科思创聚氨酯创新材料与定制解决方案
Covestro Polyurethane Systems and Solutions

推动中国汽车行业可持续发展

Driving sustainable development in the automotive industry

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聚氨酯在汽车行业的应用
Polyurethan Applications for the Automotive Industry

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开创精彩世界
To Make the World a Brighter Place

科思创是全球最大的聚合物制造商之一。公司在2016年的销售额达119亿欧元，业务重点是制造高科技聚合物材料和为用于日常生活多种领域中的产品开发创新性解决方案。它主要服务于汽车、电气/电子以及建筑、体育和休闲行业。前身为拜耳材料科技公司的科思创公司在全球30个生产基地从事生产活动。

With 2016 sales of EUR 11.9 billion, Covestro is among the world's largest polymer companies. Business activities are focused on the manufacture of high-tech polymer materials and the development of innovative solutions for products used in many areas of daily life. The main segments served are the automotive, electrical and electronics, construction and sports and leisure industries. Covestro, formerly Bayer MaterialScience, has 30 production sites worldwide.

科思创为汽车行业提供定制化聚氨酯解决方案

汽车行业是科思创最重要的产品应用行业之一，随着汽车行业的持续发展，我们与全球主要汽车厂商建立了密切的合作关系，在全球主要汽车市场建立了专业的研发团队和完善的服务网络。我们携手汽车工业客户开展汽车材料从前期设计、开发、测试直至商业化生产的全面合作，是汽车材料定制化解决方案不可或缺的合作伙伴。

聚氨酯材料在汽车内饰上有广泛的应用，在降低有机挥发物（VOC）排放方面被认为是最环保的材料之一。近年来，汽车轻量化成为降低油耗，减少汽车尾气排放，实现汽车节能减排的重要技术措施。基于聚氨酯的轻质高强复合材料在汽车上的应用也不断扩大。随着技术的不断进步，聚氨酯在汽车轻量化方面将发挥越来越大的作用。

作为聚氨酯的发明者，科思创依托在汽车行业积累的丰富经验，与我们的合作伙伴一起，为促进中国汽车行业的可持续发展而努力。

Covestro Provides Customized Polyurethane Solution for Automotive Industry

Automotive industry is one of the key application industries of Covestro. With the development of automotive industry, Covestro establishes close cooperation with leading automotive manufacturers and wide service networks. We cooperate with various partners in the industry to carry out the material design, development, testing and commercialization. We are your valuable partner providing customized polyurethane solutions.

Polyurethanes are widely used in the Automotive interior applications, and are considered to be one of the best eco-friendly materials to lower volatile organic compounds (VOC) emission inside of the cars. In recent years, lightweight cars are becoming a critical solution to reduce fuel consumption and vehicle exhaust emissions. Polyurethane based composite with high strength and light weight is applied to more and more applications for automobiles.

As the inventor of polyurethane, Covestro cooperates with our partners globally to continue driving sustainable development in the automotive industry with our experts.

产品体系表
Product Portfolio

汽车用聚氨酯体系 Polyurethane Solutions for the Automotive Industry

应用 Application	Bayfit®	Bayfit® SA	Bayfill®	Baysafe®	Bayflex® integral skin foam	Bayflex® RIM / RRM	Baydur®	Baydur® STR / Baypreg® F	Baynat®
仪表板/饰件 Instrument Panel /Trim			●					●	
备胎盖板/天窗拉板 Load Floor / Sun Shade								●	
顶棚 Headliner								●	●
玻璃包边 Modular Window Encapsulation						●			
方向盘 Steering Wheel					●				
吸音部件 Sound Absorption Foam		●							
头枕 Headrest	●				●				
座椅 Seating	●								
保险杠 Front and Rear Bumper				●		●		●	
门下围板/翼板/侧板 Rocker Panels / Side Molding / Panels / Wing						●			
扰流板 Spoilers / Wind Deflector					●	●	●	●	
座椅支撑部件/发动机挡罩 Seat and Backrest Shell / Engine Shroud								●	
吸能衬垫 Energy-absorbing Padding			●	●					
填充泡 Foam Flling of Cavity			●	●			●		
遮阳板 Sun Visor	●		●	●					

性能范围	Bayfit®	Bayfit® SA	Bayfill®	Baysafe®	Bayflex® integral skin foam	Bayflex® RIM / RRM	Baydur®	Baydur® STR / Baypreg® F	Baynat®
软质泡沫 Flexible foam	●	●							
半硬泡沫 Semi-rigid foam			●	●	●				
硬质泡沫 Rigid foam				●			●	●	●
弹性的 Elastic	●	●			●	●			
发泡的 Foamed	●	●	●	●	●		●	●	●
微孔的 Microcellular						●	●		
自结皮 Integral skin foam					●		●		
纤维增强或矿物填充 Fibre reinforcement or mineral filling						●		●	

仪表板
Instrument Panel

Bayfill® 聚氨酯半硬质填充泡沫

汽车内部更加舒适安全

Bayfill®聚氨酯半硬质填充泡沫，填充于仪表板的骨架和装饰表皮之间，其特点是流动性好，脱模时间短。该工艺能将复杂的部件生产一体化，降低成本，除了提高舒适性之外，在产生碰撞时，可吸收冲击能量，从而降低驾驶者受伤的风险。此外，这种仪表板能降低噪音，使驾驶更安全。

主要特点:

