WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

Company Directive

ENGINEERING SPECIFICATION

EE SPEC: 129/1

Specification for Wood Poles and Associated Timber for Overhead Lines

Summary
This document specifies the selection and treatment of wood poles and associated timber components for use on overhead lines.

Author: Mike Chapman

Implementation Date: September 2016

Approved by

Policy Manager

Date: 9 September 2016

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Introduction

This document specifies the selection and treatment of wood poles stay blocks, and other ancillary timbers for use on WPD's overhead network and is based on ENATS 43-88 issue 5 February 2010.

Main Changes

Correction made to the figure number in Clause 3.5.1 & Appendix A3 that should be used when treating copper treated poles.

A paragraph has also been included for the manufacturer to, where instructed by WPD, apply additional protection to the butt end of water soluble preserved i.e. copper treated (CCA) poles so as to mitigate some of the risk of the premature onset of ground level decay.

Fig 1, 2, 14 and appendix B1 has been amended to clarify that it is the 'Class' of pole that is required at the gouge mark rather than the diameter.

Impact of Changes

Staff may start to see copper treated (CCA) poles supplied with additional protection applied at the butt end.

There will be no impact to the Business as poles have continued to be been fabricated to the correct Figure 72206.

Implementation Actions

Staff handling copper treated (CCA) poles that have additional protection applied at the butt end should handle them with additional care so as to mitigate any damage that may be caused to the membrane if fitted. Additional handling, transportation and installation guidance can be found by following this link.

Purchasing should issue the amended specification to WPD pole suppliers.

Implementation Timetable

This Policy can be implemented with immediate effect.

Document Revision & Review Table		
Date	**Comments**	**Author**
04/8/2016	• Clause 3.5.1, Appendix A1 & A3 - Reference to figure number that should be used when treating copper treated poles changed from Fig 14 to Fig 72206. • A paragraph has also been included in 3.5.1 for the manufacturer to, where instructed by WPD, apply additional protection to the butt end of copper treated poles. Further instructions on handling and transportation can be found by following this link. • Fig 1, 2, 14 and appendix B1 has been amended to clarify that it is the 'Class' of pole that is required at the gouge mark rather than the diameter.	Mike Chapman
01/07/2015	New Specification	Mike Chapman

CONTENTS

1.0 SCOPE

This document specifies the selection and treatment of wood poles stay blocks, and other ancillary timbers for use on WPD's overhead network and is based on ENATS 43-88 issue 5 February 2010.

2.0 REFERENCES

This Specification makes reference to and should be used in conjunction with, the following documents and their references:

BS EN 14229:2010	Wood poles for overhead lines.
ENATS 43-88	Selection and Treatment of Wood Poles and Associated Timber for Issue 5: 2010 Overhead Lines.

3.0 WPD REQUIREMENTS

This section outlines additional requirements to ENATS 43-88, BS1990 and relevant BS EN standards.

In the event of conflicting requirements preference shall be in the following order of consideration:

1. EE 129 - WPD's Wood Pole Equipment Specification
2. ENATS 43-88 - Selection and treatment of Wood Poles and Associated Timber for Overhead Lines.
3. Appropriate European or National Standards

3.1 GENERAL REQUIREMENTS

3.1.1 Species for Poles

As a general rule all standard WPD poles shall be fabricated using Scots Pine (Pinus Sylvestris).

Where it is necessary to supply Douglas Fir (Pseudotsuga Menziesii) poles then this shall be only after agreement has been sought from a WPD Overhead Line Engineer and the poles are impregnated using standard AWPAC4.

3.1.2 **Size**

An additional class known as 'Medium Stout' are included in this specification. These shall be marked on the pole as MS.

All poles shall comply with the minimum diameters and lengths quoted in Appendix A after dressing.

3.1.3 **Straightness**

A Double Sweep or a short crook is not permitted.

3.1.4 **Knots**

A minimum distance between adjacent rings of knots shall be 300mm. The distance shall be measured between the edges of the knots.

3.1.5 **Growth Rings**

There shall be a minimum of 8 growth rings per 25mm. The combination of the light coloured early wood and the darker coloured late wood form a single growth ring.

Measurements shall be taken at the tip within 50mm of the circumference.

3.1.6 **Juvenile Wood**

The diameter of the juvenile wood shall not exceed 50% of the pole diameter when measured at the tip. Juvenile wood is the area inside the 12^{th} ring from the pith.

3.2 **SEASONING**

3.2.1 **Stacking**

It will be the responsibility of the Supplier to inform WPD of the measures to be taken to maintain the quality of the poles prior to treatment.

3.2.2 **Moisture Content**

The moisture content of **all** poles shall be ascertained by the use of an approved electrical digital or analogue moisture meter having insulated probes at least 25mm in length or other meter as agreed and approved in writing by WPD.

Where batches of poles are to pre warmed together after seasoning, the methodology to be used shall be agreed with WPD.

The moisture content of all poles within the charge shall be within a 5% range; this is to reduce the possibility of over drying individual poles.

3.2.3 **Permeability**

Pre-warming immediately prior to preservation to improve permeability to WEI Type B and C creosote is permissible and preferable to the addition of naphthalene to thin the creosote. However the methodology to be used shall be agreed with WPD.

3.3 **FABRICATION**

3.3.1 **Drilling**

All holes shall be drilled to WPD's dimensions and care must be taken to ensure that all holes in the same plane are through, and perpendicular to, the central axis of the pole.

Holes drilled within 1m of the pole top shall not be nearer than 25mm to any shake. This shall be measured between the hole edge and the closest side of the shake after preservation.

Holes in the same plane shall have tolerances between the hole centres of + / - 3 mm maximum.

The crossarm bolt holes shall be in the same plane as any sweep in the pole.

Once the drilling process has been complete all holes shall be checked to ensure they are in the correct plane and within tolerance.

3.3.2 **Scarfing**

All scarfing shall be to WPD's dimensions.

3.3.3 **Marking**

Marking shall be carried out by gouging, branding, or routing. The basic requirements are given in Appendix D.

Proposed European standards will require more information to be included on the pole than is practicable by the traditional methods of gouging, branding or routing.

Therefore, as an alternative to gouging, branding or routing, the supplier may provide the information specified in Appendix B on an engraved stainless steel

(INOX) disc of nominal diameter of 45mm fastened in a circular recess drilled into the pole. The information disc shall be placed in line with the crossarm bolt holes 3m from the butt so as to act as the gouge mark.

If a disc is used a second identical disc shall be also fixed 6m from the pole butt in line with the crossarm bolt hole. This is to provide a secondary method of identification in the event of theft of, or damage to the disc at the 3m mark.

Regardless of the method of marking employed, the information in Appendix B shall be provided.

3.3.4 **Traceability**

The supplier shall mark all poles to identify the treatment charge by means of a Batch Number (at gouge mark) or Latschbacher Label (at pole tip) to ensure Traceability

3.3.5 **Fabrication**

The individual members of 'H', 'A', Rutter, or twin structures shall be matched.

Where non-standard (i.e. drawing not included within this document) requests are made the appropriate WPD Drawing will be supplied at the time of each order. Western Power Distribution requires that these structures be pre-assembled, complete with brace and key blocks and if required, with steelwork and/or cross bonding to ensure fabrication and trussing dimensions are compatible.

The trussing tackle, and associated components, must be clearly and indelibly identified and delivered with the poles for which it has been adjusted to fit.

Where requested with the order, additional holes may be needed to accommodate to allow the installation of pole step.

3.4 **PRESERVATIVE TREATMENT (CREOSOTE)**

3.4.1 **Sapwood Thickness**

The minimum sapwood thickness shall be 25mm.

