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SPECIFICATION NO.TI/SPC/OHE/TOOLPL/1991

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GOVERNMENT OF INDIA

MINISTRY OF RAILWAYS

TECHNICAL SPECIFICATION FOR

RATCHET LEVER HOIST

(PUL-LIFTS)

ISSUED BY

TRACTION INSTALLATION DIRECTORATE

RESEARCH DESIGN AND STANDARDS ORGANISATION

MANAK NAGAR, LUCKNOW 226011

(INDIA)

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SPECIFICATION FOR: Ratchet Lever Hoist (Pul-Lifts)

SPECIFICATION NUMBER: TI/SPC/OHE/TOOLPL/1991

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DATE			
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ISSUED TO----------

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TECHNICAL SPECIFICATIONNO.TI/SPC/OHE/TOOLPL/1991
FOR
RATCHET LEVER HOIST (PUL-LIFTS)

1. Scope:

1.1 This specification covers the requirements of "Ratchet Lever Hoist' herein called as the 'Pul-lift' with roller chain with lifting capacities of 0.8 t, 1.6 t and 3.2 t, required for maintenance of overhead traction lines. This specification supersedes specification No. RE/OHE/23(9/61). This specification revised to update strandard, to incorporate A&C slip.

2. Service conditions:

2.1The Pul-lift alongwith its associated fittings is intended to be used outdoor throughout india including marine/industrially polluted areas under the atmospheric conditions prevailing in india. The pul-lift and its associated fittings/components may be subjected to rough handling during the course of maintenance of overhead traction lines and during transportation.

2.2 The "make in India" policy of government of India shall be applicable.

3. Governing specification:

3.1 The Pul-lift shall generally conform to IS:11340-1985 or latest specification for "Ratchet Lever Hoist' which is hereinafter referred to as the "Governing specification". The provisions of the governing specification shall be applied in the manner altered, amended or supplemented by this specification.

4. Deviations from specification:

4.1 Any deviation from this specification calculated to improve the performance, utility and efficiency of the equipment, proposed by the tenderer will be given due consideration provided full particulars with justification thereof are furnished.

5. Workmanship and construction:

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5.1 General-The pul-lift shall be as light in weight as possible and shall be robust in construction to bear the rigours of service to which it will be subjected to.

5.2 Housing-The housing of the hoist shall be either cast or fabricated and shall be designed for proper strength and maintain alignment under all expected conditions of service. If of fabricated construction, it shall be stress relieved before machining and assembly.

5.3 Gears-The gears shall be made of alloy steel and designed for proper strength and surface durability, such as to afford efficient operation throughout guarantee period. In case of enclosed gearing, means shall be provided for ample lubrication.

5.4 Load brake- each pul-lift shall be provided with self actuated automatic mechanical brake which will prevent self lowering of the load and arrest and sustain load in all working positions whilst the load chain is in tension. The load brake shall also allow smooth lowering of the load without serious overheating which may impair efficient working of the pul-lift. After each operation, the brake shall automatically and instantaneously engaged, so that the load is held suspended in any position.

5.5 Pawls- pawls shall be of sufficient strength to arrest the full load from lowering due to gravity. The pawls shall engage with the ratchet wheel either by means of a spring other than tension spring or by some other equally effective means. It shall be so positioned that it engages the ratchet wheel under gravity, should its operating mechanism fail. Adequate arrangement shall be made to ensure that the pawl does not seize on the pawl pin. The pawl and the ratchet shall be made of steel duly heat treated to provide satisfactory degree of wear resistance together with toughness. The hardness of pawl tip shall not less than 40 HRC and that of ratchet not less than 30 HRC.

5.6 Suspension:

5.6.1 Hooks-Top and bottom hooks shall conform to IS:3815-1969 or latest 'Specification for point hooks with shanks for general engineering purposes" or IS 8610-1977 or latest ''Specification for point hooks with shank capacity upto 25 tonnes-trapezoidal section" The bottom hook shall be so designed that it shall be free to swivel in the loaded condition without twisting the load chain .The top hook, if required to swivel, shall be fitted with plain bearing. Ball & roller bearing shall not be used. The continuous length of the shank engaged by nut on the load side shall at least be equal to 2/3 times the diameter of shank before being interrupted by the drilling for split pins or other fixings unless the shank is shaped from the solid to afford the same degree of security as though fitted with the nut. Both the hooks shall be fitted with safety catches.

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5.6.2 Other fittings- Suspension fittings other than hooks shall be of sufficient strength. All suspension fittings shall be readily detachable for inspection of stressed parts such as shanks.

5.7 Load Chain- The load chain shall be of suitable grade, liberally rated to withstand the load which the pul-lift is required to handle. Each pul-lift shall be supplied with minimum length of chain as indicated in Annexure-I of this specification. Load chain of roller type shall conform to IS:2403-1975 or latest 'Specification for transmission steel roller chain and chain wheels'.