- 降低了汽车内部VOC含量
- 改善耐老化性能
- 生产效率得到提高，能90秒脱模，返修率低
- 改进的IP体系具有更好的拉伸强度，能集成安全气囊一体化生产

Bayfill®泡沫体系的机械性能:

项目	单位	高密度体系	低密度体系	检测方法
密度	kg/m³	150	120	DIN 53420
抗张强度	kPa	337	345	DIN EN ISO 1798
断裂伸长率	%	74	60	DIN EN ISO 1798
压缩硬度40%—压缩	kPa	49	43	DIN EN ISO 3386
压缩变形，50%，70℃，22小时	-	<10%	<10%	DIN 53572

Bayfill® semi-rigid PUR filling skin foam

Comfort and safety for car interior

Bayfill® (the semi-rigid PUR filling skin foam), which combines the instrument panel retainer with the decorative skin, is characterized by good flowability and short demoulding times. The process also allows integrated production of complex contours to save cost. With this material, beside improvements in comfort, the impact energy will be absorbed in the case of a collision and consequently the risk for injuries of the Passengers can be minimized concerning minor damages. In addition, an instrument panel made with Bayfill® contributes to noise reduction thus enhancing the driving experience.

Key features:

- Low VOC emissions in car interior
- Improved aging properties
- Higher productivity, demoulding time 90s / low rework rate
- Advanced systems for IP provide high tensile strength, with integrated production of airbag

Mechanical properties of Bayfill® foam systems:

Item	Unit	High density	Low density	Test method
Density	kg/m³	150	120	DIN 53420
Tensile strength	kPa	337	345	DIN EN ISO 1798
Elongation at break	%	74	60	DIN EN ISO 1798
Compression hardness 40%-compression	kPa	49	43	DIN EN ISO 3386
Compression set, 50%, 70°C, 22h	-	<10%	<10%	DIN 53572

备胎盖板 / 天窗拉板
Load Floor / Sun Shade

Baypreg® F 三明治结构材料

更轻质，更强的承载能力

在汽车工业中，减轻材料重量至关重要。Baypreg®F三明治材料是由聚氨酯与增强材料进行复合，是纤维复合概念的进一步延伸，拓宽了复合材料在汽车行业的应用范围。用三明治复合结构材料制成的产品，其核心部分呈蜂窝结构或波浪结构，具有重量轻，很强的承载能力，已得到市场的高度认可。因此，无论何时需要非常轻质且高弯曲强度的材料，首先考虑的是由Baypreg®F制成的三明治结构部件。

使用Baypreg®F体系生产部件，效率更高，成本更低，产品重量轻、尺寸稳定好，实现一体化生产工艺，更经济更节约成本。一体化生产的插件材料可根据特定需求进行选择。采用该体系结合适当的玻纤毡和内部结构层，能生产出满足不同需要的三明治结构产品，拓宽了应用范围。

主要特点:

- 玻纤毡和特殊纸蜂窝的聚氨酯三明治结构
- 重量轻
- 高刚性,高硬度,抗变形
- 尺寸稳定性好，抗热形变性能好
- 线性膨胀系数小
- 断裂后不会产生尖锐边缘
- 引入其他部件的一体化生产，提高强度

Baypreg® F Sandwich Composite

Lighter by loading more

In the automotive industry, reductions in weight are of the essence. Baypreg® F sandwich composite is produced with polyurethane remove being reinforced with specialized materials, which further extend the fiber composite concept and open up a broad range of advanced applications for the automotive industry. Products based on sandwich composite materials with core elements of a honeycomb or wave structure, have been recognized by the market with light weight and excellent loading bearing capability. So, whenever extreme low weight and very high flexural strength are required, sandwich elements made of Baypreg® F come into focus.

Cost-efficient production of lightweight but still dimensionally stable components in a one-step pressing process is made possible by using Baypreg® F system. The selection of materials for components is primarily determined by the particular requirements. With Baypreg® F-system and specially selected fiber mats and core layers, it is possible to produce tailor-made sandwich constructions for a broad range of applications.

Key features:

- PU sandwich of glass mats and special paper honeycombs
- Light weight
- High stiffness and rigidity, particularly resistant to deformation
- High heat resistance and dimensional stability
- A low co-efficient of linear expansion
- Breaks without leaving sharp edges
- Integrated production with other elements, improved strength

顶棚
Headliner

Baynat® 聚氨酯硬质泡沫

自承载性好，抗弯曲，抗断裂

Baynat®是一种特殊的聚氨酯硬质泡沫，将Baynat®片材结合纤维增强材料和装饰性材料，经过模压成型呈三明治结构，用于生产汽车顶棚。

主要特点:

- 轻质
- 高温下良好的自承载性
- 尺寸稳定性好
- 吸收噪音
- 安装时，能防弯曲，防断裂

Baynat® 泡沫体系的机械性能:

项目	单位	汽车内饰用，冷模法片材		检测方法
		高密度体系	低密度体系	
密度	kg/m³	29-33	20-24	DIN 53420
压缩强度	Mpa	0.13-0.23	0.09-0.15	DIN 53421
开孔率	%	80-90	80-90	DIN ISO 45
伸长率（块泡顶部）	%	20-26	20-26	DIN 53455
拉伸强度	N/cm²	28-38	18-22	DIN 53455
弯曲强度	kPa	240-300	120-160	DIN 53423

Baynat® Rigid Foam

Self-supporting, buckle and break resistant

Baynat® is a specialized rigid foam in sheet form which is compression moulded into sandwiched headliners in combination with fibrous facings and decorative materials.

