



भारत सरकार
GOVERNMENT OF INDIA
रक्षा मंत्रालय
MINISTRY OF DEFENCE

संयुक्त सेवा विनिर्देश
JOINT SERVICES SPECIFICATION

ON

LACQUER, NITROCELLULOSE, ADHESIVE ORANGE
& RED (AMMUNITION PROTECTIVE COMPOSITION
No. 219 ORANGE AND No. 219 RED)
DCAN 8010-000 929 to 8010-000 930

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
NEW DELHI-110 011

LIST OF MEMBERS ASSOCIATED WITH FORMULATION OF THIS STANDARD

1. The third revision of this Joint Services Specification 8010-48 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)	

TABLE OF CONTENTS

S. No.	Topic	Page No.
0.	FOREWORD	1
1.	SCOPE	3
2.	RELATED SPECIFICATIONS/DOCUMENTS	3
3.	MATERIAL/FINISH	4
4.	MANUFACTURE	5
5.	TENDER SAMPLE	5
6.	PRE-INSPECTION OF STORES/CONSIGNMENT	5
7.	QUALITY ASSURANCE	5
8.	WARRANTY	6
9.	PACKAGING	7
10.	MARKING	7
11.	DEFENCE CATALOGUE NUMBER	7
12.	SAFETY OF OPERATIONS	8
13.	SUGGESTIONS FOR IMPROVEMENT	8
APPENDICES		
APPX 'A'	ESTIMATION OF TOTAL SOLIDS	9
APPX 'B'	ACCELERATED WEATHERING TEST	10
APPX 'C'	DETERMINATION OF FASTNESS TO LIGHT	12
APPX 'D'	DETERMINATION OF DURABILITY	13
APPX 'E'	DETERMINATION OF pH	14
APPX 'F'	REQUIREMENTS OF NITROCELLULOSE	15

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 8010-48 : 2016 (Third Revision):

- a) was prepared in the year 1985.
- b) was revised in the year 2004 & 2012 and supersedes the same.

0.4 This specification would be used for Supply and Quality Assurance of Lacquer, Nitrocellulose, Adhesive Orange & Red (Ammunition Protective Composition No. 219 Orange & APC No. 219 Red).

0.5 Quality Assurance Authority for the item covered in 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.

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 Supply and Quality Assurance of Lacquer, Nitrocellulose, Adhesive Orange & Red (Ammunition Protective Composition No. 219 Orange & APC No. 219 Red) suitable for use in brass components of ammunition and is suitable for preservation of labels.

2. RELATED SPECIFICATIONS/DOCUMENTS

References are made in this specification to:

<i>S. No.</i>	<i>Specification No. & Year</i>	<i>Nomenclature</i>
a)	IS 101 (Part 3/Sec 1) : 1986 (Third Revision) AMD 2 Reaffirmed 2012	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 3 Tests on Paint Film Formation Sec 1 Drying Time
b)	IS 101 (Part 3/Sec 4) : 1987 (Third Revision) AMD 3 Reaffirmed 2014	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 3 Tests on Paint Film Formation Sec 4 Finish
c)	IS 101 (Part 5/Sec 1) : 1988 (Third Revision) Reaffirmed 2014	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 5 Mechanical Test on Paint Films Sec 1 Hardness Tests
d)	IS 101 (Part 5/Sec 2 : 1988 (Third Revision) AMD 3 Reaffirmed 2014	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 5 Mechanical Test on Paint Films Sec 2 Flexibility and Adhesion
e)	IS 101 (Part 6/Sec 2) : 1989 (Third Revision) Reaffirmed 2014	Methods of Sampling and Test for Paints, Varnishes and Related Products Part 6 Durability Tests on Paint Films Sec 2 Keeping Properties
f)	IS 101 (Part 6/Sec 5) : 1997 Reaffirmed 2012	Method of Sampling and Test for Paints, Varnishes and Related Products Part 6 Durability Tests on Paint Films Sec 5 Accelerated Weathering Test
g)	IS 138 : 1992 (Third Revision) AMD 1 Reaffirmed 2014	Ready Mixed Paint, Marking, for Packages and Petrol Containers-Specification
h)	IS 170 : 2004 (Fourth Revision) Reaffirmed 2016	Acetone-Specification
j)	IS 231 : 1957 AMD 2 Reaffirmed 2015	Specification for Amyl Acetate

Related Specifications/Documents (Concluded)

