India's International Trade of Four Specific Commodities in the Recent Past

Some Insights

Preface

The study uses trade indicators to analyse merchandise export and import data in a way that should be useful for the purpose of policy. The indicators provide a glimpse of the trade patterns of the world and the performance of India in comparison to various other countries. They have been used in the case of India's exports of **Acrylic Polymers in Primary Forms and Ferro Alloy** and imports of **Frames and Mountings for Spectacles, Goggles & Rosin and Resin Acids** to indicate the possible directions policy may take.

The data used in this study has been sourced from the Export Import Data Bank of the DGCI&S, Department of Commerce, and Government of India and from the United Nations Comtrade Database. Introduction notes of each commodities has been sourced from the various sights –viz Wikipedia, Britannica, The Economic Times etc.

Computations are based on data at ITC-HS four-digit level (ITC-HS Code-3906 & 7202for export and 9003 & 3806 for import) and the latest finalized data available on the UN Comtrade Database up to year 2021 and on the DGCI&S Database up to March'2023. So, trends from 2018 to 2021 have been shown when we extract the data from UN Comtrade and from 2019 to 2022 have been shown when we extract the data from DGCIS Data base.

In this report, we will see various analysis and aspects of India's Precious as well as International export trade of Acrylic Polymers in Primary Forms and Acrylic Polymers in Primary Forms and Ferro Alloy and imports of Frames and Mountings for Spectacles, Goggles & Rosin and Resin Acids**.** We will use both the 4 digit Commodity codes, for our analysis, as appropriate.

Trends in India's as well as International Trade i.e. Exports and Imports of above four Commodities are given below in different tables :

- Table1 : India's top 10 Export destination of Acrylic Polymers with their shares in percentage.
- Table 2 : World's top 10 Exporters of Acrylic Polymers with their shares in percentage.
- Table 3 : World's top 10 Importers of Acrylic Polymers with their shares in percentage.
- Annex- I : Top 3 sources of Acrylic Polymers of World's top 3 Importers.
- Table 4 : India's top 10 Export destination of Ferro Alloy with their shares in percentage.
- Table 5 : World's top 10 Exporters of Ferro Alloy with their shares in percentage.
- Table 6 : World's top 10 Importers of Ferro Alloy with their shares in percentage.
- Annex-II : Top 3 sources of Ferro Alloy of World's top 3 Importers.
- Table 7 : India's top10 Sources of Frames and Mountings for Spectacles, Goggles with their shares in percentage.
- Table 8: World's top10 Importers of Frames and Mountings for Spectacles, Goggles with their shares in percentage.
- Table 9 : India's top 10 Sources of Rosin and Resin Acids with their shares in percentage.
- Table 10 : World's top 10 Importers of Rosin and Resin Acids with their shares in percentage.

EXPORT

Acrylic Polymers in Primary Forms

Nylon is a generic designation for a family of synthetic polymers composed of polyamides (repeating units linked by amide links). Nylon is a silk-like thermoplastic, generally made from petroleum, that can be melt-processed into fibers, films, or shapes. Nylon polymers can be mixed with a wide variety of additives to achieve many different property variations. Nylon polymers have found significant commercial applications in fabric and fibers (apparel, flooring and rubber reinforcement), in shapes (moulded parts for cars, electrical equipment, etc.), and in films (mostly for food packaging).

Nylon was the first commercially successful synthetic thermoplastic polymer. DuPont began its research project in 1927. The first example of nylon, (nylon 66), was synthesized using diamines on February 28, 1935, by Wallace Hume Carothers at DuPont's research facility at the DuPont Experimental Station. In response to Carothers' work, Paul Schlack at IG Farben developed nylon 6, a different molecule based on caprolactam, on January 29, 1938.

Nylon was first used commercially in a nylon-bristled toothbrush in 1938, followed more famously in women's stockings or "nylons" which were shown at the 1939 New York World's Fair and first sold commercially in 1940, whereupon they became an instant commercial success with 64 million pairs sold during their first year on the market. During World War II, almost all nylon production was diverted to the military for use in parachutes and parachute cord. Wartime uses of nylon and other plastics greatly increased the market for the new materials

Mono Filament Yarn can be obtained by direct spinning or by splitting the Mother Yarn. It has exceptional resistance and hence it is utilized for fuel and chemicals. This type of monofilaments is widely used in the production of filter fabrics and automotive utilities. A polyester Monofilament yarn is also used in knitting and weaving. It can be availed in Semi Dull, Bright & also in Dope Dyed finishes.

High tenacity nylon yarns showed load-extension behaviour, characterized by the secant modulus aft some 100 stabilization cycles, that can be represented as a linear function of mean load and load range. Mean load is the dominant factor, the influence of load range being one order of magnitude smaller. It is reasonable to expect that high efficiency ropes made with these yarns show modulus between0.75 and 0.8 of the modulus of the yarns used. This approximation can be used for preliminary design analyses. All nylon yarns showed asymptotic behaviour as loading approaches zero, as opposed to the typical behaviour of PET yarns. Considering that rope constructional stretch adds tensile compliance to the yarn it can be concluded the high efficiency nylon ropes should not show impact when loaded from the slack condition. This characteristic is very interesting in the application of connecting two units moored in Deepwater.

Nylon 6.6 & 6 high strength multifilament yarn are used in industrial applications i.e. tire cord fabrics, UV protected Fabrics, fishing Net, Airbags etc.

N6 UV protected white yarn, high strength multifilament yarn, used for manufacturing fishing nets, ropes,braid,canvas.

Available Deniers : 210D/36F,420D/ 70F,630D/ 105F,840D/ 140F,1050D/ 175F,1260D /210F,1680D/ 280F,1890D/280F. N6 industrial filament yarn, multifilament yarn with high tenacity,

UV protected, mainly used for manufacturing tyre cord fabric, canvas , ropes . 840D/ 140F,1260D/ 210F,1680D/ 280F,1890D/ 280F

N6 high strength multifilament yarn, UV protected ,black yarn, mainly used for manufacturing fishing nets,ropes,braid,canvas.840D/ 140F, 1260D/ 210F,1680D/ 280F,1890D/ 280F.

N6.6 industrial yarn, high strength multifilament yarn, mainly used for manufacturing conveyer belt, ropes, braid, canvas .

These are broadly classified under **H.S. Code-3906**.

Table - 1

India's Top 10 destination of Acrylic Polymer (H.S Code-3906)

