GOVERNMENT OF INDIA
MINISTRY OF DEFENCE

JOINT SERVICES SPECIFICATION

ON

MOULDING POWDERS, MOULDED PLASTICS (PHENOLIC)

JSS 9330-05:2012
(Revision No. 1)

DIRECTORATE OF STANDARDISATION
DEPARTMENT OF DEFENCE PRODUCTION
MINISTRY OF DEFENCE
'H' BLOCK, NIRMAN BHAWAN PO
NEW DELHI - 110 011

GOVERNMENT OF INDIA
MINISTRY OF DEFENCE

JOINT SERVICES SPECIFICATION

ON

MOULDING POWDERS, MOULDED PLASTICS (PHENOLIC)

JSS 9330-05:2012
(Revision No. 1)

DIRECTORATE OF STANDARDISATION
DEPARTMENT OF DEFENCE PRODUCTION
MINISTRY OF DEFENCE
'H' BLOCK, NIRMAN BHAWAN PO
NEW DELHI - 110 011

LIST OF MEMBERS ASSOCIATED WITH ARMAMENT STANDARDISATION SUB COMMITTEE

1. This Joint Services Specification has been approved by Dr. SN Asthana, Sc 'G' Director, Directorate of Armaments (R&D), and Chairman Armament Standardisation Sub Committee by circulation.

2. The following members were present/consulted in approving the document: -

Sl No.	Name & Designation	Organisation
1.	Shri AC Jain, Addl. Director	Dte of Armaments, DRDO Orgn, New Delhi
2.	Col SK Mohan	ADGWE/GS (WE-2/3), New Delhi
3.	Col RN Nambiar	Dte of Arty (GS/Artillary-5), New Delhi
4.	Shri B.P. Singh, DON	Dte Gen of Naval Armt, Naval HQ, New Delhi
5	Air Cmde R Kumar, PDA	Dte of Armt & Safety Eqpt, Air HQ, New Delhi
6.	Col Sunil Bhatia	DGEME, Army HQ, New Delhi
7.	Capt VP Varghese	DGNAI, Naval HQ, New Delhi
8.	Shri Yogesh Kumar, SSO – II	DGAQA, DD (Armt) Gp, New Delhi
9.	Shri R. K. Ramteke Deputy Controller	CQA (ME), Pune
10	Col JS Lotay, Jt Controller	CQA (Amn), Pune
11.	Lt Col Y.C Panday	CQA (SA), Ichapur, West Bengal
12.	Col A.N. Mathur	CQA (W), Jabalpur
13.	Shri SC Aglawe, Sc 'F'	HEMRL, DRDO, Pune
14.	Shri GC Adhikari, Sc 'F'	ARDE/DRDO Orgn, Pune
15.	Shri Shrish Kumar Jt. General Manager	Ammunition Factory, Pune
16.	Shri S K Saxena, NSO	Secretary ASSC

RECORD OF AMENDMENTS

Amendment		Amendment pertains to : Sl. No./Para No./ Column No.	Authority	Amended by	Signature & Date
No.	Date			Name & Appointment (IN BLOCK LETTERS)	

CONTENTS

0. FOREWORD

0.1 This Joint Services Specification has been prepared by the Armament Standardisation Sub Committee on the authority of the Standardisation Committee, Ministry of Defence.

0.2 This specification has been approved by the Ministry of Defence and is mandatory for use by the Defence Services.

0.3 This specification is the revision of JSS 9330–05 : 2002 and supersedes the same.

0.4 This specification would be used for supply and quality assurance of Moulding Powders, Moulded Plastics, (Phenolic).

0.5 Quality Assurance Authority for the item covered in this specification is The Controller, Controllerate of Quality Assurance (Military Explosives), Aundh Road, Kirkee, Pune - 411 020. Enquiries regarding this specification relating to any contractual conditions should be addressed to the Quality Assurance Authority named in the tender or contract. Other enquiries should be referred to: -

The Director,
Directorate of Standardisation,
Ministry of Defence,
`H' Block, Nirman Bhawan PO
New Delhi - 110 011

0.6 Copies of this specification can be obtained on payment from: -

The Director,
Directorate of Standardisation
Standardisation Documents Centre,
Ministry of Defence
Room No. 5, ‘J’ Block
Nirman Bhawan, PO New Delhi - 110 011.

