INDUSTRIEVEREINIGUNG
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FEDERATION OF REINFORCED PLASTICS

The European Market for Fibre-reinforced Plastics / Composites 2024

Market developments, trends, challenges and outlook

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March 2025

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The AVK is the German trade association for fibre-reinforced plastics/composites and represents the interests of producers and processors at national and European level.

The range of services includes specialised working groups, seminars and conferences as well as the provision of market-relevant information (www.avk-tv.de).

Nationally, the AVK is one of the four supporting organisations of the GKV - Gesamtverband Kunststoffverarbeitende Industrie - and internationally a member of the European composites umbrella organisation EuCIA - European Composites Industry Association.

AVK is a founding member of Composites Germany.

1 Summarising introduction

Composites market continues downward trend

The European composites industry was unable to halt the downward trend in 2024. European production volumes fell significantly for the third year in a row.

The current development is largely due to structural weaknesses in key application areas as well as economic and industrial challenges in the core European regions. Germany, which remains the largest economy in the EU with a share of GDP >24 %, is particularly affected. According to an initial estimate by EUROSTAT - based on seasonally and calendar-adjusted quarterly data - GDP rose by 0.7 % in the eurozone and by 0.8 % in the EU. According to initial estimates, GDP in Germany fell by 0.2 % in the same period. The French economy, the second-largest economy in the EU (share of total EU GDP >16 %), was also in recession in 2024 according to initial estimates. Here, GDP fell by 0.1 %.[1]

This negative trend is being triggered by general economic weaknesses, particularly in the manufacturing and industrial sectors. The automotive industry and the construction and infrastructure sector in particular, as the most important application industries for the composites industry in Europe, are currently showing strong negative trends. The swings are even more pronounced in the automotive sector than in the construction/infrastructure sector. The electrical/electronics sector, the third most important sector, is also currently in decline and is unable to compensate for the massive cuts in the two sectors.

Overall, economic development in the European Union has been much less dynamic than in other major regions of the world for many years (see Fig. 1).

[11] EUROSTAT: https://ec.europa.eu/eurostat/de/web/products-euro-indicators/w/2-30012025-ap#:~:text=Nach%20einer%20ersten%20Sch%C3%A4tzung%20der,Datenquellen%2C%20die%20weiteren%20Revisionen%20unterliegen.

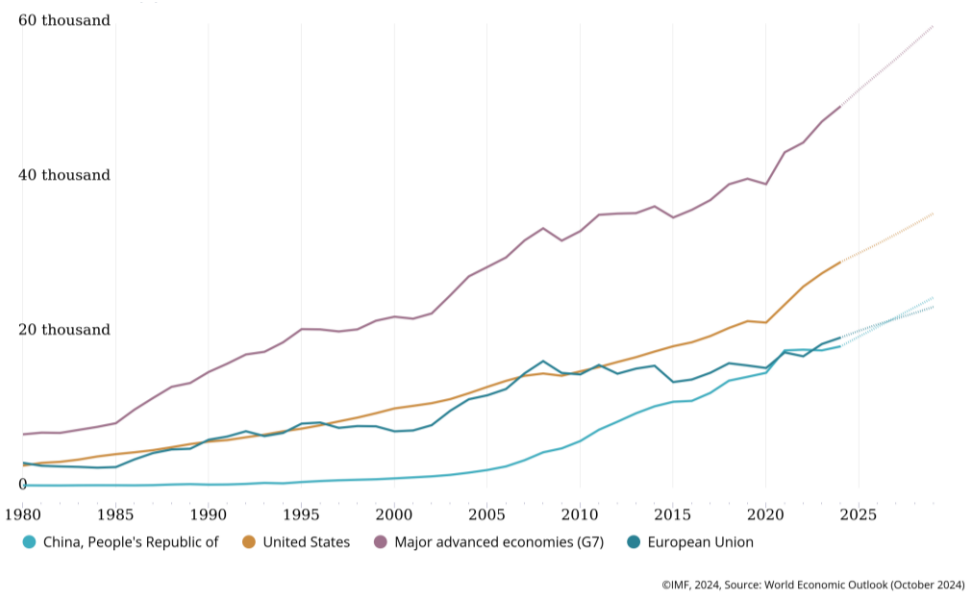

Figure 1: GDP, current prices (Billions of U.S. dollars)

Even though absolute growth was recorded for many years, it often lagged behind that of other regions of the world.

The picture for the composites industry is similar. The decline in absolute market volume in Europe was coupled with a growing global market. This drives the gap between the European and global composites industry ever wider. Europe's market share has been declining for many years.

There was already a significant decline of 9 % in the European production volume in 2022. A further decline of 8 % in the overall market for composites in Europe was recorded for 2023. In 2024, the market will fall by 5.6 % to a total volume of 2.416 million tonnes.

In contrast, the global market for composites remained stable in 2022. In 2023, the overall market grew by around 6 % to a total volume of around 13 million tonnes. 2024 now sees a further increase of around to a total of 13.5 million tonnes (source: JEC). These 13.5 million tonnes still include a number of uncertainties, particularly with regard to the Chinese market, which means that the total volume worldwide could be significantly higher if optimistic estimates are made.

Glass fibre-reinforced systems continue to account for over 95 % of the overall market. Other material systems, such as CFRP (carbon fibre-reinforced plastics) or NFRP (natural fibre-reinforced plastics), however, remain specialities, with CFRP in particular continuing to develop positively in the corresponding application segments.

Overall, the decline in thermoplastic composites of -3.9 % in 2024 is lower than in the area of thermoset materials, which saw a drop of 8.4 %.

Over 60 % of thermoplastic composites continue to flow into the automotive sector. The figure for thermosets is 28 %. In the thermoset composites market segment, almost 40 % of the production volume flows into the construction and infrastructure sector. Here, too, there will be a significant decline in market momentum in 2024. According to a current ifo forecast, "European construction activity will decline by a total of 4 % in the period 2023/24, but will only increase by 3 % thereafter until 2026. (...) Residential construction, which accounts for almost half of all construction projects in Europe, will shrink by a tenth overall in 2023 and 2024 (new construction: -18 %). The chances of a significant recovery in the coming years are estimated to be low (-4.3 %). (...) In contrast, the civil engineering segment will continue its expansion unperturbed (+7.8 %), which is due to the fact that sufficient public and private funds can continue to be mobilised for the extensive investment requirements of the transport and energy infrastructure."[2]

In terms of economic policy, the phase of tension and increasing uncertainty continues. A strong focus on national economic strategies in the USA and China, but also in parts of Europe, is having a negative impact on international trade. This is a particular challenge for strongly export-orientated nations such as Germany. In addition, there is enormous price pressure for raw materials, semi-finished and finished products, particularly from Asian countries. This pressure is partly due to unequal competitive conditions, but also to a lack of competitiveness in individual sectors. Added to this is a subsidy policy, especially in China, which partially cancels out fair competition.

[2] Source: https://bau-muenchen.com/de/bau-insights/detail/bauaktivitaeten%E2%80%AFin-deutschland-und-europa.html

However, this is also due to a slowdown in domestic economic growth, which is leading to corresponding overcapacities. Russia's war of aggression against Ukraine continues to lead to high energy prices in parts of Europe. These are placing an increasing burden on industry and - coupled with corresponding CO2 levies - are making economically competitive production more difficult. A clear focus on sustainable solutions and products is desirable and unavoidable. However, it would be important to ensure that the corresponding economic and industrial support is not lost in the process. The focus here cannot and should not be on subsidies, but on a package of balanced measures to promote European industry, which continues to be a central pillar of the economy.

In regional terms, Germany, Spain/Portugal, Italy and the Eastern European countries continue to maintain their strong positions in the European context, albeit with slight shifts. The UK continues to hold its own in this context with a market share of 13.8 % of the production volume recorded here. With a share of over 19 % (2023 = 19.4 %) of the overall market, Germany remains the country with the highest market volume. Overall, however, the production volume has also declined here.

2 The market under review

When considering glass fibre reinforced materials (GRP), this analysis again includes all GRP with a thermoset matrix. NCF (non-crimp fabrics) continue to be shown separately. In the thermoplastics market, long fibre reinforced thermoplastics (LFT), glass mat reinforced thermoplastics (GMT) and continuous fibre reinforced thermoplastics (CFRTP) will continue to be included. In addition, the European production volume for short glass fibre reinforced thermoplastics is shown separately.

On the application side, the figures are shown for the two relevant material systems thermoplastics and thermosets as well as in aggregated form. Regionally, the analysis of the GRP market includes all thermoset materials in the relevant countries in Europe whose production volumes can be validly recorded.

3 Overall development of the composites market

According to the latest figures, the volume of the global composites market will total 13.5 million tonnes in 2024 (source: JEC). In 2023, with a volume of 13 million tonnes, growth was around 4 %.

In comparison, the European composites production volume fell by 5.6 % in 2024. The total European composites market thus comprises a volume of 2,416 kilotonnes (kt) after 2,559 kt in 2023 (see Fig. 2). The market is therefore declining and falling back to the level of 2012.

