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**GLOBAL EPOXY**

**RESIN MARKET**

**FORECAST & OPPORTUNITIES, 2030**





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**MARKET INTELLIGENCE. CONSULTING**

**Executive Summary**

Epoxy resins have a set of unique combination of properties and performance characteristics. They are used in the manufacturing of huge variety of components and end products where their presence may not always obvious but is vital for the function or service life enhancement of the end product.

The socio-economic value of downstream industries (eg. building & construction, transportation, general industrial, consumer goods, wind power, aerospace, marine, Electrical & Electronics and others) depending on the enabling characteristics of epoxy resins, which exceed the epoxy industry values many times over.

One of the major sector for Epoxy resins are in the manufacturing of wind turbine blades as structural elements, (fibre composites), as coatings of generators and other components and as adhesives. This provides the blades with added strength and high durability at a light weight, enables longer blades. Protective coatings enhance operational lifetimes of both components and turbines at low cost. These characteristics together ensure more energy generation at a lower unit cost.

In electrical and energy distribution systems as sealants, coatings and adhesives, as well as in the manufacturing of primary components such as transformers, insulators and bushings. In the water pipe/infrastructure sector, epoxies prevent corrosion and leaks and extend the operational lifetime of pipes. Epoxy resins are used in cars, trucks, motorcycles, trains, boats and aircraft. In internal parts, advantages include weight reduction (leading to lower emissions), increased durability, mechanical strength and heat resistance

In the medical sector, epoxy resins are widely used in surgical instruments, diagnostic equipment and prosthetics.

Epoxies are also used extensively in flooring, protecting against wear, preventing slippage and providing high chemical and abrasion resistance. As the largest end-user sector examined, accounting for approx. 1/5th of epoxy resin manufacturer’s sales.

Bisphenol-A, Epoxy resin is the major type of Epoxy resin accounts for around 80-85% share which possess resistance to various organic and inorganic acids, alkalis, salt solutions and oxidizing chemicals etc. Novolac epoxy resin segment provides high temperature performance, corrosion, and chemical resistance, pultrusion and carbon fibre & is projected to exhibit the highest CAGR of the demand. Brominated Epoxy resin The common characteristic of this Brominated epoxy resin is that it has good self-quenching and heat resistance.

The key players operating in the global epoxy resin market are Olin Corporation, Tohto Kasei, BASF SE, Atul Ltd., Dow Chemical Company, Hexion Inc., Huntsman Corporation, Kukdo Chemicals Co. Ltd., Nan Ya Plastics Corporation, Olin Corporation, Solvay SA, and Techstorm Advanced Materials.

Asia-Pacific and Europe region account for the largest share in global Epoxy Resin market, on account of presence of major infrastructure development projects and chemical industry in these two regions. Consumers benefit from high quality and long-lasting products that enable today’s lifestyle at a reasonable cost.

\*One of the starting substances of epoxy resins, Bisphenol A (BPA), has been thoroughly assessed by EU and international regulatory agencies such as the European Food Safety Authority (EFSA) and the US Food & Drug Agency (FDA). Both concluded that epoxy materials based on BPA are safe under current use and exposure conditions

**Chapter 3. Market Outlook and Relevance of the Project**

**3.1. Demand Supply Outlook – Global Epoxy Resin Market**

**Table 1: Global Epoxy Resin Demand-Supply Scenario, 2015-2030F (Thousand Tonnes)**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Parameters** | **2015** | **2020** | **2021E** | **2025F** | **2030F** |
| **Total installed Capacity** | 3765.5 | 4484 | 4519 | 4648 | 4648 |
| **Total Production** | 2888 | 3258 | 3501 | 3742 | 4144 |
| **Total Demand/ Consumption** | 2775.1 | 3272.75 | 3506.47 | 4416.09 | 5532.25 |
| **Total Demand (Y-O-Y Growth Rate, %)** | 0.00% | -3.41% | 7.14% | 5.45% | 4.37% |
| **Demand – Supply Gap** | 112.79 | -14.74 | -5.84 | -673.78 | -1388.75 |

*Source: TechSci Research*

In 2020, the global Epoxy Resin industry witnesses a de-growth of around -3.14% in 2020 as compared to preceding year on account of COVID-19 outbreak worldwide. The improve in overall demand by year end was witnessed following upsurge in demand of Epoxy resin being used in Wind . The demand from marine and renewables sector has also shown upward trend contributing to the increase in demand. Owing to its superior properties which includes high viscosity index, crack resistance, resistance to high temperature and others, the total demand is anticipated to reach 1224 thousand tonnes. The demand-supply gap of VER estimated to be around 47.3 thousand tonnes in 2021E which is further expected to expand in forthcoming years on account of lack of significant increase of total production across the country in recent years which is further being pushed by flooding demand across various developing countries such as China, India, and others.

China and USA contribute to the major Epoxy Resin producing capacities across the globe. Further, more capacities are expected to be commissioned in Asia Pacific region to meet the ongoing demand across the globe. AOC, INEOS Composites, Swancor Holding, Showa Denko are leading global supplier of Epoxy Resin with broad range of product portfolio. Some of the major players are focusing on expanding their existing capacities and further focusing on merger & acquisition to grab the substantial share in the market to conquer pouring in demand. Such as, in 2019, INEOS, one of the leading players have completed the acquisition of composite business of Ashland Composites.

**Figure 1: Global Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**2021-2030**

**CAGR**

**5.45% By Volume**

*Source: TechSci Research*

**2015-2020**

**CAGR**

**1.63% By Volume**

Global demand of Epoxy Resin is witnessed to grow at a significant CAGR in recent years and further anticipated to expand in coming years. The growth in the overall market is significantly pushed by increase in investments in construction and infrastructure improvement sector worldwide. Moreover, the demand for paints & coatings and adhesives applications have been increased in past few years which are the major driving factors for the market growth worldwide. The growth in 2020 is however declined by nearly 10% due to COVID-19 pandemic across the globe which have severely disrupted the supply chain and overall consumption from downstream industries. The total consumption globally is expected to rise by CAGR of around 5.68% by 2030 on account of rising focus on building & construction across various emerging nations as well as infrastructure projects across developed nations such as European countries, USA and others. These factors would directly propel the demand for epoxy resin in coming years as well.

**Revenue Analysis of leading Global Epoxy Resin Manufacturers, By Value (USD Million), 2018-2020**

-2.26%

-0.90%

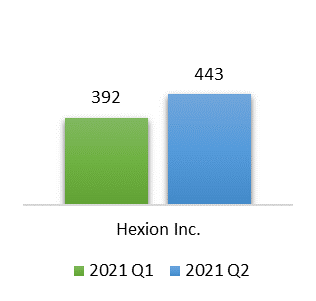
-7.60%

-12.10%

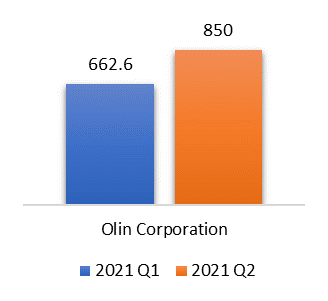
*Source: Annual Reports*

-2.07%

-9.76%



13%



28%

*Source: Annual Reports*

*Source: Annual Reports*

Through revenue analysis of global epoxy resin manufacturers, the revenues of major players have been declining since 2018 due to decrease in the prices of epoxy resin and disruption in the supply chain management. Due to Covid-19, the demand and prices of epoxy further reduced which affected the revenues of companies. Through quarterly revenue analysis, the revenues of companies have been rising due to increasing demand of the epoxy resins and increasing prices of the resin. The betterment of supply chain management and rising demand from various end user industries contributed to the increasing market for Epoxy Resin. Companies have been noticing the rise in their revenue quarterly, especially through epoxy resin which serves as the raw material for Epoxy Resin. As shown in the graph, Olin Corporation and Hexion Inc. both witnessed the increase revenues by 28% and 13%, respectively from Q1 2021 to Q2 2021.

**3.1.1. Capacity By Company**

**Table 1: Global Epoxy Resin Capacity, By Company (Thousand Tonnes), 2015-2030F (Continued)**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Company** | **Plants** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021E** | **2025F** | **2030F** |
| AOC – Aliancys | 3 | 135.00 | 135.00 | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 | 145.00 |
| INEOS Composites | 3 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 105.00 | 105.00 | 105.00 | 105.00 |
| Swancor Holding Co., Ltd. | 1 | 60.00 | 60.00 | 60.00 | 60.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 |
| Scott Bader Company Ltd. | 3 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 |
| Showa Denko K.K. | 3 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 55.00 | 85.00 | 85.00 | 85.00 |
| Polynt-Reichhold | 3 | 40.36 | 40.36 | 40.36 | 50.36 | 50.36 | 50.36 | 50.36 | 50.36 | 50.36 |
| Eternal Chemical (China) Co., Ltd. | 3 | 40.00 | 40.00 | 40.00 | 40.00 | 45.00 | 45.00 | 45.00 | 50.00 | 50.00 |
| Sino Polymer | 2 | 38.00 | 38.00 | 38.00 | 38.00 | 38.00 | 38.00 | 38.00 | 38.00 | 38.00 |
| DIC Corporation | 1 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Hexion Inc. | 1 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Poliya | 2 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Allnex Group | 1 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Interplastic Corporation | 1 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Reinhold Gmbh | 1 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Saudi Arabia Industria Resins Ltd. | 1 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| En Chuan Chemical Industries Co., Ltd. | 1 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| Sewon Chemical | 1 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Innovative Resins Pvt. Ltd. | 1 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Orson Chemicals | 1 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Crystic Resins India Private Limited | 1 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Satyen Polymers Pvt. Ltd. | 1 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Mechemco Resins Pvt Ltd | 1 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Moras Chemicals India Pvt. Ltd. | 1 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 |
| Ashland Global Holdings Inc. | 1 | 55.00 | 55.00 | 60.00 | 60.00 | 60.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Others |  | 232.28 | 232.28 | 232.28 | 234.28 | 234.28 | 234.28 | 239.28 | 239.28 | 244.28 |
| **Total** |  | **938.12** | **938.12** | **953.12** | **965.12** | **980.12** | **985.12** | **1020.12** | **1025.12** | **1030.12** |

