الشركة السعودية للكهرباء
Saudi Electricity Company
نعمل بإتقان من أجلكم

20-SDMS-01

REV. 03 (05-06-2018)

SPECIFICATION FOR OCTAGONAL STEEL POLES

Saudi Electricity Company

1. SCOPE

This specification defines the minimum technical requirements for design, engineering, manufacture, testing, inspection and performance of octagonal steel poles intended to be used in the distribution system of Saudi Electricity Company (SEC).

2. CROSS REFERENCES TO OTHER SEC STANDARDS

This specification shall always be read in conjunction with the latest revision of SEC Specification No. 01-SDMS-01 titled "General Requirements for all Equipment/Materials," which shall be considered as an integral part of this specification. It shall also be read in conjunction with SEC purchase order or contract schedules and scope of work/technical specifications for projects, as applicable.

3. APPLICABLE CODES AND STANDARDS

The latest revision of the following codes and standards shall be applicable for the equipment/materials covered in this specification. In case of any deviation, the vendor/manufacturer may propose equipment/materials conforming to alternate codes or standards. However, the provisions of SEC standards shall supersede the provisions of the alternate standards in case of any difference.

Table 1: List of applicable standards

Standard #	Title
AISC	Manual of Steel Construction, 14th Edition
ASCE 48-11	Design of Steel Transmission Pole Structures
ASTM A36M	Standard Specification for Carbon Structural Steel
ASTM A123	Standard Specification for Zinc (Hot-Dip Galvanized) Coatings of Iron and Steel Products
ASTM A143	Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement

Standard #	Title
ASTM A153	Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A215	Martensitic Stainless Steel and Alloy Steel Castings for Pressure Containing Parts Suitable for High Temperature Service
ASTM A239	Standard Test Method for Locating the Thinnest Spot in a Zinc (Galvanized) Coating on Iron or Steel Articles by the Preece Test (Copper Sulfate Dip)
ASTM A307	Standard Specification for Carbon Steel Bolts and Studs, 60000 PSI Tensile Strength
ASTM A320	Alloy-Steel Bolting Materials for Low Temperature
ASTM A351	Austenitic Steel Castings for High Temperature Service
ASTM A325	Standard Specification for Structural Bolts, Steel, Heat-Treated, 120/105 PSI Minimum Tensile Strength
ASTM A354	Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs and Other Externally Threaded Fasteners
ASTM A370	Standard Test Methods and Definitions for Mechanical Testing of Steel Products
ASTM A384	Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
ASTM A385	Standard Practice for Providing High Quality Zinc Coatings (Hot-Dip)
ASTM A394	Standard Specification for Carbon and Alloy Steel Nuts
ASTM A490	Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints
ASTM A537	Pressure Vessel Plates, Heat Treated, Carbon-Manganese-Silicon
ASTM A572	High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality
ASTM A577M	Standard Specification for Ultrasonic Angle Beam Examination of Steel Plates
ASTM A578M	Standard Specification for Ultrasonic Straight Beam Examination of Plain and Clad Steel Plates for Special Application
ASTM A588	Standard Specification for High-Strength Low-Alloy Structural Steel with 50Ksi (345Mpa) Minimum Yield Point to 4-inch (100mm) Thick

Standard #	Title
ASTM A633	Standard Specification for Normalized High-Strength Low-Alloy Structural Steel Plates
ASTM A673	Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
ASTM A687	Standard Specification for High-Strength Non-Headed Steel Bolts and Studs
ASTM E165	Standard Test Method for Liquid Penetrant Examination
ASTM E709	Standard Guide for Magnetic Particle Examination
AWS D1.1	Structural Welding Code, Steel
AWS D10.9	Specification for Qualification of Welding Procedures and Welders for Piping and Tubing
ISO 630	Standards for Structural Steels
ISO R657	Recommendation for Hot-Rolled Steel Sections
ISO 1459	Metallic Coatings - Protection Against Corrosion by Hot Dip Galvanizing - Guiding Principles
ISO 1460	Metallic Coatings - Hot-Dip Galvanized Coatings on Ferrous Materials - Gravimetric Determination of the Mass per Unit Area
ISO 1461	Metallic Coatings - Hot Dip Galvanized Coatings on Fabricated Ferrous Products – Requirements
ISO 3575	Continuous Hot-Dip Zinc-Coated Carbon Steel Sheet of Commercial, Lock-Forming and Drawing Qualities
ISO 4997	Cold-Reduced Steel Sheet of Structural Quality
ISO 4998	Continuous Hot-Dip Zinc-Coated Carbon Steel Sheet of Structural Quality
ISO 7413	Hexagon Nuts for Structural Bolting, Style 1, Hot-Dip Galvanized (Oversize Tapped) - Product Grades A and B - Property Classes 5, 6 and 8
ISO 7417	Hexagon Nuts for Structural Bolting - Style 2, Hot-Dip Galvanized (Oversize Tapped) - Product Grade A - Property Class 9
SASO/SSA 39	Mechanical Testing of Welded Joints
SASO/SSA 107	Tensile Steel Testing
SASO/SSA 157	Charpy Method of Impact Test on Metals

4. DESIGN, MATERIALS AND FABRICATION

4.1. GENERAL

The galvanized octagonal steel poles shall be a single-piece of required length. Their cross sectional shapes shall be tapered octagonal and conform to dimensions given in the tables and drawings in this specification.

The octagonal steel poles shall satisfy the dimensional length and pole top loading requirements as per the design parameters listed in Table-2, Table-5, and Table-6. The dimensions across the flats for top and bottom for all poles as listed in Table-2 are a preferred design to utilize one dimension for each type of pole.

Designated holes shall be pre-drilled and then capped UV resistant plastic plugs.

4.2. DESIGN

4.2.1. Types, dimensions and characteristics of standard steel poles included in this specification are given in Table-2.

4.2.2. Applications of the standard steel poles are given in Tables-3 and Table-4.

4.2.3. The standard poles shall be suitable for the specified applications based on the design parameters given in Tables-5 and Table-6.

4.2.4. Poles are designed to withstand the worst possible combination of simultaneous loading of:

- Lateral loads consisting of wind forces on conductors corresponding to wind spans, wind force on insulators, wind force on pole and maximum conductor tension.
- Vertical loads consisting of pole self-weight, weights of conductors, insulators, cross-arm, pole-mounted equipment, lineman and compressive force due to reaction of stays wherever applicable.

4.2.5. The maximum design unit stress shall not exceed the minimum yield stress as stated in this specification for the particular application and types of loads, including overload capacity factors.

4.2.6. For prequalification purposes or as requested by SEC, the following shall be submitted to verify conformance of the octagonal steel poles with the requirements specified in this specification and related standards:

a. Mill Tests Reports and Certificates specifying conformance of materials with applicable standards.

b. Computer-based design calculation and simulations on various loading scenarios and structure type per SEC construction standards including SEC equipment specifications and ratings.

c. Full Audit Report from approved independent third-party inspector witnessed by SEC.

d. Type test report and certificates.

e. AutoCAD drawings in (*.dwg) digital format, 2013 version.

f. Capacity and layout of octagonal steel pole test facility.

g. Capacities and capabilities of all equipment used to manufacture the poles.

h. E-copy of the above documents in USB Flash Drive.

