Thermoplastic Composites Market

Market Scenario and Competitive Landscape

A CURA DI

Ufficio Valorizzazione della Ricerca

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Data 26/10/2022

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Disclaimer

Introduction and Methodology

"Market Scenario" is a customized and organized analysis to gather information about target markets and competitive landscape in a particular sector.

"Market Scenario" provides relevant information to identify and analyze market needs, market size and competition in the fields of interest of the customer. A technology or a product developed by the customer can be characterized according to the sectors and potentiality of application, target market, competitive advantages and potential partners of the technology. The analysis is performed with the application of technology and business intelligence tools. The research in the information providers is usually based on the use of keywords or by thematic area, according to the specific topic of interest.

The results of the assessment are data about the target or global market potential, market value and applicability of the technologies or products developed by the customer, the trends of the market of interest, the segmentation of the market (e.g., by application, geography or indication), the supply chain and the competitive advantages of products or technologies, the key players active in the market of interest and the possible direct or indirect competitors of the customer.

Context

This analysis provides data about the **global market for thermoplastic composites**, with reference to the resin, product and fiber types, the end-use industries, the geographical market segments and the competitive landscape of the sector.

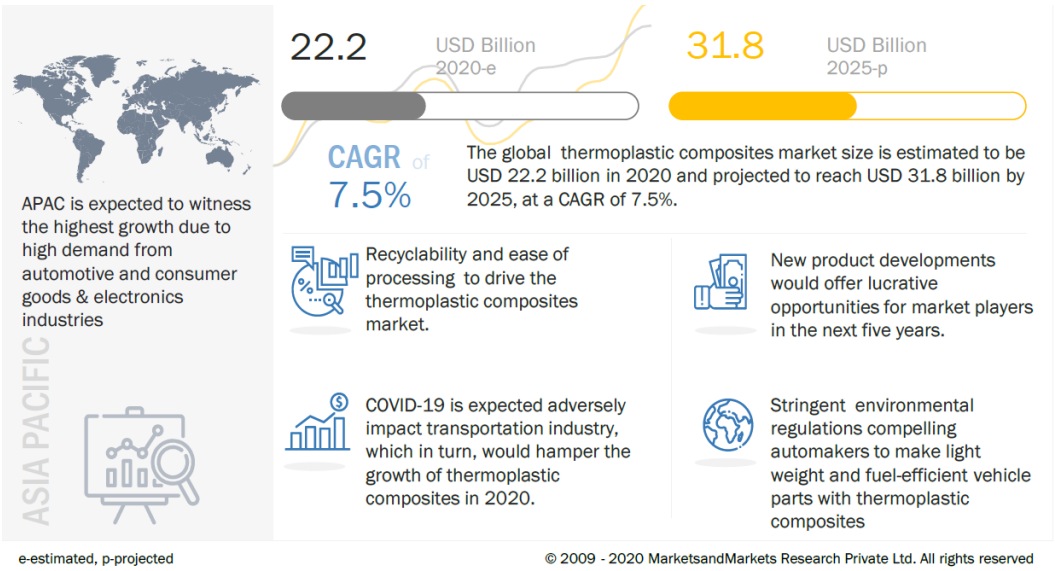
1 Thermoplastic Composites Market

Thermoplastic composites are lightweight materials formed by combining two or more distinct materials, of which one is a binding material (known as a matrix), and the other is a reinforcement material (which is generally a fiber). Thermoplastic composites mainly consist of a thermoplastic-polymer matrix containing resins such as polypropylene, polyamide, polyetheretherketone, and polycarbonate, fibers, including glass, carbon, aramid, natural, mineral, and basalt. The resins are required to hold the fiber and bind the material together, while the fiber provides structure and strength to the thermoplastic composites. A blend of two resins (known as hybrid) is also used to manufacture thermoplastic composites, where properties of different resins are required as per the specific needs of the application.