3.4.2 **Creosote Penetration**

The sapwood shall be completely impregnated with creosote to penetration class NP5 in accordance with the requirements of BS EN 351 Part 1, which shall be verified by means of test borings and subsequent testing of these borings using a sapwood / heartwood reagent.

3.4.3 **Bleeding poles**

At time of tender the supplier shall inform WPD on their procedures for identifying, segregating and re-treating bleeding poles.

WPD's preference is for, creosoted poles to be stacked for a minimum period of three months before delivery. If agreed with WPD this period may be shortened.

Any pole that still displays bleeding must be re-washed, in the pressure vessel, and if still in the same condition must be rejected.

Bleeding poles must not be dispatched and poles that subsequently bleed before erection shall, by arrangement, be returned for re-treatment. See Table 3.4.4 below

The re-treatment of bleeding poles shall be carried out on a charge comprising of bleeding poles only.

3.4.4 **Western Power Distribution evaluation test for bleeding poles.**

This test shall be carried out by placing a hand covered in a light coloured cotton glove or cloth on the pole and the results assessed against Table 'Bleeding Pole Classification' below.

A vinyl or latex glove should be worn on the hand to protect the tester from any creosote soaking through the cotton glove/cloth.

Residue shall mean creosote which has soaked into the fibres of the cotton glove/cloth.

Slight surface discolouration of the glove/cloth shall not count as residue.

Table 3.4.4 - Bleeding Pole Classification			
Category Number	**Result of Test**	**Comments**	**Action**
A	Dry, no residue on glove/cloth	Any part of the pole	Accept
B	Dry, no residue on glove/cloth	Any part of the pole except the knots. Wet areas of creosote around knots are acceptable.	Accept
C	Dry, no residue on glove/cloths	Any part of the pole Up to 40% of pole surface may be covered in dried solidified creosote residue (tar).	Accept
D	Dry, no residue on glove/cloths	Any part of the pole Over 40% of pole surface is covered in dried solidified creosote residue (tar).	Reject
E	Wet, residue soaked into glove/cloth	Any part of the pole except the knots. Definite thin film of creosote and possibly in patches or strips	Reject
F	Wet, residue soaked into glove/cloth	Any part of the pole except the knots. Whole pole has a thin layer of creosote over the entire surface area	Reject
G	Wet, residue soaked into glove/cloth	Any part of the pole except the knots. Thick wet tar in strips or patches.	Reject

3.4.5 **Pollution Prevention Measures**

After treatment all poles shall be stacked and stored so as remove the risk of creosote migrating into the surrounding area; this should be generally in accordance with ST: EN2F. At time of tender the supplier should indicate how they will achieve this at their storage facilities.

3.5 PRESERVATIVE TREATMENT (WATER SOLUBLE PRESERVATIVES)

3.5.1 General

Poles fabricated in line with Fig 72206, shall be preserved using water soluble preservatives which are permitted for use in the UK and which have been approved for use by WPD.

Unless agreed with WPD only Pinus Sylvestris shall be treated, using the high pressure process specified in BS 8417 clause 4.3.3.

So as to mitigate some of the risks of the premature onset of ground level decay, when instructed by WPD, poles shall be fabricated with an additional means of protection applied to the butt end of the pole; which as a minimum shall be continuous from 100mm above ground to 600mm below ground level as indicated in Fig 72206.

This additional protection shall be approved by WPD and where appropriate be applied such that it is sealed against the air and water, and is robust and resilient to damage during transportation, handling and installation.

3.5.2 Water Soluble Preservative Loading and Tests

The treatment cycle shall be such as to give complete penetration of the sapwood to penetration class NP5.

The minimum retention shall be appropriate to a 30 year desired service life specified in Table 9 of BS 8417. Suppliers should at time of tender provide evidence that their treatment process will provide this.

3.6 RE-TREATMENT

3.6.1 Un-fabricated Black Stock

Un-fabricated Black Stock for special applications and strategic spares (e.g. 18, 20, 22, 24m poles) shall be drilled for the application required.

Provided all drilled holes are fitted with bolts then no further treatment is required.

Pole tops shall not be shortened unless the pole is sent for re-treatment.

3.7 QUALITY REQUIREMENTS

3.7.1 General

The pole supplier shall have in operation a quality management system and documentation shown in Section 14 of ENATS43-88 and at the time of tender

provide details of their quality management system so as to ensure that each phase of pole fabrication is monitored.
Western Power Distribution reserves the right to visit the Suppliers works at random to carry out witness testing or to verify quality procedures are maintained at all stages.

3.7.2 **Specific**

Quality inspectors shall be provided with Western Power Distribution quality requirements, defect acceptance criteria, fabrication details which shall be visible at each inspection location.

The information shall be provided in the inspector's native language and shall include diagrams as appropriate.

3.7.3 Where WPD requires a supplier to hold emergency stocks these shall be rotated, as a minimum, every 2 years.

APPENDIX A1 - Standard Pole Sizes

Medium Grade Single Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
60847	8	1	145	210
60848	8.5	1	150	215
60849	9	1	150	220
60850	9.5	1	150	225
60851	10	1	150	230
60852	10.5	1	150	235
60853	11	1	150	240
60854	11.5	1	150	245
60855	12	1	150	250
60856	13	1	160	260
60857	14	1	160	275

Medium Stout Grade Single Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
60151	10	1	170	260
60152	11	1	175	270
60153	12	1	180	285
60154	13	1	185	295

Stout Grade Single Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
30070	8.5	1	190	265
30071	9	1	190	275
30072	9.5	1	190	280
30073	10	1	190	285
30074	10.5	1	190	290
30075	11	1	190	295
30076	11.5	1	190	300
30077	12	1	190	305
30079	13	1	195	320
30081	14	1	195	335
30083	15	1	195	350
30085	16	1	200	365
43580	17	1	200	375

Extra Stout Grade Single Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
50077	9	1	190	300
50078	9.5	1	190	305
50079	10	1	210	310
50080	10.5	1	210	315
50081	11	1	215	320
50082	11.5	1	215	330
50083	12	1	215	335
50084	13	1	215	350
50085	14	1	220	365
50086	15	1	220	375

Medium Grade Matched 'H' Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.***	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
42640	8.5	2	175	215
42641	9	2	175	220
42642	9.5	2	175	225
42643	10	2	175	230
42644	10.5	2	175	235
42645	11	2	175	240
42646	11.5	2	175	245
42647	12	2	175	250
42648	13	2	175	260
42649	14	2	175	275

* Minimum medium pole top dia. taken from the requirements of ENATS 43-40

Stout Grade Matched 'H' Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
42650	8.5	2	230	265
42651	9	2	230	275
42652	9.5	2	230	280
42653	10	2	230	285
42654	10.5	2	230	290
42655	11	2	230	295
42656	11.5	2	230	300
42657	12	2	230	305
42658	13	2	230	320
42659	14	2	230	335
42660	15	2	230	350
42661	16	2	230	365
60258	17	2	230	375
60259	18	2	230	390

* Minimum stout pole top dia. taken from the requirements of ENATS 43-40

Extra Stout Grade Matched 'H' Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
60260	16	2	230	390

