

Composite Systems

Flexible. Reliable. Efficient.

灵活 · 可靠 · 高效 ·

Design, engineering and production by a single supplier

DORNIER is the reliable partner for all requirements relating to any aspect of the production of application-specific lines for manufacturing semi-finished composite products. Whether single components or a customized turnkey complete line: DORNIER plans, designs and builds everything in-house.

History

The world-renowned aircraft manufacturer Dornier began building textile machines after the Second World War. The reason for this change of direction: The Allied Forces had prohibited the company from building airplanes in Germany. In 1950, Lindauer DORNIER GmbH was founded in what remains the company's headquarters at Lindau-Rickenbach by Peter Dornier, son of the famous aviation pioneer Claude Dornier. The first fruits of the search for a new field of activity there were shuttle weaving machines. But soon afterwards, Lindauer DORNIER GmbH also began making specialty machines, including dryers for the cardboard, paper and construction panel industry. In the mid-1960s, film stretching lines for the packaging and plastic film industry and textile finishing machines for tubular knit goods were added to the product portfolio.

The rapier weaving machine, developed in 1967, and the air-jet weaving machine introduced in 1989 represented the most significant milestones in the company's rise to become Germany's only weaving machine manufacturer of international standing. The end products made on our weaving machines comprise extremely high-performance fabrics for airbags, carbon fabrics for composite structures and aramid fabrics for fire-resistant or bullet-proof applications. But equally for the finest silk fabrics, intricate Jacquard items and ultrafine worsteds, the DORNIER system family offers the ideal tool. With the DORNIER Composite Systems® product line, founded in 2014, we continuously offer new answers to the challenging demands of the dynamic composite industry in the form of innovative production lines for composite semi-finished goods of all kinds.

设计，构建，生产由单一供应商完成

多尼尔作为可靠的合作伙伴，可提供满足各种要求的生产半成品复合材料产品的专用生产线。无论是单个组件还是定制的关键工程线均由多尼尔内部规划、设计和构建。

历史

世界著名飞机制造商多尼尔在二战后开始制造纺织机械。重新定位的原因是：盟军禁止该公司在德国制造飞机。1950年著名航空先驱Claude Dornier的儿子Peter Dornier在该公司位于林道-维康巴赫的总部建立了林道·多尼尔有限公司。在新领域的第一个研究成果是有梭织机。不久，林道·多尼尔有限公司开始生产特种机械，包括纸板、纸张及建筑板材行业的干燥机。上世纪60年代中期，多尼尔产品系列加入了用于包装和塑料薄膜工业的薄膜拉伸生产线及圆筒针织品的纺织后整理机器。

1967年开发的剑杆织机，1989年问世的喷气织机，是多尼尔一跃成为德国唯一一家具有世界知名度的织机制造商的重要里程碑。我们织机的最终产品包括用于安全气囊的高性能织物、用于复合结构的碳纤维织物和用于防火或防弹应用的芳纶织物。同样最好的丝绸面料、精致的提花制品和高细精纺纱线，多尼尔系列产品都是不二之选。凭借成立于2014年的多尼尔复合材料系统产品线，我们不断为不断变化中的复合材料行业的挑战性需求提供新的答案，以创新生产线的形式提供各种半成品。



LIGHTWEIGHT DESIGN OF THE FUTURE WITH LINES FROM DORNIER

来自多尼尔的
未来轻量化设计的生产线

Semi-finished composite goods, the key to lightweight design of the future

The relevance of lightweight design is growing more and more important in many industries. The reasons for this are many and varied and are strongly influenced by the application:

- In aviation and the automobile industry, legal regulations governing pollutant emissions and the long-term rise in fuel prices are drivers for manufacturers' lightweight construction strategies.
- In the renewable energies sector, longer rotor blades can be manufactured for wind turbines, and help to increase their output.
- In machine building, component weights are reduced to increase machine speeds, thereby also improving productivity.

As metal materials reach their lightweight limits more and more frequently, fiber-reinforced plastics (FRP) have been successfully employed for many years. High-performance fibers are combined with a polymer matrix. Carbon and glass fibers in particular have highly application-friendly properties profile with regard to mechanical characteristics. When the fibers are positioned precisely in the direction of the loads acting on them, their excellent properties can be exploited ideally. Thermoplastic and thermoset polymers fulfill a key function as matrix material for the fibers, to make FRP components lightweight and strong at the same time.

A unique combination

The mission of DORNIER Composite Systems® is to provide machines and production lines for the flexible, economical manufacture of high-quality semi-finished composite goods. To do this, we rely on our decades of experience in building weaving machines for the textile industry and film stretching lines for the plastics industry. The result of this combination is an innovative family of products for integrating fibers and matrix: tape production lines, tape weaving machines and a technology platform for 3D woven fabrics. We also offer customized conversions and modifications for our roving weaving machine.

