



भारत सरकार
GOVERNMENT OF INDIA
रक्षा मंत्रालय
MINISTRY OF DEFENCE

संयुक्त सेवा विनिर्देश
JOINT SERVICES SPECIFICATION

ON

POTASSIUM SULPHATE, GRADE 1 AND GRADE 2
DCAN

Grade 1 - 6810-001 147
Grade 2 - 6810-005 763

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. This Joint Services Specification has been approved by Shri RS Gauba, Sc 'G', Associate Director, PO-II, DRDO, Chairman, Armament Standardisation Sub-committee.
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)	

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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 6810-110 : 2016, (Fourth Revision):

- a) was prepared in the year 1989.
- b) was revised in the year 1994, 2003 & 2011 and supersedes the same.

0.4 This specification would be used for Supply and Quality Assurance of Potassium sulphate, grade 1 and grade 2.

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.

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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

1.1 This specification is meant to govern Supply and Quality Assurance of Potassium sulphate, grade 1 and grade 2.

1.2 Potassium sulphate, grade 1 is suitable for use in the manufacture of Propellant Explosives. Potassium sulphate, grade 2 is suitable for use in the manufacture of Propellant SBM 82 for charge M₄ A₂.

2. RELATED SPECIFICATIONS/DOCUMENTS

Reference is made in this specification to:

<i>S. No.</i>	<i>Specification No. & Year</i>	<i>Nomenclature</i>
a)	IS 138 : 1992 (Third Revision) AMD 1 Reaffirmed 2014	Ready Mixed Paint, Marking, for Packages and Petrol Containers-Specification
b)	IS 460 (Part 1) : 1985 (Third Revision) AMD 1 Reaffirmed 2013	Specification for Test Sieves Part 1 Wire Cloth Test Sieves
c)	JSG 0112 : 2015 (Second Revision)	General Methods of Tests and Assessment of Impurities in Chemicals/Materials used in the Manufacture of Explosives and Ammunition

3. MATERIAL

Potassium sulphate, grade 1 and grade 2 shall consist essentially of Potassium sulphate in the form of a white or near white crystalline powder, free from gritty particles, visible impurities and foreign matter. It shall comply with the sieving requirements given in **6.4**.

4. TENDER SAMPLE

The manufacturers/supplier/contractors shall submit a tender sample of 250 g essentially from the same batch/lot of manufacture, free of all charges and conforming to this specification, to the Quality Assurance Officer/Quality Assurance Authority, when called for in the tender.

5. PRE-INSPECTION OF STORES/CONSIGNMENT

5.1 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.

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5.2 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.

6. QUALITY ASSURANCE

6.1 Inspection

6.1.1 Potassium sulphate, grade 1 and grade 2 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.

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

6.2 Sampling

A representative sample of 250 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

6.3 Criteria for Conformity

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

6.3.2 The foregoing provisions shall apply equally to prime contractors and to any sub-contractor.

6.4 Testing

Samples taken from any portion of supply shall be in accordance with the **3** above and shall comply with the following requirements:

<i>S. No.</i>	<i>Characteristics</i>	<i>Passing Limit</i>		<i>Test Method</i>
		<i>Grade 1</i>	<i>Grade 2</i>	
a)	Moisture at 105°C, percent by mass	0.2 Max	0.5 Max	JSG 0112 Method No. 1 (a)
b)	Water insoluble matter, percent by mass	0.1 Max	0.1 Max	JSG 0112 Method No. 4

S. No.	Characteristics	Passing Limit		Test Method
		Grade 1	Grade 2	
c)	Above insoluble matter digested in aqua regia and insoluble retained on No. 63 micrometre IS Sieve	Nil	Nil	JSG 0112 Method No. 6 & 18
d)	Reaction of 10% aqueous extract to Brome thymol blue Indicator:			JSG 0112 Method No. 5 (a)
	1) Acidity as Sulphuric acid, percent by mass	0.005 Max	-	
	2) Alkalinity as Potassium hydroxide, percent by mass	0.005 Max	-	
e)	Ammonium compounds calculated as Ammonia, percent by mass	0.05 Max	0.05 Max	JSG 0112 Method No. 9
f)	Compounds of metals other than Potassium, calculated as their oxides, total percent by mass	0.5 Max	0.5 Max	APPX 'A'
g)	Chlorides, calculated as Potassium chloride, percent by mass	0.1 Max	0.01 Max	APPX 'B'
h)	Potassium sulphate content, percent by mass	99.0 Min	99.0 Min	APPX 'C'
j)	Sieving Requirements: percent by mass			JSG 0112 Method No. 18
	1) Retained on No. 15 micrometre IS Sieve	Nil	-	
	2) Passing through 300 micrometre IS Sieve	-	100 Min	-
	3) Passing through 210 micrometre IS Sieve	-	95 Min	
k)	Hygroscopicity, percent (At 27°C ±2°C, RH 90 %)	-	0.4 Max	APPX 'D'
m)	pH of Aqueous extract	-	6 to 8	JSG 0112 Method No. 5 (b)

NOTE - Particulars of sieves referred to above are given in IS 460 (Part 1).

