KOPEX-Ex™

Kopex-Ex™ Hazardous Location Conduit Systems

In this section...

Kopex-Ex™ Hazardous Location Conduit Systems

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Overview

Section 1: Introduction to Kopex

Kopex has been a manufacturer and supplier of electrical conduit systems since 1947 and is a recognized authority in all aspects of conduit system specification, design and manufacture.

As a world leader, Kopex offers an outstanding range of metallic and non-metallic conduit fittings and accessories for all applications, including hazardous areas, with its Kopex-Ex™ range.

Kopex-Ex offers global support with distributors and retailers in all areas of the world. If you are ordering products, looking for advice or making a general enquiry, Kopex-Ex distributors are fully trained in all aspects of the product range.

Our rigorous quality standards and a dedicated design and development program ensure that Kopex-Ex™ products are not only of the highest specification and reliability, but also meet many worldwide standards.

Kopex-Ex™ excels in delivering critical system protection across industrial and automotive applications, with leading brands such as Adaptaflex® and Harnessflex®.

Section 2: Introduction to Hazardous Areas

The information given in this catalog is intended to provide an insight into the products offered by Kopex-Ex™ for use in hazardous areas. We will outline the areas that are designated as hazardous, explain the reasons for the designation and the supporting legislation. In addition, we will outline what products can be used, as well as point out potential advantages in using our products over those of our competitors.

Please note that we can only give general advice on the application of our products, and we presume that the personnel working in these areas are fully qualified to determine the appropriate product for a particular installation. It should also be highlighted that in normal circumstances, it is the plant owner or operator who is responsible for plant safety and for ensuring that all products used therein meet the necessary codes of practice.

2.1 Explosive Atmospheres

The danger of explosion exists in all hazardous areas, and it is important to understand what constitutes an explosive atmosphere. This occurs when gas, vapor, mist, dust or flyings are mixed with air in such proportions that it has the potential to catch fire or explode.

Three things need to be present for an explosion to occur:

1. Flammable gas, vapor, mist, dust or flyings with
2. Air in the correct ratio, ignited by an
3. Ignition source (i.e. electrical spark)

This is commonly known as the “Ignition Triangle.”

Flammable Materials

The classification of flammable materials includes several key characteristics including:

- Relative Density: This is the density of the gas, vapor or dust relative to the density of air.
- Flash Point: This is the minimum temperature at which a vapor/air mixture forms over the surface of the liquid that can be ignited by a separate source.
- Flammable Limit: This is the upper or lower explosive limit at which a substance will ignite (mixture percentage of gas/dust to air), i.e. methane LEL 4.4%, UEL 17%.

Minimum Ignition Energy (MIE)

This is the lowest energy that is sufficient to effect ignition of the most easily ignitable explosive atmosphere under specified test conditions.

Sources of Ignition

There are many sources of ignition that can cause an explosion:

- Sparks
- Electrical arcs
- Heat from the sun
- Static charge
- Open flames
- Engine exhausts
- Chemical reaction

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2.2 Understanding Installations

It is the responsibility of the operator to prevent conditions favorable for explosions. Measures need to be taken with respect to electrical and non-electrical products to prevent ignition.

So what does the operator need to think about when providing a safe environment?

1. In the principle design of any plant, all hazards and risks should be reduced to a minimum.
2. When installing electrical plant equipment, it should be installed, where possible, in non-hazardous areas. If this is not an option, the least hazardous area possible should be selected (see Zones below for further details).
3. All electrical equipment and wiring connections need to be designed, installed, operated and maintained so that they do not become an ignition source.

There are also three requirements that electrical equipment must satisfy:

1. Construction and installation has to comply with the regulations and requirements for use in a hazardous areas (this may be country specific).
2. All electrical products have to be installed to the manufacturer's instructions and follow any constraints/limitations that any certification requires. (For example, if the product is certified as a component, then the piece of equipment that it is attached to may need to be tested and certified with this component in-situ.)
3. On completion of an installation, an inspection should be carried out by a competent body.

Zones/Classes

Hazardous zones/classes are defined in order to assess their risk and cite relevant measures to prevent ignition of flammable gases and dusts. The classifications of zones and divisions are laid down in the relevant standards. The classification of a zone or division can comprise the following data:

1. Area classification drawings.
2. Information on ventilation/air conditioning that may affect a hazardous area.
3. Details on the sources of release of gases and dusts.
4. Details of the flammable substances stored or being handled.

2.3 Product Marking Guide

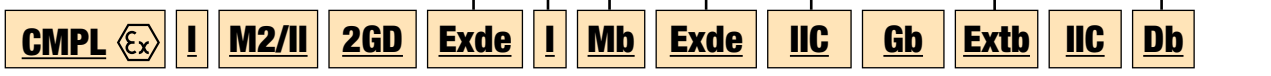
Classification of Equipment for Use in Potentially Explosive Atmospheres

CLASSIFICATION OF HAZARDOUS AREAS		EUROPEAN/IEC OR NEC CLASSIFICATIONS		
FLAMMABLE SUBSTANCES	Temporary behavior of flammable substances in hazardous places	TYPICAL ZONES	REQUIRED MARKING FOR INSTALLATION: EQUIPMENT GROUP	REQUIRED MARKING FOR INSTALLATION: EQUIPMENT PROTECTION LEVEL
Gases Vapors	Is present continuously or for long periods or frequently	Zone 0	II	Ga
	Is likely to occur in normal opertion occasionally	Zone 1	II	Gb
	Is not likely to occur in normal operation but, if it does occur, will persist for a short period of time.	Zone 2	II	Gc
Dusts	Is present continuously or for long periods or frequently	Zone 20	III	Da
	Is likely to occur in normal opertion occasionally	Zone 21	III	Db
	Is not likely to occur in normal operation but, if it does occur, will persist for a short period of time.	Zone 22	III	Dc
Methane Dusts	—	Mines	I	Ma
	—	Mines	I	Mb

SUBDIVISION OF GASES AND VAPORS

Apparatus may be used in group	GASES AND VAPORS			
IIA	Ammonia Methane Ethane Propane	Ethyl Alcohol Cyclohexane N-Butane	Gasoline N-Hexane	Acetaldehyde
IIB	Town gas, Acrylnitril	Ethylene Ethylene Oxide	Ethylene Glycol Hydrogen Sulphide	Ethyl-Ether
IIC	Hydrogen	Ethine (acetylene)	Sulphide of Carbon	

DUST	
IIIA	Combustible Flyings
IIIB	Non-Conductive Dust
IIIC	Conductive Dust



(Product stamp detail)

CLI.DIV1.ABCD | **CLII.DIV1.EFG**

(Class & Divisions)

CLI (Class I), Div. 1 — Where ignitable concentrations of flammable gases, vapors or liquids are present within the atmosphere under normal operation conditions.

CLI (Class I), Div. 2 — Where ignitable concentrations of flammable gases, vapors or liquids are present within the atmosphere under abnormal operation conditions.

Class I Areas — Group A: Acetylene; Group B: Hydrogen; Group C: Propane and Ethylene; Group D: Benzene, Butane and Propane.

CLII (Class II), Div. 1 — Where ignitable concentrations of combustible dusts are present within the atmosphere under normal operation conditions.

CLII (Class II), Div. 2 — Where ignitable concentrations of combustible dusts are present within the atmosphere under abnormal operation conditions.

Class II Areas — Group E: Metal Dust; Group F: Carbon and Charcoal; Group G: Flour, Starch, Wood and Plastic.

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RETRICTION FOR USING APPARATUS	
Requirements	MARKING
Equipment without restriction	—
Equipment with special condition may be noted	X
Ex component, which is not intended to be used alone and requires additional certification before being used in hazardous area	U

PROTECTION TECHNIQUE			
APPLICATION	TYPE OF PROTECTION	MARKING	EN/IEC STANDARD
All Applications	General Requirements	—	60079-0
Control Stations, Motors, Fuses, Switchgear, Power Electronics	Flameproof enclosure	**Exd**	60079-1
Installation Materials, Motors, Luminaires	Increased Safety	**Exe**	60079-7
Measurement and Control, Automation Technology, Sensors, Actuators	Intrinsic Safety	**Exi**	60079-11
Switch and Control Cupboards, Analyzers, Computers	Pressurization	**Exp**	60079-2
Coils of Motors or Relays, Solenoid Valves	Encapsulation	**Exm**	60079-18
Transformers, Relays, Control Stations, Magnetic Contactors	Oil Immersion	**Exo**	60079-6
Capacitors, Transformers	Powder Filling	**Exq**	60079-5
See at the Top — Only for Zone 2	"Non-Sparking"	**Exn**	60079-15
For Use in Zone 0, 1, 2/For Use in Zone 1, 2	Dust Atmospheres	**Ext**	60079-31

IECEx SIRA09.0103 X

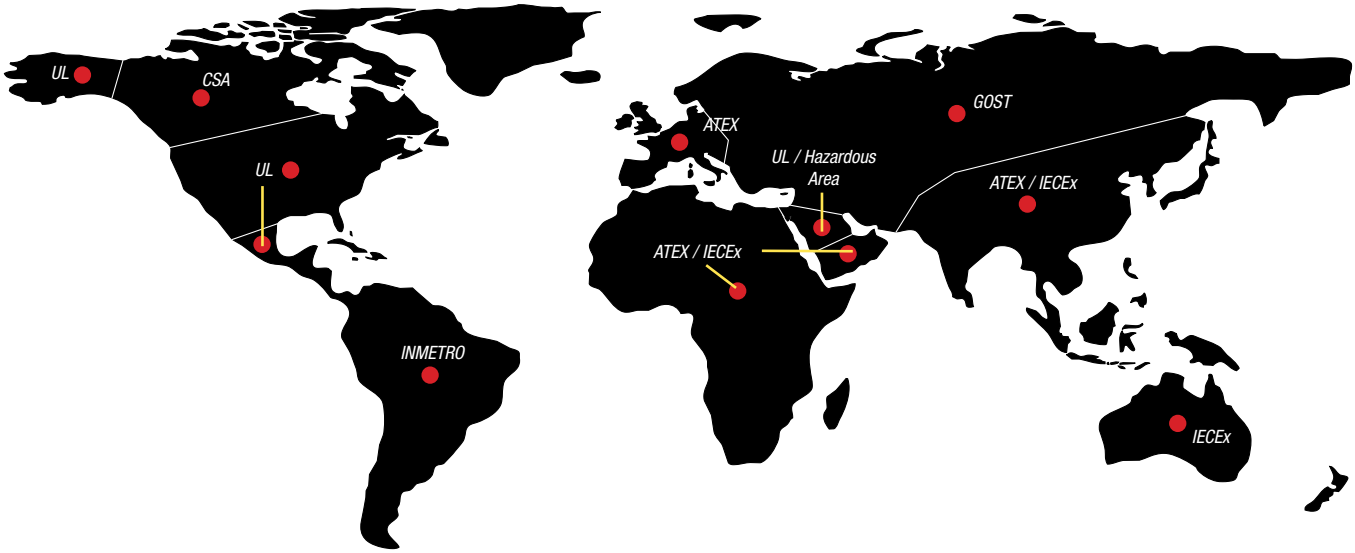
(Certification Number)

New Marking — EPLs (Explosion Protection Levels)

The introduction of the EPLs and changes in the EN 60079 series standard has introduced new marking requirements.

Section 3: Standards and What They Mean

In this section, we outline the different standards used throughout the world and what they mean for products specified for use in hazardous areas. Below is a map of the world that illustrates the standards generally used in these regions.



3.1 The ATEX Europe Directives 94/9/EC

ATEX requires employers to eliminate or control risks from dangerous substances and to classify areas where explosive atmospheres may occur into zones, as laid down in regulations. ATEX directives are designed to protect employees, the public and the environment from accidents caused by explosive atmospheres. Since July 1, 2006, all existing sites, as well as new sites, must be fully ATEX compliant.

Directive ATEX100a applies to equipment suppliers and manufacturers; ATEX137 applies to end users. These directives complement each other but have different purposes. ATEX100A covers both electrical and non-electrical products intended for use in hazardous areas, including mechanical equipment. The directive came into existence in 2003, and products sold within the European Union designed for use in hazardous areas must have ATEX certification and bear the ATEX marking on the product or on a certificate plate. The obligation is placed upon the manufacturer or supplier of the product, and the intention is to facilitate free movement of goods within the EU.

Declaration of Conformance

This has to be issued by the supplier for every order that is to be installed in a hazardous area. This document has to show that the equipment supplied complies with the latest harmonized standard.

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Zone Definitions (as per ATEX 60079-10)

Zone 0

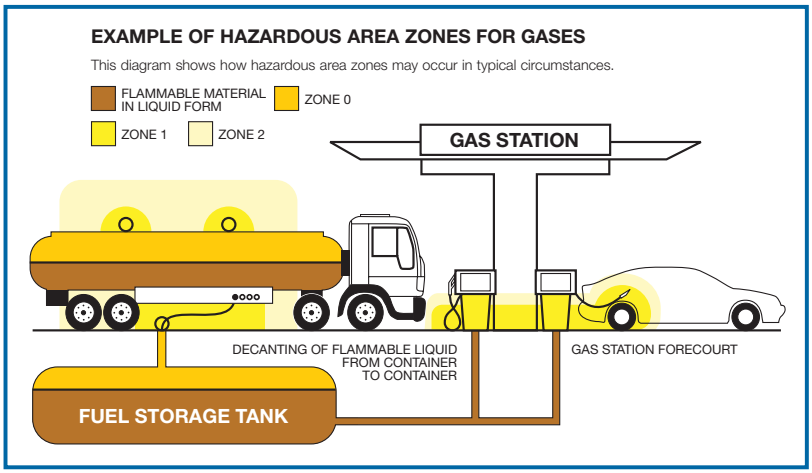
Place in which an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapor or mist is present continuously, for long periods or frequently.

Zone 1

Place in which an explosive mixture of air, gas, vapor or mist is likely to occur during normal operation, occasionally.

Zone 2

Place in which an explosive atmosphere consisting of a mixture of air and flammable substances in the form of gas, vapor or mist is not likely to occur in normal operation but, if it does occur, will persist for a short period only.



Zone 20

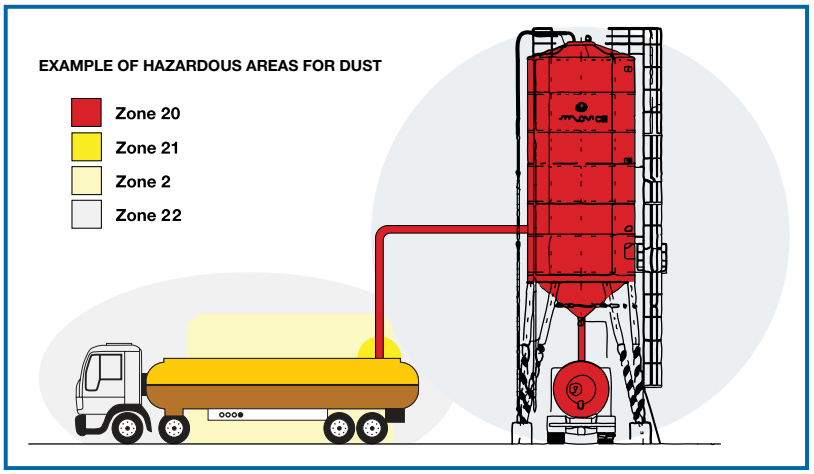
Area in which an explosive atmosphere in the form of a cloud of combustible dust in air is present continuously, or for long periods or frequently.

Zone 21

Area in which an explosive atmosphere in the form of a cloud of combustible dust in air is likely to occur in normal operation, occasionally.