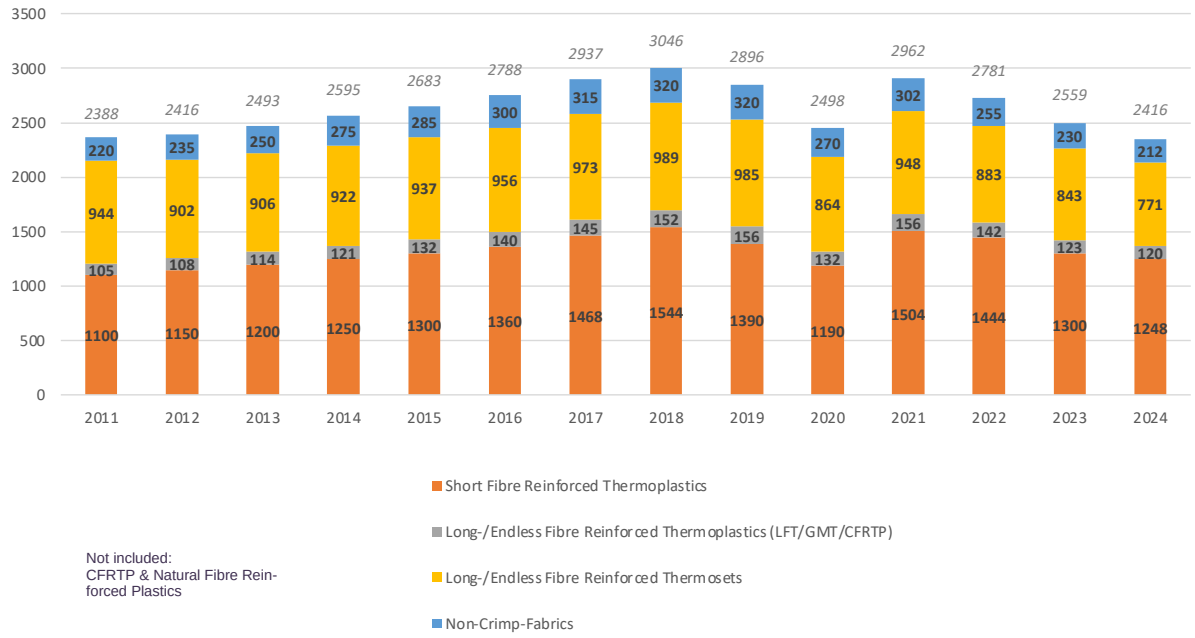

Figure 2: Composites production volume in Europe since 2011 (in kt)

Overall, market momentum in Europe was, as already explained, significantly lower than in the global market. Europe's share of the global market is now around 18 % (after around 20 % in 2023). Market shares continue to shift in favour of America and Asia.

As in previous years, development within Europe is not uniform. The differences can be attributed to very different regional core markets, the high variability of the materials used, a wide range of different manufacturing processes and widely differing areas of application. Accordingly, developments vary from region to region.

Spain/Portugal, Italy and the UK were able to gain slight market shares, whereas Germany and France in particular suffered slight losses. The shifts in the other regions covered here remained marginal.

While SMC/BMC materials in particular were still growing in 2023, this trend came to a halt in 2024. A decline in production volumes must now also be reported in this area. A detailed analysis of both the regional development and the development of different processes/systems follows in the next chapters.

The largest share of total composites production in terms of volume goes to the transport sector, which accounts for almost 50 % of the market volume (see Fig. 3). The next two largest areas are the electrical/electronics sector and applications in construction and infrastructure. The transport sector includes car production, but also commercial vehicles, aviation, public transport and many more. The construction/infrastructure sector includes pipelines, containers, tanks, profiles, etc. The electrical/electronics sector includes, for example, switches, housings, telecommunications equipment and control cabinets. This does not include CFRP volumes, which only have a minor influence on this distribution with a share of around 2 to 3 % of the total market.

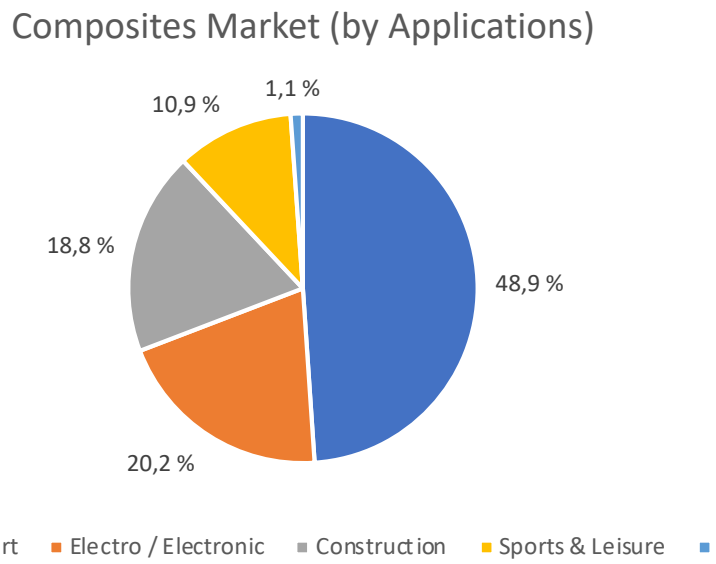

Figure 3: Total composites market by application area in 2024 (in %)

3.1 Development of the market for thermoset composites

The total production volume of thermoset composites amounted to 983 kt in 2024, compared to 1,073 kt in the previous year. This material group thus accounted for 41.8 % (2023: 43 %) of the total market in Europe. Compared to the long-term trend, there is now a significant decrease market share in contrast to thermoplastic systems (see Fig. 4).

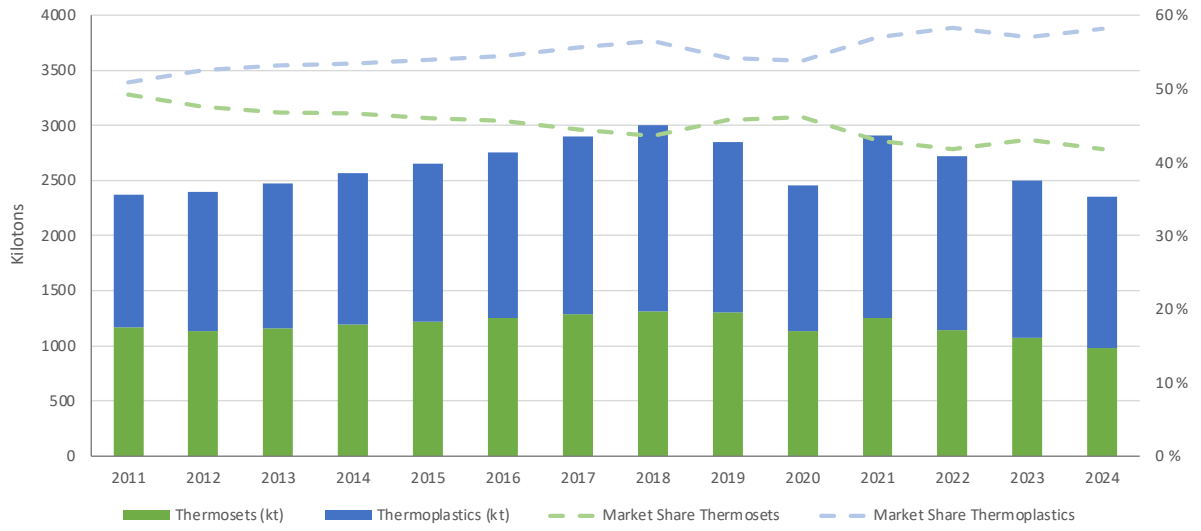

Figure 4: The European composites market by material system (in % and kilotonnes)

The two main areas of application for thermoset composites remain the construction/infrastructure sector and the transport sector (see Fig. 5).

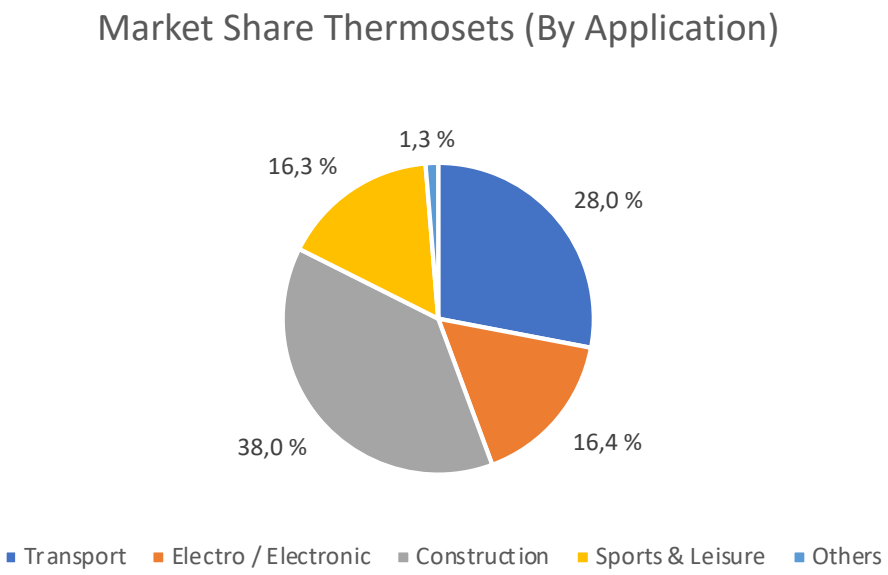

Figure 5: Thermoset composites by application area 2024 (in %)

While the transport sector was still the largest application segment for the GRP industry (hereinafter referred to as all long and continuous fibre-reinforced thermoset and thermoplastic composites) until 2019, there has been a general shift towards the construction and infrastructure sector in recent years. In 2024, however, the losses in the construction and infrastructure segment were greater, so that the market shares are slightly converging again. For many years now, the thermoplastics market has been dominated by applications in the transport sector, particularly with components for cars and commercial vehicles. The following chapter provides an overview of thermoplastic materials.