*Source: TechSci Research*

The current Global capacity of Epoxy Resin is approximately 985 thousand tonnes and is expected to reach around 1030 thousand tonnes by 2030. This increase in capacity Is led by robust rise in demand of Epoxy Resin. Major manufacturing company like INEOS Composites had acquired the Ashland’s composite business in 2019. Ashland has 25 MTPA facility in Germany and 30 MTPA facility in USA. Similarly, in 2020, Showa Denko K.K, Japanese Epoxy Resin Producer had completed its expansion of VER production line to almost double of its existing capacity through its Chinese subsidiary Shanghai Showa Highpolymer Co., Ltd. (SSHP). Also, in 2014 Chinese Epoxy Resin market leader Sino Polymer Co. Ltd announced strategy cooperation with Europe’s Nord Composites under which Nord Composite would produce Sino Polymer’s MFE brand of VER in its plant located in Italy as well as Nord Composites had been authorized to do business with MFE brand of VER in France, Italy, and UK markets. Further, Several Manufacturers are Planning to invest strongly in Epoxy Resin capacity expansion owing to its increasing applications in pipe & tanks, electronics & communication, and marine applications. Major manufacturers like AOC, Swancor Holding Co., Ltd., Showa Denko K.K. etc. have increased or have plans to increase their capacity owing to the rising demand from end user industries.

*Source: UNEP, Frankfurt School-UNEP Centre*

**Table 2: Global Epoxy Resin Production, By Company (Thousand Tonnes), 2015-2030F**

**3.1.2. Production By Company**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Company** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021E** | **2025F** | **2030F** |
| AOC - Aliancys | 117.20 | 117.51 | 118.91 | 119.26 | 119.90 | 111.91 | 112.61 | 120.31 | 128.01 |
| INEOS Composites | 28.58 | 29.60 | 31.20 | 32.00 | 32.69 | 81.09 | 81.49 | 88.99 | 97.81 |
| Swancor Holding Co., Ltd. | 43.89 | 47.15 | 50.15 | 50.77 | 60.08 | 55.71 | 58.51 | 63.05 | 66.91 |
| Showa Denko K.K. | 43.53 | 45.02 | 45.74 | 46.38 | 46.95 | 45.07 | 71.17 | 75.02 | 80.67 |
| Scott Bader Company Ltd. | 45.29 | 45.87 | 46.06 | 46.18 | 46.93 | 44.84 | 46.02 | 47.31 | 49.82 |
| Polynt-Reichhold | 32.83 | 32.97 | 33.05 | 41.20 | 41.35 | 39.83 | 39.80 | 42.26 | 43.05 |
| Eternal Chemical (China) Co., Ltd. | 30.90 | 31.45 | 32.03 | 31.98 | 36.24 | 34.23 | 35.39 | 43.07 | 46.27 |
| Sino Polymer | 30.44 | 30.93 | 31.40 | 31.58 | 31.59 | 29.10 | 30.96 | 32.05 | 33.43 |
| Poliya | 25.56 | 25.75 | 25.89 | 26.04 | 26.34 | 25.35 | 25.90 | 26.80 | 27.89 |
| Hexion Inc. | 23.82 | 24.31 | 24.49 | 24.38 | 25.04 | 23.90 | 24.86 | 25.11 | 25.42 |
| DIC Corporation | 22.48 | 24.47 | 24.70 | 24.90 | 24.95 | 23.68 | 24.61 | 25.72 | 27.22 |
| Saudi Arabia Industria Resins Ltd. | 15.15 | 16.08 | 16.84 | 16.36 | 16.54 | 15.70 | 17.20 | 17.80 | 19.40 |
| Reinhold Gmbh | 15.44 | 15.80 | 15.96 | 15.92 | 16.29 | 14.85 | 15.65 | 16.40 | 18.00 |
| Interplastic Corporation | 14.97 | 15.03 | 14.90 | 15.16 | 15.23 | 14.45 | 14.28 | 15.38 | 15.51 |
| Allnex Group | 14.91 | 15.25 | 14.99 | 15.33 | 15.67 | 14.42 | 14.58 | 16.00 | 18.00 |
| En Chuan Chemical Industries Co., Ltd. | 7.22 | 7.40 | 7.60 | 8.08 | 8.46 | 7.31 | 7.69 | 8.68 | 9.27 |
| Sewon Chemical | 2.44 | 2.56 | 2.59 | 2.62 | 2.65 | 2.53 | 2.62 | 2.76 | 2.88 |
| Innovative Resins Pvt. Ltd. | 1.36 | 1.38 | 1.45 | 1.50 | 1.53 | 1.43 | 1.33 | 1.51 | 1.63 |
| Orson Chemicals | 0.56 | 0.57 | 0.60 | 0.62 | 0.63 | 0.59 | 0.55 | 0.62 | 0.67 |
| Satyen Polymers Pvt. Ltd. | 0.46 | 0.45 | 0.47 | 0.48 | 0.52 | 0.49 | 0.42 | 0.48 | 0.55 |
| Crystic Resins India Private Limited | 0.44 | 0.44 | 0.45 | 0.46 | 0.50 | 0.47 | 0.41 | 0.46 | 0.54 |
| Mechemco Resins Pvt Ltd | 0.29 | 0.31 | 0.31 | 0.33 | 0.34 | 0.31 | 0.32 | 0.36 | 0.38 |
| Moras Chemicals India Pvt. Ltd. | 0.32 | 0.31 | 0.32 | 0.32 | 0.30 | 0.29 | 0.30 | 0.31 | 0.33 |
| Ashland Global Holdings Inc. | 44.71 | 45.26 | 49.34 | 50.10 | 50.55 | 0.00 | 0.00 | 0.00 | 0.00 |
| Others | 170.54 | 174.61 | 186.17 | 188.22 | 191.06 | 171.25 | 181.67 | 195.99 | 214.90 |
| **Total** | **733.33** | **750.47** | **775.59** | **790.16** | **812.33** | **758.81** | **808.32** | **866.43** | **928.57**  *Source: TechSci Research* |

The Current Global Production of Epoxy Resin Stood at around 758 thousand tonnes and is expected to reach around 928 thousand tonnes. The Increase in production is led by mainly strong demand of Epoxy Resin in downstream fibre reinforced plastic (FRP) applications. Asia pacific region holds approximately 44 % of the total production capacity contributed by major players Jinling AOC Resins Co., Ltd., Showa Denko K.K., Sino Polymer, INEOS Composites among others. In 2020, COVID-19 pandemic affected the production as major plants were shut due to lockdown measures. Total production value in 2020 saw a decline of approximately 8% as compared to 2019 production level. However, it is expected that in 2021, approximately 7% production growth is expected owing to pent up demand created by covid shutdowns in 2020. Global Players such as INEOS Composites, Interplastic Corporation, AOC, LLC are strongly investing in their production capacity to meet the growing demand.