Zone 22

Area in which an explosive atmosphere in the form of a cloud of combustible dust in air is not likely to occur in normal operation but, if it does occur, will persist for a short period only.



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Forms of Protection

Safety can be adhered to using two methods: either locating the equipment in a safe area outside the hazardous area or by having the equipment designed, installed and maintained to the standards for that area. There are a number of standards that equipment can be designed to meet. To understand this, we need to explain the different forms of protection.

Exd (Flameproof Enclosure Type D)

Equipment that includes electrical components may arc or spark in an atmosphere that is explosive. The construction of this equipment needs to be designed to prevent transmission of an explosion to an explosive gas atmosphere surrounding the enclosure. This equipment must be inspected to ensure that the integrity of the product is maintained as per the manufacturer's instructions.

Exe (Increased Safety Enclosures Type E)

This relates to equipment that may have mixtures of explosive dusts and gases within them but is not designed to withstand an internal explosion. Instead, the likelihood of explosion is reduced by the following conditions:

- Components fitted within the equipment shall not produce a spark/arc in normal operation that can ignite an explosive atmosphere
- Electrical equipment maintains a high level of reliability
- Electrical products need to meet a minimum level ingress protection of IP54
- Electrical products should have a high impact resistance

Exde

A combination of Exd and Exe type enclosures.

Exi

This applies to intrinsically safe equipment. These are products that incorporate circuits which, due to low energy potential, are not capable of igniting an explosive atmosphere. This section is split down into Ex ia for equipment in Zone 0/20, Ex ib for Zone 1/21 and Ex ic for Zone 2/22.

ATEX Kopex-Ex™ Products

RANGE NAME	ATEX NUMBER	STANDARD
Nylon Conduit Systems Anti-Static	BASEEFA08 ATEX0003X	EN60079-0:2006 EN60079-7:2007 EN61241-0:2006 EN61241-1:2004
Flameproof Conduit Glands Group II	BASEEFA06 ATEX0256X	EN60079-0:2004 EN60079-1:2003 EN60079-7:2001 EN61241-0:2004
Group I Glands G1, E, U	SIRA09A ATEX1231X	EN61241-1:2004
Thread Converters, Reducers, Enlargers	BASEEFA07 ATEX0247X	EN60079-0:2006 EN60079-1:2004 EN60079-7:2003 + Amendments EN61241-0:2004 EN61241-1:2004
Standard Stopping Plugs	BASEEFA08 ATEX6324	EN60079-0:2004 EN60079-1:2007
Tamper-Proof Stopping Plugs	BASEEFA08 ATEX6324	EN60079-0:2004 EN60079-1:2007
Hex-Head Stopping Plugs	BASEEFA08 ATEX0325X	EN60079-0:2006 EN60079-7:2007 EN61241-0:2004 EN61241-1:2004
Dome-Head Stopping Plugs	BASEEFA08 ATEX0325X	EN60079-0:2006 EN60079-7:2007 EN61241-0:2004 EN61241-1:2004
Nylon Cable Glands	SIRA00 ATEX1072X	
Nylon Stopping Plugs	SIRA00 ATEX1074X	EN50014:1997 EN50018:2000 EN50281-1-1:1998

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Kopex-Ex™ Products to Zones Comparison Chart

ZONES	PRODUCTS		
Zone 0, 20	No products certified		
Zones 1, 2, 21, 22	Nylon conduit systems Standard stopping plugs Dome-head stopping plugs	Liquidtight conduit systems Tamper-proof stopping plugs Nylon glands	Thread converters Hex-head stopping plugs Nylon stopping plugs

Kopex-Ex™ Protection Table

FORMS OF PROTECTION	DESCRIPTION OF FORM	KOPEX-EX PRODUCT RANGE
Exe (Increased Safety)	Designed to prevent ignition	Nylon conduit systems Liquidtight conduit glands Thread converters Hex-head stopping plugs Dome-head stopping plugs Nylon glands Nylon stopping plugs
Exd (Flameproof Enclosure)	Designed to prevent transmission	Liquidtight conduit glands Conduit gland Thread converters Standard stopping plugs Tamper-proof stopping plugs
Ext (Dust Environment)		Nylon conduit systems Conduit glands Thread converters Standard stopping plugs Tamper-proof stopping plugs

3.2 Hazardous Areas Class and Division or Class and Zone

Class I Div. 1

1. Location in which ignitable concentrations of flammable gases or vapors can exist under normal operating conditions.
2. Location in which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage.
3. Location in which breakdown or faulty operation of equipment or processes might release ignitable concentration of flammable gases or vapor and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.

Class I Div. 2

1. Location in which volatile flammable liquids or flammable gases are handled, processed or used, but in which the liquids, vapors or gases normally confined within closed containers or closed systems can escape only if there is an accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment.
2. Location in which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation and which might become hazardous through failure or abnormal operation of the ventilation equipment.
3. Location that is adjacent to a Class I Div. 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Class II

Locations are those that are hazardous because of the presence of combustible dust.

Class II Div. 1

1. Location in which combustible dust is in the air under normal operating conditions in quantities sufficient to produce explosive or ignitable mixtures.
2. Location where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition though simultaneous failure or electric equipment, through operation of protection devices or from other causes.
3. Location in which Group E combustible dusts (metal dusts such as aluminium, magnesium and their alloys) may be present in quantities sufficient to be hazardous.

Class II Div. 2

1. Location in which combustible dust due to abnormal operations may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.
2. Location where combustible dust accumulations are present but are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus, but could as a result of infrequent malfunctioning of handling or processing equipment become suspended in the air.
3. Location in which combustible dust accumulations on, in or in the vicinity of the electrical equipment could be sufficient to interfere with the safe dissipation of heat from electrical equipment, or could be ignitable by abnormal operation or failure of electrical equipment.

Class III

Locations are those that are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures.

Class III Div. 1

Location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured or used. Includes rayon, cotton, jute, hemp, cocoa fiber and similar materials.

Class III Div. 2

Location in which easily ignitable fibers are stored or handled other than in the process of manufacture.

Class I Group Classifications

Group A: Acetylene

Copper(I) acetylide (or cuprous acetylide) is an inorganic chemical compound with the formula Cu_2C_2. It is a heat- and shock-sensitive high explosive, more sensitive than silver acetylide. Copper acetylide can be prepared by passing acetylene gas through a copper(I) chloride solution in presence of ammonia: $C_2H_2 + (2)CuCl \rightarrow Cu_2C_2 + (2)HCl$.

Copper acetylide can form inside pipes made of copper or an alloy with high copper content, which may result in a violent explosion. This was found to be the cause of explosions in acetylene plants, and it led to the abandonment of copper as a construction material in such plants. Copper catalysts used in petrochemistry can also possess a degree of risk under certain conditions.

Group B

Flammable gas, flammable liquid-produced vapor or combustible liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value less than or equal to 0.45mm or a minimum igniting current (MIC) ratio less than or equal to 0.40.

Group C

Flammable gas, flammable liquid-produced vapor or combustible liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value greater than 0.45mm and less than or equal to 0.75mm, or a minimum igniting current (MIC) ratio greater than 0.40 and less than or equal to 0.80.

Group D

Flammable gas, flammable liquid-produced vapor or combustible liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value greater than 0.75mm or a minimum igniting current (MIC) ratio greater than 0.80.

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Class II Group Classifications

Group E

Atmospheres containing combustible metal dusts (including aluminium, magnesium and their commercial alloys) or other combustible dusts whose particle size, abrasiveness and conductivity present similar hazards in the use of electrical equipment.

Group F

Atmospheres containing combustible carbonaceous dusts that have more than 8 percent total entrapped volatiles or that have been sensitized by other materials so that they present an explosion hazard. Coal, carbon black, charcoal and coke dusts are examples of carbonaceous dusts.

Group G

Atmospheres containing combustible dusts not included in Group E or F, including flour, grain, wood, plastic and chemicals.

Protection Techniques

Explosion-Proof Apparatus — Class I Div. 1 or Div. 2

Apparatus enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor that may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes or explosion of the gas or vapor within, and that operates at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby.

Dust Ignition Proof — Class II Div. 1 or Div. 2

Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure.

Dust Tight — Class II Div. 2 or Class III Div. 1 or Div. 2

Enclosures constructed so that dust will not enter under specified test conditions.

Class I Zone 0, Zone 1 and Zone 2 Locations

Class I Zone 0

Location in which ignitable concentrations of flammable gases or vapors are present continuously or for long periods of time, i.e. locations inside vented tanks or vessels.

Class I Zone 1

1. Location in which ignitable concentrations of flammable gases or vapors are likely to exist under normal operating condition.
2. Location in which ignitable concentrations of flammable gases or vapors are likely to exist frequently because of repair or maintenance operations or because of leakage.
3. Location in which equipment is operated or processes are carried on, of such a nature that equipment breakdown or faulty operations could result in the release of ignitable concentrations of flammable gases or vapors and also cause simultaneous failure of electrical equipment in a way that causes the electrical equipment to become a source of ignition.
4. Location that is adjacent to a Class I Zone 0 location from which ignitable concentrations of vapors could be communicated, unless communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Class I Zone 2

1. Location in which ignitable concentrations of flammable gases or vapors are not likely to occur in normal operation. If ignitable concentrations do occur, they will happen only for a short period of time.
2. Location in which volatile flammable liquids, flammable gases or flammable vapors are handled, processed or used, but in which the liquids, gases or vapors normally confined within closed containers of closed systems can escape only if there is an accidental rupture or breakdown of the containers or system or as a result of abnormal operation of the equipment with which the liquids or gases are handled, processed or used.
3. Location in which ignitable concentrations of flammable gases or vapors normally are prevented by positive mechanical ventilation but which may become hazardous as a result of failure or abnormal operation of the ventilation equipment.
4. Location that is adjacent to a Class I Zone 1 location, from which ignitable concentrations of flammable gases or vapors could be communicated, unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

Note: *The Zone 2 classification usually includes locations where volatile flammable liquids or flammable gases or vapors are used that become hazardous due to an accident or some unusual operating condition.*

Overview

Material Groups for Class I Zones 0, 1 and 2

Group I For mining, not covered by NEC®.

Group II Subdivided into IIC, IIB and IIA for protection technique "D."

Group IIC Atmospheres containing acetylene, hydrogen, flammable gas or flammable liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value less than or equal to 0.50mm or a minimum igniting current (MIC) ratio less than or equal to 0.45.

Group IIB Atmospheres containing acetaldehyde, ethylene, flammable gas, flammable liquid-produced vapor or combustible liquid-produced vapor mixed with air that may burn or explode having either a maximum experimental safe gap (MESG) value greater than 0.50mm and less than or equal to 0.90mm or a minimum igniting current (MIC) ratio greater than 0.45 and less than or equal to 0.80.

Group IIA Atmospheres containing acetone, ammonia, ethyl alcohol, gasoline, methane, propane, flammable gas or flammable liquid-produced vapor mixed with air that may burn or explode, having either a maximum experimental safe gap (MESG) value greater than 0.90mm or a minimum igniting current (MIC) ratio greater than 0.80.

MESG

The maximum experimental safe gap of flammable gases and vapors is the lowest value of the safe gap measured, according to 60079-1-1, by varying the composition of the mixture ("flame propagation in the most incendive mixture"). The safe gap is the gap width at which, in the case of a given mixture composition, a flashback just fails to occur.

MIC

The ratio derived by dividing the minimum current required from an inductive spark discharge to ignite the most easily ignitable mixture of a gas or vapor by the minimum current required from an inductive spark discharge to ignite methane under the same test conditions.

Protection Techniques

Class I Zone 1 or 2

Flameproof "D" Type of protection where the enclosure will withstand an internal explosion or flammable mixture that has penetrated the interior.

Increased Safety "E" Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service.

Wiring Methods

Class I Zone 0 Intrinsically safe only

Class I Zone 1 As Class I Zone 0
- MC-HL cable
- ITC-HL cable
- MI cable
- Rigid metallic conduit
- Rigid non-metallic conduit

Class I Zone 2 As Class I Zone 1
- Threaded rigid metal conduit
- Flexible metal conduit with listed fittings
- Liquidtight flexible metallic conduit with listed fittings
- Liquidtight flexible non-metallic conduit with listed fittings

Zones 20, 21 and 22 Locations for Combustible Dusts, Fibers and Flyings

Dust-tight enclosures constructed so that dust will not enter under specified test conditions.

Zone 20 An area in which combustible dust or ignitable fibers and flyings are present continuously or for long periods of time in quantities sufficient to be hazardous.

Zone 21 An area in which combustible dust or ignitable fibers and flyings are likely to exist occasionally under normal operation in quantities sufficient to be hazardous.

Zone 22 An area in which combustible dust or ignitable fibers and flyings are not likely to be present under normal operation in quantities sufficient to be hazardous.

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Wiring Methods

All Zones Threaded rigid metal conduit
Liquidtight metal conduit with listed fittings
Liquidtight non-metallic conduit with listed fittings

Wiring Methods

LOCATION	WIRING METHODS	KOPEX-EX™ PRODUCT RANGE
CLASS I DIV. 1	- Threaded rigid conduit or threaded steel intermediate metal conduit - Type MI cable with termination fittings - MC-HL cable for industrial establishments with restricted public access (other restrictions apply) - ITC-HL cable for industrial establishments with restricted public access (other restrictions apply)	- HA Universal Flameproof Gland with Rigid Conduit - SP/TSP Stopping Plugs - Thread Adapters
CLASS I DIV. 2	All as for Class I Div. 1: - Type PLTC cable - Type ITC cable - Type MI, MC, MV or TC cable - Flexible metal fittings - Flexible metallic conduit with listed fittings - Liquidtight flexible metal conduit with listed fittings - Liquidtight flexible non-metallic conduit with listed fittings	- All HA glands: HA - G1 HA - U HA - E HA - U/SW - SP/TSP Stopping Plugs - Thread Adapters
CLASS II DIV. 1	All as Class II Div. 1: - Threaded rigid conduit or threaded steel intermediate metal conduit - Type MI cable with termination fittings - MC-HL cable for industrial establishments with restricted public access (other restrictions apply) - Dust-tight flexible connectors - Liquidtight flexible metal conduit with listed fittings - Liquidtight flexible non-metallic conduit with listed fittings	- All HA glands: HA - G1 HA - U HA - E HA - U/SW - SP/TSP Stopping Plugs - Thread Adapters
CLASS III DIV. 1	- Rigid metal conduit, rigid non-metallic conduit, intermediate metal conduit, electrical metallic tubing, dust-tight wireways - Type MC or MI cable - Liquidtight flexible metallic conduit with listed fittings - Liquidtight flexible non-metallic conduit with listed fittings	- All HA glands: HA - G1 HA - U HA - E HA - U/SW - SP/TSP Stopping Plugs - Thread Adapters
CLASS III DIV. 2	As for Class III Div. 1	- All HA glands: HA - G1 HA - U HA - E HA - U/SW - SP/TSP Stopping Plugs - Thread Adapters

3.3 IECEx

The IECEx designation is an international certificate of conformance that applies to products used in a hazardous area.

This designation provides:

a) A single certification of conformity for manufacturers to comply with that includes:

i) Testing and assessment of products to a standard, including a full test report

ii) Ongoing surveillance of manufacturer's premises

b) A fast-track process for countries where regulations still require the issuing of national Ex certificates or approvals

This designation is gradually being adopted by all the known standards organizations across the world.

