

Serving the Midlands, South West and Wales

Company Directive

ENGINEERING SPECIFICATION EE SPEC : 20/4

Relating to Substation Security Fences

Policy Summary

This Specification sets out installation requirements and specifications for substation security fencing and gates.

Author:

Philip Hooper

Implementation Date:

March 2017

Approved by

Policy Manager

17 march 2017

Date:

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IMPLEMENTATION PLAN

Introduction

This Standard Technique sets out the specification and installation requirements to be used for substation security fences.

Main Changes

Section 11 has been added in order to set out the general requirements for the installation of an electrified fence system.

Impact of Changes

This formalises the general design criteria for an electrified fence system and incorporates the addition of the of 358 security fence to prevent members of the public inadvertently touching the electrified wires.

Implementation Actions

Team Managers shall advise members of their staff who are involved in the specification of substation security fences that this specification has been issued.

Implementation Timetable

This document shall be implemented with immediate effect.

REVISION HISTORY

Document Rev	vision & Review Table	
Date	Comments	Author
March 2017	Section 11 has been added in order to set out the general requirements for the installation of an electrified fence system	Philip Hooper

1.0 INTRODUCTION

- 1.1 This Standard Technique sets out the specification and installation requirements to be used for substation security fences.
- 1.2 The design of security fencing shall consist of a palisade fence conforming to British Standard 1722 Part 12 2006 Specification for steel palisade fences, enhanced to WPD requirements. Where an alternative design is required for an 11kV distribution substation it shall conform to the criteria as described in Appendix B of this document.
- 1.3 The security fence shall be not less than 2.4 metres high to conform with the requirements under The Electricity Safety Quality and Continuity, Regulation 11 part (b) which states that the supplier shall enclose any part of a substation in the open air, containing live apparatus which is not encased, by a fence not less than 2.4 metres in height to prevent, so far as is reasonably practicable, danger or unauthorised access.
- 1.4 The specification set out below is based on the British Standard 1722 Part 12 2006 showing the options required, WPD additional requirements and WPD standard drawing numbers as applicable. The paragraph numbering and table references shown in brackets match those in BS 1722 Part 12 2006.

2.0 GENERAL (Section 1 BS 1722 Part 12 2006)

2.1 Scope

Steel palisade fences and gates for security purposes in corrugated pales at 2.4m height, with posts at 2.75m centres.

3.0 DIMENSIONS (Section 3 BS 1722 Part 12 2006)

3.1 The minimum dimensions of components for a Security palisade fence given in tables 1,2,3,4,5,6 and 7 of BS 1722 Part 12 2006.

3.2 Spacing and Face to View

The maximum spacing of pales centre to centre shall be:

• 146mm (18 pales per 2.75m bay) for corrugated pales

The minimum face to view (width) shall be:

• 70mm for corrugated pales for security fences

3.3 Thickness

Pale thickness for security fences shall be:

- Corrugated D 3.9mm minimum nominal thickness exclusive of finish as given in table 6 of BS 1722 Part 12 2006
- Corrugated W section 3.0mm minimum nominal thickness exclusive of finish as given in table 6 of BS 1722 Part 12 2006

Corrugated W section pales shall be used as the standard pales unless otherwise specified.

3.4 Strength

Tests to be in accordance with Appendix A of BS 1722 Part 12 2006.

For security palisade fencing the maximum deflection at the middle of the span under a test load of 3.5kN shall not exceed 10mm.

4.0 MATERIALS (Section 4 BS 1722 Part 12 2006)

4.1 Steel

As detailed in paragraph 4.1 of the British Standard, or the equivalent in a European Standard.

4.2 Bolts, Nuts and Washers

As detailed in paragraph 4.2 of BS 1722 Part 12 2006

- a) Post to Rail fixing : M12 Cup Square headed Bolts to BS 4933 strength Grade 8.8 and Shear headed cone nuts.
- b) Pale to Rail fixing :-Corrugated pales require a M8 saddle headed bolt, W section pales a M8 "T" headed bolt to strength Grade 8.8 both to be used with Shear headed cone nuts.

There is NO British Standard for Shear headed Cone Nuts. Cone nuts to be steel strength grade 8 as detailed in BS 4190 and threaded in accordance with BS 3643.

4.3 Cold Swaged Pin and Collar Fixings

Not applicable for security fences.

