



TECHNICAL SPECIFICATION FOR MCT BLOCKS

Owner : M/s Indian Oil Corporation Limited (IOCL) – Paradip Refinery

Consultant/PMC : M/s TECHNIP ENERGIES LIMITED

Purchaser / LSTK Contractor : M/s Bharat Heavy Electricals Limited (BHEL)

Engineering Sub-Contractor : M/s Engineers India Limited (EIL)

Site : Paradip Refinery, Paradip, Odisha, India

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Revisions:
Refer to record of
revisions

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PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 2 of 8

1. SCOPE:

The scope shall include MCT blocks design, manufacture, assembly, testing at vendor's works, packing and delivery to site as per this specification.

2. APPLICABLE STANDARDS:

BS 476 and all other applicable International / Indian Standards

3. TECHNICAL REQUIREMENTS:**3.1 Type of System:**

- i) Prefabricated MCT insert blocks shall be adjustable diameter type with centre core. Base material of insert blocks and wedges shall be EPDM rubber with halogen free and low smoke index-FI classification as per NF-16-101 and NF-16-102, Heat Radiation test in compliance with M2 classification as a minimum. UV ageing test as per ISO 4892-2 and oxygen index test as per ASTM D2863. The MCT blocks shall be rodent resistant etc. The MCTs selected shall be repeatedly re-openable and re-useable without the need for discarding or replacing any block of the components or even special tools.
- ii) The modules shall be individually adaptable to accommodate a wide range of cable types. The Multi-diameter modules with center core shall be capable of accommodating cable sizes by simple techniques and procedures.

Bidders shall quote for the flexible blocks with center core, which can be used for large varieties of cable Outer Diameters as follows:

- 30 size Block: (+ 0, 10 mm to 25 mm)
- 40 size Block: (+ 0, 21.5 mm to 34.5 mm)
- 60 size Block: (+ 0, 28 mm to 54 mm)
- 90 size Block: (+ 0, 48 mm to 71 mm)
- 120size Block: (+ 0, 67.5 mm to 99 mm)

3.2 Service:

- i) The MCT inlets are to be used to seal the cable entries into rooms i.e. cable cellar / control room. The components used shall withstand fire, mechanical shock, vibration, thermal cycling etc. and seal the inner environment of cellar/control room from external disturbances like explosion pressures, water ingress/leaks and other phenomenon which may cause damage or malfunctioning of the equipment located in control room.
- ii) Materials used should have been tested for fire, pressure, explosion pressures, mechanical shocks, vibration, cable tension, low/high temperatures, cable temperature rise, rodent attack, thermos cycling, sound insulation etc.

4. SPECIFIC REQUIREMENTS:

- i) MCT Blocks/Frames shall be suitable for installation in concrete and brickwork Buildings, where cables have already been drawn. Material of frame shall be **Stainless steel** construction including frames, stay plates, wedges bolts etc. Depth of frame shall be 60 mm as a minimum. MCT frames shall be suitable for welded installation.
- ii) MCT blocks shall be suitable for installation, after cables are laid & terminated between equipment. MCTs shall be suitable for installing on wall cutouts of Control Room, Cable Cellars of Switch Gear Buildings.
- iii) MCT Sealing system shall be a prefabricated cable sealing system of modular based for the protection of cables against hazardous gases induced by fire Smoke, gas & water.
- iv) The MCT shall be provided complete with accessories like insert blocks, wedges, stay plates, lubricant, end packing etc.
- v) Prefabricated MCT insert blocks shall be adjustable diameter type Insert blocks shall be adjustable diameter type with centre core. Base material of insert blocks and wedges shall be EPDM rubber with halogen free and low smoke index-FI classification as per NF-16-101 and NF-16-102, Heat Radiation test in compliance with M2



PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 3 of 8

classification as a minimum. UV ageing test as per ISO 4892-2 and oxygen index test as per ASTM D2863. The MCT blocks shall be rodent resistant etc.

