YOUR FUTURE WITH CARBON

碳纤维为您打造未来

CFK VALLEY™

Content I 目录

Dear Readers,

Hardly any other sector currently holds so exciting development and growth potentials as the CFRP sector. A strong international competition and more and more industrial application areas mark the development. Anyone wishing to position himself successfully here must always keep on trying and develop an international network. We would like to support you effectively in doing this. Since its establishment in 2004, CFK Valley e. V. has internationally made a name for itself as one of the world's leading networks for Composites Technology.

Along with the generation of new application areas, the key topics for the future include automation and internationalisation. For this, our network offers to you the matching framework. From training to research, development, production, operation, maintenance, environment, safety, etc. right up to recycling, all stages are covered by the know-how of our international colleagues. We offer you a sturdy support so that you can act successfully assured of a good future.

We have already supported a lot of exciting projects, many more are present in the preparatory phase or are just about to start. We would like to design the future together with you by finding solutions for putting the innovative material CFRP to a better use.

On the following pages, we give you an insight into the structure, the objectives and the tasks of CFK Valley e. V. We are also available to you for a personal consultation and an information session.

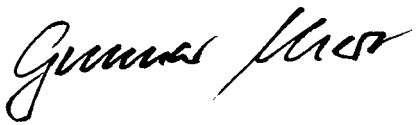
亲爱的读者们，

碳纤维增强塑料行业的发展和增长展示出了扣人心弦的潜力，当今世界上，几乎没有任何其他部门能与它相比。强大的国际竞争和不断扩展的工业应用领域标志着这种发展。任何想在此成功定位的人，势必紧密关注跟进发展，并建立国际网络。在此我们可以为您提供有效的帮助。自2004年成立以来，CFK-Valley碳纤维增强塑料协会作为复合材料的技术网络在世界上具有引领地位，在国际上享有盛名。

除了新的应用领域的开发，未来世界的关键话题，还包括自动化和国际化。为此，我们的网络为您提供了相应的框架。从培训到研究、开发、生产、运营、维护、环保、安全等等，直至回收，对于所有阶段，我们的国际专业同行都能提供专业知识。有我们的鼎力相助，您可对未来的成功稳操胜券。

我们曾经支持过很多令人振奋的项目，还有更多的项目正在筹备或者即将启动。我们愿意和您一起规划未来，寻找解决方案，更好地利用碳纤维增强塑料这种创新复合材料。

下面，我们将向您介绍CFK-Valley协会的结构、目标和任务。我们也愿意为您提供个人咨询并进行信息会谈。
谨致诚挚的问候！



Sincerely, Gunnar Merz, CEO of CFK Valley e. V.
CFK-Valley协会执行总裁 古纳尔·莫尔兹

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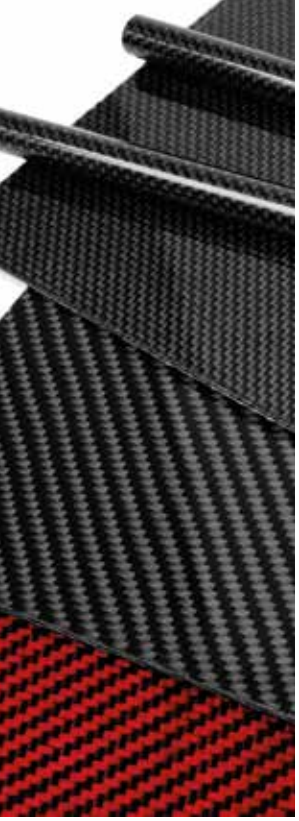


MATERIAL CFRP
THE LIGHT ALTERNATIVE

Carbon fiber reinforced plastic (CFRP) is best suitable for the manufacture of products, which must be light, but at the same time should show a high stability. CFRP has the same strength as metals and is being used today in more and more innovative application areas e.g. in the automobile and medical technology or also in construction, where products made from CFRP are being used in roof construction right up to building complete houses.

CFRP is a so-called composite material. Carbon fibres are embedded in a matrix, which consists e.g. of duroplastic epoxy resin or thermoplastic synthetic materials, and is brought into shape. This results in excellent mechanical properties, such as an extremely high tensile strength and stiffness in the compound. Apart from this, further convincing advantages are fatigue behaviour, resistance to corrosion, low thermal expansion and a good damping capacity at low density (2/3 of aluminium, 1/5 of steel).

STRONG ARGUMENTS

The advantages of CFRP are relevant for many sectors. Moreover, the innovative material can be adjusted in a highly flexible way to the respective requirements. For this, the individual fibres in bundles or in webs are placed precisely in the component. As compared to steel and aluminium construction this enables a weight reduction of more than 50% or more than 20%. At the same time, the stiffness can be increased four-fold.

CFRP is also versatile in use, for the production of lighter and hence energy -saving aeroplanes as well as for the manufacture of vehicles, ships and rotor blades for wind power plants and many more. So far, the processing requires a lot of manual work. This is increasingly being changed by the automation of the production processes. Naturally, this development will also leave a positive impact on the price-performance ratio.

碳纤维增强塑料材料
轻质替代品

碳纤维增强塑料 (CFRP) 最适合制造既轻便又具有高度稳定性的产品。碳纤维增强塑料具有与金属相同的强度 , 正被用在越来越多的创新应用领域 , 例如 , 它不仅用在汽车和医疗技术上 , 还用在建筑领域。从屋顶结构到建造完整的房屋 , 都在使用碳纤维增强塑料的产品。

碳纤维增强塑料是一种复合材料。 碳纤维被嵌入在一个由热塑性环氧树脂或热塑性人造材料构成的矩阵 , 并使其成形。 这导致它具有极其优良的机械性能 , 如极高的拉伸强度 , 以及复合材料的刚度。 除此之外 , 更令人信服的优势是疲劳性能 , 耐腐蚀性 , 低热膨胀性和低密度时 (2/3铝 , 1/5钢) 的良好阻尼能力。

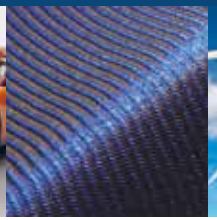
有力的论据

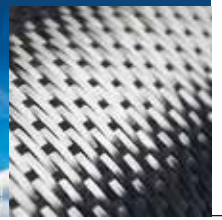
碳纤维增强塑料的优点对许多领域都具有重要价值。 而且 , 这种创新材料高度灵活 , 可以适应各种要求。单根纤维可以通过捆扎或网织被精确地放置在部件中。 与钢和铝的建造方式相比 , 可分别减少的重量达50%或 20%。同时 , 刚度可以增加四倍。

碳纤维增强塑料在使用中也是多功能的。它可用于生产更轻、由此而节能的飞机 , 也可用于制造汽车、船、风力发电厂的转子叶片等等。虽然目前的生产还需要大量的手工工作。 通过生产过程的自动化提高 , 这将会得以改变。 当然 , 这一发展也将对性价比产生积极的影响。

DELIVERING THE FUTURE OF COMPOSITE SOLUTIONS

Gurit has a track record of more than 30 years of innovation in the advanced composites industry. From engineering the first advanced composite sailing boat, to patented material technology and the production of high-class automotive components, we support customers around the globe in transforming conventional, big and heavy structures into lightweight, efficient high-performance solutions.



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THE BOARD OF DIRECTORS 理事会

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博士
执行总裁

Prof. Dr.-Ing. Axel S. Herrmann
Chief Technology Officer (CTO)
博士, 教授
技术总裁

Dipl.-Ing. Thomas Friedrichs
Chief Financial Officer (CFO)
工程硕士
财务总裁

THE STRUCTURE OF CFK VALLEY E.V.

CFK VALLEY 协会的结构

As a „registered association", CFK Valley e.V. has a supervisory board and a board of directors.

CFK Valley 是经过注册的协会，设有监委会和董事会。

THE ADVISORY BOARD 监委会

Prof. Dr.-Ing. Dieter Meiners
Chairman of the Advisory Board
博士教授
监委会主席

Dr.-Ing. Jens Walla
Vice-Chairman of the Advisory Board
工程博士
监委会副主席

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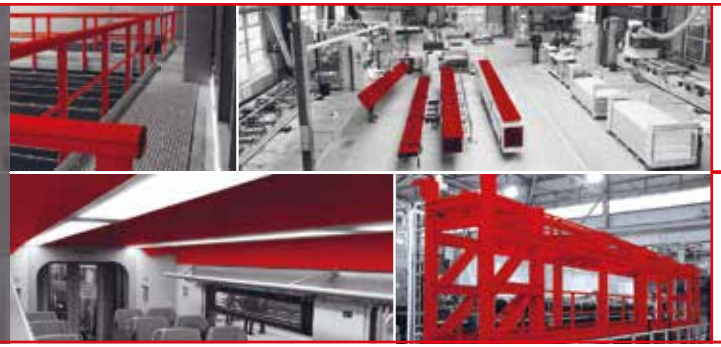

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OUR OFFICE
CFK VALLEY E. V.

