

Drawing approval subject to valid vendor registration



**FOR EPC CONTRACTS ONLY**

**NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.**

**ANNEXURE-II (SURGE ARRESTERS)**

**GUARANTEED TECHNICAL PARTICULARS FOR 360kV 20kA TYPE-SH METAL OXIDE GAPLESS PORCELAIN LIGHTNING ARRESTER**

1. Name of Manufacturer : LAMCO INDUSTRIES PRIVATE LIMITED.,  
H.O & WORKS: SANATHNAGAR-IE, HYD  
WORKS: AUTOMOTIVE PARK, TSIIC,  
MUPPIREDDYPALLY, T.S, INDIA.
2. Arrester class & type : Medium Duty Station Class Metal Oxide  
Gapless Lightning Arrester "MORESTER"  
Type-SH, MODEL-'LMAS'
3. Applicable standard : IEC 60099-4 of 2014
4. Rated arrester voltage KV : 360
5. Max. con. operating voltage MCOV KV : 294
6. Nominal discharge current with  
8/20 micro seconds wave KA : 20
7. Long duration discharge Class : 4 (STATION HIGH)
8. Minimum Energy discharge capability "KJ/KV Of Ur" : 12
9. Max. switching current impulse  
residual voltage at
  - i) 2000 A KVpeak : 730
  - ii) 500 A KVpeak : 700
10. Max. residual voltage with 1/20 micro  
second current wave at 20KA KVPeak : 1000
11. Max. residual voltage with 8/20 mic.  
sec.wave
  - i) 10 kA KVpeak : 860
  - ii) 20 kA KVpeak : 915
  - iii) 40 kA KVpeak : 1000
12. Safe fault current kArms : 50
13. Lightning impulse withstand voltage of  
arrester housing with 1.2/50 us wave KVpeak: 1425
14. One minute power frequency withstand  
voltage of housing dry-wet KVrms : 630
15. Reptitive Charge Rating : 2.4C

Continued on page...2

Chief Engineer  
Projects

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

::2::

16. Steep Current Impulse 1/20 micro Sec KVpeak : 1000
17. High current short duration impulse  
withstand level with 4/10 us wave KVpeak : 100
18. Pressure relief class Class : A (50 kArms)
19. Over-voltage withstand capability (with prior duty)
- a) 0.1 seconds kVrms : 432
  - b) 1 second kVrms : 414
  - c) 10 second kVrms : 396
20. a) Reference voltage KV : Greater than the rated  
Arrester voltage at 4mA  
reference current
- b) Reference current mA : 4
21. Number of units per phase and Rating of each unit  
: 4  
KV : 90
22. Min.total creepage distance mm : 10600
23. Leakage current mA : Less than 0.8
24. Total (approx) weight of arrester Kgs : 383 ±10%
25. Maximum cantilever strength of SA (Including wind load) Kg : 350 (deflection 20mm)
26. Overall Height of SA mm : 5000±200
27. Maximum distance recommended from equipment to be protected by SA mtr : 25
28. Min.distance between phase and grounded object mm : 6000
29. Min. distance between arrester phase legs mm : 6500
30. Make of porcelain Insulators : CJI, RAVIKIRAN, GENESIS or any other reputed manufacturer
31. Partial Discharge @1.05 C.O.v : less than 10pC.
32. R.I.V @ 1.1 COV : less than 2500µV.

Drawing approval subject to valid vendor registration

Continued on page...3

Chief Engineer  
Projects

::3::

Drawing approval subject to valid vendor registration

33. Size of Zno bLock	
i) Diameter	: 75±2 mm
ii) Height	: 22±2 mm
34. No. of Zno Blocks for Each	:30
35. Rating of Block	:3.0kV
36. watt loss/ kV @ C.O.V	: 0.5W (max)
37. Continuous Current at COV	
i) Resistive	:< 0.5 mA
ii) Capacitive	:< 1.2 mA
iii) Total	:< 1.5 mA

