

Global Thulium-170 Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global Thulium-170 market size is expected to reach \$ 22.46 million by 2032, rising at a market growth of 6.9% CAGR during the forecast period (2026-2032).

In 2025, global Thulium-170 production was approximately 3,100,000 mCi, with a global average market price of around \$4.00 per mCi. That year, total global production capacity for Thulium-170 reached approximately 4,600,000 mCi, and the industry's average gross profit margin stood at about 37%. Thulium-170 (Tm-170) is an artificial radioisotope of the element thulium, characterized by an atomic number of 69, a mass number of 170, and a half-life of approximately 128.6 days. It primarily decays via beta-minus (??) emission into stable Ytterbium-170 (Yb-170), accompanied by low-energy gamma rays and characteristic X-rays. Due to its relatively low radiation energy and the ability to utilize compact shielding, it is well-suited as a radiation source for the non-destructive testing (NDT) of thin-walled materials and for experimental research.

The upstream segment primarily encompasses high-purity natural Thulium-169 raw materials, thulium oxide or metallic thulium targets, target cladding materials, and research reactors with associated neutron irradiation facilities. Since natural thulium consists almost entirely of the stable isotope Thulium-169, Tm-170 is typically produced via the $^{169}\text{Tm}(n, \gamma)^{170}\text{Tm}$ reaction, eliminating the need for complex pre-irradiation isotope enrichment. Key upstream barriers include the preparation of high-purity targets, reactor neutron flux capabilities, irradiation scheduling, radiological handling capabilities, and qualifications for nuclear material transport. The midstream segment involves target encapsulation, reactor irradiation, cooling, radiochemical analysis, activity calibration, sealed source fabrication, quality inspection, and compliant packaging and transport. Because the produced Tm-170 and unreacted Tm-169 are isotopes of the same element—making separation via standard chemical methods

difficult—the product's specific activity is primarily determined by neutron flux, irradiation duration, and target characteristics. Producers must control radioactive impurities, source core dimensions, activity uniformity, and seal integrity, while offering products in forms such as oxides, solutions, foils, or sealed radioactive sources based on customer requirements. Downstream applications primarily include industrial NDT, research in nuclear physics and radiation technology, instrument calibration, and experimental medical research. In the industrial sector, its low-energy photons enable close-range radiography of thin-walled metal components, small-diameter piping, welds, and precision parts; in the scientific research sector, it is used for detector response testing, shielding material evaluation, dosimetry, and nuclear decay studies. Thulium-170 has also been investigated for use in brachytherapy, bone pain palliation, and as a radioisotope heat source; however, these applications generally remain in the research or specific project implementation stage and have not yet developed into a large-scale market comparable to that of nuclides such as Cobalt-60 and Iridium-192.

The development of Thulium-170 (Tm-170) has been primarily driven by the demand for industrial non-destructive testing. Its low-energy photon emissions make it suitable for inspecting thin-walled metals, small-diameter pipes, precision welds, and electromechanical components; furthermore, it can be fabricated into compact, portable radiation sources that require no external power supply. Sectors such as petrochemicals, aerospace, shipbuilding, pressure vessel manufacturing, and on-site engineering inspection—which require lightweight equipment capable of operating in complex spaces—provide a market niche for Tm-170. However, given that Iridium-192, Selenium-75, Ytterbium-169, and digital X-ray systems remain the primary alternatives, Tm-170 is best positioned for applications requiring shallow penetration depths and specialized operating conditions, rather than as a wholesale replacement for traditional radiation sources.

Research into nuclear medicine and radiotherapy represents a potential driver for growth. Tm-170 undergoes primarily beta-minus (β⁻) decay with a half-life of approximately 128.6 days and emits low-energy photons; research areas include brachytherapy, localized tumor irradiation, bone pain palliation, and radioactive microsphere therapy. Its advantages lie in the ability to produce it via direct neutron activation of natural Thulium-169 (ensuring a relatively clear supply of target material) and the fact that low-energy radiation facilitates the control of radiation doses to surrounding tissues. Nevertheless, medical applications remain largely in the stages of preclinical research, dosimetry validation, or small-scale trials; short-term demand stems mainly from research institutions, so it should not yet be viewed as a mature, large-scale medical market.

Supply-side development is driven by the availability of irradiation resources in research reactors and capabilities in radioactive source manufacturing. Tm-170 is typically produced via the $^{170}\text{Tm}(n, \gamma)^{170}\text{Tm}$ reaction route. Industry barriers center on high-flux reactor scheduling, target design, specific activity control, impurity detection, hermetic encapsulation, and cross-border transport qualifications. Due to Tm-170's relatively short half-life—resulting in a continuous decline in activity during storage and transport—the industry is increasingly adopting an on-demand production model characterized by "confirmed order ? target irradiation ? activity calibration ? rapid delivery," alongside strategies such as regionalized supply, delivery cycle management, and pricing models that account for activity loss due to decay.

Report Scope

This report studies the global Thulium-170 production, demand, key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for Thulium-170 and provides market size (US\$ million) and Year-over-Year (YoY) Growth, considering 2025 as the base year. This report explores demand trends and competition, as well as details the characteristics of Thulium-170 that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global Thulium-170 total production and demand, 2021-2032, (mCi)

Global Thulium-170 total production value, 2021-2032, (USD Million)

Global Thulium-170 production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (mCi), (based on production site)

Global Thulium-170 consumption by region & country, CAGR, 2021-2032 & (mCi)

U.S. VS China: Thulium-170 domestic production, consumption, key domestic manufacturers and share

Global Thulium-170 production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (mCi)

Global Thulium-170 production by Type, production, value, CAGR, 2021-2032, (USD Million) & (mCi)

Global Thulium-170 production by Application, production, value, CAGR, 2021-2032, (USD Million) & (mCi)

This report profiles key players in the global Thulium-170 market based on the following parameters - company overview, production, value, price, gross margin, product portfolio, geographical presence, and key developments. Key companies covered as a part of this study include ORNL, Rosatom, Nordion, ISOFLEX USA, etc.

This report also provides key insights about market drivers, restraints, opportunities, new product launches or approvals.

Stakeholders would have ease in decision-making through various strategy matrices used in analyzing the World Thulium-170 market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (mCi) and average price (US\$/mCi) by manufacturer, by Type, and by Application. Data is given for the years 2021-2032 by year with 2025 as the base year, 2026 as the estimate year, and 2027-2032 as the forecast year.

Global Thulium-170 Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Market Segmentation

Global Thulium-170 Market, Segmentation by Type:

Thulium-170 Chloride

Thulium-170 Oxide

Thulium-170 Metal

Chelate

Global Thulium-170 Market, Segmentation by Radioactivity:

Low Activity (<100 mCi)

Medium Activity (100 mCi–20,000 mCi)

High Activity (20,000–200,000 mCi)

Global Thulium-170 Market, Segmentation by Manufacturing Method:

Direct Activation

Solution Dispensing

Surface Deposition

Double-layer Sealing

Micro Encapsulation

Global Thulium-170 Market, Segmentation by Radionuclidic Purity:

95%-99%

>99%

Global Thulium-170 Market, Segmentation by Application:

Nuclear Medicine

Industrial Tracer

Scientific Research

Companies Profiled:

ORNL

Rosatom

Nordion

ISOFLEX USA

Key Questions Answered

1. How big is the global Thulium-170 market?
2. What is the demand of the global Thulium-170 market?
3. What is the year over year growth of the global Thulium-170 market?
4. What is the total value of the global Thulium-170 market?
5. Who are the Major Players in the global Thulium-170 market?
6. What are the growth factors driving the market demand?

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