



## **Electricity Specification 334**

**Issue 6**

**October 2016**

### **HV and LV Fuse-Links**

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#### **Approved for issue by the Technical Policy Panel**

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Issue and Amendment Summary

| Amendment No.<br>Date | Brief Description and Amending Action   |
|-----------------------|---|
| 0<br>25/10/89         | <p>Issue 1</p> <p>Original Issue</p> <p>Prepared by: M.J.Kay</p>  |
| 0<br>16/11/95         | <p>Issue 2</p> <p>Re-issued.</p> <p>Prepared by: E.Hamilton</p>   |
| 0<br>15/07/03         | <p>Issue 3</p> <p>This latest issue of ES334 now embraces LV HRC Fuse-links and HV Expulsion Fuse-links as well as HV HRC Fuse-links. The document also replaces ES 333.</p> <p>Prepared by: S. Rushton</p> <p>Approved by the Standards Steering Group and signed on its behalf by:</p>  |
| 0<br>01/08/08         | <p>Issue 4</p> <ul style="list-style-type: none"> <li>▪ Latest template applied.</li> <li>▪ Technical detail updated to reflect latest national and international specifications</li> </ul> <p>Prepared by: G Bryson</p> <p>Approved by the Technical Policy Panel and signed on its behalf by:</p>   |
| 0<br>09/05/11         | <p>Issue 5</p> <ul style="list-style-type: none"> <li>▪ Latest template applied.</li> <li>▪ Addition of 40A and 50A fuses to Schedule D to allow compliance with CP331.</li> <li>▪ Addition of removable buttonhead types to Schedule J</li> <li>▪ Addition of 3A and 5A ratings to Schedule L</li> <li>▪ Addition of requirements for Automatic Sectionalising Links to section 7.9 and Schedule M.</li> </ul> <p>Prepared by: G Bryson</p> <p>Approved by the Technical Policy Panel and signed on its behalf by:</p> |

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| <p>0</p> <p>01/10/16</p> | <p>Issue 6</p> <ul style="list-style-type: none"> <li>▪ Latest template applied.</li> <li>▪ Addition of 40A service termination fuses to Schedule D to line up with CP331 and CP606 G20</li> <li>▪ Addition of extra fuses to Schedule F and Schedule I to cover red spot and safeclick type fuse holders</li> <li>▪ Removal of Schedule K - DIN type fuses as these are no longer required</li> <li>▪ Review of all fuses listed to remove various unused items and update all commodity codes and descriptions for new SAP system</li> </ul> <p>Prepared by: S Rushton</p> <p>Approved by the Technical Policy Panel and signed on its behalf by: Steve Cox</p> |
|                          |   |

## HV AND LV FUSE-LINKS

### 1. FOREWORD

This specification details the requirements for the purchase of Fuse-Links by Electricity North West Limited (Electricity North West) to be used on the LV and HV distribution systems.

### 2. SCOPE

This specification includes HV Fuse-Links for use in switch-fuse units and drop out expulsion Fuse-Links for the overhead network. On the LV network it covers J type Fuse-Links for use on the distribution system, industrial Fuse-Links, domestic cut-out Fuse-Links, street lighting and other ancillary Fuse-Links. These Fuse-Links are all detailed in national, international and industry standards that are listed within the technical particulars for each type.

### 3. DEFINITIONS

|                          |  |
|--------------------------|--|
| <b>Approval:</b>         | Sanction by the Electricity North West Protection Systems Manager that specified criteria have been satisfied.   |
| <b>Contract:</b>         | 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.   |
| <b>Contractor:</b>       | The person or person's firm or company, including personal representatives, successors and permitted assigns, whose tender has been accepted by Electricity North West.  |
| <b>Fuse</b>              | A device that by the fusing of one or more of its specially designed and proportioned components opens the circuit in which it is inserted by breaking the current when it exceeds a given value for a sufficient time. The Fuse comprises all the parts that form the complete device.                            |
| <b>Fuse-Link</b>         | The part of a Fuse including the Fuse element(s), intended to be replaced after the Fuse has opened.   |
| <b>High Voltage (HV)</b> | A voltage exceeding Low Voltage (LV).  |
| <b>HRC</b>               | High Rupture Capacity.   |
| <b>Low Voltage (LV)</b>  | A voltage exceeding 50V ac but not exceeding 1000V ac or a voltage exceeding 120V dc but not exceeding 1500V dc.   |
| <b>Specification:</b>    | The Specifications and schedules (if any) agreed by the parties for the purpose of the Contract.   |
| <b>Sub-Contractor:</b>   | 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 Electricity North West Protection Systems Manager, and the legal representatives, successors and assigns of such person. |
| <b>Supplier:</b>         | Any person or person's firm or company who supplies goods to Electricity North West or to its contractor.  |

|                  |  |
|------------------|--|
| <b>Tender:</b>   | An offer in writing to execute work or supply goods at a fixed price.  |
| <b>Tenderer:</b> | The person or person's firm or company, including personal representatives, successors and permitted assigns, invited by Electricity North West to submit a tender.  |
| <b>Words</b>     | Words importing persons shall include firms and corporations; words importing the singular only, also include the plural, and vice versa where the context requires. |
| <b>Work</b>      | All materials, labour and actions required to be provided or performed by the Contractor under the Contract.   |
| <b>Writing</b>   | Any manuscript, typewritten or printed statement under seal or hand as the case may be.  |

## **4. GENERAL REQUIREMENTS**

### **4.1 Equipment Standards**

Electricity North West welcomes innovation and alternatives to traditional designs that still meet the functional requirements of this Specification.

