



**PRODUCT MANUAL**  
**FOR MINERAL MIXTURES FOR SUPPLEMENTING CATTLE FEEDS**  
**ACCORDING TO IS 1664 : 2002**

*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 1664 : 2002
	<b>Title</b>	:	Mineral Mixtures for Supplementing Cattle Feeds
	<b>No. of Amendments</b>	:	01
2	<b>Sampling Guidelines</b>	:	
a.	<b>Raw material</b>	:	All ingredients used shall be as per clause 4 of IS 1664.
b.	<b>Grouping guidelines</b>	:	NA
c.	<b>Sample size</b>	:	250 gram
3	<b>List of test equipments</b>	:	Please refer-ANNEX-A
4	<b>Scheme of inspection and testing</b>	:	Please refer-ANNEX-B
5	<b>Possible test in a day:</b>		
	a) Moisture test b) Total Ash test c) Fineness d) Presence of organic matter/proteinous impurities e) Acid Insoluble ash test		
6	<b>Scope of the license:</b>		
	“Licence is granted to use Standard Mark as per IS 1664 : 2002 with the following scope:		
	Name of the product	:	Mineral Mixtures for Supplementing Cattle Feeds
	Type	:	Type- 1 / Type -2

ANNEX A

**TO PRODUCT MANUAL  
FOR MINERAL MIXTURES FOR SUPPLEMENTING CATTLE FEEDS  
ACCORDING TO IS 1664 : 2002**

**LIST OF TEST EQUIPMENTS**

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

S.No	Tests used in with Clause Reference	TEST EQUIPMENTS,
1	Moisture Cl 6.3 and Table 1, (i) (Annex A of IS 5470)	Silica crucible, Analytical balance, Vacuum oven (capable of maintaining 60°C and 500 mmHg pressure)
2	Calcium Cl 6.3 and Table 1, (ii)	Weighing balance, Incinerating dish (made of platinum, silica or porcelain), Sintered glass filter crucible, Electric Muffle furnace, Sintered glass filter crucible (P-16), Boiling water bath, Beaker Volumetric flask, Hot plate, Pipette, Burette, Glass rod Conical flask, Stand, pH meter, Hydrochloric acid, Nitric acid Sulphuric acid, Ammonia solution, Ammonium oxalate, Citric acid monohydrate, Potassium permanganate, Distilled water, Ammonium chloride, Bromocresol green.
3	Phosphorous, Cl 6.3 and Table 1, (iii)	UV Spectrophotometer, Water complying to at least grade 3, Calcium carbonate, Hydrochloric acid, Nitric acid, Sulfuric acid, Ammonium monovanadate solution, Molybdovanadate reagent, Phosphorus standard solution, Ashing crucible, Electric muffle furnace, Kjeldahl flask, One-mark volumetric flasks, Test tubes, Sand bath, Beaker, pipettes, Weighing balance, Measuring jar, Hot air oven.
4	Magnesium, Cl 6.3 and Table 1, (iv)	Spectrophotometer, Distilled Water, Conc. Hydrochloric acid, Lanthanum nitrate solution, Volumetric flask, Caesium chloride solution, Stock solution of Magnesium, Standard solution of Magnesium, Polyethylene bottle, Electric hot plate, Lanthanum/Caesium blank solution, Pipettes, Analytical balance, Incineration dishes(Platinum, quartz or porcelain), Glassware-hard borosilicate glass, Gas burner, Boiling water bath, Electric muffle furnace, Atomic absorption spectrophotometer, Air-acetylene flame, Hollow cathode lamps/electrode-less discharge lamps, Measuring jar, Filter paper.
5	Salt, Cl 6.3 and Table 1, (v)	Weighing balance, Measuring jar, Ferric sulphate solution, Ferric sulphate, Distilled water, Ammonium hydroxide solution, Conc. Nitric acid, Ferric sulphate indicator solution, Whatman no.41 Funnel, Standard silver nitrate solution, Standard potassium thiocyanate solution, Hot air oven, Pipette, Graduated flask, Beaker, Volumetric flask, Glass rod, Burner, Burette, Stand.
6	Iron Cl 6.3 and Table 1, (vi)	Distilled Water, Conc. Hydrochloric acid, Lanthanum nitrate solution, Volumetric flask, Caesium chloride solution ( Lanthanum/Caesium blank solution, Pipettes, Analytical balance