Key features:

- Lightweight
- Good self-supporting, even under the effects of heat
- Dimensionally stable
- Noise-absorbing
- Buckle and rupture-resistant during installation

Mechanical properties of Baynat® rigid foam:

Item	Unit	Cold-foamable semi-finished sheet for automotive interior trim		Test method
		High density	Low density	
Density	kg/m³	29-33	20-24	DIN 53420
Compressive strength	Mpa	0.13-0.23	0.09-0.15	DIN 53421
Open Cells	%	80-90	80-90	DIN ISO 45
Elongation(top of bun)	%	20-26	20-26	DIN 53455
Tensile strength	N/cm²	28-38	18-22	DIN 53455
Bending strength	kPa	240-300	120-160	DIN 53423

天窗玻璃包边
Window Encapsulation

Bayflex® MP/ WR

设计自由，模块整合

Bayflex®用于生产车窗和天窗的玻璃包边。由于其良好的流动性，且生产压力低于注塑模成型的生产压力，因此该材料非常适合用于生产大型、曲线型窗户的包边。使用反应注射成型（RIM）技术进行生产，使得插件的整合变得更简单。现有两种体系：Bayflex® MP和Bayflex® WR，Bayflex® MP需与模内漆（IMC）配合使用。

主要特点:

- 流动性能好，生产压力低
- 可快速脱模
- 低吸水性
- 插件整合能力强
- 可配合模内漆(IMC)使用
- 耐气候性好

Bayflex® MP/ WR体系的机械性能:

项目	单位	Bayflex® WR体系	Bayflex® MP体系	检测方法
密度	g/m^3	>1.05	>1.05	DIN 53420
表面硬度	-	92A	85A	DIN 53505
拉伸强度	Mpa	18	18	DIN 53504
断裂伸长率	%	250	280	DIN 53504
撕裂强度	kN/m	88	92	DIN 53515

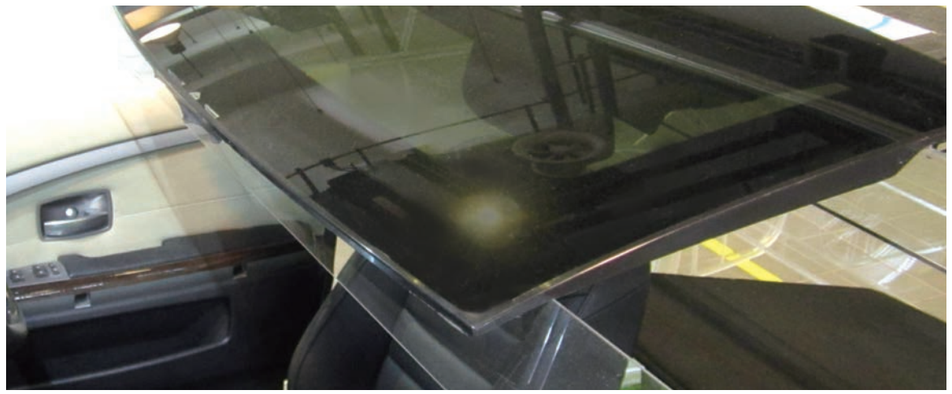
Bayflex® MP/ WR

Design freedom and modular integration for window and glass roof encapsulation

Bayflex® is RIM system which can be used to encapsulate windows and glass roofs. Due to its excellent flowability and processing pressures that are lower than in the case with injection molding, the material is particularly suitable for encapsulation of large, curved windows. Due to the use of RIM technology it is possible to integrate inserts easily. Two systems are available: Bayflex® MP and Bayflex® WR. Bayflex® MP needs to work together with in-mold paint (IMC)

Key features:

- Good flowability and low processing pressures
- Fast demold times (25 s for Bayflex® MP, 30 s for Bayflex® WR)
- Low water absorption
- Excellent Insert integration capability
- Can work with in-mold paint (IMC)
- Good resistance to weather



Mechanical properties of Bayflex® MP/ WR:

Item	Unit	Bayflex® WR	Bayflex® MP	Test method
Density	g/m^3	>1.05	>1.05	DIN 53420
Surface hardness	-	92A	85A	DIN 53505
Tensile strength	Mpa	18	18	DIN 53504
Elongation at break	%	250	280	DIN 53504
Tear strength	kN/m	88	92	DIN 53515

方向盘
Steering Wheel

Bayflex® 20/30 聚氨酯微孔泡沫

有弹性更安全

Bayflex® 20/30是一种柔软、半硬质、有弹性的多功能自结皮聚氨酯泡沫，主要用于汽车内饰，如方向盘，是汽车内部部件的理想材料，该材料能提高乘客受冲撞后的安全性。方向盘必须耐磨损、拥有结实或坚固的表皮，内部柔软有弹性。一旦发生车祸，结皮泡沫就能吸收冲击能，从而降低乘客受伤的危险性。

主要特点:

- 触感柔软
- 快速脱模 成型时间短
- 表面磨损低
- 加工工艺性能好
- 良好的物理性能
- 低有机物挥发值

Bayflex® 20/30泡沫体系的机械性能:

项目	单位	性能	测试方法
密度	kg/m³	350-650	DIN 53420
表面硬度(Shore A)	-	50-70	DIN 53505
断裂伸长率	%	120-150	DIN 52571
抗张强度	MPa	2-4	DIN 53571
撕裂强度	N/m	300-700	ASTM D3574-11

Bayflex® 20/30

Elastic and safe

Bayflex® 20/30 polyurethane foam is flexible, semi-rigid and elastic. A versatile integral skin foam is used mainly for car interiors including steering wheel. As the ideal material for these applications, Bayflex® 20/30 can increase passive safety for passengers in case of impact. Steering wheels possess a wear-resistant, compacted or solid outer skin and a soft, flexible cellular core. In the case of an accident the skin foam absorbs impact energy and consequently reduces the risk of injuries for the passengers.