Variations shall be clearly identified and prices for compliant and non-compliant equipment detailed separately.

### **4.2 Regulatory Requirements**

The design of the equipment shall meet the requirements of the Health and Safety at Work Act 1974, the Electricity at Work Regulations 1989 and the Provision and Use of Work Equipment Regulations 1998, for the maximum safety of all personnel.

### **4.3 Equipment Description**

The Fuse-Link shall consist of a sealed barrel of insulating material containing the Fuse element or elements. The end caps on the barrel shall be of a non-ferrous metal, plated to prevent corrosion, which shall act as both the current carrying contact and fixing arrangements, with or without tags.

The material for the Fuse element shall be stated in the Tender.

The Fuse-Links shall be non-deteriorating and the external design and dimensions shall be in accordance with the standards referred to within this Specification.

### **4.4 Proof of Performance**

Evidence of proof of performance shall be submitted with the Tender. Time / current characteristics complying with the relevant national, international or industry standard for each type of Fuse-Link and the curves for the Fuse-Links shall be submitted with the Tender.

### **4.5 Departures from Specification**

The Tender shall state at the time of tendering all departures from the requirements of this specification.

The Tenderer shall complete the clause conformance declaration in Appendix B.

#### **4.6 Markings**

HV Fuse-Links shall be clearly marked with the identifying markings and their rating reference as specified in Energy Networks Association Technical Specification (ENA TS) 12-8. LV Fuse-Links shall be clearly and indelibly marked in accordance with BS EN 60269-1. Provided that the current carrying capability is not impaired, it is preferred that the current rating shall be impressed on an end cap. Where this is not the case, the marking of the current rating shall be such that it will not suffer from the effects of abrasion or the effects of oil immersion where appropriate.

### **5. GENERAL REQUIREMENTS FOR APPROVALS AND TESTING**

#### **5.1 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 Electricity North West Protection Policy Manager, and receipt of a written agreement to the proposed change from the Electricity North West Protection Policy Manager.

#### **5.2 Electricity North West Technical Approval**

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

5.2.2 Alternatively, the Tenderer may submit technical reports and other data that he considers will demonstrate, to the satisfaction of the Electricity North West Protection Policy Manager, compliance with this specification. Acceptance of this evidence shall be at the discretion of the Electricity North West Protection Policy Manager but will not be unreasonably withheld.

5.2.3 Approval shall be 'factory specific' and is not transferable to another factory without the written approval of the Electricity North West Protection Policy Manager.

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

#### **5.3 Quality Assurance**

5.3.1 The Tenderer shall confirm whether or not approval is held in accordance with a Quality Assurance Scheme accredited under BS EN ISO 9001. 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.

5.3.2 The right is reserved for the Electricity North West Protection Policy Manager 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.

5.3.3 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 Electricity North West Protection Policy Manager, fitness for installation and service.

- 5.3.4 The Tenderer shall provide free of charge to Electricity North West such samples as may, in the opinion of the Electricity North West Protection Policy Manager, be reasonably required for inspection and/or retention as quality control samples. The Electricity North West Protection Policy Manager will confirm the requirement for samples at the time of Tendering.
- 5.3.5 The right is reserved for the Electricity North West Protection Policy Manager 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.
- 5.3.6 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: 2015 - Environmental Management Systems.

## **5.4 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 Act 1974 and the Control of Substances Hazardous to Health Regulations 2002, 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 Electricity North West Protection Policy Manager will, if requested, confirm his agreement to this prior to receipt of the information.

## **5.5 Identification Markings**

- 5.5.1 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 Electricity North West Protection Policy Manager, and shall in all cases include the Electricity North West Approved Description and Commodity Code Number.
- 5.5.2 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 Electricity North West Protection Policy Manager.

## **5.6 Minimum Life Expectancy**

The minimum life expectancy of all products covered by this Specification is 40 years.

## **5.7 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.

## **6. REQUIREMENTS FOR TYPE AND ROUTINE TESTING.**

The Electricity North West Protection Policy Manager shall set out the requirement of the following tests to be carried out by the Supplier at the Supplier's cost.



## 6.1 Requirement for Type Tests at the Supplier's Premises

These are a series of one-off type tests, which are carried out to ensure the satisfactory performance of the product design, under extremes of operating stresses, and of endurance, as may be appropriate, to be determined by the Electricity North West Protection Policy Manager.

These may or may not be destructive tests.

## 6.2 Requirement for Routine Tests at the Supplier's Premises

These tests may be required to be carried out on every individual unit or component, as specified, or at some regular frequency to be determined by the Electricity North West Protection Policy Manager.

