Specification No CQA(GS)/US/476(a)
This superseds Spec No : CQA(GS)/US/476

Rijb
GO|GS-4

Government of India
Ministry of Defence
DGQA Organisation

Specification
for

DS Cat No. 3815-000102

ICE PITON 'F' TYPE

Controller
Controllerate of Quality Assurance (General Stores)
Department of Defence Production,
Ministry of Defence (DGQA),
Kanpur-208004

Issue: 2011

RECORD OF AMENDMENTS

Amendment Sr. No.	Date Dd / mm / yy	Details of Amendments	Amendment Carried out By & Date

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CONTENTS

0.0. **FOREWORD**:

0.1 This specification has been prepared by Controllerate of Quality Assurance (General Stores) Kanpur on behalf of Director General of Quality Assurance, Ministry of Defence, New Delhi.

0.2 This Specification supersedes the Specification No. CQA (GS)/US/476.

0.3 This specification shall be used to guide procurement, manufacture and Quality Assurance of the store for which it is intended.

0.4 The Quality Assurance authority for the store covered by this specification is the Controller, Controllerate of Quality Assurance (General Stores), Ashok Path, Kanpur-208004. Enquires regarding this specification related to technical or any other contractual condition shall be referred to the authority named in the purchase documents viz tender or contract.

0.5 This specification is a dynamic/live document and is therefore likely to undergo changes. Any major change in design should have the approval of general staff/users, financial concurrence in the form of DGQA approval. Therefore a specification issued holds good only for the supply order which specifically mentions this specification.

0.6 Copy of any other reference documents such as specification/drawing/ instruction/guides etc can be obtained on payment from the CQA(GS), Kanpur.

0.7 Wherever a reference to any other specification occurs in this specification, it shall be taken as a reference to the latest version of that specification.

1.0 **SCOPE**

1.1 This specification covers the requirements of Ice Piton 'F' Type and provides guidance to contractors/suppliers, manufacturers, Quality Assurance agencies and stockist, indentors etc.

1.2 This specification covers the material fabrication, manufacture, heat treatment, workmanship, quality control, inspection testing and packing for Ice Piton 'F' Type for high altitude war fare.

2.0 **RELATED SPECIFICATIONS/ DRAWINGS AND DOCUMENTS**

2.1 Drawing attached to this specification of Ice Piton 'F' Type forms a part of this specification. Any modifications suggested during the manufacture of pilot sample shall be incorporated in the drawing with prior approval of inspection authority.

2.2 All materials used in the manufacture of Ice Piton 'F' Type shall conform to the relevant Indian standard specification. Wherever these have not been specified relevant defence or other specifications as mentioned shall be applicable.

Sl No	Specification	Title/Subjects
(i)	IS:1572-1986 (Reaffirmed 2006) (Second Revision)	Electroplating coating of Cadmium on Steel
(ii)	IS:1068-1993 (Reaffirmed 2006) (Third Revision)	General tolerance for dimensions, form and position.
(iii)	IS:1757-1988 (Reaffirmed 2003) (Second Revision)	Method for Beam impact test (V Notch on steel)
(iv)	DEF-STAN 10-13/2	Special cold resistant steel produced by Mishra Dhatu Nigam Ltd. Hyderabad
(v)	MDN-172	Special cold resistant steel produced by Mishra Dhatu Nigam Ltd. Hyderabad.

2. 3 Copy of Indian Standard specifications referred above may be obtained from Bureau of Indian standards, Manak Bhawan, 9 Bahadur Shah Zafar Marg, New Delhi-110 011.

3.0 STANDARD PATTERN

Standard pattern of Ice Piton 'F' Type held by Controllerate of Quality Assurance (General Stores) Post Box No. 127, Kanpur, shall constitute the standard as regards any particulars or properties, not noted or defined in this specification.

4.0 GENERAL DESCRIPTION

4.1 Ice Piton 'F' Type governed by this specification is required for high altitude warfare. This is used as climbing aid for static and running belays in high altitude areas covered with snow/ice.

4.2 Ice Piton 'F' Type is a piece of metal designed to be hammered or screwed in ice and to be used as means of static belay, running belay or as an artificial aid for climbing. The piton consists of shank and head having a loop of such dimensions as to allow the passage of one or two Karabiners. The shank has got number of square shaped ribs along its length.

