

Bharat Heavy Electricals Limited
Transmission Business Group
Noida

Dated: 04.11.2019

Customer: M/s MPPTCL

Project: Construction of new 400kV sub-stations , transmission lines and Augmentation work/feeder bay work on total turnkey basis TR-501(Lot No1) against dts 28.02.2014

Bill of Quantity

<u>Sno</u>	<u>Description</u>	<u>UOM</u>	<u>Qty</u>
1	400kV BPI – 8kN with Corona Ring	Nos	1

-----XXX-----



MADHYA PRADESH POWER TRANSMISSION CO.LTD.
(A wholly owned Govt. of Madhya Pradesh Undertaking)
CIN: U40109MP2001SGC014880

Block No.3 Shakti Bhawan, Rampur, Jabalpur (M.P.) 482008
Phone : (0761)270-2162, 2238, 2134 Fax:(0761)2665593 e-mail: mptransco@nic.in

No. 04-01/ADB-III/TR-501/Lot-1/TK-II / 4683

Dated : 17 JUN 2015

To,

M/s. Bharat Heavy Electricals Ltd,
Tower-A, 5th Floor, Advant Navis
IT Business Park, Plot No. 7,
Express Highway, NOIDA, UP

Fax 0120-6748494

Sub: Construction of new 400kV sub-stations, transmission lines and Augmentation work/feeder bay work on total turnkey basis TR-501(Lot no. 1) against contract dtd. 28.02.2014.

Ref:- i. Your letter No. TBEM/MPPTCL/TR-501/83012/LOT-1/400PI/SK dtd. 06.06.2015.
ii. This office order No. 04-01/ADB-III/MPPTCL/TR-501/Lot-1/TK-II/06602-3 dtd.28.02.2014.

Dear Sirs,

This has reference to your letter dtd. 06.06.2015 vide which you have submitted M/s Sarvana make drawings of 400 KV solid core cylindrical post Insulator for our approval against contract dtd 28.02.2014, as per following details:-

Sl No.	Drawing/details (Solid core Insulators)	Drg. No.
1	400 KV Solid Core cylindrical post Insulator (C8-1800)	400-SC-A-0110 Rev. 03
2	Top, Middle & bottom units for 400 kV Solid core cylindrical post	SIL-MC-9322
3	Shed Profile for 400 kV Solid core cylindrical Post	SIL-MC-8557
4	Corona grading ring for 400 kV Solid core cylindrical post	SIL-MC-8242T Rev. 01

All the above drawings are generally found in order and are hereby approved. Copies of the approved drawings duly stamped are enclosed herewith for your further needful.

Thanking you.

Encl : As above

Yours sincerely,

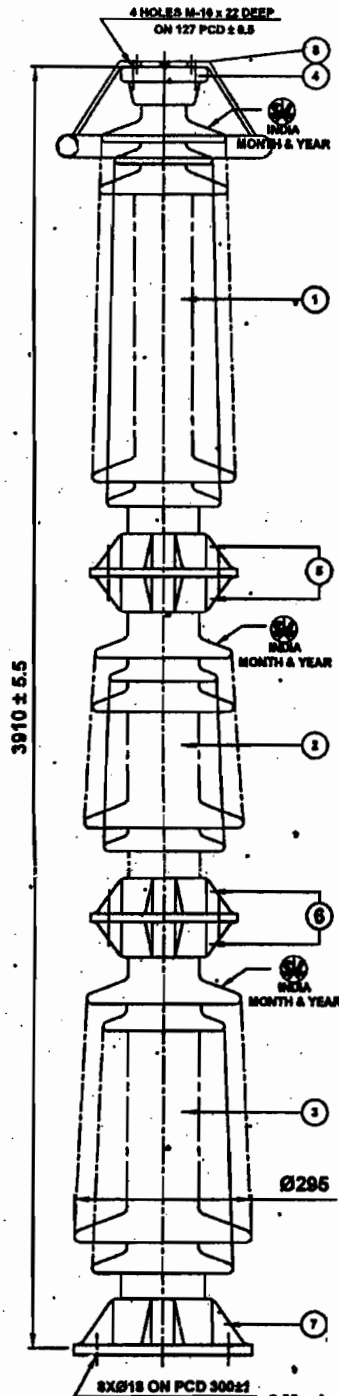
Chief Engineer (Procurement)

