Guide to the installation of Wrexham mineral insulated cables

The installation procedures, materials and components of the installation shall comply with the relevant standards approvals and specification.

Examples:

a) The current edition to the IEE regulations for electrical installations (BS 7671)
b) The appropriate British Standard specifications and codes of practice.
c) The Electricity Supply authority regulations.
d) The relevant National or International standards and codes of practice.

The Cable

Copper sheathed, Copper conductor cables, insulated with compressed mineral insulant, manufactured and tested in accordance with BS EN 60702-1:2002. LPCB approved and manufactured under a product licence 333a/01. WMC UK manufacturing facility is registered BS EN ISO 9001 Assessed Quality Management System, by LPCB, approval number 333

Light Duty Grade Cables

Rated up to 500 volts suitable for use where the voltage between the conductor/ sheath and between conductors does not exceed 500 volts r.m.s a.c or 500 volts d.c.

Heavy Duty Grade Cables

Rated up to 750 volts suitable for use where the voltage between the conductor/ sheath and between the conductors does not exceed 750 volts r.m.s a.c or 750 volts d.c.

Outer Coverings

Wrexham Mineral Cables can be supplied with an overall Low Smoke Zero Halogen (LSZH) thermoplastic
serving. This serving may be required for one of the following reasons:
a) To provide protection of the copper sheath in potentially corrosive environments.
b) To provide circuit identification by colour.
c) For Aesthetic reasons.

Served cables are Halogen Free and have extremely low flame propagation. When served cables are used in corrosive environments it is essential to replace any covering removed to
facilitate termination, by taping over the exposed copper sheath and backnut of the ring type gland, under the
gland shroud.

Terminating

A termination is required at each end of a length of cable and it should be fitted as soon as the cable end has been prepared, i.e., cut to length and the sheath removed approx. 6 inches. All termination's supplied by Wrexham Mineral Cables comply with the requirements of BS EN 60702-2:2002 and should be fitted in accordance with the manufacturers latest recommended terminating procedure (see ADS 004).

Seals

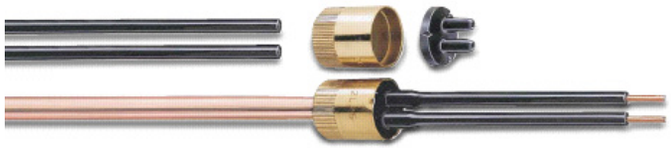
The standard seal ref: WRPS or Earth tail seal ref: WRPSL has a recommended continuous operating temperature range of -80˚C to 105˚C for all general use.

The WRPSL seal has an integral earth tail crimped and soldered into the brass seal pot and are offered as an alternative to the standard seal (WRPS) for conductor sizes up to and including 50mm^2.

Where cables are not secured into enclosures by means of cable glands, WRPSL (Earth Tail Seals) must be utilized to ensure the integrity of the circuit protective conductor.

Glands

Externally Threaded Glands Ref: WRGM (BRASS)
Manufactured and tested in accordance with BS EN 60702-2:2002.
Approved for apparatus (type of protection 'd') Zones 1 & 2, Groups IIA, IIB and IIC.
Along with apparatus (type of protection T) zones 20, 21 & 22, groups IIIA, IIIB & IIIC.
In compliance with EN 60079-0, EN 60079-1 and EN 60079-3 under SIRA licence SIRA02ATEX1305X & IECEx SIR 19.0051X
For ambient service temperatures of -20˚C to 450˚C



Jointing

Wrexham Mineral Cable ring type glands are provided with standard ISO metric conduit threads, so they can be used with standard entry switch, socket and conduit boxes. This feature facilitates the ready jointing of cable by means of through-type boxes of suitable size and shape. If it is necessary for the joint to be watertight the box should be filled with a suitable plastic sealing compound. The alternative is an internally screwed brass sleeve Ref: WRJMZ available in 20mm, 25mm, 32mm and 40mm sizes. Terminated in the usual manner, using screw-on seals with ring type compression glands. The conductors are joined by crimp connector or soldered ferrule. Following the manufacturers latest recommended jointing procedure (see ADS 011).

