

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

METER BOX MADE OUT OF SHEET MOULDING
COMPOUND (SMC) GRADE S3 SUITABLE FOR LT
AC SINGLE PHASE 5 - 30 AMPS STATIC ENERGY
METER

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TECHNICAL SPECIFICATION OF METER BOX MADE OUT OF SHEET MOULDING COMPOUND (SMC) GRADE S3 SUITABLE FOR LT AC SINGLE PHASE 5 - 30 AMPS STATIC ENERGY METER.

1.00 SCOPE

This specification covers design, manufacturing, testing and supply of meter box made out of Sheet Moulding Compound (SMC) confirming to IS: 13410. The Meter Box shall be suitable for housing single phase energy meters on wall mounting in indoor as well as outdoor applications.

2.00 SERVICE CONDITIONS

The meter box to be supplied against this specification shall be suitable for satisfactory continuous operation under the following service conditions.

- | | |
|---|------------------------|
| (a) Max. ambient temperature | 50°C |
| (b) Max. relative humidity | 100% |
| (c) Max. annual rainfall | 1450 mm |
| (d) Max. wind pressure | 150Kg./ m ² |
| (e) Max. altitude above mean sea level | 1000 meters |
| (f) Seismic level (Horizontal acceleration) | 0.3 g |
| (g) Ref. Ambient temperature for temperature rise | 50°C |
| (h) Isoceraunic level (days/year) | 50 |
| (i) Climatic condition: Moderately hot & humid tropical climate conducive to rust and fungus growth | |

3.00 APPLICABLE STANDARDS

Unless otherwise modified in this specification, the meter box shall generally confirm to IS: 14772 / 2000 (Amended upto date) and material of construction i.e. sheet moulding compound (SMC) shall confirm to IS: 13410 and requirement of this specification.

4.00 DESIGN & CONSTRUCTION:

- 4.01 The meter box shall be made from Thermosetting Plastic i.e. glass reinforced polyester sheet moulding compound (SMC) confirming to IS: 13410/ 1992, & requirement of this specification.
- 4.02 The meter box shall be so constructed as to have roof tapering down for easy flow of rainwater
- 4.03 The meter box shall be made of anti corrosive, dust proof, rust proof, vermin and water proof, ultra violet stabilized and flame retardant S3 grade SMC material having good dielectric and mechanical strength property.

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- 4.04 The surface appearance or part of meter box must be smooth, non porous and homogeneous, free from ripples, defects and marks. No fillers or fibres should be visible at any place.
- 4.05 The Meter Box shall be moulded using 100% virgin SMC, grade S-3 material. The box shall be weather proof, unbreakable and scratch resistant & shall have good workmanship. For SMC, the wall thickness of the meter box base shall be minimum 3 mm on load bearing side and 2 mm on all other sides, thickness of cover shall be minimum 2 mm
- 4.06 The meter box must be UV stabilized to ensure that it does not get 'Yellow' over a period of time. It should not change in colour, shape, size, dimensions when subjected to 200 hrs on UV ageing test as per ASTM: G53 (Cl. No. 9.3). Also, it shall be capable of withstanding temperature of boiling water for five minutes continuously without distortion or softening.
- 4.07 The minimum inside dimensions of the meter box shall be suitable for installation of all types of meters purchased from various meter manufacturers considering the clearances indicated elsewhere in this specification.
- 4.08 The meter box shall be made from thermosetting plastic i.e. glass reinforced polyester sheet moulding compound confirming to IS: 13410 /1992, Grade S3 & requirement of this specification.
- 4.09 Meter box should have base raised by about 10 mm in the box for easy wiring for fixing the meter. The meter screws shall not protrude outside.
- 4.10 The internal dimensions of single phase meter box shall be such that there should be minimum 60 mm clearance at the bottom, 40 mm clearance on all three sides, 25 mm clearance at the front and 10 mm clearance at the back between meter and meter box inner wall. Thus the minimum internal overall dimensions of the meter box shall be as below.
- 275 mm (H) x 230 mm (W) x 120 mm (D)
- 4.11 The tolerance permissible on the various dimensions of the meter box shall be $\pm 3\%$.
- 4.12 The base and cover of meter box shall be individually in one piece
- 4.13 The cover shall be made overlapping type having collars on all four sides. The cover of meter box shall have 4 nos. of non-detachable self-locking push fit type arrangement. It should have suitable non-detachable fitting to base such that if pushed once inside, the cover

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shall rest on the base of box in such a way that any access from outside to the meter is not possible. The locking (press fit) knob shall get completely contained in the locking hub inside the meter box. The locking hub shall be closed at its base.