Copy to:

1. The Chief Engineer (EHT-C) MPPTCL, Jabalpur.
2. The Chief Engineer (EHT-M&I) MPPTCL, Jabalpur, with one set of drawing.
3. The S.E. (EHT) Circle, MPPTCL, Bhopal/Jabalpur/Indore.
4. The Executive Engineer (EHT:C.)Dn. MPPTCL, Bhopal/Barwaha-II/Ujjain with one set of drawing.
5. The Executive Engineer (EHT:C.) Dn.-I MPPTCL, Jabalpur with one set of drawing.

400-SC-A-0110

ALL DIMENSIONS ARE IN MM

**GUARANTEED TECHNICAL PARTICULARS****GENERAL :**

- STANDARDS APPLICABLE : IS 2544 - 1973 / IS:5350-II-1973/
IEC : 60168 - Ra- 2001
- TYPE OF INSULATOR : SOLIDCORE POST - A- PUNCTURE PROOF
- NO. OF UNITS PER STACK THREE
- MIN. NOM. CREEPAGE DISTANCE MM 10500
- PRO. CREEPAGE DISTANCE MM 4275
- DRY ARGING DISTANCE MM 3400
- SHED PROFILES CONFORMS TO IEC 60815-1986
- COLOUR OF GLAZE : BROWN
- FERROUS PARTS HOT DIP GALVANISED CONFORMS TO
IS : 2633 - 1986, IEC : 60168 - Ra-2001.
- NET WEIGHT (APPROX) KGS 340

MECHANICAL VALUES :

- ULTIMATE CANTILEVER STRENGTH KN 8
- ULTIMATE TORSIONAL STRENGTH KN.M 6
- ULTIMATE TENSILE STRENGTH KN 167
- ULTIMATE COMPRESSION STRENGTH KN 330

ELECTRICAL VALUES :

- NOMINAL SYSTEM VOLTAGE KV (rms) 400
- HIGHEST SYSTEM VOLTAGE KV (rms) 420
- DRY POWER FREQUENCY WITHSTAND VOLTAGE KV (rms) 760
- WET POWER FREQUENCY WITHSTAND VOLTAGE KV (rms) 680
- LIGHTNING IMPULSE WITHSTAND VOLTAGE (1.2 / 50 μ SEC. WAVE) KV (peak) 1800
- DRY POWER FREQUENCY FLASHOVER VOLTAGE KV (rms) 890
- WET POWER FREQUENCY FLASHOVER VOLTAGE KV (rms) 820
- LIGHTNING IMPULSE FLASHOVER VOLTAGE (1.2 / 50 μ SEC. WAVE)

POSITIVE	KV (peak) 1850
NEGATIVE	KV (peak) 1875
- SWITCHING SURGE WITHSTAND VOLTAGE KV (Peak) 1175
- CORONA EXTINCTION VOLTAGE KV (Peak) >320
- RIV DATA