0.7 This specification holds good only for the supply order for which it is issued.

1. SCOPE

1.1 This specification is meant to govern, supply and quality assurance of Moulding Powders, Moulding Plastics (Phenolic) suitable for preparation of moulded plastic stores for use in Armament stores to replace parts, even metallic.

2. RELATED SPECIFICATIONS/DOCUMENT

2.1 Reference is made in this specification to: -

IS 138 : 1992	Ready Mixed Paint, Marking, for Packages and Petrol Containers - Specification (Third Revision) Reaffirmed 2009, Amds 1
IS 867:1963	Methods of test for phenolic moulding materials Reaffirmed 2008
JSG 0112:1997 (Revision No. 1)	General method of testing and assessment of impurities in chemicals/materials used in the manufacturing of explosives and ammunition.

2.2 Copies of the Indian Standards, are obtainable on payment from: -

Bureau of Indian Standards,
Manak Bhavan,
9, Bahadur Shah Zafar Marg,
New Delhi - 110 002

or

their regional/branch offices.

2.3 Copy of the JSG is obtainable on payment from :-

The Director,
Directorate of Standardisation
Standardisation Documents Centre,
Ministry of Defence
Room No. 5, 'J' Block
Nirman Bhawan, PO New Delhi - 110 011.

3. DESCRIPTION

3.1 The Moulding materials shall consist of a synthetic resinoid derived from the reaction of Phenol or its homologous with Formaldehyde. The uncured material suitable for feeding the mould, shall be in powder, flake or granular form or compressed pellets or tablets and comprising a mixture of thermosetting resin with various fillers which become hard, infusable and insoluble after being cured by heat and pressure. The articles moulded from it shall have the required Tensile strength, Impact strength and other desired mechanical properties.

3.2 The mouldings shall conform to the drawings quoted in the contract and shall comply in all respects with this specification.

3.3 The powder may be supplied in appropriate type as ordered according to the end use which shall be stated in the contract.

3.4 No other form or type of moulding composition may be used without the prior sanction of Quality Assurance Authority.

3.5 The moulder shall not add to or mix with the moulding powder or any other moulding powder, whether it be of the same type or not, any filler or any other material whatsoever without the prior sanction of the Quality Assurance Authority.

3.6 Types

3.6.1 The moulding material shall be classified into three types viz Type I, Type II and Type III based on mechanical strength as given in clause 6.7.

3.6.2 The specific type (I, II or III) shall be mentioned by the purchaser in the supply order/Tender enquiry.

4. TENDER SAMPLE

4.1 The contractor shall submit the material in its premoulding state and its moulded pieces of stores, free of charge, when called for in the tender. Both shall be in accordance with the requirements of this specification.

5. PRE-INSPECTION OF STORES/CONSIGNMENT

5.1 Manufacturer/Contractor must satisfy themselves that the stores are in accordance with the terms of the 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 the contract. A declaration by the contractor that 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 pre-inspection showing the features checked/tested and will have the test certificate attached to the Challan/declaration.

5.2 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.

6. QUALITY ASSURANCE

6.1 Inspection

6.1.1 The Moulding material and in the case of moulded stores, the material in the pre-moulding stage and its finished stores, both shall be subject to inspection by and to the approval of the Quality Assurance Officer/Quality Assurance Authority.

6.1.2 Samples of the required material and of the packages may be taken from any portion of the batch/lot/consignment.

6.2 Sampling

6.2.1 Representative samples of the material in the premoulding stage and moulded stores shall be drawn as per instruction of the Quality Assurance Authority.

6.3 Criteria for Conformity

6.3.1 If, on examination, any sample be found not to conform to this specification, the whole batch/lot/consignment may be rejected.

6.3.2 The foregoing provisions shall equally apply to the prime contractors and sub contractors, if any.

6.4 **Testing**

6.4.1 In the case of moulding materials, the finished material and its moulded test specimen made as per Appendix 'A' or finished store and in the case of mouldings, the mouldings and its respings shall be tested as given below :-

6.4.2 Testing of moulding powders (pre-moulding stage) as received.

Sl. No.	Characteristics	Requirement	Test Method
1.	Nature of filler (organic) Qualitative examination	—	Appendix 'B'

6.5 Visual fillet examination of specks prepared test specimen or mouldings :

6.5.1 The mouldings shall be free from porosity, blisters, gas pockets, or any other defects and complying in all respects with dimensions shown on the drawing. The mouldings shall be normally black in colour, free from fillet specks, of even and smooth finish and without surface defects. The cut section shall have a homogenous texture. Undesirable fins or flash marks shall be removed by a method approved by the Quality Assurance Officer. Metal or other inserts shall be incorporated in the mouldings only when shown in the drawing. Such inserts shall be incorporated thoroughly and there shall be no pockets between insert and moulding. Screw threads shall be well and truly formed. Where split moulds have been used in the formation of screw threads the finish shall be such that the action of the thread is easy and free from jerkiness or undesirable looseness.

