WESTERN POWER DISTRIBUTION

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Company Directive

ENGINEERING SPECIFICATION
EE SPEC: 208

Unitised Assembly of Transformer, LV Transformer Mounted Cabinet and 12kV Switchgear, including Housing, as a Complete Unit for Direct to Site Delivery

Summary:

This WPD Engineering Equipment Specification is for the supply of a complete substation that is to be used to provide a dedicated sole use SNE supply to an outdoor feeder pillar so as to enable the connection of multiple EV car charging hubs.

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Implementation Date: **January 2022**

Approved by

Carl Ketley-Lowe
Engineering Policy Manager

Date: **20th January 2022**

Target Staff Group	**Elecrticity System Development; Purchasing; Engineering Policy**
Impact of Change	**Amber**
Planned Assurance checks	**As these are initially to be used for development application then the Engineering Policy Team will ensure compliance with this EE SPEC on an ongoing basis.**

IMPLEMENTATION PLAN

Introduction

This WPD Engineering Equipment Specification (EE SPEC) is for the supply of a complete substation that is to be used to provide a dedicated sole use SNE supply to an outdoor feeder pillar so as to enable the connection of multiple EV car charging hubs.

Main Changes

This is a new document.

Impact of Changes

This EE SPEC will allow for the purchase of special application substation assemblies so as to be able to provide electricity supplies to dedicated car charging hubs.

Implementation Actions

- The Electricity System Development Team will work with Procurement and Engineering Policy to procure units required for trial and development purposes.

- The Electricity System Development Team will work with selected local 11kV planners to identify suitable sites for trial of the arrangement detailed in EE SPEC 208, of which this transformer will form part.

- Engineering Policy will create new CROWN templates as required.

Implementation Timetable

To be used for tenders following the issue date.

REVISION HISTORY

Document Revision & Review Table		
Date	**Comments**	**Author**
January 2022	• This is a new document.	Andrew Reynolds / Stephen Hennell / Anthony Smith

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1.0 INTRODUCTION

1.1 This WPD Engineering Equipment Specification details the requirements for the supply of a complete substation that is to be used to provide a dedicated sole use SNE supply to an outdoor feeder pillar so as to enable the connection of multiple EV car charging hubs.

1.2 An EV charging hub will consist of a group of car chargers, typically 150kW DC rapid chargers.

1.3 It is not intended that this assembly replaces the standard WPD package substation arrangements, and is an addition to the range of substation designs that WPD currently utilises.

1.4 It is the intention that this assembly shall be compact in nature and not necessarily follow the standard Energy Networks Association Technical Specification (ENATS) arrangement for compact unit substations.

1.5 Note: Whilst this EE SPEC has been written to include a 1.6MVA transformer option, this is not available for use until aspects of ENA Rec P2 are being reviewed/revised.

2.0 POLICY

2.1 This assembly shall utilise already specified designs from WPD Engineering Equipment Specifications where possible, however new to WPD designs may be offered. Any new to WPD designs shall follow and meet the general WPD specifications for a product, or meet an appropriate ENA Technical Specification.

2.2 The basic requirement of the equipment arrangements covered by this specification shall be that although consisting of discrete items specified elsewhere these combined units shall be considered as a single entity.

2.3 The ground profile of the assembly does not, and perhaps should not, be of the standard units substation and GRP housing dimensions as detailed in EE SPEC 19 "*Specification of GRP Substation Enclosures*" It is considered that an alternate ground profile may be beneficial in securing suitable site locations, for example in a spare car parking bay.

2.4 Any housing/arrangement offered shall have an internal volume of less than $29m^3$ in order that permitted planning allowances can be utilised.

3.0 TRANSFORMER

3.1 The transformers offered shall be rated at either 1000kVA or 1600kVA in accordance with EE SPEC 206 as specified by WPD at the time of enquiry.

3.2 Due to the nature of the load, which is anticipated may have extended periods at no or low load, any transformer offered shall have losses that are equal to, or better than Tier 2 reduced by an additional 10%.

Transformers shall meet the requirements of WPD EE SPEC 206.

3.3 Transformer design does not need to follow the normal practice for unit substations with HV and LV connections located on a single side, or to freestanding transformers with the HV and LV connections located on the opposing long sides. It may be beneficial to consider a design with the HV and LV connections located on the opposing short sides.