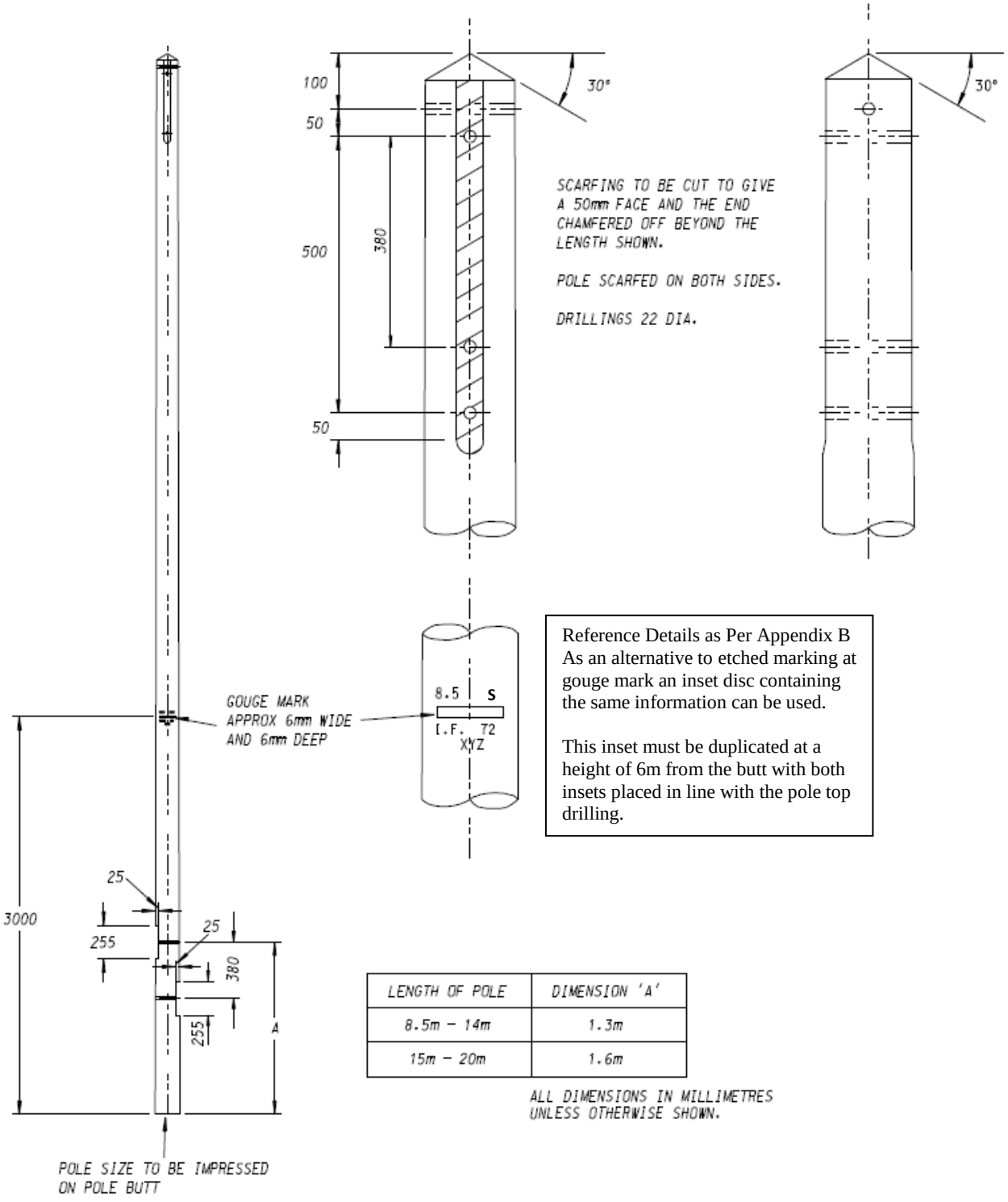
Medium Grade Single Creosoted Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
39027	8	14	145	210
30060	8.5	14	150	215
30061	9	14	150	220
30062	9.5	14	150	225
30063	10	14	150	230
30064	10.5	14	150	235
30065	11	14	150	240
30066	11.5	14	150	245
30067	12	14	150	250
30068	13	14	160	260
30069	14	14	160	275

Medium Grade Single Water Soluble Preserved Poles				
Item code	**Length**	**Fig No.**	**Minimum Top Diam.**	**Minimum Dia. 1.5m from**
	(m)		**(mm)**	**Butt (mm)**
37125	8	72206	145	210
37130	8.5	72206	150	215
37424	9	72206	150	220
37132	9.5	72206	150	225
37133	10	72206	150	230
37109	10.5	72206	150	235
37426	11	72206	150	240

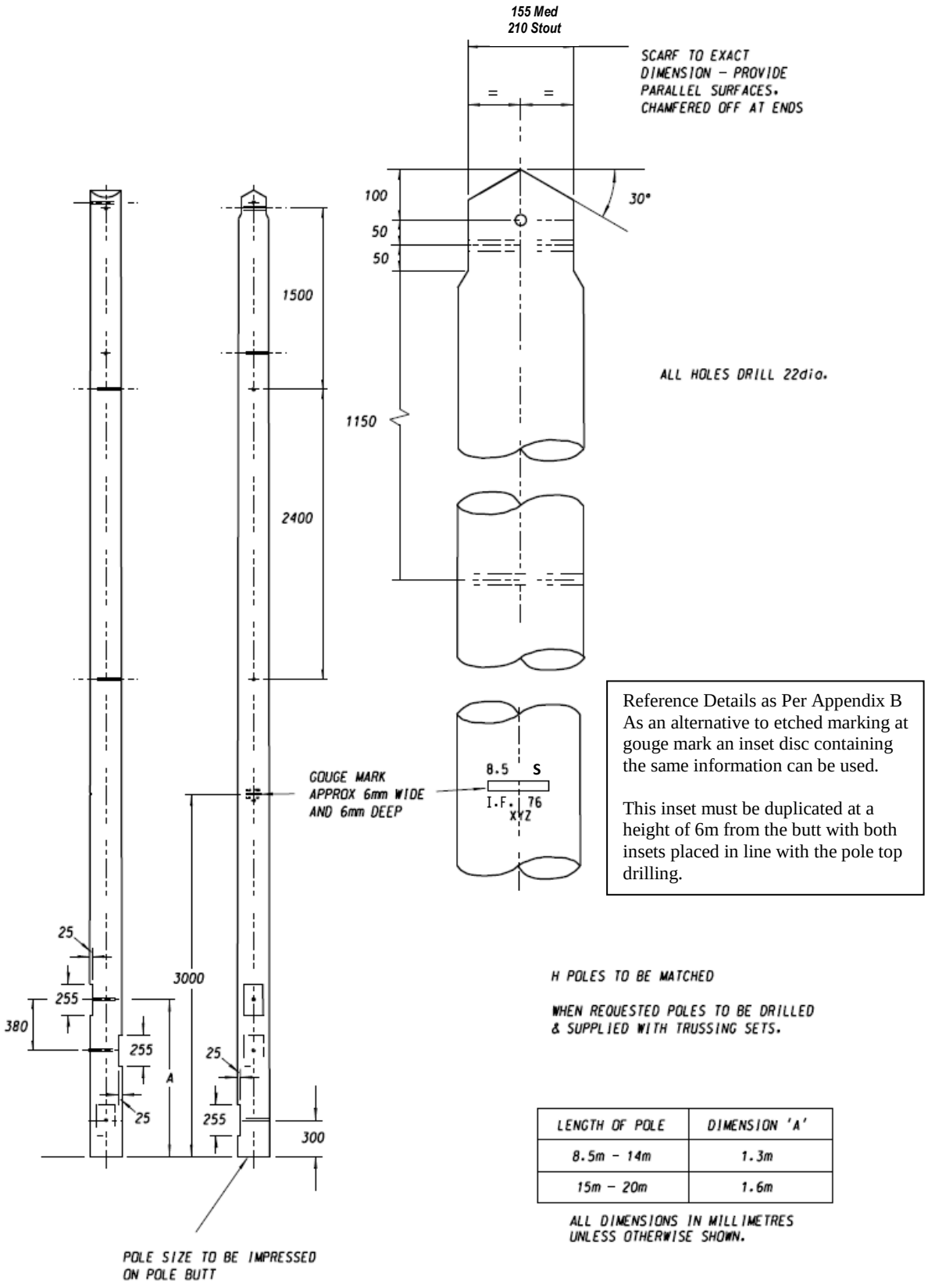
APPENDIX A2 - Blocks, Plugs, Boards, Posts and Rails