3.2 Development of the market for thermoplastic composites

The market for thermoplastic composites in Europe comprised a total volume of 1,368 kt in 2024, compared to 1,423 kt in the previous year (source: AMAC). Nevertheless, the market share of these systems in the overall European market rose to 58.2 % after 57 % in 2023. Compared to the previous year, the market volume fell by 3.9 % and therefore less significantly than for thermoset materials.

The largest material group within thermoplastic composites, but also in the overall market, are the so-called short glass fibre reinforced plastics. Here, the reinforcing fibres are only a few millimetres long. The reinforcing effect is therefore very different from that of long or continuous fibre systems. This is another reason why these materials are often not considered in the composites sector. In terms of materials, this material group is dominated by polyamide (PA). In the LFT sector, where significantly longer fibres are used, the picture is different. Polypropylene (PP) is predominantly here.

Overall, short glass fibre-reinforced thermoplastics account for a volume of 1,248 kt after 1,300 kt in 2023. The decline is therefore 4 %. The market share in the thermoplastic composites segment remains at over 90 %. The share of the overall European composites market for this individual material group is 52 % (see Fig. 6).

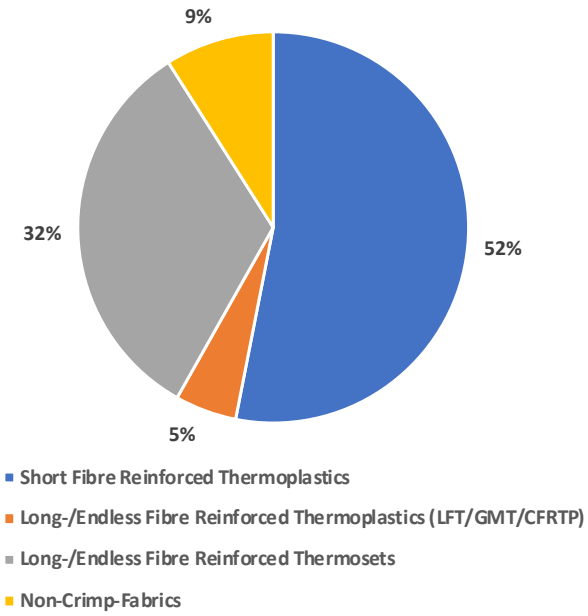

Figure 6: The European composites market in 2024, broken down by material system

The second largest group within the group of thermoplastic materials is long fibre reinforced plastics (LFT). LFTs accounted for a market volume of 88 kilotonnes in 2024. The decline in this segment was just over 2 %. The market for glass mat reinforced thermoplastics (GMT) is significantly smaller with a total volume of 23 kt and continuous fibre reinforced thermoplastics with a volume of 10 kt.

The main area of application for thermoplastic composites is the transport sector, which accounts for almost two thirds of the market (see Fig. 7). Within this segment, the passenger car and commercial vehicle sectors dominate. Together with electrical/electronic applications, this results in a market share of almost 90 % by 2024.

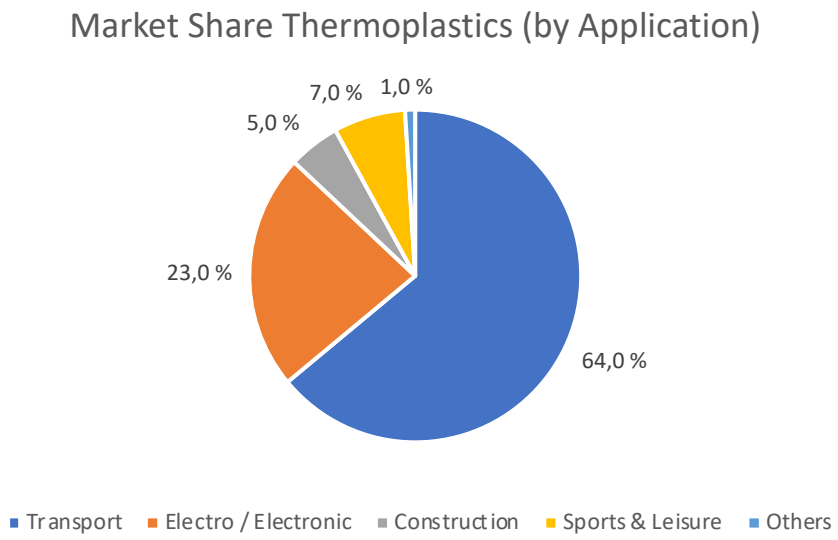

Figure 7: Thermoplastic composites by application area 2024 (in %)

The passenger car market is of central importance for thermoplastic composites. While there was often talk of economic weakness in the automotive industry in the first two years after the coronavirus pandemic, the full extent of the structural problem facing the European and, above all, the German automotive industry will become apparent in 2024. The first sales problems were already evident in 2018. Although new car registrations in the EU are rising again slightly after a record low of almost 30 years (9.3 million units registered in 2022), they remain well below the peak of 2018/2019 (see Fig. 8).

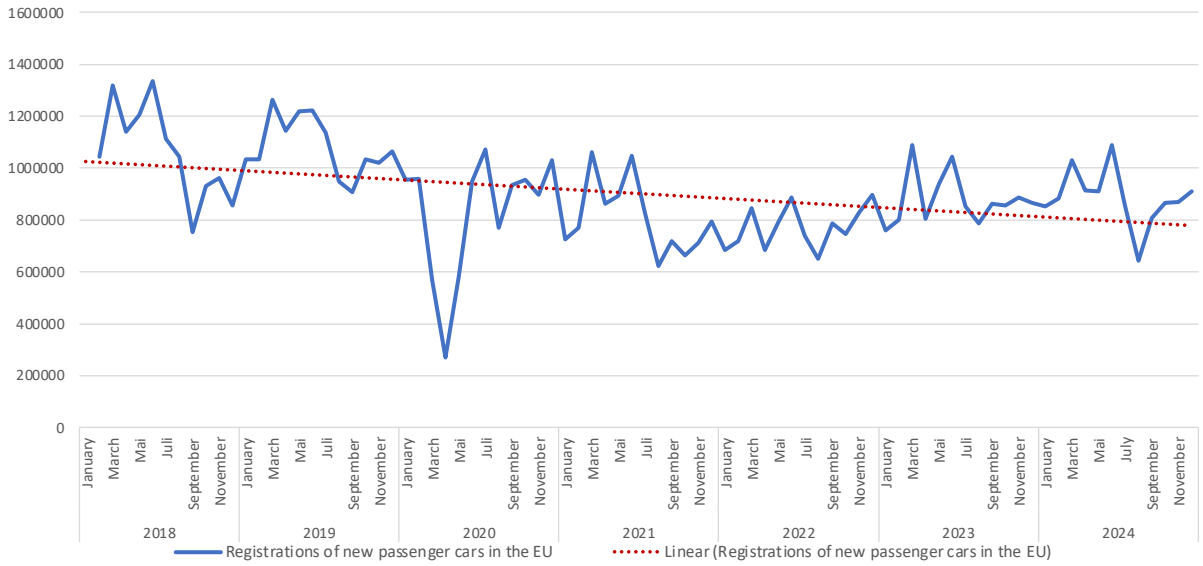

Figure 8: New car registrations in the EU

The cumulative volume for 2024 is around 10.6 million units, compared to 10.5 million units in the previous year.

There is also a general trend on the part of European OEMs (original equipment manufacturers), which continues to depress sales figures. Production and therefore sales of high-volume models are often being cut back in favour of higher-priced, high-margin models. This is compounded by a massive drop in sales in key export markets such as China and the USA. The situation is exacerbated by declining registration figures in the e-mobility sector in Europe. Since 2024, European and, above all, German OEMs have been facing a massive crisis on a scale never before seen in the modern European automotive industry. OEMs are currently taking countermeasures, primarily in the area of efficiency improvements and redundancies, including plant closures. In the medium term, however, these measures alone will not be enough to consolidate the automotive industry and its central position in German/European industry.

In contrast, the commercial vehicle sector (vans, trucks and buses) presents a pleasing picture. In 2024, a total of 1,950,163 units were registered in the European Union. In the previous year, this figure was 1,847,930 units, which corresponds to an increase of around 5.5 %. The growth is even more pronounced compared to 2022 - 1,605,950 new vehicles were registered in this year. This represents an increase of over 20 %.