6.6 Chemical tests on moulded stores/test specimen:-

6.6.1 The rasping of the moulded stores/test specimen, passing through a 250 micrometre IS sieve shall comply with the requirements shown below :-

6.6.2 The iron particles from the raspings shall be removed by a magnet.

Srl. No.	Characteristics	Requirements	Test Method
1	2	3	4
(i)	Water soluble matter, per cent	Max 2.0	Appendix 'C'

Srl. No.	Characteristics	Requirements	Test Method
1	2	3	4
(ii)	Aqueous extract tested for		
	(a) Formaldehyde, per cent	Max 0.05	Appendix 'D'
	(b) Phenol, per cent	Max 0.50	IS : 867 Method 15
	I Ammonia, per cent	Max 0.02	IS : 867 Method 16
	(d) Chlorides as Sodium chloride, percent by mass	Max 0.10	JSG 0112 Method 7 (b)
	(e) Sulphates as Sodium sulphate, percent by mass	Max 0.20	JSG 0112 Method 8
	(f) pH	5 to 8	JSG 0112 Method 5 (b)
(iii)	Acetone soluble matter Percent by mass	Max 6.0	IS : 867 Method 14

6.7 The moulded stores/specimen in addition shall comply with the requirements shown below :-

Srl. No.	Characteristics	Requirements			Refer to IS 867
		Type I	Type II	Type III	
1	2	3	4	5	6
(i)	Tensile strength, kg/cm², Min	400	350	350	Method No. 9
(ii)	Izod Impact Strength (notched), kg.m, Min	0.03	0.05	0.07	Method No. 10
(iii)	Water absorption, mg , Max	100	100	150	Method No. 12
(iv)	Swelling after immersion in water, mm , Max	0.152	0.152	0.254	Method No. 12

7. WARRANTY

7.1 The stores supplied against the contract shall be deemed to be warranted against defective material and performance by the contractor for a period of 12 months from the date of receipt of the store at the consignee's end and if during this period any of the stores supplied is found defective, the same shall be replaced by the contractor/manufacturer, supplier or contractor free of all charges, at the consignee's premises.

8. PACKAGING

8.1 The moulding material shall be supplied in sound, clean and dry approved packages, containing an approved quantity.

8.2 The moulded stores shall be packed and delivered as required by the store specification, drawing or contract.

8.3 The inclusion of any foreign matter or impurities in any of the packages shall render the whole consignment liable to rejection.

9. MARKING

9.1 All packages containing the material shall be indelibly legibly marked with the following details as applicable :-

i) Nomenclature and specification number of the material with type.

ii) Name and address of the consignee.

iii) A/T or S.O number and date.

iv) Consignment number

v) Lot/batch number and date of manufacture

vi) Gross and net mass.

vii) Consecutive number of package and total number of packages in the consignment.

viii) Date of supply.

ix) Contractor's initials or recognised trade mark.

9.2 In addition to the above the Quality Assurance Officer/Quality Assurance Authority may suggest some more marking/identification considered suitable at the time of Inspection.

9.3 The paint used for marking the outer packages shall conform to IS : 138 and to the satisfaction of the Quality Assurance Officer/Quality Assurance Authority.

10. SAFETY OF OPERATIONS

10.1 Nothing in this specification shall relieve the manufacturer / supplier / contractor / user of his responsibility for the safety of operations in manufacture, storage, transit or use of this store.

11. SUGGESTIONS FOR IMPROVEMENT

11.1 Any suggestion for improvement in this document may be forwarded to: -

The Director,
Directorate of Standardisation,
Ministry of Defence,
`H' Block, Nirman Bhawan PO,
New Delhi- 110 011.

APPENDIX 'A'

A. PREPARATION OF TEST SPECIMEN

A.1 Test specimen from moulding powders shall be prepared in positive moulds with a moulding pressure of 150 kg to 480 kg per square cm and temperature between 150ºC to 170ºC.