Blocks, Plugs, Boards, Posts & Rails					
Item code	**Descriptor**	**Fig / Drawing No.**	**Length mm**	**Width mm**	**Depth mm**
30092	Type 1 Stay Block	439103	850	250	125
30091	Type 2 Stay Block	439103	1300	250	125
NS	Type 3 Foundation Block	439103	1500	250	125
NS	Type 4 Foundation Block	439103	2500	250	125
30093	Type 1 'H' Pole Brace Block	439112	2600	250	125
30094	Type 1 'H' Pole Brace Block	439112	3000	300	150
36508	33kV Cable Backboard & Lid 'H' Pole Arrangement	438920	As Per Drawing		
50105	Wood Pole Plug 12mm (Mattson Borer size 3)	Appendix A5 – Item 1	50	12	
50106	Wood Pole Plug 22mm	Appendix A5 – Item 3	75	24	
52297	Wood Post	E115	2100	150	75
52298	Plain Wood Rails	E115	2500	87	38
52299	Pointed Wood Post	E115	1800	87	38

APPENDIX A3 - General Arrangement Pole Drawings



OH4T Fig 1 - Single Pole Drillings, Scarfing & Marking



LENGTH OF POLE	DIMENSION 'A'
8.5m – 14m	1.3m
15m – 20m	1.6m

OH4T Fig 2 - H Pole Drilling, scarfing & Marking

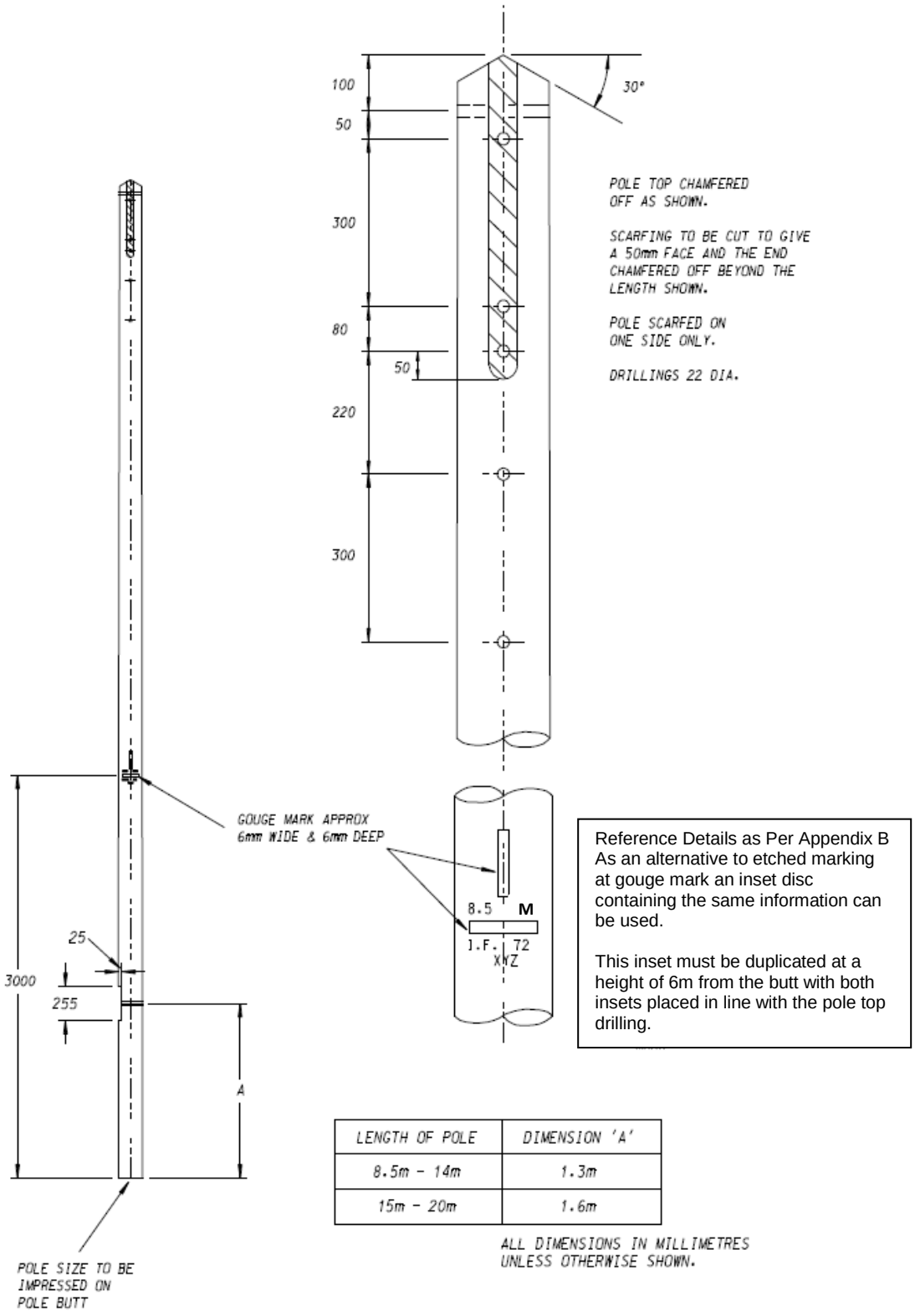


Fig 14 - Single Pole Drillings and Markings
(For LV Open Wire Lines to ESI 43-30, LV ABC to 43-12 & 11kV Light Construction)

