DOCUMENT NO. : 4410-001-572-PVE-B-0133 - DRAWING & GTP / DATA SHEET FOR 420 KV BPI Rev00

420 kV, 8kN Solid Core Post Insulator (M/s. IEC Make)

Sr. No.	Drawing/Document No.	Revision No.	Document & Drawing Title
1	8901	Rev. 1	G.A. DRAWING & DATA SHEET (GTP) FOR 420 kV SOLIDCORE POST INSULATOR
2	PF / 8959-P1	Rev. 0	TOP SHELL FOR 420 kV SOLIDCORE POST INSULATOR
3	PF / 8959-P2	Rev. 0	MIDDLE SHELL FOR 420 kV SOLIDCORE POST INSULATOR
4	PF / 8901-P3	Rev. 0	BOTTOM SHELL FOR 420 kV SOLIDCORE POST INSULATOR
5	T / H1 S 026	Rev. 0	TOP CAP (127 PCD)
6	T / H2 S 6556	Rev. 0	INTERMEDIATE FLANGE-1 (200 PCD)
7	T / H2 S 6660	Rev. 0	INTERMEDIATE FLANGE-2 (254 PCD)
8	T / H2 S 6705	Rev. 0	BOTTOM FLANGE (300 PCD)
9	T / H2 S 400 0 001	Rev. 1	CORONA GRADING RING FOR 420kV SOLIDCORE INSULATOR

PROJECT : NORTH KARANAPURA SUPER THERMAL POWER PROJECT (3 x 660 MW)

CUSTOMER / OWNER :

N.T.P.C LTD.,
(A Government of India Enterprise)

EPC CONTRACTOR

BHEL PO No.125P167
dtd. 16.11.15

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP, MM, IOC, LODHI ROAD, NEW DELHI

SUPPLIER / MANUFACTURER

INSULATORS AND ELECTRICALS COMPANY COMPANY
(PROP: HINDUSTHAN URBAN INFRASTRUCTURE LTD.,)
MANDIDEEP (M.P)

TOTAL NO. OF PAGES			ONE
	NAME	SIGN	DATE
DSND			
CHKD			
APPD			

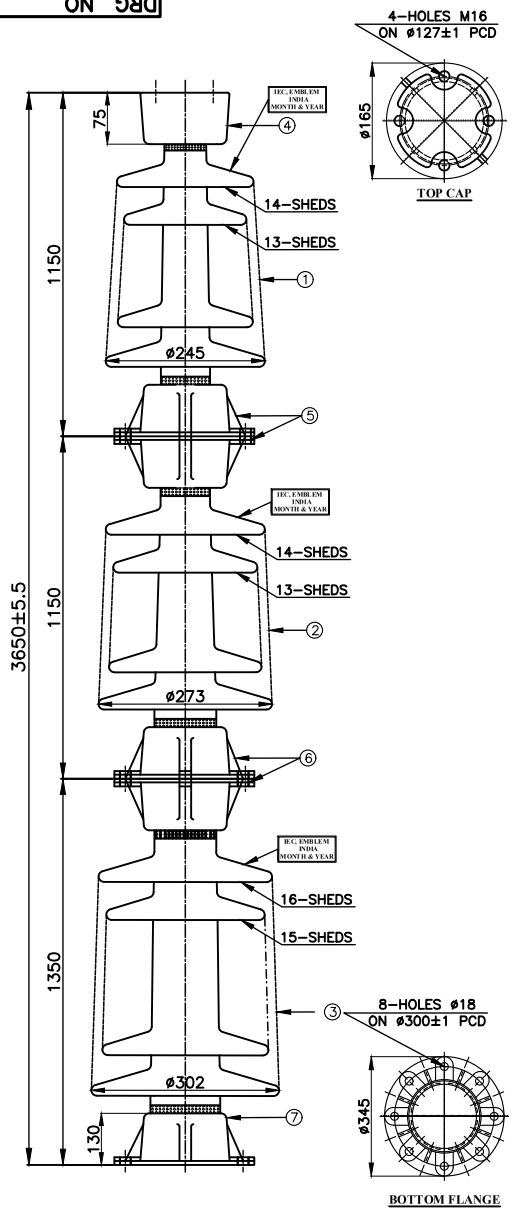
TITLE : IEC DRG. No. 8901 Rev 1

DRAWINGS AND GTP / DATA SHEET FOR
420 kV, 8kN SOLID CORE POST INSULATORS
(M/s. IEC Make)

SUBMITTED FOR [ ] PRELIMINARY [ ] TENDER [ ] INFORMATION [✓] APPROVAL [ ] CONSTRUCTION

DRG. NO. 8901

ALL DIMENSIONS ARE IN mm



GUARANTEED TECHNICAL PARTICULARS :-

GENERAL :-

1. Applicable standards IS:2544 / IS:5350 / IEC:60273
   IEC:60168 / IEC:60815
2. Type : Solidcore Post Insulator
3. Colour of Glaze : Brown
4. All ferrous parts are to be hot dip galvanized
5. Power frequency puncture voltage — kV — Puncture proof
6. Min.Nom.Creepage distance — mm — 10500
7. Weight of complete stack (approx.) — kg — 251

MECHANICAL VALUES :-

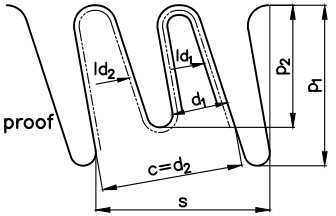
1. Ultimate Cantilever strength (Upright)	kN	8.0
2. Ultimate Torsional strength	kNm	6.0
3. Ultimate Tensile strength	kN	160
4. Ultimate Compression strength	kN	320

ELECTRICAL VALUES :-

1. Nominal system voltage	kV(rms)	400
2. Highest system voltage	kV(rms)	420
3. Power frequency withstand voltage (Dry)	kV(rms)	760
4. Power frequency withstand voltage (Wet)	kV(rms)	680
5. Power frequency flashover voltage (Dry)	kV(rms)	720
6. Power frequency flashover voltage (Wet)	kV(rms)	700
7. Lightning impulse withstand voltage (1.2 / 50 μ sec. +Ve/−Ve wave)	kVp	1550
8. Lightning Impulse flashover voltage (+Ve)	kVp	1600
(−Ve)	kVp	1650
9. Switching impulse withstand voltage (Wet)	kVp	1175
10. Min. Corona extinction voltage	kV	320

RADIO INTERFERENCE VOLTAGE DATA

Test voltage to ground	kV(rms)	305
Max. RIV at 1 MHz	uV.	< 500



SHED PROFILE

420 kV	AS PER IEC : 60815	PART-1 (ACTUAL)	PART-2 (ACTUAL)	PART-3 (ACTUAL)
$c=d_2$	≥ 30	57	57	58
s/p_1	≥ 0.8	1.08	1.08	1.11
l_{d1}/d_1	< 5	3.75	3.75	3.60
l_{d2}/d_2	< 5	3.96	3.96	3.82
p_1-p_2	≥ 15	15	15	15
l_t/S_t	≤ 4	3.50	3.48	3.60
$(2p_1+2p_2+s)/l$	> 0.7	1.10	1.10	1.10

Recommended Hardware For Mounting :
Top : M16 x 35 Long - 4 Nos. M.S. Bolts
Middle : M16 x 60 Long - 12 Nos.M.S. Bolts
Bottom : M16 x 60 Long - 8 Nos.M.S. Bolts
(With Nuts & Washers)

S.No.	DESCRIPTION	MATERIAL	QTY.	FINISH
7.	BOTTOM FLANGE	MCI/SGI	1	HOT DIP GALVANIZED
6.	INTERMEDIATE FLANGE−2	MCI/SGI	2	HOT DIP GALVANIZED
5.	INTERMEDIATE FLANGE−1	MCI/SGI	2	HOT DIP GALVANIZED
4.	TOP CAP	MCI/SGI	1	HOT DIP GALVANIZED
3.	BOTTOM SHELL	PORCELAIN	1	BROWN GLAZED
2.	MIDDLE SHELL	PORCELAIN	1	BROWN GLAZED
1.	TOP SHELL	PORCELAIN	1	BROWN GLAZED

PROJECT: NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)

OWNER: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

QBTGM: BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, TRANSMISSION BUSINESS GROUP, NOIDA

BHEL P.O. No. : 125P167 dated 16.11.15

NTPC Doc. No. : 4410-001-572-PVE-B-0133

INSULATORS & ELECTRICALS COMPANY (PROP:−HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)

DRN.	A.K.D.	14.11.03
CHKD.		
APPD		

REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH
	N.T.S.		PORCELAIN & MCI / SGI	AS ABOVE

