



**PRODUCT MANUAL FOR  
SODIUM NITRATE FOR EXPLOSIVES AND PYROTECHNIC  
INDUSTRY  
ACCORDING TO IS 12681: 1989**

*This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.*

1.	<b>Product</b>	:	IS 12681: 1989
	<b>Title</b>	:	Sodium nitrate for explosives and pyrotechnic industry.
	<b>No. of Amendments</b>	:	0.
2.	<b>Sampling Guidelines:</b>		
a)	<b>Raw material</b>	:	No specific requirement.
b)	<b>Grouping guidelines</b>	:	Not applicable.
c)	<b>Sample Size</b>	:	500 g.
3.	<b>List of Test Equipment</b>	:	Please refer ANNEX – <u>A</u>
4.	<b>Scheme of Inspection and Testing</b>	:	Please refer ANNEX – <u>B</u>
5.	<b>Possible tests in a day :</b>		
	Description, Moisture and volatile Matter, Matter insoluble in water, Nitrites, Chlorides (as Cl), Sulphates (as SO <sub>4</sub> ), Iodates (as NaIO <sub>3</sub> ), pH of 10% solution		
6.	<b>Scope of the Licence :</b>		
	“Licence is granted to use Standard Mark as per IS 12681: 1989 with the following scope:		
	Name of the product	:	Sodium nitrate for explosives and pyrotechnic industry.

**ANNEX A**

**List of Test Equipment**

*Major test equipment required to test as per the Indian Standard*

Sl. No.	Tests used in with Clause Reference		Test Equipment
	Cl. No.	Test	
1.	(Cl. 2.2) Table 1 , Sl. No. (1)	Assay	<ul style="list-style-type: none"> <li>i. Ferrous ammonium sulphate</li> <li>ii. Potassium permanganate</li> <li>iii. Ammonium molybdate</li> <li>iv. Sulphuric acid</li> <li>v. weighing balance</li> <li>vi. Volumetric Flask( 5ml, 10ml, 25 ml, 50ml, 100ml , 250ml , 500ml, 1000ml )</li> <li>vii. Demineralized</li> <li>viii. Sodium nitrate GR</li> <li>ix. UV Spectrophotometer with 1 cm cell</li> <li>x. Sodium hydroxide solution</li> <li>xi. Hot Plate/ Water Bath</li> <li>xii. Pipette</li> <li>xiii. Measuring Cylinder(0.5ml, 1ml, 2ml, 5ml, 20ml, 25ml)</li> <li>xiv. Stop Watch</li> <li>xv. Calculator</li> <li>xvi. Bromothymol blue indicator</li> <li>xvii. Beaker</li> </ul>
2.	(Cl. 2.2) Table 1 , Sl. No. (2)	Moisture and volatile matter	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Petri-dish</li> <li>iii. Air-oven</li> <li>iv. Desiccator</li> <li>v. Thermometer</li> </ul>
3.	(Cl. 2.2) Table 1 , Sl. No. (3)	Matter insoluble in water	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Tared sintered glass</li> <li>iii. Crucible desiccator</li> </ul>

4.	(Cl. 2.2) Table 1 , Sl. No. (4)	Nitrites	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Potassium Permanganate,</li> <li>iii. Sulphuric Acid</li> <li>iv. Conical flask (Class A)( 250ml, 500ml)</li> <li>v. Burette (Class A) &amp; Stand ( 50ml)</li> </ul>
5.	(Cl. 2.2) Table 1 , Sl. No. (5)	Chlorides	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Standard Silver Nitrate Solution,</li> <li>iii. Concentrated Nitric Acid</li> <li>iv. Ferric Ammonium Sulphate Indicator</li> <li>v. Standard Ammonium Thiocyanate Solution, 0.1 N approximately.</li> <li>vi. Nitrobenzene</li> </ul>
6.	(Cl. 2.2) Table 1 , Sl. No. (6)	Sulphates	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Concentrated Hydrochloric Acid</li> <li>iii. Barium Chloride Solution</li> <li>iv. Sintered Glass Crucible</li> <li>v. Separating Funnel</li> <li>vi. Mixing/ Stirring Rod</li> </ul>
7.	(Cl. 2.2) Table 1 , Sl. No. (7)	Chlorates	<ul style="list-style-type: none"> <li>i. Above facilities and,</li> <li>ii. Aniline Hydrochloride</li> <li>iii. Saturated potassium chlorate</li> <li>iv. Glass Stopper Bottle</li> </ul>

