

Company Directive

STANDARD TECHNIQUE : TP4B/3

Relating to 11kV and 6.6kV Transformer Protection

Policy Summary

This document describes the requirements for protecting 11kV/LV and 6.6kV/LV distribution transformers including conventional ground mounted transformers, padmount transformers and pole mounted transformers.

Author: Andy Hood

Implementation Date: October 2021

Approved by



Carl Ketley-Lowe
Engineering Policy Manager

Date: 12th October 2021

Target Staff Group	All staff involved with the design, specification, operation, commissioning, maintenance and replacement of 6.6kV and 11kV networks.
Impact of Change	Amber - Fuse ratings and CT ratios for XF Type TLF protection have been aligned with the latest version of ENATS 12-6. Requirements for 1000kVA padmount transformers have been added. Requirements for 11kV and 6.6kV fuses in air have also been added.
Planned Assurance checks	One month after the issue of the document the author shall check that the changes to TLF protection have been implemented in the plant workshops.

All references to Western Power Distribution or WPD must be read as National Grid Electricity Distribution or NGED

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IMPLEMENTATION PLAN

Introduction

This document specifies the standard protection requirements for WPD owned 11kV and 6.6kV conventional ground mounted transformers, padmount transformers and pole mounted transformers.

Main Changes

The document has been reviewed and references have been updated. XF Type TLF fuse ratings and CT ratios have been changed to align with the latest version of ENATS 12-6. In practice, this has increased the ratings of XF Type TLF fuses used to protect 800kVA (11kV/LV) and 1000kVA (11kV/LV and 6.6kV/LV) transformers. Requirements for the protection of 1000kVA padmount transformers have been included. Table A5, A6, C5 and C6 have also been added which specify the requirements for 11kV and 6.6kV fuses in air.

Impact of Changes

Target Staff Group	All staff involved with the design, specification, operation, commissioning, maintenance and replacement of 6.6kV and 11kV networks.
Impact of Change	Amber - Fuse ratings and CT ratios for XF Type TLF protection have been aligned with the latest version of ENATS 12-6. Requirements for 1000kVA padmount transformers have been added. Requirements for 11kV and 6.6kV fuses in air have been added.

Implementation Actions

Managers involved with the design, specification, operation, commissioning, maintenance and replacement of 6.6kV and 11kV networks shall ensure they are aware of and follow the requirements of this document.

An explanation video is provided [here](#)

Implementation Timescale

This document shall be implemented one calendar month after its issue for all new and substantially modified installations. Whenever fuses are replaced the new fuse ratings, types and, where applicable, CT ratios shall be in accordance with this document.

REVISION HISTORY

Document Revision & Review Table		
Date	Comments	Author
October 2021	• Document has been reviewed and re-written • Document format has been updated • Document references have been updated • 2.1.1 - The term 'protection device' has been defined • 2.1.2 - The maximum length of single core cables has been increased to 20m • 2.1.3 - Fuse replacement requirements have been clarified • 3.0 - Information on the protection of overhead networks has been updated • 4.1 - The background on general protection principles has been updated • 4.2 - Table 1 has been added • Table A1 - TLF fuses used to protect 800kVA and 1000kVA transformers have been increased to align with ENATS 12-6 • 4.3 - The equipment schedule has been replaced with a reference to EE SPEC:52 • Table A2 - The maximum LV fuse size for 1000kVA transformers has been reduced to 500A and a note has been added regarding the use of OLFMA fuses with Reyrolle RKSS switchgear • Table A5 and A6 - Air Fuse Links requirements for 11kV/LV transformers have been added • Table B1 - Requirements for 1000kVA padmount transformers have been added • Table C1 - TLF fuses used to protect 1000kVA transformers have been increased to align with ENATS 12-6 • Table C2 - The maximum LV fuse size for 1000kVA transformers has been reduced to 500A • Table C5 and C6 - Air Fuse Links requirements for 6.6kV/LV transformers have been added	Andy Hood

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1.0 INTRODUCTION

- 1.1 This document specifies the standard protection requirements for WPD owned 11kV and 6.6kV conventional ground mounted transformers, padmount transformers and pole mounted transformers. Some aspects of this document also apply where WPD plant and equipment directly protects customer owned and IDNO owned transformers.
- 1.2 Where there are any difficulties in applying the requirements of this document the author shall be notified who will determine if a variation is appropriate.

