Indian Minerals Yearbook 2021

(Part- III : MINERAL REVIEWS)

60th Edition

KYANITE, SILLIMANITE AND ANDALUSITE

(ADVANCE RELEASE)

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES

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17 Kyanite, Sillimanite and Andalusite

Kyanite, sillimanite and andalusite are unhydrous aluminosilicate minerals that have the same chemical formula Al_2O_3 but differ in crystal structure and physical properties. When calcined at high temperature around 1,350 ^{0}C to 1,380 ^{0}C for kyanite and slightly higher for andalusite and sillimanite, these minerals are converted to mullite, (3 Al_2O_3.2SiO_2) and silica (SiO_2) which are refractory minerals.

Synthetic mullite is made by heating mixtures of alumina and silica or bauxite and kaolin at around 1,550 ^{0}C to 2,000 ^{0}C. Refractories are heat resistant materials used in high temperature applications, such as, furnaces, ladles, kilns, in the metallurgical, glass, chemical, cement and other industries.

RESERVES/RESOURCES

Kyanite

The total reserves/resources of kyanite as per NMI database, based on UNFC system as on 1.4.2020 in the country has been placed at 105.68 million tonnes. Out of these resources, only 0.84 million tonnes are Reserves and 104.83 million tonnes are under Remaining Resources. Out of total resources, high and medium-grade resources together account for merely 1.44%, low-grade 8.17%, mixed-grade 0.52%, quartz kyanite rock, kyanite gneiss rock & kyanite schist 78.4% and granular, others & not-known grades 1.63%. Statewise, share of Telangana is 45.75% of the total resources followed by Andhra Pradesh with 30.28%, Karnataka 12.46% and Jharkhand 7.22%. The remaining 3.69% resources are in Kerala, Maharashtra, Rajasthan, Tamil Nadu and West Bengal collectively (Table-1).

Sillimanite

The total reserves/resources of sillimanite as per NMI database, based on UNFC system in the country as on 1.4.2020 has been placed at 72.26 million tonnes. Out of these resources, 8.26 million tonnes are under Reserves Category, while about 64.00 million tonnes are under the Remaining Resources. Out of total resources, more than 73.89% are granular high-grade, while quartz sillimanite rocks and sillimanite-bearing rocks are about 21.03%. Resources of massive sillimanite of all grades are about 4.80%. The resources are located mainly in Odisha (24.49%), Tamil Nadu (24.01%), Uttar Pradesh (15.84%), Andhra Pradesh (15.32%), Kerala (9.58%) and Assam (6.38%). The remaining 4.38% resources are in Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Rajasthan and West Bengal (Table-2).

Andalusite

The total reserves/resources of andalusite in the country as on 1.4.2020 as per NMI database, based on UNFC system has been placed at 12.60 million tonnes. Most of the resources are of Reconnaissance category located in Uttar Pradesh (Table-3).

EXPLORATION & DEVELOPMENT

Details of exploration & development, if any, are covered in the Review of "Exploration & Development" under "General Reviews".

Table – 1 : Reserves/Resources of Kyanite as on 1.4.2020 (P)
(By Grades/States)

(In tonnes)