APPENDIX 'B'

B. QUALITATIVE IDENTIFICATION OF NATURE OF THE FILLERS

(Tests are to be done on the original, uncured moulding powder only).

B.1 Take a little of the Acetone extracted powder and disperse it in a little water. Take few drops of the dispersion on microscopic slide. Dry it on a water bath. Add Standard staining solution (two drops of Phloroglucinol in Hydrochloric acid) and observe it under microscope (100 magnification) for colour and shape of fibre.

For wood pulp. (mechanical filler)	Magenta colour; thick, short fibres having irregular cross section like cut wood pieces.
For chemical pulp (paper, rag, cotton, etc.)	No change in colour, (i) for Cotton and rag twisted fibrous structure (ii) for paper partly structure of wood pulp having magenta colour and partly of cotton fibrous structure without any colouration.

B.2 Take few drops of dispersion on another microscopic slide, dry it on a water bath and add two drops of standard staining solution i.e. Herzberge solution (I_2 and $ZnC1_2$). Note the colour change :-

For wood pulp (mechanical filler)	No change in colour.
For chemical pulp. (i) Rags, cotton etc.	Wine red colour.
(ii) Paper pulp	Partly wine red and partly colourless

APPENDIX `C'

C. DETERMINATION OF WATER SOLUBLE MATTER

C.1 A weighed amount of raspings passing through a 250 micrometre IS sieve are covered with 10 times their own mass of boiling distilled water and the suspension allowed to cool naturally for one hour with occasional shaking. The extract is then filtered by suction through a sintered glass filter, 10 ml. of the filtered extract is evaporated and the residue dried to constant mass in a suitable oven at a controlled temperature not exceeding 105ºC.

APPENDIX `D'

D. DETERMINATION OF FORMALDEHYDE

D.1 To 100 ml of the aqueous extract prepared as in Appendix 'C' above are added 5 ml of a 5 per cent solution of Dimedone in grade 1 alcohol. A few drops of Bromophenol blue indicator are added and sufficient dilute Hydrochloric acid is added to produce a yellow colour. Dilute Sodium hydroxide is then added until the mixed solution is just purple and then added 50 ml of a mixture of 2 volumes of IN Sodium acetate and 1 volume of IN Hydrochloric acid.

D.2 The whole solution is allowed to stand 12 hours and is filtered on a tared sintered glass Gooch funnel (porosity G.8), washed free from chloride with a little cold water and dried to constant mass at 60°C (Approx. 3 hours) or at 100°C. (Approx. ½ hour).

Calculation: -

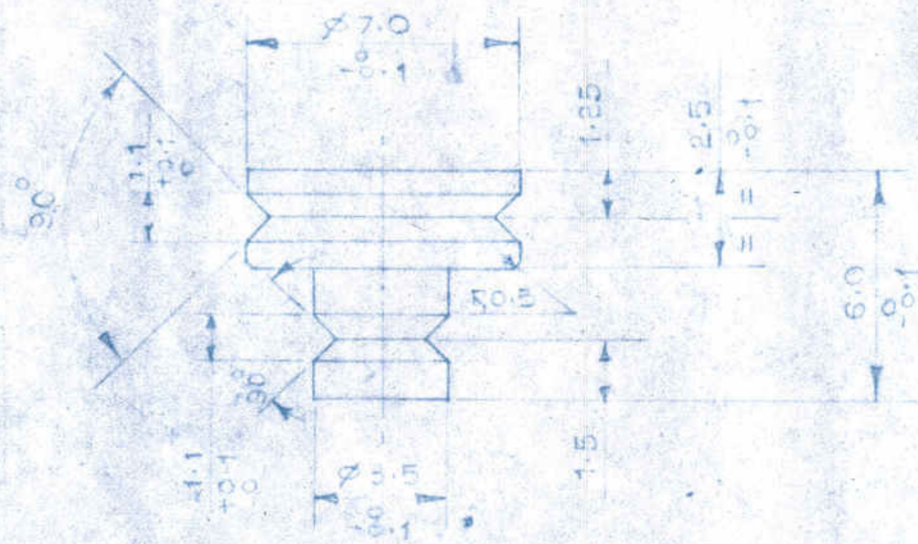
Formaldehyde, per cent (CH_2O) = 1.03 X M

Where M = mass of the Formaldehyde dimedone precipitate.

