

Global PCB Brown Oxide Treatment Lines Supply, Demand and Key Producers, 2026-2032

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Abstracts

The global PCB Brown Oxide Treatment Lines market size is expected to reach \$ 162 million by 2032, rising at a market growth of 5.7% CAGR during the forecast period (2026-2032).

PCB brown oxide treatment lines are horizontal wet process equipment used for inner layer copper surface treatment before multilayer PCB, HDI board, IC substrate, and high reliability printed circuit board lamination. Their core function is to create a controlled micro roughened or organometallic bonding surface on copper, improving adhesion between copper layers and prepreg or resin systems during lamination. A typical line consists of loading, degreasing, micro etching, activation, brown oxide reaction, multi stage rinsing, drying, cooling, unloading, chemical circulation, temperature control, spray modules, filtration, automatic dosing, and PLC based process control. Key specifications include working board width, conveyor speed, treatment length, spray pressure, bath temperature, line material, cleanliness level, chemical compatibility, automation level, and recipe control capability. These systems are mainly used in high layer count server PCBs, telecom boards, automotive electronics boards, consumer electronics boards, industrial control boards, rigid flex boards, and IC substrates where stable interlayer bonding is critical. In 2025, the global average price of PCB brown oxide treatment lines was about US\$430,000 per unit, the average industry gross margin was around 30%-38%, and global shipments were approximately 245 units.

PCB brown oxide treatment lines form a narrow but important segment within PCB wet process equipment. Their value is concentrated in inner layer copper surface preparation before multilayer lamination, rather than in general PCB production equipment. The upstream supply chain includes stainless steel and engineered plastic

tanks, spray systems, pumps, valves, piping, filters, heaters, temperature control modules, sensors, PLC control systems, motors, conveyors, and process chemicals. The midstream consists of line design, equipment manufacturing, process integration, installation, commissioning, and after sales support. The downstream market mainly includes multilayer PCB, HDI, high speed communication board, AI server PCB, automotive electronics board, industrial control board, and IC substrate manufacturers. As PCB products move toward higher layer counts, finer lines, tighter process windows, and higher reliability requirements, the role of brown oxide treatment lines is increasingly linked to yield stability, interlayer adhesion, and long term board reliability.

The competitive landscape is regional and specialized rather than broadly consolidated. European and North American suppliers tend to have stronger capabilities in process integration, oxide replacement technologies, and high end horizontal wet process lines. Taiwan based equipment companies have long served the PCB wet process market and are competitive in customization, practical engineering, and customer support. Mainland Chinese suppliers are gaining share through local delivery, cost efficiency, faster installation cycles, and closer service to expanding domestic PCB capacity. The relocation and expansion of PCB manufacturing capacity in Mainland China and Southeast Asia are also reshaping the supply chain. In parallel, industry consolidation and technology integration are pushing some suppliers to combine chemicals, process know how, and equipment platforms, making the product less like a standalone mechanical line and more like an integrated process equipment solution.

The policy and demand environment remains generally supportive. Electronics supply chain localization, high end PCB substitution, server and communication infrastructure investment, automotive electronics growth, and IC substrate capacity expansion all support demand for stable inner layer treatment equipment. However, this is still a mature process equipment category, and growth is limited by the relatively small number of lines required per PCB factory, the long service life of existing equipment, chemical process lock in, and price competition among Asian suppliers. Future opportunities will mainly come from high layer count boards, AI server PCBs, HDI and substrate capacity additions, automation upgrades, energy saving retrofits, cleaner process control, and gradual penetration of oxide replacement routes. Overall, PCB brown oxide treatment lines should be viewed as a stable growth niche driven by high end PCB structural upgrading rather than a high volume, fast replacement equipment market.

This report studies the global PCB Brown Oxide Treatment Lines production, demand,

key manufacturers, and key regions.

This report is a detailed and comprehensive analysis of the world market for PCB Brown Oxide Treatment Lines 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 PCB Brown Oxide Treatment Lines that contribute to its increasing demand across many markets.

Highlights and key features of the study

Global PCB Brown Oxide Treatment Lines total production and demand, 2021-2032, (Units)

Global PCB Brown Oxide Treatment Lines total production value, 2021-2032, (USD Million)

Global PCB Brown Oxide Treatment Lines production by region & country, production, value, CAGR, 2021-2032, (USD Million) & (Units), (based on production site)

Global PCB Brown Oxide Treatment Lines consumption by region & country, CAGR, 2021-2032 & (Units)

U.S. VS China: PCB Brown Oxide Treatment Lines domestic production, consumption, key domestic manufacturers and share

Global PCB Brown Oxide Treatment Lines production by manufacturer, production, price, value and market share 2021-2026, (USD Million) & (Units)

Global PCB Brown Oxide Treatment Lines production by Type, production, value, CAGR, 2021-2032, (USD Million) & (Units)

Global PCB Brown Oxide Treatment Lines production by Application, production, value, CAGR, 2021-2032, (USD Million) & (Units)

This report profiles key players in the global PCB Brown Oxide Treatment Lines 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 MKS Instruments, Inc., SCHMID Group, Kunshan Dongwei Technology Co., Ltd., Shenzhen Tianhua Machine Equipment Co., Ltd., Hi Ji Co., Ltd., Lian Yih Technology Co., Ltd., SONGTEX TECHNOLOGY CO., LTD., Universal Circuit Board Equipment Co., Ltd., Wise S.r.l., AMPOC Far East Co., Ltd., 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 PCB Brown Oxide Treatment Lines market

Detailed Segmentation:

Each section contains quantitative market data including market by value (US\$ Millions), volume (production, consumption) & (Units) and average price (K US\$/Unit) 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 PCB Brown Oxide Treatment Lines Market, By Region:

United States

China

Europe

Japan

South Korea

ASEAN

India

Rest of World

Global PCB Brown Oxide Treatment Lines Market, Segmentation by Type:

Conventional Brown Oxide Treatment Lines

Black and Brown Oxide Convertible Lines

Oxide Replacement Treatment Lines

Micro Roughening Adhesion Promotion Lines

Others

Global PCB Brown Oxide Treatment Lines Market, Segmentation by Board Type:

Multilayer PCB Lines

HDI PCB Lines

IC Substrate Lines

Rigid Flex PCB Lines

Others

Global PCB Brown Oxide Treatment Lines Market, Segmentation by Equipment Configuration:

Horizontal Conveyorized Lines

Vertical Wet Process Lines

Others

Global PCB Brown Oxide Treatment Lines Market, Segmentation by Application:

Telecom and Networking Equipment

Automotive Electronics

Consumer Electronics

Industrial Medical

Others

Companies Profiled:

MKS Instruments, Inc.

SCHMID Group

Kunshan Dongwei Technology Co., Ltd.

Shenzhen Tianhua Machine Equipment Co., Ltd.

Hi Ji Co., Ltd.

Lian Yih Technology Co., Ltd.

SONGTEX TECHNOLOGY CO., LTD.

Universal Circuit Board Equipment Co., Ltd.

Wise S.r.l.

AMPOC Far East Co., Ltd.

Key Questions Answered:

1. How big is the global PCB Brown Oxide Treatment Lines market?
2. What is the demand of the global PCB Brown Oxide Treatment Lines market?
3. What is the year over year growth of the global PCB Brown Oxide Treatment Lines market?
4. What is the production and production value of the global PCB Brown Oxide Treatment Lines market?
5. Who are the key producers in the global PCB Brown Oxide Treatment Lines market?
6. What are the growth factors driving the market demand?

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