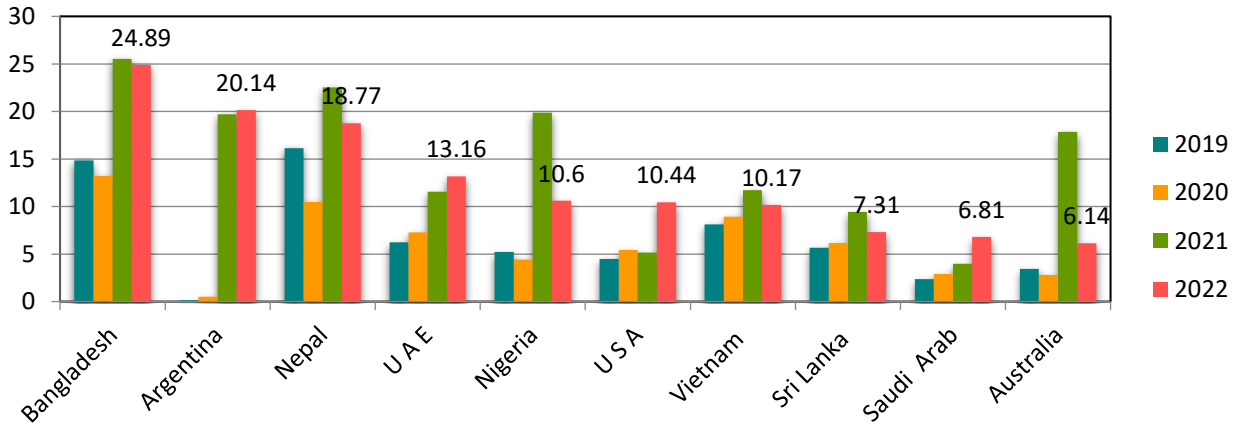
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Bangladesh	14.85	13.83	13.21	12.42	25.52	9.16	24.89	11.96
2.	Argentina	0.14	0.13	0.52	0.49	19.71	7.07	20.14	9.68
3.	Nepal	16.12	15.01	10.47	9.84	22.53	8.08	18.77	9.02
4.	U A E	6.22	5.79	7.27	6.83	11.54	4.14	13.16	6.32
5.	Nigeria	5.21	4.85	4.40	4.13	19.88	7.13	10.60	5.09
6.	U S A	4.47	4.17	5.42	5.09	5.15	1.85	10.44	5.02
7.	Vietnam	8.13	7.57	8.91	8.38	11.71	4.20	10.17	4.89
8.	Sri Lanka	5.66	5.27	6.17	5.80	9.43	3.38	7.31	3.51
9.	Saudi Arab	2.37	2.21	2.91	2.74	3.97	1.42	6.81	3.28
10.	Australia	3.44	3.20	2.80	2.63	17.84	6.40	6.14	2.95
	Others	40.79	37.98	44.32	41.66	131.42	47.16	79.63	38.27
	Total	107.41	100	106.39	100	278.69	100	208.06	100

Source: DGCI&S.

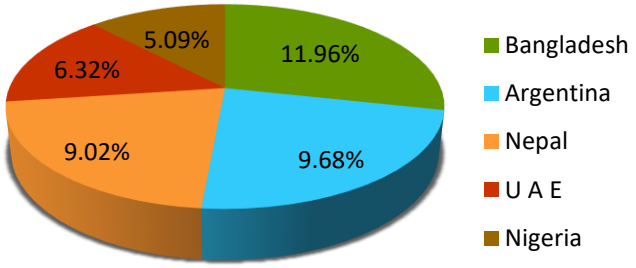
Note : India's Export including re-export

Country wise import of Acrylic Polymer export from India for 2019-2022**(in million US $)**

Data label given on the basis of 2022



India's top 5 destinations of Acrylic Polymer by percentage India in 2022:



Bangladesh is the largest market for Acrylic Polymers In Primary Forms export from India in 2022. In 2022, Bangladesh imported US$ 24.89 million worth Acrylic Polymers In Primary Forms from India. It was followed by Argentina (US $ 20.14 M) and Nepal (US $ 18.77 M). It is noticeable that during the review period Bangladesh and Nepal were the largest market for Acrylic Polymers In Primary Forms export from India up to the year 2021. In 2022 India exported US $ 208.06 million worth Acrylic Polymers In Primary Forms export from India to the world wide which was fallen by more than 25.35 times from the year 2021.

Table-2

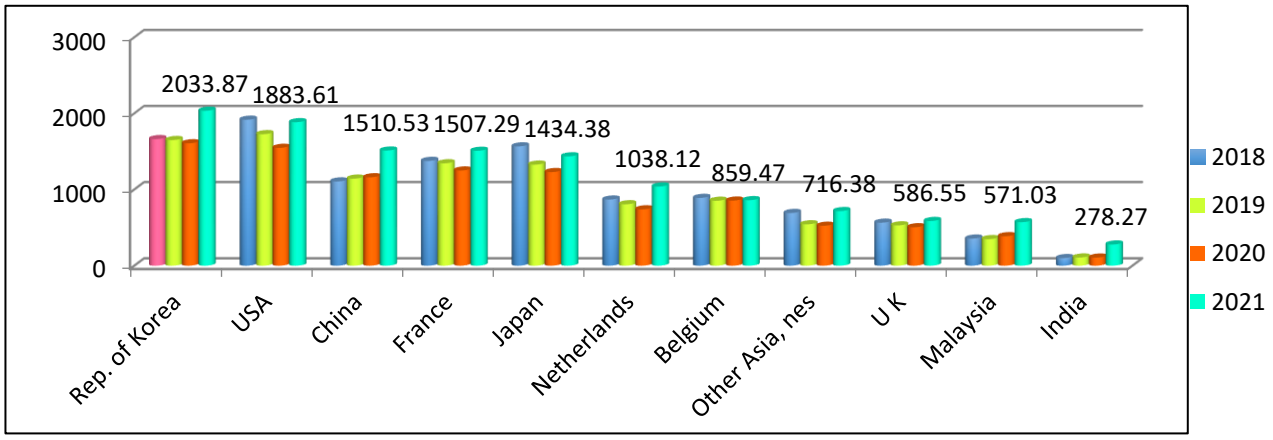
World's Top 10 exporter of Acrylic Polymer (H.S Code-3906)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Rep. of Korea	1661.10	11.34	1648.64	11.99	1606.12	12.14	2033.87	12.08
2.	USA	1915.81	13.08	1725.84	12.56	1546.16	11.68	1883.61	11.19
3.	China	1105.51	7.55	1142.09	8.31	1159.85	8.76	1510.53	8.97
4.	France	1374.82	9.39	1343.34	9.77	1248.84	9.44	1507.29	8.95
5.	Japan	1565.46	10.69	1326.01	9.65	1227.90	9.28	1434.38	8.52
6.	Netherlands	867.57	5.92	805.90	5.86	739.20	5.59	1038.12	6.16
7.	Belgium	889.47	6.07	851.78	6.20	853.99	6.45	859.47	5.10
8.	Other Asia, nes	691.64	4.72	542.94	3.95	523.87	3.96	716.38	4.25
9.	U K	564.21	3.85	528.70	3.85	504.34	3.81	586.55	3.48
10.	Malaysia	355.43	2.43	348.57	2.54	386.67	2.92	571.03	3.39
16.	**India**	**99.78**	**0.68**	**107.40**	**0.78**	**106.34**	**0.80**	**278.27**	**1.65**
	Others	3554.19	24.27	3373.92	24.55	3331.26	25.17	4420.54	26.25
	Total	14644.99	100	13745.13	100	13234.55	100	16840.03	100

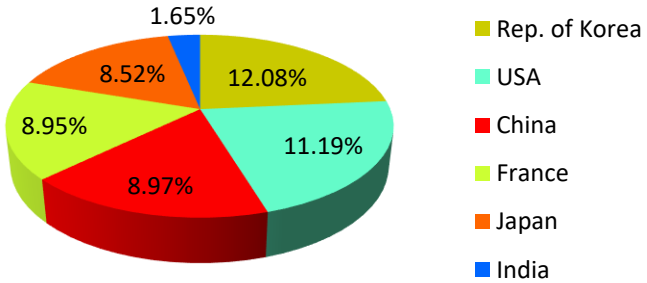
Source: UN Comtrade

Leading Acrylic Polymer exporter of world from 2018 to 2021 **(Values in US$ million)**

Data label given on the basis of 2021



Country wise world's leading exporter of Acrylic Polymer by percentage in 2021



In 2021, the world exports of Acrylic polymers in primary forms exceeded US $ 16.8 billion. It was $13.23 billion in the previous year. shows the increase by 27.25% from the 2020. The value of imports of Acrylic polymers in primary forms to the world from Rep of Korea totalled US $ 2.03 billion or 12.08% share of world export in 2021, make it the largest exporter of Acrylic polymers in primary forms in the world in 2021. USA and China are to be found 2nd and 3rd largest exporter of the commodity with 11.19% and 8.97% share of world export in that year. In the same year **India** became the 16th largest exporter of Acrylic polymers in primary forms with 1.65% share of world export of Acrylic polymers in primary forms.