45

DRG. No.	DET No 3	SHTS.	SHT NO.
ERDL DRG 971	PART No.		

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



NOTES:-

1) ALL SHARP EDGES AND BURRS ARE TO BE REMOVED.
2) DIMENSIONS ARE TO BE READ AS APPLYING AFTER COATING.
3) FOR EASE OF FABRICATION OF PRIMER ASSEMBLY, EMPTY, DIMENSION 6.0 CAN BE INCREASED AS REQUIRED KEEPING ALL OTHER DIMENSIONS CONSTANT. DIMENSION 6.0 CAN THEN BE MAINTAINED BY MACHINING AFTER MOULDING.

MATERIAL:-

BRASS TO IS : ~~3433-1966~~ 6912-1985 ~~CuZn 42 Pb2~~ IN ~~HOT ROLLED~~ FLB CONDITION 'M'
OR ~~BRASS TO~~ BS~~S~~ 2874 1986 CZ 122 IN ~~(H)~~ 'M' CONDITION.

PROTECTIVE FINISH:-

TO BE SILVER PLATED TO MIN 5 MICRON THICKNESS

P. No.	DATE	AUTHORITY	BRIEF RECORD	ZONE	SIGN CD	SIGN SD
	19.4.10	ARD 2403	MATL. & MATL. SPECN. AMENDED			
	10-10-88		PROVISIONALLY SEALED BY D.N.A.I.			MSRole

DRG SEALED

DRN NAGPURE	CHD.	TRD.	COMP.	ASSY DRG ERDL DRG 971/1
CD	PASSED Salunke	SCALE:- 5:1		DESIGN AUTHORITY
APPROVED FOR DIRECTOR		EST MASS:		ERDL PUNE-411021
		GAUGE SCHD:		
		DATE: 18-5-86		
MATL: AS ON DRG.				
PROTECTIVE FINISH:- AS ON DRG.				

TITLE: CONTACT BOLT

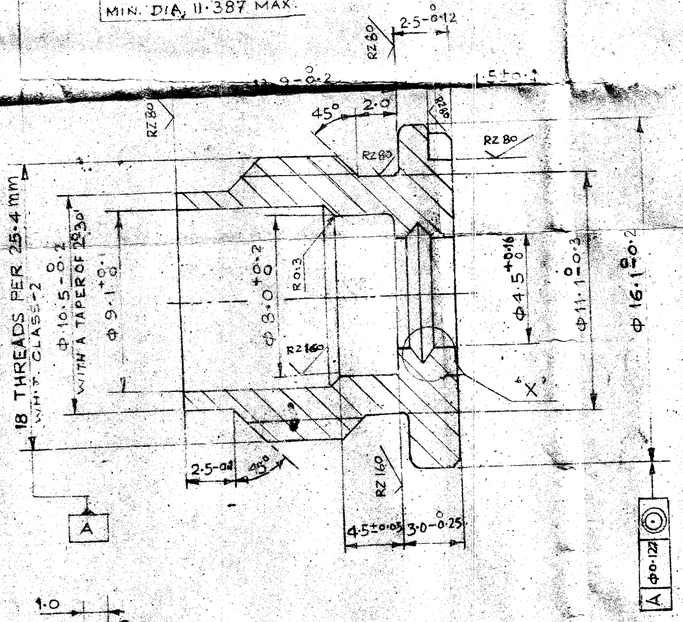
DRG No. ERDL. DRG 971		
DET. No. 3	SHTS.	SHT No.
PART No.		
D. S. CAT. No.		
A.H.S.P.		

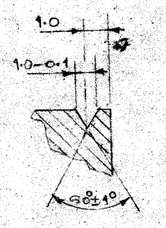
MAJ. DIA. 13·193 $^{-0.158}_{-0.458}$

EFF. DIA. 12·290 $^{0}_{-0.115}$

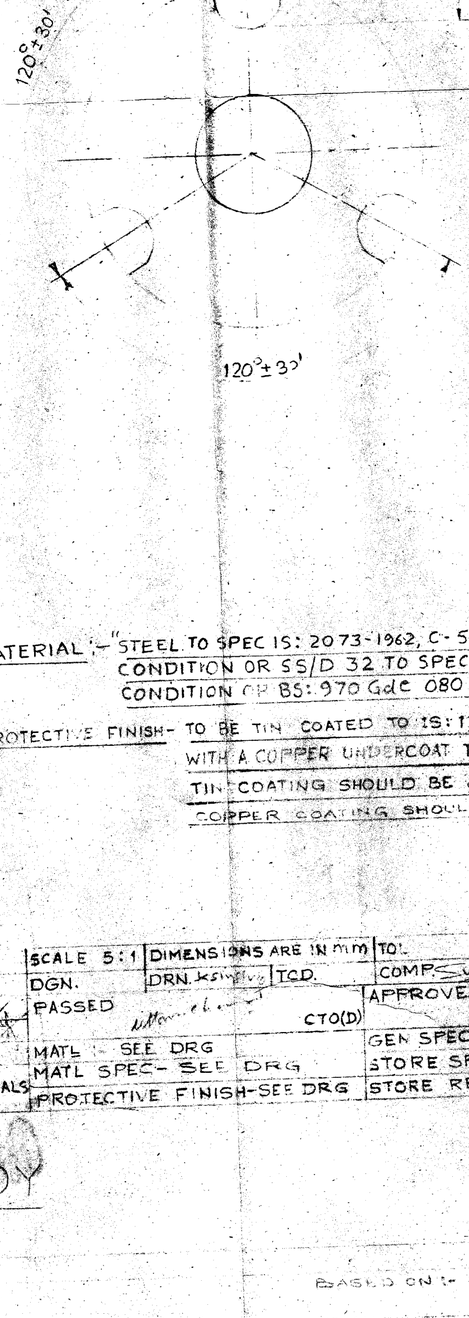
MIN. DIA. 11·387 MAX.

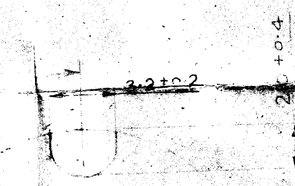
18 THREADS PER 25·4 mm WHIT. CLASS-2





VIEW AT-'X'





NOTES:-

DIMENSIONS TO APPLY AFTER COATING. COMPONENTS TO BE CHECKED BEFORE COATING CONSIDERING COATING

SURFACE ROUGHNESS:-

Rz 40 UNLESS OTHERWISE STATED.

MATERIAL :- "STEEL TO SPEC IS: 2073-1962, C-55 Mn 75 IN NORMALIZED CONDITION OR SS/D 32 TO SPECN JSS 9510-1 IN NORMALIZED CONDITION OR BS: 970 Gde 080 M 50 IN NORMALIZED CONDITION.

PROTECTIVE FINISH- TO BE TIN COATED TO IS: 1359-1966 GDC (Sn 8) WITH A COPPER UNDERCOAT TO IS: 1772-1961 GD. A TIN COATING SHOULD BE 8 MICRONS (MINIMUM) COPPER COATING SHOULD BE 5 MICRONS (MIN)

R No.	DATE	ZONE	BRIEF RECORD	AUTHORITY	INITIALS
	24-09-07	BC-1,2,3	"MATL. SPECN. AMENDED."	ARD 2371	
	20-3-95	A-1	DRG No. NAD 1589/1/1 WAS NASK 651 (REV)	ARD 2230	
	15.12.93		APPROVED		

SCALE 5:1	DIMENSIONS ARE IN mm	TOL.	DS CAT No.
DGN.	DRN.	TCD.	COMP. CHD.
PASSED		CTO(D)	APPROVED DNAI
MATL - SEE DRG			GEN SPEC-NA SPEC A 318
MATL SPEC- SEE DRG			STORE SPEC
PROTECTIVE FINISH-SEE DRG			STORE REF No.

ASSY DRG. ERDL 971

DTE OF NAVAL ARMAMENT INSPECTION NHQ, NEW DELHI.

DRG No.