Grade/State	Reserves				Remaining Resources								Total Resources (A+B)
	Proved STD111	Probable STD121	Probable STD122	Total (A)	Feasibility STD211	Pre-feasibility STD221	Pre-feasibility STD222	Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India : Total	**3933558**	**331193**	**122314**	**846865**	**1331061**	**940452**	**1864398**	**561680**	**3577402**	**96560462**	**-**	**104835455**	**105682321**
By Grades													
High grade	-	-	-	-	-	4317	21867	-	297827	114689	-	438700	438700
Medium grade	325113	-	43449	368562	34540	-	276651	-	34410	371144	-	716745	1085307
Low grade	66562	992	-	67554	691161	29990	1191151	386247	2214900	4063596	-	8577045	8644599
High & medium mixed	-	-	-	-	-	-	-	-	93640	47750	-	141390	141390
Medium & low mixed	-	-	-	-	-	-	-	-	-	48000	-	48000	48000
High, medium & low mixed	-	-	-	-	13097	89650	10606	-	45000	210025	-	368378	368378
Granular	1620	-	-	1620	578	117	-	700	167000	79434	-	247829	249449
Quartz kyanite rock	-	330202	-	330202	-	816378	38000	-	-	81696358	-	82550736	82880938
Kyanite gneiss rock	-	-	-	-	-	-	-	-	-	5370800	-	5370800	5370800
Kyanite schist	-	-	-	-	-	-	-	-	724625	4250000	-	4974625	4974625
Unclassified	63	-	-	63	-	-	-	-	-	-	-	-	63
Others	-	-	78865	78865	591685	-	326123	-	-	73046	-	990854	1069719
Not-known	-	-	-	-	-	-	-	174733	-	235620	-	410353	410353
By States													
Andhra Pradesh	-	-	-	-	-	-	399	-	-	32003829	-	32004228	32004228
Jharkhand	-	331193	-	331193	1017105	920088	523589	-	1754900	3727685	-	7943367	8274560
Karnataka	181600	-	-	181600	230660	15930	119368	386247	1610502	10628753	-	12991460	13173060
Kerala	-	-	-	-	-	-	-	174733	-	10000	-	184733	184733
Maharashtra	210075	-	122314	332389	69621	4317	1210436	-	45000	1734241	-	3063615	3396004
Rajasthan	-	-	-	-	13097	-	10606	-	-	-	-	23703	23703
Tamil Nadu	1683	-	-	1683	578	117	-	700	167000	79434	-	247829	249512
Telangana	-	-	-	-	-	-	-	-	-	48350000	-	48350000	48350000
West Bengal	-	-	-	-	-	-	-	-	-	26520	-	26520	26520

Figures rounded off

Table – 2 : Reserves/Resources of Sillimanite as on 1.4.2020 (P)
(By Grades/States)

(In tonnes)

Grade/States	Reserves				Remaining Resources								Total Resources (A+B)
	Proved STD111	Probable		Total (A)	Feasibility STD211	Pre-feasibility		Measured STD331	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
		STD121	STD122			STD221	STD222						
All India : Total	**7968445**	**3655**	**290200**	**8262300**	**503301**	**23406**	**20549508**	**4771654**	**17630364**	**16115664**	**4411195**	**64005091**	**72267391**
By Grades													
Massive high grade	91790	3655	68112	163557	-	-	-	-	-	11903	-	11903	175460
Massive medium grade	59084	-	3619	62703	-	4000	-	-	-	29705	-	33705	96408
Massive low grade	38000	-	-	38000	15300	-	519	15000	850000	2258786	-	3139605	3177605
Massive high & medium	-	-	-	-	-	-	-	-	-	19800	-	19800	19800
Massive medium & low	-	-	-	-	-	-	-	-	-	38	-	38	38
Granular high	7776113	-	218469	7994582	404001	8336	20548989	2656654	7430300	13794916	561595	45404791	53399373
Quartz sillimanite rock	-	-	-	-	-	-	-	-	-	-	3748000	3748000	3748000
Sillimanite-bearing rock	-	-	-	-	-	-	-	2100000	9350000	-	-	11450000	11450000
Others	-	-	-	-	-	11070	-	-	-	-	-	11070	11070
Unclassified	3458	-	-	3458	84000	-	-	-	-	-	-	84000	87458
Not-known	-	-	-	-	-	-	-	-	64	516	101600	102180	102180
By States													
Andhra Pradesh	1451556	-	218469	1670025	-	11070	462830	-	7430300	1491539	-	9395739	11065764
Assam	-	-	-	-	-	-	-	-	850000	6700	3748000	4604700	4604700
Jharkhand	-	-	-	-	-	-	-	-	-	83000	-	83000	83000
Karnataka	-	-	-	-	-	-	-	-	-	982725	-	982725	982725
Kerala	553000	-	-	553000	432713	-	-	2564254	-	3369200	-	6366167	6919167
Madhya Pradesh	-	-	-	-	-	-	-	-	-	-	101600	101600	101600
Maharashtra	174474	3655	3619	181748	15000	-	-	15000	64	516	-	30580	212328
Meghalaya	14400	-	68112	82512	-	-	-	-	-	55807	-	55807	138319
Odisha	5640985	-	-	5640985	-	-	6557013	-	-	4943600	561595	12062208	17703193
Rajasthan	-	-	-	-	300	-	519	-	-	-	-	819	819
Tamil Nadu	134030	-	-	134030	55288	12336	13529146	92400	-	3529577	-	17218747	17352777
Uttar Pradesh	-	-	-	-	-	-	-	2100000	9350000	-	-	11450000	11450000
West Bengal	-	-	-	-	-	-	-	-	-	1653000	-	1653000	1653000