2.0 GROUND MOUNTED AND PAD MOUNTED TRANSFORMERS

2.1 General

2.1.1 HV protection

Every conventional ground mounted and padmount transformer shall be protected by a dedicated HV protective device. In this context a protective device is either a:

- circuit breaker fitted with time lag fuses (TLFs)
- circuit breaker fitted with a phase fault and earth fault protection relay
- oil fuse switch (OFS) fitted with HV expulsion fuses
- pole mounted fuse unit fitted with HV overhead expulsion fuses
- set of HV ELSP current limiting fuses in combination with a set of HV bay-onet fuses

It is not acceptable to use a WPD protection device to directly protect more than one ground mounted or padmount distribution transformer, irrespective of the ownership of the transformer/s.

2.1.2 LV protection

The LV network supplied from each 11kV and 6.6kV ground mounted and pad mounted transformer shall be protected by LV fuses or by LV circuit breakers. LV fuse-link ratings and circuit breaker settings shall be chosen to grade with the HV protection device, so far as is reasonably practicable.

In the case of WPD transformers, the LV cabinet containing these fuses and/or circuit breakers may either be mounted on the transformer itself or be connected to the transformer by a set of LV single core cables. The length of these LV cables shall be kept to a minimum and must not exceed 20m.

The largest size of LV fuse-link which grades with the HV protection is specified in the following tables. Standard Protection settings for LV circuit breakers are specified in ST:SD5E.

2.1.3 Fuse Replacement

Where one or more TLF fuse, OFS fuse or bay-o-net fuse operates, it is possible that the other intact fuses in the set may have also been subjected to fault current causing them to become permanently weakened or damaged. Given this, it is necessary to replace the whole set of fuses before the transformer is re-energised.^[1]

Note [1] ELSP current limiting fuses that are installed inside the tank of pad mounted transformers are designed to clear high fault current whereas the bay-o-net fuses installed in the elbows are designed to operate for lower fault current. ELSP fuses are inaccessible and do not need to be replaced when the associated bay-o-net fuses operate. If one or more ELSP fuse operates this signifies a fault on the HV side / winding of the transformer and, in this case, the whole pad mounted transformer will need to be replaced.

2.2 **Conventional Ground Mounted Transformers**

WPD owned transformers rated up to 1000kVA are, as standard, protected by a circuit breaker fitted with XF type time lag fuse (TLF) protection. Alternatively they may be protected by an oil fuse switch (OFS), by a circuit breaker fitted with re-wireable TLFs or by overhead expulsion fuses. It is also acceptable to protect WPD transformers using a circuit breaker fitted with a protection relay although this is a non-standard arrangement.

All new and substantially modified HV customer connections, including those supplying a single customer transformer, shall be protected by a circuit breaker fitted with a protection relay (typically a self-powered protection relay)^[2].

In the past HV customer connections were often protected by a WPD circuit breaker fitted with TLFs or by a WPD OFS; such arrangements may be retained where they provide adequate protection for the customer's plant and equipment. Where WPD's switchgear is replaced for any reason the protection shall satisfy the requirements for new connections.

2.2.1 TLF Protection

Standard XF Type TLF ratings and CT ratios are specified in ENATS 12-6 for WPD's standard transformers. These requirements are reproduced in Table A1 and C1.

Historically, rewireable TLFs were also used to protect WPD transformers but these should, where practical, be replaced with XF Type fuses. Rewireable fuse ratings and CT ratios are included in Table A3 and C3 for reference.

Where both phase fault and earth fault A.C. trip coils are installed TLFs shall be fitted across the phase fault trip coils but should not be connected across the earth fault trip coil.