5.0 CONSTRUCTION (Section 5 BS 1722 Part 12 2006)

5.1 Pales

Pales shall be secured to the rails at every intersection by galvanised M8 mild steel "T" headed bolts to BS 4933 strength grade 8.8 and permacone nuts strength grade 8. Pale tops shall be triple pointed and splayed.

5.2 Fence Posts

Posts shall be hot rolled to the minimum sections shown in table 1 and 2 of BS 1722 Part 12 2006 and they shall be provided at 2.75m centres. Posts shall fabricated with pointed tops and be embedded in concrete foundations to minimum depths given in table 1 and 2 of BS 1722 Part 12 2006.

Posts shall receive the following works treatment, hot dip galvanising in accordance with BS EN ISO 1461.

5.3 Stays

Not normally required.

5.4 Rails

Fences shall have three horizontal rails of the section given in table 1 and 2 of BS 1722 Part 12 2006 fitted as shown in SFGA 20 (Appendix A). They shall be fixed to the posts using cone nuts as specified in Section 4.2.

The oversail from the centre of the upper rail fixing to the top of the pales and the oversail from the centre of the lower rail fixing to the bottom of the pales shall be as given in table 1 and 2 of BS 1722 Part 12 2006.

5.5 Post to Rail Connection

Rails shall be secured to posts with connector plates. Connector plates shall be connected to the post by Welding.

Plates shall be a minimum of 40mm depth and 8mm thick and of sufficient length to give a minimum distance of 9mm to the edge of the hole. Post to Rail fixings cone nuts as specified in Section 4.2.

5.6 Intermediate Supports

Intermediate supports as specified in BS table 2 shall be provided to the lower structural rail. Each support shall be 40mm x 40mm x 5mm angle bolted to the rail by "T" bolts and cone nuts as specified in Section 4.2, 2 supports are required per 2.75m bay.

5.7 **Protective Treatment**

After the fabrication of gates and fencing components, including the punching or drilling of any holes and all welding, the fencing and gates shall receive the following works treatment.

Hot dip galvanising in accordance with BS EN ISO 1461.

5.8 **Renovation of Coatings**

Small areas of hot dip galvanised coating damaged by welding, cutting or by excessively rough treatment during transit and erection shall be renovated by the use of low melting point zinc alloy repair rods or powders made specifically for the purpose, or other means in accordance with BS 5493 such as zinc rich paint. Sufficient material shall be applied to provide a zinc coating at least equal in thickness to the original layer.

- 5.9 The general arrangement and construction of the palisade fence will be as detailed on WPD drawing numbers as listed in Appendix A
- 5.10 Palisade fence bays of width less than 2.75 metres care must be taken to ensure that the pale to pale and pale to post clear space is 76mm max. Where rails are to be re-drilled or cut they must receive renovation of the coating as detailed in 5.8 above.
- 5.11 Rail fixing where it is impossible to use cone nuts to fix to the connector plates, bolts as detailed in table 2 of BS 1722 Part 12 2006 and complying with Section 4.2 may be used.
- 5.12 Nut and bolt fixings where used threads are to be burred over after the nut has been tightened, the finish must receive a renovation to the coating as detailed in 5.8 above.
- 5.13 If removable panels are required for future plant removal a cone nut fixing as detailed in Section 4.2 only must be used. For details of a removable post see WPD drawing number SF70.
- 5.14 All signs/notices shall be positioned at the top rail with the top fixing strap above the rail, this will stop the sign from being slid down the pales and providing a foothold.

6.0 FOUNDATIONS AND SILLS (Section 8 BS 1722 Part 12 2006)

6.1 General

As detailed in BS 1722 Part 12 2006.

6.2 Holes for Fence Post Foundations

As detailed in BS 1722 Part 12 2006.

6.3 Concrete Sills

As detailed in BS 1722 Part 12 1990, but 200mm wide. A concrete sill is required on all WPD installations, the sides are to be shuttered and the top weathered.

6.4 Concrete for Post Foundations and Sills

As detailed in BS 1722 Part 12 2006.

7.0 ADDITIONAL SECURITY (Section 8 BS 1722 Part 12 2006)

7.1 Burrowing

Provide a concrete sill in accordance with BS Section 8.1.3.

7.2 Pale Removal

Not required.

8.0 CONSTRUCTION OF GATES (Section 7 BS 1722 Part 12 2006)

8.1 General

The general arrangement and construction of the gates will be as detailed on WPD drawing number SFGA 22 and SFGA 24 (Appendix A). The distance from the bottom edge of the gates pales to the surface of the road shall not exceed 50mm when the gate is in the closed position.