Figures rounded off

Table – 3 : Reserves/ Resources of Andalusite as on 1.4.2020
(By Grades/ States)

(In '000 tonnes)

State	Total Reserves	Remaining Resources				Total Resources (A+B)
	Total (A)	Indicated STD332	Inferred STD333	Reconnaissance STD334	Total (B)	
All India : Total	**-**	**58040**	**56210**	**11800**	**126050**	**126050**
By Grades						
Low	-	58040	56210	11800	126050	126050
By States						
Jharkhand	-	-	-	11800	11800	11800
Uttar Pradesh	-	58040	56210	-	114250	114250

Figures rounded off

PRODUCTION & STOCKS

Kyanite

The production of kyanite was 4,925 tonnes in 2020-21, this increased by 41% as compared to 3,498 tonnes in previous year. There were 5 reporting mines in 2020-21 against 4 reporting mines in the previous year. Three principal producers contributed the entire production of kyanite during the year.

In 2020-21, 605 tonnes, i.e., about 12.28% of the total production of kyanite was of grade 40% Al_2O_3 & above and the remaining 87.72%, i.e., about 4,320 tonnes was of grade below 40% Al_2O_3. About 10.96% out of the total production was reported by the Public Sector and 89.04% by Private Sector (Tables - 4 to 6).

Mine-head closing stocks of kyanite for 2020-21 were at 11.263 tonnes as against 9622 tonnes in 2019-20 (Table-7).

The average daily employment of labour was 57 in 2020-21 as against 69 in the preceding year.

Table – 4 : Principal Producers of Kyanite, 2020-21

Name & address of producer	Location of mine	
	State	District
Pavri Kyanite Mines, A-1, Indra Sagar, Ravindranath Tagore Marg, Civil Lines, Nagpur- 440 001, Maharashtra.	Maharashtra	Bhandara
Maharashtra State Mining Corporation Ltd Plot No. 7, Ajni Chowk, Wardha Road, Nagpur - 440 015, Maharashtra.	Maharashtra	Bhandara
Mohammad Akram Rasheed, 3 Marcha Halli, H.D.Kote Mysore-571 125. Karnataka	Karnataka	Mysore