Table-3

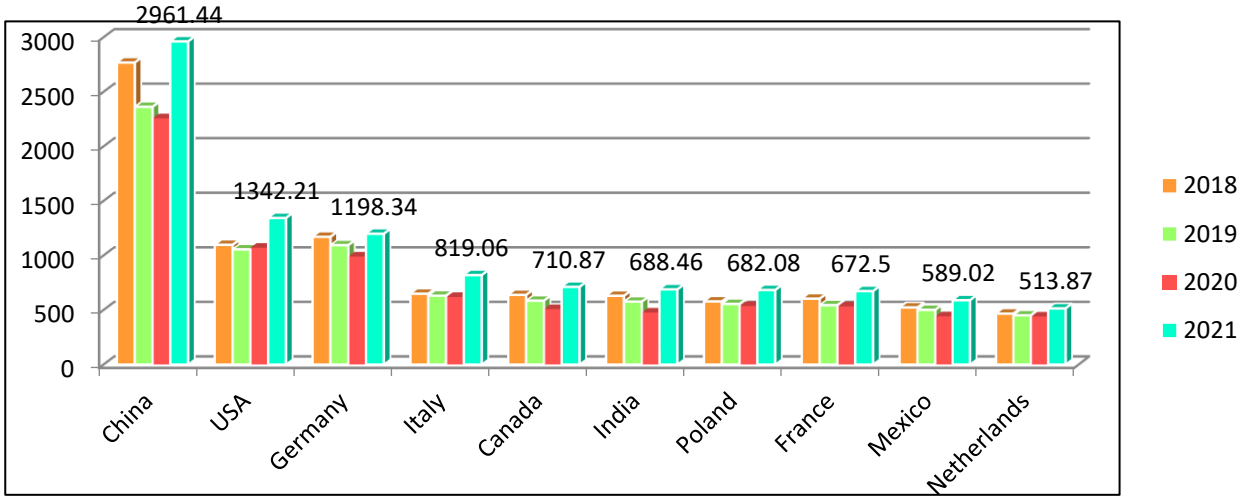
World's top 10 Importers of Acrylic Polymer (H.S Code-3906)

Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	2767.17	15.81	2361.39	14.43	2255.88	14.45	2961.44	15.67
2.	USA	1096.41	6.27	1054.54	6.44	1069.28	6.85	1342.21	7.10
3.	Germany	1170.19	6.69	1093.08	6.68	989.53	6.34	1198.34	6.34
4.	Italy	648.07	3.70	630.23	3.85	618.45	3.96	819.06	4.33
5.	Canada	637.61	3.64	584.33	3.57	506.97	3.25	710.87	3.76
6.	**India**	**629.20**	**3.60**	**575.86**	**3.52**	**475.82**	**3.05**	**688.46**	**3.64**
7.	Poland	577.79	3.30	554.76	3.39	535.62	3.43	682.08	3.61
8.	France	603.04	3.45	543.50	3.32	532.46	3.41	672.50	3.56
9.	Mexico	522.39	2.99	500.29	3.06	440.97	2.82	589.02	3.12
10.	Netherlands	466.06	2.66	450.28	2.75	439.25	2.81	513.87	2.72
	Others	8382.08	47.90	8020.12	49.00	7747.03	49.62	8720.10	46.14
	Total	17500.00	100	16368.37	100	15611.27	100	18897.96	100

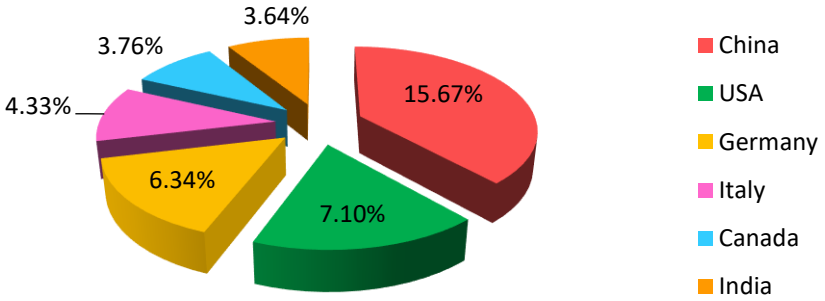
Source : UN Comtrade

Leading Acrylic Polymers importers of world from 2018 to 2021 **(Values in million USD)**

Data label given on the basis of 2021



Country wise world's leading importers of Acrylic Polymers by percentage in 2021

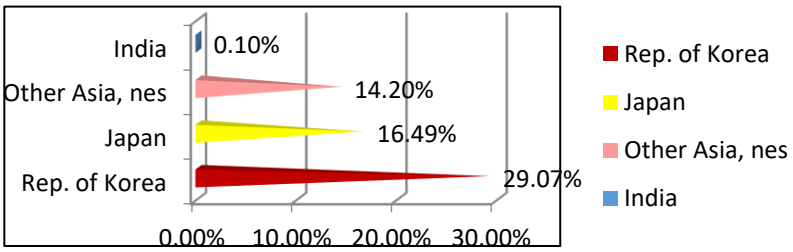


Global purchases of imported Acrylic polymers in primary forms cost a total US $ 18.89 billion in 2021. In that year, imported Acrylic polymers in primary forms appreciated by 21% from US $ 15.61 billion during 2020. From a major importing countries perspective, China consumed the highest dollar worth of imported Acrylic polymers in primary forms during 2021 with purchases valued at US $ 2.96 billion or 15.67% of the world total. In second and third place were USA and Germany at 7.10% and 6.34% of globally imported Acrylic polymers in primary forms in 2021. In that year **India** was at 6th position in ranking in the world with share of 3.64% of world total import value of Acrylic polymers in primary forms.

Annexure-1

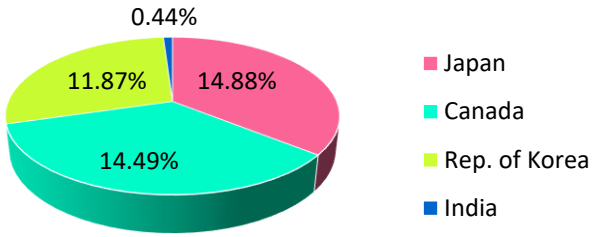
Major sources of world's top three importers of Acrylic Polymer (H.S Code-3906)

i) Top 3 Sources of Acrylic Polymers to China in 2021 by percentage:



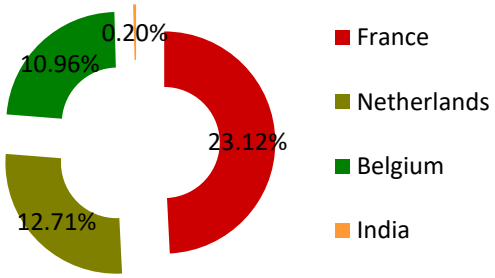
In the year 2021 China imported 29.07% share of its requirement of Acrylic Polymers from Rep. of Korea, 2nd largest source of Acrylic Polymers to China was Japan with 16.49% share of China's total import in that year and Other Asia, nes was the 3rd largest source of the commodity to China. **India**'s account was only 0.10% of china's total import of Acrylic Polymer in 2021. **Source : UN Comtrade)**

ii) Top 3 Sources of Acrylic Polymers to USA in 2021 by percentage***:***



USA was the 2nd largest importer of Acrylic Polymers in2021. USA's 3 major source countries of Acrylic Polymers in 2021 were Japan (14.88%), Canada (14.49%) and Rep. Of Korea (11.87%). In the same year **India** exported 0.44% of Acrylic Polymers to USA. S**ource: UN Comtrade)**

iii) Top 3 Sources of Acrylic Polymers to Germany in 2021 by percentage***:***



Germany imports 23.12% share of Acrylic Polymers from France in 2021. Netherlands and Belgium were 2nd and 3rd major source countries of the Acrylic Polymers to Germany with 12.71% and 10.96% share of Germany's total import in that year. **India** has exported to Germany only 0.20% share of Germany's total export of Acrylic Polymers in the same year. **(Source: UN Comtrade)**

Ferro Alloy

Ferroalloy refers to various alloys of iron with a high proportion of one or more other elements such as manganese (Mn), aluminium (Al), or silicon (Si). They are used in the production of steels and alloys. The alloys impart distinctive qualities to steel and cast iron or serve important functions during production and are, therefore, closely associated with the iron and steel industry, the leading consumer of ferroalloys. The leading producers of ferroalloys in 2014 were China, South Africa, India, Russia and Kazakhstan, which accounted for 84% of the world production. World production of ferroalloys was estimated as 52.8 million tonnes in 2015.