The central point of contact and communication for the operative networking is the CFK Valley office in Stade. Our experienced team is available here to be of assistance to you. Competent, committed and solution-oriented, our employees bundle the tasks of the work of the association and take care of the individual requirements of the members. The team includes:

我们的办公地点
CFK VALLEY 碳纤维增强塑料协会

CFK Valley的网络运作的联络和交流中心设在斯塔德(Stade)办公地点。
在这里,我们经验丰富的团队可以为您提供咨询和帮助。 我们的员工有能力、有责任感,并以解决问题为主导,既完成协会工作,又并照顾成员的个性要求。
该团队包括:

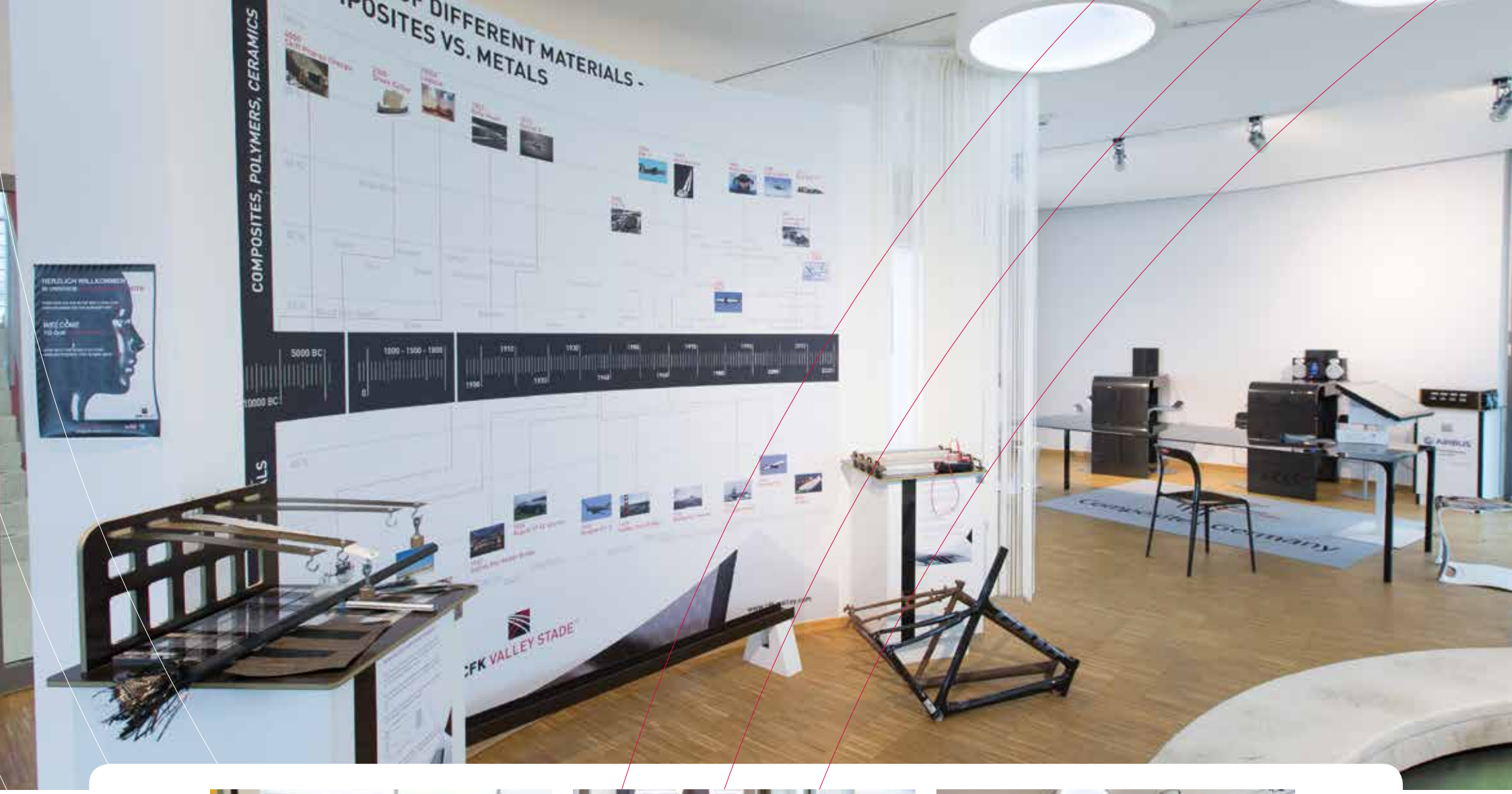
Dr. Gunnar Merz
博士
Chief Excecutive Officer (CEO)
执行总裁 (CEO)
Phone/电话: +49 4141 40740-10
E-Mail/邮件: merz@cfk-valley.com

Ulrike Roth
女士
Assistant to the CEO
总裁助理
Phone/电话: +49 4141 40740-13
E-Mail/邮件: roth@cfk-valley.com

Melanie Holzgrebe
女士
Office Management
办公室主管
Phone/电话:
+49 4141 40740-0
E-Mail/邮件:
holzgrebe@cfk-valley.com

Anna-Kathrin Eisenheim
女士
Accounting/Controlling
财务/监管
Phone/电话: +49 4141 40740-20
E-Mail/邮件:
eisenheim@cfk-valley.com

Johanna Sarah Klee
女士,
Student
双元教育
Phone/电话: +49 4141 40740-14
E-Mail/邮件: klee@cfk-valley.com


COMPOSITES, POLYMERS, CERAMICS
DIFFERENT MATERIALS -
POSITES VS. METALS
5000 BC
10000 BC
1000 - 1500 - 1800
CFK VALLEY STADE

THE INFO-POINT IN STADE
EXPERIENCE THE INNOVATIONS FIRST-HAND

Visit our Info-point in Stade! You can get to know here the properties of the material CFRP as well as its process chain from the fibre to the finished product in a lively, constantly changing technical exhibition. The Info-point is the central point of contact for the interested public.

The exhibition is structured in technology modules like materials, manufacture, processing, mounting, products and recycling so that visitors can directly track the CFRP process chain. For all those who wish to go deeper in the subject, we offer a detailed technical tour with a prior registration.

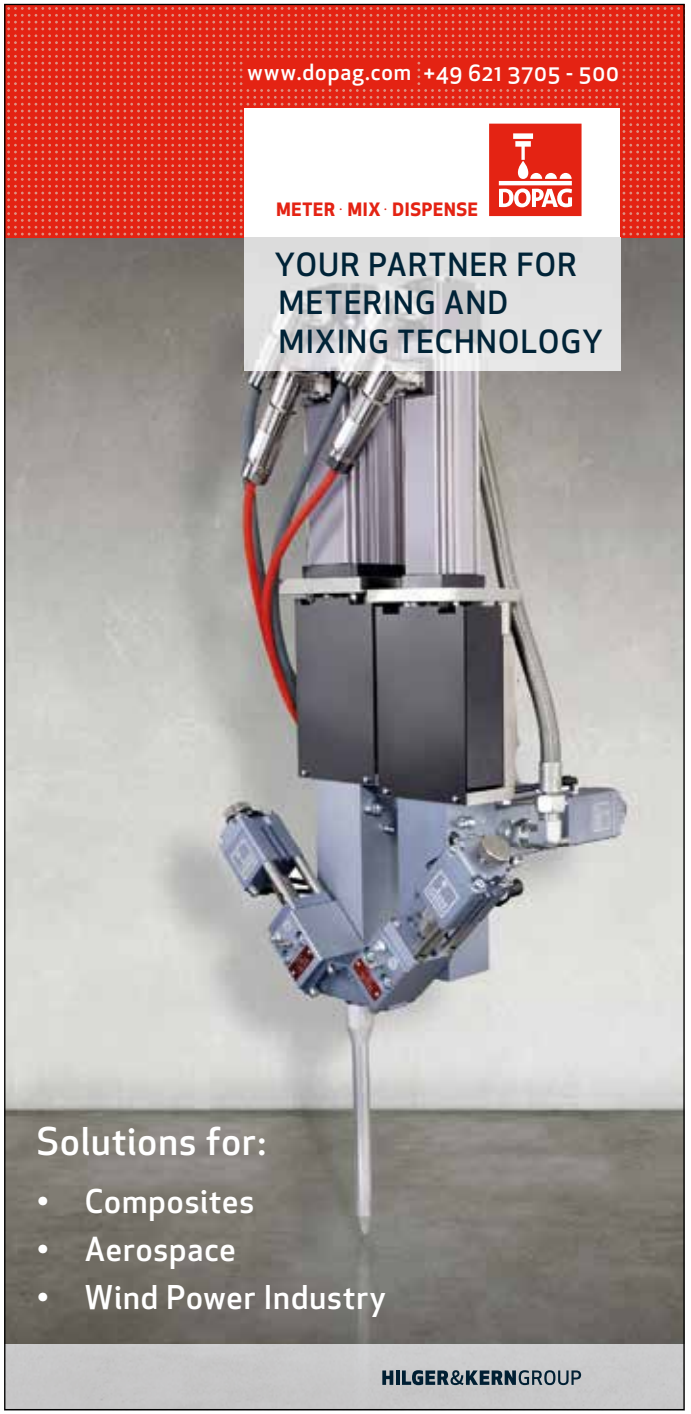
Since its opening in the year 2011, more than 10.000 people have visited the exhibition and have informed themselves about the material CFRP and its special properties and advantagesin the different application areas.