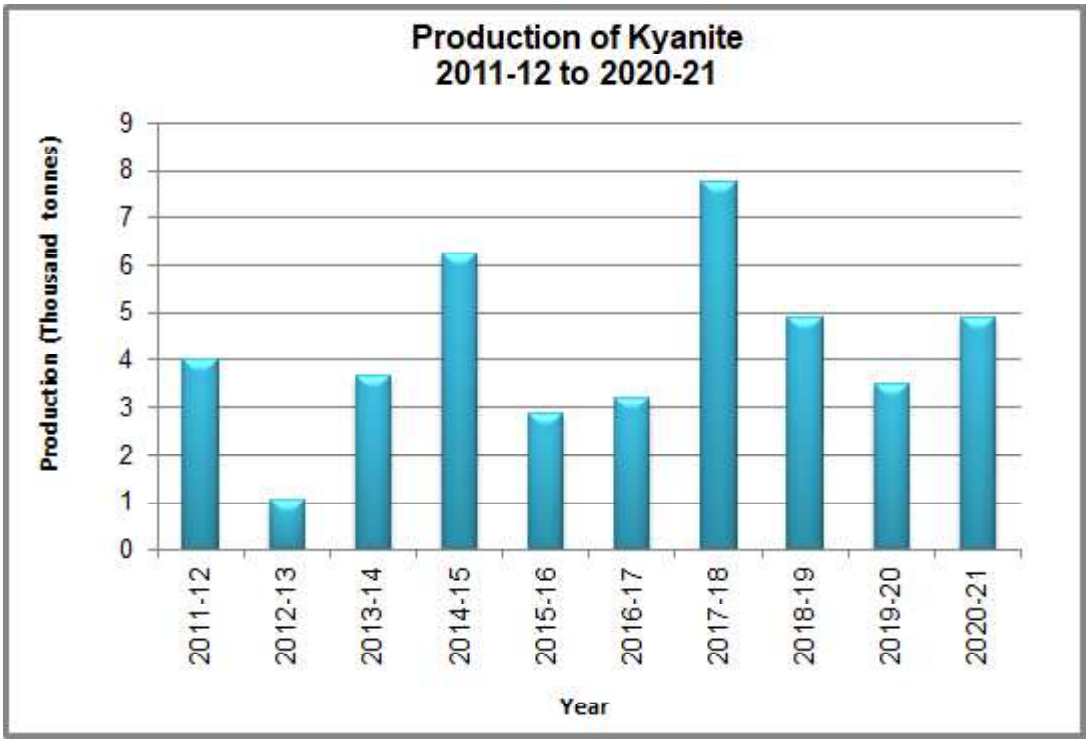

Table – 5 : Production of Kyanite, 2018-19 to 2020-21
(By States)

(Qty in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21 (P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	**4889**	**15757**	**3498**	**12728**	**4925**	**10837**
Karnataka	-	-	400	880	3780	7414
Maharashtra	4889	15757	3098	11848	1145	3423

Table – 6 : Production of Kyanite, 2019-20 and 2020-21
(By Sectors/States/Districts/Grades)

(Qty in tonnes; Value in ₹ '000)

State/District	2019-20					2020-21 (P)				
	No. of mines	Quantity			Value	No. of mines	Quantity			Value
		40% Al_2O_3 & above	Below 40% Al_2O_3	Total			40% Al_2O_3 & above	Below 40% Al_2O_3	Total	
India	**5**	**2248**	**1250**	3498	**12728**	**4**	**605**	**4320**	4925	**10837**
Public sector	1	13	850	863	1511	1	-	540	540	1106
Private sector	4	2235	400	2635	11217	3	605	3780	4385	9731
Karnataka	**1**	**-**	**400**	**400**	**880**	**1**	**-**	**3780**	3780	**7414**
Mysuru	1	-	400	400	880	1	-	3780	3780	7414
Maharashtra	**4**	**2248**	**850**	**3098**	**11848**	**3**	**605**	**540**	**1145**	**3423**
Bhandara	4	2248	850	3098	11848	3	605	540	1145	3423

Table – 7 : Mine-head Closing Stocks of Kyanite, 2019-20 & 2020-21 (By States/Grades)

(Qty in tonnes)

State	2019-20			2020-21 (P)		
	40% Al_2O_3 & above	Below 40% Al_2O_3	Total	40% Al_2O_3 & above	Below 40% Al_2O_3	Total
India	**249**	**9373**	**9622**	**1646**	**9617**	**11263**
Jharkhand	-	1327	1327	1325	1	1326
Karnataka	-	7915	7915	-	9440	9440
Maharashtra	249	131	380	321	176	497

Sillimanite

The production of sillimanite at 11,110 tonnes in 2020-21 decreased by 16% as compared to 13,221 tonnes in the previous year. There were 1 reporting mine in 2020-21 as against 6 mines reported in the year 2019-20. The main reason for decrease in number of mines is on account of classification of some sillimanite producing mines, as Beach Sand Minerals (BSM) mines in Andhra Pradesh, Odisha and Kerala. Earlier these mines were considered under sillimanite as a part of MCDR mineral prior to separate classification as BSM and Non-BSM. This has also resulted in shrinking of production. Besides, three mines reported production of sillimanite as an associated mineral with kyanite during the year. (Table-8, 9 & 10)

The whole production of sillimanite was reported by Private Sector during the year 2020-21. Maharashtra is the only State which contributed cent per cent production of sillimanite during the year 2020-21.