Ferroalloys are produced generally by two methods: in a blast furnace or in an electric arc furnace. Blast furnace production continuously decreased during the 20th century, whereas the electric arc production is still increasing. Today, ferromanganese can be still efficiently produced in a blast furnace, but, even in this case, electric arc furnace are spreading. More commonly, ferroalloys are produced by carbothermic reactions, involving reduction of oxides with carbon (as coke) in the presence of iron. Some ferroalloys are produced by the addition of elements into molten iron.

It is also possible to produce some ferroalloys by direct reduction processes. For example, the Krupp-Renn process is used in Japan to produce ferronickel.

Ferroalloy processes are divided into continuous and periodic. Continuous processes are characterized by continuous loading of the charge and periodic (or continuous) slag and ferroalloy tapping. The charge is in the furnace at a certain level throughout the process. The electrodes are immersed in a charge continuously. The furnaces used for these processes usually have high power (>16 MVA) and the reducing agents are carbon materials (coke, char, charcoal, anthracite coal).

Batch processes use a certain amount of charge material for the same heat. The charge loaded into the furnace is completely melt, leading to the reduction of the elements. The products are released periodically (metal and slag tapping), most often at the same time.

The ferro-alloy industry is associated with the iron and steel industries, its largest customers. Ferro-alloys impart distinctive qualities to steel and cast iron and serve important functions during iron and steel production cycles. The principal ferroalloys are those of chromium, manganese, and silicon. The history of ferroalloys is relatively short if compared to that of iron and steel. Ancient iron artefacts were of fairly pure iron containing only carbon as a significant alloying element. That was self-evident as the steel was produced via direct reduction route in bloomer-type furnaces at so low temperatures that iron was formed in so lid state and other components like manganese and silicon which are typical in modern steels were found only as slag inclusions in steel. Occasionally, iron could contain such easily reducible elements like Ni and Cu originating from ores or in the case of nickel even from meteoritic iron. When bigger shaft furnaces were developed with stronger air blasting through tuyeres, temperature in the combustion zone was increased, and iron could dissolve more carbon and melt: thus the blast furnace process was discovered. This progress took place in the late Medieval Age in Central Europe. The product was carbon-saturated cast iron which typically contained a few percents of silicon and eventually also some manganese depending on the ore composition. Pig iron from blast furnaces was used as foundry iron for castings or converted to steel by difficult and time-conswning refining process. Such processes were gradually developed but bloomery steel kept its dominance until the 19th century.

The history of the utilization of ferroalloys exceeds only about 150 years back. Since that the production technologies for ferroalloys have developed and great variety of alloys specified for different steel grades have become available. The usage has strongly extended for diverse purposes including refining, alloying for improved strength, hardness, ductility, corrosion resistivity etc. During the last few decades micro-alloyed steels have emerged and grown faster than the conventional low-alloyed steel grades. On the other hand production of stainless steels has grown still faster which can be seen especially in FeCr consumption.
The levels of impurities in ferroalloys vary greatly and the customers' requirements depend on the steel grades and object of use i.e. the requirements are different for final trimming additions than for primary basic additions. Most metallic impurities as well as C, Sand P are limited by distinct analysis limits whereas such components like Ti, Al, Ca, Mg, N which can have detrimental influences via formation of inclusions and precipitates can be more critical to control. That kind of optimization of ferroalloys for different steel grades and purposes would be a challenging task for model developers.

These are broadly classified under **H.S. Code-7202**.

Table - 4

India's Top 10 destination of Ferro Alloy (HS Code –7202)

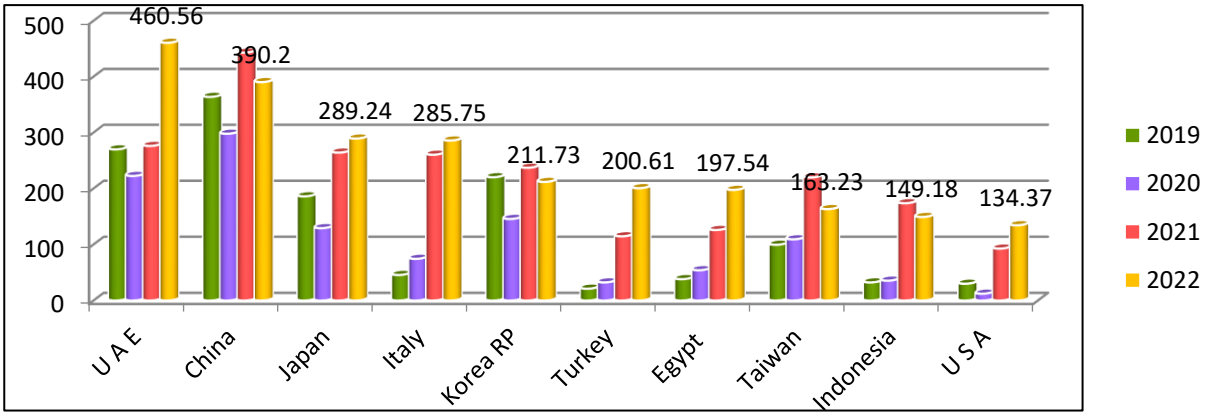
Rank	Countries	2019		2020		2021		2022	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	U A E	269.89	14.62	222.40	14.65	276.01	8.74	460.56	12.85
2.	China	363.74	19.70	297.84	19.62	442.92	14.03	390.20	10.89
3.	Japan	186.00	10.08	129.20	8.51	264.11	8.37	289.24	8.07
4.	Italy	45.62	2.47	74.41	4.90	260.26	8.24	285.75	7.97
5.	Korea RP	220.12	11.92	145.65	9.59	237.03	7.51	211.73	5.91
6.	Turkey	21.10	1.14	32.32	2.13	114.67	3.63	200.61	5.60
7.	Egypt	38.16	2.07	54.10	3.56	125.91	3.99	197.54	5.51
8.	Taiwan	99.57	5.39	109.28	7.20	219.73	6.96	163.23	4.55
9.	Indonesia	32.28	1.75	35.45	2.33	173.73	5.50	149.18	4.16
10.	U S A	29.97	1.62	12.15	0.80	92.73	2.94	134.37	3.75
	Others	539.50	29.23	405.59	26.71	949.77	30.09	1101.73	30.74
	Total	1845.95	100	1518.38	100	3156.85	100	3584.15	100

Source: DGCI&S

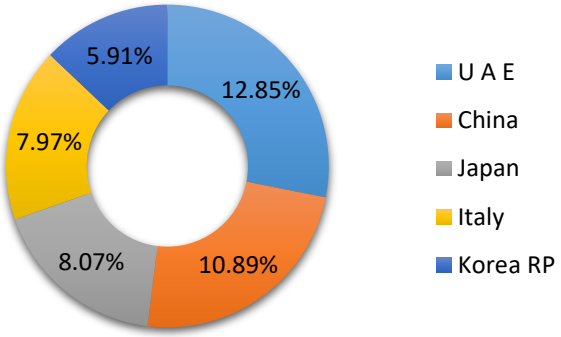
Note : India's Export including re-export