8.	(Cl. 2.2) Table 1 , Sl. No. (8)	Perchlorates	<ul style="list-style-type: none"> <li>i. Above Facilities and,</li> <li>ii. Wide-necked flask -300ml with cork</li> <li>iii. Reflux condenser,</li> <li>iv. An inlet tube ( 6 mm bore )</li> <li>v. Short tube( 12 mm bore ) fitted with a cork.</li> <li>vi. Concentrated Hydrochloric Acid</li> <li>vii. Sulphur Dioxide, gas.</li> <li>viii. Dilute Sulphuric Acid, approximately 12 N.,</li> <li>ix. Titanous Chloride Solution, 3 percent</li> <li>x. Ammonium Thiocyanate Solution</li> <li>xi. Standard Ferric Ammonium Sulphate Solution, approximately 0'1 N</li> <li>xii. Potassium bichromate</li> <li>xiii. Carbon Dioxide</li> <li>xiv. Apparatus Assembly as per fig 1 &amp; fig 2.</li> <li>xv. Rubber bunk board with 2 holes</li> <li>xvi. Leading tube</li> <li>xvii. Cork with glass lined hole</li> <li>xviii. Potassium chlorate (Perchlorate free)</li> </ul>
9.	(Cl. 2.2) Table 1 , Sl. No. (9)	Iodates	<ul style="list-style-type: none"> <li>i. Above Facilities and,</li> <li>ii. Standard Potassium Iodide Solution,</li> <li>iii. Sodium Hydroxide, one percent solution.</li> <li>iv. Hydrogen Peroxide, 3 percent solution.</li> <li>v. Hydrogen Supleide Gas</li> <li>vi. Ortho-Toluidine Solution</li> <li>vii. Nessler's cylinders</li> <li>viii. Litmus Paper</li> </ul>
10.	(Cl. 2.2) Table 1 , Sl. No. (10)	Total calcium and magnesium or compounds of these metals calculated as oxides	<ul style="list-style-type: none"> <li>i. Above Facilities and,</li> <li>ii. Ammonium Ferrocyanide, one percent solution.</li> <li>iii. Ethyl Alcohol</li> <li>iv. Standard Calcium Carbonate Solution,</li> <li>v. Hydrochloric acid</li> </ul>

11.	(Cl. 2.2) Table 1 , Sl. No. (11)	Ammonium compounds	<ul style="list-style-type: none"><li>i. Above Facilities and,</li><li>ii. Mercuric iodide</li><li>iii. Potassium iodide</li><li>iv. Sodium hydroxide</li><li>v. 500 ml of water</li><li>vi. Rubber stoppered borosilicate glass ware</li><li>vii. Ammonium Chloride Solution</li></ul>
12.	(Cl. 2.2) Table 1, Sl. No. (12)	pH	<ul style="list-style-type: none"><li>i. Above Facilities and,</li><li>ii. pH meter with glass electrodes</li><li>iii. Sampling Scoop</li></ul>

*a) The above list is indicative only and may not be treated as exhaustive.*

*b) The least count, range, and other specifications of the equipment, reagents etc shall be as specified in the standard*

**ANNEX B**

**Scheme of Inspection and Testing**

**1. LABORATORY** - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

**1.1** The manufacturer shall prepare a calibration plan for the test equipment.

**2. TEST RECORDS** – The manufacturer shall maintain test records for the tests carried out to establish conformity.

**3. LABELLING AND MARKING** –The Standard Mark as given in the Schedule of the license and Licence Number (i.e.CM/L- ...) shall be incorporated legibly and indelibly on each container/package of the product, provided always that the product thus marked conforms to specifications of the standard. Labelling/markings and packing shall be done as per the provision of the Indian Standard. In addition, details of BIS website shall be marked as follows: “For details of BIS certification please visit [www.bis.gov.in](http://www.bis.gov.in)”.

**4. CONTROL UNIT** – For the purpose of this Scheme, all packages of Sodium nitrate for explosives and pyrotechnic industry produced under similar conditions and from same machinery/plant, in a day shall constitute a control unit.

**4.1** In case the plant operates in several shifts, one sample may be taken from the production of each shift and mixed together to form a composite sample, on which the tests may then be conducted as per the frequency defined in the levels of control in Table 1.

**5. LEVELS OF CONTROL** - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2.0 above.

**5.1** All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

**6. REJECTIONS** – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

**TABLE 1: LEVELS OF CONTROL**

(1)				(2)	(3)		(4)
Test Details				Test Equipment Requirement R: required (or) S: Sub-contracting permitted	Levels of Control		Remarks
Clause	Requirement	Test Method			No. of Sample	Frequency	
		Clause	Reference				
2.1	Description	-	-	R	One Sample	Each Control Unit	-
	Assay	A-2	IS 12681	R	One Sample	Each Control Unit	-
2.2	Moisture and volatile matter	A-3	IS 12681	R	One Sample	Each Control Unit	-
	Matter insoluble in water	A-4	IS 12681	R	One Sample	Each Control Unit	-
	Nitrites	A-5	IS 12681	R	One Sample	Each Control Unit	-
	Chlorides	A-6	IS 12681	R	One Sample	Each Control Unit	-
	Sulphates	A-7	IS 12681	R	One Sample	Each Control Unit	-
	Chlorates	A-8	IS 12681	S	One Sample	Once in three months	These properties are majorly depended on quality of raw materials. Caustic soda procured is ISI marked as it is under compulsory certification from BIS. Liquid ammonia and nitric acid are very stable in nature with respect to relevant properties. Unless there is a change in supplier, the properties are likely to remain same. Thus once tested, these values may be considered to be consistent for a longer period.
	Perchlorate	A-9	IS 12681	S	One Sample	Once in three months	
	Iodates	A-10	IS 12681	S	One Sample	Once in three months	
	Total calcium and magnesium or compounds of these metals calculated as oxides	A-11	IS 12681	S	One Sample	Once in three months	
Ammonium compounds	A-12	IS 12681	S	One Sample	Once in three	-do-	

(1)				(2)	(3)		(4)
Test Details				Test Equipment Requirement R: required (or) S: Sub-contracting permitted	Levels of Control		Remarks
Clause	Requirement	Test Method			No. of Sample	Frequency	
		Clause	Reference				
						months	
	pH	A-13	IS 12681	R	One Sample	Each Control Unit	-

Note-1: Whenever there is a change in raw material supplier, all tests may be carried out at the first control unit produced to ensure conformity of the product as per the standard notwithstanding the level of control mentioned above. Same may be kept in record accordingly.

Note-2: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-3: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval to BO Head.