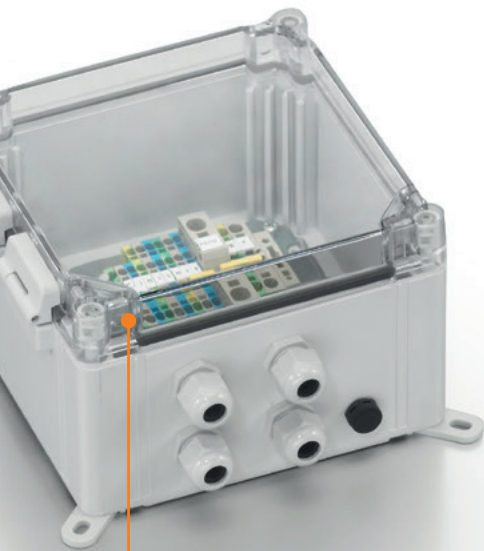
Sealable lid

The lid and the lid screws on the MPC and FPC enclosures have been fitted with sealed holes.



Easy to install

The enclosures feature holes for attaching DIN rails and mounting plates using self-tapping screws. The FPC and MPC enclosures are also equipped with support slots for circuit boards.



Sturdy and impact resistant

Because of their high fibreglass content, the enclosures are extremely rugged, weather resistant and can resist impacts up to 7 joules.



Technical Overview – Metal enclosures



| | Klippon® TB MH | Klippon® TB QL | Klippon® TB FS | Klippon® TBi QL |
|--------------------------------------|--|---|---|--|
| Material | Stainless steel | Stainless steel | Stainless steel | Stainless steel |
| Material Specification | Stainless steel 1.4404 (316L) 1.50 mm | Stainless steel 1.4404 (316L), enclosure 1.50 mm | Stainless steel 1.4404 (316L), enclosure 1.50 mm | Stainless steel 1.4301 (304), enclosure 1.50 mm |
| Sea water resistance | very good | very good | very good | very good |
| UV resistance | very good | very good | very good | very good |
| Halogen free / cadmium free | x / x | x / x | x / x | x / x |
| Surface finish | electropolished | electropolished | electropolished | electropolished |
| Intended use | Explosive hazard areas, offshore, oil and gas industry, chemical industry, process industry | Explosive hazard areas, offshore, oil and gas industry, chemical industry, process industry | Explosive hazard areas, offshore, oil and gas industry, chemical industry, process industry | Machine construction, transport, power |
| Dimensions | | | | |
| L x W x H (min.) in mm | 229x152x133 | 229x152x133 | 229x152x133 | 300x200x150 |
| L x W x H (max.) in mm | 987x740x200 | 987x740x200 | 987x740x200 | 800x600x220 |
| Geometry | 3 standard depths | 3 standard depths | 3 standard depths | 2 standard depths |
| Specific characteristics | | | | |
| Gland plates | 0,1,2,3,4 | 0,1,2,3,4 | 0,1,2,3,4 | 0,1 |
| Type of gasket | Flat gasket | Flat gasket | Flat gasket | Flat gasket |
| Seal material | Silicone | Silicone | Silicone | Neoprene |
| Enclosure attachment | 4 mounting feet with 11 mm hole size | 4 mounting feet with 11 mm hole size | 4 mounting feet with 11 mm hole size | Direct mounting (11 mm mounting holes on rear wall) or via mounting feet (optionally available) Welded mounting bracket |
| Installation mounting | 4 or 6 mounting bolts with M6 threaded holes | 4 or 6 mounting bolts with M6 threaded holes | 4 or 6 mounting bolts with M6 threaded holes | |
| Temperature range | -60 °C...+135 °C | -60 °C...+135 °C | -60 °C...+135 °C | -40 °C...+85 °C |
| Impact resistance | 10 J Industrial applications 7 J ATEX applications | 10 J Industrial applications 7 J ATEX applications | 10 J Industrial applications 7 J ATEX applications | 10 J Industrial applications |
| IP - protection class | IP 66, IP 67 / | IP 66 / | IP 66, IP 67 / | IP 66 / |
| NEMA protection class | Nema 3, Nema 4x, Nema 12 | Nema 3, Nema 4x, Nema 12 | Nema 3, Nema 4x, Nema 12 | Nema 3, Nema 4x, Nema 5 |
| Flammability rating | | | | |
| Surface resistance (in ohms) | | | | |
| Approvals | | | | |
| ATEX | x | x | x | |
| EN 60079-7 Increased safety | x | x | x | |
| EN 60079-11 Intrinsic safety | x | x | x | |
| EN 60079-31 Dust ignition protection | x | x | x | |
| IEC Ex | x | x | x | |
| IEC60079-7 Increased safety | x | x | x | |
| IEC60079-11 Intrinsic safety | x | x | x | |
| EN 60079-31 Dust ignition protection | x | x | x | |
| RMR / LR / GL | x / - / x | x / - / x | x / - / x | - / - / x |
| GOST Ex | x | x | x | |
| cULus | x | x | x | x |
| CCOE / INMETRO | x / x | - / x | x / x | |
| AEX | * | * | * | |
| Configuration | Lid hinges Removable lid Gland plates Welded mounting feet Fitting for a padlock | Lid hinges Gland plates Welded mounting feet Quarter lock | Removable lid Gland plates Welded mounting feet | Lid hinges Gland plates Direct mounting, Optional mounting feet Quarter lock |

* Approvals are pending



| | Klippon® TBi FS | Klippon® STB | | Klippon® K | |
|--------------------------------------|---|--|--|---|---|
| | | | | | |
| Material | Stainless steel | Stainless steel | Sheet steel | Aluminium | |
| Material Specification | Stainless steel 1.4301 (304), enclosure 1.50 mm | Stainless steel 1.4404 (316L) 1.50 mm | Powder-coated steel sheet 1.0330 | High quality aluminium alloy (Al-Si12) | |
| Sea water resistance | very good | very good | good | good | |
| UV resistance | very good | very good | insufficient | very good | |
| Halogen free / cadmium free | x / x | x / x | x / x | x / x | |
| Surface finish | electropolished | electropolished, Mirror-polish | powder-coated | neutral, powder-coated | |
| Intended use | Machine construction, transport, power | Ex areas, packing industry, railways, shipping, process industry | Packing industry, railways, shipping, process industry | Ex-areas, process industry, transport, railways, shipping, port facilities, packaging, mechanical engineering | |
| Dimensions | | | | | |
| L x W x H (min.) in mm | 300x200x150 | 120x120x80 | | 50x45x30 | |
| L x W x H (max) in mm | 800x600x220 | 250x400x130 | | 230x280x111 | |
| Geometry | 2 standard depths | 5 standard depths | | 11 standard depths | |
| Specific characteristics | | Ex-version | Industrial version | Ex-version | Industrial version |
| Gland plates | 0,1 | none | none | none | none |
| Type of gasket | Flat gasket | Flat gasket | Flat gasket | Moulded sealing | Moulded sealing |
| Seal material | Neoprene | Silicone | Silicone | Silicone | Chloroprene, Silicone |
| Enclosure attachment | Direct mounting (11 mm mounting holes on rear wall) or via mounting feet (optionally available) | External holders with 8 mm holes | External holders with 8 mm holes | 4 holes for M4 to M6 screws | 4 holes for M4 to M6 screws |
| Installation mounting | Welded mounting bracket | 20 mm C-rail welded to the enclosure | 20 mm C-rail welded to the enclosure | M4 to M6 threaded holes | M4 to M6 threaded holes |
| Temperature range | -40 °C...+85 °C | -60 °C...100 °C | -60 °C...120 °C | -50 °C...135 °C | -40 °C...+80 °C (CR); 50 °C...+135 °C (VMQ) |
| Impact resistance | 10 J Industrial applications | 7 J | 10 J | 7 J | 10 J |
| IP - protection class | IP 66 / | IP 66 | IP 66 | IP 66, IP 67 / | IP 66, IP 67, IP 68 / |
| NEMA protection class | Nema 3, Nema 4x, Nema 5 | | | Nema 4x | Nema 4x |
| Flammability rating | | | | | |
| Surface resistance (in ohms) | | | | | |
| Approvals | | | | | |
| ATEX | | x | | x | |
| EN 60079-7 Increased safety | | x | | x | |
| EN 60079-11 Intrinsic safety | | x | | x | |
| EN 60079-31 Dust ignition protection | | x | | x | |
| IEC Ex | | x | | x | |
| IEC60079-7 Increased safety | | x | | x | |
| IEC60079-11 Intrinsic safety | | x | | x | |
| EN 60079-31 Dust ignition protection | | x | | x | |
| RMR / LR / GL | - / - / x | - / x / x | - / x / - | x / - / x | x / - / x |
| GOST Ex | | x | | x | |
| cULus | x | x | | | x |
| CCOE / INMETRO | | - / x | | | |
| AEX | | * | | | |
| Configuration | | | | | |
| | Removable lid Gland plates Direct mounting, Optional mounting feet | TAS 20 C-profile rail Welded mounting feet Earth studs in enclosure lid and base | | Internal earthing screw in the enclosure base an external earth stud | internal earthing screw in the enclosure base |