Mine-head closing stocks for the year 2020-21 were 1479 tonnes as against 10,113 tonnes in the previous year (Table - 11).

The average daily employment of labour during 2020-21 was 4 as against 36 in the previous year.

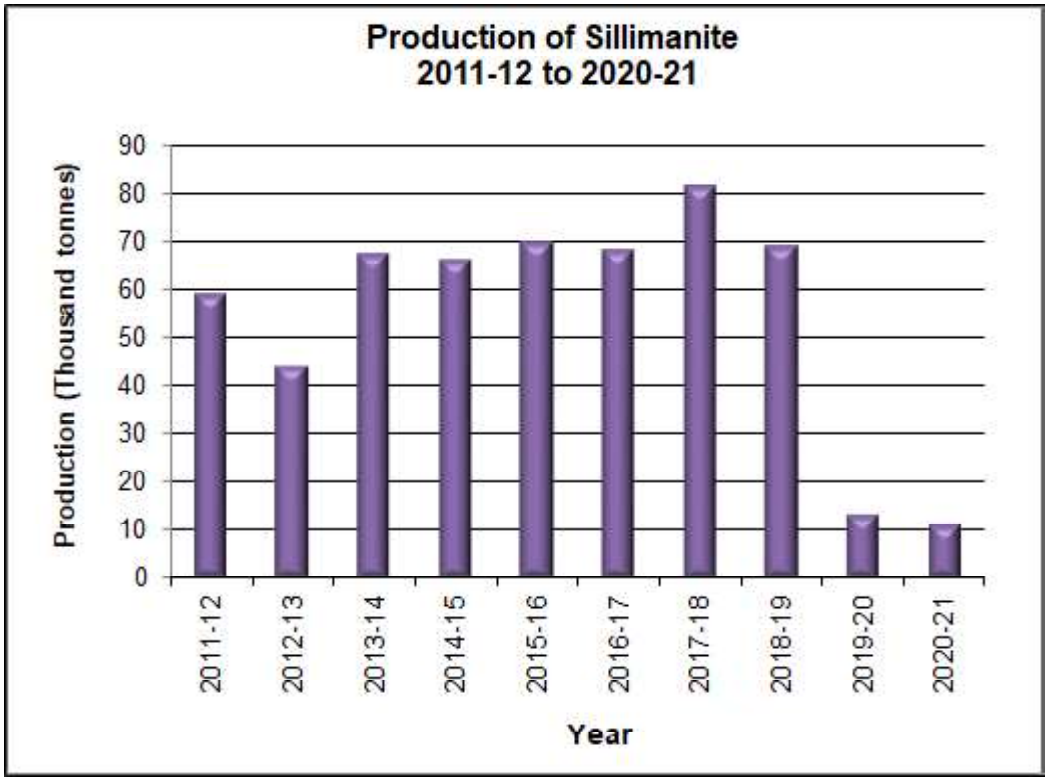

Table – 8 : Principal Producers of Sillimanite, 2020-21

Name & address of producer	Location of mine	
	State	District
*Dighori Kyanite Mine, Apna Nagar, Tkiya Ward, Nagpur Road Bhandara, Bhandara-441 904, Maharashtra.	Maharashtra	Bhandara
*Pavri Kyanite Mines, A/1, Indrasagar, Ravindranath Tagore Road, Civil Lines, Nagpur- 440 001, Maharashtra.	Maharashtra	Bhandara

* *Producing as an associated mineral with kyanite*

Table – 9 : Production of Sillimanite, 2018-19 to 2020-21 (By States)

(Qty in tonnes; Value in ₹'000)

