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भारत सरकार
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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Technical Specification for Synthetic Packing for 140t Diesel Hydraulic Breakdown Cranes

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Price Rs.300/-

Technical Specification for Synthetic Packing for 140 T Diesel Hydraulic Breakdown Cranes

1. GENERAL

1.1 The specification covers the requirements of design, manufacture, testing, supply and commissioning of Synthetic packing to be used packing under propping jacks of 140t Diesel hydraulic breakdown cranes as well as re-railing jacks of Indian Railways.

1.2 Indian Railways have been using 140 T diesel-hydraulic breakdown cranes for relief operation whenever there is derailment of engine, coaches, wagons etc. During relief operations, wooden packings are used under the propping jacks. It is desired to replace these wooden packings with synthetic packings made of composite materials, i.e. Propylene based natural fibre composites or equivalent. The manufacturer shall indicate the chemical composition of the composites used in the making of the packing. The packing should be lighter and stronger capable of withstanding compressive stresses without temporary/permanent change in shape.

1.3 The tenderer is expected to design in accordance with the best current international practices.

1.4 Brief description of the Synthetic packing with diagram as well as technical parameters shall be submitted along with the offer. The relevant technical details shall be in English.

1.5 Offer shall be made in accordance with the specification, by giving clause-by-clause comments. Deviation from the specification, if any, in order to improve the performance, availability and reliability of the packing can be considered. All such proposals shall, however, be accompanied with complete technical details and justification for the proposed deviation.

2. CONTRACTOR'S RESPONSIBILITY

The contractor shall be entirely responsible for execution of the contract strictly in accordance with the terms & condition of this specification/contract, notwithstanding any approval, which the purchaser or the nominated Inspecting Officer may have given:

a) Of the detailed drawings prepared by the contractor.

b) Of his sub-contractors for materials.

c) Of other parts of the work involved by the contractor.

d) Of the test carried out either by the contractor or by purchaser or the nominated Inspecting Officer.

3. QUALITY ASSURANCE PLAN

3.1 The tenderer shall provide satisfactory evidence, acceptable to the purchaser, to the effect that the manufacturer has adequate machinery & plant facilities and that the firm follows a "Quality Assurance Programme".

3.2 QAP shall include details of chemical and physical properties of raw material used for manufacture of synthetic packing as follows:

i) Tensile strength test

ii) Hardness test
iii) Longitudinal bending stress
iv) Impact test
v) Modulus of elasticity
vi) Compressive strength – Parallel to surface & perpendicular to surface

3.3 Different test results shall also be submitted in the QAP. Different tests/checks done during each stage of manufacture of the packing will also be indicated.

3.4 The supplier shall have necessary facilities at his Works or at the Works of his sub-vendors for carrying out various load/performance tests on the packing and the facilities shall be indicated in the offer.

3.5 The supplier shall supply test certificates of different type of packings about their load carrying capacities.

4. DESIGN DEVELOPMENT

4.1 Synthetic packing of different thickness will be used for building a column of height varying from 300 mm to 800mm under the propping pads of the crane. During operation, it is likely that one prop of crane may get subjected to maximum load of 250T (compressive) load. Minimum surface area of propping pad will be 500mmx300mm. Packing is required to be made of following sizes:

i) 1000mm(L) x 300mm(W) x 250mm(T)
ii) 1000mm(L) x 300mm(W) x 200mm(T)
iii) 1000mm(L) x 300mm(W) x 100mm(T)

4.2 Packing shall be light and its weight shall be at least 5 % less as compared to wooden packing of similar dimension and of density 900 Kg/m³. Weight of each type of packing will be indicated by the tenderer.

4.3 Surface of synthetic packing shall be coarse and it shall be possible to work in combination with wooden packing. It shall be possible to stack either synthetic packings or wooden packings without any slippage under each prop of crane.

4.4 Material of synthetic packing will be composite material and it shall be either polypropylene based or equivalent. Material should not change shape during loading and unloading when salvaging operation is going on. Material should not take permanent set during 100 cycle of loading. It shall be capable to withstand very high compressive load and bending stresses encountered in re-railing of locos and loaded wagons with adequate safety margin.

4.5 Synthetic packing shall be fire retardant, anti termite/ fungus/borer resistance and impervious to other insects.

4.6 Synthetic packing shall be cold and boiling water resistant. Shall not get delaminated even in the boiling water. It shall be resistant to most chemical, oil, gasoline, pathogens, and salt water.

4.7 Synthetic packing shall be durable and shall have life same as codal life of crane (26 years). It shall be possible to repair damages easily. It shall be such that it does not rot, crack, wrap or splinter and shall be maintenance free. It shall be resistant to expansion under varying climatic condition and have good insulation qualities.