**Global Advanced Composites Market Share, By Region, By Value, 2015 & 2020**

*Source: TechSci Research*

**2015**

**2020**

*Source: TechSci Research*

**3.1.3. Capacity By Location / Country**

**Table 2: Global Epoxy Resin Capacity By Location, By Company (Thousand Tonnes), 2015-2030F**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Region** | **Country** | **Location** | **Company** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021E** | **2025F** | **2030F** |
| Asia Pacific | India | Silvassa, Dadra And Nagar Haveli | Orson Chemicals | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| Asia Pacific | India | Pune, Maharashtra | Reichhold India Pvt. Ltd. | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 |
| Asia Pacific | India | Valsad, Gujarat | Moras Chemicals India Pvt. Ltd. | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 | 0.36 |
| Asia Pacific | India | Bhiwadi, Rajasthan | Innovative Resins Pvt. Ltd. | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 | 1.80 |
| Asia Pacific | India | Dombivli, Maharashtra | Mechemco Resins Pvt Ltd | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 | 0.40 |
| Asia Pacific | India | Mumbai, Maharashtra | Satyen Polymers Pvt. Ltd. | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Asia Pacific | India | Faridabad, Harayana | Crystic Resins India Private Limited | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 |
| Asia Pacific | India | Total | Total | 4.12 | 4.12 | 4.12 | 4.12 | 4.12 | 4.12 | 4.12 | 4.12 | 4.12 |
| Asia Pacific | China | Jiangsu | INEOS Composites | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 |
| Asia Pacific | China | Shanghai | Sino Polymer | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | China | Jiangsu | Eternal Chemical (China) Co., Ltd. | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| Asia Pacific | China | Shanghai | Showa High Polymer Singapore Pte Ltd | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 50.00 | 50.00 | 50.00 |
| Asia Pacific | China | Jiangsu | Jinling AOC Resins Co., Ltd. | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 |
| Asia Pacific | China | Others | Others | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 30.00 | 30.00 | 35.00 |
| Asia Pacific | China | Total | Total | 185.00 | 185.00 | 185.00 | 185.00 | 185.00 | 185.00 | 220.00 | 220.00 | 225.00 |
| Asia Pacific | Japan | Itabashi-ku, Tokyo | DIC Corporation | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Asia Pacific | Japan | Kawasaki | Showa Denko K.K. | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | Japan | Others | Others | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| Asia Pacific | Japan | Total | Total | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 | 60.00 |
| Asia Pacific | South Korea | Daedeok-gu, Daejeon | Sewon Chemical | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Asia Pacific | South Korea | Others | Others | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | South Korea | Total | Total | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 |
| Asia Pacific | Singapore | Sgx Centre 1 | Showa High Polymer Singapore Pte Ltd | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Asia Pacific | Singapore | Others | Others | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Asia Pacific | Singapore | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | Taiwan | Kaohsiung | Eternal Materials Co.,Ltd. Lu-chu Plant | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | Taiwan | Changhua | En Chuan Chemical Industries Co., Ltd. | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| Asia Pacific | Taiwan | Nantou | Swancor Holding Co., Ltd. | 60.00 | 60.00 | 60.00 | 60.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 |
| Asia Pacific | Taiwan | Others | Others | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Asia Pacific | Taiwan | Total | Total | 105.00 | 105.00 | 105.00 | 105.00 | 115.00 | 115.00 | 115.00 | 115.00 | 115.00 |
| Asia Pacific | Malaysia | Changshu, Jiangsu Province | Eternal Materials（malaysia）sdn.Bhd. | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | Malaysia | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Asia Pacific | Malaysia | Total | Total | 10.00 | 10.00 | 10.00 | 10.00 | 15.00 | 15.00 | 15.00 | 20.00 | 20.00 |
| Asia Pacific | Rest of APAC | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Asia Pacific | Asia Pacific | Total | Total | 427.12 | 427.12 | 427.12 | 427.12 | 442.12 | 442.12 | 477.12 | 482.12 | 487.12 |
| Europe | Germany | Marl | Ashland Global Holdings Inc. | 25.00 | 25.00 | 25.00 | 25.00 | 25.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | Germany | Marl | INEOS Composites | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Europe | Germany | Frankfurt | Allnex Group | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Europe | Germany | Dusslinge | Reinhold Gmbh | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Europe | Germany | Others | Others | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| Europe | Germany | Total | Total | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 | 80.00 | 80.00 | 80.00 | 80.00 |
| Europe | France | Drocourt | Scott Bader Company Ltd. | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Europe | France | Others | Others | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Europe | France | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Europe | Italy | Monfalcone | Sino Polymer | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 | 18.00 |
| Europe | Italy | Brembate Sopra | Polynt S.P.A. | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Europe | Italy | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | Italy | Total | Total | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 | 23.00 |
| Europe | Switzerland | Schaffhausen | AOC - Aliancys | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Europe | Switzerland | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | Switzerland | Total | Total | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| Europe | Netherlands | Ohio | Hexion Inc. | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Europe | Netherlands | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | Netherlands | Total | Total | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Europe | Russia | Pisticci | Poliya | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Europe | Russia | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | Russia | Total | Total | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| Europe | United Kingdom | Wollaston | Scott Bader Company Ltd. | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Europe | United Kingdom | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Europe | United Kingdom | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| Europe | Rest of Europe | Total | Total | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 |
| Europe | Europe | Total | Total | 208.00 | 208.00 | 208.00 | 208.00 | 208.00 | 213.00 | 213.00 | 213.00 | 213.00 |
| North America | USA | Pittsburgh | INEOS Composites | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 35.00 | 35.00 | 35.00 | 35.00 |
| North America | USA | Houston | Polynt-reichhold | 35.00 | 35.00 | 35.00 | 45.00 | 45.00 | 45.00 | 45.00 | 45.00 | 45.00 |
| North America | USA | Minnesota, | Interplastic Corporation | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| North America | USA | California | AOC, LLC | 60.00 | 60.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 | 70.00 |
| North America | USA | Wilmington | Ashland Global Holdings Inc. | 30.00 | 30.00 | 35.00 | 35.00 | 35.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| North America | USA | Others | Others | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 | 40.00 |
| North America | USA | Total | Total | 185.00 | 185.00 | 200.00 | 210.00 | 210.00 | 210.00 | 210.00 | 210.00 | 210.00 |
| North America | Canada | Others | Others | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| North America | Canada | Total | Total | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 | 5.00 |
| North America | Mexico | Others | Others | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| North America | Mexico | Total | Total | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 | 10.00 |
| North America | North America | Total | Total | 200.00 | 200.00 | 215.00 | 225.00 | 225.00 | 225.00 | 225.00 | 225.00 | 225.00 |
| MEA | UAE | Dubai | Scott Bader Company Ltd. | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| MEA | UAE | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MEA | UAE | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| MEA | Saudi Arabia | Jubail | Saudi Arabia Industrial Resins Ltd. | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| MEA | Saudi Arabia | Others | Others | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 |
| MEA | Saudi Arabia | Total | Total | 28.00 | 28.00 | 28.00 | 28.00 | 28.00 | 28.00 | 28.00 | 28.00 | 28.00 |
| MEA | Turkey | Istanbul | Poliya | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| MEA | Turkey | Others | Others | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| MEA | Turkey | Total | Total | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 | 15.00 |
| MEA | Rest of MEA | Total | Total | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 | 20.00 |
| MEA | MEA |  | Total | 83.00 | 83.00 | 83.00 | 83.00 | 83.00 | 83.00 | 83.00 | 83.00 | 83.00 |
| Global | Global | Total | Total | 938.12 | 938.12 | 953.12 | 965.12 | 980.12 | 985.12 | 1020.12 | 1025.12 | 1030.12 |

*Source: TechSci Research*

Majority of vinyl ester capacities are strategically located in China. Rising industrialization and urbanization in developing nations such as India and China will influence the Epoxy Resin producers to expand the capacity in this region. Also, favorable government policies for renewables like wind and solar energy influences major vinyl ester producers to setup capacity in these countries. On the other hand, Capacities located in developed nations of Western European and North American countries will show a moderate growth in expansion due to the market slowly reaching to its maturity in these regions. Also, government regulation to commercialize capacity is more stringent in these regions compared to Asia Pacific. In India, most of the demand of Epoxy Resin is met through import as currently most of the companies are operating at low capacity. North America is the second-largest supplier of Epoxy Resin market, led by the United States. In USA, major producers are AOC, LLC, INEOS Composites and Polynt-Reichhold. In 2019, INEOS Composites acquired the Ashland’s composite business becoming one of the largest producers of the chemical.

**Average operating efficiency of Indian Companies versus Outside Indian Companies, 2015 – 2030F**

*Source: TechSci Research*

**3.1. 4. Operating Efficiency By Company**

**Table 4: Global Epoxy Resin Operating Efficiency, By Company (Thousand Tonnes), 2015-2030F**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Company** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021E** | **2025F** | **2030F** |
| AOC - Aliancys | 86.81% | 87.04% | 82.01% | 82.25% | 82.69% | 77.18% | 77.66% | 78.14% | 78.14% |
| INEOS Composites | 71.45% | 74.00% | 78.00% | 80.00% | 81.72% | 77.23% | 77.60% | 81.20% | 81.81% |
| Swancor Holding Co., Ltd. | 73.15% | 78.58% | 83.58% | 84.61% | 85.83% | 79.58% | 83.58% | 85.87% | 87.97% |
| Showa Denko K.K. | 79.15% | 81.85% | 83.16% | 84.32% | 85.36% | 81.95% | 83.73% | 85.43% | 85.43% |
| Scott Bader Company Ltd. | 82.35% | 83.39% | 83.75% | 83.96% | 85.33% | 81.53% | 83.67% | 84.40% | 84.52% |
| Polynt-Reichhold | 81.33% | 81.70% | 81.90% | 81.81% | 82.11% | 79.10% | 79.02% | 82.91% | 83.25% |
| Eternal Chemical (China) Co., Ltd. | 77.25% | 78.63% | 80.08% | 79.96% | 80.54% | 76.07% | 78.64% | 80.87% | 83.75% |
| Sino Polymer | 80.09% | 81.40% | 82.62% | 83.11% | 83.13% | 76.59% | 81.49% | 81.97% | 83.11% |
| Poliya | 85.21% | 85.82% | 86.30% | 86.81% | 87.81% | 84.50% | 86.35% | 87.77% | 87.79% |
| Hexion Inc. | 79.42% | 81.03% | 81.64% | 81.26% | 83.46% | 79.67% | 82.87% | 83.08% | 83.29% |
| DIC Corporation | 74.94% | 81.55% | 82.32% | 83.00% | 83.18% | 78.94% | 82.03% | 82.74% | 82.74% |
| Saudi Arabia Industria Resins Ltd. | 75.73% | 80.40% | 84.18% | 81.79% | 82.72% | 78.49% | 86.00% | 87.00% | 87.00% |
| Reinhold Gmbh | 77.22% | 79.02% | 79.82% | 79.62% | 81.43% | 74.23% | 78.23% | 80.00% | 80.00% |
| Interplastic Corporation | 74.84% | 75.16% | 74.49% | 75.81% | 76.14% | 72.26% | 71.39% | 76.52% | 76.64% |
| Allnex Group | 74.53% | 76.23% | 74.93% | 76.63% | 78.33% | 72.12% | 72.92% | 74.00% | 77.00% |
| En Chuan Chemical Industries Co., Ltd. | 72.23% | 74.04% | 75.96% | 80.77% | 84.62% | 73.08% | 76.92% | 80.77% | 84.62% |
| Sewon Chemical | 81.20% | 85.32% | 86.28% | 87.23% | 88.20% | 84.33% | 87.33% | 89.00% | 89.00% |
| Innovative Resins Pvt. Ltd. | 75.55% | 76.58% | 80.58% | 83.28% | 84.86% | 79.72% | 73.62% | 77.63% | 82.23% |
| Orson Chemicals | 77.93% | 78.96% | 82.96% | 85.66% | 87.24% | 82.10% | 76.00% | 80.01% | 84.61% |
| Crystic Resins India Private Limited | 76.53% | 75.55% | 77.50% | 79.45% | 86.53% | 81.40% | 70.67% | 74.58% | 76.53% |
| Satyen Polymers Pvt. Ltd. | 74.15% | 73.17% | 75.12% | 77.07% | 84.15% | 79.02% | 68.29% | 72.20% | 74.15% |
| Mechemco Resins Pvt Ltd | 72.51% | 77.28% | 78.06% | 82.00% | 84.50% | 76.40% | 80.22% | 85.00% | 86.90% |
| Moras Chemicals India Pvt. Ltd. | 87.53% | 85.55% | 89.20% | 89.85% | 83.74% | 79.39% | 82.54% | 82.74% | 82.74% |
| Ashland Global Holdings Inc. | 81.29% | 82.28% | 82.23% | 83.51% | 84.25% | 0.00% | 0.00% | 0.00% | 0.00% |

