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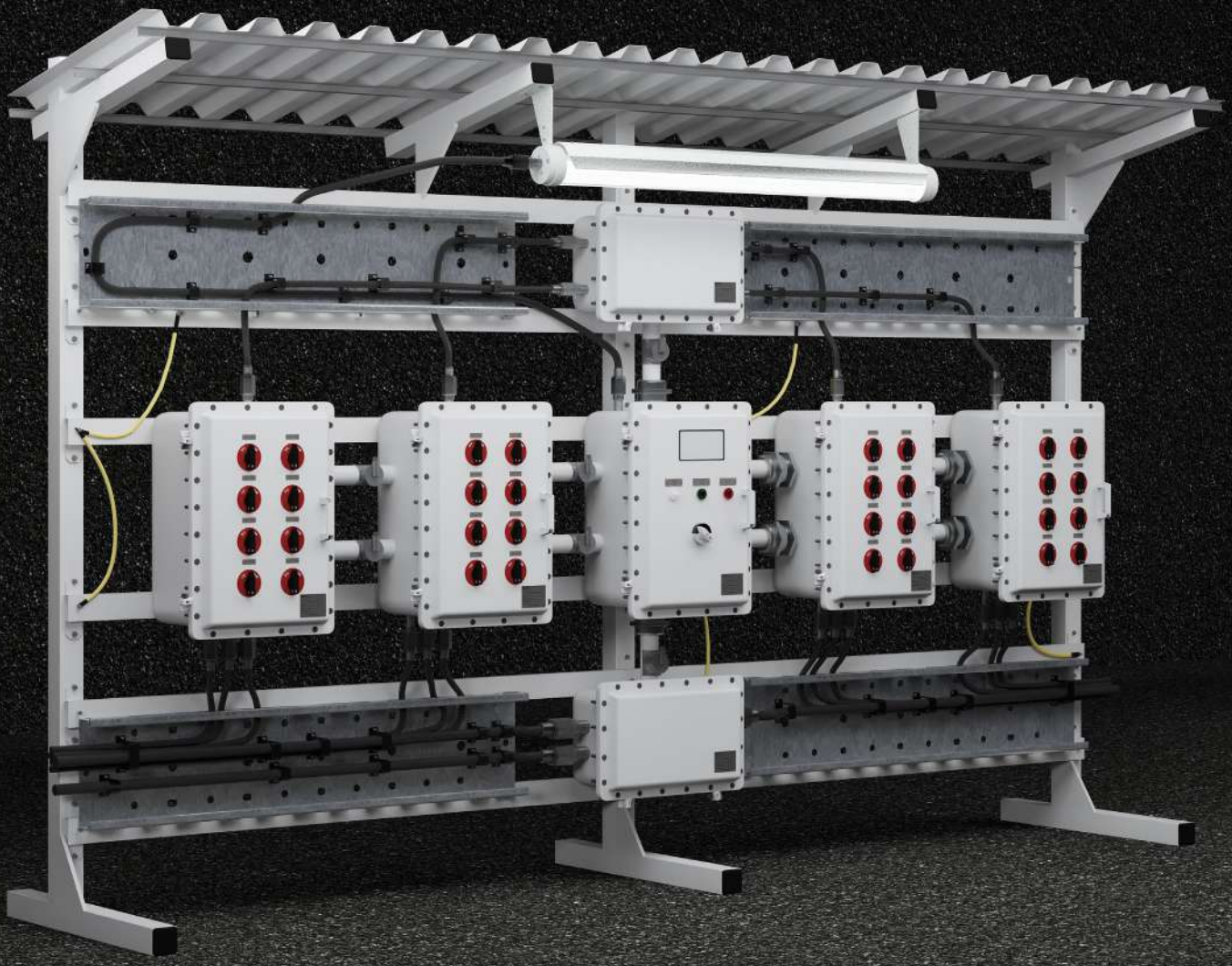


CATALOGUE

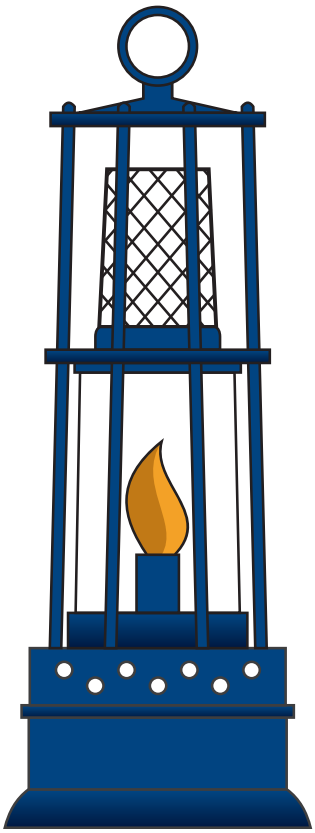
EXPLOSION-PROOF DISTRIBUTION BOXES

REV. 1

SIGMA INDUSTRIES
MANUFACTURING PLANT

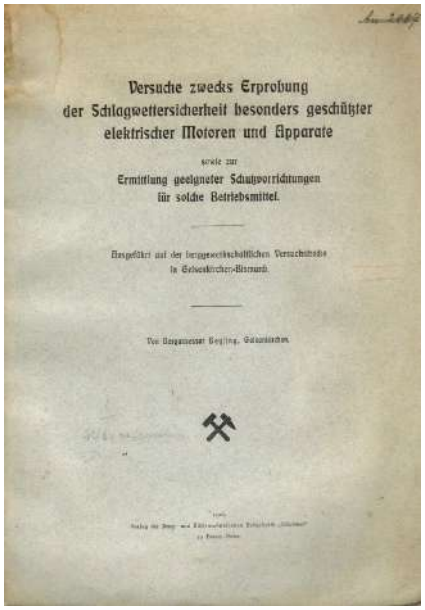
THE FIRST NATIONAL MANUFACTURER OF EXPLOSION-PROOF EQUIPMENT IN KAZAKHSTAN

www.sigma-industries.kz



Explosion protection history and legal provisions

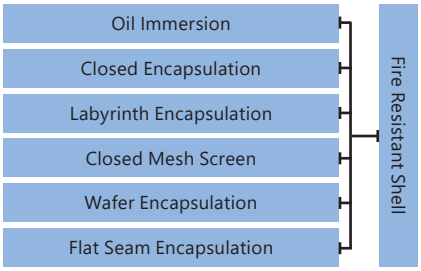
The first contribution to explosion safety was made in 1815 by the English chemist Sir Humphry Davy, who developed an oil lamp that prevented the spread of flames using a closely-spaced mesh screen. The elementary experiments carried out by Dr. Karl Beiling, a mining engineer, related to the special protection of electric motors and apparatus in coal mines against fire, became a decisive step in developing explosion protection.


Versuche zwecks Erprobung
der Schlagwettersicherheit besonders geschützter
elektrischer Motoren und Apparate

Ermittlung geeigneter Schutzvorrichtungen
für solche Betriebsmittel.

The principles of designing devices to protect electrical machines, transformers, and switchgear against the effects of flame, published in 1912, were based on the results of these experiments.

The following types of protection have been adopted as protective measures:



Since 1924, incandescent lamps were only allowed to illuminate dangerous areas while the luminous element was hermetically sealed. Incandescent lamps had to be protected by durable glass, which closed the lamp socket tightly.

Light switches were to be installed outside hazardous areas, and in the event of a malfunction or lack of explosion-proof lighting, access to these places was allowed only with a protective lamp. Therefore, in general, electrical installations were not used in hazardous locations.

Machines with slip rings or commutators had to be designed so that the slip ring or commutator was closed and the enclosure was thoroughly purged under overpressure with outside air or suitable gas. The purging must begin before the machine is turned on, or the machine must be built into a fireproof enclosure. This requirement is applied to all places where explosive gas or vapor-air mixtures are present.

Base for the explosion

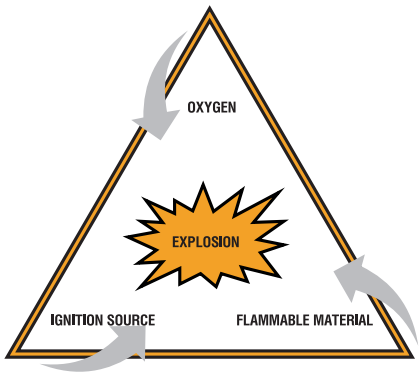
As a rule, for an explosion to occur in the ambient air, the simultaneous presence of three factors is necessary:

– Flammable material

– Oxygen/Air

– Ignition source

In production and workplaces, hazardous areas can occur wherever the first two conditions for an explosion are met. Typical dangerous regions are formed at:



– Chemical Plants

– Oil Refineries

– Enamel Factories

– Paint Workshops

– Sewage Disposal Plants

– Mills and stores for crushed products and other flammable dust

– In-tank installations and places where flammable gases, liquids, and solids are loaded

The first two factors – combustible agent and air – must be present in sufficient quantities to form an explosive atmosphere. Legislative definitions of explosion protection, arising from occupational health and safety regulations, apply to workplaces. For this reason, explosion protection is usually limited to describing reactions with oxygen in the air. Oxidation reactions are typically accompanied by an increase in heat and pressure and therefore meet the criteria for an explosion.

It is generally accepted that a volume of 10 liters of an explosive mixture in a confined space can cause harm, especially to people. For this reason, any area in which such a volume of an explosive mixture can collect is called a potentially explosive atmosphere.

EXPLOSION FACTORS

Oxygen

The amount of oxygen in the air can only oxidize/burn a certain amount of flammable material. This ratio can be determined theoretically; it is called the stoichiometric mixture. When the amount of flammable material and available atmospheric oxygen are close to the correct ratio, the effect of the explosion – the increase in temperature and pressure – is the strongest. If flammable material is too small, combustion will be difficult to propagate or stop altogether. A similar situation occurs when flammable material is too high for the amount of oxygen present in the air. All flammable materials have an explosive

range, depending on the available activation energy. This range is usually determined by igniting the mixture with an electric spark. The lower and upper explosive limits limit the explosive range, and this means that explosions do not occur below and above these limits. This fact can be exploited by sufficiently diluting combustible agents with air or preventing air/oxygen from entering a part of the equipment. However, the latter option is not possible, or only viable with limitations, in an environment where people work regularly and therefore should be reserved for manufacturing equipment.

Inflammable substance

he flammable substance can be gaseous, liquid, or solid. Its reactivity with atmospheric oxygen is considered for a general discussion about workplaces.

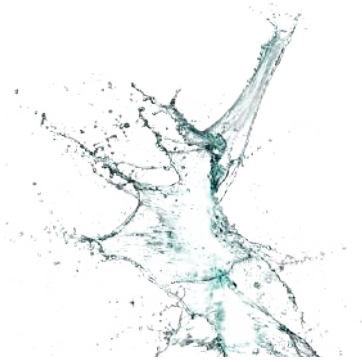
• Flammable gases

The flammable gas may be an element such as hydrogen, which can be made to react with oxygen with very little additional energy. Flammable gases are often compounds of carbon and hydrogen, and these flammable gases and vapors require only small power to react with atmospheric oxygen.

Vapor is the part of the liquid (when it comes to explosion protection of flammable liquids) that has evaporated into the ambient air due to vapor pressure above the surface of the liquid, around a jet of this liquid or liquid droplets. Mist is a special kind of liquid that, because of its explosive behavior, in tandem with vapors, can be included to meet safety considerations.

• Inflammable liquids (vapors)

Inflammable liquids are often hydrocarbon compounds such as ether, acetone, or naphtha. Even at room temperature, enough of them can go into the vapor phase so that an explosive atmosphere forms at their surface. Other liquids form such an atmosphere at their surface only at elevated temperatures. Under atmospheric conditions, this process is



strongly influenced by the temperature of the liquid.

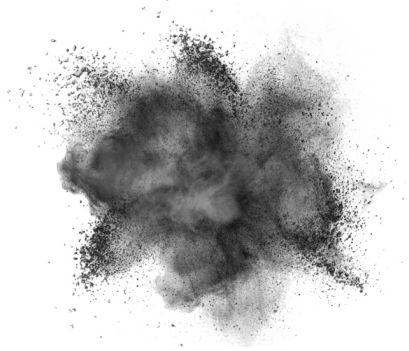
For this reason, the flashpoint is an important consideration when handling inflammable liquids. The flashpoint refers to the lowest temperature at which an inflammable liquid, under specified test conditions, produces sufficient vapor on its surface for an effective ignition source to ignite the vapor-air mixture.

Flashpoint is essential for the classification of potentially explosive atmospheres. Inflammable liquids with a high flashpoint are less dangerous than those with a flashpoint at or below room temperature.

Spraying a flammable liquid can produce a mist consisting of tiny droplets with a massive surface area, like spray cans or automotive spray stations. Such vapor can explode, and in this case, the flashpoint is less critical. For a fine mist from an inflammable liquid, the behavior relevant to safety can be approximated from the known behavior of vapors.

• Inflammable solids (dust)

Inflammable solids (dust or volatile particles) can react with atmospheric oxygen and produce catastrophic explosions. Usually, more energy is required to activate a blast in the air than in the case of gases and vapors. However, once combustion begins, the energy released by the reaction creates high temperatures and pressures. In addition to the chemical properties of the solid itself, the fineness of the particles and the total surface area play an important role, which increases with fineness. Properties are processes that occur directly on



the surface of a solid. Lighting and extinguishing a paraffin candle makes it possible to demonstrate several processes occurring in a solid material in a short period, which are not easily represented in a simplified form.

The experiment shows that when the wick of a candle is ignited, the paraffin melts, then evaporates, and this vapor feeds the flame. After the candle is extinguished, the paraffin fumes are still felt, the molten paraffin solidifies, and the paraffin fumes dissipate. The paraffin candle is now harmless again. Dust reacts differently depending on whether it is in a deposited dust layer or a suspended dust cloud. Layers of dust can begin to smolder on hot surfaces, while a cloud of dust ignited locally or on contact with a hot surface can explode immediately. Dust explosions are often the result of smoldering layers of dust that rise and can cause ignition. If such a layer is agitated, for example, by mechanical cleaning methods during transportation or incompetence extinguishing attempts, this can lead to a dust explosion.

A gas or vapor/air explosion can also stir up dust, which often results in a gas explosion occurring first, followed by a dust explosion. In deep coal mines, methane/flame explosions often caused coal dust explosions, the consequences of which were more severe than those of the initial flame explosion.

Ignition sources

A large number of ignition sources are possible using technological facilities.

Hot surfaces (5.3.2) result from energy losses in systems, equipment, and components during regular operation. In the case of heaters, they are desirable, and usually, these temperatures can be controlled.

In the event of a fault – for example, in an overload or tight bearings – the energy loss, hence the temperature, inevitably increases. Technological facilities should always be evaluated to see if it stabilizes, i.e., whether it can reach the final temperature or an unacceptable temperature rise is possible, which must be prevented by taking appropriate measures.
Examples: coils, resistors or lamps, hot equipment surfaces, brakes, or overheated bearings.

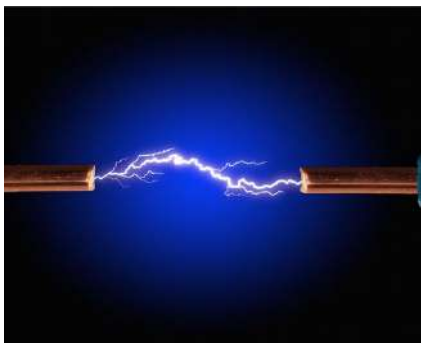
Flames and hot gases (including hot particles) (5.3.3) can be generated inside internal combustion engines or analyzed devices during regular operation and malfunction. Here, protective measures are required to

prevent them from leaving the housing for a long time.
Examples: exhaust gases from internal combustion engines or particulates that form as a result of sparks during switching circuit breakers and corrode the material of the circuit breaker contacts.

Electrical devices (5.3.5) should typically be suitable ignition sources. Only sparks of shallow energy with an energy of only microwatt seconds can be considered too weak to start an explosion.

For this reason, appropriate measures must be taken to prevent such ignition sources. Examples: sparks during switching, sparks on commutators, or slip rings.

Busbars and other earthed voltage sources, such as electrical corrosion protection of equipment, can lead to stray electric currents cathodic protection (5.3.6), leading to a voltage difference between different grounding points. Therefore, it is necessary to provide a highly conductive connection to all electrically conductive parts of the equipment so that the voltage difference is reduced to a safe level. It does not matter whether the electrically conductive equipment is an electrical or non-electrical part of the installation, as the cause of the current may be outside the equipment.
Equipotential bonding must always be ensured, regardless of whether such currents are expected or not and whether their sources are known.
Regardless of the presence or absence of electric tension, electric sparks can be caused by **static electricity** (5.3.7). The stored energy can be released in sparks and serve as an ignition source. Since this ignition source can occur completely independently of the



electric tension supply, it must also be considered when working with non-electrical devices and components. This is due to separation processes; therefore, it is necessary to evaluate the cases where this ignition source should be considered.

Friction during regular operation can cause an electrostatic charge. For example, portable devices cannot be grounded or connected to an equipotential bonding ring. A static charge may occur during regular operation when interacting with the wearer's clothing.
Prevent static electricity from becoming an ignition source by taking appropriate measures.
Examples: transmission belts of plastic materials, portable device housings, synthetic clothing material. Separation processes when rolling out paper or plastic film, plastic pipe systems.

Lightning (5.3.8) and a lightning strike can ignite an explosive atmosphere. Lightning invariably ignites an explosive atmosphere. However, there is also the possibility of ignition due to the high temperature reached by lightning.

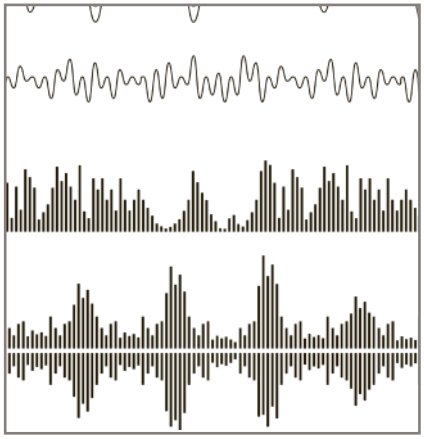
Large currents flowing from a lightning strike can cause sparks near the strike.

Radiofrequency (RF) electromagnetic waves have a frequency of 104 Hz up to 3x1011 Hz. Among the ignition sources in which radiation energy affects an explosive mixture, the following should be highlighted:

Electromagnetic radiation – radio waves (5.3.9)
Electromagnetic radiation – IR radiation, visible spectrum (5.3.10)
Ionizing radiation – UV radiation (5.3.11)
Ultrasound (5.3.12)

Systems, devices, and components using radiation can be installed and operated in a hazardous area if their parameters are permanently and reliably limited, and this equipment is checked.
Examples: transmitting and receiving equipment, mobile phones, photoelectric beam barriers, and scanners.

