

Sl. No:	Characteristics	Requirements		
		Type 1 Grade I	Grade II	Type 2
ii)	Volatile matter percent by mass, max.	0.5	0.5	0.5
iii)	Residue on sieve percent by mass, max.	0.25 on 40-micron IS Sieve (400 mesh)	0.25 on 63-micron IS Sieve (240 mesh)	0.1 on 40-micron IS Sieve (400 mesh)
iv)	Oil absorption [@]	-----6 to 12-----		15 to 30
v)	Particle shape	Characteristics of the material and similar to that of approved sample.		
vi)	Colour	A close match to that of approved sample		
vii)	Matter soluble in water, percent by mass, max.	-----0.5-----		
viii)	pH of the aqueous extract	-----6 to 8-----		
ix)	Relative density* at 25/25°C	-----4.45-----		3.36

* Synonymous with specific gravity.

@ Weight of oil in grams required by 100 g of the material

TABLE- 8.3 : UNIT-WISE SPECIFICATION OF BARYTES IN PAINT INDUSTRY

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
1.	Anglo Dutch Paint Colour & Varnish Works (P) Ltd., 60, Najafgarh Rd., Industrial Area, New Delhi-110016	As extender/ filler	Size 300 mesh	1. Krishnappa Asbestos & Barytes Ltd., Cuddapah, A.P. 2. Tiffins Barytes Asbestos & Paints Ltd., Cuddapah, A.P.

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
2.	Bombay Paints & Allied Products Ltd., Gavanpada Chembur, Bombay-400074	-do-	Powder, BaSO ₄ -95% min. CO ₂ -0.5% max.	1. Techno Industrial Syndicate, Bombay. 2. Universal Sales Corporation, Bombay. 3. Asiatic Minerals, Bombay. 4. Bharat Pulverising Mills Pvt. Ltd., Bombay. 5. Mineral Mining Co. Pvt. Ltd., Bombay. 6. Gurukrupa Minerals, Bombay 7. Industrial Minerals, Bombay.
3.	British Paints (India) Ltd., 32, Chowranghee, Road, Calcutta.	-do-	As per IS specification Ltd.,	Bonson & Company Calcutta.
4.	Comet Paints Ltd., Anand - Sojitra Road, Vallabh Vidyanagar, Distt. Kaira, Gujarat.	-do-	Suitable for paint industry	Narasu & Company Cuddapah, A.P.
5.	Goodlass Nerolac Paints Ltd., P.B.No: 699, Forbes Building Charanjit Rai Marg, Fort, Bombay.	As extender/ filler	Snow white and white barytes	1. Allied Corpn., Bombay. 2. Bharat Pulverising Mills Ltd., Bombay. 3. Hindusthan Mineral Products Co. Pvt. Ltd., Bombay. 4. Jyoti Trading Corporation, Bombay.

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
	Goodless Nerolac (Concl.)			5. United Overseas Trading Corpn., Bombay. 6. Chandra Trading Co., Bombay. 7. Indian Earth Products, Bombay. 8. Mineral Mining Co. Pvt. Ltd., Bombay. 9. Synor Chemicals Bombay
6.	I.C.I. (India) Pvt. Ltd., 34, Chowranghee, Calcutta.	As a diluent in cement colour	White & Off colour barytes powder, free from carbonates.	R. Gandhi & Co., Bombay
7.	India Paint Colour & Varnish Company Ltd., 14, Netaji Subhas Road, Calcutta-1.	As extender/ filler	Snow white and off colour	1. A.G. Minerals Pvt. Ltd., Calcutta. 2. Bonson Pigments & Chemicals Co., Calcutta. 3. Commercial & Rly. Stores Co., Calcutta. 4. Lalit Pvt. Ltd., Calcutta.
8.	Modi Paint & Varnish Works, Modinagar, Distt. Meerut, U.P.	As extender/ filler	Off colour & Snow white powder, BaSO ₄ -95 min. CO ₂ - 0.5% max.	1. Tiffin's Barytes Asbestos and Paints Pvt. Ltd., Cuddapah, A.P. 2. Rayalseema Mining Industry, Cuddapah, A.P.