But there is also growth potential here. In the peak year of 2019, 2,087,162 units were registered within one year.[3]

According to ACEA, this positive development is primarily due to a very positive trend in delivery vehicles/vans (+8.3 %) and buses (+9.3 %). There was a decline of -6.3 % in heavy goods vehicles.[4]

The reasons for this are complex. The rising demand for light delivery vehicles is due to an increased need for freight/logistics/road transport. In general, the availability of capacity is described as good. However, there are still bottlenecks in the area of drivers, for example. The logistics chains at suppliers for the production of new vehicles also do not always function smoothly. In addition, warehouse/warehouse traffic continues to increase. On the other hand, the economy is slowing down in general, which is particularly evident in delivery traffic with heavy goods vehicles and the associated decline in the willingness of transport companies to invest.

The figures presented illustrate a recovery in the vehicle market, although this is currently only reflected in the European composites market in very different ways. On the one hand, there is weakness in the passenger car business, the full impact of which will probably not be felt until later in the year, while on the other, good business in the commercial vehicle sector appears to be slowing the decline somewhat at present.

4 Trend developments in processes/parts

Table 1 shows the quantitative development of the main processes/parts for composites production in recent years. The naming of individual segments is not always completely stringent or clear-cut. In addition to the processes, there are numerous other

[3] https://www.acea.auto/figure/new-commercial-vehicle-registrations-in-eu/

[4] ACEA: https://www.acea.auto/cv-registrations/new-commercial-vehicle-registrations-vans-8-3-trucks-6-3-buses-9-2-in-2024/

production processes/technologies that can essentially be assigned to one of the areas mentioned.

	2020	2021	2022	2023	2024
SMC (kt)	174	197	190	202	187
BMC (kt)	70	81	78	79	72
SMC/BMC (kt)	**244**	**278**	**268**	**281**	**259**
Hand lay-up (kt)	121	135	120	107	94
Spray-up (kt)	88	97	85	79	71
Open mould (kt)	**209**	**232**	**205**	**186**	**165**
RTM (kt)	**131**	**138**	**130**	**123**	**113**
Sheets (kt)	85	92	84	76	70
Pultrusion (kt)	50	56	52	50	48
Continuous processing (kt)	**135**	**148**	**136**	**126**	**118**
Filament winding (kt)	70	72	68	60	56
Centrifugal casting (kt)	60	65	62	54	48
Pipes and Tanks (kt)	**130**	**137**	**130**	**114**	**104**
Non-Crimp-Fabrics (kt)	**270**	**302**	**255**	**230**	**212**
Others (kt)	**15**	**15**	**14**	**13**	**12**
Total Market Thermoset (kt)	**1.134**	**1.250**	**1.138**	**1.073**	**983**
GMT (kt)	**29**	**27**	**25**	**23**	**22**
LFT (kt)	**93**	**119**	**105**	**90**	**88**
CFRTP (kt)	**10**	**10**	**12**	**10**	**10**
Short Fibre (kt)	**1.190**	**1.504**	**1.444**	**1.300**	**1.248**
Total Market Thermoplastics (kt)	**1.322**	**1.660**	**1.586**	**1.423**	**1.368**
Total Composites Market (kt)	**2.456**	**2.910**	**2.724**	**2.496**	**2.351**

Table 1: Composites production volumes in Europe by process/parts (kt = kilotonnes)

Figure 9 below illustrates the long-term development of the various market segments as a long series since 2011.

The short glass fibre reinforced plastics have been excluded from the analysis here. On the one hand, this serves to provide a better overview, and on the other hand, the differences between this material group and the GRP industry have already been pointed out above: The material properties of short glass fibre-reinforced materials differ from those of long and continuous fibre-reinforced systems, in some cases significantly. The glass fibres contained are generally less than 2 mm in length. Nevertheless, they increase the property level compared to non-reinforced materials. In particular, there is a positive influence on the modulus of elasticity and the stiffness of the materials. With increasing fibre length, there is also an increase in strength and impact strength.

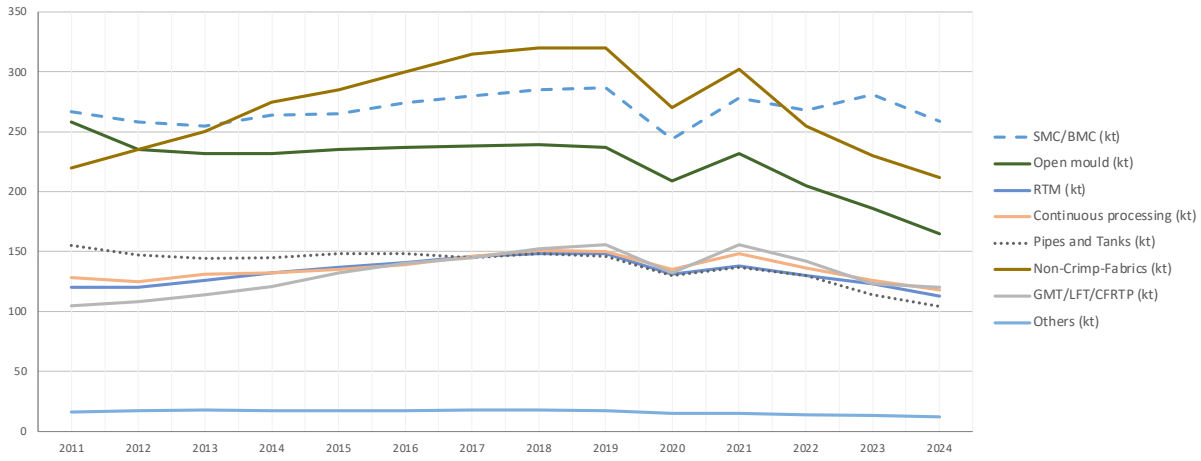

Figure 9: Long-term development of selected composites market segments (in kilotonnes)

It is clear to see that SMC/BMC are now once again the largest single segment in the European GRP market (all thermoset and long and continuous fibre-reinforced thermoplastic materials). These are often used in large series applications in the electrical/electronics and transport sectors, as well as in the construction and infrastructure sectors. Non-crimp fabrics form the second largest group. Applications here are mainly in the wind energy/rotor blade sector and in boat building. In third place are the so-called open processes, which are often strongly characterised by craftsmanship. In terms of volume, the other processes mentioned here are almost at a similar level. It is clear to see that all market segments will be affected by declines in 2024.

The following is an individual assessment of the segments recognised here.

4.1 SMC/BMC

With a processing volume of 259,000 tonnes, the production of SMC (sheet moulding compound) and BMC (bulk moulding compound) components is the largest market segment in the thermoset GRP industry. Both processes account for more than 22 % of the European market volume. The semi-finished products/compounds are processed using pressing and injection moulding processes.

SMC/BMC are primarily used in (large-scale) series production. Both materials have been successfully established in the electrical/electronics and transport sectors for many years. Together, these two application segments account for an estimated 90 % of the market volume in this segment, with the transport sector accounting for over 60 % of the total volume.

Typical applications include headlight systems, lamp housings, control cabinets, housings and exterior components in the commercial vehicle and automotive sectors as well as in public transport. In recent years, applications in the e-mobility sector have increasingly been added, particularly in the area of battery housings and -covers as well as charging infrastructure.

While SMC/BMC was one of the few segments to report growth in 2023, the picture for 2024 is also negative. The production volume will fall by almost 8 % over the course of the year following growth of 4.9 % in 2023, with developments varying over the course of the year. The picture was still positive in the first half of the year, primarily due to demand for battery covers from individual OEMs. This was reversed in the second half of the year and the market slipped into negative territory. The reasons for this include regulatory uncertainties in specific areas of application and the slowdown in demand in the passenger car, construction and infrastructure sectors. A number of battery cover projects in particular were postponed in the second half of the year.

SMC is the significantly larger of the two market segments, with a volume of 187 kilotonnes (kt). The market volume for BMC is 72 kt. The SMC market will decline by 7.4 % and the BMC market by 8.9 % in 2024.

4.2 NCF - Non-Crimp Fabrics

In the 2000s up until the coronavirus pandemic, this area experienced above-average growth. Production peaked in 2018/2019 with a total volume of 320 tonnes. NCF became the largest market segment within the European composites industry.

However, a severe recession is currently being felt here too. For the third year in a row, a decline in production volume must be reported for 2024. Overall, the market segment is losing 7.8 % and still accounts for a volume of 212 kt. In the past five to six years, NCFs have therefore lost almost a third of their market volume in Europe.

The main areas of application are the wind industry and boat and shipbuilding. There are also individual applications in the areas of transport/local public transport, sport and leisure as well as construction and infrastructure.

Sustainability, renewable energies and the wind industry in particular are repeatedly cited as potential growth drivers, including for the composites industry. However, it has been proven that the industry is currently unable to benefit from the opportunities that present themselves on the surface. A paradox that can only be explained on closer inspection.

The fact is that modern wind turbines would be inconceivable without blades made from composites. The nacelles, for example, are also made from composites. Germany is the European and global leader in this sector. Around 25 % of the total capacity installed in Europe (278 megawatts) is located in Germany (70 MW). And Germany is continuing to invest. It will also be the leader in new installations in 2024 (see Fig. 10). If the forecasts are to be believed, this trend will continue. Other countries are also continuously investing in the wind industry as a future technology for a sustainable energy supply.