Table 2: Types, Dimensions and Characteristics of Standard Octagonal Steel Poles

Pole Type	Brief Description	Top Across Flat Dia. (mm)	Bottom Across Flat Dia. (mm)	Shaft Thickness (mm)	Shaft Weight (kg)	Ultimate load (kg)	Color code (no. of Bands)
OC10	10m Steel Pole, Low Voltage	100	345	4	227	803	White (1)
OC13S	13m Steel Pole, Medium Voltage, Single Circuit	155	410	4	377	1530	Red (1)
OC14S	14m Steel Pole, Medium Voltage, Single Circuit	155	430	4	420	1564	Yellow (1)
OC14D	14m Steel Pole, Medium Voltage, Double Circuit	155	600	4	544	2431	Yellow (2)
OC15S/D	15m Steel Pole, Medium Voltage, Single & Double Circuit	155	450	4	466	1545	Green (1)
OC10SFS	10m Steel Pole, Self-Support, Low voltage	230	590	5	527	4968	White (3)
OC13SFS	13m Steel Pole, Self-Support, Single Circuit	230	750	7	1143	8781	Red (3)
OC14SFS	14m Steel Pole, Self-Support, Single Circuit	230	790	7	1282	8874	Yellow (3)
OC15SFS	15m Steel Pole, Self-Support, Single Circuit	230	830	7	1429	8898	Green (3)

Table 3: Applications of Standard Octagonal Steel Poles for Single Circuit Lines

Pole Type	Pole Structure	Angle of Deviation	No. of Stays/Location From Top	Buried Depth	Crossarm Location From Top
		(Degrees)	(mm)	(mm)	(mm)
OC10	Intermediate, LV	0-15	N/A	1500	N/A
	Medium angle, LV	16-60	1@150	1500	N/A
	Heavy angle, LV	61-90	1@150	1500	N/A
	Terminal, LV	-	1@150	1500	N/A
OC13S OC14S OC15S/D	Intermediate, MV	0-5	N/A	2000	50
	Light angle, MV	6-15	1@250	2000	50
	Medium angle, MV	16-60	1@250 & 1@350	2000	50
	Heavy angle, MV	61-90	1@250 & 1@350	2000	50
	Section, MV	-	2@250 along the line	2000	50
	Terminal, MV	-	1@250 & 1@350	2000	50
OC10SFS*	Self-Support, LV	16-90	N/A	1500	N/A
OC13SFS*	Self-Support, MV	6-90	N/A	2000	50
OC14SFS*					
OC15SFS*					

* For the installation of the above specified angles without guy support.

Table 4: Applications of Standard Octagonal Steel Poles for Double Circuit Lines

Pole Type	Pole Structure	Angle of Deviation	No. of Stays/Location from Top	Buried Depth	Cross arm Location From Top
		(Degrees)	(mm)	(mm)	(mm)
OC14D	Intermediate, MV	0-5	N/A	2000	50, 1250 & 2450
	Light Angle, MV	6-15	1@250 & 1@350	2000	50, 1250 & 2450
	Medium Angle, MV	16-60	1@250 & 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450
	Heavy Angle, MV	61-90	1@250 & 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450
	Section, MV	-	2@250 & 2@2650 along the line	2000	50, 1250 & 2450
	Terminal, MV	-	1@250, 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450
OC15S/D	Intermediate, MV	0	N/A	2000	50, 1250 & 2450
	Light Angle, MV	1-15	1@250 & 1@350	2000	50, 1250 & 2450
	Medium Angle, MV	16-60	1@250 & 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450
	Heavy Angle, MV	61-90	1@250 & 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450
	Section, MV	-	2@250 & 2@2650 along the line	2000	50, 1250 & 2450
	Terminal, MV	-	1@250, 1@350, 1@2650 & 1@2750	2000	50, 1250 & 2450

Table 5: Design Parameters for Single Circuit LV and MV (with Earth-Wire) Line

Description		10m	13m, 14m and 15m
Span (m)	Basic	50	100
	Wind	55	110
	Weight	75	150
Wind pressure (N/m^2)	On pole	1200	1200
	On conductors at 10°C	600	600
Factor of Safety	Vertical loads	1.5	1.5
	Transverse loads	1.5	1.5
	Longitudinal loads	1.5	1.5
	Ultimate load		
	Conductor minimum breaking strength	3.0	3.0
Planting Depth (m)		1.5	2.0
Types of structure	Unstayed	Intermediate (0-15°)	Intermediate (0-15°)
	Stayed	-	Light angle (6-15°)
	Stayed	Med. angle (16-60°)	Med. angle (16-60°)
	Stayed	Heavy angle (60-90°)	Heavy angle (61-90°)
	Stayed	-	Section
	Stayed	Terminal	Terminal
	Unstayed	Self-support (90°)	Self-support (90°)
Allowable Deflection at Pole Top		5% of expose length	5% of expose length
Conductors	Phase	$120mm^2$ Quadruplex Cable (3-Insulated AAC for Phase & 1 – Bare ACSR/AW Messenger – Neutral)	$170mm^2$ ACSR/AW (Merlin) in horizontal configuration $70mm^2$ ACSR/AW (Quail) for Branch
	Earth wire	N/A	$70mm^2$ ACSR/AW (Quail) below crossarm
Stay wires	Minimum Breaking Load	65kN	101kN
	Max. Tension	90% of min. breaking load	90% of min. breaking load
	Min. angle to the pole	37°	37°
Temperature	Minimum	-2°C	-2°C
	Maximum	+80°C	+80°C

Table 6: Design Parameters for Double Circuit MV (with Earth-Wire) Line

Description		14m	15m
Span (m)	Basic	100	100
	Wind	110	110
	Weight	150	150
Wind pressure (N/m^2)	On pole	1200	1200
	On conductors at 10°C	600	600
Safety factor	Vertical loads	1.5	1.5
	Transverse loads	1.5	1.5
	Longitudinal loads	1.5	1.5
	Ultimate loads	1.5	1.5
	Conductor Minimum Breaking Strength	3.0	3.0
Planting depth (m)		2.0	2.0
Type of structure	Unstayed	Intermediate (0-5°)	Intermediate (0-5°)
	Stayed	Light angle (6-15°)	Light angle (6-15°)
	Stayed	Med. angle (16-60°)	Med. angle (16-60°)
	Stayed	Heavy angle (61-90°)	Heavy angle (61-90°)
	Stayed	Section	Section
	Stayed	Terminal	Terminal
Allowable deflection at pole top		5° of exposed length	5° of exposed length
Conductors	Phase	$170mm^2$ ACSR/AW (Merlin) in vertical configuration	$170mm^2$ ACSR/AW (Merlin) in vertical configuration
	Earth wire	$170mm^2$ ACSR/AW (Quail) below crossarm	$170mm^2$ ACSR/AW (Quail) below crossarm
Stay wires	Min braking load	101kN	101kN
	Max tension	90% of Min. breaking load	90% of Min. breaking load
	Min angle to the pole	37°	37°
Temperature	Minimum	-2°C	-2°C
	Maximum	+80°C	+80°C

4.3. MATERIALS

4.3.1. Structural steel for pole shaft shall comply with the applicable requirements of ASTM A572 or equivalent with mechanical properties as given below:

- Minimum Yield Strength: 355 N/mm²
- Minimum Ultimate Tensile Strength: 490 N/mm²
- Maximum Ultimate Tensile Strength: 620 N/mm²

4.3.2. Structural steel for bearing plate and top cap shall comply with the applicable requirements of ASTM A36 or equivalent with minimum yield strength of 250 N/mm².

4.3.3. Pole shaft, bearing plate and top cap shall be hot-dipped galvanized after fabrication, including all drilling, cutting and welding. Galvanizing shall be done in accordance with the requirement of 01-SDMS-01 and the minimum average thickness of coating shall be 0.100 mm equivalent to 720 g/m². Bearing plates of large A/F diameter steel poles shall be flattened after galvanization to remove warping deformities.