5.0 **MATERIAL**

5.1 The Ice Piton 'F' Type shall be manufactured out of special cold resistance steel C-55 as per DEF-STAN-10-13/2 or MDN-172

5.2 Test certificates of material from recognized Government approved labs shall be obtained showing physical and chemical properties, if the manufacturer does not have his own laboratory.

5.3 Material utilized for manufacture of the store shall be free from decarburization.

5.4 Firm shall submit the Purchase Invoice along with test certificate of the raw material. The details shall include name of manufacture unit/source and year of manufacture.

5.5 Steel of grade C-55 as per Defence Standard DEF-Stan-10-13/2

Chemical composition: For steel C-55 grade

C	-	025-0.40
Si	-	0.10-0.35
Mn	-	0.20-0.70
Ni	-	2.70-3.30
Cr	-	0.50-1.0
Mo	-	0.40-0.70
V	-	0.25 Max
S & P	-	0.015 Max each

Physical properties:

Proof stress – 86 kg/mm^2 (0.2% strain),
UTS - 102 kg/mm^2
Elongation - 10%

OR

For steel, MDN-172 of Midhani

C	-	0.33-0.40
Si	-	0.17-0.37
Mn	-	0.25-0.50
Cr	-	1.20-1.70
Ni	-	3.0-3.50
Mo	-	0.35-0.45
V	-	0.20 Max
S&P	-	0.15 Max each

Physical properties:

0.2% Proof Stress	-	92.96 kg/mm2
UTS	-	104 kg/mm2
% Elongation	-	18 to 20
% Reduction	-	66 to 68
CVN value at 40°c	-	27 Joules

6.0 PROCESSING/ MANUFACTURING

6.1 The Ice Piton 'F' Type shall be manufactured to the shape & design as shown in the relevant plate attached to this specification.

6.2 Ice Piton 'F' Type shall be manufactured from round bars of 25mm dia of 100mm length of steel C-55 as per DEF-STAN-10-13/2 or MDN-172 by forging adopting the following manufacturing processes:-

(a) Blanking
(b) Hot forging
(c) Trimming
(d) Machining
(e) Heat treatment
(f) Shot Blasting
(g) Cadmium coating

6.3 **Forging :** The maximum temperature of forging shall be restricted to 1150 deg C when the job is reduced to 25% or less, the finishing temperature shall be around 1100 deg C.

6.4 **Heat treatment**: After forging process, Ice Piton shall be subjected to heat treatment to attain a homogeneous hardness within the range of 350 to 450 HV.

6.5 **Hardening** : Now, the components shall be cooled to room temperature by sand cooling. The same shall be placed in furnace at a temperature of 400 deg C and kept there for two hours minimum. The temperature shall then be increased to 860±10 deg C gradually, in four and half hours. Retain the components at this temp for two hours and then remove from the furnace. Immediately quench in oil bath. Temperature of the oil bath shall be maintained at 80 deg C minimum. Any industrial oil may be used for quenching.

6.6 **Tempering**: Tempering process will start just after removal from oil-bath so that the temp of components may not go below 80 deg C. In no case, the components shall be allowed to dwell in room temperature for more than 4 hours. The components shall be charged into furnace at 350 to 400 deg C which shall be maintained for four hours. Now, the temperature of the furnace shall be raised to 650 deg C uniformly in four hours, increasing the temperature at the rate of 60 to 70 deg C per hour. Then, the components shall be removed from the furnace and allowed to cool in the air at room temperature.

7.0 TOLERANCES

7.1 Tolerance on dimensions of the components shall conform to 'Medium class' of IS:2102-1993, Part-I, (Re-affirmed 2003).

8.0 WORKMANSHIP AND FINISH

8.1 The workmanship and finish of the Ice Piton 'F' Type shall be of the high order and at par with those of similar equipment of sealed pattern held by AHSP.

8.2 Over the entire area, store shall be free from plating defects such as pits, bore spots, burrs, chipping, blister, dent marks, peeling of plating etc.

8.3 All the sharp edges shall be removed and store shall be free from such defects.

8.4 The Ice Piton 'F' Type shall be Cadmium electroplated and chromate passivated conforming to Fe/Cd/12 of IS:1572-86 (2nd Revision) Reaffirmed-1999.

