

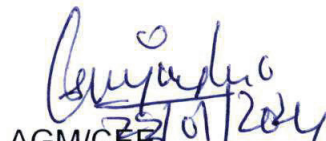
Document No: CEE/DETC/PQR/ 140730118.


Additional Terms and Conditions for Bidders (including Pre-Qualification requirements) ATC for “End Fitting”.

Additional Terms and conditions:

S. No	Description of requirement	Document to be attached
1	Bidder should submit a self-declaration stating that, “Offered item is same as per enquiry and there is no deviation”.	Self-declaration on letterhead of firm.
2	Data Sheet / Drawings / Catalogues of the product (s) offered in the bid, are to be uploaded along with the bid documents. Buyers can match and verify the Data Sheet with the product specifications offered. In case of any unexplained mismatch of technical parameters, the bid is liable for rejection	Data Sheet / Drawings / Catalogues of the product (s)


23/01/24
Manager/CEE


23/01/2024
AGM/CEE


23/01/2024
AGM (HOD-CEE/CXX/OFE)

24571/2024/HEP-CEE40700

टेलीफोन/Tele : 2451200 (PBX) 2060
 2450115 (DID)
 फैक्स/Fax : 91-0522-2458300
 Office of
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 2009
 स.डि.का. के.एन. - 680 038
 BY SPEED POST - 680 038
 Government of India-Ministry of Railways
 Research Designs & Standards Organisation
 Lucknow - 226 011
 Date 14-09-2009
 No.EL/7.1.108/C
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 pl study & send in
 Dy. Engr/D

- मेसर्स कन्ट्रोलवेल इण्डिया प्रा० लि०, ए-101, प्रिथ्वी पार्क, प्लॉट नं० 4.5 & 6, सेक्टर-30, सेनपाडा, नवी मुम्बई- 400705
M/s. Control Well India Pvt. Ltd., A-101, Prithvi Park, Plot No. 4.5 & 6, Sector-30, Sanyodh, Navi Mumbai- 400705.
- मेसर्स त्रिपती प्लास्टोमेटिक्स प्रा० लि०, बी-141-ए, रोड नं० 9-डी, विश्वाकर्मा इ० एरिया, जयपुर-302013 राजस्थान
M/s. Tirupati Plastomatics Pvt. Ltd., B-141-A, Road No. 9-D, Vishwakarma Industrial Area, Jaipur- 302013 (Rajasthan)
- M/s. Kontakt , Old 5/7 'F' Type 4th Main Road, SIDCO Nagar, Villivakkam, Chennai-600049.
- मेसर्स LAPP इण्डिया प्रा० लि०, ई-3040, राजाजीपुरम, लखनऊ- 226017
M/s. LAPP India Pvt. Ltd., E-3040, Rajajipuram , Lucknow-226017.
- मेसर्स एस.एस.के. इंजीनियरिंग कं० लि०, फैक्टरी एरिया, पी०बी० नं० 8, कपूरथला-144601, पंजाब
M/s. ESS ESS Kay Engg. Co. Ltd., Factory Area, P.B. No.8, Kapurthala-144601, Punjab (India)

Dear Sir,

Sub : Draft Specification No. RDSO/PE/SPEC-D/AC/0138- 2009 (Rev.0) of conduit system for cable management

इस कार्यालय के दिनांक 11.09.2009 के समसंख्यक पत्र को मूल रूप में संलग्न सूचनार्थ एवं आवश्यक कार्यवाही हेतु भेजा जा रहा है ।

धन्यवाद

संलग्न : यथोक्त

(सुरेश चन्द्र)

ए.डी.ई.

कृते महानिदेशक/अ०अ०मा०स०/लखनऊ

प्रति

मुख्य विद्युत इंजीनियर

- सवारी डिब्बा कारखाना, चेन्नई-600 038
- रेल डिब्बा कारखाना, हुसैनपुर, कपूरथला -144 602

संलग्न : यथोक्त

(सुरेश चन्द्र)

ए.डी.ई.