4.3.4. Bolts, nuts and locknuts for top cap, bearing plate and earthing nut shall be steel Grade 4.6 and shall comply with the applicable requirements of ASTM A307 and ASTM A563 or equivalent and hot-dipped galvanized in accordance with the requirement of 01-SDMS-01 with minimum average coating thickness of 0.100mm, equivalent to 720 g/m².

4.3.5. Weld material shall be compatible with the material of the pole as defined by American Welding Society.

4.3.6. The bearing plate and pole shaft shall be painted with a flexible, water-resistant, rust-preventing, physically drying bituminous coat with thickness not less than 0.120mm. The application of the bituminous coating shall be as follows:

a. On bearing plate, all surfaces shall be coated with bituminous coat.

b. On pole shaft bottom-section, bituminous coating shall be applied:

- Externally: planting depth + 500mm
- Internally: up to 1000mm from the bottom

4.3.7. A weatherproof, high-temp grade, silicone U-Type edge sealing gasket shall be inserted on the top edge of the pole shaft prior to mounting the top cap to prevent water ingress.

4.4. FABRICATION

4.4.1. Shearing and cutting shall be performed carefully and all portions of the work shall be finished neatly. Copes and re-entrant cuts shall be filleted before cutting.

4.4.2. All forming and bending during fabrication shall be done by method that will prevent embrittlement or loss of strength in the material being worked.

4.4.3. All welding operations shall be done in accordance with the American Welding Society, AWS D1.1.

4.4.4. Bolt holes as specified in the applicable drawings shall be punched or drilled. Holes may be punched when the material thickness does not exceed the diameter of the hole. Holes of any diameter may be drilled. Holes shall be cylindrical, perpendicular to the pole shaft, free of burrs, and clean cut without torn or ragged edges. The use of burning torch for cutting holes will not be permitted.

4.4.5. Extra holes for the purpose of lifting or other than those specified in the drawings are not permitted.

4.4.6. All pre-drilled holes shall be provided with durable ultra-violet resistant, plastic plugs.

4.4.7. Steel pole shall be provided with M12 earthing nut at the location specified in applicable drawing. Hot-dipped galvanized M12 x 30 mm long hexagonal bolt with washer shall be screwed on to the earthing nut.

4.4.8. Steel poles shall be provided with detachable top cap and base bearing plate. Flat bar with drilled and tapped hole to suit M12 bolt shall be welded to the top and bottom of the pole for attaching the top cap and base bearing plate, respectively. Hot-dipped galvanized M12 x 30 hexagonal bolts and washers shall be provided for attaching the top cap and base plate.

4.4.9. The following tolerances shall apply:

- ± 0.5 % for overall length
- ± 5 mm for A/F diameter
- ± 2 mm for center-to-center distance between holes
- ± 0.5 mm for diameter of pre-drilled holes

4.4.10. Straightness of the pole shaft shall be within 1 mm/m and without any twist.

4.5. MARKING

4.5.1. Each pole shall be provided with 80 mm x 80 mm nameplate riveted to the shaft at the location specified in applicable drawing, as shown below. All markings shall be legible and so applied to remain legible under normal handling and installation practices.

4.5.2. Each pole shall be provided with color coding consisting of 50 mm wide band with the following color painted to the pole at the location specified in applicable drawing:

- 10 m Single Circuit – White
- 13 m Single Circuit – Red

- 14 m Single Circuit – Yellow
- 15 m Single Circuit – Green
- Double Circuit – Same color as the above except double band 50mm apart.
- Self-Support – Same color as the above except triple band 50mm apart.

5. INSPECTION AND TESTING

To verify conformance with the requirements of this specification and quality assurance of the octagonal steel poles SEC designated representative will conduct acceptance inspection and witness testing at the manufacturer's plant.

5.1. INSPECTION/ROUTINE TEST REQUIREMENTS

5.1.1. Samples conforming in SEC approved drawings shall be subject for inspection and testing (Proof Load Test and Deflections) prior to mass production.

5.1.2. Visual inspection shall include but not limited to: dimensional verification, checks for satisfactory workmanship, material quality, freedom from surface defects, even distribution and thickness of bituminous coating, and for compliance with the purchase order requirement, as applicable.

5.1.3. SEC designated representative shall have free access at all times while work is being carried out, to all areas of the manufacturer's plant which concerns the work.

5.1.4. Inspection/routine tests may be made during all stages of manufacturing, testing and shipping. Inspection may be at the point of shipment or delivery site at SEC option. However, inspection and acceptance shall not relieve the supplier of his conformance with the requirements of this specification.

5.1.5. Proof Load Test (Horizontal Testing)

The tubular steel poles shall be proof tested in accordance with applicable standards. One pole of each design for every consignment shall be tested as per the manufacturer’s testing procedure approved by SEC.

Manual application of load during testing shall not be allowed. Digital dynamometer shall be used to obtain accurate readings.

The proof test will verify the adequacy of steel pole to withstand the static design loads specified for that structure as an individual entity under controlled conditions.

In the event of any one pole not fulfilling the test requirements, further two shall be tested. Should either of these fail, the whole order of the particular type of pole shall be deemed to have failed to comply in this specification.

5.2. TYPE TESTING REQUIREMENTS

5.2.1. All materials shall be type tested in accordance with the latest applicable standards specified in this specification. Type testing shall be witnessed by SEC delegates and/or SEC approved third-party auditors/experts contracted by the manufacturer.

5.2.2. Following the completion of all the tests, certified copies of the type test reports shall be submitted to SEC for review and approval.

5.2.3. Type tests shall include but not limited to:

a. Full-scale Loading Test (Vertical Testing)

Should it be requested by SEC, full-scale loading tests shall be performed in accordance with the applicable requirements of ASCE 48-11 or equivalent. The manufacturer shall make sure that it has the adequate facility to perform the procedure. Prior in the conduct of the test, the manufacturer shall submit structural drawings per SEC construction standards showing the proposed schemes detailing the application of loads and the measurement points to determine the deflections of critical points.

b. Deflections (During Pole Test)

Pole deflections under load shall be measured and recorded. Deflection readings shall be recorded for the “before-load”, “load-on” and “load-off” conditions as well as at all intermediate holds during loading. All deflections shall be performed to common base readings, such as the initial positions, taken before any test loads are applied.

A no-load deflection reading shall be taken five minutes after the removal of the maximum test load, the reading shall not exceed the allowable deflection (5% of the exposed length).

c. Test Reports

The supplier shall furnish a full and comprehensive report of each pole test and shall include detailed diagrams and tabulation showing values and methods of

load application and deflection records of each load test, photographs of test set up and description (with photographs) of all failures, if any.

Include mill test reports of the material used and the results of any tensile tests of specimens cut from any members, which failed during the testing program. Particular emphasis shall be placed on the determination of the mechanical properties of the material.

d. Test Acceptance

The supplier upon receipt of written acceptance from SEC for the satisfactory performance of the pole loading tests, may start fabrication of the steel poles.

6. PACKING AND SHIPMENT

In addition to the packing and shipping requirements specified in 01-SDMS-01, the following shall be fulfilled:

a. The pole shall be stacked with spacers and blocks in order to avoid damages of zinc coating during the loading and transportation.

b. All octagonal steel poles in conformance with the requirements of this specification shall be supplied pre-assembled, i.e. top cap and bearing plates are pre-installed on the pole shaft. Supplying any loose part/component is not acceptable.

c. Poles shall be delivered in bundles of 6 poles with the arrangement of 2 layers, with 3 poles per layer, and strapped at four (4) locations of equal distances with the use of high tensile, low-elongation steel straps size 31 mm x 0.8 mm (min.) and necessary wood separators, padding or cushion material underneath the steel straps.

d. Wooden separators shall be provided between the horizontal and vertical layers of poles to avoid scratches and to facilitate slinging.

e. Bundled poles shall be so arranged such that the earthing hardwares are not disturbed during normal handling.

f. Reasonable care shall be exercised in the handling and shipment of steel poles. Any expense incurred due to the careless handling and shipment of steel poles shall be considered as a legitimate back charge against the supplier.