for **LAMCO INDUSTRIES PRIVATE LIMITED.**

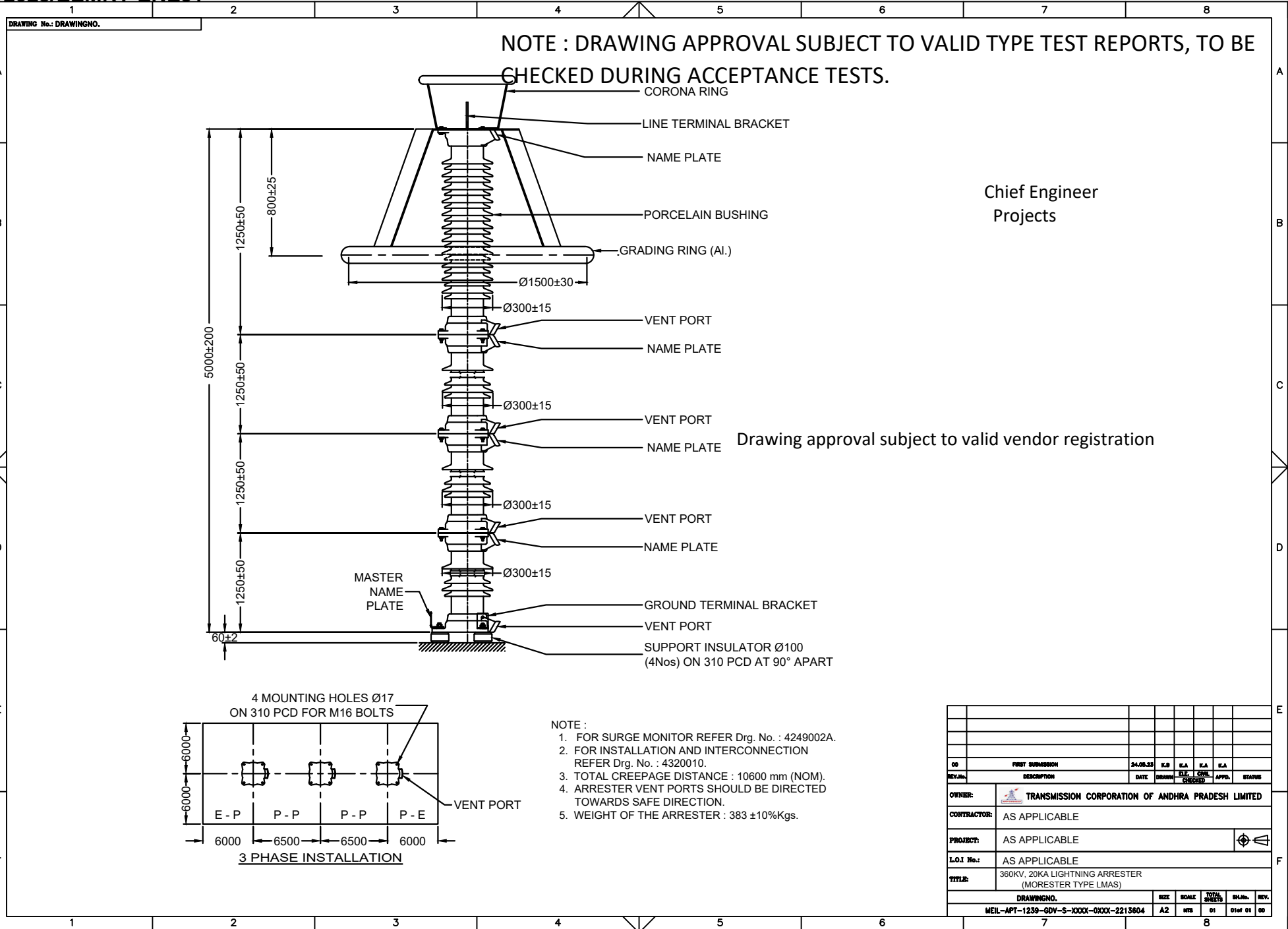
**(K. ARUN)****SENIOR MANAGER (D&D)**

**NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.**

- 1) Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators in the substation during foundation works to ensure safe live to ground clearances as per IE rules.
- 2) Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings, the EPC contractors shall be instructed to supply the same in line with CT/PT/CVT/Isolators requirement and compatibility.

Chief Engineer  
Projects

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing



Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

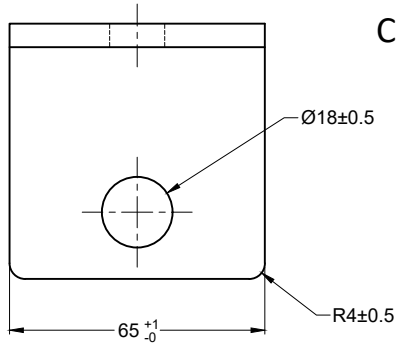
- NOTE :
1. FOR SURGE MONITOR REFER Drg. No. : 4249002A.
  2. FOR INSTALLATION AND INTERCONNECTION REFER Drg. No. : 4320010.
  3. TOTAL CREEPAGE DISTANCE : 10600 mm (NOM).
  4. ARRESTER VENT PORTS SHOULD BE DIRECTED TOWARDS SAFE DIRECTION.
  5. WEIGHT OF THE ARRESTER : 383 ±10%Kgs.

NO	DESCRIPTION	DATE	DRWN	CHKD	APPD	STATUS
01	FIRST SUBMISSION	24.05.23				
<b>OWNER:</b> TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED <b>CONTRACTOR:</b> AS APPLICABLE <b>PROJECT:</b> AS APPLICABLE <b>L.O.I No.:</b> AS APPLICABLE <b>TITLE:</b> 360KV, 20KA LIGHTNING ARRESTER (MORESTER TYPE LMAS)						
<b>DRAWINGNO.</b> MEIL-APT-1239-GDV-S-XXXX-0XXX-2213604 <b>SIZE</b> A2 <b>SCALE</b> NTS <b>TOTAL SHEETS</b> 01 <b>SH.No.</b> 01 of 01 <b>REV.</b> 00						



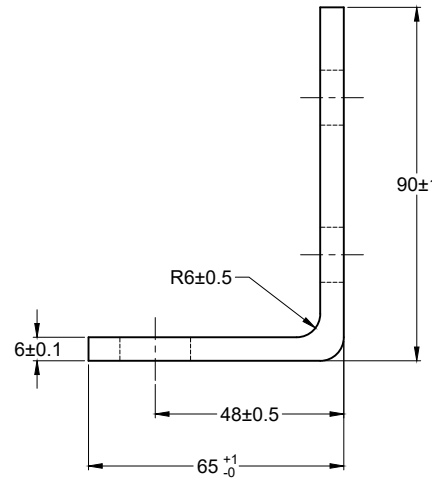
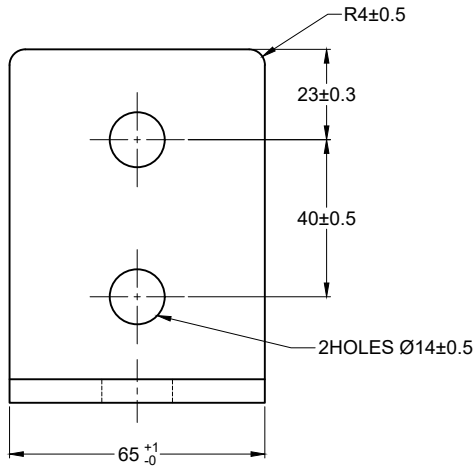
This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.



Chief Engineer  
Projects

Drawing approval subject to valid vendor registration



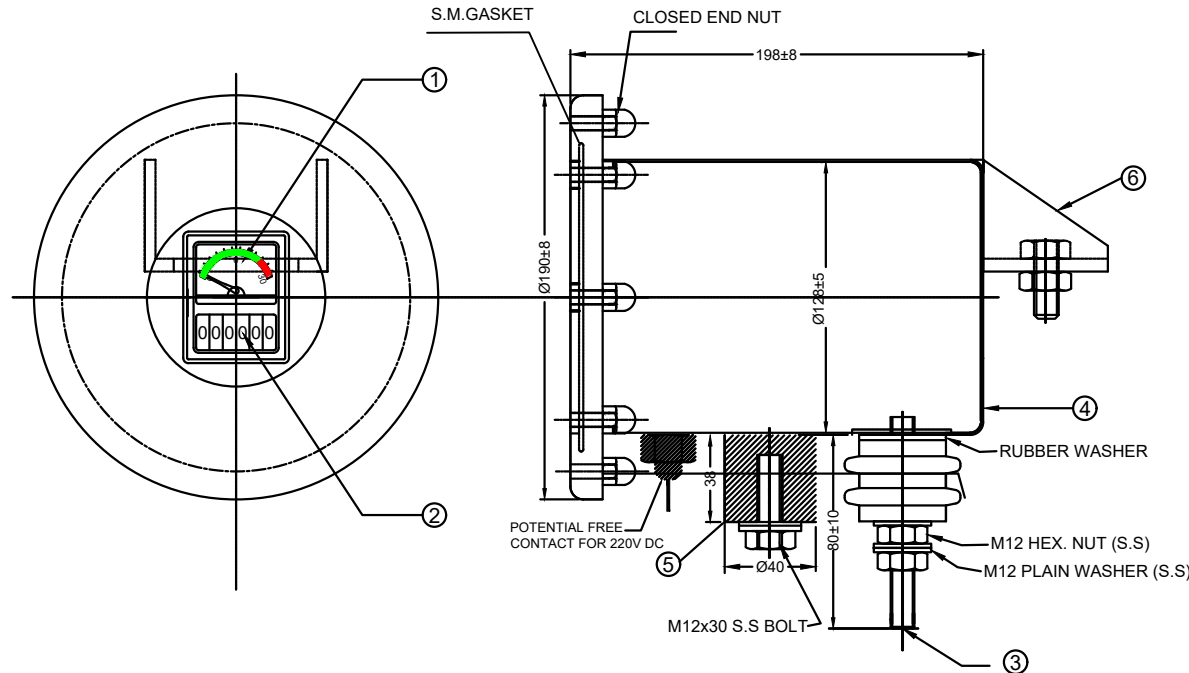
NOTE

1. MATERIAL : M.S.PLATE.
2. FINISH : HOT DIP GALVANISED.
3. WEIGHT : 400±10% Gms.

REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPR.	STATUS
00	FIRST SUBMISSION	24.08.23	E.B	K.A	K.A	K.A
OWNER:  TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED CONTRACTOR: AS APPLICABLE PROJECT: AS APPLICABLE L.O.J No.: AS APPLICABLE TITLE: GROUND TERMINAL BRACKET						
DRAWING NO.						
MEIL-APT-1239-GDV-S-XXXX-XXXX-6220151		SIZE	SCALE	TOTAL SHEETS	SHEET No.	REV.
		A2	MTS	01	01 of 01	00

