IND/ME/758 (ek) (e)
5.2.81

Certified Correct Copy of Sealed/Unsealed Drawings/Specification At this date 30/X/93
for G. I. M. E. Pune

ADHESIVE SYNTHETIC

DC NO 2378-ME
5.2.81

LETEST

APPROVAL REFERENCE	DATE OF APPROVAL	APPROVAL AUTHORITY
No.79799/DGI(Arm-13)	Dec 1979	D.I.(ARMTS)

ATTESTED TRUE COPY
OF ORIGINAL SPECIFICATION
NO.
D. G. M. (Q) / MR.

DC NO. 3754-ME
12-12-02

CONTROLLERATE OF QUALITY ASSURANCE(MILITARY EXPLOSIVES)

AUNDH ROAD, KHADKI, PUNE - 411 003.

DEPARTMENT OF DEFENCE PRODUCTION

MINISTRY OF DEFENCE

ADHESIVE SYNTHETIC

C O N T E N T S

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IC-NO. 3754-ME
12-12-02
← Quality Assurance.

0. FOREWORD

0.1 This specification has been prepared by the Controllerate of Quality Assurance(Military Explosives)Aundh Road, Khadki, PUNE - 411 003.

0.2 For additional copies or any other enquiry regarding this specification, reference should be made to the Inspecting Authority (i.e. CQA(ME) Khadki).

1. SCOPE

1.1 This specification is meant to govern supply and inspection of adhesive synthetic.

1.2 This material is suitable for use as an adhesive for paper components of various ammunition and spirally wound containers.

1.3 The adhesive synthetic is unsuitable for use in the proximity to explosives and if used inside unventilated containers will give rise to acidic vapours which may cause corrosion of metal.

2. RELATED DOCUMENTS

2.1 The related documents mentioned at clause 2.2 are those applicable at the date of publication of this specification. It is contractor's responsibility to confirm their current applicability and to obtain from the Authority Holding Sealed Particulars (i.e. CQA(ME)KIRKEE) information concerning any change that may be necessary due to cancellation, replacement or supersession of any of these documents.

2.2 Copies of the related specifications referred to in clauses 8.1, 10.1.1 and Appendix 'C' are obtainable as follows :

IND/ME and JS Specifications	X	Controllerate of Quality Assurance (Military Explosives) AUNDH ROAD, KHADKI, PUNE - 411 003.
IND/ME/786(b) IND/ME/789	X	

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Indian Standards

IS : 168-1973
IS : 1783-1974
IS : 138-1981
IS : 101-1964

Indian Standards Institution
Manak Bhavan
9, Bahadur Shah Zafar Marg
NEW DELHI - 110 002.

3. DESCRIPTION

3.1 The adhesive synthetic shall be milk white fluid in the emulsion form based mainly on polyvinyl acetate resin. The adhesive shall not contain high boiling/inflammable solvents and inorganic fillers exceeding 3% and 1% respectively and shall be suitably plasticised. The adhesive shall be free flowing homogeneous liquid with a suitable consistency, shall be free from grit, any visible impurities and foreign matter.

3.2 The adhesive shall not cake hard in the container when exposed for 24 hours. Howeverm on removal of the skin formed due to surface evaporation, the properties of the adhesives shall not be adversely affected and shall conform with the test requirements laid down in clause 8.1.

3.3 In addition, the properties of the adhesive shall not be adversely affected, when the paper components made with this adhesive are dried at temperature not exceeding 100°C to facilitate quick drying.

4. TENDER SAMPLE

4.1 The contractor shall submit a tender sample in duplicate, each of 500 g, free of charge and conforming to this specification, when called for in the tender.

5. PRE-INSPECTION

5.1 Before tendering the store to the Inspector, the contractor shall carry out a through inspection of each delivery to satisfy himself that the store fully conforms to this specification and shall render a certificate to that effect to the Inspecting Officer.

6. INSPECTION

6.1 The adhesive synthetic and the packages in which it is contained shall be subject to inspection by, and to the final approval of the Inspecting Officer/Inspection Authority.

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

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

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

7. SAMPLING

7.1 Normally two representative samples each of 500 g shall be drawn from each batch/lot. However, the number of samples to be drawn will be at the discreation of the Inspecting Officer.