TEST VOLTAGE TO GROUND	KV (rms) 305
MAX. RIV AT 0.5 TO 2 Mhz	KV (rms) 300

Bolt, Nut and Washer details

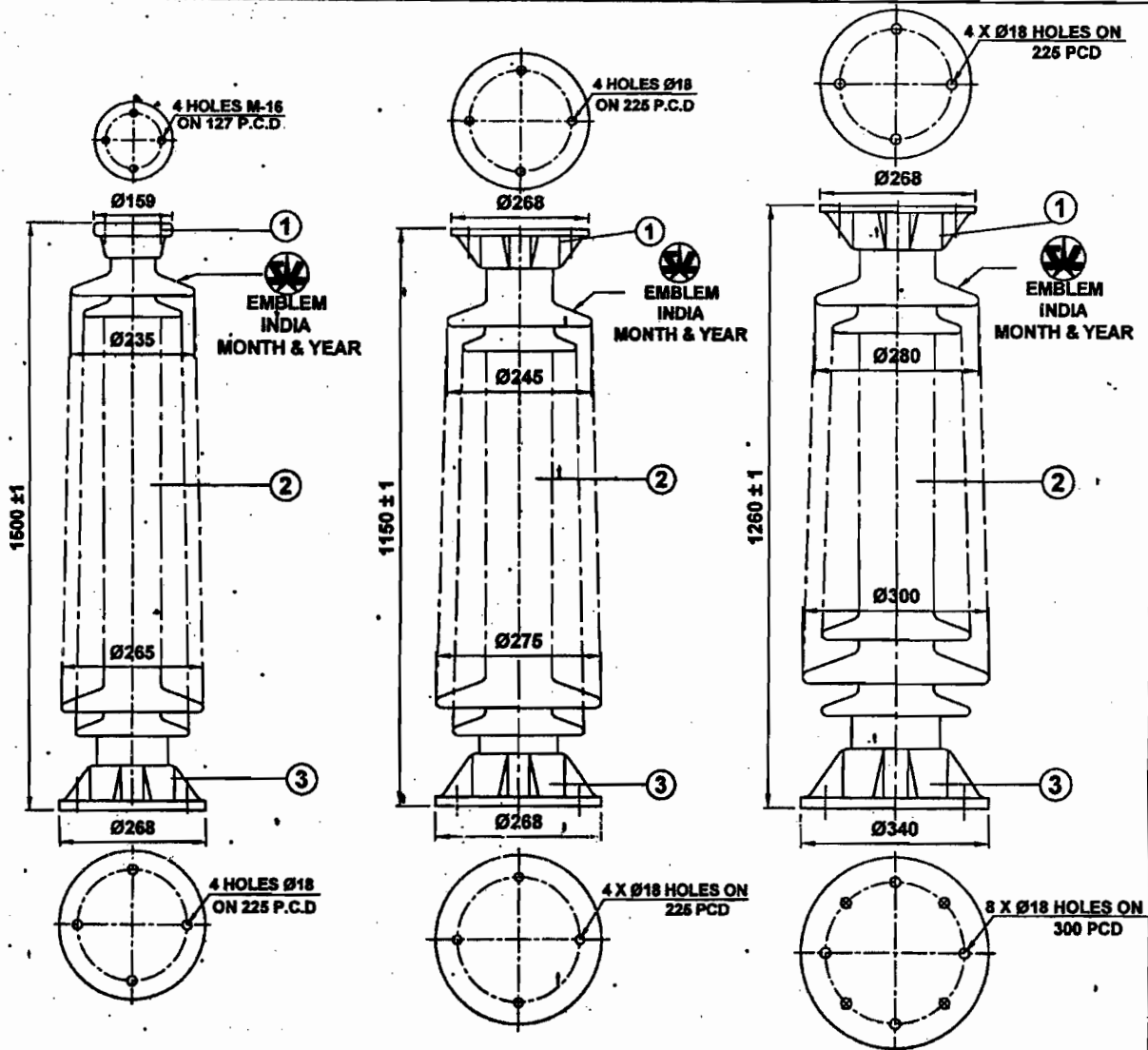
Unit-1 -Top side -4Nos x M16 x 35 Length
 Middle-1- 4 Nos x M16 X 60Length & 4Nos spring washer
 Middle -2-4 Nos X M16 X 60 Length & 4 Nos Spring washer
 Bottom unit- 8 Nos x M16 x 60 Length & 8.Nos Spring washer

APPROVED
 Executive Engineer (S/s) III
 O/o Chief Engineer (Procurement)
 MPPTCL, JABALPUR

* Mechanical Value SL.No.4 & Electrical values sl.no.3,6 & 7 As per customer specification modified