7. GUARANTEE

The vendor shall guarantee the steel poles against all defects arising out of faulty design, poor workmanship, or sub-standard materials for a period of five (5) years from date of delivery.

If no exceptions to this specification are taken and no list of deviations is submitted, it shall be deemed that, in every respect, the octagonal steel poles offered conforms in the requirements of this specification.

8. SUBMITTALS

In addition to documentations specified in 01-SDMS-01, the following shall be submitted by the vendor/manufacturer:

a. Design information and drawings to be supplied with the proposals:
   - Detailed drawings of steel pole showing the complete dimensions identification marks, number and location of pre-drilled bolt holes, details of pole top cap, bearing plate, hole plastic plug, earthing nut and marking plate.
   - Detailed drawing/procedure for bundling of poles.
   - Details of anti-corrosion coating.

b. Submittals required following award of contract:
   - Drawings for final SEC approval shall be submitted prior to start of manufacturing. Supplier shall furnish all final drawings in original ACAD 2013 version (*.dwg) digital format.
   - Manufacturing schedule, progress report, sample inspection and test schedules.

c. Test reports including but not limited to the following shall be submitted prior to issuance of releases (MT&I):
   - Routine test reports (Proof Load Test and Deflections)
   - Test reports on galvanizing and bituminous coating thickness.
   - Dimensional verification report
   - Verification of hole positions and sizes
   - Certified mill test reports for all materials

9. TECHNICAL DATA SCHEDULE

Table 7: Octagonal Steel Poles

SEC Inquiry No: Item No:

Description	SEC Specified Values*	Vendor Proposed Values**
Pole Type	*	
Length, m	10 / 13 / 14 / 15	
Top A/F diameter, mm	*	
Bottom A/F diameter, mm	*	
Shaft Thickness, mm	4 / 5 / 7	
Pole Ultimate Load, kg	*	
Total Weight After Galvanization, kg	*	
Standard Designation/Grade of Steel for Pole Shaft	*	
Minimum Yield Stress of Steel Materials for Pole Shaft, N/mm^2	355	
Minimum Coating Weight of HDG of Pole Shaft, g/m^2	720	
Thickness of Bituminous Coating for Pole Shaft (Inner/Outer)	120µm / 120µm	
Overall Thickness of Bituminous Coating for Bearing Plate	120µm	
Weather-proof, High-Temp Grade, Silicone U-Type Edge Sealing Gasket on Top End of Pole Shaft	Provided	
Grade 4.6, HDG Fasteners (Bolts, Nuts, Lock-Nuts)	As specified	
Pre-drilled Holes are Capped with UV-Resistant Plastic Plugs	As specified	
M12 x 30mm Mounting Bolts with Washers for Earthing	As specified	
M12 x 30mm Mounting Bolts with Washers for Top Cap & Bearing Plate	As specified	
Tolerances	As specified	
Straightness of the Pole	As specified	
Nameplate with Complete Information	As specified	
Nameplate Affixed on the Pole Shaft Using Steel Rivets	As specified	
Steel Pole Color Code (Number of Bands)	As specified	

Octagonal Steel Poles

SEC Inquiry No: Item No:

a. Additional Technical Information or Features Specified by SEC

b. Additional Supplementary Data or Features Proposed by Bidder/Vendor/Supplier.

c. Other Particulars to be filled-up by the Bidder/Vendor/Supplier.

d. List of Deviations and Clauses to which exception is taken by the Bidder/Vendor/Supplier. (Use separate sheet, if necessary).

Description	Manufacturer of Material/Equipment	Vendor/Supplier
Name of Company		
Location and Office Address		
Name and Signature of Authorized Representative with Date		
Official Seal / Stamp		

10. DRAWINGS

Figure 1: OC10 – 10 Meter Octagonal Steel Pole for Low-Voltage

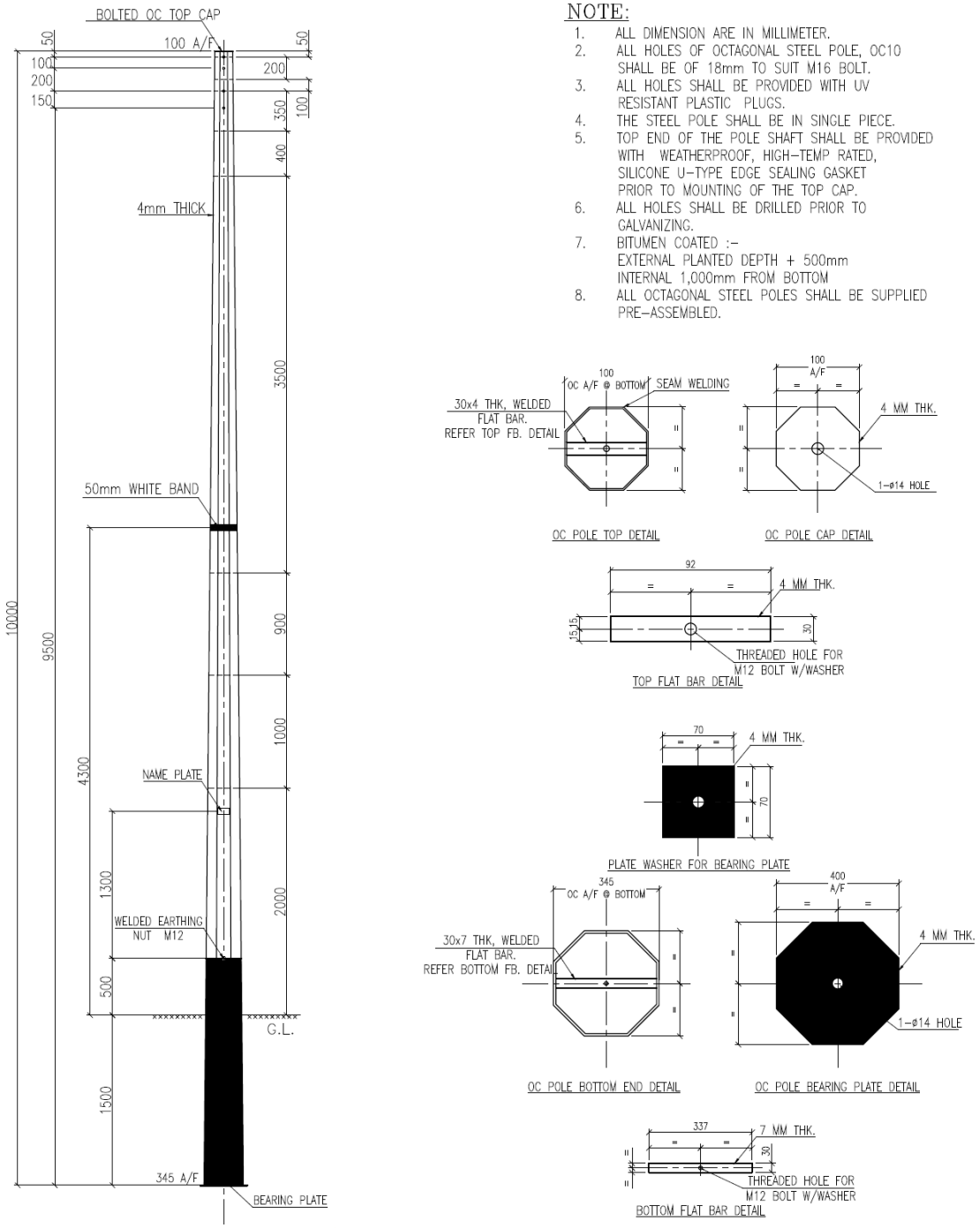
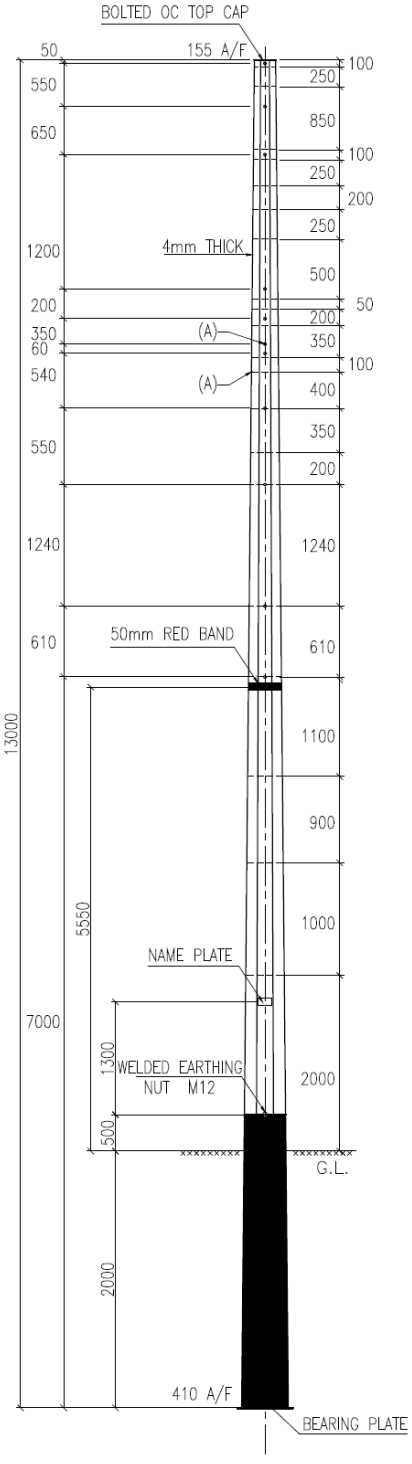