Key features:

- Soft touch
- Fast demolding time, short molding times
- Low surface abrasion
- Excellent processability
- Good mechanical properties
- Low VOC emissions

Mechanical property examples of Bayflex® 20/30 foam:

Item	Unit	Bayflex® 20/30	Test method
Density	kg/m³	350-650	DIN 53420
Surface hardness (Shore A)	-	50-70	DIN 53505
Elongation at break	%	120-150	DIN 52571
Tensile strength	MPa	2-4	DIN 53571
Tear strength	N/m	300-700	ASTM D3574-11

吸音泡沫
Sound Absorption Foam

Bayfit® SA吸音泡沫

降低车内噪音

汽车的声学性能的表现正逐渐显示其越来越重要的地位。随着噪音法规日益严格，驾驶员对汽车舒适度要求日益提高，从高级汽车到小型汽车都在发动机舱和座舱内安装了声音吸收装置。

Bayfit®SA软质聚氨酯模塑泡沫是用于汽车的吸音部件的理想材料，降低噪音的聚氨酯材料应用于包括:

- 汽车地毯的泡沫背衬
- 隔离层泡沫背衬（发动机舱与座舱之间）
- 发动机舱的隔音

Bayfit®SA体系能满足各种需求。当空气振动和固体振动噪音同时存在时，Bayfit®SA泡沫体系能很好的满足各种高声学吸音要求。同时该泡沫体系还提供了很好的机械性能和和耐候性能。Bayfit®SA有多种分类产品，如从高弹性的到标准的、黏弹性的到黏性的。

主要特点:

- 流动性能良好，工艺性好
- 脱模时间短
- 物理性能优良
- 吸音性能好
- 低有机物挥发值

Bayfit® SA泡沫体系的机械性能:

项目	单位	Bayfit® SA	检测方法
密度	kg/m³	50-80	DIN 53420
压缩强度40%	kPa	3-10	DIN 53577
压缩变形50%,70℃,22h	%	4-8	DIN 53572
断裂伸长率	%	90-140	DIN 52571
抗张强度	kPa	100-160	DIN 53571
撕裂强度	N/m	180-280	ASTM D3574-11

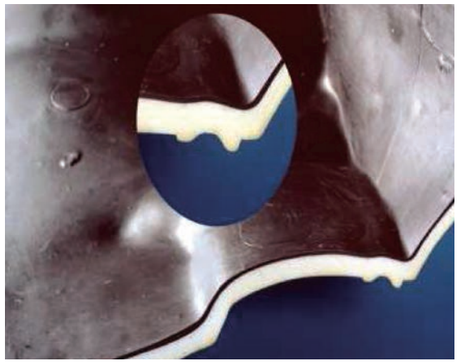
Bayfit® SA System

For quieter cars

The acoustic properties of motor vehicles are taking on increasing importance. In response to more stringent noise legislation and growing demands of comfort from motorists, both top of-the models and smaller, compact cars are being fitted with sound absorption in the engine compartment and passenger area.

Bayfit® SA flexible polyurethane molded foam, system is ideal material for sound absorption elements in cars. The techniques of polyurethane materials for noise reduction include:

- Foam-backed vehicle carpeting
- Foam-backed insolation layer between the engine compartment and passenger area
- Sound insulation in the engine compartment

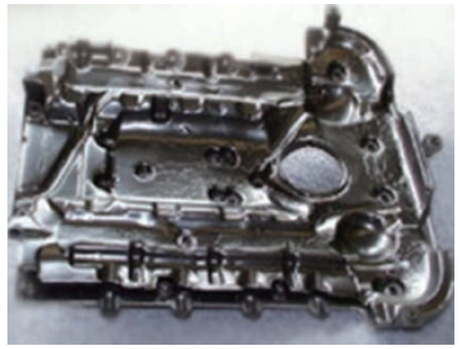


泡沫背衬的汽车地毯
Foam-backed vehicle carpet

Bayfit® SA range of system provides the perfect answers to these and other requirements. In the case of both air borne and solid-borne noise, Bayfit® SA foams satisfy the most demanding acoustic requirements. At the same time they provide high mechanical properties and weather resistance. Bayfit® SA is available in grades ranging from high resilient through standard and viscoelastic to adhesive.