*Source: TechSci Research*

The operating efficiency of the Epoxy Resin lies between the range of 80-90% at present and it is expected to further increase due to rising demand and the need to increase the production of Pipes & Tanks and renewables Industry. There was a slight decrease in the operating rates of 2020 as compared to 2019 due to the supply chain disruptions and lockdown constraints faced by companies during the coronavirus pandemic. Globally, Companies are producing at high operating rates in 2021 compared to last year due to increasing demand for the chemical from the pipes & tanks industry, construction sector, marine industry, and renewables like wind energy. Moreover, rising investment in defense sector by major economies drove the companies to operate at higher efficiency. Other factors supporting operating rates are increasing investment in renewables like wind and solar energy in emerging economies in the Asia Pacific.

**Figure 2: Global Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

**3.1.5. Demand By Application**

Pipes and Tanks serves as the major application of Epoxy Resin which contributes around 59% of the total demand due to its excellent properties of corrosion, chemical and thermal resistance. The rising demand from renewable sector such as wind energy also serves as the major driving factor for the vinly ester resin market. The demand from marine components where it is used as the coating material which prevents the material from corrosion and various chemicals also contributes to the increasind demand. The chemical is used in various industries deu its excellent chemical and corrosion resistance and low permeability. It is also being majorly used in materials for pipe linings, steel and concrete linings, secondary containment, and to fabricate FRP ( Fibreglass Reinforced Plastics) storage tanks. The chemical stands somewhere between polyester and epoxies in terms of price and mechanical properties. Its major advantage is that they offer better resistance to moisture absorption and hydrolytic attack than polyester. It forms skin between the gel coat and the glass/polyester laminate or over the gel coat which prevents the hydrolysis induced osmotic blistering. It can be used for the entire lamination of boats which provides greater flexibilty and toughness than polyester. The wind energy is one of the fastest growing consumers of fibre reinforced plastics in the world. Major companies like AOC, Reichhold, INEOS produces a range of closed mould resins for wind blade composites including bisphenol A epoxy based Epoxy Resin, orthophthalic and isophthalic polyester and general purpose polyester. These resins are modified to deal with a range of processing, performance and cost requirements. For instance, DSM has developed a range of low viscous Epoxy Resin for the production of wind turbine blades. Other applications includes defense, aerospace and electrical & electronics where it is exrtensively used as the coating material providing resistance from moisture, chemicals and heat. It also contributes to the strenght and stiffness of the parts.

*Others include Défense, Aerospace, Electrical and electronics etc.*

*Source: TechSci Research*

**Global Advanced Composites Production, By Volume, 2016-2025F (Million Tons)**

*Source: TechSci Research*

**Figure 3: Global Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.1.6. Demand By Type**

*Others include Urethane Modified Epoxy Resin, Elastomer Modified Epoxy Resin etc.*

*Source: TechSci Research*

Epoxy Resin is mainly of three types namely Bisphenol A, F, S Epoxy Resin, Novolac Epoxy Resin, and Brominated Epoxy Resin. Out of the three, Bisphenol A, F, S Epoxy Resin dominates the global market with a market share of more than 50% in 2020. As Bisphenol A has been banned in Europe, the demand of Bisphenol A Epoxy Resin is expected to gradually decrease as Bisphenol A will be replaced by Bisphenol F and S. The Bisphenol- A type Epoxy Resin contributes around 50% of the sglobal Epoxy Resin types due to its excellent properties of corrosion resistance to a variety of alkalis, organic and inorganic salts, salt solutions and oxidizing chemicals etc. It is majorly used in domestic and commercial potable water applications in both piping and tanks. Morevover, its applications in spray-up, hand lay-up and filament winding applications and its capability of adapting to most other methods of fabrication with no additional modifications makes it most relevant among different types. Novolac Epoxy Resin contributes around 27% which has been specially modified for improved fabrication properties. It provides end-user improved product quality and fabrication efficiency which offers extended shelf life and adds improved flexibilty to fabricators. Some applications for novolac Epoxy Resin includes heat sheilds, resistance coatings, parts for flue gas desulfurization, chimney liners, and other structural composite componenets where high heat resistance is required. Brominated Epoxy Resin are flame restardant brominated Epoxy Resin which provides corrosion resistance to a wide variety of alkaline and acidic environments. Novolac based Epoxy Resin, despite of possesing better properties than Bisphenol A Epoxy Resin, holds less share than Bisphenol A as its technology to manufacture is quite complex, expensive, requires particular infrastructure, raw materials, & above all expertise. Other chemistry includes urethane and elastomer modified Epoxy Resin which are modified with many unique features providing exceptional characteristics such as elastomer modified may also be used as a primer on carbon steel, high density PVC foam and other dissimilar subtrates.

**3.1.7. Demand By Sales Channel**

**Figure 4: Global Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

*Source: TechSci Research*

The major sales channel for Global Epoxy Resin Market is the Direct Sales Channel with a market share of around 83% in 2020 which has been gradually growing since 2015 to 2020 with a market share of around 81% in 2015. As the Epoxy Resin has major application in areas like wind energy, automotive etc., companies prefer direct sales channel over indirect sales channel in order to reduce their logistics costs. For captive epoxy resin manufacturer, the percentage margin through direct sales stands at 24.56% which includes sales through company websites, direct export and direct sales while the margin through indirect sales stands at 27.33% which includes sales through distributor or retailer including transportation charges and distributor share. For non captive epoxy resin manufatcurer, the margin through direct sales stands at 20.41% while the through indirect sales it stands at 23.33%.

**3.1.8. Demand By Region**

**Figure 5: Global Epoxy Resin Market Share, By Region, By Volume, 2021E & 2030F**

*Source: TechSci Research*

Region wise, Asia Pacific holds the major share of Global demand for Epoxy Resin with a market share of 44.67% in 2021 which is expected to rise gradually during the forecast period to around 46% in 2030. Epoxy Resin has major application in areas like wind energy, automotive, and other areas having a demand of high-performance materials having chemical resistance properties. Asia pacific being home to world’s major population, is expected to have high demand of energy in the forecast period. With the countries moving towards more and more sustainable energy solutions, the demand for wind energy is expected to grow exponentially in Asia pacific during the forecast period hence the region will keep the lion’s share of global demand for Epoxy Resin. North America and Europe have a respective demand share of around 22% each. Asia pacific, owing to the high demand from various industries in China, such as chemical, water & wastewater treatment, construction and renewables, is anticipated to be the fastest growing region. The increasing demand for FGD systems which use vinyl ester linings for protection from corrosion due to environmental regulations on harmful emissions also contributed to the increasing market for vinyl ester.

**3.1.9. Sales By Company**

**Figure 6: Global Epoxy Resin Market Share, By Company, By Volume, 2020**

*Others include Poliya, Hexion Inc., DIC Corporation, Saudi Arabia Industrial Resins Ltd.., Reinhold GmbH, Interplastic Corporatio, Allnex Group, Sewon Chemical, Innovative Resins Pvt. Ltd., Orson Chemicals etc.*

*Source: TechSci Research*

Top 8 companies control around 60% share in global Epoxy Resin market. AOC is leading the market followed by INEOS Composites and Swancor Holding Co., LTD. The company has been providing the end user customers or consumers with styrene free Epoxy Resins and is also being consequently developing its styrene free resin technology which marks it as an essential element in its innovation strategy. The styrene free resin provides significant benefits which outweighs the higher resin cost including close to zero smell during resin handling such as in hand lay-up operation, in relining installation, in industrial factories it reduces safety risk which is simplified permitting process, minimizes emissions from moulded components and improvement in resin functional performance. AOC, the leader in composites market, has been able to bring novel styrene free resins to commercial sales in the last twenty years and is also being partnered with various companies to develop out of the box solutions which may bring both sustainability and performance. INEOS Composites and Swancor Holding Co., LTD. also holds the major share in the Epoxy Resin market. INEOS Composites provides high quality vinyl ester products such as AME™, Arotran™, Derakane™, Derakane™ Signia™, Hetron™. Most of the Indian companies such as Mechemco resins pvt ltd., Innovative Resins Pvt. Ltd. etc. manufactures vinyl ester of INEOS’s vinyl ester quality. The major drivers identified for their growth are robust supply chain management clubbed with proposed expansion plans for upcoming Epoxy Resin manufacturing facilities.