कृते महानिदेशक/अ०अ०मा०स०/लखनऊ

(113)

24571/2024/HEP-CEE40700

टेलीफोन/Tele : 2451200 (PBX)
2450115 (DID)
फैक्स/Fax : 91-0522-2458500



भारत सरकार - रेल मंत्रालय
अनुसंधान अधिकल्प और मानक संगठन
लखनऊ - 226 011

Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011

No.EL/7.1.108/C

Date 11.09.2009

1. M/s. Control Well India Pvt. Ltd., A-101, Prithvi Park, Plot No. 4.5 & 6, Sector-30, Sanpada, Navi Mumbai- 400705.
2. M/s. Tirupati Plastomatics Pvt. Ltd., B-141-A, Road No. 9-D, Vishwakarma Industrial Area, Jaipur- 302013 (Rajasthan)
3. M/s. Kontact, Old 5/7 'F' Type 4th Main Road, SIDCO Nagar, Villivakkam, Chennai-600049.
4. M/s. LAPP India Pvt. Ltd., E-3040, Rajajipuram, Lucknow-226017.
5. M/s. ESS ESS Kay Engg. Co. Ltd., Factory Area, P.B. No.8, Kapurthala-144601, Punjab (India)

Dear Sir,

Sub : Draft Specification No. RDSO/PE/SPEC-D/AC/0138- 2009 (Rev.0) of conduit system for cable management

A Draft Specification No. RDSO/PE/SPEC-D/AC/0138- 2009 (Rev.0) of conduit system for cable management has been prepared by RDSO and enclosed herewith for your comments.

You are requested to go through the enclosed specification and submit your comments to RDSO latest by 25.09.2009. To discuss various clauses mentioned in said specification a meeting with conduit manufacturers is proposed to be held at RDSO on 30.09.2009. You are requested to expedite your comments at the earliest and attend the meeting at RDSO, Lucknow.

Thanking you,

Yours-faithfully

(Prafulla Chandra)

DSE (TL-AC System Design)
for Director General/PS & EMU

DA : As above

Copy to :

Chief Electrical Engineer

- Integral Coach Factory, Chennai.-600038
- Rail Coach Factory, Hussainpur, Kapurthala-144 602

It is requested to send your comments on draft specification at the earliest.

(Prafulla Chandra)

DSE (TL-AC System Design)
for Director General/PS & EMU

DA : As above



सत्यमेव जयते

DRAFT

भारत सरकार
रेल मंत्रालयGOVERNMENT OF INDIA
MINISTRY OF RAILWAYSअनुसंधान अभिकल्प एवं मानक संगठन
RESEARCH DESIGNS AND STANDARDS ORGANISATION
MINISTRY OF RAILWAYS

केबिल प्रबंधन के लिये कन्ड्यूट प्रणाली की विशिष्टि

SPECIFICATION OF CONDUIT SYSTEM FOR CABLE MANAGEMENT

आर.डी.एस.ओ./पी.ई./एस पी ई सी/ एसी/0138-2009 परिशोधन.(0)
Spec No. RDSO/PE/SPEC/AC/0138- 2009 (Rev. 0)

S. No.	Date of amendment	Revision	Reason

अनुमोदित
APPROVEDकार्यकारी निदेशक/पी एस एण्ड ई एम यू
ED/PS & EMU

Prepared By SSE/Design/Elect.	Checked By DSE(TL-AC & System Design)
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SPECIFICATION OF CONDUIT SYSTEM FOR CABLE MANAGEMENT

Foreword:

Presently, the Flexible conduits used in wiring of cables are as per IS: 9537. Mostly PVC conduit & fittings are used. However, in LHB coaches Polyamide conduits are being used. A need was felt to standardize the specification for halogen free, fire retardant conduit for rolling stock application.

1.0 Scope

- 1.1 This specification covers performance parameters, general & technical requirements, method of sampling, inspection & testing, supply, installation, commissioning of conduits and its fittings
- 1.2 The conduit system of cable management shall comprise of polyamide flexible conduit and end fittings with threaded ends (both metric and Pg thread) provided with suitable gaskets and metallic lock nuts ensuring IP protection of the system.