TITLE: 420 kV SOLIDCORE POST INSULATOR

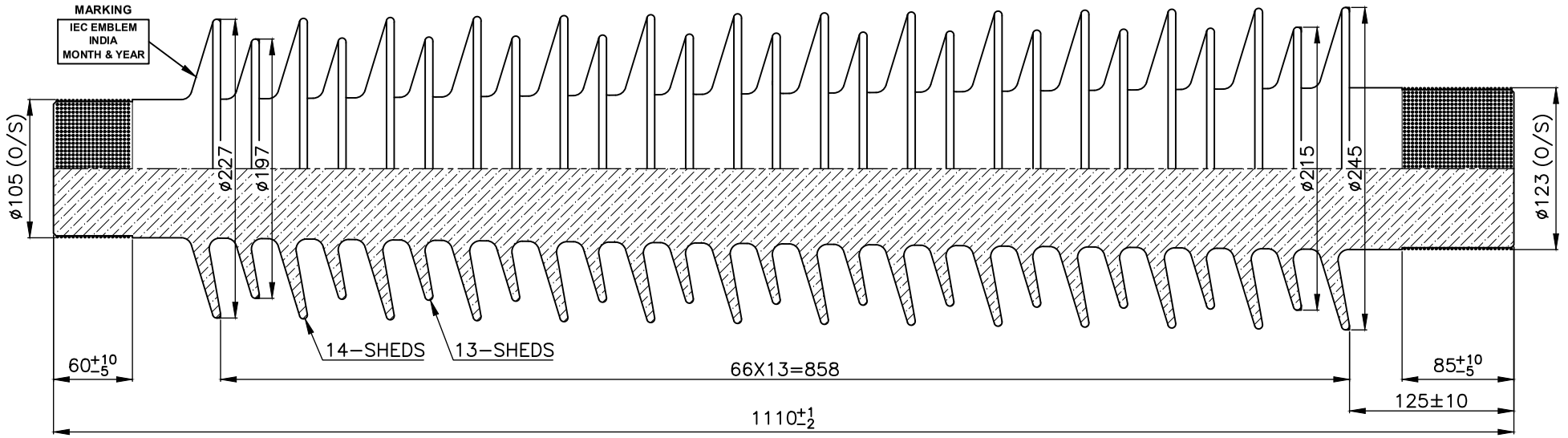
DRAWING NO. 8901 REV 1

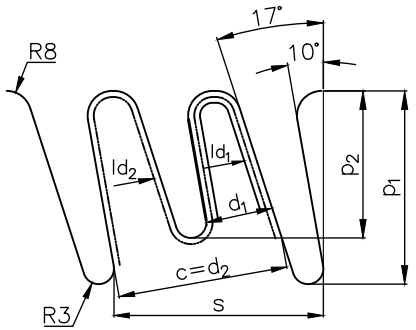
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

1.The equipment should confirm to heavy pollution class -III of IEC60815.
2.The make of equipment is subject to NTPC QA approval.

DRG. NO. PF / 8959-P1

ALL DIMENSIONS ARE IN mm





SHED PROFILE

420 kV	AS PER IEC : 60815	ACTUAL
$c=d_2$	≥ 30	57
s/p_1	≥ 0.8	1.08
l_{d1}/d_1	< 5	3.75
l_{d2}/d_2	< 5	3.96
p_1-p_2	≥ 15	15
Creepage Factor	≤ 4	3.50
Profile Factor	> 0.7	1.10

NOTES :-

1. STANDARDS APPLICABLE IS:2544 / IS:5350 / IEC:60815 / IEC:60168
2. SURFACES MARKED THUS ▽▽ ARE TO BE UNGLAZED AND GROUND & PERPENDICULAR TO THE AXIS & PARALLEL TO EACH OTHER.
3. COLOUR OF PORCELAIN = BROWN GLAZED.
4. MINIMUM NOMINAL CREEPAGE DISTANCE = 3365 mm.

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA
	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)

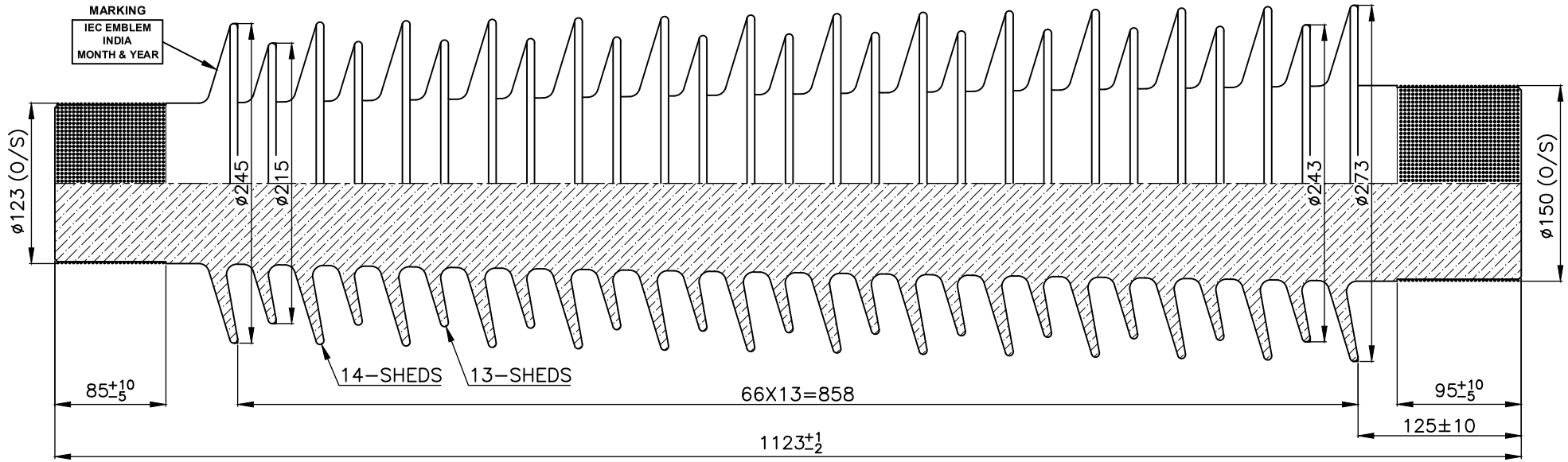
DRN.	SUNIL	27.10.14
CHKD.	A.K.D.	27.10.14
APPD	S.A.P.	27.10.14

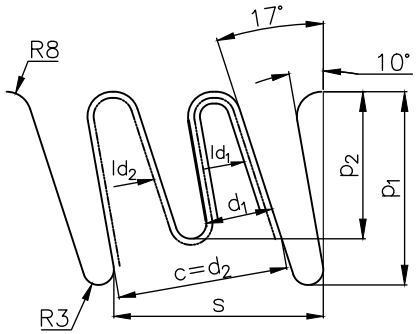
REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH	WT.(KG.)
	--		PORCELAIN	AS ABOVE	

TITLE	DRAWING NO.	REV
TOP SHELL FOR 420 kV SOLIDCORE POST INSULATOR	PF / 8959-P1	0

DRG. NO. PF / 8959-P2

ALL DIMENSIONS ARE IN mm





SHED PROFILE

420 kV	AS PER IEC : 60815	ACTUAL
$c=d_2$	≥ 30	57
s/p_1	≥ 0.8	1.08
l_{d1}/d_1	< 5	3.75
l_{d2}/d_2	< 5	3.96
p_1-p_2	≥ 15	15
Creepage Factor	≤ 4	3.48
Profile Factor	> 0.7	1.10

NOTES :-

1. STANDARDS APPLICABLE IS:2544 / IS:5350 / IEC:60815 / IEC:60168
2. SURFACES MARKED THUS ▽▽ ARE TO BE UNGLAZED AND GROUND & PERPENDICULAR TO THE AXIS & PARALLEL TO EACH OTHER.
3. COLOUR OF PORCELAIN = BROWN GLAZED.
4. MINIMUM NOMINAL CREEPAGE DISTANCE = 3355 mm.

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)		
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)		
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133	
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN. SUNIL 27.10.14 CHKD. A.K.D. 27.10.14 APPD S.A.P. 27.10.14	

REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH	WT.(KG.)
	--		PORCELAIN	AS ABOVE	