8 *	CORONA GRADING RING	AL. ALLOY - DRG.NO.SIL-MC-8242/T	1	---
4,5,6 & 7	CAP & FLANGE	M.C.I. / S.G.I.	6	HOT - DIP - GALVANIZED
1, 2 & 3	INSULATOR BODY	PORCELAIN KER - 110.2	3	BROWN GLAZED
SL. No.	DESCRIPTION	MATERIAL	No.OFF	FINISH
CUSTOMER REF. OWNER MADHYA PRADESH POWER TRANSMISSION COMPANY LIMITED PROJECT CONSTRUCTION OF NEW 400KV SUB STATION, TRANSMISSION LINES AND AUGMENTATION WORK/FEEDER BAY WORK ON TOTAL TURN KEY BASIS (LOT NO. -1) -BALAGHAT, BADNAWAR, BHOPAL, CHHEGAON AND NAGDA EPC PURCHASER BHARAT HEAVY ELECTRICALS LTD TRANSMISSION BUSINESS GROUP			SCALE NTS	MAT. SEE TABLE P = 278 A = 340
TITLE			DRAWN	R.DN
400 / 420 KV			CHECKED	R.R. <i>By</i>
SOLIDCORE CYLINDRICAL POST INSULATOR			APPROVED	Dr.APG
(C8 - 1800)			DATE	31.04.04
SARAVANA GLOBAL ENERGY LIMITED			DRG. NO.	REV.
Adminl. Office & Works : Cuddalore Road, P.N. Kuppam, Kurinjipadi Post			400-SC-A-0110	3
Cuddalore Dist. 607 302 Tamil Nadu.				

REV.3 DATE : 05.07.08.
 REV.2 DATE : 14.07.08
 REV.1 DATE : 30.07.05



TOP UNIT
MIN. CREEPAGE DISTANCE: 4500mm

MIDDLE UNIT
MIN. CREEPAGE DISTANCE: 2800mm

BOT. UNIT
MIN. CREEPAGE DISTANCE: 3200mm

GUARANTEED TECHNICAL PARTICULARS

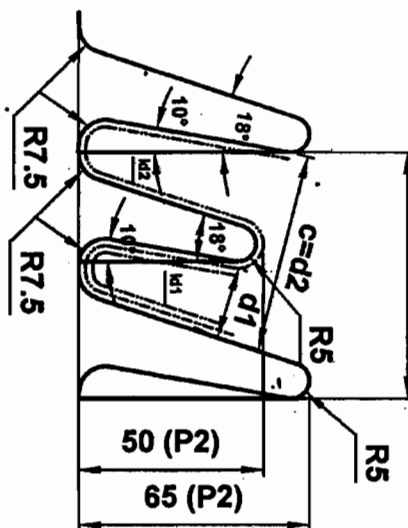
GENERAL:

1. REFERENCE STANDARDS : IS 2544 - 1973 / IEC : 60168 - 2001
2. TYPE OF INSULATOR : SOLIDCORE POST TYPE
3. SHED PROFILES CONFORMS TO IEC 60815-1986

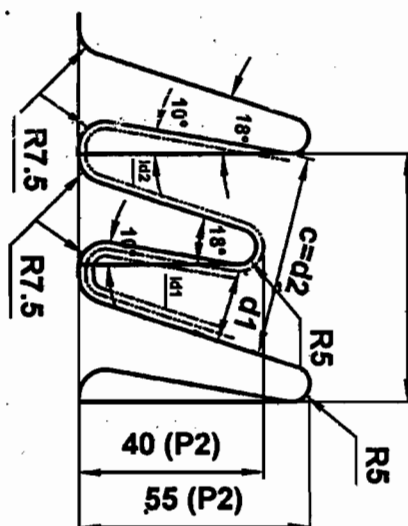
APPROVED
Executive Engineer (S/s) III
O/o Chief Engineer (Procurement)
MPPTCL, JABALPUR
4. GENERAL TOLERANCE UNLESS SPECIFIED
 $\pm (0.04 D + 1.5)$ WHERE 'D' IS ≤ 300 mm
 $\pm (0.025 D + 6)$ WHERE 'D' IS ≥ 300 mm
WHERE 'D' IS THE DIMENSION SPECIFIED IN mm