* Approvals are pending

Technical Overview – Plastic enclosures



| | Klippon® POK | | TBF | MPC | FPC |
|--------------------------------------|--|----------------------------------|--|--|--|
| | | | | | |
| Material | Polyester | | Polyester | Polycarbonate | Polycarbonate |
| Material Specification | Glass-fibre reinforced polyester in accordance with DIN 16913 | | Glass-fibre reinforced polyester, polycarbonate transparent cover | | |
| Sea water resistance | very good | | very good | very good | very good |
| UV resistance | good | | good | good | good |
| Halogen free / cadmium free | x / x | | x / x | x / x | x / x |
| Surface finish | Grey (industrial version), Black (Ex version) | | grey | grey | grey |
| Intended use | Ex-areas, energy production, transportation, process industries, port facilities | | Building installation, transportation, energy production, building sites, manufacturing industry, packaging industry | Building installation, transportation, energy production, building sites, manufacturing industry, packaging industry | Building installation, transportation, energy production, building sites, manufacturing industry, packaging industry |
| Dimensions | | | | | |
| L x W x H (min.) in mm | 75x80x55 | | 186x151x139 | 125x75x75 | 200x200x130 |
| L x W x H (min.) in mm | 405x400x120 | | 603x603x175/210 | 250x175x150 | 600x400x130 |
| Geometry | 6 standard depths | | 3 standard depths | 4 standard depths | 1 standard depth |
| Specific characteristics | Ex version (Black) | Industrial version (grey) | | | |
| Gland plates | none | none | none | none | none |
| Type of gasket | Moulded sealing | Moulded sealing | O-ring | Foam seal | Foam seal |
| Seal material | Silicone | Chloroprene | Polyurethane | Polyurethane | Polyurethane |
| Enclosure attachment | 4 holes for M4 to M6 screws | 4 holes for M4 to M6 screws | 4 holes or external mounting brackets (accessory) | 4 holes or external mounting brackets (accessory) | 4 holes or external mounting brackets (accessory) |
| Installation mounting | M4 to M6 threaded holes | M4 to M6 threaded holes | 4 or 6 clamping screws M4 | Self-tapping screws | Self-tapping screws |
| Temperature range | -55 °C...+100 °C | -40 °C...+100 °C | -50 °C...+150 °C (grey); -50 °C...+130 °C (transparent) | -50 °C...+130 °C | -50 °C...+130 °C |
| Impact resistance | 7 J | 7 J | 4 J (grey lid) 7 J (transparent lid) | 7J | 7J |
| IP - protection class | IP 66 | IP 66 | IP 66 (transparent lid) IP 67 (grey lid) | IP 66, IP 67 | IP 66, IP 67 |
| Flammability rating | UL94 V0 | UL94 V0 | UL94 HB (grey), V2 (transparent) | V2 | V2 |
| Surface resistance (in ohms) | <10 ⁹ | 10 ¹² | 10 ¹² | 10 ¹⁶ | 10 ¹⁶ |
| Approvals | | | | | |
| ATEX | x | | | | |
| EN 60079-7 Increased safety | x | | | | |
| EN 60079-11 Intrinsic safety | x | | | | |
| EN 60079-31 Dust ignition protection | x | | | | |
| IEC Ex | x | | | | |
| IEC60079-7 Increased safety | x | | | | |
| IEC60079-11 Intrinsic safety | x | | | | |
| EN 60079-31 Dust ignition protection | x | | | | |
| RMR / LR / GL | - / x / x | - / x / x | | | |
| GOST Ex | x | | | | |
| cULus | | * | | | |
| CCOE / INMETRO | | | | | |
| AEX | | | | | |
| Configuration | Fastening screws for the mounting plate | | grey or transparent lid | grey or transparent lid | grey or transparent lid |

* Approvals are pending

A closer look at Weidmüller's production of stainless steel enclosures – manufacturing expertise at the highest level

Weidmüller provides the global market with high-quality Klippon® enclosures manufactured at our main enclosure production site. These enclosures are built to satisfy the toughest industrial demands. During production only the highest quality materials are used along with state-of-the-

art processing technology in order to maintain this high standard of quality for the new Klippon® TB enclosure range.

1. Laser cutting



In the first production step, the raw metal steel sheet is placed in position and is cut to form by a laser.



The metal sheets are cut to the proper size by the laser in a fully automatic process with no mechanical factors influencing the cut.

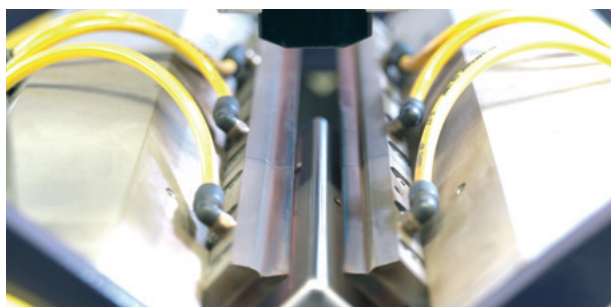
Each enclosure is laser engraved with its article number, product designation and unique order number. This information is used to provide complete identification and product traceability during the entire production process.

2. Design



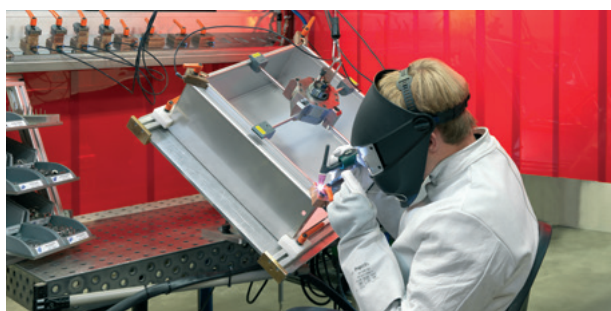
The one-piece enclosure blank cut-out is then mechanically adjusted using a bending machine to form the familiar enclosure body. The entire bottom section of the enclosure is made from a single sheet cut-out piece, so the welding is kept to a minimum. This results in precise, flat seal surfaces.

3. Process-compatible welding method



The moveable corners and edges of the sheet are welded into a single unit in a fully automated process. They are fixed in place with a standardised clamping mechanism. An inert gas is used on both sides during the welding process to protect against corrosion.

INFO: Weidmüller is a DVS-certified welding shop and relies on the tungsten inert gas (TIG) welding process to produce 100 % reliable joints that are uniform in appearance.



The sensitive sealing edges are welded manually.

INFO: Weidmüller's enclosure production process is certified according to the welding quality standard DIN EN ISO 3834-3 and DIN EN 15085-2. Thus it is approved for the welding of railway wagons and railway components.

4. Attaching the inner-thread sockets



Conventional mechanically sealed inner-thread sockets are used for attaching add-on components (such as a gland plate) to the enclosure body. Weidmüller has developed a unique new welding process whereby

the innerthread socket is welded permanently to the enclosure in just a tenth of a second.