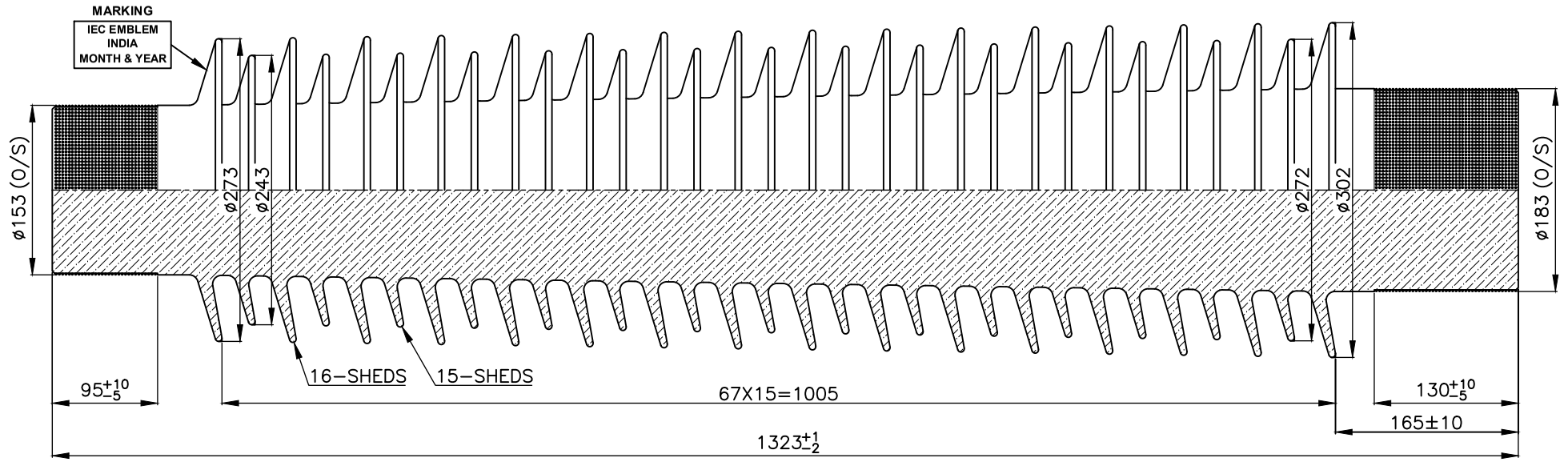
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

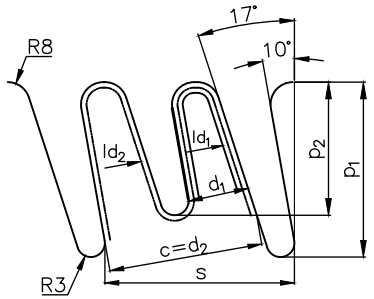
TITLE: MIDDLE SHELL FOR 420 kV SOLIDCORE POST INSULATOR

DRAWING NO. PF / 8959-P2 REV 0

DRG. NO. PF / 8901-P3

ALL DIMENSIONS ARE IN mm





SHED PROFILE

420 kV	AS PER IEC : 60815	ACTUAL
$c=d_2$	≥ 30	58
s/p_1	≥ 0.8	1.11
l_{d1}/d_1	< 5	3.60
l_{d2}/d_2	< 5	3.82
p_1-p_2	≥ 15	15
Creepage Factor	≤ 4	3.60
Profile Factor	> 0.7	1.10

NOTES :-

1. STANDARDS APPLICABLE IS:2544 / IS:5350 / IEC:60815 / IEC:60168
2. SURFACES MARKED THUS ▽▽ ARE TO BE UNGLAZED AND GROUND & PERPENDICULAR TO THE AXIS & PARALLEL TO EACH OTHER.
3. COLOUR OF PORCELAIN = BROWN GLAZED.
4. MINIMUM NOMINAL CREEPAGE DISTANCE = 3780 mm.

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA

BHEL P.O. No. : 125P167 dated 16.11.15

NTPC Doc. No. : 4410-001-572-PVE-B-0133

INSULATORS & ELECTRICALS COMPANY
(PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.)
MANDIDEEP (M.P.)

DRN.	A.K.D.	08.12.03
CHKD.	A. Choubey	27.10.14
APPD	A. Choubey	27.10.14

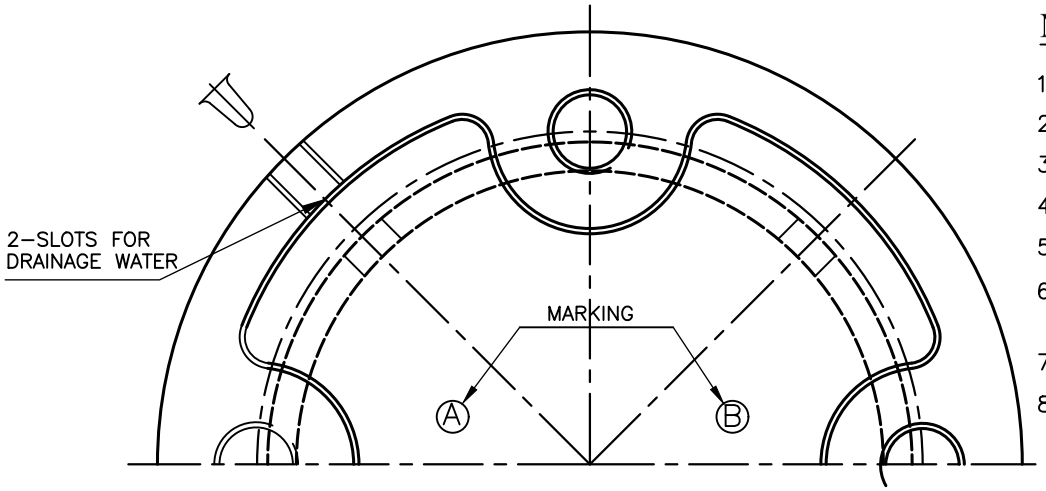
REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH	WT.(KG.)
	--		PORCELAIN	AS ABOVE	

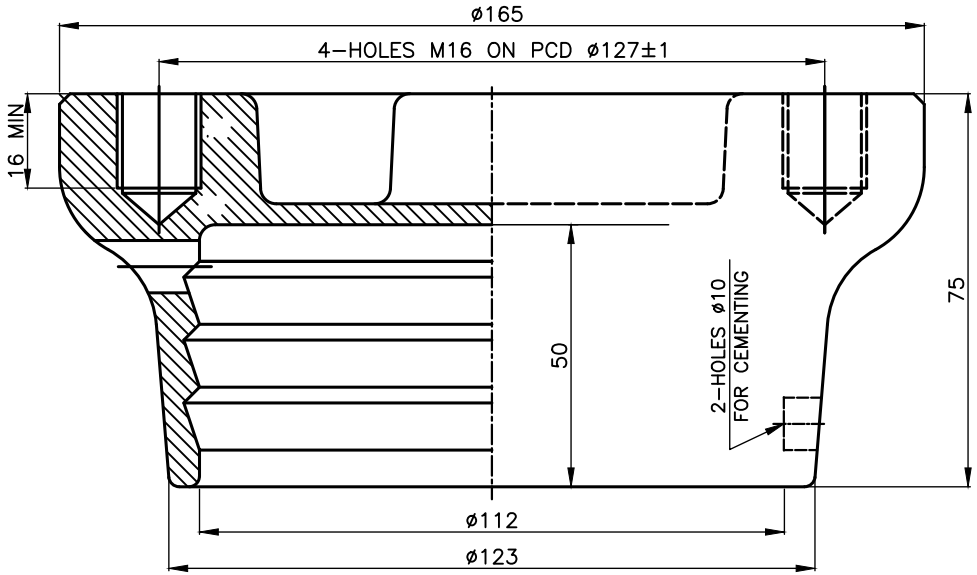
TITLE: **BOTTOM SHELL FOR 420 kV SOLIDCORE POST INSULATOR**

DRAWING NO. **PF / 8901-P3** REV **0**

DRG. NO. T / H1 S 026

ALL DIMENSIONS ARE IN mm





NOTES :-

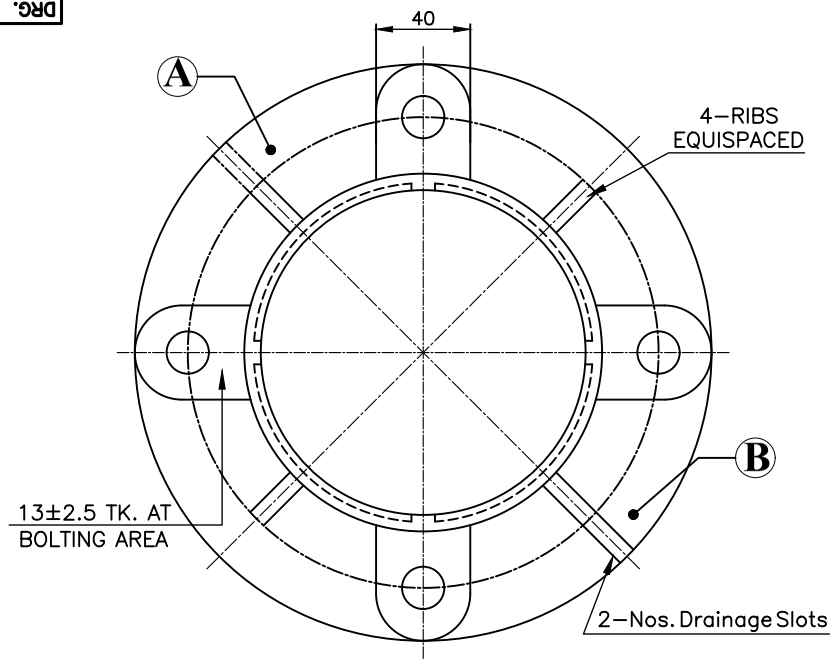
1. MATERIAL :– S.G.I. AS PER IS:1865–1991
2. UNSPECIFIED TOLERANCES :– S.G.I. AS PER IS:8350–1977 (Cl.–2)
3. ALL DIMENTIONS ARE AFTER HOT DIP GALVANIZING.
4. CASTINGS SHOULD BE SAND BLASTED AFTER HEAT TREATMENT.
5. CASTINGS SHALL BE SMOOTH FREE FROM ABRASIVE MATERIALS AND BLOW HOLES.
6. THE CASTINGS ARE TO BE HOT DIP GALVANIZED AS PER IS:4759–1984 WITH ZINC CONFORMING TO GRADE Zn–99.95 OF IS:209–1979.
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)		
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)		
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133	
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN. A.K.D. 27.10.99 CHKD. A.C. 27.10.99 APPD N.V. 27.10.99	
REF. DRG. NO. 8959	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I. / FINISH AS ABOVE
TITLE	TOP CAP (127 PCD)	DRAWING NO. T / H1 S 026	REV 0