3.4 Separate tender prices should be submitted for any offer of 'non-standard' transformers (which may include amorphous metal or other approved materials), supported by full cost/benefit information.

4.0 HV SWITCHGEAR

4.1 The HV switchgear offered shall ideally be selected from EE SPEC 122 however an alternate may be offered provided that it meets EE SPEC 2. It would be preferable if the switchgear offered has an ENA Notice of Conformity or is currently undergoing conformity assessment.

Whilst non-SF6 filled switchgear is preferred it is appreciated at this time the technology may not be sufficiently mature to be able to offer a non-SF6 filled unit. Tenderers may offer alternate non-SF6 units for consideration, however they should also submit an SF6 filled unit as an option.

Any switchgear offered shall be a transformer mounted unit comprising a single circuit breaker and capable of providing a fully rated make-proof earth towards the incoming circuit and a make-proof earth towards the transformer. Under no circumstances shall a ring main unit comprising of two switch disconnectors and a circuit breaker be installed.

For 1000kVA transformers a circuit breaker with TLF protection is considered adequate for use on the 11kV network, however a circuit breaker with a self-powered relay will be required for 6.6kV network application. For 1600kVA transformers a circuit breaker with a self-powered protection relay is required for use on the 11kV network.

4.2 An alternate means may be offered where the 11kV cable is directly terminated onto the transformer using load-break elbows. If this is offered then the design shall include the necessary parking bushing positions, and a means of enabling the connection of parked elbows to earth so as to be able to provide a circuit main earth on the incoming cable.

Protection shall be provided as per the Pad Mount option of EE SPEC 206.

Any access door to the cable connection chamber using this design shall incorporate a multi-bolt design that requires a specific tool (eg penta-head bolts), and that at least one of these bolts shall be enclosed within a tube such that a WPD standard padlock can be applied.

5.0 LV TRANSFORMER MOUNTED CABINET

5.1 The assembly shall use a transformer mounted cabinet reference as specified in EE SPEC 16. These shall be TMC 16/-/SCC or TMC 25/-/SCC so as to match the transformer maximum rated output (including any temporary, time limited, overload allowance.

5.2 The assembly shall be configured such that only SNE supplies to an EV car charging hub can be provided. The arrangement shall permit this requirement to be met for hot or cold sites.

5.3 Any LV cabinet shall not, under any circumstances, have connection ways provided or facilitated that could be connected either to the general WPD LV network, or directly to another single customer.

6.0 EARTHING AND BONDING

6.1 Provision shall be made for the assembly to be employed on substation sites that are designated either hot or cold.

6.2 Earthing and bonding connections (to suit 30kA for 1 second) shall be supplied and fitted as required to simplify the connection of the combination unit to the earth system.

6.3 With regard to the unit substation arrangements the following connections shall be required:

- between the earth terminals of the HV switchgear and the transformer tank.
- between the earth terminals of the LV equipment labelled "LV steelwork earth" and the transformer tank.

6.4 The earthing tapes shall be terminated on the same side of the transformer earth flag.

7.0 HOUSING

7.1 The housing shall enclose all component parts of the assembly and be either GRP (as EE SPEC 19) or be metallic. Any metallic housing shall be either be fabricated on a material that is inherently rust resistant or prepared with suitable treatments and finishes so as to be meet the requirements of 7.7 below.

7.2 The provision of any vents or grilles required for cooling purposes shall be designed or placed so as to minimise the likely transmission of sound/noise from the housing, or direct it so as to reduce the likely sound levels emitted from the assembly.

7.3 The housing shall incorporate internal arc over-pressure relief sufficient to ensure that failure of the door securing arrangement shall not occur for all reasonable fault occurrences taking into account the equipment contained.

7.4 Any access doors shall have multi-point espagnolette type locking arrangements that can be secured with a standard WPD substation access padlock.

7.5 The handle and padlock shall be designed and constructed in such a way that cutting tools cannot readily be applied to the padlock hasp; and such that impact with hammers (for example) cannot be achieved.

7.6 There shall be no provision for internal lighting and/or heating.

7.7 The building module exterior walls, roof and doors shall be painted, and consideration should be given to the diverse nature of WPDs network and locations that these buildings may be situated in from town centres to coastal locations an atmospheric corrosivity category C4 should be used as a standard. Enhanced coating systems should be offered for use in atmospheres up to and including Marine Coastal and Offshore. Consideration for special coatings such anti-graffiti top-coats must be considered.