IECEx Kopex-Ex™ Products

RANGE NAME	IECEX NUMBER	STANDARD
NYLON CONDUIT SYSTEMS ANTI-STATIC	IECEx BAS08.0001X	IEC60079-0:2006 IEC60079-7:2007 IEC61241-0:2006 IEC61241-1:2004
FLAMEPROOF CONDUIT GLANDS	IECEx BAS06.0059X	IEC60079-0:2004 IEC60079-1:2003 IEC60079-7:2001
GROUP 1 GLANDS G1, U, E	IECEx SIRA09.0103X	IEC61241-0:2004 IEC61241-1:2004
THREAD CONVERTERS REDUCERS ENLARGERS	IECEx BAS07.0090X	IEC60079-0:2006 IEC60079-1:2004 IEC60079-7:2003 + Amendments IEC61241-0:2004 IEC61241-1:2004
STANDARD STOPPING PLUGS	IECEx BAS08.0109X	IEC60079-0:2004 IEC60079-1:2007
TAMPER-PROOF STOPPING PLUGS	IECEx BAS08.0109X	IEC60079-0:2004 IEC60079-1:2007
HEX-HEAD STOPPING PLUGS	IECEx BAS08.0108X	IEC60079-0:2006 IEC60079-7:2007 IEC61241-0:2004 IEC61241-1:2004
DOME-HEAD STOPPING PLUGS	IECEx BAS08.0108X	IEC60079-0:2006 IEC60079-7:2007 IEC61241-0:2004 IEC61241-1:2004

3.4 UL® (America) and CSA (Canada)

The American standard is the only one to have different classifications and locations. ATEX and IECEx designate Groups and Zones whereas the NEC® designates Classes and Divisions — and there is no direct comparison between the two. This means it is imperative that the American and international standards' designations are not interchanged within an area.

3.5 GOST (Russia)

GOST follows rules similar to IECEx as far as the breakdown of the Zones and other criteria are concerned. However, Russia requires separate GOST markings on a product.

GOST is divided into GOST (R), which is the standard for the Russian Federation, and GOST (K), which is the standard for Kazakhstan.

Section 4: Equipment vs. Component

Within the ATEX and IECEx standards, hazardous area products can be classified as Equipment Restricted, Equipment Unrestricted or Components.

This is symbolized in the part marking by a character immediately following the certificate number:

10ATEX1234	Equipment for use without restriction
10ATEX1234X	Equipment for use under special conditions or restrictions (outlined in certificate schedule)
10ATEX1234U	Component not intended to be used alone and requires additional certification when in-situ (partial certificate can form basis for testing)

Products certified as pieces of equipment can be used with any other piece of certified equipment without the need for product or installation testing. However, products certified as components will require further testing when in-situ to confirm the overall assembly of finished product complies with and meets the requirements of the ATEX standard.

4.1 Kopex-Ex™ Classifications

PRODUCT	ATEX CLASSIFICATION	RESTRICTIONS/CONDITIONS
Non-Metallic Conduit System	Equipment	Conduit and gland must be used together
HA-GI Barrier Glands	Equipment	IP must be maintained upon installation
HA-U Universal Glands	Equipment	IP must be maintained upon installation
HA-GII Barrier Glands	Equipment	IP must be maintained upon installation
Thread Converters	Equipment	IP must be maintained upon installation
SP Stopping Plugs	Equipment	None
TSP Stopping Plugs	Equipment	None
HSP Stopping Plugs	Equipment	IP must be maintained upon installation
DSP Stopping Plugs	Equipment	IP must be maintained upon installation
Couplers	Component	Must be certified in conjunction with usage

4.2 UL®/CSA Classifications

Unlike ATEX and IECEx, UL®/CSA do not classify products as Equipment or Components. Instead, they are simply "Listed" for consumer use or "Recognized" as approved components. All Kopex-Ex™ products are Listed products and can be used with the following limitations:

UL®/CSA Classifications

PRODUCT	UL/CSA HAZLOC	RESTRICTIONS/CONDITIONS
HA-GI Barrier Glands	Class I Div. 2	Flexible conduit gland
HA-U Universal Glands	Class I Div. 1	Rigid conduit only
Thread Converters	Class I Div. 1	Plated brass and stainless steel only
SP Stopping Plugs	Class I Div. 1	Plated brass and stainless steel only
TSP Stopping Plugs	Class I Div. 1	Plated brass and stainless steel only

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Section 5: Cable vs. Conduit

The feeding of electrical and data cables around a hazardous area is often complex and requires a great deal of thought. In this section, we outline the decisions that need to be made as well as list possible options from Kopex-Ex™.

5.1 Cable

Besides narrowing down selections, choosing the right cable is further complicated by requirements of Exd, which requires:

- Cable to be substantially compact and circular
- Cable to include extruded beading
- Cable to include non-hygroscopic fillers

The next thing to consider is the amount of cables required and where they are terminating. For example, if they are terminating at the same control box, then this may impact on the size of the enclosure due to size limitations of the glanding plate (see example below).

5.2 Conduit

When applying conduit systems, the cable limitations are negated because you can run cables through the conduit system. This permits multi-cores to be run through the same conduit, reducing the number of cable entries required (see examples below).

This method can have a number of benefits, and selection criteria can be greatly reduced by answering the following questions:

- Is the application Exe or Exd?
- How many cables are required? Knowing your count enables you to calculate the cable cross-sectional area to establish the conduit size.

Advantages of conduit systems:

- Easier termination of the cables
- Reduced installation time
- Greatly reduced risk of the enclosure's integrity being compromised
- Additional cables can be added without the need for drilling more entries (Exe only)
- Potential to reduce the enclosure size
- Minimized risk of damage through crushing
- Potential to run power and data through one conduit system (data needs to be screened)
- EMC can be obtained through the conduit
- Use of SWA cable not required

Exd

Exe

Exd

Exe

Overview

Section 6: Applications of Products

Exd

Skids

- Liquidtight conduit systems
- Conduit glands
- Thread converters
- Standard stopping plugs
- Tamper-proof stopping plugs

Control Boxes

- Thread converters
- Standard stopping plugs
- Tamper-proof stopping plugs

Motors

- Liquidtight conduit systems
- Conduit glands
- Thread converters
- Standard stopping plugs
- Tamper-proof stopping plugs

Lighting

- Thread converters
- Standard stopping plugs
- Tamper-proof stopping plugs

Exe

Skids

- Nylon conduit systems
- Thread converters
- Hex-head stopping plugs
- Dome-head stopping plugs
- Nylon glands
- Nylon stopping plugs

Control Boxes

- Nylon conduit systems
- Thread converters
- Hex-head stopping plugs
- Dome-head stopping plugs
- Nylon glands
- Nylon stopping plugs

Motors

- Nylon conduit systems
- Thread converters
- Hex-head stopping plugs
- Dome-head stopping plugs
- Nylon glands
- Nylon stopping plugs

Lighting

- Nylon conduit systems
- Thread converters
- Hex-head stopping plugs
- Dome-head stopping plugs
- Nylon glands
- Nylon stopping plugs

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Section 7: Product Features and Benefits

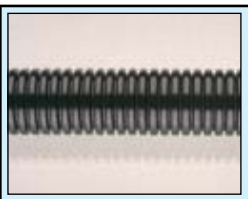
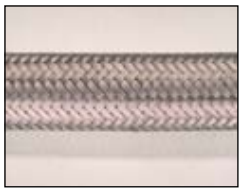
RANGE NAME	FEATURES	BENEFITS
NYLON CONDUIT SYSTEMS	Dual-certified ATEX/IECEx	Highly flexible and high strength
ANTI-STATIC	Braided versions available	No requirement for double stocking
		Reduces the amount of glanding
		Allows for running of multi-core
CONDUIT GLANDS	Certified to ATEX, IECEx and CSA	No requirement for retesting
GROUP I		Mining applications installation options
G1, U, E		High temperature can be used with rigid conduit
CONDUIT GLANDS	Dual-certified ATEX/IECEx	No requirement for retesting once installed
GROUP II		Reduces the amount of glanding
THREAD CONVERTERS	Tested as Equipment	No requirement for retesting once installed
	Dual-certified ATEX/IECEx	No requirement for double stocking
	Full identification marking	No problems on site with inspections
	Tested to the latest 60079 version	
	Certified to UL® Standard for Class I Div. 1	
STANDARD STOPPING PLUGS	Tested as Equipment	No requirement for retesting once installed
	Dual-certified ATEX/IECEx	
	Tested to the latest 60079 version	
	Certified to UL Standard for Class I Div. 1	
TAMPER-PROOF STOPPING PLUGS	Tested as Equipment	No requirement for retesting once installed
	Dual-certified ATEX/IECEx	
	Tested to the latest 60079 version	
	Certified to UL Standard for Class I Div. 1	
HEX-HEAD STOPPING PLUGS	Tested as Equipment	No requirement for retesting once installed
	Dual-certified ATEX/IECEx	IP rating guaranteed
	Sealing washers and O-rings supplied C/W	
DOME-HEAD STOPPING PLUGS	Tested as Equipment	No requirement for retesting once installed
	Dual-certified ATEX/IECEx	IP rating guaranteed
	Sealing washers and O-rings supplied C/W	

ATEX

Advice on the Latest Standards

Kopex-Ex can help you with the latest laws and directives. Just contact the Thomas & Betts Technical Support team by phone or e-mail for prompt and up-to-date advice.

Exe Application for Zones 1, 2, 21 and 22

		TEMP. RATING	SPECIAL CHARACTERISTICS	APPROVALS	MATERIAL
ANTI-STATIC POLYAMIDE 12		Static -20° C to 80° C	Specialist anti-static grade Surface resistivity 106 Ω RTI 110° C to EN60079-0	BASEEFA 08 ATEX 0003X IECEx BAS08.0001X	Anti-Static Nylon 12
OVERBRAIDED POLYAMIDE 12		Static -20° C to 80° C	EMC screening level: 60 dB at 1 MHz RTI 110° C to EN60079-0	BASEEFA 08 ATEX 0003X IECEx BAS08.0001X	Anti-Static Nylon 12 with Stainless Steel Overbraid

		TEMP. RATING	SUITABLE CONDUIT	APPROVALS	IP RATING*
STRAIGHT MALE (NICKEL-PLATED BRASS)		Static -20° C to 80° C	Unbraided Nylon Conduit EXB	BASEEFA 08 ATEX 0003X IECEx BAS08.0001X	IP66
FIXED STRAIGHT MALE (NICKEL-PLATED BRASS)		Static -20° C to 80° C	Overbraided Conduit EXBB	BASEEFA 08 ATEX 0003X IECEx BAS08.0001X	IP66

** With recommended seal and washer.*

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Liquidtight Non-Metallic Flexible Conduits and Fittings

ATEX

BRITISH CONDUIT SIZE (MM)	16	20	25	32	42	54
COIL LENGTHS (M)	10/30/50	10/30/50	10/30/50	10/30/50	10/30/50	10/30/50
MINIMUM BORE (MM)	11.15	16.45	21.5	27.5	35.2	46.2
OUTSIDE DIAMETER (MM)	16.5	21.20	28.35	34.5	42.4	54.3
COLOR						
BLACK	EXB03*	EXB04*	EXB05*	EXB06*	EXB07*	EXB08*
	EXBB03*	EXBB04*	EXBB05*	EXBB06*	EXBB07*	EXBB08*

** Add coil length to complete part number (e.g. 10 meters = EXB0510).*

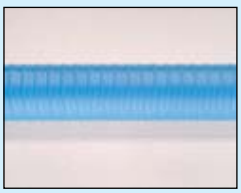
METRIC THREAD SIZE (MM)	16	20	25	32	42	54
NPT THREAD SIZE (IN.)	½	½	¾	1	1¼	1½
METRIC	EXPQM0303	EXPQM0404	EXPQM0505	EXPQM0606	EXPQM0707	EXPQM0808
NPT	EXPQA0304	EXPQA0404	EXPQA0505	EXPQA0606	EXPQA0707	EXPQA0808
METRIC FIXED	EXBQM0303	EXBQM0404	EXBQM0505	EXBQM0606	EXBQM0707	EXBQM0808
NPT FIXED	EXBQA0304	EXBQA0404	EXBQA0505	EXPBQA0606	EXBQA0707	EXBQA0808

*For locknuts and seals, see **pages E-324–E-325**.*

Liquidtight Flexible Metallic Conduit System — Galvanized Steel

Conduit Selection

See **pages E-316–E-317** for suitable Hazardous Area Glands.

GALVANIZED STEEL		GENERAL TEMP. RATING	FLAME PROPAGATION	SPECIAL CHARACTERISTICS	APPROVALS
GENERAL OIL RESISTANT		Static -25° C to 105° C Flexing -25° C to 105° C	Flame dies in less than 30 seconds after ignition source is removed	Flame-retardant PVC covering	IEC 61386
LOW FIRE HAZARD		Static -25° C to 90° C Flexing -5° C to 90° C	Flame dies in less than 30 seconds after ignition source is removed	Limited fire hazard, zero halogen (BS6425 Pt. 1)	LUL Fully Compliant (E1042A6) MOD to NES 518: Issue 3 DEF STAN 61-12 (Part 31) Issue 1 IEC 61386
HIGH TEMPERATURE		Static -50° C to 130° C Flexing -5° C to 130° C	Flame dies in less than 30 seconds after ignition source is removed	Flame resistance: (UL94V-2) Chemical and oil resistant	IEC 61386
LIMITED FIRE HAZARD FLEXIBLE		Static -25° C to 90° C Flexing -5° C to 90° C	Flame dies in 30 seconds after ignition source is removed	Limited fire hazard covering EMC screening level: 60 dB at 1 MHz braided	MOD NES 518: Issue 3 DEF STAN 61-12 (Part 31) Issue 1
HIGH FLEXIBILITY HIGH TEMPERATURE		Static -65° C to 150° C Flexing -45° C to 135° C	Flame dies in 30 seconds after ignition source is removed	High flexibility High temperature	IEC 61386

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Liquidtight Metallic Flexible Conduits

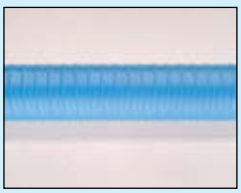
BRITISH CONDUIT SIZE (MM)	16	20	25	32	40	50	63
US TRADE SIZE (IN.)	⅜	½	¾	1	1¼	1½	2
INSIDE DIAMETER (MM)	12.5	16.0	21.0	26.4	35.3	40.4	51.6
COIL LENGTHS (M)	10/30	10/30	10/30	10/20	10/20	10/20	10/20
COLOR							
BLACK	EXLB03*	EXLB04*	EXLB05*	EXLB06*	EXLB07*	EXLB08*	EXLB09*
BLACK	EXLT03*	EXLT04*	EXLT05*	EXLT06*	EXLT07*	EXLT08*	EXLT09*
BLACK	EXLH03*	EXLH04*	EXLH05*	EXLH06*	EXLH07*	—	—
BLUE	EXLLH03*	EXLLH04*	EXLLH05*	EXLLH06*	EXLLH07*	—	—
BLACK	EXLBBT03*	EXLBBT04*	EXLBBT05*	EXLBBT06*	EXLBBT07*	EXLBBT08*	EXLBBT09*
BLACK	EXLHC03*	EXLHC04*	EXLHC05*	EXLHC06*	EXLHC07*	EXLHC08*	EXLHC09*

** Add coil length to complete part number (e.g. 10 meters = EXLB0310).*

Liquidtight Flexible Metallic Conduit System — Stainless Steel 316

Conduit Selection

See **pages E-316–E-317** for suitable Hazardous Area Glands.