Finally, **adiabatic compression and shock waves** (5.3.13) inside tubular structures operating under negative pressure can also become an ignition source.
Examples: rupture of a long fluorescent tube in a hydrogen atmosphere.



Primary explosion protection

Primary explosion protection aims to replace combustible agents or atmospheric oxygen with something else or reduce their quantity to such an extent that there is no danger of forming an explosive mixture.
Increasing air circulation flushing air through ventilation can be achieved by constructive measures, for example, open-plan gas stations where there is a minimal potentially explosive atmosphere.

Replacement of atmospheric oxygen is not possible in rooms where people work. For this reason, the measures available for such places are limited:

• Avoiding or limiting the use of combustible agents capable of forming an explosive atmosphere
• Preventing or limiting the release of combustible agents and thus the formation of the explosive mixture in and around the valve, e.g., by:
- Limiting their concentration
- Using covers filled with an inert substance
- Natural or artificial ventilation
- Monitoring the concentration using a gas detection system which gives an alarm/shuts down the system

Secondary explosion protection

Suppose, despite primary explosion protection measures, a dangerous, potentially explosive atmosphere is likely to form (to the extent that actions are required to protect workers from combustible factors). In that case, the ignition of this hazardous, potentially explosive atmosphere must be effectively prevented. All possible ignition sources are evaluated, and appropriate protective measures are applied.

Effective ignition sources on equipment and installations can, for example, be prevented using protection appropriate to the level of protection required. The classification of potentially explosive areas into zones (frequency and duration of occurrence of a dangerous explosive atmosphere and local environmental conditions) serves as the basis for determining the level of protection of equipment. In addition, it is necessary to know the essential explosion characteristics for flammable materials (temperature classes, dust ignition temperatures, explosion sub-groups, etc.) and the local environmental conditions.

Explosion characteristics help the control operator accurately determine the risk in a given area, allow the equipment manufacturer to select the right solution for the work equipment, and finally oblige the installation engineer to select and assign suitable devices. Ultimately, this data is contained in the labeling of the device.

Tertiary explosion protection

If the primary and secondary explosion protection measures are insufficient, additional protection measures must be taken. Their purpose is to limit the explosion's impact and/or reduce it to a non-dangerous level. The most common actions to limit the hazardous

effects of an explosion are as follows:
• Blast-resistant Design: containers, apparatuses, pipelines are built in such a way as to be resistant to pressure shocks to withstand the explosion inside.
• Blast Relief: rupture discs or blast flaps are installed that open in a safe direction in the event of an explosion and ensure that the plant is not subjected to a load that exceeds its blast resistance.
• Explosion Suppression and Explosion

Propagation Prevention: explosion suppression systems prevent reaching maximum explosion pressure by quickly injecting extinguishing agents into containers and installation. Explosive decoupling limits possible explosions to individual parts of the installation.

Relevance and benefits of zone classification in the workplace

The practice of dividing potentially explosive atmospheres into zones has developed. This classification considers the various hazards from explosive atmospheres and allows explosion protection measures to be taken that reflect safety engineering and economic efficiency. For the European Community, zone definitions are uniformly presented in Directive 2014/34/EU, and it should be applied with a technical understanding of the particular situation.

Potentially explosive atmospheres are classified into zones depending on the frequency and duration of the explosive atmosphere. Many details and influencing factors must be considered to classify the zones in a particular case.

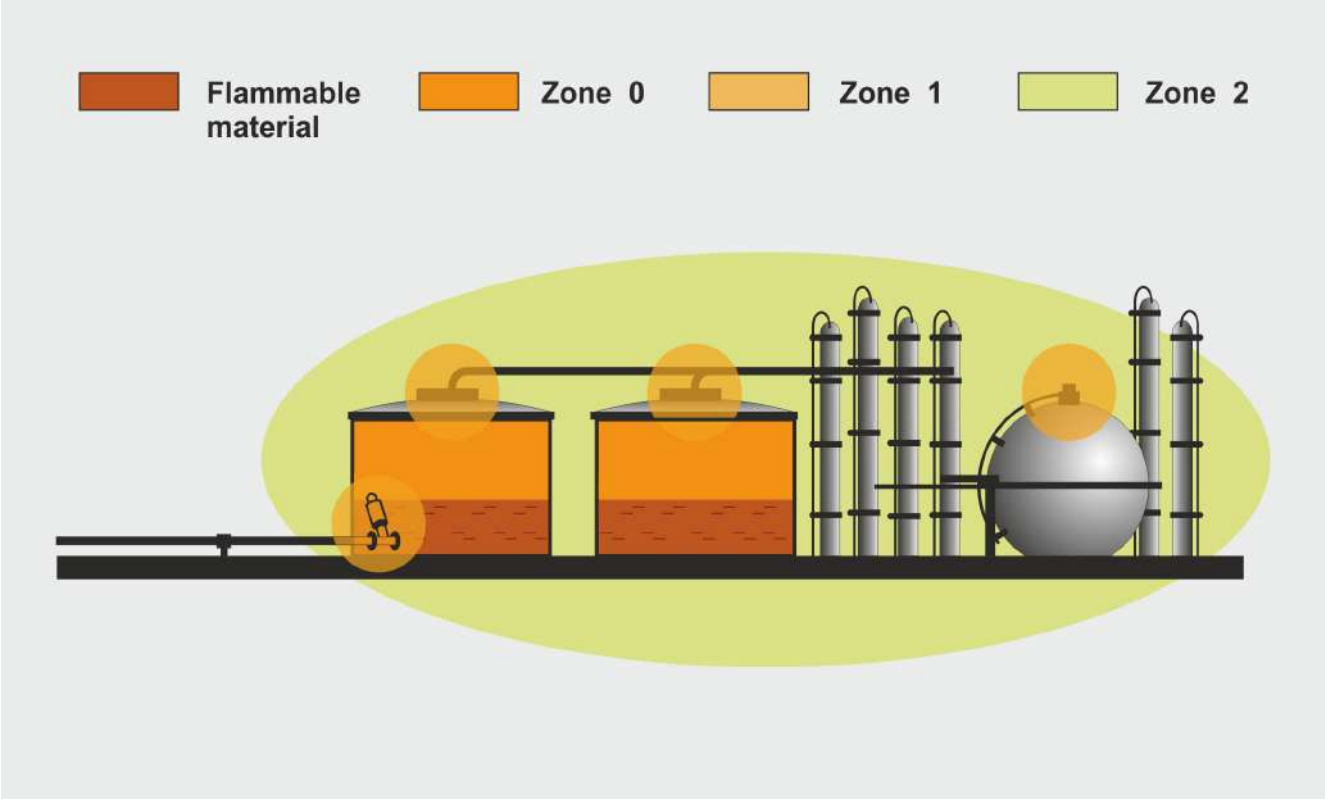
IEC 60079-10-1 assumes a roughly similar classification for gases and vapors, also applying to future facilities built to US NEC 505. IEC 60079-10-2 provides support for classifying areas with dust.

Potentially hazardous areas are classified according to the frequency and duration of the explosive atmosphere. This classification defines the scope of the measures to be taken under Section A of Annex II of Directive 2014/34/EU in conjunction with Annex I of Directive 2014/34/EU.

In workplaces, potentially explosive atmospheres are usually classified as zones 1 and 2, 21 and 22. Zones 0 and 20 are limited to tiny inaccessible areas in workplaces or are typically limited to the interior of technological facilities.

Notes:
Under atmospheric conditions, an explosive atmosphere is a mixture of air and inflammable substances in gases, vapors, mists, or dust. After ignition, combustion spreads to the entire unburned mixture.

A dangerous explosive atmosphere is an explosive atmosphere that causes damage in an explosion and requires introducing measures to protect workers from combustible factors.



Gases, vapors

Zone 0
A zone in which an explosive atmosphere consisting of a mixture of air with inflammable substances in the form of gas, vapor, or mist is present continuously or for a long time or frequently (EN 60079-10-1).

Zone 0 mainly covers the interior of closed containers, pipes, and apparatus containing inflammable liquids. Here, the corresponding operating temperature is above the ignition point, and the danger zone is above the surface of the liquid, not in it.

Most gases of flammable liquids are heavier than air and propagate similarly to liquids. In cavities such as the pump's pit and sump, these explosive gases can usually reside for a longer time, so it is necessary to reckon on Zone 0 here.

In Zone 0 equipment, ignition sources must be protected from an explosion, even if failures are infrequent.

In the event of failure of one type of protection or simultaneous occurrence of two faults, sufficient explosion protection must be provided.

According to the design requirements of DIN EN 60079-26 (VDE 170/0171/ Part 12-1), the necessary explosion protection is achieved if the equipment is designed under the type of protection "ia" according to EN 60079-11, Intrinsic safety, or satisfies the requirements of two types of protection series EN 60079, which operate independently of each other.

For this reason, for example, flame-retardant luminaires were additionally hermetically sealed or intrinsically safe devices in protection type "ib" in pots.

According to Directive 014/34/EU, equipment for Zone 0 must meet the requirements of category 1G. In Zone 0, the risk of ignition due to electrostatic charges, even in rare cases, must be reliably excluded. For this reason, the requirements of EN 0079-0 for equipment for use in Zone 0 are significantly higher than those for equipment for Zone 1.

Zone 1
A zone in which an explosive gaseous atmosphere consisting of a mixture of air with inflammable substances in the form of gas, vapor, or mist may occur from time to time during regular operation (EN 60079-10-1).

In Zone 1, inflammable or explosive substances are produced, processed, or packaged. This includes proximity to loading hatches or filing and unloading devices, fragile equipment, pipes, and glands on pumps and guides that are not adequately sealed. A flammable concentration is likely to occur during regular use.

Ignition sources that occur during regular, trouble-free operations and those that usually happen during malfunctions must be reliably prevented. The chapter "Electrical equipment for use in hazardous areas" describes the individual types of protection. According to Directive 2014/34/EU, Zone 1 equipment must meet the requirements of category 2G.

Zone 2
A zone in which an explosive atmosphere consisting of a mixture of air with inflammable substances

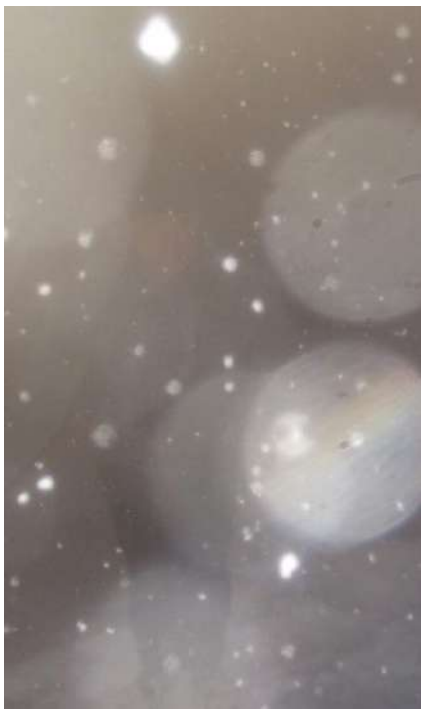
in the form of gases, vapors, or mists is unlikely to occur during regular operation and, if it does happen, will persist for only a short period (EN 60079-10-1).

Zone 2 includes areas around Zones 0 and 1 and areas around flanged connections on pipes in enclosed spaces. In addition, it has locations in which, due to natural or forced ventilation, the lower explosive limit is reached only in exceptional cases, for example, in the environment of outdoor installations. In Zone 2, inflammable or combustible substances are produced or stored. The probability of an explosive concentration occurring is rare, and if it happens, it only lasts for a short time.

During regular, uninterrupted operation, ignition sources must be reliably prevented. According to Directive 2014/34/EU, equipment for Zone 2 must meet the requirements of category 3G. In addition, of course, any equipment that meets the requirements for equipment for use in Zones 0 and 1 are allowed.

Dust
Zone 20
A zone in which an explosive atmosphere in the form of a cloud of flammable dust is constantly present, or for a long time, or frequently (EN 60079-10-2).

Zone 20 generally covers areas inside closed containers, pipes, and apparatuses in which flammable dust in the form of a cloud is present constantly or for a long time or often. When using equipment for Zone 20, ignition sources must be protected from an explosion, even if the malfunction is rare. For this reason, the equipment must meet the following requirement:
In case of failure of one type of protection or simultaneous occurrence of two faults, adequate explosion protection must be provided. According to directive 2014/34/EU, equipment for use in Zone 20 must meet the requirements of category 1D.



Zone 21
A zone in which an explosive atmosphere in the form of a cloud of flammable dust in the air may occasionally occur during regular operation (EN 60079-10-2).

Zone 21 includes, among other things, mills, coal supplies or grain stores, and the area around gas stations. Here, for example, explosive dust clouds can occur due to the periodic emission of dust from the hole. The risk of danger due to dust deposits is often underestimated.

Explosive dust-air mixtures can be formed due to the formation of a glow nest or low-temperature carbonization gas and a result of deflagration of low-temperature carbonization gas, gas, or dust swirling caused by a smoldering fire.

Ignition sources that occur during regular, trouble-free operation and sources that generally happen in the event of malfunctions must be reliably prevented.

The individual types of protection are described in the chapter “Electrical equipment for se in hazardous areas.” According to Directive 2014/34/EU, equipment for Zone 21 must meet the requirements of category 2D.

Zone 22
A zone in which an explosive atmosphere in the form of a cloud of flammable dust in the air is unlikely to occur during regular operation, and it persists only for a short period (EN 60079-10-2).

Under normal operating conditions, zone 22 is unlikely to form an explosive dust/air mixture, and an explosive atmosphere can only be expected in malfunctions, for example, due to whipped dust. During regular, uninterrupted operation, ignition sources must be reliably prevented. According to Directive 2014/34/EU, equipment for zone 22 must meet the requirements of category 3D.

Dust reacts differently depending on whether it is in a deposited dust layer or a suspended dust cloud. Layers of dust can begin to smolder on hot surfaces, while a cloud of dust

ignited locally or on contact with a hot surface can explode immediately. Dust explosions are often the result of smoldering layers of dust that rise and can cause ignition. If such a layer is agitated, for example, by mechanical cleaning methods during transport or incompetence extinguishing attempts, this can lead to a dust explosion.

A gas or vapor/air explosion can also stir up dust, which often results in a gas explosion occurring first, followed by a dust explosion. In deep coal mines, methane/flame explosions often caused coal dust explosions, the consequences of which were more severe than those of the initial flame explosion.

Notes:
1. Layers, deposits, and piles of fuel must be treated like any other source that may form an explosive atmosphere.

2. Normal operation means using the installations within their design parameters.

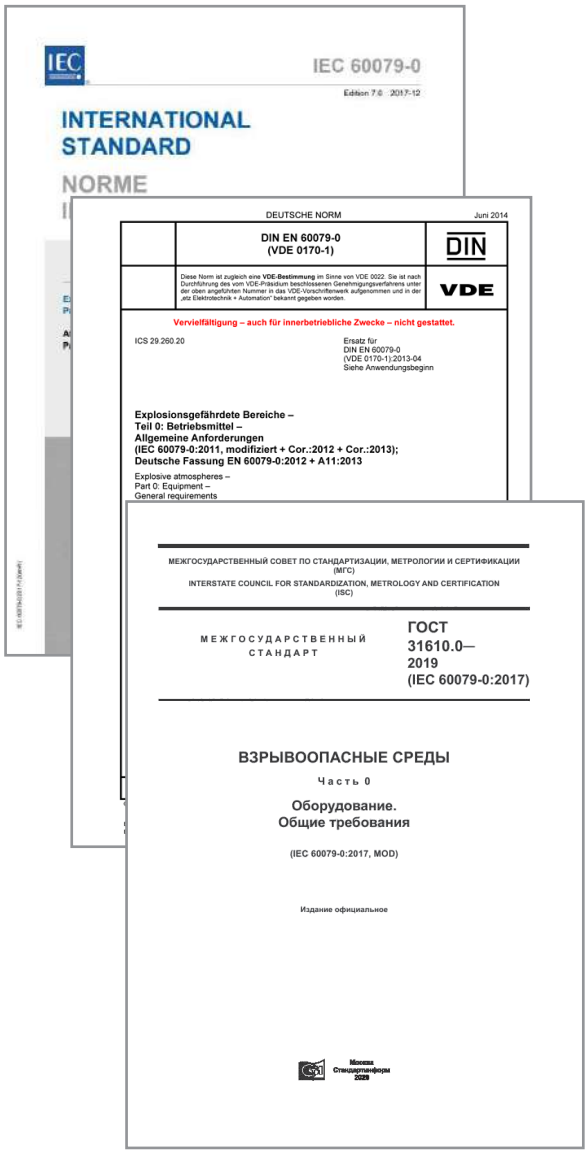
3. Explosive atmosphere definitions comply with EU directives and EN standards.

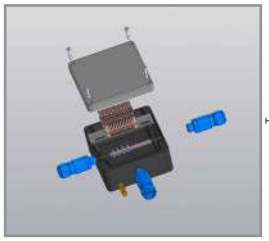
Principles and rules for the prevention of ignition sources in electrical devices

As a rule, all the hazards arising from gases, vapors, and dust are formed according to the same chemical and physical laws and processes. In this regard, the prevention of these dangers should be carried out according to uniform principles.

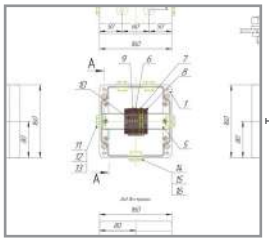
At present, uniform principles, rules, and requirements are prescribed by the International Electrotechnical Commission (IEC), the European Committees for Standardization CENELEC and CEN, and the Eurasian Economic Commission (EEC).

All participants from the manufacturer to the operator accept the obligation to comply with all standards adopted for explosion protection. Compliance with all requirements and measures is entrusted to the authorities and certified certification bodies.