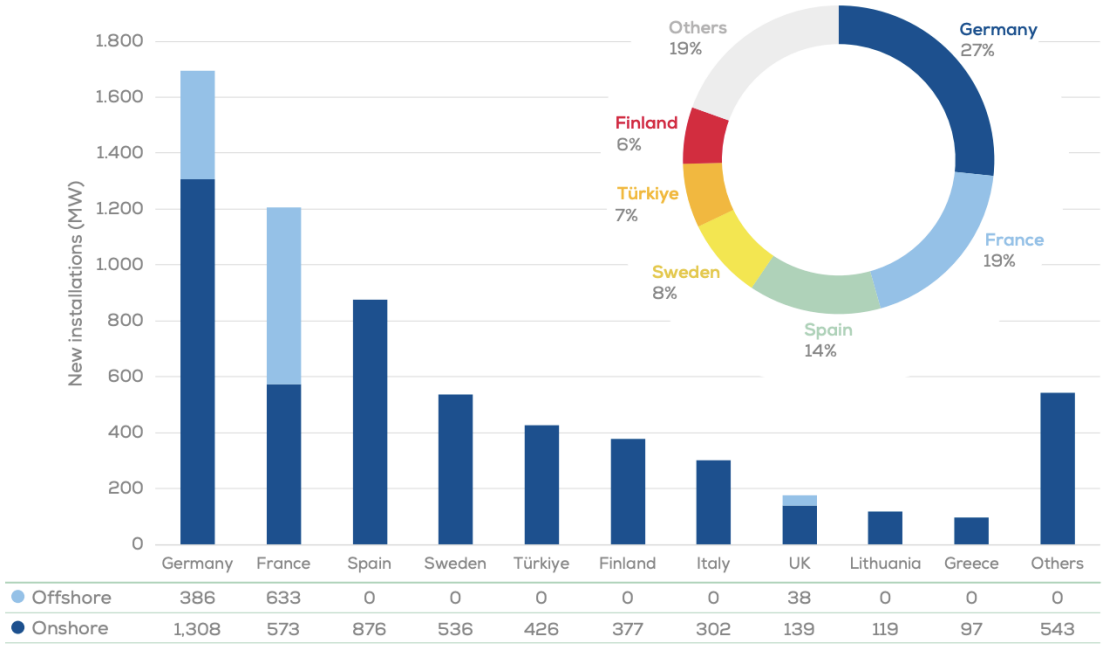

Figure 10: New onshore and offshore wind turbines in Europe in the first half of 2024 (source: WindEurope)

For 2030, WindEuropa (Latest wind energy data for Europe - Autumn 2024) forecasts a capacity of almost 110 megawatts for Germany and almost 350 MW for Europe. The composites industry should receive key growth impetus here. However, this is not happening at the moment, rather the opposite is the case.

A paradoxical phenomenon that was already evident in the early 2000s. Germany was a leader in the solar industry. As part of political decisions, the feed-in tariff was drastically reduced. The industry slid into crisis and production gradually migrated to China. Attempts to reverse the decline through import tariffs also failed. The production of German modules came to a virtual standstill. The European/German solar industry, which was actually a prospering market, now benefited primarily from Asian manufacturers. European companies succumbed to price competition.

A similar picture is currently emerging for composites in the wind industry. While Europe/Germany used to be the global leader, particularly in the production of system components and blades, manufacturing has now almost completely disappeared from Europe - and with-it numerous players along the entire supply chain.

There are only a few manufacturers that still produce in Europe. Almost all system components made from composites now come from Asia. Even if European manufacturers from other sectors are currently still benefiting from the systems, the starting position of European suppliers is deteriorating drastically.

For some years, it was more of a fear than a reality that Chinese companies could participate in entire tenders in Europe. Recently, it has become clear that the reality has reached European supply chains: "The dam burst a few years ago in Italy: Beleolico, the first wind farm in the Mediterranean, was built with Chinese wind turbines. For almost three years now, ten small 3-megawatt turbines from Mingyang have been supplying 60,000 people in the Italian boot heel with wind power "Made in China". Last summer, the second domino fell in Germany. The Waterkant project in the North Sea also decided to equip the wind farm with turbines from Mingyang. Near Borkum, 16 huge turbines with an output of 18.5 megawatts are to be installed in the water. (...) Chinese manufacturers are already bidding for a wind farm in French Brittany with a new and gigantic 20-megawatt turbine. (...) Chinese manufacturers, on the other hand, have not only caught up with the European pioneers in terms of technology. They offer their customers generous financing conditions such as years of deferred payment. On average, Chinese turbines also cost 20 per cent less than the European or North American alternative. In some cases, they are even said to be up to 50 per cent cheaper - despite the high delivery costs incurred for the cumbersome transport of the huge turbines by sea."[5]

Once again, we are experiencing a decline in the European renewable energy industry. Despite necessary and politically desired growth, European industry is unable to profit. We are placing an extremely sensitive area, the basic energy supply, in the hands of Asian suppliers/providers. Our own supply chains are being lost. This is a fatal development from the point of view of energy security and European industry.

[5] https://www.capital.de/wirtschaft-politik/windenergie--chinas-naechster-angriff-auf-europas-zukunftsbranchen-35444190.html

The European Union is beginning to react with investigations and the establishment of corresponding European quotas. However, these are hardly taken into account in tenders. This is a fatal signal for the composites industry. It remains to be seen whether it is not already too late and history will repeat itself.

The wind industry could be a growth driver, especially against the backdrop of a difficult macroeconomic situation. At present, it is not and is therefore additionally fuelling the negative trend in the European composites industry against the backdrop of an overall increase in market volume worldwide.

4.3 Open procedures

The open process segment - hand lay-up and fibre spraying - remains one of the largest segments in the GRP market in Europe with a production volume of 165 kt. However, this market segment also declined significantly in 2024, by an above-average 11.3 %.

For many years, the share of open procedures in the overall market has steadily decreased. In the course of the coronavirus pandemic, however, there have been individual, specialised applications that have significantly increased demand. Due to the lockdown and the associated travel restrictions, swimming pool construction, for example, has developed very positively in many cases. The corresponding willingness of private households to invest was very high. This exceptionally positive effect is now over. The general trend of open procedures losing market share continued. While the market share of open systems was still at 20 % in 2011, it has now fallen to 14.1 %. In absolute figures, the production volume has fallen from 258 kt to the 165 kt now reported in the same period.

In general, open processes will nevertheless make an important contribution to GRP production volumes in the coming years. Due to their low investment costs, these processes are often the method of choice for customised production, one-off production or small batch sizes in particular. For the production of large components or highly complex products, fibre spraying and manual lamination are still very well suited as the most original forms of GRP processing.

The ongoing and increasing tightening of the legal framework for processing, particularly for unsaturated polyesters/styrene, as well as adjustments to the limits for other raw materials are making production in Europe increasingly difficult and costly. In addition to the tightening of the legal framework, which in some cases requires costly renovations/conversions of production facilities, the industry reports that it is becoming increasingly difficult to find suitable or well-trained labour. This makes production even more difficult.

4.4 RTM

In this report, the RTM (Resin Transfer Moulding) segment covers all processes in which resin is infused/injected into a closed cavity. In addition to the various injection processes (HP-RTM, P-RTM, RTM-Light, etc.), this also includes infusion processes. Not included are those RTM processes in which the above-mentioned NCFs are used.

In recent years, many different variations of the RTM process have been developed. What all processes have in common is that dry fibres/semi-finished fibre products are used. The coated mould (in addition to corresponding fibre products, core materials can also be used, for example) is then sealed or closed. The resin flows through the cavity in the closed mould either with the help of pressure and/or vacuum. The fibres and corresponding additional products/semi-finished products are flowed around or through.

After a phase in which RTM processes were able to develop continuously, the European production volume here also fell by 8.1 % to a total of 113 kt. This means that the decline is roughly as high as that of the entire thermoset composites market.

The production spectrum of this technology is very broad and the process variants diverse. In addition to small quantities, larger series can also be produced. It is possible to produce both small components and larger products. In addition, a variety of different fibre and matrix systems can be used. Typically, corresponding preforms are also used.

The areas of application are correspondingly broad, ranging from vehicle construction, public transport, boat and shipbuilding to the sports and leisure sector and aviation.

4.5 Continuous processes

The production of GRP components using the so-called continuous processes (pultrusion and production of flat sheets) shows a decline in production volume of 6.4 % in 2024. Overall, the production level for pultrusion will fall by 4 % to a volume of 48 kt. For flat sheets, there will be a decline of 7.9 % to a volume of 70 kilotonnes.

Panels have been produced for years, primarily for vehicles, e.g. for side panelling on trucks, caravan bodies or for the conversion of commercial vehicles. There are also applications in the façade sector or for interior fittings. Like swimming pool construction, the caravan industry has also benefited from an exceptional market environment since the start of the coronavirus pandemic. The market is currently experiencing an opposing trend.

