



भारत सरकार
GOVERNMENT OF INDIA
रक्षा मंत्रालय
MINISTRY OF DEFENCE

संयुक्त सेवा विनिर्देश
JOINT SERVICES SPECIFICATION

ON

AMMUNITION PROTECTIVE COMPOSITIONS
(ADHESIVES, VARNISHES AND LACQUERS) (VARIOUS)
(SHELLAC BASED)

मानकीकरण निदेशालय
रक्षा उत्पादन विभाग
रक्षा मंत्रालय
'एच'-ब्लॉक, निर्माण भवन डाकघर
नई दिल्ली-११००११

DIRECTORATE OF STANDARDISATION
DEPARTMENT OF DEFENCE PRODUCTION
MINISTRY OF DEFENCE
'H' BLOCK, NIRMAN BHAVAN POST OFFICE
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LIST OF MEMBERS ASSOCIATED WITH FORMULATION OF THIS STANDARD

1. The fourth revision of this Joint Services Specification 8010-63 has been approved by Shri RS Gauba, Sc 'G', Associate Director, PO-II, DRDO, Chairman, Armament Standardisation Sub-committee by circulation.
2. The representatives of following organisations have been present/consulted in approving the document:

S. No.	Organisations
1.	Programme Office-II, DRDO Orgn, New Delhi
2.	ADGWE/GS (WE-2/3), New Delhi
3.	Dte of Arty (GS/Artillery-5), New Delhi
4.	Dte Gen of Naval Armt, Naval HQ, New Delhi
5.	Dte of Armt & Safety Eqpt, Air HQ, New Delhi
6.	DGEME, Army HQ, New Delhi
7.	DGNAI, Naval HQ, New Delhi
8.	DGAQA, JD (Armt) Gp, New Delhi
9.	CQA (ME), Pune
10.	CQA (Amn), Pune
11.	CQA (SA), Ichapur, West Bengal
12.	CQA (W), Jabalpur
13.	HEMRL, DRDO, Pune
14.	ARDE/DRDO Orgn, Pune
15.	Ammunition Factory, Pune
16.	Secretary ASSC

RECORD OF AMENDMENTS

Amendment		Amendment pertains to S. No./Para No./ Column No.	Authority	Amended by	Signature & Date
No.	Date			Name & Appointment (In block letters)	

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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 JSS 8010-63 : 2016 (Fourth Revision):

- a) was prepared in the year 1990.
- b) was revised in the year 1997, 2004 & 2012 and supersedes the same.

0.4 This specification would be used for Manufacture, Quality Assurance and Procurement of Ammunition Protective Compositions (Adhesives, Varnishes and Lacquers) (Various) (Shellac Based).

0.5 Quality Assurance Authority for the item covered in this specification is the Controller, Directorate of Quality Assurance (Military Explosives), Aundh Road, Pune-411 020. Enquiries regarding technical parameters shall be addressed to the Quality Assurance Authority, while other enquiries shall be referred to:

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

0.6 Non-registered users can obtain the following on payment:

a) **Copies of IS from:**

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

or

their regional/Branch offices.

b) **Copies of JSSs/JSGs from:**

The Director,
Directorate of Standardisation,
Standardisation Documents Centre,
Ministry of Defence,
Room No. 05, 'J' Block,
Nirman Bhawan PO,
New Delhi-110 011.

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0.7 Indian Standard (IS) specifications are available free of cost for registered users on:

Directorate of Standardisation Website:

www.ddpdos.gov.in

For registration visit our website.

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

0.9 Directorate of Standardisation Website - All the approved JSSs/JSGs are available on the Directorate of Standardisation Website *www.ddpdos.gov.in*. Defence Organisations desirous of accessing a copy of this document are requested to approach the Directorate of Standardisation for obtaining user id/password to access the website.

1. SCOPE

This specification is meant to govern Manufacture, Quality Assurance and Procurement of Ammunition Protective Compositions (APC) 201, 202, 211, 212, 218, 222, 223, 224, 225, and 226 which are suitable for use as Adhesives, Varnishes and Lacquers in ammunition components.

2. RELATED SPECIFICATIONS/DOCUMENTS

2.1 References are made in this specification to:

<i>S. No.</i>	<i>Specification No. & Year</i>	<i>Nomenclature</i>
a)	IS 138 : 1992 (Third Revision) AMD 1 Reaffirmed 2014	Ready Mixed Paint, Marking, for Packages and Petrol Containers-Specification
b)	IS 361 : 2009 (Third Revision) Reaffirmed 2014	Specification for Normal Butyl Alcohol, Technical
c)	IS 435 : 1973 (Second Revision) AMD 4 Reaffirmed 2015	Specification for Castor Oil
d)	JSS 6810-122 : 2014 (Third Revision)	Turmeric Ammunition
e)	JSS 6820-03 : 2015 (Third Revision)	Dyes for Lacquers Shellac
f)	JSS 6820-02 : 2012 (Second Revision)	Dyes for Colored Smoke Compositions
g)	JSS 8010-17 : 2016 (Second Revision)	Shellac
h)	JSS 6810-98 : 2014 (Third Revision)	Spirit Denatured Grade 1 and 2 Ammunition
j)	IND/ME/369 (b)	Tritolyl Phosphate
k)	IND/ME/522	Dye Auramine

2.2 Copies of the IND/ME specifications can be obtained on payment from:

The Controller,
Controllerate of Quality Assurance (Military Explosives),
Aundh Road,
Pune-411 020.

3. MATERIAL

The Ammunition Protective Composition shall be homogeneous solutions of Shellac in Spirit, alongwith other ingredients as called for in the following table:

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<i>S. No.</i>	<i>Nomenclature</i>	<i>Spirit Denatured to JSS 6810-98</i>	<i>Shellac to JSS 8010-17</i>	<i>Remarks</i>
a)	Adhesive Shellac Thin (APC 201)	1 litre	800 g	-
b)	Adhesive Shellac Thick (APC 202)	1 litre	1200 g	-
c)	Shellac Lacquer (APC 211)	1 litre	125 g	If required to be tinted, add: 1) 0.8 g Dye Oil Orange to JSS 6820-02 or 2) 0.56 g Dye Auramine to IND/ME/522 or 3) 50 g Turmeric Ammunition to JSS 6810-122
d)	Varnish Shellac Plasticised (APC 212)	1 litre	500 g	Add: 1) 40 g N-Butyl Alcohol to IS 361 2) 25 g Tritolyl Phosphate to IND/ME/369 (b)
e)	Varnish Cap Annulus (APC 218)	1 litre	350 g	Add 12.5 g Castor Oil to IS 435
f)	Varnish Shellac, 6% clear (APC 222)	1 litre	50 g	-
g)	Varnish Shellac, 13.5% (APC 223)	1 litre	125 g	-
h)	Varnish Shellac, 20% (APC 224)	1 litre	200 g	-
j)	Varnish Shellac, 30% (APC 225)	1 litre	325 g	-
k)	Varnish Shellac, 40% (APC 226)	1 litre	500 g	-

NOTE - Items (g) to (k) shall be tinted when required by adding 0.5 g of the appropriate dye conforming to the JSS 6820-03.

4. MANUFACTURE

These Ammunition Protective Compositions shall be prepared by dissolving shellac and other ingredients in spirit Denatured Grade 1 Ammunition and then straining through book muslin. The composition shall be well stirred before use in order that the shellac may be evenly distributed. Spirit Denatured, lost by evaporation shall be replaced as required, before use.

5. TENDER SAMPLE

The manufacturer/contractor/supplier shall submit one tender sample of 500 ml essentially from the same batch/lot of manufacture, free of all charges and conforming to this specification, to the Quality Assurance Officer/Quality Assurance Authority when called for in the tender.

6. PRE-INSPECTION OF STORES/CONSIGNMENT

6.1 Manufacturers/contractors must satisfy themselves that the stores are in accordance with the terms of contract and fully conform to the required specification, by carrying out a thorough pre-inspection of each lot before actually tendering the same for inspection to the Quality Assurance Officer nominated under the terms of the contract. A declaration by the contractor that a 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.

6.2 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.

7. QUALITY ASSURANCE

7.1 Inspection

7.1.1 Ammunition Protective Compositions (Adhesive, Varnishes and Lacquers) (Various) (Shellac Based) and the packages in which it is packed shall be subjected to inspection by and to the approval of the Quality Assurance Officer/Quality Assurance authority.

7.1.2 Sample of the material and the packages in which it is contained may be taken from any portion of a consignment.

7.2 Sampling

A representative sample of 200 ml shall be drawn from each container. Normally the number of containers to be selected at random from a batch/lot shall depend on the size of the batch/lot and shall be in accordance with the following table:

<i>No. of containers in a Batch/Lot</i>	<i>No. of containers to be sampled</i>
Up to 25	3
26 to 50	4
51 to 100	5
101 to 150	6
151 to 300	7
301 to 500	8
501 and above	10

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7.3 Criteria for Conformity

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

7.3.2 The foregoing provisions shall apply equally to prime contractors and to any sub-contractor, if any.

7.4 Test Requirements

Samples taken from any portion of batch/lot/consignment shall conform to Clause **3** above and in addition shall conform to the test requirements shown in the following table:

S. No.	Characteristics		Passing Standard										Test Method
			APC 201	APC 202	APC 211	APC 212	APC 218	APC 222	APC 223	APC 224	APC 225	APC 226	
a)	Total non-volatile matter, percent by mass	<i>Min</i> <i>Max</i>	48 52	58 62	13 15	37 40	30 32	5.5 6.5	13 14	19 21	28 31	37 40	Appx 'A'
b)	Ash, percent by mass	<i>Max</i>	0.50	0.60	0.10	0.40	0.40	0.05	0.10	0.20	0.30	0.40	Appx 'B'
c)	Iodine Value	<i>Max</i>	20	20	20	20	20	20	20	20	20	20	Appx 'C'
d)	Adhesion and finish		Smooth, firmly adherent, continuous hard film, free from cracks and warts										Appx 'D'

NOTE - Confirmatory test for shellac is given at Appx 'E'.

8. WARRANTY

The stores supplied against this specification shall be deemed to bear warranty for 12 months from the date of receipt of stores at consignee's end and against defective design/material/workmanship/performance. If during this period any of the stores supplied is found defective, the same shall be rectified/replaced by the contractor, free of charge, at the user's premises within a period of three months from date of intimation of defect.

9. PACKAGING

9.1 Packaging (preservation, identification and packing) of the store shall be in accordance with the terms of the contract.

9.2 The inclusion of any foreign matter or impurities in any of the package will render the whole consignment liable to rejection.

10. MARKING

10.1 All packages containing the material shall be indelibly and legibly marked with the following details:

- a) Nomenclature and specification number of the material.
- b) Name and address of the consignee.
- c) A/T or SO number and date.
- d) Consignment number.
- e) Batch No. and date of manufacture.
- f) Gross and net mass.
- g) Consecutive number of package and total number of packages in consignment.
- h) Date of supply.
- j) Manufacturer's initials or recognized trademark.

10.2 The paint used for marking should conform to IS 138 (latest issue) and to the satisfaction of the Quality Assurance Officer/Quality Assurance Authority.

10.3 In addition to the above, the Quality Assurance Officer may suggest more markings/identifications suitable at the time of inspection.

11. DEFENCE CATALOGUE NUMBERS

Defence Catalogue Numbers allotted to these stores are:

<i>S.No.</i>	<i>APC No.</i>	<i>DCAN</i>
a)	201	8010-000 005
b)	202	8010-000 006
c)	211	8010-000 307
d)	212	8010-000 308
e)	218	8010-000 314
f)	222	8010-000 318
g)	223	8010-000 319
h)	224	8010-000 320
j)	225	8010-000 321
k)	226	8010-000 322

12. SAFETY OF OPERATIONS

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

13. SUGGESTIONS FOR IMPROVEMENT

Any suggestion for improvement in this document shall be forwarded to:

The Director,
Directorate of Standardisation,
Ministry of Defence,
'H' Block, Nirman bhawan PO,
New Delhi-110011.

DETERMINATION OF NON-VOLATILE MATTER

A-1. Weigh accurately a petridish of 100 mm diameter (M_1). Transfer 5 g of sample by means of weighing bottle to the petridish. Evaporate the sample on a water bath and place in an oven at 100°C to 105°C for three hours. Cool to room temperature in a desiccator and weigh (M_2).

A-2. Calculation

$$\text{Non-Volatile matter, \% by mass} = \frac{(M_2 - M_1) \times 100}{\text{Mass of sample taken}}$$

APPX 'B'
(Clause 7.4)

DETERMINATION OF ASH

B-1. Weigh accurately a tared silica dish (M_1). Transfer, 5 g of sample by means of weighing bottle to the tared silica dish. Burn of the sample in the dish gently in a fuming cupboard and ignite at 800°C in a muffle furnace for 30 minutes. Cool the dish to room temperature in a desiccator and weigh (M_2).

B-2. Calculation

$$\text{Ash content, \% by mass} = \frac{(M_2 - M_1) \times 100}{\text{Mass of sample taken}}$$

DETERMINATION OF IODINE VALUE OF NON-VOLATILE MATTER

C-1. Reagents

- a) Glacial Acetic acid.
- b) Chloroform.
- c) Potassium iodide, analytical grade.
- d) Sodium thiosulphate, crystalline.
- e) Starch.
- f) Wij's solution.

C-2. Wij's solution can be prepared either by the following methods:

Method A

- a) Dissolve 12.7 g Iodine in one litre of Glacial Acetic acid, heat gently to effect solution. Cool the solution and determine the halogen contents by titrating 10 ml with 0.1 N Sodium thiosulphate solution in the presence of an excess of Potassium iodide and water. Pass a stream of dry Chlorine gas into the Iodine solution until the halogen content determined as above is doubled.
- b) Heat the solution thus prepared to 100°C for 20 minutes and allow it to cool to room temperature.

Method B

- a) Dissolve 8 g of Iodine trichloride in 500 ml of Glacial Acetic acid. Determine the Iodine trichloride content as above. (1 ml of 0.1 N Sodium thiosulphate = 0.005832 g Iodine trichloride). Calculate the quantity of Iodine required to convert the Trichloride to Mono-Chloride. Weigh out the necessary amount of Iodine and add it gradually to the Iodine trichloride solution with constant stirring until a test portion gives almost double the halogen content. Filter through glass wool. Dilute the solution with Glacial Acetic acid until 25 ml is equivalent to 50 ml of 0.1 N Sodium thiosulphate when titrated in the presence of water and Potassium iodide.
- b) Heat the Wij's solution thus prepared to 100°C for 20 minutes and cool it to room temperature. Store in a glass stoppered amber colored bottles in a cool place protected from light and heat.

C-3. Procedure

a) Weigh accurately about 0.2 g of the ground residue of Appx 'A' into a dry stoppered 250 ml Iodine flask. Add 20 ml of Glacial Acetic acid and warm to dissolve. Cool to 20°C. Add 10 ml of Chloroform and place in a bath at 20°C. At the end of 30 minutes add 20 ml of Wij's solution, which shall be at the temperature of 20°C, moisten stopper with a 10 percent Potassium iodide solution, place the flask in the dark at 20°C. After exactly one hour, add 10 ml of a 10 percent solution of Potassium iodide to the solution in the reaction flask, wash down the stopper and neck of the flask into the solution and quickly titrate with 0.1 N Sodium thiosulphate solution using freshly prepared starch solution as indicator towards the end point of the titration.

b) Carry out a blank without the ground residue using precisely the same procedure.

C-4. Calculation

$$\text{Iodine value} = \frac{0.1269 \times (V_1 - V_2) \times N \times F \times 100}{M}$$

where,

V_1 = Volume in ml of standard Sodium thiosulphate solution required for the blank;

V_2 = Volume in ml of standard Sodium thiosulphate solution required for the sample;

N = Normality of Sodium thiosulphate solution;

F = Factor of standard Sodium thiosulphate solution; and

M = Mass in g of the sample taken.

DETERMINATION OF ADHESION AND FINISH

Take a clean, bright tin panel, 100 mm long, 25 mm wide and 0.315 mm thick. Dip the panel into the APC, remove and allow to dry in a vertical position. Examine the film for cracks, wrinkles, warts etc. The film should be firmly adherent to the metal surface.

APPX 'E'
(Clause 7.4)

CONFIRMATORY TEST FOR SHELLAC

Take about 1 g of the composition in a G3 sintered glass crucible, wash with a few ml of hot Methylated spirit. To the filtrate add a few drops of 10% Lead acetate solution in water. A mauve colour indicates the presence of Shellac.