Key features:

- Good flowability and processability
- Short demolding time
- Excellent mechanical properties
- High noise absorption capability
- Low VOC emissions



发动机舱内的隔音效果
Sound insulation in the engine compartment

Mechanical properties of Bayfit® SA foam system:

Item	Unit	Bayfit® SA	Test method
Density	kg/m³	50-80	DIN 53420
Compressive strength 40%	kPa	3-10	DIN 53577
Compression set 50%,70℃,22h	%	4-8	DIN 53572
Elongation at break	%	90-140	DIN 52571
Tensile strength	kPa	100-160	DIN 53571
Tear strength	N/m	180-280	ASTM D3574-11

头枕
Headrest

Bayfit® (Headrest)

保护乘客的头枕

Bayfit® (Headrest)体系是用于汽车头枕的软质聚氨酯模塑泡沫，使用其生产的头枕能显著加强对乘客的被冲击保护。

主要特点:

- 基于MDI体系的产品，性能更优越
- 触感柔软，安全保护性能好
- 加工性能优良
- 耐老化性能好
- 可直接在表皮覆盖层内完成注射成型（FIC技术）
- 脱模快，生产效率高

Bayfit® (Headrest)泡沫体系的机械性能:

项目	单位	性能	检测方法
密度	kg/m³	45-60	DIN 53420
压缩强度40%	kPa	4-12	DIN 53577
压缩变形50%,70℃,22h	%	4-8	DIN 53572
断裂伸长率	%	90-140	DIN 52571
抗张强度	kPa	100-160	DIN 53571
撕裂强度	N/m	180-280	ASTM D3574-11

Bayfit® (Headrest)

For the safety of head rests

Bayfit® (Headrest) flexible polyurethane molded foam is used mainly to produce head rest for automobiles. Head rest made of this material can significantly enhance passive safety for passengers in case of impacts.

Key features:

- Better properties with MDI system
- Soft touch, high ability to enhance passive safety
- Good processability
- Excellent aging resistance
- Injection molding (FIC) can be directly processed in covering layer
- Fast demolding process, high production efficiency

Mechanical properties of Bayfit® (Headrest) foam system:

Item	Unit	Bayfit® (Headrest)	Test method
Density	kg/m³	45-60	DIN 53420
Compressive strength 40%	kPa	4-12	DIN 53577
Compression set 50%,70℃,22h	%	4-8	DIN 53572
Elongation at break	%	90-140	DIN 52571
Tensile strength	kPa	100-160	DIN 53571
Tear strength	N/m	180-280	ASTM D3574-11

座椅
Seating

Bayfit® Seats聚氨酯软质泡沫

舒适的高品质座椅

Bayfit®泡沫体系是用于汽车座椅的软质聚氨酯模塑泡沫，可以极好地满足不同的需求，达到多种汽车座椅的标准。使用满足人体工程学的设计，能带来良好的减震性能，长久使用依然性能良好，耐气候性好，舒适安全。

主要特点:

- 能抗强负荷，能长期保持良好的弹性
- 适合生产任何形状的座椅
- 在进行大量生产的同时，整合插件和表面织物直接发泡成型
- 生产过程中能增强侧面的稳定性（双重硬性技术）

Bayfit® Seats泡沫体系的机械性能:

项目	单位	Bayfit® T（基于TDI）	Bayfit® M（基于MDI）	检测方法
密度	kg/m³	38-48	45-60	DIN 53420
压缩强度40%	kPa	2-8	4-12	DIN 53577
压缩变形50%,70℃,22h	%	6-10	4-8	DIN 53572
断裂伸长率	%	100-150	90-140	DIN 52571
抗张强度	kPa	100-160	130-200	DIN 53571
撕裂强度	N/m	200-450	180-280	ASTM D3574-11

Bayfit® Seats

For perfect seats

Bayfit® flexible polyurethane molded foam is used mainly for seats in cars. The foams can ideally meet varied demands and criteria of car seats, such as ergonomic design, favorable vibration damping, long-term performance properties, climatic comfort and safety.

Key features:

- Ability to resist high loads and excellent long-term flexibility
- Can be manufactured in virtually any shape
- Can be mass-produced with inserting for fixing the cover, fabric can be foamed directly in place
- Can be produced with enhanced lateral stability (dual hardness technology)

Mechanical properties of Bayfit® Seats system foam:

Item	Unit	Bayfit® T (TDI-based)	Bayfit® M (MDI-based)	Test method
Density	kg/m³	38-48	45-60	DIN 53420
Compressive strength 40%	kPa	2-8	4-12	DIN 53577
Compression set 50%,70℃,22h	%	6-10	4-8	DIN 53572
Elongation at break	%	100-150	90-140	DIN 52571
Tensile strength	kPa	100-160	130-200	DIN 53571
Tear strength	N/m	200-450	180-280	ASTM D3574-11

汽车门板
Door Trim Panel

Baypreg® NF

采用聚氨酯和天然纤维，更为轻质

Baypreg® NF是一种特殊的双组分聚氨酯体系，通过压缩模塑成型的方法，用于生产纤维增强的汽车内部组件。也可以结合天然纤维，如麻布和剑麻，来生产薄壁、单位面积重量轻的剪切镶板。

主要特点:

- 良好的机械性能，轻质
- 良好的尺寸稳定性
- 线性膨胀系数小
- 热量回收利用，保护环境

Baydur® STR (RRIM)

适用范围广

Baydur® STR体系是通过反应注射成型RRIM加工工艺生产的，十分适用于汽车门剪切镶板，用来加固散热片，单一操作也可将附加插件和其它加固材料归并其中。该应用的选择范围广，通过结构部件的整合、生产步骤的简化，为经济生产提供了显著优势。

主要特点:

- 用磨碎玻璃或Lapinus 纤维进行加固
- 直接在覆盖材料上起泡
- 尺寸稳定性好，雾化值小
- 脱模时间短

不同体系工艺要求:

