Electricity Specification 400D5

Issue 1  November 2004

Duct Seal

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Approved for issue by the
Technical Policy Panel

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# Amendment Summary

<table>
<thead>
<tr>
<th>Amendment No.</th>
<th>Date</th>
<th>Brief Description and Amending Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11/11/04</td>
<td>Initial issue</td>
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Prepared by: DPH

Approved by the Standards Steering Group and signed on its behalf by:
Uncontrolled copy.
DUCT SEAL

1. SCOPE

This specification covers the technical requirements for a duct seal system to seal ducts 32mm to 150mm (internal diameter) for use on the Electricity North West Limited (hereinafter referred to as Electricity North West) Distribution system.

2. DEFINITIONS

Approval: Sanction by the Engineer that specified criteria have been satisfied.

Contract: The agreement between 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, whose tender has been accepted by Electricity North West.

ENATS: Electricity Networks Association Technical Specification.

Engineer: Policy and Standards Manager (Electricity North West) or his successor or such person specifically nominated on his behalf.

Specification: The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.

Sub-Contractor: Any person (other than the Contractor) named in the Contract for any part of the Works or any person to whom any part of the Contract has been sub-let with the consent in writing of the Engineer, and the legal representatives, successors and assigns of such person.

Supplier: Any person or person's firm or company who supply goods to Electricity North West or electricity north west 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 Electricity North West to submit a tender.

Words: Words importing persons shall include firms and corporations; words importing the singular only, also include the plural, and vice versa where the context requires.

Work: All materials, labour and actions required to be provided or performed by the Contractor under the Contract.

Writing: Any manuscript, typewritten or printed statement under seal or hand as the case may be.
3. GENERAL REQUIREMENTS FOR APPROVALS AND TESTING

3.1 Product not to be changed

No change in the product, packaging or labelling shall be made after Approval has been granted without prior notice to the Engineer, and receipt of agreement from the Engineer, in writing, to the proposed change.

3.2 Electricity North West technical approval

3.2.1 The Tenderer shall submit, with this Tender, proposals for testing which will demonstrate, to the satisfaction of the Engineer, compliance with this Specification. Such tests shall be carried out without expense to Electricity North West.

3.2.2 Alternatively, the Tenderer may submit technical reports and other data that he considers will demonstrate, to the satisfaction of the Engineer, compliance with this Specification. Acceptance of this evidence shall be at the discretion of the Engineer but will not be unreasonably withheld.

3.2.3 The supplier and product shall comply with all the relevant requirements of Electricity North West documents EPD311 and CP311.

3.3 Quality assurance

3.3.1 The Tenderer shall confirm whether or not approval is held in accordance with a quality assurance scheme accredited under ISO 9000. If not, he shall submit a statement of the quality assurance procedures employed to control the quality of the product, including the performance of Suppliers and Sub-Contractors.

3.3.2 The right is reserved for the Engineer to require, from time to time, the repeat of such tests as he may deem to be reasonably necessary to demonstrate continued compliance with the Specification.

3.3.3 The Tenderer shall submit, with his Tender, a list of tests and inspections which are carried out on the product prior to despatch which shall demonstrate, to the satisfaction of the Engineer, fitness for installation and service.

3.3.4 The Tenderer shall provide free of charge to Electricity North West such samples as may, in the opinion of the Engineer, be reasonably required for inspection and/or retention as quality control samples. The Engineer will confirm the requirement for samples at the time of tendering.

3.3.5 The right is reserved for the Engineer to make, from time to time, such inspections of the tenderer’s facilities as he may deem to be reasonably necessary to ensure compliance with this Specification and any Contract of which it forms a part.

3.3.6 The Tenderer shall submit, with his Tender, such details of product packaging disposal, as will enable Electricity North West to comply with the requirements of BS EN ISO 14001: 1996 - Environmental Management Systems.
3.4 Formulation
The Tenderer shall submit, with his Tender, such details of the formulation and use of the product and associated substances as will enable Electricity North West to comply with the obligations of the Health and Safety at Work etc Act 1974 and the Control of Substances Hazardous to Health Regulations 1988, in the use, storage and disposal of the product. The Tenderer may stipulate, prior to submission of such information, that he requires it to remain confidential and the Engineer will, if requested, confirm his agreement to this prior to receipt of the information.

3.5 Identification markings
3.5.1 The Tenderer shall submit, with his tender, details of markings which it is proposed to apply to the product or packaging to identify manufacturing batches or items. The forms and content of such markings shall be subject to the Approval of the Engineer, and shall in all cases include the Electricity North West Approved Description and Commodity Code Number.

