

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			



**Specification of Hydraulic Rail Bender (Jim Crow) Heavy Duty  
(Spec. No.- TM/SM/5 dated 08.05.1991)  
(Second Revision- 2022)**

**Track Machines & Monitoring Directorate**

**RESEARCH DESIGNS AND STANDARDS ORGANISATION**

**Manak Nagar, Lucknow-226011**

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   1 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

## SPECIFICATION OF HYDRAULIC RAIL BENDER (JIM CROW) HEAVY DUTY

(No.TM/SM/5) (dt. 08 .5 .1991) (First Revision- 2020)

### 1.0 SCOPE

**1.1** This specification lays down the requirements of Hydraulic system commonly known as Hydraulic Jim Crow for bending/dekinking of rail section (either free rails or those in track) with minimum effort. This system is an alternative to the conventional screw type Mechanical Jim Crow.

**1.2** It may be used for bending/dekinking all type of Rails sections 90 R to 60 kg.

**2.0 References:** Following IS codes have been referred to in this specification. Updated copies of the same shall be applicable and available with firm.

i.	IS 2644-1994 (Reaffirmed-2017)	High Tensile Steel Castings for General Engineering and Structural Purposes - Specification
ii.	IS 5657-1970 (Reaffirmed-2016)	Specification for Jim Crows
iii.	IS: 4552 (part-II) – 1993 (Reaffirmed-2019)	Automotive Vehicles - Portable Jacks for Automobiles, Part- 2 Hydraulic Jacks - specification
iv.	IS 1337-1993 (Reaffirmed-2016)	Electroplated coating of hard chromium for engineering purposes- Specification
v.	IS:1986-1981 (Reaffirmed-2016)	Code of practice for hard chromium plating on iron and steel for general engineering purposes
vi.	IS: 6838-1973 (Reaffirmed-2015)	Dimensions for 'O' Rings and Grooves for Vacuum Flanges

### 3.0 MATERIAL AND CONSTRUCTION:

**3.1** The basic components of Jim Crow shall be comprised of a portable assembly of the following:

- a) Steel Frame
- b) Hydraulic Units

**3.2** The steel frame shall be of material grade 4 of IS-2644-1994 (specification for High Tensile Steel Castings).

**3.3** The machine consisting of above shall be of compact and robust design suitable for Indian Railway.

**3.4** Holding span for bending shall be between 725-900 mm.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   2 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

- 3.5** The effort required to operate the hydraulic pump shall not exceed 30 kg while bending /dekinking of any rail section.
- 3.6** The clamping system and hydraulic force application system shall be such that the action and reaction and co-planner thus preventing rail head from twisting.
- 3.7** Releasing of the Jim Crow on sighting an approaching train shall be quick and easy and in any case shall not take more than 30 seconds.
- 3.8** It shall be able to operate efficiently in an environmental condition as expected in India.
- 3.9** The overall weight of the machine shall not be more than 115 kgs.
- 3.10** Oil seals (Nutrings, O-rings, Washer etc.) shall be of special high pressure brand of synthetic neoprene/Nitrile reinforced with Taflon (PTFE) back up rings and shall confirm to IS-6838-1973.
- 3.11** The assembly of the Jim Crow and the detail of various components shall be as per drawing and specifications of the manufacturers approved by purchaser/RDSO.

#### **4.0 FUNCTIONAL REQUIREMENTS**

- 4.1** The working capacity of hydraulic Jim Crow shall be of 60t.
- 4.2** The construction of the machine shall be such that-parts can be easily and quickly replaced in case of break down while carrying out work at site.
- 4.3** It shall be easy to use, operate and maintain.
- 4.4** Hydraulic stroke of Piston shall not be less than 40mm.

#### **5.0 WORKMANSHIP AND FINISH**

- 5.1** All the metal surfaces shall be properly finished. Rough and sharp edges shall be removed. It shall be free from burrs, cracks, seams and other manufacturing defects.
- 5.2** All the working parts and the parts subjected to wear shall be accurately machined to such tolerance as will ensure the fitting of spares with minimum of adjustments.

#### **6.0 INSPECTION AND TESTING: -**

- 6.1** Inspection of the equipment shall be carried out by the purchaser/CTE or his authorised representative at various stages of manufacturing. The manufacturer shall provide all testing facilities including transportation that are required by the inspection officials for proper inspection of the equipment. In case these facilities are not available at manufacturers premises he would be required to get them arranged in near by Technical Institution or Test House approved by purchaser.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   3 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

**6.2** The equipment shall be subjected to following tests before passing approving by inspecting officers. The sequence of conducting the tests and their frequency shall be as given in clause 6.3.