**ASIA PACIFIC EPOXY RESIN MARKET OUTLOOK**



**3.2.1. Asia Pacific Demand Supply Outlook**

**Figure 21: Asia Pacific Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**2015-2020**

**CAGR**

**5.05%% By Volume**

**2021E-2030F**

**CAGR**

**5.86% By Volume**

*Source: TechSci Research*

Asia Pacific’s Epoxy Resin demand is anticipated to increase at a CAGR of around 6.42% from approximately current demand of 322 thousand tonnes to around 575 thousand tonnes in 2030. Exports are higher as compared to imports due to presence of major Epoxy Resin producers in the region. Total export in 2020 stood at around 17.81 while import stood at around 14 thousand tonnes. Increasing export is attributed to mainly increasing demand of Epoxy Resin from fiber reinforced plastic (FRP) application in pipe and tank industry. Average operating rate in Asia pacific region varies from around 78% to 84% and is expected to reach 94% in 2030. Demand supply gap is expected to reach 92 thousand tonnes in 2030 from 19.04 thousand tonnes in 2022. However, several manufacturers are investing heavily in capacity expansion to meet the growing demand of Epoxy Resin in the region.

**Capacity, Production and Operating Efficiency**

**Figure 22: Asia Pacific Epoxy Resin Capacity & Production (Thousand Tonnes), 2015-2030F**

The Current Asia Pacific capacity of Epoxy Resin stood at around 442 thousand tonnes and is expected to reach approximately 487 thousand tonnes. The major dominant player in Asia Pacific Epoxy Resin includes Swancor Holding Co., LTD., Jinling AOC Resins Co., Ltd., INEOS Composites, Showa which holds around 46% of total Asia Pacific capacity. Manufacturers are adding new capacities to meet the growing demand of Epoxy Resin in the region. in 2020, Showa Denko K.K, Japanese Epoxy Resin Producer had completed its expansion of VER production line to almost double of its existing capacity through its Chinese subsidiary Shanghai Showa Highpolymer Co., Ltd. (SSHP). New Players are also entering the Epoxy Resin market due to its increasing demand from fiber reinforced plastics (FRP) application, paints and coating and marine industry among others. Furthermore, Government of India’s “Make In India” initiative to give impetus to composite industry by increasing the per capita consumption of fiber reinforced plastics (FRP) products is going to attract investors for capacity addition of Epoxy Resin to meet the customer demand.

**Figure 23: Asia Pacific Epoxy Resin Production Operating Rate (Percentage), 2015-2030F**

**Asia-Pacific Refinery Throughput, By Country, 2016-2020 (‘000 Barrels per Day)**

*Source: TechSci Research*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Country** | **2016** | **2017** | **2018** | **2019** | **2020** |
| **China** | 9,599 | 10,155 | 10,684 | 11,084 | 9,452 |
| **India** | 4,462 | 4,475 | 4,561 | 4,930 | 3802 |
| **Japan** | 3,453 | 3,289 | 3,258 | 3,280 | 2963 |
| **South Korea** | 2,484 | 2,516 | 2,784 | 2,928 | 2349 |
| **Indonesia** | 822 | 848 | 836 | 885 | 802 |
| **Rest of Asia-Pacific** | 4,756 | 4,582 | 4,685 | 4,736 | 4136 |

**Figure 20: China IIP Growth Rate, 2013-2017**

*Source: TechSci Research*

**Figure 24: Asia Pacific Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

**3.2.1.1. Demand By Application**

*Others include etc.*

*Source: TechSci Research*

Pipes and Tanks constitutes the major share amongst the applications of vinyl ester possessing around 60% of the total demand followed by marine components and renewables around 20% and 6%, respectively. The region will be noticing huge investment in renewable energy sector like wind and solar energy further increasing the market for the product. Increasing industrialization and rising investments in defence sector further increased the market for vinyl ester. The use of Epoxy Resin in electrical & electronics industry majorly takes place in China due to established industry in the country. With the development of new technologies in the infrastructure development and construction activities, contributed to the rising demand.

**3.2.1.2. Demand By Type**

**Figure 25: Asia Pacific Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

*Others include etc.*

*Source: TechSci Research*

Bisphenol- A is the major demanding type of vinyl ester possessing the share of 51% followed by novolac and brominated contributing around 28% and 8%, respectively. Bisphenol- A Epoxy Resin provides resistance to wide variety of bleaches, alkalis and organic compounds possessing applications in various chemical processing industry. The resin also provides toughness and superior elongation to fibre reinforced plastic (FRP) equipment with less cracking and better impact resistance. Increasing industrialization coupled with various government initiatives to increase investment in renewable sector is anticipated to increase the market for vinyl ester for the forecasted period.

**Figure 25: Asia Pacific Epoxy Resin Market Share, By Grade, By Volume, 2015–2030F**

**3.2.1.2. Demand By Grade**

**3.2.1.3. Demand By Sales Channel**

**3.2.1.4. India Epoxy Resin Market**

*Source: TechSci Research*

**Figure 26: Asia Pacific Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

**Figure 28: India Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

*Source: TechSci Research*

India Epoxy Resin market is anticipated to reach 20.30 thousand tonnes in 2030 growing with a healthy CAGR of 7.66% for the forecasted period. Currently, the demand stood at 9.53 thousand tonnes showing de-growth from the preceding year due to COVID-19 breakdown. Further, the gap between demand and supply in anticipated to increase from 7 thousand tonnes in 2020 to 16 thousand tonnes in 2030 due to no major capacity expansions of companies in the country. Majorly the companies are operating at an efficiency between 77% to 92%. However, in 2020 due to COVID-19 the demand of Epoxy Resin was impacted as major industries were shut.

**India Construction Market Size, By Value, 2015-2025F (USD Million)**

*Source: TechSci Research*

Demographic Dividends, low per capita consumption, increasing export demand and government initiatives are key growth drivers

*Source: IBEF*

**Sector Wise Demand**

*Source: TechSci Research*

**India’s GDP Forecast for FY2022, By Rating Agency (Percentage)**

*Source: Press Release by Rating Agencies*

**State-wise installed capacity of Wind Energy Power Generation as on 31.07.2021.**

|  |  |
| --- | --- |
| **States** | **Wind Power (MW)** |
| Tamil Nadu | 9717.04 |
| Gujarat | 8782.12 |
| Maharashtra | 5012.83 |
| Karnataka | 4938.60 |
| Rajasthan | 4326.82 |
| Andhra Pradesh | 4096.65 |
| Madhya Pradesh | 2519.89 |
| Telangana | 128.10 |
| Kerala | 62.50 |

*Source: TechSci Research*

**India has unique advantage in catering to domestic as well as Global Epoxy Resin Markets**

*Source: TechSci Research*

**The Indian Chemical Industry has Triple Growth Drivers**

Automobiles

Textiles

Information Technology

Defense

Construction

Chemicals

Domestic Demand Growth

Import Substitution

Export Potential



*Source: TechSci Research*

**Figure 29: India Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

**3.2.1.4.1. Demand By Application**

**3.2.1.4.2. Demand By Type**

*Others include etc.*

*Source: TechSci Research*

*Source: TechSci Research*

**Figure 30: India Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**



**EUROPE**

**EPOXY RESIN MARKET OUTLOOK**



**3.2.2. Europe Demand Supply Outlook**

**Figure 7: Europe Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**2021E-2030F**

**CAGR**

**3.91% By Volume**

**2015-2020**

**CAGR**

**1.67% By Volume**

*Source: TechSci Research*

Europe current capacity of Epoxy Resin stood at 177 thousand tonnes. Major Epoxy Resin player in Europe includes INEOS Composites, Hexion Inc, Scott Bader Company Ltd., and AOC among others. These Companies hold approximately 52% share of total capacity in Europe as of 2020.Further, INEOS Composites acquired Ashland Holdings resin business in 2019. Ashland has 40 MTPA facility in Germany and 70 MTPA facility in USA which has now become INEOS Composites business. Another major player Scott Bader company Ltd has 15 MTPA capacity in France as well as 20 MTPA Capacity in United Kingdom. Further, Scott Bader made strategic investment of more than 1.2 million Euro in 2017 to add capacity addition for its composite business led by strong demand of Scott Bader products from its customer. Many new players are expected to enter Europe Epoxy Resin market due to favourable government policies and strong demand of the Epoxy Resin led by growing demand of renewable energy such as wind energy, solar energy which has Epoxy Resin application.

**Capacity, Production and Operating Efficiency**

**Figure 8: Europe Epoxy Resin Capacity & Production (Thousand Tonnes), 2015-2030F**

*Source: TechSci Research*

Europe’s current capacity of Epoxy Resin stood at 213 thousand tonnes. Major Epoxy Resin player in Europe includes INEOS Composites, Hexion Inc, Scott Bader Company Ltd., and AOC among others. These Companies hold approximately 52% share of total capacity in Europe as of 2020.Further, INEOS Composites acquired Ashland Holdings resin business in 2019. Ashland has 40 MTPA facility in Germany and 70 MTPA facility in USA which has now become INEOS Composites business. Another major player Scott Bader company Ltd has 15 MTPA capacity in France as well as 20 MTPA Capacity in United Kingdom. Further, Scott Bader made strategic investment of more than 1.2 million Euro in 2017 to add capacity addition for its composite business led by strong demand of Scott Bader products from its customer. Many new players are expected to enter Europe Epoxy Resin market due to favourable government policies and strong demand of the Epoxy Resin led by growing demand of renewable energy such as wind energy, solar energy which has Epoxy Resin application.

