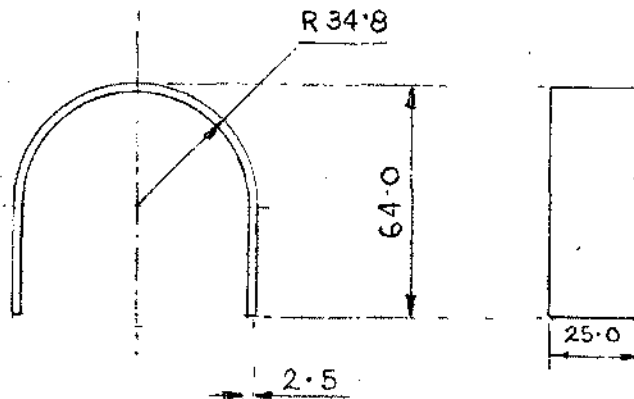


ALL DIMENSIONS CONFORM TO IS: 696
DIMAS ARE IN M.M. UNLESS OTHERWISE STATED

DET No. 18	SHTS. 6	SHTS. 4
DRG. No. ARDE 2122		

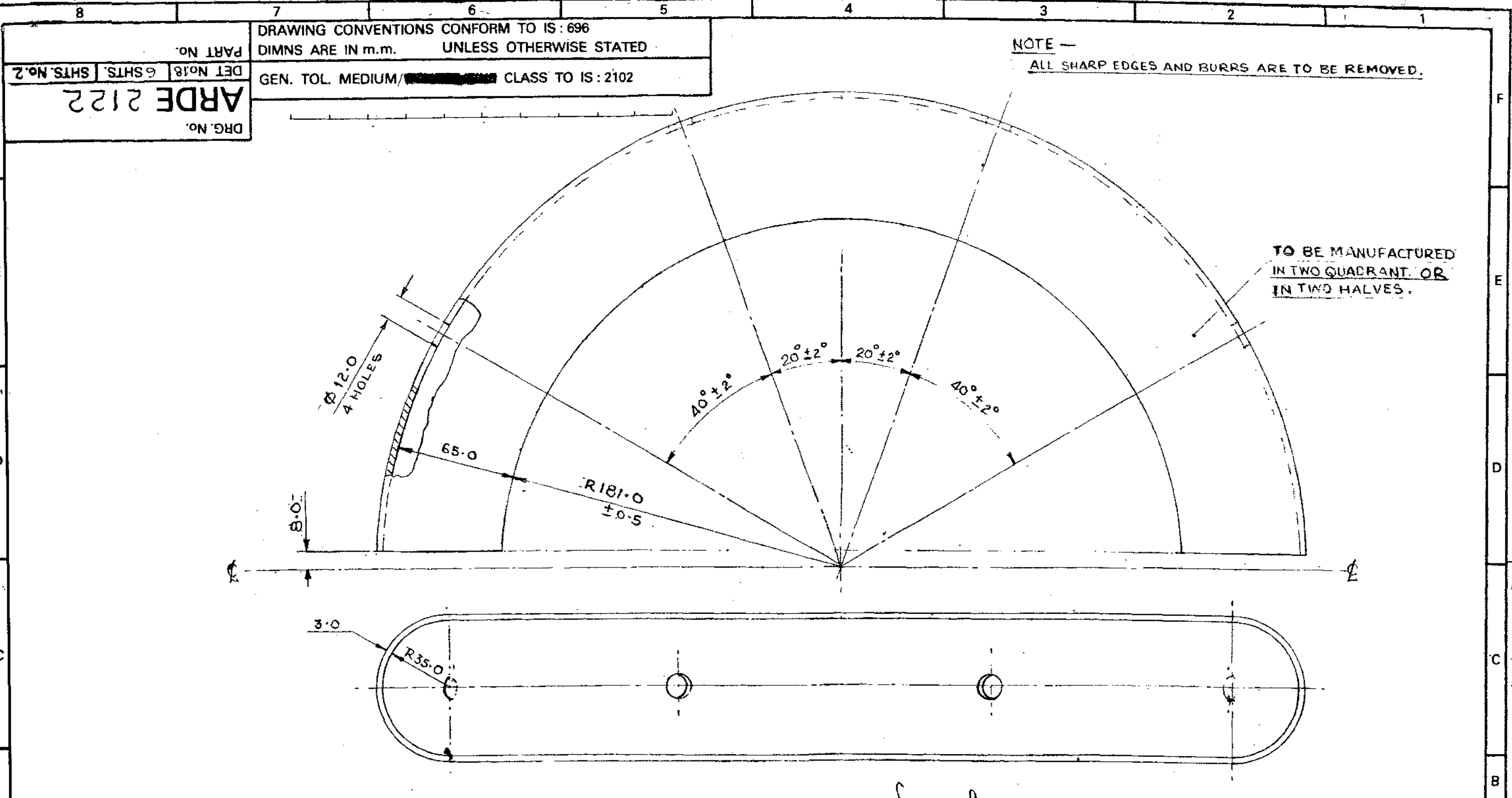
GEN. TOL. MEDIUM/CLASS TO IS: 2102



R. NO.	DATE:	AUTHORITY	BRIEF RECORD	ZONE	CD	GO
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DRN. <i>Handwritten</i>	CHD. <i>Handwritten</i>	TRD.	COMP.
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FOR DIRECTOR		GAUGE SCHD:	
DATE: 25-8-88		DESIGN AUTHORITY	
MATL: STEEL TO IS: 1079		ARDE PUNE - 411 021	
PROTECTIVE FINISH:			
TITLE:		DRG. No. ARDE 2122	
STRENGTHENING-PLATE-I		DET. No. 18 SHTS. 6 SHT.No. 4	
		PART No.	
		D. S. CAT. No.	
		A.H.S.P.	

1	2	3	4														
PART No.		DRAWING CONVENTIONS CONFORM TO IS: 898 DIMNS ARE IN m.m. UNLESS OTHERWISE STATED															
DET No. 20 SHTS.		GEN. TOL MEDIUM/CLASS TO IS: 2102															
DRG. No.																	
ARDE 2122																	
NOTE : ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.																	
PROTECTIVE FINISH ——— PHOSPHATED TO IS: 3618 CLASS 'B' AND TO BE PAINTED ONE COAT OF PAINT FINISHING (AIR DRYING) TO SPEC IS: 168 DEEP BRONZE GREEN TINT NO 224, TO SPEC IS: 5																	
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:10%;">R. NO.</td> <td style="width:15%;">DATE:</td> <td style="width:25%;">AUTHORITY</td> <td style="width:30%;">BRIEF RECORD</td> <td style="width:10%;">ZONE</td> <td style="width:10%;">CD</td> <td style="width:10%;">GO</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td colspan="2" style="text-align: center;">SIGN</td> </tr> </table>				R. NO.	DATE:	AUTHORITY	BRIEF RECORD	ZONE	CD	GO						SIGN	
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FOR DIRECTOR		EST MASS:	ARDE PUNE - 411 021														
		GAUGE. SCHD:															
DATE: 26.8.88																	
MATL: STEEL TO IS: 1079 St 34																	
PROTECTIVE FINISH: PHOSPHAT TO IS: 3618 CLASS 'B'		DRG. No.															
TITLE:		ARDE 2122															
		DET. No. 20 SHTS. SHT.No.															
		PART No.															
		D. S. CAT. No.															
CLAMPING PLATE		A.H.S.P.															
		25															



DRG. No. ARDE 2122				DET. No. 18				SHTS. 6				SHT. No. 2			
PART No.				GEN. TOL. MEDIUM/CLASS TO IS: 2102				DRAWING CONVENTIONS CONFORM TO IS: 696				DIMNS ARE IN m.m. UNLESS OTHERWISE STATED			
DRG. No. ARDE 2122				DET. No. 18				SHTS. 6				SHT. No. 2			
R. No.				DATE:				AUTHORITY				BRIEF RECORD			
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TITLE:				RING				ZONE				CD GO SIGN			
DRG. No. ARDE 2122				DET. No. 18				SHTS. 6				SHT. No. 2			
PART No.				D. S. CAT. No.				A.H.S.P.				19			

NOTE — ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.

TO BE MANUFACTURED IN TWO QUADRANT OR IN TWO HALVES.

DRG. No. ARDE 2122

DET. No. 18 SHTS. 6 SHT. No. 2

PART No.

D. S. CAT. No.

A.H.S.P.

19

1	2	3	4
PART No.		DRAWING CONVENTIONS CONFORM TO IS: 696 DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
DET No. 21	SHTS	GEN. TOL. MEDIUM/CLASS TO IS: 2102	
DRG. No.			

NOTE — ALL SHARP EDGES & BURRS ARE TO BE REMOVED.

AFTER PHOSPHATING APPLY ONE COAT OF PAINT FINISHING (AIR DRYING) TO IS: 168, DEEP BRONZE GREEN TINT NO 224, TO CONFIRM TO IS: 5. THREADS & SURFACES MARKED X X X TO BE FREE FROM PAINT & COAT WITH LUTING THIN MK-5 (APC-10) TO SPEC: JSS: 8030-15.

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APPROVED: <i>Handwritten</i>		EST MASS:	DESIGN AUTHORITY
FOR DIRECTOR		GAUGE SCHD:	ARDE PUNE-411 021
		DATE:	

MATL: STEEL TO IS: 2004: 20C8

PROTECTIVE FINISH: PHOSPHATED TO IS: 3618, CLASS 'B'

TITLE:

PLUG TRANSI

DRG. No.
ARDE 2122

DET. No. 21 | SHTS. | SHT.No.

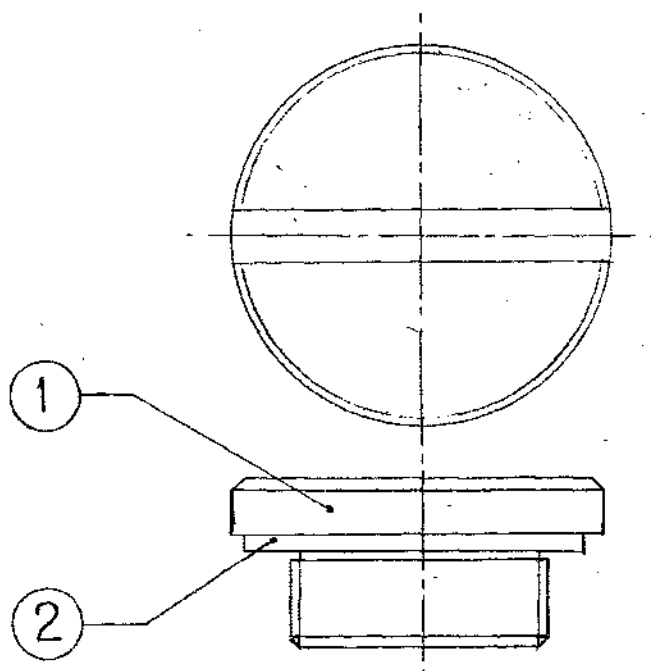
PART No.

D. S. CAT. No.

A.H.S.P.

1	2	3	4
PART No.		DRAWING CONVENTIONS CONFORM TO IS : 696 DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
DET No. 13		GEN. TOL. MEDIUM/COURSE/FINE CLASS TO IS : 2102	
SHTS. No.			
ARDE 2122			
DRG. No.			

LIST OF COMPONENTS						
ITEM NO	NOMENCLATURE	NO OFF	MATL	DRG. NO	DET. NO	PART. NO
1	PLUG.	1		ARDE 2122	14	
2	WASHER	1		" "	15	



R. NO.	DATE:	AUTHORITY	BRIEF RECORD	ZONE	CD	GO
					SIGN	

DRG SEALED (Rev) <i>ARDE Pune</i> <i>gpcat 20 Apr 90</i> <i>CRE(AA)</i>			
DRN. <i>ARDE Pune</i>	CHD. <i>ARDE Pune</i>	TRD.	COMP.
CD <i>ARDE Pune</i>	PASSED <i>ARDE Pune</i>	SCALE: 1:1	ASSY DRG. ARDE 2122/1
APPROVED <i>ARDE Pune</i>	FOR DIRECTOR	EST MASS:	DESIGN AUTHORITY
		GAUGE SCHD:	ARDE PUNE-411 021
		DATE: 31-3-89	
MATL:			
PROTECTIVE FINISH:		DRG. No.	
TITLE:		ARDE 2122	
		DET. No. 13 SHTS. SHT.No.	
		PART No.	
		D. S. CAT. No.	
		A.H.S.P.	

PLUG ASSY.

Master Set

(30)

313

RESTRICTED

ARDE/SPECN/491
(superseding specification
no. ARDE/SPECN/376)

Copy No. _____

Provisionally Sealed



123

भारत सरकार

Government of India

रक्षा मंत्रालय

Ministry of Defence

अनुसंधान तथा विकास संगठन

Research & Development Organisation

SPECIFICATION FOR MANUFACTURE, ASSEMBLY AND QUALITY ASSURANCE OF

HSLD 450 KG MC/HE A/C BOMB (EMPTY ASSEMBLY)

FOR BOTH CAST AND FORGED VERSIONS

पु. को. स. अनुभाग
Q. P. C. SECTION
आ. नि. जनरल प्रबन्ध
J. F. K. ABALPUR

Issued By

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ARMAMENT RESEARCH & DEVELOPMENT ESTABLISHMENT,
ARMAMENT POST, PUNE 411 021.

RESTRICTED

RESTRICTED

RESTRICTED

Master Set

ARDE/SPECN/491
(superseding specification
No. ARDE/SPECN/376)

Provisionally Scaled

SPECIFICATION FOR MANUFACTURE, ASSEMBLY AND QUALITY ASSURANCE OF

HSLD 450 KG MC/HE A/C BOMB (EMPTY ASSEMBLY)

FOR BOTH CAST AND FORGED VERSIONS

RESTRICTED

ARDE/SPECN/491
(superseding specification
No. ARDE/SPECN/376)

SPECIFICATION FOR MANUFACTURE, ASSEMBLY AND QUALITY ASSURANCE OF

HSLD 450 KG MC/HE A/C BOMB (EMPTY ASSEMBLY)

FOR BOTH CAST AND FORGED VERSIONS

0. FOREWORD

0.1 This specification is the property of the Ministry of Defence and must be returned to the Department/Agency from which it is received, immediately after the tender has been declined or on completion of the contract or on demand.

0.2 This specification or any other information issued in connection therewith may only be used for specific enquiries, tenders or orders placed by a competent authority on behalf of the Ministry of Defence. It is not to be used for any other purpose, whatsoever, without the express written sanction of the DTD&P (Air). Any enquiry regarding this specification should be addressed to the Inspecting Authority named in the tender or contract.

ISSUED BY :

The Director
Armament Research & Development Establishment
Research and Development Organisation
Ministry of Defence
Pashan, PUNE - 411 021

SEALED BY :

The Chief Resident Engineer (AIR ARMAMENT)
Resident Technical Office
Ministry Of Defence
Pashan, PUNE - 411 021

OBTAINABLE FROM :

The Director
Directorate of Technical
Development & Production (Air)
Ministry of Defence
DHD PO, NEW DELHI - 110 011

.....2.

1. SCOPE

1.1 This specification governs the manufacture, assembly and quality assurance of HSLD 450 Kg bomb (empty assembly) for both cast and forged versions of the bomb body. Conditions or clauses applicable for cast or forged version of the bomb body are brought out with specific reference to the version. Where such specific mention is not made, the applicable conditions or clauses shall be deemed to apply for both the versions of the bomb body.

1.2 This document also classifies production violations of dimensional and geometric features associated with individual components of this store, into critical, major and minor defects, and lays down methods of inspection.

2. DOCUMENTS

2.1 **Applicable document-** The following document of issue in effect on date of invitation for bids or request for proposal, or finalising the contract form a part of this document to the extent specified herein:

Drawing - ARDE/2122 - HSLD 450 Kg bomb (empty assembly)

2.2 Copies of drawing and specification required can be obtained from the agency mentioned under "Obtainable from" at para 0.2 or as directed by the contract.

3. REQUIREMENTS

3.1 This specification shall be read in conjunction with the drawing no. ARDE/2122 and the relevant contract requirements. All parts must be manufactured strictly in accordance with the limits and dimensions thereon and as required by this specification. Any question relating to the drawings or specifications should be referred to the Inspecting Authority mentioned in the contract.

3.2 No component/part shall be built up or repaired in any way not provided for by the drawings or this specification, unless authorised in writing by the Inspecting Officer or by any other agency authorised by him.

3.3 When the specification or drawing permits a choice or alternate materials, the manufacturer is required to notify the Inspecting Officer in writing which of the permitted alternative he chooses. If the choice of the alternative is changed during the course of the manufacture, the manufacturer shall obtain the prior permission of the Inspecting officer before such a change-over.

3.4 The contractor may subcontract the manufacture of sub assemblies or part thereof with the prior permission and approval of the Inspecting Officer.

3.5 Wherever specifications are quoted on the drawings or in this specification, the latest issues are implied, unless stated otherwise.

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- 3.6 A list of specifications referred to herein is given in Appendix "A" to this specification.
- 3.7 Unless otherwise stated in the contract, the contractor is also required to supply all paintings, varnishes, puttings and other preservatives called for on the drawings or in this specification.
- 3.8 Any sample which may be supplied to the contractor shall be taken as a general guide to assembly only and not as an indication of workmanship or dimension.

4. MATERIALS AND COMPONENTS

4.1 All materials used in the manufacture of the store shall comply with the requirements of the material specifications or properties quoted in the relevant drawings.

4.1.1 The material IT 906, conforming to the following shall be used for casting of the bomb body :

Chemical composition

Carbon	-	0.28 to 0.33
Silicon	-	0.30 (Maximum)
Manganese	-	1.30 to 1.50
Nickel	-	0.75 to 1.25
Chromium	-	0.60 to 1.00
Molybdenum	-	0.35 to 0.55
Sulphur & Phosphorous	-	0.03 (Maximum) each

Mechanical properties (After casting & heat treatment)

U.T.S.	-	100 Kgf/sq.mm (Minimum)
Y.S.	-	85 Kgf/sq.mm (Minimum)
Elongation	-	14 % (Minimum)
Izod Impact Value	-	3.0 m kgf (Minimum)
Hardness	-	300 TO 340 HB

(The Izod Impact value specified above is provisional and will be reviewed on availability of data for 50 bombs)

4.2 All materials used in the manufacture of the store must have been accepted as satisfactory by the Inspecting Officer before being taken into use. No mechanical work, heat treatment or other operation which may modify their physical properties must be carried out on the materials after they have been submitted for test, unless so required by the drawing or authorised by the Inspecting Officer.

4.3 Where materials to the specification called for cannot be obtained, materials to other specifications giving equivalent mechanical properties may be used if authorised in writing by the Inspecting Officer who may require alternative materials to be subjected to such additional tests as he may direct before acceptance. The Inspecting Officer shall permit such a change in materials or material condition in consultation with and with the approval of CRE(AA) & ARDE, PUNE.

Para 4.1.1 Last two lines deleted vide R.C.M.A Letter No. R.C.M.A(AA)/1440/47244, dt. 21 Sept. 98 E 98A V. 11

4.4 The Bomb shall consist of all the components listed in the schedule of parts supplied with the drawings no. ARDE/2122 and all must be supplied by the contractor unless otherwise stated in the contract.

5. MANUFACTURING PROCESS

5.1 General

5.1.1 Workmanship - Machined components are to be finish machined to conform to the surface finish and dimensions called for on the relevant drawings. All rags and burrs are to be removed as they are formed when cutting or drilling operations are carried out on components and assemblies.

5.1.2 Heat treatment - The heat treatment cycle to yield the required mechanical properties of the components shall be established based on sample test specimen, manufactured out of material specified for the component. The heat treatment cycle, once found to be satisfactory, shall be finalised and frozen for the entire period of the contract. No change in the heat treatment cycle shall be made without permission of the Inspecting Officer. Minor variation, if required, in the heat treatment parameters to account for the permissible variation of the chemical composition of the raw material shall be finalised in consultation with the Inspecting Officer. No component shall be heat treated more than ~~once~~ ^{Three times}. Repeated heat treatment shall be resorted to with the permission of the Inspecting Officer who may, in addition to rechecking of the raw material composition of the concerned component, look into the heat treatment cycle as a whole before giving such permission.