3.5.2 The Tenderer shall submit, with his Tender, such details of marking gross weight on components, assemblies and packages, as will enable Electricity North West to comply with the Health and Safety Manual Handling Operation Regulations 1992, for components, assemblies and packages supplied with a gross weight over 1kg. The forms and content of such markings shall be subject to the Approval of the Engineer.

3.6 Minimum life expectancy
The minimum life expectancy of all products covered by this specification is 20 years.

3.7 Manufacturers already approved
Clauses 3.2.1, 3.2.2, 3.2.3, 3.3.1, 3.3.3 and 3.3.4 will be waived in the case of products already approved.

3.8 Product conformity
Preference will be given to those suppliers who can provide suitable Product Conformity Certification to a recognised or specified standard, or an equivalent certification.
4. **TECHNICAL PARTICULARS**

The system shall provide all items necessary to form a duct seal under the following conditions. The supplier shall provide written confirmation/tests to show compliance.

### 4.1 Pressure

Up to 0.5 bar water pressure.

### 4.2 Type of Duct

32 to 150mm bore.

PVC-U, Polyethylene, Earthenware, Stoneware, Cast Iron, Steel and Asbestos Cement.

### 4.3 Contents of Duct

Empty or with any combination of:

- Polyethylene and PVC sheathed cable.
- Lead sheathed cable.
- Draw Rope.

### 4.4 Quantity of Cables

Any combination of cable diameters from 6 to 76mm, which may be contained in the duct, according to the following requirement:

- Spacing between cables = 10mm
- Spacing between cables and inside wall of duct = 6mm

These requirements are purely to calculate the maximum number and variety of cables which may be in the duct, the seal does not have to hold the cables in these positions.

### 4.5 Environment

0°C to 30°C.

Duct may be empty or have existing cables.

Horizontal or vertical ducts.

With/without cable lubricant on cables and/or duct.

Potentially explosive atmospheres.

With/without running water of up to 10 litre per minute.

Possible contamination from chemicals found in manholes, joint boxes etc.

### 4.6 Installation

Shall be easy to install and removed by one person.

Shall fit internally into the duct.

### 4.7 Health and Safety

Shall not contain any hazardous substances.
5. **TESTS**

All tests shall be carried out at 23±3°C with 0.5 ± 0.02 bar, air pressure against seal. One cable, diameter 20 - 25mm, through seal, tests started at least 24 hours after seal made.

<table>
<thead>
<tr>
<th>Test</th>
<th>Parameters</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Axial Pull</td>
<td>Load applied to cable = Radius of cable (mm) x 10N Duration 4 hours</td>
<td>No leaks</td>
</tr>
<tr>
<td>Bending</td>
<td>Bending force applied at a distance of 250mm from end of duct</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>Cable bent at 45° to duct, held for 5 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repeat bending in opposite direction then return to straight</td>
<td></td>
</tr>
<tr>
<td>Torsion</td>
<td>Torque applied at a distance of 250mm from end of duct</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>Torque applied to cable = Radius of cable (mm) x 10Nm, (max. 50 Nm), for 5 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Repeat the torque application in the opposite direction then return cable to untwisted state</td>
<td></td>
</tr>
<tr>
<td>Vibration</td>
<td>Cable clamped at a distance of 250mm from end of duct</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>Cable shall be subjected to a sinusoidal 10Hz vibration of 6mm peak-to-peak amplitude for 10 days</td>
<td></td>
</tr>
<tr>
<td>Water head</td>
<td>Duration 30 days</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>5m water head</td>
<td></td>
</tr>
<tr>
<td>Temperature cycling</td>
<td>Temperature range -15 to 30°C in air</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>Cycle duration: 5.25 hours at 30°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.75 hour transition to -15°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5.25 hours at -15°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.75 hour transition to 30°C</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 cycles</td>
<td></td>
</tr>
<tr>
<td>Chemical resistance</td>
<td>Immersion duration 30 days</td>
<td>No leaks</td>
</tr>
<tr>
<td></td>
<td>One sample in each test solution:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Petrol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Diesel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Paraffin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d) Cable Lubricant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>e) Cable fluid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f) Solution Leak Detecting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>g) Solution of 1 % Antarox CO630 in water</td>
<td></td>
</tr>
</tbody>
</table>
6. INSTRUCTIONS

Approved pictorial instructions showing usage and assembly shall be included with every seal.

7. DOCUMENTS REFERENCED

7.1 Health and Safety at Work etc Act 1974
7.2 Control of Substances Hazardous to Health Regulations 1988
7.3 Health and Safety Manual Handling Operation Regulations 1992
7.4 ISO 9000 - Quality Management & Quality Assurance Standards

8. KEYWORDS

Cable; duct