8.2 Where pales are not welded they shall be attached, by the same method as the fence pales, to a 40mm x 6mm flat (set 40mm to view) stitch welded to the gate frame by 50mm welds at pale centers on alternate sides.

If pales are not welded, vertical members of the same section as the frame shall be welded and located behind the pales at intervals not greater than 2m and not more than 1m from the hinge end of the frame.

8.3 Hinges

Hinges shall be arranged in accordance with BS 1722 Part 12 (7.2) to prevent gates being lifted off.

The construction of the hinges will be as detailed on WPD drawing number SF 71A and SF 71B (Appendix A).

8.4 Drop Bolts and Slam Plates

The construction of the drop bolts and slam plates will be as detailed on WPD drawing numbers listed below (see Appendix A) :-

SF 65A Drop bolt and slam plate arrangement on inward opening palisade double gates.

SF 65B Drop bolt and slam plate arrangement on outward opening palisade double gates.

The gate locking bolt shall be sufficiently long to prevent gates being "sprung" open by pulling/pushing. Gate drop bolts shall be arranged so that they cannot be lifted without the other gate of the pair being opened.

8.5 Locking Devices

The construction of the locking devices will be as detailed on WPD drawing numbers listed below:-

SF 63A Locking arrangement on palisade type gates.

The door flap on the WPD locking box is to be fitted into the gate complete with non WPD standard 1 x 1 rim cylinder and Union rim cylinder deadlock type 1148 back box. Since flaps are tailor made to fit a specific gate and because the flaps are removable, they shall be marked to show to which gate they are to be fitted. The complete operation of the door flap assembly in the gate is to be fully tested prior to despatch to site.

8.6 Gate Posts

Posts shall be RSJ or universal column sections of the dimensions given in table 4 of BS 1722 Part 12 2006.

Posts shall receive the following works treatment, hot dip galvanising in accordance with BS EN ISO 1461.

9.0 INSTALATION (Section 8 BS 1722 Part 12 2006)

9.1 Line and Level

As detailed in BS 1722 Part 12 2006.

9.2 Posts

As detailed in BS 1722 Part 12 2006.

9.3 Intermediate Supports

As detailed in BS 1722 Part 12 2006.

9.4 Bolts and Fastenings

As detailed in BS 1722 Part 12 2006.

9.5 Erection of Palisade Fences

As detailed in BS 1722 Part 12 2006.

10.0 FENCE AND WALL SECURITY ENHANCEMENT

- 10.1 All external features outside WPD's control which could effect the statutory height requirement or afford access to the site eg. banks, gates, fences, walls, trees, storage of material etc must be given full consideration.
- 10.2 Approved methods of enhancing palisade fence and wall security include;
 - (a) Increase of fence height
 - (b) Provision of increased height fence/transition or wing panels
 - (c) Provision of anti-climbing guards
 - (d) Provision of galvanised or stainless steel barbed wire or tape, or a durable rotating vane arrangement at NOT LESS than 2.4 metres height above ground level or a position where a person might reasonably be expected to stand.
 - Note:- The approved type of rotating vane galvanised steel anti-climbing device is the EXPAMET system, namely Expamet anti-vandal scaling barrier.
 - (e) In areas of high vandalism, galvanised 358 mesh panels can be added to the fence as shown in SFGA 23 (Appendix A) to enhance security.

10.3 Specification for Wing Panels

Wing fences are to be used at the junction of the palisade with all abutting fences to maintain the required statutory 2.4m fence height in order to prevent unauthorised access. The wing fence gives full height protection and does not afford a high level walkway.

All wing fences must be the same height as the security fence (min 2.4m) and of minimum length of 2 metres, fitted with insulated fixings at both top and bottom arris rail (4 in total), all as shown on WPD Drawing No SFGA21 and as detailed in ST:TP21K Clause 3.4.

A low height boundary fence could also be overcome by the use of increased height fence/transition panels, provided 2.4m clearance can be obtained all as specified in 10.4.

Construction of wing panel will be as detailed in WPD Drawing No SFGA21 and as specified below:-

All materials used shall comply in all aspects with the requirements of BS 1722 Part 12 2006 for security palisade.

Rails - two horizontal rails shall be steel flat bar 65mm x 10mm, fixed to the posts using cone nuts as specified in Section 4.2.

Pales - shall be fixed on alternative sides of the flat bar, with galvanised M8 mild steel "T" headed bolts and permacone nuts as 5.1. Pale spacing on each side of the bar to be at 150mm centres.