5.1.3 Welding

5.1.3.1 Welding fixtures - Suitable welding fixtures are required to be used for welding of assemblies. The welding fixtures are required to be designed with utmost care with the approval of the Inspecting Officer for locating and welding these components without any distortion to obtain geometric tolerances specified in the drawing.

5.1.3.2 Fusion Welding - All fusion welding shall be carried out by the metal arc process as per IS: 9595. All welding operators shall have been checked and approved according to Section 4 of IS : 817 as competent to carry out welding with the material shown in the drawings to produce consistently high quality welds. The welders shall also undergo 'Periodic Control Test' at regular intervals of six months in case the duration of the contract exceeds six months. All fusion welding shall be carried out in such a manner as to ensure that the welds are of good, clean metal, free from cracks, gas holes, slag inclusions and all other impurities. The surfaces of the welds shall have an even contour and regular finish and shall indicate proper fusion with and penetration of the parent metal. Welds showing cracks or cavities or blow holes may be rectified with the approval of the Inspecting Officer.

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2 Cast bomb body

2.1 The bomb body for the cast version shall be cast in one piece out of the material mentioned in the relevant drawing.

2.2 Machining - The external shape of the bomb body shall be finish machined as per relevant drawing. Owing to slender shape of the bomb body, internal machining to obtain the required profile has been found to be difficult and time-consuming. It is, therefore, recommended that the bomb body be cast in such a way as to require no internal machining at all. The machining allowance required to be provided on the cast bodies shall be the minimum possible to give the finished dimensions and fettled, dressed and cleaned.

2.3 Shot/sand blasting - The interior of the bomb body, when cast in such a way requiring partial machining or no machining at all, shall be thoroughly cleaned by shot/sand blasting. No shot/sand blasting is required to be done for bombs whose full length of the internal profile is obtained by machining. The interior of the bomb body, in all cases, shall be free from irregularities, discontinuities of profile (except those of the lug housings) or surface defects. Minor surface defects which do not lead to local weakening of the shell are permissible. Surface defects, if any, shall be rectified by welding with the consent of the Inspecting Officer as per para 5.2.4 .

2.4 Repair by Welding - Repair of welds shall be carried out by competent operators, duly approved by the Inspecting Officer. Only electrodes which deposit metal of the same general properties as the parent metal shall be used. All surfaces to be welded shall be cleaned from scale, dirt, paint, heavy rust or other surface deposits. Where necessary to obtain a crack free weld the casting shall be re-heated to a temperature of 250 deg.C +/- 10deg.C. All slag shall be thoroughly removed from welds and ground to give a smooth finish without discontinuities or steps. Great care must be taken not to reduce the wall thickness in the dressing operation. Welded bomb body shall be stress relieved at a temperature of 250 deg.C +/- 10 Deg. The quality and acceptability of the repair by welding shall be adjudicated by the Inspecting Officer whose decision on these matters shall be final. Weld repairs upto maximum of 20 leaking holes may be permitted. One blow hole of size upto 12 mm dia and 5 mm depth on those portion can also be weld repaired. Maximum depth upto which the grinding is permitted for weld repair shall not exceed 1/3rd of the wall thickness at that point. However, bombs with more than 4 leaking holes within a circle of radius 25 mm shall not be repaired and are to be rejected.

2.5 Heat treatment - All bomb body castings shall be heat treated prior to machining, to achieve the mechanical properties specified at para 4.1.1. above. The bomb bodies shall be stress relieved after machining and welding of lug housing plate by re-heating to a temperature of 250 deg c. +/- 10 deg.C with sufficient soaking time to give uniform temperature throughout the body, followed by cooling in still air.

3 Forged bomb body

3.1 Forging - The sections, Front, Mid and Rear, shall be forged out of the specified material and machined internally to

.....6.

dimensions as per relevant drawings. The steel for forging shall be made by the open hearth process (acid or basic) or an electric process (acid or basic).

5.3.2 Welding- The Bomb body shall be fabricated by welding of the three sections as per relevant drawing and in accordance with the welding procedure laid down in IS : 9595, by means of manual arc/semi-automatic/automatic welding using covered electrodes. The sections shall have edges prepared as per Single V butt weld (without backing) as per Appendix 'B' of the above IS specification. However, the requirements for preheating to avoid hydrogen cracking shall be based on the equivalent carbon content, weld deposit diffusible hydrogen content given by the consumables, combined thickness and arc energy. These parameters, once finalised subject to the welding approval tests brought out below, shall be frozen and strictly adhered to for subsequent welding operations for fabrication of the bomb body. No change in any of the parameters shall be made without the permission of the Inspecting Officer. When change is required to be made in the welding procedure to account for the variation in chemical composition of the raw material and changes in the consumables' properties, the change shall be finalised in consultation with and with the approval of the Inspecting Officer.

5.3.2.1 Approval tests for welding procedures shall be made on test pieces cut from a pair of sheets. Each sheet shall measure 350 mm x 100 mm and thickness 12 mm. The test pieces shall be forged from the same material stock as that of the bomb sections and heat treated in the same way to the same hardness as that of the bomb sections and then subjected to the approval tests as per IS : 7307 (Part I). The required approval tests and the relevant IS specification for the method of testing are given below:

Approval tests

Specification

- | | |
|---|--------------------|
| (a) Transverse tensile test | IS : 3600 (Part 3) |
| (b) All-weld tensile (longitudinal) test | IS : 3600 (Part 4) |
| (c) Transverse root and face bend tests | IS : 3600 (Part 5) |
| (d) Longitudinal root and face bend tests | IS : 3600 (Part 7) |
| (e) Transverse side bend test | IS : 3600 (Part 6) |

The number of test specimen shall be one each for above tests. For tensile tests, the diameter of the test specimen shall be 5.64 mm and the parameters, tensile strength, yield stress, percentage elongation after fracture and percentage reduction of area, shall be checked. All these parameters shall record values at least equal to 95% of the corresponding values for the bomb section material in the heat treated condition. For all bend tests, the angle of bend shall be 120 degrees and the test piece shall not exhibit any evidence of cracks or impending cracks in the weld region.

5.3.3 Heat treatment- The welded bomb body shall be heat treated to obtain the required hardness/mechanical properties.

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5.3.4 Machining - Three forged sections shall be machined internally as per the drawing dimensions. The external contour (of the bomb body) shall be finish machined as per relevant drawing after welding and heat treatment.

5.3.5 On completion of heat treatment, welding, machining & stress relieving as applicable, the bomb body shall have the form and dimensions shown on the drawing.

5.4 Lug Housing Plate - The lug housing plate assembly shall be close fit from inner side of bomb body. The top surface of the housing must be flush to the bomb body surface. The lug housing plate assy shall be welded from out side the bomb body by the electric arc process. An approved welding fixture shall be used to achieve alignment etc. as per the drawing and shall be approved by Inspector. Local pre-heating of bomb body to a temperature of 250 ± 10 deg.C shall be done for stress relieving.

5.5 Lug Housing, Filling Plug & Nose Plug - All the housings, filling plug and nose plug shall be forged and machined to the form and dimensions as on the respective drawings. Alternatively, these components may be manufactured from forged bars/plates with the prior approval of the Inspecting Officer. All flats must be rounded off. After heat treatment the internal and external screw threads must be within the limits and fits given on the drawing.

6. QUALITY ASSURANCE PROVISIONS

6.1 General - The contractor shall offer free of charge all the specimen/test pieces, duly machined, if required, for testing/checking of raw materials and arrange testing/checking of these specimen/test pieces at the testing agency duly approved by the Inspecting Officer. When finished or partly finished stores or components are expended or damaged in tests, re-tests or examinations as stipulated in the specification or elsewhere as a condition of acceptance, the contractor supplying the stores will be required to supply, replace or repair, free of charge, the stores so damaged or expended which become the property of the Government.

6.2 Responsibility of contractor - The contractor shall undertake cent per cent inspection of the items before offering the same to the Inspecting Officer for acceptance, and maintain detailed records. Contractor's documentation shall include details of raw material source, its mechanical properties and chemical composition. The document shall be comprehensive including the entire raw material flow history with details of succeeding operations performed on it at his various production facilities. It is the responsibility of the prime contractor to ensure maintenance of such document by his subcontractor(s), if subcontracting is resorted to. Such document shall be made available for scrutiny of the Inspecting Officer on demand.

6.2.1 Submission of items/store- At the time of submitting each completed lot of item for acceptance of the Inspecting Officer, the contractor shall supply the following information accompanied by a certificate attesting that the information provided is correct and applicable to the items/store being submitted.

- (a) A statement that the lot complies with all of the quality assurance provisions specified in this and applicable documents.
- (b) A statement that all the materials purchased by the contractor meet the requirements and that certificates of conformance are available for review/scrutiny.
- (c) A statement that only the material, bonded and cleared by the Inspecting officer, is used for the lot of items being offered and that no deviation/change in the approved process of manufacture has been made.
- (d) No. of items in the lot.
- (e) Date submitted.

The certificate shall be signed by a responsible agent of the contractor.

6.2.2 The contractor may also submit items with dimensional and geometric deviations for concessional acceptance by the Inspecting Officer. When such request is made, the contractor shall submit along with the details of items and related deviations, causative factors, already identified by him, leading to such deviations along with the details of remedial action. He shall also provide a guarantee that such concessional acceptance shall not be sought by him subsequently. However, the acceptance of deviated components will depend on the discretion of Inspecting Officer.

6.3 Formal acceptance of material or components, by the Inspecting Officer, shall not relieve the manufacturer of his responsibility for any parts which may subsequently prove to be defective. If the material or components from batches accepted after inspection prove to be subsequently defective during examination or assembly, the manufacturer shall undertake to replace the defective material or components free of cost.

6.4 Gauges and fixtures- During all stages of manufacture and assembly, all components shall be subjected to examination, gauging and, where necessary, testing. The contractor shall supply at his own cost all the necessary gauges as listed in Appendix 'C' and necessary test fixtures as required by this specification. He shall also offer central facilities for inspection of components, if manufactured by various sub-contractors.

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- 6.5 If, on examination of 20% of a delivery, it is found that 25% of the number examined depart from the approved design, further examination will be suspended and the whole quantity returned to the contractor.

7 TESTING

7.1 Raw Material- The entire raw material required for manufacture of the store shall be procured, as far as possible, at a stretch and offered for acceptance of the Inspecting Officer. These materials shall be subjected to the appropriate tests given in the material specifications quoted on the drawing. The method of preparation of the test pieces and method of testing shall comply with the conditions laid down in the relevant specifications.

7.2 Casting

7.2.1 Material - At the commencement of each production batch, the Inspecting Officer may, at his discretion, require full chemical composition of the material taken from the crucible or ladle from which the casting are poured. The number and type of test sample shall be agreed upon between the Inspecting Officer and the contractor but after satisfactory control of the material has been achieved, such tests may be omitted at the discretion of the Inspecting Officer.

7.2.2 Mechanical tests

7.2.2.1 Three sets of two test pieces for checking tensile and Izod tests shall be taken from each melt representing the beginning and end of each cast or of each batch. Test samples shall be cast attached to or separate from the bomb body as agreed to between the Inspecting Officer and the Contractor. When test samples are cast attached to the bomb body they shall not be detached from the castings until heat treatment has been completed or until they have been stamped to identify them with the melt to which they relate.

7.2.2.2. Where test samples are cast separately, these shall be cast in the moulds of the same material as is used for the bomb body castings and shall be made at the same time as the castings and run from the same ladle. When cold and before heat treatment they shall be stamped to identify them with the melt to which they relate. Test bars shall be heat treated with the castings they represent.

7.2.2.3 Two sets of test pieces, one representing the beginning and the other, the end of casting, shall be subjected to both tensile and Izod tests. The tensile tests shall be carried out on test pieces conforming to the dimensions of Indian Standards Test Piece, or of one of the subsidiary round test pieces, in accordance with the requirements of B.S. 18 "Tensile Testing of Metals". Izod impact tests shall be in accordance with the requirements laid down in B.S. 131 "Forms of Notched Bar Test Pieces". If any one of the test pieces fails to meet the specified tensile strength, elongation or Izod values, the balance set of

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test pieces shall be subjected to tensile and Izod tests as mentioned above. If any one the test piece fails to meet the specified strength, elongation or Izod value the batch represented by the test pieces shall be rejected.

7.2.3 Crack Detection - On completion of heat treatment, welding and machining etc but before any finishes are applied each bomb body shall be checked for the presence of cracks by magnetic crack detection method. The bomb bodies having presence of cracks are to be rejected.

to specification IS: 3703

7.3 Forging

7.3.1 Material - The raw material shall have the chemical composition, and the minimum mechanical properties (ultimate tensile strength - 100 kgf/sq.mm, yield strength - 85 kgf/sq.mm, hardness of 300-340 HB as per the relevant specification quoted in the drawing. Testing of raw material stock, both for chemical and mechanical properties, may be undertaken at any time during period of forging as an in-process check on raw material quality.

7.3.2 Welding

7.3.2.1 Test Pieces - Two test pieces, each measuring 350mm x 100mm x 12mm thick from the forging stock of material shall be taken and welded along with the every alternate bomb during bomb welding. The test pieces shall be subjected to radiographic examination for checking the soundness of the welding prior to heat treatment and subsequent tensile test. The data, thus generated shall be used to assess the quality of the welding in the bomb bodies. These test coupons shall be subjected to heat treatment as per recommended schedule. Two tensile test pieces shall be cut as per IS : 7307 (para 1) and IS : 3600 (part I). The diameter of the test specimen shall be 5.64mm. One test piece shall be subjected to tensile test as per standard procedures and the parameters, tensile strength, yield stress, percentage elongation after fracture and percentage reduction of area, shall be checked. All these parameters shall record values at least equal to 95% of the corresponding values for the bomb section material in the heat treated condition. If the second specimen fails to meet the criteria, the bombs represented by the test specimen shall be rejected.

1 annex IS: 1182

7.3.2.2 Bomb Body - When all the welding operations are completed, each bomb body shall be subjected to liquid penetrant test as per IS : 822 and IS : 3658 for detection of surface defects such as surface cracks and blow holes, along the welded surface. The test shall be carried out on all bomb bodies as soon as all welding operations are completed. All the bomb bodies shall be free from the above surface defects. If any one bomb body exhibits surface defect on its welded portions, the bomb body shall be rectified by rewelding with the approval of the

Amended vide RCMA letter No. RCMA(AA)/1440/4/Tech dt 21 Sep 98
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Inspecting Officer and submitted for liquid penetrant test, as before for the surface flaws mentioned above.

7.4 Hardness Test - Hardness tests shall be carried out on each finished bomb body irrespective of the method of manufacture until the Inspector is satisfied that acceptable and uniform results are being obtained. The number and location of the points on each bomb body shall be at the discretion of the Inspector and shall be sufficient to check variation in hardness with change of section along the bomb body. This number should not exceed normally six per bomb body.

7.5 Pressure Test - After completion of all heat treatment, welding, machining etc, but before any finishes are applied, each bomb body shall be subjected to a hydraulic pressure test of 4 kg/sq.cm for five minutes when no leakage must be seen.

7.6 Other components - All the components having hardness values specified in drawings shall be subjected to the hardness test.

7.7 Proof Loading of Lugs - After stress relieving and before any finishes are applied, the lug housing plate assembly welded to the bomb body shall be subjected to the proof load given on the drawings. The load shall be tensile in nature and shall be applied slowly by approved means. The reaction points on the bomb body shall be designed to avoid any local high loads. The adapter used for proof loading of lug housing shall have the same mechanical properties of the lug housing and shall have matching thread profile and fit. Great care must be taken not to damage the screw threads during this test. There must not be any sign of weld failure or appreciable permanent set of the lug housing due to the load applied.

7.8 Weight & C.G - The weight and centre of gravity position of each bomb body shall be checked and shall lie within the limits given on the drawing.

8. Finishes

8.1 Care must be taken to apply only the appropriate finishes to the surfaces specified on the drawings and to exclude all metal spray, bitumen, paint or varnish from screw threads etc., which are required to be free from such finishes.

8.2 Surface Preparation - All components to be metal sprayed, painted, coated with bitumen or varnish shall be made perfectly clean, dry and free from grease, scales, dust or other foreign matter. Removal of grease shall be either by burning in a degreasing furnace at 250 deg C or by using an approved organic solvent. Removal of scales and oxides shall be by blasting with a suitable abrasive grit.

8.3 Metal spraying - The surface to be metal sprayed shall be prepared and coated with ZINC in accordance with the requirement of Appendix 'B'. The thickness of ZINC coating at any one point shall be 0.1. to 0.2 mm. The spraying shall be automatically controlled and metal spraying pistols of an approved type only shall be used. Great care must be taken not to damage or coat screw threads etc. which are specified to be free from finishes.

8.3.1 The thickness and adhesion test specified in Appendix 'B' shall be carried out on first lot 100% and later on may be reduced at the discretion of the Inspector. Any damage to the ZINC coat resulting from tests shall be rectified by respraying.

8.4 Phosphate Treatment Where phosphate treatment is specified a process approved in accordance with specification IS - 3618 class B should be used.

8.5 Varnishing The whole of the internal surface of the bomb body shall be coated with varnish stoving ammunition to specification no. IND/ME/674 (b). While applying the varnish particular care shall be taken to ensure that all joints and crevices are sealed, and the coatings shall be free from thin patches, tears, air bubbles and ripples, to the satisfaction of the Inspecting Officer. Coating of varnish shall not be thicker than 0.25 mm.

8.6 Painting- All painting operations shall be carried out under clean and dry conditions. Condensations of moisture before and during painting operations must be avoided and draughts and dust excluded. The under-coat must be thoroughly dry before the finishing coat is applied. The resultant finish must match the relevant standard of colour and must present a smooth surface free from brush marks, thin patches and other blemishes. Undue accumulation of paint at any point and tears and blobs must be avoided. All screw threads and the surfaces indicated on the drawing must be free from paint. The paint to be used should conform to IS: 168, tint NO.224

9. Marking, Packing & Supply - The supply of bomb body (empty assembly) will comprise of the complete assembly as per drawing no. ARDE/2122 including all components thereof.

9.1 Rolling rings to drawing no. ARDE/2122 Det. 17 shall be used with the bomb body before despatch of empty bombs from contractors works.

9.2 After completion of assembly and all finishes, label as shown in the drawing shall be fixed to the filling plug in the position by the method shown in the relevant drawing.

9.3 The bombs shall be transported in such away as to avoid damage to the painted surface of the bomb body.

9.4 Bomb bodies will normally be supplied in lots of quantity 50 each.

10. APPROVAL FOR INITIAL PRODUCTION

10.1 The manufacturer shall submit a detailed process sheet indicating check points/test stages with gauges, instruments and test set-up proposed to be provided by the manufacturer for approval by the Inspecting Officer before commencement of bulk production.

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10.2 The Contractor shall also submit one complete unit as per Drawing No. ARDE/2122 manufactured by full production tools, jigs and fixtures, to the Inspecting Officer for approval before bulk production is proceeded with. Such approval shall not be given until the store has been examined by the Inspecting Officer specified in the contract. No further production may be undertaken by the Contractor until this approval is given.

10.3 The initial production samples are required to undergo all tests/examinations as explained in paras above. When tests are carried out and the store submitted fails to meet the test conditions, the Contractor may submit additional samples for further tests and the whole cost of all such tests shall be borne by the Contractor.

Prayer
3/5/93
(R. PERUMAL)
Scientist 'D'
Group In-charge

APPROVED
Shah
3 May 93
Air Cde
(R. N. SHAH)
Head of the Division
(Air & Navy)

PROVISIONALLY SEALED

S R Kulkarni
3 May 93
Air Cde
(S R KULKARNI)
CHIEF RESIDENT ENGINEER (AA)

.....14.