In contrast to conventional joints, the welded joint created by this process requires no additional sealing material. This significantly reduces the harmful influences that mechanical impact, excessive torque and vibrations can have on the seal of the inner-thread sockets. Laboratory tests confirm a leak-free connection is maintained with a pressure of more than 1000 kg ensuring performance even under the harshest conditions. (IP test, CT, vibration and pressure testing: see page 26.)

5. Electro-polishing



The Klippon® TB enclosure range is supplied as standard with an electro-polished finish which increases corrosion resistance and reduces surface deposits and germs. We have installed one of the most modern computercontrolled electro-polishing facilities in the world at our production site. This facility was designed and optimised especially for electro-polishing our stainless steel enclosures.

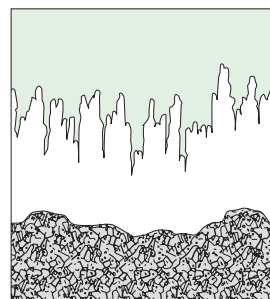
INFO: The electro-polishing process

The enclosures are hung in variably sized titanium units, contacted and then dipped into a pool under computer control. This pool contains a mixture of phosphoric and sulphuric acids; this is referred to as the electrolyte. The enclosures are then anodised in a DC circuit. Up to 1500 A is applied to each enclosure. Afterwards, leftover electrolyte is rinsed off during a six-stage rinsing that reaches into the surface pores. Finally, a hot bath in deionised water is used to free the surface of calcium carbonate residue. The enclosure is then dried automatically.



INFO: Characteristics

- Less chance for surface germs and deposits
- Preventing discolouration of the enclosure surface
- Passivation of the surface
- Removal of surface contaminants
- Decorative gloss
- Pure metal, voltage-free surfaces
- Good corrosion resistance and fatigue strength
- Reduced formation of deposit coatings
- Optimal when welding and soldering



A cross-section of the enclosure surface **before** the electro-polishing: Germs and dust take hold easily on the rough enclosure surface which could lead to a higher risk of corrosion.

A cross-section of the enclosure surface **after** the electro-polishing: The electro-polishing process removes the spikes and thus smooths the surface. This reduces nucleation and significantly improves the corrosion resistance.

6. Seals



The seals for the lid and gland plate are cut to shape in a flexible and precise process that uses a blade with a cutting speed of up to 1000 mm/s.

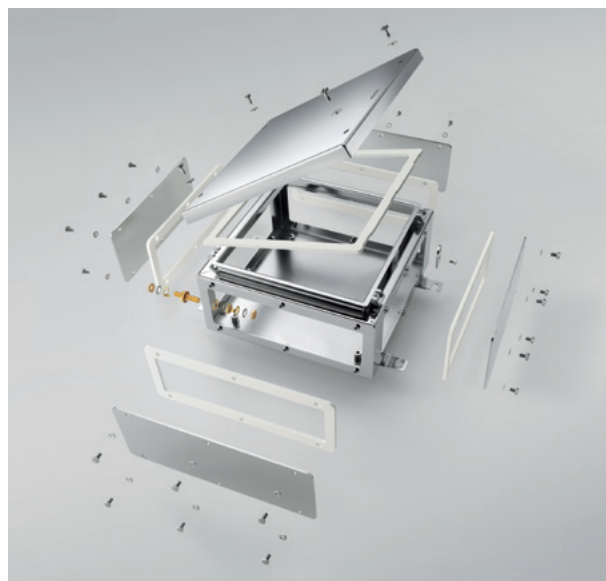
INFO: A reliable seal ensures protection against external influences even at extreme temperatures. Thus the seal is one of the most important components of an enclosure. The seal must exhibit a high degree of resilience so that it can remain functional. Weidmüller's silicone gasket is the solution for all these requirements.



7. Mounting



The enclosures are then assembled with other essential components, such as the lid, gland plates and earth stud.



8. Quality control



Dimensional control

The enclosure dimensions are tested (random samples) using a 3-D measuring arm. This permits errors to be clearly identified.



Vacuum testing

Computer-assisted vacuum testing is used to check random enclosures for leaks. The sensitivity of these tests is so high that they can detect a hole in the enclosure that is 0.1 mm in diameter.

9. Packaging



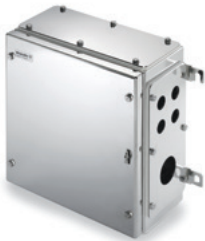
The enclosures are packed in a specially designed flexible carton before they are shipped.

INFO: Standardised protective inserts at all corners of the enclosure protect the enclosure perfectly and fit tightly in order to avoid any slippage during transportation. The carton has been designed so that it can be reused even after cable glands have been attached to the enclosure.



Integrating, augmenting and customising: perfectly complimenting your application needs

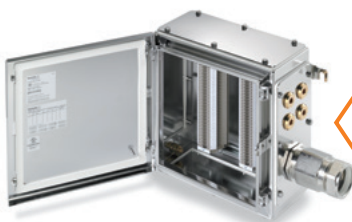
A variety of customised configurations can be constructed at enclosure manufacturing facility. Weidmüller not only produces enclosures; we can also customise them according to specific customer requirements.



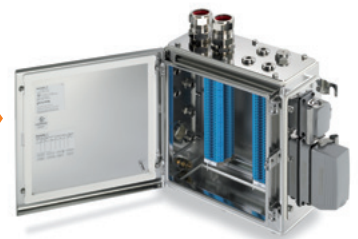
A wide range of customised options are available, including customisation with holes and cut-outs.



Fully assembled with the required add-on components already fitted: such as cable glands, stopping plugs, pressure compensating elements or heavy-duty connectors.



And populated with a variety of internal components (such as terminal blocks or electronic components) in compliance with international regulations and specifications.



The new Klippon® TB enclosure range consists of 12 sizes and 3 standard depths. A variety of enclosure variants can then be configured based on these.

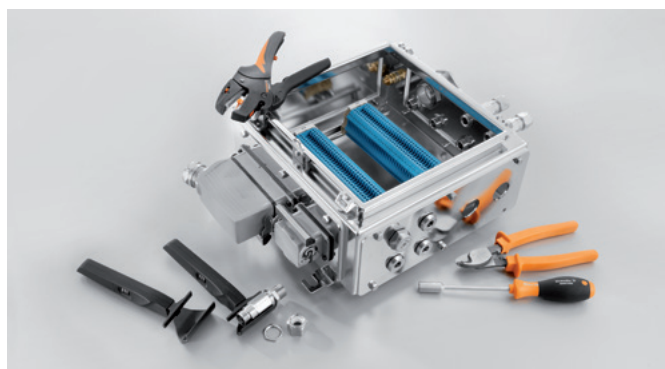
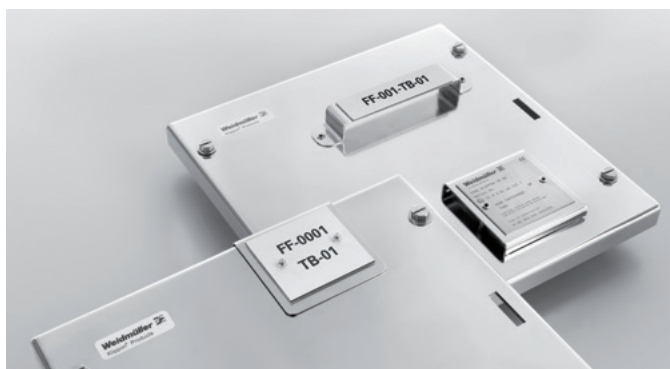
The enclosures can be fitted with two different locking systems on request. They can also be ordered with various materials, surface and sizes.

The structured system of accessories for the new Klippon® TB enclosure range means that you can easily adapt the enclosure to the specific requirements of each application. There are a wide range of variants available which combine our options for adding additional components during production or for complete on-site assembly:

- Seal material: Silicone seal (standard) or chloroprene seal
- 0 to 4 gland plates
- Replaceable gland plates, 3 mm and 6 mm versions
- Different material and surface options
- Removable lid with hinge (can be attached on either side) or without hinge / with or without padlock hasp and facility
- Quarter-turn lock closure with different lock inserts

- Ready-made holes and cut-outs on all sides of the enclosure: in your custom sizes and pre-assembled with the appropriate add-on accessories
- Mounting plates for your choice of components within the enclosures
- Attachment set for mounting the internal components
- Earth stud made from either brass or stainless steel
- Rain hoods
- Welded-on / riveted ratings plate holder, outer
- Welded-on / riveted document holder made from stainless steel, in sizes DIN A4, A5 and A6, inner
- Populated with terminals or other electronic devices and components
- Special coatings
- With or without welded-on mounting feet
- Enclosures in landscape format

Use high-quality Weidmüller tools on the enclosures to ensure proper workmanship. The essentials are provided: usability oriented for the application and the user, functionality and reliability for your application.



