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UNSEALED SPECN NO. CQA(GS)/LIS/479[a]  
(Supersedes Specn No. RDEE/ENGR/SPCN/245)

GO/G-9

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CONTROLLER'S APPROVAL  
BASED ON THE M/S NO 3  
OF GROUP CASE NO  
S/12375/99  
21/4/04  
GO/93



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GOVERNMENT OF INDIA  
MINISTRY OF DEFENCE

RESEARCH & DEVELOPMENT ESTABLISHMENT (ENGRS)  
DIGHI, PUNE-411015

UNSEALED SPECIFICATION No. CQA[GS]/US/479[a]  
SPECIFICATION No. RDEE/ENGR/SPCN/245

FOR

DR CAT No.:- 3020-015307

**PULLEY**

ISSUED BY  
CONTROLLER  
CONTROLLERATE OF QUALITY ASSURANCE (GENERAL STORES)  
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# CERTIFICATE

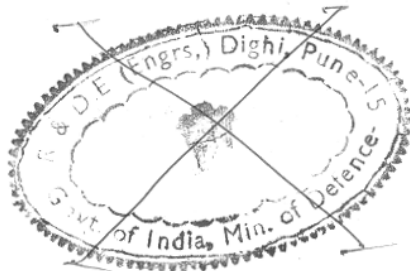
Certified that this SPECIFICATION contains pages which have been serially numbered from ONE to ~~SEVEN~~

Signature : 

Name : AK BANDYOPADHYAY

Designation : Scientist 'D'

Group : FD - MOUNTAINEERING EQUIPMENT



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AMENDMENT RECORD SHEET

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PROVISIONAL SPECIFICATION No. RDEE/ENGR/SPCN/0245

SPECIFICATION FOR PULLEY

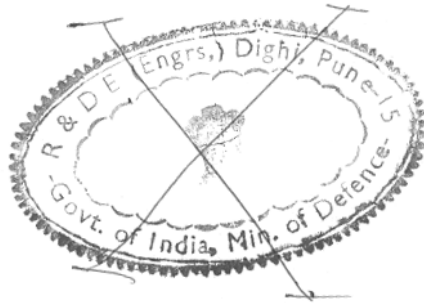
Sr. No.	Date of amendment	Ref of Para / Clause	Amendments Carried out	Ref. to atuhorisation	Signatures of the person authorising it

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SPECIFICATION FOR PULLEY

REVIEW AND APPROVAL

1. Recommendation of the Originator of the document



*R C Pathak*  
Approved / Not Approved  
Signature  
Brig (Dr.) R C PATHAK  
Jt. Director  
(Authorised Person)

2. Amendment to be effective from date :

**SECTION I - GENERAL**

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12

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

**SECTION II - SCOPE**

- 2.1 This specification covers the material fabrication/manufacture workmanship, quality control, inspection & testing and packaging for Pulley for high altitude and glacier area.

**SECTION III - DRAWINGS & SPECIFICATIONS**

- 3.1 Drawing number given below pertains to Pulley forms a part of this specification. Any modifications suggested for improvement of performance or otherwise during the manufacture of the first batch of production shall be considered for incorporating in the drawing and specifications with the prior approval of *Inspection* ~~Inspecting~~ Authority.

Drawing No.	Nomenclature
PUL-03-001	PULLEY

- 3.2 Tolerances. Tolerances on dimensions of the components if not specifically mentioned in the drawing, shall conform to medium class as per IS-2102.
- 3.3 All materials used in the manufacture of Pulley shall conform to the relevant Indian Standard Specifications wherever relevant IS has not been mentioned either Defence or other specifications, as referred in this specification shall be applicable.

**Indian Standard****Nomenclature**

60/3-9



IS-733 : Specification for wrought aluminium and aluminium alloy bars, rods and sections (for general engineering purpose)

IS-1868 : Specifications for anodic coating on aluminium

**AS TM/ASME**

ASME : Stainless Steel Grade/Type  
304/316

ASTM - D4066 : Specification for Nylon C-66

**SECTION IV - GENERAL DESCRIPTION**

- 4.1 The Pulley is an aid in rope-climbing and rappelling in mountaineering. It is also used for load hauling. Pulley consists of a small nylon roller with groove around for easy passage of braided nylon rope, two lips made of aluminium alloy, mounting pin and two washers of stainless steel. The nylon roller is fitted with the aluminium lips (one each on either side) with the mounting pin and washers. When finished, the pulley weighs approximately 50 gms and withstand a testload of 1000 kg.