State	2018-19		2019-20		2020-21(P)	
	Quantity	Value	Quantity	Value	Quantity	Value
India	**69919**	**564498**	**13221**	**37903**	**11110**	**26611**
Andhra Pradesh	31243	288810	-	-	-	-
Kerala	7318	82173	-	-	-	-
Maharashtra	13404	49477	13221	37903	11110	26611
Meghalaya	24	168	-	-	-	-
Odisha	17930	143870	-	-	-	-

Note: *The main reason for decrease in number of mines is classification of some sillimanite producing mines, as BSM mines in Andhra Pradesh, Kerala and Tamil Nadu. Earlier, these mines were considered under sillimanite mineral as a part of MCDR mineral as there was no separate classification of Beach Sand minerals (BSM) and Non-Beach Sand Minerals (Non-BSM).*

Table – 10 : Production of Sillimanite, 2019-20 & 2020-21 (By Sectors/States/Districts)

(Qty in tonnes; Value in ₹'000)

State/District	2019-20			2020-21 (P)		
	No. of mines	Quantity	Value	No. of mines	Quantity	Value
India	**2(3)**	**13221**	**37903**	**1(2)**	**11110**	**26611**
Public sector	2	-	-	1	-	-
Private sector	(3)	13221	37903	(2)	11110	26611
Andhra Pradesh	**-**	**-**	**-**	**-**	**-**	**-**
Srikakulam	-	-	-	-	-	-
Kerala	**-**	**-**	**-**	**-**	**-**	**-**
Kollam	-	-	-	-	-	-
Maharashtra	**2(3)**	**13221**	**37903**	**1(2)**	**11110**	**26611**
Bhandara	2(3)	13221	37903	1(2)	11110	26611
Meghalaya	**-**	**-**	**-**	**-**	**-**	**-**
Khasi Hills West	-	-	-	-	-	-
Odisha	**-**	**-**	**-**	**-**	**-**	**-**
Ganjam	-	-	-	-	-	-

Figures in parentheses indicate the number of associated mines with kyanite

Note: *The main reason for decrease in number of mines is classification of some sillimanite producing mines as BSM mines in Andhra Pradesh, Kerala and Tamil Nadu. Earlier, these mines were considered under sillimanite mineral as a part of MCDR mineral as there was no separate classification of Beach Sand minerals (BSM) and Non-Beach Sand Minerals (Non-BSM).*

Table – 11: Mine-head Closing Stocks of Sillimanite, 2019-20 & 2020-21 (By States)

(In tonnes)

State	2019-20	2020-21 (P)
India	**10113**	**1479**
Andhra Pradesh	-	-
Kerala	-	-
Meghalaya	188	188
Maharashtra	9925	1291
Odisha	-	-

Andalusite

There was no production of andalusite reported since 1988.

MINING & MARKETING

Kyanite

Kyanite mines are worked by opencast manual as well as semi-mechanised methods. Generally, the mineral is marketed under three grades: 60% Al_2O_3 and above, 50 - 60% Al_2O_3 and less than 50% Al_2O_3. These three grades are used in the manufacture of refractories.

Sillimanite

Sillimanite mines are also worked by opencast method. Pohra mine of Maharashtra State Mining Corporation Ltd is semi-mechanised.

USES

Kyanite, sillimanite and andalusite are mainly used in refractories and ceramic products because of their ability to form mullite phase at high temperature. Mullite is an essential component of high-alumina refractories forming the inner lining of furnaces and high temperature vessels widely used in the production of metals, ceramics, glass and cement. These are used in manufacturing refractory products like dense bricks, insulating bricks, monolithic & castables. Sillimanite refractory bricks are extensively used in steel and glass industries and also in ceramics, cement kilns, heat treatment furnaces and petrochemical industries.