- vi) The MCT assembly shall be IP68 as per IEC-60529 and shall be installed as per the recommended practice of supplier. No spare space shall be left uncovered in the frame. Uncovered space in frames shall be provided with adjustable diameter insert blocks of corresponding sizes as required based on the MCT layout & **actual cable schedule requirement provided during detail engineering**. Solid blocks shall not be used.
- vii) **The size of the cable blocks shall be decided by vendor based on the final cable schedules furnished during detailed engineering.**
- viii) All the instruments and equipment of MCT shall be suitable for use in hot, humid, sea coastal and tropical industrial climate in which corrosive gases and / or chemicals may be present.
- ix) MCT blocks shall be secured against the ingress of fumes, dampness, insects and vermin. All external surfaces shall be suitably treated to provide protection against corrosive plant atmosphere.
- x) Wedge shall be used to compress the modules in the frame. Design of wedge shall not require any special tools to install/uninstall. All bolts shall be of stainless steel. Stay plates shall be used for separating the module layers.
- xi) Multi-diameter blocks with center core blocks (designed as halves with each pair having sleeves to make a precision fit for corresponding cable dimension), shall be with peel-able sleeves for simpler & smoother installation.
- xii) While preparing the MCT layout, vendor to ensure that power cables, FF/non-IS cables, IS cables and FO/serial link cables are suitable segregated.
- xiii) Separate MCT Frames shall be considered for LT Power cables. Multi-diameter blocks with center core shall be provided to fill the unused space in the frame. Solid blocks should not be used.
- xiv) Complete MCT assembly including MCT frames, blocks, wedges, stay plates etc. shall be manufactured and supplied from the factory location where these components have been manufactured for type test as specified above.

5. QUANTITY:

- i) Cable entry into the SRR and substation shall be through Multi Cable Transit (MCT) frames and blocks. Following are the MCT Frames which are required for this project SRR-811 & SS-331S buildings:

S.No	MCT Frame Type	Main supply Quantity	Mandatory spares Quantity
SRR-811			
1	6+6 X10	2 No's	10% of each size & type of adjustable diameter MCT Block used (rounded up to the next higher number)
2	6+6 X1	1 No	
SS-331S			
1	6+6 X2	1 No	

- ii) **Bidders shall size and provide MCT Blocks based on above frame sizes. Cable schedule shall be furnished during the detailed engineering post order.**
- iii) Spare space in the MCT Block shall be filled with Multi-diameter blocks with center core of suitable sizes. The Spare space in the Frame shall not be left uncovered
- iv) All the blocks including all types of spares shall be usable and shall be supplied with plugs & wraps.



PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 4 of 8

6. TESTS AND INSPECTION:

Following Tests shall be carried out as minimum at Vendor's works and Test Certificates shall be furnished for owner's review before dispatch of equipment.

- i) The inspection and testing shall be carried out at manufacturer's works as per related specifications, International codes and practices/standards, approved documents / drawings and shall be witnessed by owner or owner's appointed TPI.
- ii) Testing and inspection of all items shall be carried out as per approved factory testing procedures. For items where no testing is witnessed by owner or owner appointed TPI, following test certificates shall be furnished for owner's review before dispatch of equipment:
 - ** Verification of Certificates as applicable for the material statutory certificate for Intrinsic safety and explosion proof certificates of conformity.
 - ** Visual Verification of quantity, quality and workmanship.
- iii) MCT shall have type test certificate for the following and submit the same along with offer as well as during inspection:
 - a. Water tightness of 4 bar pressure.
 - b. Gas tightness of 2.5 bar pressure
 - c. Blast resistance testing with blast load of minimum 6 psi for 100 millisecond duration or Blast resistant testing with blast load of minimum 20 psi for 20 millisecond duration.
 - d. Fire rating with 2 hours' test for fire integrity and insulation as per EN-1366/UL-1479.

The above testing shall have been carried out with MCT frame of minimum size 6+6x2.
- iv) Bidders shall submit all test certificates /test results to purchaser in bound volumes along with test procedures for each test carried out.
- v) All type test certificates shall be submitted for BHEL review including
 - a. Shock test as per MIL-S-901C & MIL-S-901D
 - b. Vibration test as per MIL-STD-167-1
 - c. Test for through stop fire penetrations
 - d. Acid gas (Hydrogen chloride etc.) emission test.
 - e. Smoke density test.
 - f. Watertight integrity test.
 - g. Test for rodent & termite repulsion property: vendors shall furnish the test details to analyze the property by chemical method. Sampling to be done for every offered lot/size as per sampling plan.

Notes:

- 1) No deviation on above mentioned requirements would be accepted.
- 2) Final inspection shall be carried out at manufacture's place by owner or owner appointed TPI representatives.
- 3) Bidder shall quote unit prices for all the varieties of MCT Blocks being offered by them, for addition/deletion in qty (if required).
- 4) In case type test certificates are older than 5 years from date of commercial bid Opening, vendor shall carry out the type test at his own cost.