Intermediate supports - None required.

Bay height - 2.4m.

Bay width - 2.75m.

Wing panels to be attached to corner posts using 75 mm x 50 mm x 6 mm angle cleats 65 mm long.

10.4 Increased Height Fence/Transition Panel

The fence height can be increased at the junction of the palisade with a low height boundary fence or any other third party structure to maintain the required statutory 2.4m fence height in order to prevent unauthorised access.

A full bay transition panel to be provided between the 2.4m and the increased height fence section.

Construction of transition panels:-

All materials used shall comply in all aspects with the requirements of BS 1722 Part 12 2006 for security palisade.

Rails - as specified in Section 5.4, but with top rail raked to maintain the top oversail to pales distance and comply with the higher fence requirements.

Pales - as specified in Section 3.3 and 3.4 and secured to the rails as specified in Section 5.1. Pale heights to increase proportionately from lower to higher height across bay width.

Posts - all as detailed in Section 5.2.

Intermediate supports - as specified in Section 5.6.

Bay height - 2.4m to required height.

Bay width - 2.75m.

10.5 Fence Height

For fences of heights over 2.4m the materials and construction must comply in all aspects with BS 1722 Part 12 2006 for security palisade.

For non standard fence heights ie 2.7 and 3.3m component sizes for the nearest higher fence in table 2 of BS 1722 Part 12 2006 are to be used.

The principles and details applied in WPD Drawing Numbers SFGA 20, SFGA 22 and SFGA 24 for 2.4m palisade to be applied to the construction of fence and gates of increased heights.

For example the main changes in BS 1722 Part 12 2006 for a 3.0m fence are as follows:-

Posts - UB 127 x 76mm 13.0 kg/m - Table 2.

Rails - 50 x 50 x 6mm with 12 mm connector bolt dia. - Table 2.

Pales - Oversail - Top 475mm - Bottom 380mm - Table 2.

Fence post holes - square hole 450 x 450mm, round hole 600mm dia. - Table 10.

Gates - Frame sizes - Table 3.

Sizes of steel gate posts (RSJ or universal column) - Table 4 Fittings for steel palisade type gates - Table 8 Dimensions for gate fittings - Table 9

11.0 ELECTRIFIED FENCES

- 11.1 Electric fence systems shall be compliant with BS EN 61011, such that the maximum energy that can be produced by the security energiser is limited by design to a maximum of 5 Joules into a load of 500 Ohms, the designed shall be such that it will comply with this output even under abnormal conditions such as component failure, abnormally high supply voltage, temperature etc and to meet the requirements of IEC 335/1.
- 11.2 The design of the electrified fence panels and gates etc. shall be as shown in the appropriate drawings in Appendix A.
- 11.3 Additional requirements are:
 - a) Indication lights to indicate when the electric fence has been de-energised to be positioned such that they are visible at points of entry etc. The indication lamps shall use Red LED's to denote that the fence is energised and Green LED's to denote that the fence is de-energised
 - b) SCADA system providing confirmation of the status of the fence should the on-site lights fail where required.
 - c) A switch shall be fitted to the gate in order to de-energise the gate zone only; the switch must not de-energise the rest of the system or illuminate the light indicating that the fence has been switched OFF. A time delay of shall be built into the circuitry to ensure that this zone does not become energised immediately after the gate is closed, the time delay shall be of a sufficient length to allow the gate to be locked before the fence becomes energised. The minimum value for this time delay shall be 120 seconds.
 - d) Keypad security system for de-energising or re-energising the electric fence.
 - e) A optional shroud (shown in drawing SF74) may be fitted to the gate in order to prevent inadvertent contact with the electric fence when closing the gate.
- 11.4 Operation features of the electric fence shall be such that they are able to comply with the operating instructions as described within ST: SP 5C.

12.0 EARTHING

- 12.1 Suitable clearance or threaded holes for earthing terminations have been catered for on fence posts, gate posts and gates. These are as detailed on the WPD drawing numbers SFGA 20, SFGA 22A and SFGA 22B.
- 12.2 Earthing conductor to be laid across all gates as detailed in ST:TP21K Clause 3.2 for 132, 66 & 33kV substations or ST:TP21D section 5.2.1.4 for 11kV substations.