The results of these tests may be required to be supplied to Electricity North West with each unit purchased or retained for inspection, at a period to be determined by the Electricity North West Protection Policy Manager.

## 7. TECHNICAL REQUIREMENTS

### 7.1 HV HRC Fuse-Links

HV Fuse-Links shall comply with BS EN 60282-1 and ENA TS 12-8-3. Fuse-Links may be required for operation under oil and other Fuse-Links may be required for operation in air.

Fuse-Links will be required for system voltages of 6.6kV and 11kV. The nominal ratings for Fuse-Links for use on those systems are 7.2kV and 12kV respectively.

Fuse-Links are required to carry without deterioration the permitted overloads of associated ground mounted distribution transformers to ENA TS 35-1. Fuse-Links shall also grade with LV Fuse-Links to BS 88-2 as used on the LV side of the distribution transformer.

HV Fuse-Links for use under oil shall conform to the dimensions of BS EN 60282-1 Type II, dimension A = 63.5mm and dimension D = 359mm.

HV Fuse-Links for use in air shall conform to the dimensions of BS EN 60282-1 Type III, dimension A = 80mm and E = 419mm. Tag arrangement D to be used.

All HV Fuse-Links shall be fitted with strikers for operation of the fuse-switch tripping mechanism. The direction of striker pin operation shall be clearly and indelibly marked on the Fuse-Link. Tactile recognition shall also be provided on the end cap at the striker end. Operating circuits for strikers shall be so arranged that striker operation will result irrespective of the point at which the main elements are interrupted.

Each homogeneous series of HV Fuse-Links shall have been tested in each design of fuse-switch equipment supplied to ENA TS 41-36 (or previously supplied to prior versions of this and equivalent specifications). This requirement shall be considered to be met by certified short circuit tests to ASTA 22, or equivalent, on two different designs of fuse-switch combinations, in Short-Circuit Testing Liaison (STL) member test laboratory. One design shall be with the Fuse-Links mounted horizontally and the other shall be with the Fuse-Links mounted vertically. These tests shall be undertaken on the maximum rating of Fuse-Link for a given body size.

The specific ratings required are detailed in Schedules A and B.

## 7.2 LV Fuse-Links (Distribution Network)

LV Fuse-Links to BS EN 60269 and BS 88 shall have a full-range breaking capacity with Q1 class fusing factor and be for either general application or the protection of motor circuits (denoted “gG” or “gM”).

LV Fuse-Links for use on Electricity North West’s distribution network shall comply with BS EN 60269-1; ENA TS 12-8-3 and BS 88-2. They shall have a rated breaking capacity of 46kA at 415V.

The specific ratings required are detailed in Schedule C.

## 7.3 LV Fuse-Links (Domestic and Similar Premises)

Fuse-Links for use in domestic and similar premises shall comply with BS 88-3 with particular regard to the time-current characteristics, pre-arcing  $I^2t$  and cut-off values. Fuse-links for domestic services shall be suitable for use in cut-outs to the requirements of BS 7657.

The dimensions of the Fuse-Links shall be in accordance with BS 88-3, for both Type IIa and IIb.

The specific ratings required are detailed in Schedule D.

## 7.4 LV Fuse-Links (Street Lighting Services)

Fuse-Links for street lighting applications shall conform to BS EN 60269-1 and BS 7654.

Fuse-Links for street lighting services shall be suitable for use in street lighting cut-outs to the requirements of BS 7654. Fuses for use in these cut-outs shall be of the offset tag type with 38mm fixing centres and a minimum breaking capacity of 16kA at 415V ac, in accordance with BS EN 60269-1.

The specific ratings required are detailed in Schedule E.

## 7.5 LV Fuse-Links (Industrial Premises)

For industrial applications, LV Fuse-Links shall comply with BS EN 60269-1; IEC 60269-2-1 and BS 88-2 and shall have a dual rating of 80kA at 415V ac and 40kA at 250V dc.

The above standards cover a range of industrial fuse-links of the following types:

- 2 hole offset tag with 44mm, 73mm and, 94mm centres
- 2 hole central tag with 111mm centre
- Central tag with 4 hole fixings and 133/184mm centres
- Compact types with offset blade tag

The specific ratings required are detailed in Schedules F, G, H and I respectively.

## 7.6 HV Expulsion Fuse-Links

Fuse-Links shall be suitable for use in overhead line fuse equipment supplied to ENA TS 41-36 and to prior ENA specifications. Fuse-Links shall comply with BS 2692-2 and where specified, IEEE C37-42 requirements for slow-blowing T characteristics.

Fuse-Links are required for use on the 6.6kV and 11kV distribution systems. The rated breaking capacity shall be 8kA.

There are variations of Fuse carriers and these require Fuse elements with:

- (a) Tails at both ends
- (b) Button at one end and tail at the other
- (c) ¼ inch UNF screw thread at one end and tail at the other
- (d) Universal type which can be used as either (a) or (b).