International approvals

Weidmüller's products and services meet our own strict standards as well as international quality and safety standards. All Weidmüller enclosures are specially tailored to the harsh, fluctuating conditions found in demanding industries. They are certified for compliance with international standards and comply with the latest ATEX and IECEx directives concerning areas requiring explosion protection. They also have approvals for use in standard industrial applications (such as UL, cULus, GOST, Germanischer Lloyd, Lloyds Register and Russian Maritime Register). Weidmüller products and technology have gained a foothold overall: in electrical distribution systems, control/monitoring systems, boiler and turbine monitoring systems, fuel management control, combustion control, and in monitoring and distribution systems.



Expertise for application-specific solutions

Weidmüller's Customer-Specific Solutions department offers ATEX-certified components and application-specific ATEX solutions for use in explosive-risk zones. In explosive-risk zones, special measures must be taken to ensure the safety and health of workers. This is the focus of the ATEX Directives 1999/92/EC and 94/9/EC from the European Community. They categorise separate hazardous zones and define the appropriate explosion protected equipment to be used in these zones. Weidmüller's Customer-Specific Solutions department is monitored by an EU notified body according to European regulations. It complies with the requirements specified by the IECEx certification scheme for devices, which is based on the standards of the International Electro-technical Commission.



Perfect protection and safety

- Enclosure expertise – for all IP protection classes
- Enclosures for areas requiring explosion protection
- Viewing windows, drilled holes and threads can be added
- Complex processing steps, such as milled contours
- Welding – Class C5, DIN 6700 – for stainless steel and steel sheet enclosures. Welding work for CL2-certified applications according to the DIN EN 15085-2 European standard
- Surface coatings on request
- Customised markers for devices and facilities

Quality you can depend on ...

Weidmüller enclosures are often exposed to harsh conditions during use. Because of their excellent quality, they provide years of reliable protection against water, dust, strong impacts, vibration, corrosion and extreme temperature fluctuations.

All components used in areas requiring explosion protection are subject to strict security requirements. All of their functional details must be tested to make sure they are durable and tough enough to perform under extreme environmental conditions.

Since an enclosure is only as reliable as its weakest component, Weidmüller makes sure that each component complies with the same high quality standards – so there are no weak spots on the entire enclosure.

The Klippon® TB enclosures have been certified and approved according to the new IEC/EN 60079 set of standards. This set of standards defines a harmonised approach to designing and manufacturing equipment for areas requiring explosion protection.

The enclosures must comply with the requirements found in the empty enclosures standard according to EN 62208 and IEC 60079-0, 7 and 31. These specify the following tests:



Empty enclosure standard, acc. to DIN EN 62208 Page 26

- Static load
- Axial loads of metal inserts
- Degree of protection against dust and water (IP code)
- Degree of protection against mechanical impacts (IK code)
- Proof of continuity of PE circuit
- Corrosion testing
- Durability of markings

Durability of markings EX tests according to IEC 60079-0 Page 29

- Long-term thermal test

Additional testing Page 30

- Torque test
- Vibration and shock testing according to DIN EN 61373
- Computed tomography (CT)
- Light resistance test (sun test)
- Flammability test
- Surface analysis (REM)

Quality control during the manufacturing process Page 20

- Vacuum testing
- Dimensional control

Empty enclosure standard according to DIN EN 62208

Static load

The load capacity of an enclosure is tested using a static load test. The enclosure is subjected to a certain load (a weight specified by the manufacturer) for one hour. No damage should be incurred by the enclosure during this time.

Depending on their sizes, the Klippon® TB enclosures can withstand loads ranging from 15 to 300 kg.

We can, on request by the customer, calculate the carrying capacity of the enclosure when under heavy loads.

Axial loads of metal inserts

The load capacity of the mounting plates installed in the enclosure are tested here. An axial force is put on the mounting plates. This force depends on the thread size of the fastening screws in use (refer to the standards table below).

| Thread size | Pull-out force, in N |
|-------------|----------------------|
| 4 | 350 |
| 5 | 350 |
| 6 | 500 |
| 8 | 500 |
| 10 | 800 |
| 12 | 800 |

The enclosure may not be changed in any way after the testing has taken place.

Degree of protection against dust and water (IP code)

The main purpose of an enclosure is to protect its inner components from external influences such as dust and moisture.

Thus enclosures are rated according to their IP (ingress protection) level. The enclosures are tested according to DIN EN 60529 to provide proof of their IP class.

The first number of the IP code indicates the degree of dust resistance that the enclosure provides.

IP protection code, first digit

| DIN EN 60529 Digit | Guarding against access to dangerous components | Protection against foreign objects |
|--------------------|---|---|
| 0 | No protection | No protection |
| 1 | Protected against back of hand access | Protected against access by solid foreign objects (Diameter from 50 mm) |
| 2 | Protected against finger access | Protected against access by solid foreign objects (Diameter from 12.5 mm) |
| 3 | Protected against tool access | Protected against access by solid foreign objects (Diameter from 2.5 mm) |
| 4 | Protected against wire access | Protected against access by solid foreign objects (Diameter from 1.0 mm) |
| 5 | Protected against wire access | Protection against dust |
| 6 | Protected against wire access | Sealed against dust |

For the IP6X test, the enclosure is placed in a test chamber filled with talcum powder for 8 hours. The talcum powder is kept in a constant state of suspension and a vacuum is created within the enclosure. IP6X protection is met if no dust deposits can be seen within the enclosure.



The second digit of the IP code indicates the enclosure's resistance against water.

IP protection code, second digit

| DIN EN 60529 Digit | Protection against water |
|--------------------|---|
| 0 | No protection |
| 1 | Protection against vertically falling drops of water |
| 2 | Protection against falling water drops, when the enclosure tilted up to 15° |
| 3 | Protection against water spray that falls at an angle up to 60° from vertical |
| 4 | Protection against splashed water from all sides |
| 5 | Protection against jets of water from all angles |
| 6 | Protection against strong jets of water |
| 6K | Protection against strong high-pressure jets of water |
| 7 | Protection against sporadic submersion |
| 8 | Protection against continuous submersion |

In the IPX6 dynamic test, the enclosure is subjected to a strong jet of water (100 l/min flow rate). The jet is directed in each direction at the enclosure for three minutes.

The IPX7/IPX8 static test is a completely different type of test. Here the enclosure is submerged under 1 metre of water for 30 minutes (for IPX7) or for 72 hours (for IPX8).

The test is passed successfully if the water is not able to damage the enclosure. An internal Weidmüller test specification also stipulates that no ingress of water is acceptable.



For the American market, a proof of impermeability can be carried out according to UL 50E (a hose-down test). In such a test, the enclosure is subjected to a water stream from all sides with a flow of 240 l/min.



Degree of protection against mechanical impacts (IK code)

An enclosure may be subjected to external impacts and certain impact forces during actual use. These impacts must not impair or damage the functionality of the enclosure. The enclosures must undergo an IK impact resistance test to establish this. In this test, a test hammer falls on the test piece from a height of 700 mm with an impact force of 7 joules in accordance with IEC 60079-0 (for Ex applications), or a force of 10 joules (IK09) in accordance with DIN EN 50102 (for industrial applications).



The test is passed when the enclosure is still able to maintain its IP degree and when the lid can be removed and reattached after the test.

The relationship between the IK code and impact force

| IK-code | IK00 | IK01 | IK02 | IK03 | IK04 | IK05 | IK06 | IK07 | IK08 | IK09 | IK10 |
|---------------------|------|------|------|------|------|------|------|------|------|------|------|
| Load energy, joules | *) | 0.15 | 0.2 | 0.35 | 0.5 | 0.7 | 1 | 2 | 5 | 10 | 20 |

*) Not protected according to the present standard.