1.1 Global Market and Market Dynamics

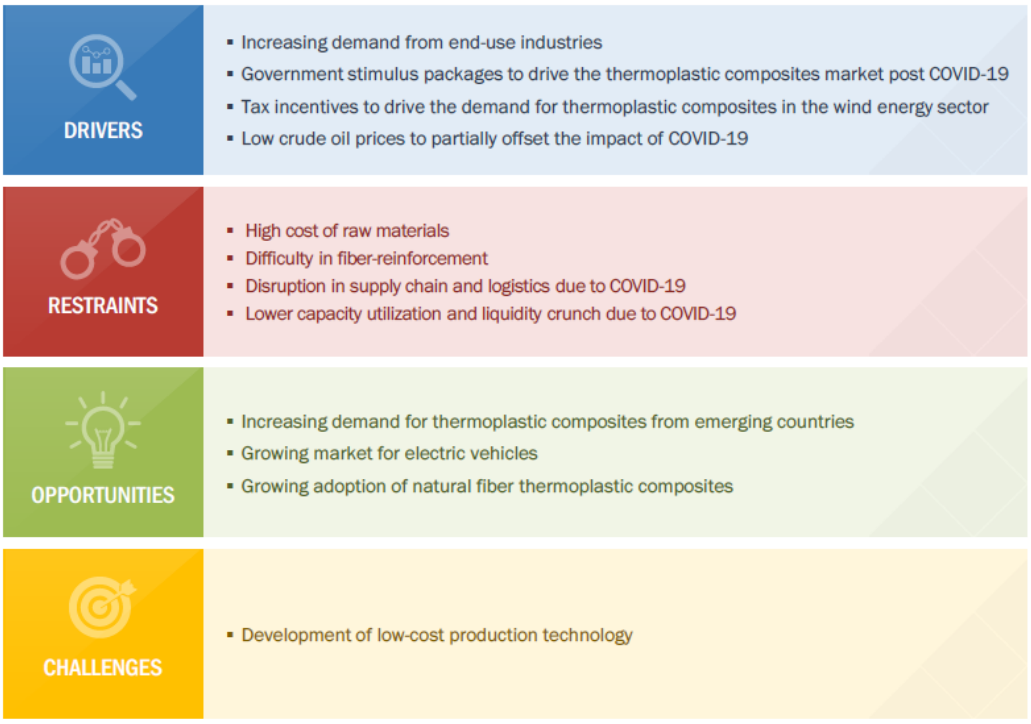
Thermoplastic composite is one of the fastest-growing composite materials due to its growing adoption in aerospace & defense, transportation, consumer goods & electronics, wind, sports & leisure, and construction applications. The **global thermoplastic composites market** size is estimated to be USD 22.2 billion in 2020 and projected to reach USD 31.8 billion by 2025, at a Compound Annual Growth Rate (CAGR) of 7.5% (Figure 1).

Figure 1. Global Thermoplastic Composites Market in the Period 2020 - 2025



The market of thermoplastic composites is driven by the high demand in transportation and aerospace & defense applications. These composites are used in these applications due to their superior mechanical properties and high impact resistance. The use of thermoplastic composites also enables weight-reduction. There is increasing demand from the APAC region, which is providing an opportunity for the thermoplastic composites manufacturers.

Figure 2. Drivers, Restraints, Opportunities and Challenges in Thermoplastic Composites Market

