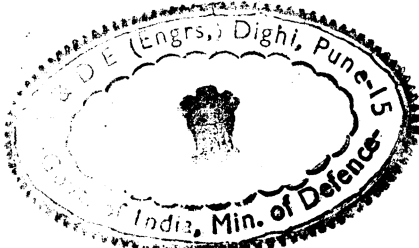


UNSEALED SPECN NO. CCA(45) LIS/481 (a)
(Supersedes Specn No. RDEF/EHGR/SPCN/8242)

DEFENCE SPECIFICATION



FOR

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JUMARS

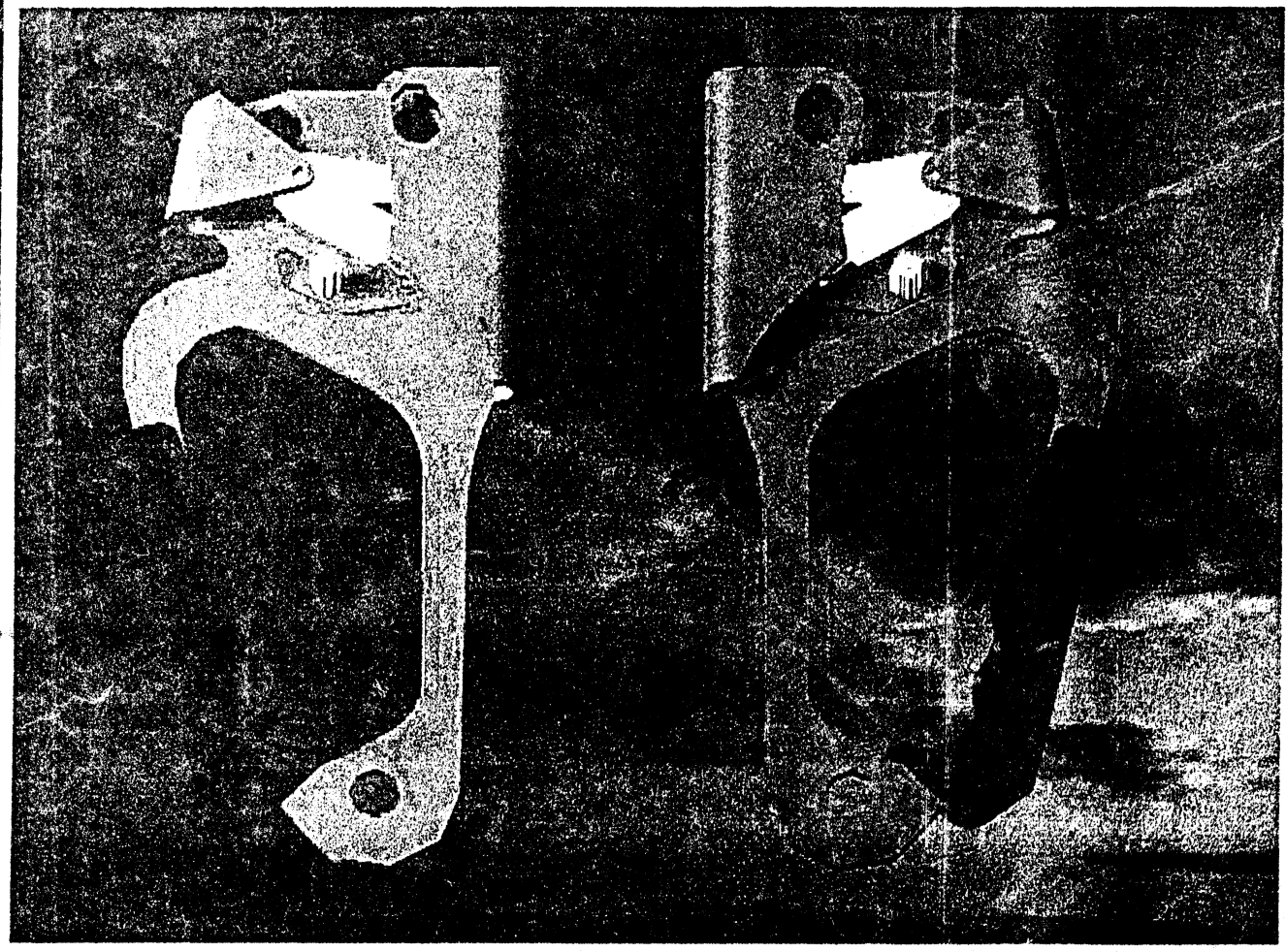
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CONTROLLER'S APPROVAL
BASED ON THE MIS NO. 03
OF GROUP CASE
NO S/12377/57

[DSCAT NO. 8465-000912]