Leading Ferro Alloy importers from India from 2019-2022**(Values in million USD)**

Data label given on the basis of 2022



India's top 5 major destinations of Ferro Alloy by percentage in 2022:



During the year 2022 Indian exporters nearly exported US $ 3.58 Billion of Ferro Alloys to the top global markets which was more than 13.53% more than the year 2021. In 2022 India's Ferro Alloys export worth value to UAE was around US $ 460.56 Million, which holds the top position with the share of 12.85% of the total export of India. With the share of 10.89 %, China takes runner up position in the global importers of Ferro Alloys from India in that year whereas up to the year 2021 China was the top most destination country of Ferro Alloy export from India. In the year 2022 Japan imported 8.07% share of India's total export value of Ferro Alloys, takes 3rd position. In 2022 the export value of Ferro Alloys have been reached at the pick.

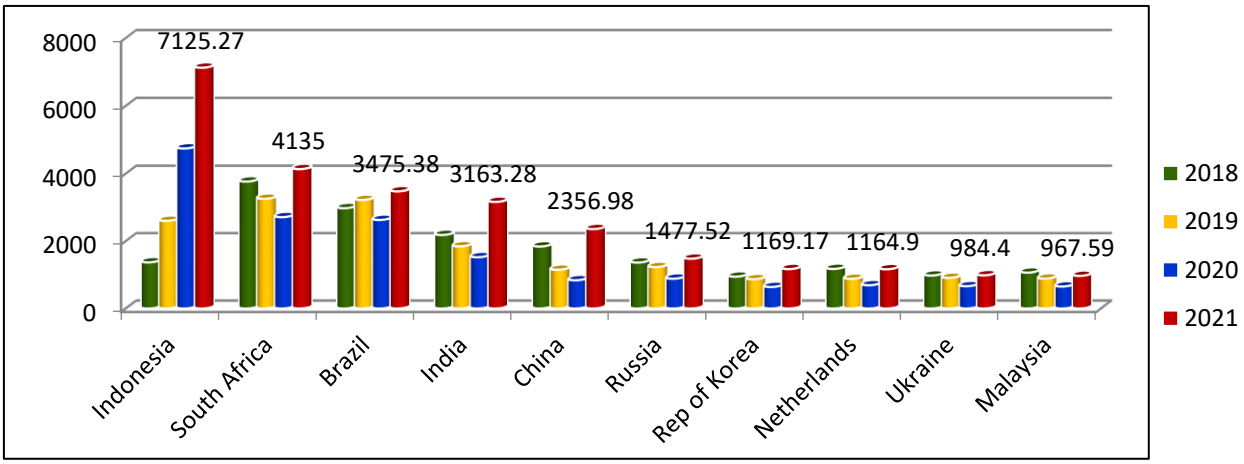
Table - 5

World's Top 10 exporters of Ferro Alloy (HS Code –7202)

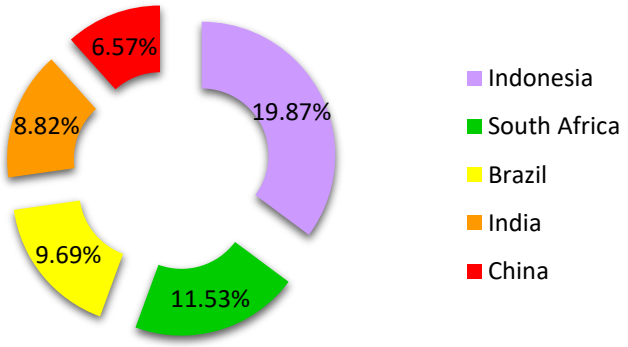
Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	share (%)	Value (million$)	share (%)	Value (million$)	Share (%)
1.	Indonesia	1367.82	4.76	2600.65	9.88	4745.00	19.76	7125.27	19.87
2.	South Africa	3766.72	13.11	3254.53	12.36	2709.96	11.29	4135.00	11.53
3.	Brazil	2976.22	10.36	3219.77	12.23	2627.90	10.95	3475.38	9.69
4.	**India**	**2181.74**	**7.59**	**1844.41**	**7.00**	**1521.67**	**6.34**	**3163.28**	**8.82**
5.	China	1839.64	6.40	1149.20	4.36	837.51	3.49	2356.98	6.57
6.	Russia	1362.93	4.74	1227.72	4.66	884.39	3.68	1477.52	4.12
7.	Rep of Korea	945.28	3.29	868.73	3.30	637.73	2.66	1169.17	3.26
8.	Netherlands	1174.33	4.09	880.69	3.34	689.63	2.87	1164.90	3.25
9.	Ukraine	977.85	3.40	910.04	3.46	660.89	2.75	984.40	2.75
10.	Malaysia	1064.02	3.70	886.84	3.37	651.71	2.71	967.59	2.70
	Others	11081.78	38.56	9491.95	36.04	8042.20	33.50	9831.58	27.42
	Total	28738.32	100	26334.53	100	24008.59	100	35851.06	100

Source: UN Comtrade

Leading Ferro Alloy exporters of world from 2018 to 2021 **(Values in million USD)**
Data label given on the basis of 2021



Country wise export trends in world's leading Ferro Alloy exporters by percentage in 2021:



In the year 2021, global ferroalloy exports reached at US $ 35.85 Billion, rising by 49.33% compared to the year 2020. In 2021 the top 3 exporters of Ferro alloy in the world were Indonesia, South Africa and Brazil. Indonesia was the largest exporter of Ferro alloy and accounts for US $ 7.12 Billion or 19.87% share of world export of Ferro Alloy exported to the world, followed by South Africa with US $ 4.13 Billion and Netherlands at the 3rd spot with US $ 3.47 Billion. In the same year Ferro Alloys export to the world from **India** was US $ 3.16 Billion which holds the 4th position in the world export of Ferro Alloys with 8.82% share of world export of Ferro Alloys.

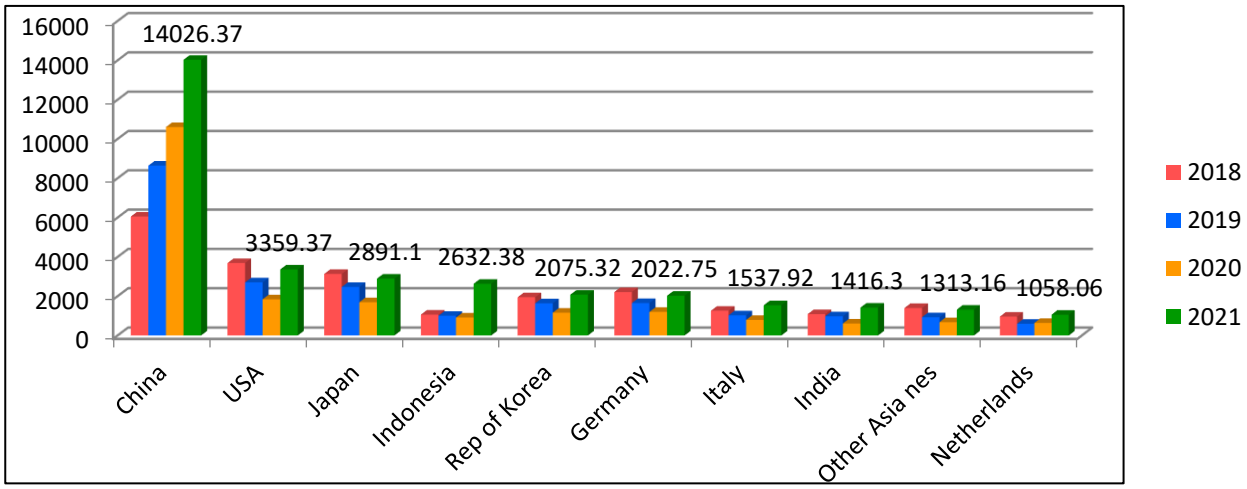
Table - 6

World's Top 10 Importers of Ferro Alloy (HS Code –7202)