Not protected according to the present standard.

Metal enclosures must ensure electrical continuity, either using the conductive parts of the enclosure, or using a separate protective earth conductor, or by using both.

The Klippon® TB enclosures provide sufficient earthing options to ensure this continuity: a self-locking M10 earth bolt on the bottom enclosure section and two additional M6 earth screws in the lid and bottom.

The contact resistance of the enclosures is measured with a current of 10 A DC.

The measuring current is fed in via the outer PE and the bottom of the enclosure.

The PE connection must remain under the required limit of 100 mΩ liegen.

Salt spray corrosion test (proves corrosion resistance)

Enclosures are often used outdoors so that they often come into contact with rain or sea water. It is critical to determine that the enclosures are (and will continue to be) resistant to corrosion for these types of applications.

In order to simulate such a scenario, a corrosion test is carried out on the enclosure where it is subjected to a salt water mist. This is used to indicate weak points, pores or damage to the surface.

In this test, the enclosures are placed in a humid atmosphere (40 °C and 95 % humidity). They are then sprayed with a salt water mist for over 336 hours in accordance with DIN EN ISO 9227.

After this exposure, the enclosure is rinsed off for 5 minutes so that any evidence of corrosion can be precisely identified. The test is passed if no formation of red rust is found on the enclosure.



Durability of markings

All labels on the enclosure must be tested for their wipe resistance. One test using water and one test using mineral spirits are conducted.

The test is passed when the labelling can still be read well.

Upon request by the customer, the wipe resistance test can be carried out with other chemicals and solvents for ATEX and ICEX Type lable.

EX tests according to IEC 60079-0

Long-term thermal test

During use, the enclosures may be exposed to extremely high and low temperatures, and to extreme temperature fluctuations. The heat/cold resistance test determines the temperature range in which the enclosures maintains their full functionality.

Thermal stability

According to the IEC directive 60079-0 edition 2011 section 26.8, the enclosures must be subjected to hot storage in two steps:

1. For 336 hours at 90 °C and 95 % humidity
2. For 336 hours at 125 °C (IPX7 test group) or at 155 °C (IPX6 test group)

Cold stability

Then, in accordance with section 26.9, the enclosures is stored in the cold for 24 hours at -65 °C. The impact test is then carried out with 7 joules of impact energy in accordance with IEC 60079-0.

This test is passed when the enclosure is able to maintain its IP protection level after the cold and hot storage.

* Exemplary test values for the Klippon® TB enclosure series



Additional testing

Torque test

During this test, the lid, gland plate screws and earthing screws are all tightened and loosened from the enclosure using the torque recommended by the manufacturer. This is repeated five times.

If the torque value required to destroy a rivet or shear off a bolt is greater than the specified torque, then the test is considered passed.

Vibration and shock testing

The enclosures can be exposed to extreme vibrations and oscillations during use. The vibration and shock test can determine how much vibration an enclosure can withstand.

The steel and aluminium enclosures are mainly tested for railway requirements and compliance with DIN EN 61373.



Computed tomography (CT)

Using computer tomography, we can create two-dimensional radiographic images and volume models of the enclosures to assist us in the development stage. This allows us to see the welded joints and immediately identify any potential leakage areas without using any destructive tests.

This process is used on the Klippon® TB enclosures to find any possible leaks around the welded inner-thread sockets (refer to page 17 "Attaching the inner-thread sockets").

Light resistance test (sun test)

The light resistance test is used to check the UV resistance of plastic enclosures. In this test, the enclosures are subjected to a beam of simulated sunlight for 168 hours which corresponds to daylight phase D 65 according to CIE.

After the radiation exposure, the enclosure is inspected for cracks and colour changes, and is compared with an untested enclosure. If no differences, no colour changes and no cracks can be detected on the enclosure, then the test has been passed.



Flammability test

The flammability characteristics of plastic are tested here and categorised in the following classes according to UL 94 :



Surface analysis

Scanning electron microscopy provides a high-resolution view of the surface that also has a high depth of field. When used together with electron probe microanalysis (or EDX: energy dispersive x-ray analysis), a qualitative and quantitative analysis of the chemical composition of the surface is possible. This delivers a spatial resolution in the micron range.

The following aspects can be examined when inspecting enclosures:

- Inspection of welded-on, electro-polished components
- Corrosion analysis (for example, the brass earthing stud)
- Analysis of the pores on the silicone seal
- Chemical analysis of the surface of the enclosure

| Flammability ratings | Position Test piece | Criteria | Enclosure | Image |
|----------------------|------------------------|---|---------------------------------|-------|
| HB | horizontal | <ul style="list-style-type: none"> • Burn rate < 76 mm/min; thickness of test piece < 3 mm • Burn rate < 38 mm/min; thickness of test piece > 3 mm | TBF (Grey lid) | |
| V-0 | vertical | <ul style="list-style-type: none"> • Self-extinguishing within 10 s • No drippage permitted | Klippon® POK | |
| V-1 | vertical | <ul style="list-style-type: none"> • Self-extinguishing within 30 s • No flaming drippage permitted | | |
| V-2 | vertical | <ul style="list-style-type: none"> • Self-extinguishing within 30 s • Flaming drippage permitted | TBF (transparent lid), MPC, FPC | |
| 5VB | horizontal | <ul style="list-style-type: none"> • Self-extinguishing within 60 seconds, after five times exposing to a 500 W flame for five seconds each • Test piece may burn through (burn hole) | | |
| 5VA | horizontal | <ul style="list-style-type: none"> • Similar to 5VB but test piece may not burn through (no burn hole) | | |

The basics of explosion protection

Explosive atmosphere

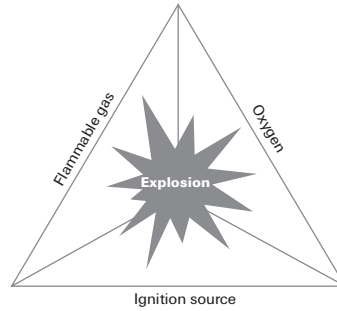
An explosive atmosphere is created by an air mixture of flammable gases, vapours, mist or dust. When an ignition occurs in an explosive atmosphere, the reaction continues independently in these atmospheric conditions. Such atmospheric conditions are in the range from 0.8 to 1.1 bar absolute pressure and -20 °C to +60 °C mixture temperature.

This specification is the basis for the European directives and their derived regulations. The danger of an explosion exists when the following conditions are met simultaneously:

- The proportion of flammable substances is so high that an explosive mix can occur
- An ignition source capable of igniting the mixture is located in the same room
- There is sufficient oxygen available for an explosion

Ignition sources that can trigger an explosion include:

- Electrical sparks and arcs, for example
 - During the opening and closing of circuits
 - Discharges from charged equipment parts
 - At the switching mechanism in switching equipment
 - From damaged cables and wires
 - Short circuits
 - Electrical compensating currents
- Sparks created mechanically from friction, impact or grinding motions
- Hot surface, such as live wires in junction boxes, motor windings, heating conductors, bearings, shaft bushings
- Electrostatic charges resulting from cutting processes where at least one chargeable substance is involved



ATEX directive 1999/92/EG

According to ATEX Directive 1999/92/EC, the employer must provide the appropriate measures to protect the safety and health of its employees. One such measure is dividing a hazardous area into zones where there is a risk that an explosive atmosphere may be present.

| Zone division | |
|-----------------------------------|--|
| Flammable gases, vapours and mist | |
| Zone 0 | A zone where there is a constant and long-term occurrence of an explosive atmosphere (consisting of air mixed with flammable gases, vapours or mist). |
| Zone 1 | A zone where, during normal operations, an explosive atmosphere (consisting of air mixed with flammable gases, vapours or mist) occurs occasionally. |
| Zone 2 | A zone where, during normal operations, an explosive atmosphere (consisting of air mixed with flammable gas, vapour or mist) is not anticipated, but could rarely occur for only a short period. |
| see EN60079-14:2008 | |

| Zone division | |
|---------------------|---|
| Flammable dusts | |
| Zone 20 | A zone where, during normal operations, an explosive atmosphere (consisting of a flammable dust in the air) occurs often or for longer periods. |
| Zone 21 | A zone where, during normal operations, an explosive atmosphere (consisting of a flammable dust in the air) occurs occasionally. |
| Zone 22 | A zone where, during normal operations, an explosive atmosphere (flammable dust in the air) is not anticipated, but could possibly occur for only a short period. |
| see EN60079-14:2008 | |

The ATEX device category is used to select the proper EX devices for a particular zone (refer to the ATEX Directive 94/9/ EC, on pages 31–33). Since there are no device categories in the IECEx definition, the equipment protection level (EPL) is used to pick the suitable devices. These equipment protection levels assess the risk of internal ignition within a device, whereby the type of internal ignition protection applied is not a factor.