STAINLESS STEEL 316		GENERAL TEMP. RATING	FLAME PROPAGATION	SPECIAL CHARACTERISTICS	APPROVALS
GENERAL OIL RESISTANT		Static -25° C to 105° C Flexing -25° C to 105° C	Flame dies in less than 30 seconds after ignition source is removed	Flame-retardant PVC covering	IEC 61386
LOW FIRE HAZARD		Static -25° C to 90° C Flexing -5° C to 90° C	Flame dies in less than 30 seconds after ignition source is removed	Limited fire hazard, zero halogen (BS6425 Pt. 1	LUL Fully Compliant (E1042A6) MOD to NES 518: Issue 3 DEF STAN 61-12 (Part 31) Issue 1 IEC 61386
HIGH TEMPERATURE		Static -50° C to 130° C Flexing -5° C to 130° C	Flame dies in less than 30 seconds after ignition source is removed	Flame resistance: (UL94V-2) Chemical and oil resistant	IEC 61386
LIMITED FIRE HAZARD FLEXIBLE		Static -25° C to 90° C Flexing -5° C to 90° C	Flame dies in less than 30 seconds after ignition source is removed	Limited fire hazard, zero halogen (BS6425 Pt. 1) EMC screening level: 60 dB at 1 MHz braided	LUL Fully Compliant (E1042A6) MOD to NES 518: Issue 3 DEF STAN 61-12 (Part 31) Issue 1 IEC 61386
HIGH FLEXIBILITY HIGH TEMPERATURE		Static -65° C to 150° C Flexing -45° C to 135° C	Flame dies in less than 30 seconds after ignition source is removed	High flexibility High temperature	IEC 61386

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Liquidtight Metallic Flexible Conduits

BRITISH CONDUIT SIZE (MM)	16	20	25	32	40	50	63
US TRADE SIZE (IN.)	⅜	½	¾	1	1¼	1½	2
INSIDE DIAMETER (MM)	12.5	16.0	21.0	26.4	35.3	40.4	51.6
COIL LENGTHS (M)	10/30	10/30	10/30	10/20	10/20	10/20	10/20
COLOR							
BLACK	EXSB03*	EXSB04*	EXSB05*	EXSB06*	EXSB07*	EXSB08*	EXSB09*
BLACK	EXST03*	EXST04*	EXST05*	EXST06*	EXST07*	EXST08*	EXST09*
BLACK	EXSH03*	EXSH04*	EXSH05*	EXSH06*	EXSH07*	—	—
BLUE	EXSLLH03*	EXSLLH04*	EXSLLH05*	EXSLLH06*	EXSLLH07*	—	—
BLACK	EXSBBT03*	EXSBBT04*	EXSBBT05*	EXSBBT06*	EXSBBT07*	EXSBBT08*	EXSBBT09*
BLACK	EXSHC03*	EXSHC04*	EXSHC05*	EXSHC06*	EXSHC07*	EXSHC08*	EXSHC09*

** Add coil length to complete part number (e.g. 10 meters = EXLB0310).*

ATEX Flameproof Gland

See data sheets for full approval information.

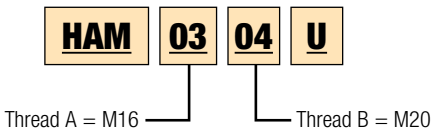
GROUPS, ZONES, CLASS & DIVISION		IP RATING	TEMPERATURE	APPROVALS
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 2 ABCD CLASS II DIV. 1 EFG	 *See **pages E-312–E-315** for suitable conduits.*	IP66	-60° C to 130° C	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X Exde I Mb Exde IIC Gb Extb IIIC Db CSA File No. 2310045
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 BCD (RIGID CONDUIT ONLY) CLASS II DIV. 1 EFG	 *See **pages E-312–E-315** for suitable conduits.*	IP66	-60° C to 130° C	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X Exde I Mb Exde IIC Gb Extb IIIC Db CSA File No. 2310045
UNIVERSAL GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 BCD (RIGID CONDUIT ONLY) CLASS II DIV. 1 EFG	 *See **pages E-312–E-315** for suitable conduits.*	IP66	-60° C to 130° C	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X Exde I Mb Exde IIC Gb Extb IIIC Db CSA File No. 2310045
UNIVERSAL SWIVEL GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 BCD (RIGID CONDUIT ONLY) CLASS II DIV 1. EFG	 *For use with all conduits including rigid.*	IP66	-60° C to 130° C	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X Exde I Mb Exde IIC Gb Extb IIIC Db CSA File No. 2310045

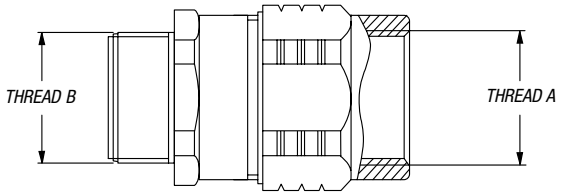
Groups I & II
Cat. No. Explanation

HAM = Metric Male Thread

HAA = NPT Male Thread

0304 = Thread Sizes





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Liquidtight Hazardous Location Glands

See **pages E-328–E-333** for Fitting Instructions.

BRITISH CONDUIT SIZE (MM)	16	20	25	32	40	50	63
METRIC THREAD SIZE (MM)	20	20	25	32	40	50	63
NPT THREAD SIZE (IN.)	⅜	½	¾	1	1¼	1½	2
METRIC - BRASS	HAM0304G1	HAM0404G1	HAM0505G1	HAM0606G1	HAM0707G1	HAM0808G1	HAM0909G1
METRIC - NICKEL-PLATED BRASS	HAMM0304G1	HAMM0404G1	HAMM0505G1	HAMM0606G1	HAMM0707G1	HAMM0808G1	HAMM0909G1
METRIC - STAINLESS STEEL	HAMS0304G1	HAMS0404G1	HAMS0505G1	HAMS0606G1	HAMS0707G1	HAMS0808G1	HAMS0909G1
NPT THREAD - BRASS	HAA0304G1	HAA0404G1	HAA0505G1	HAA0606G1	HAA0707G1	HAA0808G1	HAA0909G1
NPT THREAD - NICKEL-PLATED BRASS	HAAM0304G1	HAAM0404G1	HAAM0505G1	HAAM0606G1	HAAM0707G1	HAAM0808G1	HAAM0909G1
NPT THREAD - STAINLESS STEEL	HAAS0304G1	HAAS0404G1	HAAS0505G1	HAAS0606G1	HAAS0707G1	HAAS0808G1	HAAS0909G1
METRIC - BRASS	HAM0304E	HAM0404E	HAM0505E	HAM0606E	HAM0707E	HAM0808E	HAM0909E
METRIC - NICKEL-PLATED BRASS	HAMM0304E	HAMM0404E	HAMM0505E	HAMM0606E	HAMM0707E	HAMM0808E	HAMM0909E
NPT THREAD - BRASS	HAA0304E	HAA0404E	HAA0505E	HAA0606E	HAA0707E	HAA0808E	HAA0909E
NPT THREAD - NICKEL-PLATED BRASS	HAAM0304E	HAAM0404E	HAAM0505E	HAAM0606E	HAAM0707E	HAAM0808E	HAAM0909E
METRIC - BRASS	HAM0304U	HAM0404U	HAM0505U	HAM0606U	HAM0707U	HAM0808U	HAM0909U
METRIC - NICKEL-PLATED BRASS	HAMM0304U	HAMM0404U	HAMM0505U	HAMM0606U	HAMM0707U	HAMM0808U	HAMM0909U
METRIC - STAINLESS STEEL	HAMS0304U	HAMS0404U	HAMS0505U	HAMS0606U	HAMS0707U	HAMS0808U	HAMS0909U
NPT THREAD - BRASS	HAA0304U	HAA0404U	HAA0505U	HAA0606U	HAA0707U	HAA0808U	HAA0909U
NPT THREAD - NICKEL-PLATED BRASS	HAAM0304U	HAAM0404U	HAAM0505U	HAAM0606U	HAAM0707U	HAAM0808U	HAAM0909U
NPT THREAD - STAINLESS STEEL	HAAS0304U	HAAS0404U	HAAS0505U	HAAS0606U	HAAS0707U	HAAS0808U	HAAS0909U
METRIC - BRASS	HAM0304U/SW	HAM0404U/SW	HAM0505U/SW	HAM0606U/SW	HAM0707U/SW	HAM0808U/SW	HAM0909U/SW
METRIC - NICKEL-PLATED BRASS	HAMM0304U/SW	HAMM0404U/SW	HAMM0505U/SW	HAMM0606U/SW	HAMM0707U/SW	HAMM0808U/SW	HAMM0909U/SW
METRIC - STAINLESS STEEL	HAMS0304U/SW	HAMS0404U/SW	HAMS0505U/SW	HAMS0606U/SW	HAMS0707U/SW	HAMS0808U/SW	HAMS0909U/SW
NPT THREAD - BRASS	HAA0304U/SW	HAA0404U/SW	HAA0505U/SW	HAA0606U/SW	HAA0707U/SW	HAA0808U/SW	HAA0909U/SW
NPT THREAD - NICKEL-PLATED BRASS	HAAM0304U/SW	HAAM0404U/SW	HAAM0505U/SW	HAAM0606U/SW	HAAM0707U/SW	HAAM0808U/SW	HAAM0909U/SW
NPT THREAD - STAINLESS STEEL	HAAS0304U/SW	HAAS0404U/SW	HAAS0505U/SW	HAAS0606U/SW	HAAS0707U/SW	HAAS0808U/SW	HAAS0909U/SW

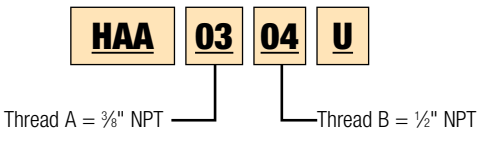
For thread conversion options, contact Technical Support.

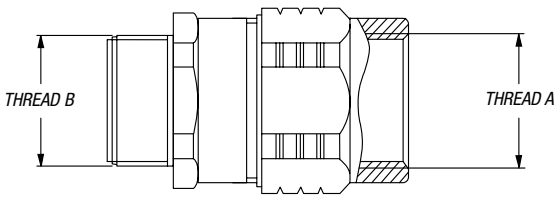
Universal Groups I & II Cat. No. Explanation

HAM = Metric Male Thread

HAA = NPT Male Thread

0304 = Thread Sizes





Enlargers, Reducers and Thread Converters

Exd "Flameproof" and Exe "Increased Safety" Enlargers, Reducers and Thread Converters

Our comprehensive range of Adapters and Reducers provides a method of matching threadforms on hazardous area-approved equipment while ensuring the integrity and Ex approval of the installation is maintained.

The new Kopex-Ex™ line of converters meets the latest ATEX/IECEx and CSA/UL® standards. This means that all the standards are marked on the product around the main body, which allows for them to be seen easily once installed — a key component of the new standard.

Enlargers (/E) are used where the thread size of the female side of the device is larger than the male side

Reducers (/R) are used where the thread size of the female side of device is smaller than the male side

Thread Converters (/TC) are used where a conversion is required between thread types (e.g. metric to PG)

Kopex-Ex™ Enlargers, Reducers and Thread Converters are designed for hazardous area applications and are certified to protection concepts Exd "Flameproof" and Exe "Increased Safety" for use in Zone 1, 2, 21 and 22 applications under NEC® Class I Div. 1 ABCD Class II Div. 1 EFG.

For assembly instruction, see **page E-335**.

MALE EXTERNAL THREAD		METRIC FEMALE INTERNAL THREAD		
	M16	M20	M25	M32
M16		EX/M16-M20/E	EX/M16-M25/E	
M20	EX/M20-M16/R		EX/M20-M25/E	EX/M20-M32/E
M25	EX/M25-M16/R	EX/M25-M20/R		EX/M25-M32/E
M32	EX/M32-M16/R	EX/M32-M20/R	EX/M32-M25/R	
M40	EX/M40-M16/R	EX/M40-M20/R	EX/M40-M25/R	EX/M40-M32/R
M50	EX/M50-M16/R	EX/M50-M20/R	EX/M50-M25/R	EX/M50-M32/R
M63	EX/M63-M16/R	EX/M63-M20/R	EX/M63-M25/R	EX/M63-M32/R
M75	EX/M75-M16/R	EX/M75-M20/R	EX/M75-M25/R	EX/M75-M32/R
PG9	EX/PG9-M16/TC	EX/PG9-M20/TC		
PG11	EX/PG11-M16/TC	EX/PG11-M20/TC		
PG13	EX/PG13-M16/TC	EX/PG13-M20/TC		
PG16	EX/PG16-M16/TC	EX/PG16-M20/TC	EX/PG16-M25/TC	
PG21	EX/PG21-M16/TC	EX/PG21-M20/TC	EX/PG21-M25/TC	EX/PG21-M32/TC
PG29	EX/PG29-M16/TC	EX/PG29-M20/TC	EX/PG29-M25/TC	EX/PG29-M32/TC
PG36	EX/PG36-M16/TC	EX/PG36-M20/TC	EX/PG36-M25/TC	EX/PG36-M32/TC
PG42	EX/PG42-M16/TC	EX/PG42-M20/TC	EX/PG42-M25/TC	EX/PG42-M32/TC
PG48	EX/PG48-M16/TC	EX/PG48-M20/TC	EX/PG48-M25/TC	EX/PG48-M32/TC
NPT ⅜"	EX/038-M16/TC			
NPT ½"	EX/050-M16/TC	EX/050-M20/TC	EX/050-M25/TC	
NPT ¾"	EX/075-M16/TC	EX/075-M20/TC	EX/075-M25/TC	EX/075-M32/TC
NPT 1"	EX/100-M16/TC	EX/100-M20/TC	EX/100-M25/TC	EX/100-M32/TC
NPT 1¼"	EX/125-M16/TC	EX/125-M20/TC	EX/125-M25/TC	EX/125-M32/TC
NPT 1½"	EX/150-M16/TC	EX/150-M20/TC	EX/150-M25/TC	EX/150-M32/TC
NPT 2"	EX/200-M16/TC	EX/200-M20/TC	EX/200-M25/TC	EX/200-M32/TC
NPT 2½"	EX/250-M16/R	EX/250-M20/R	EX/250-M25/R	EX/250-M32/R
NPT 3"	EX/300-M16/R	EX/300-M20/R	EX/300-M25/R	EX/300-M32/R

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Enlargers, Reducers and Thread Converters

Connector Description

EX - Brass
EXN - Nickel-Plated Brass
EXS - Stainless Steel 316

IP Rating

IP66

Approvals

- Approved to Exe II and Exd IIc, Groups 1 and 2, Zones 1, 2, 21, 22
- ATEX Certification: BASEEFA 07 ATEX 0247X
- IECEx Certification: IECEx BAS07.0090X
- Approved to Class I Div. 1 ABCD Class II Div. 1 EFG (does not include M16 and ⅜" NPT or unplated brass products)
- UL® 1203
- CSA C22.2 No. 60079-04, C22.2 No. 60079-1

M40	M50	M63	M75
EX/M25-M40/E			
EX/M32-M40/E	EX/M32-M50/E		
	EX/M40-M50/E	EX/M40-M63/E	
EX/M50-M40/R		EX/M50-M63/E	EX/M50-M75/E
EX/M63-M40/R	EX/M63-M50/R		EX/M63-M75/E
EX/M75-M40/R	EX/M75-M50/R	EX/M75-M63/R	
EX/PG29-M40/TC			
EX/PG36-M40/TC	EX/PG36-M50/TC		
EX/PG42-M40/TC	EX/PG42-M50/TC	EX/PG42-M63/TC	
EX/PG48-M40/TC	EX/PG48-M50/TC	EX/PG48-M63/TC	
EX/100-M40/TC			
EX/125-M40/TC	EX/125-M50/TC		
EX/150-M40/TC	EX/150-M50/TC	EX/150-M63/TC	
EX/200-M40/TC	EX/200-M50/TC	EX/200-M63/TC	
EX/250-M40/R	EX/250-M50/R		
EX/300-M40/R	EX/300-M50/R		EX/300-M75/R