LIST OF SPECIFICATIONS:

SR NO.	SPECN NO.	BRIEF NOMENCLATURE
1.	IS - 5	Colours for ready mixed paints & enamels
2.	IS - 168	Ready mixed paint, air drying, semi - glossy / matt, for general purposes
3.	IS - 410	Cold rolled brass sheet, strip & foil
4.	IS - 676	Code of practice for general engg. drgs
5.	IS - 813	Scheme of symbols for welding
6.	IS - 814	Covered electrodes for metal arc welding of structural steel
7.	IS - 1079	Hot rolled carbon steel sheet & strip
8.	IS - 1363	Hexagon head bolt.
9.	IS - 1369	Dimensions for Screw thread runouts & undercuts
10.	IS - 1570	Steel specified by IS. & or YS.
11.	IS - 1573	Electroplated coatings of Zinc on iron & steel
12.	IS - 2004	Carbon steel forgings for general Engg. purposes
13.	IS - 2016	Plain washer - steel.
14.	IS - 2102	General tolerances for dimensions & form & position
15.	IS - 2269	Hexagonal socket head cap screw.
16.	IS - 3063	Single coiled rectangular section spring washers for bolts, nuts and screws.
17.	IS - 3618	Phosphate treatment of iron and steel for protection against corrosion
18.	IS - 4218	ISO metric screw threads
19.	IS - 5517	Steel for hardening & Tempering
20.	IS - 6094	Hexagonal socket set screw.
21.	IS - 9595	Metal arc welding of carbon & carbon manganese steel
22.	IS - 18	Method for tensile testing of metals
23.	IS - 131	Methods for notched bar tests
24.	IS - 220	Specification for ingot Zinc (Replaced by IS 3436)
25.	IS - 243	Specification for Linseed oils (Replaced by IS 6900)
26.	IS - 970	Specification for wrought steels for mechanical & allied Engg. purposes
27.	IS - 1580	Unified Screw Threads.
28.	IS - 3436	Specification for ingot Zinc
29.	IS - 4174	Self tapping screw & metallic drive screw
30.	IS - 6900	Specification for raw, refined & boiled linseed oils for paints & varnishes
31.	IND/ME/674(b)	Varnish stoving Ammunition
32.	IND/ME/884	Valcanised chloroprene rubber compounds (Neoprene Rubber)
33.	JSS-8010-28	Varnish stoving APC-221
34.	JSS-8030-9	Mineral Jelly
35.	JSS-8030-14	Cement RD-1192K Ammunition (APC-2)
36.	JSS-8030-15	APC-10
37.	JSS-9150-03	Grease ZX-30
38.	DID-392-A	Grease ZX-30 (Replaced by JSS-9150-03)
39.	IT-906	Alloy steel casting of Armour plates
40.	IS-9595	Recommendation for Metal Arc welding of Carbon & Carbon Manganese steels
41.	IS-3600	Method of testing fusion welded joints & weld metal in steel.
42.	IS - 7307	Approval tests for welding procedures.
43.	IS - 822	Code of procedure for inspection of welds.
44.	IS - 3658	Code of practice for liquid penetrant flaw detection

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REQUIREMENTS & TESTS FOR SPRAYED METAL COATING

1 Surface Preparation

B.1.1 The surface after preparation shall be free from grease, rust, scale or other foreign matter and shall provide an adequate key for the subsequent sprayed metallic coating. The surface shall be obtained by shot blasting or sand blasting. Only clean, sharp, angular grit shall be used uncontaminated with paint, grease, etc. Residual grit from the grit blasting operation shall be removed from the surfaces, for e.g. by dry compressed air, before spraying.

B.1.2 The prepared surface shall be comparable in roughness with reference surface produced in accordance with para 8 below.

B.1.3 The sprayed coating shall be applied as soon as possible after surface preparation. If visible deterioration as compared with a freshly prepared surface has occurred, then surface preparation shall be repeated.

B.2 Coating Metal- The composition of the Zinc to be sprayed shall comply with the requirements of BS 3436 Grade B (99.9 percent purity) but the copper content shall not exceed 0.05 percent.

B.3 Method of Application

B.3.1 The coating shall be applied to clean and dry surface prepared in accordance with para.1, by means of an approved metal spraying pistol.

B.3.2 The surface of the sprayed coating shall be of uniform texture free from lumps and coarse areas.

B.3.3 To provide some safeguard against excessive oxidation, the coating applied shall exhibit a bright metallic lustre when lightly burnished.

B.3.4 If it is necessary to apply a further coating to achieve the specified thickness great care must be taken that there is no contamination or corrosion of the previous coating. The thickness of the coating shall be measured by means of a magnetic or electro-magnetic thickness meter approved by the Inspector, the calibration of which has been checked against a known similar thickness of coating within an accuracy of ± 10 percent before and after the test. The effect of the measurements of modifications of the magnetic field associated with the shape and thickness of the article shall be taken into account when checking the calibration of the instrument.

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B.4 Adhesion

B.4.1 The sprayed metallic coating shall fulfil the requirements of the test described below.

B.4.2 Using a straight edge and hardened steel scriber ground to a sharp 30 deg. point, two parallel lines shall be scribed at a distance apart equal to ten times the average coat thickness. In scribing the two lines enough pressure shall be applied on each occasion to cut through the coating to the basic metal in a single stroke. If, at the second cut, any part of the coating between the lines breaks away from the basic metal, it shall be deemed to have failed the test.

B.5 Preparation of Reference Surface

B.5.1 The basic metal shall be a flat piece of steel not less than 1/4" thick and having a hardness of the same order as the bomb body. An unbroken surface shall be grit blasted in accordance with the details given below, until a uniformly rough clean surface has been attained and maintained without visible change for at least 25 per cent of the total blasting time.

ABRASIVE	- Chilled iron grit No. 24
AIR PRESSURE	- Not less than 2.5 kg/sq cm (30 lbs/sq in.)
NOZZLE DIAMETER	- Not exceeding 12.7mm (1/2 inch.)
NOZZLE POSITION	- At right angles to and about 228.6mm (9 inches) from the surface.

NOTE: For components with hardness in excess of 350 BHN it may be necessary to replace the chilled iron with alumina or similar hard abrasive.

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APPENDIX 'C'

DEFECT CLASSIFICATION LIST
AND
INSPECTION SCHEDULE
FOR HSLD 450 KG MC/HE A/C BOMB

COMPONENT :- BOMB BODY MACHINING

DRG.NO.ARDE/2122
DET 3.

Sl. No.	Drawing Dimensions	Zone	Classification of Defect	Recommended method of Inspection
1.	Dia 88.20 + 0.5 - 0.0	D 8	Major	Gauge
2.	0.25 Con	E 8	Major	Gauge
3.	M70 x 3 - 6H	D 8	Critical	Gauge *
4.	53.4 + 0.5	E 8	Major	Gauge
5.	13.0 +/- 0.2	E 8	Major	Gauge
6.	Dia 69.90 + 0.5 - 0.0	D 8	Major	-
7.	R 50.0	D 8	Minor	-
8.	L 795	E 7	Major	Gauge
9.	14.0	E 6	Critical	Gauge
10.	L1767+4	F 6	Major	Gauge
11.	917	E 7	Major	Gauge
12.	530	E 5	Minor	Gauge
13.	204	E 4	Minor	Gauge
14.	14".00 +/- 0.03"	E 5	Critical	Gauge
15.	250 +/- 0.5	E 5	Critical	Gauge
16.	R 2520 +0, -3.5	E 7	Minor	Gauge
17.	R 1992 +0, -9.0	E 6	Minor	Gauge
18.	25.0	E 7	Critical	Gauge
19.	Dia 66+0.5	E 5	Major	Gauge
20.	90 Deg.	E 5	Minor	Gauge
21.	0.0	E 4	Critical	Gauge
22.	Dia 360.0-0.5	D 4	Major	Gauge
23.	0.0	E 4	Critical	Gauge
24.	R 153	E 4	Minor	Gauge
25.	R 1009	E 3	Minor	Gauge
26.	Dia 240 + 0.5 - 0.0	D 3	Major	Gauge
27.	R 4	D 3	Minor	-
28.	123	E 3	Minor	Gauge
29.	101.6 +1.0	D 8	Major	Gauge
30.	45 Deg	E 3	Major	- do -
31.	35	E 3	Minor	As per drawing
32.	30 Deg	E 3	Major	As per drawing
33.	32+0.5	D 3	Minor	Gauge
34.	202.5 + 1.00	D 3	Major	Gauge
35.	303 + 0.0 - 0.4	D 3	Major	Gauge

* "NO GO" Thread gauge, entering up to 3 threads permitted.

*****18.

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Critical

Major

D 5

P 5

Add the following after SI No.56 :-

57.	58.
	

36. 345.0	D 3	Major	-
37. 20.0+0.2	D 3	Major	Gauge
38. 35.0 ± 1.00	D 3	Major	-
39. 0.25 (Concentricity)	C 3	Major	As per
40. 6.4	E 1	Minor	Gauge
41. 22 Deg .30 Min.	E 1	Minor	Gauge
42. 219 ± 0.2 PCD	D 1	Major	Gauge
43. 45 Deg.	D 1	Major	Gauge
44. 220.0 ± 1.0			
-0.0	D 1	Major	Gauge
45. 6.5 ± 0.5	D 2	Major	Gauge
46. Dia 11.0 ± 0.2	D 2	Minor	Gauge
47. Dia 6.8 ± 0.2	D 2	Minor	Gauge
48. 10.16	F 2	Minor	Gauge
49. Body wt. 209 ± 10			
Kg	C 7	Critical	-
50. 5.0. 836 ± 12, -18	C 7	Critical	-
(From nose)			
51. 115 ± 3	E 8	Minor	Gauge
52. 11.25 D	F 3	Minor	As per
53. 1 x 45 Deg.	D 3	Minor	-
54. 2 x 45 Deg.	D 3	Minor	-
55. Surface finish :			
inside 25 microns	A 8	Minor	-
outside 3.2 microns	A 8	Major	-
56. 15.0	E 6	Critical	Gauge

COMPONENT : PLATE

DRG. NO. ARDE/2122
DET-5

Sl. No.	Drawing Dimensions	Zone	Classification of Defect	Recommended method of Inspection..
1.	R 160	E 8	Major	Gauge
2.	R 35	D 1	Minor	Gauge
3.	R 5	E 5	Minor	Gauge
4.	Dia 65.0 ± 0.5	E 2, E3, E 6	Major	Gauge
5.	250.0 ± 0.1	E 4	Critical	Gauge
6.	14.00 ± 0.03"	E 4	Critical	Gauge
7.	52 Deg ± 30 Min.	D 2, D3, D6	Minor	-
8.	26.0	E 1	Major	-
9.	21.0	E 7	Major	-
10.	10.2 ± 0.2	E 7	Major	-
11.	460	E 4	Minor	-
12.	85.0	C 1	Major	-
13.	52.0 ± 0.1	E 2	Major	-
14.	0 Deg. 24 Min.	E 3	Major	-
15.	Perpendicularity 0.05	E 7	Major	-

.....19.

COMPONENT : LUG HOUSING

DRG.NO.ARDE/2122
DET-6.

Sl. No.	Drawing Dimensions	Zone	Classification of Defect	Recommended method of Inspection
1.	M 45X2-6H	C 3	Critical	Gauge
2.	dia 64.95 $\pm$ 0.05	C 3	Major	-
3.	36.5 $\pm$ 0.2	B 4	Major	Gauge
4.	26.0 $\pm$ 0.2	B 3	Major	Gauge
5.	10.2-0.2 +0	B 2	Major	Gauge
6.	R 5	B 2	Minor	Gauge
7.	52deg.-0 Deg. 30 min.	B 2	Minor	Gauge
8.	1.5 X 45 deg.	B 2	Minor	-
9.	2.0 U/C	B 3	Minor	-
10.	Perpendicularity 0.05	C 4	Major	-

COMPONENT : NOSE PLUG

DRG.NO.ARDE/2122
DET.7

Sl. No.	Drawing Dimensions	Zone	Classification Of defect	Recommended method of Inspection
1.	2.0"-12UNS-1A	D 5	Critical	Gauge
2.	dia 60.0-0.3	D 6	Major	Gauge
3.	101.8 +0, -0.2	C 3	Minor	-
4.	dia 47.6	D 7	Minor	-
5.	dia 44.3-0.4	D 6	Major	-
6.	122.0	E 7	Minor	-
7.	3.0(U/c)	C 7	Minor	-
8.	25.4	C 6	Minor	-
9.	69.9-0.2	E 6	Minor	Gauge
10.	14.0	C 6	Minor	Gauge
11.	R 10.0	D 8	Minor	Gauge
12.	R 1.0	D 6	Minor	-
13.	2.5	E 4	Minor	-
14.	8.0	E 4	Minor	-
15.	1X 45 deg.	D 6	Minor	-

COMPONENT : PLUG FOR LUG HOUSING

DRG.NO.ARDE/2122
DET.8

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	M 45x 2-6g	A 3	Major	Gauge
2.	22.0	B 3	Minor	Gauge
3.	4 X 6 deep	B 3	Minor	-
4.	M 14 X 2-6H	B 3	Major	Gauge

RESTRICTED

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COMPONENT : RING NUT

DRG.NO. ARDE/2122
DET.9

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	219.0 + 0.2 - 0.2	D 6	Major	Gauge
2.	M 200 X 3-6H	D 7	Critical	Gauge
3.	Dia 239.0+0 -0.5	D 7	Major	Gauge
4.	30.0 - 0.5	E 7	Major	-
5.	20.0	C 7	Minor	-
6.	15.0	C 7	Minor	-
7.	5 x 45 deg.	C 3	Minor	-
8.	M 6	C 3	Minor	-
9.	219+0.1 PCD	D 4	Major	Gauge

COMPONENT : FILLING PLUG

DRG.NO. ARDE/2122
DET 10

Sl. No.	Drawing Dimension	Zone	Classification of defect	Recommended method of Inspection
1.	M 70x3 -6 H	D 3	Critical	Gauge
2.	M 200 x 3 - 6 g	D 3	Critical	Gauge
3.	Dia 202.0 - 0.5	D 2	Major	Gauge
4.	Dia 262.0 - 0.2	D 5	Minor	-
5.	Dia 221.0 - 0.1	D 5	Minor	-
6.	Dia 170.0 -	D 5	Minor	-
7.	Dia 102.0	D 4	Minor	-
8.	20.0+0.5	D 4	Minor	-
9.	10.0	D 4	Minor	-
10.	48.0	E 1	Minor	-
11.	34.0	E 1	Major	Gauge
12.	47.0	C 1	Minor	-
13.	21.0	C 1	Minor	-
14.	63.0	C 4	Minor	-
15.	R 12.7	D 2	Minor	-
16.	R 10	D 2	Minor	-
17.	R 0.5	C3,D4	Minor	-
18.	Concentricity 0.3	C 2	Major	-
19.	7.5	D 2	Minor	-
20.	3.5 U/C	D 1	Minor	-

COMPONENT : CONTAINER EXPLODER

DRG.NO. ARDE/2122
DET:-11

Sl. No.	Drawing Dimensions	Zone	Classification of Defect	Recommended method of Ins.
1.	257.3 + 0.8	D 7	major	Gauge
2.	247.1 + 0.5	D 7	Minor	Gauge
3.	M 70x3 -6G	E 6	Critical	Gauge
4.	M6	E 2	Minor	Gauge

.....21.

RESTRICTED

RESTRICTED

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6. 20.341.0	F 6	Minor	Gauge
7. 8.7	F 5	Minor	Gauge
7. 4.6 +/- 0.5	E 5	Minor	Gauge
8. 45 deg.	E 6	Minor	-
9. Dia 6.0	E 2	Minor	Gauge
10. Dia 57.1 +/- 0.5	E 8	Minor	-
11. 1.5 R +/- 0.5	E 8	Minor	Gauge
12. 5.0 R +/- 1.0	E 8	Minor	Gauge
13. Dia 45.3 +0.5	E 7	Major	Gauge
14. Dia 66.3 + 0.5	E 6	Major	Gauge
15. Dia 51.2	E 6	Minor	Gauge
16. Dia 66.7	E 5	Minor	-
17. 0.8 R	E 5	Minor	-
18. 2.0"-12UNS-1B	E 5	Critical	Gauge
19. Dia 61.0 + 0.2	E 5	Minor	Gauge
20. Dia 86.6 - 0.5	E 4	Major	Gauge
21. 4.6 +/- 0.5	E 3	Minor	-
22. 1 x 45 deg	E 5	Minor	-
23. 4.6 +/- 0.5	E 2	Minor	-
24. 12.7	D 5	Minor	-
25. 53.1 +/- 0.5	F 5	Minor	-
26. 1 x 45 deg	E 6	Minor	-
27. R 38.1	E 4	Minor	Gauge
28. 45 deg	F 4	Major	Gauge
29. Dia 8.0	F 2	Minor	Gauge
30. 73.0 +/- 0.1 PCD	F 2	Minor	Gauge
31. 25.4	D 8	Minor	-
32. Dia 47.0	C 8	Minor	-
33. 45 deg	C 8	Minor	-
34. R 0.8	D 5	Minor	-
35. 30 deg	D 5	Minor	-
36. Concentricity 0.3	D 4	Critical	-
37. Concentricity 0.3	D 5	Critical	-

COMPONENT : DETONATOR HOLDER

DRG. NO. ARDE/2122

DET.12

Drawing Dimensions	Zone	Classification of defect	Recommended method of Ins.
1. Dia 43.5 +/- 0.5	D 8	Minor	Gauge
2. Dia 32.3 +/- 0.5	D 8	Major	Gauge
3. Dia 8.7 + 0.2	D 8	Minor	Gauge
4. R 0.8	D 7	Minor	Gauge
5. R 1.5	D 7	Minor	Gauge
6. 2.0"-12UNS-1A	E 7	Critical	Gauge
7. Dia 35.3 (u/c)	D 7	Minor	-
8. 4.6 +/- 0.5	D 6	Major	Gauge
9. 69.8 +/- 0.5	C 7	Minor	-
10. 74.4 +/- 0.5	C 7	Minor	-
11. 16.5 +/- 0.7	C 6	Minor	-
12. Dia 47.6	C 6	minor	Gauge
13. 5.00	C 6	Minor	-
14. 1x45 deg	E 6	Minor	Gauge
15. 4.6 +/- 0.5	E 6	Minor	-
16. 8.6	E 6	Minor	-
17. 25.4 +/- 0.5	E 6	Major	Gauge

.....22.

RESTRICTED

RESTRICTED

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10. H35.179.1 34.950	D 6	Critical	Gauge
11. 14 TPI Whit. Worth form			
12. Dia 44.5	D 5	Minor	Gauge
13. Dia 55.5 -0.3	D 5	Minor	Gauge
14. Con. 0.2	E 5	Critical	Gauge
15. PCD 40.3 +/-0.1	C 4	Minor	Gauge
16. R 26.2	E 4	Minor	Gauge
17. 15 deg.	E 6	Minor	-

COMPONENT : PLUG

DRG.NO. ARDE/2122

DET. 14

Sl.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	dia 51.0 0 -0.2	B 3	Minor	-
2.	6.4	B 3	Minor	-
3.	5.0	B 2	Minor	-
4.	1.5 x 45 deg.	C 2	Minor	Gauge
5.	23.0	C 2	Major	Gauge
6.	15.3+0.3	C 2	Major	Gauge
7.	H34.925.L 34.696	B 2	Critical	Gauge
8.	14 TPI Whit. Worth Form			
9.	3.0 D/C	B 2	Minor	-

COMPONENT : WASHER FOR D.H.

DRG.NO. ARDE/2122

DET. 15

Sl.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	Dia 47.5	C 3	Minor	-
2.	Dia. 38.5	B 3	Minor	-
3.	2.0	C 2	Minor	-

COMPONENT : BASE TRANSIT

DRG.NO. ARDE/2122

DET. 16

Sl.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	dia 360.0-1.0	D 4	Minor	-
2.	dia 306.5+0.5	D 4	Minor	-
3.	303.5 + 0.5	D 4	Major	Gauge
4.	24.2	C 2	Minor	-
5.	14.0 + 0.2	D 2	Major	Gauge
6.	63.5	B 4	Minor	-
7.	6.5 X 45 deg.	C 4	Minor	-
8.	6 X 45 deg.	B 3	Minor	-
9.	M 12 X 1.75	D 1	Major	Gauge

.....23.

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COMPONENT : RING WELDING ASSY.