(PLATE TYPE)

M. D. S. Multis
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ASCENDING LH & RH



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UNSTALLED SPECN NO. CRA(GS)/US/481 [a]
(Supersedes Specn No RDEE/ENGR/SPCN/0248)

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GOVERNMENT OF INDIA
MINISTRY OF DEFENCE
RESEARCH & DEVELOPMENT ESTABLISHMENT (ENGRS)
DIGHI, PUNE-411015

UNSTALLED SPECN NO. CRA(GS)/US/481 [a]
SPECIFICATION No. RDEE/ENGR/SPCN/0248

SPECIFICATION

FOR

[DSCAT No. 8465-000912]

JUMARS(PLATE TYPE) ASCENDING

ISSUED BY THE CONTROLLED

LH & RH

CONTROL RATE OF QUALITY ASSURANCE (GENERAL STORES)

POST BOX NO. 127

KANDUR

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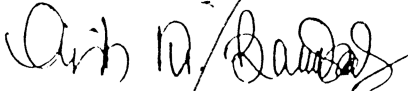
CONTENTS

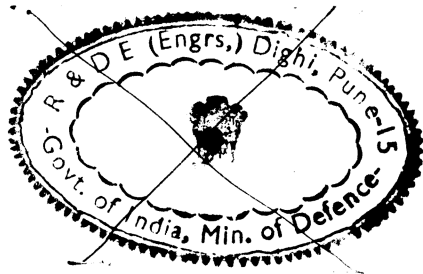
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CERTIFICATE

^{with}
GC/G-9

Certified that this SPECIFICATION contains pages which have been serially numbered from ONE to **TWENTY NINE**.

Signature : 
Name : AK BANDYOPADHYAY
Designation : Scientist 'D'
Group : FD - MOUNTAINEERING EQUIPMENT



Ak

SECTION I

shall
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GENERAL INSTRUCTIONS

- 1.1 This specification and other information used in connection thereof may be used for a particular order placed or to be placed by a competent authority. It may not be used for any other purpose, whatsoever, without Express Written Sanction of ~~The Director, R&DE (Engrs), Dighi, PUNE-411015.~~ *Controller, Directorate of Quality Assurance (General Stores), Kanpur*
- 1.2 This specification must be returned on submission of tender / on completion of the order.
- 1.3 Any proposal for change in this specification and the manufacture will be addressed to ~~The Director, Research & Development Establishment (Engrs), Dighi, PUNE-411015.~~ *Controller, Directorate of Quality Assurance (General Stores), Kanpur* No request for any deviation will be entertained from the sub-contractor, if any, except through the main contractor.
- 1.4 The ^{Inspection} ~~inspecting~~ authority, at his discretion may check the test results obtained at the manufacturer's work by independent test at the Govt. Test House or elsewhere.

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SECTION II

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SCOPE

- 2.1 This specification covers the materials, fabrication, manufacture, heat-treatment, workmanship, quality control, inspection, testing and packing for Jumars hereafter will be referred to as Jumars (Left Hand & Right Hand) in the succeeding paragraphs used as a rope climbing aid in mountaineering.

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SECTION III

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DRAWINGS & SPECIFICATIONS

- 3.1 Drawing numbers given below pertaining to Jumars (LH & RH) form a part of this specification. Any modifications suggested during the manufacture of prototypes shall be incorporated in these drawings with the prior approval of Inspecting Authority.

DRAWING NO.	TITLE
JUM2100000100	: Jumar Assembly
JUM0100000200	: Body
JUM0100000300	: Jaw
JUM0100000400	: Lever
JUM2100000500	: Roller Grip
JUM0100000600	: Pin, stopper
JUM0100000700	: Pin, small
JUM0100000800	: Pin, Large
JUM0100000900	: Pin, Thimble
JUM0100001000	: Thimble
JUM0100001100	: Spring
JUM0100001200	: Spring, Angular

- 3.2 **Tolerances.** Tolerances on dimensions of the components if not specifically mentioned in the drawings shall conform to medium class as per IS-2102.
- 3.3 All materials used in the manufacture of Jumars (LH & RH) shall conform to the relevant Indian Standard specification. Whenever these have not been specified relevant Defence or other specifications as mentioned shall be applicable.

AB

3.4 The following specifications shall apply :

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INDIAN STANDARD

NOMENCLATURE

- IS-737 : Wrought Aluminium and aluminium alloys, sheet and strip
(for general engineering purposes).
- IS-1068 : Electroplated coatings of nickel plus chromium and copper
plus nickel plus chromium on iron and steel.
- IS-3444 : Specification for corrosion resistant alloy steel and nickel
based castings for general applications

OTHER SPECIFICATIONS

- ASTM ~~304~~ : Stainless steel 304/316
- ASTM ~~304~~ : Standard specification for chromium nickel stainless and
heat resisting steel spring wire

3.5 Copies of Indian Standard specifications referred to above may be obtained from Bureau of Indian Standards, Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI-110001.

