

3M™ Electrical Markets Division
Understanding Resins



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Understanding resins

and how they apply to
electrical cable jointing



Introduction

Resins have long been established as part of the process to create electrical cable joints, whether for low, medium or high voltage applications. - Of course, today there are also 'cold applied' jointing techniques (such as 3M™ Cold Shrink), which can remove the need for resins (or the alternative of heat sources) in some instances, but there are many products and situations where resins are still used.

Indeed, there are some instances when resins are necessary, often in combination with cold-applied joints. Examples might include joining modern XLPE and paper insulated cables together, or in potentially hazardous environments where hydrocarbon-resistance needs to be ensured. Even when resins are not really required, some users still prefer to use them as an additional protective layer as a 'belt and braces' approach.

Clearly, resins are a key part of cable jointing, now and for the foreseeable future.

Addressing increasing legislation

Like many products, resins are now subject to increasing regulation and legislation, which is good news for the environment, plus health and safety. However, the information can be potentially confusing for installers and specifiers, but in reality, the situation is very straightforward and – as long as everyone is armed with the right facts - does not cause any real hindrance within the cabling industry.

This booklet aims to set out these facts in a straightforward, no-nonsense way, with minimal jargon and no 'hype'. Although this booklet is not a detailed guide to 3M products, 3M provides both resin-free and resin-based jointing options, including a fully integrated resin delivery system, complying with the guidelines and requirements of the REACH Regulation. Details for further information can be found at the end of this booklet.

The CLP Regulation

What is it?

The CLP Regulation covers the Classification, Labelling and Packaging of substances and mixtures. It aligns existing EU legislation to the United Nations Globally Harmonised System (GHS). For electrical cabling installers, this affects the labelling of resins that contain Methylene Diphenyl di-isocyanate (MDI) the polyurethane hardener in resin mixtures, also often referred to as oligomers. MDIs are essentially hardeners that help to cure the resin. The CLP has classified MDIs tested in aerosol format as 'carcinogen category 4' (inhalation of vapour; suspected of causing cancer). This means that when resins are used in liquid form (as is typically the case in electrical jointing), the risk of cancer can be assumed as significantly reduced (category 2).

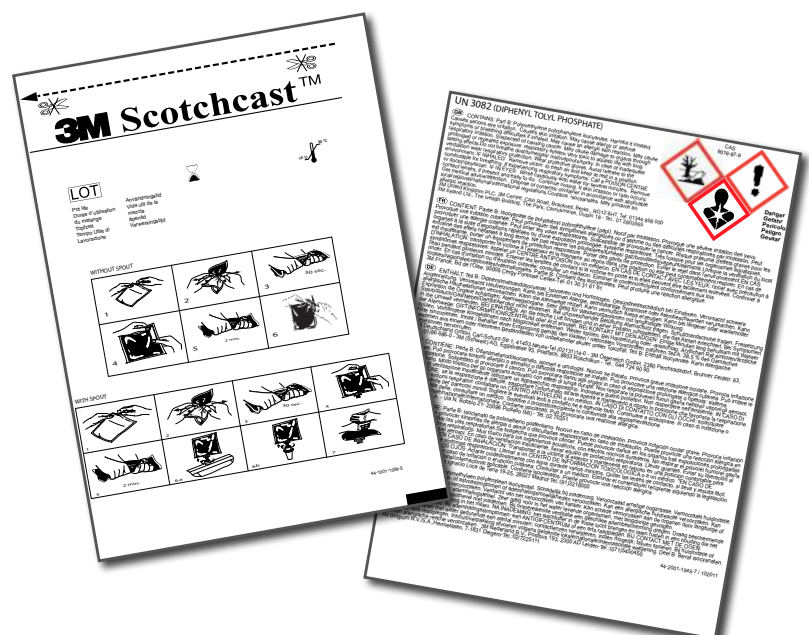
What are the timescales?

The requirement for suppliers to amend their labelling came into effect December 1st 2010 (for individual substances only: mixtures are subjected to a prolonged implementation time until June 1st 2015). There has been no legislation implemented to replace MDIs, which are commonly used in various industries.