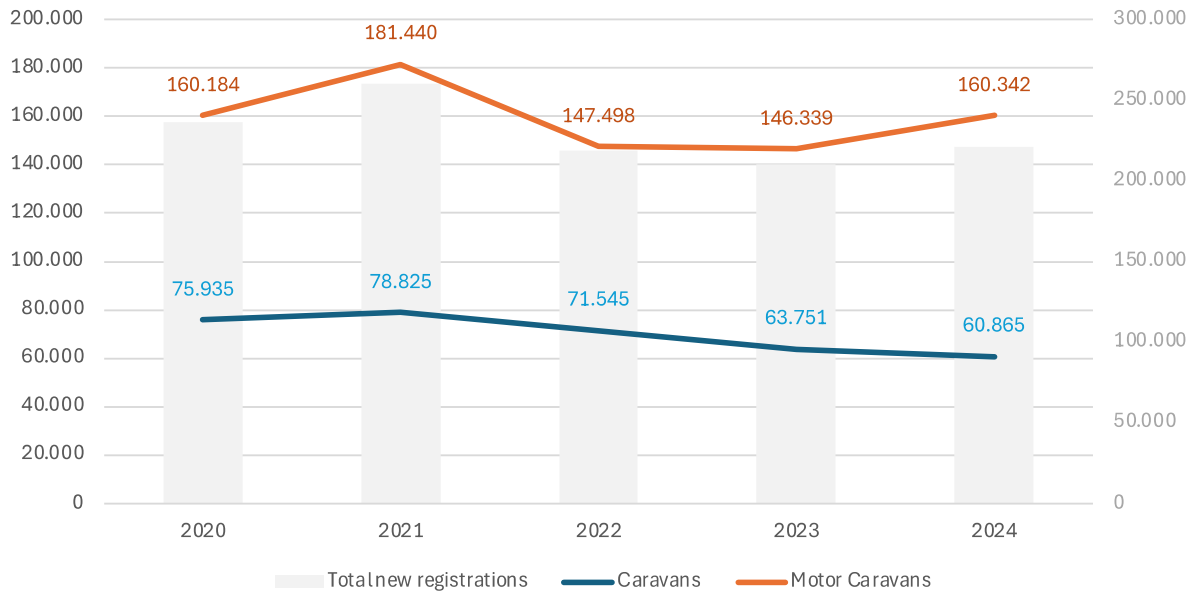

Figure 11: Registrations of new leisure vehicles in Europe

The ECF (European Caravan Federation) shows a decline of 4.7 % in new caravan registrations in Europe between 2023 and 2024, but an increase of 9.5 % for caravans. Overall, the market is therefore developing positively, increasing by 5.2 % to 221,207 units.

The declines that can nevertheless be seen in this market segment can therefore only be explained by corresponding import/export effects or by a weakness in the commercial vehicle segment.

Pultrusion is used to produce continuous profiles. Like SMC/BMC technology and thermoplastic processes, pultrusion is often considered to have an extremely promising future due to its process specifics.

The construction and infrastructure sector in particular has been recognised as a potential major future market in pultrusion for several years. These include, for example, the area of reinforcement systems in bridge and building construction, window and staircase/ladder profiles, as well as antenna systems (keyword 5G network). In addition to lightweight construction, other specific material properties play a key role in these areas in particular. These include, for example, the permeability of radio waves, corrosion resistance, extensive freedom from maintenance, the possibility of load-compliant design and the non-conductivity of current and temperature.

In many cases, however, there is still a lack of corresponding general approvals and norms/standards, which would further accelerate their use. This lack of "safety" still leads to great reluctance on the part of many architects and material decision-makers. In addition, many decision-makers are still unaware of the positive properties of GRP compared to other building materials.

Existing applications in the construction and infrastructure sector are currently facing major challenges due to a weakening construction industry. Although the order books are still well filled, new orders are often not materialising. High interest rates and material costs coupled with the high cost of living are having a particularly negative impact on private construction, but public construction is also currently unable to achieve the targets it has set itself.

4.6 Pipes and tanks

The market segment of GRP pipes and tanks, manufactured using centrifugal or winding processes, fell by 6.3 % in the year under review.

The production volume totalled 104 kt in 2024, with 56 kt attributable to the winding process and 48 kt to the centrifugal process.

The main areas of application for GRP pipes and tanks are plant construction, public and private pipeline construction and the oil/gas and chemical industries as users.

This segment is currently dominated by a few large producers that have a comparatively large amount of material in their operational throughput for the GRP industry.

GRP pipe/tank and plant construction is a typical area in which GRP materials have numerous advantages. These include, for example, excellent resistance to aggressive media such as salting.

In addition, the maintenance intervals when using GRP and the service life of the systems can be significantly extended. The load-bearing design is also an enormous advantage in many areas of application.

There is still a high potential for growth in the pipe sector, but especially in tank and plant construction, which can be utilised, for example, by further improving the general perception of the materials. There are also numerous research activities, particularly in the field of winding technology. For example, hydrogen tanks are currently being wound (using carbon fibres) that can withstand a pressure of several 100 bar and are also very light. This opens up very interesting potential fields of application for the future, for example in the automotive sector, which does not yet account for a significant market share.

Despite these generally positive future prospects, this sector is also particularly affected by the weaknesses in the construction and infrastructure sector and the generally difficult economic situation. In particular, there is currently a lack of major new investment in plant construction. Although maintenance and repairs are still being carried out, new orders are largely lacking.

4.7 LFT/GMT/CFRTP

In the following presentation, short glass fibre reinforced plastics are considered separately from the long and continuous fibre reinforced thermoplastics LFT/GMT/CFRTP.

The latter group has similar issues regarding material properties, areas of application and, in some cases, processing as long and continuous fibre-reinforced thermoset materials.

Materials with a short fibre reinforcement (less than 2 mm fibre length) differ from LFT/GMT/CFRTP in terms of the influence on the material properties and the (load-appropriate) design.

Figure 12 below provides an overview of the development of this market segment. The market for GMT declined by 4.3 % to a total volume of 22 kt in 2024. The decline was therefore slightly higher than that of the overall market for thermoplastic materials, which shrank by 3.9 %.

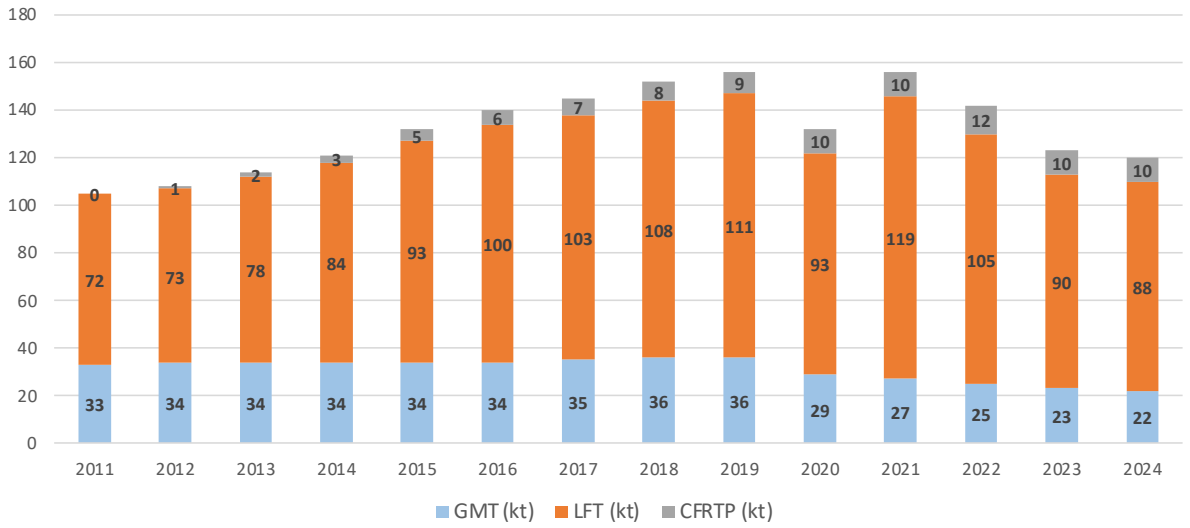

Figure 12: Market development LFT/GMT/CFRTP (in kt)

LFT (long fibre reinforced thermoplastics) will lose 2.2 % overall in 2024 and reach a production volume of 88,000 tonnes. CFRTP (continuous fibre-reinforced thermoplastics) remain a niche product. There were no significant changes here, which should be seen as a positive sign against the backdrop of a generally declining market. The market segment reaches a volume of 10 kt.

This market segment in particular is highly dependent on the transport sector. Almost the entire volume recorded here is likely to flow into the transport sector. The automotive sector is also a key factor here.

However, there are also good opportunities for tapes, especially with carbon fibre reinforcement, in the aviation industry, for example. However, the high cost structure of the materials, both GFRP and CFRP, often represents an obstacle to their future use in the automotive segment.

4.8 Short glass fibre reinforced thermoplastics

Even if the properties of short glass fibre-reinforced materials sometimes differ significantly from those of long and continuous fibre-reinforced systems - as mentioned above - this important group of materials is still classified as composites - not least because it is a plastic reinforced with fibres. The glass fibres contained are generally less than 2 mm in length. Nevertheless, they significantly increase the level of properties compared to non-reinforced materials. Above all, there is a positive influence on the modulus of elasticity and the stiffness of the materials. With increasing fibre length, there is also an increase in strength and impact strength.

The European market for thermoplastic short glass fibre reinforced materials will decline by almost 4 % in 2024. The production level will fall to 1,248 kt (source: AMAC).

Nevertheless, short glass fibre reinforced thermoplastics remain by far the largest single segment in the composites industry. The production level falls significantly behind the pre-corona level (see Fig. 13).