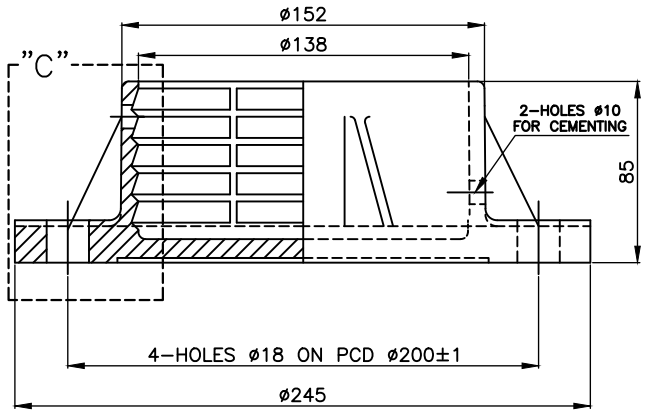
DRG. NO. T / H2 S 6556

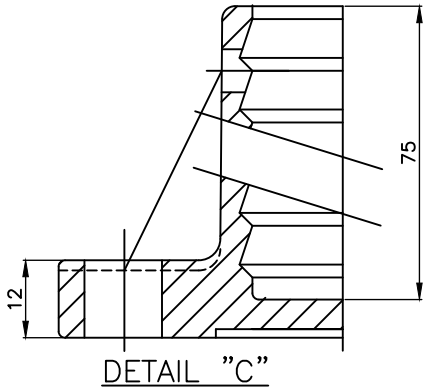
ALL DIMENSIONS ARE IN mm



NOTES :-

1. MATERIAL :– S.G.I. AS PER IS:1865–1991
2. UNSPECIFIED TOLERANCES :– S.G.I. AS PER IS:8350–1977 (Cl.–2)
3. ALL DIMENTIONS ARE AFTER HOT DIP GALVANIZING.
4. CASTINGS SHOULD BE SAND BLASTED AFTER HEAT TREATMENT.
5. CASTINGS SHALL BE SMOOTH FREE FROM ABRASIVE MATERIALS AND BLOW HOLES.
6. THE CASTINGS ARE TO BE HOT DIP GALVANIZED AS PER IS:4759–1984 WITH ZINC CONFORMING TO GRADE Zn–99.95 OF IS:209–1979.
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.





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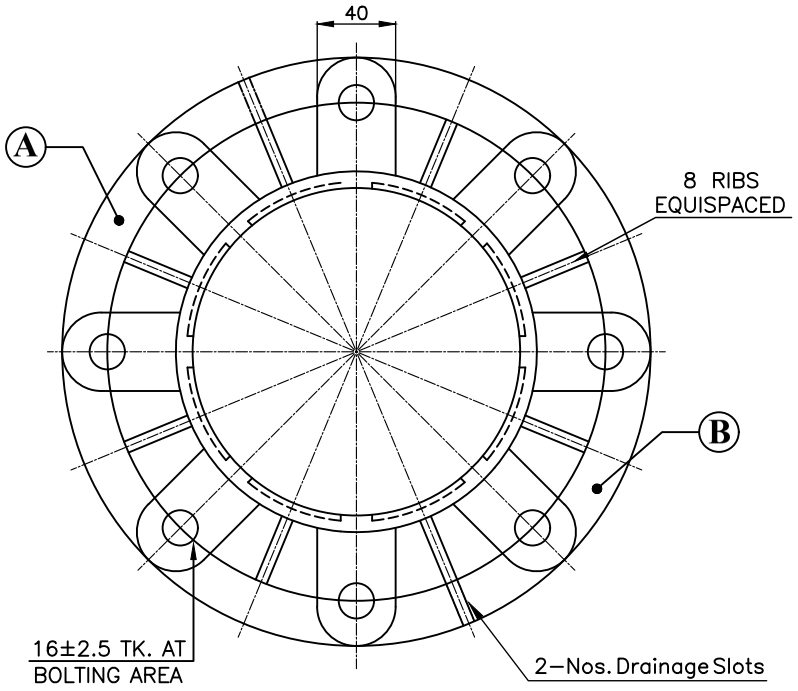
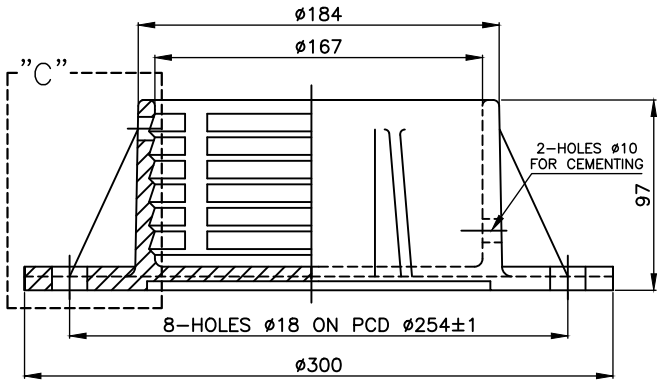
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)				
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)				
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133			
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	24.04.15	
		CHKD.	A.K.D.	25.04.15	
		APPD	S.A.P.	27.04.15	
REF. DRG. NO. 8959	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I.	FINISH AS ABOVE	
TITLE INTERMEDIATE FLANGE-1 (200 PCD)	DRAWING NO. T / H2 S 6556	REV 0			

DRG. NO. T / H2 S 6660

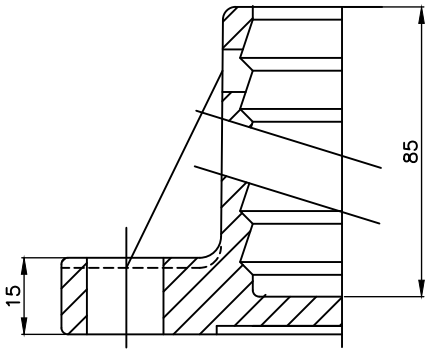
ALL DIMENSIONS ARE IN mm





NOTES :-

1. MATERIAL :– S.G.I. AS PER IS:1865–1991
2. UNSPECIFIED TOLERANCES :– S.G.I. AS PER IS:8350–1977 (Cl.–2)
3. ALL DIMENTIONS ARE AFTER HOT DIP GALVANIZING.
4. CASTINGS SHOULD BE SAND BLASTED AFTER HEAT TREATMENT.
5. CASTINGS SHALL BE SMOOTH FREE FROM ABRASIVE MATERIALS AND BLOW HOLES.
6. THE CASTINGS ARE TO BE HOT DIP GALVANIZED AS PER IS:4759–1984 WITH ZINC CONFORMING TO GRADE Zn–99.95 OF IS:209–1979.
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.