Historically, types (a) and (b) have been used on the Electricity North West network as individual types. However, the Fuse range has been recently rationalised and only type (d) is now purchased which is equivalent to either type (a) or (b). Type (c) has not been historically used in Electricity North West but a new HV fuse mount is being purchased that will require this type of link in the future.

It is preferable that a single range of Fuse-Links be adaptable to cover the three applications.

Overall length of Fuse-Links shall be as specified in Schedule J.

The specific ratings required are detailed in Schedule J.

## **7.7 Time Fuse-Links**

Time Fuse-Links (for use with current transformer releases) for HV transformer protection are required in accordance with ENA TS 12-6-2. The ratings, dimensions, marking and performance shall all be in accordance with ENA TS 12-6-2.

The specific ratings required are detailed in Schedule K.

## **7.8 Automatic Sectionalising Links (ASLs)**

ASLs are a self contained device designed to work in conjunction with auto reclosers. ASLs shall have the same dimensional and mounting requirements as HV Expulsion Fuse-Links and shall comply with the relevant section of ENA TS 41-36.

The specific ratings required are detailed in Schedule L.

### **7.9.1 Principle of Operation**

If the line current increases above a pre-set value (pick-up current) a logic circuit shall activate. The upstream recloser shall then operate to remove the fault from the line. The logic circuit, shall store the incident for approximately 25 second (reclaim time). The recloser shall then close to restore the line. If the fault current is not present the logic circuit shall time out after the reclaim time and revert to its original state. If the fault current is still present, the logic circuit shall then open the ASL during the dead time of the recloser following its next operation. Opening of an ASL relies on the firing of a chemical actuator which needs to be replaced every time an ASL has operated.

The logic circuit shall be designed to inhibit operation for magnetic inrush or impulse currents.

## 8. PROTECTION, PACKAGING AND DELIVERY

The Contractor shall ensure that each item is suitably protected and packaged to maintain it fit for service prior to installation.

The Tenderer shall submit, with the Tender, details of the proposed packaging arrangements and identification markings.

Tenderers shall state on the price schedules the lead times offered. Deliveries shall be specified with the order and may be to any stores within Electricity North West's area.

## 9. DOCUMENTS REFERENCED

Health and Safety at Work etc Act 1974

Control of Substances Hazardous to Health Regulations 2002

Manual Handling Operations Regulations 1992 (as amended)

Electricity at Work Regulations 1989

Provision and Use of Work Equipment Regulations 1998

BS EN ISO 9001: Management Systems. Requirements  
2015

BS EN ISO Environmental Management Systems. Requirements  
14001: 2015

BS EN 60269-1: Low Voltage Fuses. General Requirements  
2007 + A2:2014,  
BS 88-  
1:2007+A2: 2014

BS HD 60269-2: Low Voltage Fuses. Supplementary requirements for fuses for use by  
2013, BS 88- authorised persons (fuses mainly for industrial application)  
2:2013

BS HD 60269-3: Low Voltage Fuses. Supplementary requirements for fuses for use by  
2010+A1:2013, unskilled persons (fuses mainly for household and similar applications)  
BS 88-3:2010

BS EN 60282-1: High Voltage Fuses. Current Limiting Fuses  
2009 + A1:2014

BS 2692-2:1956 Fuses for voltages exceeding 1000V ac. Expulsion fuses

BS 7654:2010 Specification for single phase street lighting cut-out assemblies for low  
voltage public electricity distribution systems. 25A rating for highway  
power supplies and street furniture

BS 7657:2010 Specification for cut-out assemblies up to 100A rating, for power  
supplies to buildings.

ASTA 22 The rules for short circuit testing of high voltage combination units

IEEE C37-42 IEEE Std Specifications for High Voltage Expulsion-Type Distribution  
Class Fuses, Fuse and Disconnecting Cutouts, Fuse Disconnecting

## Switches, and Fuse Links

|               |   |
|---------------|---|
| ENA TS 12-6-2 | Time fuse-links (for use with current transformer releases on circuit breakers) |
| ENA TS 12-8-3 | The application of fuse links to 11kV and 6.6kV / 415V distribution networks    |
| ENA TS 35-1   | Distribution transformers (from 16kVA to 2000kVA)                               |
| ENA TS 41-36  | Switchgear for service up to 36kV (cable and overhead conductor connected)      |
| EPD311        | Approval of Equipment   |
| CP311         | Equipment Approval Process  |

## 10. KEYWORDS

11kV; 6.6kV; Distribution; Domestic; Fuse; Industrial; LV; Protection

## APPENDIX A

### SCHEDULES

Schedule A – HV Fuse-Links for Use in Oil

Schedule B – Tag Type HV Fuse-Links for Use in Air

Schedule C – LV J Type Cylindrical Slotted Tag Fuse-Links

Schedule D – Domestic Service Termination Fuse-Links

Schedule E – HRC Fuse-Links for Street Lighting Services

Schedule F – Industrial 2 Hole Offset Tag Fuse-Links

Schedule G – Industrial 2 Hole Central Tag Fuse-Links

Schedule H – LV Central Tag Fuse-Links with 4 Hole Fixing

Schedule I – Industrial Compact Fuse-Links with Offset Blade Tag

Schedule J – HV Expulsion Fuse-Links

Schedule K – Time Fuse-Links

Schedule L – Automatic Sectionalising Links

## SCHEDULE A

### HV FUSE-LINKS FOR USE IN OIL

(to BS EN 60282-1 and ENA TS 12-8)