项目	Baydur® STR	Baydur® SF	LFI	Baypreg® NF
重量	>1500	>1500	>1800	>1350
是否有泡沫覆盖	是	是	是	否
刚度	+	+ -	+	+
耐冲击性	+	-	+	+
熟化时间	90-150	45-120	90-150	45-60
产品飞边处理	需要	简易	需要	需要
嵌件	可能	可能	可能	受限
发泡设备	常规设备	柱塞泵 / 反应注射设备	LFI长玻纤注射设备	喷涂设备
压机	常规	常规	常规	热压
其它设备	机械手	可搅拌填料	机械手	机械手

Baydur® STR (LFI)

轻质又经济

Baydur®STR可以与不同的加固材料结合使用，例如纤维原丝毡或长玻璃粗纱（LFI），形成轻质复合物。此外，Baydur®STR不会产生裂痕，能大大提高乘客的安全性，这对中小型经济化汽车的批量生产及改装车配件具有重要作用。

Baydur® STR: 奔驰CLK汽车门板，通过磨碎玻璃纤维增强
Baydur®STR: Mercedes CLK Door Panel reinforced with chopped glass fibers

Baypreg® F: 奥迪A2汽车门板，通过天然纤维原丝毡增强
Baypreg® F: Audi A2 Door Panel, reinforced with Natural fiber mat

Baypreg® NF

Polyurethane plus natural fibres for lighter weight

Baypreg® NF is a special two-component polyurethane system for the production of fiber-reinforced automotive interior fittings by compression moulding. It can be combined with natural fibers like flax and sisal to produce thin section trim paneling with a low unit area weight.

Key features:

- Good mechanical properties coupled with light weight
- Good dimensional stability
- A low coefficient of linear expansion
- Environment-friendly by thermal recycling

Baydur® STR (RRIM)

For a wide range of applications

Systems made of Baydur® STR produced by the RRIM processing are very suitable for door trim panels as reinforcing fins. Moreover, attachment inserts and other reinforcing materials can be integrated in a single operation. With wide range of application options, the materials additionally offer major advantages for economical production through the integration of structural elements and the reduction of manufacturing steps.

Key features:

- Reinforced with milled glass or Lapinus fibers
- Direct foaming onto cover-stock
- Dimensionally stable and low fogging values
- Short demolding time

Different processing requiremens:

Item	Baydur® STR	Baydur® SF	LFI	Baypreg® NF
Weight	>1500	>1500	>1800	>1350
Foam on cover	yes	yes	yes	no
Rigidity	+	+ -	+	+
Resistance to impact	+	-	+	+
Maturing time	90-150	45-120	90-150	45-60
Treatment of edge	yes	easy	yes	yes
Embedded components	Possible	Possible	Possible	Limited
Foaming equipment	Conventional	Plunger / RRIM	LFI machine	Spray machine
Compressor machine	Normal	Normal	Normal	Hot press
Other equipment	Robot	Filler blend	Robot	Robot

Baydur® STR (LFI)

Enables weight and cost benefits

Baydur® STR can be combined with various reinforcing materials like fibre mats or cut glass rovings (LFI) to form composites and save weight. Furthermore, Baydur® STR does not split and thus contributes to the increase of the passenger safety as well. It is playing a major role for small and middle batch series concerning economic production, and for the modification of auto parts.

Baydur® STR: 奔驰S级汽车门板，通过天然纤维增强
Baydur® STR: Mercedes S class Door Panel reinforced with natural fiber

Baydur® STR: 兰吉雅汽车门板，通过磨碎玻璃或Lapinus纤维增强
Baydur® STR: Lancia Door Panel reinforced with glass or Lapinus-fibers

汽车外饰
Car Exterior

Bayflex® XGT 聚氨酯微孔泡沫

重量轻，设计自由

Bayflex® XGT、Bayflex® 110、Bayflex® 180是由模塑成型的微孔泡沫或呈实心无泡结构的聚氨酯材料，通常被用于需要上漆的组件，特别适合量产低、性能要求高的产品，例如前后保险杠、扰流板、挡泥板、门下围板和门板。该材料流动性极好，可以生产外形复杂的部件。Bayflex® XGT 110/180与其它塑料相比有许多优势。

主要特点:

- 良好的流动性，可以用于生产大或薄的部件
- 良好的抗碎石冲击和刮擦性能
- RIM自动操控工艺可降低成本
- 膨胀系数小，组件安置精确(Wollastonit < 40 * 10-6 k; C-纤维 < 25 * 10-6 k)
- ESTA 可以涂层 (基于C-纤维)
- 设备投资成本低，适合小批量生产
- A级表面
- 生产周期短

Bayflex® XGT系统成品机械性能:

应用	单位	Bayflex®110 农用/建筑设备外饰件	Bayflex®180 保险杠、扰流板、挡泥板、门下围板和门板	测试方法
KMilled纤维MF7980含量	%	25	24	-
密度	g/cm³	1.06	1.25	DIN 53420
邵氏硬度(D)	-	75	70	DIN 53457
拉伸强度	MPa	22	20	DIN 53504
断裂伸长率	%	220	130	DIN 53504
弯曲模式	MPa	260	1600	DIN 53457
热变形温度	℃	≥110	≥150	DIN ISO75-2 Method B
冲击强度	kj/m²	冲不断	冲不断	DIN 53435
线性热膨胀系数	10⁻⁶/mK	40	40-50	DIN 53752
建议产品厚度	mm	2.5-3.5	2.5-3.5	-

Bayflex® XGT Polyurethane Foam

Weight reduction and design freedom

Bayflex® XGT, Bayflex® 110, Bayflex® 180 are molded micro-cellular foam or solid polyurethane materials usually reinforced with fillers. The materials are used for painted body parts, especially for high-performance products in low production, such as bumper covers, spoilers, side panels, wings, rocker panels and door panels. The material permits complex shapes with long flow paths. Bayflex® XGT 110/180 advances compared to other plastics by a number of properties.