- 12.3 All new or refurbishment fencing schemes for 132, 66 & 33kV substations shall be sent to Primary System Design and checked for compliance with ST:TP21K for 132, 66 & 33kV, including consideration of all known underground cables and overhead conductors crossing the fence line, and the position of any lighting columns.
- 12.4 All new or refurbishment fencing schemes for 11kV Distribution Substations shall conform to the design as specified in ST: TP 21D.
- 12.5 It will be necessary to fit temporary earth's to all new fence construction works, if none are available then earth rods must be installed as required; having checked for presence of buried apparatus.
- 12.6 Earthing requirements for gates are as detailed in ST:TP21K Clause 3.2 for 132, 66 & 33kV substations or ST:TP 21D section 5.2.1.4. for 11kV substations.

Western Power Distribution

SCHEDULE OF DRAWINGS

STANDARD SECURITY PALISADE FENCING AND GATES

Drg.No.	Rev.	Title
SFGA Series	5	
SFGA 20	2	Standard Palisade Fence Panel
SFGA 21	1	Standard Palisade Fence Wing Panel
SFGA 22	5	Standard Palisade Fence Double Gate
SFGA 23	1	Standard Palisade Fence Panel – Enhanced Security
SFGA 24	2	Standard Palisade Fence Single Gate
SFGA 25	2	Electrified Palisade Fence
SFGA 26	2	Electrified Palisade Double Gate
SFGA 27	2	Electrified Palisade Single Gate
SF Series		
SF 63	9	Locking Arrangement for Palisade Fence Gates
SF 65A	1	Double Gate – Inward Opening Slam Plate & Drop Bolt Details
SF 65B	1	Double Gate – Outward Opening Slam Plate & Drop Bolt Details
SF 70	1	Removable Palisade Fence Post Details
SF 71A	1	Double Gate – Inward Opening Palisade Hanging Details
SF 71B	1	Double Gate – Outward Opening Palisade Hanging Details
SF 71C	1	Single Gate – Palisade Hanging Details
SF 72	3	Insulated Palisade Fence Panel Fixing Details
SF 73	1	Anti-Vandal Scaling
SF 74	1	Electrified Double Gate – GRP Protective Shroud

See WPD Network Drive:

EDS (<u>\\AVDOCS01)\S</u> WEST\STD, OVERHEAD AND 11kV\Fencing and gates (NEW SERIES)



ASCERTAIN POSITION AND DEPTH OF ELECTRICITY, GAS, WATER OR OTHER UNDERGROUND SERVICES PRIOR TO COMMENCEMENT OF EXCAVATION, DRILLING OR ERECTION IN THE WORKING AREA DO NOT MANUALLY HANDLE COMPLETE FENCE PANELS WITHOUT TAKING SPECIAL PRECAL FINISH TO STEEL COMPONENTS: HOT DIP GALAVANISED TO BS EN ISO 1461 AFTER FABRICATION (INCLUDING ALL WELDING m FILLET WELDS THROUGHOUT - TO BS EN 1011 2No. 14mm DIA. × 25mm LONG SLOTTED HOLES IN CONNECTOR PLATE TO RECEIVE M12 POST – RAIL FIXINGS Þ PLAN SHOWING SETTING OUT FOR INTERNAL AND EXTERNAL CORNERS TO BS EN 10025- Θ AGGREGATE SIZE) WESTERN POWER DISTRIBUTION Design Department. Avonbank, Feeder Road, Bristol BS2 OTB Tel: 0117 933 2000 Fax: 0117 933 2001 GRADE FND3 (20) (2)€ FENCE POST MAY 晤 ENGINEERING SPECIFICATION 170 x 50 x 8mm CONNECTOR PLATE WELDED TO FENCE POST OUTER FLANGE WITH 5mm CONTINUOUS FILLET WELD ALL ROUND ₽ \bigcirc DETAILS OF STANDARD 2.4m SECURITY PALISADE FENCE GREGATE SIZE) 2784 USING N.T.S. WIRE LOW MELTING 2No. 14mm DIA. x 25mm LONG SLOTTED HOLES IN CONNECTOR PLATE TO RECEIVE M12 POST - RAIL FIXINGS - EE SPEC : 20 \bigcirc BRUSH TIONS (MASS OF FENCE PANEL ₽ ନ୍ନ TYPICAL INTERNAL CORNER FIXING DETAIL € FENCE POST Z AND POINT ZINC ALLOY REPAIR RODS OR POWDERS IN ACCORDANCE WITH REPAIR -99 USING H٦ APP FENCE Y ROVED 36 \bigcirc FENCE Ш AND PUNCHING ZINC APPROX. 150kg / RISK OF ARTICULATION) ORNER FENCE \bigcirc \bigcirc (\sim) Θ RICH PAINT IN ₽ \bigcirc 36 3 Θ -2784 N.T.S.-R -FENCE POST DRILLING OF HOLES) $\prec \bigcirc$ ACCORDANCE WITH WESTERN POWER Drg. --- 30 € FENCE POST Y -69 No. SFGA 20 € FENCE POST € CORNER FENCE POST Rev No \sim



