

DORNIER COMPOSITE SYSTEMS®

CS

Quality creates value

**DORNIER**

COMPOSITE  
SYSTEMS

## From flying people to flying threads

100 years ago all aircrafts were built of composite fiber materials, the natural composite material wood and coated woven cotton fabric, braced with piano wire. More than 90 years ago Professor Claude Dornier decided to replace the known materials by the more expensive and heavier aluminium. 40 years ago the fabric came back: in 1973 the "Alpha Jet" of Dassault/Dornier was the first high performance aircraft with series-produced structural components made of carbon fiber composite material. Basic material was a carbon fabric produced on a DORNIER rapier weaving machine. Nowadays 90% of all woven carbon fiber fabrics worldwide are manufactured on DORNIER rapier weaving machines. By now 50 - 80% of the structural parts in all recent aircrafts are made of reinforced carbon fiber composites.



Aircraft Blériot XI with textile fiber covered wood construction, around 1909.



Endurance test and group photo on a Dornier Komet II in all-metal construction, around 1922.



Dornier/Dassault Alpha Jet with extended CFRP speedbrakes, around 1973.



Dear readers, customers of  
Lindauer DORNIER GmbH,

Founded in 1950 by my father, Peter Dornier, as the first industrial activity of the Dornier works following the 2nd World War, it has in the meantime established a good name for itself throughout the world with its equipment for the textile and plastics industry. We are extremely happy and proud to have been shown such great trust and confidence by so many for such a long time. From this we feel an obligation and are motivated to continue our search for new solutions and new products, whilst making our production methods better and more efficient.

We contrast durable high quality products, whose useful lives of 20 to 30 years are by no means a rarity, with our fast-moving lives today. Unsparing in terms of innovation, our investment in research and development in the last 10 years has amounted to some 200 million Euros. New buildings and more efficient production lines, and, particularly, our highly qualified workforce, create the conditions for a thoroughly optimistic view of the future. As one of the few in our sector, we are proud to exclusively produce "Made in Germany", and it is characteristic of our company that it seeks its success first of all through technical progress.

New and interesting developments in the field of textile technology plus a new generation of weaving machines stand ready for you in our technology center in Lindau. The Dornier Museum, opened in 2009 in Friedrichshafen – a mere 20 km away – enables you to make an inspiring journey in time through 100 years of pioneering spirit and innovative lightweight construction. Here you will be able to see the chronological development from the first all-metal aeroplane in 1916 through to the first mass-produced aircraft with carbon fibre components in 1973, alongside many other pioneering innovations.

Come and visit us – we look forward to welcoming you at beautiful Lake Constance!

Yours faithfully  
Peter D. Dornier

Today, Lindauer DORNIER GmbH located in Lindau, Lake Constance, as a Bavarian-Swabian family company solely producing "Made in Germany", is no longer fabricating aircraft parts, but a technological market leader in weaving systems for technical textiles as well as for large biaxially oriented polyester and PP film production lines.

Having been part of the Dornier GmbH group until 1985, Lindauer DORNIER delivered its first weaving machines into the carbon fiber composite industry already 40 years ago at the launch of two important aerospace projects – the Dornier/Dassault "AlphaJet" and the Dornier "AEROS" satellite programme. Since then – and especially in the last five years – an ever increasing number of companies have entered this growing market, that is mainly fuelled today by new applications of carbon fiber (CF) in the aerospace, automotive and wind energy sector. CF composites, having a strength to weight ratio more than 10 times better compared to metallic materials like steel or even aluminium, give promising prospects for the design of future lightweight structures like automobiles, trains, trucks and larger, more powerful wind turbines, helping to reduce CO<sub>2</sub> emissions. The use of the corrosion free carbon fiber to replace steel armouring in new concrete structures, as well as in the repair of older examples of architecture, could open up a large new market for textile reinforcement products in the building industry.