The same TLF ratings and CT ratios shall be applied where WPD provide the protection for customer owned transformers with the same characteristics as WPD's transformers (i.e. with the same kVA ratings, voltage ratings, impedance and tapping range). Further information is included in Section 4.2^[2].

IDNOs may specify alternative TLF ratings if they wish.

2.2.2 OFS Protection

Historically WPD owned 11kV and 6.6kV transformers rated up to 1000kVA were protected by an HV Oil Fuse Switch (OFS) fitted with a set of HV expulsion fuses.

Standard Oil Fuse Switch (OFS) fuse-link ratings are specified in Table A2 and Table C2.

The same OFS fuse ratings shall be applied where WPD provide the protection for customer owned transformers that have the same characteristics as WPD's transformers (i.e. with the same kVA rating, voltage ratings, tap range and impedance). Further information is included in section 4.2^[2].

OFSs are not used to protect of IDNO transformers.

Note [2] Engineering Design specify all non-standard fuse ratings and CT ratios.

2.2.3 Overhead Expulsion Fuse Protection

Historically some WPD ground mounted transformers rated at 315kVA or less were installed without an OFS or a HV circuit breaker and were protected by a set of HV pole-mounted expulsion fuses. These existing arrangements, colloquially known as 'village substations' may be continue to be used as long as the HV fuse unit is located within 100 meters of the transformer and is accessible from the substation site. This option shall not be used for new or significantly modified installations.

The applicable transformer sizes, expulsion fuse types and ratings are specified in Table A4 and Table C4.

Overhead expulsion fuses are not used to protect customer owned or IDNO owned transformers.

2.2.4 Air Fuse Link (AFL) Protection

Fuses fitted in air are used in some types of 11kV and 6.6kV switchgear. Standard AFL ratings are specified in Table A5, A6, C5 and C6.

The same AFL ratings shall be applied where WPD provide the protection for customer owned transformers that have the same characteristics as WPD's transformers (i.e. with the same kVA rating, voltage ratings, tap range and impedance). Further information is included in section 4.2^[2].

AFLs are not used to protect of IDNO transformers.

Note [2] Engineering Design specify all non-standard fuse ratings and CT ratios.

2.3 Pad Mounted Transformers

WPD owned pad mounted transformers shall be protected by two sets of HV fuses connected in series. These fuses consist of one set of bay-o-net fuses, rated for the clearance of low levels of fault current and one set of ELSP current limiting fuses, rated to clear high levels of fault current. The combination of fuses provide adequate protection over the full range of possible fault current.

Table B1 specifies the fuse-links to be used for 11kV pad mounted transformers.

6.6kV pad mounted transformers are not currently approved for use within Western Power Distribution.

WPD do not provide the protection for customer owned or IDNO owned padmount transformers.

3.0 POLE MOUNTED TRANSFORMERS

- 3.1 WPD's HV overhead networks are protected by ground mounted circuit breakers, pole mounted circuit breakers and, where applicable, pole-mounted fuses in accordance with POL: TP4 and ST: SD4A. These protection devices also provide a measure of protection for pole mounted transformers.

Overhead systems within Western Power Distribution are either group fused or group sectionalised.^[3]

Note [3] Automatic Sectionalising Links (ASLs) and other sectionalising switchgear are not considered to be protection devices as they do not interrupt fault current; upstream circuit breakers provide the protection function in these circumstances.

Where HV overhead expulsion fuses are installed the following types shall be used:

- 50A Type T (slow blow) fuses.
- 50A Type K (fast blow) fuses

Further guidance on the application of overhead expulsion fuses and ASLs is included in POL: TP4 and ST: SD4A.

No additional HV protection is provided for pole mounted transformers.

LV fuses used to protect the LV network supplied by each pole mounted transformer shall be mounted on the same pole as the transformer. ST: OH4H specifies standard LV fuse ratings and LV tail sizes.

4.0 BACKGROUND INFORMATION

4.1 General Protection Principles

ENATS 12-6 and 12-8 provide recommendations for the protection of 11kV and 6.6kV transformers by TLFs and by Oil Fuse Switches / Air Fuse Switches, respectively. These documents base their recommendations on the following principles.