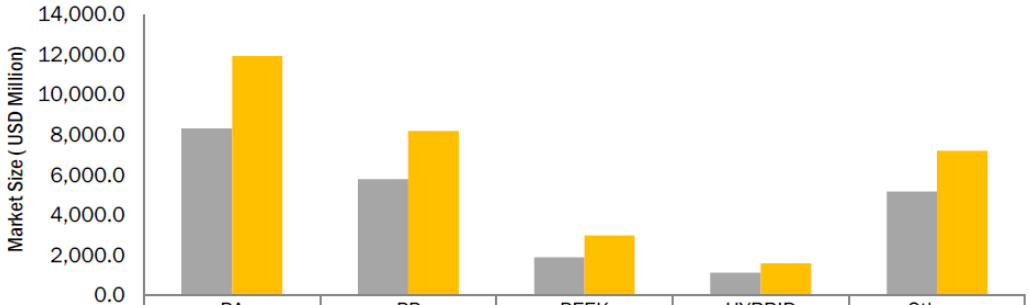


1.2 Market by Resin Type

A wide range of base **resins** is used in the production of thermoplastic composites. These resins include: polypropylene (PP), polyamide (PA), polyetheretherketone (PEEK), polycarbonate (PC), polyphthalamide (PPA), and polysulfone polyphenylene sulfide (PES), among others. On the basis of resin type, the thermoplastic composites market is segmented into: **polypropylene, polyamide, polyetheretherketone, hybrid (blend of two resins), and others** (polycarbonate (PC), acrylonitrile butadiene styrene (ABS), polyoxymethylene (POM) and polyphenylene sulfide (PPS)). The properties of thermoplastic resins, such as recyclability, remolding/ reshaping capabilities, chemical resistance, and superior aesthetical finishes, have led to their higher use as compared to thermoset resins in these applications.

The global market for thermoplastic composites was led by the **polyamide resin segment**, in terms of value, in 2020. This segment is expected to grow to USD 11,910 million by 2025, growing at a CAGR of 7.5% in the period 2020 – 2025 (Figure 3). The polypropylene resin-based thermoplastic composites accounted for the second-largest share, in terms of value and volume, in 2020. PEEK-based thermoplastic composites are expected to register the highest CAGR during the forecast period due to their high demand and penetration in the medical and aerospace & defense industries, owing to their superior performance properties, ability to sustain high temperatures, and chemical inertness. The other resins-based thermoplastic composites accounted for the third-largest share, in terms of volume, in 2020. The market for hybrid resins is poised to grow at a CAGR of 7.3% between 2020 and 2025.

Figure 3. Thermoplastic Market, by Resin Type, in the Period 2020 – 2025 (USD Million)



	PA	PP	PEEK	HYBRID	Others
2020	8,300.8	5,768.1	1,860.9	1,096.9	5,150.8
2025	11,910.2	8,188.5	2,962.5	1,561.3	7,186.6
CAGR (2020-2025)	7.5%	7.3%	9.7%	7.3%	6.9%

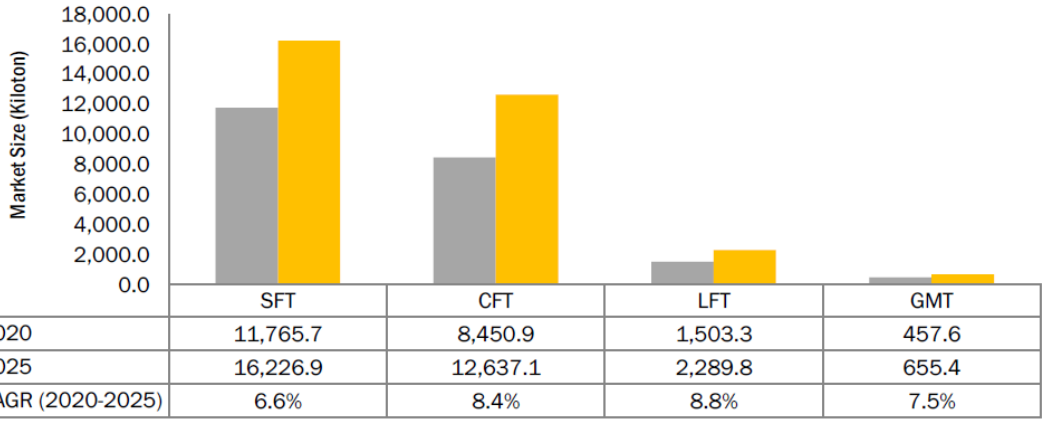
1.3 Market by Product Type

Thermoplastic composites can be divided into four **product types**: **short fiber thermoplastic (SFT), long fiber thermoplastic (LFT), continuous fiber thermoplastic (CFT) and glass mat thermoplastic (GMT)**. Thermoplastic composites are majorly consumed with short fibers due to high demand from the automotive and consumer goods & electronics industries. LFT is the fastest-growing segment owing to better strength offered by this product type, which is driving the demand in the transportation, aerospace & defense, and other applications.