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

**NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.**



Chief Engineer  
Projects

**NOTE :**

- \* DEGREE OF PROTECTION : IP - 67.
- \* SEALANT APPLIED AT GASKETS
- \* STANDARD : IS/IEC 60947-1 : 2004
- \* GASKET DETAILS:  
MATERIAL : NEOPRENE RUBBER  
SIZE : OD-150mm, ID-120mm, THICK-8mm.  
CROSS SECTION VIEW OF GASKET Ref.Drg.No.4250002A
- \* MAKE OF COUNTER - ISHKRA  
MAKE OF mA METER : UBAH / BEEMET
- \* PAINT SHADE : 631 of IS 5
- \* SURGE MONITOR COLOUR : SIEMENS GRAY
- \* MAKE : LAMCO
- \* WEIGHT : 3.3 Kgs ±10%

1. LEAKAGE CURRENT MONITOR.
2. SURGE COUNTER, CYCLOMETRIC TYPE.
3. LINE TERMINAL.(M12 S.S STUD)
4. POWDER COATED S.M. - BOX.
5. EARTHING TERMINALS
6. SUPPORT BRACKET
7. RANGE OF LEAKAGE CURRENT METER (0-10mA)
  - a) 0 - 6 mA (HEALTHY) GREEN ZONE
  - b) 6 - 10 mA (DANGER) RED ZONE

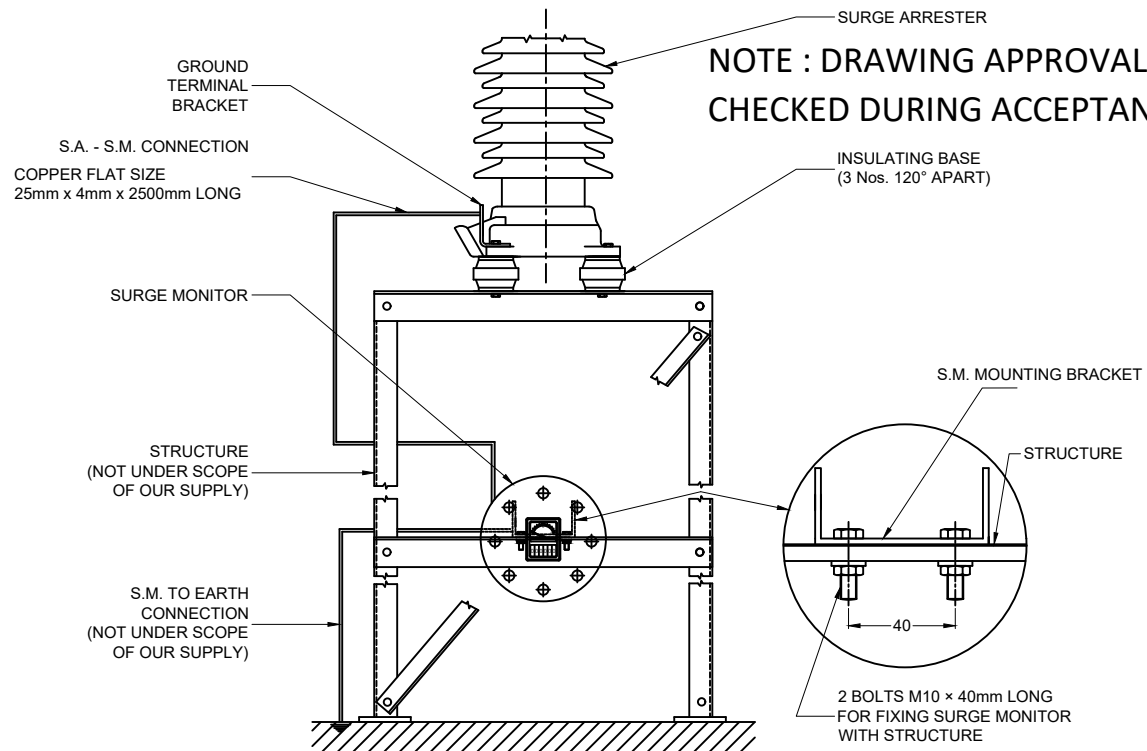
Drawing approval subject to valid vendor registration

REV.No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.	STATUS
01	FIRST SUBMISSION	02.06.23	K.B	K.A	K.A	
OWNER: TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED CONTRACTOR: AS APPLICABLE PROJECT: AS APPLICABLE L.O.I No.: AS APPLICABLE TITLE: SURGE MONITOR G.A.						
DRAWING NO.		SIZE	SCALE	TOTAL SHEETS	SHEETS	REV.
MEIL-APT-1239-GDV-S-XXXX-XXXX-4249002A		A2	1/8"	01	01 of 01	01

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

1) Minimum 300mm plinth shall be maintained for CT/PT/CVT/Isolators in the substation during foundation works to ensure safe live to ground clearances as per IE rules.

2) Since the supply of terminal connectors is not in the scope of manufacturer as mentioned in the drawings, the EPC contractors shall be instructed to supply the same in line with CT/PT/CVT/Isolators requirement and compatibility.



**NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.**

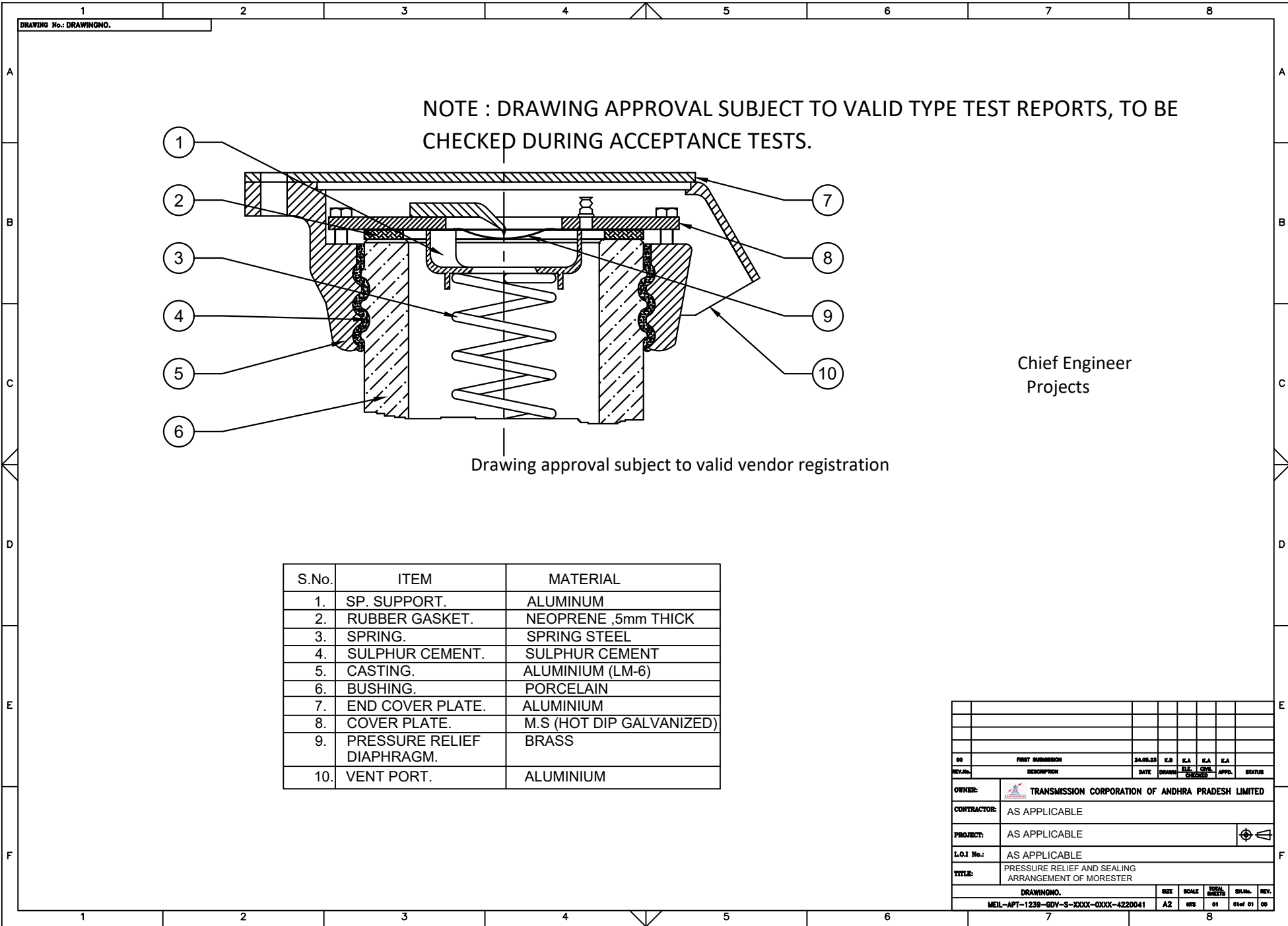
Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

REV. No.	DESCRIPTION	DATE	DRWN	CHKD	APPD	STATUS
00	FIRST SUBMISSION	24.08.23	K.B	K.A	K.A	K.A
<b>OWNER:</b> TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED <b>CONTRACTOR:</b> AS APPLICABLE <b>PROJECT:</b> AS APPLICABLE <b>L.O.I No.:</b> AS APPLICABLE <b>TITLE:</b> METHOD OF CONNECTING SURGE MONITOR WITH SURGE ARRESTER						
<b>DRAWINGNO.</b>						
MEIL-APT-1238-GDV-S-XXXX-0XXX-4320010						
<b>SIZE</b>		<b>SCALE</b>	<b>DATE</b>	<b>REV.</b>	<b>BY</b>	<b>CHKD</b>
A2		1/20	01	01 of 01	00	00



This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing



Chief Engineer  
Projects

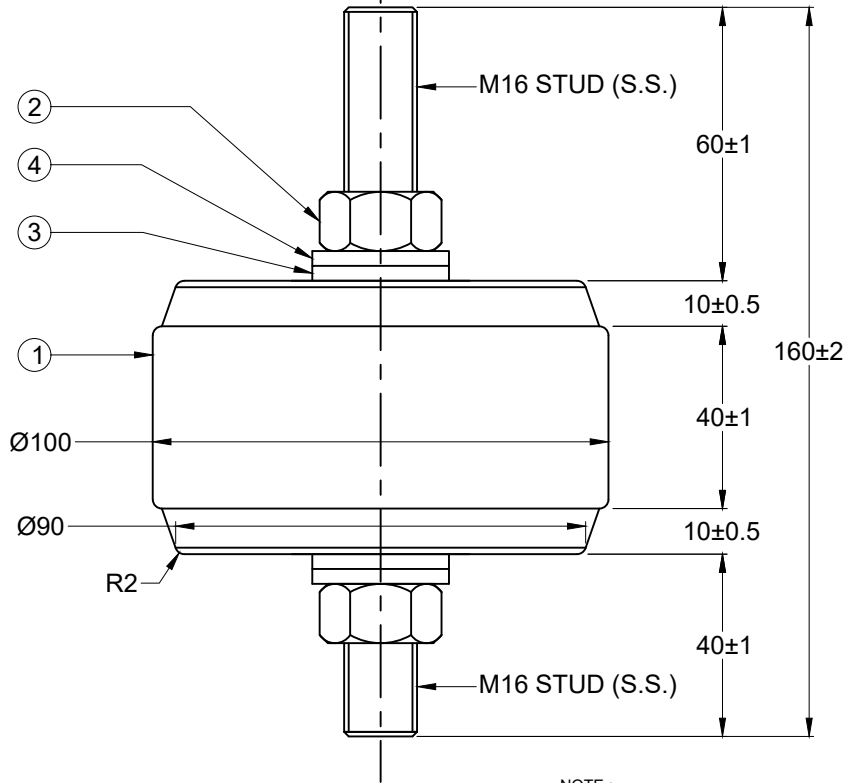
S.No.	ITEM	MATERIAL
1.	SP. SUPPORT.	ALUMINUM
2.	RUBBER GASKET.	NEOPRENE ,5mm THICK
3.	SPRING.	SPRING STEEL
4.	SULPHUR CEMENT.	SULPHUR CEMENT
5.	CASTING.	ALUMINIUM (LM-6)
6.	BUSHING.	PORCELAIN
7.	END COVER PLATE.	ALUMINIUM
8.	COVER PLATE.	M.S (HOT DIP GALVANIZED)
9.	PRESSURE RELIEF DIAPHRAGM.	BRASS
10.	VENT PORT.	ALUMINIUM

NO	FIRST SUBMISSION	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
REV. No.	DESCRIPTION	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE	DATE
OWNER:	TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED									
CONTRACTOR:	AS APPLICABLE									
PROJECT:	AS APPLICABLE									
I.O.I No.:	AS APPLICABLE									
TITLE:	PRESSURE RELIEF AND SEALING ARRANGEMENT OF MORESTER									
DRAWINGNO.										
MEIL-APT-1238-GDV-S-XXXX-XXXX-4220041										
SIZE	SCALE	TOTAL SHEETS	SHEET No.	REV.						
A2	1:1	01	01 of 01	00						

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

DRAWING No.- DRAWINGNO.