**Figure 9: Europe Epoxy Resin Production Operating Rate (Percentage), 2015-2030F**

*Source: TechSci Research*

*Source: TechSci Research*

**European Countries Real Estate Investment, 2020 (USD Billion)**

|  |  |
| --- | --- |
| **Countries** | **Investment (USD Billion)** |
| Germany | 57 |
| France | 28 |
| Netherland | 14 |
| Spain | 12 |
| Italy | 9 |

*Source: TechSci Research*

**3.2.2.1. Demand By Application**

**Figure 10: Europe Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

*Others include etc*

*Source: TechSci Research*

Europe Epoxy Resin application is dominated by pipes and tanks with the share of around 58% where it is used as a coating material which protects the industrial pipes and tanks from various chemicals and heat. Marine components and renewables together contribute around 22% of the total demand. Epoxy Resin is employed as a lining over marine components preventing resistance from alkalis, acids, heat, and various other chemicals. The growing investments in renewable sector such as wind and solar energy in the region also contributed to the rising market for vinyl ester. The growing demand of renewables like wind and solar energy in the region further increased the market and is anticipated to further increase for the forecasted period.s

**3.2.2.2. Demand By Type**

*Source: TechSci Research*

**Figure 11: Europe Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

Europe Epoxy Resin type is dominated by Bisphenol-A, F, S due to its extensive use in the pipes and tanks industry where it is used as a coating material in tankers preventing them from corrosion, chemicals, and heat. Novolac and brominated Epoxy Resin together contributes around 35% share of the total region demand. Increasing industrialization and rising investments in the renewable sector increased the market for bisphenol- A, F, S vinyl ester in the region. Major Epoxy Resins producers in the region manufactures Bisphenol- F as Bisphenol- A has been banned due to its carcinogenic property.

**3.2.2.3. Demand By Sales Channel**

*Source: TechSci Research*

**Figure 12: Europe Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

**Figure 12: Europe Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.2.2.4. Demand By Type**



**NORTH AMERICA EPOXY RESIN MARKET OUTLOOK**



**Figure 14: North America Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**3.2.3. North America Demand Supply Outlook**

*Source: TechSci Research*

North America’s demand of Epoxy Resin stood approximately 163 thousand tonnes as of 2020. Demand is anticipated to increase at a CAGR of approximately 4.92% during the forecast period to reach around 280 thousand tonnes in 2030. This increase in demand is attributed to growing infrastructure projects and increasing investment in renewable energies. Import in 2020 stood at around 4.5 thousand tonnes while export remained approximately 3.70 thousand tonnes in the same year. Europe and Asia are major supplier of Epoxy Resin in North America. Average operating rate in North America region varies from around 87% to 90%. Demand supply gap is expected to reach 158 thousand tonnes in 2030 from approximately 3.38 thousand tonnes in 2021. However, several manufacturers are investing heavily in capacity expansion and new technology development to meet the growing demand of Epoxy Resin in the region.

**Capacity, Production and Operating Efficiency**

**Figure 15: North America Epoxy Resin Capacity & Production (Thousand Tonnes), 2015-2030F**

*Source: TechSci Research*

North America’s Epoxy Resin capacity stood approximately 225 thousand tonnes as of 2020 which accounts for nearly 25% of worlds capacity. North America market is dominated by five players. They are INEOS Composites, Polynt-Reichhold, Interplastic Corporation, AOC – Aliancys and Ashland Global Holdings Inc. However, in 2019 INEOS Composites acquired the Ashland’s Epoxy Resin business. Ashland has 70 MTPA facility in USA which has now become the INEOS composites’s business. These players hold close to 81% share of region’s total capacity. Polynt group after acquisition of CCP composites in 2014 made further investment to merge its business with Reichold in 2017 to become Polynt-Reichold group with significant global presence in North America, Europe, and Asia regions. Additionally, Polynt-Reichold group is strongly investing in new technology development to meet the growing customer demand of its product. Furthermore, Interplastic Corporation has been making associations with industry organization such as American Composites Manufacturing Associations (ACMA) to gain industry expertise in the composite business.

*Source: TechSci Research*

**Figure 16: North America Epoxy Resin Production Operating Rate (Percentage), 2015-2030F**

**North America GDP at Current Prices, 2013-2020F (USD Trillion)**

*Source: World Bank*

**3.2.3.1. Demand By Application**

**Figure 17: North America Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

*Others include etc.*

*Source: TechSci Research*

Pipes and Tanks emerged as the major application of vinyl ester in the region due to its property of providing resistance against various chemicals and heat to industrial tanks, pipes as well as pipes and tanks used in water and wastewater treatment. It also provides superior mechanical properties to industrial tankers and pipes. The lining over marine components provides good surface profile reducing post cure on finished parts. In renewable sector like wind energy it provides excellent strength, toughness, and chemical resistance over a broad range of temperatures. Marine components and renewables together constitute around 26% of regional demand. Increasing marine industry in the region also contributed in pacing the market of vinyl ester. The increasing demand for renewable energy in the region helped the market of the product to surge in recent years and is anticipated to further increase the market in the region.

**3.2.3.2. Demand By Type**

**Figure 18: North America Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

*Source: TechSci Research*

North America Epoxy Resin type is dominated by Bisphenol-A, F, S vinyl ester which constitutes around 50% due to its extensive use in the pipes and tanks industry employed as a coating material which provides resistance to corrosion, various chemicals, and heat. Novolac and brominated Epoxy Resin together contributes around 35% share of the total region demand. Increasing industrialization and rising investments in the renewable sector increased the market for bisphenol- A, F, S vinyl ester in the region. Brominated Epoxy Resin is suitable for mouldings that are subjected to particularly high static or dynamic loads.

**Figure 19: North America Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

**3.2.3.3. Demand By Sales Channel**

**Figure 12: North America Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.2.2.4. Demand By Type**

*Source: TechSci Research*

*Source: TechSci Research*



**SOUTH AMERICA EPOXY RESIN MARKET**

**OUTLOOK**



**Figure 31: South America Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**2021E-2030F**

**CAGR**

**3.94% By Volume**

**2015-2020**

**CAGR**

**0.81% By Volume**

*Source: TechSci Research*

South America’s Epoxy Resin demand is anticipated to increase at a CAGR of approximately 3.82% and reach 23.76 thousand tonnes by 2030 from 20.28 thousand tonnes in 2020. This increase in demand is led by strong demand growth in fibre reinforced plastics (FRP), marine components and wind energy. Rising industrialization and urbanization in the region contributed to the rising demand of the product. The increase in demand in industrial applications where it is used as a lining system for water treatment, air pollution, chemical processing and to mineral processing providing resistance from corrosion. The gap between demand and supply has gradually been increasing year by year to 4 thousand tonnes in 2030 due to no major capacity expansions in the region.

**Capacity, Production and Operating Efficiency**

**Figure 32: South America Epoxy Resin Capacity & Production (Thousand Tonnes), 2015-2030F**

*Source: TechSci Research*

*Source: TechSci Research*

**Figure 33: South America Epoxy Resin Production Operating Rate (Percentage), 2015-2030F**

**South America Advanced Composites Market Size, By Value, 2015-2025F (USD Billion)**

**Brazil Residential, Commercial & Green Building Market Size, By Value, 2030F (USD Billion)**

|  |  |
| --- | --- |
| **Segment** | **2025F** |
| Residential Building | 328.0 |
| Commercial Building | 47.5 |
| Residential Green Building | 34.0 |
| Commercial Green Building | 3.9 |

*Source: TechSci Research*

**3.2.3.1. Demand By Application**

*Others include etc.*

*Source: TechSci Research*

**Figure 34: South America Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

The pipes and tanks are the major demanding application in the region due to increasing demand from industries where it is used as lining over tankers or chimneys. The increasing demand for renewable energy like wind and solar energy in the region helped the market of the product to surge in recent years and is anticipated to further increase the market in the region. Furthermore, the demand from the marine sector stimulated the market for the product in the region. South America market has been observing growing demand from the marine industry aided by upcoming new projects with energy efficient solutions. Further, growing investments in renewables increased the market for Epoxy Resin. Due to its property of lower water absorption, it is preferred over unsaturated polyester resin in the region.

**Figure 35: South America Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

*Source: TechSci Research*

The demand of Bisphenol- A, F, S dominates the Epoxy Resin market in South America due to increasing demand in chemical industry. With the rising marine industry and renewable energy, the demand of Epoxy Resin for pipes and tanks, marine and renewables has shown an increasing trend. Bisphenol- A, F, S cover approximately 50% of the total demand of Epoxy Resin in South America followed by Novolac Epoxy Resin.

*Source: TechSci Research*

**Figure 36: South America Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

**Figure 12: South America Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.2.2.4. Demand By Type**

*Source: TechSci Research*



**MIDDLE EAST & AFRICA EPOXY RESIN MARKET**

**OUTLOOK**



**Figure 38: Middle East & Africa Epoxy Resin Market Size, By Volume (Thousand Tonnes), 2015–2030F**

**2021E-2030F**

**CAGR**

**4.38% By Volume**

**2015-2020**

**CAGR**

**-0.21% By Volume**

*Source: TechSci Research*

MEA’s demand of Epoxy Resin is expected to grow at a CAGR of approximately 3.57% during the forecast period and expected to reach around 88 thousand tonnes in 2030 from 55 thousand tonnes in 2020. Since very small number of players are manufacturing Epoxy Resin in MEA, imports are higher than exports. Total import in 2020 stood at around 2.15 thousand tonnes while total export stood at around 0.30 thousand tonnes. However, there was decrease in import demand in 2020 as compared to 2019 due to COVID-19 pandemic. Average operating rate in MEA region varies from around 79% to 80% and is expected to reach 93% in 2030. Though demand supply gap is expected to reach approximately 29 thousand tonnes in 2030, companies are ramping up production and investing into capacity addition to meet the demand supply gap in the region.