8.0 SAFETY SIGNS AND NOTICES

8.1 The assembly shall be fitted with WPD combined property label and “danger of death safety signs to the opening access door.

8.2 Where there are two doors forming a pair, then the safety sign shall be fitted to the second opening door of the pair.

8.3 Where there separate access doors at each end of the housing, for example, then a safety sign shall be fitted to each door or door pair.

8.4 Provision shall be made so as to permit the fixing of a WPD standard specification substation name label.

8.5 If the high voltage switchgear contains SF6 then a WPD specification SF6 notice shall be attached to the opening door or doors.

8.6 WPD shall provide the required safety signs to the manufacturer as free issue items.

9.0 PAINTING AND FINISH

9.1 The manufacturer shall be responsible for the painting and finish of the complete assembly. Any steelwork required in the assembly of the combination units shall be painted to the same standard as the component parts.

9.2 It shall be acceptable for minor paintwork damage occurring in the assembly process to be made good.

APPENDIX A

1 - SUMMARY OF INITIAL OPTIONS FOR UNITISED ASSEMBLY (FOR 11KV APPLICATION)

Tx Capacity [kVA]	Style [EE SPEC 206]	Tx HV side	Tx LV side	Customer street pillar connection
1000	Special DT	CB with TLFs	Enhanced cable box [EE SPEC 16 TMC 16/-/SCC]	Additional drawing required
			Basic cable box*	As per Fig 13 & 14 of SD5E
		CB with Self-Powered Relay	Enhanced cable box [EE SPEC 16 TMC 16/-/SCC]	Additional drawing required
			Basic cable box*	As per Fig 13 & 14 of SD5E
	Padmount	Bay-o-Net fuses etc	Enhanced cable box equivalent	Additional drawing required
			Basic cable box*	As per Fig 13 & 14 of SD5E
1600	Special DT	CB with Self-Powered Relay	Enhanced cable box [EE SPEC 16 TMC 16/-/SCC]	Additional drawing required
			Basic cable box*	As per Fig 13 & 14 of SD5E

2 - SUMMARY OF INITIAL OPTIONS FOR UNITISED ASSEMBLY (FOR 6.6KV APPLICATION)

Tx Capacity [kVA]	Style [EE SPEC 206]	Tx HV side	Tx LV side	Customer street pillar connection
1000	Special DT	CB with Self-Powered Relay	Enhanced cable box [EE SPEC 16 TMC 16/-/SCC]	Additional drawing required
			Basic cable box*	As per Fig 13 & 14 of SD5E

[* *Note: Once the Enhanced cable box is available then the Basic cable box option will be withdrawn*.]

APPENDIX B

SUPERSEDED DOCUMENTATION

This is a new document and no document is superseded by its issue.

APPENDIX C

ASSOCIATED DOCUMENTATION

ENATS 35-1	*Distribution Transformers (for 16kVA to 1000kVA)*
ENATS 37-2	*"Public Electricity Network Distribution Assemblies"*
ENATS 41.36	*Switchgear for Service Up to 36kv (Cable And Overhead Conductor Connected)*
EE SPEC 2	*12kV Cable Connected Outdoor Extensible and Non-Extensible Secondary Type Switchgear and Metering Units*
EE SPEC 5	*11kV Distribution Transformers*
EE SPEC 16	*LV Distribution Fuseboards*
EE SPEC 19	*Specification of GRP Substation Enclosures*
EE SPEC 112	*Specification for 11kV Cable Accessories*
EE SPEC 122	*WPD Assessed Switchgear and Associated Plant for use on the distribution network*
EE SPEC 140	*Steel Substation Buildings*
EE SPEC 206	*11kV Distribution Transformers with Non-oil Based Fluid for Electric Car Charging Hubs and Other Special Applications*
EE SPEC 207	*Outdoor Freestanding Low Voltage Feeder Pillar to provide SNE Connections to Multiple EV Car Charging Hubs*
ST: SD5E	*Design of Low Voltage Commercials and Industrial Connections*
ST: SD1K	*Installation of Sole Use Substations for Electric Vehicle Charging*

APPENDIX D

IMPACT ON COMPANY POLICY

There is no impact on existing policy.

APPENDIX E

RECORD OF COMMENTS DURING CONSULTATION

No comments received.

APPENDIX F

KEYWORDS

Circuit Breaker; Assembly; Transformer; Car Charging Hub