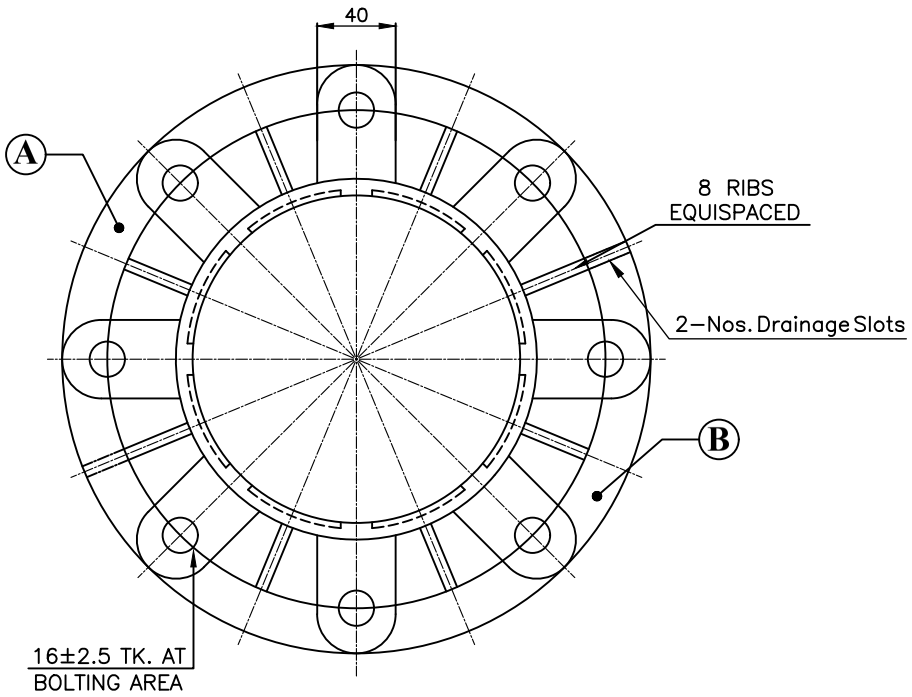


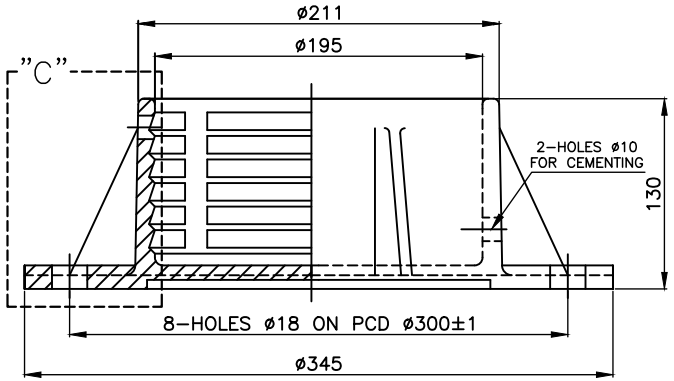
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)				
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)				
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133			
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	24.04.15	
		CHKD.	A.K.D.	25.04.15	
		APPD	S.A.P.	27.04.15	
REF. DRG. NO. 8959	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I.	FINISH AS ABOVE	
TITLE INTERMEDIATE FLANGE-2 (254 PCD)		DRAWING NO. T / H2 S 6660		REV 0	

DRG. NO. T / H2 S 6705

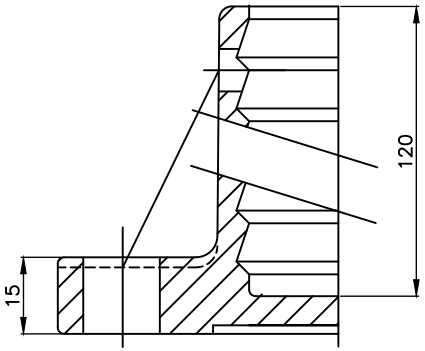
ALL DIMENSIONS ARE IN mm





NOTES :-

1. MATERIAL :– S.G.I. AS PER IS:1865–1991
2. UNSPECIFIED TOLERANCES :– S.G.I. AS PER IS:8350–1977 (Cl.–2)
3. ALL DIMENTIONS ARE AFTER HOT DIP GALVANIZING.
4. CASTINGS SHOULD BE SAND BLASTED AFTER HEAT TREATMENT.
5. CASTINGS SHALL BE SMOOTH FREE FROM ABRASIVE MATERIALS AND BLOW HOLES.
6. THE CASTINGS ARE TO BE HOT DIP GALVANIZED AS PER IS:4759–1984 WITH ZINC CONFORMING TO GRADE Zn–99.95 OF IS:209–1979.
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.



DETAIL "C"

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)			
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)			
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133		
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	24.04.15
		CHKD.	A.K.D.	25.04.15
		APPD	S.A.P.	27.04.15

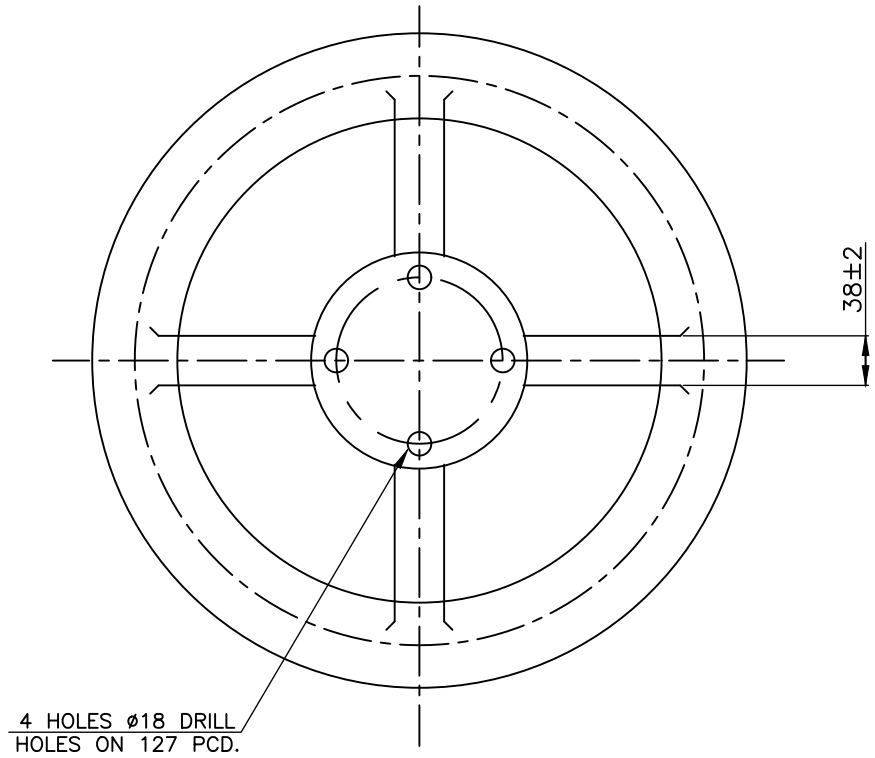
REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH
8959	N.T.S.		S.G.I.	AS ABOVE

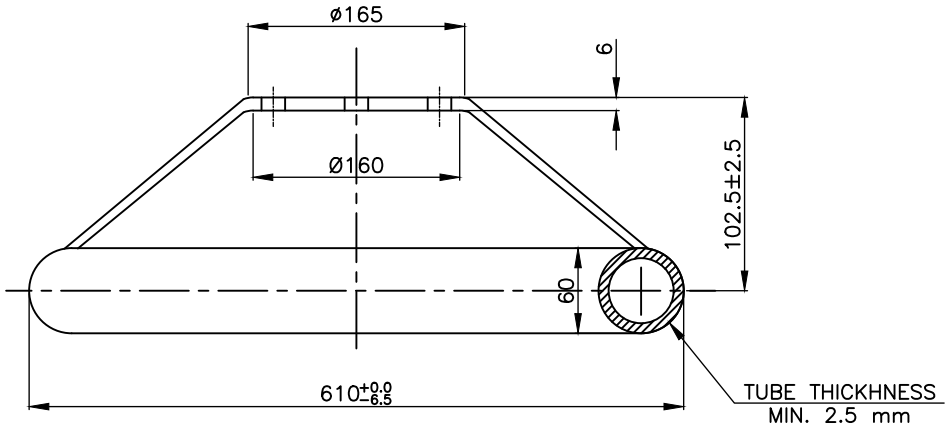
TITLE	DRAWING NO.	REV
BOTTOM FLANGE (300 PCD)	T / H2 S 6705	0

DRG. NO. **T / H2 S 400 0 001**

REVISIONS

ALL DIMENSIONS ARE IN mm





PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)
OWNER	***NTPC Limited*** (A GOVERNMENT OF INDIA ENTERPRISE)
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA
	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0133

INSULATORS & ELECTRICALS COMPANY
(PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.)
MANDIDEEP (M.P.)

DRN.	PRASHANT	03.03.94
CHKD.	S.D.	03.03.94
APPD	S.D.	03.03.94

REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH
	N.T.S.		**AL. ALLOY / M.S.**	**SMOOTH**

TITLE	DRAWING NO.	REV
CORONA GRADING RING FOR 420kV SOLIDCORE INSULATOR	**T / H2 S 400 0 001**	**1**

DOCUMENT NO. : 4410-001-572-PVE-B-0136 - DRAWING & GTP / DATA SHEET FOR 245 KV BPI Rev01

245 kV, 6 kN Solid Core Post Insulator (M/s. IEC Make)

Sr. No.	Drawing/Document No.	Revision No.	Document & Drawing Title
1	CQ S 220 P 022	Rev. 1	G.A. DRAWING & DATA SHEET (GTP) FOR 245 Kv SOLIDCORE POST INSULATOR
2	PF / 8754-P1	Rev. 0	TOP SHELL FOR 245 kV SOLIDCORE POST INSULATOR
3	PF / 8754-P2	Rev. 0	BOTTOM SHELL FOR 245 kV SOLIDCORE POST INSULATOR
4	T / H1 S 6358	Rev. 0	CAP (127 PCD)
5	T / H2 S 6502	Rev. 0	INTERMEDIATE FLANGE (184 PCD)
6	T / H2 S 6655	Rev. 0	BOTTOM FLANGE (254 PCD)

PROJECT : NORTH KARANAPURA SUPER THERMAL POWER PROJECT (3 x 660 MW)

CUSTOMER / OWNER :

N.T.P.C LTD.,
(A Government of India Enterprise)