**Figure 39: Middle East & Africa Epoxy Resin Capacity & Production (Thousand Tonnes), 2015-2030F**

**Capacity, Production and Operating Efficiency**

*Source: TechSci Research*

Total capacity of Epoxy Resin in MEA region stood at around 83 thousand tonnes as of 2020. The major Epoxy Resin producer includes Scott Bader Company Ltd., Saudi Arabia Industria Resins Ltd., and Poliya . These companies hold 66% share of total capacity in MEA region. Scott Bader is market leader in composite business with customer base in Middle East, North Africa, Central & West Africa, and the Far East Regions. There is no major capacity expansion in MEA region as of 2020 however, many new players are expected to invest into capacity addition to tap the growing demand of Epoxy Resin led by strong growth in automotive, renewable sectors. The major demand in the region comes from pipes and tanks applications where it is used as a lining system making it chemical, corrosion and thermal resistance. The demand from renewables and marine also contributes to the increasing demand of Epoxy Resin.

**Figure 40: Middle East & Africa Epoxy Resin Production Operating Rate (Percentage), 2015-2030F**

*Source: TechSci Research*

**Table 10: Projects Planned and Underway in Middle East Region, By Sector, By Value, As of 2020 (USD Million)**

|  |  |  |
| --- | --- | --- |
| **S. No.** | **Sector** | **Value (USD Million)** |
| 1. | Construction | 80,080 |
| 2. | Oil & Gas | 67,036 |
| 3. | Power | 29,019 |
| 4. | Water | 8,732 |
| 5. | Chemical | 565 |
| 6. | Industrial | 250  *Source: TechSci Research* |

**3.2.5.1. Demand By Application**

**Figure 41: Middle East & Africa Epoxy Resin Market Share, By Application, By Volume, 2015–2030F**

*Others include etc.*

*Source: TechSci Research*

Epoxy Resin is used for variety of applications including industrial tanks and pipes, pultruded profiles, and corrosion resistant. It is also being used in marine and automotive vehicles. Pipes and tanks application dominates the Epoxy Resin market due to its usage as a coating material over industrial tanks, pipes, and chimneys. With the increasing industrialization and rising investment in construction sector, the demand for Epoxy Resin increased and is anticipated to further surge for the forecasted period. The rising marine industry and rising investment in renewable energy like wind and solar also stimulated the market for vinyl ester. Due to increasing infrastructural activities in the region, the market for vinyl ester increased.

**Figure 42: Middle East & Africa Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.2.5.2. Demand By Type**

*Others include Urethane Modified Epoxy Resin, Elastomer Modified Epoxy Resin etc.*

*Source: TechSci Research*

The most demanding Epoxy Resin type is Bisphenol- A, F, S due to its extensive use in industrial tanks, pipes and chimneys, water and wastewater treatment plant pipes and tanks. The Bisphenol- A, F, S holds the maximum share of approximately 52% followed by novolac and brominated vinyl ester holding the share of around 28% and 9%, respectively. With the increase in industrial activities and growing investment in infrastructure development and renewable energy helped the market for bisphenol- A and novolac to grow.

**3.2.5.3. Demand By Sales Channel**

**Figure 43: Middle East & Africa Epoxy Resin Market Share, By Sales Channel, By Volume, 2015–2030F**

*Source: TechSci Research*

**Figure 12: Middle East & Africa Epoxy Resin Market Share, By Type, By Volume, 2015–2030F**

**3.2.2.4. Demand By Type**

*Source: TechSci Research*

**3.3. MARKET DYNAMICS**

**Market Drivers**

***Government support in India to increase per capita consumption of FRP composites***

Driven by strong demand from various end use industries such as wind energy, transportation, electrical and electronics, defense, aerospace, pipes and tanks, construction and marine, the composite industry, also known as fiber-reinforced plastics (FRP) industry, will also be supporting government’s ‘Make in India’ initiatives giving big push to future market of Epoxy Resin. In 2021, per capita consumption of composites in United States and China is 11.4 kg and 2.8 kg, respectively. The per capita consumption in India stood at 0.36 kg which is among the lowest.

***Growing usage as Lining System in Industrial Applications***

In number of industrial applications, Epoxy Resin lining systems are used for water treatment, chemical processing, and air pollution control, to mineral processing which provides unparallel corrosion resistance in fiberglass reinforces plastic tanks, ducting, stacks & chimneys, scrubbers, pipes and other components. Therefore, Epoxy Resin liners fit best for the most challenging industrial environments due to its properties of high heat resistance, exceptional durability and minimal maintenance requirements.

***Robust Growth of Construction Sector***

With rising urban population and public and private sector investments in construction projects, the overall construction market is witnessing rapid growth. The demand for Epoxy Resin in building & construction industry has been rising over the last few years owing to their varied Types including pipes and tanks. Robust growth in construction sector in Japan coupled with implementation of favourable government policies to support construction and infrastructure growth are the primary factors expected to influence the demand.

**Figure 22: APAC Construction Sector Contribution to GDP, 2013-2019, (%)**

*Source: World Bank*

**Figure 23: Japan Total Construction Investments, By Value (USD Million), 2015-2019**

*Source: TechSci Estimates*

***Ageing Infrastructure***

The ageing infrastructure is driving opportunities for building materials including VER based FRP tanks. Most of the infrastructure such as roads, water supply and sewerage system were constructed in developed nations are 30-40 years old. The government and local civic bodies incur huge maintenance cost hence there is an urgent need for repair.

**Table 3: Europe Percentage of Infrastructure that is minimum 50 years old, 2018, 2023 & 2033**

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2018 | 2023 | 2033 |
| Highway Bridges | Approx. 25% | Approx. 39% | Approx. 63% |
| Tunnels | Approx. 20% | Approx. 27% | Approx. 42% |
| River Management Facilities | Approx. 32% | Approx. 42% | Approx. 62% |
| Sewage Pipes | Approx. 4% | Approx. 8% | Approx. 21% |

*Source: TechSci Research*

**Market Challenges**

***Fragmented market of composites industry in China and India***

The fragmented composite industry in India and China which consist of around 15000 stakeholders in the value chain including small, mid-sized and large players across these two countries. Also, the lack of awareness among end- user industries is the major challenge for the growth of vinyl ester which also impacts the margin of the industry. Lack of regulatory framework, absence of a recycling policy and standardization of end-use products are some of the major challenges for the composites industry. Global composites market is highly fragmented with more than 1000 mid and small regional players operate in the market.

|  |  |
| --- | --- |
| **Composite Manufacturers** | |
| Teijin Ltd. | PPG Industries, Inc. |
| Toray Industries, Inc. | Huntsman Corporation LLC |
| Owens Corning | SGL Group |
| Reliance Composites | Hexcel Corporation |
| Crest Composites | DuPont |
| Momentive Performance Materials, Inc | Weyerhaeuser Company |

*Source: TechSci Research*

***High Volatility in Raw Material Prices***

Styrene, epoxy resin, methacrylic acid, etc., are few of the raw materials majorly used in the production of construction sealants and bonding such as butyl rubber, acrylic urethane, silicone rubber sealant, etc. Over the years, raw materials used in sealants industry have observed price fluctuations globally. Diligently working on product selling prices to react to changes in raw material cost and simultaneously maintaining market share is a key challenge for construction sealants producers.

**Styrene and Epoxy Resin Prices, 2017-2021E (USD per Ton)**

*Source: TechSci Research*

**3.5. MARKET TRENDS & DEVELOPMENTS**

***Capacity Expansion by existing players in APAC region***

With growing demand for Epoxy Resin in various sector such as wind energy, transportation, electrical and electronics, defense, aerospace, pipes and tanks, construction and marine, companies have started investing in expanding manufacturing facilities. Moreover, companies are increasingly focusing on developing nations due to availability of cheap labor such as China and India. For instance, Showa Denko Group completes expansion of lines to produce vinyl ester in Shanghai due to increasing demand of the product in electronic parts such as Liquid Crystal Displays (LCDs) and touch panels on account of the progress in telecommunication technologies.

***Emerging applications***

The emerging application of Epoxy Resin is electronics and telecommunication due to its use in the process to produce electronic parts including LCDs and touch panels which has been rapidly increasing in APAC region mainly in China. Moreover, its application in pipes and tanks, marine industry, defence, transportation etc. has been rapidly increasing due to its excellent corrosion resistance and chemical resistance properties thereby increasing the use of vinyl ester as corrosion resistance inner lining material. Epoxy Resins usage in the making of pipes and tanks also adds to the increasing demand due to increasing population, industrialization and urbanization. Growing utilization of Epoxy Resin in electronics and telecommunications is likely to increase its foothold in the market over coming years.

***Mergers and Acquisitions***

Merger & acquisition activities are becoming prevalent in the Epoxy Resin market globally. In 2019, INEOS Composites acquired Ashland Composites. Additionally, Polynt and Reichhold also had a merger in the same year to expand and increase its market share. Showa Denko, which is stronger in the market of Epoxy Resin, is continuously expanding its capacity to cater the increasing demand in China.

***Growing Focus towards Research & Development***

Composites market is witnessing presence of various market players which in turn has resulted in growing focus towards the research and development activities for new applications such as pipes and tanks and marine. For instance, Swancor Holdings Ltd. product SWANCOR 901 is a Bisphenol-A type epoxy Epoxy Resin which is currently being researched for new applications. Epoxy Resin properties of corrosion resistance and thermal resistance makes them the best fit for industrial applications which is used as lining system for tanks and pipes.