半成品复合材料，是未来轻量化设计的关键

在很多工业中，各种轻量化设计越来越重要，原因各不相同，在很大程度上取决于应用：

- 在航空航天和汽车领域中，有关污染物排放和长期上涨的燃料价格的立法正在推动制造商的轻量化战略。
- 在可再生能源领域，可生产用于风力涡轮机的更长的转子叶片，从而提高其性能。
- 在机械制造中，减少部件重量以提高机器速度，从而提高生产率。

由于金属材料受其轻量化的限制，纤维增强塑料(FRP)已使用多年。高性能纤维与聚合物基质相结合，特别是碳纤维和玻璃纤维在机械特性方面有高度应用友好的特性。当纤维精确地定位在作用于它们的载荷方向上时，它们的优异性能可以充分发挥。热塑性和热固性聚合物作为纤维的基质材料发挥着关键作用，同时使FRP组件轻盈而坚固。

独一无二的组合

多尼尔复合系统的使命是为灵活高效地生产高质量的半合成复合材料提供机器和生产线。为此，我们数十年致力于为纺织工业、塑料行业打造纺织机和薄膜拉伸生产线。这种组合的成果是创新系列产品，用于纤维和基质的最佳组合：展宽带生产线、展宽带编织机和3D织物技术平台。同时，我们还为粗纱织机提供定制转换及改装。



“Made in Germany”

Systems by DORNIER are “Made in Germany”. A high production depth demonstrates the strength of the company's in-house value creation. It enables us to offer our customers the highest possible quality, durability and flexibility for efficient, process-reliable and scalable manufacturing of semi-finished goods.

“德国制造”

多尼尔系列产品是德国制造，高深度产品展示了公司内部价值创造的优势。保证了我们可以为客户提供高质量、耐用、高效灵活、工艺可靠及可扩展的半成品制造。

INNOVATIVE BY TRADITION

传统创新

Application-specific production

One of DORNIER's greatest strengths is the application-specific production of components and lines according to the customer's wishes. As an independent, mid-sized family enterprise, our highest priorities are trust and an understanding of our customers' needs.

特定产品的生产

多尼尔最大的优势之一就是可以根据客户意愿，定制产品组件和生产线。作为一个独立的中型家族企业，我们的首要任务是对客户需求的信任和理解。



Quality creates value: individual serial production

No two lines are exactly alike; each one is designed, developed and built specifically for its intended purpose in close consultation with the customer. Even so, all lines have something in common: high economy, quality and reliability are standard.

质量创造价值: 个性化的批量生产

没有两条生产线完全相同，每一条都是在与客户密切协商的基础上专门为其预期目的而设计、开发和制造的。即便如此，所有生产线都有一些共同点：高经济性、质量和可靠性是标准配置。



COMPLETE LINES FROM A SINGLE PROVIDER

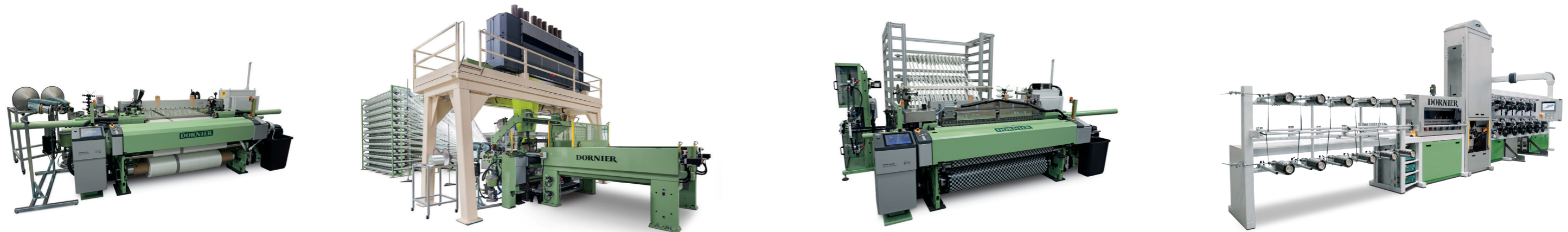
整条生产线来自同一供应商

Benchmark in productivity, flexibility and reproducibility

The high production speeds achieved with lines by DORNIER along with consistently high availability yields the highest possible level of productivity. With enormous flexibility, the lines can handle large and small production runs with equal efficiency – this ensures that our customers remain supremely competitive.