Manufacturers of this item shall get RDSO approval for their product for which the guidelines can be obtained from website www.rdsogov.in. Such manufacturers shall have infrastructure for manufacture, testing and supply of conduits and its fittings as per requirements specified in this specification.

2.0 Scope of supply

Purchaser shall specify the size of conduit and its accessories as per their requirement confirming to this specification.

3.0 Governing Specifications

Manufacture should have the following standards in compliance of this specification

Specification/ standards	Description
IEC- 61386-1	Conduits system for cable management- General Requirement
IEC- 61386-23	Conduits system for cable management (Flexible conduits system)
IEC-61373	Railway applications-Rolling stock equipment-shock and vibration tests
IEC -60529	Classification of degrees of protection provided by enclosures of equipment.
NFF 16-101 &102	Fire ,smoke & toxicity requirements
IEC-60423	Conduit system of cable management (Out side diameter of conduit for electrical installation & threads for conduits and its fittings)

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Any deviation from this specification proposed by the manufacturer, aimed to improve upon the performance, Utility and reliability /efficiency of the equipment will be given due consideration, provided full particulars of the deviations with justification are furnished.

In such a case, the manufacturer shall quote according to this specification and deviation of any, proposed by him, shall be quoted as an alternative. In case of any contradiction between the provisions of IS/IEC and this specification, the later shall prevail.

4.0 Operating and Service Conditions:

The Conduits and its fittings system shall perform satisfactorily in the following environmental conditions & shall be sturdy and suitable for the following service conditions normally to be met in service on board/underslung on railway coaches:

Ambient	- 4 to 55 °C
Standing under sun	70°C
Train speed	160 Km/h
Relative Humidity	Upto 100%
Altitude	Max 1200 m above sea level
Atmosphere	Extremely dusty and desert weather. The dust contents in the air may reach as high value as 1.6 mg/cubic meter.
Annual rain fall	Very heavy in certain areas: between 1750 to 6250 mm.
Coastal area	The equipment shall be designed to work in humid salt laden and corrosive atmosphere. The maximum values of the condition shall be as under : Maximum pH value 8.5 Sulphate 7 mg/liter Max. concentration of chlorine 6 mg/liter Max. conductivity 130 micro semen/cm
Shocks and Vibration	The conduits and its accessories shall withstand satisfactory vibrations and shocks normally encountered in service as indicated below: a) Max. vertical acceleration - 3.0 g b) Max. lateral acceleration - 3.0 g c) Max. longitudinal acceleration - 3.0 g (‘g’ being the value of acceleration due to gravity)

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5.0 DESIGN AND TECHNICAL REQUIREMENTS

5.1 CONDUIT

The Conduit system for cable management shall comprise of mainly conduit, end fittings, lock nuts, terminal sleeve etc. The material for the conduit and its accessories shall be poly amide -6 (PA-6) and free from halogen, phosphorous, sulphur and cadmium. It should be UV resistant and resistant to abrasion and corrosive environment.

- 5.1.1 It shall be resistant to flame propagation as per IEC-61386/1.
- 5.1.2 There shall be no sharp edges, burrs or surface projections which are likely to damage insulated conductors or cables or inflict injury to the user or installer.
- 5.1.3 The conduits shall be internally and externally corrugated, thick walled heavy duty generally conforming to dimensions as per IEC-60423.
- 5.1.4 The conduit and conduit fittings shall withstand the stresses likely to occur during transport storage etc.
- 5.1.5 The colour of the conduits and accessories shall be black, unless otherwise specified.
- 5.1.6 Flexible conduit shall be suitable for provision in the under carriage of Railways with high impact strength suitable for working in service conditions as per clause 4.0. It should have following properties:-
 - a) Conduit shall be internally and externally corrugated.
 - b) Conduit should as per classification "heavy" for resistant to compression, tensile strength and suspended load capacity as per IEC-61386-1.
 - c) Conduit should be non-flame propagating as defined in IEC- 61386-1.
 - d) The conduit shall of suitable for category A-2 application as per para 5.4 of NFF 16-101.
 - f) Its self extinguishing class shall be I3 as per NFF 16-101.
 - g) Its smoke emission classification shall be F3 as per NFF 16- 101.
 - h) It should be suitable for continuous temperature range -40°C to 105 °C.
- 5.1.7 Conduit shall have di-electric strength and insulation resistance as per para 11.3 of IEC-61386-1.
- 5.1.8 The complete cable protection system shall be suitable for IP-67 as per IEC-60529 for its connection.