Product idea



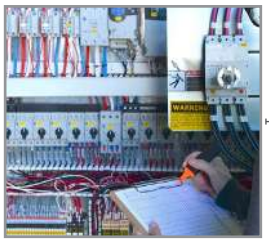
Design according to IEC 60079-0

Testing and certification by a certified certification body

Analysis of production for the quality system under the requirements of Directive 2014/34/EU (QAN) or IECEx (QAR) and EN ISO 80079-34

Production with acceptance tests

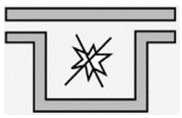
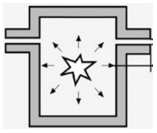
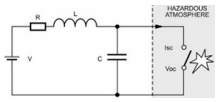
Mounting under EN IEC 60079-14



Inspection under Directive 1999/92/EG (EU) or EN IEC 60079-14

Maintenance and repair under Directive 1999/92/EG (EU) or EN IEC 60079-17b IEC 60079-19

EQUIPMENT GROUP	EXPLOSION PROTECTION LEVEL	CLASS AREA
I – Equipment intended for use in underground workings of mines, mines and in their ground structures, hazardous by firedamp	Ma	The explosive gas mixture is present continuously or for an extended period
	Ma	There is a possibility of the presence of an explosive gas mixture under normal operating conditions
II – Equipment intended for use in potentially hazardous environments, except for underground workings of mines, mines and their ground structures hazardous by firedamp	Ga	0 – Explosive gas mixture is present continuously or for an extended period
	Gb	1 – There is a possibility of the presence of an explosive gas mixture under normal operating conditions
	Gc	2 – It is unlikely that an explosive gas mixture is present under normal operating conditions, and if it occurs, it is rare and exists for a short time
III – Equipment intended for use in potentially explosive dust atmospheres, except for underground workings of mines, mines and their ground structures, hazardous due to mine dust	Da	20 – An explosive atmosphere in the form of a cloud of flammable dust in the air is present continuously, frequently, or for an extended period
	Db	21 – Occasionally, an explosive atmosphere in the form of a cloud of flammable dust in the air is likely to occur during regular operation
		22 – An explosive atmosphere in the form of a cloud of flammable dust in the air during the normal process is unlikely, but if flammable dust appears, it persists only for a short period

TYPES OF EXPLOSION PROTECTING OF ELECTRICAL EQUIPMENT				
Protection method	Labeling	Zone	Principe of protection	Standard
	e	1	Elimination of spark or elevated temperature, arc discharges	EN IEC 60079-7
	d	1	The spread of explosions into the external environment is excluded.	EN IEC 60079-1
	ia	0	Limitation of spark energy or temperature increase, arc discharges.	EN IEC 60079-11
	ib	1		
	ic	2		

EQUIPMENT EXPLOSION PROTECTION LEVEL		
2	Electrical equipment of increased reliability against explosion: explosion protection is provided only in regular operation	Zone 2
1	Explosion-proof electrical equipment: explosion protection is ensured both under normal operating conditions and in case of probable damage depending on the operating conditions, except for damage to the means that provide their explosion protection	Zone 1
0	Especially explosion-proof equipment, in which special measures have been taken and explosion protection equipment	Zone 0

1 Ex e IIC T5 Gb X

Special requirements prescribed in the certificates of conformity and in the instructions for use

TEMPERATURE GRADES

GAS GROUP

- T1 < 450°C
- T2 < 300°C
- T3 < 200°C
- T4 < 135°C
- T5 < 100°C
- T6 < 85°C

IIA IIB IIC

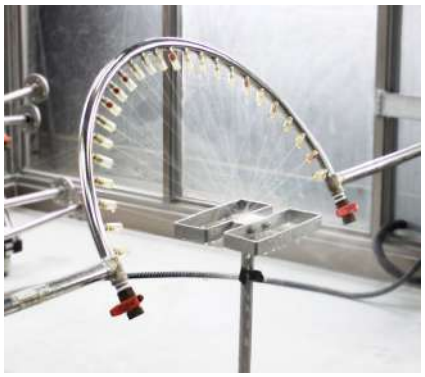
Ammonia 630°C	1,2 Dichloroethane 440°C	Gasoline 220-300°C	Acetaldehyde 140°C		
Carbon monoxide 605°C	Ethylbenzene 431°C	Diesel oil 220-300°C	Triethylamine 190°C		
Phenol 595°C	Ethanol 400°C	Mazut 220-300°C			
Methane 595°C	Nitromethane 415°C	Aviation fuel 220-300°C			
Benzene 555°C	Trichlorethylene 410°C	Naphthalene 540°C			
Acetone 535	Metilamine 408	Kerosene 288°C			
Ethane 515°C	Ethylenediamine 382°C	Turpentine 254°C			
Acetic acid 485°C	Amyl acetate 380°C	Hexane 230°C			
Propane 470°C	Butane 365°C	Heptane 215°C			
Xilen 464°C	Butanol 340°C	Octane 205°C			
Ethyl acetate 470°C	Amyl spirit 300°C	Nonan 205°C			
Methanol 440°C					

Coal gas 560°C	Ethylene oxide 45°C	Hydrosulfide 270°C	Dibutyl ether 185°C		
Hydrocyanic acid 538°C	Ethylene 440°C	Ethylene glycol 235°C	Diethylene ether 175°C		

	Formaldehyde 424°C	Tetrahydrofuran 224°C	Dipropyl Ether 170°C		
Hydrogen 560°C	Acetylene 305°C				Carbon disulphide 95°C

IP Protection
IEC 60529

IP Code marking is a systematization of the values of the protection of the electrical appliances and electrical equipment enclosure under the influence of various adverse conditions, such as the humidity effects, open liquid ingress, dust, pollution, and the impact of different environments. IK Protection
EN 62262



Protection against solid objects	IP XX		Protection against water
No protection	0	0	No protection
Protected against particles with a diameter of ≥50 mm	1	1	Protection against condensate moisture, raindrops falling strictly in a vertical position
Protection against particles with a diameter of ≥12.5 mm	2	2	Drip-proof, angle of incidence up to 15°
Protection against particles with a diameter of ≥2.5 mm	3	3	Drip-proof, angle of incidence up to 60°
Protection against particles with a diameter of ≥1 mm	4	4	Protection against drops of liquid of any direction
Complete protection against foreign objects of any size, partial protection against dirt and dust	5	5	Protection against short exposure to a flow (jet) of liquid of random direction
Complete protection against various objects, total particles confinement	6	6	Protection of the housing from prolonged exposure to a strong flow of liquid (water) of accidental direction
		7	Protection against moisture impregnation inside the equipment case during short-term immersion in liquid (water) to a depth of 1 m
		8	Protection against wicking of liquid into products when immersed to a specified depth for a specified period
		9	Protection against ingress of hot water jet under pressure into the products

IK Protection
EN 62262

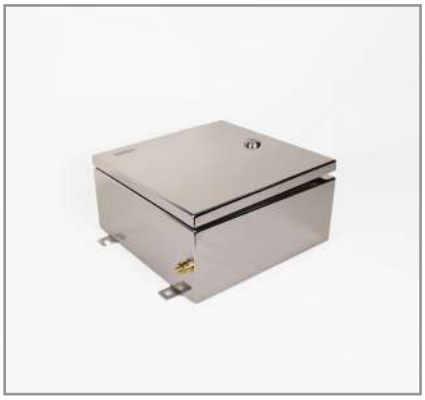
The IK index is another international standardization that will be responsible for the ability of the device design to withstand kinetic energy and various kinds of mechanical damage. This value indicates how strong the shell is. Equipped with a durable case made of an alloy of metal and polymer, which guarantees a high level of protection. As in the previous case, standardization has a digital index, which has a protection level from 00 to 10.

IK-XX	Impact energy	Species Exposure conditions
00	0 J	No protection
01	0.15 J	A drop of a load weighing 200 g from a height of 7.5 cm
02	0.20 J	A drop of a load weighing 200 g from a height of 10 cm
03	0.35 J	A drop of a load weighing 200 g from a height of 17.5 cm
04	0.50 J	A drop of a load weighing 200 g from a height of 25 cm
05	0.70 J	A drop of a load weighing 200 g from a height of 35 cm
06	1 J	A drop of a load weighing 500 g from a height of 20 cm
07	2 J	A drop of a load weighing 500 g from a height of 40 cm
08	5 J	A drop of a load weighing 1700 g from a height of 29.5 cm
09	10 J	A drop of a load weighing 5000 g from a height of 20 cm
10	20 J	A drop of a load weighing 5000 g from a height of 40 cm

JUNCTION BOXES

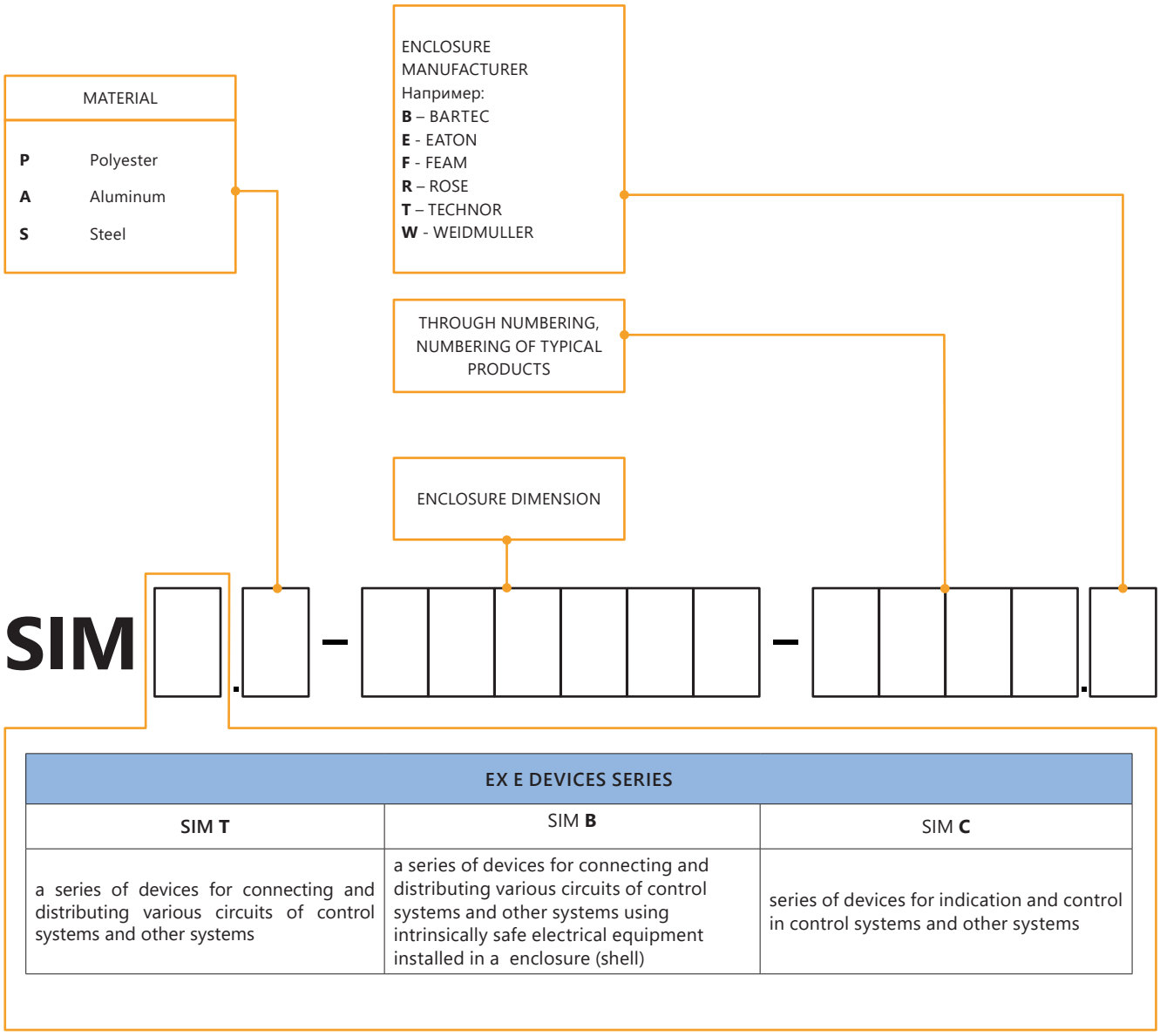
DATA	SIM_P STANDARD SERIES	SIM_P OCTA SERIES
Material	Glass fiber reinforced thermoset polyester	Glass fiber reinforced thermoset polyester
Surface	Surface tension < 109 Ω IEC 60093	Surface tension < 109 Ω IEC 60093
Gasket	Silicone	Silicone
Minimum size, mm	70×80×56	81×81×75
Maximum size, mm	405×400×200	200×200×125
IP	IP 66	IP 66
Temperature conditions	-60 °C ~ +90°C	-60 °C ~ +90°C
Mechanical strength	7 J	7 J
Fasteners		

Compliancies		
TP TC (EAC)	ЕАЭС RU C-KZ.HA65.B.01196/21W	ЕАЭС RU C-KZ.HA65.B.01196/21W
ATEX	2022	2022
IECEx	2022	2022
Features		



SIM_A СЕРИЯ STANDARD	SIM_S СЕРИЯ STANDARD	SIM_S СЕРИЯ ТВ
Aluminum DIN EN 1706 EN AC-Asli 12 (Fe)	Stainless steel AISI 316L	Stainless steel AISI 316L
Powder coating	Electropolished, mirror-finished	Electropolished
Silicone	Silicone	Silicone
64×58×34	120×120×80	229×152×133
600×600×202	250×400×130	980×740×200
IP 66	IP 66, IP 67	IP 66, IP 67
-60 °C ~ +90°C	-60 °C ~ +100°C	-60°C ... +135°C (IP 66) -60°C ... +105°C (IP 67)
7 J	7 J	7 J

ЕАЭС RU C-KZ.HA65.B.01196/21W	ЕАЭС RU C-KZ.HA65.B.01196/21W	ЕАЭС RU C-KZ.HA65.B.01196/21W
2022	2022	2022
2022	2022	2022
	C-channel TAS 20 Welded mounting feet Grounding studs in the enclosure	Lid hinges Removable cover Gland plates Welded mounting feet Padlock Mount



EX E DEVICES SERIES		
SIM T	SIM **B**	SIM **C**
a series of devices for connecting and distributing various circuits of control systems and other systems	a series of devices for connecting and distributing various circuits of control systems and other systems using intrinsically safe electrical equipment installed in a enclosure (shell)	series of devices for indication and control in control systems and other systems

EXPLOSION PROTECTION	
Marking (EN 60079-0)	II 2G Ex e IIC T6÷T4 Gb II 2D Ex tb IIIC T85°C/T100°C/T135°C Db
Certificates	TC RU C-DE.AA87.B.00971 PTB 01 ATEX 1061 U IECEX PTB 08.0003U
SPECIFICATIONS	
Material	glass fiber reinforced thermoset polyester
Color	RAL 9011 graphite black
Gasket	Silicone
Ingress protection (EN 60079-0)	IP 66
Mechanical strength (EN 60079-0)	7 J

Advantages

* Chemically resistant

* Heat resistant

* Surface resistance < 10 Ω

* Corrosion resistant

The enclosure material is resistant to petroleum pollution, oils, aromatic hydrocarbons, bacteria, enzymes, impacts and has a long service life.

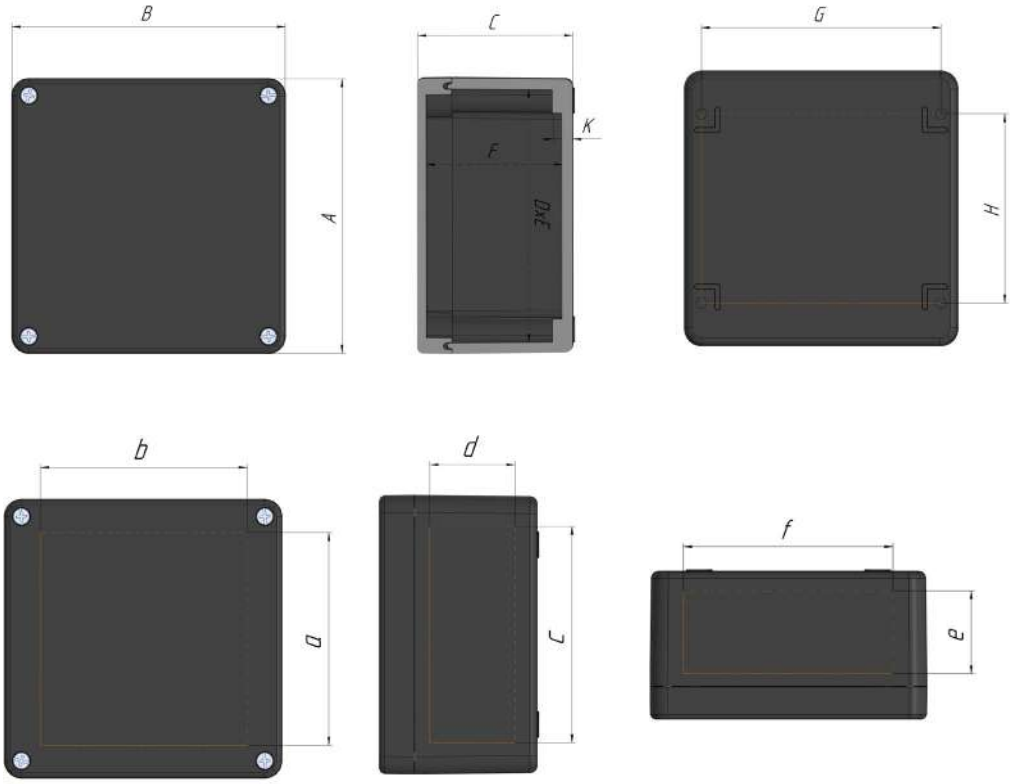
The enclosure of the polyester product is enriched with carbon, which helps reduce the surface resistance of the material and therefore reduces the risk of static electricity.

The sealing system at the junction of the lid and the enclosure makes it possible to operate in a maritime climate and cases of fire extinguishing systems activating. All fasteners are made of stainless steel AISI304 (AISI316L), which guarantees high reliability of fastening.