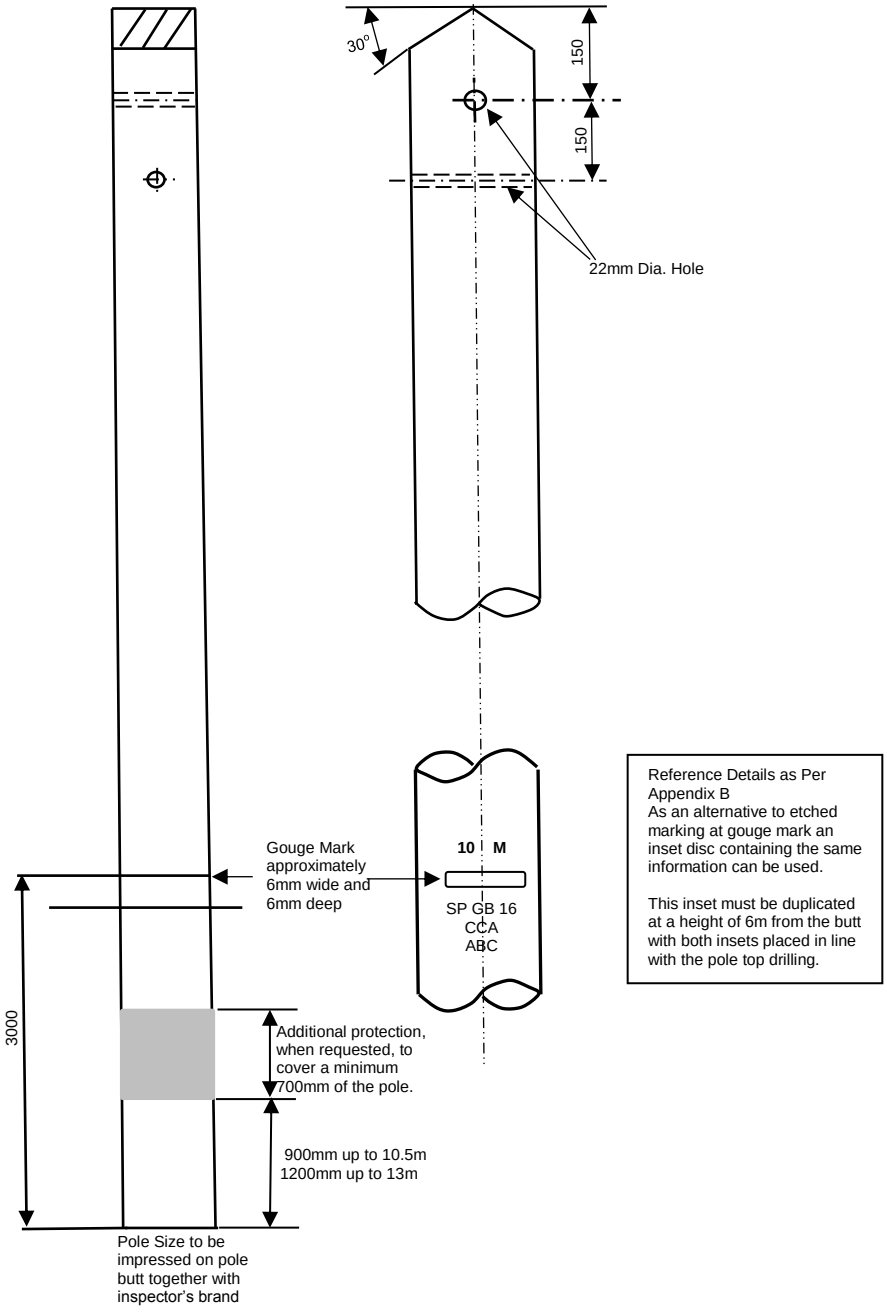
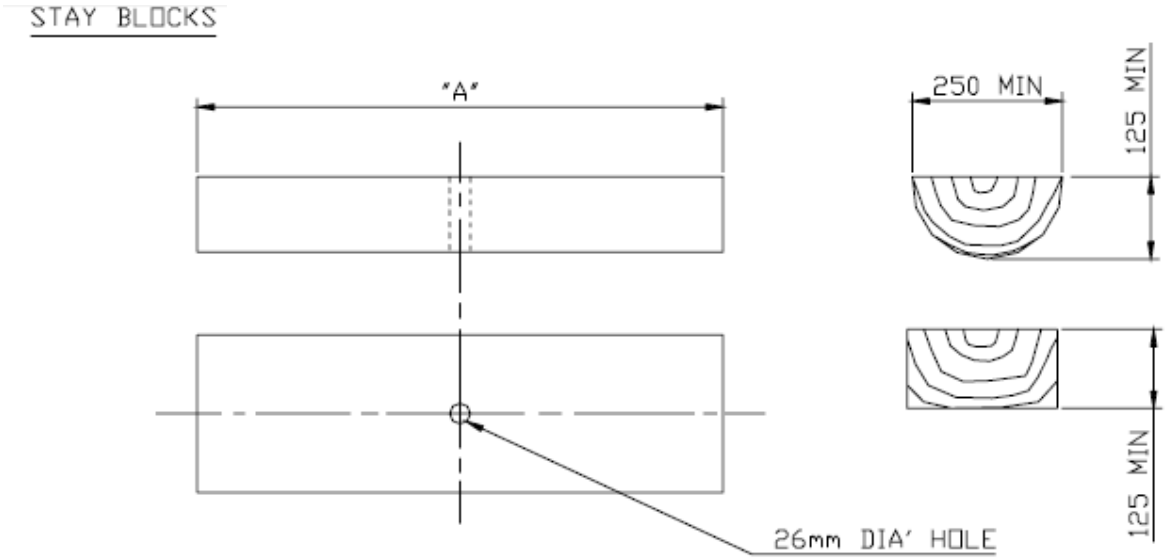
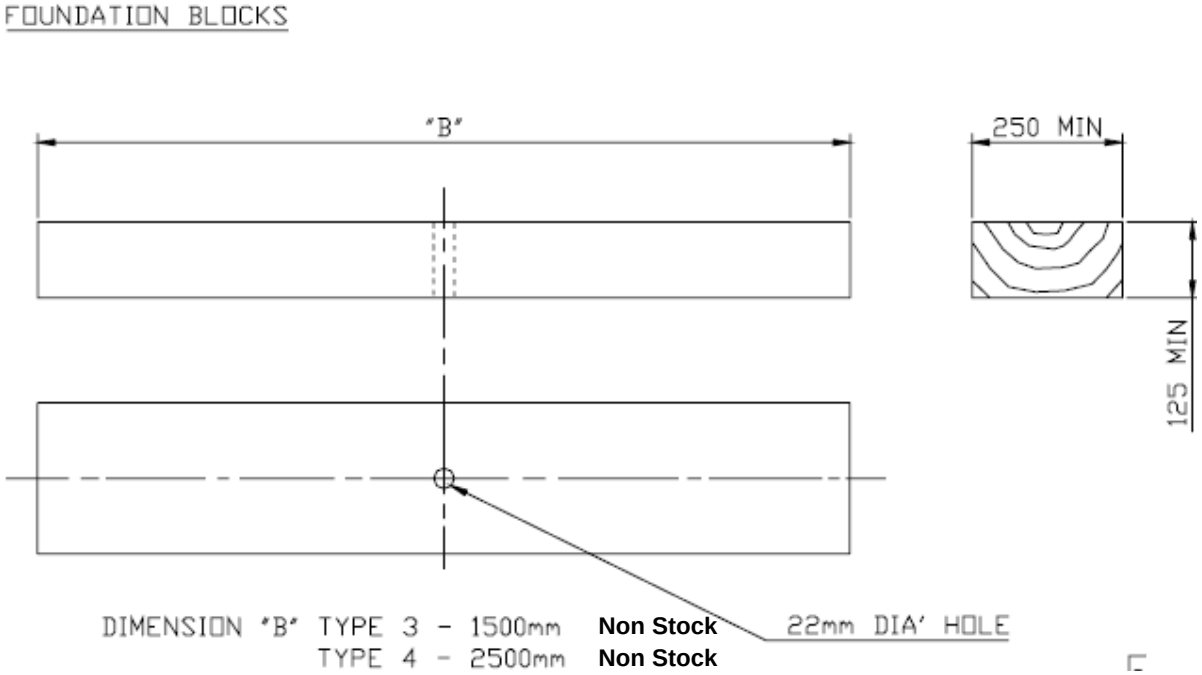


Fig 72206 –LV ABC Pole (Copper Treated)
(Based on ENATS 431201)