**SECTION V - MATERIALS**

- 5.1 As the Pulley is to be used on high altitude and on glacier areas under sub-zero (-40 Deg C) temperature conditions the materials to be used in its fabrication shall be as follows:-

- (a) Nylon roller - Nylon C-66
- (b) Side lips - Aluminium alloy B51SWP sheet
- (c) Mounting pin - Stainless Steel grade 304 round
- (d) Washers - Stainless Steel grade 304 round

## SECTION VI - MANUFACTURE, WORKMANSHIP & FINISH

- 6.1 Pulley shall be manufactured by adopting the procedure narrated below.
- 6.1.1 Nylon Roller. Nylon roller shall be made by injection moulding out NYLON C-66 using a die-set specifically manufactured for the roller.
- 6.1.2 Side Lips. Side lips shall be made by die-punching and bending from aluminium alloy B51SWP sheet. The lips are then further processed for necessary holes by machining. Finally the lips are given an anodic coating.
- 6.1.3 Mounting pin. Mounting pin shall be fabricated by machining from stainless steel round of SS Grade 304/316.
- 6.1.4 Washers. Washers shall be made by machining from stainless steel round of grade 304/316.
- 6.1.5 Assembly. Assembly of all the components shall be made with proper care so that no damage is done to the side lips. Rivetting of the pin shall be done in a fixture to be specially made by the contractor.
- 6.2 Workmanship and Finish. The workmanship and finish of the equipment shall be of the highest order and not less than those of the same type of equipment available in the international market. The workmanship and finish shall ensure that the lips, pin, washers and nylon roller are free from all burrs and pits and that has flared material around the rivetting are finished smooth.

## SECTION VII - QUALITY CONTROL

- 7.1 Quality control shall be exercised by adopting the procedure enumerated below :
- 7.1.1 The nylon roller shall be tested for the suitability under sub-zero temperature conditions by keeping the roller in a climatic chamber under -50 Deg C for a minimum period of five hours and then taking out the roller and immediately striking it with light hammering on an anvil or base plate. On striking at that Cold condition the roller shall not develop any crack or disintegrate. The assembled pulley shall be subjected to a proof had of 1000 kg (tensile) which should sustain without any deformation at failure.

7.2 Sampling & Conformity Criteria. The sampling for all the tests as deemed required shall be at the discretion of ~~Inspecting Authority~~.

*Inspection Authority*

*GO/G-9*

7.3 **Pre-Inspection.** Manufacture/Contractor shall 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 before actually tendering the same for inspection to the Inspecting Authority. A declaration by the contractor that the necessary pre-inspection has been carried out on the stores tendered, shall be submitted along with 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 and shall be accompanied by manufacturers test certificate and laboratory test results whichever becomes relevant.

### SECTION VIII - INSPECTION

8.1 *Inspecting* The *Sr RAO, SBAE(GS) of the area concerned* Inspection Authority shall be the Director, R & DE (Engrs), Dighi, Pune - 411 015 or his authorised representative.

8.1.1 It shall be open to the Inspecting Authority to inspect the components of Pulley at any stage of manufacture namely:-

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

The contractor/manufacturer shall provide all facilities to the Inspecting Authority 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 expenses the Inspecting Officer of reasonable accommodation and inspection, testing facilities for satisfying himself that the stores are being or have been manufactured in accordance with the specifications. To ensure this the inspector shall have free and full access at any time during the period of contract to the contractor's work and the contractor shall make all arrangements required for inspection at his premises or any other connected place including the place of his sub-contractor if any at his own expenses.

8.4 The Contractor shall bear all the costs connected with such tests and any other tests covered under quality control provision and provide without any extra charges, all materials, tools,



gauges, labour and assistance, other than special or independent tests which he shall require to be made in his 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 the tests, the contractor shall bear the cost of carrying out such tests elsewhere.