5.8 Load chain wheel- The load chain wheel shall be made of material duly heat treated suitable for use with load chain employed and be of adequate strength and shall be suitably designed to ensure effective operation of chain. The load chain wheel shall conform to IS:2403-1975 or latest .

5.9 Guide – Means shall be provided for effective guidance of the load chain into chain wheel.

5.10 Stripper – A stripper shall be provided to ensure effective disengagement of load chain from the load chain wheel.

5.11 Operating lever- it shall be light in weight and of adequate strength with the shape easy to grip.

5.12 Reversing knob- A suitable shaped and designed reversing knob shall be provided to reverse the direction of the operation without lowering the load.

5.13 Reverse motion stop – Each pul-lift shall be equipped with a reverse motion stop which should come into action if self actuated load brake fails to operate.

5.14 Quick release lever –A lever may also be provided for releasing pawl engagement in case quick winding under no load which increases the life of panel.

5.15 Lubrication – All moving parts shall be grease lubricated. Standard grease nipples shall be provided for this purpose.

5.16 All components shall be treated for rust prevention.

6. Materials – The material used in the construction of Pul-lift shall conform to the following standards:

Name part	Specification No.
Frame	IS:2062 Grade A or latest
Operating lever	IS: 2062 Grade A or latest
Chain wheel	IS: 617-1975 Grade 4600 or latest

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Fasteners	IS: 1030 -1982 or latest IS: 2107 - 1977 or latest IS: 2108 – 1977 Gr BM 340 or latest Stainless steel conforming to Grade A4, Property class 50 of BS 6105-1981 Or latest

6.1 If other materials except that of fasteners are used, the manufacturer shall produce adequate evidence that such parts/components have been used strictly conforming to the requirements of relevant standards.

7. Dimensions and weight:

7.1 The weight of pul-lifts of different capacities should preferably not exceed the figure indicated in Annexure-1.

7.2. The preferred leading dimensions of pul-lifts are given in Annexure-I.

8. Extra length of chain:

8.1 As an option the rates for extra length of chain per metre of different sizes shall also be quoted so that additional length may be ordered, if required.

9. Effort:

9.1 The manufacturer shall declare the operating effort on the lever required to raise a load equal to the working load limit, together with the effective radius of operating lever of pul-lift.

10. Freedom from defects:

10.1 All parts of the machine shall be free from casting/manufacturing defects and other irregularities. No repairs shall be done to the castings and other components to hide their defects.

11. Supply :

11.1 The pul-lift shall be supplied complete in all respects including load chain and operating lever of sufficient length to facilitate application of required force. The manufacturer shall obtain the following information from the purchaser before manufacture of pul-lift.

a) Safe working load, and

b) Maximum range of lift

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12. Inspection, certificate of test and examination:

12.1 Inspection – The representative of the purchaser shall have access to the works of manufacturer at all reasonable times for the purpose of witnessing the method of manufacturing, specified tests, inspecting the testing equipment and methods of examination.

12.2 Certificate of test and examination – A certificate of test and examination shall be issued with every consignment of pul-lift giving the following information for each one:

a) Distinguishing mark,

b) Description,

c) Range of lift,

d) Safe working load,

e) Proof load applied,

f) Rating,

g) Chain size, length & grade,

h) Number tested, and

i) Month and year of manufacture

13. Packing and Marking

13.1. The Pul-Lift shall be properly packed duly assembled in strong wooden boxes so as to avoid damage during transit. One box shall contain not more than two assemblies.

13.2 The following details shall be permanently and legible marked on a suitable part or name plate giving the following information:

a) Manufacturer’s name and trade mark,

b) Safe working load,

c) Size and grade of chain,

d) Proof load applied and,

e) Rating, and

f) Month and year of manufacture.

13.3 Every packing shall carry in legible and indelible lettering the following information:

i) Type of machine packed,

ii) Number of machines packed,

iii) Production batch number.

iv) Manufacturer's name, brand or trade mark,

v) Net and gross weight,

vi) Contract number/purchase order number and consignee,

vii) Date of inspection, and

viii) Any other particulars which the manufacturer wants to specify.

14. Tests:

14.1 All the tests specified in this specification shall be carried out at the manufacturer's works and shall be arranged without making any claim or charges for such tests including labour, machinery/apparatus, etc. however, such tests for which the facility is not available with the manufacturer, may be conducted with reputed testing agencies after specific approval of purchaser. All such tests shall be witnessed by the representative of RDSO/Purchaser. The cost of samples or components destructed during type testing shall be borne by the manufacturer.