APPENDIX A4 - Blocks, Plugs, Boards, Posts and Rails

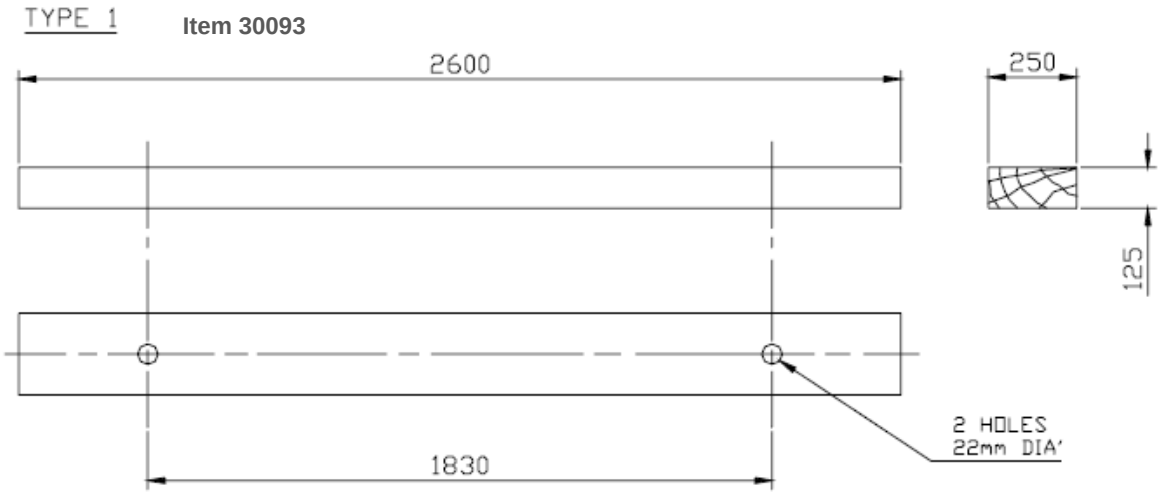


DIMENSION "A" TYPE 1 - 850mm **Item 30092**
TYPE 2 - 1300mm **Item 30091**



DIMENSION "B" TYPE 3 - 1500mm **Non Stock**
TYPE 4 - 2500mm **Non Stock**

Fig. 439103 - Wood Stay and Foundation Blocks



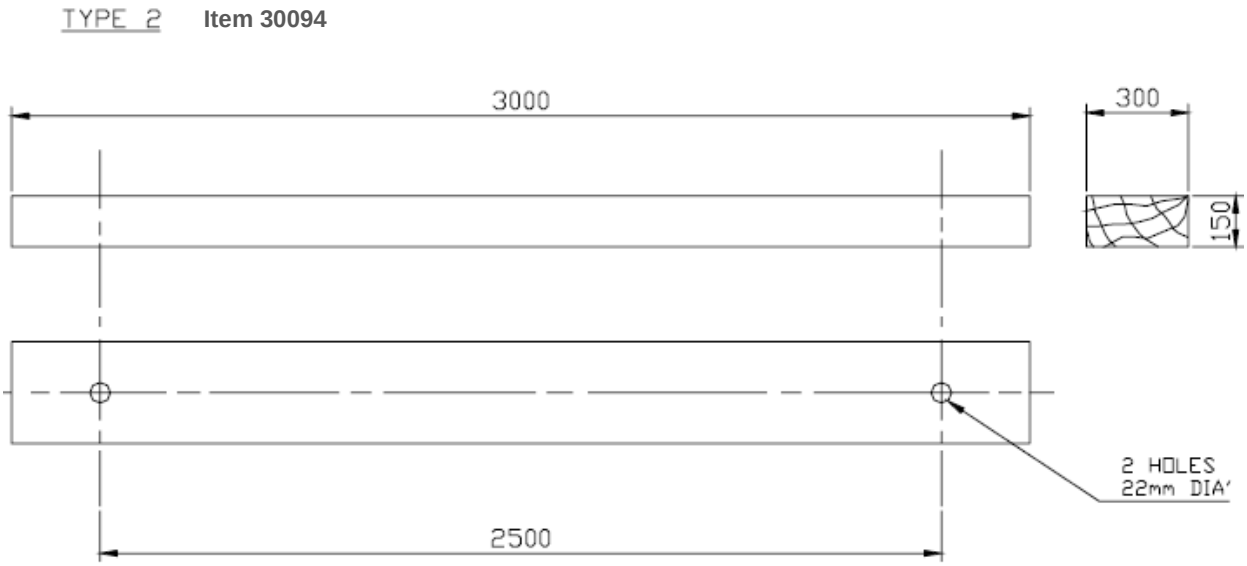
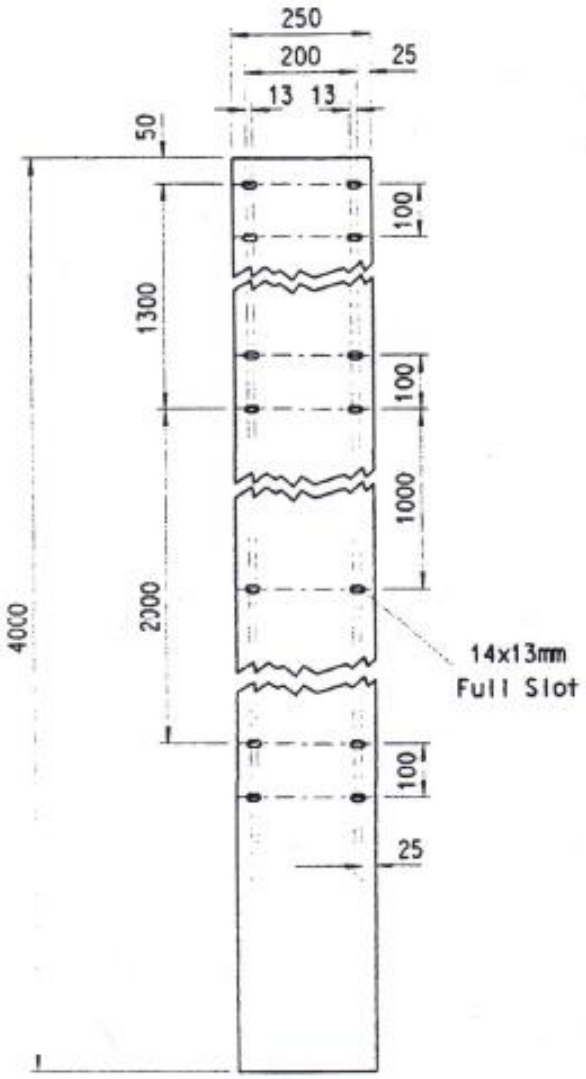
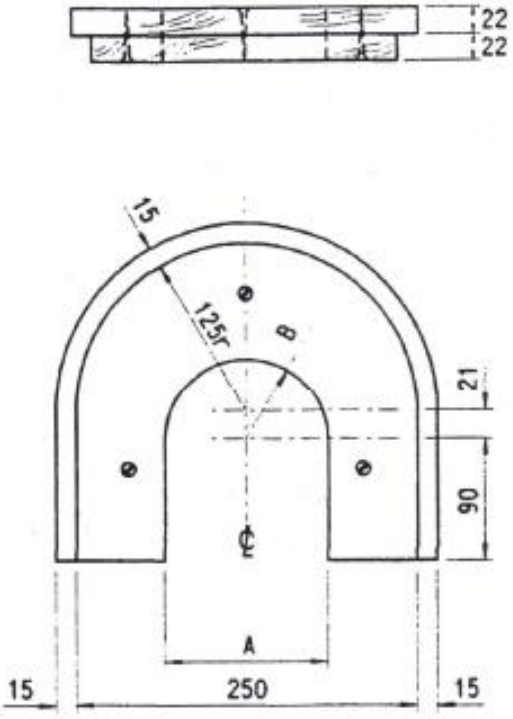


Fig. 439112 – Wood Brace Blocks for 'H' Poles



Item 1 - Backboard
250 x 50 Deal Board



Item 2 - Lid
Two pieces to be glued
and screwed together.

3x185sq.mm s/c	A=120 B=60
3x400sq.mm s/c	A=130 B=65

Notes

1. All dimensions in millimetres.
2. To be manufactured from Deal. timber to be straight grained and free from large shakes and knots.
3. To be creosoted to BS 913 after manufacture.