Equipment protection level (Equipment Protection Levels - EPL)

| Mining operations at risk of firedamp (Group I) | |
|---|--|
| EPL Ma | Devices to be installed in a mine that have a „very high“ level of protection; where there is sufficient certainty that no ignition source exists, even when gases escape during operations. |
| EPL Mb | Devices to be installed in a mine that have a „high“ level of protection; where there is sufficient certainty that there will be no ignition source in the time that elapses between the onset of escaping gas and the actual shut-down of the device. |
| see EN60079-0:2010 | |
| Gases (Group II) | |
| EPL Ga | Devices for use in explosive gas atmospheres with a „very high“ level of protection. Such devices provide no ignition source in normal operations or during faults which are not expected on a regular basis. |
| EPL Gb | Devices for use in explosive gas atmospheres with a „high“ level of protection. Such devices provide no ignition source in normal operations or during faults which are not expected on a regular basis. |
| EPL Gc | Devices for use in explosive gas atmospheres with an elevated level of protection. Such devices provide no ignition source in normal operations. They also have additional safeguards to ensure that in the case of regularly anticipated events (such as the failure of a lamp) there is never an ignition source. |
| see EN60079-0:2010 | |
| Dusts (Group III) | |
| EPL Da | Devices for use in combustible dust atmospheres with a „very high“ degree of protection. Such devices provide no ignition source in normal operations or during rarely occurring faults. |
| EPL Db | Devices for use in combustible dust atmospheres with a „high“ level of protection. Such devices provide no ignition source in normal operations or during faults which are not expected on a regular basis. |
| EPL Dc | Devices for use in combustible dust atmospheres with an „elevated“ level of protection. Such devices provide no ignition source in normal operations. They also have additional safeguards to ensure that in the case of regularly anticipated events (such as the failure of a lamp) there is never an ignition source. |
| see EN60079-0:2010 | |

ATEX directive 94/9/EG 1

Article 95 of the treaty establishing the European Union concerns itself with aligning the directives of the various member nations. Guided by the new strategy, ATEX Directive 94/9/EC specifies the basic safety and health requirements. It is aimed at manufacturers of components and devices which are intended for use in potentially explosive atmospheres. In this directive, the product requirements are defined according to equipment (device) groups and equipment categories.

This is the category that, according to the ATEX Directive 1999/92/EC (see above), defines the usability for each zone. Harmonised standards (protective strategies) can be used to prove compliance with the basic safety and health requirements.

Devices are divided into three equipment groups and categories.

Equipment group I applies to equipment and devices intended for use in underground parts of mines, and to those parts of sub-surface installations of such mines, liable to be endangered by firedamp and/or combustible dust.

Category M1

Products in this category must continue to operate in the presence of an explosive atmosphere for safety reasons. They feature stand out explosion protective mechanisms which function as follows:

- When one integrated protective mechanism fails, at least one other protective mechanism is available to provide the required safety level
- Or, the required level of safety is ensured even when two faults occur that are independent of each other

Category M2

These products must be switched off whenever an explosive atmosphere is present. However it is possible that an explosive atmosphere could occur when the category-M2 device is operating and cannot be immediately switched off. For this reason, such devices must be equipped with protective measures which provide a high degree of safety. The protective measures integrated in products of this category provide the required degree of safety during normal operations and also during difficult operating conditions due to rough handling or fluctuating environmental conditions.

¹ DIRECTIVE 94/9/EC OF THE EUROPEAN PARLIAMENT AND COUNCIL from 23 March 1994: on the harmonisation of regulations from the member states concerning equipment and protective systems intended for use in explosive-risk zones

Equipment group II applies to equipment and devices intended for use in other places liable to be endangered by explosive atmospheres.

Equipment group II is subdivided into **three categories**:

Category 1

These devices may be used in a zone where explosive atmospheres are continually or often present.

These devices must provide the required safety and explosion protective mechanisms to ensure, even during rarely occurring faults, that

- If a protective safety mechanism fails, the required level of safety is guaranteed by at least one other independent safety mechanism, or
- The required level of safety is guaranteed even when two independent faults occur

Category 2

These devices may be used in zones where an explosive atmosphere (from gases, vapours, mist or air-borne dust) is not anticipated, but could rarely occur for a short period. These devices guarantee the required safety level during normal operations.

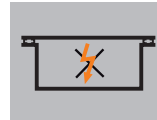
Category 3

Die Geräte sind zur Verwendung in Bereichen bestimmt, in denen nicht damit zu rechnen ist, dass eine explosionsfähige Atmosphäre durch Gase, Dämpfe oder Nebel oder aufgewirbelten Staub entstehen kann, aber wenn sie dennoch auftritt, dann aller Wahrscheinlichkeit nach nur selten oder während eines kurzen Zeitraums. Die Geräte gewährleisten bei normalem Betrieb das erforderliche Maß an Sicherheit.

Protection concepts

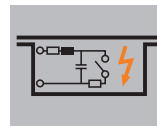
The selection of the ignition protection type is based on the zone categories described above. In the ATEX field of application for example, the Ex ia ignition protection type is permitted for Zone 0 (the highest probability of an explosive atmosphere).

Increased safety Ex e – no sparks and surface temperature limited to a safe level



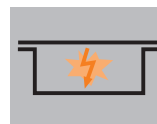
This increased safety level is intended for products that encounter no sparks during normal operations or during faults. The surface temperature of the relevant components is limited to a value below the ignition temperature. An increased safety level is reached by reducing the current load, by improving the insulating properties, and by maintaining clearance and creepage distances which exceed those used in standard industrial applications. This protection strategy is typically used in junction boxes.

Intrinsic safety Ex i – ignition energy limited to a safe level



Intrinsic safety is intended for products in which the electrical energy that flows into or is stored in the product is not sufficient to ignite the surrounding explosive atmosphere. This must also hold true for fault scenarios. Because of the way this intrinsic safety is achieved, it is essential that not only the devices exposed to the explosive atmosphere are properly constructed. The connected electrical devices must also be constructed and designed accordingly. Intrinsically safe devices and intrinsically safe equipment components are divided into protection categories „ia“ (for Zone 0, 1 and 2), „ib“ (for Zone 1 and 2), and „ic“ (only for Zone 2). A typical application is for control and display circuits using low voltage and low current.

Flameproof Ex d encapsulation Limits the explosion to the interior of the enclosure



Flameproof enclosures are designed for devices that generate sparks or have hot surfaces which are capable of ignition in normal operations. With this type of ignition protection, industrial components – which normally could not be used in explosive atmospheres – may be used when they are installed within flameproof enclosures.

The surrounding explosive atmosphere can penetrate into the enclosure and it can cause an internal explosion during the lifespan of the device.

The enclosures must be stable enough that they are not deformed or destroyed by the pressure created. All of the enclosure’s couplings and connections are designed so that they will not transmit an internal explosion to the surrounding outer atmosphere. These couplings are referred to as ignition gaps.

The explosion group (IIA, IIB, IIC) is relevant for this ignition protection type. Devices using this protective strategy may not be used in Zone 0.

Classification of devices into groups

Gas Ex protection is divided into Groups I and II. In Group II, flammable gases, vapours and mist are subdivided into subgroups IIA, IIB and IIC, depending on their capability to ignite or their explosive transmission capacity.