		Incineration dishes (Platinum, quartz or porcelain), Glassware-hard borosilicate glass, Electric hot plate/Gas burner, Boiling water bath, Electric muffle furnace, Atomic absorption spectrophotometer, Air-acetylene flame, Hollow cathode lamps/electrode –less discharge lamps, Measuring jar Filter paper whatmann, Stock solution of iron, Standard solution of iron.
7	Iodine Cl 6.3 and Table 1, (vii)	Methyl orange indicator(methyl orange 0.50g), Distilled water, Volumetric flask, Dil. Sulphuric acid, Bromine water, Potassium iodide solution, Burette, Beaker, Sodium thiosulphate solution, Measuring jar, Sodium sulphite solution, Phenol solution, Standard sodium thiosulphate solution, Starch solution, Sodium chloride solution, Potassium iodide control solution, Conc. Sulphuric acid, Filter paper, Funnel, Graduated flask, Pipette, Erlenmeyer flask, Glass rod, Stand.
8	Copper Cl 6.3 and Table 1, (viii)	Distilled Water, Conc. Hydrochloric acid, Lanthanum nitrate solution, Volumetric flask, Caesium chloride solution, Lanthanum/Caesium blank solution, Pipettes, Analytical balance Incineration dishes (Platinum, quartz or porcelain), Glassware-hard borosilicate glass, Electric hot plate/Gas burner, Boiling water bath, Electric muffle furnace, Atomic absorption spectrophotometer, Air-acetylene flame, Hollow cathode lamps/electrode –less discharge lamps, Measuring jar, Filter paper whatmann, Stock solution of copper, Standard solution of copper.
9	Manganese Cl 6.3 and Table 1, (ix)	Distilled Water, Conc. Hydrochloric acid, Hydrochloric acid Dil. Hydrochloric acid, Lanthanum nitrate solution (Lanthanum nitrate), Volumetric flask, Caesium chloride solution (Caesium chloride), Lanthanum/Caesium blank solution, Pipettes, Analytical balance, Incineration dishes (Platinum, quartz or porcelain), Glassware-hard borosilicate glass, Electric hot plate/Gas burner, Boiling water bath, Electric muffle furnace, Atomic absorption spectrophotometer, Air-acetylene flame, Hollow cathode lamps/electrode –less discharge lamps, Measuring jar, Filter paper whatmann, Stock solution of Manganese, Standard solution of Manganese.
10	Cobalt Cl 6.3 and Table 1, (x)	Spectrophotometer /Photometric colorimeter, Distilled water Citric acid, Sodium hydroxide solution, Phenolphthalein solution), Burette, Pipette, Standard flask, Stand, Methyl red indicator solution, Measuring jar, Weighing balance, Bromophenol blue indicator solution, Dithizone solution in chloroform, Refrigerator, Dithizone solution in carbon tetrachloride, Dark bottle, Phenolphthalein indicator solution, Buffer solution, Buffer solution, Volumetric flask, Conc . Nitric acid, Perchloric acid, Conc. Sulphuric acid, Cresol red indicator solution, Nitroso-R Salt, Standard cobalt solution, Graduated flask, Separating funnel, pH paper, Burner, Beaker, Muffle furnace.
11	Fluorine Cl 6.3 and Table 1, (xi)	Ion selective electrode meter, Solid state fluoride, electrode, Magnetic stirrer and stir bars(MS-500), Plastic lab ware, Deionized water, 100ppm/100mg/kg, Fluoride standard sol., Reference electrode filling sol, Total ionic strength adjustment buffer, Single junction reference