- 4.14 The cover in closed position should be overlapped on base such that direct entry of screwdriver, tool or film is not possible. The cover shall be provided with semi circular / circular gasket of sufficient size to completely fit to the base. The gasket should be made out of good quality neoprene rubber.
- 4.15 The meter box base and cover shall have minimum 2 nos. of matching wire sealing holes for MSEDCL sealing purpose.
- 4.16 Meter box shall conform to IP-55.
- 4.17 Zinc passivated screws of sufficient sizes shall be provided inside the meter box for mounting the meters manufactured by various meter manufacturers.
- 4.18 4 nos. of keyholes of minimum diameter 5 mm shall be provided at the four corners at the backside of the meter box to facilitate mounting of the meter box on the wall or wooden board or pole. 4 nos. of 37.5 mm long, 5 mm diameter mounting stainless steel screws with suitable stainless steel washers shall be provided along with each meter box.
- 4.19 2 nos. of holes with polymeric grommets; for securely fixing the cable; of maximum diameter of 6 or 8 mm shall be provided at the bottom of meter box for incoming and outgoing cables.
- 4.20 The thermal endurance of SMC shall be as per clause no. 6.8 of IS: 13410 / 1992.
- 4.21 Colour of meter box shall be Siemens Grey
- 4.22 The cover shall be provided with viewing window of minimum size of 100 mm x 100 mm.

The triplex toughened glass of minimum 100 x 100 x 3 mm shall be provided in the viewing window from inside of the cover for observing meter reading so that the glass can not be removed from outside. It shall be so fitted that in the event of breaking, it shall be possible to replace it after opening the door. Sufficient holding arrangement for the glass in place shall be provided on the inside of meter box cover.

5.00 TESTS

- 5.01 The meter box shall be fully type tested as per IS 14772 / 2000 (amended up to date), IS: 13410 / 1992 and other relevant standards. The type test report shall clearly indicate the constructional features

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identifying material of construction and its grade / composition as per IS: 13410 / 1992 and other type tests as well as acceptance tests. All the Type Tests shall be carried out from Laboratories, which are accredited by the National Board of Testing and Calibration Laboratories (NABL) of Govt. of India such as CPRI, ERDA or CIPET, to prove that the meter box meets the requirements of specification. Type Test Reports conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable. The tenderer shall also furnish the particulars giving specific required details of Meter boxes in schedule 'A' attached (As per Guaranteed Technical Particulars uploaded on e - Tendering site). The offers without the details in Schedule 'A' stand rejected. The tenderer shall submit all the type test reports as below along with offer. The type test report of meter box having identical constructional and other features carried out during last five- years will be valid.

5.02 The meter box shall pass all the acceptance and routine tests as laid down in IS 14772 / 2000 (amended up to date) & IS: 13410 and also additional acceptance tests as prescribed in this specification.

5.03 Identifying material of construction and its grade / composition as per IS: 13410 and other type tests as well as acceptance tests shall be submitted for approval before commencement of supply.

5.04 Type Tests for SMC Meter Box:

Sr. No.	Test	Reference Standard	Required Value
1	Marking	IS 14772:2000, Cl. 7	Manufacturer Name & Danger Logo Screen Printing
2	Dimensions	IS 14772:2000, Cl. 8	As per specification and drawing
3	Protection against Electric Shock	IS 14772:2000, Cl. 9	As per IS
4	Provision for Earthing	IS 14772:2000, Cl. 10	As per IS
5	Construction	IS 14772:2000, Cl. 11	No Crack or Damage
6	Resistance to Ageing, to humid condition, to ingress of solid objects and to harmful ingress of water	IS 14772:2000, Cl. 12	No Crack or Damage
7	Mechanical Strength	IS 14772:2000, Cl. 13	No Crack or Damage
8	Resistance to Heat	IS 14772:2000, Cl. 14	No ball impression