What's the impact?

It is the responsibility of suppliers to ensure that labelling has been updated, so there should be no specific action required by customers or users and as ever, it is important to follow the manufacturer's instructions. However, for peace of mind, customers may wish to double-check with their suppliers that they adhere to the new labelling requirements.

3M has given MDI hardeners used in association with its jointing products the CLP classification Acute Toxicity (inhalation) Category 4, Skin Corrosion/Irritation: Category 2, Respiratory Sensitiser Category 1 and Skin Sensitizer Category 1, which will be accompanied with the exclamation mark and health hazard pictograms. This is in line with the Association of Isocyanate Manufacturers (ISOPA)'s own guidelines, as a product with low volatility. Customers of other products are advised to check with their suppliers.



REACH

What is it?

REACH stands for the Registration, Evaluation, Authorisation and Restriction of Chemicals and requires all companies manufacturing or importing substantial amounts of chemicals to register them on one central database. It is also important to understand that it is not just the chemical that must be registered, but the intended application too.

REACH gives the chemicals industry greater responsibility for managing the risk to humans and the environment and to provide safety information across the supply chain. The regulation also calls for a switch from some of the most dangerous chemicals to safer alternatives where they exist.

In addition, if they contain so-called substances of very high concern (SVHC) in excess of 0.1 weight-%, there exists a further authorisation and notification requirement for products that come within the scope of REACH. An SVHC is a chemical substance that meets certain toxicity criteria (Art. 57 of REACH), has been put on the so-called candidate list, which is published by the ECHA (European Chemicals Agency). The first list came into force in October 2008, and it is permanently extended by further entries of SVHC on an approximately biannual basis. Listing of a substance as an SVHC is the first step in the procedure for authorisation of restriction of use of a chemical. Suppliers of SVHC-containing articles are obliged to inform their industrial customers proactively about this fact.

3M resins have been developed not to contain SVHC.

What are the timescales?

REACH came into effect June 1st 2007, but the timescales for different chemical products to comply varies. December 2010 saw the end of the first registration period for the most dangerous and / or higher volume substances.

What's the impact?

As far as users are concerned, it makes sense to check the REACH implementation status of their current suppliers. Quite considerable resources are required to meet REACH rules, so larger organisations may find it easier than small organisations.

RoHS

What is it?

The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". This Directive bans the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

Electrical power cables with nominal voltages up to 250V will be added to the scope of the new edition of the RoHS Directive, while all cables exceeding the upper limits for the Low Voltage Directive (LVD) will continue to be exempted. The CE mark will take over the additional function of a RoHS label. (see description of the CE mark below). Customers may look for the reassurance of RoHS compliance from their suppliers, though the CE mark may have more impact in the future.

What are the timescales?

The previous version of the RoHS Directive came into force in the UK on February 1st 2008. The latest version (RoHS Recast) was published on May 30th 2011 and has still to pass the parliamentary path, similar to a national law.

What's the impact?

Producers and importers into the European Union are responsible for ensuring that their products comply with the regulations and that they maintain evidence of that compliance for inspection by the enforcement authority.

The supplier is obliged to inform the customer whether the offered product is RoHS-compliant or not.

It is then the customer's responsibility to decide whether or not he or she can use the product for the intended application. However, it is generally legal to sell non-compliant products, as long as there are still corresponding RoHS exemptions in existence.



CE Mark

What is it?

The CE mark on a product indicates that the manufacturer or the importer for the EU has respected specified requirements for safety, health and environment.

These requirements are described in EU directives (for instance, the Low Voltage Directive). Which products or product groups have to be CE marked has been expressed by the CE Marking Directive (CEMD). CE compliance will be expressed by the DoC (Declaration of Conformity), a document that will be forwarded to the customer on request.

What's the impact?

Cables subject to the LVD as well as accessories for them (e.g. joints) are required to contain the CE mark. It is either illegal to apply the CE mark to a product that is not listed in the CEMD, does not have CE compliance verified by passing tests according to relevant directives, or is missing the CE mark for a product subject to the CEMD.

As far as the electrical industry is concerned, resins do not carry CE marks, but low voltage cable joint accessories up to & including 0.6/1kV certainly should do.