EPC CONTRACTOR

BHEL PO No.125P167
dtd. 16.11.15

BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION BUSINESS GROUP, MM, IOC, LODHI ROAD, NEW DELHI

SUPPLIER / MANUFACTURER

INSULATORS AND ELECTRICALS COMPANY COMPANY
(PROP: HINDUSTHAN URBAN INFRASTRUCTURE LTD.,)
MANDIDEEP (M.P)

TOTAL NO. OF PAGES			ONE
	NAME	SIGN	DATE
DSND			
CHKD			
APPD			

TITLE : IEC DRG. No. CQ S 220 P 022 Rev 1

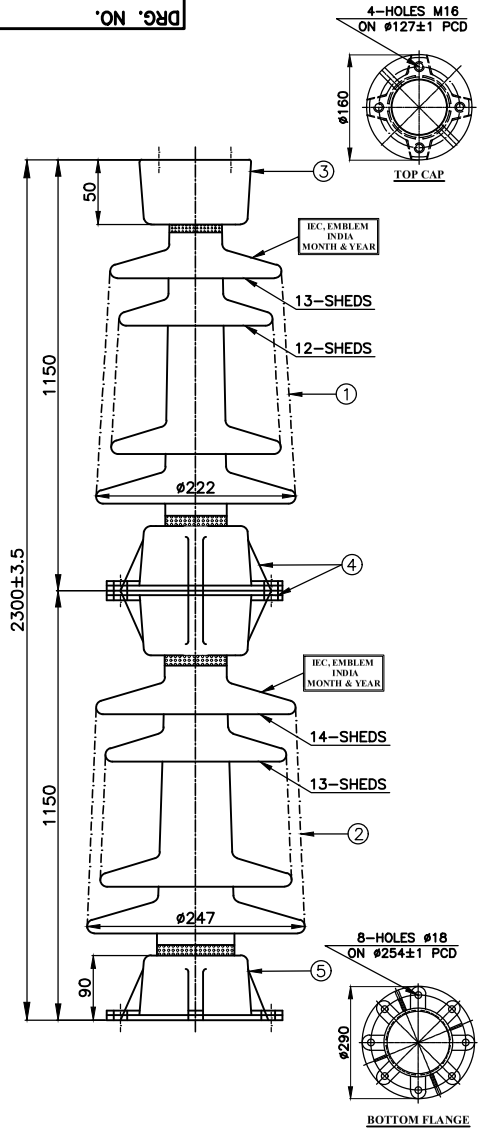
DRAWINGS AND TYPE TEST DATA SHEET FOR
245 kV, 6kN SOLID CORE POST INSULATORS
(M/s. IEC Make)

SUBMITTED FOR [ ] PRELIMINARY [ ] TENDER [ ] INFORMATION [✓] APPROVAL [ ] CONSTRUCTION

PROJECT :		NKSTPP, EPC-400/220 KV SWITCHYARD
NTPC DRG NO:		4410-001-572-PVE-B-0136 Rev01
DRG TITLE:		220kV BPI - Drawings & datasheet
2. Comments over 220 kV Drawings and data sheet		
SR. NO.	BHEL/NTPC Comments	IEC Confirmation / Compliance
1	Please check and Discuss	The mechanical parameter for Torsional strength : corrected as 5.0 kNm (Revised drawing submitted)
2	Make of equipment shall be NTPC QA approved. The BPI shall be heavy pollution category (class-III) as per IEC 60815	We confirm IEC make insulators as per NTPC QA approvals
		Offered insulators will meet heavy pollution category (class-III) as per IEC 60815 (i.e creepage distance shall be min. 25mm/kV)

DRG. NO. CQ S 220 P 022

ALL DIMENSIONS ARE IN mm



GUARANTEED TECHNICAL PARTICULARS :-

GENERAL :-

1. Applicable standards IS:2544 / IS:5350 / IEC:60273
   IEC:60168 / IEC:60815
2. Type : Solidcore Post Insulator
3. Colour of Glaze : Brown
4. All ferrous parts are to be hot dip galvanized
5. Power frequency puncture voltage — kV — Puncture proof
6. Min.Nom.Creepage distance — mm — 6125
7. Weight of complete stack (approx.) — kg — 110

MECHANICAL VALUES :-

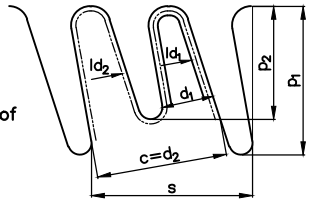
1. Ultimate Cantilever strength (Upright)	kN	6.0
2. Ultimate Torsional strength	kNm	5.0
3. Ultimate Tensile strength	kN	110
4. Ultimate Compression strength	kN	220

ELECTRICAL VALUES :-

1. Nominal system voltage	kV(rms)	220
2. Highest system voltage	kV(rms)	245
3. Power frequency withstand voltage (Dry)	kV(rms)	510
4. Power frequency withstand voltage (Wet)	kV(rms)	460
5. Power frequency flashover voltage (Dry)	kV(rms)	625
6. Power frequency flashover voltage (Wet)	kV(rms)	570
7. Lightning impulse withstand voltage (1.2 / 50 µ sec. +Ve/–Ve wave)	kVp	1050
8. Lightning Impulse flashover voltage (+Ve)	kVp	1210
(–Ve)	kVp	1240
9. Switching impulse withstand voltage (Wet)	kVp	750
10. Min. Corona extinction voltage	kV	156

RADIO INTERFERENCE VOLTAGE DATA

Test voltage to ground	kV(rms)	156
Max. RIV at 1 MHz	uV.	< 500



SHED PROFILE

245 kV	AS PER IEC : 60815	PART-1 (ACTUAL)	PART-2 (ACTUAL)
$c=d_2$	≥ 30	64.3	56.6
s/p_1	≥ 0.8	1.28	1.15
l_{d1}/d_1	< 5	3.28	3.64
l_{d2}/d_2	< 5	3.48	3.80
p_1-p_2	≥ 15	15	15
l_t/S_t	≤ 4	2.89	3.14
$(2p_1+2p_2+s)/l$	> 0.7	1.14	1.13

Recommended Hardware For Mounting :
Top : M16 x 35 Long - 4 Nos. M.S. Bolts
Middle : M16 x 60 Long - 4 Nos.M.S. Bolts
Bottom : M16 x 60 Long - 8 Nos.M.S. Bolts
(With Nuts & Washers)

S.No.	DESCRIPTION	MATERIAL	QTY.	FINISH
5.	BOTTOM FLANGE	MCI/SGI	1	HOT DIP GALVANIZED
4.	INTERMEDIATE FLANGE	MCI/SGI	2	HOT DIP GALVANIZED
3.	TOP CAP	MCI/SGI	1	HOT DIP GALVANIZED
2.	BOTTOM SHELL	PORCELAIN	1	BROWN GLAZED
1.	TOP SHELL	PORCELAIN	1	BROWN GLAZED

PROJECT: NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)

OWNER: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

QBTGM

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
TRANSMISSION BUSINESS GROUP
NOIDA

BHEL P.O. No. : 125P167 dated 16.11.15

NTPC Doc. No. : 4410-001-572-PVE-B-0136

INSULATORS & ELECTRICALS COMPANY
(PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.)
MANDIDEEP (M.P.)

DRN.	A.K.D.	14.11.03
CHKD.		
APPD		

REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH
	N.T.S.		PORC ELAIN & MCI / SGI	AS ABOVE