7. 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 date of intimation of defect.

8. PACKAGING

8.1 The material shall be supplied in sound and dry kegs, casks or other approved packages containing an approved quantity.

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

9. MARKING

9.1 All packages containing the material shall indelibly and legibly be 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 the Consignment.
- h) Date of Supply.
- j) Manufacturer's initials or recognised trademark.

9.2 The paint used for marking should conform to IS 138 (latest issue) and to the satisfaction of the Quality Assurance Officer/Quality Assurance Authority.

9.3 In addition to the above the Quality Assurance Officer may suggest some more marking/identification suitable at the time of inspection.

10. DEFENCE CATALOGUE NUMBER

The Defence Catalogue Number allotted to Potassium Sulphate are:

<i>S. No.</i>	<i>Nomenclature</i>	<i>DCAN</i>
a)	Grade 1	6810-001 147
b)	Grade 2	6810-005 763

11. SAFETY OF OPERATIONS

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.

12. SUGGESTIONS FOR IMPROVEMENT

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.

DETERMINATION OF COMPOUNDS OF METALS OTHER THAN POTASSIUM

Qualitatively test for metallic radicals (other than potassium) by the normal methods of group analysis. If present, it should be separated and estimated by standard method and expressed as a percentage on the sample as the oxide of the respective metallic radical.

APPX 'B'
(Clause 6.4)

DETERMINATION OF CHLORIDE CONTENTS

Dissolve 2 g of the sample in 100 ml of distilled water and make faintly acidic with 10% Nitric acid and add 1 ml of 10 percent Silver nitrate solution. If turbidity is obtained within 5 minutes, Chloride will be present in the sample. If presence of chlorides is confirmed, the same shall be determined by following method No. 7(b) or 20 of JSG 0112 by using N/50 $\text{AgNO}_3/\text{NH}_4\text{CNS}$.

DETERMINATION OF POTASSIUM SULPHATE CONTENT

Accurately weigh about 0.5 g of the sample and dissolve in 100 ml of distilled water. Filter through a No. 42 Whatman filter paper and wash thoroughly by distilled water. The filtrate is then made slightly acidic by Hydrochloric acid and heated. To the hot solution add drop by drop hot solution of 10% Barium chloride till the precipitation of Barium sulphate is complete. Digest or keep overnight and filter through a Gooch crucible. Wash the precipitate till free from chloride, dry ignite, cool and weigh. From the mass of Barium sulphate calculate the percentage of Potassium sulphate.

Calculation:

$$\text{Potassium Sulphate content} = \frac{\text{Mass of Barium Sulphate} \times 0.7466}{\text{Wt. of the sample taken}} \times 100$$

percent by mass

DETERMINATION OF HYGROSCOPICITY

D-1. Apparatus - Desiccator, Weighing bottles, approximately 7 cm in diameter and 3 cm high.

D-2. Procedure - Weigh accurately about 5 g sample in a weighing bottle. Place the weighing bottle with the lid off in the desiccator containing an aqueous sludge of Zinc sulphate (hydrated) which gives the desired relative humidity. Allow to stand for 24 hours at 27°C ±2°C (see Note). Take out the weighing bottle, put on the lid and weigh immediately (M₁). Then dry at 100°C for 2 hours, cool in a desiccator and reweigh (M₂).

D-3. Hygroscopicity, percent =
$$\frac{M_1 - M_2}{M_2} \times 100$$

NOTE - The test atmosphere of 90 % relative humidity at 27°C ±2°C may be obtained as follows:

Place in a desiccator an aqueous sludge of hydrated Zinc sulphate so that the area of the surface of the sludge is not less than 75% of the floor of the desiccator. Supports for keeping the sample in the desiccator shall be so arranged that there is minimum obstruction in the diffusion of water vapours within the desiccator and the height of the exposed sample above the Zinc sulphate sludge does not exceed 10 cm. The desiccator shall be maintained at a temperature of 27°C ±2°C.