Key Features:

- Excellent flowability allows thin-walled or very large composites
- Very good stone chipping resistance
- Cost reduction through automation of the RIM process
- Accurate fitting through low expansion coefficients (Wollastonit < 40 * 10-6 k; C-fibers < 25 * 10-6 k)
- ESTA coating possible (based on C-fibers)
- Low plant investment cost
- Class A finish
- Short cycle times

Mechanical property example of Bayflex® XGT:

Properties	Units	Bayflex®110 Agricultural/ Construction	Bayflex®180 Bumper covers, spoilers, side panels, wings, rocker panels and door panels	Test Method
KMilled fibre MF7980 in the elastomer	%	25	24	-
Density	g/cm³	1.06	1.25	DIN 53420
Shore hardness (D)	-	75	70	DIN 53457
Tensile strength	MPa	22	20	DIN 53504
Elongation at break	%	220	130	DIN 53504
Flexural modulus	MPa	260	1600	DIN 53457
Thermal deformation temperature	℃	≥110	≥150	DIN ISO75-2 Method B
Impact strength	kj/m²	Not broken	Not broken	DIN 53435
Coefficient of linear thermal expansion	10⁻⁶/mK	40	40-50	DIN 53752
Recommended molded wall thickness	mm	2.5-3.5	2.5-3.5	-

聚氨酯汽车内部低气味解决方案

Low Odor Solution for Automotive Interior Environment

随着消费者对车内乘坐舒适度的要求越来越高，气味被认为是影响车内舒适度的重要因素之一。车内气味的来源非常复杂，如何降低车内气味排放是汽车厂商面临的重大挑战之一。

针对聚氨酯材料在汽车内饰上的主要应用，科思创分析了气味产生的六大主要来源，在不损失材料力学性能以及工艺性能的前提下，通过对原材料的选择，质量把控和产品配方，显著改善车内气味，从而有效降低车内的气味排放水平。


SGS

测试报告 No. CHSAUTO1600783001 日期: 2016年09月28日 第2页,共4页

测试结果：

测试样品描述：

样品编号	SGS样品ID	描述
SN1	CHG16-207833.001	黑色泡沫

备注：

(1) 1 mg/kg = 0.0001%

(2) MDL = 方法检测限

(3) ND = 未检出 (< MDL)

(4) "-" = 未规定

气味测试

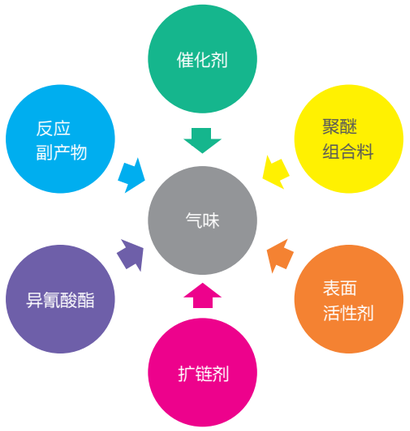
测试方法： 依据VS-01.00-T-14004-A1-2014的测试方法。

样品 SN1 C

试验类别

试验人员	试验条件 2
人员1	2.5 级
人员2	3.0 级
人员3	2.5 级
人员4	2.5 级
人员5	3.5 级

试验条件和类型请参阅报告

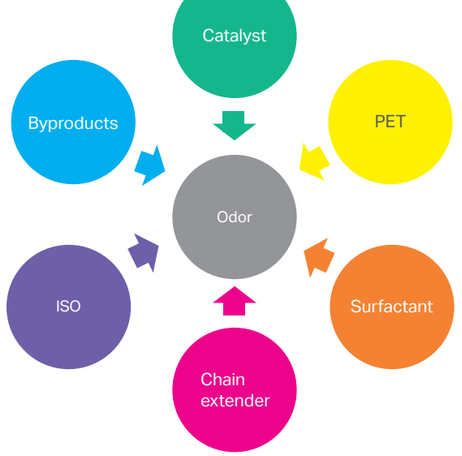


聚氨酯泡沫在汽车内的气味检测结果:

测试机构	测试标准	测试时间	测试条件	测试结果	
通标标准技术服务有限公司（SGS）	VS-01.00 -T-14004 -A1-2014	2016年 9月	80 ±2°C (2h ±10min)	测试人员1	2.5
				测试人员2	3.0
				测试人员3	2.5
				测试人员4	2.5
				测试人员5	3.5
				报告值	**2.5**

With increasing demand on driving comfort, the interior odor is a big concern for consumers. In fact, interior odor always comes from complex sources. Therefore, reducing odor inside automobiles becomes a serious challenge to automobile OEMs.

In terms of automotive interior applications using polyurethanes, Covestro found out six sources that influence the interior odor. Through strict raw material selection, quality control and formulation optimizing, we successfully reduced the interior odor level without compromising the mechanical and processing properties of the material.