AOC research- https://www.aoc-resins.com/pdf/tech\_cr\_Next\_Gen\_Novolac\_Epoxy\_VE.pdf

**3.5. Technology Evaluation**

**Process Flow Diagram**

Reactor

Temp :140°C

Time :4-6 Hr

Epoxy Resin

Bisphenol-A

Methacrylic Acid, Additives

Styrene Monomer

Blender

Temp:70°C

Time:2-4 Hr

Finished Products ready for packing

*Source: TechSci Research*

Epoxy Resins are downstream product of Epoxy Resin. Mostly manufacturing companies have their in-house technology and R&D facilities to make formulations. Major reactions are carried out with the help of batch reactor and blender which can be outsourced. Generally Manufacturing process involves mixing of feedstock material in batch reactor and blending with organic solvent such as styrene monomer. There is no technology licensor for the product.

**3.6. Pricing Analysis**

**India Epoxy Resin Monthly Prices, January 2018 Onwards (USD/Tonne)**

*Source: TechSci Research*

Discussions of Vinyl Ether Resins (VER) remained firm since the beginning of 2021 following the pickup in market activities as the economy significantly rebounded from Covid repercussions. However, the increment has been marginal yet consistent due to constraint fluctuations in base Novolac costs. There has not been an adverse impact on the second wave of Covid in India, as the demand remained consistent from packaging sector amidst favorable consumer sentiments. Thus, after showcasing a marginal dullness in May, Prices again revived in June following the resumption in market activities across the nation. Besides, soaring freight cost along several trade routes since the beginning FY 2022 has also contributed to raise its values at times of prevalent demand pattern.

**India Vinyl Ether Resin Yearly Prices, July 2010 Onwards (INR/Tonne)**

Sharp fall in values of upstream crude in 2016 hampered the performance of the overall chemical and petrochemical sector leading to a drop in prices of Epoxy Resins (VER) along with various other products. Its market fundamentals revived significantly in FY17 following sharp rebound in market activities. However, in FY19 and FY20 prices remained in a stable to narrow range amidst the uncertainty prevailing from stable feedstock and muted demand pattern. In FY21, VER witnessed a marginal dive again, due to ground-breaking fall in crude values and devastating hit on the global economy in wake of the Covid outbreak.

**3.9. Customer Analysis**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year** | **Product Description** | **Customer / Distributor Name** | **Destination Country** | **Plant Location** | **Supplier Name** | **Shipment Origin** | **Annual Off-take Quantity (Tonnes)** | **Price (USD/Tonnes)** | **Incoterms** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Reichhold India Private Limited** | **India** | **Tianjin** | **Reichhold Polymers Tianjin** | **China** | **2,634.48** | **3.78** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Carborundum Universal Limited** | **India** | **Nantou** | **Swancor Ind M Sdn Bhd** | **Malaysia/Taiwan/China** | **588.17** | **2.23** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Orson Chemicals** | **India** | **Nantou** | **Swancor Ind M Sdn Bhd** | **Malaysia/Taiwan** | **1,052.25** | **2.56** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Sunrise Industries India Ltd** | **India** | **Jiangsu** | **Jinling Aoc Resins Co Ltd** | **China/Thailand** | **369.60** | **3.52** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Rex Resins** | **India** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **34.20** | **2.10** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Vibrant Specialities** | **India** | **N/A** | **Synthomer Trading Limited** | **France** | **40.50** | **2.21** | **Delivered At Place – Tax And Duties** |
| **2020** | **Novolac Epoxy Resin** | **Chemical Process Equipments Pvt Ltd** | **India** | **Benicarló** | **Ineos Composites** | **Spain** | **471.97** | **5.74** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Nagase India Private Limited** | **India** | **Kawasaki** | **Showa Highpolymer Singapore Pte Ltd** | **Japan** | **243.81** | **3.01** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Dakle Industrial Plastics** | **India** | **N/A** | **Z To Order NA** | **Taiwan** | **32.00** | **2.31** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Basf India Limited** | **India** | **Dubai** | **Basf Construction Chemicals Uae Llc** | **United Arab Emirates** | **24.27** | **11.26** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Apex Printing Sleeves India Private Limited** | **India** | **Collierville** | **M S Aoc Llc** | **United States Of America, Poland** | **28.03** | **7.09** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Devi Polymers Private Ltd** | **India** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **9.20** | **2.33** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Emerald Performance Chemical Private Limited** | **India** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **2.00** | **2.04** | **Delivered At Place – Tax And Duties** |
| **2020** | **Novolac Epoxy Resin** | **Mahindra Cie Automotive Limited** | **India** | **Nantou** | **M S Swancor Highpolymer Co Ltd** | **Taiwan** | **3.10** | **2.78** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Epp Composites Pvt Ltd** | **India** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **48.00** | **3.18** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Hindustan Zinc Limited** | **India** | **N/A** | **China Nonferrous Metal Industrys Foreign Engineeri** | **China** | **5.00** | **7.11** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Jrd Polymer Pvt Ltd** | **India** | **Collierville** | **Aliancys Ag** | **France** | **16.05** | **3.87** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Kalinga Inceptum Private Limited** | **India** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **2.06** | **2.94** | **Delivered At Place – Tax And Duties** |
| **2020** | **Novolac Epoxy Resin** | **Mahindra Cie Automotive Limited** | **India** | **Nantou** | **M S Swancor Highpolymer Co Ltd** | **Taiwan** | **3.10** | **2.78** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Future Pipe Industries** | **Egypt** | **Kaohsiung** | **Eternal Materials Co Ltd** | **Taiwan** | **600.00** | **2.73** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Saudi Arabian AMIANTIT Company** | **Saudi Arabia** | **Shanghai** | **Sino Polymer** | **China** | **1,440.00** | **5.83** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **B A F F Polymech Pvt Ltd** | **Sri Lanka** | **Dubai** | **Scott Bader Middle East Ltd** | **United Arab Emirates** | **7.61** | **4.50** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Edgeng Pvt Ltd** | **Sri Lanka** | **Sungei Kadut** | **Wee Tee Tong Chemicals Pte Ltd** | **Singapore** | **3.00** | **2.58** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Bin Tariq (Pvt) Limited** | **Pakistan** | **Shanghai** | **Changzhou Pro-tech Trade Co.,Ltd,** | **China** | **14.40** | **2.37** | **Delivered At Place – Tax And Duties** |
| **2020** | **Bisphenol-a Type Epoxy Epoxy Resin** | **Fiber Craft Inds.** | **Pakistan** | **Al Jubail** | **Saudi Industrial Resins Limited** | **Saudi Arabia** | **12.30** | **3.20** | **Delivered At Place – Tax And Duties** |

*Source: TechSci Research*

**3.11. Global Demand-Supply Gap**

**Demand Supply Scenario**

The overall market for Epoxy Resin is currently in surplus situation in APAC region because downstream manufacturers are still consuming Vinyl Ester. However, companies are currently operating at lower rates due to uncertainty in demand potential owing to current pandemic situation. But estimated demand supply gap in APAC region till 2025 may generate the need for capacity addition or running plants at 100% capacities to overcome the supply gap.

Major demand for Epoxy Resin in Europe is derived from pipes and tanks, and renewables. Major producers such as AOC, INEOS Composites produce and consume Epoxy Resin in various type and forms. In Europe, most of the Epoxy Resins are used in renewables especially in Wind Energy.

Consequently, Epoxy Resin, has increasingly been used manufactured by Unsaturated polyester resins manufacturer companies across Europe as an alternative to other compounds. Thus, demand for Epoxy Resin has recently taken an exponential pace in European market. However, on the supply side, European market is still dependent on Asia-Pacific region for Epoxy Resin. It is estimated that in 2020, half of the demand for Epoxy Resin from Europe will be catered through imports.

In North America, Epoxy Resin has been used in the production of pipes and tanks. In 2020, many players including market player, AOC have revamped their total production significantly in the United States during year-end. AOC manufactures Epoxy Resin for thermal, corrosion, and chemical resistance applications which is used in the manufacture of pipes and tanks, marine and renewables. It is also being used as lining systems in industries to protect the pipes and tanks from corrosion and various chemicals.

**3.12. Suggested Capacities (Ideal Product Mix and capacity recommendation)**

|  |  |  |
| --- | --- | --- |
| **Chemistry** | **Product** | **Suggested Capacity** |
| Epoxy Resin | Bisphenol – A Epoxy Resin,  Novolac Epoxy Resin,  Brominated Epoxy Resin | 30,000 Tonnes Per Annum |

*Source: TechSci Research*

The suggested capacity is around 30 KTPA as in 2025 the demand supply gap is anticipated to reach 10 KTPA on account of which Reliance shall be using 15 KTPA for captive consumption, producing XVR 6811 Vinyl esters which is Bisphenol Epoxy Vinyl Ester for Pultrusion which shall be utilised in the manufacturing of wind turbine blades, nose cones and its nacelle covers at Vadodara Composite Division FRP Product along with support structures for Solar Panels to cater the renewable energy industry demands. The remaining around 15 KTPA shall be utilising for non-captive which includes direct export and catering to domestic demand.

**Target EXIM Countries**

|  |  |
| --- | --- |
| **Region** | **Deficit Countries** |
| North America | USA |
| Mexico |
| APAC | Bangladesh |
| Pakistan |
| Australia |
| Indonesia |
| Middle East & Africa | UAE |
| Turkey |
| Iran |
| Pakistan |
| South Africa |
| Egypt |
| Algeria |
| Israel |
| South America | Brazil |
| Europe | European Union |
| Russia |
| Poland |
| Czech Republic |
| Portugal |
| Greece |
| Croatia |
| Sweden |

*Source: TechSci Research*