Fig 438920 - 33kV Cable Backboard & Lid 'H' Pole Arrangement
Item 36508

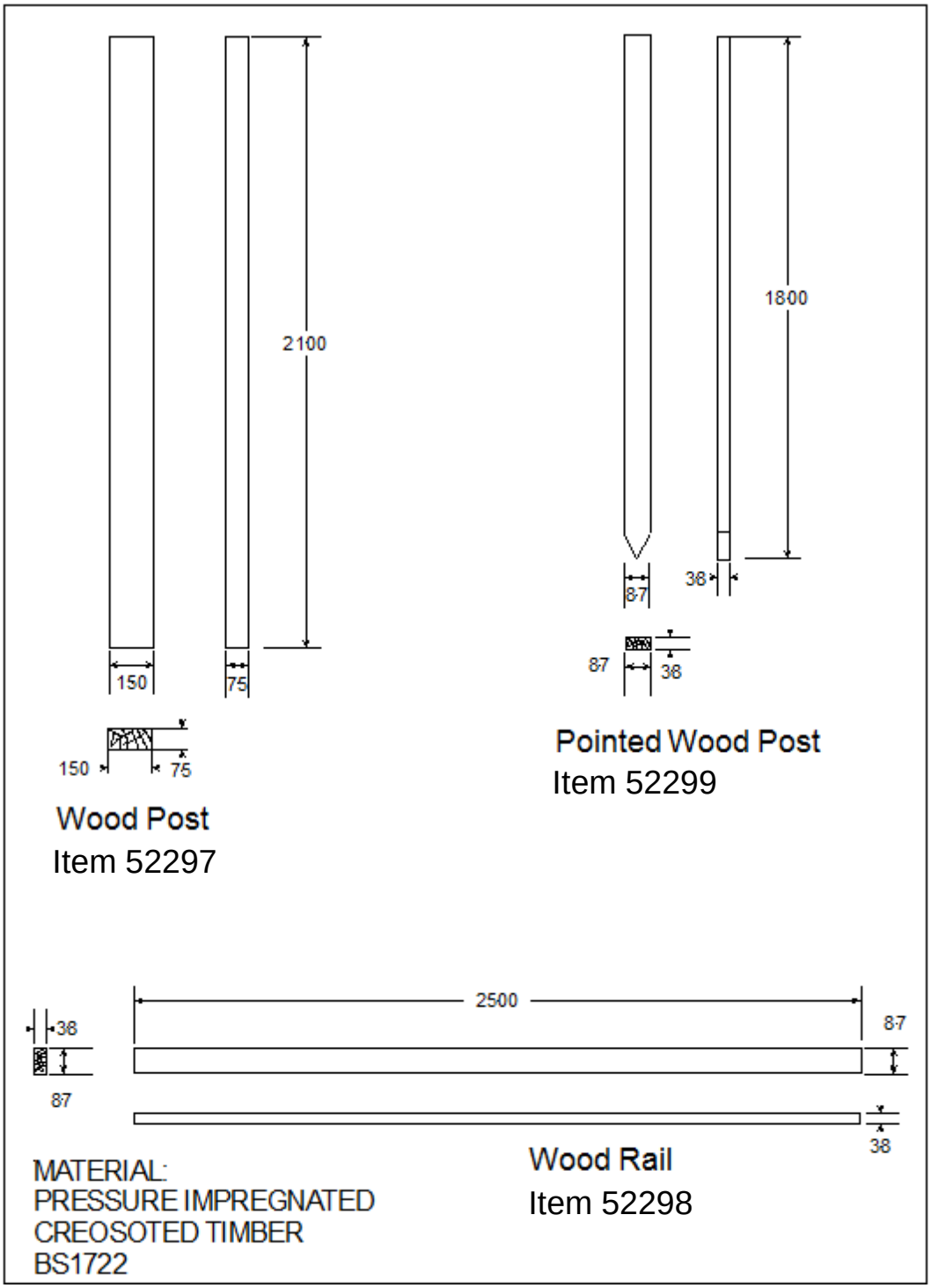
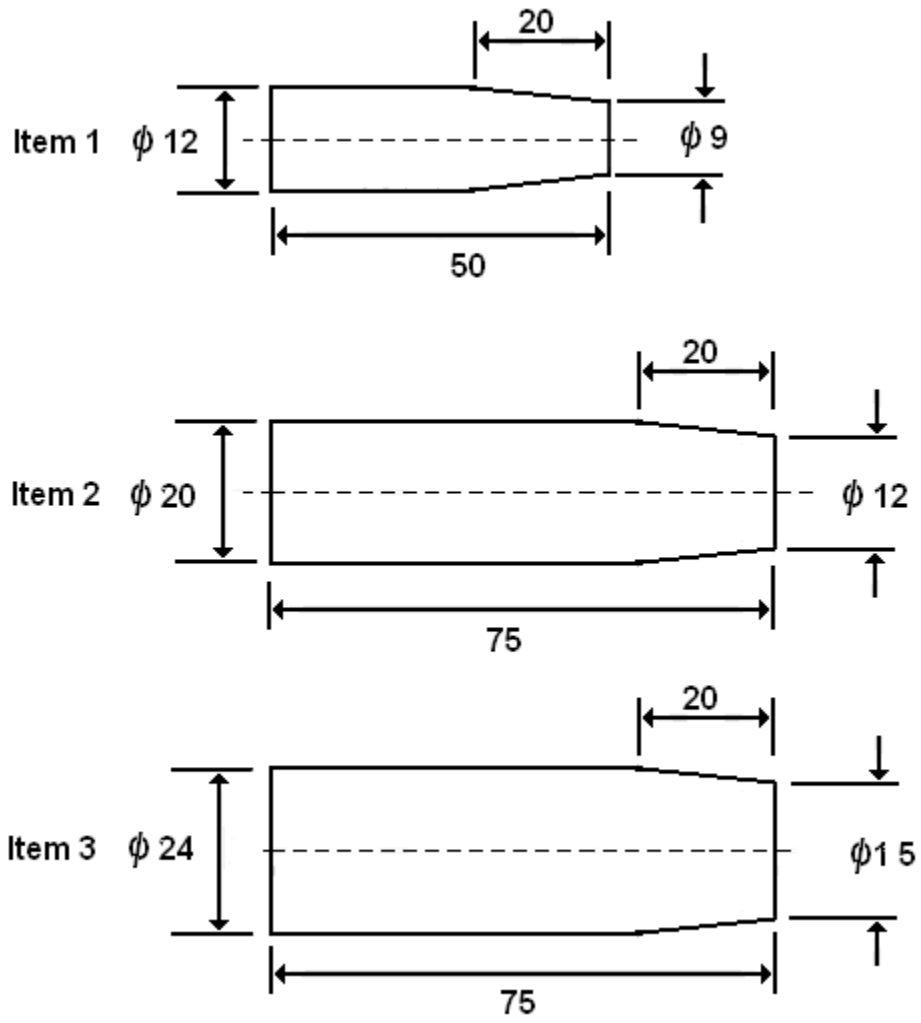