<i>S. No.</i>	<i>Specification No. & Year</i>	<i>Nomenclature</i>
k)	IS 356 : 1991 (Second Revision) Reaffirmed 2012	Ester Gum-Specification
m)	IS 537 : 2011 (Second Revision)	Toluene-Specification
n)	IS 1448 (Part 25) : 1976 (First Revision) Reaffirmed 2013	Methods of Test for Petroleum and its Products Part 25 Determination of Kinematic and Dynamic Viscosity
p)	IS 2552 : 1989 (Third Revision) AMD 1 Reaffirmed 2013	Steel Drums (Galvanized and Ungalvanized)
q)	IS 14421 : 1997 AMD 1 Reaffirmed 2013	Plasticizer Esters-Specification
r)	JSS 6810-98 : 2014 (Third Revision)	Spirit Denatured Grade 1 and Grade 2 Ammunition
s)	JSS 6810-125 : 2014 (Third Revision)	Carbamite
t)	JSS 6820-02 : 2012 (Second Revision)	Dyes for Coloured Smoke Compositions

3. MATERIAL/FINISH

3.1 The composition shall be clear orange coloured free flowing liquid, free from grit, foreign matter and visible impurities and shall be suitable for application by brushing to paper labels, when required for brass ammunition components, the composition shall be dyed red.

3.2 The composition shall essentially consist of the following ingredients conforming to their respective specifications amended to date, and in the proportion shown below:

<i>S. No.</i>	<i>Ingredients</i>	<i>Specification</i>	<i>Proportions Parts by Mass</i>
a)	Acetone	IS 170	20.0
b)	Amyl Acetate	IS 231	20.0
c)	Carbamite	JSS 6810-125	0.25
d)	Denatured Spirit, Grade I	JSS 6810-98	20.0
e)	Di-N-butyl Phthalate	IS 14421	3.5
f)	Dye Oil Orange or Dye Rhodamine B Base	JSS 6820-02	0.20 0.1
g)	Nitrocellulose	APPX 'F'	8.5
h)	Resin Ester Gum Glycerol Ester Type	IS 356	1.5

Material/Finish (Concluded)

<i>S. No.</i>	<i>Ingredients</i>	<i>Specification</i>	<i>Proportions Parts by Mass</i>
j)	Toluene	IS 537	26.5

4. MANUFACTURE

The composition Lacquer, Nitrocellulose, Adhesive Orange and Red (Ammunition Protective Composition No.219 Orange and 219 Red) shall be manufactured by a process which will produce the product conforming to this specification.

5. TENDER SAMPLE

The manufactures/suppliers/contractors shall submit two tender samples each of 200 g essentially from the same batch/lot of manufactured, 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 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 The composition Lacquer, Nitrocellulose, Adhesive Orange and Red (Ammunition Protective Composition No. 219 Orange and 219 Red) and the packages in which it is packed shall be subjected to inspection by and to the approval of Quality Assurance Officer/Quality Assurance authority.

7.1.2 Samples of the finished material and of the packages in which it is contained may be taken from any portion of the batch/lot/consignment.

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

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

7.2 Sampling

Two representative samples of 200 g 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

7.3 Test Requirements

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

<i>S. No.</i>	<i>Characteristics</i>	<i>Passing Standard</i>	<i>Test Method</i>
a)	Drying time, Hard Dry	2 minutes 30 second <i>Max</i>	IS 101 (Part 3/Sec 1)
b)	Finish	Smooth transparent firmly adherent non- brittle film	IS 101 (Part 3/Sec 4)
c)	Viscosity at 25°C	200 <i>Min</i> x 10 ⁻⁶ m ² /s 300 <i>Max</i> x 10 ⁻⁶ m ² /s	IS 1448 (Part 25)
d)	Total Solids Percent	12.0 <i>Min</i> 14.0 <i>Max</i>	Appx 'A'
e)	Flexibility	Shall pass	IS 101 (Part 5/Sec 2)
f)	Scratch Hardness	-do-	IS 101 (Part 5/Sec 1)
g)	Accelerated Weathering	-do-	Appx 'B'
h)	Fastness to Light	-do-	Appx 'C'
j)	Durability	-do-	Appx 'D'
k)	pH	4.0 <i>Min</i> 7.5 <i>Max</i>	Appx 'E'
m)	Keeping Qualities	12 months <i>Min</i>	IS 101 (Part 6/Sec 2)

8. WARRANTY

The store supplied against this specification shall be deemed to bear warranty for 12 months from the date of receipt of store 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 the date of intimation of defect.

9. PACKAGING

9.1 The composition shall be supplied in mild steel drums conforming to IS 2552 (latest issue). Each drum shall contain not more than 5 kg or as a stated in the contract.

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 foreign matter or impurities in any of the packages shall render the whole batch/lot/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. *

* 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.

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

11. DEFENCE CATALOGUE NUMBER

The Defence Catalogue Numbers allotted to stores are:

<i>S. No.</i>	<i>Nomenclature</i>	<i>DCAN</i>
a)	Lacquer, Nitrocellulose, Adhesive Orange (Ammunition Protective Composition No. 219 Orange)	8010-000 929
b)	Lacquer, Nitrocellulose, Adhesive Red (Ammunition Protective Composition No. 219 Red)	8010-000 930

12. SAFETY OF OPERATIONS

Nothing in this specification shall relieve the manufacturer/supplier/contractor/user of his responsibility for the safety of operation in manufacture, storage, transit or use of the 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-110 011.