DRG.NO.ARDE/2122

DET.18 SHT.NO.1.

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	400.0 $\pm$ 0.5	C 5	Minor	Gauge
2.	3.0	D 6	Minor	-
3.	3.0	D 4	Minor	-
4.	100.0	C 3	Minor	Gauge

COMPONENT : RING

DRG.NO.ARDE/2122

DET.18. SHT. 2

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	R 101.0 $\pm$ 0.5	D 5	Major	Gauge
2.	B.0	D 7	Major	Gauge
3.	dia 12.0	D 7	Minor	-
4.	40 deg $\pm$ 2 deg.	D 5	Minor	-
5.	20 deg $\pm$ 2 deg	D 4	Minor	Gauge
6.	65.0	D 6	Major	-
7.	3.0	C 7	Major	Gauge
8.	R 35.0	C 7	Major	Gauge

COMPONENT:- PLATE

DRG. NO. ARDE/2122

DET.18 SHT.NO.3.

Sl. No.	Drawing Dimensions	Zone	Classification	Recommended method of inspection.
1.	132.0	B 2	Minor	-
2.	100.0 $\pm$ 0.5	C 2	Major	Gauge
3.	3.0	B 2	Minor	-
4.	R=16.0	C 1	Minor	-
5.	Dia. 9.0	C 1	Minor	-

COMPONENT :- STRENGTHENING PLATE

DRG. NO. ARDE/2122

DET.NO.18.SHT.NO.4.

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of inspection
1.	2.5	B 2	Minor	-
2.	25.0	C 3	Minor	Gauge
3.	64.0	C 3	Minor	Gauge
4.	R 34.8	C 3	Minor	Gauge

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COMPONENT :- RING WELDING

DRG. NO. ARDE/2122

ASSEMBLY (Two halves)

DET.18. SHT.NO.5

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of inspection
1.	400.0 +/-0.05	C 5	Major	Gauge
2.	100.0	C 3	Major	Gauge
3.	3.0	D 6	Minor	Gauge
4.	3.0	D 4	Minor	Gauge
5.	90 deg.	D 2	Minor	-

COMPONENT :- STRENGTHENING PLATE-II

DRG. NO. ARDE/2122

DET.NO.18.SHT.NO.6

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of inspection
1.	22.0	C 7	Minor	Gauge
2.	4.0	C 7	Minor	Gauge
3.	3.0	E 7	Minor	Gauge
4.	R 243.0	D 5	Minor	Gauge

COMPONENT : COVER PLATE

DRG.NO.ARDE/2122

DET.19

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	50.0	E 8	Minor	-
2.	10.0	E 6	Minor	-
3.	R 8.0	E 6	Minor	-
4.	250 +/-1.0	D 5	Major	Gauge
5.	270.0	D 4	Minor	Gauge
6.	3.0	E 2	Major	Gauge
7.	R 10.0	D 3	Minor	Gauge
8.	310.0+2.0	C 5	Major	Gauge
9.	540.0+2.0	C 5	Major	Gauge
10.	36.0+1.0	C 2	Minor	-
11.	24.0	D 2	Minor	-
12.	R 10.0	D 3	Minor	-

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RESTRICTED

COMPONENT : CLAMPING PLATE

DRG.NO.ARDE/2122
DET.20

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	540	C 2	Minor	-
2.	R 12.0	C 4	Minor	-
3.	dia 9.0	C 4	Major	-
4.	3.0	B 4	Minor	-

COMPONENT : PLUG TRANSIT

DRG.NO.ARDE/2122
DET. 21

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	dia 70.0	C 1	Minor	Gauge
2.	80.0	A 2	Minor	Gauge
3.	50.0	B 2	Minor	Gauge
4.	10.0	B 2	Minor	-
5.	14.0	B 2	Major	Gauge
6.	dia 30.0	C 2	Major	Gauge
7.	2 x 45 deg.	C 2	Minor	-
8.	H 34.925, L 34.696 14 TPI Whit Worth Form	C 3	Critical	Gauge
9.	8.0	C 4	Minor	-
10.	3.0	C 4	Minor	-
11.	dia 102.0 -0.5	C 4	Major	Gauge

COMPONENT :- BOMB BODY MACHINING
FORGED VERSIONDRG.NO.ARDE/2122
DET 41 SHT 1

Sl. No.	Drawing Dimensions	Zone	Classification of Defect	Recommended method of Inspection
1.	Dia 88.20 + 0.5 - 0.0	D 8	Major	Gauge
2.	0.25 Con	E 8	Major	Gauge
3.	M70 x 3 - 6H	D 8	Critical	Gauge *
4.	53.4 + 0.5	E 8	Major	Gauge
5.	13.0 +/- 0.2	E 8	Major	Gauge
6.	dia 69.90 + 0.5 -0.0	D 8	Major	-
7.	R 50.0	D 8	Minor	-
8.	L 795	E 7	Major	Gauge
9.	14.0	E 6	Critical	Gauge
10.	L1767+4	F 6	Major	Gauge
11.	917	E 7	Major	Gauge

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12. 530	E 5	Minor	Gauge
13. 284	E 4	Minor	Gauge
14. 14".00+/- 0.03"	E 5	Critical	Gauge
15. 250 +/- 0.5	E 5	Critical	Gauge
16. R 2520 +0, -3.5	E 7	Minor	Gauge
17. R 1992 +0, -9.0	E 6	Minor	Gauge
18. 25.0	E 7	Critical	Gauge
19. Dia 66+0.5	E 5	Major	Gauge
20. 90 Deg.	E 5	Minor	Gauge
21. 8.0	E 4	Critical	Gauge
22. Dia 360.0-0.5	D 4	Major	Gauge
23. 8.0	E 4	Critical	Gauge
24. R 158	E 4	Minor	Gauge
25. R 1009	E 3	Minor	Gauge
26. Dia 240 + 0.5 - 0.0	D 3	Major	Gauge
27. R 4	D 3	Minor	-
28. 123	E 3	Minor	Gauge
29. 101.6 +/- 1.0	D 8	Major	Gauge
30. 45 Deg	E 3	Major	- do -
31. 35	E 3	Minor	As per drawing
32. 30 Deg	E 3	Major	As per drawing
33. 32+0.5	D 3	Minor	Gauge
34. 202.5 + 1.00	D 3	Major	Gauge
35. 303 + 0.0 - 0.4	D 3	Major	Gauge
36. 345.0	D 3	Major	-
37. 20.0+0.2	D 3	Major	Gauge
38. 40.0 + 1.00	D 3	Major	-
39. 0.25 (Concentricity)	C 3	Major	As per drawing
40. 6.4	E 1	Minor	Gauge
41. 22 Deg .30 Min.	E 1	Minor	Gauge
42. 219 + 0.2 PCD	D 1	Major	Gauge
43. 45 Deg.	D 1	Major	Gauge
44. 220.0 +1.0 -0.0	D 1	Major	Gauge
45. 6.5 +0.5	D 2	Major	Gauge
46. Dia 11.0+/-0.2	D 2	Minor	Gauge
47. Dia 6.8 + 0.2	D 2	Minor	Gauge
48. 10.16	F 2	Minor	Gauge
49. Body wt. 209 +/-10 Kg	C 7	Critical	-
50. C.G. 836 +12, -18 (From nose)	C 7	Critical	-
51. 100 +/- 3	E 8	Minor	Gauge
52. 11.25 D	F 3	Minor	As per drawing
53. 1 x 45 Deg.	D 3	Minor	-
54. 2 x 45 Deg.	D 3	Minor	-
55. Surface finish :			
inside 6.3 microns	A 8	Minor	-
outside 3.2 microns	A 8	Major	-
56. 15.0	E 6	Critical	Gauge

* "NO GO" Thread gauge, entering up to 3 threads permitted.

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COMPONENT : FRONT SECTION

DRG.NO.ARDE/2122
DET. 41 SHT 3

Sl. No.	Drawing Dimensions	Zone	Classification of defect	Recommended method of Inspection
1.	101.6 + 1.0	D 8	Major	Gauge
2.	88.2 + 0.5	D 8	Major	Gauge
3.	13.0	D 8	Major	Gauge
4.	M 70X3-6H (IS 4218)	C 8	Critical	Gauge
5.	53.4 + 0.5	D 8	Major	Gauge
6.	100.0 + 3.0	E 8	Minor	Gauge
7.	R 50.0	C 7	Minor	---
8.	69.9 + 0.5	D 7	Major	---
9.	795.0	E 6	Major	Template
10.	457.0	E 6	Major	Template
11.	R 2520.0 + 0-3.5	E 6	Minor	Template
12.	R 1992.0 + 0-9.0	D 6	Minor	Template
13.	Concentricity 0.25	C 7	Major	-----
14.	0 333.6 +0.5	C 4	Major	GE
15.	50	E 4	Major	GE
16.	Surface finish 6.3 inside	F 3	Major	Gauge

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COMPONENT : MIDDLE SECTION

DRG.NO.ARDE/2122  
DET. 41 SHT 4

| Sl. No. | Drawing Dimensions           | Zone | Classification of defect | Recommended method of Inspection |
|---------|------------------------------|------|--------------------------|----------------------------------|
| 1.      | Dia 333.6+1.5-0              | D 8  | Major                    | GE                               |
| 2.      | Dia 344 +1.5-0               | D 4  | Major                    | GE                               |
| 3.      | Concentricity<br>0.25        | C 3  | Major                    | ---                              |
| 4.      | Length 764                   | E 6  | Major                    | Gauge                            |
| 5.      | Surface finish<br>Inside 6.3 | F 3  | Major                    | Gauge                            |

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RESTRICTED

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COMPONENT NAME SECTION		DRG. NO. ARDE/2122 DET. 41 SHT 5	
Sl. No.	Feature	Classification of defect	Recommended method of Inspection
1.	Dia 38.0 ± 0.05 H 8	Major	Gauge
2.	R 150	Minor	Gauge
3.	Dia 110.0 ± 0.05 H 8	Minor	Template
4.	Dia 38.0 ± 0.05 H 8	Major	---
5.	H 8.0	Major	---
6.	Dia 38.0 ± 0.05 H 8	Major	GE
7.	22.0 ± 0.05 H 8	Minor	GE
8.	Concentricity 0.20	Major	GE
9.	H 0.2	Major	GE
10.	20.0 ± 0.05 H 8	Major	Gauge
11.	20.0	Major	Gauge
12.	6.5 ± 0.05 H 8	Major	Gauge
13.	Dia 6.5 ± 0.05 H 8	Major	Gauge
14.	Concentricity 0.1	Major	---
15.	Dia 11.0 ± 0.05 H 8	Minor	---
16.	22.0 ± 0.05 H 8	Major	GE
17.	PCD 21.0	Major	Gauge
18.	22 deg 30 min 10	Minor	---
19.	Surface Finish Inside 6.3	Major	---

03/05

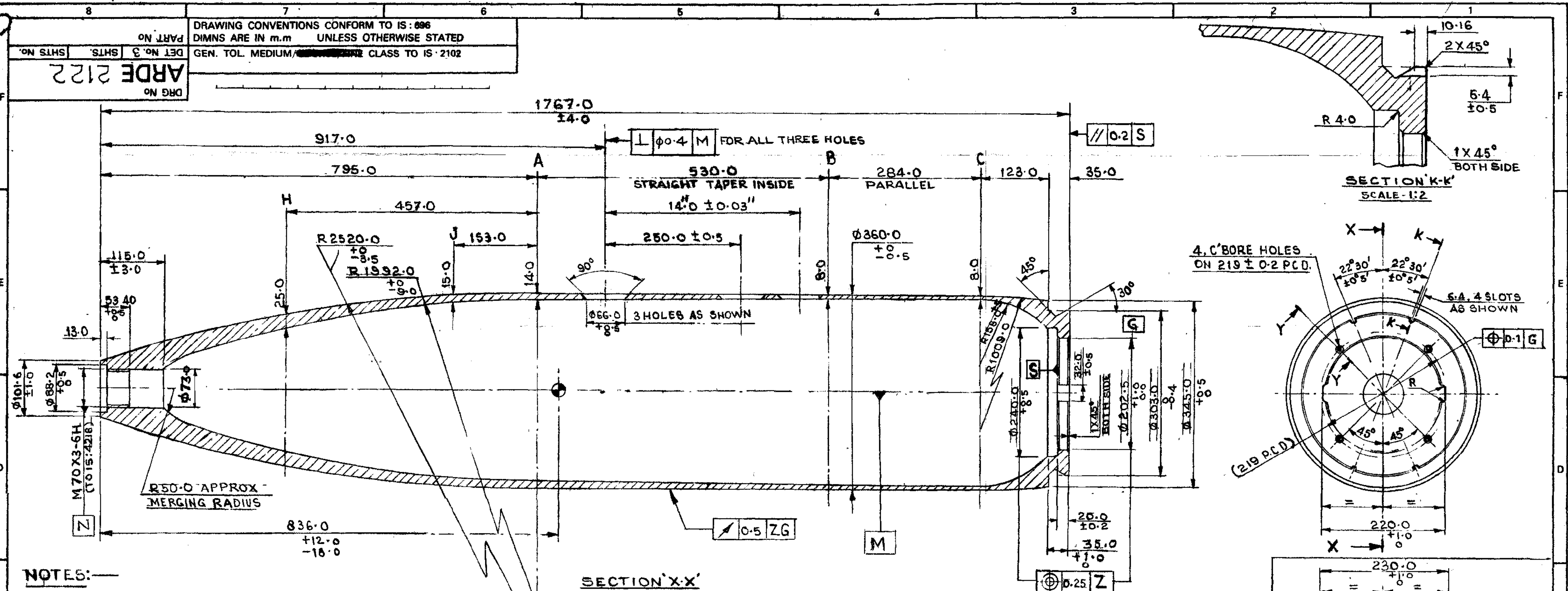
RESTRICTED

1	2	3	4
PART No.		DRAWING CONVENTIONS CONFORM TO IS : 696 DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
DET No. 13 SHTS.		GEN. TOL. MEDIUM / CLASS CLASS TO IS : 2102	
DRG. No.			

ARDE 2122

1	30-1-95	—	AMENDED VIDE AL No: 4/95	DB3	We...	Sign
R. NO.	DATE :	AUTHORITY	BRIEF RECORD	ZONE	CD	GO
DRG SEALED (Prov) <i>Arvind and. Gupta 20/1/90</i> CRE (AA)						
DRN. No. 13	CHD. No.	TRD.	COMP.	ASSY DRG. ARDE 2122/13		
CD	PASSED	SCALE: 1:1	DESIGN AUTHORITY			
		EST MASS:	ARDE PUNE - 411 021			
APPROVED		GAUGE SCHD:				
FOR DIRECTOR		DATE: 29-3-89				
MATL: NEOPRENE RUBBER TO IND/ME/ 884 (PROV).C3						
PROTECTIVE FINISH:				DRG. No.		
TITLE:				ARDE 2122		
				DET. No. 13 SHTS.		
				PART No.		
				D. S. CAT. No.		
				A.H.S.P.		

WASHER



NOTES:—

- 1 ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.
- 2 $\varnothing 360.0 \pm 0.5$ TO BE OBTAINED BY MACHINING AFTER HEAT TREATMENT.
- 3 SCREW THREADS RUNOUTS & UNDERCUTS TO BE IN ACCORDANCE WITH IS:1369
- 4 THE EXTERNAL DIA IS TO BE MEASURED AT TWO POINTS ON CIRCUMFERENCE 90° APART AT EACH POSITION 'A' & 'C' THE MEAN DIA AT THESE TWO POSITIONS TO BE NOMINAL DIA SHOWN $\varnothing 360 \pm 0.5$ THE MAXIMUM VARIATION FROM NOMINAL DIA. AT ANY ONE POINT MUST NOT EXCEED 2.5 mm
- 5 ALL THREE HOLES FOR LUG HOUSING MUST BE IN ONE AXIS. SHIFT OF 0.1 (EITHER SIDE) FOR THE MIDDLE HOLE FROM THE LINE JOINING THE TWO EXTREME HOLE IS PERMITTED.
- 6 WALL THICKNESS: —
- 7 WALL THICKNESS IS TO BE MEASURED AT POSITION A, B, C, H & J. AT EACH POSITION THICKNESS IS TO BE MEASURED AT FOUR POINTS CIRCUMFERENTIALLY 90° APART AND IN SAME LONGITUDINAL LINE OF THE BOMB BODY.
- 8 AT POSITIONS A, B & C THE WALL THICKNESS SHOULD BE NOMINAL, WALL THICKNESS AT THESE POSITIONS ± 2.0
- 9 AT POSITIONS H & J, THE WALL THICKNESS SHOULD BE NOMINAL THICKNESS AT THESE POSITIONS ± 2.5
- 10 CONCENTRICITY & PARALLELISM WILL BE CHECKED AFTER MACHINING. (ON THE MACHINE)
- 11 THREADS TO BE COATED WITH LUTING THIN MK-5 (APC-10) TO SPEC. USS: 8030-15
- 12 SURFACE FINISH: — $\frac{25}{0}$ INSIDE, $\frac{3.2}{0}$ OUTSIDE.
- 13 WEIGHT OF THE BODY TO BE $2.09 \text{ Kg} \pm 10 \text{ g}$.
- 14 C.G. 836.0 ± 12.0

PROTECTIVE FINISH:—

THE INTERNAL SURFACE IS TO BE COATED WITH VARNISH-
STOVING AMMUNITION TO SPEC. IND/ME/674(b).

HARDNESS :- 300-340 HB

[illegible]

HIGH SPEED LOW DRAG, 450Kg
MC/HE, a/c. BOMB BODY, MACHINING
(FOR CASTING)

DRG No.		
ARDE 2122		
DET. No 3	SHTS	SHT No
PART No		
D. S CAT No.		
A.H.S.P.		

1	2	3	4
PART No.		DRAWING CONVENTIONS CONFORM TO IS: 8000 DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
DET No. 18 SHTS. 6		GEN. TOL. MEDIUM/CLASS TO IS: 2102	
DRG. No. ARDE 2122			

NOTE: -

ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.

2, HOLES, $\phi 9.0$

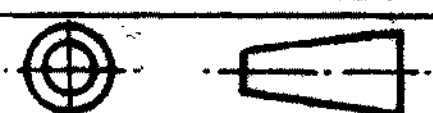
R 16.0

100.0

± 0.5

3.0

(132.0)

R. NO.	DATE:	AUTHORITY	BRIEF RECORD	ZONE	CD	GO
					SIGN	
DRG SEALED <i>Chw; P. K. Kulkarni. G. D. Patil 20 Mar 90 CRE (AA)</i>						
DRN. 501600001	CHD. <i>St</i>	TRD.	COMP.	ASSY DRG. ARDE 2122/18.SHT.1		
C.D. <i>Patil</i>	PASSED <i>Patil</i>	SCALE: 1:2 EST MASS:		DESIGN AUTHORITY		
APPROVED <i>Patil</i> FOR DIRECTOR		GAUGE SCHD: DATE: 26-8-88		ARDE PUNE-411 021		
MATL: STEEL TO IS: 1079. St 34.						
PROTECTIVE FINISH:				DRG. No.		
TITLE:				ARDE 2122		
				DET. No. 18 SHTS. 6 SHT.No. 3		
				PART No.		
				D.E. CAT. No.		
				A.H.E.P.		

