भारत सरकार
GOVERNMENT OF INDIA

रक्षा मंत्रालय
MINISTRY OF DEFENCE

संयुक्त सेवा विनिर्देश
JOINT SERVICES SPECIFICATION

ON

AMINO GUANIDINE BICARBONATE FOR MANUFACTURE OF TETRAZENE (DS Cat. No. 6810-000 646)

Issued by

मानकीकरण निदेशालय
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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)	

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 6810-40 : 2015, (Revision No. 3)

a) was revised in the year 2000.
b) is a revision of JSS 6810-40 : 2009, (Revision No. 2) and supersedes the same.

0.4 This specification means to govern Manufacture, Supply and Quality Assurance of Amino Guanidine Bicarbonate for manufacture of Tetrazene.

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,
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b) Copies of JSSs/JSGs from:

The Director,
Directorate of Standardisation
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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.

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1 SCOPE

1.1 This specification is meant to govern Manufacture, Supply and Quality Assurance of Amino Guanidine Bicarbonate for use in the manufacture of Tetrazene.

2 RELATED SPECIFICATIONS/DOCUMENTS

2.1 Reference is made in this specification to:

S No.	*Specification No. & Year*	*Nomenclature*
a)	IS 138 : 1992 (Third Revision) Reaffirmed 2014 AMD 1	Ready Mixed Paint, Marking, for Packages and Petrol Containers-Specification.
b)	JSG 0112 : 2015 (Revision No. 2)	General Methods of Tests and Assessment of Impurities in Chemicals/Materials used in the Manufacture of Explosives and Ammunition.

3 MATERIAL

3.1 The material shall consist essentially of Amino Guanidine Bicarbonate, $NH_2 - \underset{\underset{NH}{||}}{C} - NH - NH_2 . H_2CO_3$, and shall be in the form of White to pinkish, free flowing powder and free from hard mass, visual impurities and foreign matter.

4 MANUFACTURE

4.1 Amino Guanidine Bicarbonate shall be manufactured by a process which will produce the product conforming to this specification.

5 TENDER SAMPLE

5.1 The contractor/manufacturer shall submit two tender samples each of 200 g essentially from the same batch/lot/consignment of supply/manufacture, free of charge and conforming to this specification.

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 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 Amino Guanidine Bicarbonate and the packages in which it is packed shall be subject to inspection by and to the approval of the Quality Assurance Officer/Quality Assurance Authority.

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

7.2 Sampling: A representative sample 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:

No. of Containers 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

7.3 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 sub-contractors, if any.

7.4 Test Requirements

7.4.1 Samples taken from any portion of the batch/lot/consignment of the material shall conform to clause 3.1 and in addition shall conform to the following test requirements:

Test Requirements of Amino Guanidine Bicarbonate for Manufacture of Tetrazene

S No.	*Characteristics*	*Passing Standard*	*Test Method*
a)	Purity as Amino Guanidine Bicarbonate, %	97.5 *Min*	Appendix 'A'
b)	Sulphated ash, % by mass	0.5 *Max*	JSG 0112 Method 2 (b)
c)	Matter insoluble in dilute Sulphuric acid (H_2SO_4), % by mass	0.2 *Max* (shall not be gritty in nature)	Appendix 'B'
d)	Melting point in °C	168 *Min*	Appendix 'C'
e)	Volatile matter, % by mass	0.05 *Max*	JSG 0112 Method 1 (b)
f)	Zinc as Zn, % by mass	0.03 *Max*	Appendix 'D'
g)	Iron as Fe, % by mass	0.001 *Max*	Appendix 'E'
h)	Choloride as Cl, % by mass	0.01 *Max*	JSG 0112 Method 7 (b)

8 WARRANTY

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

9 PACKAGING

9.1 The material (Amino Guanidine Bicarbonate) shall initially be packed in ploythene bag of 0.13 mm thickness. The mouth of each bag will be suitably tied with a tape cotton or jute thread. The polythene bag will then be covered with another polythene bag and its mouth to be tied or stitched. This bag will then be kept in rigid polythene container having screw type lid.

9.2 Amino Guanidine Bicarbonate shall not be kept directly in contact with ground. They shall rest on platforms raised sufficiently above ground and arranged in stacks, kept apart to permit ventilation.

9.3 The inclusion of any 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 S.O. Number and Date.
d) Consignment Number.
e) Batch Number and Date of Manufacture.
f) Gross and Net Mass.
g) Consecutive Number of Package and Total Number of Packages in the Consignment.
h) Date of Supply.
j) Manufacturer's or Recognised Trademark.

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

10.3 The paint used for marking should conform to IS 138 and to the satisfaction of the Quality Assurance Officer/Quality Assurance Authority.

11 DEFENCE STORES CATALOGUE NUMBER

11.1 Defence Stores Catalogue Number allotted to this store is 6810-000 646.

12 SAFETY OF OPERATIONS

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

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 DETERMINATION OF PURITY AS AMINO GUANIDINE BICARBONATE

A.1 Weigh 0.05 g of the substance accurately in an Iodine flask and dissolve it in 20 ml of 5 N Sulphuric Acid and add 5 ml of water and 50 ml of N/10 Potassium Iodate solution (KIO_3) keep the flask in dark place surrounded by ice for 3 minutes. Exactly after 3 minutes of addition of Potassium Iodate Solution (KIO_3) add 3 g of Potassium Iodide (KI) i.e. 30 ml of 10% KI. Titrate with N/10 Sodium thiosulphate using Starch as an indicator. Carry out a blank under similar conditions.

