COMPOSITES UNITED

MARKET REPORT 2024

THE GLOBAL MARKET FOR CARBON FIBERS AND CARBON COMPOSITES

Market Developments, Trends, Forecasts and Challenges

– freely accessible short version –

SHORT VERSION

Michael Sauer

Table of contents

Contents of the extended version:
(exclusive for members of Composites United;
available for purchase by non-members)

List of illustrations

Contents of the extended version:
(exclusive for members of Composites United;
available for purchase by non-members)

About Composites

Composites United e. V. (CU) is one of the world's largest networks for fiber-based, multi-material lightweight composites. Around 350 members have joined forces to form this powerful industry and research association in order to jointly develop the lightweight construction solutions of the future. Several regional clusters and specialist networks support the association's activities throughout the DACH region, as well as international representative offices in Japan, South Korea, China and India.

The CU was created with effect from January 1, 2019 from the merger of the two existing associations Carbon Composites e. V. and CFK Valley e. V. The CU is based in Berlin, and the association is also represented at locations in Augsburg and Stade, as well as by local representatives at numerous other locations. Further information on the activities of the CU can be found at: www.composites-united.com.

About the author

Michael Sauer studied materials science at the University of Augsburg. After working at OSRAM AG and Premium Aerotec AG, he currently works as a project manager and senior business developer at Fraunhofer IGCV. He is currently working on his doctorate at the Technical University of Munich in the field of recycling carbon fibers. He has been working for Composites United in the Market Report department since 2017 and has been the first author of the annual market report since 2018.

Important Note: Published short report version

Composites United e. V. expressly points out that this version of the Composites Market Report 2024 is a published shortened version. It can be quoted without restrictions.

A corresponding non-published extended version with a significantly larger overall scope is available from Composites United e.V. This extended version cannot be quoted without restrictions and is not released for publication by of distribution to third parties. The extended version is personalized and its basic use is reserved for the members of the Composites United for their internal use as a source of information. However, the extended version may also be purchased by third parties. Composites United e.V. reserves the right to release and/or publish it in individual cases.

For further questions, please contact:

market.report@composites-united.com

1 General information

Now in its fifteenth edition, the Composites United e. V. (CU) market report - The global market for carbon fibers and carbon composites - has been published annually since 2010 as an overview of current market developments in the field of carbon fibers (CF) and carbon composites (CC).

For this report, information and data were provided by members of the CU or collected by CU employees themselves and verified and supplemented with the help of external market data.

The CU expressly points out that the information shown here can never provide a complete overview of the actual market conditions due to the complex and dynamic market development with individually differing data sources. The aim of the CU is to provide an overview of current trends and overarching development directions based on the sources provided. All information is non-binding and without guarantee, so that no claims can be made against the CU, e.g. for utilisation in a commercial sense.

It should also be noted that direct comparisons with previous versions of the report or external market reports must take into account the framework conditions applicable in the individual case and any assumptions made. In the interests of the best possible comparability, the CU endeavours to achieve a uniform and consistent presentation in its publications on the basis of the available data. Although new content is constantly being added, the structure chosen for this purpose is as consistent as possible.

The sometimes very dynamic developments in combination with economic and political measures that are difficult to predict in the short term make reliable forecasting even more difficult. This applies in particular to the forecasts shown for specific areas. In this respect, it must be emphasised that the illustrations, diagrams and data shown can only represent a possible

scenario of future developments. The exact nature of the underlying influencing factors must be continuously monitored. However, it is of course a clear concern of the CU to achieve the most robust information possible on the basis of the given data. We will be happy to help you optimise the evaluation, use and interpretation of the data shown, as well as individual factors at

market.report@composites-united.com

In the interests of better comparability with other market reports and to ensure that the data shown is easier to understand, the two most common growth rates and their calculation are listed below:

Averaged Annual Growth Rate (AAGR) = Arithmetic Mean Return (AMR) = Arithmetic mean of n annual growth rates (AGR):

$$AAGR(t_1, t_n) = \frac{AGR(t_1) + AGR(t_2) + \cdots + AGR(t_n)}{n} = \frac{1}{n}\sum_{i=1}^{n} AGR(t_i)$$

Compound Annual Growth Rate (CAGR) = annual growth rate between n years, assuming constant growth in percentage terms:

$$CAGR(t_1, t_n) = \left(\frac{A(t_n)}{A(t_1)}\right)^{\frac{1}{n}} - 1 \quad \leftrightarrow \quad A(t_n) = A(t_1)(1 + CAGR)^n$$

2 Carbon fiber: Global market overview

2.1 Carbon fiber demand worldwide

In this reporting year 2024, a global average carbon fiber demand volume of around 126,500 tonnes was calculated. For an observation period since 2010, this corresponds to an average annual growth rate of +10.07 % (CAGR 2010-2024). For a shorter development period over the past five years, this results in a growth rate of +7.38 % (CAGR 2019-2024), as well as direct year-on-year growth of +7.66% since 2023.