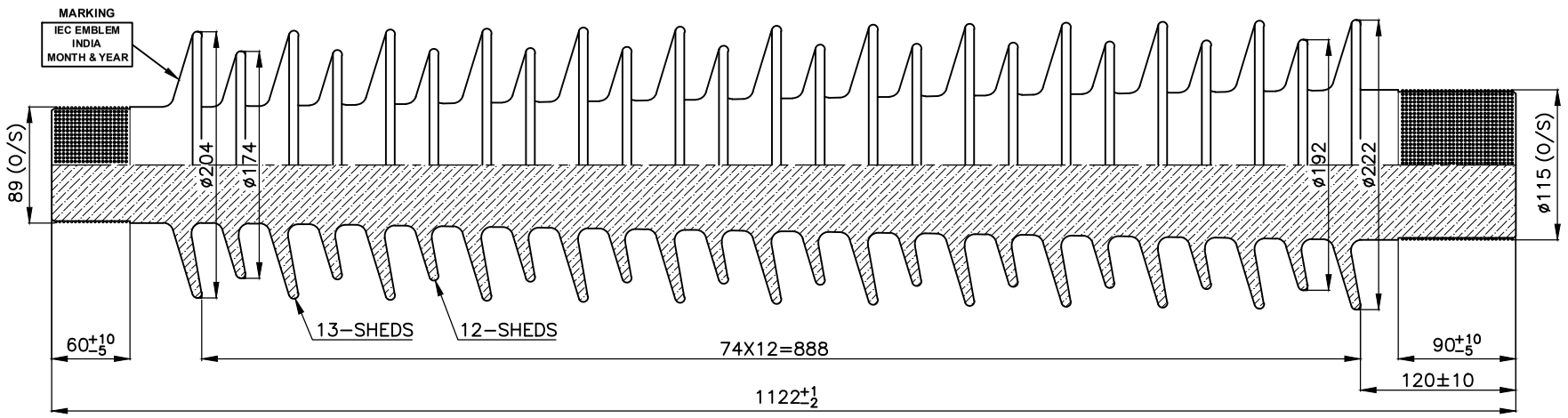
TITLE: 245 kV SOLIDCORE POST INSULATOR

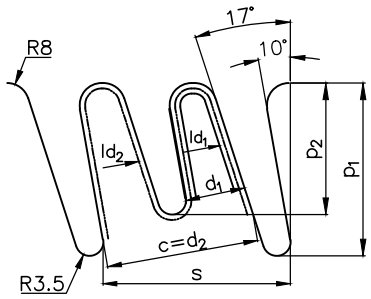
DRAWING NO. CQ S 220 P 022 — REV 1

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

DRG. NO. PF / 8754-P1

ALL DIMENSIONS ARE IN mm





SHED PROFILE

245 kV	AS PER IEC : 60815	ACTUAL
$c=d_2$	≥ 30	64.3
s/p_1	≥ 0.8	1.28
l_{d1}/d_1	< 5	3.28
l_{d2}/d_2	< 5	3.48
p_1-p_2	≥ 15	15
Creepage Factor	≤ 4	2.89
Profile Factor	> 0.7	1.14

NOTES :-

1. STANDARDS APPLICABLE IS:2544 / IS:5350 / IEC:60815 / IEC:60168
2. SURFACES MARKED THUS ▽▽ ARE TO BE UNGLAZED AND GROUND & PERPENDICULAR TO THE AXIS & PARALLEL TO EACH OTHER.
3. COLOUR OF PORCELAIN = BROWN GLAZED.
4. MINIMUM NOMINAL CREEPAGE DISTANCE = 2975 mm.

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)	
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)	
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0136
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN. SUNIL 10.07.14 CHKD. A.K.D. 10.07.14 APPD S.A.P. 10.07.14

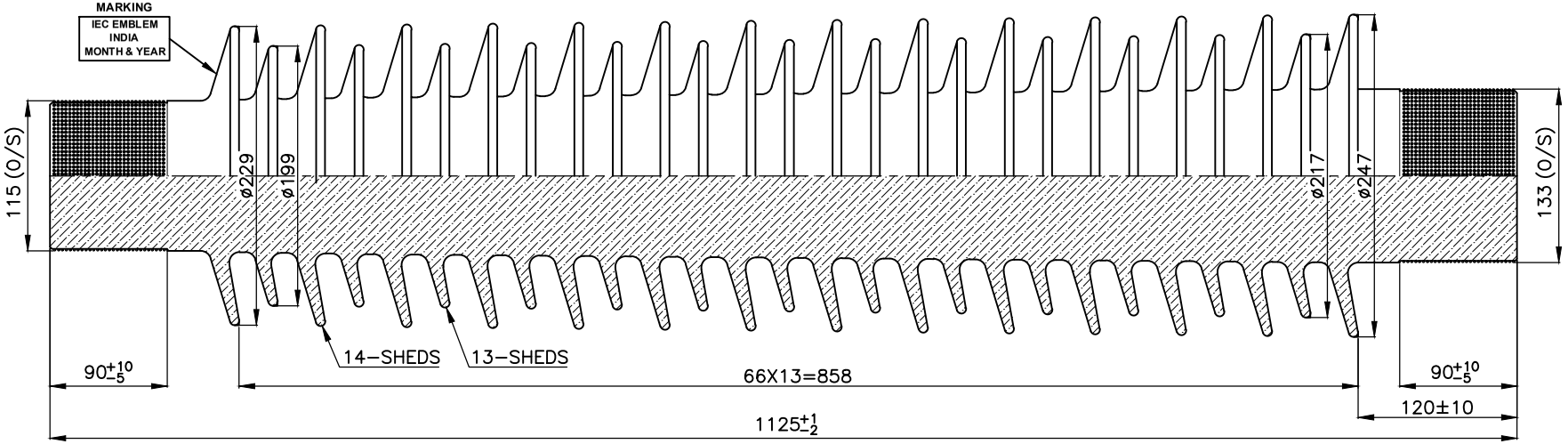
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

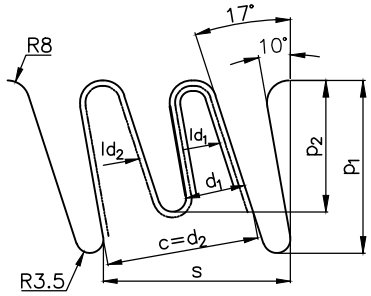
REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH	WT.(KG.)
	--		PORCELAIN	AS ABOVE	

TITLE	DRAWING NO.	REV
TOP SHELL FOR 245 kV SOLIDCORE POST INSULATOR	PF / 8754-P1	0

DRG. NO. PF / 8754-P2

ALL DIMENSIONS ARE IN mm





SHED PROFILE

245 kV	AS PER IEC : 60815	ACTUAL
$c=d_2$	≥ 30	56.6
s/p_1	≥ 0.8	1.15
l_{d1}/d_1	< 5	3.64
l_{d2}/d_2	< 5	3.80
p_1-p_2	≥ 15	15
Creepage Factor	≤ 4	3.14
Profile Factor	> 0.7	1.13

NOTES :-

1. STANDARDS APPLICABLE IS:2544 / IS:5350 / IEC:60815 / IEC:60168
2. SURFACES MARKED THUS ▽▽ ARE TO BE UNGLAZED AND GROUND & PERPENDICULAR TO THE AXIS & PARALLEL TO EACH OTHER.
3. COLOUR OF PORCELAIN = BROWN GLAZED.
4. MINIMUM NOMINAL CREEPAGE DISTANCE = 3150 mm.

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)	
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)	
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0136
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN. SUNIL 10.07.14 CHKD. A.K.D. 10.07.14 APPD S.A.P. 10.07.14

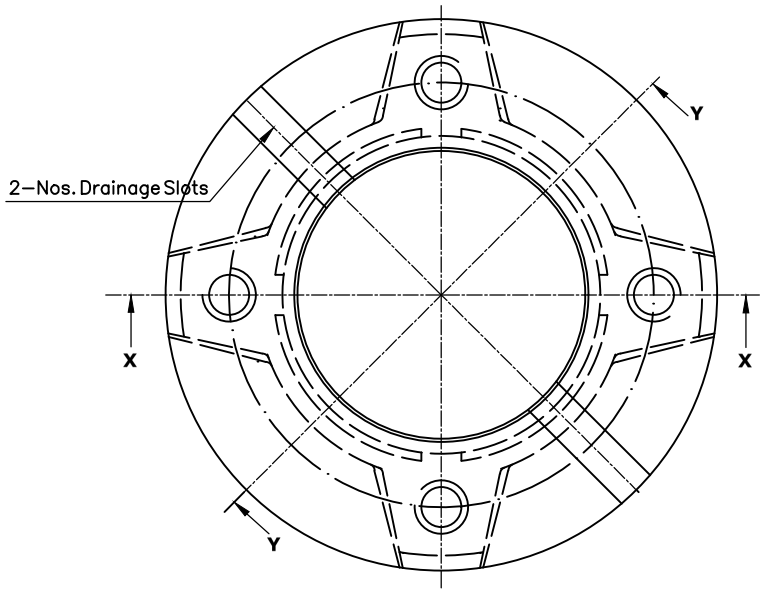
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

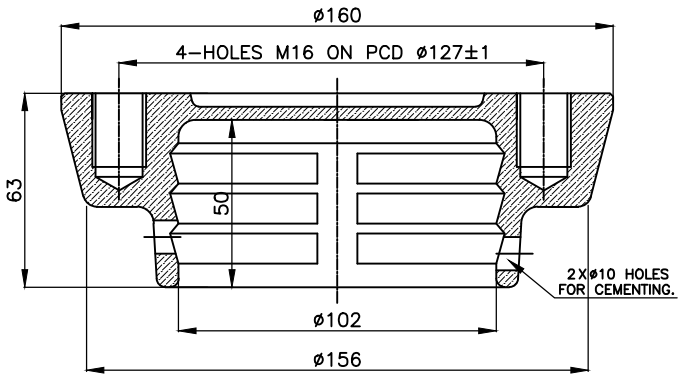
REF. DRG. NO.	SCALE	PROJECTION	MATERIAL	FINISH	WT.(KG.)
	--		PORCELAIN	AS ABOVE	

TITLE	DRAWING NO.	REV
BOTTOM SHELL FOR 245 kV SOLIDCORE POST INSULATOR	PF / 8754-P2	0

DRG. NO. T / H1 S 6358

ALL DIMENSIONS ARE IN mm

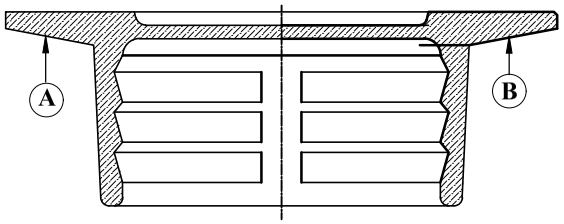




SECTION-X-X

NOTES :-

1. MATERIAL :– S.G.I. AS PER IS:1865–1991
2. UNSPECIFIED TOLERANCES :– S.G.I. AS PER IS:8350–1977 (Cl.–2)
3. ALL DIMENTIONS ARE AFTER HOT DIP GALVANIZING.
4. CASTINGS SHOULD BE SAND BLASTED AFTER HEAT TREATMENT.
5. CASTINGS SHALL BE SMOOTH FREE FROM ABRASIVE MATERIALS AND BLOW HOLES.
6. THE CASTINGS ARE TO BE HOT DIP GALVANIZED AS PER IS:4759–1984 WITH ZINC CONFORMING TO GRADE Zn–99.95 OF IS:209–1979.
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.