1 ml of N/10 Sodium thiosulphate = 0.0034 g of Amino Guanidine Bicarbonate.

NOTE- Alternatively weigh 0.5 g accurately and dissolve it in 5N H_2 SO_4 in a measuring flask of 250 ml capacity, 20 ml of this solution may be used for purity determination.

Appendix 'B'

B MATTER INSOLUBLE IN DIL $H_2 SO_4$ (SULPHURIC ACID)

Dissolve 5 g of the material (Amino Guanidine Bicarbonate) in a beaker of 500 ml capacity in dilute Sulphuric acid. Heat it on a burner on an asbestos padded wire gauze for a few minutes till all the Amino Guanidine Bicarbonate dissolves. Cool and dilute it with distilled water, filter through a tared G3 crucible (M_1), wash the residue in the crucible with distilled water and treat with Acetone, dry in an oven, cool and reweigh (M_2).

$$\text{Matter insoluble in } H_2 SO_4 \text{ \% by mass} = \frac{(M_2 - M_1) \times 100}{5}$$

B.2 Confirm the presence/absence of grit by feeling the insoluble matter in the beaker with a glass rod. If grit is suspected, treat the insoluble matter with Aqua Regia and then with storng Alkali. Wash the insoluble matter with distilled water. Treat with Acetone. Dry and weigh on a tared paper scoop.

$$\text{Grit, \% by mass} = \frac{\text{Difference in mass} \times 100}{5}$$

NOTE- shall not be gritty in nature.

Appendix 'C'

C DETERMINATION OF MELTING POINT

C.1 The capillary tube (14 cm long and 0.9 mm to 1 mm internal dia.) is filled with the finely powdered dried sample by tapping till the length of the packed sample is 3 mm to 5 mm. Any substance adhering to the outside of the tube must be wiped off.

C.2 The filled melting point tube is now attached to the lower end of the thermometer in such a way that the substance is at the level of the middle of Mercury bulb (Which has previously been wetted with the bath liquid). The thermometer, with the tube attached, is inserted into the centre of the bath. The melting point apparatus (bath) is heated comparatively rapidly with a flame untill the temperature of the bath is within 15ºC of the melting point of the substance, and then slowly and regularly at the rate of about 2ºC per minute untill the substance melts completely. The temperature at which the substance commences to liquiefy and the temperature at which the solid has disapperared (melting point range) are observed. For a pure substance the melting point range should not excced 0.5ºC to 1ºC. It is usually less. It should be noted that a freshly filled capillary tube should always be employed for each subsequent determination. After the melting point has been determined, the thermometer reading is corrected by reference to the calibration chart of the thermometer.

NOTES-

1 The length of the heating column of the bath should be about 14 cm and the thermometer bulb should about 3 cm above from the bottom of the heating bath.

2 First approximate melting point is determined by heating rapidly and then for accurate determination the bath is allowed to cool to about 30 °C and the second capillary is substituted for first and an accurate determination is made.

Appendix 'D'

D DETERMINATION OF ZINC CONTENT

D.1 Reagents

i) *EDTA Solution*: Dissolve 18.615 g of A.R Disodium dihydrogen ethylene diamine tetra acetate dihydrate in water and dilute it to 1000 ml in a Volumetric flask with redistilled or de-ionised water to make approximate M/20 EDTA solution.

ii) *Erichrome Black T Indicator*: Dissolve 0.2 g of the dyestuff in 15 ml of Triethylamine and 5 ml of absolute Ethanol.

iii) *Buffer Solution (pH-10)*: Add 142 ml of concentrated Ammonia solution (Specific gravity 0.88 to 0.90) to 17.5 g of A.R. Ammonium chloride and dilute to 250 ml with distilled water.

D.2 Procedure

D.2.1 Take a 5 g of the sample in silica dish, ash it on slow flame and muffle it untill all carbonaceous matter is burnt off. To the residue in the crucible, add few drops of dilute HCl and few ml of distilled water. Exract the content of crucible by adding hot distilled water. Add distilled water to make the volume to about 100 ml in a conical flask. Add Buffer solution (2 ml of Buffer solution for every 25 ml of the solution (i.e. extract) to be titrated). Add few drops of Erichrome black-T indicator. Titrate with EDTA solution untill the colour changes from wine red to blue. Calculate Zn content as follows:

$$\text{Zn content, \% by mass} = \frac{0.06538 \times 0.05 \times V \times 100}{\text{Mass of the sample taken}}$$

Where

V = Volume in ml of EDTA solution required in titration.

NOTE- EDTA being a primary standard, by taking accurate mass, the solution at (i) above gives exact M/20 solution i.e. factor-1.000. If additional check on the concentration of EDTA solution is required, it may be standardised by titration with nearly neutralised $ZnCl_2$ or $ZnSO_4$ solution.

Appendix 'E'

E DETERMINATION OF IRON CONTENT

E.1 Ignite 2 g of sample in silica dish at about 600ºC to 700ºC till free from Carbon. Cool, weigh and calculate the percentage of ash. Dissolve the ash in 10 ml of 50% V/V Hydrochloric acid by warming, cool and transfer to a Nessler's cyclinder. Dilute to 50 ml with distilled water and add 30 mg of Ammonium per sulphate and 3 ml of 10% NH_4 CNS solution. Colour produced shall not be greater than blank containing 40 ml of distilled water, 10 ml of 50% V/V of Hydrochloric acid, 30 mg of Ammonium per sulphate 3 ml of 10% NH_4CNS and 0.01 mg of Fe.