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5.1.9 The conduit shall be circular in section with concentricity of more than 90%. The concentricity shall be calculated as the ratio of the maximum and minimum thickness measured on the same cross section on the opposite sides.

5.1.10 Threads and out side diameter shall comply with IEC-60423. Other dimensions shall comply with the requirements of IEC-61386 (Part-2).

5.2 CONDUIT ACCESSORIES

5.2.1 End Fittings

The end fittings are the connectors provided at the ends of the flexible conduits at each end which in turn terminates in the equipment / sub-assembly used for outdoor application. The connection to the flexible conduit shall be such as not to become loose due to vibrations encountered in rolling stock. This shall include the end fittings and accessories such as y-connector (for taking out two outputs from one). The type and size requirement shall be specified by the purchaser.

For connection of flexible conduit with end fitting, system shall be such as the conduit is fitted with push in or safety lock retaining ring type arrangement to be inserted for fixing the conduit. Incidental dismantling or reduction in sealing performance shall not be permitted.

Threading provided at the end shall be made of nickel plate brass for metric/Pg thread to IEC 60423 respectively.

To maintain the suitable IP level the fitting shall be provided with sleeves or O-ring to avoid water ingress.

The fitting shall be provided with a metallic thread (insert part) to guarantee a secure and vibration free safe between the fitting and the connection partner. No metallic part shall however have direct contact with cables traversing through it

5.2.2 Tube Clamps

The tube clamps are required for holding the conduits in place are metal clamps or pipe holder with through heavy fixing hole for fastening with screws.

5.2.3 Terminal sleeves

These are cylindrical sleeves for conduit termination and are used at the end of the conduits where no connector with threads are necessary and to avoid the damage of cable isolations through sharp cutting edges on the conduit.

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5.2.4 Lock nuts

These lock nuts are to be used in conjunction with end fittings suitable for both metric and Pg thread. The material shall be brass nickel plated.

6.0 TESTS

6.1 Type test:

- 6.1.1 Only after the detail drawings and the design have been approved and the clearance given to this effect, the manufacturer shall take up the manufacture of the prototype. It is to be clearly understood that any changes, required to be done in the prototype or any additional tests other than specified herein are required to be conducted on the prototype unit or its components, they shall be done expeditiously. During the process of manufacture of the equipment, if the purchaser so desires, he may conduct/repeat any of the routine or additional tests to satisfy himself that the quality of the model being manufactured is of the required standards.
- 6.1.2 Subject to agreement between user and manufacturer, RDSO/ purchaser shall repeat some or all type tests once in three years on sample basis, so as to confirm the quality of the product to meet the specified requirements.
- 6.1.3 The type tests shall be carried out by RDSO representative on prototype unit either totally or in part under the following conditions without any additional cost:
- A manufacturer undertakes to manufacture for the first time.
 - An important change in design details of machines has been introduced.
 - Specification is modified necessitating re-designing of equipment.
 - Unsatisfactory performance reported from user Railways.
 - Resumption of production after an interruption of more than two years.
- 6.1.4 Investigation tests are intended to obtain additional information regarding the performance of the production. They shall be specially requested either by the user or by the manufacturer.
- 6.1.5 RDSO may conduct surprise check on manufacturing process and quality control along with any of the tests to ensure quality of product and its conformance to RDSO.
- 6.1.6 The suitability of the conduits and its fittings shall be ascertained by inspection, bench test at the firm's works, that in stationary coach and service trial on the coach.
- 6.1.7 The tests shall be carried out at the works of the manufacturer or a reputed testing laboratory in presence of Indian Railway representative on the prototype

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unit of the conduits as per relevant governing specifications modified or amplified. The manufacture shall have all possible necessary arrangement for testing of conduits and its fittings.