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
				3. Krishnappa Asbestos & Barytes, Pvt. Ltd., Cuddapah, A.P.
9.	Mysore Lac & Paint Works Ltd. P.B. No. 82, Mysore-570001. Karnataka	-do-	Off colour & snow white fine powder	1. Cuddapah Star Barytes, A.P. 2. Mysore Minerals Ltd., Bangalore, Karnataka.
10.	Nagrath Paints Pvt. Ltd., P.B. No. 241, 46, Fazalganj, Kanpur, U.P.	-do-	Off colour & snow white powder BaSO ₄ -95% min. CO ₂ - 0.5% max.	1. Ghousia Mineral Trading Co., Cuddapah, A.P. 2. Krishnappa Asbestos & Barytes Pvt.Ltd Cuddapah, A.P. 3. National Chemicals, Kanpur, U.P. 4. S.N. Pandey & Co., Kanpur, U.P.
11.	Premier Paints, 123/435, Fazalganj Kanpur, U.P.	-do-	White powder, Size : 300 mesh BaSO ₄ - 98.5%	Tiffin's Barytes, Asbestos & Paints Pvt.Ltd., Cuddapah, A.P.
12.	Ravi Paints & Chemicals Ltd., P.B.No. 5050, 85/87, Armenian Street, Tamil Nadu	-do-	Off colour snow white powder BaSO ₄ - 95% min. CO ₂ - 0.5% max.	Tiffin's Barytes, Asbestos & Paints Pvt.Ltd., Cuddapah, A.P.
13.	Shalimar Paints Ltd., 13, Camac Street, Calcutta-17	As extender/ filler	Snow white & off colour powder, Size : 240 mesh	1. Bonson & Company, Calcutta.

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
	Shalimar Paints (Concl.)			2. A.G. Minerals Pvt.Ltd., Calcutta. 3. Commercial & Rly. Stores Co., Calcutta. 4. Revati Traders Calcutta. 5. Indian Mineral Industries Ltd. Calcutta. 6. Associated Chemical Industrial Corpn., Calcutta. 7. Bharat Pulverising Mills Pvt.Ltd., Bombay.
14.	Sigma Paints Ltd. 221, Dr. D.N. Road, Bombay-1	-do-	Dry powdery off colour & snow white barytes, BaSO ₄ - 95% min. CO ₂ - 0.5% max. Bombay.	1. Universal Minerals & Chemicals Co., Bombay. 2. Universal Sales Corpn. 3. Asiatic Minerals., Bombay. 4. Jyoti Trading Co., Bombay.

The IS specification (64-1972) for barytes for barium sulphate pigments for paints is given in two types.

Type - 1 : Includes natural barytes categorised in two grades (grade-1 and grade-2). Type-2 is precipitated barytes. The ASTM covers the barium sulphate pigments as barytes and blanc fixe. The BaSO₄ percent by mass (min) suggested in IS specification for Type-1 (Grade 1 and Grade 2) is 95, and for Type-2 is 97; in ASTM the suggested percentage is 94 for barytes and 97

for blanc fixe. Specific gravity is not considered for ASTM specifications whereas in IS specification for Type-1, it is 4.45 and for Type-2 it is 3.36. In ASTM, the silica is suggested to be 2 percent maximum by mass for both barytes and blanc fixe. Ferric oxide in ASTM specifications is suggested to be 0.05 percent by maximum mass for barytes and 0.02 percent by mass maximum for blanc fixe. For both the IS and ASTM specifications volatile matter should be 0.5 percent maximum by mass. As per IS specifications, matter soluble in water

should be 0.5 percent maximum by mass and in ASTM it should be 0.2 percent maximum by mass. The pH should be 6 to 8 for IS specifications, but 3.5 minimum for ASTM. The oil absorption should be 6 to 12 for Type-1 and 15 to 30 for Type-2 in IS specification, but it is not mentioned in ASTM specifications. The sieve residue for IS specification for grade-1 of Type 1 is 0.25 percent maximum by mass on 40 micron IS sieve (400 mesh), for grade-2 of Type-1, 0.25 on 63 micron IS sieve (240 mesh), and for Type-2, 0.1 on 40 micron IS sieve (400 mesh). As per ASTM total residue retained on No: 325 (44 sieve) is 0.5 percent maximum.¹¹

(4) PAPER INDUSTRY

The paper coating pigment should possess the following properties :-

Uniform particle distribution, non-hygroscopic, low abrasiveness, good electrical resistance properties, appropriate refractive index and good dispersion in water. Typical blanc fixe paper coating grade is as follows.^{4,10}

Density	... 4.0 - 4.2
Brightness	... 95 - 99 percent
Mean particle size (micron)	... 0.5 - 4.0
Hardness	... 3 - 4
Binder requirement (g casein/100g pigment)	... 9 - 14
Oil Index (gm oil/100 g pigment)	... 12 - 22
Water index (g water/100 g pigment)	... 16 - 23
Zeta potential (mv)	... 20 - 35
Specific surface (sg.m/g)	... 4.0 - 4.5