4.8 The synthetic packing shall have properties of being sawed, drilled and screwed like other wood product for stacking purposes.

4.9 The synthetic packing shall have features of being provided with handrails at suitable locations so that it can be easily carried by minimum number of crew.

5. SCOPE OF SUPPLY

5.1 The supply shall include different size of packings as per tender requirements:-

S. No.	Synthetic packing sizes
1	1000 x 300 x250 mm
2	1000 x 300 x200 mm
3	1000 x 300 x100 mm

6. SERVICE CONDITIONS

6.1 The synthetic packing shall work satisfactorily under the following climatic conditions.

a) Variation of ambient temperature from 0ºC to 55ºC with 100% relative humidity.

b) Heavy rainfall with thunderstorms.

c) Dusty and corrosive atmosphere with dust content in air up to 1.6 g/m^3.

d) Altitude – upto 1200 m above Mean Sea level.

7. INSPECTION & ACCEPTANCE TEST OF PROTOTYPE SET OF PACKINGS

7.1 Physical dimensions & weight check of each type of packing shall be done as agreed and approved by the purchaser.

7.2 Following type tests will be carried out in the presence of inspector nominated by purchaser on samples of prototype set of synthetic packing as given below:

i) Water absorption percentage- a) After 4 Hours b) After 24 Hours

ii) Swelling test due to water absorption – Changes in size – Length x breadth x Height.

iii) Boiling water resistant test

iv) Fire resistant test

a. Flammability
b. Flame penetration
c. Rate of burning

v) Resistant to acid, alkali, benzene, acetone solvent for 6 to 8 hours

7.2.1 Test scheme for carrying out the above tests shall be furnished by the supplier along with the offer.

7.3 Supplier should carry out Physical test for the parameters mentioned at clause 3.2 for verification of the claims made.

7.4 **Load test:**

Load test to be carried out to assess strength and toughness of each packing. Capacity/capability of synthetic packing shall also be checked at manufacturer's premises.

7.5 **Field Trial and Approval of Prototype set of synthetic packing**

7.5.1 A joint check at the consignee's end shall be carried out by the successful tenderer or his agent during unpacking of the consignment packing in order to ascertain short shipment or transit damages, if any.

7.5.2 After the above inspection test at the manufacturer's works, the synthetic packings will be subjected to field trial on 140T diesel-hydraulic breakdown cranes for a period of two years by the purchaser. During the span of two years, it shall be ensured by the railways that the crane with these packings as prop base is at least subjected to frequent load trials at least 40 times with minimum 30t load and at least 20 tomes with 80-85t loaded wagons and a record of same will be maintained. The trials may be planned at base depot of cranes. The purchaser shall clear the prototype only after it has performed satisfactorily and has not changed shape during field trial.

8. TECHNICAL LITERATURE AND SERVICE MANUALS

8.1 Detailed technical and service manual shall be specially prepared and at least three copies each shall be supplied free of cost per set of equipment ordered by the consignee. In addition, two copies of the above manuals & catalogue shall be dispatched to "The Director General (MP), RDSO, Lucknow – 226011".

9. SERVICE ENGINEERING AND AFTER-SALES SERVICE

9.1 The contractor shall provide, at his own expense, the services of competent engineers, during commissioning as well as warranty period of the equipment.

9.2 The tenderer shall clearly bring out the facilities available with him or his sub-contractor for providing adequate after-sales service during warranty as well as post warranty period. The tenderer shall indicate the service organization at various places in India and the availability of trained staff, maintenance spares etc. at these places.

10. PACKING

10.1 All the synthetic packing shall be suitably packed to avoid damage during transit.

11. MARKING: Marking shall be done on each packing about manufacturer's name, size, year of manufacturing etc.

12. WARRANTY

12.1 The packing shall be guaranteed for quality against permanent deformation for a period of 60 months from the date of commissioning. The contractor at his own expense at users premises shall replace any part of the equipment failing or proving unsatisfactory in service due to defective design, material or workmanship within 60 months from the date of commissioning. The replaced part shall again be subjected to guarantee of 60 months.

13. REFERENCE

13.1 The tenderer should provide satisfactory evidence acceptable to the purchaser to show that he is licensed manufacturer with adequate plant and manufacturing capacity and follows a Quality Assurance Programme to ensure in house control of consistent quality standards.

13.2 The equipment “Synthetic packing” quoted should be proven and bidder should furnish a list of how many similar equipment are working in various railways or other sectors in various countries or India. The list should include information on details of order, date of supply and commissioning in last three years.

13.3 A minimum 50 numbers of synthetic packing must have been supplied by the supplier and should be working satisfactorily for two years.

In the absence of the above information, the tender is liable to rejected.