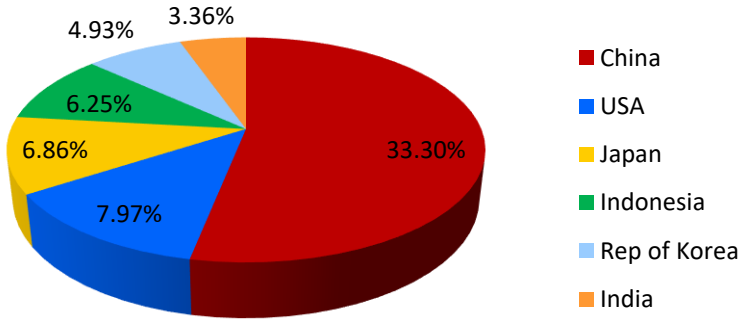
Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	6051.26	18.44	8643.87	29.33	10605.73	40.56	14026.37	33.30
2.	USA	3686.32	11.23	2703.69	9.18	1839.86	7.04	3359.37	7.97
3.	Japan	3131.51	9.54	2471.36	8.39	1691.80	6.47	2891.10	6.86
4.	Indonesia	1062.77	3.24	1004.42	3.41	915.56	3.50	2632.38	6.25
5.	Rep of Korea	1946.69	5.93	1637.36	5.56	1161.60	4.44	2075.32	4.93
6.	Germany	2209.55	6.73	1649.30	5.60	1200.78	4.59	2022.75	4.80
7.	Italy	1261.36	3.84	1025.92	3.48	792.56	3.03	1537.92	3.65
8.	**India**	**1085.14**	**3.31**	**976.08**	**3.31**	**607.37**	**2.32**	**1416.30**	**3.36**
9.	Other Asia nes	1398.36	4.26	929.34	3.15	678.29	2.59	1313.16	3.12
10.	Netherlands	960.65	2.93	594.45	2.02	640.26	2.45	1058.06	2.51
	Others	10020.24	30.54	7831.67	26.58	6013.45	23.00	9794.01	23.25
	Total	32813.87	100	29467.47	100	26147.25	100	42126.74	100

Source :UNComtrade

Leading Ferro Alloy importers of world from 2018 to 2021 **(Values in million USD)**
Data label given on the basis of 2021



Country wise import trends in world's Ferro Alloy importers by percentage in 2021 :

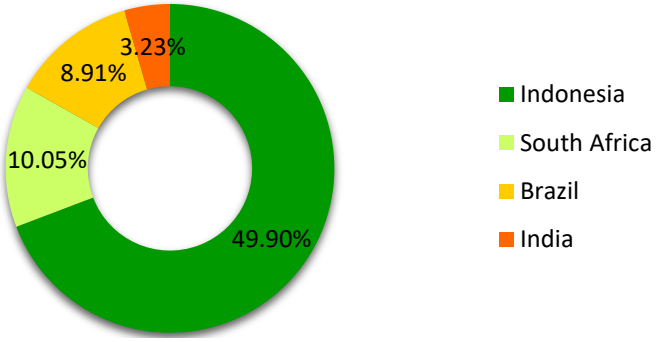


In the 2021, China (US $ 14 B) constitutes the largest importer of ferroalloys worldwide, comprising 33.30% shae of the total world export. The second position in the ranking was occupied by USA (US $ 3.36 B), with an 7.97% share of global imports. It was followed by the Japan, with a 6.86% share. In that year **India** (US $1.41B) constitutes the 8th largest importer of ferroalloys worldwide, comprising 3.36% of the world export. In 2021, global import of Ferro alloys amounted to US $ 42.12 Billion increasing for the year after consecutive three years of falling.

Annexure-II

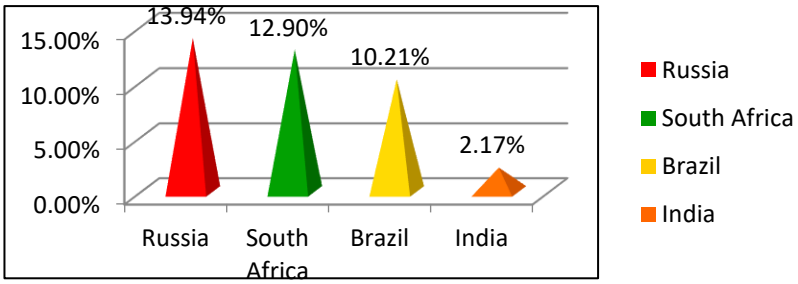
Major sources of world's top three importers of Ferro Alloy (HS Code –7202)

i) Top 3 Sources of Ferro Alloy to China in 2021 by percentage:



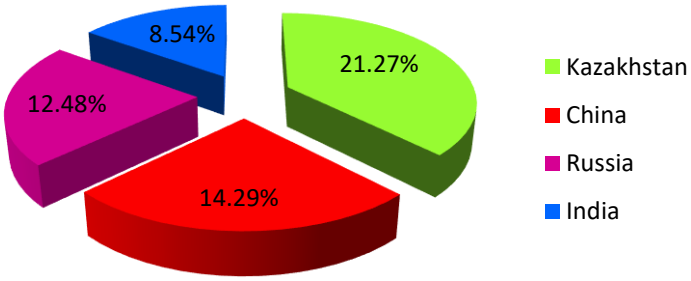
Indonesia dominates in Ferro Alloys imports structure of China's market which was near 50% of China's total imports in 2021, It was distantly followed by South Africa (10.05%) and Brazil (8.91%). In 2021 Ferro Alloys exported from **India** to China was 3.23% China's total import of Ferro alloys. **Source: UN Comtrade)**

ii) Top 3 Sources of Ferro Alloy to USA in 2021 by percentage**:**



Russia was the primary source country to USA for Ferro Alloys exports from Russia with a 13.94% share of USA's total import of Ferro Alloys in 2021. South Africa (12.90%) and Brazil (10.21%) were 2nd and 3rd largest source countries for Ferro Alloys to USA in the same year **India** also an important source for the commodity to USA. Its share was 2.17% of USA's total import in 2021. **(Source: UN Comtrade)**

iii) Top 3 Sources of Ferro Alloy to Japan in 2021 by percentage**:**



Japan imports 21.27% share of Ferro Alloys from Kazakhstan in 2021. The 2nd largest source of the commodity to Japan was China with 14.29% share of Japan's total import in that year. Ferro Alloys imported from **India** in 2021 to Japan was 8.54% share of Japan's total Ferro Alloys import. **(Source : UN Comtrade)**

IMPORT

Frames and Mountings for Spectacles, Goggles

Glasses frames comprise of three main parts, containing multiple sub-parts within their construction. Primarily, there is the frame-front and two protrusions known as temples. These main components come in many different forms and materials which have their own specific functions, styles and names.

Eyeglass frames fabricated from shape-memory alloys which have optimized elastic properties, which exhibit a combination of shape-memory and optimized elastic properties, which utilize the shape-memory property of these alloys in fastening elements or which utilize the flexibility and fatigue resistance of the martensitic state of the alloys as a hinge element.

The present invention relates to frames for eyeglasses and more particularly to frames fabricated from shape-memory alloys.