Overall Diameter of Cable	Spacing of Clips in mm					
	Horizontal			Vertical		
	Surface	Tray	Max	Surface	Tray	Max
Up to 9mm	350	500	600	375	500	800
9mm - 15mm	375	650	900	425	650	1200
15mm - 20mm	450	700	700	500	700	2000
Above 20mm			2000			3000

Bending the Cables

Bends shall normally be restricted to a minimum radius of six times the bare cable diameter. When sharper bends are required, they may be made to a minimum of three times the cable diameter, but re-straightening may not be carried out due to work hardening of the copper sheath. Two bending levers available WZBLA (cables 10 – 16mm) & WZBLB (cables 16 – 27mm).

Straightening the Cable

A rubber mallet or a hammer and block of wood being used for final dressing. A metal hammer alone should never be used as it may result in unsightly dents that cannot be removed.

Fixing the Cable

Wrexham Mineral Cables can be fixed to surfaces by means of clips ref: WRC (bare) & WRCHL (LSZH coated). Two way saddles ref: WRS (Bare) & WRSFL (LSZH coated) or fixing strip, pre-punched ref: WRSH (Bare) & WRSHL, solid ref: WRSZ. The recommended & maximum distance between fixings is dependent on the size of the cable.

Testing

The magnesium oxide insulation of Wrexham Mineral Cable has been specially formulated with a high-density compaction to oppose moisture ingress. If left unsealed during installation atmospheric moisture will only penetrate to a depth of 20 - 40mm. Subsequent stripping back of the copper sheath during termination will remove any effected insulation. Insulation testing should never be carried out on cables which have unsealed ends because this will result in false and misleading readings. Moisture in the atmosphere can be recorded across the face of the exposed magnesium oxide insulation resulting in false low insulation resistance readings. After both ends have been terminated with permanent seals, the cable should be tested for insulation resistance at a d.c. voltage appropriate to the intended operating voltage, as per regulations. This initial test is to check for major faults, (Short circuits within the seal pot) in which case the fault can be located and rectified. The insulation resistance reading should be noted and compared with the value measured twenty-four hours later. The insulation resistance should be at least 100meg ohms and have risen from the initial test.

Transient Overvoltage

A Transient Over voltage is a short duration increase in voltage measured between two or more conductors. Anything from micro seconds (millionths of a second) to a few milliseconds (thousandth of a second) induration. The increase in voltage will vary from a few volts to thousands of volts, between two or more conductor's live/phase, neutral and earth. 'Transient Overvoltage' is both technically and descriptively the best term. However, transients are also variously referred to as surges, spikes and glitches. The term 'surge' though widely used, should be used with caution. In some parts of the world, Britain amongst them, surge is used by the electricity supply industry to refer to a sustained overvoltage of several cycles duration. Transient over voltages are by definition a very specific form of disturbance.

Electrical Switching

Transient overvoltages caused by electrical switching are common and can be a source of considerable interference. Current flowing through a conductor creates a magnetic field in which energy is stored. When the
current is interrupted or switched off the energy in the magnetic field is suddenly released. In an attempt to dissipate itself it becomes a high voltage transient. The more energy stored, the larger the resulting transient. Higher currents and longer lengths of conductor both contribute to more energy stored and also released. It is common knowledge that inductive circuits such as
motors, transformers, electrical drives, contactor coils and miniature fluorescent fittings can produce transient voltages exceeding the line voltage. When the current flowing in them is suddenly interrupted, and under adverse conditions these transient voltages can cause a breakdown in the various components. This phenomenon is recognised in the IEE Wiring Regulations (BS 7671) and it is the Designers/Installers responsibility to ensure compatibility between circuit components.

Suppressors available

Order Ref: WRRN 1 A heavy duty single phase suppressor. Three can be used star connected for motors in the range of 1hp to 6hp. Suitable for use up to 250 volts a.c with the star point connected to neutral. Order ref: WRRN 2 Two wire suppressors for use up to 415 volts a.c. Intended for Use with contactor coils. Order Ref: WRRN 3 Three wire suppressor for use up to 415 volts a.c. For motors up to and including 1hp. (To be connected at the motor terminals). Order Ref: WRRN 4 Two wire suppressor 240 volt a.c. For use with discharge lighting.

Cable selection

Cables should be selected in accordance with the requirements of the current edition of the IEE regulations for electrical installation. The type of cable used in a particular installation depends on the conditions of installation and the suitability of the cable.