Enlargers, Reducers and Thread Converters *(continued)*

For assembly instruction, see **page E-335.**

MALE EXTERNAL THREAD	NPT FEMALE INTERNAL THREAD				
	NPT ⅜	NPT ½	NPT ¾	NPT 1	NPT 1¼
M16	EX/M16-038/TC	EX/M16-050/TC			
M20		EX/M20-050/TC	EX/M20-075/TC		
M25		EX/M25-050/TC	EX/M25-075/TC	EX/M25-100/TC	
M32		EX/M32-050/TC	EX/M32-075/TC	EX/M32-100/TC	EX/M32-125/TC
M40		EX/M40-050/TC	EX/M40-075/TC	EX/M40-100/TC	EX/M40-125/TC
M50		EX/M50-050/TC	EX/M50-075/TC	EX/M50-100/TC	EX/M50-125/TC
M63		EX/M63-050/TC	EX/M63-075/TC	EX/M63-100/TC	EX/M63-125/TC
M75		EX/M75-050/TC	EX/M75-075/TC	EX/M75-100/TC	EX/M75-125/TC
PG9		EX/PG9-050/TC			
PG11		EX/PG11-050/TC			
PG13		EX/PG13-050/TC			
PG16		EX/PG16-050/TC	EX/PG16-075/TC		
PG21		EX/PG21-050/TC	EX/PG21-075/TC	EX/PG21-100/TC	
PG29		EX/PG29-050/TC	EX/PG29-075/TC	EX/PG29-100/TC	EX/PG29-125/TC
PG36		EX/PG36-050/TC	EX/PG36-075/TC	EX/PG36-100/TC	EX/PG36-125/TC
PG42		EX/PG42-050/TC	EX/PG42-075/TC	EX/PG42-100/TC	EX/PG42-125/TC
PG48		EX/PG48-050/TC	EX/PG48-075/TC	EX/PG48-100/TC	EX/PG48-125/TC
NPT ½"			EX/050-075/E		
NPT ¾"		EX/075-050/R		EX/075-100/E	
NPT 1"		EX/100-050/R	EX/100-075/R		EX/100-125/E
NPT 1¼"		EX/125-050/R	EX/125-075/R	EX/125-100/R	
NPT 1½"		EX/150-050/R	EX/150-075/R	EX/150-100/R	EX/150-125/R
NPT 2"		EX/200-050/R	EX/200-075/R	EX/200-100/R	EX/200-125/R
NPT 2½"		EX/250-050/R	EX/250-075/R	EX/250-100/R	EX/250-125/R
NPT 3"		EX/300-050/R	EX/300-075/R	EX/300-100/R	EX/300-125/R

MALE EXTERNAL THREAD	PG FEMALE INTERNAL THREAD				
	PG9	PG11	PG13	PG16	PG21
M16	EX/M16-PG9/TC	EX/M16-PG11/TC	EX/M16-PG13/TC		
M20	EX/M20-PG9/TC	EX/M20-PG11/TC	EX/M20-PG13/TC	EX/M20-PG16/TC	
M25	EX/M25-PG9/TC	EX/M25-PG11/TC	EX/M25-PG13/TC	EX/M25-PG16/TC	EX/M25-PG21/TC
M32	EX/M32-PG9/TC	EX/M32-PG11/TC	EX/M32-PG13/TC	EX/M32-PG16/TC	EX/M32-PG21/TC
M40	EX/M40-PG9/TC	EX/M40-PG11/TC	EX/M40-PG13/TC	EX/M40-PG16/TC	EX/M40-PG21/TC
M50	EX/M50-PG9/TC	EX/M50-PG11/TC	EX/M50-PG13/TC	EX/M50-PG16/TC	EX/M50-PG21/TC
M63	EX/M63-PG9/TC	EX/M63-PG11/TC	EX/M63-PG13/TC	EX/M63-PG16/TC	EX/M63-PG21/TC
M75	EX/M75-PG9/TC	EX/M75-PG11/TC	EX/M75-PG13/TC	EX/M75-PG16/TC	EX/M75-PG21/TC
PG11	EX/PG11-PG9/TC				
PG13	EX/PG13-PG9/TC	EX/PG13-PG11/TC			
PG16	EX/PG16-PG9/TC	EX/PG16-PG11/TC	EX/PG16-PG13/R		EX/P16-PG21/E
PG21	EX/PG21-PG9/TC	EX/PG21-PG11/TC	EX/PG21-PG13/R	EX/PG21-PG16/R	
PG29	EX/PG29-PG9/TC	EX/PG29-PG11/TC	EX/PG29-PG13/R	EX/PG29-PG16/R	EX/PG29-PG21/R
PG36	EX/PG36-PG9/TC	EX/PG36-PG11/TC	EX/PG36-PG13/R	EX/PG36-PG16/R	EX/PG36-PG21/R
PG42	EX/PG42-PG9/TC	EX/PG42-PG11/TC	EX/PG42-PG13/R	EX/PG42-PG16/R	EX/PG42-PG21/R
PG48	EX/PG48-PG9/TC	EX/PG48-PG11/TC	EX/PG48-PG13/R	EX/PG48-PG16/R	EX/PG48-PG21/R
NPT ½"	EX/050-PG9/TC	EX/050-PG11/TC	EX/050-PG13/TC	EX/050-PG16/TC	
NPT ¾"	EX/075-PG9/TC	EX/075-PG11/TC	EX/075-PG13/TC	EX/075-PG16/TC	EX/075-PG21/TC
NPT 1"	EX/100-PG9/TC	EX/100-PG11/TC	EX/100-PG13/TC	EX/100-PG16/TC	EX/100-PG21/TC
NPT 1¼"	EX/125-PG9/TC	EX/125-PG11/TC	EX/125-PG13/TC	EX/125-PG16/TC	EX/125-PG21/TC
NPT 1½"	EX/150-PG9/TC	EX/150-PG11/TC	EX/150-PG13/TC	EX/150-PG16/TC	EX/150-PG21/TC
NPT 2"	EX/200-PG9/TC	EX/200-PG11/TC	EX/200-PG13/TC	EX/200-PG16/TC	EX/200-PG21/TC

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Enlargers, Reducers and Thread Converters

NPT 1½	NPT 2	NPT 2½	NPT 3
EX/M40-150/TC			
EX/M50-150/TC	EX/M50-200/TC		
EX/M63-150/TC	EX/M63-200/TC		
EX/M75-150/TC	EX/M75-200/TC		
EX/PG29-150/TC			
EX/PG36-150/TC			
EX/PG42-150/TC	EX/PG42-200/TC		
EX/PG48-150/TC	EX/PG48-200/TC		
EX/125-150/E			
	EX/150-200/E		
EX/200-150/R			
EX/250-150/R	EX/250-200/R		EX/250-300/E
EX/300-150/R	EX/300-200/R	EX/300-250/R	

PG29	PG36	PG42	PG48
EX/PG21-PG29/E			
	EX/PG29-PG36/E		
EX/PG36-PG29/R		EX/PG36-PG48/E	
EX/PG42-PG29/R	EX/PG42-PG36/R		EX/PG42-PG48/E
EX/PG48-PG29/R	EX/PG48-PG36/R	EX/PG48-PG42/R	
EX/PG21-PG29/E			
	EX/PG29-PG36/E		
EX/PG36-PG29/R		EX/PG36-PG48/E	
EX/PG42-PG29/R	EX/PG42-PG36/R		EX/PG42-PG48/E
EX/PG48-PG29/R	EX/PG48-PG36/R	EX/PG48-PG42/R	
EX/100-PG29/TC			
EX/125-PG29/TC	EX/125-PG36/TC		
EX/150-PG29/TC	EX/150-PG36/TC	EX/150-PG42/TC	
EX/200-PG29/TC	EX/200-PG36/TC	EX/200-PG42/TC	EX/200-PG48/TC

Stopping Plugs

GROUPS, ZONES, CLASS & DIVISION			IP RATING	APPROVALS
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 ABCD CLASS II DIV. 1 EFG (UL® 1203 NICKEL-PLATED BRASS AND ST/ST ONLY)		Stopping Plug	IP66	BASEEFA 08 ATEX 6324 IECEx BAS08.0109X UL 1203 Exd I Exd IIC
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 ABCD CLASS II DIV. 1 EFG (UL® 1203 NICKEL-PLATED BRASS AND ST/ST ONLY)		Tamper-Proof Stopping Plug	IP66	BASEEFA 08 ATEX 6324 IECEx BAS08.0109X UL 1203 Exd I Exd IIC
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 ABCD CLASS II DIV. 1 EFG (UL® 1203 NICKEL-PLATED BRASS AND ST/ST ONLY)		Hex-Head Stopping Plug	IP66 for thread holes IP65 for plain holes -60° C to 80° C	BASEEFA 08 ATEX 0325X IECEx BAS08.0108X UL 1203 Exe I Exe II Extb IIIC
GROUPS I & II ZONES 1, 2, 21 AND 22 CLASS I DIV. 1 ABCD CLASS II DIV. 1 EFG (UL® 1203 NICKEL-PLATED BRASS AND ST/ST ONLY)		Dome-Top Stopping Plug	IP66 for thread holes IP65 for plain holes -60° C to 80° C	BASEEFA 08 ATEX 0325X IECEx BAS08.0108X UL 1203 Exe I Exe II Extb IIIC
GROUPS I & II ZONES 1, 2, 21 AND 22		Nylon Stopping Plug	IP66 for thread holes	SIRA 00 ATEX 1074X

Note: *For items ⅜ (M20) to ¾ (M25) with "US" in part number – UL Listed only.*
For items ⅜ (M20) to ¾ (M25) without "US" in part number – ATEX/IECEx only.
For items larger than ¾ (M25) – Dual Listed ATEX/IECEx and UL.

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Stopping Plugs

FOR BRASS — EX/ NICKEL-PLATED BRASS — EXN/ STAINLESS STEEL — EXS

See **page E-336** for Fitting Instructions.

Intertek ATEX

NPT THREAD SIZE (IN.)	⅜	½	¾	1	1¼	1½	2		
METRIC THREAD SIZE (MM)	20	20	25	32	40	50	63		
PG THREAD SIZE	PG9	PG11	PG13	PG16	PG21	PG29	PG36	PG42	PG48
THREAD TYPE - NPT	EX/038/SP	EX/050/SP	EX/075/SP	EX/100/SP	EX/125/SP	EX/150/SP	EX/200/SP	—	—
THREAD TYPE - METRIC	EX/M16/SP	EX/M20/SP	EX/M25/SP	EX/M32/SP	EX/M40/SP	EX/M50/SP	EX/M63/SP	—	—
THREAD TYPE - PG	EX/PG9/SP	EX/PG11/SP	EX/PG13/SP	EX/PG16/SP	EX/PG21/SP	EX/PG29/SP	EX/PG36/SP	EX/PG42/SP	EX/PG48/SP
THREAD TYPE - NPT	EXUS/038/SP-NP	EXUS/050/SP	EXUS/075/SP	—	—	—	—	—	—
THREAD TYPE - NPT	—	EXNUS/050/SP	EXNUS/075/SP	—	—	—	—	—	—
THREAD TYPE - NPT	—	EXUS/050/SP-UP	EXUS/075/SP-UP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/SP	EXUS/M25/SP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXNUS/M20/SP	EXNUS/M25/SP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXSUS/M20/SP	—	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXSUS/M20/SP-Z	—	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/SP-UP	EXUS/M25/SP-UP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/SP-NP	EXUS/M25/SP-NP	—	—	—	—	—	—
THREAD TYPE - NPT	EX/038/TSP	EX/050/TSP	EX/075/TSP	EX/100/TSP	EX/125/TSP	EX/150/TSP	EX/200/TSP	—	—
THREAD TYPE - METRIC	EX/M16/TSP	EX/M20/TSP	EX/M25/TSP	EX/M32/TSP	EX/M40/TSP	EX/M50/TSP	EX/M63/TSP	—	—
THREAD TYPE - PG	EX/PG9/TSP	EX/PG11/TSP	EX/PG13/TSP	EX/PG16/TSP	EX/PG21/TSP	EX/PG29/TSP	EX/PG36/TSP	EX/PG42/TSP	EX/PG48/TSP
THREAD TYPE - NPT	—	EXUS/050/TSP	EXUS/075/TSP	—	—	—	—	—	—
THREAD TYPE - NPT	—	EXNUS/050/TSP	EXNUS/075/TSP	—	—	—	—	—	—
THREAD TYPE - NPT	—	EXNUS/050/TSP-UP	EXNUS/075/TSP-UP	—	—	—	—	—	—
THREAD TYPE - NPT	—	EXNUS/050/TSP-NP	EXNUS/075/TSP-NP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/TSP	EXUS/M25/TSP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXNUS/M20/TSP	EXNUS/M25/TSP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/TSP-UP	EXUS/M25/TSP-UP	—	—	—	—	—	—
THREAD TYPE - METRIC	—	EXUS/M20/TSP-NP	EXUS/M25/TSP-NP	—	—	—	—	—	—

THREAD TYPE - METRIC	EX/M16/HSP	EX/M20/HSP	EX/M25/HSP	EX/M32/HSP	EX/M40/HSP	EX/M50/HSP	EX/M63/HSP	—	—
THREAD TYPE - PG	EX/PG9/HSP	EX/PG11/HSP	EX/PG13/HSP	EX/PG16/HSP	EX/PG21/HSP	EX/PG29/HSP	EX/PG36/HSP	EX/PG42/HSP	EX/PG48/HSP

Products supplied with sealing washers and "O" rings.

THREAD TYPE - METRIC	EX/M16/DSP	EX/M20/DSP	EX/M25/DSP	EX/M32/DSP	EX/M40/DSP	EX/M50/DSP	EX/M63/DSP	—	—
THREAD TYPE - PG	EX/PG9/DSP	EX/PG11/DSP	EX/PG13/DSP	EX/PG16/DSP	EX/PG21/DSP	EX/PG29/DSP	EX/PG36/DSP	EX/PG42/DSP	EX/PG48/DSP

Products supplied with sealing washers and "O" rings.