- Fuses shall withstand magnetising inrush assumed to be 10x rated current for 0.1 second.
- Transformer overloads up to 150% of nameplate rating shall be allowed for
- Discrimination with LV fuses shall be possible
- ENATS 12-6 requires phase to earth faults in the LV terminal zone to be cleared by TLF protection within 5s
- ENATS 12-8 requires 3 phase faults in the LV terminal zone to be cleared within 1s by OFS fuses.

ENATS 12-8 and ENATS 12-6 assume that transformer impedances are at, or close to 5% (based on the transformer name plate rating). These documents also use a 0.6x factor when determining the fault current associated with a phase to neutral or phase to earth faults in the LV terminal zone of the transformer. This factor is designed to take account of the source impedance, fault impedance, arc voltage drop and low-voltage cable impedance.

For three phase transformers the most onerous case for discriminating between HV protection and LV protection is for a phase to phase fault on the low voltage side of the transformer. This is due to the 2:1:1 current distribution that occurs at the HV connection to the transformer.

4.2 Standard Ground Mounted and Padmount Transformers

The settings specified in the following tables are appropriate where transformers with standard kVA ratings, impedances and tapping ranges have been installed. Further details are provided in Table 1:

Rated Power	Short Circuit Impedance (on rated power base)	Tapping Range
11kV/250V 1Ph Padmount:		
50kVA	3% or 4.5% ^[5]	+5% to -5%
11kV/433V-250V 3Ph Padmount:		
50kVA	4.5%	+5% to -5%
100kVA	3% or 4.75% ^[5]	
200kVA	3% or 4.75% ^[5]	
1000kVA	4.75%	
11kV/433V-250V 3Ph Ground Mounted:		
50kVA	4.5%	+5% to -5%
100kVA	4.75%	
200kVA	4.75%	
300 and 315kVA	4.75%	
500kVA	4.75%	
750kVA and 800kVA	4.75%	
1000kVA	4.75%	
6.6kV/433V-250V 3Ph Ground Mounted:		
200kVA	4.75%	+5% to -5%
300 and 315kVA	4.75%	
500kVA	4.75%	
750kVA and 800kVA	4.75%	
1000kVA	4.75%	
11kV/6.6kV/433V-250V (dual ratio) 3Ph Ground mounted:		
200kVA (3ph)	4.75%	+5% to -5% of 11kV, +8.3% to -8.3% of 6.6kV
300 and 315kVA (3ph)	4.75%	
500kVA (3ph)	4.75%	
750kVA and 800kVA (3ph)	4.75%	
1000kVA (3ph)	4.75%	

Table 1 Standard 3 Phase Transformer Impedances

Note [5] EE SPEC: 5 currently specifies an impedance of $\leq 3\%$

4.3 E5 Codes for WPD Fuses

EE SPEC: 52 provides information on all of the fuses used by WPD with the exception of the fuse wire used for some older TLFs. This document also lists all the relevant E5 codes.

PROTECTION REQUIREMENTS FOR 3 PHASE 11kV GROUND MOUNTED TRANSFORMERS

11kV T/F Rating	Standard TLF Settings – XF Type			Maximum Standard LV Fuse Rating
	TLF rating	CT Ratio	TLF type	
200 kVA	3A	50/5	XF3	200A
	3A	40/5	XF3	160A
300 kVA & 315 kVA	5A	50/5	XF5	315A
	7.5A	40/5	XF7.5	
500 kVA	10A	50/5	XF10	400A
	12.5A	40/5	XF12.5	
750 kVA & 800 kVA	7.5A	100/5	XF7.5	500A ^[A1]
	10A	80/5	XF10	
1000 kVA	10 A	100/5	XF10	500A ^[A1]
	12.5A	80/5	XF12.5	