PLATE

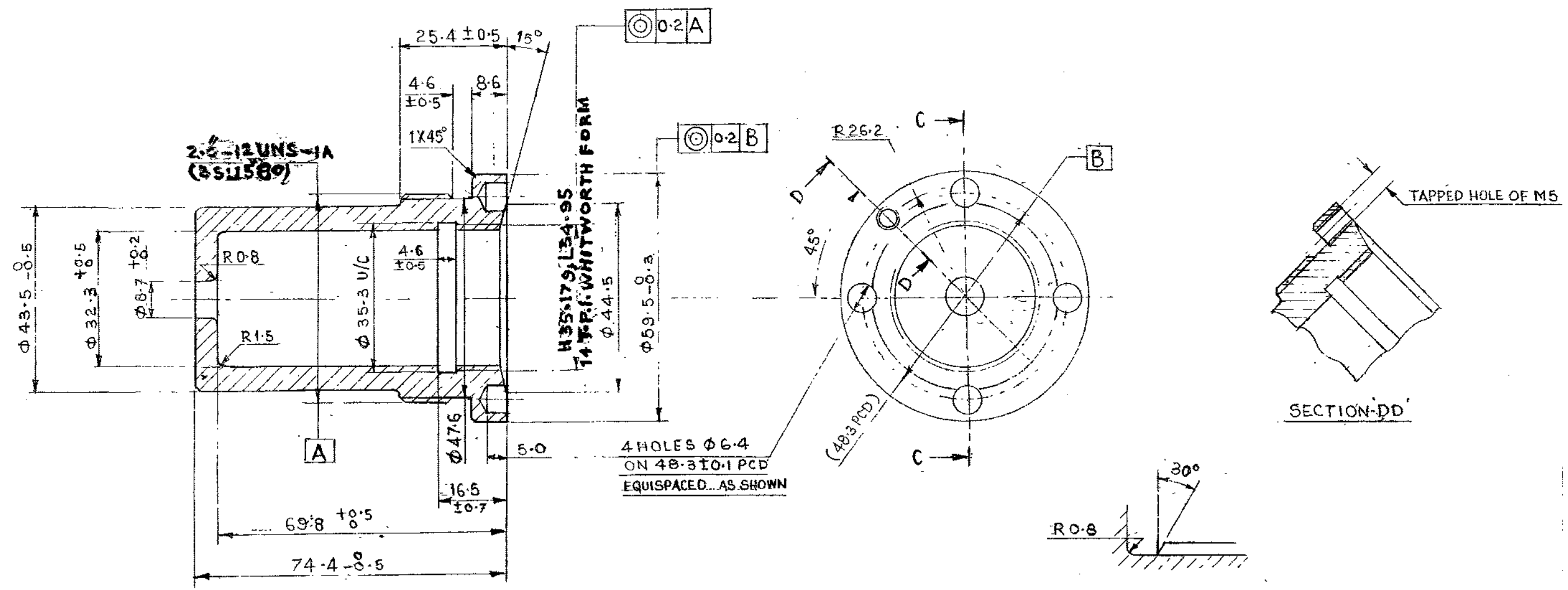
8		7		6		5		4		3		2		1	
PART No.		DRAWING CONVENTIONS CONFORM TO IS: 696													
DET No. 12		DIMNS ARE IN m.m. UNLESS OTHERWISE STATED													
SHTS. No.		GEN. TOL. MEDIUM/CLASS TO IS: 2102													
ARDE 2122															
DRG. No.															

NOTES :—

EXTERNAL AND INTERNAL SURFACES TO BE COATED (2 COATS) WITH VARNISH OIL STOVING AMMUNITION TO SPEC. JSS: 8010-28 (APC-221) GRADE-1 SPECIAL

THREADS TO BE FREE FROM VARNISH AND COAT WITH LUTING THIN MK-5 (APC-10) TO SPEC. JSS: 8030-15

SURFACE FINISH: — $\nabla_{0.8}$ ALL OVER.



DRN. 2122/1	CHD. 10	TRD.	COMP.	ASSY DRG. ARDE 2122/1
CD P. 10	PASSED	SCALE: 1:1		DESIGN AUTHORITY
APPROVED	FOR DIRECTOR	EST. MASS:		ARDE PUNE - 411021
		GAUGE SCHD:		
		DATE: 4.4.89		
MATL: STEEL TO IS: 2004; 20C8, MINIMUM 120D				
VALUE OF 2.766 kgfm				
PROTECTIVE FINISH: PHOSPHATED TO IS: 3618 CLASS 'B'				

R. NO.		DATE: 7-3-9		AUTHORITY		BRIEF RECORD		ZONE		CD		GO		SIGN		TITLE: DETONATOR HOLDER	
DRG SEALED		(hrr)		24 Mar 90		CRE (AA)											
DRG. No.		ARDE 2122															
DET. No. 12		SHTS.		SHT. No.													
PART No.																	
D. S. CAT. No.																	
A.H.S.P.		12															

25
x 2

S. NO.	DRG. NO./DETAIL	DESCRIPTION	PART NO.	QTY. REQ.	MATERIAL	REMARKS
1	ARDE 2122/1 SMT 2	HIGH SPEED LOW DRAG 450 KG MC/HE, O/C BOMB EMPTY GEN. ASSY.	1	1	AS ON DRG.	✓
2	ARDE 2122/2 SMT 2	BOMB BODY, LUG HOUSING WELDING ASSY.	1	1	AS ON DRG.	✓
3	" " " 3	HIGH SPEED LOW DRAG 450 KG MC/HE, O/C BOMB BODY MACHINING DRAWING (FOR CASTING)	1	1	AS ON DRG.	✓
4	" " " 4	LUG HOUSING ASSY	1	1	AS ON DRG.	✓
5	" " " 5	PLATE	1	1	AS ON DRG.	✓
6	" " " 6	LUG HOUSING	3	3	"	✓
7	" " " 7	NOSE PLUG	1	1	"	✓
8	" " " 8	SEE AFTER 84 No. 32	1	1	"	✓
9	" " " 9	RING NUT	1	1	"	✓
10	" " " 10	FILLING PLUG	1	1	"	✓
11	" " " 11	CONTAINER EXPLODER	2	2	"	✓
12	" " " 12	DETONATOR HOLDER	2	2	"	✓
13	" " " 13	PLUG ASSY	1	1	"	✓
14	" " " 14	PLUG	1	1	AS ON DRG.	✓
15	" " " 15	WASHER	1	1	"	✓
16	" " " 16	BASE TRANSIT	1	1	"	✓
17	" " " 17	ROLLING RING, GENERAL ARRANGEMENT	1	1	"	✓
18	" " " 18	RING WELDING ASSY (TWO QUADRANT)	4	4	"	✓
19	" " " 19	RING	1	1	AS ON DRG.	✓
20	" " " 20	PLATE	2	2	"	✓
21	" " " 21	STRENGTHENING PLATE - 1	1	1	"	✓
22	" " " 22	RING WELDING ASSY (TWO HALVES) ALTERNATE DESIGN.	4	4	"	✓
23	" " " 23	STRENGTHENING PLATE - II	1	1	AS ON DRG.	✓
24	" " " 24	COVER PLATE	1	1	"	✓
25	" " " 25	CLAMPING PLATE	1	1	"	✓
26	" " " 26	PLUG TRANSIT	1	1	"	✓
27	" " " 27	LABEL	1	1	"	✓
28	" " " 28	CONT. ON SHT. NO. 2				

ARDE PASHAN PUNE - 21

SEALED (PROV) *[Signature]* (CRECA)

27 APR. 58

DISINDEX OF :-

ARDE 2122

DET. NO.

SHEET NO. 1

NO. OF SHTS. 3

S.N.	DRG. NO. / DET. NO.	DESCRIPTION	PART NO.	NO. REQD.	MATL.	REMARK
28	ARDE 2122 / 41 SMT 1	HIGH SPEED LOW DRAG 450 KG MC/HE O/C BOMB BODY MACHINING FORGED & WELDED		1	—	
29	" " 41 SMT 2	BOMB BODY - FORGED (WELDING ASSY)		1	—	
30	" " 41 SMT 3	FRONT SECTION		1	AS ON DRG	
31	" " 41 SMT 4	MIDDLE SECTION		1	"	
32	" " 41 SMT 5	REAR SECTION		1	"	
3	ARDE 2122 / SMT 1/2	PLUG DUMMY		1		
GA	ARDE 2122 / SMT 2/2	PLUG FASTENING		2		APPROVED WIDE PL. No. Date 17/11/77 22/9/78
CONTD. ON SMT NO 3						
AHSP						
COMP. BY <i>[Signature]</i>	CHD. BY <i>[Signature]</i>	TRD	COMPR. BY <i>[Signature]</i>	FOR DIRECTOR	ARDE PASHAN PUNE-21	
PASSED BY <i>[Signature]</i>	CD <i>[Signature]</i>	APPROVED DATE 20.4.93			SEALED (PROV. <i>[Signature]</i> & C.R.E. (L.A.S.) 27 APR. 98	
HIGH SPEED LOW DRAG 450 KG MC/HE O/C BOMB FILLING & MARKING GENERAL ASSY.					DRG. INDEX OF — ARDE 2122	
					DET. NO SMT NO 2	NO OF SMTS 3

SNO	DRG NO / DET NO	DESCRIPTION	PART NO	MR REQD.	MATL	REMARKS
PART-B, LINER (TUBE OMITTED FOR SUPPLY OF BOMB WITHOUT LINER)						
38	MODE 2122 / 1 SHT	HIGH SPEED LOW DRAG 450 Kg MC/HE, O/C BOMB EMPTY GENERAL ASSY.		1		ONE SET OF TOOLS & FIXTURES REQUIRED FOR FABRICATION OF BLADDERS AND FIXING OF SPACERS
34	" " / 2 SHT	HMA/HMG LINED BOMB BODY WITH LINER		1		
35	" " / 22	HMA/HMG 2771 BLADDER ON FORMER		1	AS ON DRG.	
36	" " / 23	SPACER		1	"	
37	" " / 24	METHOD OR BLADDER INFLATION/BALLOON				
38	" " / 25	FORMER FOR HMA/HMG BLADDER		1	AS ON DRG.	TOOL
39	" " / 26	ROLLER FOR CALENDERING		1	"	"
40	" " / 27	AIR POCKETED SHEET			"	"
41	" " / 28	METHOD OF FIXING OF SPACER				
42	" " / 29 SHT	TUBE AND RING ASSY.		1		TOOL
43	" " / 29 SHT	TUBE		1	AS ON DRG.	"
44	" " / 29 SHT	RING		1	"	"
45	" " / 30 SHT	GUIDE ASSY.		1		"
46	" " / 30 SHT	GUIDE		1	AS ON DRG.	"
47	" " / 30 SHT	BAR		1	"	"
48	" " / 31	WASHER		1	"	"
49	" " / 32	PLATE SUPPORTING		1	"	"
50	" " / 33	NOT		1	"	"
51	" " / 35	FORMER & ROLLER ASSY.		1		FIXTURE
52	" " / 36	ADJUSTABLE ROLLER ASSY, FOR FORMER		2		"
53	" " / 37 SHT	BASE PLATE & SUPPROT (WELDING ASSY)		2		"
54	" " / 32 SHT	BASE PLATE		1	AS ON DRG.	"
55	" " / 37 SHT	SUPPORT		1	"	"
56	" " / 38	ROLLER		2	"	"
57	" " / 39	PIN		2	"	"
58	" " / 40	CHANNEL		1	"	"

AHSP

COMP *as per*

CHD *as per*

TRD

COMP *as per*

ARDE PASHAN PUNE-21

PASSED *as per*

CD *as per*

APPROVED *as per*

DATE 20.4.93

FOR DIRECTOR

SEALED (PROV) *as per* 27 APR 93

DRG INDEX OF :-

HIGH SPEED LOW DRAG 450 Kg MC/HE, O/C

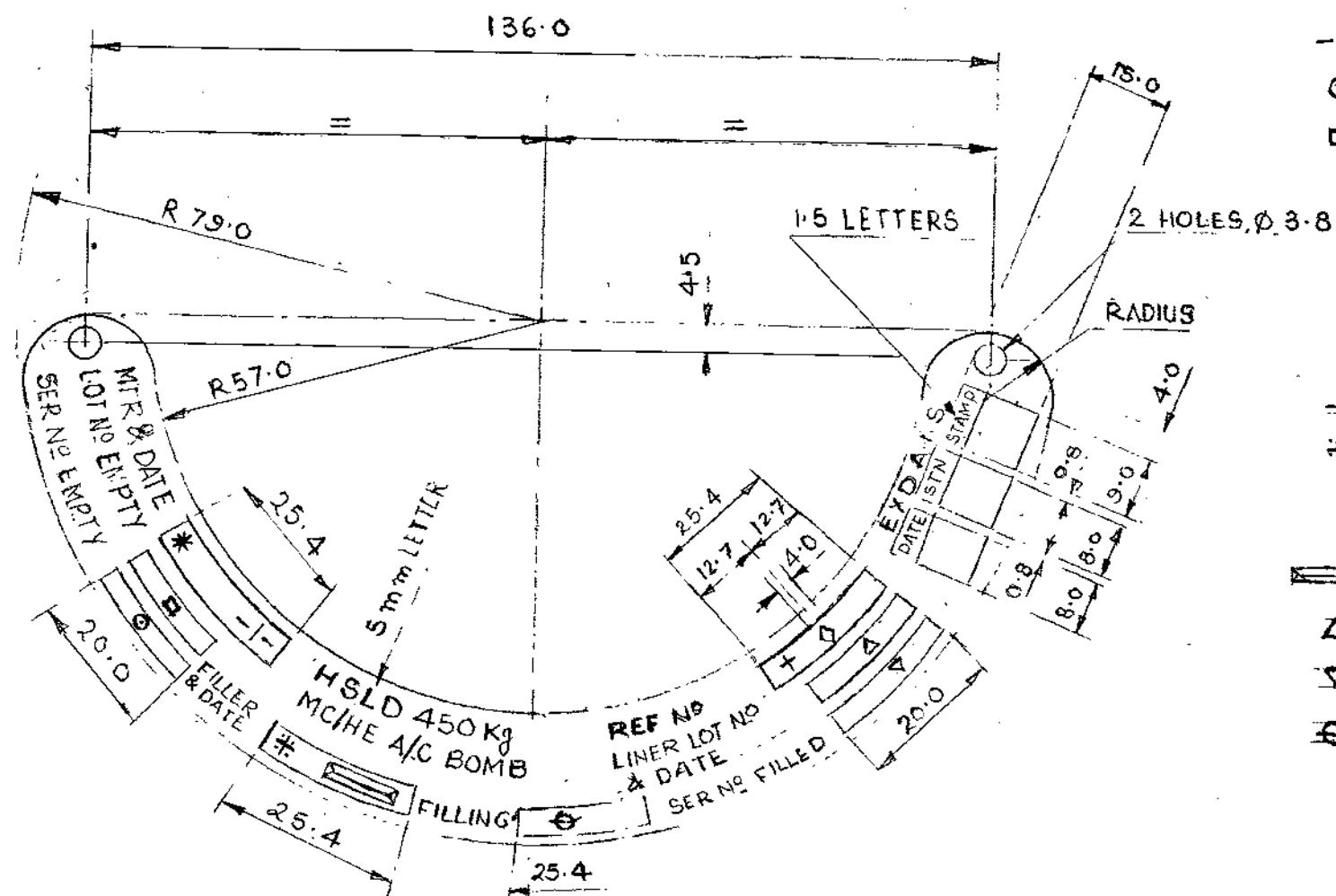
BOMB FILLING & MARKING GENERAL ASSY.

ARDE 2122

DET NO

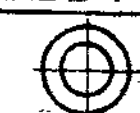
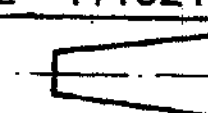
SHT NO 3 - 119 OF SHTS 3

8		7		6		5		4		3		2		1	
PART No.		DRAWING CONVENTIONS CONFORM TO IS : 696													
DET No. 34		DIMNS ARE IN m.m. UNLESS OTHERWISE STATED													
SHTS. No.		GEN. TOL. MEDIUM/CLASS TO IS : 2102													
DRG. No.		ARDE 2122													



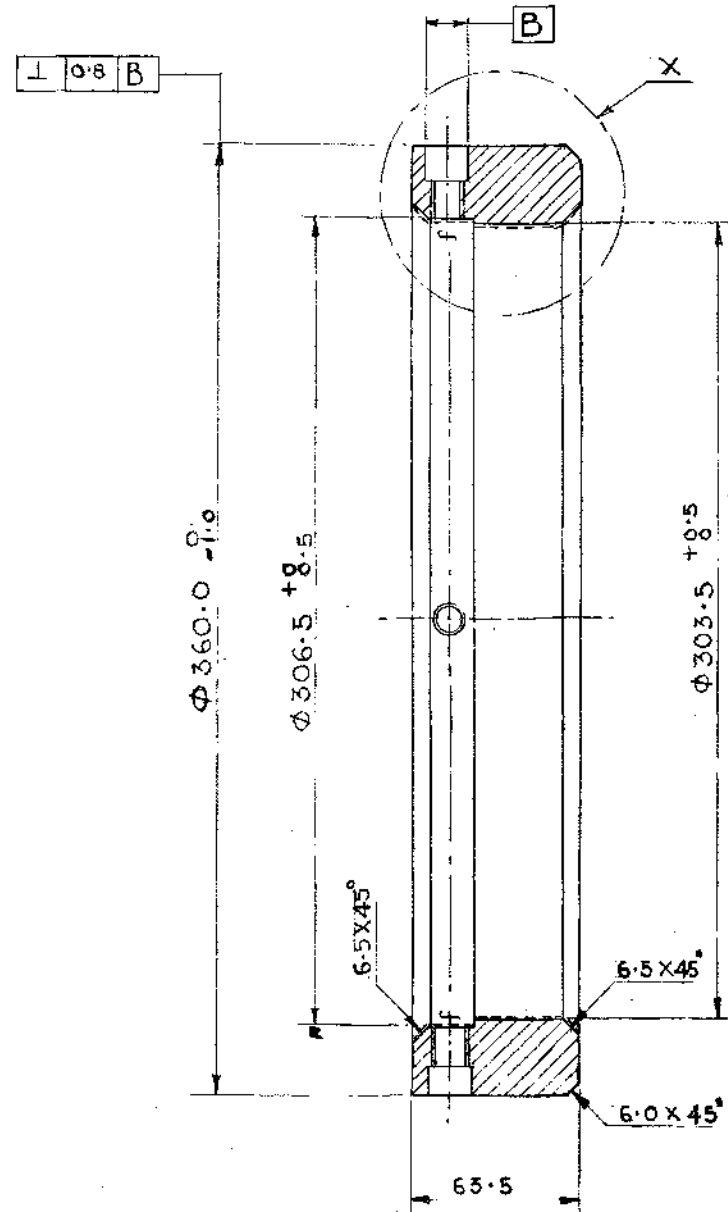
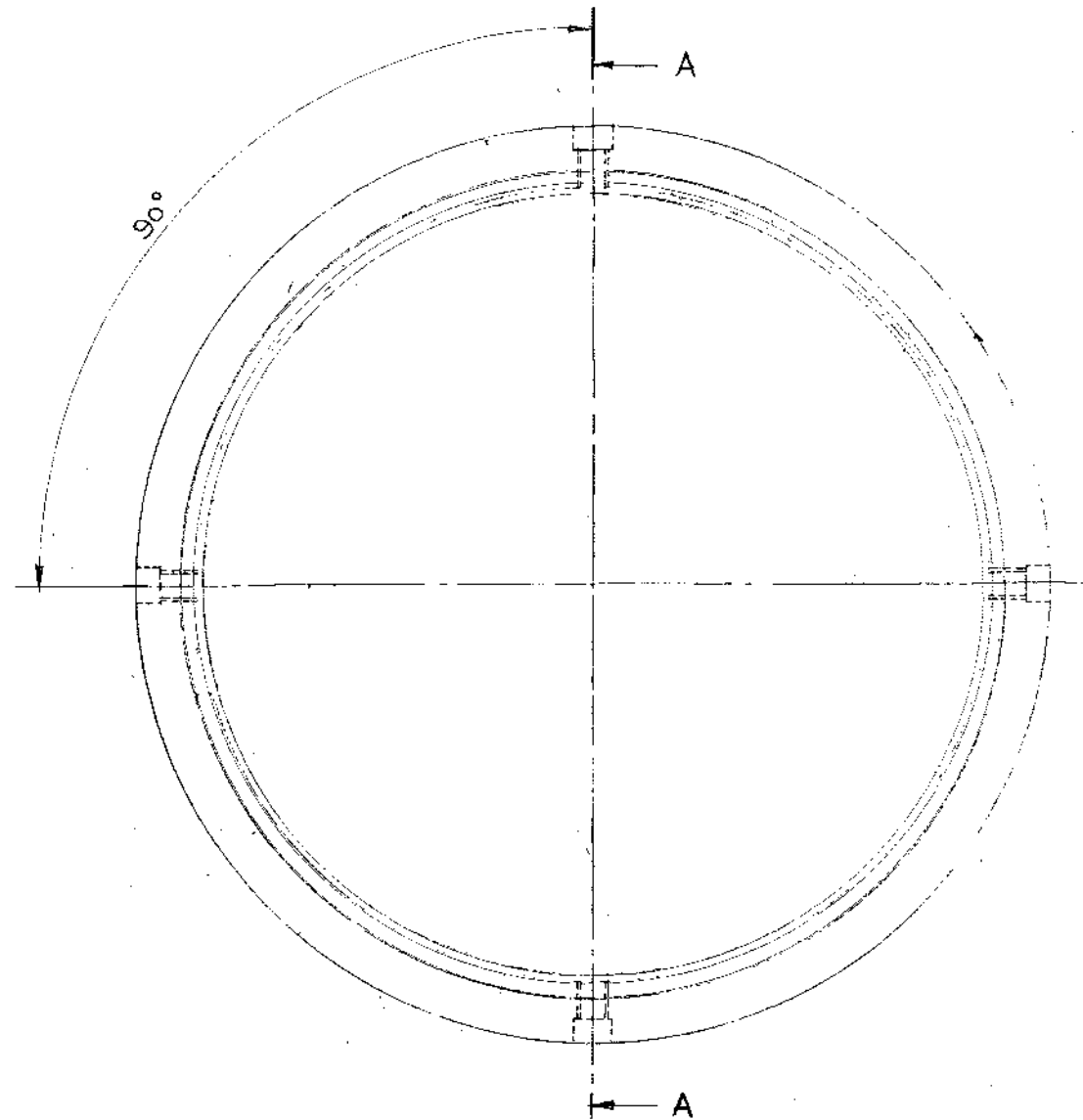
- * MONOGRAM OR INITIALS OF BOMB BODY MANUFACTURER.
- /- MONTH & YEAR OF BOMB BODY MANUFACTURE
- SERIAL No OF EMPTY BOMB.
- LOT No OF EMPTY BOMB
- + STORES REF No TO BE OBTAINED FROM INSPECTING OFFICER.
- # MONOGRAM OR INITIALS OF FILLING STATION, OR RECOGNISED TRADE MARK OR APPROVED INSPECTION STAMP OF FILLING CONTRACTOR.
- ≡ DATE OF FILLING. MONTH & YEAR
- △ LOT No. AND MONTH & YEAR OF LINER MANUFACTURE.
- ▽ SERIAL No OF FILLED BOMB
- ⊙ NATURE OF FILLING