斯塔德(STADE)信息展
亲临现场感受创新

欢迎您来访问斯塔德(Stade)信息展!
信息展是针对感兴趣的公众而建立的联系中心。在这个充满生机、不断更新的专业展览上,您可以了解碳纤维增强塑料的性能,
还可以看到从纤维到成品的生产过程。

此展览是由材料、制造、加工、装配、产品和回收等技术模块组成的。参观者可以直接跟踪碳纤维增强塑料的加工链。 对于希望深入了解的人士,我们会通过事先报名提供详细的专业讲解。

自2011年开幕以来,已有一万多人参观了展览,了解了碳纤维增强塑料的材料、特性以及在不同领域的优势。



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MILESTONES OF DEVELOPMENT
INNOVATION HAS FUTURE

Established in 2004, CFK Valley e. V. has now become an internationally recognised competency network for carbon fiber reinforced plastic. Around 120 national and international companies and research institutes are now part of the network and are promoting like this the fibre composite technology as industrial production technology. Various study groups have already been initiated along the value-addition chain and a technology roadmap has been implemented.

NUMBERS AND FACTS

2004 Seven members establish CFK Valley e. V. in Stade. These include Airbus, CTC, Saertex, Hexcel Composites, German Aerospace Centre (DLR), Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM and the Hanseatic City of Stade. In the same year the Technology Centre Stade (TZS), which houses the member companies of the CFK Valley, is inaugurated. A hall with a size of more than 2,500 square metres and 1,600 square metres of office space are available here.

2005 By now, 35 members are already engaged in the association. The Technology Centre employs 60 specialists.

2006 Laying of the foundation stone for the new university building, in which the CFRP engineers, unique in the world, are to be trained. In autumn, 46 students begin their study course here.

2007 In the STADEUM the CFK-Valley Stade Convention takes place for the first time as international specialist conference along with a trade fair. Around 400 participants and 40 exhibitors from all over the world take part in it.

2008 New construction of the Composite Campus Stade as head-office of the PFH. Around 100 students have registered themselves by now. The Council of the City of Stade decides for a new construction of the research centre CFK NORD, in which the automation technologies are to be developed for large CFRP components.

2009 Ground-breaking ceremony for the construction of the CFRP Research Centre CFK NORD. An effective area of 18,600 square metres is planned, of this, 12,300 square metres for the research hall and 6,300 square metres for offices, conference and ancillary rooms as well as for a reception hall.

2010 Inauguration of the CFK NORD. Main tenants are the Centre for Lightweight Production Technology (ZLP) of the German Aerospace Centre (DLR) as well as the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM.

2011 Inauguration of the Info-point. The “Vision 2015” is defined, whose focus is on the core objectives of internationalisation, diversification and regional value-addition. The world’s largest research autoclave with a diameter of 5.8 metres and a length of 20 metres is set up in the CFRP research centre. Rolls-Royce, as manufacturer of drive technology for aeroplanes and ships, becomes the 100th member of CFK Valley e. V.

2013 CFK Valley e. V., together with Carbon Composites e. V., AVK and VDMA, establishes the economic community Composites Germany.

2014 CFK Valley gets a new structure. Dr. Gunnar Merz becomes the full-time CEO. Founding of CFK Valley Japan.

2015 Establishment of CFK Valley Belgium.

2016 Extension of international contacts to Korea / Inauguration of the world’s first bus stops made of visible carbon in Stade.

2017 CFK Valley China is being planned.

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发展里程碑
创新拥有未来

CFK Valley协会 自2004年成立以来，已经发展成为了国际公认的碳纤维增强塑料的技术网络。目前约有120个国内外的公司和研究机构加盟，以此促进了纤维复合材料技术成为工业制造技术的进程。并且在价值链的各个环节上启动了多个工作组，技术路线图也已经得以实施。

数据和事实

2004年 7名成员在斯塔德（Stade）成立了CFK Valley 协会。其中包括空中客车公司，斯塔德复合材料技术中心 CTC，萨尔特克斯 Saertex 公司，赫氏Hexcel 复合材料公司，德国航空航天中心（DLR），弗劳恩霍夫制造技术和应用材料研究所，以及汉萨城斯塔德市。同年，斯塔德技术中心（TZS）落成剪彩，成为CFK Valley 的成员公司所在地。这里有2500多平方米的大厅和1600平方米的办公空间。

2005年 协会已经拥有35名协会成员。技术中心雇用了60名专业人员。

2006 新大学楼举行奠基仪式。这所独一无二的大学将培养来自全球的碳纤维增强塑料工程师。当年秋季有46名大学生在这里开始了他们的学业。

2007 在STADEUM剧场举行了首届斯塔德碳纤维增强塑料专业国际会议。同时在旁边举行了专业交易会。来自世界各地的参会者约400名，参展者40多名。

2008 哥廷根私立大学斯塔德复合材料校区成立。目前已有100名左右的学生注册入学。斯塔德市议会决定建立碳纤维增强塑料北部研究中心（CFK NORD），开发用于碳纤维增强塑料大型部件的自动化技术。

2009 碳纤维增强塑料北部研究中心（CFK NORD）举行奠基仪式。18600平方米的建筑面积中，12300平方米为科研大厅，6.,300平方米作为办公室、会议厅，多功能室以及接待厅。

2010 碳纤维增强塑料北部研究中心（CFK NORD）揭幕。主要租户是德国航空航天中心（DLR）的轻型生产技术中心（ZLP）和弗劳恩霍夫生产技术和应用材料研究所（IFAM）。

2011 信息展落成典礼。制定了“2015年远景规划”。其核心目标的重点是国际化、多样化和价值创造区域化。
CFK研究中心安装了世界上最大的科研高压釜。其直径为5.8米，长度为20米。劳斯莱斯（Rolls-Royce）作为飞机和船舶推进技术制造商，成为了CFK Valley协会的第100个成员。

2013 CFK Valley协会和碳复合材料协会、增强塑料工业联盟（AVK）和德国机械设备制造联盟（VDMA）一起成立了德国复合材料经济共同体。

2014 CFK Valley协会建立新的组织结构。古纳尔·莫尔兹Gunnar Merz博士成为全职首席执行官。CFK Valley协会日本分会成立。

2015 CFK Valley协会比利时分会成立。

2016 扩大与韩国的国际联系 / 世界上第一个碳纤维巴士停车站在斯塔德（Stade）举行建成典礼。

2017 CFK Valley协会中国分会正在筹备中。

AIRBUS IN STADE

Alle 1,5 Sekunden startet oder landet weltweit ein Airbus-Flugzeug. Das Werk Stade ist immer dabei. Denn die Seitenleitwerke aller Airbus-Baumuster – von der A320- und A330-Familie über die A350 XWB und A400M bis zur A380 – werden am Standort vor den Toren der Hansestadt gebaut. Sie sind aus CFK gefertigt, dem schwarzen Baustoff mit hervorragenden Eigenschaften: sehr leicht, extrem fest, strapazierfähig.

Der Airbus-Standort Stade mit seinen rund 1800 Mitarbeitern ist konzernweit das Kompetenzzentrum für Seitenleitwerke – und führend in der Verarbeitung von Kohlefaserverbundwerkstoffen. Bereits 1983 war das erste Seitenruder aus CFK für die A310 hergestellt worden. Heute werden neben den Seitenleitwerken auch CFK-Komponenten wie Landeklappen für die A320, Spoiler für die A330 und Druckkalotten für A330 und A380 gebaut. Für das jüngste Mitglied der Airbus-Flotte, die A350 XWB, fertigt Stade die obere und untere Rumpfschale der Sektion 18/19 sowie die obere Flügelschale. Sie ist 32 Meter lang und damit weltweit das größte integrale CFK-Bauteil. Für das Militärtransportflugzeug A400M liefert Stade die oberen und unteren Flügelschalen, für den Eurofighter die Rumpfschale.

