SP Electricity North West

Electricity Specification ES400 R10

Cold Pour Resin Compounds for encapsulation of cable joints up to 33kV

Issue 6 February 2026

Amendment summary

Issue No/Date	Description
4 **March 2022**	The new template for Engineering Specification Documents has been applied. Updated throughout and technical requirements rewritten to preclude any resin containing isocyanates. Type Testing updated to latest standards. Requirement for recyclable plastic content in packaging added Prepared by: Philip Howell Approved by: Policy Approval Panel and signed on its behalf by Steve Cox, DSO Director
5 **September 2022**	Cold Weather Test updated. Approved Resin in Appendix B added. Prepared by: Philip Howell Approved by: Policy Approval Panel and signed on its behalf by Steve Cox, DSO Director
6 **February 2026**	New template applied. Removed Appendix B, which contained information on approved suppliers/resin. This information will now be captured on the Approved Materials spreadsheet only – ES281. Prepared by: Elizabeth Pattison Approved by: Technical Policy Panel and signed on its behalf by Paul Turner, PAP Chair

Contents

1. Introduction

This document provides the general requirements for the material specifications and testing of cold pour resinous compounds used as an encapsulating medium in cable joints up to and including 33kV which are installed on the electricity distribution network (Network) owned by Electricity North West Limited, as Distribution Licensee, herein referred to as SP Electricity North West.

2. Scope

The specification for cable joints up to 33kV used on the Network are based on designs requiring encapsulation with a suitable cold pour compound which will cure within a short time and provide the necessary mechanical protection, moisture ingress protection and secondary insulation properties.

This specification covers the requirements for a suitable cold pour compound for this application. Traditionally the material used has been polyurethane based resin compounds with a hardener component which contains isocyanate chemicals, typically Diphenylmethane diisocyanate (MDI).

However, in recent years there has been introduction of regulations requiring stricter requirements for the labelling and training of operatives relating to the potential hazards asscociated with these materials if they are misused. As a consequence of the these increasing regulations being imposed on manufacturers and end–users, this version of the specifcation specifically exlcudes any resin compounds containing isocyanate chemicals in order to reduce possible risks to operator health and remove any future requirements for training of operators in the safe use of products containing isocynates.

The overall specification promotes materials which are intrinsically safe, requiring minimum health and safety risk warning labelling and presents a sustainable solution for disposal and packaging wherever possible.

3. Definitions

ABS	Acrylonitrile Butadiene Syrene
Approval	Sanction by the SP Electricity North West Circuits Policy Manager that specified criteria have been satisfied.
Compound	Material consisting of two or more parts which are mixed together.
Contract	The agreement between SP Electricity North West and the Contractor for the execution of the Works including therein all

	documents to which reference may properly be made in order to ascertain the rights and obligations of the parties under the said agreement.
Contractor	The person or person's firm or company, including personal representatives, successors and permitted assigns, who's Tender has been accepted by SP Electricity North West.
HIPS	High Impact Polystyrene
MDI	Diphenylmethane Diisocyanate
PETG	Polyethylene Terephthalate Glycol
PILC	Paper Insulated Lead Covered
PVC	Polyvinyl Chloride
Resin	A solid or liquid synthetic organic polymer
Specification	The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.
Supplier	Any person or person's firm or company who supplies goods to SP Electricity North West or to its Contractor.
Tender	An offer in writing to execute work or supply goods at a fixed price.
Tenderer	The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by SP Electricity North West to submit a Tender.
XLPE	Cross Linked Polyethylene

4. General Requirements for Approvals and Testing

4.1. Product not to be Changed

Compliance with this clause shall be in accordance with ES001.

4.2. SP Electricity North West Technical Approval

Compliance with this clause shall be in accordance with ES001.

4.3. Quality Assurance

Compliance with this clause shall be in accordance with ES001.

4.4. Formulation

Compliance with this clause shall be in accordance with ES001.

4.5. Identification Markings

Compliance with this clause shall be in accordance with ES001.

4.6. Minimum Life Expectancy

The minimum life expectancy of all products covered by this Specification is 60 years.

4.7. Product Conformity

Compliance with this clause shall be in accordance with ES001.

4.8. Confirmation of Conformance

The Tenderer shall complete the conformance declaration sheets in Appendix A. Failure to complete these declaration sheets may result in an unacceptable bid.

5. Requirements for Type and Routine Testing

Compliance with this clause shall be in accordance with ES001.

5.1. Requirement for Type Tests at Suppliers Premises

Compliance with this clause shall be in accordance with ES001.

5.2. Requirement for Routine Tests at the Supplier's Premises

Compliance with this clause shall be in accordance with ES001.

6. Technical Requirements

6.1. General Requirements

The resin compound shall comply in all respects with the specification detailed below unless otherwise agreed in writing by SP Electricity North West.

