ZIRCONIUM AND HAFNIUM

(Data in metric tons unless otherwise specified)

Domestic Production and Use: In 2025, one company recovered zircon (zirconium silicate) from surface-mining operations in Florida and Georgia as a coproduct from the mining of heavy-mineral sands, and a second company processed existing mineral sands tailings in California. Zirconium metal and hafnium metal were produced from zirconium chemical intermediates by one producer in Oregon and one in Utah. Zirconium chemicals were produced from domestic and imported materials by the metal producer in Oregon and by at least five other companies. The leading end use for zircon was ceramics. Other primary uses of zircon included foundry sand, refractories, and zirconium chemicals. The leading use of hafnium metal was in superalloys.

Salient Statistics—United States:	2021	2022	2023	2024	2025[e]
Production, zirconium ores and concentrates [zirconium oxide (ZrO_2) content]	<100,000	<100,000	<100,000	<100,000	<100,000
Imports:					
Zirconium ores and concentrates (ZrO_2 content)[1]	18,500	31,900	20,400	18,900	16,000
Zirconium, compounds	—	—	—	—	1,300
Zirconium, unwrought, powder, and waste and scrap	746	346	451	493	530
Zirconium, wrought	264	288	312	372	380
Hafnium, unwrought	23	43	72	64	72
Hafnium, wrought	NA	2	6	13	12
Exports:					
Zirconium ores and concentrates (ZrO_2 content)[1, 2]	10,000	11,200	13,200	15,400	10,000
Zirconium, unwrought, powder, and waste and scrap	589	1,090	1,080	1,180	1,300
Zirconium, wrought	966	821	706	808	1,000
Hafnium, unwrought	—	15	58	12	15
Hafnium, wrought	NA	3	3	5	7
Consumption, apparent,[3] zirconium ores and concentrates (ZrO_2 content)[1]	<100,000	<100,000	<100,000	<100,000	<100,000
Price:					
Zircon, dollars per metric ton (gross weight):					
Premium grade, cost, insurance, and freight, China[4]	1,530	2,300	2,160	2,000	1,800
Imported[5]	1,450	2,130	1,980	2,080	1,900
Zirconium, sponge, ex-works China,[6] dollars per kilogram	25	30	28	24	22
Hafnium, unwrought,[6] dollars per kilogram	781	1,590	6,130	4,560	3,800
Net import reliance[7] as a percentage of apparent consumption:					
Zirconium ores and concentrates	<25	<50	<25	<25	<25
Hafnium	NA	NA	NA	NA	NA

Recycling: Companies in Oregon and Utah recycled zirconium from new scrap generated during metal production and fabrication and (or) from post-commercial old scrap. Zircon foundry mold cores and spent or rejected zirconia refractories are often recycled but could not be quantified. Hafnium metal recycling was minimal.

Import Sources (2021–24): Zirconium ores and concentrates: South Africa, 48%; Australia, 35%; Senegal, 15%; and other, 2%. Zirconium, compounds: China, 41%; South Africa, 31%; France, 12%; Australia, 10%, and other, 6%. Zirconium, unwrought: China, 55%; Germany, 15%; Canada, 12%; France, 7%; and other, 11%. Zirconium, wrought: France, 72%; Germany, 10%; Belgium, 7%; China, 4%; and other, 7%. Hafnium, unwrought: Germany, 54%; China, 21%; France, 12%; United Kingdom, 8%; and other, 5%. Hafnium, wrought: Germany, 68%; China, 14%; France, 9%; Italy, 7%; and other, 2%.

Tariff: Item	Number	Normal Trade Relations 12–31–25
Zirconium ores and concentrates	2615.10.0000	Free.
Zirconium compounds	2825.60.0020, 2836.99.5010	3.7% ad valorem
Ferrozirconium	7202.99.1000	4.2% ad valorem.
Zirconium, unwrought and powder	8109.21.0000, 8109.29.0000	4.2% ad valorem.
Zirconium waste and scrap	8109.31.0000, 8109.39.0000	Free.
Other zirconium articles	8109.91.0000, 8109.99.0000	3.7% ad valorem.
Hafnium, unwrought, including powders	8112.31.0000	Free.
Hafnium, other	8112.39.0000	4% ad valorem.

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ZIRCONIUM AND HAFNIUM

Depletion Allowance: 22% (domestic), 14% (foreign).

Government Stockpile: Not available.

Events, Trends, and Issues: Global mine production of zirconium mineral concentrates decreased by 12% to an estimated 1 million tons gross weight in 2025. Several companies continued exploration and development projects with planned production of zirconium mineral concentrates in Australia, Mozambique, South Africa, Sri Lanka, Tanzania, and elsewhere. The leading global exporters of zirconium mineral concentrates were Australia and South Africa. China was the leading importer of zirconium mineral concentrates. U.S. imports and exports of zirconium mineral concentrates decreased in 2025. Australia, Senegal, and South Africa were still the leading import sources of zirconium mineral concentrates. The United States was a net exporter of zirconium metal. U.S. exports of unwrought hafnium decreased whereas imports increased. The leading global exporters of unwrought hafnium were China and Germany.

World Mine Production and Reserves: Significant revisions were made to the 2024 production for Australia and Mozambique based on Government reports. World primary hafnium production data and quantitative estimates of hafnium reserves were not available. Zirconium reserves for Australia, China, Indonesia, and South Africa were revised based on company and Government reports.

	Zirconium mineral concentrates, mine production[e] (thousand metric tons, gross weight)		Zirconium reserves[8] (thousand metric tons, ZrO_2 content)[1]
	2024	2025	
United States	[9]100	[9]100	500
Australia	400	400	[10]55,000
China	100	100	500
Indonesia	81	52	3,400
Madagascar	31	26	2,100
Mozambique	[11]124	160	1,500
Senegal	[11]68	70	2,600
Sierra Leone	25	25	290
South Africa	290	270	5,900
Other countries	71	40	5,700
World total (rounded)	1,300	1,200	>70,000

World Resources:[8] Resources of zircon in the United States included about 14 million tons associated with titanium resources in heavy-mineral-sand deposits. Phosphate rock and sand and gravel deposits could potentially yield substantial amounts of zircon as a byproduct. World resources of hafnium are associated with those of zircon and baddeleyite. Quantitative estimates of hafnium resources were not available.

Substitutes: Chromite and olivine can substitute for zircon for some foundry applications. Dolomite and spinel refractories can also substitute for zircon in certain high-temperature applications. Niobium (columbium), stainless steel, and tantalum provide some substitution in nuclear applications, and titanium and synthetic materials may substitute in some chemical processing plant applications. Boron or cadmium-silver-indium alloys can substitute for hafnium metal in nuclear control rods. Zirconium can be used interchangeably with hafnium in certain superalloys.

[e]Estimated. E Net exporter. NA Not available. — Zero.

[1]Calculated ZrO_2 content as 65% of gross weight.

[2]Excludes zircon in mixed mineral concentrates.

[3]Defined as production + imports – exports.

[4]Source: Fastmarkets IM.

[5]Unit value based on landed-duty-paid United States imports for consumption from Australia, Senegal, and South Africa.

[6]Source: Argus Media group, Argus Non-Ferrous Markets, annual average.

[7]Defined as imports – exports.

[8]See Appendix C for resource and reserve definitions and information concerning data sources.

[9]Data are rounded to the nearest hundred thousand tons to avoid disclosing company proprietary data.

[10]For Australia, Joint Ore Reserves Committee-compliant or equivalent reserves were 21 million tons, ZrO_2 content.

[11]Reported.