8. TEST REQUIREMENTS

8.1 Samples drawn from any portion of the supply shall comply with clause 3.1 above and shall also conform to the following requirements:

Sl. No.	Characteristic	Passing Standard	Reference to Test Method
1	2	3	4
1.	Ash content, percent, Max.	1.0	Appendix 'A'
2.	pH of adhesive synthetic Min. Max.	 5.0 8.0	Appendix 'B'
3.	Strength of adhesive		
a)	i) When two test pieces of commercial kraft paper are joined together and tested.	The paper shall not get detached at the joint.	Appendix 'C' (i)
	ii) When two test pieces of paper laminated are joined together and tested.	-do-	Appendix 'C' (ii)
b)	When two test pieces of Deal wood are joined together and tested at a load of 5 kg.	The Deal wood shall not be detached at the joint.	Appendix 'D'
4.	Water soluble chlorides, calculated as sodium chloride, percent, Max.	0.15	Appendix 'E'

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1	2		3	4
5.	Water soluble sulphates, calculated as sodium sulphate percent,	Max.	0.6	Appendix 'F'
6.	Total solids percent,	Min. Max.	45.0 55.0	Appendix 'G'
7.	Mass per 10 litres in kg,	Min. Max.	9.0 12.0	Clause No.25 of IS 101-1964.

9. Practical Trial

9.1 If required by the terms of AT/SO, the contractor shall furnish a quantity not less than 25 kg for practical trial. This quantity shall be in addition to the samples drawn by the Inspecting Officer and shall be from the same bulk.

9.2 The practical trial shall be by the user and shall be intended to ascertain that the adhesive supply is capable of being applied by mechanical means e.g. by rollers and shall give satisfactory adhesion between plies of paper containers/ components and shall not create working problems on winding machines.

9.3 The Inspection Authority/Inspecting Officer may waive the practical trial if the performance of past supplies from the same supplier have been consistently satisfactory.

10. PACKING AND MARKING

10.1 Packing

10.1.1 The adhesive synthetic shall be initially packed in clean and dry double polythene bag of film thickness 0.075 mm, hermetically sealed, which in turn shall be packed in sound, clean, rust free mild steel drum(conforming to Type B of IS 1783-1961 for gauge and construction) with a lid, made leakproof by means of ring lever lock arrangement or any other suitable arrangment with the prior approval of the Inspecting Officer. Quantity per package shall not exceed 200 kg.

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10.1.2 The material offered in any other packages shall have prior approval of the Inspecting Officer/Inspection Authority.

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

10.2 MARKING

10.2.1 All packages constituting a consignment shall be legibly and durably marked with the following details as applicable.

i) Nomenclature and specification No. of the material.
ii) Name and address of the consignee.
iii) A.T./S.O. No. and date.
iv) Consignment No.
v) Lot No./Batch No. and date of manufacture.
vi) Gross and net mass.
vii) Consecutive No. of package and total No. of packages.
viii) Date of supply.
ix) Contractor's initials or recognised trade mark.

10.2.2 In addition to above, the Inspecting Officer may suggest some more markings/identification at the time of inspection.

10.2.3 The paint used for marking shall be of good quality (conforming to IS 138-1981) and to the satisfaction of the Inspecting Officer.

Sd/-x x x
(Dr. SURJIT SINGH)
DIRECTOR
Controllerate of Inspection(Military Explosives)
for DIRECTOR OF INSPECTION (ARMAMENTS)

..8/-

11. APPENDICES

APPENDIX 'A'

DETERMINATION OF ASH CONTENT

Transfer about 5.0 g of the sample into a clean, dry and tared silica/porcelain dish (M1) and weigh accurately(M2). Carefully ignite the sample in the tared dish, over a Bunsen flame in a fuming chamber till all the material is entirely charred. Transfer the dish into a muffle furnace at 800°C ± 50 deg C and heat until all the carbonaceous matter is burnt off. Remove the dish and allow to cool sufficiently and transfer it into a desiccator, cool to room temperature and weigh to constant mass(M3).

$$\% \text{ Ash content} = \frac{M3 - M1}{M2 - M1} \times 100$$

APPENDIX 'B'

DETERMINATION OF pH

Shake about one gram of the sample with 100 ml of freshly boiled and cooled distilled water in a 200 ml beaker, filter and determine the pH of the filtrate with standard electrometric pH meter or universal indicator.

APPENDIX 'C'

DETERMINATION OF STRENGTH OF ADHESIVE SYNTHETIC ON PAPER

(i) Take two strips of commercial paper kraft to specification IND/ME/789 size 150 mm x 50 mm x 0.25 mm thick and apply adhesive synthetic on both the strips in a thin layer with glass rod, avoiding air bubbles over a length of 30 mm. Press together the two strips so that an overlap joint of 25 mm length is made. Allow the joint to remain under a load of 3.5 kg for 24 hours. Remove the load and allow the pasted strips to remain exposed for 24 hours at room temperature. The pasted strip when tested in a tensile strength testing machine with a rate of traverse 450 mm/minute(clamps being 180 mm apart and the joint being in the middle) shall not slip/get detached at the joint.

(ii) Prepare a test strip of paper laminated to specification IND/ME/786(b) from two strips of size 150 mm x 50 mm x 0.25 mm thick, in a similar manner as described in (i) above

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and test the pasted strip in a tensire strength testing machine with a rate of traverse 450 mm/minute (clamps being 180 mm apart and the joint being in the middle) The strip shall not slip/get detached at the joint.