Figure 2: OC13S – 13 Meter Octagonal Steel Pole for Medium-Voltage, Single Circuit



NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC13S SHALL BE OF ø22mm TO SUIT M20 BOLTS EXCEPT HOLES INDICATED BY "A".
3. HOLES INDICATED BY (A) ARE ø18mm (2NOS ONLY)
4. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
5. THE STEEL POLE SHALL BE IN SINGLE PIECE.
6. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
7. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
8. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
9. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.

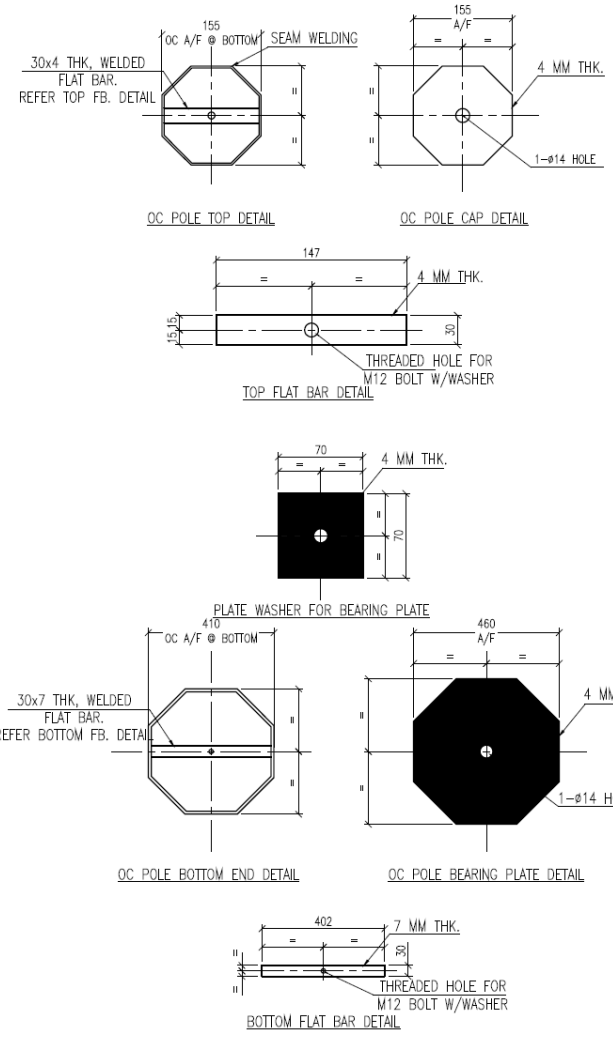
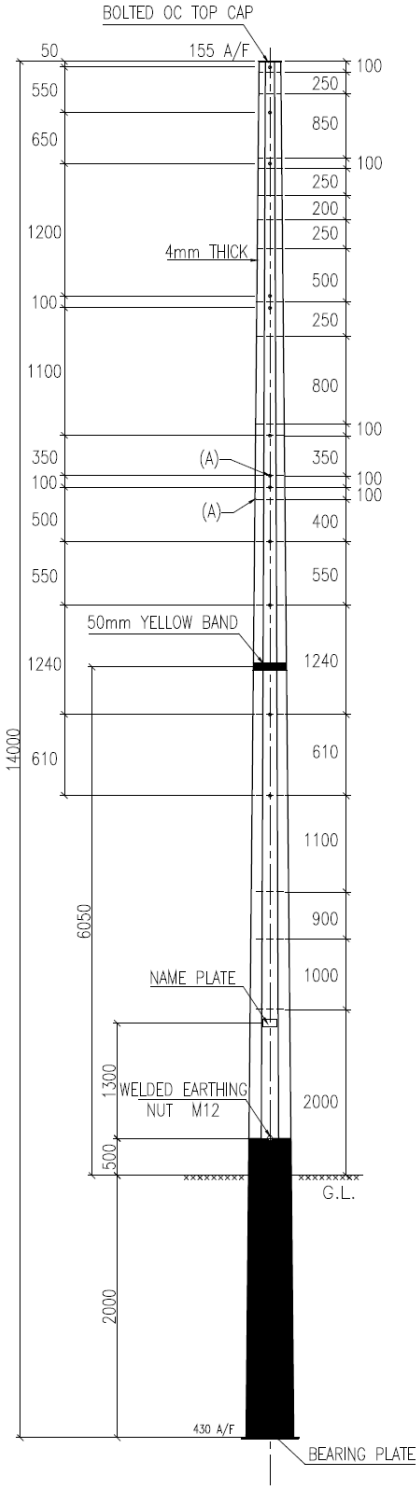
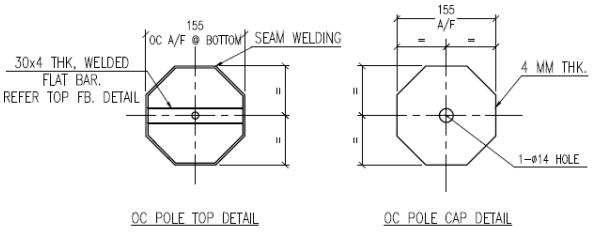