LFT is the fastest-growing product type of thermoplastic composites, by volume, that is projected to grow at a CAGR of 8.8 % by 2025 (Figure 4 and Table 1). LFT bridges the cost gap and performance properties between SFT and CFT. LFT mainly employs glass and carbon fibers that are compatible with a wide range of thermoplastic composites. Thus, there is a high demand for LFT from various end-use industries in the thermoplastic composites market.

CFT is projected to witness the second-highest growth during the forecast period. High demand for LFT and CFT in transportation and aerospace and defense applications is driving the growth of the thermoplastic composites market.

Figure 4. Thermoplastic Composites Market by Product Type, in the Period 2020 – 2025 (Kiloton)



	SFT	CFT	LFT	GMT
2020	11,765.7	8,450.9	1,503.3	457.6
2025	16,226.9	12,637.1	2,289.8	655.4
CAGR (2020-2025)	6.6%	8.4%	8.8%	7.5%

Table 1. Thermoplastic Composites Market Size, by Product Type, 2020–2025 (USD Million)

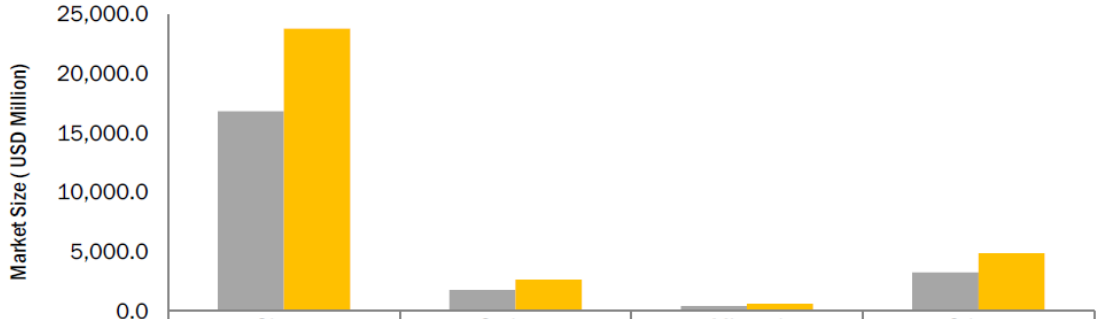
Product type	2020	2021	2022	2023	2024	2025	CAGR (2020–2025)
SFT	11,765.7	13,884.4	14,440.6	15,016.2	15,611.4	16,226.9	6.6%
LFT	1,503.3	1,779.9	1,895.6	2,018.8	2,150.0	2,289.8	8.8%
CFT	8,450.9	9,972.0	10,580.3	11,225.7	11,910.5	12,637.1	8.4%
GMT	457.6	533.1	561.3	591.1	622.4	655.4	7.5%
Total	22,177.5	26,169.4	27,477.9	28,851.8	30,294.4	31,809.1	7.5%

1.4 Market by Fiber Type

The global thermoplastic composites market, by **fiber type**, is segmented **into four types**, namely: **carbon, glass, minerals, and other thermoplastic composites** (aramid, basalt, and natural fiber-reinforced thermoplastic composites). These fibers can be used as fillers or reinforcement along with thermoplastic matrix to form composites. In addition, these fibers are used in various forms depending on their lengths, such as short fiber (less than 3mm), long fiber, and continuous fiber; and can contribute up to 70% content by weight in the thermoplastic composites. The demand for fibers is the highest in the form of long fibers, as long fiber grades exhibit minimal warping, reduced shrinkage, and excellent dimensional stability. Moreover, long fiber grades cause less wear on the cylinders and screws as there are relatively fewer fiber ends.