The metals which have historically been used to make metal eyeglass frames have usually been chosen in large part for their ease of fabrication. Metals such as nickel-silver, Monel, and phosphor bronze have fairly high yield strength but quite low work-hardening which allows them to accept large deformations during manufacture In use, however, they tend to bend rather suddenly and in quite localized sections if their yield strength is exceeded. Such sharp bends are very difficult to remove without leaving "kinks" in the bent section. The higher strength frame materials, such as high strength stainless steels and beryllium-copper, are able to withstand much higher elastic strains without permanent deformation. They are still limited to only about 1% elastic strain, however, and if their Yield strength is exceeded a bend is formed which is difficult to remove.

An eyeglass frame having at least a portion thereof fabricated from nickel-titanium based shape-memory alloy, said portion being in the work-hardened metallurgical state, said portion having been subjected to at least 30% work-hardening and having a low effective elastic modulus giving a soft, sparingly feel, said portion having greater than 4% elasticity over a temperature range from -20° C. to +40° C.

Acetate glasses frames are made from a type of bio-plastic called cellulose acetate. This incredible material is a natural compound which derives from the fibres in cotton 'bolls' or mashed up wood pulp.

Due to their high levels of cellulose, wood or cotton are both excellent sources which are cultivated, refined and mixed with acetic acid to make the sheet material, cellulose acetate.

Acetate comes in a vast variety of colours, patterns and transparencies which make it one of the best polymers for spectacle making.

There are different parts in frame like frame fronts, End pieces, Bridge, Nose pad, Hinges, Temples, Rivet etc. The frame fronts vary in terms of their material, colour shape and size. They can be made from various types of material, predominantly cellulose acetate, and metal or high-performance composites such as carbon fibre.Before plastic came on the scene, (1907,) natural materials such as bone, wood, ivory, horn and real tortoise shell were used to make the frame front and temples of a glasses frame. Since then, materials such as cellulose acetate has generally made these older materials obsolete. Full rim frame fronts cover the entire edge of a lens. Your lenses are held in place using an angled recess in the frame front called a lens groove. Half rim frame fronts are the same as full rim but their lower half is missing. This means the bottom edges of your lenses are exposed and are secured in place using a thin nylon chord called “Supra.”Rimless frame fronts are joined together via a metal bridge. Via screws, the bridge joins and secures the lenses together to make the frame front. At the edges of the lenses, the temples are also attached via screws through the outer-sides of each lens.

This is where the temples locate onto the rear side of the frame front via the hinges. End pieces vary in size and shape, depending on the style of temples on your glasses. Glasses Bridge is exactly that. It bridges the nose. For facial comfort, the bridge of your glasses has two main functions. These come from bridge bump and the bridge aperture. Hinges are the metal joints which allow you to open and close the temples on your glasses frame. Hinges can also be called “joints” as they conveniently *join* your frame front with each of your temples. An eyeglass frame as in claim 5 wherein said eyeglass frame includes a pair of lens rims and a pair of nose pads, each nose pad connected to a respective rim by a nose pad wire, said portions comprising said nose pad wires.

These are broadly classified under **H. S. Code 9003**.

Table - 7

India's Top 10 Sources of Frames and Mountings for Spectacles, Goggles (HS Code :9003)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	54.51	70.68	35.62	74.30	60.39	73.74	92.53	74.99
2.	Italy	6.94	9.00	4.38	9.13	6.78	8.28	9.16	7.43
3.	Hong Kong	8.45	10.96	2.91	6.06	6.68	8.16	8.21	6.65
4.	Canada	0.95	1.23	1.26	2.62	1.80	2.20	4.49	3.64
5.	U K	0.28	0.37	0.28	0.58	0.32	0.39	1.82	1.47
6.	Germany	0.85	1.11	0.34	0.72	0.88	1.07	1.27	1.03
7.	Austria	1.20	1.55	0.52	1.09	1.13	1.38	1.15	0.93
8.	Japan	0.10	0.13	0.18	0.38	0.07	0.09	0.63	0.51
9.	Taiwan	0.13	0.17	0.16	0.34	0.46	0.57	0.56	0.45
10.	Denmark	0.44	0.58	0.30	0.63	0.49	0.60	0.52	0.42
	Others	3.26	4.23	1.98	4.14	2.89	3.53	3.06	2.48
	Total	77.12	100	47.94	100	81.90	100	123.40	100

Source: DGCI&S

Note : India's Import including re-import

Collectively India imported US $ 123.40 Million of Spectacles Frame from different countries in 2022 and US $ 77.12 Million in 2019. Spectacles Frame import to India has rose by 50.68 % than the previous year. India Imports from China of Frames and Mountings for Spectacles, Goggles or the Like was US $ 92.53 Million during 2022 or 75% share of India's total import. The second position in the ranking was occupied by Italy (US $ 9.16 M), with an 7.43% share of India's imports. It was followed by Hong Kong, with a 6.65% share of India's total import of Frames and Mountings for Spectacles, Goggles in 2022.

Table - 8

World's Top 10 Importer of Frames and Mountings for Spectacles, Goggles (HS Code :9003)

Rank	Countries	2018		2019		2020		2021	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	USA	1206.85	17.53	1204.60	17.66	892.52	16.47	1344.54	18.89
2.	Hong Kong	888.26	12.90	875.57	12.84	756.92	13.96	923.87	12.98
3.	Italy	656.88	9.54	664.40	9.74	502.36	9.27	722.82	10.15
4.	France	471.30	6.85	486.30	7.13	403.03	7.44	510.18	7.17
5.	Germany	362.63	5.27	370.70	5.44	296.13	5.46	373.41	5.25
6.	China	216.42	3.14	225.17	3.30	190.08	3.51	262.06	3.68
7.	Netherlands	232.62	3.38	220.18	3.23	194.92	3.60	242.05	3.40
8.	Japan	226.53	3.29	232.60	3.41	202.69	3.74	232.43	3.27
9.	Canada	194.79	2.83	189.25	2.77	136.77	2.52	192.97	2.71
10.	Spain	143.77	2.09	142.98	2.10	109.67	2.02	164.56	2.31
16.	**India**	**71.47**	**1.04**	**77.19**	**1.13**	**47.78**	**0.88**	**81.96**	**1.15**
	Others	2212.63	32.14	2131.09	31.25	1687.33	31.13	2067.69	29.05
	Total	6884.15	100	6820.03	100	5420.21	100	7118.54	100

Source :UNComtrade

The world imports of Frames and Mountings for Spectacles, Goggles was totalled US $ 7.11 Billion in 2021. The total imports volume increased at an 31.34% over the year 2020. Over the period under review, global wire and cable imports attained its maximum level of US $ 7.11 Billion in 2021. USA has been the top importer of Frames and Mountings for Spectacles, Goggles with its import share of 18.89% in the year 2021 followed by Hong Kong and Italy that imported Frames and Mountings for Spectacles, Goggles of 12.98 % and 10.15 % respectively. In the same year India imports US $ 82 Million, accounted 1.15% share of world import and ranked at 16th in the world import of Frames and Mountings for Spectacles, Goggles.

Rosin and Resin Acids

Rosin is a solid form of resin obtained from pines and some other plants, mostly conifers, produced by heating fresh liquid resin to vaporize the volatile liquid terpene components. It is semi-transparent and varies in color from yellow to black. At room temperature rosin is brittle, but it melts at stove-top temperature. It chiefly consists of various resin acids, especially abiotic acid. Rosin is brittle and friable, with a faint piney odor. It is typically a glassy solid, though some rosins will form crystals, especially when brought into solution. The practical melting point varies with different specimens, some being semi-fluid at the temperature of boiling water, others melting at 100 °C to 120 °C. It is very flammable, burning with a smoky flame, so care should be taken when melting it. It is soluble in alcohol, ether, benzene and chloroform.