The supplied filling medium shall be a two-part cold pouring hard set resin compound identical to that which Type Approval has been obtained in accordance with the latest version of Electricity Networks Association Engineering Recommendation C81 "Type Approval Tests for Joints for 600/1000V Cable Systems" and/or BS EN 50393.

The resin compound shall have no detrimental effect when used in conjunction with moulded PETG, ABS, cable joint shell materials.

The resin shall be fully compatible and have no detrimental effect on all common metallic, impregnated paper, polymeric and elastomeric materials used for cable sheaths, insulation, connections, heat shrinkable and cold applied accessories, cleaning solvents and general tapes used in cable joint preparation.

The resin shall provide strong adhesion when cured to prepared polymeric cable sheath materials, lead sheaths, sealing mastics and other parts of cable joints to prevent any moisture tracking paths forming between the resin and substrate.

The resin shall be electrically insulating when fully cured.

The resin shall not contain any isocyanate chemical groups in any part of the resin or hardener.

The resin and hardener components shall be adequately protected and sealed against the ingress of moisture when stored.

The time required for curing to reach a stage where normal backfilling may commence without damage to the joint, or "setting time", shall not exceed 60 minutes at 0°C and shall not be less than 20 minutes at 30°C.

The Tenderer shall provide Manufacturers technical data sheet, including information of graphical values of resin mixing and setting times and of resin temperature variation with time at temperatures between -5°C and 30°C.

6.2. Testing Requirements

6.2.1. Type Tests

Type Approval shall be obtained in accordance with the latest version of ENA ER C81 and/or BS EN 50393.

Full Type test reports shall be supplied at the time of tender to demonstrate full compliance.

The resinous compound shall fully comply with the requirements of BS EN 60455-3-8 (2021) for Materials designated as Categories L and M.

Evidence shall be provided of the resin compound % shrinkage after curing. The maximum permitted shrinkage during curing shall be less than 1% after curing for 24hours.

6.2.2. Cold Weather Test

All plastic joint shells used for LV, 11kV and 33kV cable joints shall be tested to prove they are compatible with the Tendered resin during cold weather and will not split in these conditions due to Environmental Stress Cracking.

A sample of the Approved LV, 11kV and 33kV plastic shells and the Tendered resin should be put into an environmental chamber and left for 12 hours minimum to chill to -20°C.
Where there is more than one material used for shells (e.g. HIPS and ABS), then all material types shall be tested.

The resin shall then be mixed, and the shells filled while still inside the environmental chamber and then left for 2 hours. During the mixing, pouring and 2 hour waiting stage the temperature shall be kept between -5°C and -10°C.

After the 2-hour waiting period, the shells shall be visually examined. They shall not show any signs of splitting, cracking or resin leakage due to damage of the shell.

The Tenderer shall provide a test report detailing the result for each cable joint shell offered, including details of independent witnesses, at the time of Tender.

6.3. Packaging

The resin compound shall be supplied in suitable plastic laminate or metallised foil bags which contain all the component parts in one sealed unit.

The stated capacity of a bag pack shall be given as the volume of mixed compound in litres, which can be poured from it in two minutes at 10°C.

The bag shall prevent the components from absorbing atmospheric moisture during storage either indoors or outdoors.

The bag pack shall have two separate compartments to keep the resin components apart during storage prior to mixing. This is generally facilitated by a weak seal or plastic clip arrangement. The mixing process will be initiated by breaking the weak seal or plastic clip.

Each bag pack shall be flexible to enable mixing of the resin by manipulating by gloved hands and shall be robust enough to prevent bursting during mixing and transportation. The edges of the bag to be sealed with a double seal

All the materials shall be contained within the pack that is suitable in size and shape to ensure a totally enclosed mixing process can occur.

The bag shall be able to be cut with a pair of scissors or have a suitable method of opening to enable the mixed quantity of resin to be easily poured from the pack into the joint box assembly without risk of injury, danger or spillage.

Once poured, the remaining pack shall only contain an inert mixed resin, which hardens and can then be easily disposed of as standard waste. The pack should contain printed text “Non-hazardous when mixed” to remove any uncertainty on disposal methods.

The resin packs shall be packed in sealed plastic containers that are strong enough to avoid crushing when stacked on a pallet at the Manufacturers recommended height.

The plastic container shall have a suitable carrying handle to allow safe and easy handling. The handle shall be robust enough to withstand repeated carrying and placement in vans and cable joint bays without becoming damaged.

The plastic container shall be supplied with a suitable resealable lid made of same material as the container which shall provide protection against moisture ingress. The lid shall not come loose during transit or normal handling but shall be easily removed by gloved hands by peeling away from the container. A small gap at one point in the lid seal and container, or other method shall be incorporated to allow the lid seal to be broken to remove the lid.

Each container shall include a copy of the Manufacturers approved mixing instructions and a pair plastic protective glove.

The number of resin packs packed into each plastic container will depend on the pack size: this shall be agreed between the Tenderer and SP Electricity North West’s Underground Circuits Policy Manager.