LABLE TO BE CHEMICALLY ENGRAVED WITH LETTERING & TABLETS IN RELIEF. MARKING TO BE IN 3 TYPE STAMPED ON. AFTER MARKING, LABEL TO BE COATED WITH VARNISH TO SPEC. JSS. 8010.128

R. NO.		DATE:		AUTHORITY		BRIEF RECORD		ZONE		CD		GO		SIGN		DRG. No.		ASSY DRG. ARDE 2122	
DRG SEALED		(Signature)		G. P. 20/10/70		CRE (AA)												DESIGN AUTHORITY	
																		ARDE PUNE - 411021	
																		 	
																		DRG. No.	
																		ARDE 2122	
																		DET. No. 34 SHTS	
																		SHT. No.	
																		PART No.	
																		D. S. CAT. No.	
																		A.H.S.P.	
																		27	

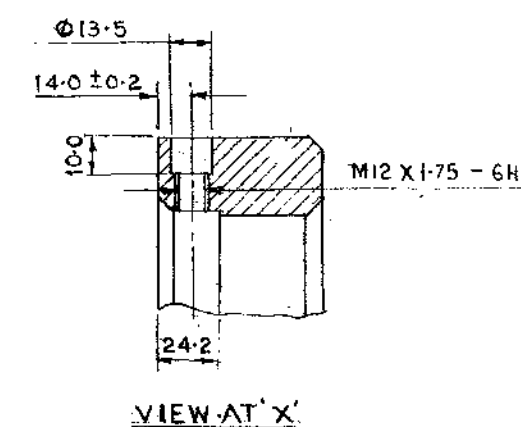
LABEL

DRAWING CONVENTIONS CONFORM TO IS: 696	
DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
GEN. TOL. MEDIUM	CLASS TO IS: 2102
DRG. No.	ARDE 2122
DET. No. 16	SHTS. 16
ON PART	ON SHS



SECTION 'AA'

- NOTES:—
- 1 ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.
 - 2 SCREW THREADS TO CONFORM TO SPEC: IS: 4218 UNLESS OTHERWISE STATED.
 - 3 TOL. FOR ANGLES GIVEN IN DEGREES. $\pm 0^{\circ}30'$
 - 4 RADIUS UNLESS STATED OTHERWISE 1:5 MACHINE AT f.
 - 5 AFTER PHOSPHATING APPLY TWO COATS OF PAINT FINISHING (AIR DRYING) TO IS: 168 DEEP BRONZE GREEN, TINT. NO 224 TO CONFORM TO IS: 5. ALL SCREW THREADS AND MATING SURFACES MARKED THUS --- ARE TO BE FREE FROM PAINT.

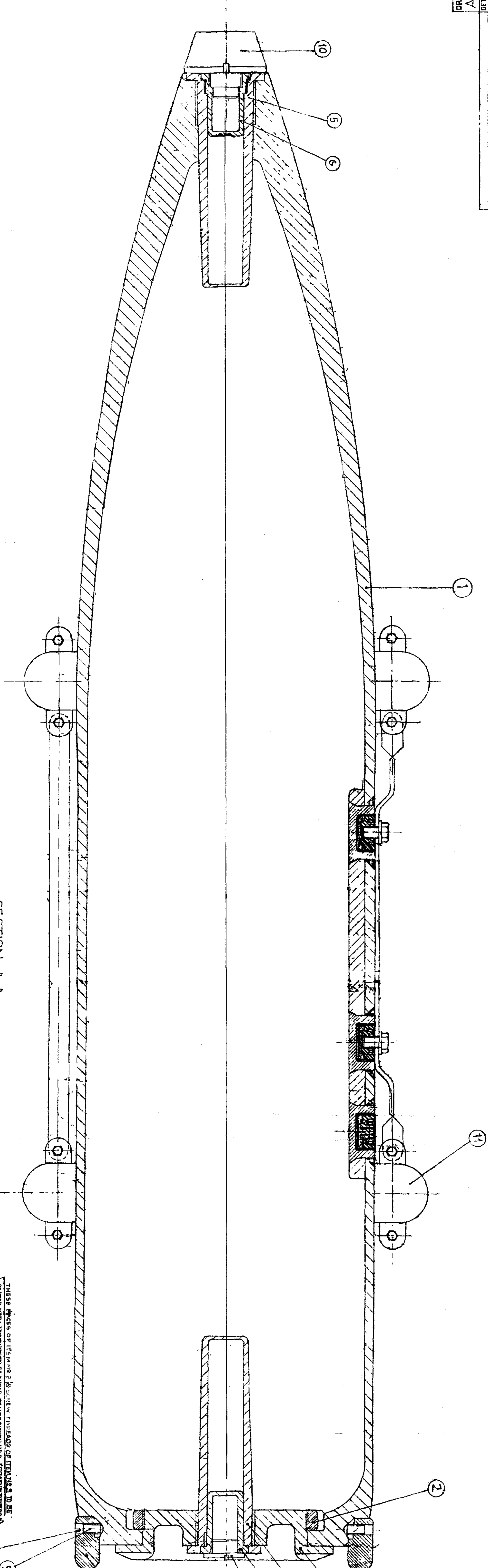


VIEW AT 'X'

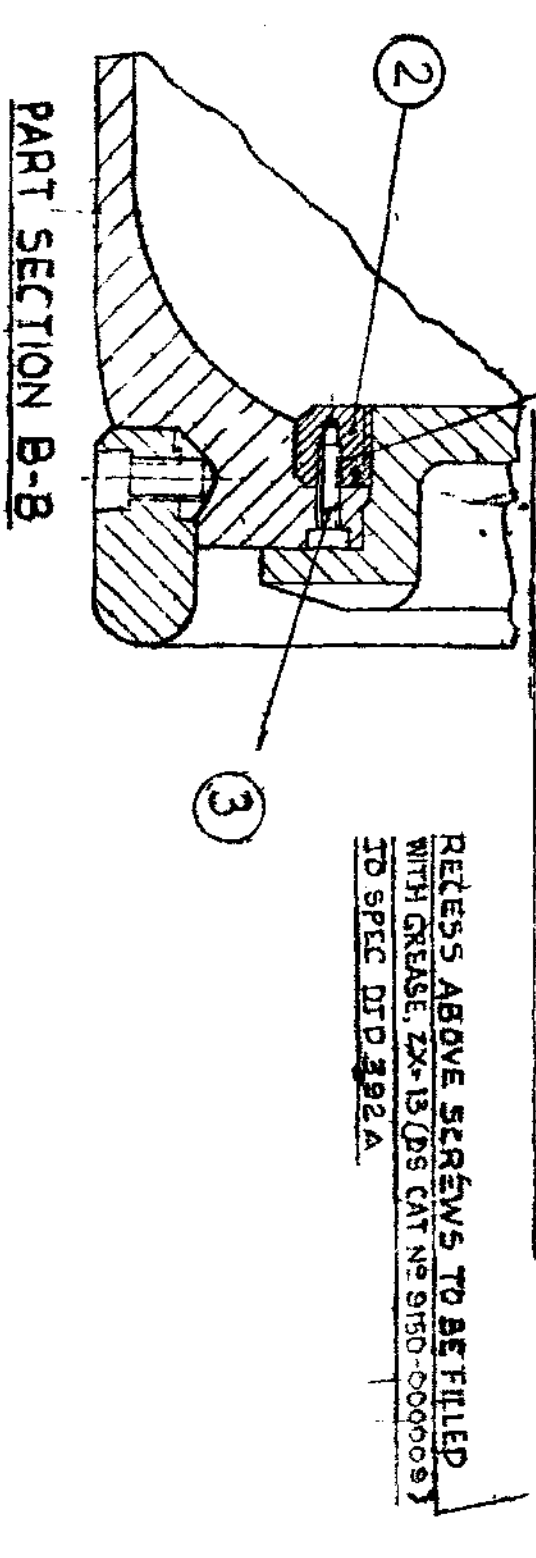
MATERIAL:—
 STEEL TO IS: 5517: 40S18 / IS: 5517: C55 Mn 75 (FORGED)
 OR, BS: 9702 PL. 1: 1983: 080M40 / BS: 970: P61: 1983: 070M5

R. NO.		DATE:		AUTHORITY		BRIEF RECORD		ZONE		CD		GO		MATERIAL		ASSY DRG. ARDE 2122/1	
DRG. SEALED																DESIGN AUTHORITY	
																ARDE PUNE - 411 021	
																DRG. No.	
																ARDE 2122	
																DET. No 16	
																SHTS.	
																PART No.	
																D. S. CAT. No.	
																A.H.S.P.	
																16	

BASE TRANSIT

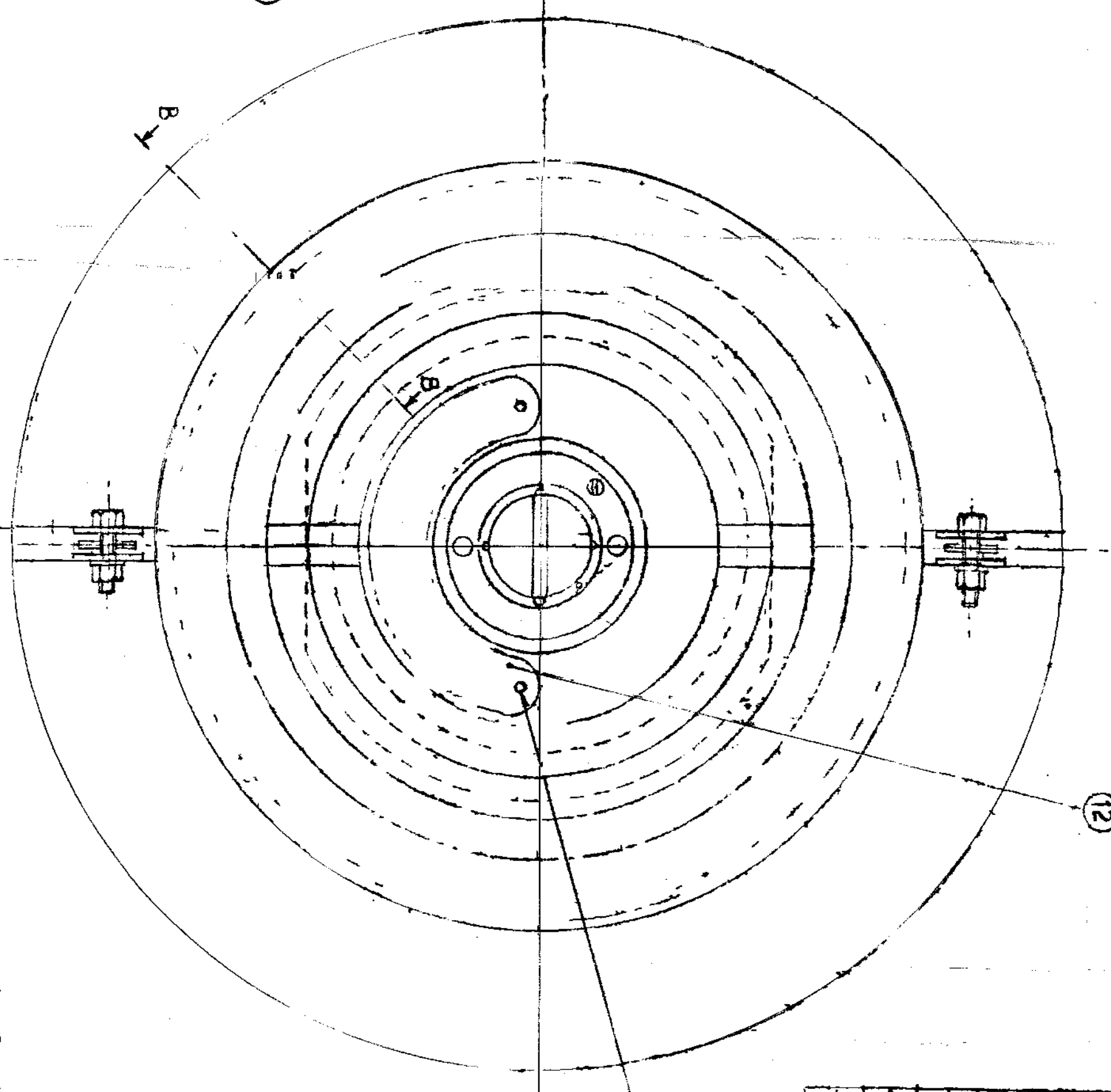


SECTION A-A



THESE THREADED PARTS OF ITEM NO. 2 & 3 SHOWN IN SECTION A-A TO BE COATED WITH ANTIMONY BEARING COMPOSITION (M2 LUBRICANT) TO BE USED FOR ASSEMBLY. WHEN CEMENT IS WET.

RECESS ABOVE SCREWS TO BE FILLED WITH GUNSEAL (X-15) OR AN EQUIVALENT TO SPEC DTD 392A.



2 HOLES OF 2.5mm DIA DEEP 10mm IN PLATE (ITEM 4) AND ATTACH LABEL (ITEM 13) BY BOLT (ITEM 12) IN POSITION AS SHOWN.

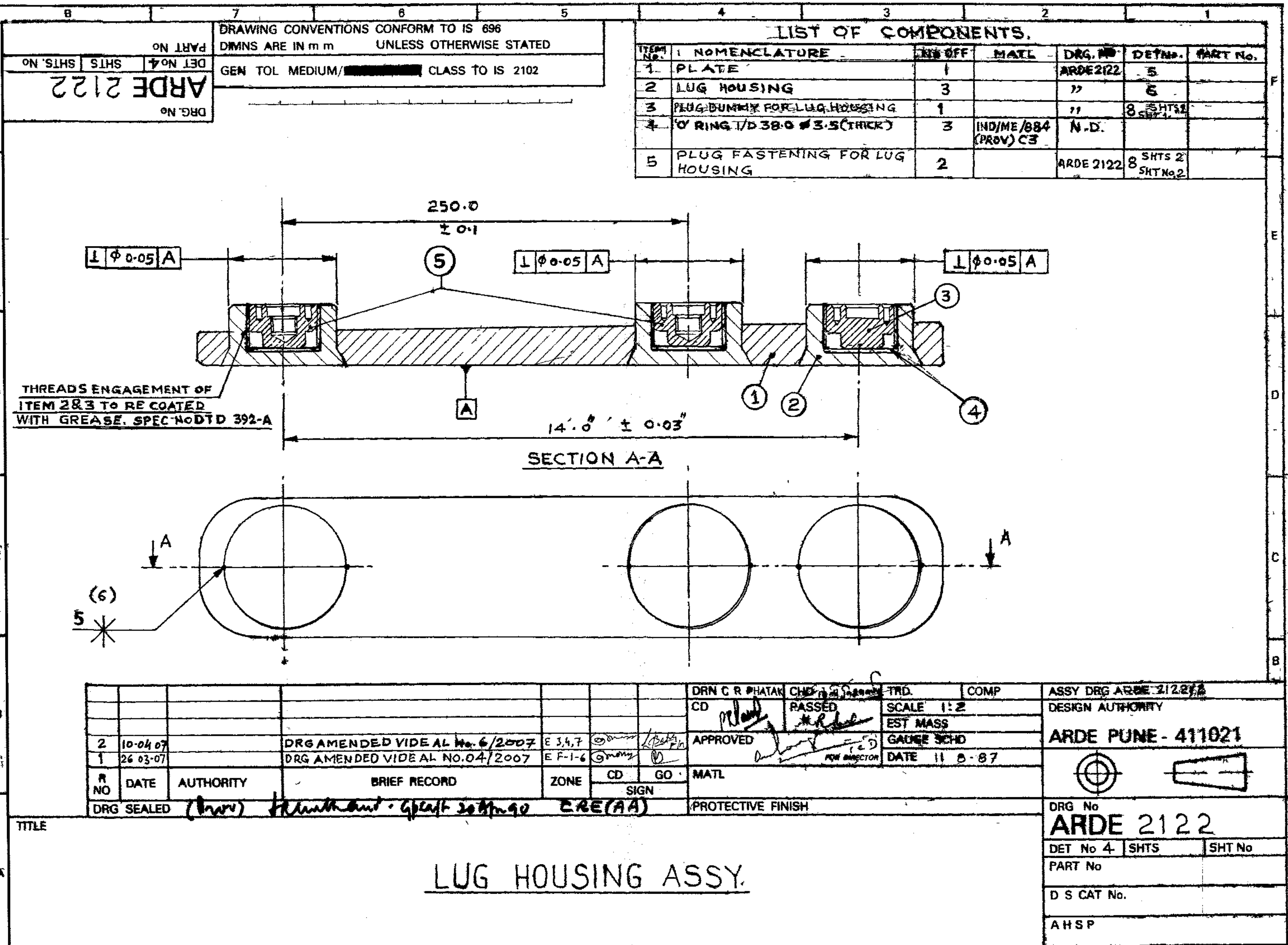
LIST OF COMPONENTS				
ITEM NO.	NOMENCLATURE	QTY	MATL	DET PART NO.
1	BOMB BODY LUG HOUSING	1		
2	WELDING ASSY	1		
3	RING NUT	1	STEEL	ARDE 2122 21/12
4	RING NUT	1	STEEL	ARDE 2122 21/12
5	ROLLING RING	1	STEEL	ARDE 2122 21/12
6	CONTAINER EXPLODER	1		
7	PLUG ASSY	1		
8	BASE TRANSIT	1	STEEL	ARDE 2122 21/12
9	WELDED SCREW HOUSING	1		
10	PLUG TRANSIT	1		
11	ROLLING RING	1		
12	BOLT	2		
13	PLATE SCREW 16x8x10mm TO BS-4174	2		