Carbon fiber's ability to reduce weight, lower energy consumption, and enhance the performance of finished products has increased the demand for carbon fiber-reinforced thermoplastic composites, especially in the aerospace & defense and transportation applications. This has boosted the growth of the carbon fiber-reinforced thermoplastic composites market and thus is expected to register the highest CAGR during the forecast period (Figure 5).

Figure 5. Thermoplastic Composites Market, by Fiber Type, in the Period 2020 - 2025



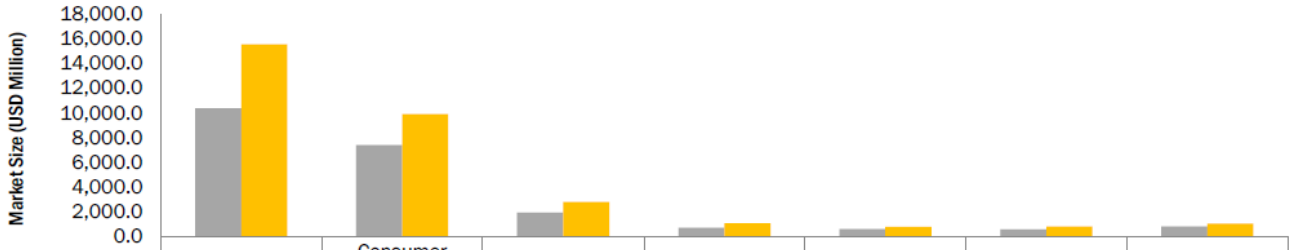
	Glass	Carbon	Mineral	Others
2020	16,796.6	1,748.2	392.9	3239.7
2025	23,792.3	2,621.4	558.1	4837.2
CAGR (2020-2025)	7.2%	8.4%	7.3%	8.3%

1.5 Market by End-Use Industry

Thermoplastic composites have various applications, owing to their excellent properties, such as molded surface finish, lightweight, insulation against heat transfer, and high strength. The usage of thermoplastic composites is fragmented across various kinds of end-use applications, and its consumption is expected to continue to increase in those applications.

The **aerospace & defense** industry would register the highest CAGR in terms of value during the forecast period due to the increasing demand for interior applications in the aircraft (Figure 6). The thermoplastic composites offer properties such as low weight, increased fuel efficiency, FST properties, corrosion resistance, and ability to mold into different and complex shapes. Thus, the growth of thermoplastic composites is the highest in the aerospace & defense industry.

Figure 6. Thermoplastic Composites Market by End-Use Industry, in the Period 2020 - 2025



	Transportation	Consumer Goods & Electronics	Wind Energy	Aerospace & Defense	Construction	Sports & Leisure	Others
2020	10,340.6	7,365.2	1,910.2	662.5	575.4	545.2	778.3
2025	15,515.4	9,866.7	2,774.2	1,062.6	757.8	793.3	1,039.2
CAGR (2020-2025)	8.5%	6.0%	7.7%	9.9%	5.7%	7.8%	6.0%

Others include oil & gas, medical and marine

Transportation is the largest consumer of thermoplastic composites in terms of value and volume. In addition, there is a high demand for fuel-efficient automobiles and heavy vehicles; and therefore, composites are increasingly used in automobiles and heavy vehicles. Owing to increasing environmental awareness, automakers, and heavy vehicle manufacturers use thermoplastic composites in various transportation applications due to its properties of lightweight, high strength, and ease-of-reforming, and reshaping. Similarly, the increasing demand for thermoplastic composites from

rail coaches and rolling stock manufacturers contributes to the growth of the thermoplastic composites market in the transportation application.