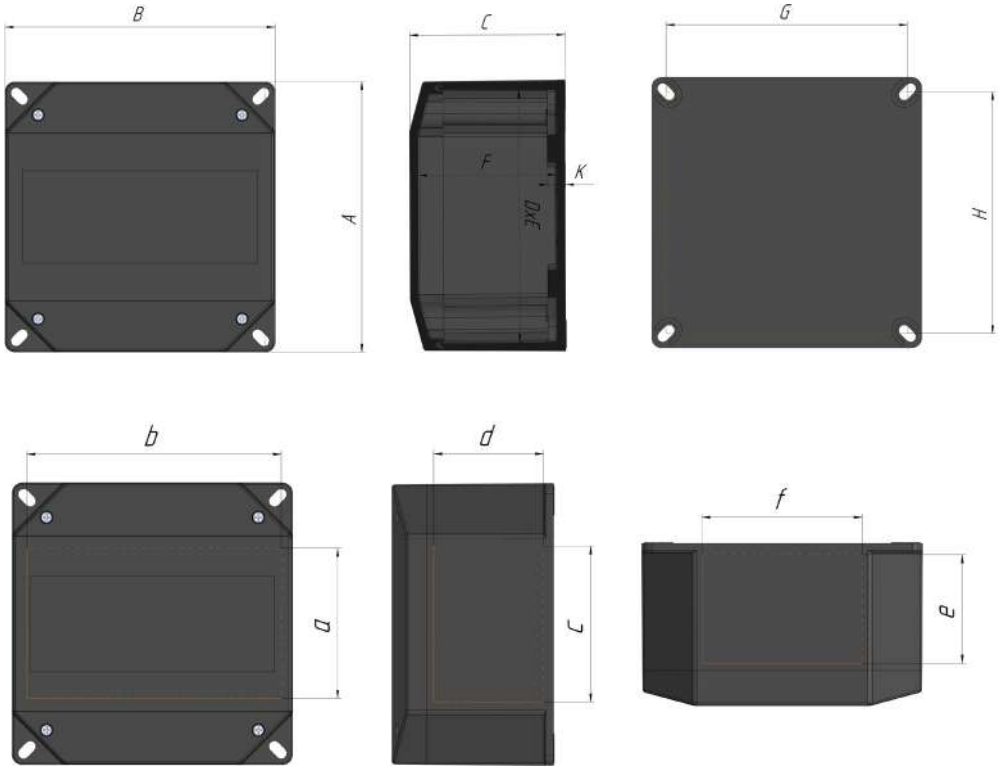
Polyester enclosures are today a contemporary and more cost-saving solution to various electrical problems and act as junction boxes, enclosures for monitoring and metering devices, control and security systems, and distribution systems.

Polyester has a low coefficient of thermal expansion

TANDARD SERIES



SERIES OCTA



SIZE RANGE

Enclosure code	Fig.	A	B	C	D	E	F	G	H	K
SIM__.P-080806	I	80	75	56	71	66	46	45	59	5
SIM__.P-080807	II	81	81	75	71	71	65	69	69	5
SIM__.P-080808	I	80	75	75	71	66	65	45	59	5
SIM__.P-081106	I	110	75	56	101	66	46	45	89	5
SIM__.P-081108	I	110	75	75	101	66	65	45	89	5
SIM__.P-081606	I	160	75	56	151	66	46	45	139	5
SIM__.P-081608	I	160	75	75	151	66	65	45	139	5
SIM__.P-081906	I	190	75	56	181	66	46	45	169	5
SIM__.P-081908	I	190	75	75	181	66	65	45	169	5
SIM__.P-082306	I	230	75	56	221	66	46	45	218	5
SIM__.P-082308	I	230	75	75	221	66	65	45	218	5
SIM__.P-121209	I	122	120	91	113	111	80	82	106	5
SIM__.P-121208	II	121	121	75	111	111	65	100	100	5
SIM__.P-122209	I	220	120	91	211	111	80	82	204	5
SIM__.P-161609	I	160	160	91	148	148	79	110	140	6
SIM__.P-161609	II	161	161	93	151	151	82.5	140	140	5
SIM__.P-162609	I	260	160	91	248	148	79	110	240	6
SIM__.P-163609	I	360	160	91	348	148	79	110	340	6
SIM__.P-165609	I	560	160	91	348	148	79	110	540	6
SIM__.P-252612	I	255	250	121	243	238	109	200	227	6
SIM__.P-252616	I	255	250	161	243	238	149	200	227	6
SIM__.P-254012	I	400	250	121	388	238	109	200	372	6
SIM__.P-254016	I	400	250	161	388	238	149	200	372	6
SIM__.P-256012	I	600	250	121	588	238	109	200	580	6
SIM__.P-361815	I	360	360	91	348	348	79	310	340	6
SIM__.P-414016	I	400	405	121	393	388	109	380	355	6
SIM__.P-414020	I	400	405	200	393	388	189	380	355	6

Enclosure code	Fig.	a	b	c	d	e	f
SIM__.P-080806	I	46	57	27	24.5	32	47
SIM__.P-080807	II	66	34.5	39.5	49.5	49.5	39.5
SIM__.P-080808	I	46	57	27	53.5	52	47
SIM__.P-081106	I	76	57	27	24.5	33	77
SIM__.P-081108	I	76	57	27	53.5	52	77
SIM__.P-081606	I	126	57	33	24.5	33	127
SIM__.P-081608	I	126	57	33	53.5	52	127
SIM__.P-081906	I	156	57	33	24.5	33	157
SIM__.P-081908	I	156	57	33	53.5	52	157
SIM__.P-082306	I	196	57	33	24.5	33	88×2
SIM__.P-082308	I	196	57	33	53.5	52	88×2
SIM__.P-121209	I	78	100	57	48	57	79
SIM__.P-121208	II	106	64.5	69.5	49.5	49.5	69.5
SIM__.P-122209	I	176	100	56	48	57	177
SIM__.P-161609	I	108	135	80	52	60	110
SIM__.P-161609	II	146	104.5	109.5	62	62	109.5
SIM__.P-162609	I	208	135	80	52	60	210
SIM__.P-163609	I	308	135	80	52	60	310
SIM__.P-165609	I	508	135	80	52	60	238×2
SIM__.P-252612	I	202	225	166	77	85	205
SIM__.P-252616	I	202	225	166	77.5	85	205
SIM__.P-254012	I	345	225	166	78	85	348
SIM__.P-254016	I	345	220	166	78	85	348
SIM__.P-256012	I	545	225	168	78	85	258×2
SIM__.P-361815	I	314	284	290	79	79	320
SIM__.P-414016	I	345	375	321	76.5	85	348
SIM__.P-414020	1	345	375	321	155.5	164	348

MAXIMUM NUMBER OF TERMINALS AND CABLE GLANDS

Enclosure code	Fig.	Terminal cross-section						Side A/B					Side C/D				
		2,5	4	6	10	16	35	1	2	3	4	5	1	2	3	4	5
SIM__.P-080806	1	4*						2	1				1				
SIM__.P-080807	2	5*						1	1				1	1			
SIM__.P-080808	1	4*						4	1	1			2	1	1		
SIM__.P-081106	1	11*	9*					2	1				1				
SIM__.P-081108	1	11*	9*					6	2	2			1	1	1		
SIM__.P-081606	1	20*	17*					4	3				1				
SIM__.P-081608	1	20*	17*					8	3	2			2	1	1		
SIM__.P-081906	1	26*	21*					5	4				1	1			
SIM__.P-081908	1	26*	21*					12	5	3			2	1			
SIM__.P-082306	1	34*	29*					8	4				1	1			
SIM__.P-082308	1	34*	29*					12	6	4			2	1	1		
SIM__.P-121209	1	13	11	8	6			2	1				2	1			
SIM__.P-121208	2	12	9	7				4	2	1	1		4	2	1	1	
SIM__.P-122209	1	33	28	21	16			12	6	3	2		4	2	1	1	
SIM__.P-161609	1	21	18	13	11	9		9	6	3	2	2	6	3	2	1	1
SIM__.P-161609	2	18	13	11	9			5	2	2			5	2	2		
SIM__.P-162609	1	41	34	26	21	17		17	11	5	3	3	6	3	2	1	1
SIM__.P-163609	1	60	50	38	30	25		26	16	7	5	4	6	3	2	1	1
SIM__.P-165609	1	102	85	63	51	42		40	24	12	8	6	6	3	2	1	1
SIM__.P-172714	3	44	37	28	22	18		22	12	8	3	3	12	6	4	2	1
SIM__.P-252612	1	78	64	50	20	16	12	24	12	8	4	3	18	10	7	3	3
SIM__.P-252616	1	78	64	50	20	16	12	24	12	8	4	3	18	10	7	3	3
SIM__.P-254012	1	136	114	86	34	29	21	42	21	14	7	5	18	10	6	3	2
SIM__.P-254016	1	136	114	86	34	29	21	42	21	14	7	5	18	10	6	3	2
SIM__.P-256012	1	216	180	136	54	45	34	36	30	12	6	4	18	10	7	3	3
SIM__.P-272714	3	76	64	48	38	16	12	22	12	8	3	3	22	12	8	3	3
SIM__.P-275414	3	184	154	116	92	38	29	22	12	8	3	3	22	12	8	3	3
SIM__.P-361815	1	53	45	34	27	22	18	26	16	7	5	4	20	10	6	5	
SIM__.P-414016	1	204	171	129	68	58	21	42	21	14	7	5	36	18	13	6	5
SIM__.P-414020	1	204	171	129	68	58	21	88	45	28	17	12	77	43	26	15	11

THREAD TABLE					
Code	1	2	3	4	5
ISO 965/I	M20	M25	M32	M40	M50
ASA B2.1	½" NPT	¾" NPT	1" NPT	1¼" NPT	1½" NPT

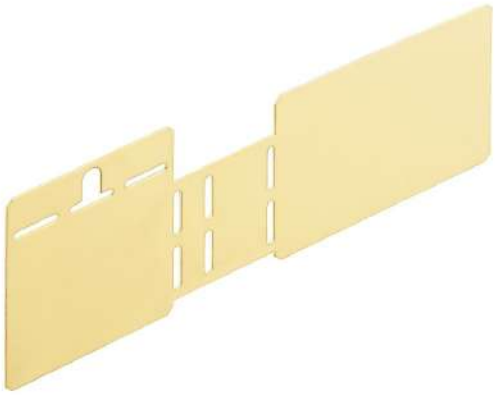
ACCESSORIES

1. MOUNTING LOOPS

2. HINGES

3. GROUND BOLTS

4. MOUNTING PLATE



5. GROUND PLATE

EXPLOSION PROTECTION	
Marking (EN 60079-0)	II 2G Ex e IIC T6÷T4 Gb II 2D Ex tb IIIC T85°C/T100°C/T135°C Db
Certificates	TC RU C-DE.AA87.B.00971 PTB 98 ATEX 3101 U IECEx PTB 08.0005U
SPECIFICATIONS	
Material	aluminum die casting DIN EN 1706 EN AC-AlSi 12 (Fe)
Color	RAL 7001, powder-coated silver white
Gasket	Silicone
Ingress protection (EN 60079-0)	IP 66
Mechanical strength (EN 60079-0)	7 J

Aluminum alloy is the most suitable for maximum corrosion resistance in aggressive environments, especially in atmospheres saturated with salt, hydrogen sulfide, and other chemicals. The hulls are coated with gray epoxy paint.

The wall thickness makes it possible to drill threaded holes in the enclosure walls for connecting cable glands.

Since aluminum is an excellent conductor, grounding for cable glands is provided through contact with the enclosure wall without additional measures to ensure the continuity of the ground circuit.

Aluminum products have proven to solve various electrical problems in the sealing and shielding of electronic and pneumatic components and modules.

Advantages

* Chemically resistant to acetone,

ammonia, gasoline, benzene and fuel oil

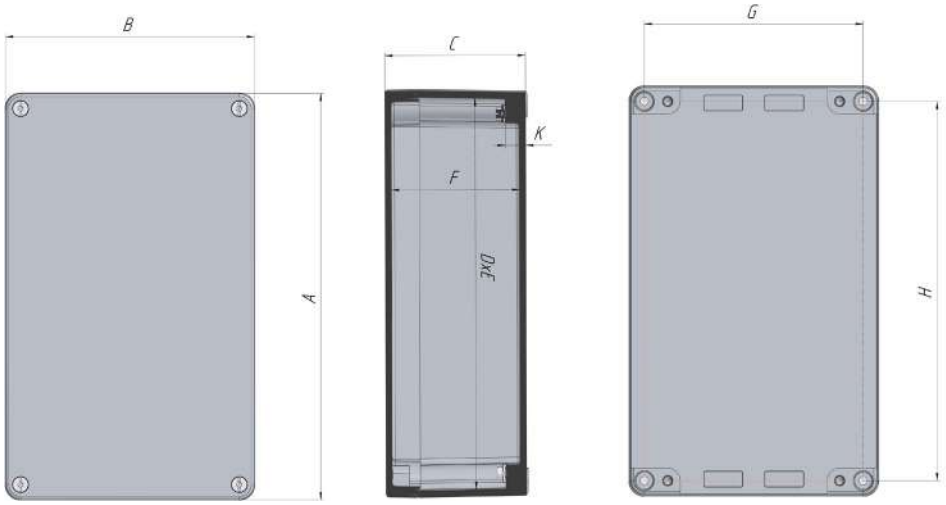
* Heat resistant

* Corrosion resistant

Aluminum has a low density (2.7 g/cm3) with relatively high strength characteristics

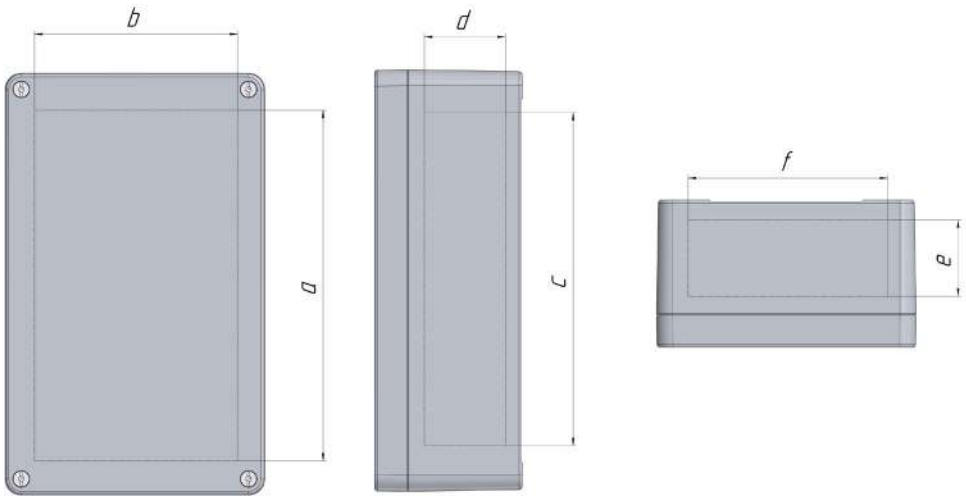
SIZE RANGE

Enclosure code	A	B	C	D	E	F	G	H	K
SIM__.A-080806	75	80	57	67	72	51	63	52	3
SIM__.A-081306	125	80	57	117	72	51	113	52	3
SIM__.A-081806	175	80	57	167	72	51	163	52	3
SIM__.A-082505	250	80	52	242	72	45	238	52	4
SIM__.A-101008	100	100	81	92	92	74	86	66	3
SIM__.A-101608	160	100	81	152	92	74	146	66	3
SIM__.A-102008	200	100	81	192	92	74	186	66	3
SIM__.A-121208	122	120	81	113	111	72	106	82	4
SIM__.A-121209	122	120	91	113	111	82	106	82	4
SIM__.A-122208	220	120	81	211	111	72	204	82	4
SIM__.A-122209	220	120	91	211	111	82	204	82	4
SIM__.A-123608	360	120	81	351	111	72	344	82	4
SIM__.A-141409	140	140	91	131	131	85	120	93	4
SIM__.A-142009	200	140	91	191	131	85	180	93	4
SIM__.A-161609	160	160	91	151	151	82	140	110	4
SIM__.A-162609	260	160	91	251	151	82	240	110	4
SIM__.A-163609	360	160	91	351	151	82	340	110	4
SIM__.A-165609	560	160	91	551	151	82	540	110	4
SIM__.A-181810	180	180	101	171	171	92	130	160	4
SIM__.A-182810	280	180	101	271	171	92	130	260	4
SIM__.A-231011	100	230	111	89	220	101	80	180	5
SIM__.A-232011	202	232	111	160	222	102	180	180	4
SIM__.A-232018	202	232	181	160	222	170	180	180	5
SIM__.A-232811	280	230	111	240	221	102	260	180	4
SIM__.A-233311	330	230	111	289	220	102	310	180	4
SIM__.A-233318	330	230	181	289	220	170	310	180	6
SIM__.A-234011	400	230	111	360	220	102	380	180	4
SIM__.A-234023	400	230	225	359	219	214	380	180	5
SIM__.A-236011	600	230	111	588	218	100	580	180	6
SIM__.A-314011	404	313	111	242	303	101	382	262	4
SIM__.A-314014	403	312	141	242	300	129	382	262	6
SIM__.A-314018	404	313	181	242	303	169	382	262	6
SIM__.A-314023	404	313	227	243	300	216	382	262	5
SIM__.A-316011	600	313	111	588	298	99	360	580	6
SIM__.A-316018	600	310	181	588	298	169	360	580	6
SIM__.A-606020	600	600	202	588	588	189	525	555	6



SIZE RANGE

Enclosure code	a	b	c	d	e	f
SIM__.A-080806	41	62	22	36	25	32
SIM__.A-081306	91	62	72	36	25	32
SIM__.A-081806	141	62	122	36	25	32
SIM__.A-082505	216	62	217	34	23	32
SIM__.A-101008	66	82	67	53	44	52
SIM__.A-101608	126	82	127	53	44	52
SIM__.A-102008	166	82	167	53	44	52
SIM__.A-121208	100	78	79	53	44	56
SIM__.A-121209	100	78	79	53	44	56
SIM__.A-122208	100	176	177	53	44	56
SIM__.A-122209	100	176	177	53	44	56
SIM__.A-123608	100	316	317	53	44	56
SIM__.A-141409	120	96	97	53	44	76
SIM__.A-142009	120	156	157	53	44	76
SIM__.A-161609	135	108	80	52	60	110
SIM__.A-162609	135	208	80	52	60	210
SIM__.A-163609	135	308	80	52	60	310
SIM__.A-165609	135	508	80	52	60	238×2
SIM__.A-181810	155	128	147	63	53	132
SIM__.A-182810	155	228	247	63	53	132
SIM__.A-231011	196	82	197	53	44	52
SIM__.A-232011	147	202	150	81	75	150
SIM__.A-232018	147	202	150	150	144	150
SIM__.A-232811	225	200	228	81	75	148
SIM__.A-233311	275	200	278	81	75	148
SIM__.A-233318	275	200	278	151	145	148
SIM__.A-234011	345	200	348	81	75	148
SIM__.A-234023	345	200	348	195	189	148
SIM__.A-236011	545	200	258×2	81	75	148
SIM__.A-314011	349	283	352	82	72	229
SIM__.A-314014	349	283	352	112	102	229
SIM__.A-314018	349	283	352	152	142	229
SIM__.A-314023	349	283	352	207	197	229
SIM__.A-316011	545	280	548	82	72	216
SIM__.A-316018	545	280	548	152	142	216
SIM__.A-606020	545	570	548	153	143	516