生产力、灵活性及可重复性的基准

多尼尔生产线的高生产速度以及始终如一的高可用性使得生产率达到最高水平。凭借极大的灵活性，生产线可以同等效率处理大型和小型生产运行 - 这确保了我们的客户具有极高的竞争力。



High-quality reinforcing fabrics:
the P2 roving weaving machine

高质量增强织物：
粗纱织机

In the third dimension:
the TRITOS® PP weaving machine

在第三维度：
TRITOS® 多层织物生产线

Economical production of
semi-finished composite products:
the PROTOS® TW tape weaving machine

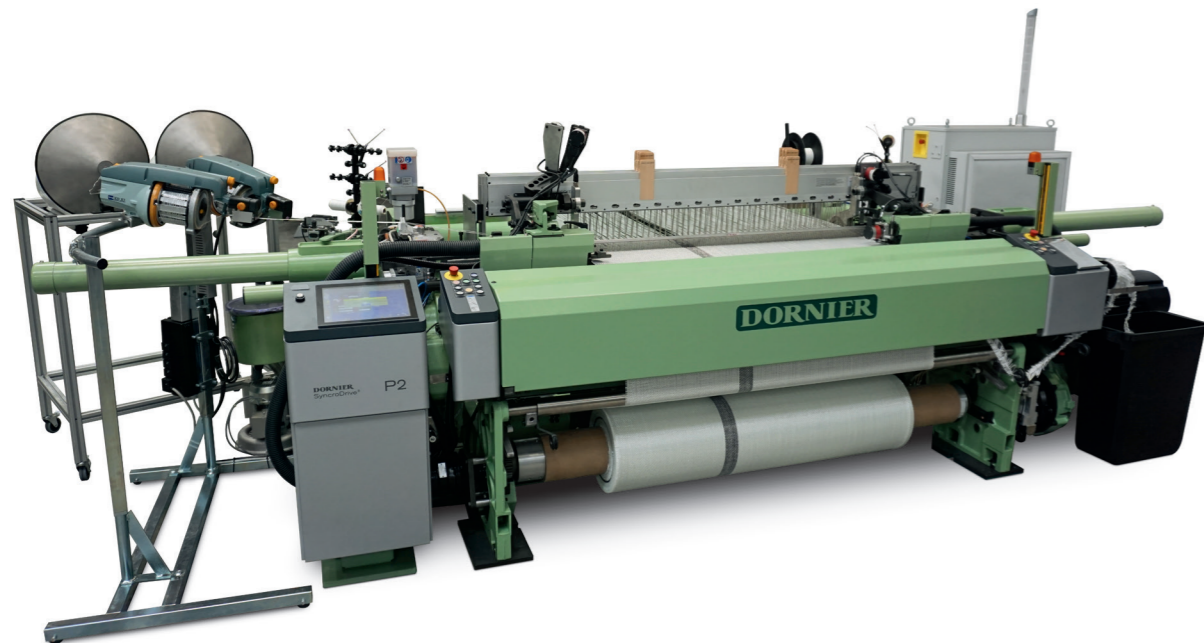
经济型生产半成品复合材料产品：
PROTOS® 展宽带织机

A clear direction:
the PROTOS® TP/TPD tape
production line

清晰的方向：
经由PROTOS®生产的展宽带

HIGH-QUALITY REINFORCING FABRICS: DORNIER P2 ROVING WEAVING MACHINE

高质量增强织物: 多尼尔P2粗纱织机



Back to the future – DORNIER and carbon fibers

From the first great all-metal airplane built from aluminum to the brake flap made with carbon fiber reinforced plastic (CFRP) – At the start of the 70s, DORNIER the pioneer in metal aircraft construction reintroduces woven materials into the structure of a serial airplane.

回到未来 – 多尼尔和碳纤维

从第一架铝制全金属飞机到由碳纤维制成的制动襟翼纤维增强塑料(CFRP) – 自上世纪70年代采用金属材料制造飞机的先驱多尼尔将编织材料重新引入飞机结构中。

Production technology for high-quality reinforcing fabrics: the roving weaving machine

Our DORNIER roving weaving machine is renowned worldwide for manufacturing high-quality reinforcing fabrics based on carbon, glass and aramid fibers. The machine combines exceptional reliability with a high level of productivity and flexibility as well as high material efficiency. Components to reduce weft waste on the left side makes fabric production even more efficient. For the processing of carbon fibers, the roving weaving machine is available in the typical protection classes.

High-precision, efficient, flexible: high-performance fabrics

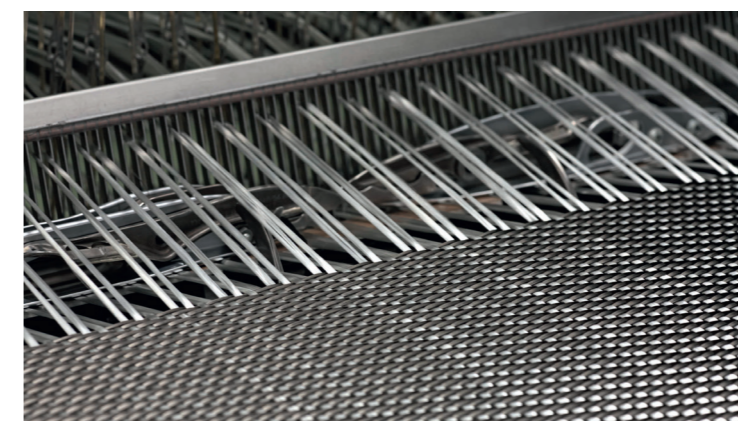
The warp material is supplied from creel or warp beam. One mono-ropier or two ropier heads with positively controlled central transfer transport the weft threads into the open weaving shed. Shedding is carried out with a powerful Dobby or Jacquard machine. A special product take-up guarantees a gentle and precise transport of sensitive fabrics.