Thermoplastic composites are gaining acceptance in the **construction** industry, as they are highly ductile in nature and can be recycled. They offer excellent strength, high toughness, and can be easily remolded, which makes them highly suitable as a construction material. They are widely used to produce window panel doors. In addition, they are also used to manufacture storage tanks, doors, lightweight structures, and window frames, among other applications. Various companies are selling products manufactured using thermoplastic composites.

1.5.1 Focus on: Aerospace and Defense

Aerospace & defense is the fastest-growing application in the thermoplastic composites market, as thermoplastic composites are lightweight and offer excellent surface finish and superior strength. The benefits of using thermoplastic composites for aerospace applications include cost performance, dimensional stability, and corrosion resistance. The thermoplastic composites provide lightweight property in the aerospace industry and hence facilitates more efficient designs—structurally and aerodynamically. The interior components produced from thermoplastic materials include floor panels, luggage bins, seats, trolleys, separation panels, keel beams, seals, fuel pipes, and bulkheads. The exterior aerospace components manufactured from thermoplastic materials include rotor blades, torsion boxes, control surfaces, fuel valves and pumps, and tail wings. Thermoplastic materials used in the defense sector provide public safety and protection to vehicles and vital installations. Moreover, continuous advancements in composite manufacturing and processing are making thermoplastics a viable option in a broad range of aerospace applications. For instance, as thermoplastics can be welded, KVE Composites (Netherlands) introduced a welding process for aircraft part manufacturer Fokker Technologies (Netherlands) using Toray Advanced Composites' CETEX thermoplastic composites.

Europe is the leading consumer in the aerospace & defense application. Europe is home to major aircraft manufacturers, including Airbus, which is one of the key reasons for the larger share of the region in the aerospace & defense application. The market size for the same was 3.3 kilotons in 2019 and is projected to grow at a CAGR of 6.7% between 2020 and 2025.

1.5.2 Focus on: other applications

The other applications considered in the thermoplastic composites market include **marine**, oil & gas, and medical. The demand for thermoplastic composites is mainly due to its properties, such as recyclability, superior quality, higher volume capabilities, short process cycle time, and ease-of-processing for the other applications. In the **marine application**, the thermoplastic composites have better application as they have the ability to offer resistance to corrosion occurring in the marine industry due to their prolonged exposure to the water surface. In this application, thermoplastic composites are used in the **hull liners**, pilot houses, engine covers, among other end uses. The thermoplastic composites are useful in highly aggressive and hotter environments. They offer improved corrosion resistance, therefore reduce maintenance costs and increase operating life. Thermoplastic composites are also resistant to fire and smoke, making them suitable for use in the oil & gas industry for applications, such as drill plugs, frac balls, dielectric insulators, pipe wrapping, and composite pipes.

North America is a major market for thermoplastic composites in other applications. The North American thermoplastic composites market size in other applications is projected to grow from USD 312.4 million in 2019 and would grow at a CAGR of 4.2% from 2016 to 2019, led by the increased use of thermoplastic composites in various applications, such as medical, and oil & gas, and marine.

1.6 Market by Geography

The thermoplastic composites market has been segmented by region into: North America, Europe, Asia-Pacific (APAC), Latin America and the MEA (Middle East and Africa). Asia-pacific is projected to register the highest CAGR during the forecast period (Table 2). Europe was the largest thermoplastic composites market in the world, in terms of value, in 2020.