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9	Resistance to Insulating Material to Abnormal Heat and Fire	IS 14772:2000, Cl. 15	No Flame and Glowing
10	Resistance to Rusting	IS 14772:2000, Clause No. 16	No sign of rust observed
11	Resistance to Tracking	IS 14772:2000, Clause No. 17	No failure or breakdown occurs before 50 Drops 175V
12	Heat Deflection Temperature @ 1.8 Mpa (On Enclosure)	IS 13411:1992	> 150
13	Exposure to Flame	IS 4249:1967	Self Extinguishing
14	Flammability	UL-94/IS-11731	V0
15	Melting Point	IS:13360 (Part-6/Sec-10):1992	Does not melt upto 400 ⁰ C
16	Degree of Protection (IP-55)	IS:13947:1993 (Part-1)	IP-55
17	Glow wire test at 960 Deg. C	IS:11000	No flame and glowing observed
18	Ball Pressure Test	IEC-335	No Ball Impression Observed
19	UV Ageing Test for 300 Hours	ASTM-G-53	No Colour Change, no chalking and No discoloration observed
20	Water Absorption	IS:13411-1992	< 0.25%
21	Material Identification	As per Laboratory Method	Glass reinforced polyester Sheet Moulding compound (SMC)
22	Spirit burner test	IS: 4249	
22	Glass content, percent by mass (Min.)	IS:13410-1992	20
23	Water Absorption, % Max	IS:13410-1992	0.20
24	Izod impact strength (Notched), KJ/m ²	IS:13410-1992	55
25	Flexural Strength ,MPa , Min	IS:13410-1992	170
26	Power Arc Resistance Sec. Min.	IS:13410-1992	180
27	Modulus of Elasticity, 10 ³ , MPa	IS:13410-1992	12 to 15
28	Tracking Resistance CTI, Min	IS:13410-1992	1000
29	Dielectric Strength at 90 ^o C in Oil KV/mm	IS:13410-1992	11

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30	Dissipation factor (4 days at 80 % RH & 1 KHz)	IS:13410-1992	0.01
31	Heat Distortion Temperature, oC ,Min	IS:13410-1992	150
32	Oxygen Index,% Min	IS:13410-1992	24

6.00 TESTING AND MANUFACTURING FACILITIES

- 6.01 The manufacturer shall have necessary machinery for production of SMC meter box.
- 6.02 The manufacturer shall have in house testing facilities for carrying out routine and acceptance tests as per IS: 14772 / 2000.
- 6.03 The bidder shall have the testing facility of flammability test of V0.

7.00 DRAWING / SAMPLE

- 7.01 The detailed dimensional drawing showing clearly the dimensions and material of meter box and its constructional features shall be invariably furnished with the offer.

8.00 MARKING / EMBOSSING

The following information shall be clearly and indelibly embossed (not printed) on the cover of the meter box.

- i) Purchase order number and date
- ii) Year and month of manufacture
- iii) Name of Purchaser: MSEDCL
- iv) Guarantee: 5 years
- v) Name and trademark of manufacturer
- vi) Danger logo (Screen Printed)

9.00 PACKING

- 9.01 The meter box shall be suitably packed in corrugated boxes in order to avoid damage during transit or handling. The lid of the corrugated boxes may be suitably sealed. The packing cases may be marked to indicate the fragile nature of the contents.
- 9.02 The following information shall be furnished with the consignment:
- Name of the consignee.
 - Details of consignment.
 - Destination.
 - Total weight of the consignment.
 - Sign showing upper / lower side of the crate.

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- Sign showing fragility of the material.

10.00 GUARANTEE

The material supplied shall be guaranteed for the period of 60 months from the date of commissioning or 66 months from the date of dispatch whichever is earlier.

11.00 SCHEDULES

The tenderer shall fill in the following schedules and submit along with the offer. If the schedules are not submitted duly filled in with the offer, the offer shall be rejected.