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200 × 150mm CONCRETE CILL (SIDES SHUTTERED AND TOP WEATHERED) FULL LENGTH OF FENCE 2400 150 EARTH STRAP FIXING POINT: 8mm DIA. HOLE ON & OF EACH FENCE POST WEB (75mm ABOVE TOP OF CILL) ---

SEE TYPICAL CONNECTION DETAIL 50-୍ର ୍ର 6 \bigcirc \bigcirc \bigcirc \bigcirc ج <u>ج</u> = = = = ω Θ

FENCE COMPONENTS:
102 x 44mm x 7.5kg/m R.S.J. FENCE POST (3200mm LONG)
65 x 10mm FLAT RAIL (2700mm LONG)
3.0mm NOM. THICK 'W' SECTION SECURITY FENCE PALE (2350mm LONG)
FIXINGS:
POST / RAIL: 'ISOELECTRIC' RESIN INSULATOR + M16 SHEAR HEADED CONE NUTS (GRADE 8)
PALE / RAIL : M8 (GRADE 8.8) T HEADED BOLTS + SHEAR HEADED CONE NUTS (GRADE 8)

FENCE POST





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65 POSTE	SF71B	SF71A	SF71B	SF71A	SF71B	SF71A	SF71B	SF71A	SF71B	SF71A	SF71B	SF71A	GATE HANGING ARRANGEMENT (DRG. REF.)
Bmm DIA. HOLE I FLANGE (SUBSTATI FACE) TO RECEIVE STRAP FIXING	SF65B	SF65A	SF65B	SF65A	SF65B	SF65A	SF65B	SF65A	SF65B	SF65A	SF65B	SF65A	DROP BOLT + SLAM PLATE ARRANGEMENT (DRG. REF.)
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WESTERN POWER

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Revision	REDRAWN IN ALIGNMENT WITH WPD ENGINEERING SPECIFICATION - EE SPE	ENHANCED SECURITY FENCE PANEL	SECTION / ELEVATION		ע עע ע	VDATION PLAN ON B-B SCALE 1:20	SUBSTATION COMPOUND concrete cill









Avonb; Tel: 0117 ° DETAILS PAI	ECTIVE - ENGINEEI SECURITY IN AREA <u>RISK ASSESED</u> O BS EN 10025- O BS EN 10025- THROUGHOUT - SALVANISED TO BS LAVANISED TO BS LAVANISED TO BS LAVANISED COATIN 1 J G ON BOLT HEAD 1 / BS EN 4652 I//TY, GAS, WATER					1655	1905	2155	2405		о љ љ	2905	(mm)
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A 26	RECTION					0.900 × 0.900	- 1.200 × 1.200	1.250 × 1.250	- 1.300 x 1.300		1.400 x 1.400	Ē	GATE POST FOUNDATION PLAN SIZE (m)
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	PART REAR GATE ELEVATION PALES OMITTED FOR CLARITY	pop EQT HWREE HOLD BEX HOLD BEX H	OPENING GATE LEAF
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REDRAWN IN ALIGNMENT WITH WPD SPECIFICATION - EE SPEC :20 Revision

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opproved sw 07/10/16 Title INWARD OPENING SINGLE LEAF SECURITY iCALE: 1:2 @A2 PALISADE GATE HANGING DETAILS	ORIGINAL ISSUE Date WESTERN POWER DISTRIBUTION Drawn Pas 26/09/16 Avonbank, Feeder Road, Bristol BS2 OTB Checked KH 07/10/16 Tel: 0117 933 2000 Fax: 0117 933 2001.	PLAN	UREB AND 65 x 12mm DRUEED 22mm DIA. URUED 22mm DIA. W20 THREAD	65 x 12mm FLAT FIXED TO R.S.J. FLANGES WITH FULL PROFILE WELD	EVATION		R.S.J. WEB AND 65 x 12mm FLAT DRILED 22mm DA.	
Drg. No. Rev No. SF 71C 1.0	WESTERN POWER							