The odor testing result of polyurethane for automotive interior applications:

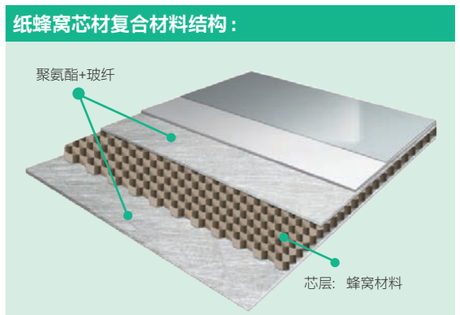
Testing Institute	Testing Standard	Testing Date	Condition	Testing Result	
SGS	VS-01.00 -T-14004 -A1-2014	Sept, 2016	80 ±2°C (2h ±10min)	Tester 1	2.5
				Tester 2	3.0
				Tester 3	2.5
				Tester 4	2.5
				Tester 5	3.5
				Rating	**2.5**

汽车轻量化解决方案
Lightweight Solution

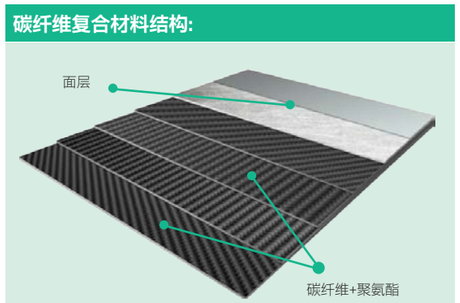
在汽车轻量化材料解决方案中，应用不同的非金属复合材料，是汽车产业减重的主要途径之一。对于新能源电动车，减重显得尤为重要，直接影响到其驾驶性能和续航里程等综合表现。

科思创的聚氨酯轻量化解决方案在汽车内饰上有多种应用，包括轻质泡沫、聚氨酯-玻纤纸蜂窝结构复合材料、聚氨酯-碳纤维复合材料等。主要产品牌号为Baydur® STR，Baypreg®F。其中Baydur STR®主要用于后扰流器，门板，门板支撑架，仪表板支撑架，引擎罩以及车顶棚。Baypreg®F可以与多种增强材料复合压缩生产模塑部件，常用的增强材料包括天然纤维和玻璃毡，主要用于门板、备胎盖板、天窗拉板、地板和衣帽架。

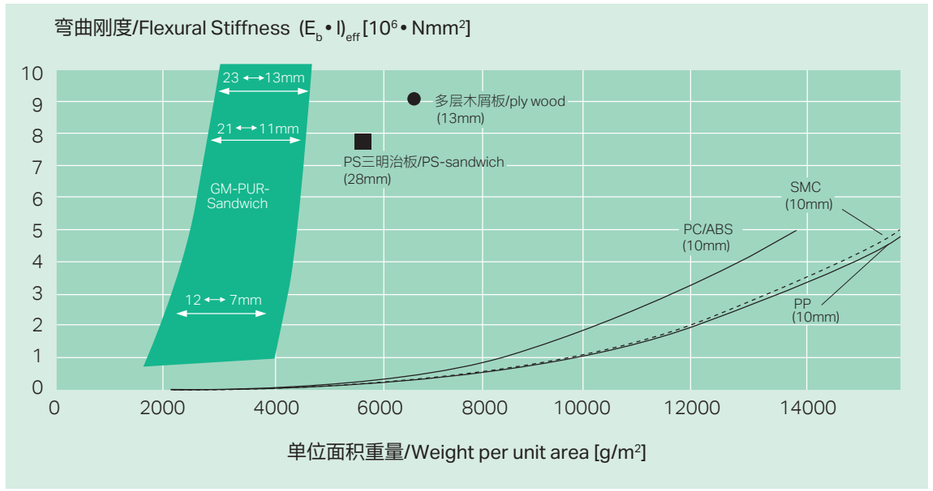
纸蜂窝芯材复合材料结构：



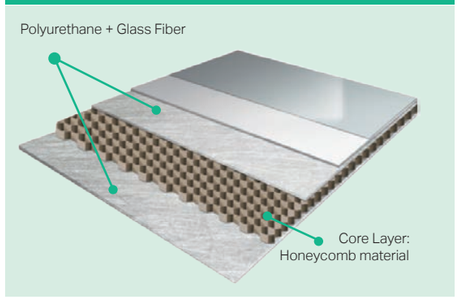
碳纤维复合材料结构:



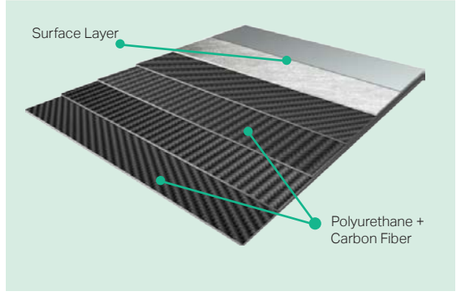
纸蜂窝结构芯材复合材料性能对比/Performances of paper honeycomb composites:



Paper Honeycomb Composite Structure :



Carbon fiber Reinforced Composite Structure :



Using non-mental composites is one of the major approaches to lower the weight of automobiles. lightweight Weight reduction is particularly important to new energy electric vehicles, which directly improves the overall performances of the vehicles including driving and mileage performance.

Covestro polyurethane-based lightweight material solutions possess a wide range of applications on automotive interiors, for example, lightweight foam, polyurethane-glass fibre honeycomb structure composite and polyurethane-carbon fiber composite. The main brands of this product system are Baydur® STR and Baypreg® F. Baydur® STR is mainly used for rear spoiler, door trim panel, support for door and instrument panel, hood, and headliner. Baypreg® F can be compression reinforced with various materials like natural fibres and glass mats, to produce molded parts for door trim panel, load floor, sun shade , floor and coat track.