9.0 QUALITY CONTROL

9.1 Quality control shall be exercised by adopting the procedures enumerated as under:-

(a) **Impact Test :** Sample Test Pieces from each lot of basic material i.e. Special Steel C-55 or MDN- 172 shall be prepared for Charpy "V" Notch Impact Test as per IS: 1757 and shall be subjected to same cycle of heat treatment as done in components. When these samples are subjected to impact test at minus 40 deg C, the same should yield 27 Joules minimum.

(b) **Hardness Test:-** The samples shall be tested for their hardness which shall be within the range of 350 to 450 HV.

(c) **Crack Detection Test** : Store shall be subjected to crack detection test before Plating, by adopting standard Non-destructive test method.

10.0 PRE-INSPECTION OF SUPPLIES BY THE PRODUCER

10.1 **Pre-inspection**:- Manufacturers/Contractors must satisfy themselves that the stores are in accordance with the terms of contract and fully conform to the required specification by carrying out a thorough pre-inspection of each lot before actually tendering the same for inspection to the Quality Assurance Officer nominated under the terms of contract. A declaration by the contractor that the necessary pre-inspection has been carried out on the stores tendered will be submitted along with the challan. The declaration will also indicate the method followed in carrying out the pre-inspection showing the features checked/tested and attach the test certificate to the challan.

10.1.1 Pre-inspection report will include the test result of performance test, material composition, hardness, crack detection test, impact test and plating thickness. Firm should submit the test certificates either from own laboratory or from Government approved laboratory.

10.1.2 If the Quality Assurance Officer finds that the pre-inspection of the consignment as required above has not been carried out, the consignment is liable for rejection.

10.2 **Advance sample** :
If required, the manufacturer shall submit five nos. of Advance samples (03 plated + 02 unplated) of acceptable quality, fabricated from specified material for approval by Controllerate of Quality Assurance (General Stores), Post Box No. 127, Kanpur, prior to commencement of bulk production.

11.0 QUALITY ASSURANCE

11.1 Examination of samples taken from any portion or the consignment or during surveillance inspection shall conform to the requirement when tested in accordance with this specification.

11.2 It shall be open to Government representative to inspect the store at any stage of manufacture, namely:-

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

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

11.3 The contractor shall afford at his own expense, the inspecting officer with reasonable 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 arrangement to facilaitate the same at his premises or any other connected place and the contractor shall arrange similar facilities at his own expense as regard any out-sourced process.

12.0 SAMPLING PROCEDURE

12.1 The supplier shall arrange the units of the homogeneous lot in such a way that all the units are easily accessible for the quality assurance officer to enable him to draw samples from any portion of the homogeneous lot.

12.2 Sampling shall be done by adopting appropriate sampling method as per IS:4905-1968 Amdt. No. 1 (Re-affirmed 2001) so that the samples drawn as per clause 13.0 for assessing various quality requirements, are truly representative of the lot.

13.0 SCALE OF SAMPLING

13.1 The number of sample units to be drawn for assessing the quality of the store, characteristic wise, should be in accordance with the sampling table for dimensions/non-destructive/visual inspection and for detailed laboratory testing.

14.0 CRITERIA FOR CONFORMITY

14.1 The Quality Assurance Officer shall draw samples as per IS:4905-1968 for dimensions/non destructive/visual examination to assess the quality of the lot. If the quality of the lot indicates conformity to the standard as laid down in sampling table, sampling for laboratory testing will be done. Otherwise the lot shall be straightway rejected.

14.2 Samples for laboratory testing shall be drawn as per sampling table and testing shall be carried out for physical and chemical parameters as per quantum of samples laid therein.

14.3 All the sample units as specified in sampling table are required to be tested/inspected irrespective of the rejection No. (=Ac+1) being achieved earlier.

14.4 Bulk Sentencing

14.4.1 If the laboratory test report indicates that the lot does not conform to the standard as specified in sampling table, the whole lot shall be rejected.

14.4.2 The lot shall be considered conforming to the specified quality, if the number of defective units observed is not more than the respective acceptance number of each class of defects.

14.4.3 When the sample size equals to the lot size, do 100% quality assurance.

14.4.4 Minor deviations in manufacturing details not affecting design, material, serviceability/functions, durability, end use or safety measures, may be granted by the Inspection Authority/Inspecting Officer.