Table A1 TLF settings for protection of 11kV ground mounted transformers

11kV T/F Rating	Standard 11kV OFS Fuse Ratings		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
100 kVA	20A	12kV OEFMA (254mm) or 12kV OHGMA (359mm)	200A
200 kVA	25A	12kV OEFMA (254mm) or 12kV OHGMA (359mm)	250A
300 kVA & 315 kVA	31.5A	12kV OEFMA (254mm) or 12kV OHGMA (359mm)	315A
500 kVA	50A	12kV OEFMA ^[A2] (254mm) or 12kV OHGMA (359mm)	400A
750 kVA & 800 kVA	63A	12kV OEFMA ^[A2] (254mm) or 12kV OHGMA (359mm)	500A ^[A1]
1000 kVA	80A	12kV OHFMA ^[A2] (254mm) or 12kV OHGMA (359mm)	500A ^[A1]

Table A2 Ratings of OFS fuses for protection of 11kV ground mounted transformers

Note [A1] 500A is the largest J Type LV Fuse that is normally used by Western Power Distribution

Note [A2] Where Reyrolle JKSS switchgear is used OLFMA fuses must be used instead as these are more mechanically robust and are capable of withstanding the higher shock/impact imposed by this switchgear.

PROTECTION REQUIREMENTS FOR 3 PHASE 11kV GROUND MOUNTED TRANSFORMERS
(continued)

11kV T/F Rating	TLF Settings – Rewireable Type ^[A3]			Maximum Standard LV Fuse Rating
	TLF rating	CT ratio	Fuse Wire Type	
200 kVA	5A	50/5	24 SWG pure tin	200A
	5A	40/5	24 SWG pure tin	
300 kVA & 315 kVA	5A	50/5	24 SWG pure tin	200A
	5A	40/5	24 SWG pure tin	
500 kVA	7.5A	50/5	23 SWG pure tin	355A
	7.5A	40/5	23 SWG pure tin	
750 kVA & 800 kVA	5A	100/5	24 SWG pure tin	400A
	5A	80/5	24 SWG pure tin	
1000 kVA	5A	100/5	24 SWG pure tin	400A
	5A	80/5	24 SWG pure tin	

Table A3 Rewireable TLF settings for protection of 11kV ground mounted transformers

Transformer Rating	11kV Overhead Expulsion Fuse Ratings	Maximum Standard LV Fuse Rating
50 kVA	10A Type K (fast blow) ^[A4]	100A
100 kVA	15A Type K (fast blow) ^[A4]	160A
200 kVA	25A Type K (fast blow) ^[A4]	250A
300 kVA & 315 kVA	25A Type K (fast blow) ^[A4]	250A

Table A4 Ratings of overhead expulsion fuse ratings for protection of 11kV ground mounted transformers

Note [A3] XF Type TLFs shall, where possible, be used in preference to rewireable TLFs (see Table A1 for XF Type TLF requirements)

Note [A4] These fuse ratings and types are only used for protecting 3 phase ‘village type’ ground mounted transformers installed without any other HV protection. They must not be used for protecting conventional overhead spurs or pole mounted transformers.

PROTECTION REQUIREMENTS FOR 3 PHASE 11kV GROUND MOUNTED TRANSFORMERS
(continued)

11kV T/F Rating	11kV Air Fuse Ratings – Clip Fittings		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
200 kVA	25A	BFGHA for various switch fuses including Statter VA & VAH BDGHN for GEC Type D OHGMA for L&C LCGT	200A
300 kVA & 315 kVA	31.5A	BFGHA for various switch fuses including Statter VA & VAH BDGHN for GEC Type D OHGMA for L&C LCGT	315A
500 kVA	45A	BFGHA for various switch fuses including Statter VA & VAH BDGHN for GEC Type D	400A
	50A	OHGMA for L&C LCGT	
750 kVA & 800 kVA	71A	BFGHA for various switch fuses including Statter VA & VAH BFGHM for GEC Type D	500A ^[A1]
	80A	OHGMA for L&C LCGT	
1000 kVA	90A	BFGHA for various switch fuses including Statter VA & VAH BFGHM for GEC Type D OHGMA for L&C LCGT	500A ^[A1]

Table A5 Ratings of fuses in air (for clip fittings) for protection of 11kV ground mounted transformers