7. DOCUMENTATION

- i) 2 sets of following drawings/documents shall be submitted along with the Technical Bids **for evaluation purpose by purchaser.**
 - a) GA drawings along with sectional/dimensional details including civil inputs.
 - b) Sizing/loading details of each MCT along with detailed BOM.
 - c) Filled in Technical Data sheets along with all technical catalogues.
 - d) Installation Procedures of the MCT Blocks.
 - e) Quality Plan along with Inspection and Test Plan and Type Test Certificates.

Notes:

Technical bid without the above will not be evaluated and bid is likely to be rejected technically.

- ii) 4 sets of above mentioned drawings/documents shall be submitted for our approval after release of LOI/PO.
- iii) 12 Copies of O&M Manuals comprising of Test certificates, Technical data sheets, Installation details, GA and dimensional details and etc. within 1 week after Inspection / dispatch of materials whichever is earlier.



PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 5 of 8

8. DEFECT LIABILITY PERIOD/WARRANTY:

The Defect Liability Period / warranty shall be as per commercial terms & conditions of the NIT.

9. IDENTIFICATION:

Each item shall be identified by the stainless still tag attached with the stainless steel wire and dispatched with proper instrument identification number.

Small parts shall also be properly tagged indicating to which main item the parts belong.

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PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 6 of 8

CHECK LIST

(To be filled by BIDDER and submitted along with Technical offer is compulsorily)

Vendor shall submit the following documents mandatorily as part of COMPLETE technical offer.

Enquiry No. / Date :

Name of the Bidder :

Project Name :

Item Description :

S. No	Document	Bidder confirmati on (Yes/No)	Remarks
1	Technical offer complies with the specifications and its associated annexures, pre-bid clarifications in Toto and there are no technical deviations. Signed and stamped copy of this specification along with annexures enclosed along with technical offer.		
2	In case of deviation, vendor to confirm that these are technically not feasible deviations and same are submitted in BHEL format . In case technically feasible deviations are proposed by the bidder and subsequently withdrawn, <u>no commercial implications can be claimed by the bidder</u>		
3	All items are manufactured conforming to latest version of material grade standard and manufacturing standard mentioned in this specifications		
4	Bidder to quote as per BHEL price format only. No other format is acceptable. Bidder to attach un-priced price bid format by indicating "QUOTED" against each item and submit with technical offer duly signed & stamped.		
5	For addition/reduction of quantity, unit rate quoted in the present offer shall be considered during ordering and shall be valid up to execution of the contract to the extent of + 10% and -30% of order Value.		
6	All the equipments / items / etc., supplied by bidder are having valid statutory approval certificates and same will be produced at any stage of contract execution to BHEL. The same were eligible to take local statutory regulatory body approval during commissioning of the system		

(Bidder's Signature and stamp with date)



PRODUCT STANDARD
PROJECT ENGINEERING & SYSTEMS DIVISION
HYDERABAD

Std. / Doc. Number

PY 56584

Rev. No.

00

Sheet 7 of 8

DEVIATION FORMAT

Enquiry No.:Item:Name of Bidder:Offer Ref. No.:

Sl. No.	Clause no. & Spec. no.	Description as per Specification	Deviation taken	Nature of Deviation	Remarks

NOTES:

1. Technical offer of the bidder will be evaluated only on the basis of Deviation Schedule. Deviation Schedule constitutes this sheet (with these Notes) duly signed and stamped.
2. Deviations, if any, shall be clearly brought out only in this format. Deviations mentioned / taken elsewhere or in any other format will be ignored.
3. Additional sheets in the same format can be attached by the vendor, if necessary.
4. Nature of Deviations shall only be of Design / Manufacturing constraints and non-availability of items / components / makes in market.
5. No price implications shall be entertained for deviations withdrawn during the technical scrutiny. If any deviations are accepted by BHEL during technical scrutiny, then also there will be no price implication. Hence, in no case there will be consideration of Price implications.
6. Reasons for the deviations shall be specified in the Remarks column.
7. If there are no deviations from the specifications, bidder still has to submit the Deviation Schedule by writing "NO Deviations" in this format.
8. If the "Deviation Schedule" is not submitted along with the offer, the bidder's offer is likely to be rejected without any further interaction with the bidder.
9. Only the accepted deviations in conjunction with the original tender shall constitute the contract document for the award of job to the bidder.

SIGNATURE
OF BIDDER

NAME

DESIGNATION

COMPANY SEAL

DATE