Electrical devices in the Group II category should be used for dust Ex protection. These are subdivided according to the properties of the dust where they can be used. Sub-group IIIA is for combustible flyings, IIIB is for non-conductive dust and IIIC for conductive dust.

| EN 60079-0 | | Directive 94/9/EG | | | EN 60079-10-X | |
|--------------------------|-----|-------------------|-----------------|--------------------|------------------------------|------|
| Flammable materials | EPL | Group | Equipment group | Equipment category | Type of explosive atmosphere | Zone |
| Methane, Coal dust | Ma | I | I | M 1 | | NA |
| | Mb | | | M 2 | | |
| Gases, mist, vapours (G) | Ga | II | II | 1 | G | 0 |
| | Gb | | | 2 | G | 1 |
| | Gc | | | 3 | G | 2 |
| Dust (D) | Da | III | II | 1 | D | 20 |
| | Db | | | 2 | D | 21 |
| | Dc | | | 3 | D | 22 |

In an explosive atmosphere, the maximum surface temperature of Ex devices is a critical factor. It must therefore be specified on the ratings plate of an assembled (non-empty) Ex enclosure (refer to the ratings plate for an assembled Ex-certified enclosure on p. 36). For dust-related Ex protection, the maximum surface temperature is specified directly (e.g. T 100 °C). For gas-related Ex protection, there is a division into temperature classes ranging from T1 to T6 (refer to the table right).

For example, an enclosure with a T6 rating has a maximum surface temperature of 85 °C. Thus it can also be used in T5–T1 zones since the temperatures in these zones do not exceed 85°C.

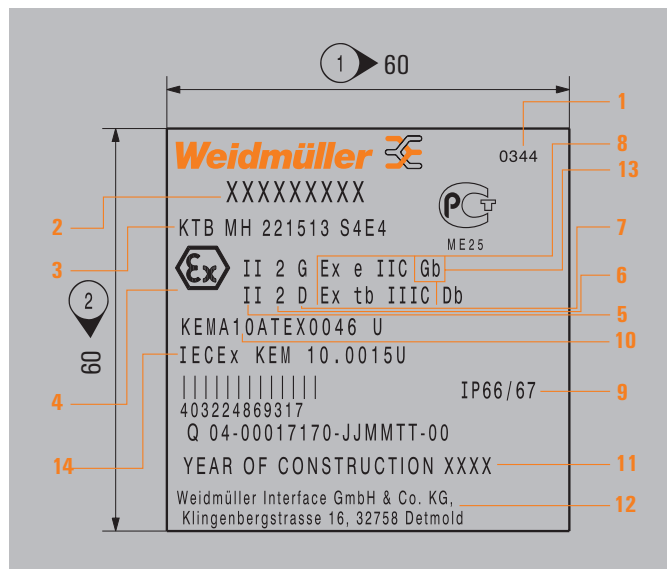
| Temperature class | T1 | T2 | T3 | T4 | T5 | T6 |
|--------------------------|---------|--|--|----------------------------|--------------|-------------------|
| Max. surface temperature | 450 °C | 300 °C | 200 °C | 135 °C | 100 °C | 85 °C |
| Explosion group | I | II A | II B | II C | | |
| | Methane | Acetone Ethane Ammonia Benzene Acetic acid Carbon monoxide Methane Methane_1 Propane Tolu_1 | Ethyl alcohol i-amyl acetate n-butane n-butyl alcohol | Gasoline Diesel power – | Acetaldehyde | Carbon disulphide |

Required labelling

A device can only be commissioned after it complies with the relevant ATEX directive. Two key prerequisites are a unique CE mark and an attached declaration of conformity for the device. An affixed CE mark confirms that the product complies with all applicable requirements found in the directives which are relevant to that product. The declaration of conformity confirms compliance with the relevant directives.

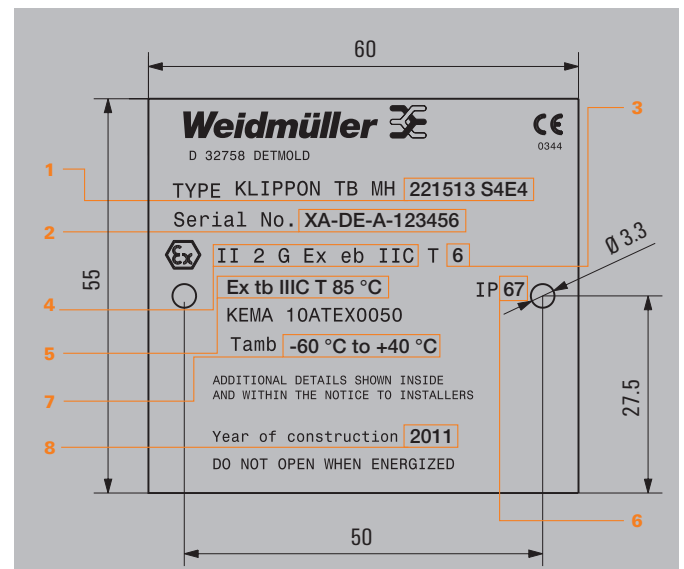
Ratings plate of an Ex-certified empty enclosure

- 1 ID number of the official notified body
- 2 Article number
- 3 Article designation
- 4 Ex marking
- 5 Equipment group
- 6 Equipment category
- 7 G gas (gas)
D flammable dust (dust)
- 8 Ignition protection type
- 9 IP protection class
- 10 EC examination certificate
- 11 Year of construction
- 12 Name and address of manufacturer
- 13 Equipment protection level (EPL)
- 14 IECEx declaration of conformity



Ratings plate for an Ex-certified, assembled enclosure

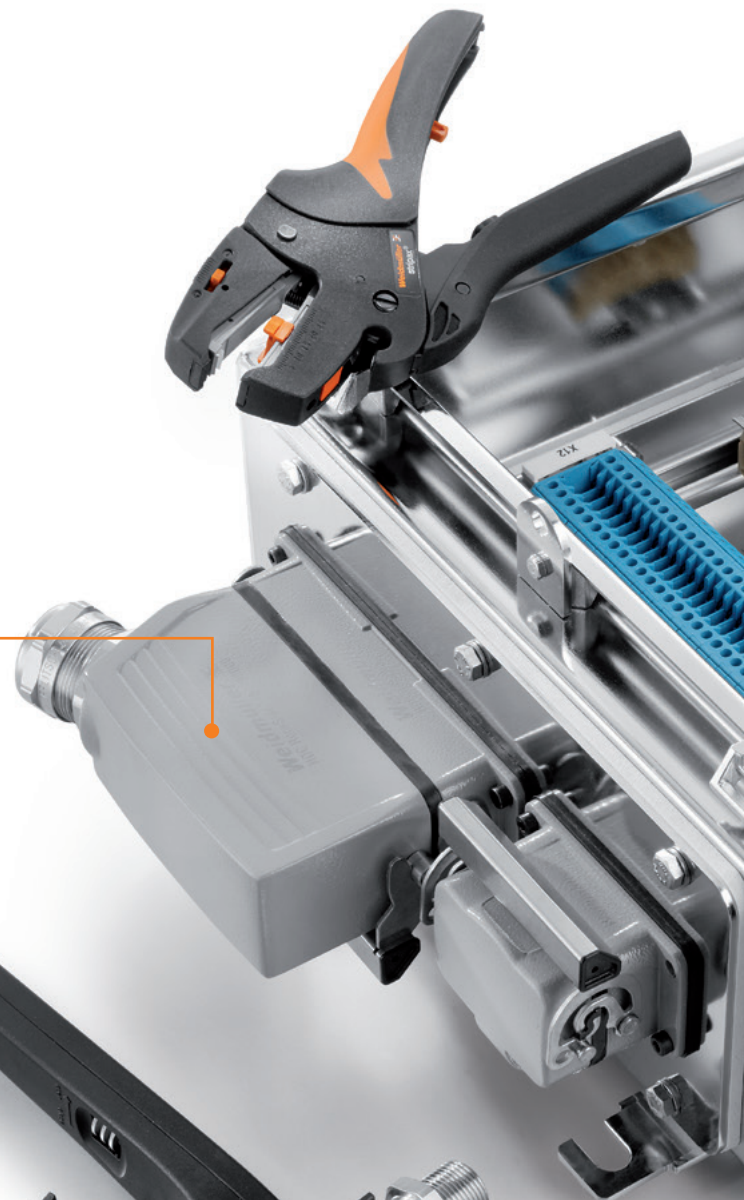
- 1 Article designation
- 2 Serial number
- 3 Temperature class
- 4 Gas protection marking
- 5 Dust protection marking
- 6 IP protection class
- 7 Ambient temperature range
- 8 Year of construction