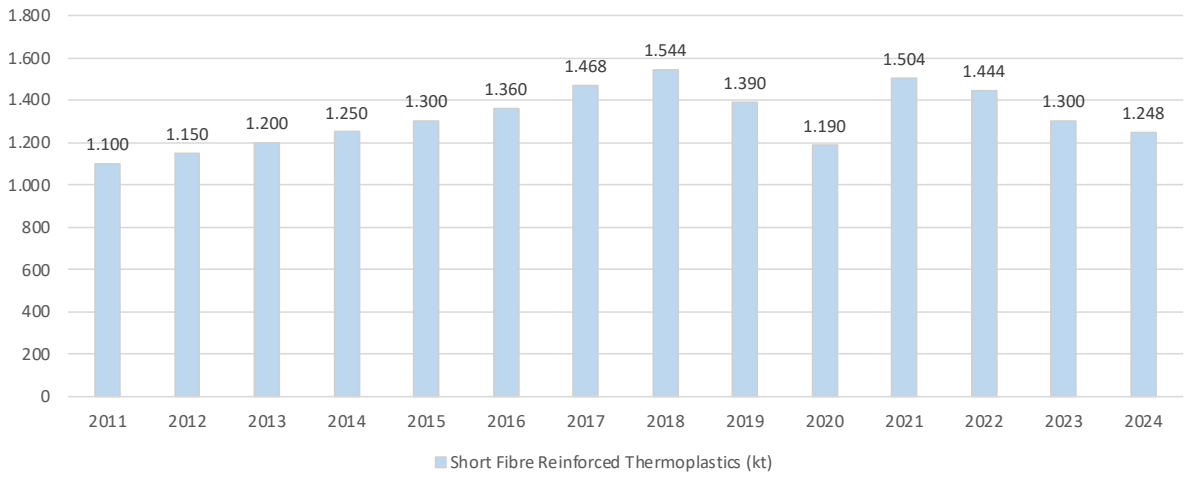

Figure 13: Market development of short glass fibre reinforced thermoplastics (in kt)

In terms of materials, the market described here is dominated by polyamide (PA). The second largest group is polypropylene (PP). Together, these two material systems account for over 80 % of the resin systems used. A different picture emerges in the LFT sector mentioned above. Here, PP is used for the most part.

Overall, the significant decline is likely due to the high importance of the automotive segment for these materials and the structural changes in the vehicle sector, as discussed above.

5 Regional market development

The regional market distribution within Europe is analysed below. The underlying data includes all long and continuous fibre-reinforced thermoset materials. Thermoplastics are not included in the regional analysis, as there is currently no regional breakdown of these material volumes.

The percentage shifts by regional focus only changed in 2024 compared to 2023 in the post-comma area. Overall, all regions covered were affected by absolute declines.

The German thermoset market will reach a volume of 187 kt in 2024 (2023 = 208 kt). With a share of 19 %, Germany is currently the largest market within the regions covered, as in the previous analyses (see Fig. 14).

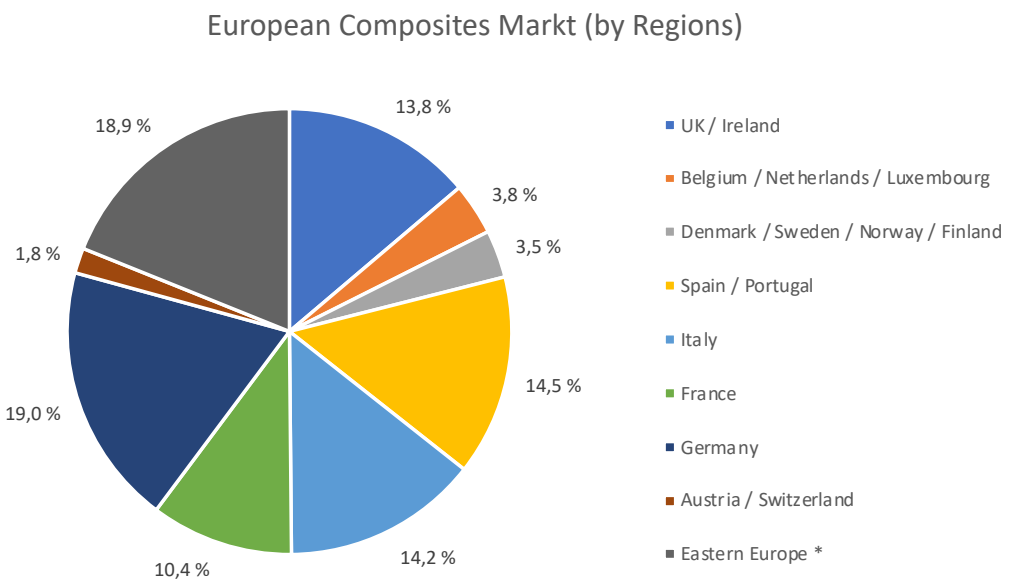

Figure 14: Regional distribution of the European market

The Eastern European countries follow in second place with a market share of 18.9 % and an absolute volume of 186 kt (2023= 204 kt). This region includes Poland, the Czech Republic, Hungary, Romania, Serbia, Croatia, Macedonia, Latvia, Lithuania, Slovakia and Slovenia. It is not always possible to clearly allocate individual volumes/material flows, which is why these countries are summarised here in a fairly large group. However, the Polish market in particular is highly relevant in this region.

With a processing volume of 143 kt (2023 = 152 kt), Spain/Portugal is the third-largest group. The market share is 14.5 %. Just behind Spain/Portugal is Italy, with a market share of 14.2 % and a composites processing volume of 140 kt (2023 = 150 kt). Together, these four regions account for almost two thirds of the European composites market. Within this group, both Italy (+0.2 %) and Spain/Portugal (+0.3 %) were able to gain slight market shares. Both the German market (-0.4 %) and the Eastern European market (- 0.1 %) lost market share.

The next largest processing region within the countries covered here is the UK/Ireland with a market share of 13.8 % and a volume of 136 tonnes. France is well behind with a market share of 10.4 % and an associated production volume of 102 tonnes. The UK market was able to gain market share in proportion (+0.2 %). The share of the French market within Europe fell by 0.4 %.

The declines in Germany and France in particular are currently in line with the overall economic trend, which is weaker in both regions than the European average - a further indication of the composites industry's high dependence on macroeconomic developments.

The remaining three, rather smaller, processing regions are led by the Benelux countries. A volume of 37 kt was produced in these countries in 2024. This region therefore accounts for a share of 3.8 %. The volume in the Northern European countries (Denmark, Sweden, Norway and Finland) was slightly lower. This region accounts for a volume of 34 kt of composites and a 3.5 %share of the overall European thermoset market. Austria/Switzerland accounts for the lowest percentage and therefore also the lowest volume share. A total of 18 kt of thermoset composites were produced there in 2024. This leads to a market share of 1,8 %.

In addition to this pure volume analysis, it is also important to bear in mind that the composites industry has very different centres of gravity in almost all regions. Accordingly, the various countries/regions are often affected very differently by macroeconomic developments. A pan-European analysis can therefore only ever provide a rough indication of developments or give an indication of fundamental trends. In detail and depending on the specific core markets and primary applications within the countries, there are often very different developments.

In Turkey, for example, pipe and tank systems dominate the market in terms of volume with a share of almost 30 %. In Germany, on the other hand, they play a rather subordinate role. Here, automotive applications and the electrical/electronics industry are dominating, as in the Scandinavian countries of Norway/Sweden, applications in the oil and gas industry.

The market figures for the Turkish composites market have also been presented here for several years. Due to a very small database, they are still shown separately here. For Turkey, the Turkish trade association TCMA reports a total volume of 246 kt for 2024 (2023 = 330 kt). This would make Turkey a significantly larger individual market than the other European countries analysed here. On the production side, continuous processes dominate with the manufacture of pipes/tanks and profiles.

Other important areas are SMC/BMC, open processes and RTM technology. The main application areas are automotive, electrical/electronics, infrastructure, energy and shipping.

6 Other composites materials - CFRP and NFRP

In addition to the material groups discussed in detail in the previous report, carbon fibre-reinforced plastics (CFRP) and natural fibre-reinforced plastics (NFRP) are the most important material groups in terms of volume.

The CFRP market volume continued to develop very dynamically in 2024. There is a significant expansion of production capacities for carbon fibres worldwide, whereas these are stagnating in Europe. Global demand for carbon fibre-reinforced plastics will increase by 7.7 % in 2024; specific demand data for Europe is not available (source: Composites United).

No new information is currently available for NFRP. According to a survey conducted by AVK in 2020 within this special composites segment, thermoplastic materials are predominantly used in this market, although thermosets are also used. Unfortunately, no current data is available on the exact processing volume.

The largest area of application is the automotive sector, followed by the consumer goods industry. Mainly flax, hemp, jute and kenaf are processed. On the processing side, compression moulding dominates production. Injection and extrusion processes are also used. In regional terms, Germany, France and some Eastern European countries (Poland, the Czech Republic and Slovenia) dominate processing.

Natural fibre-reinforced plastics are mostly used due to their special material properties (low weight, low costs, sound insulation, good mechanical properties). However, they can also help to positively influence the ecological balance of a product. There are numerous opportunities for future market development in this area in particular.