## SECTION IX - PACKAGING & IDENTIFICATION

- 9.1 **Identification.** The pulley shall be legibly and indelibly stamped/marked with the manufacturer's name and "MAXI 1000 KG" on one lip and "R&DE (E), PUNE" on the other lip. This shall be achieved by providing necessary engraving in stamping dies.
- 9.2 **Packing.** The finished pulley shall be packed as follows.
- 9.2.1 Each pulley shall be packed in a small polythene pouch of suitable size made of polythene film strong enough to sustain a load of 200 gms.
- 9.2.2 The polythene pouch with the pulley shall then be put in a small cardboard box of required size. The size and shape of box to be decided by the Inspecting Authority in consultation with the contractor during the inspection stage.
- 9.2.3 The packaging of bulk quantity shall be at the discretion of the Inspecting Authority.
- 9.3 **Identification of Package.** The bulk packages shall have the reference of the contract particulars, date of manufacture, lot number and gross weight painted/stamped legibly on them alongwith the following information:-

- (a) Manufacturer's name  
(b) Description of material



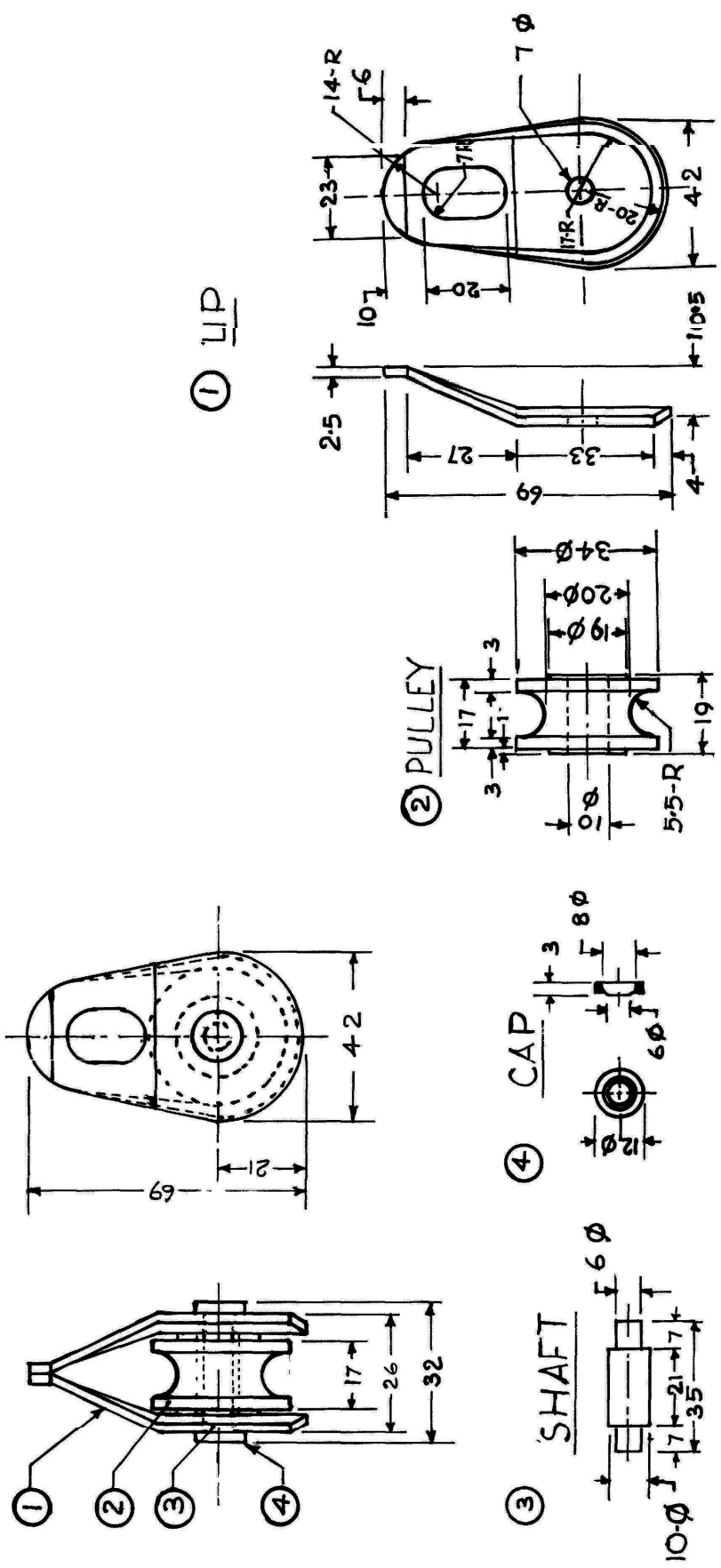
(AK BANDYOPADHYAY)  
JAG (NFSG)  
CONTROLLER

CONTROLLERATE OF QUALITY ASSURANCE (GENERAL STORES)  
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(M ULLAH)  
SSOI

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DCR/2/04  
(JASBIR SINGH)  
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(DR YADAV)  
JAG (NFSG)



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