SPECIFICATION OF HYDRAULIC SLEEPER SPACER
(No.TM/SM/17 dt.31.03.1992)

1.0 Scope:

This specification covers the requirement of a non infringing light weight hydraulic equipment used for squaring and re-spacing of sleepers specially concrete sleeper of railway track.

2.0 Materials:

The sleeper spacer shall be manufactured from a special aluminium alloy of high strength generally conforming to IS : 617-1975 alloy 2550 (A 12) or alloy steel of equivalent strength similar to IS : 3930 66, Design : 40 Ni 2 Cr.I Mo 28 or En 8/En 9/En 24 to BS : 970 for body material and IS : 1875-78 Cl. IV and En 8 to BS : 970 for raw material. Manufacturers may also explore possibilities of using fibre glass material wherever feasible keeping in view the light weight and guaranteed life of jack unit to withstand 8 tonnes of load and working pressure of 500 kg/cm² suitably designing the body and ram diameters with adequate factor of safety as per standard practices.

3.0 Chemical Analysis:

3.1 The contractor shall supply a complete analysis of the materials of all the different component parts of the jack when required to do so by the purchaser or the inspecting officer. Such analysis should be got done by him from a Government approved laboratory/ Test house.

3.2 In case of any doubt in the use of specified materials, the inspecting officer shall be free to take samples from the component for complete C&M analysis at the expense of the supplier.

4.0 Workmanship and Finish:

4.1 All metal surfaces shall be properly finished. Rough and sharp edges shall be removed.

4.2 All the working parts and the parts subject to wear shall be accurately machined to such tolerances as will ensure the fitting of spares with the minimum of adjustments.

5.0 FUNCTIONAL REQUIREMENTS:

5.1 The hydraulic sleeper spacer shall be light weight having as low weight as possible. The maximum weight of hydraulic sleeper spacer shall not be more than 14.0 Kg. Excluding the weight of operating handle / lever and reaction rods for binding sleepers. This 14.0 Kg. Weight of hydraulic sleeper spacer includes the weight of hydraulic jack, back plate (having tapered thickness ) and saddle cap.
5.2 The equipment shall have easy portability.
5.3 The jack or equipment shall have rigid, mono block construction of cylinder, reservoir and pump with base area approximately 210 sq. cm. It shall be suitable for rough and rugged use in the field and to prevent leakage of hydraulic oil through joints and oil seals etc., during normal operation.

5.4 The hydraulic jack of equipment shall have a sufficiently large capacity pump such that in about 70/75 strokes, the pump should lift the load through a height of about 125 mm.

5.5 Release valve should be so provided as can be closed by the clockwise movement of the handle at the time of operation. The anti-clockwise movement of the handle shall enable the release valve to open thereby lowering the jack ram. The position of the release valve shall be facing the operator.

5.6 Release shall be instantaneous and preferably obtained by a single twist of handle.

5.7 The equipment shall be provided with a carrying handle / sling. The oil used for hydraulic jack shall be IOC SERVO-32/46 or its equivalent.

5.8 Oil seals (Nut-ring, O-ring, washers etc.) should be of special high pressure brand of synthetic Neoprene/ Nitrile rubber / Teflon material (superior brand to be provided) generally conforming to IS:6838-78.

5.9 The jack shall have an extra arrangement at both ends to suit slanting side face of concrete sleepers and it shall be removable to facilitate vertical operation to adjust rubber pads.

5.10 The equipment shall take the reaction to square / re-space the sleepers preferably from rail or adjacent sleeper in such manner that does not get displaced from its position.

5.11 The dimensions and capacity of jack shall be as follows:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Rated capacity</td>
</tr>
<tr>
<td>(ii)</td>
<td>Maximum permissible closed length</td>
</tr>
<tr>
<td>(iii)</td>
<td>Hydraulic lift (travel of ram)</td>
</tr>
<tr>
<td>(iv)</td>
<td>Screw extension</td>
</tr>
<tr>
<td>(v)</td>
<td>Base size</td>
</tr>
<tr>
<td>(vi)</td>
<td>Length of operating handle</td>
</tr>
</tbody>
</table>

Note: Closed length shall be measured after removing back plate and saddle plate.

6.0 TESTS:
The hydraulic jack of the equipment shall be subjected to the following tests for ascertaining their suitability generally conforming to IS: 4552. The sequence of conducting the tests and their frequency shall be as given in clause 6.6.

6.1 Visual and Dimensional Test:- Jacks shall be free from defects such as cracks, blow hoes etc.

6.2 No Load Test:- Jack shall be operated without load to its maximum lift and shall work smoothly without undue clearance.