		electrode, Plastic beakers(100/250 ml), Sodium fluoride, Hot air oven, Plastic bottles, Hydrochloric acid, Weighing balance, Measuring jar, Volumetric flask, Standard fluoride solution.
12	Zinc Cl 6.3 and Table 1, (xii)	Distilled Water, Conc. Hydrochloric acid, Hydrochloric acid, Dil. Hydrochloric acid, Lanthanum nitrate solution , Volumetric flask, Caesium chloride solution Lanthanum/Caesium blank solution, Pipettes, Analytical balance, Incineration dishes (Platinum, quartz or porcelain), Glassware-hard borosilicate glass, Electric hot plate/Gas burner, Boiling water bath, Electric muffle furnace, Atomic absorption spectrophotometer, Air-acetylene flame, Hollow cathode lamps/electrode –less discharge lamps, Measuring jar, Filter paper whatmann, Stock solution of Zinc (Zinc sulfate heptahydrate, Con. Hydrochloric acid), Standard solution of Zinc.
13	SULPHUR, Cl 6.3 and Table 1, (xiii)	Magnetic stirrer, Spectrophotometer, Measuring spoons, Volumetric flasks, Stirring bars, Glycerol, Con. Hydrochloric acid, Distilled water, Ethyl alcohol, Sodium chloride, Barium chloride, Standard sulphur solution, Potassium sulphate, Weighing balance, Measuring jar.
14	Determination of Acid Insoluble Ash, Cl 6.3 and Table 1, (xiv)	Weighing balance, Silica crucible, Muffle furnace, Hot air oven, Watch glass, Whatman filter paper -42, Meker burner, Desiccators
15	LEAD, Cl 6.3 and Table 1, (xv)	Nessler cylinders, Distilled water, Pipette, Analytical balance, Measuring jar, Suitable glass wares, Hydrochloric acid, Acetic acid, Ammonium hydroxide, Hydrogen sulphide solution, Standard lead solution, Lead nitrate, Volumetric flask
16	ARSENIC, Cl 6.3 and Table 1, (xvi)	<b>a. Modified Gutzeit method</b>
		Distilled water, Acetic acid, Lead acetate solution, Cotton wool, Absorbent cotton wool impregnated with lead acetate, Mercuric bromide solution, Mercuric bromide, Rectified spirit, Sanitized Mercuric bromide paper strips, Filter paper 70×50mm, Mercuric bromide solution, Gutzeit bottle, Dil. Sulphuric acid, Conc. Hydrochloric acid, Potassium iodide solution, Stannous chloride solution, Stannous chloride 40g, Hydrochloric acid-100ml, Zinc granules, Standard Arsenic stock solution, Arsenic trioxide 0.1mg, Beaker 100ml, Sodium hydroxide 2ml, Volumetric flask—1000ml, Dil.standard Arsenic Solution, Standard arsenic solution 25ml, Volumetric flask-1000ml, Hydrogen peroxide, Hydrogen fluoride, Sulphuric acid, Sodium peroxide & Sodium carbonate, Borax.
		<b>b. Silver diethyldithiocarbamate method</b>

		Evolution and absorption apparatus, (Conical flasks, connecting tube, Hydrogen sulphide, absorption tube, spherical/conical ground glass joint, spring clip), Spectrophotometer /photometric absorptometer, Distilled water (IS 1070:1977), Silver diethyldithiocarbamate solution, Silver diethyldithiocarbamate, Water white pyridine, Pyridine, Stoppered glass bottles, Conical flask-1000ml, Conc. Hydrochloric acid, Potassium iodide solution, Stannous chloride solution, Stannous chloride, Hydrochloric acid, Connecting tube, Absorbent cotton wool, Absorption tube, Zinc granules, Conical flask-100ml, Sodium diethyl dithiocarbamate, Rectified spirit, Glass rod, Ether (IS 336:1973), Silver nitrate, Distilled water
17	Test for Presence of Organic Matter/Proteinous Impurities, Cl 6.3 and Table 1, (xvii)	Silica crucible, Hot plate, Thermometer
18	FINENESS, Clause 6.1	IS Sieve 200micron, Woven wire cloth

**The list above is indicative only and may not be taken as exhaustive.**

**ANNEX B**  
**SCHEME OF TESTING AND INSPECTION**  
**FOR CERTIFICATION OF**  
**MINERAL MIXTURES FOR SUPPLEMENTING CATTLE FEEDS**  
**ACCORDING TO IS 1664:2002**

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 equipments.