高质量增强织物生产技术: 粗纱织机

我们的多尼尔粗纱织机以生产基于碳纤维、玻璃纤维和芳纶纤维的高品质增强织物而享誉全球。该织机集卓越的可靠性、高水平的生产效率和灵活性以及高效的材料使用率于一身。减少左侧纬纱浪费的节边装置使织物生产更加高效。粗纱织机可用于加工特定防护等级的碳纤维。

精确、高效、灵活: 高性能织物

经向材料由筒子架或经轴提供。单侧剑头引纬或通过左右剑头中央交接纬纱的方式, 将纬线引入梭口中。梭口的开闭由加强型的多臂或提花机控制。特殊的卷取方式使得敏感织物在整个牵引过程中保持了低张力和精确性。



IN THE THIRD DIMENSION: DORNIER TRITOS® 3D WEAVING MACHINE

在第三维度： 多尼尔TRITOS® 3D织机

Simple and efficient weaving of complex forms: the 3D weaving machine

The 3D weaving machine is used to manufacture multilayer fabrics with complex structures for composite reinforcements. Notable features of the line include digital weave pattern programming, flexible shed geometry and rigid rapier motion for low filamentation without any additional guiding elements. Thanks to the DORNIER Weft Saver (DWS), the device that permits weaving with reduced filling waste, fabric production becomes even more economic. For the processing of carbon fibers, the 3D weaving machine is available in the typical protection classes.

Excellent damage tolerance: complex 3D fabrics

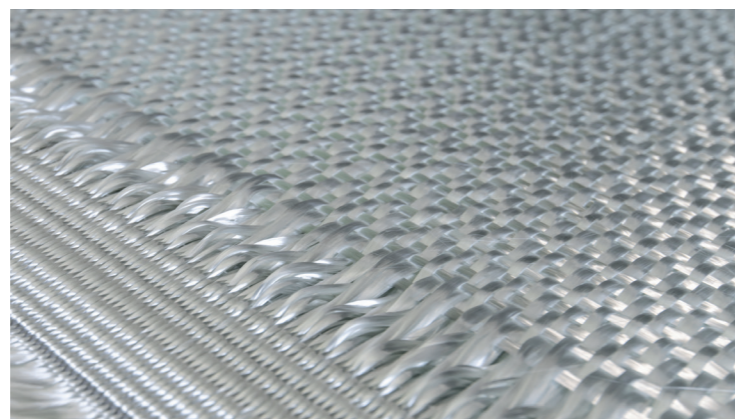
The warp material is provided through a creel. A highly flexible Jacquard machine is used for the shedding. The rapier head inserts the weft yarn into the open shed without any additional guiding elements. For thick fabrics, an integrated fabric guide and a horizontal product take-up are available. Many add-on modules from the standard product program can be integrated into our 3D weaving machine.

简单高效的复杂形式编织：3D织机

3D织机用于织造结构复杂、多层的复合增强材料。该生产线的显著特征包括数字编织图案程序、灵活的梭口几何形状及无须采用导钩的刚性剑杆引纬方式所带来的低磨擦的优点。得益于DORNIER Weft Saver (DWS)，这种设备可以在减少纬纱浪费的情况下进行编织，织物生产变得更加经济。此3D织机可加工特定防护等级的碳纤维。

出色的抗损伤性：复杂的3D面料

经向材料由筒子架提供，梭口由高度灵活的提花机控制。剑头将纬纱引入打开的梭口中，不需要任何辅助导轨或导钩。对于厚织物，可提供集成织物导向装置和水平产品卷取装置。对于我们的3D织机，可以在标准产品程序中集成许多附加模块。