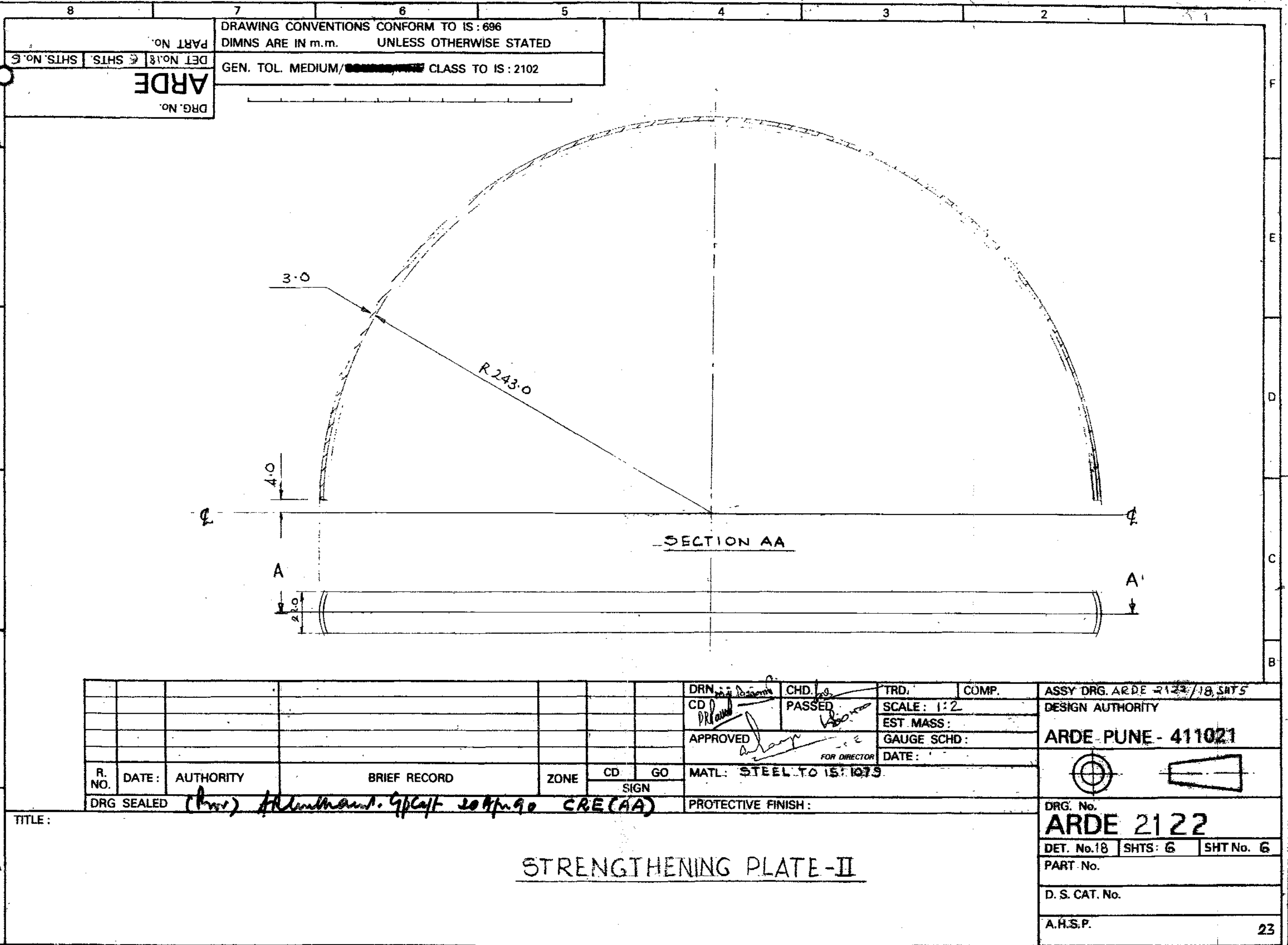
NOTE: SCREW THREADED BY ITEM NO. 4, 5, 6, 7 AND 10 TO BE COATED WITH LUTING THIN (M2-CAT-15) TO IS 8030-15.

DRG NO.	ARDE 2122
REV. NO.	1
REV. NO.	2
REV. NO.	3
REV. NO.	4
REV. NO.	5
REV. NO.	6
REV. NO.	7
REV. NO.	8
REV. NO.	9
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REV. NO.	11
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REV. NO.	90
REV. NO.	91
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REV. NO.	93
REV. NO.	94
REV. NO.	95
REV. NO.	96
REV. NO.	97
REV. NO.	98
REV. NO.	99
REV. NO.	100

HIGH SPEED LOW DRAG 450 kg.
MC/HE, a/c BOM, EMPTY GEN. ASSY

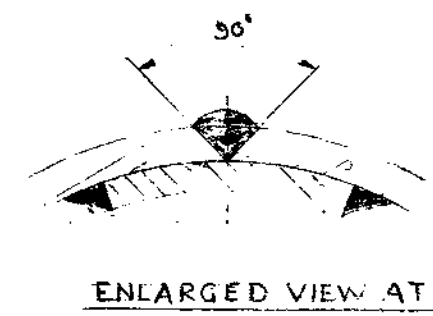
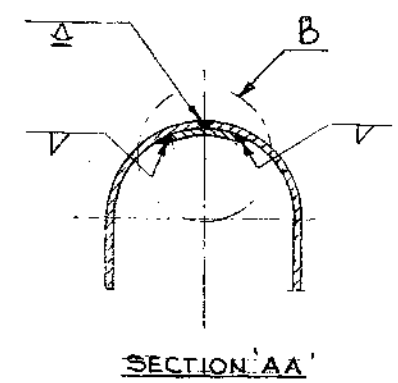
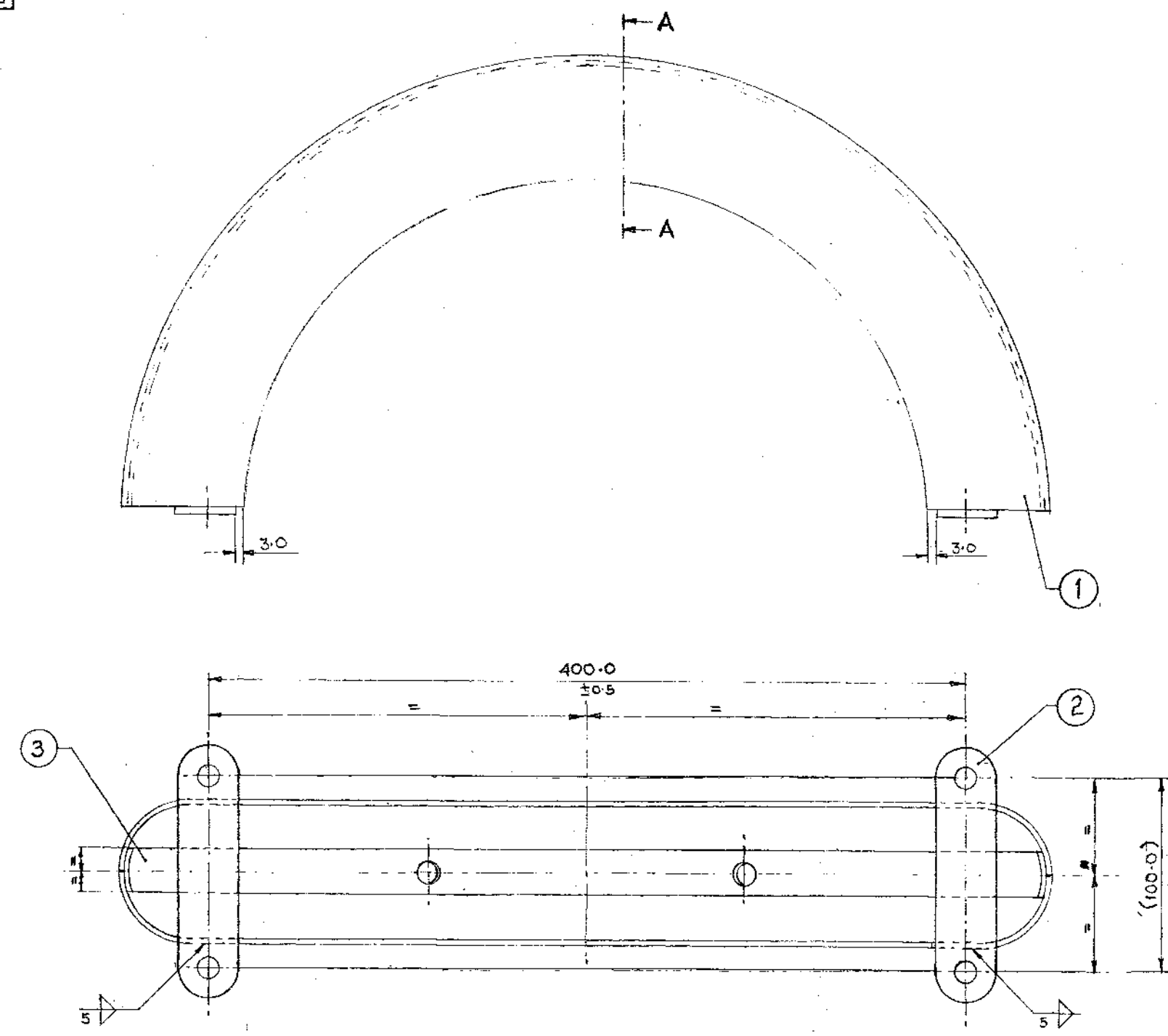
DRG NO.	ARDE 2122
REV. NO.	1
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REV. NO.	3
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REV. NO.	96
REV. NO.	97
REV. NO.	98
REV. NO.	99
REV. NO.	100





DRAWING CONVENTIONS CONFORM TO IS: 896	
DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
GEN. TOL. MEDIUM/ CLASS TO IS: 2102	
DET. No. 18	SHTS. 6
ARDE	
DRG. No.	

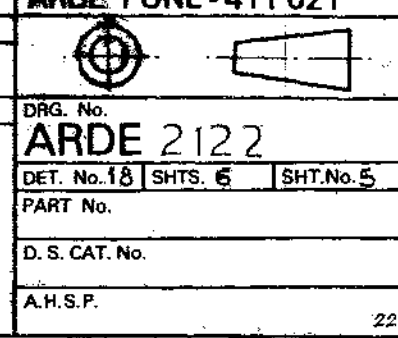
LIST OF COMPONENT					
ITEM NO	NOMENCLATURE	NO OF	MATL	DRG. NO	DET. NO PART NO
1	RING	1		ARDE 2122	18/SHT.2
2	PLATE	2		" "	18/SHT.3
3	STRENGTHENING PLATE-II	1		" "	18/SHT.6



PROTECTIVE FINISH: —
 PHOSPHATED TO IS: 3618 CLASS 'B' AND TO BE PAINTED ONE COAT OF
 PAINT FINISHING (AIR DRYING) TO SPEC. IS: 168 DEEP BRONZE GREEN
 TINT NO 224. TO CONFORM TO IS: 5

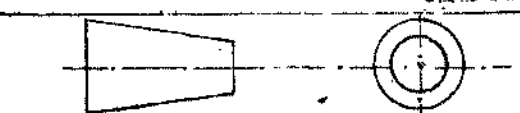
R. NO.		DATE:		AUTHORITY		BRIEF RECORD		ZONE		CD		GO		MATERIAL		PROTECTIVE FINISH:	
DRG. SEALED		(Date)		Authorised		9/11/90		CRE(AA)									
DRN. 18/11/90		CD		PASSED		TRD.		COMP.		ASSY DRG. ARDE 2122/17		DESIGN AUTHORITY		ARDE PUNE-411 021			
APPROVED		EST. MASS:		GALVE SOND:		DATE:											
DRG. No.		DET. No. 18		SHTS. 6		SHT. No. 5		PART No.		D. S. CAT. No.		A.H.S.P.					

RING WELDING ASSY.
 (TWO HALVES)
 ALTERNATE DESIGN



14
 AHSP
 DS CAT No
 PART No
 DET No 14 SHTS SHIN No
 ARDE 2122
 DRG No

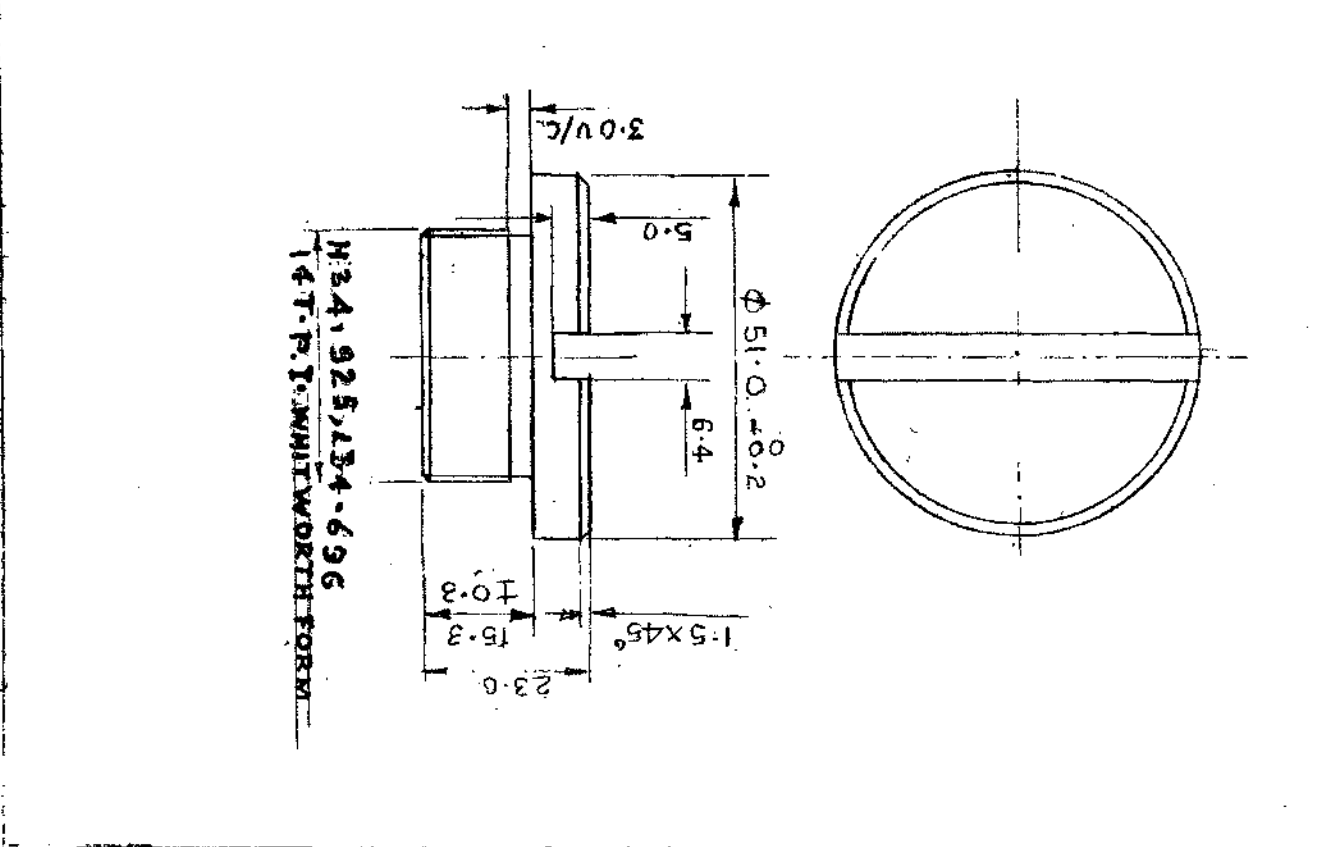
PLUG



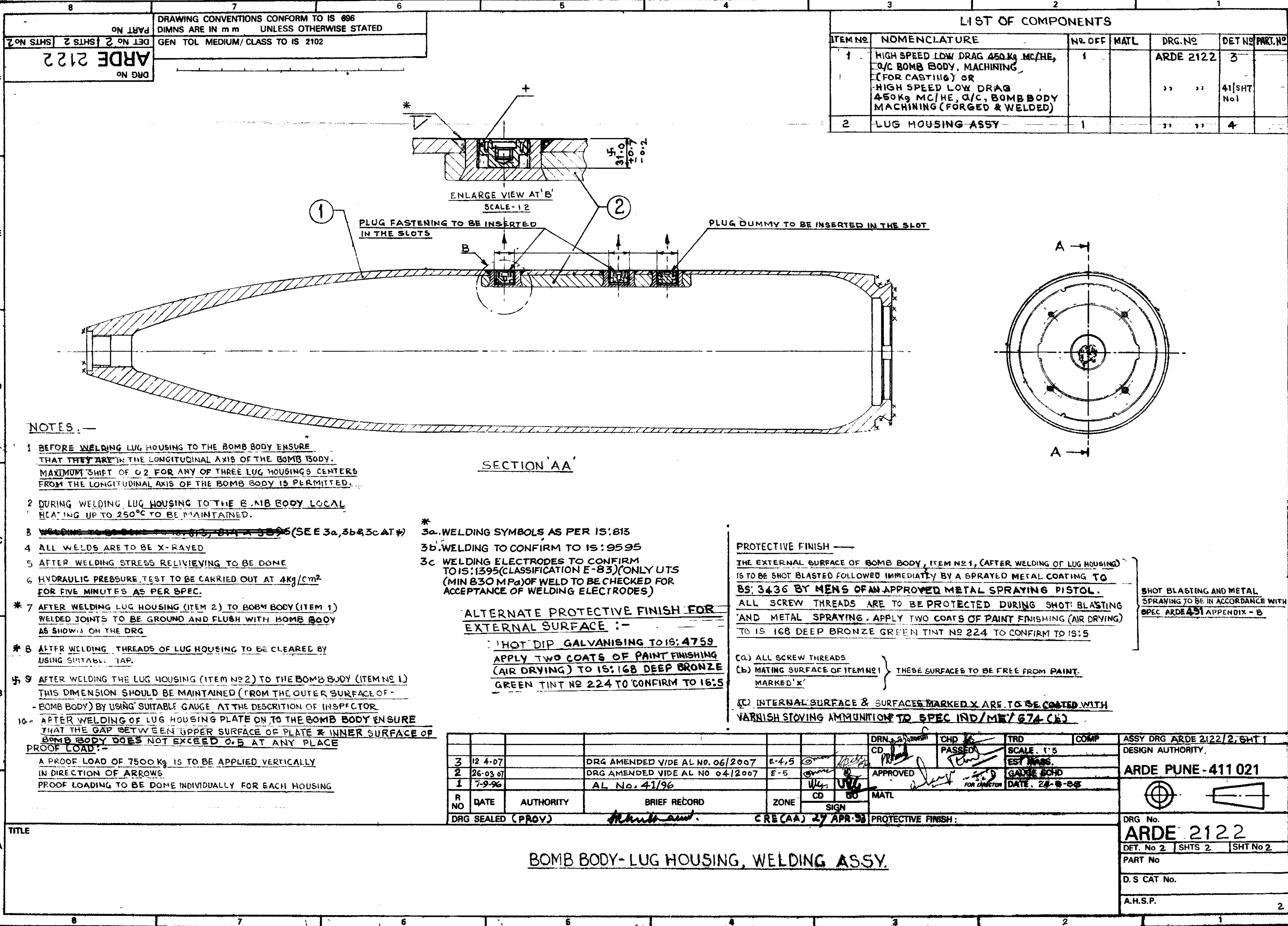
ARDE : PUNE : 21
 DESIGN AUTHORITY
 ASSY DRG : ARDE 2122/1

DRG. SEALED: (Pune) <i>[Signature]</i>	TRD: PAB	COMP:	CD
DRN: L V D	CHD: <i>[Signature]</i>	EST WEIGHT:	APPROVED: <i>[Signature]</i>
DATE: 4.2.85	GAUGE SCHD:	FOR DIRECTOR	
DATE: 4.2.85			

AMENDED VIDE NO. 666
 BRIEF RECORD
 AUTHORITY
 DATE
 R No
 1 7.3.91



DRG CONVENTIONS CONFORM TO IS 696.	DIM ARE IN mm	GEN. TOL. MEDIUM CLASS TO IS 2102.	NOTE:- ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.
DRG No	ARDE 2122	DET No 14	SHTS SHIN No
PART No			