14.5 Sampling and formation of lot

14.5.1 The delivery shall be visually inspected by the Quality Assurance Officer at the spot in the first instance to ascertain its homogeneity in respect of nature, size, shape, source and year of manufacture. If it is homogeneous, the delivery shall be treated as one lot. If not, it shall be segregated by the supplier into separate groups so that each group which is homogeneous within itself, forms a lot.

14.6 **Sampling Tables** Sampling plan AQL is 2.5% for visual inspection based on General Inspection level I and for Laboratory testing AQL is 1.5% as per details given in Table II .

TABLE I				TABLE II					
Lot Size	No. of sample to be drawn by sampling officer for visual examination.			Samples for laboratory testing					
				For Physical testing (S-4)			For Chemical testing (S-3)		
	Sample size.	Accep-tance No.	Rejec-tion No.	Sample size	Accep-tance No	Rejec-tion No.	Sample Size	Accep-tance No	Rejec-tion No.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Up to 50	5	0	1	5	0	1	3	0	1
51 to 90	5	0	1	5	0	1	5	0	1
91 to 150	8	0	1	8	0	1	5	0	1
151 to 280	13	0	1	13	0	1	8	0	1
281 to 500	20	1	2	13	0	1	8	0	1
501 to 1200	32	2	3	20	1	2	13	0	1
1201 to 3200	50	3	4	32	1	2	13	0	1
3201 to 10000	80	5	6	32	1	2	20	1	2

Note : (i) When the sample size equals or exceeds lot size, do 100% inspection/non-destructive testing with Zero Acceptance Number.

(ii)The rejection Number (Re) will always be one more than the Acceptance Number.

(iii) When lot size is more than 10,000 Nos the sample size shall be taken according to IS:2500(Pt-I)-1992 (2nd Rev).

TESTING REQUIREMENTS

14.7.1 **Physical Tests** : Design, shape, dimensions, weight, hardness and functional tests.

14.7.2 **Chemical tests** : Chemical Analysis, thickness of plating/coating and chromate passivation.

14.7.3 **Safety requirements for Pitons**: Pitons shall meet the safety requirements as per EN 568:2007.

14.7.4 **Performance test/Quality conformance inspection parameters**

14.7.4.1 **Inspection of Basic Material**

(a) Sample of all basic material as per the relevant standard.
(b) Basic material accepted based on test certificate from recognized laboratories submitted by the Contractor.
(c) Basic materials supplied by the Govt.
(d) Basic material procured by the contractor.
(e)Certificate from OEM about sourcing of specified grade & quality of material.

14.7.4.2 **Inspection of Toolings & Facilities**

(a) Ice Piton 'F' Type manufactured by using the tooling made by the contractor
(b) Jigs and Fixtures for machining.
(c) Test facilities as per Clause 6.0

14.7.4.3 **Equipment on the Shop Floor**

(a) Visual Inspection

(i) General appearance and finish.
(ii) Free from cracks & burrs
(iii) Rounding of corners.

(b) Dimensional Inspection

(i) Overall appearance and finish
(ii) Critical dimensions
(iii) Weight not more than 155 g.

14.7.4.4 **Heat Treatment**:

(a) Test pieces (3 Nos) for CVN testing as per IS:1757
(b) Heat treatment cycle (as per Section 5.0) for Ice Piton 'F' Type and test pieces.
(c) Hardness of the Ice Piton 'F' Type and that of the test pieces.
(b) Crack Detection will be checked in each lot.

14.7.4.5 **Functional Tests**

Five nos of Ice Piton shall be kept in environmental chamber at minus 40 deg C for five hours. When taken out and subjected to hammering by the moderate blow hammer 100gm, shall not break and develop cracks.

14.7.4.6 **Finishing**

(a) Quality of cleaning after heat treatment.
(b) Quality of cadmium coating as per electroplating conforming to Fe/Cd/12 of IS: 1572-1986 (2nd Rev.) Reafirmed-1999.

15.0 MARKING

15.1 Marking by the Supplier:

The store shall be indelibly and legibly marked with
(a) Manufacturer's name, initials or recognised trade mark.
(b) Year of Manufacture.

15.2 **Marking by the Quality Assurance Officer**

15.2.1 Each accepted store shall be legibly and indelibly marked using stencil plate or rubber/ steel stamp of letter size 6mm depending upon the size of the store.

15.2.2 In case where steel stamping or stenciling is not possible, the rubber acceptance mark shall be stamped on individually packages containing the items for this purpose. Each package shall be sealed by a continuous piece of gum-tape such that ends overlap each other. Acceptance mark shall be affixed on the joint of the tape-end partly covering the package.