Rev No. Drawn 1.0 PAS Chk'd 줖 App'd ٨S 3.0mm NOM. THICK 'W' SECTION SECURITY FENCE PALE Date 07.10.16 DRAWN IN ALIGNMENT WITH WPD SPECIFICATION -FACE OF FENCE POST-TYPICAL FENCE POST INSTALLATION DETAIL TOP OF FENCE 38 NOM. Revision 25 NOM. FENCE Φ Φ EE SPEC: 450 NOM. DIA. SUBSTATION COMPOUND ALL RIGHTS ARE RESERVED TO WPD (South West) DR. NO PART OF THIS DRAWING MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS INCLUDING PHOTOCOPYI ST 2 20 102 x 44mm x 7.5kg/m R.S.J. FENCE POST FENCE POST MOUNTED SUPPORT BRACKET WITH SECURITY FIXINGS TO MANUFACTURER'S DETAIL Approved SCALE: Checked Drawn ORIGINAL ISSUE EXPANDED METAL ANTI VANDAL SCALING BARRIER - WITH INTERLOCKED VANES AND CENTRAL ROTATING SPINDLE ORIGINAL SHEET SIZE: A3 1:10 PAS WS 줖 07/10/16 07/10/16 07/10/16 Title Date FINISH: GALVANISED NOTE: FOR SECURITY PALISADE FENCE DETAILS SEE DRG. No. SFGA 20 Design Department. Avonbank, Feeder Road, Bristol E Tel: 0117 933 2000 Fax: 0117 TYPICAL INTERMEDIATE INSTALLA SCALE 1:10 ANTI VANDAL WESTERN POWER DISTRIBUTION SCALING BARR FENCE SUBS COMF ÌÌ

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Rev No. 1	Drg. No. SF 73	3S2 OTB 7 933 2001. RIER
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		POUND 45 × 45 × 6mm R.S.A. FENCE RAIL
	NITED INTERMEDIATE SUPPORT SECURITY FIXINGS TO	FENCE RAIL MOU BRACKET WITH S MANUFACTURER'S

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1 NO.			IC POWER FENCE. GATES FOR		

B1.0 INTRODUCTION

- B1.1 This appendix provides the alternative specification for an 11kV distribution substation security fence.
- B1.2 The fence panels shall be of an expanded metal construction conforming to British Standard 1722 Part 14 2006 Specification for open mesh steel panels.
- B1.3 The fence shall be not less than 2.4 metres high.
- B1.4 The specification set out below is based upon British Standard 1722 Part 14 2006.
 The paragraph numbering and table references shown in brackets match those in BS 1722 Part 14 2006.
- B1.5 The fence shall have a galvanized finish as standard, however a coloured (RAL6005-Dark Green) powder coating is acceptable where required.
- B1.6 The overall design of the fence system shall comply with the criteria as set out in BS 1722 Part 14 2006 section 5
- B1.7 All signs/notices shall be positioned at the top rail with the top fixing strap above the rail, this will stop the sign from being slid down the pales and providing a foothold.

B2.0 MATERIALS

B2.1 Steel

As described in BS 1722 part 14 2006 section 4.

B2.2 Bolts, Nuts and Washers

- a) Post to Rail fixing :-M12 Cup Square headed Bolts to BS 4933 strength Grade 8.8 and Shear headed cone nuts.
- b) Pale to Rail fixing : M8 Cup Square headed Bolts to BS 4933 strength Grade 8.8 and Shear headed cone nuts.

There is NO British Standard for Shear headed Cone Nuts. Cone nuts to be steel strength grade 8 as detailed in BS 4190 and threaded in accordance with BS 3643.

B2.3 Protective Treatment

After the fabrication of gates and fencing components, including the punching or drilling of any holes, the fencing and gates shall receive the following works treatment, hot dip galvanising in accordance with BS EN ISO 1461.

B2.4 Renovation of Coatings

Small areas of hot dip galvanised coating damaged by cutting or by excessively rough treatment during transit and erection shall be renovated by the use of low melting point zinc alloy repair rods or powders made specifically for the purpose, or other means in accordance with BS 5493 such as zinc rich paint. Sufficient material shall be applied to provide a zinc coating at least equal in thickness to the original layer.