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SECTION IV

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GENERAL DESCRIPTION

4.1 **JUMARS.** Jumars are required for climbing a mountain slope with the help of climbing rope. Each Jumar has got a device (Jaw) which allows the climber only to go up along the main rope in his effort to climb upwards whereas it (Jaw) does not allow him to come down due to its unique design of teeth as they grip the main rope firmly. Each Jumar consists of the following parts :

- (a) Main Body
- (b) Jaw.

4.2 The main body of the Jumar is made of aluminium alloy sheet which is designed to support the body of the climber. The jaw is made of nickel chrome steel casting. The jaw is fitted to the main body with the help of the pivot pin and a spring. The sharp projections on the jaw enable it to have a firm grip on the main climbing rope and prevent the climber from coming down.

AR

SECTION V

MATERIAL

5.1 JUMARS. The main body of the Jumar shall be manufactured using aluminium alloy 74530 as per IS-733 / RDE-40 alloy . Springs shall be made of stainless steel wire as per ASTM 313-76 suitable for sub-zero temperature conditions. Grip shall be of Nylon Grade N-6, M-28 RC.

SECTION VI

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MANUFACTURE, WORKMANSHIP & FINISH

6.1 **JUMAR.** The Jumar shall be manufactured by adopting the processes laid down below:

- (a) **Main Body.** The main body shall be manufactured using proper press toolings for blanking, punching, bending, trimming etc. All such toolings necessary for these operations shall be developed using proper die materials. Necessary heat treatment and preventive coating by anodizing shall also be given to the main body of Jumar.
- (b) **Jaw.** The jaw shall be manufactured in special nickel chrome steel as per IS-3444 by investment casting. Electroplating coating of chromium shall be given for finishing.
- (c) **Pivot Pin.** Pivot Pin shall be manufactured out of stainless steel 304/316 as per ASTM.
- (d) **Springs.** Springs shall be made out of wires 1.0 mm nominal diameter from stainless steel suitable for sub-zero temperature conditions.
- (e) **Grip.** Grip shall be moulded in Nylon N-6, M₂-2B RC to the main body.

6.2 **WORKMANSHIP & FINISH.** Finishing of the Jumar shall be of the highest order and shall be achieved by following the processes mentioned in the preceding para 6.1.

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QUALITY CONTROL

Quality Control shall be exercised by adopting the procedure enumerated below :

- (a) **Tests for Spring (Jumars).** Each jaw shall be fully opened and released 200 times. On completion of this operation the springs fitted to the jaw shall not take a permanent set in, that the jaw shall function efficiently and spring back without sticking or jamming as soon as they are released from the open position at the conclusion of this test.
- (b) **Crack Detection Test.** The main body and jaw of the Jumar shall be subjected to crack detection test by any of the standard non-destructive test methods before finishing.
- (c) **Load Testing.** 100% of the main bodies (LH & RH) of Jumars shall be subjected to load testing by a suspended load of 1000 Kg along the longitudinal axis. The bodies thus tested shall not show any deformation/cracks. The assembled Jumars shall be tested as follows :
- A load of 500 Kg shall be tied at one end of rope of 14 mm dia and the other end of the rope shall pass through the jaw. The Ascender when lifted with the load to assess the efficacy of the jaw the rope shall not slip through the jaw.
- (d) **Hardness Testing.** The hardness of the main body after heat treatment shall be between 90 BHN to 110 BHN.

VTR

- 7.2 **SAMPLING AND CONFORMITY CRITERIA.** The sampling for various tests described for quality control shall be at the discretion of the inspecting authority.
- 7.3 **PRE-INSPECTION.** Manufacturer/Contractor must satisfy themselves that the stores are in accordance with the terms of contract and fully conform to the required specifications by carrying out a thorough pre-inspection of all materials. A declaration by the Contractor that the necessary pre-inspection has been carried out on the stores tendered shall be submitted alongwith the request for inspection and clearance of materials for the pilot sample. The declaration will also indicate the method followed in carrying out the pre-inspection showing the features checked/tested and will be accompanied by Manufacturer's test certificate and laboratory test results, wherever relevant.

(16)

SECTION VIIIJLL
GC/G-9**INSPECTION**

8.1 It shall be open to the Govt. representative to inspect the components of Jumars at any stage of manufacture namely :

- (a) Pre-inspection stage
- (b) Production stage
- (c) Stage of preparation for delivery.