**6.2.1 Visual and Dimensional test:**

The equipment shall be free from defects such as crack, blow holes etc. The equipment shall be checked dimensionally as per drawing of manufacturer approved by purchaser.

**6.2.2 Rated Pressure Test:**

The equipment shall be loaded upto its rated capacity for pushing force and shall be kept steady for one hour, the pressure at the end of the hour shall not be less than 95% of rated capacity.

**6.2.2.1 Proof pressure test:**

The equipment shall be loaded upto 120% of rated pressure for pushing force and shall be kept steady for 5 minutes, the drop in pressure shall not be more than 10% of rated pressure at the end of this period. After this test, the equipment shall operate smoothly throughout the range without slip or visible damage and shall not show any sign of leakage of oil or any other abnormality.

**6.2.2.2 Safety Valve test:**

When the equipment is overloaded beyond rated pressure for pushing force the safety valve of the hydraulic unit shall operate between the range of 110% and 120% of the nominal pushing capacity.

**6.2.2.3 Performance test:**

**6.2.2.3.1** All equipment which was successfully passed the rated pressure test and proof pressure test shall be used for this test.

**6.2.2.3.2** The equipment/hydraulic unit shall be subjected to 100% rated capacity for pushing and shall be kept steady for 2 minutes. The Ram of the hydraulic unit shall be worked out to its maximum limit. This cycle shall be repeated 25 times with an interval of 10 minutes between each cycle. After completing the 25 cycles in this manner, the equipment shall work smoothly throughout the range without undue play between moving parts and without any leakage.

**6.2.2.4 Rated pressure Test (Repeat)**

After completing the cycle test as mentioned in para 6.2.2.3 equipment shall again be subjected to rated pressure test as mentioned in para 6.2.2 and shall be in conformity with it. After this test, the equipment shall not show any sign of distortion or leakage of oil.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   4 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

**6.2.2.5 Field Test:** After conducting above tests a field test also performed in actual condition. The Jim Crow is placed parallel to the rail and laid in such a way that its ram is centrally located at the rail kink and its arms hold the rail head. The Jim Crow is kept horizontal. After Actuating hydraulic power the ram shall start moving towards the kink and eventually exert high de-kinking thrust at the rail. Sufficient power shall generate to bend/de-kink the rail. During releasing of hydraulic power the ram shall be automatically retracted and released the rail. During this operation the equipment shall not show any sign of distortion or leakage of oil.

### 6.3 Acceptance Test: Sequence of testing.

**6.3.1 Acceptance Test:** Acceptance tests are meant to be conducted on randomly picked up samples which are taken from supplies under inspection against zonal railways/purchaser's purchase order.

i)	Visual and Dimensional test (6.2.1)	: Every equipment
ii)	Rated Pressure Test (6.2.2)	: Every equipment
iii)	Proof Pressure Test	: Every equipment
iv)	Safety Valve test	: Every equipment
v)	Performance test for 25 cycles	: One out of every 10 or part thereof
vi)	Rated pressure test (repeat)	: On equipment subjected to performance test
vii)	Field Test	: On equipment subjected to performance test

**6.3.2** Any of the equipment which fails in the testing as per sequence given in clause 6.3.1 shall be rejected. However, the equipment subjected to performance test & rated pressure test (repeat) mentioned in 6.2.2.3 and 6.2.2.4 fails, the inspecting officer may reject whole lot or pass each equipment after subjecting it to performance test.

For rejection purpose, 10 nos. equipments or part thereof (say if procurement is for 6 nos. equipments it will constitute one lot only, if procurement is for 16 pieces, first 10 pieces will constitute one lot and remaining 6 pieces will constitute second lot) will constitute one lot.

**6.4** Equipment subject to performance test shall be picked up randomly.

**6.5** Before offering the equipment for inspection and testing manufacturer shall satisfy himself regarding performance of his equipment and shall give a certificate specifically mentioning that he have checked and tested hydraulic cylinder of each equipment as per IS IS 4552 (part-II) -1993 and it satisfy its provision.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   5 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

**6.6** The supplier shall also carry out the USFD testing of all the casted parts used in Jim Crow to determine internal defects and shall produce a certificate to this effect at the time of inspection.