APPX 'A'
(Clause 7.3)

ESTIMATION OF TOTAL SOLIDS

About 3 g of the composition is weighed accurately into tared flat bottomed circular dish approximately 10 cm in diameter. The dish and its contents are then heated at 100°C to 105°C for 1 hour. The dish is allowed to cool to room temperature in a desiccator and reweighed.

$$\text{Total solid content, Percent by mass} = \frac{\text{Mass of residue}}{\text{Mass of sample taken}} \times 100$$

ACCELERATED WEATHERING TEST

B-1. Panel of clean 0.315 mm tinned plate approximately 15 cm x 10 cm roughened by rubbing with No. 'O' Emery paper is coated with the composition by brushing to give a dry film mass of approximately 7 g per square meter and the film allowed to dry in horizontal position for 24 hours at room temperature.

B-2. The panel is then exposed to the accelerated weathering cycle described below for 250 hours:

B-2.1 22 Hours Exposure in an Accelerated Weathering Apparatus

a) The apparatus consist essentially of a vertical ac/dc arc burning 13 mm uncured carbons, suspended eccentrically 20 cm to 22.5 cm from the center of a cylindrical container 120 cm in diameter. The container is fitted with a lid, which is suspended over it, which does not revolve with it, but can be raised or lowered. An arc lamp is enclosed in a clear resistance glass cylinder approximately 10.7 cm in diameter and 100 mm long and the power consumption across the arc is 850 Watts to 950 Watts.

b) The painted panels are stood on galleries round the circumstance of the container, in such a way that the painted surface of each panel is facing the beam of light.

c) The suspended centrally in a container are three water atomisers by means of which the test panels are sprayed with distilled water, one atomiser being opposite each gallery. The container (but not the lid, atomisers and arc) revolve in a horizontal plane once every 20 minutes.

d) Distilled water is discharged through the atomiser at a rate of approximately 4.54 litres per hour with an air pressure of approximately 48.265 kPa (0.5 kg/cm²) in such a manner that the whole of the painted surface of each panel is evenly wetted with a fine mist. The atomisers are so placed that each panel is sprayed approximately a quarter of a revolution before it comes in closest proximity to the arc. In storage and in passage to the atomisers it must not come in to contact with any material other than stainless steel, glass, perspex or polythene.

e) The water from spray is run off through a waste-pipe in the bottom of container and under no circumstances it is re-circulated through the atomisers.

f) A suitable thermometer is fixed through the lid of container diametrically opposite to the atomiser with the bulb approximately 10 cm from the side of the container and 10 cm below the lid. When the apparatus is in use, the lid is adjusted so that the temperature of the air measured by this thermometer is not less than 38°C and not more than 44°C.

B-2.2 2 Hours Refrigeration at a Temperature of 0°C to –5°C

- a) The panel shall be removed from the above container every day for a period of 2 hour and submitted to refrigeration at a temperature between 0°C and –5°C.
- b) At the end of this period a portion approximately 8 cm x 3 cm is cut from the center of the panel and tested for bend test as described in IS 101 (Part 5/Sec 2). The sample shall pass if the metal surface is not exposed.

DETERMINATION OF FASTNESS TO LIGHT

C-1. A paper label* is coated with the composition by brushing to give dry film of about 14 g/m² and the film is allowed to dry in a horizontal position of 24 hours at room temperature. The varnished label is then exposed for 250 hours in a weatherometer as above.

C-2. The coating shall not show any marked deterioration.

***NOTE** - The paper label shall be approved by CQA (ME), Aundh Road, Pune-411 020 before use.

APPX 'D'
(Clause 7.3)

DETERMINATION OF DURABILITY

D-1. A paper label* is coated with the composition and allowed to dry as described in Appx 'C'. It is exposed for 250 hours to the accelerated weathering cycle described in Appx 'B'.

D-2. The coating shall not show any marked deterioration.

*** NOTE** - The paper labels shall be approved by CQA (ME), Aundh Road, Pune-411 020 before use.

DETERMINATION OF pH

50 g of the composition is shaken up with 100 ml of 1N Sodium chloride solution thoroughly in a separating funnel for one minute. The mixture is allowed to settle for 15 minutes. The aqueous layer is drawn out and its pH determined.

NOTE - 1N sodium chloride solution shall have pH between 6.8 & 7.2.

APPX 'F'
(Clause 3.2)

REQUIREMENTS OF NITROCELLULOSE

F-1. The nitrocellulose shall be the product of nitration of suitably purified cotton of wood cellulose and shall be of white colour and essentially free from visible impurities and foreign matter. It shall comply with the following requirements:

- a) 10 g Nitrocellulose in 100 ml of Amylacetate 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.