NAD 1589/1/1

BODY

BASED ON :- OFK DRG No. KH/S-620231 Dt. 09-1-92

USED ON : PRIMER ELECTRIC No. N 30 MK 1

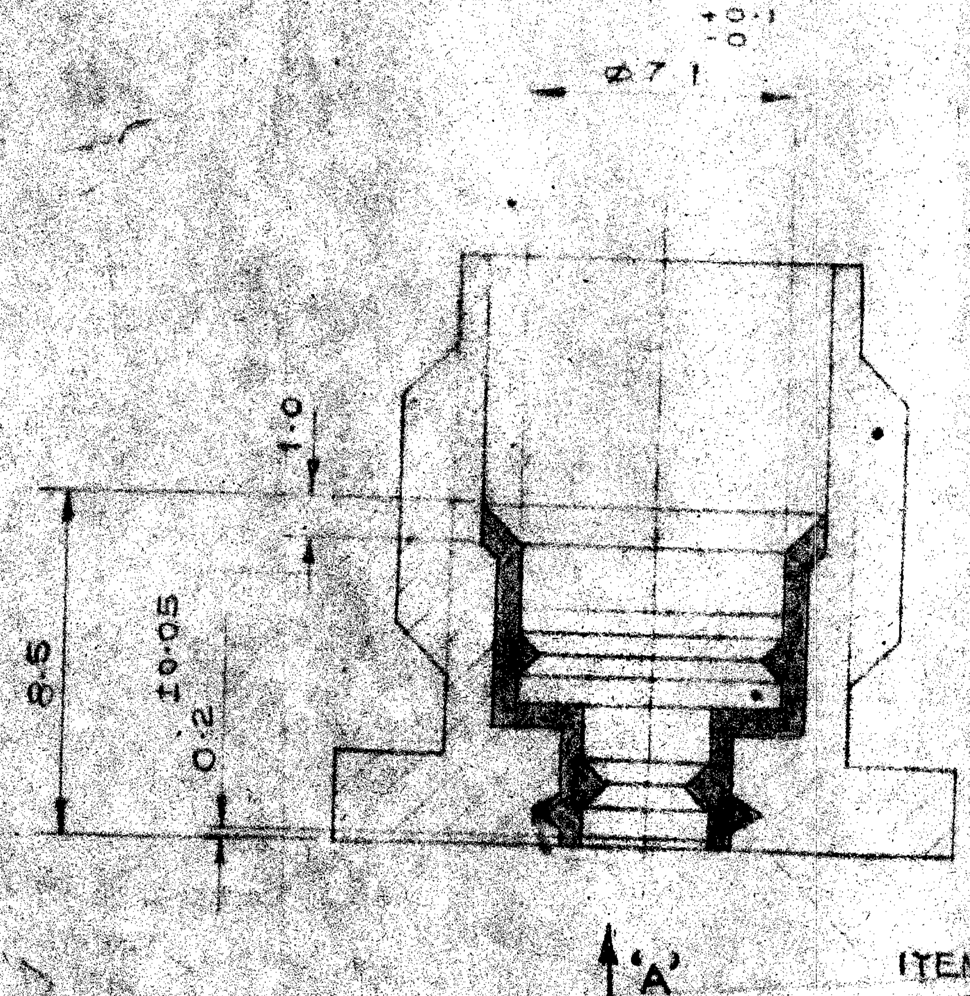
TRIM ON THIS LINE WHEN SUPPLIED TO TRADE

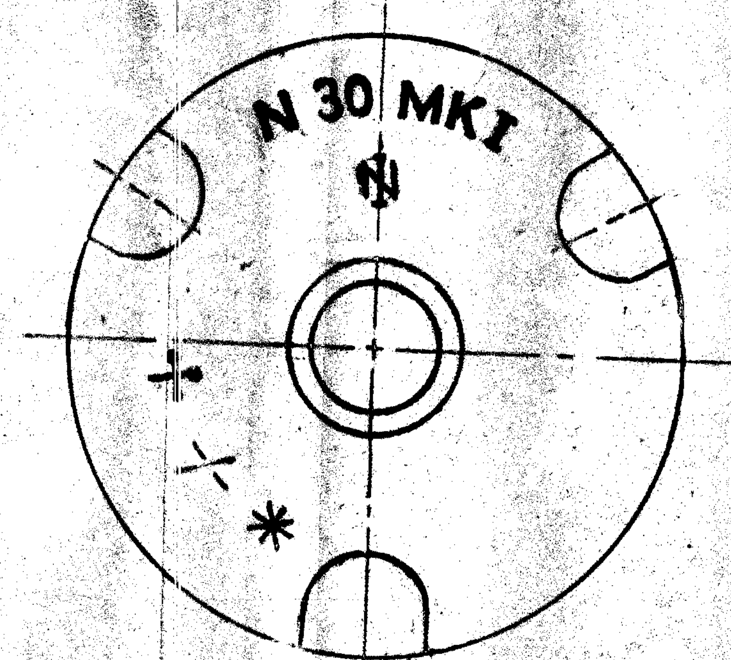
ERDL DRG 971
DET No 1 | SHTS | SHT No
PART No
D.S CAT No