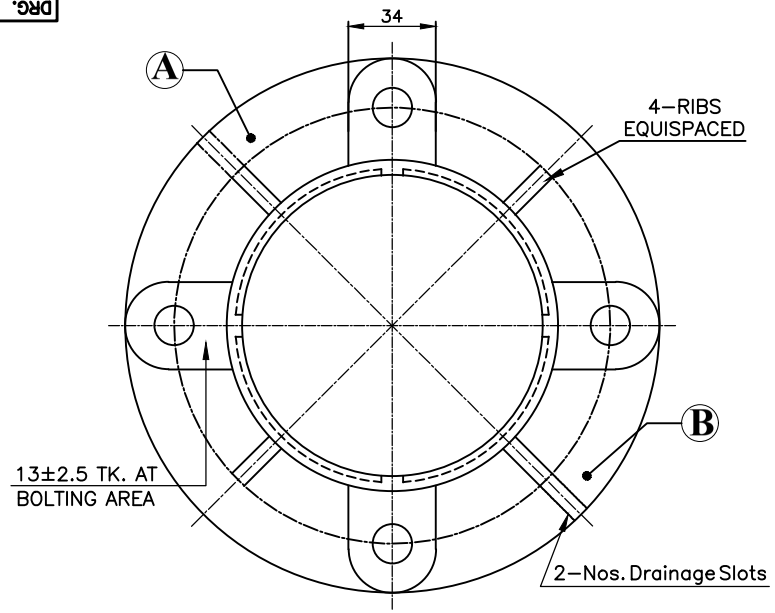
SECTION-Y-Y

REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)				
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)				
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0136			
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	02.08.14	
		CHKD.	A.K.D.	02.08.14	
		APPD	S.A.P.	02.08.14	
REF. DRG. NO. 8754	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I.	FINISH AS ABOVE	
TITLE CAP (127 PCD)			DRAWING NO. T / H1 S 6358	REV 0	

DRG. NO. T / H2 S 6502

ALL DIMENSIONS ARE IN mm



NOTES :-

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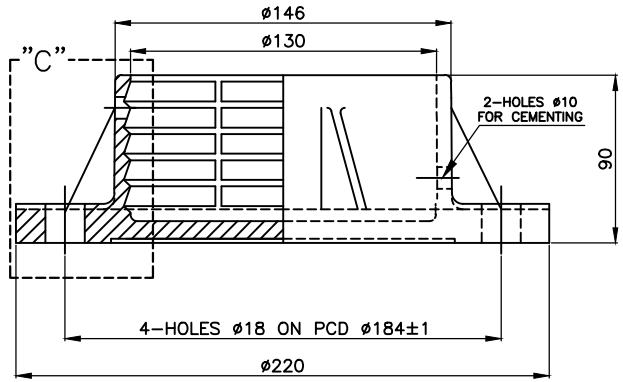
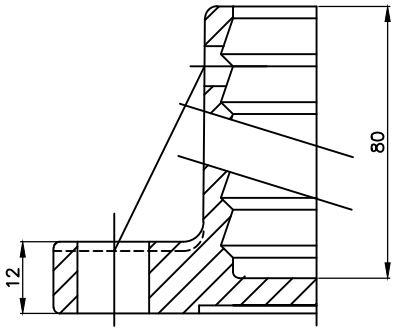




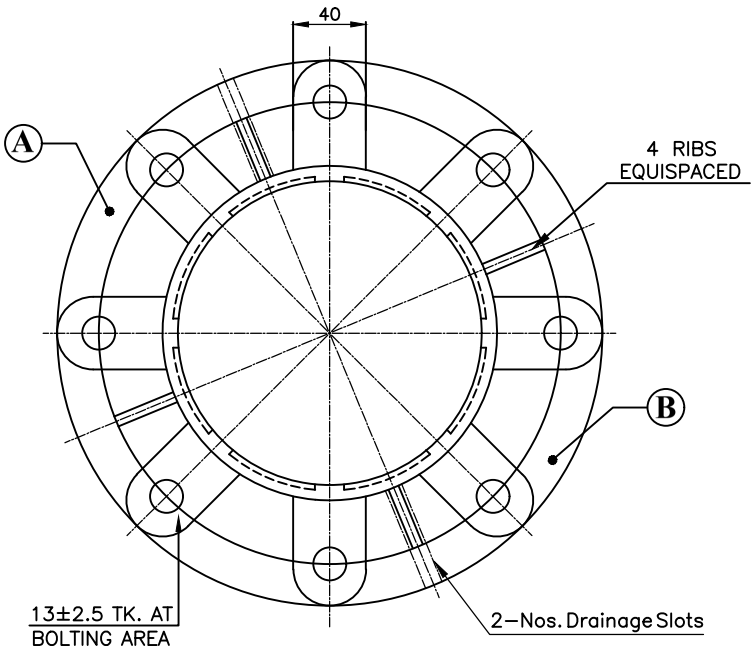
DETAIL "C"

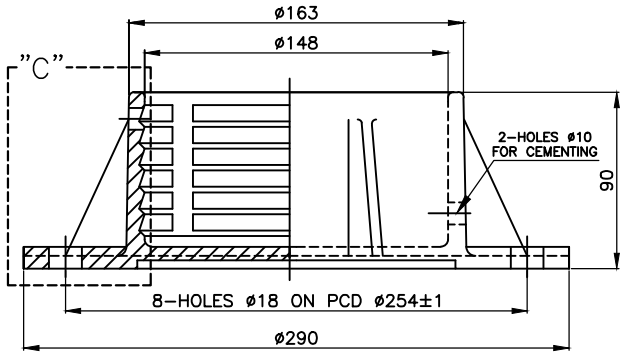
REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)				
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)				
QBTGM BHEL	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15			
		NTPC Doc. No. : 4410-001-572-PVE-B-0136			
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	18.04.14	
		CHKD.	A.K.D.	18.08.14	
		APPD	S.A.P.	18.08.14	
REF. DRG. NO. 8754	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I.	FINISH AS ABOVE	
TITLE INTERMEDIATE FLANGE (184 PCD)			DRAWING NO. T / H2 S 6502	REV 0	

DRG. NO. T / H2 S 6655

ALL DIMENSIONS ARE IN mm





NOTES :-

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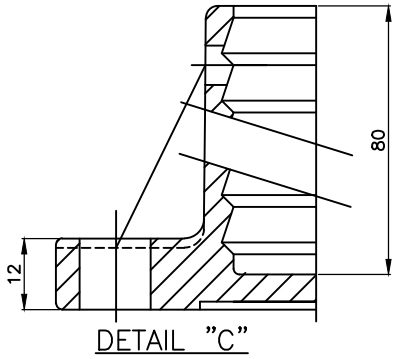
7. SUPPLIER'S MARK AT Ⓐ AND "IEC" AT Ⓑ
8. AVG. MASS OF ZINC COATING SHALL NOT BE LESS THAN 615 gm/m^2.



REV.	DATE	--	REV.	DATE	--	REV.	DATE	--	REV.	DATE	--
--	APPD.	--	--	APPD.	--	--	APPD.	--	--	APPD.	--

PROJECT	NORTH KARANPURA SUPER THERMAL POWER PROJECT (3x660MW)				
OWNER NTPC	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)				
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR TRANSMISSION BUSINESS GROUP NOIDA	BHEL P.O. No. : 125P167 dated 16.11.15 NTPC Doc. No. : 4410-001-572-PVE-B-0136			
IEC	INSULATORS & ELECTRICALS COMPANY (PROP:–HINDUSTHAN VIDYUT PRODUCTS LTD.) MANDIDEEP (M.P.)	DRN.	SUNIL	18.10.14	
		CHKD.	A.K.D.	18.10.14	
		APPD	S.A.P.	18.10.14	
REF. DRG. NO. 8754	SCALE N.T.S.	PROJECTION	MATERIAL S.G.I.	FINISH AS ABOVE	
TITLE BOTTOM FLANGE (254 PCD)			DRAWING NO. T / H2 S 6655	REV 0	