3	METAL PART (FLANGE)	M.C.I. / S.G.I.	6	HOT - DIP - GALVANIZED
2	PORCELAIN	ALUMINA PORCELAIN KER - 110.2	3	BROWN GLAZED
1	METAL PART (CAP)	M.C.I. / S.G.I.	1	HOT - DIP - GALVANIZED
SL. No.	DESCRIPTION	MATERIAL	No. OFF	FINISH
OWNER MADHYA PRADESH POWER TRANSMISSION PROJECT CONSTRUCTION OF NEW 400KV SUB STATION, TRANSMISSION LINES AND AUGMENTATION WORK/FEEDER BAY WORK ON TOTAL TURN KEY BASIS (LOT NO. -1)-BALAGHAT, BADNAWAR, BHOPAL, CHHEGAON AND NAGDA EPC PURCHASER BHARAT HEAVY ELECTRICALS LTD			SCALE NTS	MAT. SEE TABLE
TITLE TOP, MIDDLE & BOT UNITS FOR 400 KV SOLIDCORE INSULATOR TO DRG. No. 400-SC-A-0110			DRAWN	SA.T
			CHECKED	R.R.
			APPROVED	Dr.APG
			DATE	09.02.11
 SARAVANA GLOBAL ENERGY LIMITED Adminl. Office & Works : Cuddalore Road, P.N. Kuppam, Kurinjipadi Post Cuddalore Dist. 607 302 Tamil Nadu.			DRG. NO. SIL-MC-9322	
			REV. 0	

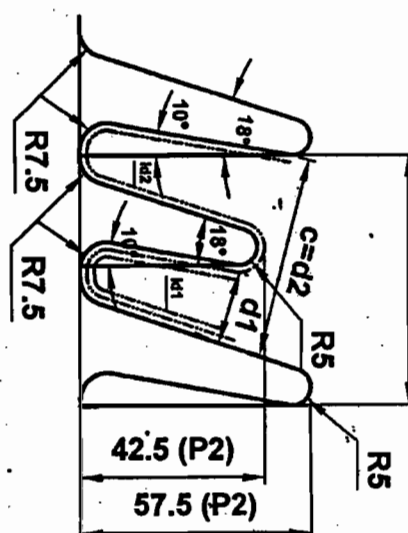
69 (S)



69 (S)



69 (S)



ALL DIMENSIONS ARE IN MM

SHĒD PARAMETERS CONFORMS TO IS : 13134 - 1992 (IEC 815)

OMER, MADHYA PRADESH POWER TRANSMISSION
CONSTRUCTION OF NEW 400KV SUB STATION, TRANSMISSION LINES
AND AUGMENTATION WORK/FEEDER BAY WORK ON TOTAL TURN KEY BASIS
(LOT NO. -1)- BALASAHIT, BADNWAR, BHOPAL, CHHESGAON AND MUSA

PARAMETERS

VALUES AS PER EC: 815	VALUES AS PER SHEDS
c = d2 ≥ 30	56
S/P > 0.8	69/66 = 1.06
Id1/d1 < 6.0	96/29 = 4.76
Id2/d2 < 6.0	235/56 = 4.19
PF > 0.70	2 (66-50)/69/235 = 4.115
CF	4660/1300 = 3.57
P1-P2 ≥ 16.0	65-50 = 15.0

PARAMETERS

VALUES AS PER IEC: 618	VALUES AS PER IEC:60
$\alpha = d_2 \geq 20$	60
$S/F > 0.8$	$60/55 = 1.09$
$d_1/d_1 < 6.0$	$77/20 = 3.85$
$d_2/d_2 < 6.0$	$106/56 = 1.90$
$P/F > 0.70$	$2(56+40)/90 = 2.20 = 1.125$
$C/F \leq 4.0$	$2000/560 = 3.57$
$P_1/P_2 \leq 16.0$	$65/40 = 1.63$