| System Rating (kV) | Current Rating (A) | ENA TS 12-8 Rating Ref | Length (mm) | Electricity North West Commodity Code | SAP Description                 |
|--------------------|--------------------|------------------------|-------------|---------------------------------------|---------------------------------|
| 11 & 6.6           | 25                 | O1                     | 359         | 82694                                 | HV FUSE OIL 25A 12kV O1 359mm   |
| 11 & 6.6           | 35.5               | O2                     | 359         | 83674                                 | HV FUSE OIL 35.5A 12kV O2 359mm |
| 11 & 6.6           | 50                 | O3                     | 359         | 84182                                 | HV FUSE OIL 50A 12kV O3 359mm   |
| 11 & 6.6           | 80                 | O4                     | 359         | 85618                                 | HV FUSE OIL 80A 12kV O4 359mm   |
| 11 & 6.6           | 90                 | O5                     | 359         | 85774                                 | HV FUSE OIL 90A 12kV O5 359mm   |
| 11 & 6.6           | 125                | O6                     | 359         | 85790                                 | HV FUSE OIL 125A 12kV O6 359mm  |
| 6.6                | 140                | O7                     | 359         | 85758                                 | HV FUSE OIL 140A 7.2kV O7 359mm |
| 6.6                | 160                | -                      | 359         | 85766                                 | HV FUSE OIL 160A 7.2kV 359mm    |

**SCHEDULE B**

**TAG TYPE HV FUSE-LINKS FOR USE IN AIR**

(to BS EN 60282-1 and ENA TS 12-8)

| <b>System Voltage (kV)</b> | <b>Current Rating (A)</b> | <b>ENA TS 12-8 Rating Ref</b> | <b>Electricity North West Commodity Code</b> | <b>SAP Description</b>    |
|----------------------------|---------------------------|-------------------------------|--|---------------------------|
| 11 & 6.6                   | 20                        | A1                            | 82716  | HV FUSE AIR 20A 12kV A1   |
| 11 & 6.6                   | 31.5                      | A2                            | 83569  | HV FUSE AIR 31.5A 12kV A2 |
| 11 & 6.6                   | 50                        | A3                            | 83704  | HV FUSE AIR 50A 12kV A3   |
| 11 & 6.6                   | 71                        | A4                            | 85294  | HV FUSE AIR 71A 12kV A4   |



## SCHEDULE C

### LV “J” TYPE CYLINDRICAL SLOTTED TAG FUSE-LINKS

| Fuse Centre | Current Rating (A) | Electricity North West Commodity Code | SAP Description                         |
|-------------|--------------------|---------------------------------------|---|
| 76mm        | 100                | 60674                                 | LV FUSE 100A 76.2mm CENTRE J TYPE       |
| 76mm        | 160                | 87718                                 | LV FUSE 160A 76.2mm CENTRE J TYPE       |
| 76mm        | 200                | 88439                                 | LV FUSE 200A 76.2mm CENTRE J TYPE       |
| 76mm        | 250                | 89494                                 | LV FUSE 250A 76.2mm CENTRE J TYPE       |
| 82mm        | 100                | 85898                                 | LV FUSE 100A 82mm CENTRE J TYPE         |
| 82mm        | 160                | 60682                                 | LV FUSE 160A 82mm CENTRE J TYPE         |
| 82mm        | 200                | 60690                                 | LV FUSE 200A 82mm CENTRE J TYPE         |
| 82mm        | 250                | 98353                                 | LV FUSE 250A 82mm CENTRE J TYPE         |
| 82mm        | 315                | 60593                                 | LV FUSE 315A 82mm CENTRE J TYPE         |
| 82mm        | 400                | 60569                                 | LV FUSE 400A 82mm CENTRE J TYPE         |
| 82mm        | 500                | 82294                                 | LV FUSE 500A 82mm CENTRE J TYPE (REZAP) |
| 92mm        | 100                | 85901                                 | LV FUSE 100A 92mm CENTRE J TYPE         |
| 92mm        | 160                | 88188                                 | LV FUSE 160A 92mm CENTRE J TYPE         |
| 92mm        | 200                | 60704                                 | LV FUSE 200A 92mm CENTRE J TYPE         |
| 92mm        | 250                | 89591                                 | LV FUSE 250A 92mm CENTRE J TYPE         |
| 92mm        | 315                | 60577                                 | LV FUSE 315A 92mm CENTRE J TYPE         |
| 92mm        | 355                | 85944                                 | LV FUSE 355A 92mm CENTRE J TYPE         |
| 92mm        | 400                | 91219                                 | LV FUSE 400A 92mm CENTRE J TYPE         |
| 92mm        | 500                | 92215                                 | LV FUSE 500A 92mm CENTRE J TYPE         |
| 92mm        | 630                | 93149                                 | LV FUSE 630A 92mm CENTRE J TYPE         |

