VOLUME-II

TECHNICAL SPECIFICATION

FOR

RIGID STEEL CONDUITS

SPECIFICATION NO: ***PE-RC-999-558-E002***

REVISION: **01**

BHARAT HEAVY ELECTRICALS LIMITED

POWER SECTOR

PROJECT ENGINEERING MANAGEMENT

NOIDA, UP (INDIA) – 201301

CONTENTS

Total nos. of sheets including cover & separator sheets = 10 sheets

COMPLIANCE CERTIFICATE

The bidder shall confirm compliance to the following by signing/ stamping this compliance certificate and furnishing same with the offer.

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusion/ deviation with regard to same

2. There are no deviation with respect to specification other than those furnished in the 'schedule of deviations'

3. Only those technical submittals which are specifically asked for in NIT to be submitted at tender stage shall be considered as part of offer. Any other submission, even if made, shall not be considered as part of offer.

4. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification.

5. Any changes made by the bidder in the price schedule with respect to the description/ quantities from those given in BOQ-Cum-Price schedule of the specification shall not be considered (i.e., technical description & quantities as per specification shall prevail).

BIDDER'S STAMP & SIGNATURE

SECTION – I

1.0 PURPOSE

This specification is intended for finalization of rate contract between BHEL PEM and Bidder. Standard technical detail as indicated in the specification shall be agreed upon between BHEL PEM and bidder. Project specific technical detail shall be made available to the bidder along with project enquiry.

2.0 SCOPE

2.1 Manufacture, Inspection and Testing at Manufacturer's works, proper packing and delivery to site of rigid steel conduits conforming to this specification.

2.2 Technical requirements of rigid steel conduits are indicated in Data Sheet-A & Section-II.

2.3 The stipulation of Data Sheet-A shall prevail in case of any conflict between the stipulations of Data Sheet-A & Section-II.

3.0 BILL OF QUANTITIES

The bidder to quote for items as per price schedule attached with NIT. **The quantity as mentioned in the BOQ is only for evaluation purpose.** However actual ordered quantity may vary from project to project throughout the contract.

4.0 DRAWINGS & DOCUMENTS TO BE SUBMITTED

4.1 After rate contract; against specific project requirement following information shall be furnished by BHEL:-

a) BOQ (Bill of Quantities)

4.2 Following documents shall be submitted for specific project requirement after placement of order for BHEL & customer's approval:-

Sl. No.	Drawings / Document Description	Document Number
1.	Technical Data Sheet for Rigid steel conduits	PE-V0-XXX-558-E402
2.	MQP for Galvanised & epoxy coated rigid conduit	PE-V0-XXX-558-E906

DATA SHEET-A

1.0 APPLICABLE STANDARDS & CODES

a) IS:9537 (Part I & II) Conduits for electrical installation.

b) IS:2629 Recommended practice for hot dip galvanizing on iron and steel.

c) IS:4759 Specification for hot dip zinc coatings on structural steel and allied products

d) IS:6745 Methods for determination of mass of zinc coating on zinc coated iron and steel articles.

e) IS:513 Cold reduced low carbon steel sheet and strip

f) IS: 10748 Hot rolled Steel strip for welded tubes and pipes

g) IS: 2633 Method for testing uniformity of coating on zinc coated articles

h) IS:6005 Code of practice for phosphating iron & steel

2.0 RIGID STEEL CONDUITS

S.No.	Description	Unit	Parameters value/ type
a	Make	-	[√] BIS approved [ ] As per enclosed sub-vendor list
b	Material	-	Hot/Cold rolled mild steel
c	Sizes	-	As per BOQ cum price schedule
d	Standard length	meter	3 – 5
e	Classification as per mechanical properties		Heavy
f	Conduit thickness (minimum)	mm	1.6 upto 32 mm dia, 2.0 above 32 mm & upto 50 mm dia
g	Surface treatment	-	Hot dip galvanizing on inside & outside surface
h	Epoxy thickness	micron	50 (applicable for epoxy coated conduits only)

3.0 SURFACE TREATMEMT

a	Pre-treatment	-	As per IS 6005 prior to galvanising
b	Type	-	Hot dip galvanizing as per IS 2629
c	Min. Thickness of zinc coating	microns	48 (upto 32 mm dia), 65 (above 32 mm & upto 50 mm dia)
d	Min. Weight of zinc coating	(gm/m2)	340 (upto 32 mm dia) 460 (above 32 mm & upto 50 mm dia)
e	Tests for galvanizing		a) Weight of zinc coating as per IS : 6745 b) Thickness of zinc coating as per IS : 4759 c) Uniformity of zinc coating as per IS : 2633 d) Adhesion as per IS: 2629

SECTION-II

1.0 INTENT OF SPECIFICATION

The intent of specification is not to specify all details of design & construction of material. The material shall, however, conform in all aspects to high standard of design, engineering and workmanship and be capable of performing in continuous operation up to & after bidder's guarantee period in manner acceptable to purchaser who will interpret the drawings & specification and shall have power to reject any work or material which in his judgement is not in full accordance with this specification.

2.0 CODES AND STANDARDS

2.1 The material shall comply with all currently applicable safety codes and statutory regulations of India as well as of the locality where the material is to be installed.

2.2 The material, construction, manufacture, inspection and testing of Rigid steel conduits shall conform to the latest revision of relevant standards as per Data Sheet-A.

2.3 In case of conflict between the applicable reference standard and this specification, the stringent requirement of the two shall govern.