(5) RUBBER INDUSTRY

In rubber industry, the mesh size is considered important. Material shall be in the form of white heavy powder. Barytes containing a minimum of 99.5 percent BaSO₄ is usually preferred. Barytes of such purity is not found in nature, hence bleached barytes or 'blanc fixe' is preferred. The Indian Standard Specification (IS-1683-1973) (first revision) for barytes for rubber industry is given below^{11,15} :

Requirements for barytes for Rubber Industry (IS-1683-1973)

Sl. No:	Characteristics	Requirements
i.	Colour	Close match to the approved sample on visual examination.
ii.	Sieve residue, percent by mass, max. a) through 75-micron IS sieve b) through 150-micron IS sieve	0.40 0.01
iii.	Relative density at 27°C	4.2 to 4.5
iv.	pH	6 to 8
v.	Moisture content, percent by mass, max.	0.5
vi.	Matter soluble in water, percent by mass	0.5

Sl. No:	Characteristics	Requirements
vii.	Matter, Insoluble in hydrochloric acid, percent by mass, max.	98
viii.	Manganese (as Mn), percent by mass, max.	0.005
ix.	Copper	To satisfy requirements of the test.
x.	Iron	-do-

The unit-wise specifications of barytes in rubber industry in respect of 5 units are given in table-8.4.

TABLE- 8.4 : UNIT-WISE SPECIFICATIONS OF BARYTES IN RUBBER INDUSTRY

Sl. No:	Name & address of consumers	Purpose for which used	Specifications	Source of supply
1.	Bombay Rubber Works Pvt. Ltd., Saki Vihar Road; Bombay- 400072	As a filler sp. gr. 4.2 to 4.5 Moisture- 0.5% max.	White fine powder,	Local supplier
2.	National Rubber Manufacturer Ltd., Leslie House, 19, Jawaharlal Nehru Road Calcutta - 700013.	-do-	White heavy Powder, sp. gr: 4.3 to 4.5 moisture- 0.5%	Universal Minerals, Calcutta
3.	Oriental Rubber Industries (Pvt.) Ltd., P.O. Box No: 1888, United Bank of India, Building, Sir P.M. Road, Bombay-400001	-do-	White powder, sp. gr. 4.2 to 4.5 Insolubility 96% InHCK min. Mn- 0.005% max.	
4.	Reliance Rubber Industries, 26, Chanditola Main Road, Calcutta-53.	-do-	Snow-white	A.K. Product, Calcutta.
5.	South India Rubber Works, P.B. No: 132, Alleppey-688001. Kerala	-do-	Brownish powder sp.gr.-4.5	1. South India Mining Co., Betamcherla, A.P. 2. Rayalseema Mining Industry, Cuddapah, A.P.

(6) ASBESTOS PRODUCTS

There is no I.S. specification of barytes for use in asbestos products. Grades of barytes used are essentially a compromise between the grade and prices. Typical brake lining grades are as follows¹¹.

Specific gravity ... 4.34 4.34

Oil absorption* ... 10.50 12.00

* (Weight of oil in grams required by 100 g of the material)

PARTICLE SIZE DISTRIBUTION OF BARYTES FOR USE IN ASBESTOS PRODUCTS INDUSTRY

Less than		Percentage
75	Micron	99 -
50	"	85 to 99.5
40	"	67 to 99
30	"	44 to 92
20	"	23 to 72
10	"	8 to 39
5	"	3 to 19
2	"	1 to 8

The asbestos products manufacturers want the material to be white or off-white colour and in powdery form. The BaSO₄ content should be about 98 percent and chlorides, sulphides and others about 2 percent.

The unit-wise specifications of barytes in asbestos products industries are given in Table 8.5.

TABLE- 8.5 : UNIT-WISE SPECIFICATIONS OF BARYTES IN ASBESTOS PRODUCT INDUSTRY

Sl. No.	Name & address of consumers	Purpose for which used	Specifications	Source of supply
1.	Hindustan Ferodo Ltd., Post Box No. 9213, Ghatkopar, Bombay- 86.	As a filler	Off-colour barytes, conforming to IS specifications	From various parties and agents in Bombay.
2.	Rane Brake Lining Ltd., "Maithri" 19, Cathedral Road, Madras- 600086	-do-	Off- colour fine powdery barytes with 98% (min.) of BaSO ₄ . Chloride, sulphide and others: 2% (max.)	Tiffin's Barytes Asbestos & Paints Ltd. Madras.
3.	Rein Talbros Pvt. Ltd., 205/94, Meghdoot, Nehru Place, New Delhi -24.	-do-	Commercial grade	R.N. Shahni & Sons, New Delhi.