PARAMETERS

VALUES AS PER ISO: 610	VALUES AS PER BS200
$\sigma = d/2 \geq 30$	84
$S/P \geq 0.5$	$69/67.5 = 1.2$
$d1/d1 < 0.5$	$83/70 = 1.1$
$d2/d2 < 0.5$	$92/86 = 1.06$
$Pf > 0.70$	$2(67.5+42.5)+66/240 = 1.12$
$Cf \leq 4.0$	$3200/1030 = 3.10$
$P1, P2 \geq 16.0$	$67.5 - 42.5 = 15.0$

APPF

Executive Engineer (S/s) III
O/o Chief Engineer (Procurement)

TITLE	MBPTCL JABALPUR SHED PROFILE FOR 400/420 KV, SOLIDCORE POST INSULATOR TO DRG. No. 400-SC-A-0110
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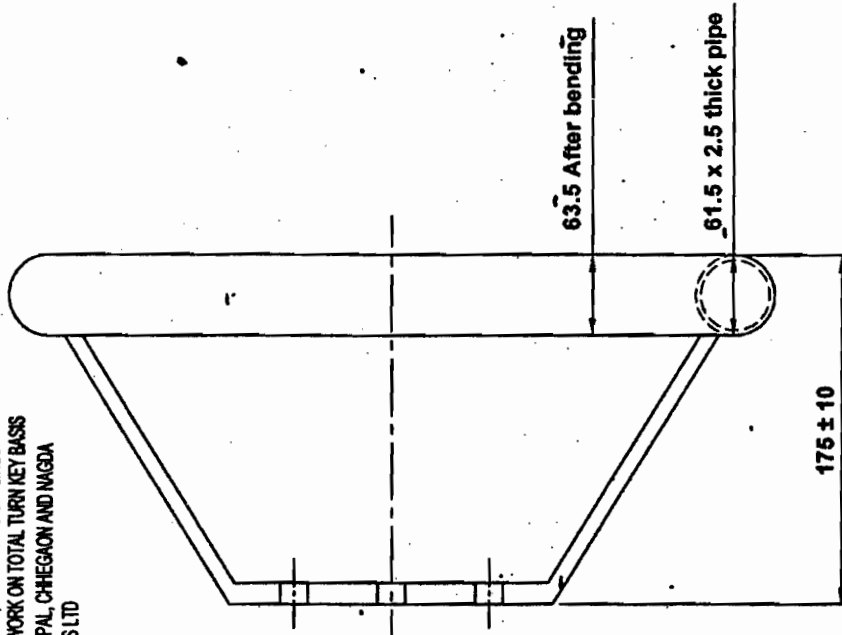
SARAVANA GLOBAL ENERGY LIMITED



Cuddalore Dist. 607 202 Tamil Nadu

DRG. NO.
SIL-MC-8557

Technical drawing of a circular component. The drawing shows a top view of a circular part with a central hole. The central hole has a diameter of $\varnothing 550 \pm 2$. The outer diameter of the component is 165 ± 5 . The drawing includes a section line and a weld symbol, indicating that the flange is welded to the main body.



APPROVED

Executive Engineer (S/s) III
Chief Engineer (Procurement)
MPPTCL, JABALPUR

TOLERANCES ON PIPE BENDING (ON 63.5) $\pm 9\%$

TITLE										CORONA GRADING RING FOR 400 KV SOLIDCORE INSULATOR										SCALE NTS		MAT.		AL. ALLOY	
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SIL DRG.No.										SIL DRG.No.															
CUS. DRG.No.										CUS. DRG.No.															
REV.										REV.															
DATE										DATE															
ALT. BY										ALT. BY															
CORONA RING TWO JOINING MENTIONED										CORONA RING TWO JOINING MENTIONED															
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