## SCHEDULE D

### DOMESTIC SERVICE TERMINATION FUSE-LINKS

(to BS 88-3)

| End Cap Diameter (mm) | Current Rating (A) | BS 88-3 Type Ref | Electricity North West Commodity Code | SAP Description                           |
|-----------------------|--------------------|------------------|---------------------------------------|---|
| 22.23                 | 40                 | IIa              | 60622                                 | LV FUSE 40A CUTOUT SMALL DIA 22.23mm IIa  |
| 22.23                 | 60                 | IIa              | 60623                                 | LV FUSE 60A CUTOUT SMALL DIA 22.23mm IIa  |
| 22.23                 | 80                 | IIa              | 60631                                 | LV FUSE 80A CUTOUT SMALL DIA 22.23mm IIa  |
| 30.16                 | 40                 | IIb              | 60640                                 | LV FUSE 40A CUTOUT LARGE DIA 30.16mm IIb  |
| 30.16                 | 60                 | IIb              | 84336                                 | LV FUSE 60A CUTOUT LARGE DIA 30.16mm IIb  |
| 30.16                 | 80                 | IIb              | 60658                                 | LV FUSE 80A CUTOUT LARGE DIA 30.16mm IIb  |
| 30.16                 | 100                | IIb              | 60666                                 | LV FUSE 100A CUTOUT LARGE DIA 30.16mm IIb |

## SCHEDULE E

### HRC FUSE-LINKS FOR STREET LIGHTING SERVICES

(to BS EN 60269-1 & BS 7654)

| Centre (mm) | Rating (A) | Description                                 | Electricity North West Commodity Code | SAP Description                        |
|-------------|------------|---|---------------------------------------|--|
| 38          | 6          | Offset tags with 1 axial and 1 lateral slot | 81302                                 | LV FUSE 6A STREET LIGHTING OFFSET TAG  |
| 38          | 10         | Offset tags with 1 axial and 1 lateral slot | 81493                                 | LV FUSE 10A STREET LIGHTING OFFSET TAG |
| 38          | 16         | Offset tags with 1 axial and 1 lateral slot | 60615                                 | LV FUSE 16A STREET LIGHTING OFFSET TAG |
| 38          | 25         | Offset tags with 1 axial and 1 lateral slot | 82708                                 | LV FUSE 25A STREET LIGHTING OFFSET TAG |

## SCHEDULE F

### INDUSTRIAL (415V) 2 HOLE OFFSET TAG FUSE-LINK

(to IEC 60269-2-1)

| Type | Rating(A) | Description                   | Electricity North West Commodity Code | SAP Description                        |
|------|-----------|-------------------------------|---------------------------------------|--|
| A1   | 6         | Offset Bolted Tag 44mm Centre | 85840                                 | LV FUSE 6A OFFSET BOLTED TAG 44mm A1   |
| A1   | 10        | Offset Bolted Tag 44mm Centre | 85841                                 | LV FUSE 10A OFFSET BOLTED TAG 44mm A1  |
| A1   | 20        | Offset Bolted Tag 44mm Centre | 85842                                 | LV FUSE 20A OFFSET BOLTED TAG 44mm A1  |
| A2   | 16        | Offset Bolted Tag 73mm Centre | 85843                                 | LV FUSE 16A OFFSET BOLTED TAG 73mm A2  |
| A2   | 20        | Offset Bolted Tag 73mm Centre | 85844                                 | LV FUSE 20A OFFSET BOLTED TAG 73mm A2  |
| A2   | 32        | Offset Bolted Tag 73mm Centre | 85845                                 | LV FUSE 32A OFFSET BOLTED TAG 73mm A2  |
| A3   | 63        | Offset Bolted Tag 73mm Centre | 85846                                 | LV FUSE 63A OFFSET BOLTED TAG 73mm A3  |
| A4   | 100       | Offset Bolted Tag 94mm centre | 85847                                 | LV FUSE 100A OFFSET BOLTED TAG 94mm A4 |

**SCHEDULE G**

**INDUSTRIAL (415V) 2 HOLE CENTRAL TAG FUSE-LINK**

(to IEC 60269-2-1)

| Type | Rating (A) | Description  | Electricity North West Commodity Code | SAP Description                          |
|------|------------|--------------|---------------------------------------|--|
| B2   | 200        | 111mm centre | 88240                                 | LV FUSE 200A IND'L 2 HOLE CENTRAL TAG B2 |
| B3   | 315        | 111mm centre | 90026                                 | LV FUSE 315A IND'L 2 HOLE CENTRAL TAG B3 |
| B4   | 400        | 111mm centre | 91588                                 | LV FUSE 400A IND'L 2 HOLE CENTRAL TAG B4 |