Since the number of "players" producing carbon fiber has tripled in the last five years, a significant reduction of fiber prices is anticipated over the next decade. Especially the entry of oil- and sun-rich countries in the Gulf area into this field will enable to produce "green" carbon fiber using solar power and converting the crude oil into a value added product of high macro-economical impact at very competitive terms.

Renewable-energy powered, carbon fiber based economies provide a unique engineering-driven vision for the coming years to stretch the availability of worlds crude oil resources, gaining more time for the development of a non oil-based chemical industry.



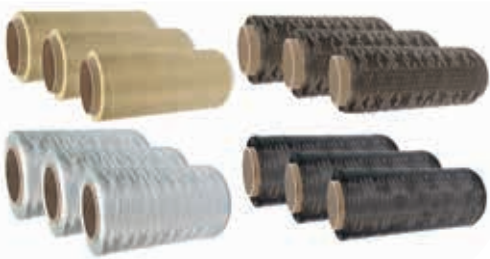
The Dornier Museum in Friedrichshafen, opened in 2009

## Tailored to your needs

DORNIER provides the opportunity to handle rovings of different materials e.g. carbon, glass, aramid or basalt. The company offers individual solutions to spread multifilament yarns and then further handle them in downstream processes.

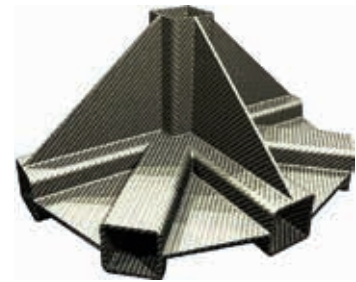
### Material feed

Individual solutions for material feed for downstream processes via creel and warp beam systems.

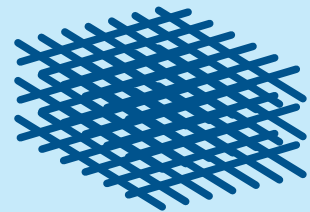
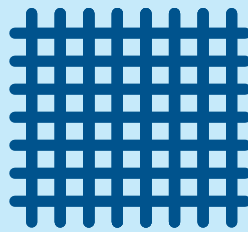
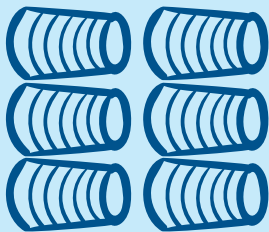


### 3D DORNIER weaving technology

Latest developments enable 3D Jacquard designs for near-net-shaped fabric structures.



© Sigmatech Ltd.



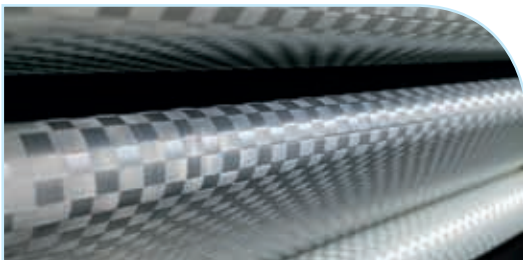
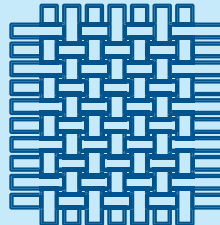
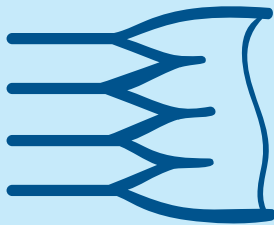
### 2D DORNIER weaving technology

Closed weaving structures are increasingly supplemented by unidirectional woven layers (UD layers) fabrics, mesh-like "drefabrics" (DORNIER EasyLeno®) and multiaxial woven structures (DORNIER ORW technology).

The broad range of applications from aerospace sector to automotive industry, sport, leisure, medical technology, architecture and up to construction industry shows that with this revolutionary material further applications are opened up.