THREAD TYPE - METRIC	EX-M16	EX-M20	EX-M25	EX-M32	EX-M40	EX-M50	EX-M63	—	—
THREAD TYPE - PG	EX-PG9	EX-PG11	EX-PG13	EX-PG16	EX-PG21	EX-PG29	EX-PG36	EX-PG42	—

Index Exe Cable Glands, Sealing Washers and Locknuts

		CONNECTOR DESCRIPTION	IP RATING	APPROVALS	THREAD TYPE — METRIC NPT
HAZARDOUS AREA INDEX EEXE CABLE GLAND		Grilon 2 R40 GM Santroprene® Seal	IP68	SIRA 00 ATEX 1072X II2GD EExeII ATEX	**ORDERING CODE**
COUPLER		EX Brass EXN Nickel-Plated Brass EXS Stainless Steel 316	IP66	BASEEFA 08 ATEX 0359U IECEx BAS08.0121U -60° C to 200° C UL1203	**THREAD SIZE - METRIC** **THREAD SIZE - NPT**
HEX LOCKNUT METRIC		EX Brass EXN Nickel-Plated Brass EXS Stainless Steel 316	**MATERIAL** Stainless Steel Brass Nickel-Plated Brass		
HEX LOCKNUT NPT		EX Brass EXN Nickel-Plated Brass EXS Stainless Steel 316	**MATERIAL** Brass/Nickel Plated		**THREAD TYPE - NPT** Dimension across Flats (mm)
SEALING JOINT WASHER METRIC			**MATERIAL** Nylon Metric Approved for Use with All ATEX/IECEx Products		Outside Diameter (mm) Thickness (mm)
EARTH TAG			**MATERIAL** Brass		

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Index Exe Cable Glands, Sealing Washers and Locknuts

M16 ⅜"	M20 ½"	M25 ¾"	M32 1"	M40 1¼"	M50 1½"	M63 2"	M75 2½"
EX-8160	EX-8240	EX-8560	EX-8640	EX-8720	EX-8800	—	—
EX/M16/C	EX/M20/C	EX/M25/C	EX/M32/C	EX/M40/C	EX/M50/C	EX/M63/C	EX/M75/C
EX/038/C	EX/050/C	EX/075/C	EX/100/C	EX/M125/C	EX/M150/C	EX/M200/C	EX/250/C
—	MXWH04	MXWH05	MXWH06	MXWH07	MXWH08	—	—
WHMB03	WHMB04	WHMB05	WHMB06	WHMB07	WHMB08	—	—
WHMM03	WHMM04	WHMM05	WHMM06	WHMM07	WHMM08	WHMM09	—
—	WHMM04	WHMM05	WHMM06	WHMM07	WHMM08	WHMM09	—
22.0	26.0	34.3	41.5	52.0	66.5	84.5	—
1.6	1.6	1.7	1.7	2.0	2.0	2.0	—
EXFM03	EXFM04	EXFM05	EXFM06	EXFM07	EXFM08	EXFM09	—
EXFM03	EXFM04	EXFM05	EXFM06	EXFM07	EXFM08	—	—
EX/M16/TAG	EX/M20/TAG	EX/M25/TAG	EX/M32/TAG	EX/M40/TAG	EX/M53/TAG	EX/M63/TAG	EX/M75/TAG

Fitting Instructions for Index EExe Hazardous Area Cable Glands

Installation:

INTO NON-THREADED ENCLOSURE

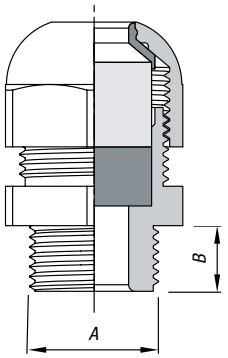
Unscrew cap and remove sealing ring. The molded dust shield must be removed. (A screwdriver or similar tool may be a useful aid.) Replace the seal (external chamfer to the cap). Replace the cap and give it half a turn. Pass the cable the required distance through the gland and tighten cap onto body. The tightening action will cause the seal to deform and close onto the cable. The entry thread is passed into the enclosure and the nut fitted. Use cable clamps to secure the cable.

THREADED ENCLOSURE

Unscrew cap and remove sealing ring. The molded dust shield must be removed. (A screwdriver or similar tool may be a useful aid.) Screw the body into the enclosure and tighten. Replace the grip and seal (external chamfer to the cap). Replace the cap and give half a turn. Pass the cable through the gland to the required distance and tighten the cap. The tightening action will cause the seal to deform and close onto the cable. Use cable clamps to secure the cable.

Routine Checking and Maintenance:

Nylon glands are items that, once assembled, do not require maintenance. An occasional check to ensure cable has not been damaged or pulled is advisable.



Nr	A	B	MAX.	MIN.
EX-8160	M16	9.0	8.0	5.0
EX-8240	M20	10.0	13.0	8.0
EX-8560	M25	11.0	19.0	13.0
EX-8640	M32	12.0	25.0	18.0
EX-8720	M40	14.0	32.0	24.0
EX-8800	M50	16.0	38.0	29.0

Fitting Instructions for Exe Non-Metallic Conduits

Kopex will not take responsibility for any damage, injury or form of loss caused where products are not installed or used as detailed in these instructions. If in doubt, contact Thomas & Betts Technical Support for advice.

Product Certification

PART NO.	ATEX CERT.	IECEX CERT.	OPERATING TEMP.	IP RATING
EXBQ/EXPQ	BASEEFA 08 ATEX 0003X	IECEx BAS08.0001X	-20° C to 80° C	IP66

Note: *For ingress protection above IP54, the use of a sealing washer or thread sealant is recommended.*

Specifications

In accordance with IEC60079-0, IEC60079-7, EN60079-0, EN600797, IEC61241-0, IEC61241-1, EN61241-0, EN61241-1

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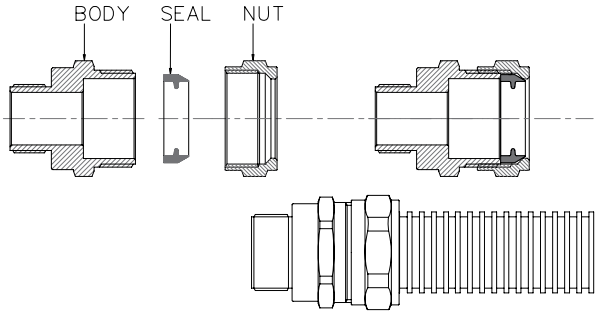
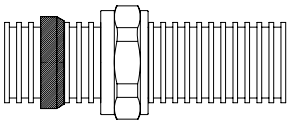
Fitting Instructions for Non-Metallic EXPQ





Apply nut and seal over conduit, ensuring chamfered edge of seal is facing towards nut. Seal to be positioned three corrugations in from the end of the conduit.

If using with plain hole, fully tighten nut onto body to secure gland onto conduit.

If using with threaded entry, leave nut loose to allow gland to freely rotate about the conduit. Screw body into entry, then fully tighten nut to complete installation.

Marking Details

Components will be marked in the following format.

CMPL BASEEFA08 ATEX0003X Ex ATEX II 2GD Exe II
ExtD IIC A21 IP66 -20 to 80 °Z (year of manufacture) B46 1HT CE
1180 IECEx BAS08.0001X (type designation)

CMPL BASEEFA08 ATEX0003X Ex ATEX II 2GD Exe II
ExtD IIC A21 IP66 -20 to 80 °C) 08 B46 1HT CE
1180 IECEx BAS08.0001X EXBQM0808

Notes:

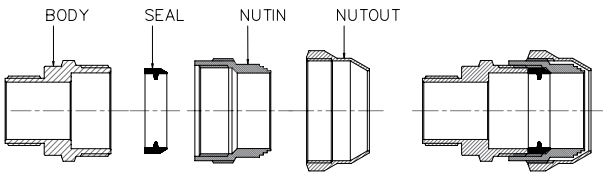
Ensure that the product is certified to the same method of protection as the equipment to which it is to be installed.

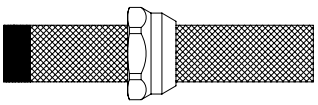
Ensure that the product can maintain the same ingress protection levels as the equipment to which it is to be installed.

Exe equipment should not be used with Exd equipment.

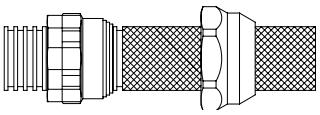
This equipment consists of discharging material and is therefore not suitable as an insulating medium.

Fitting Instructions for Non-Metallic Braided EXBQ

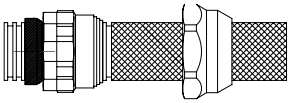




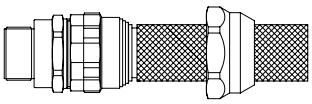
Wrap sellotape around conduit and cut to length required.
Apply the "nut out" over the braiding before removing tape.



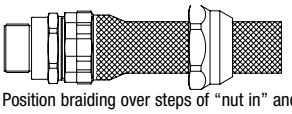
Remove tape and pull back braided sheath.
Apply "nut in" so that approximately five convolutions protrude.



Apply seal with chamfered edge towards the "nut in" three corregations in from the end of the conduit.



Loosely assemble body into the "nut in."
If using with a plain hole, fully tighten nut into body to secure gland on conduit.
If using with a threaded entry, leave nut loose to allow gland to freely rotate about the conduit. Screw body into entry, then fully tighten nut.



Position braiding over steps of "nut in" and secure with "nut out" ensuring braid is trapped between the nuts.

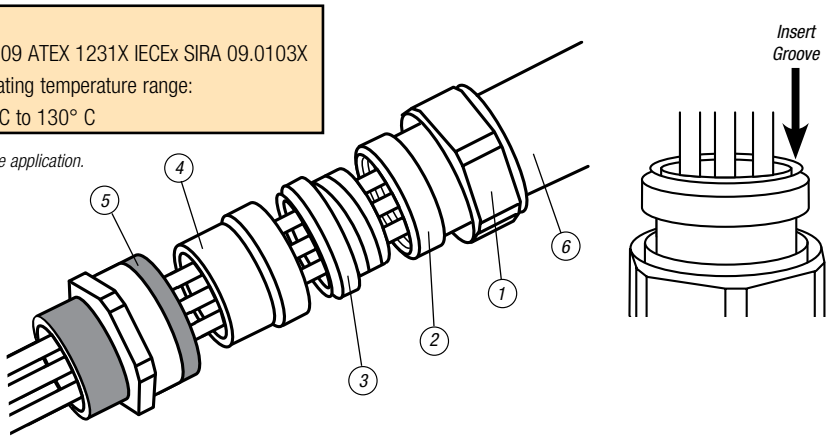
Special Conditions for Safe Use:

When the gland is used for increased safety or dust protection, the entry of the enclosure and the female thread of the gland is to be sealed (in accordance with IEC60079-14) in order to maintain the ingress protection rating of the associated enclosure.

Fitting Instructions for Exd I and IIC/Exe I and II/Extb IIIC Group I Cable Gland

Certification Details	
Approved in Exd I and IIC/Exe I and II/Extb IIIC	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X
CSA Class I Div. 2 ABCD;	Operating temperature range:
Class II Div. 1 EFG	-60º C to 130° C

IMPORTANT: *Ensure cables have suitable temperature rating for the application.*



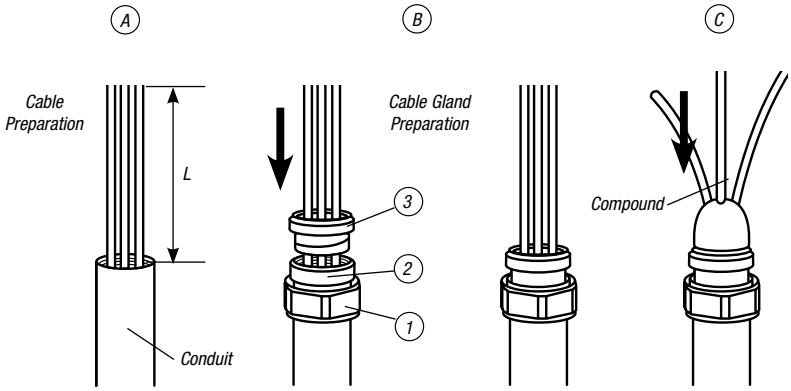
1. Backnut
2. Olive
3. Insert
4. Pot
5. Body
6. Conduit

Conduit Preparation

A. Cut conduit square using a hacksaw with a minimum of 30 teeth per inch. Pull sufficient length "L" of conductors to suit equipment and twist to form a helix, which provides maximum flexibility.

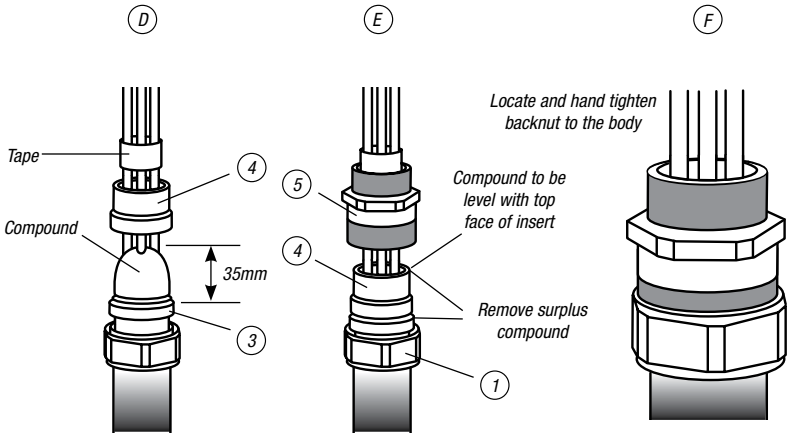
B. Pass backnut (1) and olive (2) over the conduit and conductors. Pass insert (3) over the conductors and screw into the conduit (6). Remove the pot (4) from the body (5) and pass the body (5) over the conductors. Assemble the gland. Fully tighten backnut (1) onto body (5) over the conductors, until the olive (2) is locked onto the conduit (6), then remove body (5).

C. Spread the conductors out for the compound packing. Pack the compound between the conductors as shown (see Epoxy Compound Preparation on **page E-329**).



IMPORTANT: Ensure putty fully fills insert groove.

D. With all gaps and voids filled, bring the conductors back together and pack more compound around the outside of the conductors. Tape the conductors together to prevent disturbance of the compound seal. Pass the pot (4) over the insert (3) and push until it fully locates over the insert shoulder. Push excess compound into the insert (3) and add additional amount if required. Remove all surplus compound from the top of the pot (4) and the joint face as indicated.



IMPORTANT: All surplus compound must be removed.

E. Pass the conductors through the body (5), which may have been previously fitted into the equipment. Ensure that compound does not cover end of pot (4).

F. Locate and hand tighten backnut (1) to the body.

G. Allow the compound to cure. (See Fig. 7 on **page E-329** for curing times.) To hard mass: 3 to 4 hours @ 20º C to 30º C. For optimum properties: 12 to 24 hours @ 20º C to 30º C.

IMPORTANT: The conductors must not be moved for a minimum of four hours.

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Epoxy Compound Preparation

Gloves supplied must be worn when handling this material. The epoxy compound is supplied in the form of a two-part package. These should be mixed into the ratio of 1:1 until both colors have blended into one, without any streaks. Rolling and folding is the most satisfactory method of obtaining an even blend. Once mixed, the compound must be used within 30 minutes. After this time it will begin to stiffen. The compound should be kept at an ambient temperature of no less than 20° C prior to using. At lower temperatures it becomes difficult to mix. Should any compound come into contact with the skin, it should be cleaned off with a skin cleaner and not be allowed to dry on the skin. Only compound for immediate terminations should be mixed.

- The compound may be adversely affected by some solvent vapors. If such vapors are likely to be present in the vicinity of the cable gland in service, suitable precautions may be necessary.
- The compound cures at a Shore D hardness of 85, when it can be handled. When used in the HA cable gland, shown here, the compound when fully cured is suitable for use at a temperature range of -60° C to 130° C.
- NOTE: Curing time will be extended when the ambient temperature is below 20° C. This must be taken into account.

Special Conditions for Use:

1. The cable gland has an operating temperature of -60° C to 130° C.
2. A seal must be formed between the equipment and the cable gland to maintain the appropriate degree of protection against ingress of dust, solid objects and water.

