SCANDIUM[1]

(Data in metric tons, scandium oxide equivalent, unless otherwise specified)

Domestic Production and Use: Domestically, scandium was neither mined nor recovered from process streams or mine tailings in 2024. Scandium was last produced domestically in 1969 primarily from the scandium-yttrium silicate mineral thortveitite and from byproduct leach solutions from uranium operations. Limited capacity to produce ingot and distilled scandium metal existed at facilities in Ames, IA; Tolleson, AZ; and Urbana, IL. The principal uses for scandium in 2024 were in aluminum-scandium alloys and solid oxide fuel cells (SOFCs). Other uses for scandium included ceramics, electronics, lasers, lighting, and radioactive isotopes. Global consumption has increased considerably driven by its use in SOFCs and aluminum alloys.

Salient Statistics—United States:	2020	2021	2022	2023	2024[e]
Price, yearend:					
Compounds, dollars per gram:					
Acetate, 99.9% purity, 5-gram lot size[2]	45	43	46	70	60
Chloride, 99.9% purity, 5-gram lot size[2]	133	137	140	166	157
Fluoride, 99.9% purity (99.99% purity in 2022; 2024), 1-gram lot size[3]	214	216	250	216	410
Iodide, 99.999% purity, 5-gram lot size[2]	161	161	170	200	208
Oxide, 99.99% purity, 5-kilogram lot size[4]	3.80	2.20	2.10	NA	1.20
Metal:					
Scandium, dollars per gram:[2]					
Distilled dendritic, 2-gram lot size	233	238	260	269	513
Ingot, 5-gram lot size	134	137	150	153	153
Scandium-aluminum alloy, dollars per kilogram:[4]					
1-kilogram lot size	340	350	350	NA	360
1,000-kilogram lot size	NA	NA	98	NA	32
Net import reliance[5] as a percentage of apparent consumption	100	100	100	100	100

Recycling: None.

Import Sources (2020–23): Although there are no trade codes for scandium materials exclusively, shipping records indicated imported material was mostly from Japan, China, and Philippines.

Tariff: Item	Number	Normal Trade Relations 12–31–24
Rare-earth metals:		
Unspecified, not alloys	2805.30.0050	5% ad valorem.
Unspecified, alloyed	2805.30.0090	5% ad valorem.
Compounds of rare-earth metals:		
Mixtures of oxides of yttrium or scandium as the predominant metal	2846.90.2015	Free.
Mixtures of chlorides of yttrium or scandium as the predominant metal	2846.90.2082	Free.
Mixtures of other rare-earth carbonates, including scandium	2846.90.8075	3.7% ad valorem.
Mixtures of other rare-earth compounds, including scandium	2846.90.8090	3.7% ad valorem.

Depletion Allowance: 14% (domestic and foreign).

Government Stockpile: None.

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SCANDIUM

Events, Trends, and Issues: In 2024, the global consumption of scandium oxide was estimated to be about 30 to 40 tons per year with a global capacity estimate of 80 tons per year. According to industry estimates, global production totaled 40 tons. Scandium was recovered from cobalt, nickel, titanium, and zirconium process streams. China was the leading producer. Prices quoted for scandium oxide in the United States generally decreased over a 5-year period.

In 2024, a metallurgical complex in southwestern Quebec, Canada, extracted scandium from waste streams and was planning to increase capacity from the current 3 tons per year to 12 tons per year; the increase in capacity was expected to be completed by 2025. The company is producing scandium oxide from waste streams of titanium dioxide production.

In Europe, the European Institute of Innovation & Technology started the ScaVanger project in France to produce scandium. Currently, there is no production of scandium in the European Union. The major European Union import sources for scandium are China (from the titanium dioxide industry and rare-earth-element production) and the Philippines, Kazakhstan, and Ukraine (from nickel-laterite tailings and uranium production waste). Beginning in 2026, the ScaVanger project is scheduled to begin commissioning 21 tons per year of scandium oxide production capacity as a byproduct of titanium dioxide pigment production.

In the United States, there is no current mine production of scandium but the polymetallic Elk Creek deposit in Nebraska contained a reserve of 2,600 tons of scandium. In 2023, a pilot-scale facility in New Freedom, PA, produced one kilogram of aluminum-scandium ingot.

In Australia, several polymetallic projects were under development and seeking permitting, financing, and offtake agreements including the Nyngan, Owendale, Sconi, and Sunrise projects.

In the Philippines, the Taganito high-pressure acid-leach nickel commercial plant recovered about 11,000 tons of scandium oxalate in 2024. Scandium oxalate was used to produce scandium oxide in Japan.

In Tangshan, Hebei Province, China, new scandium oxide production capacity reached 20 tons per year.

World Mine Production and Reserves:[6] No scandium was recovered from mining operations in the United States. As a result of its low concentration, scandium is produced exclusively as a byproduct during processing of various ores or recovered from previously processed tailings or residues. Historically, scandium was produced as byproduct material in China (iron ore, rare earths, titanium, and zirconium), Kazakhstan (uranium), the Philippines (nickel), Russia (apatite and uranium), and Ukraine (uranium). Foreign mine production data for 2023 and 2024 were not available.

World Resources:[6] Resources of scandium were abundant. Scandium's crustal abundance is greater than that of lead. Scandium lacks affinity for the common ore-forming anions; therefore, it is widely dispersed in the lithosphere and forms solid solutions with low concentrations in more than 100 minerals. Scandium resources have been identified in Australia, Canada, China, Finland, Guinea, Kazakhstan, Madagascar, Norway, the Philippines, Russia, South Africa, Ukraine, and the United States. Australia's reserves were about 37,000 tons of scandium as accessible Economic Demonstrated Resources (EDR) as of December 2023.[7]

Substitutes: Titanium and aluminum high-strength alloys as well as carbon-fiber materials may substitute in high-performance scandium-alloy applications. Under certain conditions, light-emitting diodes may displace mercury-vapor high-intensity lamps that contain scandium iodide. In some applications that rely on scandium's unique properties, substitution is not possible.

[e]Estimated. NA Not available.
[1]See also the Rare Earths chapter. Scandium is one of the 17 rare-earth elements.
[2]Source: Alfa Aesar, a part of Thermo Fisher Scientific Inc.
[3]Source: Sigma-Aldrich, a part of MilliporeSigma.
[4]Source: Stanford Advanced Materials.
[5]Defined as imports – exports. Quantitative data were not available.
[6]See Appendix C for resource and reserve definitions and information concerning data sources.
[7]For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 12,000 tons.