MAXIMUM NUMBER OF TERMINALS AND CABLE GLANDS

Enclosure code	Terminal cross-section						Side A/B					Side C/D				
	2,5	4	6	10	16	35	1	2	3	4	5	1	2	3	4	5
SIM__.A-080806	4	3					1	1				2	1			
SIM__.A-081306	14	11					3	2				2	1			
SIM__.A-081806	23	20					5	3				2	1			
SIM__.A-082505	38	32					8	5				2	1			
SIM__.A-101008	9	7					5	2	1			3	1	1		
SIM__.A-101608	20	17					10	4	3			3	1	1		
SIM__.A-102008	28	24					12	5	3			3	1	1		
SIM__.A-121208	13	11	8				4	2	1			4	2	1		
SIM__.A-121209	13	11	8	6			4	2	1			4	2	1		
SIM__.A-122208	33	27	21	16			12	5	3			4	2	1		
SIM__.A-122209	33	27	21	16			14	6	4			4	2	1		
SIM__.A-123608	61	50	38	30			24	10	7			4	2	1		
SIM__.A-141409	16	13	10	8			8	3	2			4	2	1		
SIM__.A-142009	28	23	17	14			12	5	3			4	2	1		
SIM__.A-161609	20	17	13	10			9	5	3	2	2	6	3	2	1	
SIM__.A-162609	40	33	25	20			17	10	5	3	3	6	3	2	1	
SIM__.A-163609	61	50	38	30			24	15	7	5	4	6	3	2	1	
SIM__.A-165609	100	84	63	50			40	24	12	8	6	6	3	2	1	
SIM__.A-181810	24	20	15	12	10		11	6	3	2	2	8	3	2	2	
SIM__.A-182810	44	37	28	22	18		18	11	5	4	3	8	4	2	2	
SIM__.A-231011							6	3	2	1	1	17	8	5	3	2
SIM__.A-232011	56	46	36	14	11	9	18	8	6	3	2	17	8	5	3	2
SIM__.A-232018	56	46	36	14	11	9	33	18	10	6	5	33	16	9	6	5
SIM__.A-232811	8	72	56	44	18	14	24	12	9	4	3	17	8	5	3	2
SIM__.A-233311	108	90	68	54	22	17	30	15	11	5	4	17	8	5	3	2
SIM__.A-233318	108	90	68	54	22	17	60	30	18	11	8	33	16	9	6	5
SIM__.A-234011	136	114	86	68	29	21	39	20	14	6	5	17	8	5	3	2
SIM__.A-234023	136	114	86	68	29	21	100	54	30	18	15	44	21	13	9	6
SIM__.A-236011	216	180	134	54	45	33	54	28	20	10	8	17	8	5	3	2
SIM__.A-314011	204	171	129	51	42	21	39	20	14	6	5	26	12	7	4	3
SIM__.A-314014	204	171	129	51	42	21	55	28	17	12	7	32	18	10	7	4
SIM__.A-314018	204	171	129	51	42	21	78	40	22	15	11	51	24	15	9	6
SIM__.A-314023	204	171	129	51	42	21	100	54	30	18	15	68	33	20	12	9
SIM__.A-316011	324	270	204	108	90	34	60	30	20	10	8	24	12	7	4	3
SIM__.A-316018	324	270	204	108	90	34	108	56	32	22	16	48	24	15	9	6
SIM__.A-606020	432	360	204	162	135	132	108	56	32	22	16	108	56	32	22	16

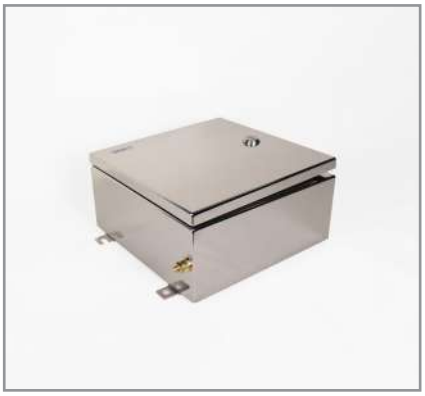
THREAD TABLE					
Code	1	2	3	4	5
ISO 965/I	M20	M25	M32	M40	M50
ASA B2.1	½" NPT	¾" NPT	1" NPT	1¼" NPT	1½" NPT

ACCESSORIES

1. MOUNTING LOOPS

2. HINGES

3. MOUNTING PLATE



EXPLOSION PROTECTION	
Marking (EN 60079-0)	II 2G Ex e IIC T6÷T4 Gb II 2D Ex tb IIIC T85°C/T100°C/T135°C Db
Certificates	TC RUC-DE.MIO62.B.04799, TC RUC-DE.BE02.B.00173 IBExU 14ATEX 1028U, IBExU 07ATEX 1147U IECEx IBE 14.0004U 6 IECEx IBE 09.0018U
SPECIFICATIONS	
Material	aluminum die casting DIN EN 1706 EN AC-AlSi 12 (Fe)
Color	RAL 7001, powder-coated silver white
Gasket	Silicone
Ingress protection (EN 60079-0)	IP 66
Mechanical strength (EN 60079-0)	7 J

Преимущества

* Long Lifetime

* Sea water resistance

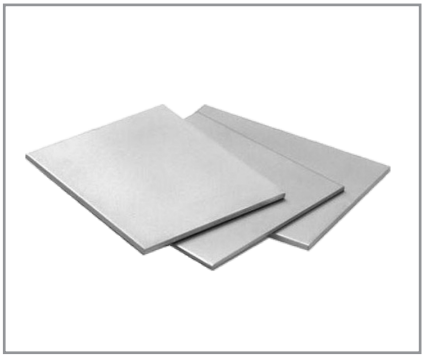
* Increased corrosion resistance

* An alloy of iron and chromium gives the surface a protective layer that is resistant to mechanical and chemical

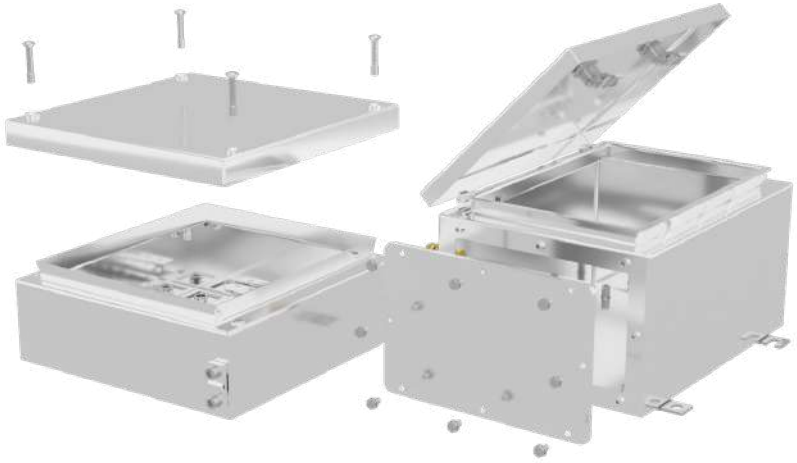
* Possibility of installation removable flanges

Equipment enclosures are stainless steel, the most suitable material for equipment with maximum environmental protection. An additional advantage is that these products are ideal for heat-resistant (refractory) systems and, when mounted with ceramic terminals, meet the requirements of IEC-331 (exposure to +750°C for 3 hours).

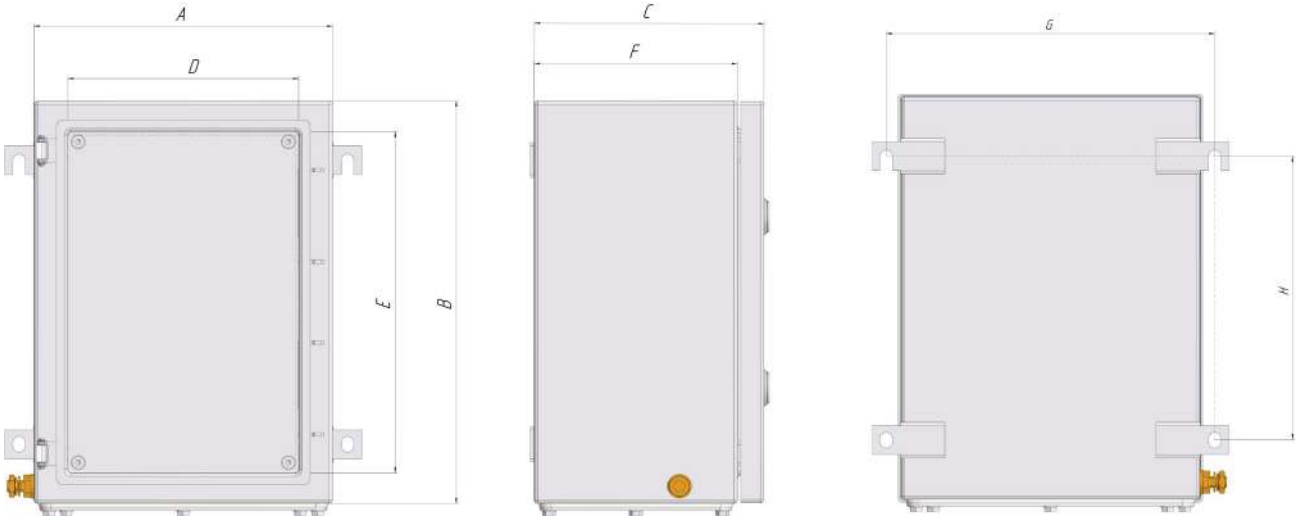
The convenience of using removable flanges for installing cable glands is that one enclosure size can be used in various electric circuit units; it is enough to replace the flanges with the perforation corresponding to this unit. Removable flanges can be installed on any of the four perimeters of the box or all edges simultaneously



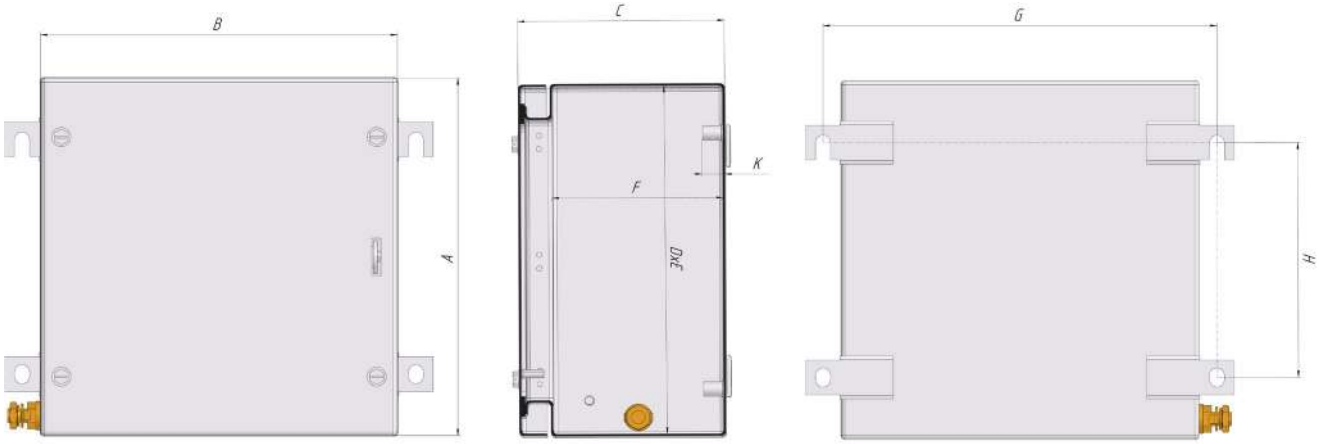
Steel AISI 316L – structural cryogenic austenitic steel has the ability to maintain the integrity of the structure with increasing and decreasing temperatures



STANDARD SERIES



TB SERIES

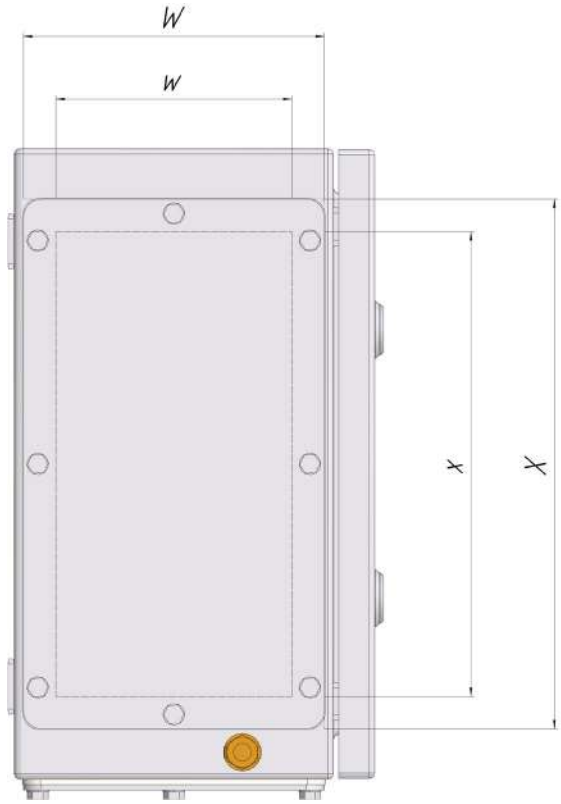


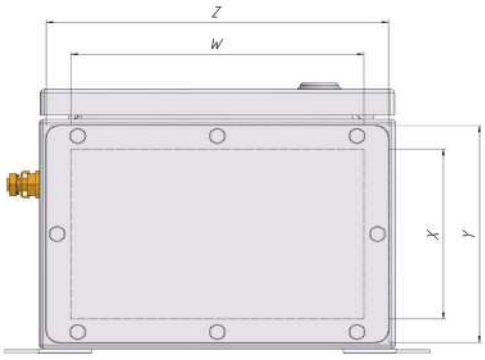
SIZE RANGE

Enclosure code	Fig.	A	B	C	D	E	F	G	H	K
SIM__.S-121208	I	120	120	80	126	126	87	145	70	100
SIM__.S-151208	I	120	150	80	126	156	87	145	100	100
SIM__.S-151509	I	150	150	90	156	156	97	175	130	100
SIM__.S-151909	I	150	190	90	156	196	97	175	130	140
SIM__.S-191910	I	190	190	100	196	196	107	215	140	170
SIM__.S-231513	II	229	152	133	93	176	110	178/208	152	11
SIM__.S-252512	I	250	250	120	256	256	127	275	200	230
SIM__.S-262615	II	260	260	150	201	207	127	286/316	170	11
SIM__.S-262620	II	260	260	200	201	207	177	286/316	170	11
SIM__.S-313115	II	306	306	150	247	253	127	332/362	203	11
SIM__.S-313120	II	306	306	200	247	253	177	332/362	203	11
SIM__.S-352615	II	350	260	150	201	297	127	286/316	247	11
SIM__.S-352620	II	350	260	200	201	297	177	286/316	247	11
SIM__.S-381612	I	380	160	120	386	166	127	405	330	140
SIM__.S-402512	I	400	250	130	406	256	137	425	350	230
SIM__.S-403015	II	400	300	150	241	347	127	326/356	247	11
SIM__.S-403020	II	400	300	200	241	347	177	326/356	247	11
SIM__.S-463815	II	458	382	150	323	405	127	408/438	305	11
SIM__.S-463820	II	458	382	200	323	405	177	408/438	305	11
SIM__.S-484815	II	480	480	150	421	427	127	506/536	327	11
SIM__.S-484820	II	480	480	200	421	427	177	506/536	327	11
SIM__.S-553515	II	550	350	150	291	497	127	376/406	350	11
SIM__.S-553520	II	550	350	200	291	497	177	376/406	350	11
SIM__.S-624515	II	620	450	150	391	567	127	476/506	420	11
SIM__.S-624520	II	620	450	200	391	567	177	476/506	420	11
SIM__.S-765115	II	762	508	150	449	709	127	534/564	508	11
SIM__.S-765120	II	762	508	200	449	709	177	534/564	508	11
SIM__.S-916115	II	914	610	150	551	861	127	636/666	559	11
SIM__.S-916120	II	914	610	200	551	861	177	636/666	559	11
SIM__.S-987420	II	980	740	200	681	927	177	766/796	625	11

SIZE RANGE

Enclosure code	d	e	f		w	x	y	z
SIM__.S-231513	100	177	100	146	64	247	64	116
SIM__.S-262615	117	208	117	254	81	178	81	224
SIM__.S-262620	167	204	167	250	131	168	131	214
SIM__.S-313115	117	254	117	300	81	224	81	270
SIM__.S-313120	167	250	167	296	131	214	131	260
SIM__.S-352615	117	298	117	254	81	268	81	224
SIM__.S-352620	167	294	167	250	131	258	131	214
SIM__.S-403015	117	348	117	294	81	318	81	264
SIM__.S-403020	167	344	167	290	131	308	131	254
SIM__.S-463815	117	406	117	376	81	376	81	346
SIM__.S-463820	167	402	167	372	131	366	131	336
SIM__.S-484815	117	428	117	474	81	398	81	444
SIM__.S-484820	167	424	167	470	131	388	131	434
SIM__.S-553515	117	498	117	344	81	468	81	314
SIM__.S-553520	167	494	167	340	131	458	131	304
SIM__.S-624515	117	568	117	444	81	538	81	414
SIM__.S-624520	167	564	167	440	131	528	131	404
SIM__.S-765115	117	2×345	117	502	81	2×315	81	472
SIM__.S-765120	167	2×341	167	498	131	2×305	131	462
SIM__.S-916115	117	2×421	117	604	81	2×391	81	574
SIM__.S-916120	167	2×417	167	600	131	2×381	131	564
SIM__.S-987420	167	2×450	167	2×353	131	2×414	131	2×317