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.



Chief Engineer  
Projects

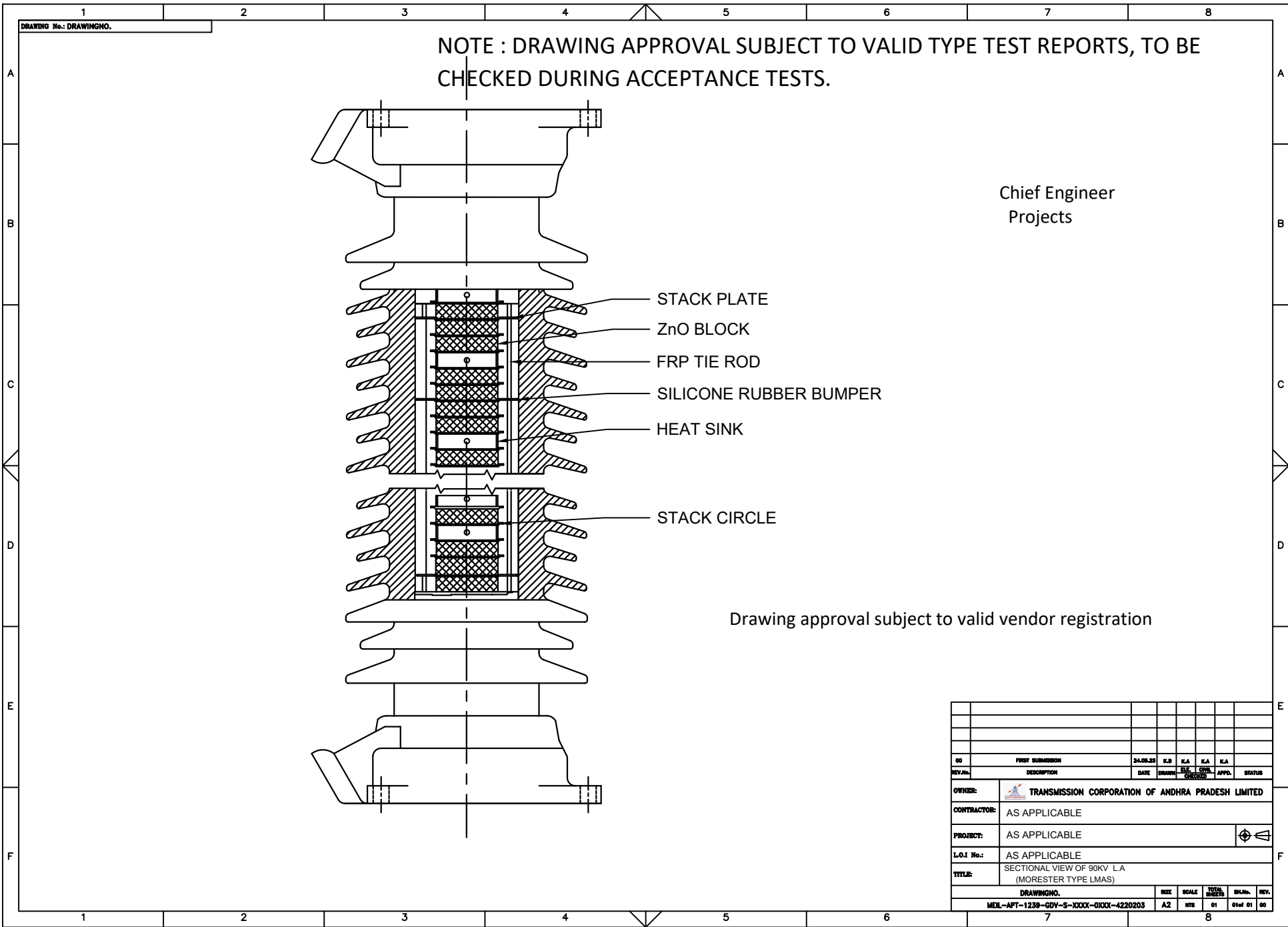
Drawing approval subject to valid vendor registration

NOTE :  
1. MATERIAL : POLYCRETE  
2. WEIGHT : 1.3Kgs ±10%

4	SPRING WASHER M16	SP. STEEL	2 Nos.
3	PLAIN WASHER M16	S.S.	2 Nos.
2	NUT M16	S.S.	2 Nos.
1	INSULATOR	POLYCRATE	1 No.
ITEM	DESCRIPTION	MATERIAL	QUANTITY

REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.	STATUS
00	FIRST SUBMISSION	24.05.23	K.B	K.A	K.A	K.A
<b>OWNER:</b> TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED <b>CONTRACTOR:</b> AS APPLICABLE <b>PROJECT:</b> AS APPLICABLE <b>L.O.I No.:</b> AS APPLICABLE <b>TITLE:</b> SUPPORT INSULATOR Ø100						
<b>DRAWINGNO.</b> MEIL-APT-1239-GDV-S-XXXX-0XXX-6221022						
SIZE	SCALE	TOTAL SHEETS	SHEET No.	REV.		
A2	M5	01	01 of 01	00		