Weaving without limits: A textile machine digitalizes the world

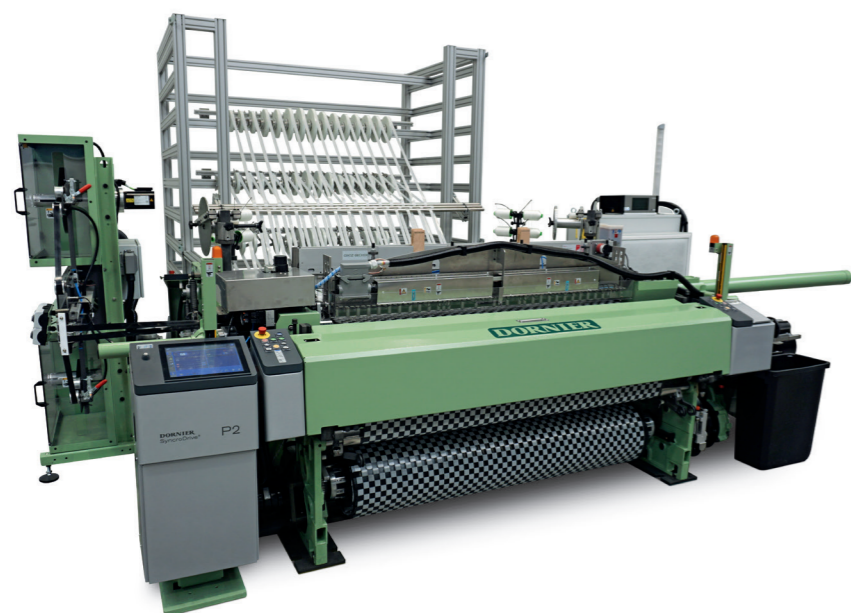
Over 210 years ago, Joseph-Marie Jacquard changed the world with a piece of cardboard: In 1805 in Lyon, France, the international capital of the silk weaving world at the time, the weaver's son invented a line for controlling a weaving loom with perforated cards, and in so doing he revolutionized much more than textile production. With the loom as a "programmable" machine, he also laid the foundations for the automation we know today. And Jacquard technology has undergone constant development to this day.

无限织造：纺织机械将世界数字化

210多年前，Joseph-Marie Jacquard用一块纸板改变了世界：1805年在法国里昂，当时的丝绸织造之都，织布工的儿子发明了控制织布机的纹板，引发了纺织产品革命。随着织机作为“可编程”机器，他还为我们今天所知的自动化奠定了基础。而提花技术至今仍在不断发展。

ECONOMICAL PRODUCTION OF SEMI-FINISHED COMPOSITE PRODUCTS: DORNIER PROTOS® TW WEAVING MACHINE

半成品复合材料的经济型生产： 多尼尔PROTOS®展宽带织机



Scalable and stable production

Nowadays, engineers intending to use fiber-reinforced composites face an immense variety of possible material combinations and process alternatives. Apart from the simple material data, other criteria which are carrying more and more weight with respect to the optimum decision are the stability of the processes and the availability of technologies and materials. The DORNIER tape weaving machine brings high levels of scalability and process stability into the composite industry. For the production of semi-finished goods for both thermoset and thermoplastic composite components the tape weaving machine is a corner stone of a reliable supply industry for lightweight components.

可扩展且稳定的生产

如今，打算使用增强纤维复合材料的工程师面临着各种各样的材料组合和工艺替代方案。除了简单的材料自身数据之外，过程的稳定性以及技术和材料的可用性会在最佳决策方面承载越来越多权重。我们的多尼尔展宽带织机为复合材料行业带来了高水平的可扩展性和工艺稳定性。对于生产热固性和热塑性复合材料部件的半成品来说，展宽带织机是轻量部件可靠供应的基石。

It combines the advantages of unidirectional structures and fabrics: the tape weaving machine

The tape weaving machine can process binder-fixed and fully impregnated tapes as well as other ribbon-like materials into textile structures featuring low undulation and a defined grammage. Thanks to their good forming behaviour they are perfectly suited for further processing into structural as well as design applications. The usage of an integrated fixation unit permits the manufacturing of open and non-displaceable fabric structures.

Further processing made easy: high-quality tape fabrics

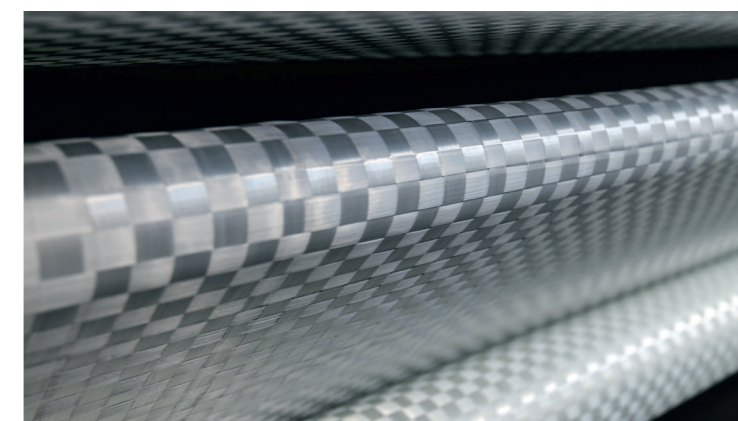
The warp tapes are provided from a creel. The weft tapes are inserted without twist by means of the DORNIER ZeroTwist® Feeder. A positively controlled rapier head pulls the weft tapes into the open weaving shed. Finally, the finished tape fabric is wound up either inside the machine or with an external winder.