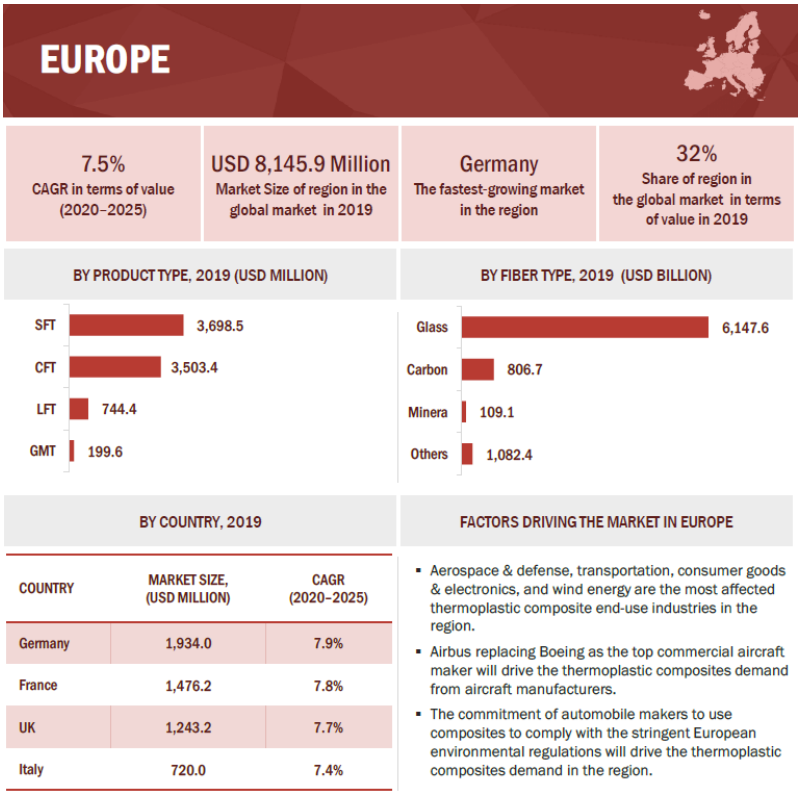
Table 2. Thermoplastic Composites Market Size, by Region, 2020–2025 (USD Million)

Region	2020	2021	2022	2023	2024	2025	CAGR (2020–2025)
North America	6,129.3	7,226.0	7,559.5	7,906.8	8,268.4	8,644.8	7.1%
Europe	6,984.9	8,231.3	8,646.1	9,082.4	9,541.3	10,023.9	7.5%
APAC	7,552.7	8,961.5	9,452.3	9,970.5	10,517.7	11,095.5	8.0%
Latin America	801.7	934.3	971.5	1,010.2	1,050.5	1,092.3	6.4%
MEA	708.8	816.4	848.5	881.8	916.5	952.6	6.1%
Total	22,177.5	26,169.4	27,477.9	28,851.8	30,294.4	31,809.1	7.5%

1.6.1 Focus on Europe

The **European region** market segment is segmented into: Germany, France, the UK, Italy, and Rest of Europe. The European thermoplastic composites industry is a significant part of the region's economy.

Figure 7. Europe: Thermoplastic Composites Market Snapshot



PA accounted for the largest share in the thermoplastic composites market in Europe in 2019 in terms of volume. However, PEEK resin is expected to register the highest CAGR in the European thermoplastic composites market, in terms of value and volume, between 2020 and 2025.

The **transportation** application is the highest contributor to the thermoplastic composites market size, in terms of volume, in Europe. The growth in the European transportation sector is comparatively higher than any other region owing to the presence of established automotive manufacturers. With the increasing lightweight requirements in vehicles, the use of LFT composites in the transportation application has also increased. The several concerns regarding the stringent regulations for reducing fuel emission can be mitigated by reducing the weight of automotive parts by using thermoplastic composites.

Aerospace & defense is projected to be the fastest-growing application of thermoplastic composites in the region during the forecast period. The increasing demand for thermoplastic composites from Airbus and its component manufacturers contributes to the growth of its market in the aerospace & defense industry.

Germany accounted for the largest share in the European thermoplastic composites market in 2019, in terms of value and volume. The thermoplastic composites market in Germany is expected to grow mainly due to the rising demand for LFT and CFT in commercial transportation and aerospace & defense sectors. Germany is followed by France in the thermoplastic composites market with high shares in terms of value.