The manufacturer shall provide all facilities, free of charge, for carrying out inspection.

8.2 No part of the work shall be repaired or rectified without the approval of the Inspecting Authority.

8.3 The Contractor shall afford, at his own expense, the Inspecting Officer of reasonable accommodation and inspection and testing facilities for satisfying himself that the stores are being or have been manufactured in accordance with the specification and for this purpose the Inspector shall have full and free access at any time during the contract to the Contractor's work and may require the Contractor to make arrangements for anything pertaining to this contract, to be inspected at his premises or any other connected place and the Contractor shall arrange similar facilities at his own expense with regard to any sub-contract he may make.

8.4 The Contractor shall pay all the costs connected with such tests and any other tests covered under quality control provisions and provide without any extra charges, all materials, tools, gauges, labour and assistance of every kind which the Inspector may consider necessary for any tests and examination, other than special or independent tests which he may require to be carried out at Contractor's premises and shall pay all costs attendant thereon, failing these facilities (in regard to which the Inspector shall be the Sole Judge) at his own premises for making tests, the Contractor shall bear the cost of carrying out such tests elsewhere.

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SECTION IXwill
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PACKING & IDENTIFICATION

- 9.1 **Identification.** The Jumars (LH & RH) shall be legibly stamped/marked at a suitable place with the manufacturer's name, recognised trade mark and year of manufacture.
- 9.2 **Packing.** The finished Jumars with the identification marks shall then be packed separately as follows :
- (a) Jumar (LH) and Jumar (RH) shall be packed separately in polythene bags made out of polythene film of suitable gauge.
 - (b) One pair of Jumars i.e. one each of left hand and right hand Jumar shall then be packed in another polythene bag/thermocole box pressed into form to accommodate two Jumars side by side.
 - (c) Ten pairs shall then be properly placed and packed in one box made out of hard cardboards.
 - (d) A number of such cardboard boxes shall be packed in wooden packing boxes for despatch.
- 9.3 The packing of bulk quantity of the equipment shall be at the discretion of the Inspecting Authority.
- 9.4 **Identification of Packages.** The bulk packages shall have the reference of the Contract particulars, date of manufacture, lot number and total weight painted/stamped legibly on it. Also each bulk package shall have the details giving the following information :
- (a) Manufacturer's Name
 - (b) Description of material
 - (c) Weight of consignment
 - (d) Any other particulars required by inspecting authority.

WB

**COMPLIANCE MATRIX WITH REFERENCE TO THE INSPECTION OF
JUMARS (PLATE TYPE)/ASCENDERS (LH & RH)
AS PER SPECIFICATION NO. RDE/ENGR/SPCN/NTL 0248**

QUALITY CONFORMANCE INSPECTION PARAMETERS

Section/ Paragraph	Description	Complies Yes/No/ Satisfactory	Remarks
-----------------------	-------------	-------------------------------------	---------

7.1

(a) INSPECTION OF BASIC MATERIALS

1. Samples of all basic materials as per the relevant standards
2. Basic materials accepted based on test certificates from recognised laboratories submitted by the contractor.
3. Basic materials supplied by the Government.
4. Basic materials procured by the contractor.

INSPECTION OF TOOLINGS & FACILITIES

1. Components manufactured by using the jigs & fixtures made by the contractor i.e. the efficacy of the toolings
2. Fixture for assembly
3. Test Facilities

(b) COMPONENTS ON THE FLOOR

Visual inspection

1. General appearance & finish
2. Free from cracks & burrs
3. Rounding of corners

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Dimensional Inspection

- 1. Overall dimensions of main body & jaw.
- 2. Critical dimensions of main body & jaw.

Assembly

- 1. Workmanship & finish
- 2. Free movements of jaw.
- 3. Tension in the springs.
- 4. Overall dimensions.
- 5. Critical dimensions
- 6. Weight

FUNCTIONAL TESTS

- 1. Tests for spring as per para 7.1(a)
- 2. Load testing as per para 7.1(c)
- 3. Hardness of main body after heat treatment.

PACKING & IDENTIFICATION

- 1. Polythene bags/thermocole box.
- 2. Sealing of Bags.
- 3. Bulk quality packing & sealing.

IDENTIFICATION

- 1. Markings

DECLARATION

The Ascenders/Jumars (LH & RH) comply all respects to the extent furnished herein.

Certified to be acceptable.

(N. ULLAH)
SSCI

GE/G-9

Authorised Rep
r Inspection Authority

(AK BANDYOPADHYAY)
JAG(NESG)
CONTROLLER

(JASBIR SINGH)
Lt. Col.
DC

(DR YADAV)
JAG(NESG)
JC

Project Officer
for DIRECTOR

AB