Note [A1] 500A is the largest J Type LV fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

PROTECTION REQUIREMENTS FOR 3 PHASE 11KV GROUND MOUNTED TRANSFORMERS
(continued)

11kV T/F Rating	11kV Air Fuse Ratings – Tag Fittings		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
200 kVA	20A	BDGHC	200A
300 kVA & 315 kVA	31.5A	BDGHC	315A
500 kVA	45A	BDGHC	400A
750 kVA & 800 kVA	71A	BFGHD	500A ^[A1]
1000 kVA	90A	BFGHD	500A ^[A1]

Table A6 Ratings of fuses in air (with tags) for protection of 11kV ground mounted transformers

Note [A1] 500A is the largest J Type LV fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

PROTECTION REQUIREMENTS FOR 11KV PADMOUNT TRANSFORMERS

Transformer Rating	Bay-o-net Fuse Rating	ELSP Fuse Rating	Maximum LV Fuse Rating
50 kVA 1ph	5A	30A	100A
50 kVA 3ph	5A	30A	100A ^[B1]
100 kVA 3ph	12A	40A	160A
200 kVA 3ph	25A	100A	315A
1000kVA 3ph	100A	165A	500A ^[B2]

Table B1 Ratings of fuses for protection of 11kV padmount transformers

Note [B1] 100A LV fuses may not grade with the 5A bay-o-net fuses used with 50kVA 3 phase padmount transformers.

Note [B2] 500A is the largest J Type LV Fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

PROTECTION REQUIREMENTS FOR 6.6KV 3 PHASE 6.6KV GROUND MOUNTED TRANSFORMERS

Transformer Rating	Standard TLF Settings – XF Type			Maximum Standard LV Fuse Rating
	TLF rating	CT Ratio	TLF type	
200 kVA	5A	50/5	XF5	160A
	7.5A	40/5	XF7.5	
300kVA & 315 kVA	10A	50/5	XF10	250A
	12.5A	40/5	XF12.5	
500 kVA	7.5A	100/5	XF7.5	400A
	10A	80/5	XF10	
750 kVA & 800 kVA	12.5A	100/5	XF10	500A ^[C1]
	15A	80/5	XF12.5	
1000 kVA	15A	100/5	XF15	500A ^[C1]
	15A	80/5	XF15	

Table C1 TLF settings for protection of 6.6kV ground mounted transformers

Transformer Rating	OFS Protection		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
100 kVA	20A	12kV OEFMA (254mm)	100A
200 kVA	31.5A	12kV OEFMA (254mm)	200A
300kVA & 315 kVA	50A	12kV OEFMA (245mm)	315A
500 kVA	80A	12kV OEFMA (254mm)	400A
750 kVA & 800 kVA	100A	7.2kV OEFMA (254mm)	500A ^[C1]
1000 kVA	140A	7.2kV OHGMA (359mm)	500A ^[C1]

Table C2 Ratings of OFS fuses for protection of 6.6kV ground mounted transformers

Note [C1] 500A is the largest J Type LV Fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

PROTECTION REQUIREMENTS FOR 6.6KV 3 PHASE 6.6KV GROUND MOUNTED TRANSFORMERS (continued)

Transformer Rating	TLF Protection –Rewireable Type ^[C2]			Maximum Standard LV Fuse Rating
	TLF rating	CT Ratio	Fuse Wire Type	
200 kVA	5A	50/5	24 SWG pure tin	160A
	7.5A	40/5	23 SWG pure tin	
300 kVA & 315 kVA	7.5A	50/5	23 SWG pure tin	250A
	10A	40/5	21 SWG pure tin	
500 kVA	5A	100/5	24 SWG pure tin	400A
	7.5A	80/5	23 SWG pure tin	
750 kVA & 800 kVA	7.5A	100/5	23 SWG pure tin	400A
	10A	80/5	21 SWG pure tin	
1000 kVA	10A	100/5	21 SWG pure tin	500A ^[C1]
	10A	80/5	21 SWG pure tin	