- 6.1.8 The test protocol indicating relevant clause of the test, condition of the test, specified value and observed value of the parameter for conduits shall be submitted by the firm before offering the sample for testing.

6.2 Routine test:

Routine test are to be carried out on each unit to verify that properties & design of the product of corresponding to those measured during type test. Proper documentation of routine tests results shall be made available with the firm and will be produced before inspecting official on demand.

6.3 Acceptance test:

Each offered lot of supply shall be subjected to acceptance tests as per RDSO approved sampling plan or as per sampling plan specified in IS 2501, at manufacturer's works. Acceptance test shall be witnessed by inspecting official nominated by purchaser/RDSO. Manufacturer on demand by inspecting official shall produce the internal/routine test report carried out by manufacturer.

6.4 Test description

S.N.	Description of test	Clause No.	Type test	Accept- -ance test	Routine test
1.	Checking of Dimensions	IEC 61386-2	Yes	Yes	Yes
2.	Compression Test	IEC 61386-1	Yes	Yes	Yes
3.	Impact Test	IEC 61386-1	Yes	Yes*	Yes
4.	Flexing Test	IEC:61386-23	Yes	Yes	Yes
5.	Tensile Test	IEC 61386-1&23	Yes	No	No
6.	Suspended load test	IEC 61386-1	Yes	No	No
7.	Thermal properties	IEC 61386-1 & 23	Yes	Yes	No
8.	Di-electric strength & Insulation Resistance Test	IEC 61386-1	Yes	Yes	No
9.	Spread of fire	IEC 61386-1	Yes	Yes	No
10.	Degree of protection	IEC-60529	Yes	No	No
11.	Self extinguishing class & Smoke emission classification	As per NF F 16-101 & 102	Yes	No	No
12.	Test of material composition	As per clause 6.5.12	Yes	No	No

NOTE: 1. Testing/measuring instruments shall be duly calibrated from any NABL recognized laboratory shall be furnished during test.

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6.5 TEST DETAILS:

6.5.1 Checking of dimensions:-

To check the uniformity of the conduits, three samples, each taken from different lengths or place separated by approximately 3meter, are cut along a plane perpendicular to the axis. The inside and outside diameter at each edge is measured at four places as far as possible equally spaced around the circumference. Dimensions shall confirm to para 5.1.2, 5.1.3 & 5.1.9 of this specification.

6.5.2 Compression Test: -

This sample shall be tested as per IEC 61386-1 Clause 10.2. The product shall be of "heavy" Class as mentioned in IEC.

6.5.3 Impact Test: -

This sample shall be tested as per IEC 61386-1 Clause 10.3. The product shall confirm to "heavy" Class as per IEC.

6.5.4 Flexing Test

The test shall be carried out as per Clause 10.5 of IEC: 61386-23.

6.5.5 Tensile Test:-

The test shall be tested as per clause 10.7 of IEC 61386-1. The product shall confirm to "heavy" Class as per IEC.

6.5.6 Suspended load Test:-

The test shall be carried out as per clause 10.8 of IEC 61386-1. The product shall confirm to "heavy" Class as per IEC.

6.5.7 Thermal Properties: -

The sample shall be tested as per clause 12 table 8 (classification-heavy) of IEC 61386-1 and IEC: 61386-23

6.5.8 Di-electric strength and Insulation Resistance Test: -

Conduits and its fittings shall be tested as per clause 11.3.1 &11.3.2 of IEC 61386.

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6.5.9 Spread of Fire: -

The test shall be conducted as per clause 13.1.3.1 and 13.1.3.2 of IEC 61386 -1.

6.5.10 Degree of Protection Fire classification:-

Conduit system when assembled shall have protection against dust & water ingress. The conduit should have IP 67 grade protection as per IEC 60529.

6.5.11 Fire resistant class & Smoke class:-

Test shall be conducted as per NF F 16-101 and NF F 16-102. The material shall confirm to fire resistant class I3 and Smoke class F3.