The upturn of previous reporting years is continuing in the current reporting period. The figure calculated for the demand volume is in the upper estimate range of the previous year's forecast (119.0 kt to 129.5 kt). At the same time, it is clear that the short-term growth rates are below the long-term CAGR 2010-2024. Whether current crisis effects such as political conflicts, supply bottlenecks or distortions in the energy market are responsible for this cannot be assessed in detail at present. However, it should be noted that due to the high concentration of CF manufacturers' production facilities at relatively few locations, the situation is relatively exposed to local conditions. This means that there is still the potential for relatively short-term distortions in the CF market environment as a result of individual location decisions or influencing factors. Overall, however, the trend remains positive despite the challenging global market environment. After the last major market distortion around 2020, longer-term growth has stabilised. It is now assumed that this is not just a catch-up effect, but real market growth. It should be explicitly pointed out that deviating developments are possible with regard to individual fiber qualities or product groups and that this chapter only provides a summarised view of all product groups.

In particular with regard to the prediction of future development, there are various framework conditions that cause a range of fluctuation. In order to increase the forecast quality and limit the individual scattering variables, two different scenarios are considered in relation to the further forecast:

- **Scenario 1** is based on an estimate of demand based on available production volumes. This means that, in simplified terms, it is assumed that all fibers requested can also be produced and, conversely, that all fibers produced will also be purchased on the market. In this respect, the expansion situation of the CF manufacturers' production capacity is indirectly reflected here. Expansion measures in the CF market environment are long-term and capital-intensive projects, meaning that it is only possible to react to real market demand with a noticeable delay, or that this demand is even assumed in advance. On the other hand, these extended investment periods result in improved traceability and data collection.
- **Scenario 2** is based on continued market development with a constant annual growth rate (CAGR 2019-2024) compared to the base year (2024). Using the shorter observation horizon along CAGR 2020-2024 would result in a slightly lower development in the area highlighted in colour (see Figure 1).

Of course, numerous other alternative scenarios are conceivable. However, the selected variants already show prospects that are open to wide-ranging interpretation. It should be noted that short-term setbacks or upturns in market development are possible as a result of external stimuli, for example. However, these are not foreseeable and therefore cannot be reliably presented as part of the above scenarios. Due to the high market concentration of the CF environment, even a change in a single market player or production location can have a significant impact, both positive and negative. In

this respect, the two development forecasts shown are by no means to be understood as upper and lower limit lines, but rather represent two independent variants of numerous possible curves, which, however, illustrate very different assumptions.

To summarise, it should therefore be noted that the trend shown in Figure 1 is subject to numerous influencing factors. The determination method chosen here is based on the evaluation of existing production capacities and the associated utilisation rates. Compared to direct market demand, this provides a more comprehensive data basis. However, this results in an important assumption that can only outline a possible market situation and should therefore be taken into account in the assessment. The scenarios used forecast continued positive development. In the reporting year, the difference between the respective forecasts of the two selected scenarios increases significantly compared to previous reporting years, which is due in particular to the current large capacity expansions in CF production. For a more detailed assessment, please refer to the explanations in the following chapters, which focus in particular on the expansion capacities of CF manufacturers and the development of the product portfolios.

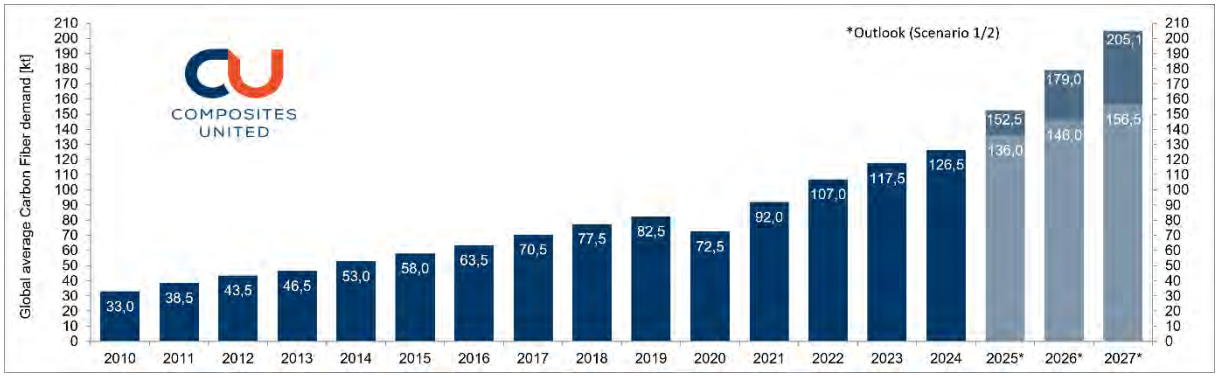

Figure1 : Development of the global average CF demand volume from 2010 to 2027 (*estimates; 03/2025)

COMPOSITES UNITED

MARKET REPORT 2024

THE GLOBAL MARKET FOR CARBON FIBERS AND CARBON COMPOSITES

Author: Michael Sauer
Composites United e.V.
Jägerstraße 54-55
10117 Berlin | Germany
www.composites-united.com

Status: March 2025