Schedule - 'A' ... Guaranteed Technical particulars (As per GTP parameters uploaded on e- Tendering site.)

The discrepancies, if any, between the specification and the catalogs and/or literatures submitted as part of the offer by the bidders, shall not be considered and representations in this regard will not be entertained.

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SCHEDULE 'A'

GUARANTEED TECHNICAL PARAMETERS

ITEM NAME	METER BOX MADE OUT OF SHEET MOULDING COMPOUND (SMC), GRADE S3 SUITABLE FOR LT AC SINGLE PHASE 5 - 30 AMPS STATIC ENERGY METER	
SR. NO.	GUARANTEED TECHNICAL PARAMETERS	GTP VALUES
(1)	MANUFACTURER'S / SUPPLIER'S NAME AND ADDRESS WITH WORKS ADDRESS	TEXT
(2)	APPLICABLE STANDARDS	TEXT
(3)	METER BOX IS MADE FROM GRADE S3 SMC MATERIAL	BOOLEAN
(4)	METER BOX IS WEATHER PROOF, UNBREAKABLE, SCRATCH RESISTANT HAVING GOOD WORKMANSHIP WITH ROOF TAPERING DOWN ON BOTH SIDES FOR EASY FLOW OF RAINWATER.	BOOLEAN
(5)	METER BOX MATERIAL IS UV STABILIZED TO ENSURE THAT IT DOES NOT GET 'YELLOW' OVER A PERIOD OF TIME.	BOOLEAN
(6)	METER BOX DOES NOT CHANGE IN COLOUR, SHAPE, SIZE, DIMENSIONS WHEN SUBJECTED TO 200 HRS ON UV AGEING TEST AS PER ASTM: G53 (CL. NO. 9.3).	BOOLEAN
(7)	TYPE TEST REPORT IN SUPPORT OF UV AGEING TEST AS PER ASTM: G53 (CL. NO. 9.3) ENCLOSED	BOOLEAN
(8)	METER BOX IS CAPABLE OF WITHSTANDING TEMPERATURE OF BOILING WATER FOR FIVE MINUTES CONTINUOUSLY WITHOUT DISTORTION OR SOFTENING.	BOOLEAN
(9)	TYPE TEST REPORT IN SUPPORT OF ABOVE (8)	TEXT

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(10)	MINIMUM INSIDE DIMENSIONS OF METER BOX ARE SUITABLE FOR INSTALLATION OF ALL TYPES OF METERS CONSIDERING THE CLEARANCES	BOOLEAN
(11)	THICKNESS OF BASE	TEXT
(12)	THICKNESS OF COVER	TEXT
(13)	METER BOX HAS CLEARANCES AS PER SPECIFICATION	BOOLEAN
(14)	OVERALL DIMENSIONS OF METER BOX LXBXH	TEXT
(15)	BASE AND COVER OF METER BOX ARE INDIVIDUALLY IN ONE PIECE.	BOOLEAN
(16)	COVER IS MADE OVERLAPPING TYPE HAVING COLLARS ON ALL FOUR SIDES.	BOOLEAN
(17)	COVER HAS 4 NOS. OF NON-DETACHABLE SELF-LOCKING PUSH FIT TYPE ARRANGEMENT.	BOOLEAN
(18)	COVER HAS SUITABLE NON-DETACHABLE FITTING TO BASE SUCH THAT IF PUSHED ONCE INSIDE, IT RESTS ON BASE IN SUCH A WAY THAT ANY ACCESS FROM OUTSIDE TO METER IS NOT POSSIBLE.	BOOLEAN
(19)	LOCKING (PRESS FIT) KNOB GETS COMPLETELY CONTAINED IN LOCKING HUB INSIDE METER BOX.	BOOLEAN
(20)	LOCKING HUB IS CLOSED AT ITS BASE.	BOOLEAN
(21)	COVER IN CLOSED POSITION OVERLAPS BASE SUCH THAT DIRECT ENTRY OF SCREWDRIVER, TOOL OR FILM IS NOT POSSIBLE.	BOOLEAN
(22)	COVER IS PROVIDED WITH SEMI CIRCULAR / CIRCULAR GASKET OF SUFFICIENT SIZE TO COMPLETELY FIT TO GROOVES OF THE BASE.	BOOLEAN
(23)	SEMI CIRCULAR / CIRCULAR GASKET IS MADE OUT OF GOOD QUALITY NEOPRENE RUBBER	BOOLEAN
(24)	COLOUR OF THE METER BOX IS SIEMENS GREY	BOOLEAN