它结合了单项结构和织物的优势：展宽带编织机

展宽带编织机可以将粘合剂固定或完全浸渍的展宽带以及其他带状材料加工成具有低起伏和确定克重的纺织品结构。由于其良好的成型性能，它们非常适合进一步加工成结构件或设计运用于其它领域。经一体化固定的部件单元可用于以开放的不可替代的织物为结构的制造业领域。

进一步加工变得简单：高质量的展宽带编织物

经向展宽带由筒子架提供。纬向展宽带通过DORNIER ZeroTwist®无翻转引纬系统引入。积极式剑头将纬向展宽带引入打开的梭口。最后，将成品织物卷绕在织机内部或使用外部卷绕装置。



A CLEAR DIRECTION: DORNIER PROTOS® TP PRODUCTION LINE

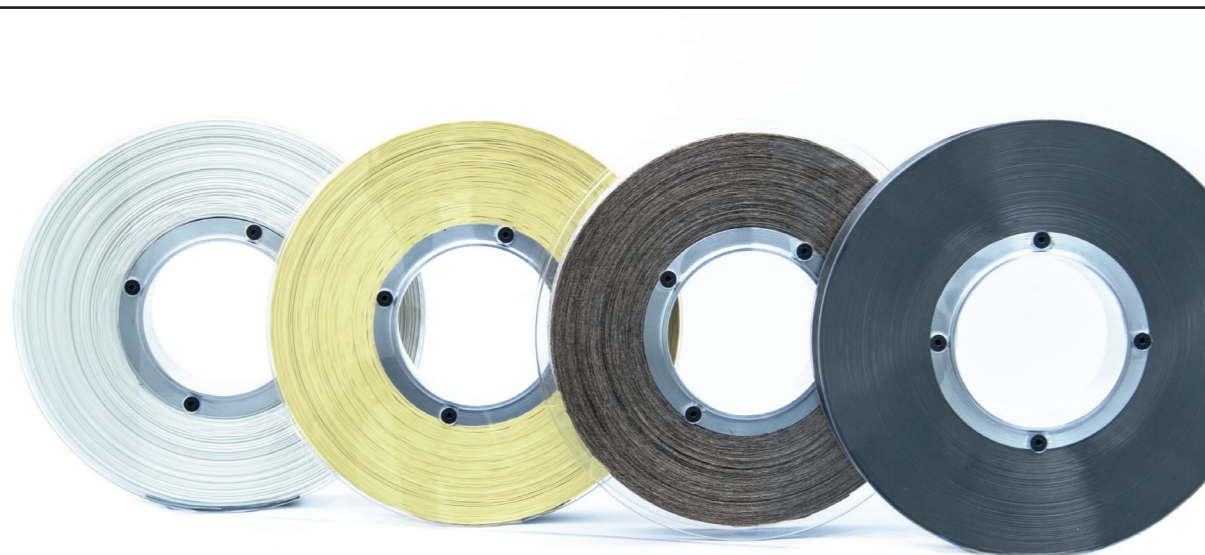
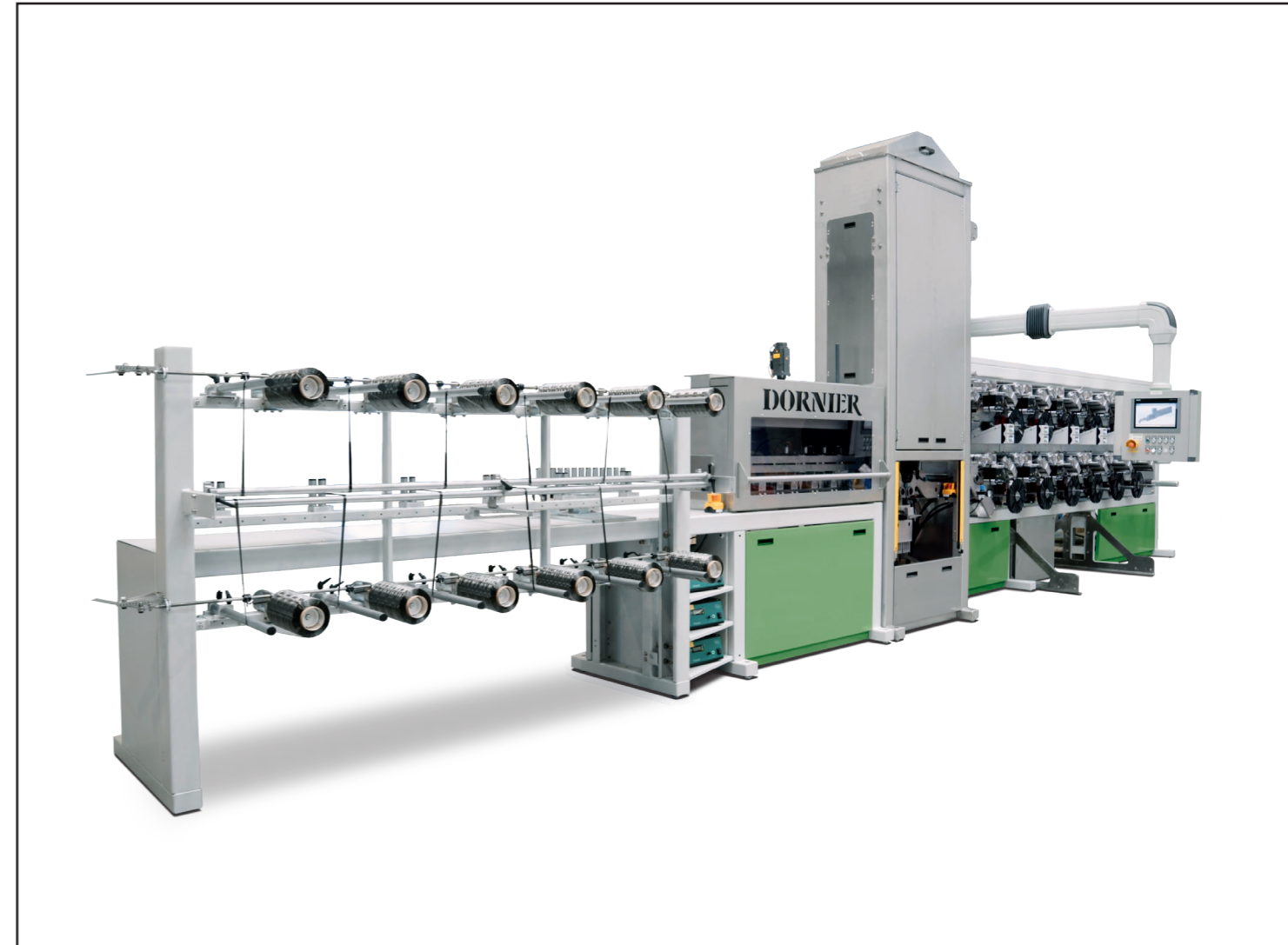
清晰的方向： 多尼尔PROTOS® 展宽带生产线