15.2.3 Final rejection may be marked by Quality Assurance Officer by stamping the letter 'X' on both sides of the manufacturers marking, thus:

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16.0 **PACKAGING**

Packing Materials		Conforming to
(a) Polythene Film 0.04 mm thickness	-	JSS : 9330-2 & Supplementary Schedule No. CIGS/SS/313 (a)
(b) Boxes Rigid Collapsible Covered Type 'D'	-	JSS:8115-1 with Amdt. No. 1 and SS No. CIGS/SS/27 (e)
(c) Adhesive Paper Tapes	-	IS:4185-1989 and SS No. CIGS/SS/185 (b)
(d) Boxes Corrugated Fiber Board	-	IS:2771 (Pt-I)-1990 and SS No. CQA (GS)/SS/290
(e) Polypropylene Strapping (0.55mm thick x 12 mm width)	-	IND/GS/1683 (a)
(f) Label Carton 50mm x 25mm (0.89mm thick)	-	Unsealed Specn. No. CIGS/US/239
(g) Label Card Board 45 x 25mm with tie on tap	-	Average bursting strength 775 KPa based on at least five tests

16.2 **Method of Packaging**

16.2.1 Each Ice Piton 'F' Type shall be individually packed in polythene bag 25 No. These packs shall be kept in box rigid collapsible of suitable size. 10 such cartons shall be packed in Corrugated Fiber Board Boxes (7 Ply) of suitable size. Finally the Boxes shall be strapped suitably spaced at two places lengthwise and at two places width wise.

16.2.2 Each package shall be affixed with a Label Carton 50 x 25mm. The label shall be coated by varnish clear.

16.2.3 One item in each package shall be tied with a Label Card Board 45 x 25mm bearing DS Cat No. and nomenclature of the store.

16.2.4 Net mass of the Box Fibre Board Corrugated shall not exceed 40 Kg. In order to maintain the limit of mass, the number of items in the package may be altered at the discretion of the QAO.

16.3 **Marking on Package**

16.3.1 Each final package shall be legibly and indelibly marked as under:-

(a) **Front and Top**
- (i) DS Cat No. and nomenclature of the store.
- (ii) Qty. Packed preceded by the abbreviation 'QTY'.

(b) **Back**
- (i) Name & address of the consignee as given in the contract.
- (ii) Mass of the package in Kg.
- (iii) Number of the individual package and total number of the packages in the consignment i.e. 1of 4,2 of 4,3 of 4 and 4 of 4 when the consignment consists of 4 packages.

(c) **Left end**
- (i) Firm's name, initial or recognized trade mark.
- (ii) Month and year of packing
- (iii)I/Note No. & Date
- (iv) A/T, SO No. & Date
- (v) Delivery No. & Date.

17.0 TECHNICAL LITERATURE/DOCUMENTS

17.1 Illustrated Spare Parts List/ History sheet/maintenance manual shall be supplied with each store wherever required/ demanded.

18.0 WARRANTY

Except as otherwise provided in the invitation to the tender, the contractor/seller will declare that the goods/stores/articles sold/supplied to the purchaser under this contract shall be of the best quality and workmanship and new in all respect and shall be strictly in accordance with the specifications and particulars contained/mentioned in the contract.

18.2 The contractor/seller will take guarantee that the said goods/stores/articles would continue to conform to the description and quality aforesaid for a period of twelve months from the date of delivery of the said goods/stores/articles to the purchaser for 12 months from the date of shipment/dispatch from the contractor's work which is earlier and not withstanding the fact that the purchaser (Inspector) may have inspected and/or approved the said goods/stores/articles, if during the aforesaid period of 12 months the said goods/stores/articles, be discovered not to conform to the description and quality aforesaid or not giving satisfactory performance or have deteriorated and the decision of the purchaser in the behalf, shall be final and binding on the contractor/seller to rectify/ replace by acceptable goods/stores/articles, or such portion there of as is found to be defective by the purchaser in the discretion on the application made there of by the contractor/seller, and in such event the above mentioned warranty period shall apply to the goods/stores/articles rectified/replaced from the date of rectification/ replacement there of, otherwise the contractor/seller shall pay to the purchaser such compensations as determined by the purchaser as may arise by reason of the breach of the warranty therein contained.