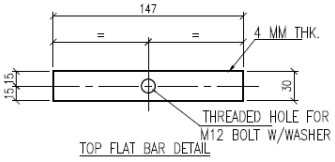
Figure 3: OC14S – 14 Meter Octagonal Steel Pole for Medium-Voltage, Single Circuit

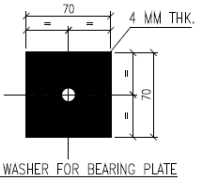


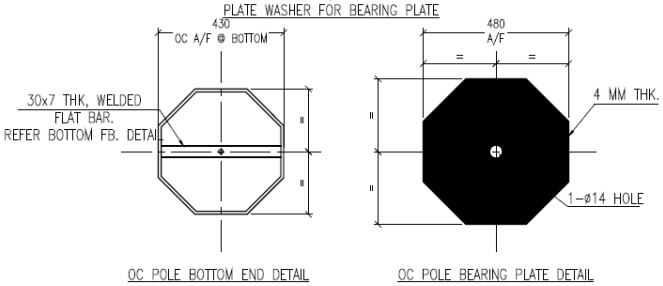
NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC14S SHALL BE OF ø22mm TO SUIT M20 BOLTS EXCEPT HOLES INDICATED BY "A".
3. HOLES INDICATED BY (A) ARE ø18mm (2NOS ONLY)
4. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
5. THE STEEL POLE SHALL BE IN SINGLE PIECE.
6. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
7. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
8. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
9. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.









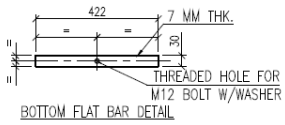
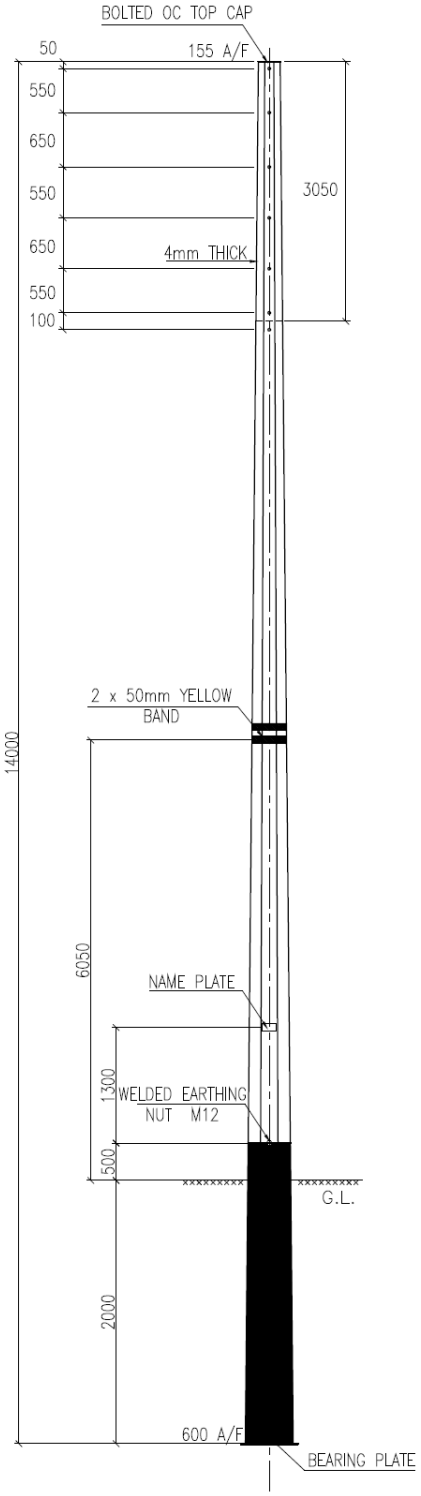
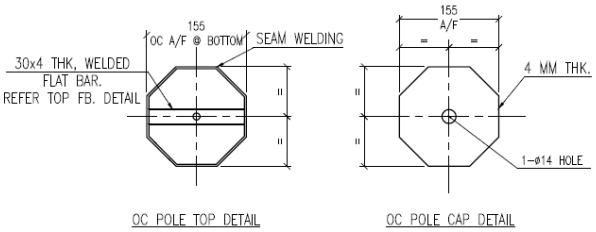


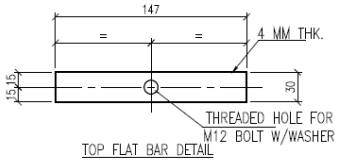
Figure 4: OC14D – 14 Meter Octagonal Steel Pole for Medium-Voltage, Double Circuit

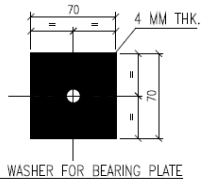


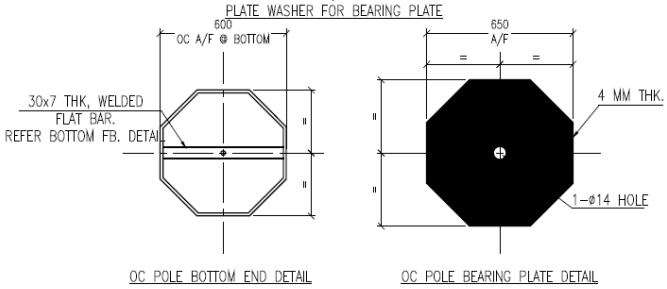
NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC14D SHALL BE OF ø22mm TO SUIT M20 BOLTS.
3. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
4. THE STEEL POLE SHALL BE IN SINGLE PIECE.
5. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
6. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
7. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
8. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.









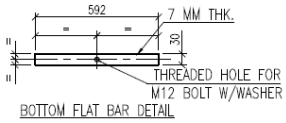
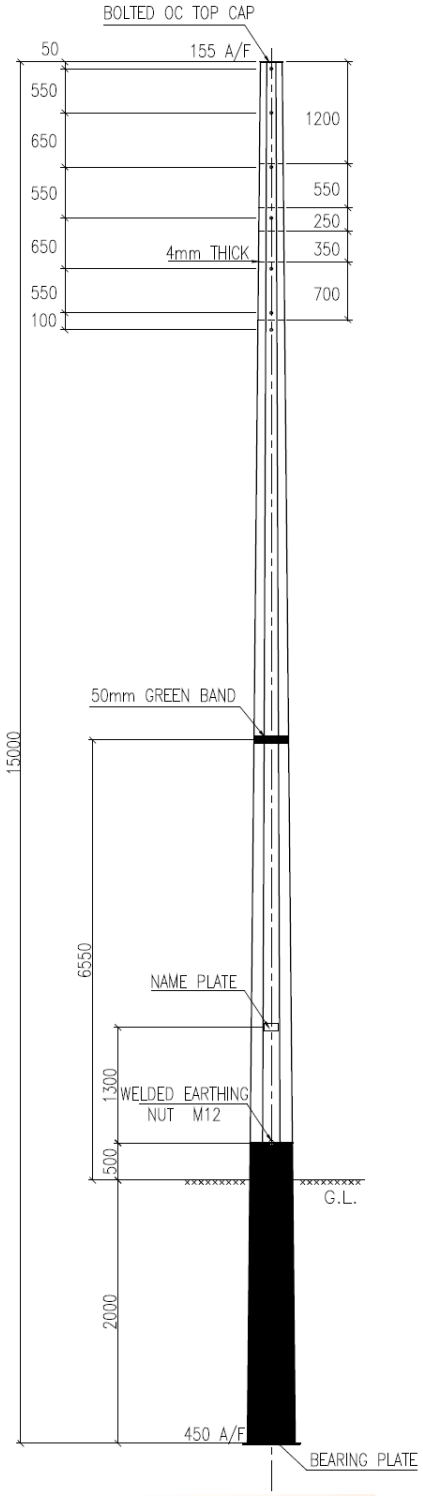
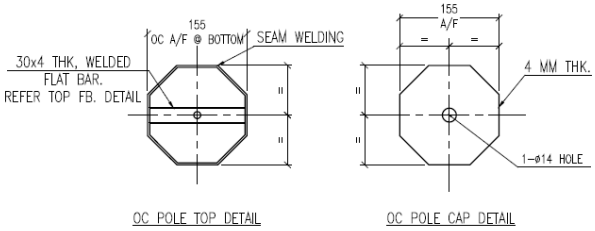


