

## IRON OXIDE PIGMENTS

(Data in metric tons unless otherwise noted)

**Domestic Production and Use:** Iron oxide pigments (IOPs) were mined domestically by two companies in Alabama and Georgia. Mine production, which was withheld to avoid disclosing company proprietary data, was slightly higher in 2022 compared with that in 2021. Five companies, including the two producers of natural IOPs, processed and sold about 29,000 tons of finished natural and synthetic IOPs with an estimated value of \$29 million. About 50% of natural and synthetic finished IOPs were used in concrete and other construction materials; 15% each in industrial chemicals and in foundry sands and other foundry uses; 5% each in animal feed and in paint and coatings; 3% each in plastics and in glass and ceramics; and the remaining 4% in other uses.

<b>Salient Statistics—United States:</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022<sup>e</sup></b>
Mine production, crude	W	W	W	W	W
Sold or used, finished natural and synthetic IOPs	48,200	19,200	18,300	26,900	29,000
Imports for consumption	179,000	159,000	173,000	192,000	200,000
Exports, pigment grade	11,100	11,000	9,120	9,910	12,000
Consumption, apparent <sup>1</sup>	216,000	167,000	182,000	200,000	220,000
Price, average unit value, dollars per kilogram <sup>2</sup>	1.58	0.69	0.72	0.70	0.75
Employment, mine and mill, number	60	55	47	55	55
Net import reliance <sup>3</sup> as a percentage of apparent consumption	78	89	90	87	87

**Recycling:** None.

**Import Sources (2018–21):** Natural: Cyprus, 40%; Spain, 30%; France, 14%; Austria, 13%; and other, 3%. Synthetic: China,<sup>4</sup> 43%; Germany, 34%; Brazil, 8%; and other, 15%. Total: China,<sup>4</sup> 42%; Germany, 33%; Brazil, 7%; Canada, 5%; and other, 13%.

<b>Tariff: Item</b>	<b>Number</b>	<b>Normal Trade Relations 12–31–22</b>
Natural:		
Micaceous iron oxides	2530.90.2000	2.9% ad valorem.
Earth colors	2530.90.8015	Free.
Iron oxides and hydroxides containing 70% or more by weight Fe <sub>2</sub> O <sub>3</sub> :		
Synthetic:		
Black	2821.10.0010	3.7% ad valorem.
Red	2821.10.0020	3.7% ad valorem.
Yellow	2821.10.0030	3.7% ad valorem.
Other	2821.10.0040	3.7% ad valorem.
Earth colors	2821.20.0000	5.5% ad valorem.

**Depletion Allowance:** 14% (domestic and foreign).

**Government Stockpile:** None.

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**Events, Trends, and Issues:** In the United States, residential construction, in which IOPs are commonly used to color concrete block and brick, ready-mixed concrete, and roofing tiles, increased slightly during the first 9 months of 2022 compared with that in the same period in 2021. IOPs are also used in paints and coatings for the aerospace, automotive, and marine industries. Vehicle production in the United States through August 2022 was 4.9% higher than that in 2021. IOPs' characteristics of chemical and thermal stability, color strength, low cost, and weather resistance make IOPs a primary choice for colorant for coatings and construction materials.

Imports of natural and synthetic pigments were estimated to have increased by 4% in 2022. Exports of pigment-grade IOPs were estimated to have increased by 21% in 2022 compared with those in 2021, mostly owing to an increase in exports to Chile, China, France, and the United Kingdom. Approximately 49% of pigment-grade IOPs exports went to Mexico; the other leading countries for exports were China (21%), Belgium (10%), and Chile (5%).

IOPs are produced by several companies, but the three largest producers with facilities in multiple countries account for approximately 50% of the global IOP production capacity, with other companies in China accounting for a majority of the rest of the capacity. Some expansions of IOP production capacity in China were announced in early 2022.

**World Mine Production and Reserves:** Reserves for Pakistan were revised based on company reports.

	Mine production <sup>6</sup>		Reserves <sup>5</sup>
	<u>2021</u>	<u>2022</u>	
United States	W	W	Moderate
Cyprus (umber)	3,100	3,500	Moderate
France	5,000	5,000	NA
Germany <sup>6</sup>	400,000	400,000	Moderate
India (ocher)	3,000,000	2,700,000	37,000,000
Italy	33,000	30,000	NA
Pakistan (ocher)	100,000	100,000	Large
Spain (ocher and red iron oxide)	<u>9,000</u>	<u>9,000</u>	<u>Large</u>
World total (rounded)	<sup>7</sup> NA	<sup>7</sup> NA	Large

**World Resources:**<sup>5</sup> Domestic and world resources for production of IOPs are adequate. Adequate resources are available worldwide for the manufacture of synthetic IOPs.

**Substitutes:** Milled IOPs are thought to be the most commonly used natural minerals for pigments. Because IOPs are color stable, low cost, and nontoxic, they can be economically used for imparting black, brown, red, and yellow coloring in large and relatively low-value applications. Other minerals may be used as colorants, but they generally cannot compete with IOPs because of their higher costs and more limited availability. Synthetic IOPs are widely used as colorants and compete with natural IOPs in many color applications. Organic colorants are used for some colorant applications, but many of the organic compounds fade over time from exposure to sunlight.

<sup>6</sup>Estimated. NA Not available. W Withheld to avoid disclosing company proprietary data.

<sup>1</sup>Defined as sold or used, finished natural and synthetic iron oxide pigments + imports – exports.

<sup>2</sup>Average unit value for finished iron oxide pigments sold or used by U.S. producers.

<sup>3</sup>Defined as imports – exports.

<sup>4</sup>Includes Hong Kong.

<sup>5</sup>See Appendix C for resource and reserve definitions and information concerning data sources.

<sup>6</sup>Includes natural and synthetic iron oxide pigments.

<sup>7</sup>A significant number of other countries, including Austria, Azerbaijan, Brazil, China, Honduras, Iran, Kazakhstan, Lithuania, Paraguay, Russia, South Africa, Turkey, Ukraine, and the United Kingdom, may produce iron oxide pigments, but available information was inadequate to make reliable estimates of output.