Complementary product portfolio

Rockstar® Heavy-Duty Connectors

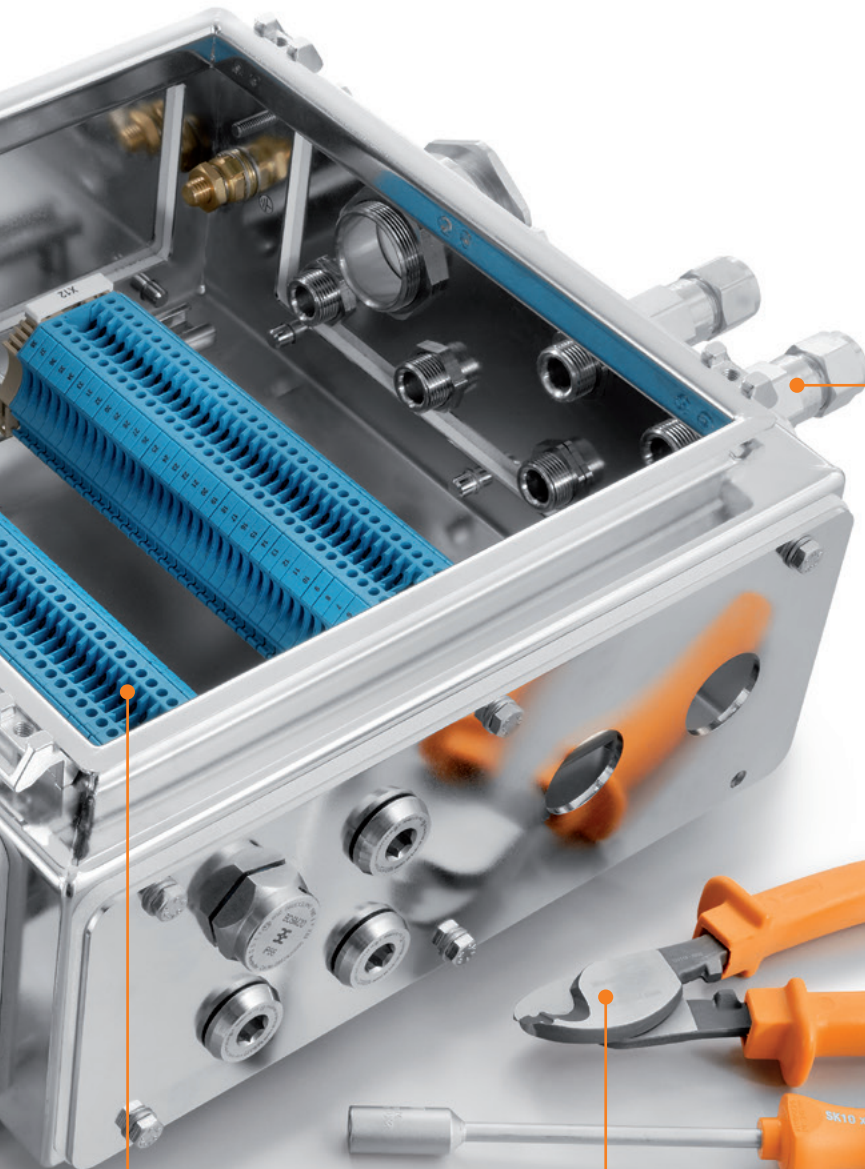
Heavy-duty connectors can be attached to the sides of the enclosures. They may be used when you require machine and facility assemblies that are reliable, simple and quick. The connector housing is made of die-cast aluminium and offers excellent protection against dirt, moisture and mechanical loads. Special modular connectors make it possible to integrate signals, power supply, pneumatics, and data connections into a single connector.



Terminal blocks

Weidmüller offers a comprehensive line of terminal blocks with a wide variety of wire connection methods. They have been tested and certified for use in standard industrial applications as well as areas requiring explosion protection.





Cable entries

Weidmüller also offers many cable entry systems to supplement our comprehensive range of enclosures. This includes cable glands (made from brass, plastic or stainless steel), stopping plugs, pressure compensating elements, adaptors and the corresponding accessories (lock nuts, sealing rings, IP washer and earth tags). Depending on the intended application, they have the required approvals and can be used for standard industrial applications, EMC applications, or even in areas requiring explosion protection.



Tools

Weidmüller offers many tools to help you while preparing and processing enclosures so that you can work safely and precisely. Weidmüller offers a large and varied selection of screwdrivers. The DMS Manual, for example, ensures that you always use the proper torque for DIN rails, gland plates and lid screws. Custom-fit holes can be punched into the enclosures using the hydraulic sheet-metal hole puncher. The FleCaFix cable gland tool is perfect for mounting and removing cable glands into these holes – it functions quickly and easily.



Weidmüller Service



The online product catalogue

The online catalogue is available to help answer any questions you may have outside of our normal business hours or on the weekend.

<http://catalog.weidmueller.com>

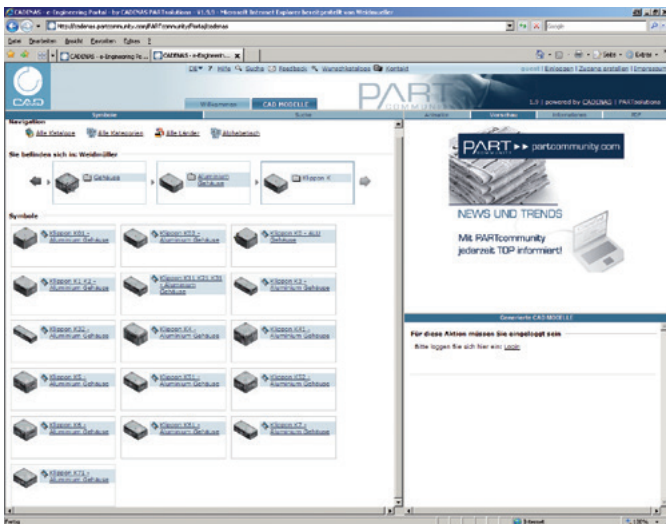
Your best source of information – 24/7, 365 days a year – the online catalogue includes product features, article numbers, and supplementary information for all product groups.

More information on the Klippon® TB enclosures can be found at:

www.klippontb.com

Check out Weidmüller’s website to find more information, offerings and your personal Weidmüller representative.

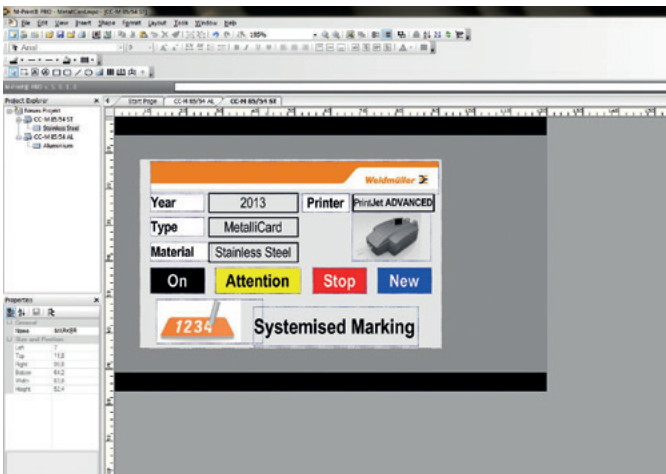
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PART Server

CAD diagrams for our Klippon® enclosures can be downloaded from our online catalogue or from our Part Server

<http://portal-de.partcommunity.com/> in a variety of formats.



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