Alle 15 Jahre verdoppelt sich das weltweite Luftverkehrsaufkommen. Die Zahl der in Stade gefertigten Bauteile wird sich weiterhin rasant erhöhen. Modernste Fertigungstechnologie und automatisierte Montagen ermöglichen auch in Zukunft weitere Ratensteigerungen. Im CFK Nord, dem direkten Nachbarn des Werks, finden Airbus-Experten den Raum und mit dem CFK Valley e. V. die passenden Partner aus Industrie und Forschung – um für die Zukunft bestens gerüstet zu sein.

Every 1.5 seconds, an Airbus aircraft takes off or lands somewhere on the planet. The Stade plant is always on board: the vertical tail planes of all Airbus types – from the A320 and A330 families to the A350 XWB and from the A400M to the A380 – are manufactured at the site on the Hanseatic City of Stade's doorstep. They are made from CFRP, the black magic of materials with excellent properties: very lightweight and extremely strong and tough.

The Airbus Stade site with its roughly 1,800 employees is the group-wide centre of competence for vertical tail planes – and the industry leader for processing carbon fibre composites. The first CFRP rudder had been manufactured for the A310 as early as 1983. Today, other CFRP components such as the flaps for the A320, spoilers for the A330, and pressure bulkheads for the A330 and A380 are manufactured here in addition to the vertical tail planes. For the youngest member of the Airbus fleet, the A350 XWB, Stade produces the upper and lower fuselage shells for section 18/19 as well as the upper wing shell. The latter measures 32 m in length, which makes it the largest monolithic CFRP component in the world. For the A400M military airlifter, Stade supplies the upper and lower wing skins, and the fuselage shell for the Eurofighter is also made here.

Every 15 years, the global air traffic volume doubles. The number of components manufactured at Stade will continue to increase at a breathtaking pace. Top-of-the-line manufacturing technology combined with automated assembly lines pave the way for further production rate increases in the future. At the CFK Nord, the immediate neighbour to the plant, Airbus experts have found the space and, at CFK Valley e. V., the suitable partners from industry and research for mastering the challenges to come.

Flügel der Zukunft

Airbus forscht am CFK Nord unter anderem an neuartigen Materialverbindungen sowie Legetechniken für Prepreg und Trockenfaser. Ziel des Projekts „Wing of the Future" ist ein hoch integrales Flügelbauteil (u. a. Haut und Stringer in einem Stück hergestellt) mit zukunftsweisenden Materialien und hohem Automatisierungsgrad. An einem Flügel-Demonstrator werden die Vorentwicklungen getestet.

Hoch automatisiert

In Kooperation mit dem Fraunhofer Institut (IFAM) Bremen entwickelt und erprobt Airbus neue Technologien für eine hoch automatisierte Montage von CFK-Seitenleitwerken – mit dem Ziel, für weitere Ratensteigerungen in der Zukunft gewappnet zu sein.

Wing of the future

Airbus' research projects at the CFK Nord include novel material combinations and lay-up techniques for prepregs and dry fibres. The objective of the "Wing of the Future" project is a highly monolithic wing component (including the skin and stringers manufactured as a single part) with pioneering materials and a high level of automation. The pre-developments are being tested using a wing demonstrator.

High level of automation

In cooperation with the Fraunhofer Institute (IFAM) Bremen, Airbus is developing and testing new technologies for a highly automated assembly process for CFRP vertical tail planes – aiming to be ready for further rate increases in the future.

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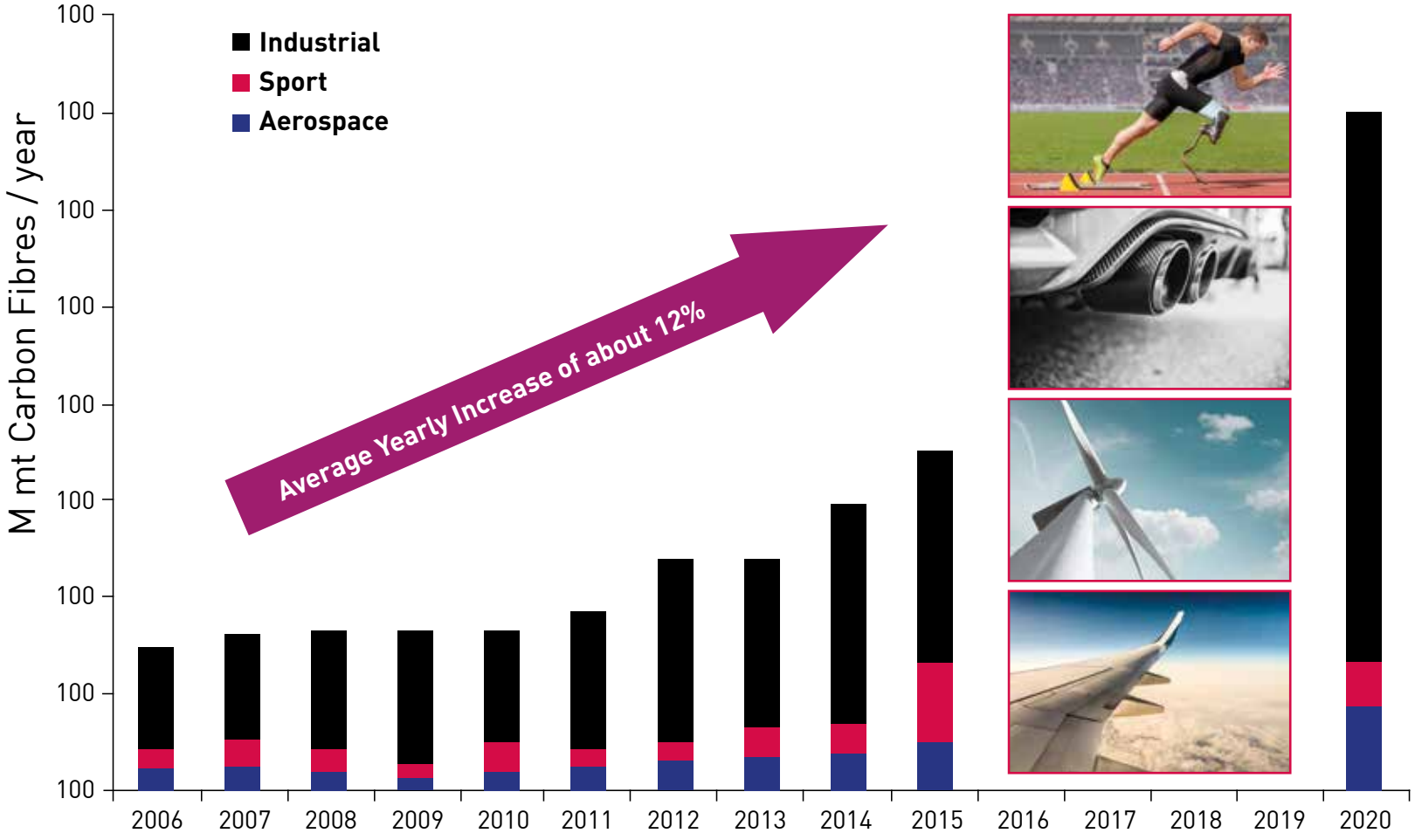
IMPORTANCE OF DIVERSIFICATION INTO INDUSTRIAL APPLICATION



Source: JEC Magazine 2014

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THINK OF FUTURE TODAY
2020 OUR VISION

Together with its national and international partners, CFK Valley e. V. will become the world's leading and most innovative composites-meta-cluster.

OUR MISSION

CFK Valley e. V. looks for national and international suitable companies, institutions and networks, which, complementary to the experience and knowledge, infrastructure, technologies and trained specialists of the members of the CFK Valley network, bring in their know-how, in order to develop innovations for market-oriented customer solutions. Along the entire value-added chain of composites, CFK Valley e. V. offers the best possible solutions at each point of time for all technology queries of internal customers or members.

OUR STRATEGY

We bundle the worldwide leading composites know-how, in order to enable the best possible services for our members and to support them at the highest level while implementing the innovations. We want to help in maintaining and expanding the technology lead of our members. We support our members in all areas important for them, such as diversification and internationalisation. We place more emphasis of the value-addition of a membership in CFK Valley e. V. For our members, we optimise the access to the direct business and to individual projects. In doing so, we advise them in all matters related to promotion. The focus hereby is primarily on small and medium-sized companies. Furthermore, we enhance the international presence of CFK Valley e. V. and work on all relevant high-level topics in the scope of Composites Germany. We actively make use of the matching promotion possibilities and initiate lighthouse projects.