## SCHEDULE H

### LV CENTRAL TAG FUSE-LINK WITH 4 HOLE FIXINGS

(to IEC 60269-2-1)

| Type | Rating (A) | Description                              | Electricity North West Commodity Code | SAP Description                       |
|------|------------|--|---------------------------------------|---------------------------------------|
| C1   | 400        | 133mm & 184mm centres, 51mm barrel width | 91480                                 | LV FUSE 400A IND'L 2 HOLE CTRL TAG C1 |
| C2   | 630        | 133mm & 184mm centres, 61mm barrel width | 93068                                 | LV FUSE 630A IND'L 2 HOLE CTRL TAG C2 |

**SCHEDULE I**

**INDUSTRIAL (415V) COMPACT FUSE-LINKS WITH OFFSET BLADE TAG**

(to BS 88-2)

| <b>Fuse Type</b> | <b>Current Rating (A)</b> | <b>Electricity North West Commodity Code</b> | <b>SAP Description</b>                 |
|------------------|---------------------------|--|--|
| E1               | 2                         | 81130  | LV FUSE 2A COMPACT OFFSET TAG TYPE E1  |
| F1               | 2                         | 81131  | LV FUSE 2A COMPACT OFFSET TAG TYPE F1  |
| F1               | 6                         | 81132  | LV FUSE 6A COMPACT OFFSET TAG TYPE F1  |
| F1               | 10                        | 81604  | LV FUSE 10A COMPACT OFFSET TAG TYPE F1 |
| F1               | 16                        | 82279  | LV FUSE 16A COMPACT OFFSET TAG TYPE F1 |
| F1               | 20                        | 82503  | LV FUSE 20A COMPACT OFFSET TAG TYPE F1 |

## SCHEDULE J

### HV EXPULSION FUSE-LINKS

(to BS 2692-2, ANSI C37-42 & ENA TS 41-36)

| Current Rating (A) | Fuse Type             | System Voltage (kV) | Length (mm) | Electricity North West Commodity Code | SAP Description                          |
|--------------------|-----------------------|---------------------|-------------|---------------------------------------|--|
| 20                 | Quick blow, Universal | 6.6, 11             | 533         | 96938                                 | HV FUSE 20A EXP LINK QK BLOW UNIVERSAL   |
| 25                 | Quick blow, Universal | 6.6, 11             | 533         | 96865                                 | HV FUSE 25A EXP LINK QK BLOW UNIVERSAL   |
| 30                 | Quick blow, Universal | 6.6, 11             | 533         | 97225                                 | HV FUSE 30A EXP LINK QK BLOW UNIVERSAL   |
| 40                 | Quick blow, Universal | 6.6, 11             | 533         | 97233                                 | HV FUSE 40A EXP LINK QK BLOW UNIVERSAL   |
| 65                 | Quick blow, Universal | 6.6, 11             | 533         | 98302                                 | HV FUSE 65A EXP LINK QK BLOW UNIVERSAL   |
| 75                 | Quick blow, Universal | 6.6, 11             | 533         | 96881                                 | HV FUSE 75A EXP LINK QK BLOW UNIVERSAL   |
| 25                 | Slow blow, Universal  | 6.6, 11             | 533         | 96849                                 | HV FUSE 25A EXP LINK SLOW BLOW UNIVERSAL |
| 30                 | Slow blow, Universal  | 6.6, 11             | 533         | 97438                                 | HV FUSE 30A EXP LINK SLOW BLOW UNIVERSAL |
| 40                 | Slow blow, Universal  | 6.6, 11             | 533         | 97551                                 | HV FUSE 40A EXP LINK SLOW BLOW UNIVERSAL |



**SCHEDULE K**

**TIME FUSE-LINKS**

(to ENA TS 12-6-2)

| <b>Current Rating (A)</b> | <b>Electricity North West Commodity Code</b> | <b>SAP Description</b>              |
|---------------------------|--|-------------------------------------|
| 3                         | 81958  | HV FUSE 3A TIME LIMIT ENATS 12-6    |
| 5                         | 81959  | HV FUSE 5A TIME LIMIT ENATS 12-6    |
| 7.5                       | 81396  | HV FUSE 7.5A TIME LIMIT ENATS 12-6  |
| 10                        | 81590  | HV FUSE 10A TIME LIMIT ENATS 12-6   |
| 12.5                      | 81833  | HV FUSE 12.5A TIME LIMIT ENATS 12-6 |
| 15                        | 81957  | HV FUSE 15A TIME LIMIT ENATS 12-6   |

## SCHEDULE L

### AUTOMATIC SECTIONALISING LINKS

(to ENA TS 41-36)