6.3 Performance Test:- Jack shall be loaded with a static load of 100% of nominal lifting capacity of jack and operated from the minimum to maximum position and back with release valve operation. After repeating this cycle 100 times jacks shall work smoothly throughout the range without undue play or slip between the moving parts and without oil leakage.

6.4 Over Load Test:- Jack shall be loaded with a static load of 120% of nominal lifting capacity of jack and operated from the minimum to maximum position and back. During this test the jack shall operate smoothly throughout the range without any slip or visible damage and shall not show any sign of leakage of oil of any other abnormality.

6.5 Load Sustaining Test:- The saddle of the jack shall be lifted to the middle of its stroke and loaded to 120% of the nominal lifting capacity. The load shall be sustained for one hour. After the end of one hour, the reduction in the height of saddle shall not be more than 3 mm. The load shall be removed after the end of this period and the test repeated three times. After this test, jack shall be left for 24 hours at room temperature and shall not shown any sign of distortion or leakage of oil at the end of this test.

6.6 Sequence of Testing:- The sequence of tests of the jacks and their frequency shall be as given below:

i) Visual and dimensional test (Clause 6.1) : Every jack
ii) No load test (clause 6.2) : Every jack
iii) First overload test (clause 6.4) : Every jack
iv) Performance (clause 6.3) : 1 out of every 20 or part thereof
v) Second overload (clause 6.4) : For the jack subjected to performance test.
vi) Load sustaining test (Clause 6.5) : For the jack subjected to performance test.

6.7 After completing the sequence of tests given above the jack shall not show any sign of damage or leakage of oil of any other abnormality in hydraulic system and shall operate without undue play between parts or slip, when a load equal to nominal lifting capacity is raised or lower.
6.8 The supplier shall provide a suitable testing frame at his works to enable the purchaser or his authorised representative to carry out the testing of the jacks as detailed in clause 6.6. In case these facilities are not available at the manufacturer premises, he shall get them arranged in the nearby technical institute or Test House approved by the purchaser.

7.0 Protection From Rust:

All working surfaces of the jack shall be coated with suitable rust preventive. All other surfaces shall be painted with the paint of approved colour and specification. The jacks shall be supplied packed in suitable wooden crates according to best trade practice generally conforming to IS : 6415 69. All the working parts shall be oiled before being assembled.

8.0 Working:

The equipment shall be legibly and indelibly marked with:

i) Name, initials and trade marks of manufacturer.
ii) Nominal lifting capacity of the jack in tonnes.
iii) Serial number of jack.

9.0 Rejection:

Any of the equipment which fail to comply with the requirements of this specification may be rejected. All the rejected equipment shall be marked with a paint of different colour or otherwise for identification to the satisfaction of the Inspecting Official.

10.0 Technical Data:

Each set of equipment shall be supplied with the following information in booklet or pamphlet form:

i) Instructions for safe operation of the jack.
ii) Salient feature of the jack.
iii) Parts list, with sectional drawing of the components.
iv) Detailed instruction pamphlet for replacing oil periodically if needed.

11.0 Spare Parts:

11.1 Each set of sleeper spacer shall be supplied with two sets of spare hydraulic seals including ‘O’ ring.

11.2 The supplier shall assure prompt and continuous service and delivery of spare parts for a minimum period of 5 years.

11.3 The spare parts required time to time shall be detailed in a list indicating description, part number, expected life etc.

12.0 Tools:
Each machine shall be supplied with a complete kit of tools required by the operator in emergency and for normal working of the equipment.

13.0 Manual:

Detail operating manual, safety precautions to be taken, maintenance and service manual shall be supplied in 3 copies along with each equipment.

14.0 Maker’s Test Certificate:

Copies of the test certificate guaranteeing the performance of equipment shall be supplied in duplicate along with delivery of each equipment.

15.0 Drawings:

The manufacturer shall supply detailed drawings exhibiting clearly the materials and dimensions so that the user shall have a clear understanding of the equipment.

16.0 Training:

Adequate training in operation and maintenance of the equipment shall be imparted to railway operators by the manufacturer either at manufacturer’s premises or at railway premises as per the convenience of purchaser at the rate of one operator per equipment.

17.0 Guarantee:

17.1 The jack shall be covered by a guarantee for one year for manufacturing as well as material defects. For constant wear & tear parts such as seals ‘O’ ring, washer etc. guarantee shall be valid for 3 months at least.

17.2 The manufacturer shall bear the entire cost of the repair or replacement of any parts found deficient/defective due to faulty material, poor workmanship etc. during the period of guarantee.

***************