SPECIFICATIONS

BIS has prescribed IS:14301-1995 (reaffirmed in 2011) for kyanite used in Refractory Industry. There are two grades, i.e., Grade-1 and Grade-2. Composition of kyanite under this specification is Al_2O_3 58% min. Grade-1 and 54% min. for Grade-2; Fe_2O_3 1.50% max., $K_2O + Na_2O$ 1% max.; other constituents would be for as agreed between the supplier and purchaser. Pyrometric Cone Equivalent (PCE) specified would have to be not less than 36 for Grade-1 and 35 for Grade-2. Size of the material is 50 to 150 mm or 10 to 50 mm.

BIS has laid down IS:14302-1995 (reaffirmed in 2011) in respect of beach sand sillimanite for use in Refractory Industry, while IS:2045-1962 in respect of natural sillimanite blocks for glass melting tanks furnaces has been withdrawn.

CONSUMPTION

Kyanite

The consumption of kyanite in various industries was 7,700 tonnes in 2019-20 which is about 51% more than previous year. Nearly 88% consumption of kyanite was accounted for by the Refractory Industry and the remaining12% by other industries (Table-12).

Sillimanite

The consumption of sillimanite was 23,400 tonnes in 2019-20, which is about 58% less than that of the previous year. Refractory Industry alone accounted for about 89% of consumption. Ceramic Industry (2%), Foundry Industry (5%) and Other Industries accounted for the rest. (Table-12).

Table – 12 : Consumption* of Kyanite and Sillimanite 2017-18 to 2019-20 (By Industries)

(In tonnes)

Industry	2017-18	2018-19 (R)	2019-20 (P)
Kyanite			
All Industries	**6600**	**5100**	**7700**
Refractory	6600	5100	6800
Others	++	++	900
Sillimanite			
All Industries	**75900**	**56100**	**23400**
Ceramic	8700	2500	500
Foundry	4000	5400	1100
Refractory	59000	43800	20800
Others (abrasives, cement, chemicals, etc.)	4200	4400	1000

Figures rounded off

** Includes actual reported consumption and/or estimates made from dispatches (as reported in Form FH under Rule-45 & MCDR, 2017/1988)wherever required and coverage may not be complete due to paucity of data.*

WORLD REVIEW

World reserve of kyanite and related minerals is large in the USA. Andalusite is limited to only a few countries. The main producer and exporter of andalusite is South Africa and Peru while USA and India are the main producers of kyanite. India is the leading producer of sillimanite. World production of kyanite and related minerals is indicated in Table-13.

The availability of inexpensive refractory-grade bauxite from China served to increase demand for refractories from alternative raw material, such as, andalusite. Demand for refractories in iron and steel production is expected to have larger increases in countries with higher growth rates in steel production. Increased demand also is anticipated for refractories used for producing other metals and in the industrial mineral market because of increasing production of cement, ceramics, glass, and other mineral products.

Table – 13 : World Production of Minerals (Kyanite, Sillimanite & Andalusite) (By Principal Countries)

(In tonnes)

Country	2018	2019	2020
France[a]			
Andalusite[e]	65000	68000	65000
India*			
Kyanite[e]	4889	3497	4925
Sillimanite[e]	69033	13236	11110
Madagascar			
Andalusite	4200	-	-
Nepal			
Kyanite[d]	1	-	-
South Africa			
Andalusite[e]	200000	190000	180000
USA			
Kyanite[b]	89200	91300	85000

Source: *BGS World Mineral Production, 2016-2020, BGS.*

(a) May Include other sillimanite minerals.

(b) Including related minerals.

(c) Years ended 31st March following the at stated.

(d) Years ending 15th July of the stated.

(e) Estimated.

**India's production during 2018-19, 2019-20 and 2020-21 in respect of kyanite is 4889 tonnes, 3498 tonnes & 4925 tonnes respectively and in respect of sillimanite is 69919 tonnes, 13221 tonnes & 11110 tonnes respectively.*

FOREIGN TRADE

Exports

Exports of kyanite during 2020-21 at 252 tonnes increased drastically by 76% from 143 tonnes in the previous year. Exports were mainly to Greece (85%), Saudi Arabia (3%) and UAE (4%). Similarly, exports of sillimanite increased by manifold to 4998 tonnes in 2020-21 from 1025 tonnes in the previous year. Sillimanite was exported mainly to Nepal (4%), Japan (7%) and China (80%). Exports of about 1% were to USA, Vietnam,Thailand and other countries. Exports of andalusite during 2020-21 also decreased manifolds to 9 tonnes from 19 tonnes in the previous year. Andalusite was exported solely to UAE (100%) (Tables - 14 to 16).