Rosin consists mainly of abiotic acid, and combines with caustic alkalis to form salts (rosinates or pinates) that are known as rosin soaps. In addition to its extensive use in soap making, rosin is largely employed in making varnishes (including fine violin varnishes), sealing wax and various adhesives. It is also used for preparing shoemakers' wax, for pitching lager beer casks, and numerous other purposes such as providing backing surfaces to tin ware, copper ware, or even silver and gold vessels when embossing or engraving them. Its relatively low melting point, and firm solid form allows liquid rosin to be poured into the vessel, and when cooled allows embossing or engraving of the vessel without deforming the vessel - even if it has a skin which is quite thin. Afterwards, the object can be reheated in an oven, and the rosin poured out for reuse. Any remaining rosin film can easily be rinsed away with alcohol or other solvents.

Rosin is also sometimes used as internal reinforcement for very thin skinned metal objects - things like silver, copper or tin plate candlesticks, or sculptures, where it is simply melted, poured into a hollow thin-skinned object, and left to harden. Prolonged exposure to rosin fumes released during soldering can cause occupational asthma in sensitive individuals, although it is not known which component of the fumes causes the problem.

The type of rosin used with bowed string instruments is determined by the diameter of the strings. Generally this means that the larger the instrument is, the softer the rosin should be. For instance, double bass rosin is generally soft enough to be pliable with slow movements. A cake of bass rosin left in a single position for several months will show evidence of flow, especially in warmer weather. Prolonged exposure to rosin, by handling rosin-coated products, such as laser printer or photocopying paper, can give rise to a form of industrial contact dermatitis.

Rosin is the resinous constituent of the oleo-resin exuded by various species of pine, known in commerce as crude turpentine. The separation of the oleo-resin into the essential oil (spirit of turpentine) and common rosin is accomplished by distillation in large copper stills. The essential oil is carried off at a temperature of between 100 °C (212 °F)° and 160 °C (320 °F), leaving fluid rosin, which is run off through a tap at the bottom of the still, and purified by passing through straining wadding. Rosin varies in color, according to the age of the tree from which the turpentine is drawn and the degree of heat applied in distillation, from an opaque, almost pitch-black substance through grades of brown and yellow to an almost perfectly transparent colourless glassy mass. The commercial grades are numerous, ranging by letters from A (the darkest) to N (extra pale), superior to which are W (window glass) and WW (water-white) varieties, the latter having about three times the value of the common qualities.

Rosin is an ingredient in printing inks, photocopying and laser printing paper, varnishes, adhesives (glues), soap, paper sizing, soda, soldering fluxes, and sealing wax.

Rosin can be used as a glazing agent in medicines and chewing gum. It is denoted by E number E915. A related glycerol ester (E445) can be used as an emulsifier in soft drinks. In pharmaceuticals, rosin forms an ingredient in several plasters and ointments. In industry, rosin is a flux used in soldering. The lead-tin solder commonly used in electronics has 1 to 2% rosin by weight as a flux core, helping the molten metal flow and making a better connection by reducing the refractory solid oxide layer formed at the surface back to metal. It is frequently seen as a burnt or clear residue around new soldering.

A mixture of pitch and rosin is used to make a surface against which glass is polished when making optical components such as lenses. Rosin is added in small quantities to traditional linseed oil/sand gap fillers ("mastic"), used in building work. When mixed with waxes and oils, rosin is the main ingredient of *mystic smoke*, a gum which, when rubbed and suddenly stretched, appears to produce puffs of smoke from the fingertips.

These are broadly classified under **H. S. Code 3806**.

Table - 9

India's Top 10 Source Countries of Rosin and Resin Acids (HS Code : 3806)

Rank	Countries	2019		2020		2021		2022	
		Value (million $)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	Indonesia	19.81	22.85	21.27	29.62	37.29	34.32	41.69	37.16
2.	Nepal	12.18	14.05	6.51	9.07	13.98	12.87	16.05	14.31
3.	China	9.16	10.57	6.69	9.32	8.27	7.61	11.02	9.83
4.	Brazil	11.86	13.69	9.60	13.37	14.29	13.15	10.38	9.25
5.	U S A	8.78	10.13	6.22	8.66	8.82	8.11	8.65	7.71
6.	Germany	2.20	2.53	2.99	4.16	3.95	3.63	7.00	6.24
7.	Sweden	6.96	8.03	5.81	8.09	5.47	5.03	4.38	3.90
8.	Argentina	1.07	1.24	3.28	4.57	3.29	3.03	1.89	1.68
9.	Vietnam	0.85	0.98	1.00	1.39	2.13	1.96	1.79	1.59
10.	Belgium	0.74	0.85	1.00	1.39	2.57	2.37	1.64	1.46
	Others	13.07	15.08	7.44	10.36	8.61	7.92	7.70	6.87
	Total	86.68	100	71.81	100	108.65	100	112.19	100

Source: DGCI&S

Note : India's Import including Re-import

The value of imports of Rosin and Resin Acids to India totalled US $ 112.19 million in 2022. Sales of Rosin and Resin Acids to India increased by more than 33.24% in value terms compared to 2021. Major five source countries of Rosin and Resin Acids to India in 2022 were Indonesia (US $ 41.69 Million), Nepal (US $ 16.05 Million), China (US $ 11.02 Million), Brazil (US $ 10.38 Million) and USA (US $ 8.65 Million). These 5 countries in total exported US $ 87.79 Million value of Rosin and Resin Acids to India which rounds up to 78.26% of the total Rosin and Resin Acids import into India in 2022.

Table - 10

World Top 10 Importer of Rosin and Resin Acids (HS Code : 3806)

Rank	Countries	2018		2019		2020		2021	
		Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)	Value (million$)	Share (%)
1.	China	117.17	8.32	107.76	8.72	137.41	11.61	182.56	11.05
2.	Germany	155.14	11.01	130.43	10.55	113.87	9.62	172.77	10.46
3.	Japan	114.52	8.13	87.95	7.11	74.51	6.29	121.70	7.37
4.	**India**	**90.68**	**6.44**	**84.15**	**6.81**	**71.04**	**6.00**	**105.64**	**6.40**
5.	Italy	61.51	4.37	55.81	4.51	58.76	4.96	88.38	5.35
6.	Netherlands	64.20	4.56	67.61	5.47	52.17	4.41	84.40	5.11
7.	USA	57.84	4.11	54.04	4.37	42.68	3.60	79.31	4.80
8.	Portugal	78.82	5.59	58.48	4.73	54.42	4.60	71.85	4.35
9.	Rep of Korea	62.06	4.40	48.63	3.93	54.44	4.60	65.76	3.98
10.	Spain	53.35	3.79	43.53	3.52	35.41	2.99	54.27	3.29
	Others	553.60	39.29	497.98	40.28	489.28	41.32	625.18	37.85
	Total	1408.90	100	1236.37	100	1183.99	100	1651.80	100

Source :UNComtrade

The imports of the five major importers of Rosin and Resin Acids, namely China, Germany, Japan, **India** and Italy represented 40.63% of total world imports in 2021. In value terms, China (US $ 182.56 M), Germany (US $ 172.77 M), Japan (US $ 121.70 M), **India** (US $ 105.64 M) and Italy (US $ 88.38M) constituted the countries with the highest levels of import of Rosin and Resin Acids in 2021. The total value of rosin and resin acids and derivatives thereof imported worldwide stood at US $ 1.65 Billion in 2021. Over the period under review, global rosin and resin acids and derivatives thereof imports reached its maximum value of US $ 1.65 Billion in 2021; however, from 2018 to 2020, it stood at a somewhat lower level.