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

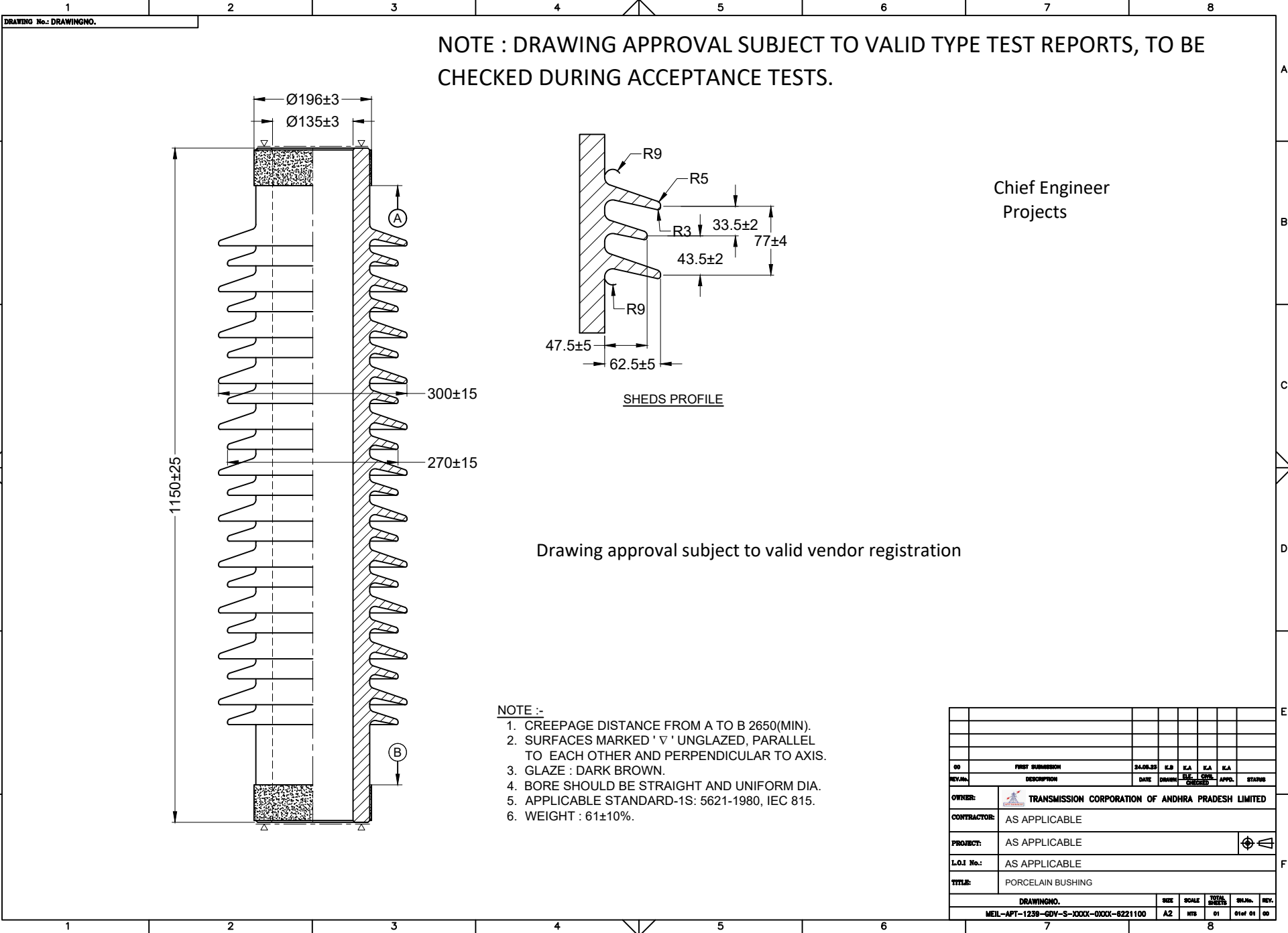


Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

NO	FIRST SUBMISSION	24.08.23	K.B	K.A	K.A	K.A
REV.No.	DESCRIPTION	DATE	DRAWN	CHECK	APPD.	STATUS
OWNER:	TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED					
CONTRACTOR:	AS APPLICABLE					
PROJECT:	AS APPLICABLE					
L.O.I No.:	AS APPLICABLE					
TITLE:	SECTIONAL VIEW OF 90KV L.A (MORESTER TYPE LMAS)					
DRAWING NO.		SIZE	SCALE	TOTAL SHEETS	SHEET NO.	REV.
MEIL-APT-1238-GDV-5-XXXX-0XXX-4220203		A2	MTB	01	01 of 01	00
					7	8

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing



NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

NOTE :-

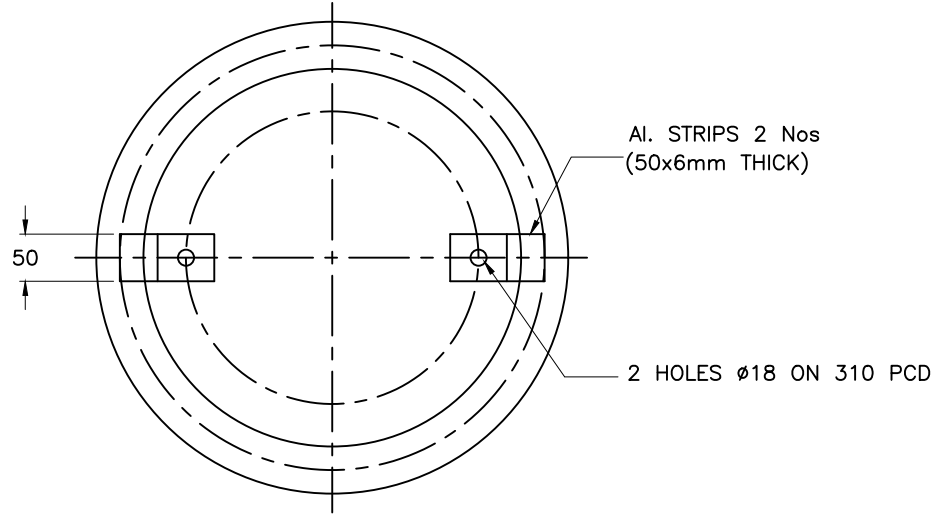
1. CREEPAGE DISTANCE FROM A TO B 2650(MIN).
2. SURFACES MARKED '▽' UNGLAZED, PARALLEL TO EACH OTHER AND PERPENDICULAR TO AXIS.
3. GLAZE : DARK BROWN.
4. BORE SHOULD BE STRAIGHT AND UNIFORM DIA.
5. APPLICABLE STANDARD-1S: 5621-1980, IEC 815.
6. WEIGHT : 61±10%.

REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPR.	STATUS
00	FIRST SUBMISSION					
OWNER:	TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED					
CONTRACTOR:	AS APPLICABLE					
PROJECT:	AS APPLICABLE					
L.O.I No.:	AS APPLICABLE					
TITLE:	PORCELAIN BUSHING					
DRAWING NO.		SIZE	SCALE	TOTAL SHEETS	SHEET NO.	REV.
MEIL-APT-1238-GDY-S-XXXX-0000-6221100		A2	NTS	01	01 of 01	00



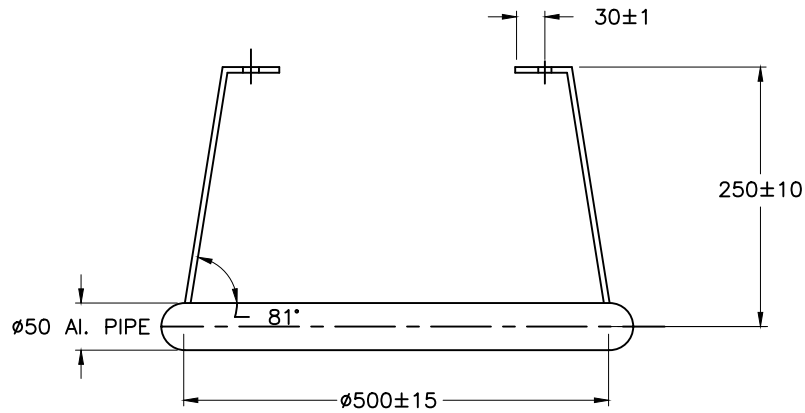
DRAWING No.: DRAWINGNO.

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.



Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

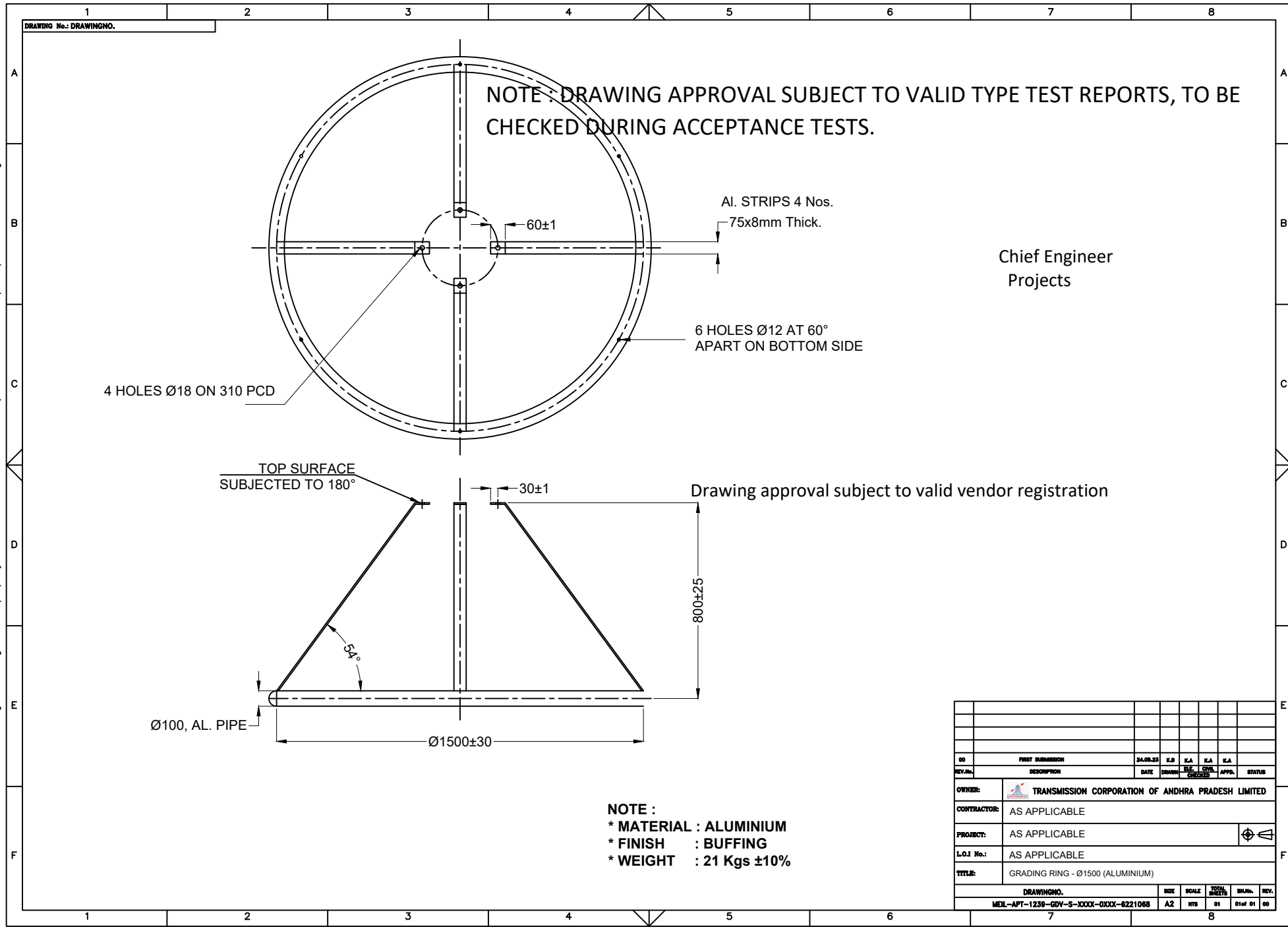


NOTE:  
 \*MATERIAL : ALUMINIUM  
 \*FINISH : BUFFING  
 \*WEIGHT : 2.4 Kgs  $\pm 10\%$

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.	STATUS
00	FIRST SUBMISSION	24.05.23	K.S	K.A	K.A	
<b>OWNER:</b> TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED <b>CONTRACTOR:</b> AS APPLICABLE <b>PROJECT:</b> AS APPLICABLE <b>L.O.I No.:</b> AS APPLICABLE <b>TITLE:</b> CORONA RING - $\phi 500$ (ALUMINIUM)						
<b>DRAWINGNO.</b> MEIL-APT-1230-00V-S-XXXX-0XXX-0221067						
			REV	SCALE	TOTAL SHEETS	SHEET No.
			A2	1/10	01	01 of 01

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing



**NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.**

Chief Engineer  
Projects

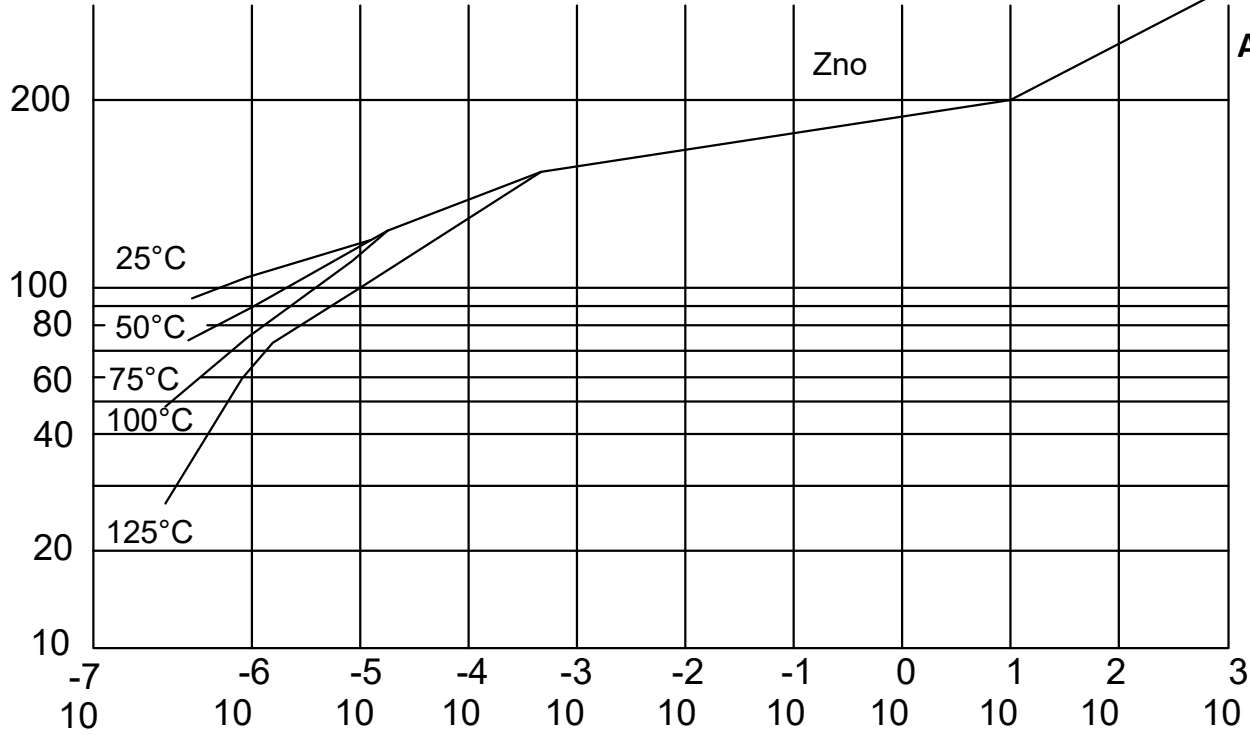
Drawing approval subject to valid vendor registration