Handling & Storage of Wrexham Mineral Cables

Wrexham Mineral Cables are manufactured from inorganic materials and therefore will not deteriorate with age. This also makes the cables highly resistant to radiation. The construction of Wrexham Mineral Cables allows storage in hot, humid and cold conditions.
Wrexham Mineral Cables can supply served cables covered in a low smoke & fume zero halogen materials which gives extremely low smoke emissions in the event of a fire. The serving is also tested under UV conditions to ensure minimum deterioration of colour.
Wrexham Mineral Cables are robust and pliable for most industries. The minimum bend radius specified in the British Standard is equal to 6 times the diameter of the cable sheath. This will allow the cable to be re-bent if necessary. However, If the cable is being installed in a situation where re-bending will not be required the bend radius may be reduced to 3 times the cable diameter.

Wrexham Mineral Cables can be supplied in drums, reels or coils. The packaging is such that it is able to withstand manual handling and decanting. The coils should be stacked no more than ten (10) coils high, placed on a standard Euro pallet to avoid floor contact & packaging contamination. It is recommended the reels should be stacked on a pallet containing six (6) reels per row x four (4) rows high. The drums should be stacked on a pallet no more than four (4) drums high. (Note Care should be taken when decanting the cable from drums and under no circumstances should the drums be rolled over uneven surfaces as this may damage the LSZH Sheath.

General Product Information

The products supplied may be described as electric cables for use in Industrial, Commercial & Domestic application. It is important that the type of cable ordered is suitable for the intended use. When handling and installing cable, the appropriate wiring codes of practice and installation regulations should be observed. It is essential that installation and connections to electrical supplies are carried out by qualified electricians.

In certain circumstances the packing of cable and accessories could give rise to hazard from, for example, the sharp edge of cable ends, the coil size and weight, or the weight of large cartons of accessories. When preparing termination's for MICC Cables, cut metal edges can cause abrasions to the hands and loose powder may cause irritation if it enters the eyes. For protection, gloves and safety eyewear may be used.

The corrosion protective over sheathing materials of these cables include LSZH thermoplastic compounds which contain substances which, in the raw state, could be hazardous to health. However, to the best of our knowledge when incorporated with MICC cables, represent no danger to health and safety, when properly used.
You are requested in accordance with the provisions of the ACT, to take such steps to ensure that the appropriate information on the proper use, and handling of our cables is made available by you to all those concerned and to anyone who may purchase or otherwise acquire from you, such products for use in his own workplace.

As a guide for safe use WMC have prepared the following COSHH details.

WMC COSHH ASSESSMENT ON CABLE GLAND SYSTEMS - INSTALLATION

Magnesium Oxide

Emergency Overview Non-combustible
Eye Contact Normal problems caused by inert particulate matter
Skin Contact May cause irritation
Inhalation No known effects other than respiratory irritation
Ingestion None known
Classification Not dangerous

First Aid Measures

On Contact with eyes	Flush with water
On prolonged contact with skin	Wash with soap and water
On breathing dust	Breathe plenty of fresh air
On ingestion	Aspiration. Harmless if swallowed

No chemical risk can be fully recycled

Small exposure to Mgo during stripping stage of cables. Whilst there is very low risk caution should be taken as follows:

Risk: Monitor skin condition

Copper sheath

No chemical risk can be fully recycled

LSZH Low Smoke Zero Halogen outer covering – polymer low qty

No risk during installation, minimal covering thickness compared to other types of construction

PVC Sleeving supplied with accessories

No risk during installation, minimal covering thickness compared to other types of construction

Brass glands & pots – Solid Brass

No chemical risk, fully can be fully recycled

RMX Compound – Putty like substance, solid

Inhalation
a) Effect: Not Normally Applicable
b) Precaution: Not Normally Applicable
c) First Aid: Not Normally Applicable

Contact – Skin
a) Effect: Little effect under normal exposure, constant contact may cause dermatitis.
b) Precaution: Not Normally Applicable
c) First Aid: Remove from contact. Wash affected area with soap and water or industrial hand cleaner.

Contact – Eye
a) Effect: Irritation due to inorganic filler particles, binder may cause discomfort.
b) Precaution: Protect eyes/use visor etc.
c) First Aid: Wash the eyes with water for at least 15 minutes. Seek medical Advice

Ingestion
a) Effect: Not normally applicable
b) Precaution: Keep away from foodstuffs, wash hands before eating, do not drink/eat when using.
c) First Aid: Seek Medical Advice

Small exposure to compound during termination stage of cables. Whilst there is very low risk caution should be taken as follows:

Risk: Monitor skin condition