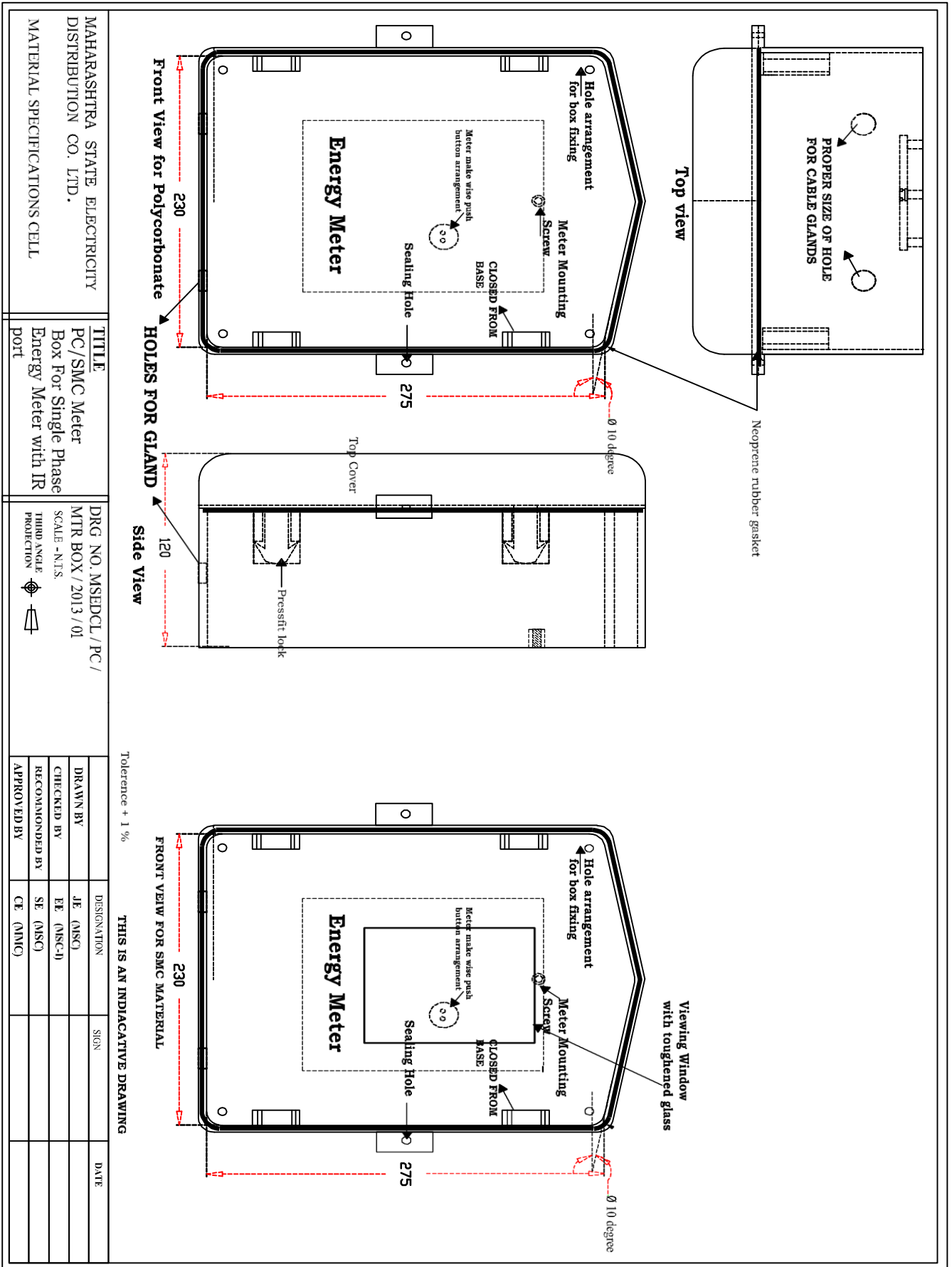
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(25)	METER BOX CONFIRMS TO IP-55.	BOOLEAN
(26)	IP-55 TYPE TEST REPORT NO. & DATE	TEXT
(27)	ZINC PASSIVATED SCREWS OF SUFFICIENT SIZES PROVIDED INSIDE METER BOX FOR METERS MOUNTING	BOOLEAN
(28)	4 NOS. OF KEYHOLES OF MINIMUM DIAMETER OF 5 MM PROVIDED AT THE FOUR CORNERS AT THE BACKSIDE OF THE METER BOX TO FACILITATE MOUNTING OF THE METER BOX ON THE WALL OR WOODEN BOARD OR POLE.	BOOLEAN
(29)	4 NOS. OF 37.5 MM LONG, 5 MM DIAMETER MOUNTING ZINC PLATED SCREWS WITH SUITABLE ZINC PLATED WASHERS PROVIDED ALONG WITH EACH METER BOX.	BOOLEAN
(30)	2 NOS. OF HOLES WITH POLYMERIC MATERIAL COLLAPSIBLE GLANDS WITH RUBBER OF MAXIMUM DIAMETER OF 6 OR 8 MM PROVIDED AT THE BOTTOM OF METER BOX FOR INCOMING AND OUTGOING CABLES.	BOOLEAN
(31)	TOUGHENED GLASS OF MINIMUM 100 X 100 X 3 MM DIMENSIONS PROVIDED IN VIEWING WINDOW	BOOLEAN
(32)	METER BOX TYPE TESTED	BOOLEAN
(33)	TYPE TEST REPORT NO. & DATE	TEXT
(34)	TYPE TEST REPORT ENCLOSED	BOOLEAN
(35)	CONFIRM FLAMMABILITY AS PER UL 94 / IS 11731	TEXT
(36)	CONFIRM SELF EXTINGUISHING AS PER IS 4249.	TEXT
(37)	CONFIRM HEAT DEFLECTION TEMPERATURE @ 1.8 MPA AS PER IS: 13411, ANNEXURE 'H' / ISO 75.	TEXT
(38)	CONFIRM GLOW WIRE TEST AS PER IS: 11000 (PART 2 / SECTION 1) / IEC 695-2-1.	TEXT
(39)	CONFIRM BALL PRESSURE TEST AS PER IS: 14772	TEXT