Imports

In 2020-21, imports of kyanite were at 1238 tonnes as against 1112 tonnes in the previous year registering an increase of 11%. Imports of sillimanite were at 606 tonnes which decreased manifolds during 2020-21 as compared to 609 tonnes in the previous year. Imports of andalusite at 15,217 tonnes decreased by 13% during 2020-21 from that of the previous year. The imports of kyanite were mainly from USA (79%) and China (14%) & Ukraine (66 %), Hong Kong (33%) were the main suppliers of sillimanite, while South Africa (77%), France (21%) were the main suppliers of andalusite in 2020-21 (Tables - 17 to 19).

Table – 14: Exports of Kyanite (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**143**	**2627**	**252**	**9033**
Greece	72	1575	216	4871
Bhutan	-	-	4	3500
UAE	13	421	12	404
Saudi Arabia	50	541	10	153
Ghana	-	-	10	90
Japan	-	-	++	14
Germany	-	-	++	1
China	1	59	-	-
Nigeria	7	16	-	-
Nepal	++	15	-	-

Figures rounded off

Table – 15: Exports of Sillimanite (By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1025**	**14961**	**4998**	**94359**
China	216	3570	4004	72772
Japan	231	7431	378	12700
Malaysia	-	-	298	5399
Nepal	487	2809	235	1296
Thailand	25	374	50	990
Vietnam	10	351	25	963
Hong Kong	-	-	3	69
U S A	++	23	1	62
Mauritius	-	-	3	22
U K	-	-	++	22
Other Countries	56	403	1	64

Fgures rounded off

Table – 16: Exports of Andalusite (By Countries)

CountryVietnam	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**19**	**1240**	**9**	**476**
UAE	19	1240	9	476

Figures rounded off

Table – 17: Imports of Kyanite
(By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**1112**	**33476**	**1238**	**42080**
USA	790	28596	985	36136
China	260	3721	180	3823
South Africa	-	-	54	1442
U A E	-	-	10	282
Australia	-	-	4	228
Malaysia	6	314	5	169
Ukraine	56	825	-	-
Japan	++	20	-	-

Figures rounded off

Table – 18 : Imports of Sillimanite
(By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**609**	**10781**	**606**	**11571**
Ukraine	416	6321	405	7080
Hong Kong	112	1696	200	3890
U S A	17	850	++	341
Japan	3	241	1	147
China	6	131	++	80
Taiwan	1	132	++	22
Burundi	-	-	++	11
South Africa	54	1398	-	-
Vietnam	++	7	-	-
UK	++	3	-	-
Other countries	++	2	++	++

Figures rounded off

Table – 19 : Imports of Andalusite
(By Countries)

Country	2019-20 (R)		2020-21 (P)	
	Qty (t)	Value (₹'000)	Qty (t)	Value (₹'000)
All Countries	**17618**	**425962**	**15217**	**428831**
South Africa	14661	343391	11762	323009
France	2871	80220	3291	100507
USA	60	1877	150	4534
UAE	-	-	14	643
China	-	-	++	71
U K	-	-	++	67
Netherlands	26	474	-	-

Figures rounded off

FUTURE OUTLOOK

The demand for high quality raw and calcined sillimanite minerals is closely linked to the need for high performance refractories with increased operational lifespans. As the predominant consumer of refractory products, the Steel Manufacturing Industry provides a reliable market indicator of the demand for sillimanite minerals.

The Asia-Pacific region remains the largest market for refractories. The production of sillimanite is likely to increase in the coming years to meet the demand. China will remain the leading market on global front. Demand for refractory minerals in India is likely to scale up in commensurate with steel production which is also likely to show an increasing trend.