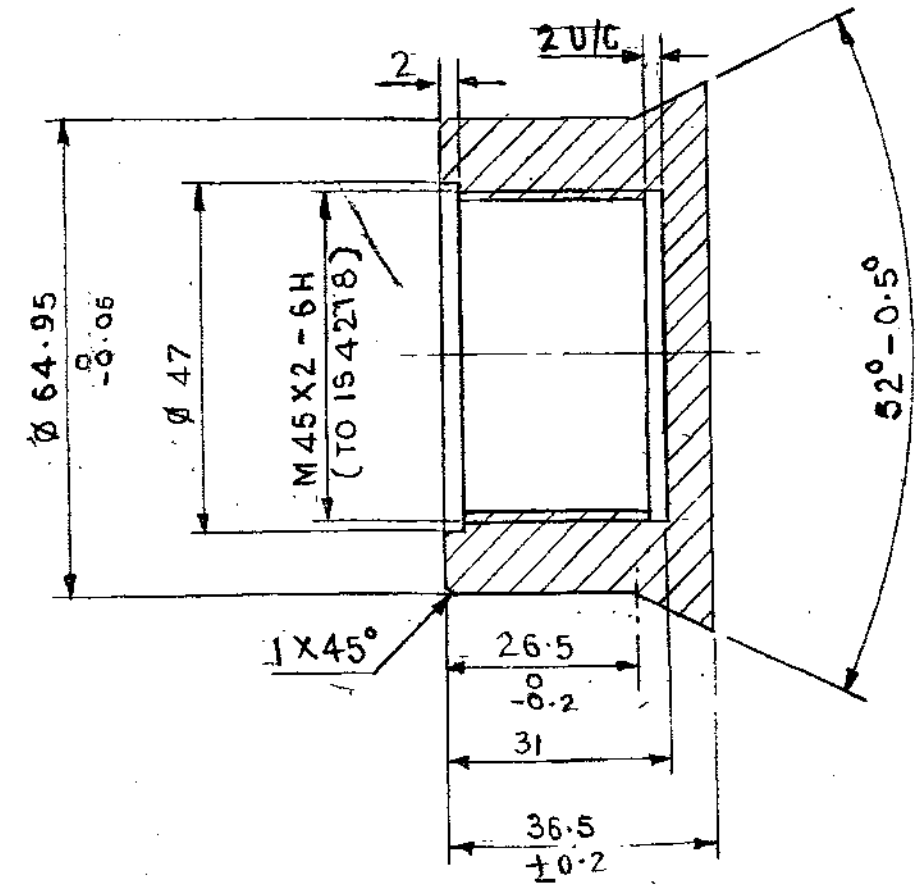
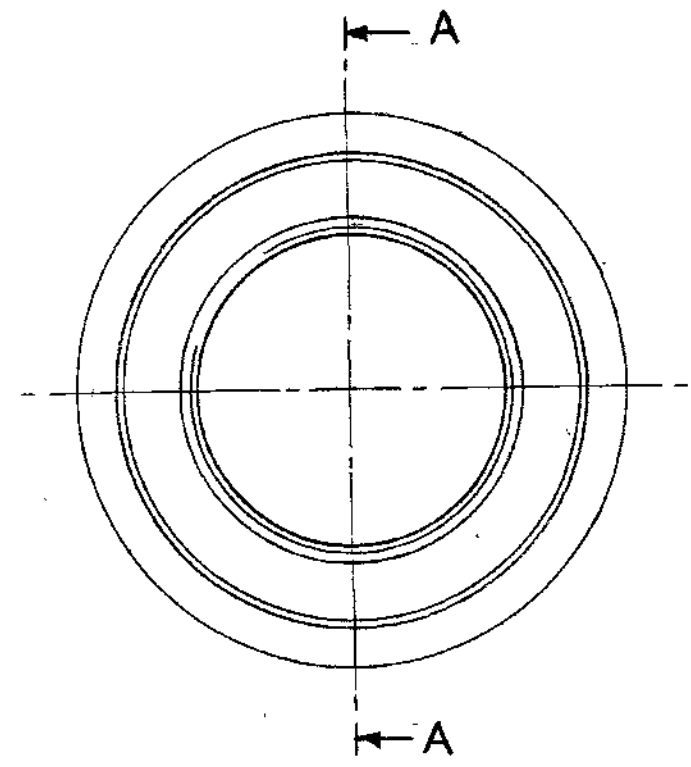


DRAWING CONVENTIONS CONFORM TO IS: 696	
DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
GEN. TOL. MEDIUM/ CLASS TO IS: 2102	
DRG. No. ARDE 2122	
DET. No. 6	
SHTS. 1	
PART No.	

NOTES —

- 1 ALL SHARP EDGES & BURRS ARE TO BE REMOVED.
- 2 AFTER PHOSPHATING COAT ALL SURFACES, EXCEPT SCREW THREADS, WITH VARNISH OIL STOPPING AMMUNITION TO SPEC JSS 8010-28 (APC-221) GRADE-1 SPECIAL COAT SCREW THREADS WITH LUTING THIN MK 5 TO SPEC JSS 8030-15 (APC-10)

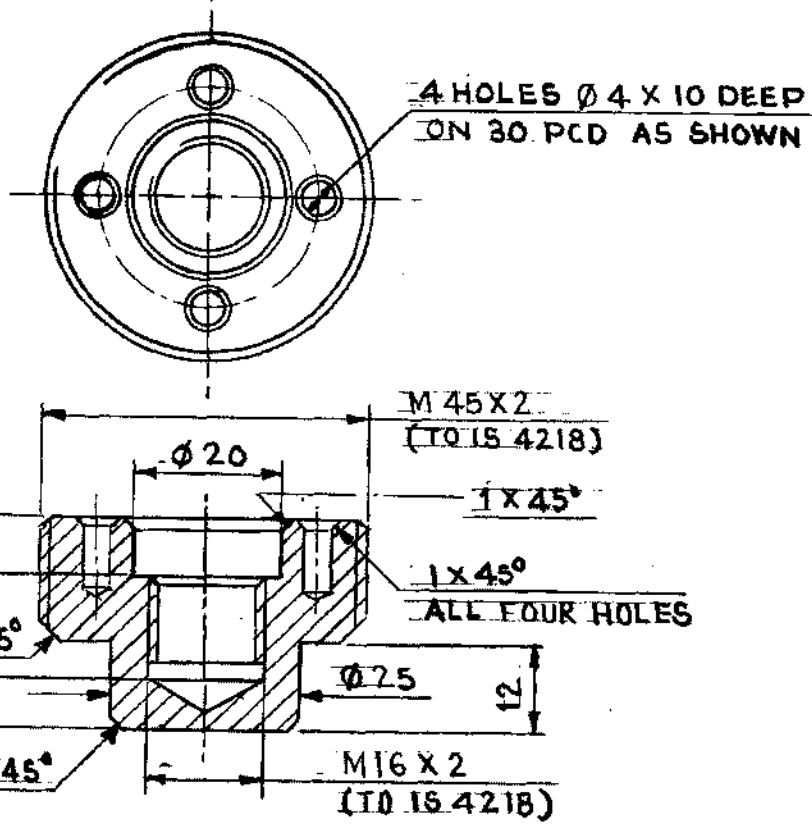
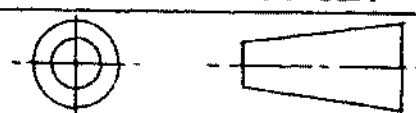
HARDNESS: HB 360 ± 30

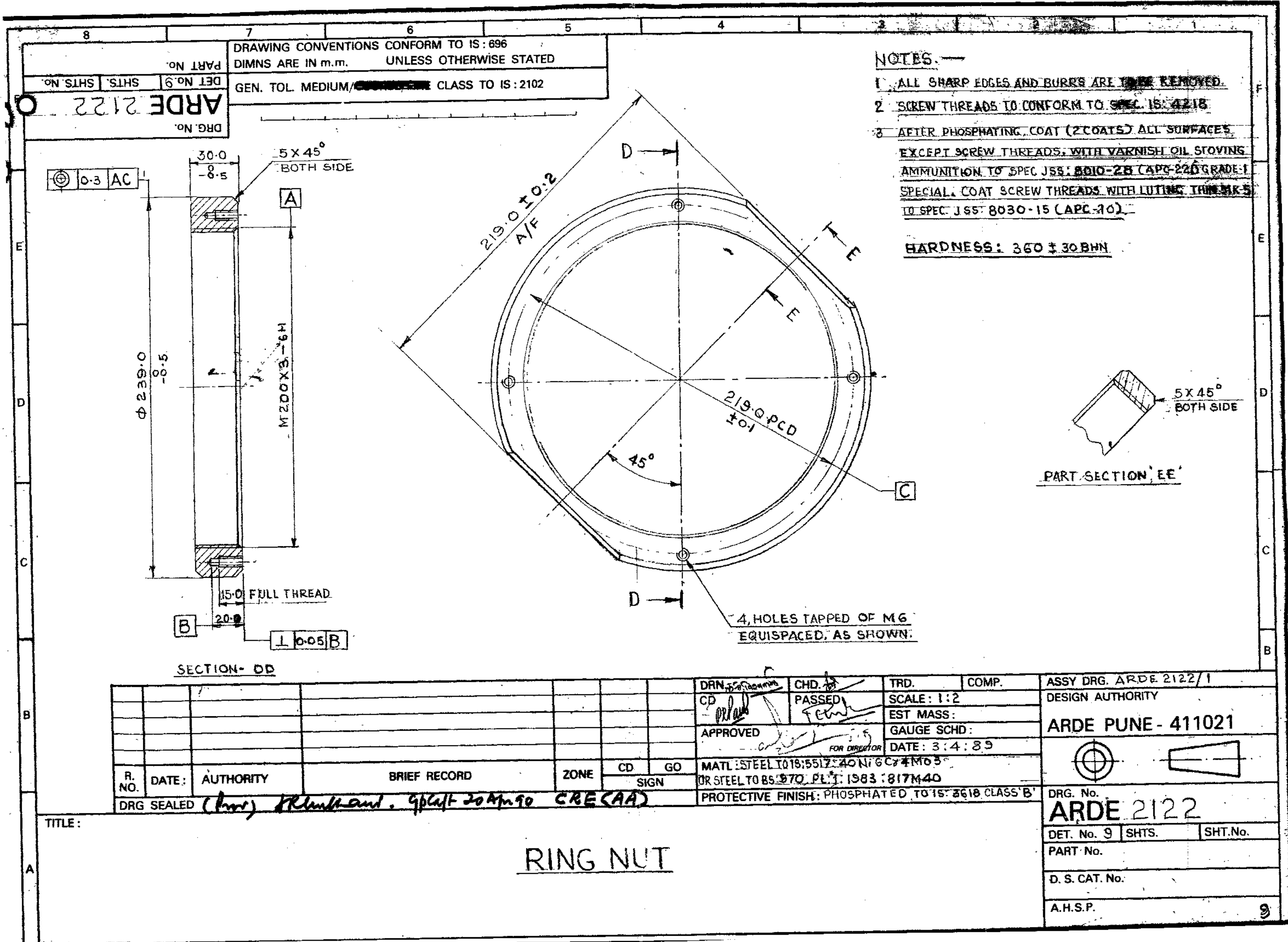


A-A — BASED ON DRG NO ARDE 9501-01/4 SHT. 1

DRG. No. ARDE 2122				ISS. 1			
DET. No. 6				SHTS. 1			
PART No.				D. S. CAT. No.			
A.H.S.P.				DRG. No. ARDE 2122			
DATE: 30/7/97				Gauge Schd:			
EST MASS:				DATE: 30/7/97			
SCALE: 1:1				DATE: 30/7/97			
TRD. COMP.				DATE: 30/7/97			
CD				DATE: 30/7/97			
APPROVED SC E				DATE: 30/7/97			
(R PERUMAL)				DATE: 30/7/97			
MATE: STEEL TO IS 5517. 40 NI 5CY 4 MO3				DATE: 30/7/97			
PROTECTIVE FINISH: PHOSPHATED TO IS: 3618 CLASS B				DATE: 30/7/97			
ZONE: CD GO				DATE: 30/7/97			
SIGN				DATE: 30/7/97			
BRIEF RECORD				DATE: 30/7/97			
AUTHORITY				DATE: 30/7/97			
DATE:				DATE: 30/7/97			
R. NO.				DATE: 30/7/97			

TITLE: **LUG HOUSING**

1	2	3	4
PART No.		DRAWING CONVENTIONS CONFORM TO IS : 696	
DET. No. 8		DIMNS ARE IN m.m. UNLESS OTHERWISE STATED	
SHTS. 2		GEN. TOL. MEDIUM / CLASS TO IS 2102	
SHTS. No. 2			
DRG. No.			
ARDE 2122			
NOTE:— <u>ALL SHARP EDGES & BURRS ARE TO BE REMOVED.</u>			
			
BASED ON DRG NO ARDE 9501-01/5, SHT.2			
R. NO.	DATE :	AUTHORITY	BRIEF RECORD
			ZONE
			CD
			GO
			SIGN
DRG. SEALED (PROV) <i>for in June 08 Aug 97</i> CRE (A.A.)			
DRN. <i>for in June 08 Aug 97</i>	CHD.	TRD.	COMP.
CD	PASSED <i>for in June 08 Aug 97</i>	SCALE : 1:1	ASSY. DRG. ARDE 2122/4
APPROVED SC'E <i>for in June 08 Aug 97</i>		EST. MASS:	DESIGN AUTHORITY
(R. PERUMAL)		GAUGE SCHD :	ARDE PUNE-411 021
MATE : STAINLESS STEEL TO IS 6527 07 Cr 18 Ni 9		DATE : 30/7/97	
PROTECTIVE FINISH :			
TITLE :		DRG. No.	
PLUG FASTENING (FOR LUG HOUSING)		ISS. 1.	
		ARDE 2122	
		DET. No. 8	SHTS. 2
		SHT. No. 2	
		PART No.	
		D.S.CAT.No.	
		A.H.S.P.	



DRAWING CONVENTIONS CONFORM TO IS: 696
DIMNS ARE IN m.m. UNLESS OTHERWISE STATED
GEN. TOL. MEDIUM/CLASS TO IS: 2102

DRG. No. ARDE 2122
DET. No. 9 SHTS. SHT.No.

30.0
8.5
5 X 45°
BOTH SIDE
A
239.0
0.5
M20X3-6H
15.0 FULL THREAD
20.0
B
1 0.05 B

219.0 ± 0.2
A/F

4 HOLES TAPPED OF M6
EQUISPACED, AS SHOWN.

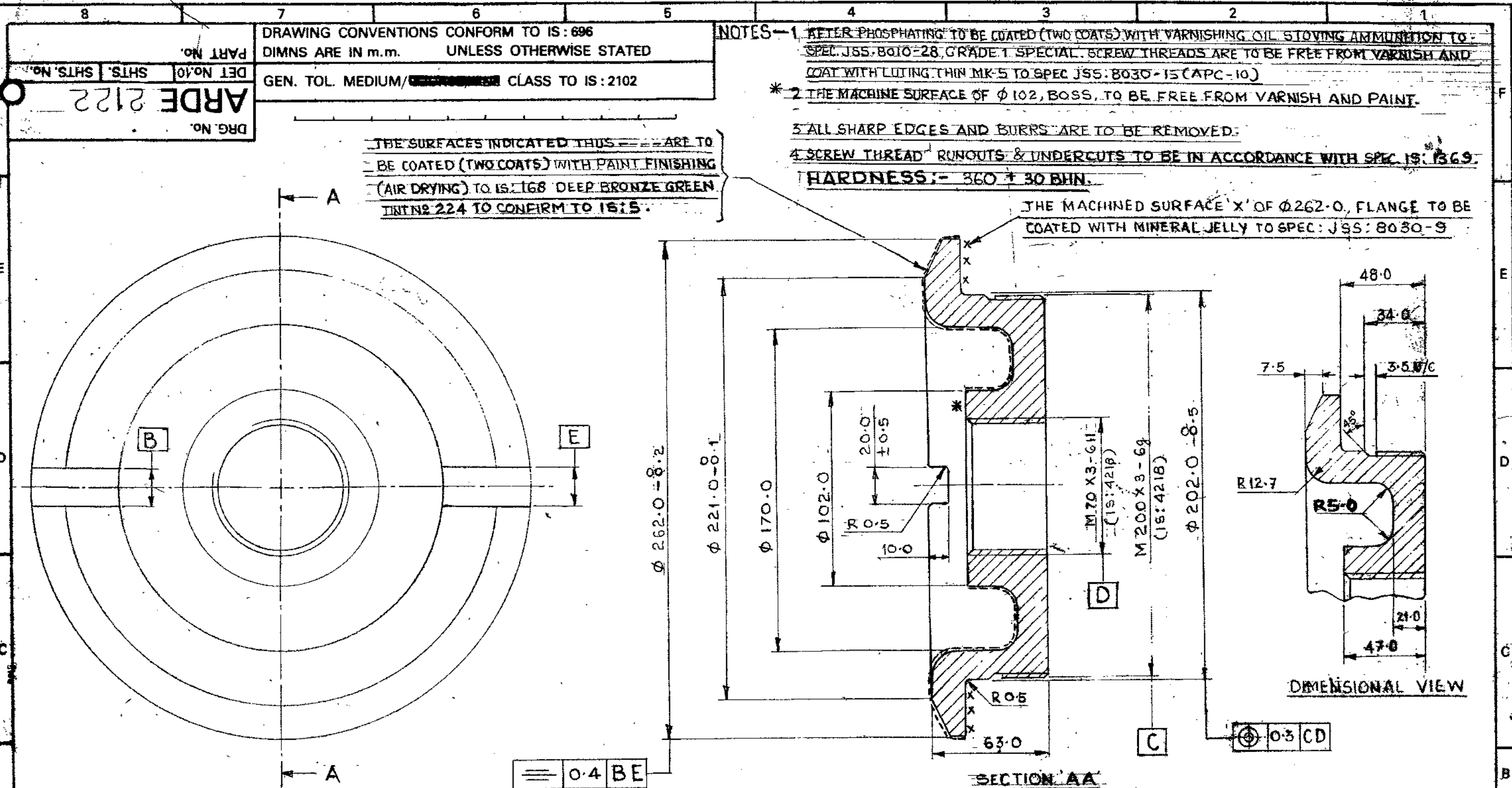
PART SECTION 'EE'

5 X 45°
BOTH SIDE

DRG. No.	CD	CHD.	TRD.	COMP.	ASSY DRG. ARDE 2122/1
APPROVED	SIGN	PASSED	SCALE: 1:2	EST MASS:	DESIGN AUTHORITY
DATE: 3.4.89	GO	FOR DIRECTOR	GAUGE SCHD:	DATE: 3.4.89	ARDE PUNE - 411021
MATL: STEEL TO IS: 5512-40 Ni 6 Cr 4 Mo 5	ZONE	CD	GO	PROTECTIVE FINISH: PHOSPHATED TO IS: 8018 CLASS 'B'	DRG. No. ARDE 2122
OR STEEL TO BS: 570 PLT: 1983: 817M40					DET. No. 9 SHTS. SHT.No.
					PART No.
					D. S. CAT. No.
					A.H.S.P.

TITLE:

RING NUT



DRN. <i>PR</i>	CHD. <i>PR</i>	TRD.	COMP.	ASSY. DRG. ARDE 2122/1
CD <i>PR</i>	PASSED <i>PR</i>	SCALE: 1:2		DESIGN AUTHORITY
APPROVED <i>PR</i>		NET MASS:		ARDE PUNE - 411021
		GAUGE SCHD:		
		DATE: 29-3-89		
MATL: STEEL TO IS: 5517: 40 Ni 6Cr 4Mo 3				
OR BS: 970: PL. 1: 1983: 817 M 40				
PROTECTIVE FINISH: PHOSPHATED TO IS: 3618 CLASS 'B'				

TITLE:

FILLING PLUG

DRG. No.
ARDE 2122

DET. No. 10 SHTS. SHT. No.

PART No.

D. S. CAT. No.

A.H.S.P.

10