**NOTE :**  
 \* MATERIAL : ALUMINIUM  
 \* FINISH : BUFFING  
 \* WEIGHT : 21 Kgs ±10%

REV. NO.	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.	STATUS
00	FIRST SUBMISSION	24.09.23	K.B	K.A	K.A	
<b>OWNER:</b> TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED <b>CONTRACTOR:</b> AS APPLICABLE <b>PROJECT:</b> AS APPLICABLE <b>L.O.I No.:</b> AS APPLICABLE <b>TITLE:</b> GRADING RING - Ø1500 (ALUMINIUM)						
<b>DRAWINGNO.</b> MEIL-APT-1238-GDV-S-XXXX-0000-6221088						
SIZE	SCALE	TOTAL SHEETS	SHEET NO.	REV.		
A2	MTB	01	01 of 01	00		

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

VOLTAGE GRADIENT (E) VOLT/mm



**CHIEF ENGINEER /PROJECTS  
APTRANSCO/VIS/VIJAYAWADA**

CURRENT DENSITY : AMP /CM (J) <sup>2</sup>

Drawing approval subject to valid vendor registration

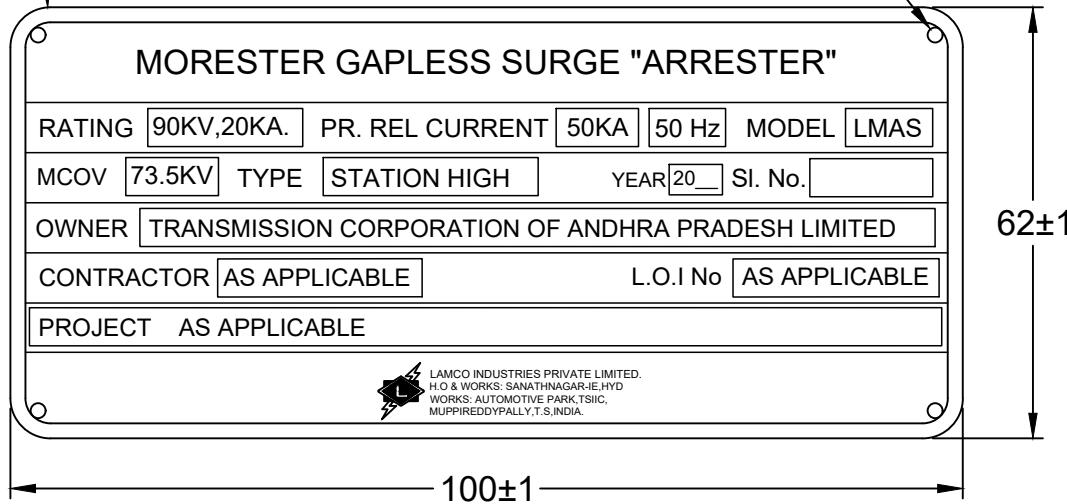
NO	FIRST SUBMISSION	24.05.23	K.S	K.A	K.A	K.A	
REV. No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPR.	STATUS	
OWNER:	TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED						
CONTRACTOR:	AS APPLICABLE						
PROJECT:	AS APPLICABLE						
LOI No.:	AS APPLICABLE						
TITLE:	CHARACTERISTIC CURVES OF ZnO ELEMENTS						
DRAWINGNO.		SIZE	SCALE	TOTAL SHEETS	SHEET No.	REV.	
MEIL-APT-1259-GDV-S-XXXX-XXXX-8221010		A2	HTD	01	01 of 01	00	



NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

LOCATION FOR RIVETING

R4(TYP)



Chief Engineer  
Projects

Drawing approval subject to valid vendor registration

- NOTE:  $\pm 0.05$
- 1) MATERIAL :THICKNESS 0.51mm (25 SWG) ALUMINIUM SHEET.
  - 2) PRINTING :
    - a) BORDER LINE AND LETTERS WHITE ON BLACK BACKGROUND..
    - c) RECTANGULAR BLANKS WHITE, LETTERS BLACK.
    - d) LETTERS TO BE ETCHED.


REV. No.	DESCRIPTION	DATE	DRWNG	CHKD	APPD.	STATUS
00	FIRST SUBMISSION	12.06.23				
OWNER: TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED CONTRACTOR: AS APPLICABLE PROJECT: AS APPLICABLE L.O.I No.: AS APPLICABLE TITLE: NAME PLATE - 100						
DRAWINGNO.						
MEIL-APT-1239-GDV-5-XXXX-XXXX-9004402						
SIZE	SCALE	TOTAL SHEETS	SHEET No.	REV.		
A2	MTB	01	01 of 01	00		

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing

DRAWING No.: DRAWINGNO.

NOTE : DRAWING APPROVAL SUBJECT TO VALID TYPE TEST REPORTS, TO BE CHECKED DURING ACCEPTANCE TESTS.

**MORESTER GAPLESS SURGE "ARRESTER"**

RATING	360KV, 20 KA	MODEL	LMAS
MAX. CONTINUOUS OPERATING VOLTAGE		294KV rms	
TYPE		STATION HIGH	
PRESSURE RELIEF CURRENT		50 KA	
FREQ	50 Hz	BIL	1425KVp
YEAR	20	Sl. No.	
OWNER TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED			
CONTRACTOR AS APPLICABLE			
L.O.I No. AS APPLICABLE			
PROJECT AS APPLICABLE			
TOTAL CREEPAGE DISTANCE		10600	
 LAMCO INDUSTRIES PRIVATE LIMITED. H.O & WORKS: SANATHNAGAR-IE, HYD WORKS: AUTOMOTIVE PARK, T.S.I.C, MUPPIREDDYPALLY, T.S, INDIA.			

Chief Engineer  
Projects

85±1.0

Ø2.5 HOLES (4Nos)

95±1.0

- NOTE: ±0.05
- MATERIAL : THICKNESS 0.51mm (25 SWG) ALUMINIUM SHEET.
  - PRINTING :
    - BORDER LINE AND LETTERS WHITE ON BLACK BACKGROUND..
    - RECTANGULAR BLANKS WHITE, LETTERS BLACK.
    - LETTERS TO BE ETCHED.

Drawing approval subject to valid vendor registration

DD	FIRST SUBMISSION	13.08.23	E.L	K.A	K.A	K.A
REV.No.	DESCRIPTION	DATE	DRAWN	CHECKED	APPD.	STATUS
OWNER:	TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED					
CONTRACTOR:	AS APPLICABLE					
PROJECT:	AS APPLICABLE					
L.O.I No.:	AS APPLICABLE					
TITLE:	MASTER NAME PLATE					
DRAWINGNO.		SIZE	SCALE	TOTAL SHEETS	SHEET NO.	REV.
MEIL-APT-1239-0DV-S-XXXX-0XXX-8004410		AZ	MTS	01	01 of 01	00

This drawing and design is the property of MEIL and must not be copied or lent without prior permission in writing