6.5.12 Test of material composition:-

The Polyamide -6 shall have the following properties

Density (gm/ cm ³) (minimum)	=1.14
Tensile strength (MPa) Min	= 40
Flexural strength (GPa) Min	= 1.0
Notched Izod (Kj/m)	=0.25
Elongation at break (%)	=60
Continuous operating Temperature	= -40 °C to +105 °C

7.0 TECHNICAL DATA

7.1 The technical information as per Annexure C "Questionnaire on offer of prototype" completes in all respect should be furnished with offer by the manufacturer.

7.2 The manufacturer shall indicate their compliance or other wise against each clause and sub-clause of the technical specification and submit with the offer. The manufacturer shall for this purpose enclose a separate statement, if necessary, indicating the Annexure and clause reference and compliance or otherwise.

7.3 The manufacturer shall submit complete design details of conduits and its fittings, necessary calculation, if any shall also be submitted.

8.0 Manufacturer's responsibility

The manufacturer's responsibility will extend to the following:

8.1 The supplier shall supply detailed instructions for proper installation of the equipment on platforms. For this purpose, the supplier shall depute his

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engineers/supervisors to purchaser site during installation of the equipment at the platform.

- 8.2 The supplier shall be responsible for commissioning, testing and field trials of the equipment in service and depute team of engineers/supervisors for this purpose during developmental stage.
- 8.3 The supplier shall arrange required instrumentation and carry out detailed tests and field trials jointly with RDSO.
- 8.4 The supplier will also offer special tools and instruments separately which may be required for maintenance. A separate quotation will be issued for the same.
- 8.5 The supplier shall recommend list of spares required for satisfactory maintenance and operation of fire / smoke detection and extinguishing system for a period of five years and quote the prices for them separately.
- 8.6 The supplier shall be responsible for carrying out improvements and modifications at his own expense on all the equipments supplied, provided such modifications/improvements are decided to be necessary for meeting the requirements of reliability, performance and safety etc, jointly between manufacturer and purchaser.
- 8.7 For the purpose of technical decisions on improvements/ modifications etc. on equipment, the final authority from the purchaser's side will be RDSO.
- 9.0 **Marking and packing**
- 9.1 The following information shall be clearly marked at a suitable place on each equipment:
- Name and Address of the manufacturer.
 - Year of the manufacturer.
- 9.2 The equipment and its sub assemblies shall be packed in thermo Cole boxes and the empty spaces shall be filled with suitable filling material. Before keeping in the thermo Cole box, the equipment shall be wrapped with bubble sheet. The equipment shall be finally packed in a wooden case of sufficient strength so that it can withstand bumps and jerks encountered in a road/rail journey.
- 10.0 **Warranty period and liability**
- 10.1 The supplier/manufacturer shall be responsible for any damage to equipments due to defective design, materials, and workmanship for a period as per IRS condition. The supplier shall replace within three days for failure such defective equipment during the warranty period at his cost. The period of warranty will be extendable in case of recurring problems attributable to defective design material

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or manufacturing. The supplier's liability in this respect of any complaints defects and/or claim shall be limited to the furnishing and installation of replacement parts free of any charge. Should any design modification be required to be made in any part of the equipment, the period of guarantee will commence from the date when the modified part is commissioned in service. If during the guarantee period, the equipment remains out of service on supplier/manufacturers account the period of warranty will be extended by such period for which the equipment remained out of service.

10.2 The supplier shall be responsible for carrying out all the modifications at his cost on any part of the equipment during the period of warranty required for satisfactory operation of the equipment as per technical specification. For any technical decision the final authority from the purchaser's side is RDSO.

10.3 All the replacements and repairs that the purchaser shall call upon the manufacturer to deliver or perform under this guarantee shall be delivered and perform by the manufacturer promptly and satisfactory.