14.2 Test certificates for the physical and chemical properties of the raw material and that for hooks and load chain for their conformity to the specifications stipulated/relevant specifications shall be obtained by the manufacturer from the suppliers of material procured/processed. The test certificates shall be produced at the time of inspection. The manufacturer shall also check the chemical composition of every lot of raw material purchased and produced. The certificate of these tests shall be produced at the time of inspection.

14.3 The representative of the RDSO/Purchaser shall be at liberty to test any or all the components of the pul-lift to check their conformity to the specifications laid down.

14.4 Before giving call to RDSO/Purchaser for inspection and testing of prototype, the manufacturer shall submit a detailed test schedule consisting of the

details of each test, nature of the test, venue of the test, duration of each test and total number of days required to complete the tests at one stretch. Once the test schedule is approved the tests shall invariably be done accordingly. However, during the process of type testing or even later RDSO/Purchaser's representative reserves the right to conduct any additional test(s) besides those specified herein, on any equipment/sub-system or system so as to test the system to his satisfaction or for gaining additional information and knowledge. In case, any dispute or disagreement arises between the manufacturer and RDSO/Purchaser's representative during the process of testing as regard to type test and for the interpretation and acceptability of the type test results, it shall be brought to the notice of Director General(Traction Installation),Research Designs and standards Organisation, Manak Nagar, Lucknow whose decision shall be final and binding.

15. Submission of data, drawings and particulars:

15.1 The manufacturer shall submit the detailed literature on handling, operation and maintenance of pul-lift.

15.2 The manufacturer shall submit for scrutiny and approval the following drawings in triplicate in size of 210 x297 or multiples thereof.

i) Drawing showing the assembly of machine (plan, elevation and cross section) including a table indicating the description of item, material specification with grade and quantity of components used in the assembly.

ii) Individual assembly of parts wherever applicable.

iii) Detailed dimensioned drawings of each part and component.

15.2.1 After all the drawings are approved, the manufacturer shall submit three reproducible tracing films for each drawings for signature of approving authority.

15.3 Only after all the design and drawings have been approved and clearance give by RDSO/Purchaser to this effect, the manufacturer shall take up manufacture of the prototype for RDSO/Purchaser's inspection. It is to be clearly understood that any changes required to be done in the prototype as required by RDSO/Purchaser shall be done expeditiously.

16. Type Tests:

16.1 Type test shall be carried out to demonstrate the suitability of design, materials and method of construction and the capability of manufacturer to produce the Pul-lift in accordance with the specification.

16.2 The manufacture shall produce at least three prototype samples for conducting following type tests:

i) Visual examination,

ii) Measurement of dimensions,

iii) Measurement of weight,

iv) Design test, and

v) Operational proof test.

The tests listed from(i), (ii), (iii) & (v) above shall be conducted on three samples of each type. The test listed at (iv) above shall be conducted on one sample.

17. Acceptance tests:

17.1 All the tests listed in Clause 16.2 except design test shall constitute acceptance tests.

17.2 Inspection and sampling procedure

17.2.1 The Pul- lift shall be offered in lot of not more than 25 numbers the components essentially belonging to the same melt/batch and manufactured from same raw material. Three assemblies shall be selected at random from every lot after it has been subjected to routine tests by the manufacturer. The assemblies so selected shall be subjected to the tests specified in clause 17. All assemblies in a lot shall be subjected to operational proof test.

18. Criteria for acceptance:

18.1 The assemblies selected shall pass the specified tests otherwise the lot shall be rejected. If failure occurs in operational proof test such assemblies only shall be rejected.

18.2 Inspector shall affix an indelible stamp, punch mark or label indicating the date of inspection and name of Inspector. The label shall be affixed with special glue so that it does not come off.

19. Routine tests: The following tests shall be carried out by the manufacturer and records maintained.

i) Visual examination,

ii) Measurement of dimensions, and

iii) Measurement of weight.

20. Method of tests:

20.1 visual examination- The components/parts of the pul-lift shall be visually examined for any manufacturing defect, deformation of parts, misalignment, rusting, pitting/corrosion twist of chain etc. No such defects which may be harmful to safe/ satisfactory operation of Pul-lift shall be acceptable. The marking shall also be seen on each pul-lift for provision of required details.

20.2 Measurement of dimensions – The major and other critical dimensions of the machine shall conform to the drawings approved by the RDSO/Purchaser.

20.3 Measurement of weight – The weight of each type of machine shall be measured and shall be within the limits specified.

20.4 Design test- At manufacturer's expense a sample of pul-lift shall be selected by the representative of purchaser and shall be subjected to at least four times the working load limit for at least one minute, without breakage of material, partial or complete, or such distortion as could result in the release of load . Following this test all parts shall be defaced to make them unusable.

20.5 Operational proof test – Each pul-lift shall be subjected to an operational proof load of 1.5 times the safe working load for two minutes through a lift which will ensure that each part of the hoist mechanism and each tooth of gear comes under load.