**DORNIER tape weaving**

Weaving of fixed and impregnated tape materials, monoaxially stretched films, differently spread materials or other ribbon-type materials. Flat biaxial surface structure with lowest undulation and low basis weights. For design applications and reinforcement structures.



**Monoaxial semi-finished products and tape production**

For the production of stabilized or coated tape materials and monoaxial textile surfaces DORNIER offers different component solutions. From calendering of different materials through powder coating up to extrusion, coating with polymer melt or coating in a foulard – the possibilities are endless.



**System solutions**

DORNIER's comprehensive know-how in the textile machinery and plant manufacture enables the elaboration of system solutions for composite materials which will meet your requirements. DORNIER Composite Systems® – tailored to your needs.

## A company with a background and a future

With both its company divisions – weaving machines and specialty machines – DORNIER belongs to the technology leaders of the world today. In specialty machine construction DORNIER is market leader for the engineering and production of drying and film stretching lines. In addition to the packaging industry, these films find ever increasing use in high-tech products like semi-conductors, capacitors and displays for mobile telephones and flat screens.

### DORNIER Composite Systems®

The DORNIER company bundles competences of the whole process chain – from roving up to the thermoplastic composite material. The in-house available know-how in the textile and specialty machinery sectors are integrated into DORNIER Composite Systems® and provide detailed solutions which will meet your requirements.

### Quality creates value

With this claim DORNIER has a fully equipped technical testing laboratory which ensures a continuous quality assurance for the entire process chain. The comprehensive know-how in the field of quality assurance offers customer-specific solutions which can be integrated into the DORNIER Composite Systems®.

DORNIER would be pleased to assist you as system provider regarding issues of quality assurance or as consulting service provider.

### MAV – Measurement Analysis Verification

DORNIER's quality assurance department provides with MAV various laboratory services of material testing, analysis and improvement as well as technical engineering and failure analysis.



### In dialogue with you

A meaningful dialogue with you, the users of our technologies, is pivotal for the success of DORNIER. For us it is matter of concern to provide prompt and competent support throughout the world at any time. You profit simultaneously through the constant exchange of experience with our skilled technicians. Therefore we maintain our own technical textile laboratories including trial machines for weaving trials in Lindau (GER), Charlotte (USA) and Shanghai (PRC). Sales teams with technicians are available for you in Mumbai (IND) and Istanbul (TR) too.



# READY FOR THE FUTURE ...

Since long DORNIER proves it's leading position with innovations in textile as well as polymer process technologies. The key competences of both sections are now combined under the label

DORNIER Composite Systems®.

The resulting strength and synergies will be used together with our partners to shape the bright future of this innovative field.

**Lindauer DORNIER GmbH**

88129 Lindau, Germany  
Telephone +49 8382 7030  
Telefax +49 8382 703386

**American DORNIER Machinery Corp.**

P.O. Box 668865  
Charlotte, N.C. 28266, USA  
Telephone +1 704 697 3310  
Telefax +1 704 697 3379

**DORNIER Machinery India  
Private Limited**

201-A, Sangeet Plaza  
Marol Maroshi Road  
Andheri (East)  
Mumbai 400 059, India  
Telephone +91 22 292 506 74  
Telefax +91 22 292 087 60

**DORNIER Makina Ltd. Sti.**

Oruç Reis Mahallesi  
Giyimkent Sitesi 6. Sokak B64 No. 38-40  
34235 Esenler/Istanbul, Turkey  
Telephone +90 212 4266 998  
Telefax +90 212 6011 603

**DORNIER Machinery (Shanghai) Co. Ltd.**

WaiGaoQiao Tax Free Zone  
299 FuTeZhong Road  
Area B G/F Block 45  
Shanghai 200131, China  
Telephone +86 21 504 62838  
Telefax +86 21 504 62138

[www.lindauerdornier.com](http://www.lindauerdornier.com)  
[sales.wm@lindauerdornier.com](mailto:sales.wm@lindauerdornier.com)