Efficient production of high-quality tapes: the tape production line

The tape production line from DORNIER is designed for the efficient manufacture of high-quality, unidirectional fiber reinforced tapes. The tapes can either be stabilized with binder material or completely impregnated with a thermoplastic matrix. The line is modular, which renders it ideal for working with various processes and materials.

Superior quality: unidirectional fiber tapes

In the tape production line the fiber material is first provided through a creel. Then the threads are spread out to form a flat tape and are optionally coated with a binder. The dry tape can be impregnated with a thermoplastic matrix. Finally, it is cut to width in the machine and wound onto flanged bobbins under quality-assured conditions.



高效生产高质量展宽带：展宽带生产线

多尼尔的展宽带生产线专为高效制造高质量单向纤维增强展宽带而设计。展宽带可以用粘合剂材料固定或用热塑性树脂完全浸渍。该生产线采用模块化设计，非常适合处理各种工艺和材料。

卓越品质：单向纤维展宽带

在展宽带生产线中，首先通过筒子架提供纤维材料。然后将束状纤维展宽以形成平铺状展宽带并且以可选的粘结剂涂覆。干型展宽带可以用热塑性树脂浸渍。最后，将其切割成适当宽度，并在质量有保证的条件下缠绕在带有边盘的盘轴上。

For our customers: the DORNIER Composite Systems® Technology Center

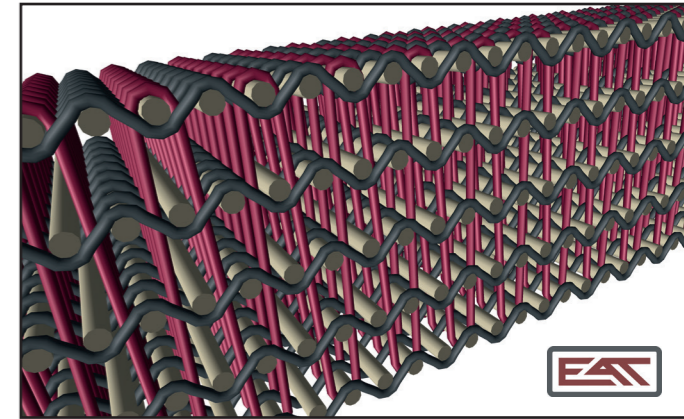
When developing high-performance fiber composite components, all stakeholders involved in the value chain need to work closely together. All production technologies of Composite Systems associated with different aspects of the lightweight design of the future are available in our DORNIER Composite Systems® Technology Center. Together with our customers, we test new process variants, build mockups, perform preproduction series and commission customer-specific systems. Training courses can be conducted right in front of the demonstration machines.

用于客户：DORNIER Composite Systems® 技术中心

在开发高性能纤维复合材料部件时，参与价值链的所有利益相关者需要紧密合作。所有关于未来轻量化设计不同方面的复合材料系统的生产技术，我们多尼尔复合材料系统技术中心均可提供。与我们的客户一起，我们测试新的工艺变体，构建模型执行预生产系列和致力于客户特定系统。培训课程可以在演示机器前进行。

Textile prototyping

The development of fabrics with complex or multilayer structures is an intuitive process thanks to adapted software solutions. We will be glad to help you to select the tools suited to your needs and show you how to turn your product ideas into real textiles.