DRAWING CONVENTIONS CONFORM TO IS 696
DIMNS ARE IN mm UNLESS OTHERWISE STATED
GEN TOL MEDIUM / COARSE / FINE CLASS TO IS 2102

LIST OF COMPONENTS

S No	DESCRIPTION	DRG No	DET No	No OFF
1	BODY	NAD 1589/1/1	—	1
2	CONTACT BOLT	ERDL DRG 971	3	1





VIEW IN DIRECTION OF ARROW 'A'

MARKINGS

- ✝ CONTRACTOR'S INITIALS OR RECOGNISED TRADE MARK
- -/- DATE OF MANUFACTURE (YEAR)
- ✱ LOT NUMBER
- N MONOGRAM

NOTE :-

INSULATION RESISTANCE BETWEEN ITEM 1 & 2 TO BE MORE THAN 100 MEGA OHMS AFTER CHARGING AT 100 V FOR ONE MINUTE.

ITEM 1 & 2 TO BE MOULDED WITH GLASS FILLED PHENOLIC RESIN TO VSS/1097 GRADE-A AS SHOWN (~~GRADE SP-16 OF M/S INDIAN PLASTICS~~) * 1330-M

LEAK TEST:- THE MOULDED PRIMERS SHOULD NOT SHOW ANY LEAKAGE WHEN TESTED AT A PRESSURE OF 28 ± 18 kgf/cm²

R. No	DATE	AUTHORITY	BRIEF RECORD	ZONE	C.D. SIGN	G.O.
6	31.01.08	ARD 2274	NOTE AMENDED			
5	12-12-97	ARD 2270	A NOTE FOR LEAK TEST ADDED	C-2,4,5		
4	20-3-95	ARD 2230	DRG No NAD 1589/1/1 WAS NASK 651 (PROV) LIST OF COMPONENTS DRG No. COLUMN.	F-2		
3	29-12-93	ARD 2214	DRG AMENDED	EF-1&2		
2	16-7-93	ARD 2203	VIEW IN DIRECTION OF ARROW A SHOWING MARKINGS ADDED.	B.C-6,7 C.D.E-2,3,4		
1	10-10-88		PROVISIONALLY SEALED BY D.N.A.I.			

✝ DRG SEALED

DRN: NAGPURE	CHD	TRD	COMP
CD	PASSED	SCALE 5:1	
APPROVED	FOR DIRECTOR	EST. MASS	
		GAUGE SCHD	
		DATE 8-8-88	
MATL:-		STORE SPECN: ERDL/PYRO/PS-152	
PROTECTIVE FINISH			

ASSY DRG ERDL DRG 971
DESIGN AUTHORITY
ERDL PUNE-411021

TITLE -

PRIMER ELECTRIC No N30 MK 1
(EMPTY)

DRG No ERDL DRG 971
DET No 1 | SHTS | SHT No
PART No
D.S. CAT No
A.H.S.P.

USED ON CTGE 30mm AMMUNITION (AK 230 GUN)

SCOPE OF WORK

REF.: ITEM CODE NO. 9911349627

1) Collection of store : After getting confirmation from OFK , firm will collect Empty component (Body and Contact) with- in one week, issued by OFK Store section.
2) Moulding of components i.e. empty Primer Body and Contact , to be carried out by the firm at the firm premises. After moulding firm will give inspection call to NAI, Khamaria with-in 3 weeks from the date of collection of material at OFK.
3) Moulded assembly (duly inspection by NAI Khamaria) are delivered / returned to OFK in well packed condition (packed in thick paper covered with polythene, each pack containing 500 nos. and last pack containing balance qty. and all the packets to be packed in one paper cartoon) along with pre-inspection report and gurantee certificate. Test report of Moulding powder used in moulding process are also to be submitted along with the aforesaid documents.
4) Usually the lot size will range from 5200-5400 Nos. of components.
5) After acceptance of moulded lot by NAI Khamaria, the proof sample shall be subjected to empty filled dynamic proof and on passing in the same final acceptance and I/Note for supplied quantity shall be given.

JGM / RS

WM/RP

HOS/A12