**6.7** During acceptance test supplier/manufacturer shall also submit test certificate.

## **7.0 PROTECTION FROM RUST AND PACKING CONDITIONS:**

Working surfaces of the cylinder piston rod shall be hard chrome plated having an average thickness of 50 (micron) confirming to IS 1337- 1993 (Electroplated coating of Hard Chromium for engineering purposes - specification) after following code of practice IS: 1986-1981 (Code of practice for hard chromium plating on iron and-steel for general engineering purposes) shall be painted with yellow paint of standard quality. The equipment shall be supplied packed in suitable wooden crates according to the best trade practices to safely transport by rail/road and reach the consignee in safe and satisfactory manner. All the working parts shall be oiled before being assembled.

## **8.0 MARKING:**

The equipment shall be legibly and indelibly marked with:

- i) Name/Trade mark of manufacturer
- ii) Contact No.
- iii) Rated capacity
- iv) Serial no. of equipment
- v) Month and year of supply

## **9.0 SPARES:**

- i) Supplier shall supply 2 sets of hydraulic rubber seals alongwith the machine free of cost. These shall be supplied in due packing.
- ii) The spare parts required should be detailed in a separate list indicating description, part number, expected life and possible source of supply in India.
- iii) The manufacturer shall be responsible for the subsequence availability of spares to ensure trouble free service for the life of the machine.

## **10.0 TOOLS:**

Each machine shall be supplied with a complete kit of ordinary tools and special tools required by the operator in emergency and for normal working of the machine.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   6 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

### 11.0 WARRANTY AND AMC:

- i) Efficient performance of the Jim Crow shall be covered under warranty for a period of one year. For replaced parts the warranty period shall begin a new. However, for constant wear & tear parts such as hydraulic seals, 'O' Ring, washer etc. warranty shall be valid for a period of 3 months.
- ii) Beyond warranty period, the supplier shall undertake upon written request of purchaser to repair or replace as quickly as possible any part/assembly exhibiting deficiencies or damages. The repairs/replacement of parts/service rendered in aforesaid period shall, however, be paid for by the purchaser.
- iii) Any part of the machine failing or proving unsatisfactory in service due to defective design, material or workmanship within 12 months from the date of commissioning shall be replaced by supplier/ manufacturer at his own expenses. If any design modification is made in any part of the equipment offered, the period of 12 months shall commence from the date of such modification.
- iv) During procurement of the machine, railways should go post-warranty AMC with the supplier for a pre-determined period as decided by the purchaser railway. This may be incorporated in the tender document as a condition of contract/Tender/Supply.

### 12.0 DOCUMENTS:

- 12.1 Detailed operating manual, safely precautions to be taken maintenance and service manuals shall be supplied in three copies alongwith each machine.
- 12.2 Copies of the maker's certificate guaranteeing the performance of the machine should be supplied in duplicate alongwith delivery of each machine.
- 12.3 The manufacturer shall supply detailed drawing exhibiting clearly the materials and dimensions so that the user can have a clear understanding of the machine.

### 13.0 TRAINING AND COMMISIONING:

- 13.1 Adequate training in operating and maintenance of the machine shall be imparted to railway operators by the manufacturer either at manufacturer's premises or at railway premises, as agreed mutually at the rate of two operator per machines.
- 13.2 After the product has been supplied at consignee premises, the supply shall be considered as complete only after field training is provided by the supplier as per para 13.1.

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   7 of 8
Prepared by	Checked By:	Issued By:	

ISO 9001-2015	Document No.: TM/SM/5	Version- 02	Date Effective From:24 /05/2022
Document Title: Specification of <b>Hydraulic Rail Bender (Jim Crow) Heavy Duty</b>			

#### 14.0 HANDLING AND TRANSPORTATION:

The equipment shall be capable of transporting to work site by braking/dismantling it into smaller parts/sub-assemblies on a mono rail wheel dolly/ trolley with a suitable attachment. The necessary attachment shall be supplied by the manufacturer alongwith machine/equipment.

**15.0** Supplier is fully responsible to maintain the quality of product supply to Indian Railways.

#### 16.0 PREFERENCE TO MAKE IN INDIA POLICY:

Compliance of the instructions contained in public procurement (Preference to Make in India) order 2017 or latest instructions issued on subject shall be ensure.

\*\*\*\*\*

JRE/SSRE/SSE	ARE/DTM/EDTM	PEDTM	Page   8 of 8
Prepared by	Checked By:	Issued By:	