7 Final comment

The European (composites) industry is at a crossroads - An appeal to value creation

"If you realise you're riding a dead horse, get off!"

This simple and succinct statement is attributed to the Dakota Indians. Regardless of how accurate the image is or who coined the wisdom, this image inevitably comes to mind in the current discussion about the future viability of industry in Europe.

Key indicators are pointing downwards. The automotive industry is experiencing one of the worst crises in its history. The construction industry is weakening. Energy and consumer prices are high. Incoming orders in the manufacturing industry have been falling continuously for months. The propensity to consume among private individuals is still at an all-time low and has barely recovered since the coronavirus pandemic (see Fig. 15). However, what is not purchased in real goods does not have to be produced.

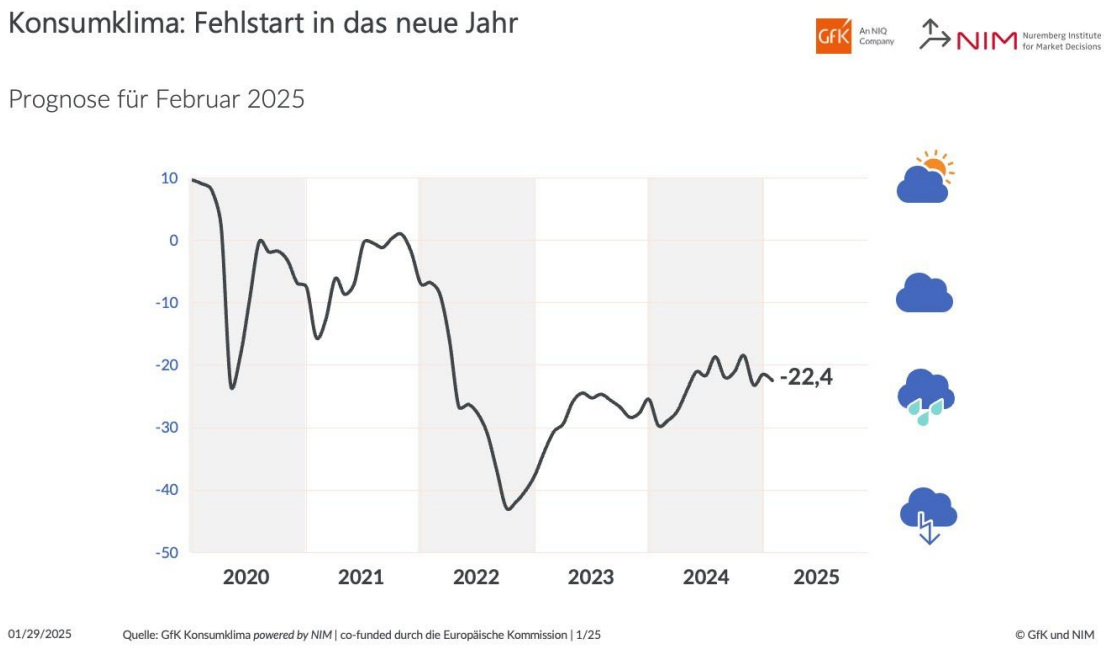

Figure 15: Consumer Climate Index Germany

In an assessment from November 2024, the OECD comes to the following conclusion: "Stable but lacklustre: the global economy is staggering but not staggering (...) A shift in consumption away from goods and towards services is leading to a revival of the service sector worldwide, but is dampening the manufacturing industry.

Its production is also increasingly shifting to the emerging markets - especially China and India - against which the established industrialised nations are losing competitiveness." And further: "Without a strong impetus for structural reforms, the IMF sees only mediocre growth in the medium term. Structural challenges such as an ageing population, weak investment and historically low productivity growth will continue to hold back global growth. (...) The medium-term outlook for the advanced economies is unchanged from previous projections. Although a revival in investment and some normalisation of productivity growth is expected, the ongoing demographic burden is likely to counteract this.[6]

So, is it time to get off the horse? Is the European (composites) industry really finished, and will it ultimately have to bow to the fact that production can be better and cheaper in other regions?

From the point of view of the European composites industry, this is the wrong way to go!

Europe is in a time of profound upheaval. No one can expect such a revolutionary change to be completed in the shortest possible time. It is not enough to flip a switch and find the one measure that will restore old conditions, only in a better light.

There will be no one single measure and even supposedly simple political recipes, as can currently be heard in almost all countries, will inevitably come to nothing. A return to local/national strategies is often cited as a way of getting to grips with the problems. But precisely the opposite has been the case in recent decades, with enormous growth in prosperity in the EU too - trade and the economy only work across borders. Industry is subject to a high degree of complexity consisting of processes, dependencies and mutually influencing conditions. There are a large number of adjusting screws that have to be moved in a coordinated manner.

[6] https://www.bmwk.de/Redaktion/DE/Infografiken/Schlaglichter-der-Wirtschaftspolitik/2024/12/10-download.pdf?__blob=publicationFile&v=6

European industry has an enormous influence on the overall economic development of the entire region.

In Germany, the manufacturing industry accounted for 20.4 % of total economic output/gross value added in 2023, while the EU average was still 16.4 %.[7] Simply writing it off and trying to replace it with something else will not work or would involve cuts that would shake European development to its foundations. Nevertheless, industry in Europe is stumbling and has been doing so for years. "Business as usual" in times of crisis will not work.

One pattern of action can currently be recognised very clearly in the European and especially the German automotive industry: Production costs must be reduced and efficiency increased. This requires the streamlining of structures and the divestment of underperforming areas a measure that can have significant short-term effects.

This raises the question of medium-term sustainability. Is it enough to turn one adjusting screw, in this case the costs, in order to remain competitive in the medium term? Will the European economy be able to catch up with the currently supposedly strong Asian and American markets by cutting costs? This question doesn't really need an answer: it won't be enough.

Shouldn't we instead be asking what has characterised our industry for many decades and has become the European USP, so to speak?

It was quality, a willingness to innovate, a drive for research and the will to change. European industry will not win a price competition, especially against China. This is nothing new. We have been seeing a migration of commodities for decades. Initially in the form of the extended workbench and today also for highly complex products. The quality does not even have to be worse.

So, should we write the horse off after all? No!

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[7] https://www.destatis.de/Europa/DE/Thema/Industrie-Handel-Dienstleistungen/Industrie.html#:~:text=Im%20EU%20%2DDurchschnitt%20entfielen%20rund,Daten%20in%20der%20Eurostat%20Datenbank.

European industry must set itself new goals and utilise the opportunities and possibilities that arise. The industrial future seldom emerges of its own accord. It needs to be actively recognised and shaped. Challenges can become crises - or open up new opportunities.

The entire sustainability debate with all its legal and political consequences can be a burden for the economy. However, it also represents an enormous opportunity, especially for composites. Politically driven, new markets are opening up. Renewable energy, new drive systems, changes in urban areas. Composites can bring their advantages to bear everywhere and, if necessary, capitalise on them. The example of the wind industry above shows that there must also be the political will to support the European industry - together, this could create enormous growth markets. Mutual recriminations will not help, only a joint approach to utilising these opportunities. The basic prerequisite is the creation of fair international competition with equal conditions. Politicians are called upon to act. There is an urgent need to create a climate that favours business. This must go beyond political concessions and be put into practice. Party political dogma will not help, only the introduction of concrete measures to relieve or, even better, promote the European economy.

There is no longer any debate about the need for sustainable action. Something must be done to get a grip on man-made climate change. This fundamental structural change must also be financed. This requires enormous financial expenditure that can only be generated by the economy/industry. To burden one's own economy to the point where it cannot exist means drying up one's own source.

Another basic requirement is to drive forward product innovations. This is where industry and research institutions are in demand. Only if the entire value chain, from the idea to the raw materials to the finished product, works together can real innovations be created.

Europe has the best conditions with an excellent university landscape and a healthy SME sector as well as industrial companies, and this is exactly where we need to start. Innovations must be authorised and made possible. This requires investment, which is an additional hurdle in economically challenging times. Joint research activities offer an optimal means, either bilaterally or publicly funded.

In many cases, the opportunities for process innovation and optimisation are still being used hesitantly. This also includes digitalisation and the use of AI and robotics. Innovations are made by people, not (yet) by machines. The possibilities are not limited to the synchronisation of production robots. Europe must catch up and not lose touch with the world leaders. This also includes opening up one's own company. Networks and partnerships will play an enormous role in the future. Ideas generally fertilise new ideas. The more openly you deal with them, the more you can think outside the box.

Whilst this is not an exhaustive list, it should make it clear that there is no simple solution. The challenges are too great. For too long, however, some sectors of industry have been self-sufficient and have not developed sustainable concepts or have done so inadequately. The current crisis was not triggered by the coronavirus pandemic alone. The problems started earlier and originated long before that. Corona has only significantly increased the impact. Reaching for tried and tested means to improve companies' balance sheets in the short term will not help the industry in the medium term, but on the contrary will lead to a sell-off of people, machines and expertise. We now need to take decisive and, above all, joint countermeasures, not to achieve small profits in the short term, but to reorganise European industry in the medium and long term.

Composites are a group of materials with enormous possibilities and potential, today and above all in the future, especially in view of the current challenges and opportunities.
The European composites industry is not dead. The horse just needs to recover and get back on its feet, then it can continue to be ridden.