MAXIMUM NUMBER OF TERMINALS AND CABLE GLANDS

Enclosure code	Fig.	Terminal cross-section						Side A/B					Side C/D				
		2,5	4	6	10	16	35	1	2	3	4	5	1	2	3	4	5
SIM__.S-121208	I	17	14	11	8	7		6	3	2	2		4	2	1	1	
SIM__.S-151208	I	23	19	14	11	9		6	3	2	2		6	2	2	1	
SIM__.S-151509	I	23	19	14	11	9		8	3	3	2	1	6	2	2	2	1
SIM__.S-151909	I	30	25	20	15	13		8	3	3	2	1	10	3	3	2	1
SIM__.S-191910	I	30	25	20	15	13		10	8	3	3	2	8	6	3	2	1
SIM__.S-231513	II	26	21	16	13	10	7	2	2	1	1		3	2	2	2	
SIM__.S-252512	I	84	70	54	44	18		12	10	8	3	3	12	10	8	3	2
SIM__.S-262615	II	62	26	19	15	12	9	9	4	3	3	2	7	3	2	2	2
SIM__.S-262620	II	62	26	19	15	12	9	14	12	6	5	2	11	9	4	4	2
SIM__.S-313115	II	80	66	50	20	16	12	11	5	4	3	3	9	4	3	3	2
SIM__.S-313120	II	80	66	50	20	16	12	17	14	8	6	3	14	12	6	5	2
SIM__.S-352615	II	62	52	38	30	12	9	9	4	3	3	2	11	5	4	3	3
SIM__.S-352620	II	62	52	38	30	12	9	14	12	6	5	2	17	14	7	6	3
SIM__.S-381612	I	68	57	44	35	29		30	16	10	6	4	12	6	4	2	1
SIM__.S-402512	I	144	120	92	74	60		30	16	10	6	4	18	10	8	3	2
SIM__.S-403015	II	117	96	48	38	32	11	11	5	4	3	3	13	6	5	4	3
SIM__.S-403020	II	117	96	48	38	32	11	17	14	7	6	3	20	17	9	7	3
SIM__.S-463815	II	216	138	102	54	44	17	15	6	5	4	4	16	7	6	5	4
SIM__.S-463820	II	216	138	102	54	44	17	23	18	10	8	4	24	21	11	9	4
SIM__.S-484815	II	296	186	138	111	62	46	19	8	7	6	5	17	7	6	5	4
SIM__.S-484820	II	296	186	138	111	62	46	29	24	13	11	5	26	21	12	10	4
SIM__.S-553515	II	192	160	120	72	60	30	13	6	5	4	3	20	9	7	6	5
SIM__.S-553520	II	192	160	120	72	60	30	20	17	9	7	3	30	26	14	12	5
SIM__.S-624515	II	325	270	164	132	78	40	18	8	6	5	4	24	10	9	7	6
SIM__.S-624520	II	325	270	164	132	78	40	27	23	12	10	4	36	30	17	14	6
SIM__.S-765115	II	546	384	240	196	128	72	21	9	7	6	5	26	12	10	8	6
SIM__.S-765120	II	546	384	240	196	128	72	32	26	14	12	5	40	34	18	14	6
SIM__.S-916115	II	792	560	434	300	200	120	25	11	9	8	6	34	14	12	10	8
SIM__.S-916120	II	792	560	434	300	200	120	38	33	18	15	6	52	42	24	20	8
SIM__.S-987420	II	1143	792	546	378	255	152	42	36	20	16	6	54	48	26	22	10

THREAD TABLE					
Code	1	2	3	4	5
ISO 965/I	M20	M25	M32	M40	M50
ASA B2.1	½" NPT	¾" NPT	1" NPT	1¼" NPT	1½" NPT

ACCESSORIES

1. PLATE HOLDER

2. LOCK SYSTEMS

3. MOUNTING PLATE

5. FLANGE PANEL

4. GROUND BOLTS

6. MOUNTING KIT

CONTROLS

CONTROL CAPPINGS

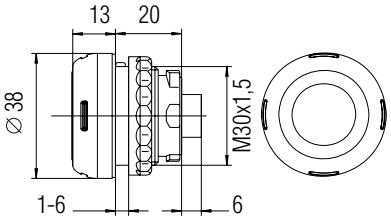
All cappings are made of high-quality thermoplastic and comply with the degree of protection IP 66/IP 67.

The cappings are valuable accessories to label holders, marking clips, metal safety collars, wrenches, etc. Cappings for increased oil resistance are also available.

Control cappings are quickly and easily mounted on control panels. Cappings certified for use in Zones 1 and 21.

EXPLOSION PROTECTION	
Marking (EN 60079-0)	II 2G E x e IIC Gb II 2D Ex tb IIIC Db
SPECIFICATIONS	
Certificates	**Installation in enclosures with wall thicknesses from 1 mm to 6 mm (thread M30x1.5). Suitable for through holes 30.3+0.3 mm**
Material	Thermoplastic enclosure
Color	RAL 7001, powder-coated silver white
Ambient temperature operation	-55°C ~ +70°C
Ingress protection (EN 60079-0)	IP 66
Mechanical strength (EN 60079-0)	7 Nm (light cappings 4 Nm)

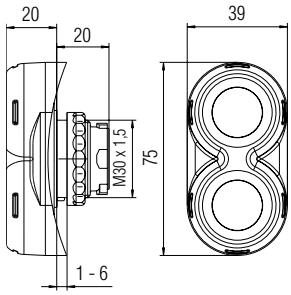
PUSH-BUTTON



Five supplied loose button cappers are red, green, yellow, white, black

Weight – 24 g

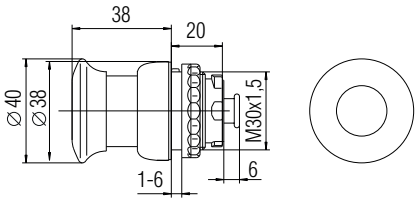
DOUBLE BUTTON



Five supplied loose button cappers are red, green, yellow, white, black

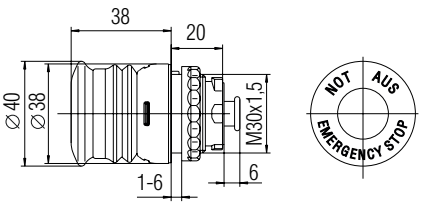
Weight – 52 g

MUSHROOM BUTTON



Black

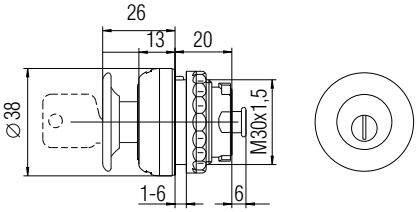
Weight – 24 g



Mushroom button with text
“EMERGENCY STOP – Pull to Release”

DIN EN 60204-1
DIN EN 60947-5-1: 2005 (VDE 0660 part 200)

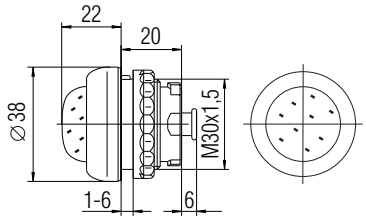
Weight – 46 g



with key-lockable without a key, unlocked with a key, locking mechanism DOM 4 A 185

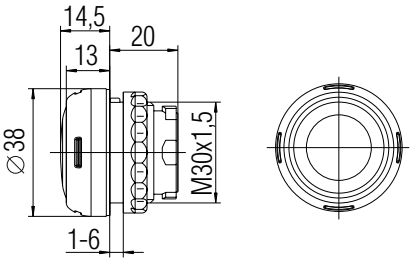
Weight – 70 g

LIGHT MODULE CAPPER



Color:
Red
Green
Yellow
White
Blue
Weight – 19 g

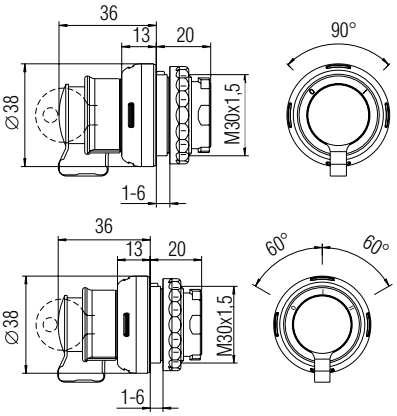
CAPPER FOR BUTTON WITH ILLUMINATION



Color:
Red
Green
Yellow
White
Blue

Weight – 19 g

KEY SWITCH



Locking mechanism RONIS 455,
with 2 or 3 switching positions, rotated by 90°

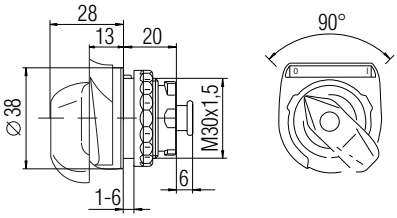
0 - I with fixation,
the key is retrieved

0 - I without fixation,
Item I - the key is not retrieved

I - 0 - II
(I + II with fixation),
the key is retrieved

Weight – 49 g

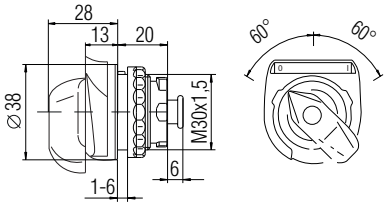
POSITION SWITCH



Black
with two (2) switching positions

0 - I with fixation
0 - I without fixation

POSITION SWITCH



Black
with three (3) switching positions

I - 0 - II
(I + II with fixation)

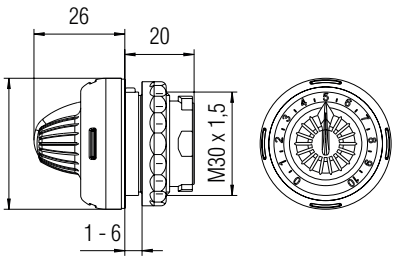
I - 0 - II
(I + II without fixation)

I - 0 - II
(I with fixation + II without fixation)

I - 0 - II
(I without fixation + II with fixation)

Weight – 33 g

CAPPER FOR POTENTIOMETER

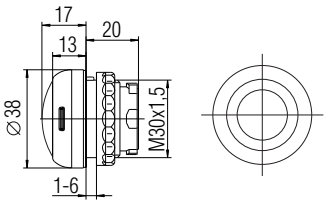


Black

durable and wear-resistant scale from 0 to 10

Weight – 24 g

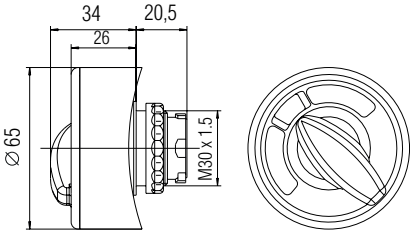
BLIND CAPPER



For closing unnecessary holes in the lid

Weight – 20 g

POSITION SELECTOR

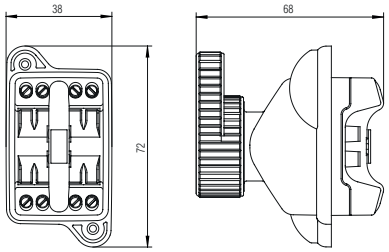


With 2 or 3 switching positions, with protective collar, lockable1, only for control units (2-pole)
0-I
I-II
I - 0 - II
HAND - 0 - AUTO
MAN - 0 - AUTO
Weight – 74 g
1 Three (3) holes on the protective collar for attaching a padlock in the O (I) position


NOT AUS
PULL
TO
RELEASE
EMERGENCY STOP
Ex geprüft
PV 08/21
BARTEC

CONTROLS

SWITCH MODULE



Explosion protection
II 2G Ex de IIC Gb
I M2 Ex de I Mb

Enclosure material
thermoplastic

Ambient temperature
-55°Cдо+60°C

Ingress protection
Terminals IP 20 (IEC 60529)

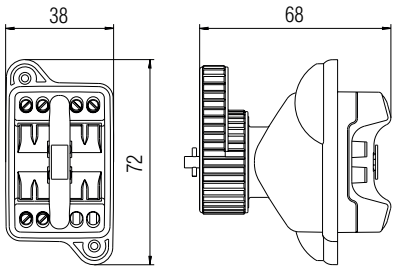
Rated galvanic isolation voltage
300 V

Conventional thermal current
16 A/+40°C, 11 A/+60°C

Mechanical durability
$>10^5$ switching

Contacts
Forced opening (self-cleaning)
1 normally closed and 1 normally open
2 normally closed
2 normally open

POTENTIOMETER MODULE



Explosion protection
II 2G Ex de IIC Gb
I M2 Ex de I Mb

Enclosure material
thermoplastic

Ambient temperature
-55°Cдо+60°C

Rated galvanic isolation voltage
500 V

Max. measurable operating voltage
AC/DC 230 V

Power consumption
max. 1 W for Ta < +40°C

Resistance material
carbon layer on the ceramic

Turn zone
mech. 285° -5°
electr. action approx. 250°

Torque (start)
0.5 to 1.5 Ncm

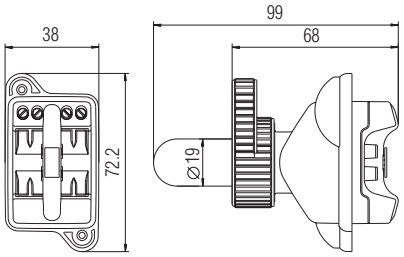
Torque (stop)
> 100 Ncm

Mechanical durability
25000 sine cycles

Resistance values
1 kΩ
2,2 kΩ
4,7 kΩ
10 kΩ

Resistance tolerance
± 20 %

LIGHT MODULE



Explosion protection
II 2G Ex de IIC Gb
I M2 Ex de I Mb

Enclosure material
thermoplastic

Ambient temperature
- 55°C ~ +50°C (+60°C AC/DC 12 to 24 V)

Ingress protection
Terminals IP 20 (IEC 60529)

Rated galvanic isolation voltage
300 V

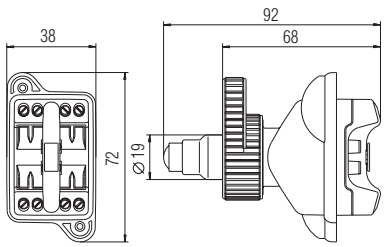
Rated supply voltage
AC 12 V to 250 V (Ta < +50°C)
DC 12 V to 60 V (Ta < +50°C)
AC/DC 12 V to 24 V (Ta < +60°C)

Power consumption
≤1 Watt

Electrcal life
>105 light hours

Light source
LED, light angle 180°
red, green, yellow, white, blue

MODULE FOR BUTTON WITH ILLUMINATION



Explosion protection
II 2G Ex de IIC Gb
I M2 Ex de I Mb

Enclosure material
thermoplastic

Ambient temperature
- 55°C ~ +50°C (+60°C AC/DC 12 to 24 V)

Ingress protection
Terminals IP 20 (IEC 60529)

Rated galvanic isolation voltage
300 V

Rated supply voltage
AC 12 V to 250 V (Ta < +50°C)
DC 12 V to 60 V (Ta < +50°C)
AC/DC 12 V to 24 V (Ta < +60°C)

Power consumption
≤1 Watt

Electrical life:
$>10^5$ light hours

Mechanical durability
$>10^5$ switching

Contacts
Forced opening (self-cleaning)
1 normally closed and 1 normally open

Light source
LED, light angle 180°
red, green, yellow, white, blue

CABLE GLANDS

SIGMA INDUSTRIES offers certified components for a secure connection to complement our wide range of enclosures. These include standard brass, plastic, and stainless steel cable glands for industrial and hazardous area applications, stopper plugs, pressurizers, and accessories such as nuts, seals, and earth rings.

CABLE GLANDS FOR EXPLOSIVE ATMOSPHERES

In general, cable glands intended for use in explosive atmospheres must first comply with any applicable industrial installation standards, such as IEC 62444, followed by the requirements of IEC 60079-0.

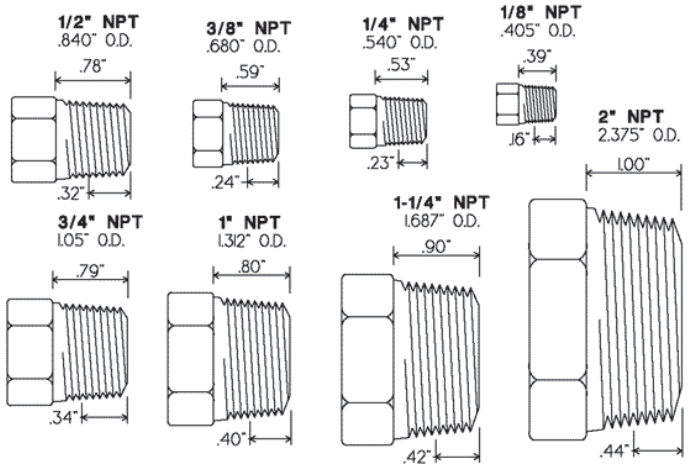
In addition, cable glands can be equipped with basic types of protection when used in explosive atmospheres according to the requirements of IEC 60079 standards applicable to armored and unarmoured cables.

BENEFITS

* Proven installation technology
* Wide choice of materials, sizes, and crimping ranges
* Tolerances according to the latest standards
* High heat resistance

Rated diameter, inch	Main diameter, mm	Threaded hole, mm	Number of turns per inch	Pitch, mm
Thread NPT (ANSI/ASME B 1.20.1)				
NPT 1/8"	10.217	8.25	27	0.940
NPT 1/4"	13.577	10.70	18	1.411
NPT 3/8"	17.016	14.10	18	1.411
NPT 1/2"	21.211	17.40	14	1.814
NPT 3/4"	26.566	22.60	14	1.814
NPT 1"	33.195	28.50	11.5	2.209
NPT 1 1/4"	41.952	37.00	11.5	2.209
NPT 2"	60.060	55.00	11.5	2.209

Rated diameter, inch	Threaded hole, mm	Number of turns per inch	Pitch, mm
Metric (ISO 965-1, ISO 965-3)			
M10	8.5	16.93	1,5
M12	10.5	16.93	1,5
M16	14	16.93	1,5
M20	18.5	16.93	1,5
M25	23.5	16.93	1,5
M32	30.5	16.93	1,5
M40	38.4	16.93	1,5
M50	48.4	16.93	1,5



Triton CDS

CMP Triton CDS Type T3CDS Certified Triple Fire Protection (Type “d”), Enhanced Safety (Type “e”) and for environments with restricted gas passage (Type “nR”) Cable Glands for indoor and outdoor use with an explosive atmosphere in Zone 1, Zone 2, Zone 21 and Zone 22.

Unique Compensating Displacement Seal System (CDS) compatible with all cable types. The CDS system protects the inner sheath from increased forces transmitted and compensated by the internal compensator built into the CDS system at a vital cable sealing point. This allows the cable gland always to be tightly tightened on the cable, regardless of its diameter.