Italy is one of the major thermoplastic composites markets in Europe. According to the International Monetary Fund World Economic data, Italy ranks eighth at the global level under the GDP ranking. The country is a headquarter place for major high-end transportation users, namely, Alfa Romeo and Maserati, which have a high demand for thermoplastic composite solutions. The presence of these key players contributes to the growth of the thermoplastic composites market in this country. However, the demand for composites would decline in the country as Italy is one of the worst-affected countries by the COVID-19 outbreak. Coronavirus has already infected more than 236,000 people in the country. Italy has witnessed the maximum number of deaths (nearly 34,167 more than any country) in the world due to COVID-19. These factors have forced the government to enforce lockdown, which in turn, has slowed down the industrial sectors in the country, thus affecting the thermoplastic composites manufacturers.

1.7 Competitive Landscape

Most of the thermoplastic composite manufacturers are concentrated in Europe. The companies which manufacture thermoplastic composites are SABIC (Saudi Arabia), Celanese Corporation (US), Lanxess AG (Germany), BASF (Germany), and Solvay S.A. (Belgium) and they are the **leading players** in the thermoplastic composites market.

Other players active in the market can be considered: Ascend Performance Materials (USA), Covestro (Germany), Daicel Polymer (Japan), Kingfa SCI. & TECH. CO. (China), RTP Company (USA), SBHPP (Japan), SGL Group (Germany), Suprem SA (Switzerland), TechnoCompound GmbH (Germany) and Victrex (UK).

The companies involved in the development of products for marine applications are the following:

- **PolyOne Corporation** (USA): introduced continuous fiber-reinforced composites, Polystrand, for the European market and Hammerhead **marine** composite panels at CAMX 2018;
- **Solvay S.A.** (Belgium) manufactures composite materials for aerospace, automotive, **marine**, wind energy, and other industrial applications.

No references have been found in the database consulted about the players Persico Marine and Baltic.

2 Conclusions

A **thermoplastic composite** is formed by the combination of thermoplastic matrix and reinforcements (fiber). The most commonly used thermoplastic matrix is polypropylene (PP), polyamide (PA), and polyetheretherketone (PEEK), among others. In a thermoplastic composite, fibers such as glass, carbon, mineral, natural fibers, and basalt are used for reinforcement to fortify the matrix in terms of strength and stiffness.

Thermoplastic composite is one of the fastest-growing composite materials due to its **growing adoption** in aerospace & defense, transportation, consumer goods & electronics, wind, sports & leisure, and construction applications. In the **marine** application, the thermoplastic composites have better application as they have the ability to offer resistance to corrosion occurring in the marine industry due to their prolonged exposure to the water surface. In this application, thermoplastic composites are used in the hull liners, pilot houses, engine covers, among other end uses. The thermoplastic composites are useful in highly aggressive and hotter environments. They offer improved corrosion resistance, therefore reduce maintenance costs and increase operating life. Due to the outbreak of COVID-9, the demand for glass thermoplastic composites has declined from marine, construction, and consumer goods & electronics industries. The high-performance properties of glass thermoplastic composites and low cost will drive the demand for glass thermoplastic composites after 2020.

Currently, the **US** is the biggest consumer of thermoplastic composites. The large market size in the country is attributed to the presence of major manufacturers, such as Celanese Corporation and DowDuPont Inc. China is expected to be the fastest-growing market for thermoplastic composites. The increasing concern of the government towards reducing emission from fuel-based vehicles is a major reason which is fostering the growth of lightweight and fuel-efficient vehicles in this country.

3 Sources

MarketsandMarkets Knowledge Store - Multisectoral database that collects market research reports in various technological fields and designed to process some information interactively. More than 1,200 market reports are published each year (https://www.mnmks.com/)[1]. The information provided have been extracted by the report: "*Thermoplastic Composites Market – Global Forecast to 2025*", July 2020.

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