抚今瞻未来
我们2020年的远景规划

CFK Valley协会愿意与其国内和国际合作伙伴一起，
在全球建立技术领先和最具创新性的复合材料超大集群。

我们的使命

为了面向市场和客户来发展创新，CFK Valley协会正在国内外寻找合适的公司、研究机构和网络，旨在利用其专业知识，对CFK Valley协会成员的经验、知识、设备、技术以及培养的专业人员形成互补。对于复合材料价值链上的任何技术问题，CFK Valley将在第一时间为协会内部的客户和成员提供最佳的解决方案。

我们的策略

我们要集中世界领先的复合技术专业知识，为我们的会员提供最好的服务，并在实施创新方面给予顶级支持。我们希望帮助会员，维护和扩大其技术优势。在多元化和国际化等重要领域，为会员提供帮助。在CFK Valley，提高会员的价值始终是我们关注的焦点。由此，我们致力于优化会员直接接触业务和项目的途径，并且就扶助资金的各种问题提供咨询。特别是中小企业更是我们关注的中心。我们将继续提高CFK Valley协会在国际上的地位，并参与德国复合材料领域内所有重要的主题讨论。我们还将积极利用相应的扶助资金，启动灯塔项目。

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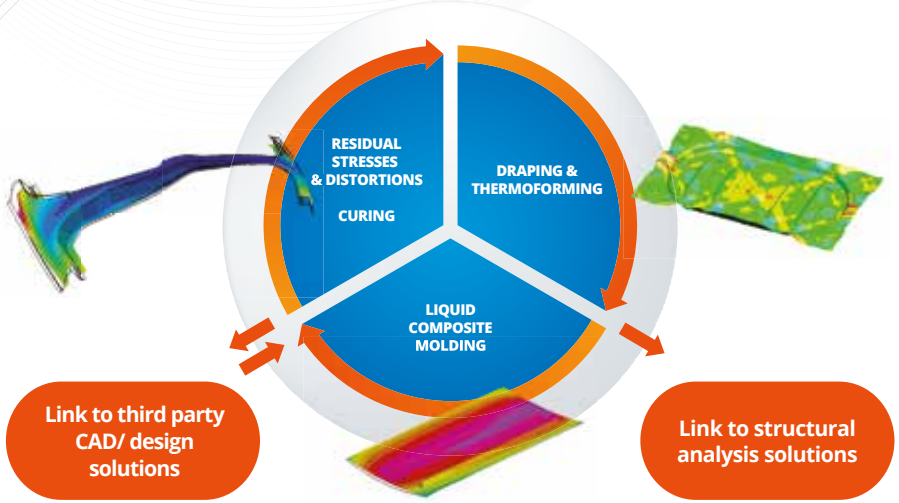
PAM-COMPOSITES

Virtual Manufacturing of Industrial Composite Parts



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CFK NORD
A SUCCESS MODEL OF RESEARCH

In the research centre CFK NORD, an integral part of CFK Valley, science economics and universities work together to develop future-enabled solutions for using CFRP in practice. The modern research centre, which was initiated with the help of grants given by the State of Lower Saxony, is operated on an area of around 18,600 square metres by a subsidiary of the Hanseatic City of Stade. The CFK NORD is thus one of the largest research centres of its kind in Europe. Starting from the initial product idea to development right up to the complete CFRP structure in the scale of 1:1, innovative solutions are developed here and implemented for the production of CFRP components as well as for CFRP mounting process. Large components can be processed optimally in the hall with a length of 135 m, width of 50 m and a height of 24 m.

USE COMMON SYNERGIES

Along with the German Aerospace Centre (DLR) with the Centre for Lightweight Production Technology, the Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM, Olin, the Premium AEROTEC GmbH, the Lower Saxony universities of Hanover, Clausthal, Braunschweig and Buxtehude as well as other companies and research institutes are present today in CFK NORD.

The success of these innovation pioneers proves the concept to be right: A lot of new tenants have established themselves successfully in the past years so that capacities have become small and an extension is being planned. In the CFRP research itself, it is seen that the synergies can be used by all project partners and offer direct benefits.

CFK NORD
科研的成功模式

碳纤维增强塑料北部研究中心CFK NORD是CFK Valley的核心组成部分。这里，科学界、工业界和大学正在联手合作，为碳纤维增强塑料的实际应用提供前瞻性的解决方案。这所现代化的研究中心，是通过下萨克森州支助建立的，由汉萨同盟市斯塔德的子公司经营，面积约18600平方米。碳纤维增强塑料北部研究中心是欧洲同类研究中心中最大的一个。在这里，最初的产品理念通过开发形成了完整的1比1规模的碳纤维增强塑料大型结构，为碳纤维增强塑料部件的生产和装配过程提出和实施了创新解决方案。在135米长，50米宽，24米高的大厅内大型部件可以得到最佳处理。

共享协同效益

除了德国航空航天中心（DLR），包括轻量化生产技术中心，在碳纤维增强塑料北部研究中心CFK NORD落户的还有弗劳恩霍夫制造技术与应用材料研究所IFAM，Olin公司，Premium AEROTEC GmbH公司，汉诺威、克劳斯塔尔、不伦瑞克、和布克斯特胡德的多所下萨克森州大学以及其他公司和研究机构。

这个创新的成功范例表明了规划的正确性：近年来，由于很多新租户在这里成功落户，空间已经显得太小，扩建正在计划中。 正是碳纤维增强塑料研究表明，协同效应对可以被所有的项目伙伴利用，并带来直接的效益。

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CFK-VALLEY STADE TECHNOLOGY
THE FUTURE STARTS HERE

At present 15 international research institutes and companies are working there on the development of futuristic processes and innovative methods in CFRP lightweight construction. In particular in the area of utility vehicles a lot of progress has been made in the past years. The participants benefit together from the close research linking. Another central topic is the expansion of close relationships with other national and international technology centres.

WORKING FOR THE COMMON SUCCESS

The technology centre was set up with the funds of the State of Lower Saxony by the Projektentwicklung Stade GmbH & Co. KG and is operated by CTC GmbH. A very large space is offered. More than 3,200 square metres are available for halls and laboratory areas as well as further 2,400 square metres for offices. Project partners can take these on rent and get closely connected with the high-technology projects. The spatial nearness to the different actors creates an optimum framework for success product innovations and a creative research work.

斯塔德CFK VALLEY技术
未来从这里启程

目前，有15个国际研究机构和公司在这里从事碳纤维增强塑料轻型制造和创新工艺的开发。这是一项开创未来的工艺。近年来，特别是在商用车领域取得了重大进展。研究中的密切联系使得参与者们受益匪浅。 另一至关重要的题目是拓展与国内和国际的其他技术中心的密切关系。

携手并进，共创成功

CFK Valley 技术中心是通过下萨克森州的项目扶助基金，由斯塔德项目开发两合公司（Stade GmbH&Co. KG）建立的，并由CTC 有限公司负责运营。这里可用的空间很大：大厅和实验室空间超过3200平方米，还有2400平方米办公室。项目合作伙伴可以在这里租赁，从而直接与高科技项目相衔接。参与者紧密的空间距离为产品创新的成功以及创造性研究工作提供了最佳框架。

CFK-VALLEY STADE SERVICE
WE OFFER MORE

Around 2,200 square metres of office space is available in CFK Valley. Primarily, the nearness to Airbus and research institutes as well as companies of CFRP Lightweight Construction enhances the attractiveness of the available space and adds more value. The service centre of municipal subsidiary Projektentwicklung Stade GmbH & Co. KG is operated here. The office spaces have a size between 30 and 80 square metres and can be rented flexibly according to your requirement with different contract tenures.

斯塔德CFK-VALLEY的服务
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斯塔德CFK Valley约有2200平方米的办公面积。它的位置紧靠着空客公司、研究机构和碳纤维增强塑料轻型结构制造公司，由此提升了可用空间的吸引力和选址的附加值。该服务中心由市属公司斯塔德项目开发两合公司（Projektentwicklung Stade GmbH&Co. KG）经营。办公室面积在30-80平方米之间，可以根据您的需要按照不同的合同期来灵活租用。

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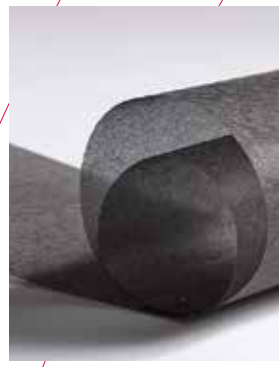

RECYCLING AND WASTE PREVENTION
A FUTURE-ORIENTED TOPIC, RELEVANT FOR ALL

The responsible handling of our natural resources through a consistent implementation of innovative recycling processes is becoming more and more significant. We work at first in prevention of waste and then at the development of concepts for a process-oriented, fully automatic recycling. The increasing use of carbon fibres requires new ways of a sustained utilisation of carbon fiber reinforced plastic.