| Current Rating (A)            | No of Shots | System Voltage (kV) | Mounting  | Electricity North West Commodity Code | SAP Description                          |
|-------------------------------|-------------|---------------------|-----------|---------------------------------------|--|
| 25                            | 2           | 6.6, 11             | J&P       | 61000                                 | HV FUSE 25A 2 SHOT ASL 15kV J&P MOUNT    |
| 25                            | 2           | 6.6, 11             | MLE       | 61040                                 | HV FUSE 25A 2 SHOT ASL 15kV MLE MOUNT    |
| 25                            | 2           | 6.6, 11             | Universal | 61080                                 | HV FUSE 25A 2 SHOT ASL 27kV UNIVL MOUNT  |
| 40                            | 2           | 6.6, 11             | J&P       | 61005                                 | HV FUSE 40A 2 SHOT ASL 15kV J&P MOUNT    |
| 40                            | 2           | 6.6, 11             | MLE       | 61002                                 | HV FUSE 40A 2 SHOT ASL 15kV MLE MOUNT    |
| 40                            | 2           | 6.6, 11             | Universal | 61085                                 | HV FUSE 40A 2 SHOT ASL 27kV UNIVL MOUNT  |
| 63                            | 2           | 6.6, 11             | J&P       | 61010                                 | HV FUSE 63A 2 SHOT ASL 15kV J&P MOUNT    |
| 63                            | 2           | 6.6, 11             | MLE       | 61050                                 | HV FUSE 63A 2 SHOT ASL 15kV MLE MOUNT    |
| 63                            | 2           | 6.6, 11             | Universal | 61090                                 | HV FUSE 63A 2 SHOT ASL 27kV UNIVL MOUNT  |
| 100                           | 2           | 6.6, 11             | J&P       | 61020                                 | HV FUSE 100A 2 SHOT ASL 15kV J&P MOUNT   |
| 100                           | 2           | 6.6, 11             | MLE       | 61060                                 | HV FUSE 100A 2 SHOT ASL 15kV MLE MOUNT   |
| 100                           | 2           | 6.6, 11             | Universal | 61100                                 | HV FUSE 100A 2 SHOT ASL 27kV UNIVL MOUNT |
| 200                           | 2           | 6.6, 11             | J&P       | 61030                                 | HV FUSE 200A 2 SHOT ASL 15kV J&P MOUNT   |
| 200                           | 2           | 6.6, 11             | MLE       | 61070                                 | HV FUSE 200A 2 SHOT ASL 15kV MLE MOUNT   |
| 200                           | 2           | 6.6, 11             | Universal | 61110                                 | HV FUSE 200A 2 SHOT ASL 27kV UNIVL MOUNT |
| Replacement Chemical Actuator |             |                     |           | 61153                                 | HV FUSE ASL REPL'MENT CHEMICAL ACTUATOR  |



| Section | Requirement                               | Conformance Code | Remarks<br>(Must be completed if Conformance Code is not C1) |
|---------|---|------------------|--|
| 4.1     | Equipment Standards                       |                  |  |
| 4.2     | Regulatory Requirements                   |                  |  |
| 4.3     | Equipment Description                     |                  |  |
| 4.4     | Proof of Performance                      |                  |  |
| 4.5     | Departures from Specification             |                  |  |
| 4.6     | Markings                                  |                  |  |
| 5.1     | Product not to be changed                 |                  |  |
| 5.2     | Electricity North West Technical Approval |                  |  |
| 5.3     | Quality Assurance                         |                  |  |
| 5.4     | Formulation                               |                  |  |
| 5.5     | Identification Marking                    |                  |  |
| 5.6     | Products already Approved                 |                  |  |
| 5.7     | Product Conformity                        |                  |  |
| 6       | Requirements for Type and Routine Testing |                  |  |
| 7.1     | HV HRC Fuse-links                         |                  |  |
| 7.2     | LV Fuse-Links (Distribution Network)      |                  |  |

| Section    | Requirement  | Conformance Code | Remarks<br>(Must be completed if Conformance Code is not C1) |
|------------|--|------------------|--|
| 7.3        | LV Fuse-Links (Domestic and Similar Premises)              |                  |  |
| 7.4        | LV Fuse-Links (Street Lighting Services)                   |                  |  |
| 7.5        | LV Fuse-Links (Industrial Premises)                        |                  |  |
| 7.6        | HV Expulsion Fuse-Links                                    |                  |  |
| 7.7        | Time Fuse-Links  |                  |  |
| 7.8        | Automatic Sectionalising Links                             |                  |  |
| 8          | Protection, Packaging and Delivery                         |                  |  |
| Schedule A | HV Fuse-Links for Use in Oil                               |                  |  |
| Schedule B | Tag Type HV Fuse-Links for Use in Air                      |                  |  |
| Schedule C | LV "J" type Cylindrical Slotted Tag Fuse-Links             |                  |  |
| Schedule D | Domestic Service Termination Fuse-Links                    |                  |  |
| Schedule E | HRC Fuse-Links for Street Lighting Services                |                  |  |
| Schedule F | Industrial (415V) 2 Hole Offset Tag Fuse-Link              |                  |  |
| Schedule G | Industrial (415V) 2 Hole Central Tag Fuse-Link             |                  |  |
| Schedule H | LV Central Tag Fuse-Link with 4 Hole Fixings               |                  |  |
| Schedule I | Industrial (415V) Compact Fuse-Links with Offset Blade Tag |                  |  |
| Schedule J | HV Expulsion Fuse-Links                                    |                  |  |

| Section    | Requirement                    | Conformance Code | Remarks<br>(Must be completed if Conformance Code is not C1) |
|------------|--------------------------------|------------------|--|
| Schedule K | Time Fuse-Links                |                  |  |
| Schedule L | Automatic Sectionalising Links |                  |  |

Additional Notes: