



रक्षा मंत्रालय
MINISTRY OF DEFENCE

संयुक्त सेवा विनिर्देश
JOINT SERVICES SPECIFICATION

ON

LACQUER : CLEAR NITROCELLULOSE (APC - 217)
(DS Cat. No. 8010 - 000 313)

मानकीकरण निदेशालय
रक्षा उत्पादन विभाग
रक्षा मंत्रालय
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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)	

Sl. No.	CONTENTS	PAGE No.
0.	FOREWORD	1 - 2
1.	SCOPE	3
2.	RELATED SPECIFICATIONS / DOCUMENTS	3 - 4
3.	MATERIAL	4 - 5
4.	MANUFACTURE	5
5.	TENDER SAMPLE	5
6.	PRE - INSEPCION OF STORES / CONSIGNMENT	6
7.	QUALITY ASSURANCE	6 - 7
8.	WARRANTY	7
9.	PACKAGING	7 - 8
10.	MARKING	8
11.	SAFETY OF OPERATIONS	8
12.	DEFENCE STORES CATALOGUE NUMBER	8
13.	SUGGESTIONS FOR IMPROVEMENT	9
14.	APPENDICES ('A' TO 'D')	10 - 13

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 (a) Second revision was done in the year 1999.

(b) This specification is revision of JSS 8010 - 42 : 2009, (Revision No. 3) and supersedes the same.

0.4 This specification would be used for Manufacture, Quality Assurance and Procurement of Lacquer : Clear Nitrocellulose (APC No. 217).

0.5 Quality Assurance Authority for the item covered by this specification is The Controller, Controllerate 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.

JSS 8010 - 42 : 2014
(Revision No. 4)

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, Supply and Quality Assurance of Lacquer : Clear Nitrocellulose (APC No. 217) suitable for use on ammunition components, for sealing and / or identification purposes.

2. **RELATED SPECIFICATIONS / DOCUMENTS**

2.1 Reference is made in this specification to :

Sl. No.	Specification No. & Year	Nomenclature
(a)	IS 101 Part 3 : Sec 1 : 1986 (Third Revision) Reaffirmed 2012 AMD 1	Methods of Sampling and Test for Paints, Varnishes and Related Products - Part 3 : Tests on Paint Film Formation - Section 1 : Drying Time.
(b)	IS 101 Part 3 : Sec 4 : 1987 (Third Revision) Reaffirmed 2009 AMD 2	Methods of Sampling and Test for Paints, Varnishes and Related Products - Part 3 : Tests on Paint Film Formation - Section 4 : Finish.
(c)	IS 101 Part 5 : Sec 1 : 1988 (Third Revision) Reaffirmed 2009	Methods of Sampling and Test for Paints, Varnishes and Related Products - Part 5 : Mechanical Test on Paint Film - Section 1 : Hardness Test.
(d)	IS 101 Part 5 : Sec 2 : 1988 (Third Revision) Reaffirmed 2009 AMD 3	Methods of Sampling and Test for Paints, Varnishes and Related Products - Part 5 : Mechanical Test on Paint Film - Section 2 : Flexibility and Adhesion.
(e)	IS 138 : 1992 (Third Revision) Reaffirmed 2009 AMD 1	Ready Mixed Paint, Marking, for Packages and Petrol Containers - Specification.
(f)	IS 170 : 2004 (Fourth Revision) Reaffirmed 2011	Acetone - Specification.
(g)	IS 231 : 1957 Reaffirmed 2011 AMD 2	Specification for Amyl Acetate.
(h)	IS 356 : 1991 (Second Revision) Reaffirmed 2012	Ester Gum - Specification.

JSS 8010 - 42 : 2014
(Revision No. 4)

Sl. No.	Specification No. & Year	Nomenclature
(j)	IS 361 : 2009	Normal Butyl Alcohol, Technical.
(k)	IS 435 : 1973 (Second Revision) Reaffirmed 2010 AMD 4	Specification for a Castor Oil.
(l)	IS 537 : 2011	Toluene - Specification.
(m)	JSS 6810 - 142 : 2002 Reaffirmed 2011	Dinitro Alpha Naphthol.
(n)	JSS 6820 - 03 : 2009 (Revision No. 2)	Dyes for Shellac Lacquers.
(o)	JSS 6810 - 125 : 2008 (Revision No. 2)	Carbamite.
(p)	JSS 6810 - 82 : 2011 (Revision No. 2)	Zinc Oxide.
(q)	JSS 8040 - 15 : 2009 (Revision No. 3)	Gum Dammar Ammunition.
(r)	JSG 0112 : 1997 (Revision No. 1)	General Methods of Test and Assessment of Impurities in Chemicals / Materials used in the Manufacture of Explosives and Ammunition.

3. MATERIAL

3.1 The Lacquer : Clear Nitrocellulose (APC No. 217) shall be in the form of a transparent liquid, free from gritty matter, aggregates, foreign matter and visible impurities.

3.2 It shall essentially consist of the following ingredients conforming to their respective specification and in the proportion shown below :

Sl. No.	Ingredients	Specification	Proportion (Parts by mass)
(a)	Normal Butyl Alcohol Technical	IS 361	3.4

Sl. No.	Ingredients	Specification	Proportion (Parts by mass)
(b)	Carbamite	JSS 6810 - 125	0.2
(c)	Gum Dammar or Ester Gum	JSS 8040 - 15 or IS 356	1.3
(d)	Nitrocellulose	Appendix 'A'	8.0
(e)	Castor Oil	IS 435	0.3
(f)	Solvent mixture composed of :		86.8
	(i) Acetone	IS 170	40.0
	(ii) Amyl Acetate	IS 231	40.0
	(iii) Toluene, pure, nitration grade	IS 537	20.0

Note : The varnish shall be tinted and / or pigmented as required for the purpose with the dye conforming to technical requirements of JSS 6820 - 03 and as per Appendix 'B'.

4. MANUFACTURE

4.1 Nitrocellulose damped with Butyl alcohol and Gum dammars are dissolved separately in the solvent mixture. They are mixed together and other ingredients added. The mixture is stirred well to give a uniform, free flowing liquid.

4.2 The method of manufacture adopted shall be such as to produce a product which shall conform to this specification and function to the satisfaction of the Quality Assurance Authority or Quality Assurance Authority (for the end store).

5. TENDER SAMPLE : The manufacturer / supplier / contractor shall submit two tender samples each of 500 ml essentially from the same batch / lot of manufacture, free of all charges and conforming to this specification, to the Quality Assurance Authority / Quality Assurance Officer as stated in the contract.

6. PRE - INSPECTION OF STORES / CONSIGNMENT

6.1 Manufacturers / Contractors 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 a necessary pre - inspection has been carried out on the stores tendered will be submitted alongwith 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 : Lacquer : Clear Nitrocellulose (APC No. 217) and the packages in which they are packed shall be subject to the inspection by and to the approval of the Quality Assurance Officer / Quality Assurance Authority.

7.2 SAMPLING

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

No. of Container in a Batch / Lot	No. of Containers to be Sampled
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

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

7.3 CRITERIA FOR CONFORMITY : If during examination any sample is found not conforming to this specification the whole batch / lot may be rejected.

7.4 **TEST REQUIREMENTS** : Samples taken from any portion of the batch of material shall conform to clause 3 and in addition shall conform to the test requirements given in the following Table :

REQUIREMENTS OF LACQUER : CLEAR NITROCELLULOSE (APC NO. 217)

Sl. No.	Characteristic	Passing Standard	Test Method
(a)	pH of water extract	4.0 Min. 7.5 Max.	Appendix 'C'
(b)	Kinematic Viscosity at 27 °C	$50 \times 10^{-6} \text{ m}^2/\text{s}$ Min. $125 \times 10^{-6} \text{ m}^2/\text{s}$ Max.	B/S U - Tube Viscometer Method Appendix 'D'
(c)	Drying time in minutes		
	(i) Surface dry	25 Max.	IS 101 Part 3 : Sec 1
	(ii) Hard dry	60 Max.	IS 101 Part 3 : Sec 1
(d)	Finish	Smooth & continuous	IS 101 Part 3 : Sec 4
(e)	Bend Test	To pass the test	IS 101 Part 5 : Sec 2
(f)	Scratch test	To pass for 700 g	IS 101 Part 5 : Sec 1

Note : At the manufacturing stage the pH should be regulated to be within 6.5 to 7.5 and efforts should be made to use the material within 8 months.

8. **WARRANTY** : The stores supplied against this specification shall conform to the terms and conditions of the contractual obligations stipulated in the supply order. The store shall be warranted for a minimum period of one year for keeping qualities and characteristics.