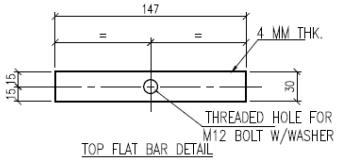
Figure 5: OC15S/D – 15 Meter Octagonal Steel Pole for Medium-Voltage, Single or Double Circuit

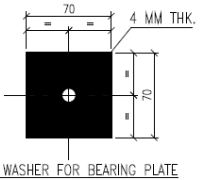


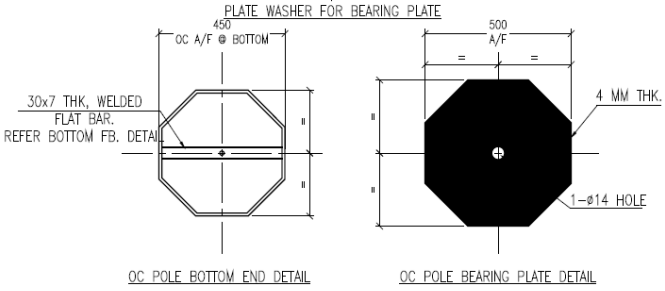
NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC15S/D SHALL BE OF ø22mm TO SUIT M20 BOLTS.
3. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
4. THE STEEL POLE SHALL BE IN SINGLE PIECE.
5. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
6. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
7. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
8. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.









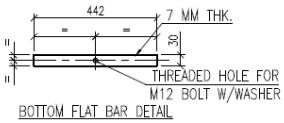
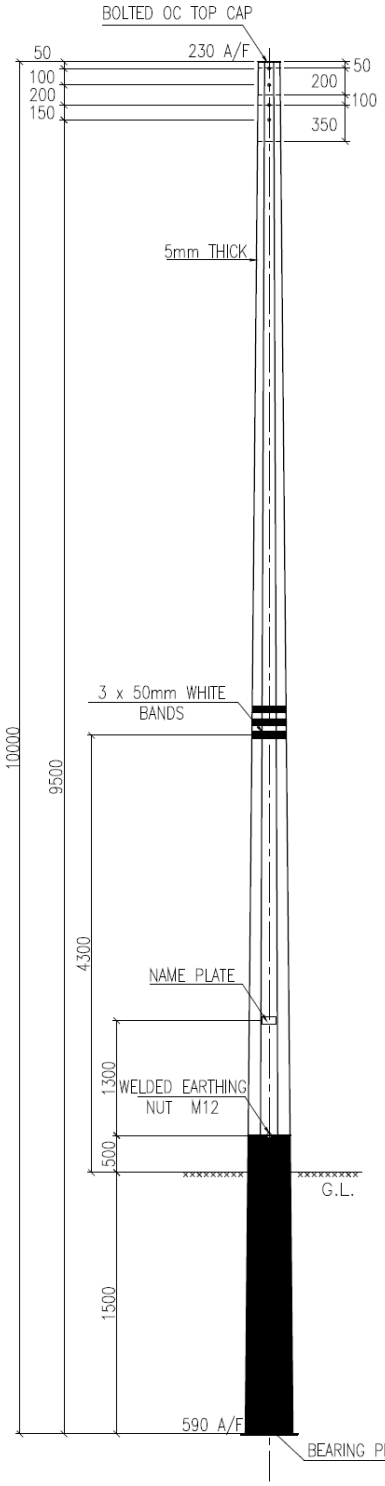
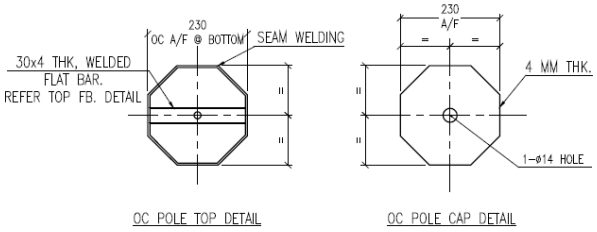


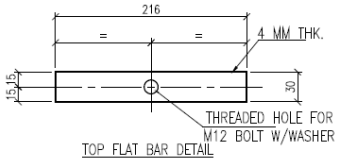
Figure 6: OC10SFS – 10 Meter Octagonal Steel Pole for Low-Voltage, Self-Support

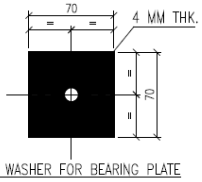


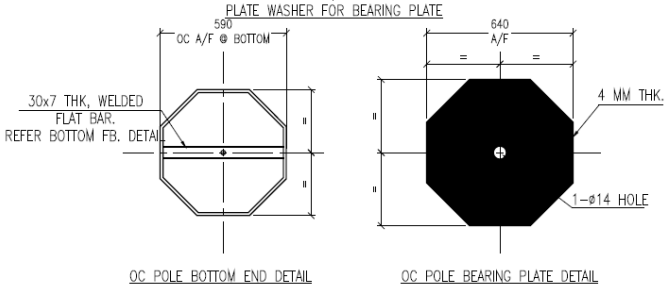
NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC10SFS SHALL BE OF ø18mm TO SUIT M16 BOLTS.
3. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
4. THE STEEL POLE SHALL BE IN SINGLE PIECE.
5. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
6. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
7. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
8. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.









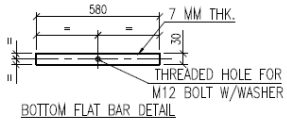
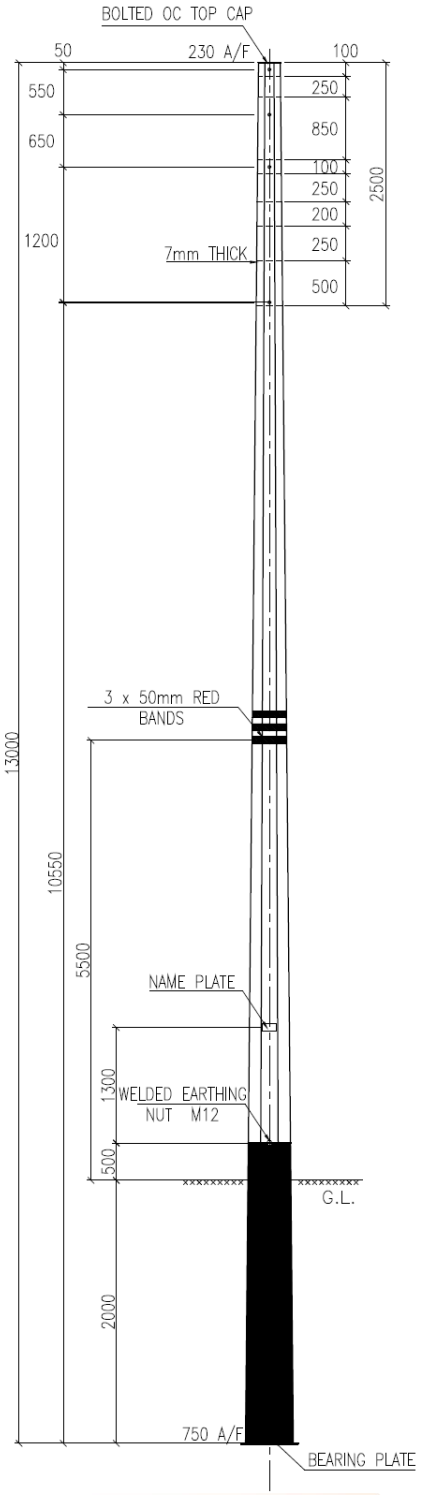
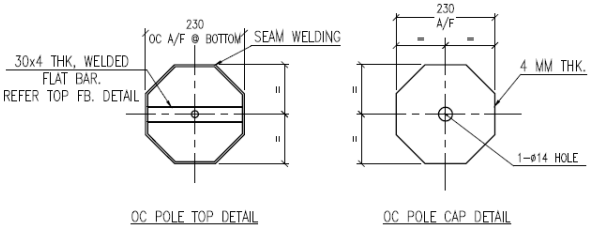