Fig E115 - Post & Rail Fencing

APPENDIX A5 - Wood Pole Plugs



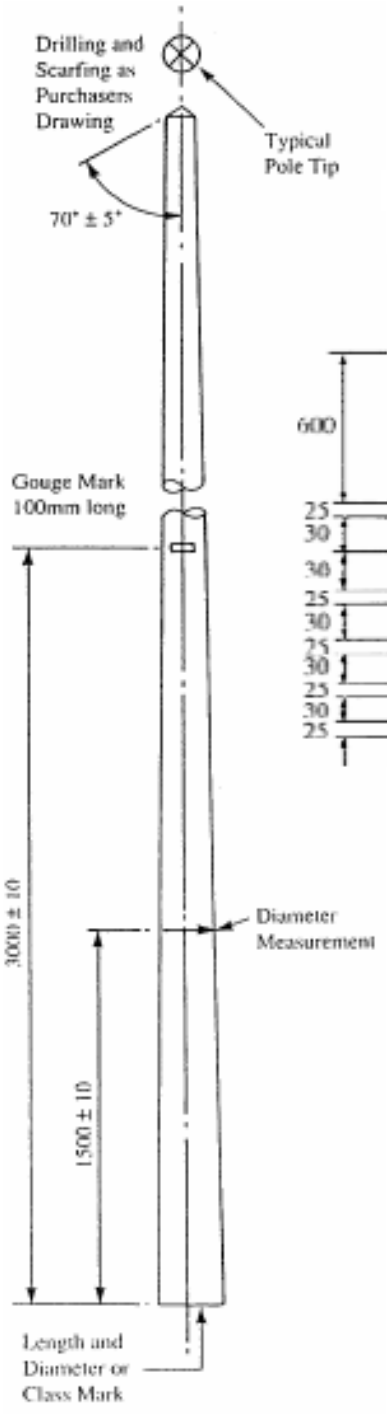
APPLICATION

Item 1 E5 Code 50105 for plugging holes made with the Mattson size No. 3 increment borer
Item 2 for plugging unused LV pole holes (18mm dia)
Item 3 E5 Code 50106 for plugging unused HV pole holes (22mm dia)

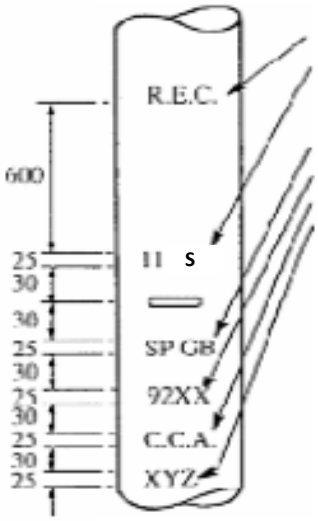
MATERIAL:

Hardwood (e.g. Beech / Ramin) straight grained and free from knots, pressure creosoted as BS 144: Part 2 or metal oxide treated as BS 4072.

APPENDIX B1 - Marking by Routing, Gouging, Branding



Typical layout



MARKING GENERALLY AS BS EN 12510

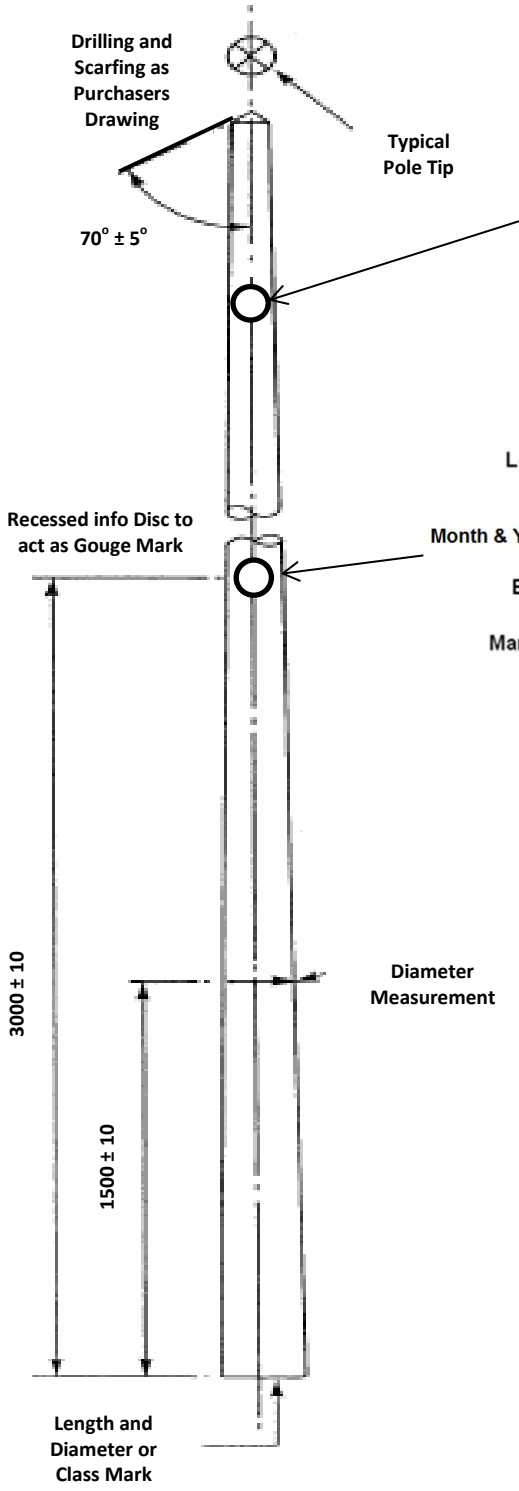
1. Ownership mark – i.e. WPD
2. Length and class of pole - e.g. 10.5S (10.5 metre stout), 10.5MS (10.5 metre medium stout)
3. Species and origin – i.e. (PS) Pinus Sylvestris, (SE) Sweden, (NO) Norway, (FI) Finland
4. Month and year of preservation – e.g. 11-2015
5. Preservative – Type
6. Initials of supplier and fabrication plant
7. Each pole to be passed by an inspector and stamped accordingly.
8. Overall Length and class of pole to be marked on the butt
9. CE mark

SPECIES CODE		COUNTRY OF ORIGIN	
Corsican Pine	PN	United Kingdom	GB
Douglas Fir	PM	Canada	CA
Lodgepole Pine	PC	Finland	FI
Larch, Dunkeld Larch, European Larch, Japanese	LE	Norway	NO
		Sweden	SE
		South Africa	SA
Norway Spruce	PA	United States of America	US
Redwood or Scots Pine	PS		
Sitka Spruce	PSI		
Western Red Cedar	TP		

All dimensions in millimetres

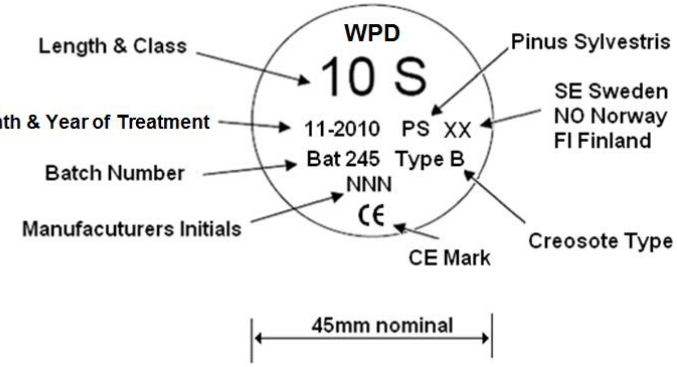
APPENDIX B2 - Marking of Information in Inset Stainless Steel Disc

The information disc shall be placed 3m from the butt so as to act as the gouge mark.



A second identical disc shall be also fixed 6m from the pole butt in line with the crossarm bolt hole. This is to provide a secondary method of identification in the event of theft of, or damage to the disc at the 3m mark.

Information Disc



Note: The CE mark may be provided via a second inset disc.

APPENDIX C

SUPERSEDED DOCUMENTATION

This document supersedes EE SPEC:129 dated July 2015 which must be withdrawn.

APPENDIX D

KEY WORDS

None