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

3. **PACKING AND MARKING** – The Standard Mark as given in Schedule of the licence shall be stenciled/printed on each bag of mineral mixtures for supplementing cattle feeds or printed on the label applied to the bag, as the case may be, provided always that the material in each bag to which this mark is thus applied conforms to every requirement of the specification.

3. 1 **Marking** – Each container shall be marked or labelled giving the information given under clause 7.2.1 and cl 7.2.2 of IS 1664. The information given under clause 7.2.2 of IS 1664 may be given in a leaflet enclosed with each container.

3.1.1 In addition, the following information shall either be marked on the container or given in the leaflet for supply along with the container:

- a) Name and type of the material;
- b) Ingredients;
- c) Guaranteed composition; and
- d) Directions for use (in case of Type 2 Mineral Mixtures, the quantity of salt required to be added before use shall be indicated).

In addition, the following details shall be mentioned on each container of material legibly and indelibly:

- a) BIS Licence No. CM/L\_\_\_\_\_.
- b) BIS website details i.e – “For details of BIS Certification please visit [www.bis.gov.in](http://www.bis.gov.in)”

3.2 **Packing** – The material shall be packed in moisture-proof bags, cartoons, boxes or drums. All containers shall be sound, clean and free from casual agents of infectious diseases and parasites.

4. **CONTROL UNIT** - For the purpose of this Scheme, the quantity of the mineral mixture homogenized at a time in a batch mixer shall constitute a control unit.

**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 above.

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

**6. RAW MATERIAL** – Any of the ingredients as specified in Annex A of IS 1664 shall be used for the preparation of mineral mixtures.

6.1 All ingredients used shall be of a quality suitable for animal consumption and shall contain no substances harmful to cattle. Animal origin material shall not be used.

6.2 A representative sample from every consignment of Oyster shell grit shall be tested for freedom from spores of *Bacillus anthracis*, *Clostridium* sp. And records maintained.

**7. 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**  
**LEVEL OF CONTROL**

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Clause	Requirements	Test Method Cl. Ref.	Test Method IS		No. of Samples	Frequency	Remarks
5.0	Description	5.0	IS 1664	R	One	Each Control Unit	
6.0	Requirements						
6.1	Fineness	6.1	-do-	R	One	Each control unit	
6.2	Freedom from spores of Bacillus anthracis and Clostridium sp	4, 5 & 6	IS 7874 (Pt 3)	S	One	Once in month	
6.3 & Table 1	Moisture, percent by mass	Annex A	IS 5470	R	One	Each control unit	
	Fluorine, percent by mass	Annex B		R	One	Every 10 <sup>th</sup> Control Unit	See note -1 below
	Total Ash	Annex C		R	One	-do-	-do-
	Presence of Proteinous/organic impurities	Annex D		R	One	-do-	-do-
	Calcium, percent by mass	-	IS 15121 or IS 13433 (Pt-1)	R	One	-do-	-do-
	Phosphorus percent by mass	-	IS 14828 or cl.6 of IS 7874 (Pt 2)	R	One	-do-	-do-



Acid insoluble ash	10	IS 7874 (Pt 1)	R	One	-do-	-do-
Lead	A -7	IS 1767	R	One	-do-	-do-
Arsenic	A -6		R	One	-do-	-do-
Magnesium	-	IS 15121	R	One	-do-	-do-
Iron	-	IS 15121	R	One	-do-	-do-
Copper	-	IS 15121	R	One	-do-	-do-
Zinc	-	IS 15121	R	One	-do-	-do-
Manganese	-	IS 15121	R	One	-do-	-do-
Salt	4	IS 7874 (Pt 2)	R	One	-do-	-do-
Iodine	8	IS 7874 (Pt 2)	R	One	-do-	-do-
Cobalt	11	IS 7874 (Pt 2)	R	One	-do-	-do-
Sulphur	Annex-B	IS 1664	R	One	-do-	-do-

Note-1: In the beginning of the production ,in case of finding any failure or when the recipe of the mixture is changed, every control unit shall be tested for the conformity to the specified requirements till such time the three consecutive control units are found to be satisfactory, thereafter the frequency suggested on this table may be introduced.

Note-2: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled 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 by BO Head.