B3.0 EXPANDED METAL PANEL (Section 3 BS 1722 Part 14 2006)

- B3.1 Dimensions for expanded metal fences panels are given in Table 1 of BS 1722 Part 14 2006.
- B3.2 The general dimensions of the fence panel shall comply with a Category 2 fence as described in BS 1722 Part 14 2006 Table 1 amended as below:-

Minimum Height of Panel	2400mm
Width of Panel	To fit 3.0m Post Centres
BS405 Reference	Special
Maximum Height of Mesh	60mm
Maximum Width of Mesh	30mm
Minimum Width of Material	3mm
Minimum Thickness of Material	3mm
MICHAESIS CO-	

- B3.3 The fence panel shall contain a minimum of 3 horizontal steel rails fixed to the mesh by steel strips secured with an anti-tamper fixing such as a cup square bolt and permacone nut.
- B3.4 The design of the fence panel shall be such that it does not provide a foothold for climbing.

B4.0 FENCE POST (Section 3 BS 1722 Part 14 2006)

B4.1 Fence posts shall be Rolled Hollow Section and made of steel complying with BS 1722 part 14 Section 4

B5.0 FOUNDATIONS AND SILLS (Section 6 BS 1722 Part 12 2006)

B5.1 General

As detailed in BS 1722 Part 14 2006.

B5.2 Holes for Fence Post Foundations

As detailed in BS 1722 Part 14 2006.

B5.3 Concrete Sills

As detailed in BS 1722 Part 14 2006, but 200mm wide. A concrete sill is required on all WPD installations, the sides are to be shuttered and the top weathered.

B5.4 Concrete for Post Foundations and Sills

As detailed in BS 1722 Part 14 2006.

B6.0 ADDITIONAL SECURITY (Section 6 BS 1722 Part 14 2006)

B6.1 Burrowing

Provide a concrete sill in accordance with BS 1722 Part 14 2006 Section 6.3.

B7.0 CONSTRUCTION OF GATES (Section 7 BS 1722 Part 14 2006)

B7.1 General

Gates are to be constructed from welded steel hollow section with an expanded metal mess welded to the frame and shall comply with BS1722 Part 14 2006 Section 7.

Standard gate sizes of 1.0m single and 2.0 double shall be used where possible. Infill mesh panels shall be used adjacent to the gates where necessary to suit existing openings. The distance from the bottom edge of the gate to the surface of the road shall not exceed 50mm when the gates are in the closed position.

B7.2 Hinges

Hinges shall be designed in accordance with BS 1722 Part 14 2006 Section 7.2.

B7.3 Drop Bolts and Slam Plates

Drop Bolts and Slam Plates shall be designed in accordance with BS 1722 Part 14 2006 Section 7.3

The gate locking bolt shall be sufficiently long to prevent gates being "sprung" open by pulling/pushing. Gate drop bolts shall be arranged so that they cannot be lifted without the other gate of the pair being opened.

B7.4 Locking Devices

The construction of the locking devices will be as detailed on WPD drawing numbers listed below:-

SF 63A Locking arrangement on palisade type gates (Appendix A).

The door flap on the WPD locking box is to be fitted into the gate complete with non WPD standard 1 x 1 rim cylinder and Union rim cylinder deadlock type 1148 back box. Since flaps are tailor made to fit a specific gate and because the flaps are removable, they shall be marked to show to which gate they are to be fitted. The complete operation of the door flap assembly in the gate is to be fully tested prior to despatch to site.

B7.5 Gate Posts

Posts shall be manufactured from steel sections and comply with BS 1722 Part 14 2006 Section 7.5.

Posts shall receive the following works treatment, hot dip galvanising in accordance with BS EN ISO 1461.

B8.0 INSTALLATION (Section 8 BS 1722 Part 14 2006)

B8.1 Line and Level

As detailed in BS 1722 Part 14 2006.

B8.2 Posts

As detailed in BS 1722 Part 14 2006.

B8.3 Intermediate Supports

As detailed in BS 1722 Part 14 2006.

B8.4 Bolts and Fastenings

As detailed in BS 1722 Part 14 2006.

B8.5 Erection

As detailed in BS 1722 Part 14 2006.

B9.0 EARTHING

B9.1 See Section 12.0 of this document

ELECTRIC FENCE WARNING SIGN BI- LINGUAL - DRAWING NUMBER G4109

E5 ITEM No 40691

ELECTRIC FENCE WARNING SIGN - DRAWING NUMBER G114107 E5 ITEM No 61566

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APPENDIX D

SUPERSEDED DOCUMENTATION

This document supersedes EE SPEC: 20/3 dated May 2012 which should now be withdrawn.

APPENDIX E

ASSOCIATED DOCUMENTS

None

APPENDIX F

KEYWORDS

Security, Substation, Fencing, Gates, Notices.