9. **PACKAGING**

9.1 The material shall be supplied in tin cans, glass, Aluminium or Polythene containers as approved by the Quality Assurance Officer / Quality Assurance Authority containing not more than 1 kg and shall be packed well enough to withstand transit hazards. When transported, the packages shall comply in every respect with the current regulations for transport of inflammable liquids by rail, road or sea.

JSS 8010 - 42 : 2014
(Revision No. 4)

9.2 Any other form of packages shall have the prior approval of the Quality Assurance Officer / Quality Assurance Authority.

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

10. MARKING

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

- (a) Nomenclature and Specification No. of the Material.
- (b) Name and Address of the Consignee.
- (c) * A.T. or S.O. No. and Date.
- (d) * Consignment No.
- (e) Lot / Batch No. and Date of Manufacture.
- (f) Gross and Net Mass.
- (g) * Consecutive No. of Package and Total Number of Packages in the Consignment.
- (h) * Date of Supply.
- (j) Manufacturer's Initials or Recognised Trademark.
- * Not applicable when the store is manufactured in ordnance Factories.

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.

11. SAFETY OF OPERATIONS

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

12. DEFENCE STORES CATALOGUE NUMBER

12.1 The Defence Stores Catalogue Number allotted to this store is 8010 - 000 313.

13. SUGGESTIONS FOR IMPROVEMENT

- 13.1 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. REQUIREMENT OF NITROCELLULOSE FOR USE IN APC 217

A.1 The Nitrocellulose shall be the product of Nitration of suitably purified cotton or wood cellulose and shall be of a good white colour, essentially free from visible impurities and foreign matter. It shall comply with the following requirements:

- (a) 10 g of the Nitrocellulose in 100 ml of Amyl acetate shall be practically free from colour, suspended matter and haze.
- (b) The Nitrogen content shall be 11.8 % to 12.2 %.
- (c) When subjected to the 132 °C stability test the quantity of Nitrogen per gram of Nitrocellulose shall not exceed 1.6 mg.

APPENDIX 'B'

B. DETAILS OF COLOUR AND DYES

B.1 The details of colour and dyes is given as under :

Sl. No.	Colour	Dye	End Use
(i)	Black	Nitrogen black , spirit soluble	For lacquering of safety caps of 106 E fuzes and similar purpose.
(ii)	Blue	Monastral Blue, Aniline Blue base, spirit soluble	For detonators and caps of primers for bullet tips and annulus of caps of SAA 0.30.
(iii)	Dark Purple	Nigrosine Black, Spirit Soluble - 35 %, Safframine Red - 40 %, Waxoline Violet 25 %	For annulus of caps of SAA.
(iv)	Green	Malachite green	For fuzes and for springs retaining the augmenting cartridges.
(v)	Orange	Dye, oil orange	For detonators
(vi)	Red	Waxoline red of Oil BNS	For time rings of fuzes filled RD 202 composition
(vii)	Violet	Methyl Violet base	For annulus of caps
(viii)	Yellow	2:4 Dinitro naphthol 5 %, Zinc oxide 95 %	For proof cartridges

B.2 All these dyes shall be of good commercial quality and also approved by the Quality Assurance Officer / Quality Assurance Authority.

APPENDIX 'C'

C. DETERMINATION OF pH

C.1 Shake together 50 g of the sample and 100 ml of one normal Sodium chloride solution in a 250 ml separating funnel for one minute. The mixture is allowed to stand for 15 minutes. The aqueous layer is drawn and its pH determined by method No. 5 (b) of JSG 0112.

APPENDIX 'D'

D. TEST METHOD FOR KINEMATIC VISCOSITY

D.1 Filter a portion of the sample through a suitable mesh or other suitable filter to remove solid particles. Select a clean and dry U - tube viscometer and provide it with firm mounting to ensure proper alignment. Charge the viscometer with the sample and allow it to remain in the water bath (maintained at test temperature) long enough to reach the test temperature. Use pressure to adjust the head level of test sample to a position in the capillary arm of the instrument about 5 mm ahead of the first timing mark. Measure in seconds, the time required for the meniscus to pass from the first timing mark to the second. Repeat the procedure described above and note the average time for calculating the kinematic viscosity. Kinematic viscosity in $\text{m}^2/\text{s} = c \times t$.

Where :

c = Calibration constant of viscometer in m^2/s .

t = The efflux time in seconds.