3.0 TECHNICAL REQUIREMENTS

3.1 Rigid conduits shall generally conform to the requirements of IS: 9537 (part I & II).

3.2 The diameter of conduits shall be uniform throughout the length. Each end of conduit length shall be threaded. The ends of conduits shall be sealed with protective caps to prevent damage to threaded portions and entrance of moisture and foreign material.

3.3 The inside surface of all conduits shall be smooth and suitable for pulling insulated cables and wires without damage.

3.4 Technical particulars of rigid conduits are specified in Data Sheet – A.

4.0 QUALITY ASSURANCE, TESTING & INSPECTION

4.1 Bidder shall confirm compliance with the BHEL's Standard Quality Plan (PE-QP-999-558-E002) as attached with the specification without any deviations. At contract stage, the successful bidder shall submit the Quality Plan for BHEL/ ultimate customer's approval. In case bidder has reference Quality Plan agreed with ultimate customer, same can be submitted for specific project after award of contract for BHEL/ ultimate customer's approval. There shall be no commercial implication to BHEL on account of Quality plan approval.

4.2 All materials shall be procured, manufactured, inspected and tested by vendor/ sub-vendor as per approved quality plan.

4.3 The supplier shall perform all tests necessary to ensure that the material and workmanship conform to the relevant standards and comply with the requirements of the specification. Charges for all these tests for all the equipments & components shall be deemed to be included in the bid price.

4.4 In case ordered quantities are manufactured and offered for inspection in more than one lot, BHEL reserves the right to witness testing on all lots without any commercial implication to BHEL.

5.0 PACKING

5.1 The material shall be packed to ensure protection against damage during transit, storage for prolonged periods and handling.

5.2 The ends of conduits shall be sealed with protective caps.

5.3 Each conduit shall be wrapped in plastic to prevent dust deposition.

5.4 The conduits should be aligned and stacked in bundles (a maximum of 25 pieces per bundle).

5.5 Each bundle shall be covered with jute fibre / thick plastic wrap for protection against extreme weather. Then, the bundle shall be tied with twin-strand mild steel wire, strong rope or steel strip.

6.0 MARKING

6.1 Rigid conduits shall be marked at least once on each manufacturing length, preferably 50 mm from one end, with the following:

a) Manufacturer’s name or trade mark, if any;
b) Country of manufacture; and
c) Nominal size of the conduits.
d) ISI Certification Mark.

Marking may be applied by moulding, stamping, printing, adhesive label or water slide transfers.

6.2 Marking shall be durable and legible.

6.3 Marking shall be checked by inspection and by rubbing lightly the marking by hand for 15 seconds with a piece of cloth soaked with water and again for 15 seconds with a piece of cloth soaked with petroleum spirit.

	QUALITY PLAN	CUSTOMER :			PROJECT TITLE			SPECIFICATION : NUMBER :			PE-RC-999-558-E002	
		BIDDER/ VENDOR :			QUALITY PLAN NUMBER	PE-QP-999-558-E002/ R1		SPECIFICATION : TITLE			TECHNICAL SPECIFICATION FOR RIGID STEEL CONDUITS	
	SHEET 1 OF 1	SYSTEM			ITEM : RIGID STEEL CONDUITS			SECTION II				
SL. NO.	COMPONENT/OPERATION	CHARACTERISTIC CHECK	CAT.	TYPE/ METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10	10	10	11
1.0	CONDUITS	1.MATERIAL	MA	VISUAL,MECH, & CHEMICAL	-	Appd Datasheet	Appd Datasheet	TEST CERT.	M	-	C, B	
		ACCEPTANCE TESTS										
		2.DIMENSIONS	MA	MEASUREMENT	IS 9537-II	IS:9537/Appd Datasheet	IS:9537/Appd Datasheet	INSPT. REPORT	M	C, B	-	
		3. MECH. PROPERTIES										
		a) BENDING TEST	CR	TEST	IS 9537-II	IS-9537	IS-9537	INSPT. REPORT	M	C,B	-	
		b) COMPRESSION TEST	CR	TEST	IS 9537-II	IS-9537	IS-9537	INSPT. REPORT	M	C,B	-	
		4. GALVANISATION TEST										
		a) UNIFORMITY OF ZINC COATING	CR	TEST	IS 9537-II	IS-2633/ APPD DS	IS-2633/ APPD DS	INSPT. REPORT	M	C,B	-	
		b) MASS OF ZINC COAT.	CR	TEST	IS 9537-II	IS-6745/ APPD DS	IS-6745/ APPD DS	INSPT. REPORT	M	C,B	-	
		c) COATING THICKNESS	CR	TEST	IS 9537-II	IS-4759/ APPD DS	IS-4759/ APPD DS	INSPT. REPORT	M	C,B	-	BY ELCOMETER
		d) EPOXY THICKNESS	MA	VISUAL/PHYSICAL	IS 9537-II	50 MICRONS	50 MICRONS	INSPT. REPORT	M	C,B	-	AS APPLICABLE
		5. PACKING & MARKING	CR	VISUAL/PHYSICAL	IS 9537-II	BHEL spec.	BHEL spec.	INSPT. REPORT	M	C,B	-	

LEGEND : B - BHEL / BHEL's CUSTOMER M - MANUFACTURER C - CONTRACTOR P - PERFORM W - WITNESS V - VERIF

BHEL	**PARTICULARS**	**BIDDER/VENDOR**
	NAME	
	SIGNATURE	
	DATE	BIDDER'S/VENDORS COMPANY SEAL

Note:- The inspection shall be carried out once for the material offered for inspection in one lot. For subsequent lots against the same project, the material can be accepted based on certificate of compliance furnished by the vendor.