Accessories:

Before carrying out the cable gland assembly or stripping of the cable gland assembly, consideration should be given to any cable gland accessories that may be required, such as:

- Locknut, to secure cable glands into position
- Sealing washer, to offer additional ingress protection of the enclosure at the cable gland entry
- Earthtag, to provide an external armor/braid bonding point
- Serrated washer, to dampen any vibrations that may loosen the locknut or cable gland assembly

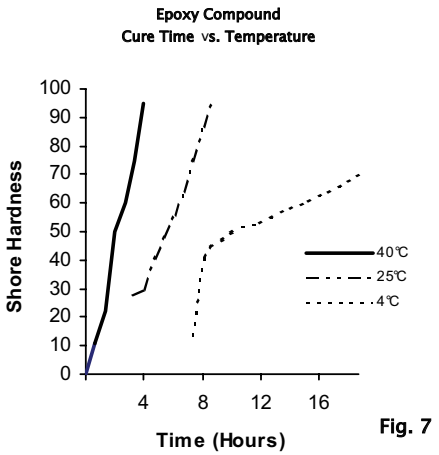


Fig. 7

FLEXIBILE CONDUIT GLAND SELECTION TABLE

SIZE REF. (CONDUIT SIZE)	KOPEX REF.	GLAND BODY ACROSS FLATS	GLAND BODY ACROSS CORNERS	GLAND NUT ACROSS FLATS	GLAND NUT ACROSS CORNERS	METRIC/NPT	MAX. DIA. OVER CORES	MAX. DIA. OVER SINGLE CORE	MAX. NO. OF CORES	OVERALL LENGTH
16/⅜"	HAM*0304G1 HAA*0304G1	28.6	31.0	32.0	34.0	M20 ½"	10.5	10.0	9	50.0
20/½"	HAM*0404G1 HAA*0404G1	28.6	31.0	32.0	34.0	M20 ½"	13.0	13.0	15	50.0
25/¾"	HAA*0505G1 HAA*0505G1	34.0	37.0	34.0 34.9 SS	37.0	M25 ¾"	17.9	17.9	28	50.0
32/1"	HAM*0606G1 HAA*0606G1	42.0	45.0	42.0 42.4 SS	45.0	M32 1"	24.0	24.0	50	50.0
40/1¼"	HAM*0707G1 HAA*0707G1	50.0	54.0	52.0	57.0	M40 1¼"	32.0	32.0	75	56.0
50/1½"	HAM*0808G1 HAA*0808G1	60.0	64.0	60.0	64.0	M50 1½"	35.0	35.0	80	58.0
63/2"	HAM*0909G1 HAA*0909G1	70.0	76.0	70.0 69.8 SS	76.0	M63 2"	45.0	45.0	100	70.0

Special Note: *For CSA Applications, conduit installations should be in accordance with C22.1.*

Fitting Instructions for Group I Universal Cable Gland

Certification Details	
Exd I and IIC/Exe I and II/Extb IIIC	SIRA 09 ATEX 1231X IECEx SIRA 09.0103X
CSA Class I Div. 1 BCD;	Operating temperature range:
Class II Div. 1 EFG	-60° C to 130° C

IMPORTANT: *Ensure cables have suitable temperature rating for the application.*

1. Universal Nut
2. Pot
3. Insert
4. Body

A. Pass nut (1) and insert (3) over the conductors. Spread conductors out so that the compound can be packed into the center (see Epoxy Compound Preparation on **page E-331**).

B. Pack the center of conductors with compound to a height of at least 15mm.

C. With all gaps and voids filled, bring the conductors back together and pack more compound around the outside of the conductors. Ensure that the face groove of the insert is fully filled with compound. Tape the conductors together to prevent disturbance of the compound seal. Pass the pot (2) over the insert (3) and push until it fully locates over the insert shoulder. Push excess compound into the insert and add additional if required. Remove all surplus compound from the top of the pot (2). Remove all compound from around the insert "O" ring.

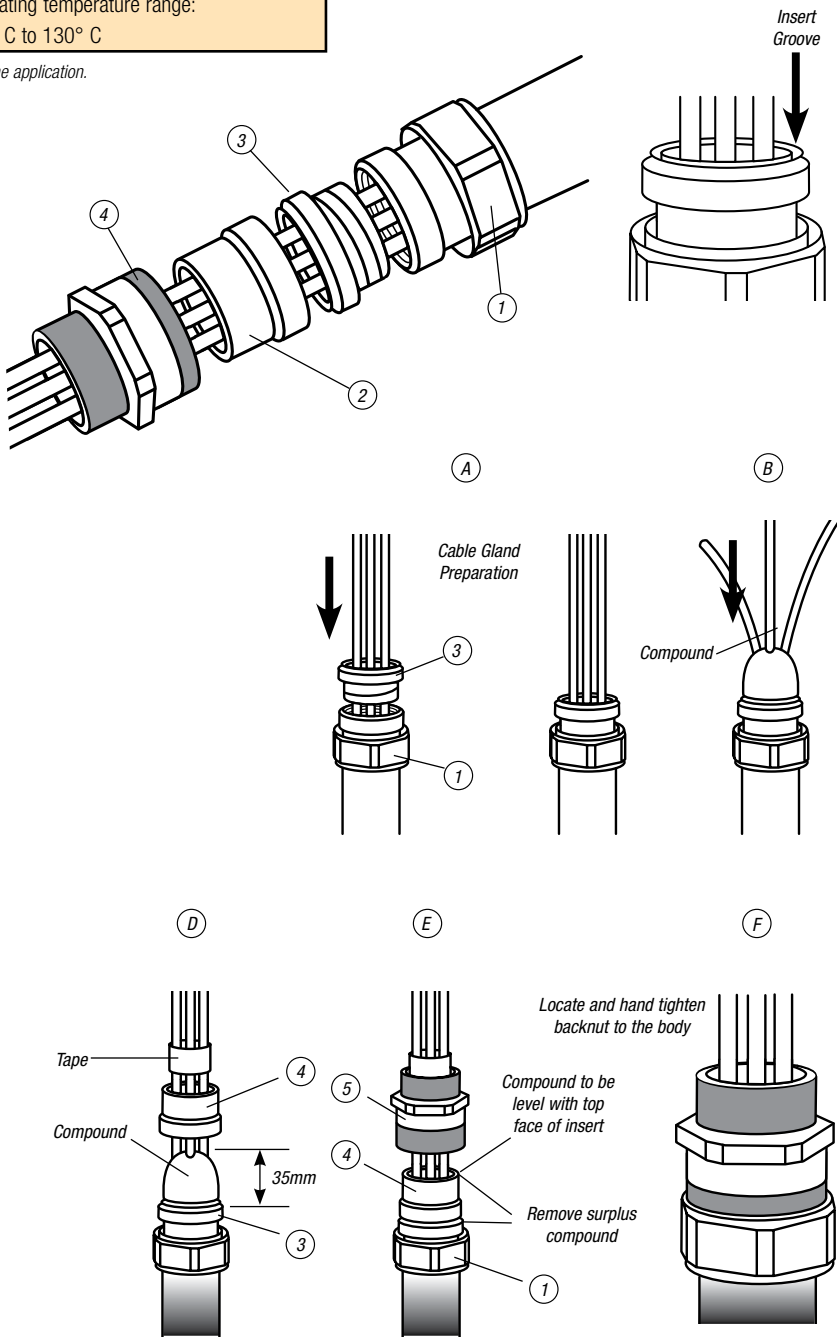
IMPORTANT: All surplus compound must be removed.

D. Pass the conductors through the body (4), which may have been previously fitted into the equipment. Ensure that compound does not cover end of pot (2).

E. Locate and hand tighten universal nut (1) to the body (4).

F. Allow the compound to cure. (See Fig. 7 on **page E-331** for curing times.) To hard mass: 3 to 4 hours @ 20° C to 30° C. For optimum properties: 12 to 24 hours @ 20° C to 30° C.

IMPORTANT: The conductors must not be moved for a minimum of four hours.



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Epoxy Compound Preparation

Gloves supplied must be worn when handling this material. The epoxy compound is supplied in the form of a two-part package. These should be mixed into the ratio of 1:1 until both colors have blended into one, without any streaks. Rolling and folding is the most satisfactory method of obtaining an even blend. Once mixed, the compound must be used within 30 minutes. After this time it will begin to stiffen. The compound should be kept at an ambient temperature of no less than 20° C prior to using. At lower temperatures it becomes difficult to mix. Should any compound come into contact with the skin, it should be cleaned off with a skin cleaner and not be allowed to dry on the skin. Only compound for immediate terminations should be mixed.

- The compound may be adversely affected by some solvent vapors. If such vapors are likely to be present in the vicinity of the cable gland in service, suitable precautions may be necessary.
- The compound cures at a Shore D hardness of 85, when it can be handled. When used in the HA cable gland, shown here, the compound when fully cured is suitable for use at a temperature range of -60° C to 130° C.
- NOTE: Curing time will be extended when the ambient temperature is below 20° C. This must be taken into account.

Special Conditions for Use:

1. The cable gland has an operating temperature of -60° C to 130° C.
2. A seal must be formed between the equipment and the cable gland to maintain the appropriate degree of protection against ingress of dust, solid objects and water.

Accessories:

Before carrying out the cable gland assembly or stripping of the cable gland assembly, consideration should be given to any cable gland accessories that may be required, such as:

- Locknut, to secure cable glands into position
- Sealing washer, to offer additional ingress protection of the enclosure at the cable gland entry
- Earthtag, to provide an external armor/braid bonding point
- Serrated washer, to dampen any vibrations that may loosen the locknut or cable gland assembly

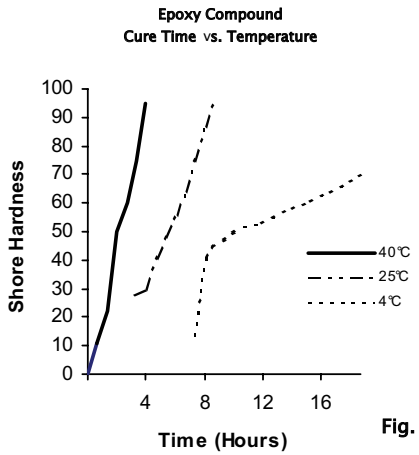


Fig. 7

C SP US Ex ATEX IECEx

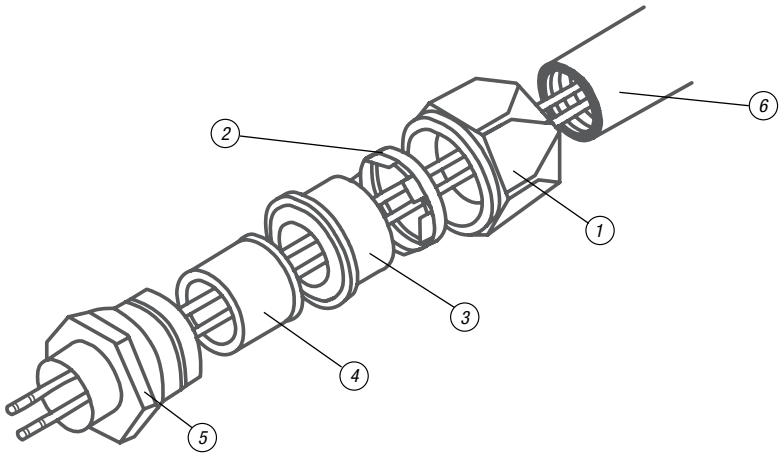
FLEXIBILE CONDUIT GLAND SELECTION TABLE

SIZE REF. (CONDUIT SIZE)	KOPEX REF.	GLAND BODY ACROSS FLATS	GLAND BODY ACROSS CORNERS	GLAND NUT ACROSS FLATS	GLAND NUT ACROSS CORNERS	METRIC/NPT	MAX. DIA. OVER CORES	MAX. DIA. OVER SINGLE CORE	MAX. NO. OF CORES	OVERALL LENGTH
16/⅜"	HAM*0304U HAA*0304U	28.6	31.0	32.0	34.0	M20 ½"	10.5	10.0	9	50.0
20/½"	HAM*0404U HAA*0404U	28.6	31.0	32.0	34.0	M20 ½"	13.0	13.0	15	50.0
25/¾"	HAA*0505U HAA*0505U	34.0	37.0	34.0 34.9 SS	37.0	M25 ¾"	17.9	17.9	28	50.0
32/1"	HAM*0606U HAA*0606U	42.0	45.0	42.0 42.4 SS	45.0	M32 1"	24.0	24.0	50	50.0
40/1¼"	HAM*0707U HAA*0707U	50.0	54.0	52.0	57.0	M40 1¼"	32.0	32.0	75	56.0
50/1½"	HAM*0808U HAA*0808U	60.0	64.0	60.0	64.0	M50 1½"	35.0	35.0	80	58.0
63/2"	HAM*0909U HAA*0909U	70.0	76.0	70.0 69.8 SS	76.0	M63 2"	45.0	45.0	100	70.0

Special Note: *For CSA Applications, conduit installations should be in accordance with C22.1.*

Fitting Instructions for Exd/Exe II Group II Cable Gland

1. Backnut
2. Gland Ring
3. Spigot/Fixed Coupler
4. Rubber Pot
5. Entry
6. Conduit (Kopex)

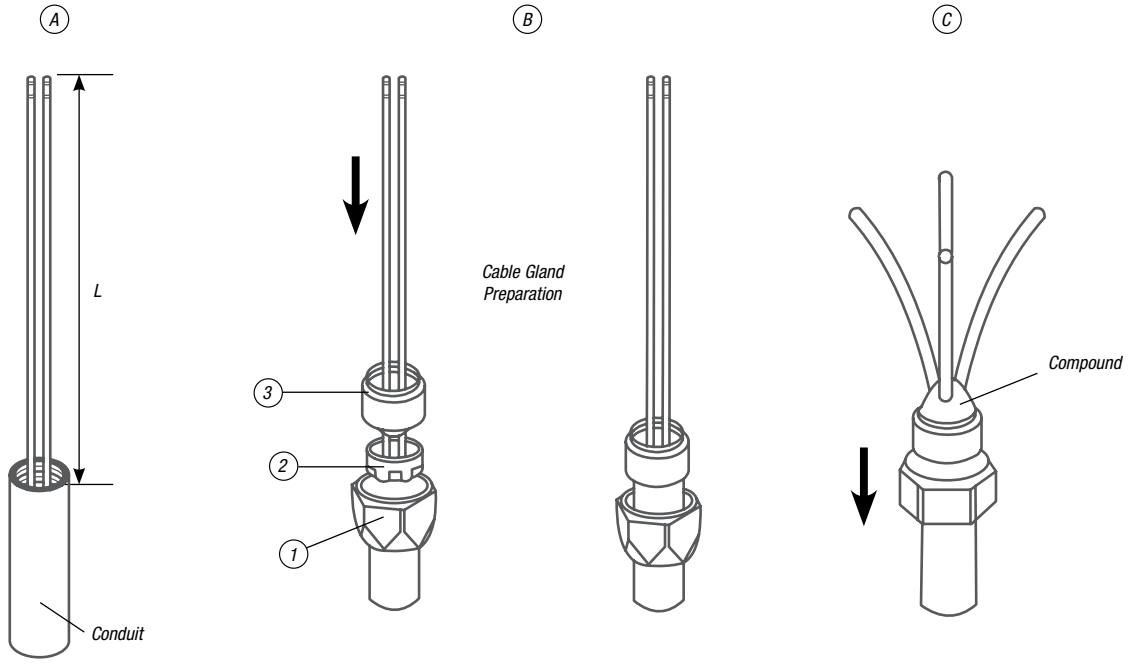


Conduit Preparation

A. Cut conduit square using a hacksaw with a minimum of 30 teeth per inch. Pull sufficient length (L) of conductors to suit equipment and twist to form a helix, which provides maximum flexibility.