TESTED IN PRACTICE

At present, for instance, the company Strehl produces new, high-quality orthoses from the carbon-fibre production wastes of Airbus. This example of a cross-sector cooperation shows how synergies provide for more sustainability.

The key for economically as well as ecologically sustainable treatment solutions can be found, in particular, in the interplay between material and fibre properties. The C.A.R. FiberTec GmbH, established in 2014, has established with its concept a single-origin and application-oriented product treatment for the resulting product portfolio of short fibres, fillers as well as textile fibre semi-finished products at the level of primary fibres for technically high-demanding markets in the fields of plastics, building chemistry as well as textile semi-finished products.

The partner for implementing the recycling concepts is the CFK-Valley Stade Recycling GmbH & Co. KG. Its know-how guarantees a safe as well as efficient disposal and treatment of production residues containing carbon fibres and end-of-life components. For the recovery and production of high quality semi-finished products of carbon fibres, such as textile structures or short fibres, a state-of-the-art, one of its kind recycling plant with a capacity of around 1,000 t was commissioned in February 2011.

废料回收和避免垃圾
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持续地采用创新回收流程，负责任地使用我们的自然资源，具有越来越大的意义。首先，我们要努力避免垃圾产生，然后要制定程序化和全自动化的废料回收规划。 随着碳纤维用量的增加，需要探寻碳纤维增强塑料可持续利用的新途径。

实践中认可

目前，空客公司的碳纤维生产废料通过斯特尔（Stehl）公司制成了新型优质的矫形器。这是一个跨行业协作的范例。它显示了协同效应更加能保证可持续性的发展。

特别是在材料和纤维性能的相互作用中，能够找到经济和生态持续加工的关键解决方案。C.A.R.纤维技术有限公司（C.A.R. FiberTec GmbH）成立于2014年。它从事于短纤维、填料和纺织半成品纤维的初级纤维加工。其产品组合面向人造材料、建筑化学以及纺织半成品市场。虽然这个技术市场要求高，由于采用了单一品种并面向应用的策略，公司能够成功地立足于市场。

斯塔德CFK- Valley废品回收两合公司（CFK-Valley Stade Recycling GmbH＆Co. KG）是回收废料的合作伙伴之一。他们的专有技术保证了含有碳纤维的生产残渣和报废组件能够得到安全和有效的清除和回收处理。为了回收和生产高质量的碳纤维半成品，如织品结构或短纤维，2011年2月一个独特的、具有1000吨处理能力的、高度现代化的废品回收工厂投入了运行。

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BREMEN
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PFH HANSECAMPUS STADE
QUALIFICATION WITH FUTURE

The basis of every successful work is the qualification of the employees. In this respect, the training and advancement of highly qualified specialists takes up a special place in the overall strategy of CFK Valley e. V. The PFH Hansecampus Stade was initiated with the financial support of the State of Lower Saxony and the Hanseatic City of Stade. The campus building is being used by the vocational school of Buxtehude and the PFH (Private University of Applied Sciences of Göttingen). On an area of around 3,000 square metres there is an auditorium for approx. 140 students,numerous seminar rooms and laboratories with the latest equipment, office and meeting rooms for professors and lecturers as well as a canteen. Specialists are trained for the material of CFRP at the PFH, which, till now, is one of its kind all over Europe.

POSSIBLE DEGREES

Graduate students can complete their course with the following degrees:
- Bachelor of Engineering in the field of composite materials/composites incl. training to become fiber composite skilled worker (campus study, 8 semesters)
- National and international English-speaking Master of Science in the field of composite materials/composites (on the job training, 3 semesters)

Moreover, campus and distance learning courses in management (bachelor, master and MBA) are also offered. Further courses are currently being planned.

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哥廷根私立大学斯塔德汉萨校区
资质让你拥有未来

每一项工作的成功都来源于员工的技能。因此，高素质专业人员的培训和继续教育对CFK　Valley协会的整体战略具有特殊的意义。在下萨克森州和汉萨市斯塔德的财政支持下，哥廷根私立大学斯塔德汉萨校区PFH Hanse Campus Stade诞生了。校区建筑由布克斯特胡德职业学校和哥廷根私立大学斯塔德汉萨校区（PFH）共同使用。　在约3000平方米的面积上，有一个能容纳大约140名学生的礼堂，众多的研讨室和实验室装备了最先进的设备，还有办公室，教授和讲师会议室以及一个餐厅。迄今为止至少在欧洲，哥廷根私立大学斯塔德汉萨校区PFH是对碳纤维增强塑料材料专家进行培训和继续教育的唯一的一所大学。

可获取的学业证书

毕业生完成学业之后，可以获得以下资格：
- 复合材料工程学士学位
  包括纤维增强塑料FVK专业技工（校园学习，8个学期）
- 德国和国际认可的、用英语授课的复合材料领域科学硕士学位
  （在职学习，3个学期）

此外还提供企业管理专业校园和远程学习课程（学士，硕士和工商管理硕士）。 其他课程已经在计划中。

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邮编城市：21684 Stade
学校电话：+49 4141 79 67-0
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ProsihP II complete plant for the processing of an A320 vertical tail plane (© Fraunhofer IFAM).
A３２０の垂直安定板を処理するProsihP IIシステム全体（©フラウンホーファー 研究所/IFAM）

Mobile CNC robot for processing main structures (© Fraunhofer IFAM).
大型構造物の機械加工のためのポータブルCNCロボット（©フラウンホーファー研究所/IFAM）。

Dr. Dirk Niermann

Head of department Automation and Production Technology

Fraunhofer Institute for Manufacturing Technology and Advanced Materials IFAM | Adhesive Bonding Technology and Surfaces

Forschungszentrum CFK Nord
Ottenbecker Damm 12 | 21684 Stade | Germany

Phone: +49 (0) 4141 78707-101
dirk.niermann@ifam.fraunhofer.de | www.ifam.fraunhofer.de

MOBILE PRECISE MILLING ROBOT FOR THE VERSATILE PRODUCTION OF MAIN STRUCTURES

As a milestone of the versatile production, the experts for automation and production technology of the Fraunhofer IFAM, Stade, developed together with project partners a mobile industrial robot for working on main structures – one of the most accurate processing robots worldwide.

The robot mounted on a mobile platform (AGV; Automated Guided Vehicle) navigates independently on production areas. An upgrade kit – independent of the robot manufacturer – for measurement and control technology, together with the stability of the new AGV, enables processes, for which the previous 6-axle robots were unfit owing to inadequate absolute accuracy and too low working space. As already demonstrated at a shell of a vertical tail plane, the mobile milling robot enables, for instance, a precise outline milling of large components.

Fraunhofer IFAM designed and realized with its project partners a mobile carrier vehicle for heavy-duty robots. The moving platform built from conventional components available in the market is set on the ground with three supports, statically determined, for carrying out the process. The extendible wheels give the whole structure a far-reaching freedom of movement – right up to rotating on the point. The system is calibrated to the component with the help of a newly developed software. An advanced camera system determines the current position of the robot for a real-time correction by compensating with the reference data.

The R&D work for the autonomous ground vehicle and the upgrading of the robot were done under the project “ProsihP II” supported by the State of Lower Saxony with the project partners Aicon 3D Systems GmbH, Airbus Operations GmbH, Artis GmbH, CTC GmbH Stade, Fraunhofer IFAM, IPMT of TU Hamburg, Ludwig Schleicher Anlagenbau GmbH, Mabi AG mz robolab GmbH, Siemens AG, and Volkswagen AG.

The system till now is designed for component lengths up to 30 m, local accuracies of 0.1 mm can be achieved. This makes it suitable for different primary structures of an aeroplane, such as wing shells or fuselage segments. In addition, with slight modifications, it can also be used for rotor blades of wind power plants or large components in ship building.