11.0 Training

The supplier shall arrange for training to IR personnel in maintenance and trouble shooting of the system supplied. Ten man-days training will be provided in operation, maintenance & trouble shooting aspects will be provided. The supplier will provide detailed technical write-up to all the trainees. The syllabus for training will have to be approved by the purchaser. The venue of training will be mutually agreed. Suitable training material will be supplied to the participants. Training will be arranged free of cost.

11.1 Infringement of patent right

Indian Railway shall not be responsible for infringement of patent rights arising due to similarity in design, manufacturing process, components used in design, development and manufacturing equipment and any other factor, which may cause such dispute. The responsibility to settle any issue lies with the manufacturer.

12.0 CARTEL FORMATION

The firms will not engage cartel formation with other firms and will also submit a declaration in this regard as per attached annexure – B.

13.0 ISO CERTIFICATION

13.1 The firm intended to develop; manufacture & supply of conduits and its fittings should have ISO: 9001: 2000 certification. The certifying agency shall be in the list of NABCB.

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- 13.2 The firm intending to develop, manufacture & supply of conduits and its fittings should have sufficient infrastructure & testing facilities. Firm will furnish the list of infrastructure manufacturing and testing facilities at the time of tendering as well as during prototype. The list shall include the Name & make of equipment/SI.No./Size & date of purchase etc.

Firm should have their Quality Assurance Plan containing the following at least:

- Organizational chart clearly bringing out the quality control set up.
- Qualification of the personnel evolved in quality control set up.
- Qualification log sheets of the personnel meaning the quality control set up.
- Process flow chart indicating the process of manufacture of conduits and its fittings.
- Quality Assurance System indicating test plan for Incoming material, Process control & System control

Firm shall also submit details of its sub-vendors as under:

- Name of the item for which sub-vendor is approved.
- The name of the approving agency.
- Inspection criteria of the sub-vendor.
- The sub-vendor has ISO: 9001 certification.
- QAP of the sub-vendor is approved by the primary vendor.
- Sub-vendor has submitted the quality manual to the primary vendor.
- Sub-vendor has all the requisite infrastructure of manufacturing and testing facilities, preferably under one roof.
- Periodical inspection schedule for sub-vendor is being followed strictly by the primary vendor.

Firm shall also maintain proper record of incoming material (Rejection & acceptance), Process control (Stage inspection) and System control so that the traceability & investigation may be ensured.

14. ENCLOSURES

Annexure A: Infrastructural and testing facilities

Annexure B: Undertaking against cartel formation

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ANNEXURE -A

INFRASTRUCTURAL AND TESTING FACILITIES REQUIRED AT FIRM'S PREMISES INTENDED TO MANUFACTURE AND SUPPLY OF CONDUITS AND ITS FITTINGS.

A) MACHINERIES & PLANTS

- (i) Extruder Polyamide with autoloader
- (ii) Micro processor based temperature control system for extruder
- (iii) Corrugators with moulds
- (iv) Chiller
- (v) Coiler
- (vi) CNC thread turning machine
- (vii) Tank for treatment of polyamide with proper temperature
- (viii) Compressor for air supply

B) MEASURING AND TESTING EQUIPMENTS

- (i) Vernier Calipers
- (ii) Micrometer
- (iii) Scale tape
- (iv) Compression test apparatus as per IEC-61386-23
- (v) Suspended load test apparatus as per IEC 61386-1
- (vi) Spread of fire test apparatus as per IEC-61386-1
- (vii) Di- electric strength & Insulation resistance test apparatus as per IEC-61386-1 & 23.
- (viii) Ingress protection Test apparatus i.e Dust chamber, Water tank.
- (ix) Digital Temp controller
- (x) Flexing test apparatus as per IEC-61386-23
- (xi) Thermal test apparatus as per IEC-61386-1
- (xii) Tensile testing machine

C) PERSONNELS & THEIR EXPERIENCE:

D) R&D FACILITIES

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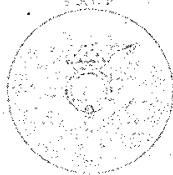
ANNEXURE -B

UNDERTAKING AGAINST CARTEL FORMATION

We, Hereby, give an undertaking that as a Registered Vendor for manufacture and supply of will not be a part of a cartel with other vendors and will be quoting competitive rates in the tenders invited by the Indian Railway/PUs.