B. Pass backnut (1) and gland ring (2) over the conduit and conductors, ensuring that the cutouts of the gland ring face the enclosures. Pass spigot/fixed coupler (3) over the conductors and screw into the conduit (6). Remove the rubber pot (4) from the entry (5) and pass the entry (5) over the conductors. Assemble the gland and tighten backnut (1) onto entry (5) until the gland ring (2) is drawn into the spigot (3), then remove entry (5).

C. Spread the conductors out for the compound packing. Pack the compound between the conductors as shown (see Epoxy Compound Preparation on **page E-334**).



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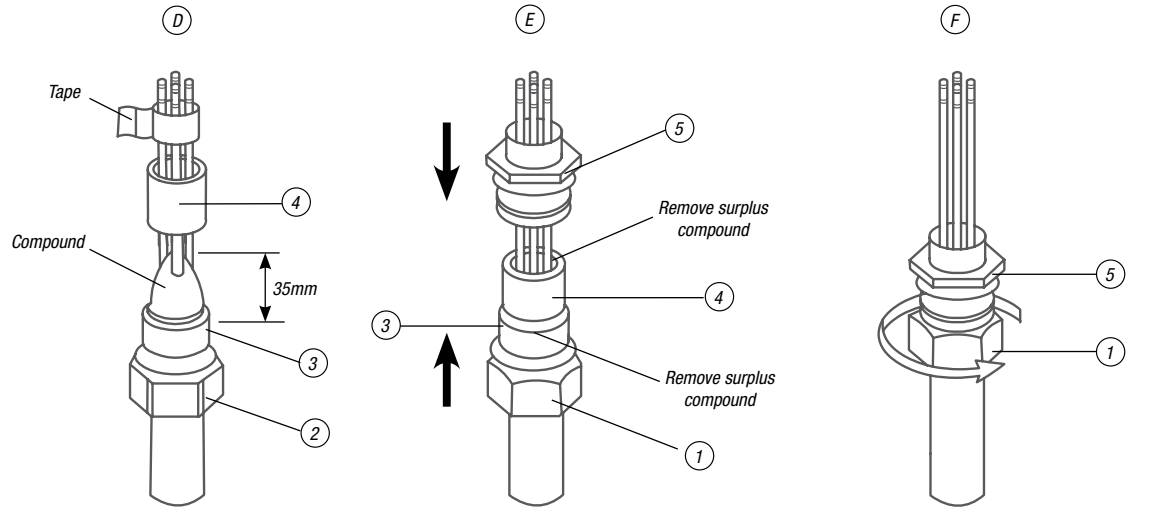


D. With all gaps and voids filled, bring the conductors back together and pack more compound around the outside of the conductors. Tape the conductors together to prevent disturbance of the compound seal. Pass the rubber pot (4) over the spigot (3) and remove any surplus compound from the top of the rubber pot (4) and the joint face as indicated.

E. Pass the conductors through the entry (5), which may have been previously fitted into the equipment. Ensure the compound does not cover end of the rubber pot (4). Fit the rubber pot (4) into the entry (5).

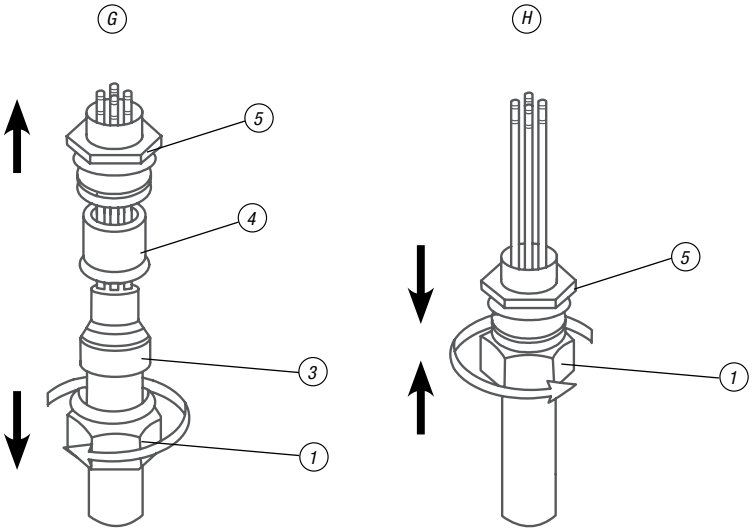
F. Locate and hand tighten backnut (1) to the entry (5).

IMPORTANT: The conductors must not be moved for a minimum of four hours.

G. Allow the compound to cure (see Fig. 7 on **page E-334** for curing times). Untighten the backnut (1) from the entry (5) to enable inspection. The rubber pot (4) may be removed for inspection to ensure that the compound packing is satisfactory. Add further compound if necessary.

H. Re-assemble the rubber pot (4) and the entry (5). Hand tighten the backnut (1) onto the entry (5) and add half a turn with a spanner/wrench.

See **page E-334** for epoxy compound preparation.



Group II Gland Expoxy Compound Preparation

Epoxy Compound Preparation

Gloves supplied must be worn when handling this material. The epoxy compound is supplied in the form of a two-part package. These should be mixed into the ratio of 1:1 until both colors have blended into one, without any streaks. Rolling and folding is the most satisfactory method of obtaining an even blend. Once mixed, the compound must be used within 30 minutes. After this time it will begin to stiffen. The compound should be kept at an ambient temperature of no less than 20° C prior to using. At lower temperatures it becomes difficult to mix. Should any compound come into contact with the skin, it should be cleaned off with a skin cleaner and not be allowed to dry on the skin. Only compound for immediate terminations should be mixed. The mixing and installation of the compound at an ambient temperature below 4º C is not recommended due to extended curing periods.

- The compound may be adversely affected by some solvent vapors. If such vapors are likely to be present in the vicinity of the cable gland in service, suitable precautions may be necessary.
- The compound cures at a Shore D hardness of 85, when it can be handled. When used in the HA cable gland, shown here, the compound when fully cured is suitable for use at a temperature range of -60° C to 130° C.

Special Conditions for Use:

1. The cable gland has an operating temperature of -60° C to 130° C.
2. A seal must be formed between the equipment and the cable gland to maintain the appropriate degree of protection against ingress of dust, solid objects and water.

Accessories:

Before carrying out the cable gland assembly or stripping of the cable gland assembly, consideration should be given to any cable gland accessories that may be required, such as:

- Locknut, to secure cable glands into position
- Sealing washer, to offer additional ingress protection of the enclosure at the cable gland entry
- Earthtag, to provide an external armor/braid bonding point
- Serrated washer, to dampen any vibrations that may loosen the locknut or cable gland assembly

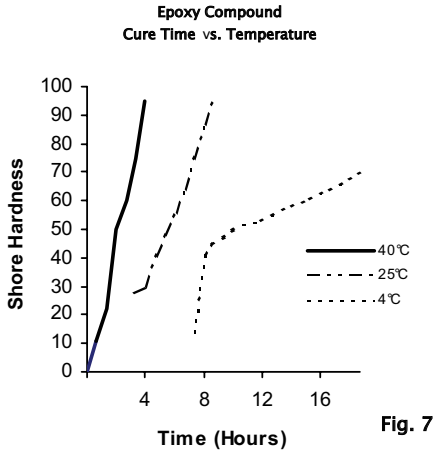


Fig. 7

FLEXIBILE CONDUIT GLAND SELECTION TABLE

SIZE REF. (CONDUIT SIZE)	KOPEX REF.	ACROSS FLATS	ACROSS CORNERS	METRIC/NPT	MAX. DIA. OVER CORES	MAX. NO. OF CORES	OVERALL LENGTH MAX.	OVERALL LENGTH MIN.
16/⅜"	HAM*0304 HAA*0304 HAA*0305	28.6	31.0	M20 ½" ¾"	8.9	6	56.8	49.1
20/½"	HAM*0404 HAA*0404 HAA*0405	28.6	31.0	M20 ½" ¾"	11.0	10	59.9	51.6
25/¾"	HAA*0505 HAA*0505 HAA*0506	34.0	37.0	M25 ¾" 1"	16.2	21	63.4	55.3
32/1"	HAM*0606 HAA*0606 HAA*0607	42.0	45.0	M32 1" 1¼"	21.9	42	70.9	61.5
40/1¼"	HAM*0707 HAA*0707	50.0	54.0	M40 1¼"	26.3	60	75.9	67.0
50/1½"	HAM*0808 HAA*0808	60.0	64.0	M50 1½"	37.1	80	83.5	75.2
63/2"	HAM*0909 HAA*0909	70.0	76.0	M63 2"	47.8	100	92.0	85.5

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Technical Information

Technical Data for Kopex-Ex™ Adapters and Reducers

These installation instructions give guidance on selection of Kopex-Ex™ products and general instructions for safety and installation of chosen Kopex-Ex™ products. All Kopex-Ex™ products should only be used in applications and environments as detailed in these instructions and other Kopex-Ex™ literature.

Kopex will not take responsibility for any damage, injury or form of loss caused where products are not installed or used as detailed in these instructions. If in doubt, contact Thomas & Betts Technical Support for advice.

ATEX

Product Certification

PART NO.	ATEX CERT.	IECEX CERT.	APPROVALS	OPERATING TEMP.	IP RATING
EX	BASEEFA 07 ATEX 0247X	IECEx BAS07.0090X	UL® 1203	-60° C to 100° C	IP66

Note: *For ingress protection above IP54, the use of a sealing washer or thread sealant is recommended.*

Certification and Material Variations for Standard Thread Sizes

PRODUCT	DESCRIPTION	PART NO.	MATERIAL
E	Enlarger	**EX**	Brass
R	Reducer	**EXN**	Nickel-plated brass
TC	Thread converter	**EXS**	Stainless steel

STANDARD MALE AND FEMALE THREAD SIZES			
M16	038	⅜" NPT	PG9
M20	050	½" NPT	PG13.5
M25	075	¾" NPT	PG16
M32	100	1" NPT	PG21
M40	150	1½" NPT	PG29
M50	175	1¾" NPT	PG36
M64	200	2" NPT	PG42
M75	250	2½" NPT	

Male thread is shown first. Example: EXN/M20-M25/E.

Material — Nickel-plated brass, M20 male to M25 female.

Specifications

In accordance with	IEC60079-0, IEC60079-7, IEC60079-1, EN60079-0, EN 60079-7, EN60079-1. IEC61241-07:2006, IEC61241-1, EN61241-0, EN61241-1

Selection

- All Kopex-Ex™ products should be selected in accordance with all relevant standards and codes of practice.
- Ensure that the product is certified to the same method of protection as the equipment to which it is to be installed.
- Ensure that the correct threadform and size is selected for the cable and/or entry hole of the enclosure.
- Ensure that the material the product is manufactured from is suitable to the enclosure material and cable gland, and also to the surrounding environmental conditions.
- Ensure that surrounding conditions do not exceed the operating temperatures stated in the Product Certification table.
- Ensure that the product can maintain the same ingress protection levels as the equipment to which it is to be installed.
- Ensure that the impact resistance of the product is suitable to that of the equipment to which it is to be installed.

Installation Guide

- All Kopex-Ex™ products should be installed in accordance with BS EN 60079-14: 1997 for electrical installations in hazardous areas (other than mines).
- The installer should ensure that no damage occurs to any thread or form of seal during installation. Where component is plated, care should be taken to prevent damage or chipping.
- Threaded Entries — Components can be installed directly into threaded entries and the recommended torque applied.
- Clearance Holes — Clearance holes should be 0.5mm larger than the major diameter of the male thread. Components installed in clearance holes should be secured with an appropriate sized locknut to recommended torque.
- Recommended Installation Torque — In order to maintain the integrity of the enclosure, it is important that an installation torque be applied as detailed below.

Installation Torque

Kopex adapters and reducers should be installed to the recommended torque values detailed in the following table. Torque values apply to non-metric thread equivalents.

MALE THREAD SIZE	METALLIC COMPONENTS (N.M.)
M16 & M20 and Equivalents	32.5
M25 and Equivalents	47.5
M32 and Equivalents	55.0
M40 and Equivalents	65.0
M50 and Equivalents	80.0
M63 and Equivalents	95.0
M75 and Equivalents	110.0

Routine Checking and Maintenance

All Kopex-Ex™ products should be checked during routine maintenance of the enclosure.

Special Notes

- Exe equipment should not be used with Exd equipment.
- Two adapters installed in series is not permitted under certification.
- When the fitting is used for increased safety or dust protection, the entry on the enclosure and the female thread on the fittings shall be suitably sealed (in accordance with IEC60079-14) to maintain the IP of the associated enclosure.

Assembly Instructions for Stopping Plugs HSP/DSP Exe I and II

Certification Details

CMPL Ex BASEEFA 08 ATEX 0325X

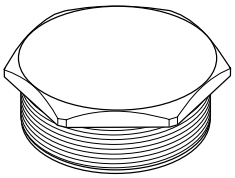
Exe I and II Ext D

IECEx BAS08.0108X

UL® 1203 (Nickel-plated brass and ST/ST only)

Class I Div. 1 ABCD

Class II Div. 1 EFG



HSP/DSP Stopping Plugs

PACK QTY.	METRIC	NPT	PG	A / F
20	M16	⅜"	13.5	20.0
20	M20	½"	16	24.0
20	M25	¾"	21	28.6
10	M32	1"	29	35.0
5	M40	1¼"	36	47.2
2	M50	1½"	42	55.0
1	M63	2"	48	70.0

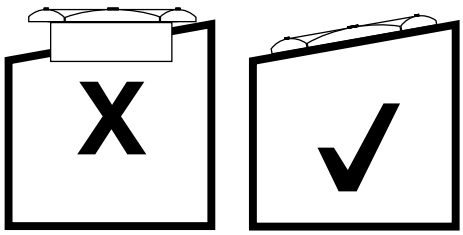
HSP/DSP - Stopping Plug is inserted from the OUTSIDE of the enclosure/equipment where ingress protection greater than IP54 is required.

Installation Instructions

Step 1 - Ensure thread type and size are compatible with enclosure thread, if applicable. Up to IP66, the stopping plugs must be fitted with an appropriate face seal.

Step 2 - Fully tighten stopping plug into the enclosure/equipment using the appropriate tools, using locknuts where necessary.

Note: *Do not use stopping plugs for closing the entry in an adapter or reducer.*



Assembly Instructions for Stopping Plugs SP/TSP Exe I and II C

Certification Details

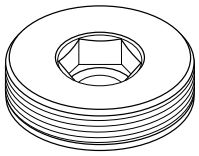
Ex I M2/II 2GD BASEEFA 08 ATEX 0324

CMPL IECEx BAS08.0109 Exe I and II C

UL 1203 (Nickel-plated brass and ST/ST only)

Class I Div. 1 ABCD

Class II Div. 1 EFG



SP/TSP Stopping Plugs

PACK QTY.	METRIC	NPT	PG	A / F
20		⅜"	11	8
20	M16		13.5	10
20	M20	½"	16	10
20	M25	¾"	21	10
10	M32	1"	29	10
5	M40	1¼"	36	10
2	M50	1½"	42	10
1	M63	2"	48	10

SP - Stopping Plug inserted from the OUTSIDE of the enclosure/equipment.

TSP - Tamper-Proof Stopping Plug inserted from the INSIDE of the enclosure/equipment.

Installation Instructions

Step 1 - Ensure thread type and size are compatible with enclosure/equipment thread. Where ingress protection greater than IP54 is required, the use of a non-setting sealant is recommended.

Step 2 - Fully tighten stopping plug in the enclosure/equipment using the appropriate hexagon allen key.

For parallel threaded stopping plugs, five threads must be engaged with an axial engagement of 8mm.

Note: *Do not use stopping plugs for closing the entry in an adapter or reducer.*

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