Cable accessories that are rated up to & including 3.3kV, which is common for many 3M Cable joints, are not required to be CE marked.

3M Scotchcast Low Voltage Joints

Complementing the re-development of our resins and delivery systems, 3M has designed a new mould body within its low voltage range.

Key Benefits:

- ✓ Simple and fast installation process - the one part mould body construction has a top seal and fixing clips, meaning that no taping is required.
- ✓ Significantly reduced chances of resin wastage, leakage, skin contact and vapour inhalation – using the built-in activation nozzle, which is a key part of the integrated resin delivery system.
- ✓ Innovative design eliminated need for sawing and taping of the ends of the resin mould – through the range-taking foam seal at each end of the mould body.

3M Resins

We are constantly striving to develop new and more innovative products that meet our customers evolving demands. Our customers – many of whom have been choosing 3M for years – do not want to settle for 'second best! To complement our new range of resins, 3M have introduced a fully integrated resin delivery system, which is designed to provide more simple and efficient resin mixing and application, while complying with health and safety requirements.

The benefits of 3M resin:

- ✓ Compliance with EU environmental legislations and user safety regulation changes – thanks to new product development
- ✓ Reduced chances of vapour inhalation - as well as skin contact, with our new delivery system
- ✓ Helping to ensure the correct measurement of compound and hardener are mixed thoroughly – using our unique two-part resin bag, which also eliminates any chance of resin contact.



3M Electrical Markets Division

The electrical markets division of 3M - the diversified technology company - provides electrical solutions to UK power utilities and companies within the oil and gas, mining and quarrying, large private construction and rail industries. Covering low, medium and high voltage applications, all solutions and products share the same focus on durability and ease-of-use. 3M electrical products are used in a wide range of applications including jointing, terminating and repairing power cables, not just within the national grid but other situations too, such as supporting private transport networks, or construction projects.

Many 3M products are designed with health, safety, and environmental issues in mind. For example, 3M has cable joint and termination kits designed specifically for hazardous areas. Other uses for 3M electrical products include insulation and protection, watertight sealing, electrical and heat resistance and transference, and locating and identifying power cables.

Product range summary

3M has more than 50 years' experience in electrical products and processes. The company's significant investment in R&D has led to innovations such as the original development of electrical insulating PVC tape and the 3M Cold Shrink range, today used by many utilities and construction companies to join and terminate low and medium voltage power cables. A more recent innovation is the development 3M Scotchcast LV Resin Jointing kits, designed to simplify and speed up installation of low voltage electrical cable systems, while its one-part mould shell minimising the risk of contact with resins.

About 3M and sustainability

Innovation—the art and science of applying creativity to develop practical and novel solutions—has been our hallmark for more than a century. It's more than a way of developing products. Innovation is part of our DNA.

We recognized early that doing business in new, smarter ways would not only create a more viable company—it could also enable us to meet our social responsibilities and reduce our impact on the environment, two objectives integral to ethical business conduct. Sustainability is a natural extension of **our values**.

Today, we're building on more than 70 years of practices that support economic, social, and environmental sustainability. Our vision is simple: we want to help meet the needs of society today while respecting the ability of future generations to meet their needs.

We are guided by **three strategic principles** that make sustainability implicit in everything we do:

Economic Success: We build lasting customer relationships by developing differentiated, practical, and ingenious solutions to their sustainability challenges.

Environmental Stewardship: We provide practical solutions and products to address our environmental challenges for ourselves and our customers.

Social Responsibility: We engage key stakeholders in dialogue and take action to improve our sustainability performance.

With these strategic principles as a framework, we're vigorously pursuing our key sustainability objectives, among them:

managing our environmental footprint; developing solutions that address environmental and social challenges for our customers and society; assuring our products are safe for their intended use through their entire lifecycle and assuring the appropriate management of any 3M health and safety issues that may touch customers, neighbours, and the public.

Information about the profile of individual products – for instance, REACH and RoHS compliance – is available by visiting:

www.3M.co.uk/sustainability

For more information on 3M™ Electrical Products
please call our information line



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