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	/ 2000 OR IEC 335	
(40)	CONFIRM 200 HRS UV AGEING TEST IS CARRIED OUT AS PER ASTM G53 (9.3)	TEXT
(41)	CONFIRM WATER ABSORPTION VALUE AS PER IS: 14772 / 2000	TEXT
(42)	CONFIRM MECHANICAL STRENGTH AS PER IS: 14772 / 2000	TEXT
(43)	CONFIRM FLEXURE STRENGTH.	TEXT
(44)	CONFIRM MODULUS OF ELASTICITY	TEXT
(45)	CONFIRM IZOD IMPACT STRENGTH NOTCHED MINIMUM.	TEXT
(46)	CONFIRM LIGHT TRANSMISSION AS PER ASTM D 1003	TEXT
(47)	GUARANTEE OF METER BOX IS 5 YEARS	BOOLEAN
(48)	IN-HOUSE TESTING FACILITY IS AVAILABLE.	BOOLEAN

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MAHARASHTRA STATE ELECTRICITY DISTRIBUTION CO. LTD.
MATERIAL SPECIFICATIONS CELL

TITLE
PC/SMC Meter Box For Single Phase Energy Meter with IR port

DRG NO. MSEDCL/PC/MTR BOX / 2013 / 01
SCALE - N.T.S.
THIRD ANGLE PROJECTION

Tolerance + 1 %

THIS IS AN INDICATIVE DRAWING

DRAWN BY	DESIGNATION	SIGN	DATE
CHECKED BY	JE (MSC)		
RECOMMENDED BY	EE (MSC-I)		
APPROVED BY	SE (MSC)		
	CE (MMC)		