APPENDIX 'D'

DETERMINATION OF STRENGTH OF ADHESIVE ON DEAL WOODEN PIECES

Take two test pieces of deal wood size 115 mm x 25 mm x 2.5 mm thick and apply adhesive synthetic with finger avoiding air bubbles on one surface of each piece of deal wood so as to cover 30 mm surface Place the pieces together with the adhesive surfaces facing each other so as to produce a 25 mm overlapped joint, thus, forming a test piece. Place three such test pieces in a screw press or under a dead load of 10 kg for 24 hours. Then remove the pieces and allow to remain exposed for 24 hours at 27°C ± 2 deg C and about 65% relative humidity. Place the test piece horizontally on a table and keep a heavy load on one end of the piece testing on the table. Keeping the joint and the other end projecting from the table. Apply a load of 5 kg to the projecting end near the joint for 5 minutes. The joint should not break or detach.

APPENDIX 'E'

DETERMINATION OF WATER SOLUBLE CHLORIDES

Preparation of aqueous extract :

Apply at thin layer of adhesive synthetic with glass rod, avoiding air bubbles on one surface of a clean, dry glass plate. Allow the glass plate to dry at room temp-rature for 48 hours. Peal or scrap off the dry sample and transfer about 10 g of sample scrappings, accurately weighed, into a clean, dry conical flask. Add 200 ml of freshly boiled and cooled distilled water, shake well and allow to remain for 2 hours with occasional stirring. Filter through a Whatman No.42 filter paper, collect the extract in a standard 250 ml flask and make up the volume.

Transfer 100 ml of extract from above into a clean, dry conical flask. Add 20 ml of dilute nitric acid and 10 ml of 0.1 N silver nitrate solution. If a significant opalescence due to the precipitation of silver chloride is obtained, shake well till all the silver chloride has coagulated. Titrate against 0.1 N ammonium thiocyanate solution using 5 ml of 10% ferric alum solution as internal indicator till reddish pink colour (titre t1).

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Carry out a blank determination under similar conditions and volumes of reagents used (titre t2).

$$\% \text{ Chlorides calculated as NaCl} = \frac{(t2 - t1) \times f \times 0.005846 \times 250}{\text{Mass of sample}}$$

Where,

f = factor of 0.1 N ammonium thiocyanate solution.

APPENDIX 'F'

DETERMINATION OF WATER SOLUBLE SULPHATES

Transfer 100 ml of extract from Appendix 'E' above, into a clean, dry 250 ml beaker. Acidity the solution with about 10 ml to 15 ml of concerntrated hydrochloric acid, boil add 5 ml of 10% hot barium chloride solution and keep overnight. Filter through a clean, dry and tared gooch/sintered glass crucible G4(M1), wash the residue with warm distilled water till free from chloride. Dry the crucible in an oven at 115°C ± 5 deg C, remove, cool in a desiccator to room temperature and reweigh to constant mass(M2).

Run a blank at the same time and apply necessary correction.

$$\% \text{ Sulphates calculated as sodium sulphate} = \frac{(M2 - M1) \times 0.609 \times 250}{\text{Mass of sample}}$$

APPENDIX 'G'

DETERMINATION OF TOTAL SOLIDS CONTENT

Transfer about 5.0 g of sample to a clean, dry and tared petri-dish with cover (M1) and weigh accurately (M2). Remove the cover and transfer the petri-dish and contents into an over at 102°C ± 2 deg C for 2 hours. Remove, cool in a desiccator to room temperature, replace the cover and weigh accurately (M3), to constant mass.

$$\% \text{ total solids content} = \frac{M3 - M1}{M2 - M1} \times 100$$

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Specification	Amendments DS CAT No.	New DC No. New DC Dt.
ALL IND/ME SPECIFICATIONS up to IND/ME/892	In all the IND/ME specifications, up to IND/ME/892, wherever it appears I) For:- Director General of Inspection Read:- Director General of Quality Assurance ii) For :- C.I.M.E (except under signature) Read:- C.Q.A.(M.E)	[illegible] [illegible] 3754-ME 12-12-02
JSS 8010-63:1997 (REV.NO.1)	Consequent upon revision of specification JSS 1036, Existing specification JSS 8010-63:1997 (REV.NO. 1) for AMMN.PROTECTIVE COMPOSITIONS (ADHESIVES,VARNISHES & LACQUERS), (SHELLAC BASED) is amemded as below:- I) Clause 2.1, Sl.No. (e) & ii)Clause 3.1,below "Table -composition " In Note For:- JSS 1036 :1964 Read:- JSS 6820-03: 2000 (Rev.No.1)	3755-ME 12-12-2002