Practical installation benefits

- Fully sequential three-step installation procedure
- Quick and easy assembly, metal contacts at all stages of installation
- CMP doesn’t aim to make edits as fast as possible but instead ensures that the installation is done right on the first try, as intended
- The concept of correct installation at the first attempt reduces the downtime of the equipment during the installation process and increases the confidence of the installer in the proper action
- Noise absorption levels from electromagnetic interference comply with current European requirements (do not exceed 50 dB when terminating shielded cables)
- Conforms to EU Low Voltage Directive 73/23/EEC

- Available in nickel-plated brass, brass, stainless steel, and aluminum
- Environmental protection of outer cable sheath under IP68 and NEMA 4X
- Provides mechanical cable retention and electrical conductivity through armored wire termination
- The reversible armored cone design and AnyWay universal clamping ring makes it easy to disconnect the cable from the equipment
- Flooding protection as standard
- Operating temperature -60 to +130°C or -20 to +200°C
- Quick and easy assembly process with constant face-to-face installation
- The “ready first-time” concept helps to reduce “downtime” during plant installation without presenting any problems for the user
- Regardless of the cable design, the risk of damage to the inner cable sheath is eliminated even if the CDS system is constantly fully tightened
- Uniform hexagonal profile

CDS Internal Fire Seal System

- Unique Compensating Displacement Seal (CDS) system suitable for all cable types
- At the critical sealing point of the cable, the CDS system protects the inner sheath of the cable from the effects of excess forces transmitted to and absorbed by the compensator built into the CDS system.
- Allows secure tightening of metal cable gland connections regardless of cable diameter

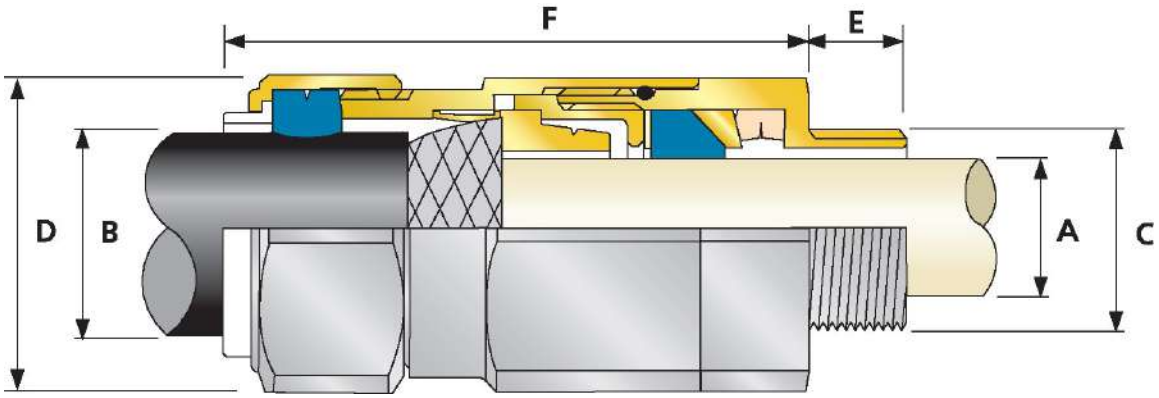
Triton CDS

Explosion-proof cable gland according to international standards

For all types of armored cables

- Fully sequential three-step installation procedure
- Reduces installation time, costs, and risks
- Suitable for indoor and outdoor installation
- Unique Compensating Displacement Seal System (CDS)
- Permanent metal connection regardless of cable diameter
- Designed to reduce plastic deformation
- Internal seal against moisture ingress
- Adjustable outer seal with heavy-duty technology
- Unique OSTG series avoids constriction
- -60˚C to +130˚C (standard), -20˚C to 200˚C (ThermEx option)
- International marking: IECEx, ATEX, UL, and cCSAus
- Excellent electromagnetic performance

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Cable gland size	Available thread type C				Inner sheath diameter A		Cable outer diameter B		Armoring range				D between edges	D between corners	Protrusion length
									Fluted cone		Stepped cone				
	Metre	Thread length	NPT	Thread length	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.1	8.6	6.1	13.1	0.3	1.0	0.8	1.25	24.0	26.4	78.7
20S	M20	15.0	½"	19.9	6.1	11.6	9.5	15.9	0.3	1.0	0.8	1.25	24.0	26.4	78.7
20	M20	15.0	½"	19.9	6.5	13.9	12.5	20.9	0.4	1.0	0.8	1.25	30.5	33.6	76.2
25S	M25	15.0	¾"	20.2	11.1	19.9	14.0	22.0	0.4	1.2	1.25	1.6	37.5	41.3	88.8
25	M25	15.0	¾"	20.2	11.1	19.9	18.2	26.2	0.4	1.2	1.25	1.6	37.5	41.3	88.7
32	M32	15.0	1"	25.0	17.0	26.2	23.7	33.9	0.4	1.2	1.6	2.0	46.0	50.6	90.7
40	M40	15.0	1 ¼"	25.6	22.0	32.1	27.9	40.4	0.4	1.6	1.6	2.0	55.0	60.5	93.2
50S	M50	15.0	1 ½"	26.1	29.5	38.1	35.2	46.7	0.4	1.6	2.0	2.5	60.0	66.0	100.7
50	M50	15.0	2"	26.9	35.6	44.0	40.4	53.0	0.6	1.6	2.0	2.5	70.1	77.1	105.8

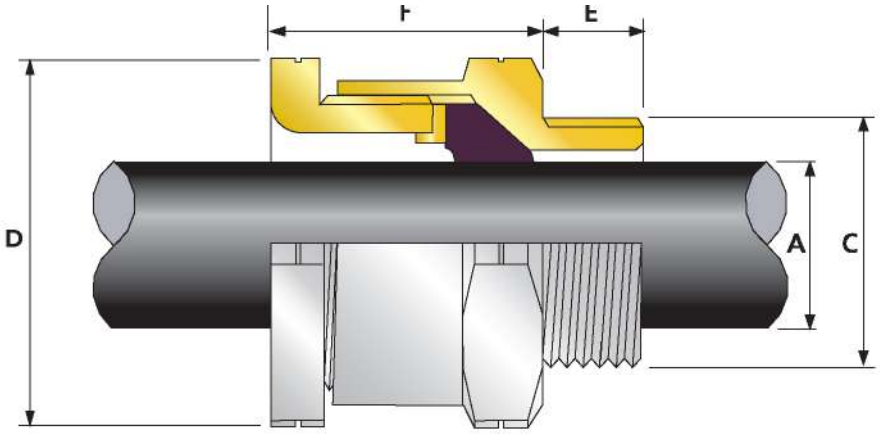
A2F100

Explosion-proof cable gland according to international standards

For all types of unarmoured and braided cables

- Fully compliant with IEC 60079-0 requirements for cable fastening
- There are no special conditions to ensure safe operation
- Certification does not require external cable fixing
- Refractory Bias Seal
- Moisture protection
- -60˚C to +130˚C
- International marking: IECEx and ATEX
- Supplied with a protective membrane

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



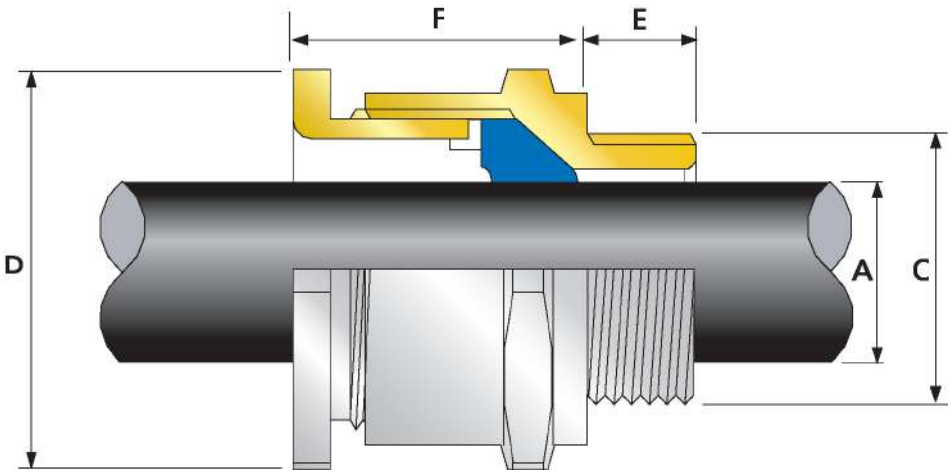
Cable gland size	Available thread type C				Inner sheath diameter A		D between edges	D between corners	Protrusion length
	Metre	Thread length E	NPT	Thread length E	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.2	8.0	24.0	26.4	30.4
20S	M20	15.0	½"	19.9	6.5	11.2	24.0	26.4	31.9
20	M20	15.0	½"	19.9	7.0	13.5	27.0	29.7	35.8
20L	M20	15.0	½"	19.9	8.7	14.0	27.0	29.7	34.3
25	M25	15.0	¾"	20.2	11.5	19.5	36.0	39.6	40.4
25L	M25	15.0	¾"	20.2	14.0	20.0	36.0	39.6	39.9
32	M32	15.0	1"	25.0	19.0	25.5	41.0	45.1	38.5
32L	M32	15.0	1"	25.0	20.2	26.3	41.0	45.1	35.5
40	M40	15.0	1 ¼"	25.6	25.0	32.2	50.0	55.0	38.8
50S	M50	15.0	1 ½"	26.1	31.0	38.2	55.0	60.5	41.4
50	M50	15.0	2"	26.9	35.6	44.0	60.0	66.0	45.8

A2F

Explosion-proof cable gland according to international standards

For all types of unarmoured and braided cables
- Refractory Bias Seal
- Moisture protection
- -60˚C to +130˚C
- International marking: IECEx and ATEX

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Cable gland size	Available thread type C				Inner sheath diameter A		D between edges	D between corners	Protrusion length
	Metre	Thread length E	NPT	Thread length E	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.2	8.7	24.0	26.4	26.0
20S	M20	15.0	½"	19.9	6.1	11.7	24.0	26.4	26.0
20	M20	15.0	½"	19.9	6.5	14.0	27.0	29.7	27.7
25	M25	15.0	¾"	20.2	11.1	20.0	36.0	39.6	35.5
32	M32	15.0	1"	25.0	17.0	26.3	41.0	45.1	35.1
40	M40	15.0	1 ¼"	25.6	23.5	32.2	50.0	55.0	35.1
50S	M50	15.0	1 ½"	26.1	31.0	38.2	55.0	60.5	33.0
50	M50	15.0	2"	26.9	35.6	44.0	60.0	66.0	37.3

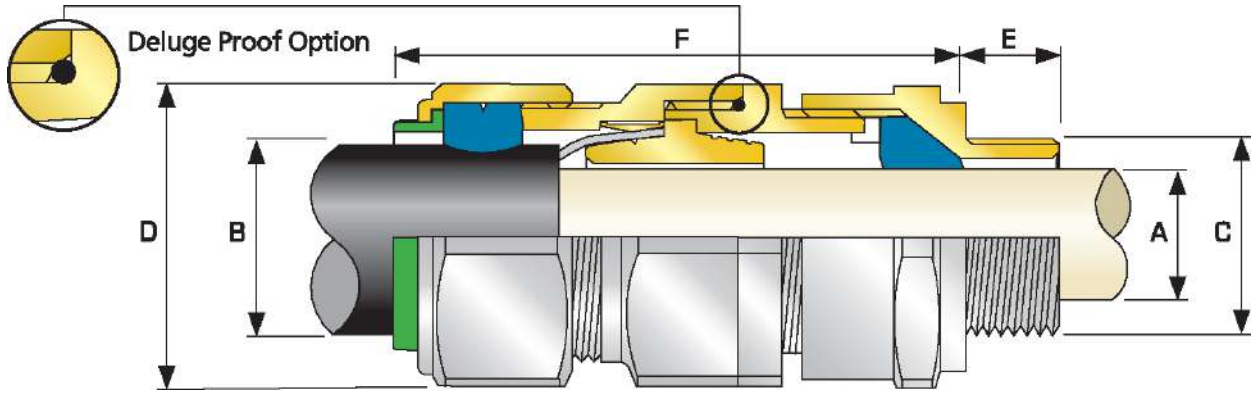
E1FU

Explosion-proof cable gland according to international standards

For all types of armored cables

- Metal-to-metal armor fastening technology
- Suitable for indoor and outdoor installation
- Refractory Internal Bias Seal
- Adjustable outer seal with heavy-duty technology
- Unique OSTG series avoids constriction
- -60˚C to +130˚C
- International markings: IECEx, ATEX, and cCSAus
- Excellent electromagnetic performance

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Cable gland size	Available thread type C				Inner sheath diameter A		Cable outer diameter B		Armoring range		D between edges	D between corners	Protrusion length
	Metre	Thread length E	NPT	Thread length E	Min.	Max.	Min.	Max.	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.1	8.6	6.1	13.1	0.3	1.0	0.8	1.25	24.0
20S	M20	15.0	½"	19.9	6.1	11.6	9.5	15.9	0.3	1.0	0.8	1.25	24.0
20	M20	15.0	½"	19.9	6.5	13.9	12.5	20.9	0.4	1.0	0.8	1.25	30.5
25S	M25	15.0	¾"	20.2	11.1	19.9	14.0	22.0	0.4	1.2	1.25	1.6	37.5
25	M25	15.0	¾"	20.2	11.1	19.9	18.2	26.2	0.4	1.2	1.25	1.6	37.5
32	M32	15.0	1"	25.0	17.0	26.2	23.7	33.9	0.4	1.2	1.6	2.0	46.0
40	M40	15.0	1 ¼"	25.6	22.0	32.1	27.9	40.4	0.4	1.6	1.6	2.0	55.0
50S	M50	15.0	1 ½"	26.1	29.5	38.1	35.2	46.7	0.4	1.6	2.0	2.5	60.0
50	M50	15.0	2"	26.9	35.6	44.0	40.4	53.0	0.6	1.6	2.0	2.5	70.1

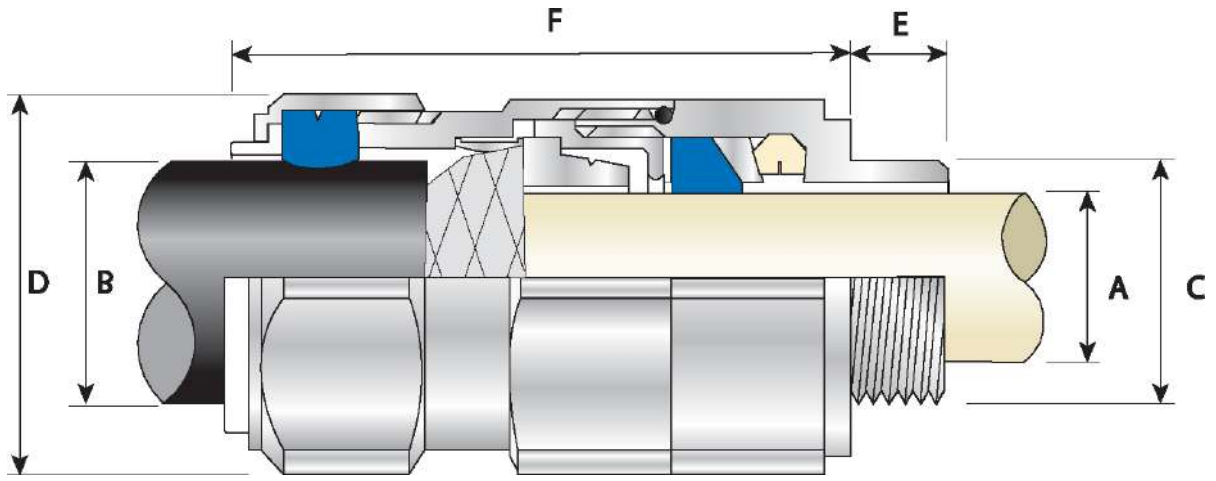
TE1FU

Explosion-proof cable gland according to international standards

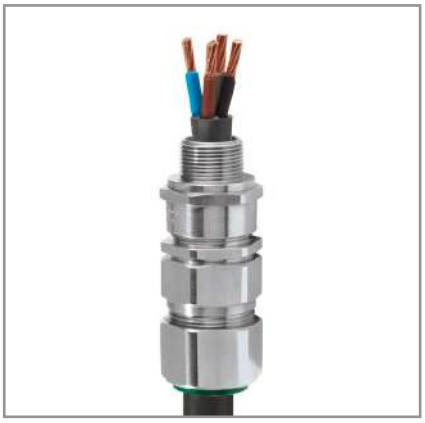
For all types of armored cables

- Compact stainless-steel structure
- Fully sequential three-step installation procedure
- Reduces installation time, costs, and risks
- Suitable for indoor and outdoor installation
- Unique Compensating Displacement Seal System (CDS)
- Metal connection regardless of cable inner sheath diameter
- Internal seal against moisture ingress
- Adjustable outer seal with heavy-duty technology
- Unique OSTG line avoids constriction
- -60˚C to +130˚C
- International markings: IECEx, ATEX, and cCSAus
- Excellent electromagnetic performance

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Cable gland size	Available thread type C				Inner sheath diameter A		Cable outer diameter B		Armoring range		D between edges	D between corners	Protrusion length
	Metre	Thread length E	NPT	Thread length E	Min.	Max.	Min.	Max.	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.1	8.6	6.1	13.1	0.3	1.0	0.8	1.25	24.0
20S	M20	15.0	½"	19.9	6.1	11.6	9.5	15.9	0.3	1.0	0.8	1.25	24.0
20	M20	15.0	½"	19.9	6.5	13.9	12.5	20.9	0.4	1.0	0.8	1.25	30.5
25S	M25	15.0	¾"	20.2	11.1	19.9	14.0	22.0	0.4	1.2	1.25	1.6	37.5
25	M25	15.0	¾"	20.2	11.1	19.9	18.2	26.2	0.4	1.2	1.25	1.6	37.5
32	M32	15.0	1"	25.0	17.0	26.2	23.7	33.9	0.4	1.2	1.6	2.0	46.0
40	M40	15.0	1 ¼"	25.6	22.0	32.1	27.9	40.4	0.4	1.6	1.6	2.0	55.0
50S	M50	15.0	1 ½"	26.1	29.5	38.1	35.2	46.7	0.4	1.6	2.0	2.5	60.0
50	M50	15.0	2"	26.9	35.6	44.0	40.4	53.0	0.6	1.6	2.0	2.5	70.1