We are aware of the fact that the Registering Authority i.e. RDSO may de-list the name of our firm from the Master List of Approved Vendors if complaint is received about such cartel formation from any of the Railways/Production Units.

We confirm that the information furnished is correct to the best of our knowledge.



Seal and Signature
(Authorized signatory of the firm)

Date:
Place:
Seal

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DISTRIBUTION

CHIEF ELECTRICAL ENGINEER:

1	Northern Railway, Baroda House, New Delhi - 110 001.
2	Central Railway, II Floor, Parcel office, CST Mumbai - 400 001.
3	Eastern Railway, Fairlie Place, Kolkata - 700 001.
4	South Eastern Railway, Garden Reach, Kolkata - 700 043
5	Southern Railway, Park Town, Chennai - 600 003.
6	Western Railway, Churchgate, Mumbai - 400 020.
7	South Central Railway, Rail Nilayam, Secunderabad - 500 371.
8	East Central Railway, Dighi Distt- Vaishali, Hajipur Bihar- 844 101.
9	North Central Railway, Balmiki Crossing, Nawab Yusuf Road, Civil Lines, Allahabad- 211 001.
10	South Western Railway, 1 st Floor, DRM Office, Hubli 580 020
11	South East Central Railway, Bilaspur.495004
12	North East Frontier Railway, Maligaon, Guwahati - 781001
13	North Eastern Railway, Gorakhpur - 273001
14	North Western Railway, Jaipur - 302006
15	West Central Railway, Jabalpur - 482001
16	East Coast Railway, Bhuvneshwar, Orissa - 751016
17	Konkan Railway, Belapur Bhavan, Sector-11, Belapur, Mumbai - 400614
18	Metro Railway, 33 /1 J.L. Nehru road, Kolkata- 700071
19	Integral coach factory, Perambur, Chennai - 600038
20	Rail Coach Factory, Kapurthala (Punjab) - 144 602

• CHIEF WORKS MANAGER:

1	Matunga Workshop, Central Railway, Mumbai 400 019.
2	Liluah Workshop, Eastern Railway, Howrah
3	C&W Workshop, Northern Railway, Alambagh, Lucknow-226 05
4	C & W Workshop, N. Rly., Jagdhari - 135 002
5	Mechanical Workshop, NER, Gorakhpur - 273 012
6	Carriage Workshop, Southern Railway, Perambur, Ayanavaram, Chennai- 600023.
7	SCR, Lallagudda Workshop, Lallaguda, Secunderabad - 500017
8	Carriage Workshop, Western Railway, Lower Parel, Mumbai-400013
9	CRWS, W. C. Railway, Nishatpura, Bhopal-462010
10	Carriage Workshop, NW Rly., Ajmer - 305001
11	Carriage Repair Workshop, Gadag Road, SWR, Hubli - 580 020
12	Carriage Workshop, S.W. Railway, Mysore Vishwanath.
13	Carriage Workshop, SE Rly., Kharagpur - 721301
14	New Bongaigaon, Railway Workshop, Danttal, Distt. Bongaigaon, Assam- 783380
15	Carriage and Wagon Workshop, N. C. Rly., Jhansi - 248003
16	Carriage and Wagon Workshop, WC Rly., Kota - 324002
17	Carriage and Wagon Workshop, Eeastern Rly., Liluha - 711204

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18	Carriage and Wagon Workshop, W. Rly., Pratap Nagar, Vadodara - 390004
19	Carriage and Wagon Workshop, N Rly., Amritsar - 143001
20	Central Workshop, Goldenrock, S. Rly., Trichi - 620004
OTHERS:	
1	Director, IRIEEN, Nasik Road (Maharashtra). - 422101
2	Senior Professor (Elect.), Railway Staff College, Lalbaug, Vadodara. - 390004
3	Director, IRCAMTECH, Maharajpur, Gwalior - 474 020.



Prepared By	Checked By
SSE/Design/Elect.	DSE(TL-AC & System Design)