20.5.1 Examination – After the proof loading the pul-lift shall be thoroughly examined for deformation, cracks, flaws or other defects on the components. The pul-lift shall be deemed to have complied with this test only if it is found free from deformation, cracks, flaws & other defects.

21. Guarantee:

21.1 All the pull lifts supplied shall be guaranteed for a period of two years from the date of receipt by the consignee.

22.0 "All the provisions contained in RDSO's ISO procedures laid down in document No.- QQ-D-7.1-11 dated 19.07.2016 Titled " Vendor- change in approved status") and subsequent versions/amendments thereof, shall be binding and applicable on the successful vendor/vendors in the contracts floated by Railways to maintain quality of products supplied to Railways".

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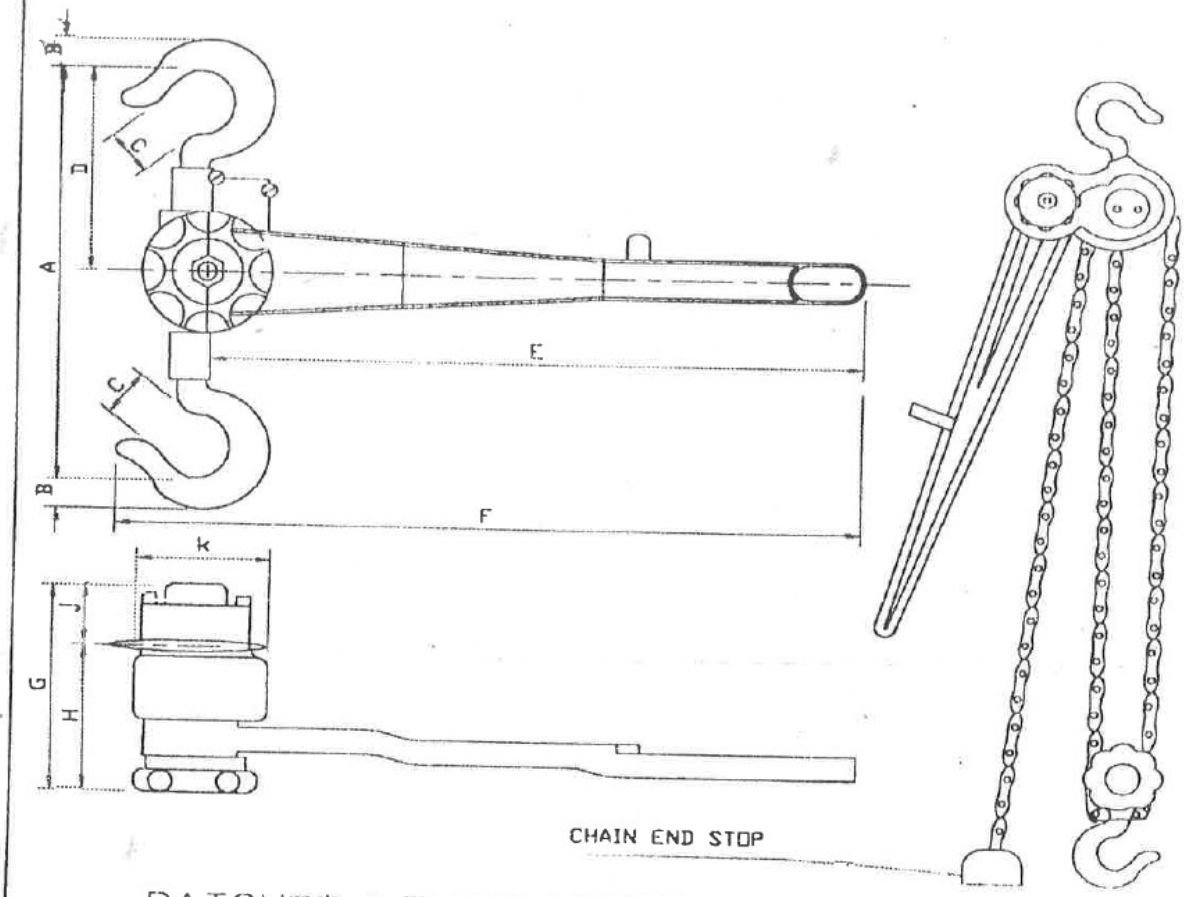

RATCHET LEVER HOIST (PUL-LIFT)

S. No.	CAPACITY (TONNES)	A	B	C	D	E	F	G	H	J	K	APPROX. LENGTH OF CHAIN	DESIRED Wt INCLUSIVE OF CHAIN
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	0.80	305	23	32	140	443	490	134	94	40	108	6m	10kg
2.	1.60	355	30	33	170	443	570	156	89	67	165	6m	10kg
3.	3.2	450	35	38	190	443	570	156	89	67	165	8m	25kg

NOTE : ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.

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