纺织原型

通过适应的软件解决方案，开发具有复杂或多层结构的织物是一个直观的过程。我们很乐意帮助您选择适合您需求的工具，并向您展示如何将您的产品创意转化为真正的纺织品。



Technology consulting

DORNIER has been a reliable supplier to the composites industry for decades. Our experts will be glad to advise you in the selection of processes and materials for your individual application situation.

技术咨询

数十年来，多尼尔一直是复合材料行业可靠的供应商。我们的专家很乐意根据您的要求在工艺和材料方面给予建议。

SERVICE FOR YOUR SUCCESS: SERVICE ADDS VALUE®

为您的成功服务: 服务增值

Low wear, low maintenance costs

Durability, low wear and low maintenance costs are qualities embodied by the robust, reliable lines from DORNIER. Some of our line components have been producing fabrics for over 60 years – efficiently and economically to this day.

Your success depends on many factors

Consulting, service and support by DORNIER begin with your interest in purchasing. Our Service Center in Lindau, with its customer service departments, a wide variety of training options and exceptional spare parts service stands as your guarantor for a long-lasting, successful cooperation. We operate a service network with our expert team and agents in all major sales markets for our lines and machines. In the USA, India, China and Turkey, DORNIER also operates its own branch offices.

低磨损、低维修成本

耐用性、低磨损及低维修成本是多尼尔坚固可靠的生产线所体现的品质。我们的部分生产线部件生产面料已有60多年的历史 - 高效和经济直到现在。

您的成功取决于多种因素

多尼尔的技术咨询，服务和技术支持您可以按需购买。我们位于林道的服务中心及其客户服务部门，多样化的培训选项和卓越的备件服务是您长期成功合作的保证。我们在所有主要销售市场都有联系合作伙伴和代理商，为我们的生产线和机器提供服务网络。在美国、印度、中国和土耳其，多尼尔还有自己的分支机构。



DIRECT LINK 4.0: DORNIER CUSTOMER PORTAL

直接连接4.0: 多尼尔客户端



Direct Link 4.0: the DORNIER Customer Portal myDoX®

Thanks to the customer portal myDoX® DORNIER's customers organise their production at the highest technological level. It completes and expands our personal technical DORNIER service and the weaving machine panel DORNIER ErgoWeave® with integrated Ethernet interface. In addition to a 24/7 online shop and the enhanced DoXWeave software for the networking of weaving machines, myDoX® offers also the direct 4.0 connection to experts and information from company DORNIER.



直接连接4.0: 多尼尔客户端myDoX®

通过客户端myDoX®, 多尼尔客户可以在最高技术水平上组织生产。它补充和扩展了多尼尔的个人技术服务和带有集成以太网接口的 ErgoWeave® 织机控制面板。除了24/7在线商店 (DoXPOS – 零件订购系统) 和用于联网织机的扩展DoXWeave软件外, myDoX® 还提供4.0直接连接来自多尼尔的专家及信息。

The benefits of myDoX®

- Online shop for original parts (DoXPOS – Parts Order System)
- Convenient access to networked weaving machines thanks to Remote Access and clear administration of machine data (DoXWeave)
- Production monitoring through communication of the weaving machines with all common production data acquisition systems or networks via Ethernet interface (DORNIER ErgoWeave®/DoXNet)
- Access to user documentation (DoXDocu)
- Optimal data overview by individually definable machine groups and numbers
- Access to previous orders and current quotations
- Improved running behavior, maintenance and shorter downtimes

Log on and get started right away

This system based on HTML5 and the most modern database technology (powered by SAP HANA) does not need any plug-ins and can be comfortably operated via PC, smartphone, tablet computer or weaving machine panel.

24/7 online shop for original parts: DoXPOS

Ordering original DORNIER parts directly and rapidly via online shop: Add the desired parts from the spare part catalogue to the cart – DORNIER ensures to deliver them promptly.

myDoX® 的优势

- 原装零件在线商店 (DoXPOS – 零件订购系统)
- 借助远程访问和清晰的机器数据管理, 可以方便地访问联网的织机 (DoXWeave)
- 通过以太网接口与织机上所有常用生产数据的采集系统或网络进行通信来进行生产监控 (DORNIER ErgoWeave®/DoXNet)
- 访问在线帮助和在线用户指南 (DoXDocu)
- 通过可单独定义的机器组和数字进行最佳数据概览
- 读取以前的订单和当前报价
- 改善运行性能, 维护并减少停机时间

注册并立即使用

该系统基于HTML5和最先进的数据库技术 (由SAP提供支持), 不需要任何插件, 可以通过PC, 智能手机, 平板电脑或织机面板轻松操作。

24/7 - 原装零件在线商店: DoXPOS

通过在线商店直接快速订购多尼尔原装零件: 将备件目录中的所需零件添加到购物车中 - 多尼尔确保及时交付。



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