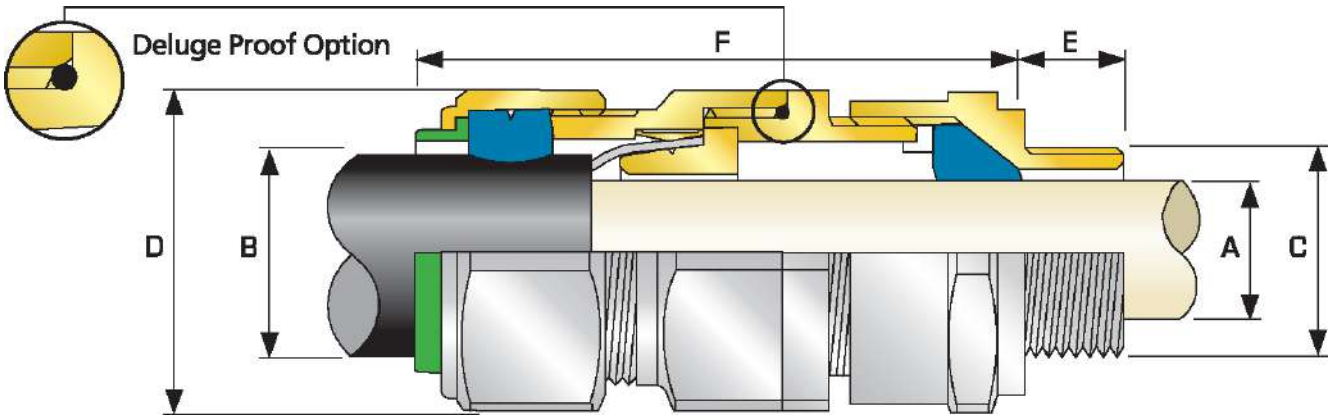
E1FW

Explosion-proof cable gland according to international standards

For all types of armored cables

- Metal-to-metal armor fastening technology
- Suitable for indoor and outdoor installation
- Refractory Internal Bias Seal
- Adjustable outer seal with heavy-duty technology
- Unique OSTG series avoids constriction
- -60˚C to +130˚C
- International markings: IECEx, ATEX, and cCSAus
- Excellent electromagnetic performance

Explosion protection marking Ex d IIC Gb, Ex e IIC Gbb



Cable gland size	Available thread type C				Inner sheath diameter A		Cable outer diameter B		Armoring range		D between edges	D between corners	Protrusion length
	Метр.	Длина резьбы "E"	NPT	Длина резьбы "E"	Мин	Макс	Мин	Макс	Мин	Макс			
20S16	M20	15.0	½"	19.9	3.1	8.6	6.1	13.1	0.8	1.25	24.0	26.4	72.5
20S	M20	15.0	½"	19.9	6.1	11.6	9.5	15.9	0.8	1.25	24.0	26.4	70.0
20	M20	15.0	½"	19.9	6.5	13.9	12.5	20.9	0.8	1.25	30.5	33.6	73.0
25S	M25	15.0	¾"	20.2	11.1	19.9	14.0	22.0	1.25	1.6	37.5	41.3	89.0
25	M25	15.0	¾"	20.2	11.1	19.9	18.2	26.2	1.25	1.6	37.5	41.3	89.0
32	M32	15.0	1"	25	17.0	26.2	23.7	33.9	1.6	2.0	46.0	50.6	86.0
40	M40	15.0	1 ¼"	25.6	22.0	32.1	27.9	40.4	1.6	2.0	55.0	60.5	90.0
50S	M50	15.0	1 ½"	26.1	29.5	38.1	35.2	46.7	2.0	2.5	60.0	66.0	91.0
50	M50	15.0	2"	26.9	35.6	44.0	40.4	53.0	2.0	2.5	70.1	77.1	95.0

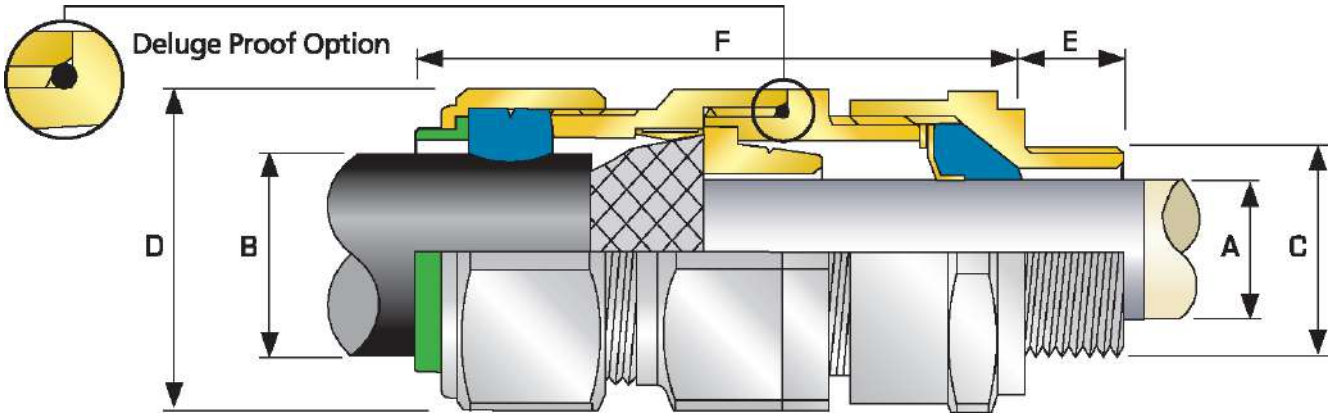
E1FX

Explosion-proof cable gland according to international standards

For cables with braid and steel tape armor

- Metal-to-metal armor fastening technology
- Suitable for indoor and outdoor installation
- Refractory Internal Bias Seal
- Adjustable outer seal with heavy-duty technology
- Unique OSTG line avoids constriction
- -60˚C to +130˚C
- International markings: IECEx, ATEX, and cCSAus
- Excellent electromagnetic performance

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Cable gland size	Available thread type C				Inner sheath diameter A		Cable outer diameter B		Armoring range		D between edges	D between corners	Protrusion length
	Metre	Thread length E	NPT	Thread length E	Min.	Max.	Min.	Max.	Min.	Max.			
20S16	M20	15.0	½"	19.9	3.1	8.6	6.1	13.1	0.3	1.0	24.0	26.4	72.5
20S	M20	15.0	½"	19.9	6.1	11.6	9.5	15.9	0.3	1.0	24.0	26.4	70.0
20	M20	15.0	½"	19.9	6.5	13.9	12.5	20.9	0.4	1.0	30.5	33.6	73.0
25S	M25	15.0	¾"	20.2	11.1	19.9	14.0	22.0	0.4	1.2	37.5	41.3	89.0
25	M25	15.0	¾"	20.2	11.1	19.9	18.2	26.2	0.4	1.2	37.5	41.3	89.0
32	M32	15.0	1"	25.0	17.0	26.2	23.7	33.9	0.4	1.2	46.0	50.6	86.0
40	M40	15.0	1 ¼"	25.6	22.0	32.1	27.9	40.4	0.4	1.6	55.0	60.5	90.0
50S	M50	15.0	1 ½"	26.1	29.5	38.1	35.2	46.7	0.4	1.6	60.0	66.0	91.0
50	M50	15.0	2"	26.9	35.6	44.0	40.4	53.0	0.6	1.6	70.1	77.1	95.0

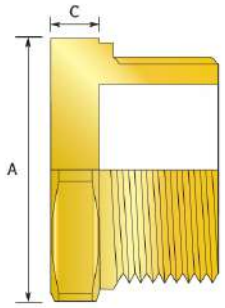
757

HEXAGON STOPPER PLUG

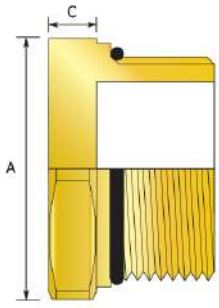
International standards-compliant accessory for explosion-proof cables and conduits

- Serves to block unused cable glands
- It can be used as a temporary or permanent gland blocker
- Available in general and industrial versions
- There is a contact surface for O-rings
- Nylon version only available with Ex e certification (-20 ˚C to +60 ˚C)
- -60˚C to 200˚C (metal)
- International markings: IECEx, ATEX, cCSAus, and UL

Explosion protection marking Ex d IIC Gb, Ex e IIC Gbb



757 Series Stopper Plug



757 Series Stopper Plug with optional 'O' ring

Thread size	Minimum thread length	Distance between opposite faces A	Diameter between opposite corners	Protrusion length C
M16 X 1.5	15.0	22.0	24.2	5.0
M20 X 1.5	15.0	24.0	26.4	5.0
M25 X 1.5	15.0	30.0	33.0	5.0
M32 X 1.5	15.0	36.0	39.6	5.0
M40 X 1.5	15.0	46.0	50.6	5.0
M50 X 1.5	15.0	55.0	60.5	5.0

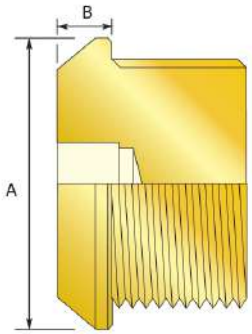
767

FLAT-CONVEX STOPPER PLUG

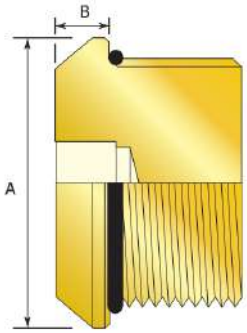
International standards-compliant accessory for explosion-proof cables and conduits

- Serves to block unused cable glands
- It can be used as a temporary or permanent gland blocker
- Available in general and industrial versions
- There is a contact surface for O-rings
- Nylon version only available with Ex e certification (-20 ˚C to +60 ˚C)
- -60˚C to 200˚C (metal)
- International markings: IECEx, ATEX, cCSAus, and UL

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



767 Series Stopper Plug



767 Series Stopper Plug with optional 'O' ring

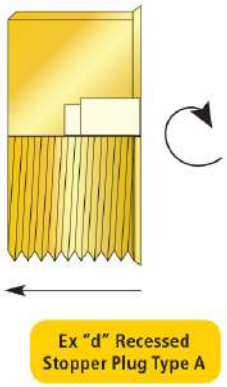
Thread size	Minimum thread length	Head diameter A	Protrusion length B	Hex wrench size A/F
M16 X 1.5	15.0	22.0	5.5	M8
M20 X 1.5	15.0	27.0	5.5	M10
M25 X 1.5	15.0	30.0	5.5	M10
M32 X 1.5	15.0	36.0	5.5	M10
M40 X 1.5	15.0	46.0	5.5	M10
M50 X 1.5	15.0	55.0	5.5	M10

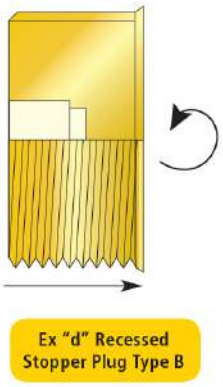
747

TRUNCATED CAP

- Serves to block unused cable glands
- It can be used as a temporary or permanent solution
- Vandal-resistant version available (Type B)
- General and industrial versions are available
- Nylon version only available with Ex e certification (-20 ˚C to +60 ˚C)
- -60˚C to 200˚C (metal)
- International markings: IECEx, ATEX, cCSAus, and UL

Explosion protection marking
II 2G Ex db IIC Gb,
Ex eb IIC Gb,
II 1D Ex ta IIIC Da
IM 2 Ex db I Mb,
Ex eb I Mb





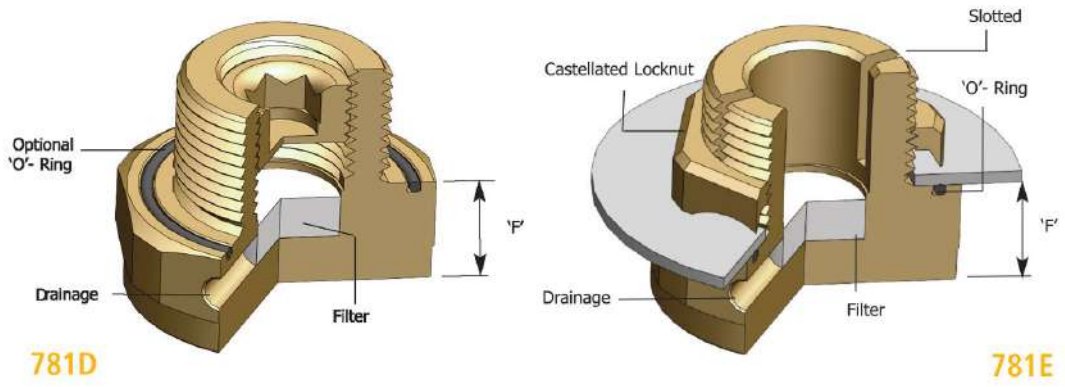
Thread size	Minimum thread length	Hex key size, A/F
M16 X 1.5	15.0	M8
M20 X 1.5	15.0	M10
M25 X 1.5	15.0	M10
M32 X 1.5	15.0	M10
M40 X 1.5	15.0	M10
M50 X 1.5	15.0	M10

781

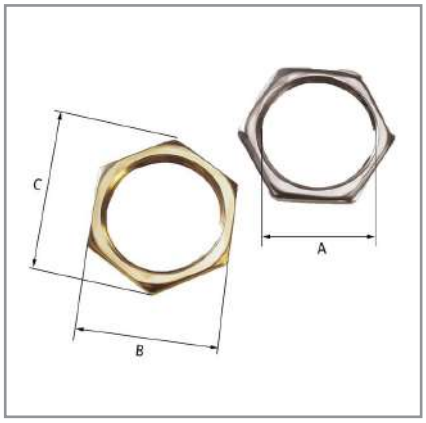
DRAIN STOPPER PLUG
International standards-compliant accessory for explosion-proof cables and conduits

- 781E for Ex e environment
- 781D for Ex d environment
- Designed to drain the liquid in devices that accumulate moisture
- Provides air circulation in the equipment
- Versions available for general and industrial versions
- Nylon version only available with Ex e certification (-20 ˚C to +60 ˚C)
- -60˚C to 130˚C (metal)
- International markings: IECEx, ATEX, and cCSAus

Explosion protection marking Ex d IIC Gb, Ex e IIC Gb



Thread size	Minimum thread length	Protrusion length F	Distance from one edge to the opposite	Distance between corners	Maximum Tightening Torque (NM)
M20 x 1.5	15.0	12.7	30.0	33.0	7
M25 x 1.5	15.0	12.7	36.0	39.6	10
½" NPT	19.9	12.7	30.0	33.0	7
¾" NPT	20.2	12.7	36.0	39.6	10



JAM NUT

Thread Diameter	Min. thickness	Distance B	Distance C
Metric			
M16 X 1,5	3,2	22	25.4
M16 X 1,5	5.0	22.0	25.4
M20 X 1,5	3,2	24	27.7
M20 X 1.5	5.0	24.0	27.7
M25 X 1,5	3,2	30	34.6
M25 X 1.5	5.0	30.0	34.6
M32 X 1,5	3,2	36	41,6
M32 X 1.5	5.0	36.0	41,6
M40 X 1,5	4,8	46	53.1
M50 X 1,5	6.3	55	63.5
NPT			
1/2" NPT	4.8	27	31.2
3/4" NPT	4.8	33	38.1
1" NPT	4.8	41	47.3
1 1/4" NPT	4.8	50	57.7
1 1/2" NPT	5.0	60.0	69.3
2" NPT	5.0	75	88.6

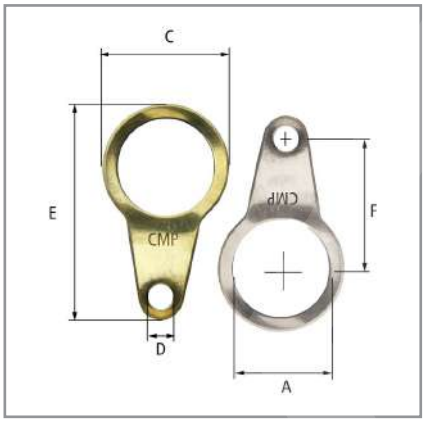
WAVY WASHER

Diameter A	Min. thickness	Outer Diameter B	Diameter A	Min. thickness	Outer Diameter B
M16	3.9	25.5	1/2" NPT	3.9	32.5
M20	3,9	32.5	3/4" NPT	3.9	40.0
M25	3,9	40.0	1" NPT	3.9	43.5
M32	3,9	43.5	1 1/4" NPT	3.9	64,5
M40	3,9	64,5	1 1/2" NPT	3.9	80.0
M50	3,9	80.0	2" NPT	3.9	100.0

They are made of stainless steel. These vibration-resistant washers are installed inside the equipment before the jam nut and act as an anti-vibration device to prevent accidental unscrewing of the cable gland or the cable gland and jam nut during operation.

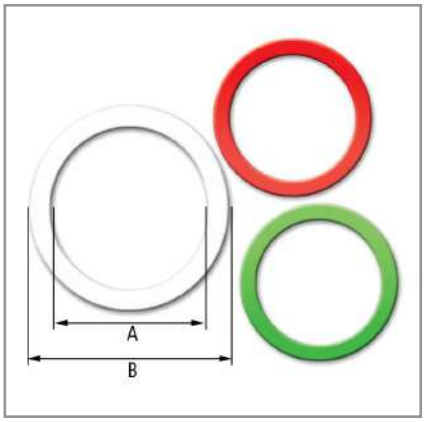
According to paragraph 6.4.1 of IEC 60079-14, unintentional loosening of the fastener must be avoided. Relative vibrations can cause this over a long period without vibration and thermal effects of varying temperatures caused by temperature variations or dissimilar clamping materials.

GROUNDING RINGS



Diameter A	Min. thickness	Rated diameter C	Hole size D	Rated length E	Rated centers F
Metric					
M16	1,3	25,4	M6	50,4	30.2
M20	1,3	27.1	M6	52.3	33.1
M25	1,5	35,1	M6	59,2	35,6
M32	1,5	45,2	M12	77	43,1
M40	1,5	53,7	M13	88,7	45,4
M50	1,5	65,2	M13	111.2	58,1
NPT					
1/2 NPT	1.3	27.1	M6	52.9	33.1
3/4 NPT	1.5	35,1	M6	59,2	35.6
1 NPT	1.5	45,2	M12	77	43.1
1 1/4 NPT	1.5	53,7	M13	88,7	45.4
1 1/2 NPT	1.5	65,2	M13	111.2	58.1
2 NPT	1.5	82,6	M13	128.7	66.8

SEALING WASHER FOR INPUT THREAD



Diameter A	Min. thickness	Outer Diameter B
Metric		
M16	2.0	25.8
M20	2.0	28.3
M25	2.0	34.45
M32	2.0	44.2
M40	2.0	52.8
M50	2.0	64.8
NPT		
½" NPT	2.0	29.65
¾" NPT	2.0	34.4
1" NPT	2.0	44.4
1 ¼" NPT	2.0	55.9
1 ½" NPT	2.0	64.8
2" NPT	2.0	77.6

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