MINISTRY OF DEFENCE

PROVISIONAL SPECIFICATION FOR

Antimony trioxide

(Specification No.HEMRL/TRIM/PROP/IM/17)

HEMRL,
SUTARWADI, PUNE - 411021

CONTENTS

0. FOREWORD

0.1 This specification has been prepared by High Energy Materials Research Laboratory, Sutarwadi, Pune-411021

0.2 This specification will be approved by the Ministry of Defence after appropriate sealing action by Controllerate of Quality Assurance (Military Explosives) and will be mandatory for use by Defence Services.

0.3 Before sealing action, any queries regarding this specification may be referred to "The Director High Energy Materials Research Laboratory, Sutarwadi, Pune-411021."

1 SCOPE

This specification is intended to govern, supply and assure the quality of Antimony trioxide. This material is intended for use as an inhibition ingredient for the booster propellant of "AKASH" Missile/ booster & sustainer propellant of "TRISHUL" Missile/Pinaka/RZ-61/Pechora.

2 RELATED SPECIFICATIONS AND DOCUMENTS

2.1 The following related specification has been referred to in the preparation of this specification.

This conforms to the specification IS 38-1976, all passing through 200 BSS & retained on 240 BSS

2.2 Any queries regarding this IS specification may be referred to "The Director, High Energy Materials Research Laboratory, Sutarwadi, Pune- 411021"

3 DESCRIPTION OF THE MATERIAL

The material shall be in the form of white crystalline powder.

4 MANUFACTURE

4.1 Antimony tri - oxide shall be manufactured by a process which will produce the product conforming to this specification.

4.2 Nothing in this specification shall relieve the manufacturer of his responsibility for the safety of his operations.

5. TENDER SAMPLE

The contractor / supplier shall submit a tender sample of 500 g free of Antimony trioxide. Acceptance of the tender will denote that the tender sample is accepted as a standard of supply, in accordance with the terms of this specification.

6 INSPECTION

6.1 Antimony trioxide and the containers in which it is packed shall be subjected to inspection and the final approval will be given by the Quality Assurance Officer / Quality Assurance Authority.

6.2 Samples of the material may be withdrawn at random from any portion of the batch /lot / consignment.

6.3 If on examination any sample is found not conforming to the requirements of this specification the whole batch / lot / consignment is liable for rejection.

7 SAMPLING

Each sample shall be labelled with date, lot number, and manufacturer's container identification number.

8. **TEST REQUIREMENTS**

Samples taken from any portion of the batch / lot/ consignment of the material shall conform to clause 3 and shall also conform the following test requirements.

Tests:

Sl No.	Characteristics	Passing Standard	Reference to Test Method
1.	Appearance	White powder free form visible impurities	----
2.	Volatile Matter, % max:	0.5	Appendix –IM/17/I
3.	Alkalinity/Acidity, % by mass, max	0.1	Appendix-IM/17/II
4.	Purity expressed as Sb_2O_3, % min.	99.0	Appendix –IM/17/III

9. **SUPPLIERS INSPECTION OF STORES / CONSIGNMENT**

Before tendering the store for inspection the supplier shall carry out a thorough inspection of each delivery to satisfy himself that the store fully conforms to this specification and shall render certificate to that effect to the Quality Assurance Officer / Quality Assurance Authority.

10 **WARRANTY**

The stores supplied against the contract shall deem to have been warranted against defective material and performance by the contractor / manufacturer for a period of 12 months from the date of receipt of the stores at the consignee's end and if during this period any of the stores supplied is found defective the same shall be replaced by the contractor / manufacturer free of charge at the consignee's premises.

11 PACKING AND MARKING

11.1 Antimony trioxide shall be packed in suitable plastic drums.

11.2 When the material is required to be transported by rail the packing shall conform to the provisions of Indian Railways Conference Association, Red Tariff No.18.

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

11.4 All packages containing the material shall be durably and legibly marked with the following details (as applicable):

xii. Nomenclature and specification number of the material.

xiii. Name and address of the consignee.

xiv. S.O. Number and date

xv. Consignment number

xvi. Lot / Batch number and date of manufacture

xvii. Batch No. & date of manufacture

xviii. Gross and net weight

xix. Consecutive number of package and total number of packages in the consignment

xx. Date of Supply

xxi. Contractor's initials or recognized trade mark

xxii. Storage temperature limit.

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

11.6 The paint used for marking shall conform to IS :138 –1981 and to the satisfaction of the Quality Assurance Officer / Quality Assurance Authority.

12 DEFENCE STORES CATALOGUE NUMBER

Defence Stores Catalogue Number allotted to this store = not allotted.

13 SUGGESTIONS FOR IMPROVEMENT

Any suggestion for improvement in this particular document may be forwarded to " The Director High Energy Materials Research Laboratory, Sutarwadi, Pune-411021"

14 SUGGESTED SOURCE OF SUPPLY

General trade.

15 SAFETY REQUIREMENT

Supplier should mention about storage conditions and safety measures during handling and transport.

16 APPENDICES

Appendix –IM/17/I

VOLATILE MATTER

1. APPARATUS

c) Oven maintained at 100 + 2°C

d) Weighing bottle

e) Mettler balance with accuracy of 0.1 mg.

2. PROCEDURE

About 2 g of antimony trioxide is weighed in a weighing bottle and is kept at 100+2°C for 2h. It is then cooled in desiccator (with silica gel) and weighed accurately.

3. CALCULATION

$$\text{Volatile matter, \% by mass} = \frac{m_2 - m_3}{m_2 - m_1} \times 100$$

Where,

m_1 = mass of the empty glass bottle, g

m_2 = mass of the empty glass bottle and sample, g

m_3 = mass of the empty glass bottle and sample after drying, g

Report the results of two determinations and their average.

Appendix –IM/17/II

Alkalinity / Acidity, % by mass

1. APPARATUS

a. Burette & Pipette

b. Beaker & filter paper

2. PROCEDURE

About 5 g of antimony trioxide is weighed correctly and 200 ml distilled water and neutral ethyl alcohol are added. It is then shaken for 5 minutes, and sediment is allowed to settle and then filtered. Filtrate is titrated with standard acid or alkali solution using methyl red or methyl orange as indicator. Acidity is expressed as % sulphuric acid and alkalinity as % sodium carbonate.

Appendix –IM/17/III

Purity expressed as Sb_2O_3

1. APPARATUS

a. Burette & Pipette

b. Beaker & filter paper

2. PROCEDURE

About 0.1 g of material is weighed and dissolved in 5 ml HCl without boiling. About 3-4 g potassium hydrogen tartrate and 20 ml of water is added and shaken well. Then 5-6 g of sodium carbonate / bi-carbonate is added, The solution is titrated against 0.1 N Iodine solution with starch as indicator. At the end point, blue colour appears.

3. CALCULATION

purity is determined as:

$$\% \text{ Purity} = \frac{7.288 \times N \times V}{M}$$

N- Normality,

V- Titration reading

M- Mass taken of Sb_2O_3