可变式大型构件制造中的移动式精密铣削机器人

作为多功能生产的一个里程碑，斯塔德弗劳恩霍夫自动化和生产技术研究所的专家与项目合作伙伴共同开发了一款用于在大型结构上工作的移动式工业机器人。这是世界上最精确的加工机器人之一。

这个机器人安装在地面自导车辆（AGV，Automated Guided Vehicle）上，可以在生产区域独立导航。新型的地面自动车具有稳定性， 并配置了非机器人厂家生产的用于测量、控制和调节技术的升级套件， 可以在目前的6轴机器人由于绝对精度不够和工作空间不足无法操作的过程中使用。正如在碳纤维增强塑料垂直尾翼的外壳中所示，移动式铣削机器人可以精确地完成大型部件的轮廓铣削。

斯塔德弗劳恩霍夫自动化和生产技术研究所与其项目合作伙伴一起设计并建造了一款用于重型机器人的移动运输车辆。 移动平台建立在地面上，在操作时具有三个静态固定的支撑柱。 可延伸的轮子让整个结构运转自由，甚至可以原地旋转。 在新开发的软件的帮助下，系统根据组件进行校准。 同时，先进的照相机系统可以通过对照目标数据来检测机器人所在位置，并进行实时校正。

自导地面车辆的研发工作和机器人的升级是在下萨克森州支助的„ProsihP II “项目框架下进行的。项目合作伙伴有：Aicon3D系统有限公司 （Aicon 3D Systems GmbH），空中客车运营公司（Airbus Operations GmbH），Artis有限公司（Artis GmbH），斯塔德CTC有限公司（CTC GmbH Stade），斯塔德弗劳恩霍夫自动化和生产技术研究所（Frauenhofer IFAM）， 汉堡技术大学生产管理和技术学院（IPMT der TU Hamburg），路德维希·史莱希尔设备建造有限公司（Ludwig Schleicher Anlagenbau GmbH），马比股份公司（Mabi AG），MZ 机器人实验室有限公司（mz robolab GmbH），西门子股份公司（Siemens AG）和大众汽车股份公司（Volkswagen AG）。

该系统目前已经被设计用于长达30米长的部件，可以实现0.1mm的局部精度。 因此，可以用于不同的飞机的主要结构，例如机翼外壳或机身部分。除此以外，只要进行微小的改造，便可以使用在风力发电机的转子叶片或造船等大型部件上。

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CFK-VALLEY STADE CONVENTION
THE INDUSTRY MEETING POINT

The CFRP sector is networked internationally. The CFK-Valley Stade Convention is today one of the most important meeting of experts for composite materials and carbon fiber reinforced plastic in lightweight construction. International specialists from economics and research meet here. Several hundred industry visitors from more than 20 countries come together in Stade, in order to exchange the latest knowledge and to make profitable contacts. Contrary to the industry trend, the convention can maintain a constantly high number of visitors and exhibitors.

AT THE PULSE OF TIME

Since 2014 each year a new partner country has determined for the convention. In 2015 it was Belgium, Korea in 2016 and Austria in 2017. The aim is to expand the transfer of knowledge as well as the synergy effects with the respective partners. The CFK-Valley Stade Convention offers an excellent platform to do this. The partner countries are characterised by a clear technology orientation and futuristic projects. An area is always defined as the leading theme, which is currently in focus in the sector. The respective industry experts have the opportunity to present the latest knowledge and results. Information about the contents can be retrieved online via www.cfk-convention.com. The language of the conference is English. Along with a series of lectures, there is also a technical exhibition, in which leading companies and renowned institutes present their product innovations and services along the entire CFRP value-added chain. Even CFK Valley e. V. participates in this exhibition in a joint booth, where the members of the association can present themselves as a strong company.

All information about participation and exhibition possibilities is given here:
www.cfk-convention.com

斯塔德炭纤维增强塑料CFK-VALLEY会议
行业的聚会

碳纤维增强塑料行业是全球联网的。斯塔德CFK-VALLEY会议是当今轻质制造业中复合材料和碳纤维增强塑料方面最重要的专家会议， 是商界和科研领域的国际专家聚会的地方。来自二十多个国家的数百名专业人员相聚在斯塔德，交流最新的发现，并建立有益的联系。此行会的参展商和观众人数保持稳定，与行业的趋势逆向而行。

把握时代的脉搏

自2014年以来，大会每年都会确定一个新的伙伴国家。2015年是比利时，2016年是韩国，2017年是奥地利。目的旨在扩大知识转让，加强与伙伴间的协同效应。斯塔德CFK-Valley会议为此提供了一个优良的平台。由于伙伴国各自具有明确的技术定位和前瞻性项目，因此大会总是根据当前行业关注的情况来确定某一领域作为会议的主题。会议上行业专家有机会介绍最新的发现和结果。会议的有关内容和信息可以在以下网站找到：www.cfk-convention.com。会议语言是英语。除了报告系列之外，还将举办配套的专业展览。主要的公司和知名机构将按照碳纤维增强塑料价值链环节展示他们的创新产品和服务。CFK-Valley也将采用联合展台参展。协会成员可以在一个强大的群体框架内展示自我。

有关参展和展览的所有信息可以在这里找到：
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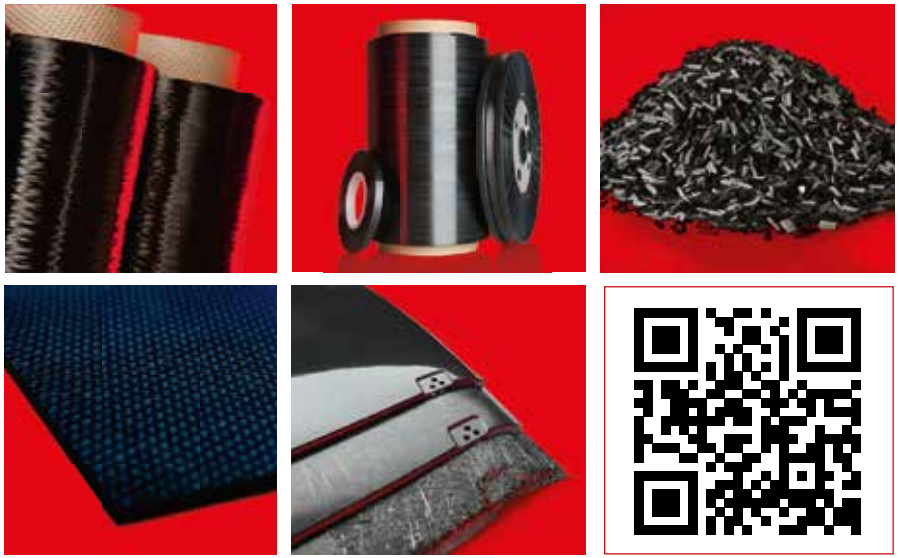

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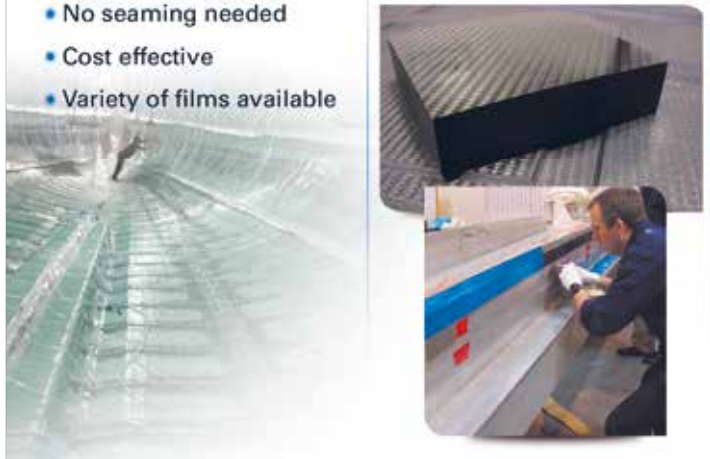

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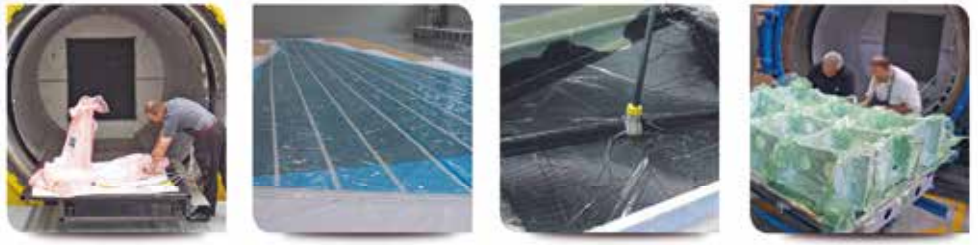

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OUR SERVICES
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We support our members with numerous attractive services. Thus, for instance, you can present your company and its services in a professional environment at our joint booth. We participate with our booth in different technical exhibitions, such as Composites Europe, the JEC in Paris, Sampe Europe and the Hannover Messe.

Another part of our services package is the media and public relations work. For this, we have set up our own CFK Valley App (iOS and Android). We see to it that all the important latest information and developments are accessible on the home page and publish an innovation report twice a year. Apart from this, we also publish brochures and flyers.

A topically very diversified training programme ensures that you are always updated with respect to technical knowledge. In practical matters, too, we are competently at your side. This, for instance, in conflict cases we can act as a mediator or support you in bank meetings for financing new establishments or projects.