The resin packs are currently supplied in 2 litre capacity bags packed as three bags per plastic container, however alternative methods of outer packaging will be considered provided they do not cause damage to the resin pack(s) or create any potential health and safety or environmental problems.

The container shall be made of plastic materials suitable for recycling and shall include a minimum of 30% recyclable material.

Alternative packaging arrangements which can be demonstrated to reduce the amount of waste, non-recyclable packaging or would show positive improvements in terms of sustainability will be actively considered.

The Tenderer shall provide details of any incentives which would promote returnable containers to reduce both costs and the amount of new plastic being used.

6.4. Labelling

The resin components shall not contain any substance, which by its inclusion would require the use of a 'toxic' label description and hazard symbol as defined with Regulation EC 1272/2008 of the European Parliament on classification, labelling and packaging of substances and mixtures.

All labelling shall fully comply to the Regulation EC No 1272/2008 using the appropriate Hazard Phrase wording and classification stipulated in the legislation.

Each resin bag pack shall be marked with the following information.

- Manufacturer's name and compound reference number.

- Pack size expressed in litres
- Manufacturer's batch number, or works order number (to allow traceability)
- Use by date.
- SP Electricity North West Commodity Code Number (a six-digit number).
- Approved description.
- Health and Safety Marking and Handling Instructions.
- The resin pack label shall state “Non-Hazardous when mixed “in bold black lettering to reduce problems in disposing as standard waste.

The plastic container shall be marked with the following information:

- Manufacturer's name and component reference number.
- SP Electricity North West Commodity Code Number (a six-digit number).
- Number of Packs and Pack size
- Gross weight of component and container in kg.
- Manufacturer's batch number, or works order number (to allow traceability)
- Use by date.
- Disposal instructions.
- The phrase “Non-hazardous when mixed”

6.5. Storage and Transportation

All resin components and packaging materials shall be capable of being stored either inside or outside under the full range of climatic conditions found in UK without any reduction in stated shelf life or deterioration of mechanical and electrical properties.

The shelf life of the resin shall be such that it can be stored before use in SP Electricity North West store points, jointers vans or sites for a minimum of 24 months from date of delivery to SP Electricity North West central stores.

6.6. Documentation

The following documentation shall be supplied by the Tenderer:

- Manufacturers technical data sheet, including information of graphical values of resin mixing and setting times and of resin temperature variation with time at temperatures between -5°C and 30°C.
- Manufacturers Material Safety Data Sheet (MSDS).
- Manufacturers instructions for storage, transport and mixing.

- Copies of all witnessed test reports on which Type Approval was given shall be included with the tender document.
- Routine test plan (example).

6.7. Samples

A sample pack, complete with all proposed labelling and documentation, shall be submitted with the Tender for Approval.

7. Documents referenced

Health and Safety at Work Etc Act 1974	
Control of Substances Hazardous to Health Regulations 2002	
Manual Handling Operations Regulation 1992	
BS EN ISO 9000	Quality management systems
BS EN ISO 14001: 2004	Environmental Management Systems
Regulation (EC) No 1272/2008 of the European Parliament and of the Council	Classification, labelling and packaging of substances and mixtures
ENA ER C81	Type Approval Tests for Joints for 600/1000 V Cable Systems
BS EN 50393	Test methods and requirements for accessories for use on distribution cables of rated voltage 0.6/1.0 (1.2) kV
BS EN 60455-3-8 (2021)	Resin based reactive compounds used for electrical insulation - Part 3-8: Specifications for individual materials - Resins for cable accessories
CP311	Approval Policy and Process

Appendix A – Conformance Declaration

Section-By-Section Conformance with Specification

The Tenderer shall declare conformance or otherwise for each product/service or range of products/services, section-by-section, using the following Conformance Declaration Codes.

Conformance Declaration Codes:

N/A =	Clause is not applicable/appropriate to the product/service.
C1 =	The product/service conforms fully with the requirements of this clause.
C2 =	The product/service conforms partially with the requirements of this clause.
C3 =	The product/service does not conform to the requirements of this clause.
C4 =	The product/service does not currently conform to the requirements of this clause, but the manufacturer proposes to modify and test the product in order to conform.

Manufacturer:

Product/Service Description:

Product/Service Reference:

Name:

Company:

Signature:

Section-By-Section Conformance

Section	Section Topic	Conformance Declaration Code	Remarks * (must be completed if code is not C1)
1	Introduction		

2	Scope		
4.1	Product not to be Changed		
4.2	SP Electricity North West Technical Approval		
4.3	Quality Assurance		
4.4	Formulation		
4.5	Identification Markings		
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6.5	Storage and Transportation		
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6.7	Samples		

*** Applicable specifications shall be stated in the Remarks column where alternatives are quoted within a section. The Remarks column shall also be used to indicate cases where the products or services exceed the quoted specifications.**