19.0 **DRAWING PLATE:** Drawing Plate attached with this specification at page 16.

20.0 SUGGESTIONS FOR IMPROVEMENT

20.1 This specification is a dynamic/ live document and subject to change/updating. Any suggestions for improvement of this document may be sent to the Controller CQA (GS), P.B. No. 127, Kanpur.

16/5

Controller
Controllerate of Quality Assurance (General Stores)
Post Box Bo. 127
KANPUR-208004

02/5/2011

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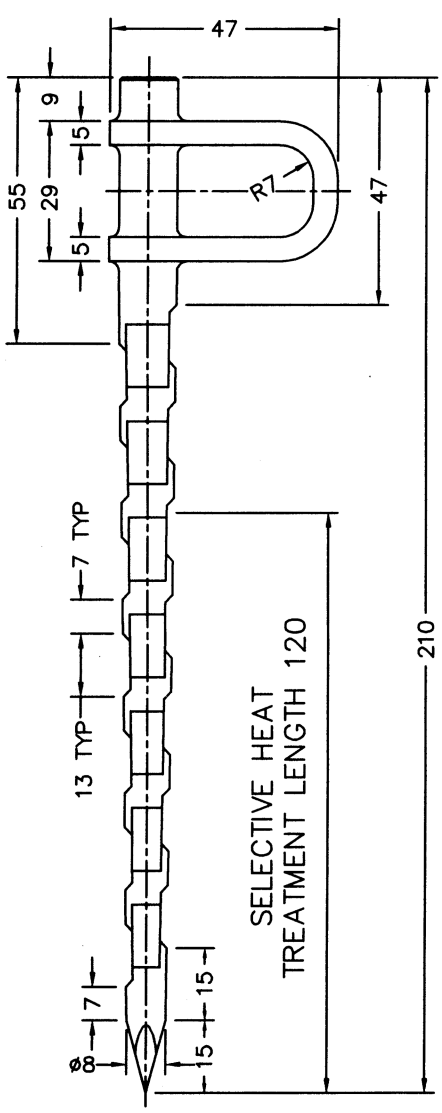
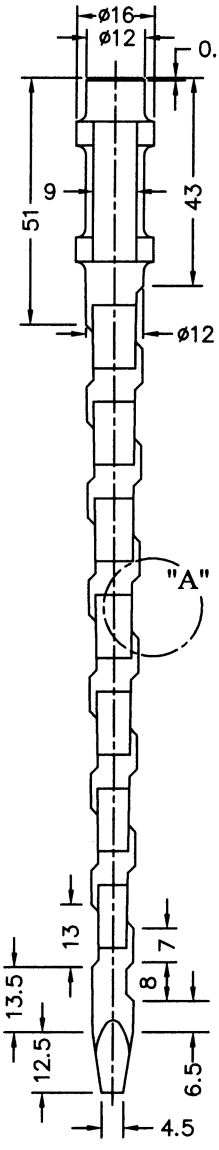
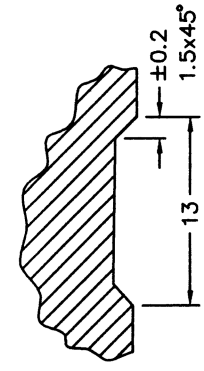
FRONT VIEW





DETAIL AT "A"

(ENLARGE VIEW)



NOTE:-

1.- HEAT TREATMENT AS PER SPECIFICATIONS.
2.- ITEM TO BE CADIMUM PLATED AS PER IS : 1572 -1960 DEPTH OF COATING AS PER TABLE 1.
3.- NET WEIGHT SHALL BE 140 Grm. APPROX.

Rejb
GO/GS-4
(RBSKushwaha)
JTO

	DATE	NAME
DGN.		
DRN.		P D ARYA
CHD.		P D ARYA
TRD.		
COMP.		

(I.B. KUNWAR)
JTO (D)

PASSED BY:- Rejb GO/GS-4

APPROVED BY:- DC/GS-4

SCALE : - - -

DS CAT NO. 3815-000102

ICE PITON 'F' TYPE

C.Q.A.(G.S.)
(MINISTRY OF DEFENCE)
KANPUR

ALL DIMENSION ARE IN MM

PLATE. ATTACHED TO SPECN. NO.-CQA(GS)/US/476 (a)

GS-9/61/2011