(7) GLASS INDUSTRY

Glass manufacturers usually require barytes containing a minimum of 98 percent $BaSO_4$ and a maximum of 1.5 percent SiO_2 , 0.15 percent Al_2O_3 and 0.15 Fe_2O_3 . The mesh

size preferred varies from 30 to 140 mesh. Iron impurities are most undesirable^{4,11}.

The unitwise specifications in glass industry for 9 units are given in Table-8.6.

TABLE - 8.6 : UNIT-WISE SPECIFICATIONS OF BARYTES IN GLASS INDUSTRY

Sl. No.	Name & address of consumers	Purpose for which used	Specifications	Source of supply
1.	Alembic Glass Industries Ltd., Alembic Road, Baroda, Gujarat.	As a batch constituent, it homogenizes the melt and gives greater brilliance and clarity to the finished glass.	Powdered barytes size-30 to 80 mesh BaO -60% min. Fe_2O_3 - 0.2% max. SiO_2 -1 -5%	1. The Standard Grinding Mills, Bombay. 2. Himatlal Vralalal & Co., Bombay 3. Tiffin's barytes Asbestos & Paints Ltd., Cuddapah. A.P. 4. Narasu & Co., Cuddapah. A.P.
2.	-do-	-do-	Size- 30 to 80 mesh BaO - 60% min. Fe_2O_3 - 0.2% max. SiO_2 - 1-5%	1. Tiffin's Barytes Asbestos & Paints Ltd., Cuddapah. A.P.
3.	Excel Glasses Ltd., Udavanagar, Pathirapalli, P.B. 181. Distt. Alleppy. Kerala.	-do-	Size - 80 to 100 $BaSO_4$ - 98% Fe_2O_3 - 0.6% max.	Tiffin's Barytes Asbestos & Paints Ltd., Cuddapah, A.P.
4.	Krishna Glass Pvt. Ltd., 23, Yusuf Building, 49, Veer Nariman road, Bombay- 400023.	-do-	Size - 30 to 100 mesh $BaSO_4$ - 90% Fe_2O_3 - 0.1%	Shah Brothers, Bombay.
5.	Mahalaxmi Glass Works Pvt. Ltd., Dr. E. Moses Road, Jacob Circle, Bombay-11.	-do-	Size -30 to 120 mesh $BaSO_4$ - 98% Iron- 0.1%	1. Universal Traders, Bombay 2. Tiffin's Barytes Asbestos & Paints Ltd., Cuddapah, A.P.

Sl. No.	Name & address of consumers	Purpose for which used	Specifications	Source of supply
6.	Packart Glass, Shanti Sadan, Mirzapur Road, Ahmedabad-380001	As a batch constituent, it homogenizes the melt and gives greater brilliance and clarity to the finished glass	Size -2.5 cm lumpfree from impurities and inclusions, Fe ₂ O ₃ - 0.06% max.	Baroda Oil & Chemical Industries, Baroda, Gujarat.
7.	Star Glass Works 299, Kurla, Andheri Road, Bombay-400072		Size 30-80 mesh	Hindusthan Mineral Company Pvt. Ltd., Bombay
8.	Universal Glass Ltd., 54, Ring Road, Lajpat Nagar-III, New Delhi-110024.	-do-	Powder BaSO ₄ - 88-90% SiO ₂ - 7-8% Fe ₂ O ₃ -0.3-0.4% Al ₂ O ₃ - 0.7-1% CaO- 1.7% MgO- 0.8% LOI- 1%	Ram Narain & Brothers, Alwar, Rajasthan.
9.	Vazir Glass Works, Ltd., M. Vasanji, Road, Bombay- 400059.	-do-	Powder BaSO ₄ -90% Fe ₂ O ₃ - 0.3% (max)	1. Krishna Commercial Syndicate, Bombay. 2. Universal Sales Corpn., Bombay. 3. Gattani Brothers, Bombay.

(8) EXPLOSIVE AND PYRO-TECHNIC INDUSTRY

The BIS (IS : 7588 - 1974) has prescribed specifications for explosive and pyrotechnic industry as given below. ¹⁸

1) The material shall consist essentially of barium sulphate, bleached or unbleached, in dry powder form. It shall be white to off-white in colour and free from extraneous matter.

The material shall comply with the requirements as given below :-

Sl. No.	Characteristics	Requirements
1.	Barium sulphate (percentage by mass)	90.0 min.
2.	Matter soluble in dilute hydrochloric acid,	3.0 max.
3.	Matter soluble in water, (percentage by mass)	0.5 max.