我们在你身旁
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我们为会员提供众多诱人的服务，例如，您可以利用我们的联合展台，在专业环境中展示您的公司及其服务内容。我们现成的展台将出现在各种专业展会上：如欧洲复合材料展，巴黎JEC展，欧洲Sampe展和汉诺威工业博览会。

我们服务的另一个组成部分是媒体和公关工作。为此，我们建立了自己的CFK Valley App 应用程序（iOS和Android）。我们确保所有重要的信息和发展都可以及时地在网站上找到，并每年发布两次 “创新报告”。另外，我们还出版宣传册和广告传单。

我们的进修和继续教育计划内容广泛，能够确保您始终掌握最新的专业知识。在实际问题中，我们也伴您身边鼎力相助，在纠纷中为您进行调解，在银行帮您为创业或新项目筹集资金。

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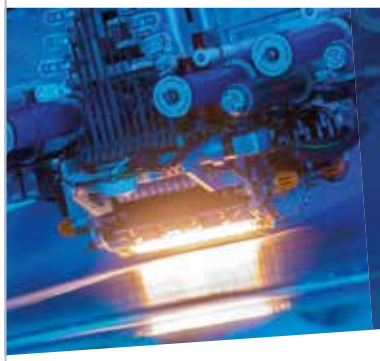

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ON A SUCCESS COURSE
LATEST PROJECTS

Construction sector

When Dr. Amer Affan purchased a sailing ship with a CFRP mast, he was absolutely fascinated by the material and its possibilities for the construction sector. In 2010, Dr. Affan visited the CFK Valley booth at the JEC Paris and became a member of the association. Today, he is one of the international experts for innovative design solutions with CFRP.

Utility vehicles

In the area of light utility vehicles too, the use of CFRP is convincing. The transporters of the vehicle class 3.5 t can manage payloads up to 1,500 kg without any problem. This is 500 kg more than the conventionally produced vehicles. For this reason, the development has also been awarded the innovation prize of the logistics sector in 2014.

In case of vehicles of the weight class up to 40 t, an additional loading of 3,000 kg is possible or even a reduction of diesel consumption by 22%!

Aviation

Following applies to aeroplanes: the lighter, the better. The largest aircraft part made from CFRP by Airbus is an upper wing shell with a length of 32 m and is installed in Airbus A350. Naturally, this was manufactured in Stade.

行进在成功的轨道上
当前的项目

建筑行业

阿梅尔·阿凡（Amer　Affan）博士买过一艘用碳纤维增强塑料做成桅杆的帆船。从那时起，他就迷上了这种材料。特别是碳纤维增强塑料对建筑业所展示各种可能性深深地吸引了他。　2010年阿凡博士在巴黎JEC展会上参观了CFK Valley的展台，并成为了该协会的成员。今天，他是碳纤维增强塑料创新设计解决方案的国际专家。

商用车

在轻型商用车领域使用碳纤维增强塑料，其结果令人信服。一辆3.5吨级的轻型运输车可以轻而易举地运载高达1500公斤的负载，比传统汽车高出500公斤。正是由于这个原因，这项发展在2014年获得了物流领域的创新奖。

对于载重量高达40吨的车辆，可以增加3000公斤的负荷，同时柴油消耗可以足足降低22%！

航空

对于飞机来说，越轻则越好。　空中客车公司用碳纤维增强塑料生产的最大的飞机部件是长32米的机翼顶部外壳，安装在空客A350上。当然，　它是在斯塔德Stade制造的。

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THE BENEFITS OF YOUR MEMBERSHIP IT IS WORTHWHILE TO PARTICIPATE

There are a lot of reasons for a membership of CFK Valley e. V. In the first place, the success-oriented bundling of research and corporate activities as well as the systematic networking of leading industry specialists can be mentioned.

Strong arguments

- Access to direct business
- Access to state-of-the-art technology in the field of composites
- Involvement in latest research projects and developments
- Networking with the relevant actors of CFRP technology
- Access to new markets and partners
- Joint public relations work
- Contacts with national and international companies and research institutes
- Access to attractive training programmes
- Participation in ongoing projects
- Reserved university places at the PFH
- Participation in multiple events of CFK Valley e. V. free of cost
- Discounted participation in the CFK-Valley Stade Convention
- Organisation of joint booth in important exhibitions
- Provision of rooms and infrastructure in CFK Valley

and many more benefits!

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会员的优惠 加入协会好处多

成为CFK Valley协会的一员，为什么值？原因很多。首当提及的是，科研和企业的携手，以及业内引领专家的系统联网。这是导向成功的联手。

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- 进入新的市场和接触新的合作伙伴
- 联合进行公关宣传
- 与国内外公司以及研究单位建立联系
- 参加有吸引力的培训活动
- 参与正在进行的项目
- 在哥廷根私立大学斯塔德汉萨校区PFH预留学习位置
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Losing weight was never so easy.

Losing weight is never fun – even for a car.
Composites with ultra-lightweight ROHACELL® Triple F foam cores inside can substantially lighten a vehicle design. Because the cores are produced via in-mold foaming, it's even easy to create lightweight parts with complex geometries and integrated inserts. **Design with freedom. Lose weight.**

- Lightweight, structural core shapes – in customized densities
- Quality cores with fine surface details, ready to be used for lay-up and curing production
- Optimal for fast processing cycles and high volume serial production
- Integrate inserts during the foaming process

Learn more at **www.rohacell.com**

ROHACELL® Triple F

EVONIK
POWER TO CREATE

ECONOMIC, 3-D STRUCTURAL FOAM CORES IN A LARGE NUMBER OF UNITS

High stiffness at low weight: Integral design, reduced resin absorption and high temperature resistance are some of the characteristics of ROHACELL® structural foam core from Evonik Performance Foams for economic production of fibre-reinforced composite sandwich components. In addition to traditional foam core material and the time-intensive method of NC milling, which is suitable for a moderate number of pieces with its high accuracy and low investment costs, Evonik developed two further processes for the production of closed-cell foam cores: thermo-shaping and in-mould foaming. These faster and material saving methods make it possible to produce a larger number of pieces at a reduced cost.

In thermo-shaping, foam sheets are shaped into complex geometries using one or two-sided tools and cycles of only minutes. Special infrared radiators heat up the inherently insulating material in seconds in a clamped frame, fast automated reforming machines bring the material into the final shape and compress it, if needed.

As the name says, with in-mould foaming, the core is foamed directly inside the mould: To do this, ROHACELL® Triple F is filled as granulate into a two-sided mould, and then heated. The granulate foams uniformly until the mould is filled completely and homogeneously. Thickness differences, sharp edges, inserts and different surfaces are possible. The highly precise components made of ROHACELL® Triple F need only to be deburred slightly before further processing. Due to its excellent mechanical properties even at high temperatures, this foam can also be used in high pressure RTM or a wet-press method.

成本便宜的大批量复杂结构泡沫芯型

重量轻， 固性高：赢创公司的ROHACELL®泡沫结构芯具有整体设计、减少树脂吸收和耐高温的特性，可以用于经济地生产纤维复合材料的夹心组件。现有的NC-铣削工艺是一个材料和时间的密集过程，在高精度和低投资成本要求下，更适合于有限数量的生产。赢创研发并优化出了另外两种生产闭孔泡沫的工艺：热成型和模内发泡。这两种工艺运作迅速，节省原料，可以实现低成本大批量生产。

在热成型过程中，板块通过单面和双面的加工工具，以时分为节奏，被制作成复杂的几何形状。在此，特殊的红外线加热器在固定的框架上几秒钟之内将内在绝缘材料加热。快速自动成型机让材料成型为最终的形状，并且根据需要将其压实。

顾名思义，在进行模内发泡时，是直接将芯部泡沫注入模具里完成的。即：将ROHACELL®Triple F颗粒倒入双面模具里， 然后加热。颗粒均匀地发泡，直到均匀地将模具完全填满。厚度差异，锋利的边缘，插入件和不同的表面均可制作。进一步处理之前，只需对高度精确的ROHACELL®Triple F部件略微进行去毛刺处理。即使在高温下，这种泡沫也具有出色的机械性能，因此可用于高压RTM或湿压法。

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münch® chemie international

Münch Chemie International GmbH

69469 Weinheim – Germany
Phone: +49 (0) 6201 9983 0

www.muench-chemie.com
facebook.com/muenchchemie

CFK VALLEY™

CFK Valley e.V.
Ottenbecker Damm 12
21684 Stade
Phone: +49 4141 40740-0
Fax: +49 4141 40740-29
info@cfk-valley.com

碳纤维增强塑料协会
协会地址：Ottenbecker Damm 12
邮编城市：21684 Stade
协会电话 +49 4141 40740-0
协会传真 +49 4141 40740-29
电子邮箱 info@cfk-valley.com

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