Table C3 Rewireable TLF settings for protection of 6.6kV ground mounted transformers

Transformer Rating	6.6kV Overhead Expulsion Fuse Ratings	Maximum LV fuse Rating
100 kVA	25A Type K (fast blow) ^[C3]	160A
200 kVA	40A Type K (fast blow) ^[C3]	250A
300 & 315 kVA	40A Type K (fast blow) ^[C3]	250A

Table C4 Ratings of overhead expulsion fuses for protection of 6.6kV ground mounted transformers

Note [C1] 500A is the largest J Type LV Fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

Note [C2] XF Type TLFs shall, where possible, be used in preference to rewireable TLFs (see Table C1 for XF Type TLF requirements)

Note [C3] These fuse ratings and types are only used for protecting 3 phase ‘village type’ ground mounted transformers installed without any other HV protection. They must not be used for protecting conventional overhead spurs or pole mounted transformers

PROTECTION REQUIREMENTS FOR 3 PHASE 6.6kV GROUND MOUNTED TRANSFORMERS
(continued)

11kV T/F Rating	11kV Air Fuse Ratings – Clip Fittings		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
200 kVA	31.5A	BFGHA for various switch fuses including Statter VA & VAH BDGHN for GEC Type D OHGMA for L&C LCGT	200A
300 kVA & 315 kVA	45A	BFGHA for various switch fuses including Statter VA & VAH BDGHN for GEC Type D	315A
	63A	OHGMA for L&C LCGT	
500 kVA	71A	BFGHA for various switch fuses including Statter VA & VAH BFGHM for GEC Type D	400A
	90A	OHGMA for L&C LCGT	
750 kVA & 800 kVA	125A	BFGHA for various switch fuses including Statter VA & VAH BFGHM for GEC Type D	500A ^[A1]
	140A	OHGMA for L&C LCGT	
1000 kVA	140A	BFGHA for various switch fuses including Statter VA & VAH BFGHM for GEC Type D	500A ^[A1]
	160A	OHGMA for L&C LCGT	

Table C5 Ratings of fuses in air (for clip fittings) for protection of 6.6kV ground mounted transformers

Note [A1] 500A is the largest J Type LV fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

PROTECTION REQUIREMENTS FOR 3 PHASE 6.6KV GROUND MOUNTED TRANSFORMERS
(continued)

11kV T/F Rating	11kV Air Fuse Ratings – Tag Fittings		Maximum Standard LV Fuse Rating
	Fuse Rating	Fuse Type	
200 kVA	31.5A	BDGHC	200A
300 kVA & 315 kVA	45A	BDGHC	315A
500 kVA	71A	BDGHC	400A
750 kVA & 800 kVA	125A	BFGHD	500A ^[A1]
1000 kVA	140A	BFGHD	500A ^[A1]

Table C6 Ratings of fuses in air (with tags) for protection of 11kV ground mounted transformers

Note [A1] 500A is the largest J Type LV fuse that is normally used by Western Power Distribution although in some cases larger fuses are fitted.

APPENDIX D

SUPERSEDED DOCUMENTATION

This document supersedes ST: TP4B/2 dated October 2001 which has now been withdrawn.

APPENDIX E

RECORD OF COMMENT DURING CONSULTATION

[ST: TP4B/3 - comments](#)

APPENDIX F

ANCILLARY DOCUMENTATION

ENATS 12-8 The application of fuse-links to 11kV/415V and 6.6kV/415V underground distribution networks.

ENATS 12-6 Time fuse links (for use with current transformer releases on circuit breakers).

ENATS 35-1 Distribution Transformers

EE SPEC: 5 11kV Distribution Transformers

EE SPEC: 52 HV and LV fuse links

ST: OH4H Mounting auxiliary equipment on wood poles

ST: SD4A Design of WPD's 11kV and 6.6kV networks

POL: TP4 Protection of 11kV and 6.6kV Systems

APPENDIX G

KEY WORDS

Protection, OFS, fuse, fuse link, TLF, transformer, ground mounted, pad mount, pole mounted.