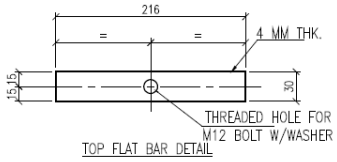
Figure 7: OC13SFS – 13 Meter Octagonal Steel Pole for Medium-Voltage, Self-Support Single-Circuit

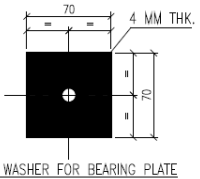


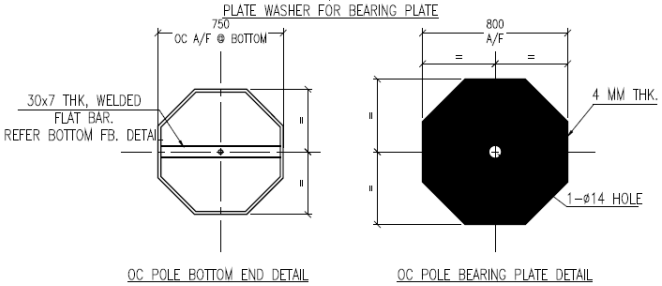
NOTE:

1. ALL DIMENSION ARE IN MILLIMETER.
2. ALL HOLES OF OCTAGONAL STEEL POLE, OC13SFS SHALL BE OF ø22mm TO SUIT M20 BOLTS.
3. ALL HOLES SHALL BE PROVIDED WITH UV RESISTANT PLASTIC PLUGS.
4. THE STEEL POLE SHALL BE IN SINGLE PIECE.
5. TOP END OF THE POLE SHAFT SHALL BE PROVIDED WITH WEATHERPROOF, HIGH-TEMP RATED, SILICONE U-TYPE EDGE SEALING GASKET PRIOR TO MOUNTING OF THE TOP CAP.
6. ALL HOLES SHALL BE PRE-DRILLED PRIOR TO GALVANIZING.
7. BITUMEN COATED :-
   EXTERNAL PLANTED DEPTH + 500mm
   INTERNAL 1,000mm FROM BOTTOM
8. ALL OCTAGONAL STEEL POLES SHALL BE SUPPLIED PRE-ASSEMBLED.









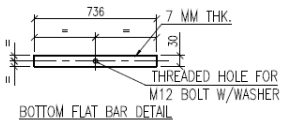


Figure 8: OC14SFS – 14 Meter Octagonal Steel Pole for Medium-Voltage, Self-Support Single-Circuit

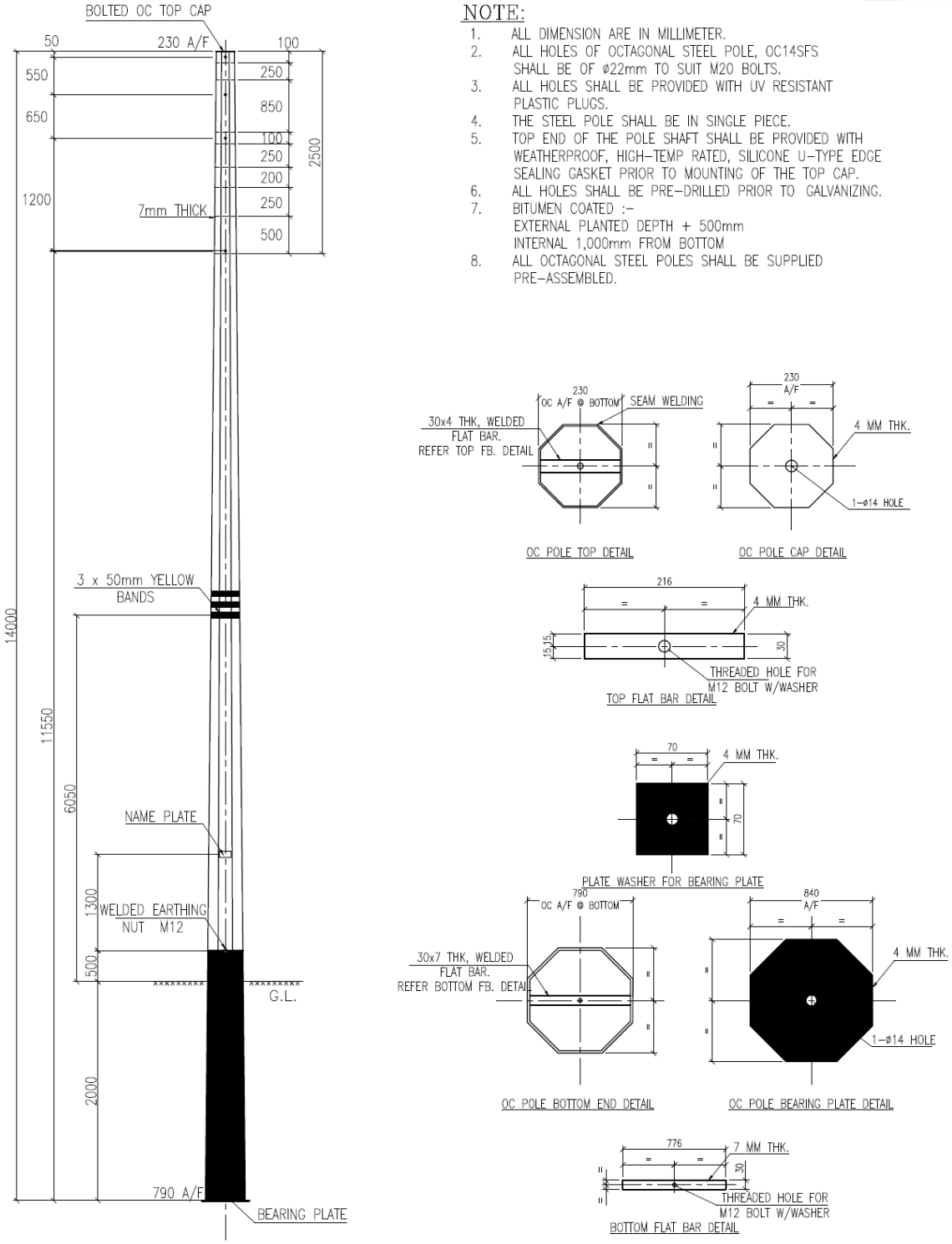


Figure 9: OC15SFS – 15 Meter Octagonal Steel Pole for Medium-Voltage, Self-Support Single-Circuit