





Structural Adhesives Guide

结构胶产品型录



ETERSET®
ETERBOND®

Eternal Materials 长兴材料

Table of Contents

目录

-
- I. **UP/VER Structural Adhesives / UP/VER 结构胶产品系列** **P.1-P.2**
 - Adhesion Strengths / 接着强度** **P.3**
 - Success Stories / 成功案例** **P.4-P.5**

 - II. **Primer / 底涂产品系列** **P.6**

 - III. **Marine Filler / Putty / Fairing Compound / 船舶补土胶 / 修补材** **P.7**

 - IV. **Applications / 应用例** **P.8**

 - V. **Epoxy Structural Adhesives / 环氧结构胶产品系列** **P.9**
 - Adhesion Properties / 接着性能** **P.9**

 - VI. **MS Adhesives / MS 胶产品系列** **P.10**

 - VII. **Stone Glue / 石材胶产品系列** **P.11**
-



长兴结构胶使用参考表

Adherend 被黏物	Foam Core 发泡芯材	Wood 木材	FRP 玻璃钢	Stainless Steel 不锈钢	Carbon Steel 碳钢	Galvanized Steel 镀锌钢	Aluminum 铝	ABS	聚碳酸酯 PC	聚丙烯酸酯 PMMA	聚氯乙烯 PVC	PP/PE/PDM S	Vulcanized rubber 硫化橡胶	Silicone Rubber 硅橡胶
Foam Core 发泡芯材	1, 3	1, 3, 4, 5, 6, 8**	1, 2, 3, 4, 5, 6	2*, 4*, 5*, 6*	2*, 4*, 5*, 6*	8	4*, 5*, 6*	NA	NA	NA	NA	NA	8	NA
Wood 木材	1, 3, 4, 5, 6, 8**	2, 4, 5, 6, 8**	2, 4, 5, 6, 8**	2*, 4*, 5*, 6*, 8**	2*, 4*, 5*, 6*	8	4*, 5*, 6*	NA	NA	NA	NA	NA	8	NA
FRP 玻璃钢	1, 2, 3, 4, 5, 6	2, 4, 5, 6, 8**	2, 4, 5, 6, 8	2*, 4*, 5*, 6*, 8	2*, 4*, 5*, 6*, 8	8	4*, 5*, 6*, 8	NA	NA	NA	7	NA	8	NA
Stainless Steel 不锈钢	2*, 4*, 5*, 6*	2*, 4*, 5*, 6*, 8**	2*, 4*, 5*, 6*, 8	2*, 4*, 5*, 6*, 8	4*, 5*, 6*, 8	8	4*, 5*, 6*, 8	NA	NA	NA	NA	NA	8	NA
Carbon Steel 碳钢	2*, 4*, 5*, 6*	2*, 4*, 5*, 6*, 8**	2*, 4*, 5*, 6*, 8	2*, 4*, 5*, 6*, 8	2*, 4*, 5*, 6*, 8	8	4*, 5*, 6*, 8	NA	NA	NA	NA	NA	8	NA
Galvanized Steel 镀锌钢	8	8	8	8	8	8	8	8	8	8	8	NA	8	NA
Aluminum 铝	4*, 5*, 6*	4*, 5*, 6*	4*, 5*, 6*, 8	4*, 5*, 6*, 8	4*, 5*, 6*, 8	8	4*, 5*, 6*, 8	NA	NA	NA	NA	NA	8	NA
ABS	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	8	NA
聚碳酸酯 PC	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	8	NA
聚丙烯酸酯 PMMA	NA	NA	NA	NA	NA	8	NA	NA	NA	NA	NA	NA	8	NA
聚氯乙烯 PVC	NA	NA	7	NA	NA	8	NA	NA	NA	NA	7	NA	8	NA
PP/PE/PDMS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vulcanized rubber 硫化橡胶	8	8	8	8	8	8	8	8	8	8	8	NA	8	NA
Silicone Rubber 硅橡胶	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

1 --- 2976PT
2 --- 2977PT
3 --- 2978PT

4 --- 2968PT series
5 --- 2958PT series
6 --- 2968PT-689

7 --- 2970PT
8 --- EP125 series

* Suggested with EP-C Primer
** For Teak only EP125E can be applied



UP/VER Structural Adhesives

UP/VER 结构胶产品系列

ETERSET® Product 产品代号	Characteristics 特性	Viscosity 黏度	Working time 操作时间 (mins)	Fixture time 夹固时间 (hours)	Tensile strength 抗拉强度 (MPa)****	Tensile modulus 抗拉模量 (MPa)****	Tensile elongation 断裂延伸率 (%)****	Typical bond thickness 胶层/填充厚度 (mm)	Density 密度 (g/ml)
2976PT	• Isophthalic 间苯型 • Lightweight 轻质型 • Low exotherm 低放热 • FRP, wood, foam core materials 适用玻璃钢、木材、泡沫芯材之黏结	• Medium viscosity 中等黏度 • Thixotropy 具摇变度	25*	4	18 - 20	1700 - 2300	7 - 10	1 - 8	0.9
2977PT	• Isophthalic 间苯型 • Reinforced with 3 mm glass fibres 含3毫米短玻纤维强化 • General purpose 通用型	• High viscosity 高黏度 • High thixotropy 高摇变度	30**	4	43 - 50	2400 - 2900	6 - 9	3 - 5	1.3
2978PT	• Isophthalic 间苯型 • Ultra-lightweight 超轻质型 • Low exotherm 低放热 • DNV approval DNV 挪威船级社认证 • FRP, foam core materials, balsa 适用玻璃钢、泡沫芯材、轻木之黏结	• Low viscosity 低黏度 • Thixotropy 具摇变度	60***	8	8 - 10	300 - 500	7 - 10	1 - 6	0.7
2958PT-60	• Vinyl ester 乙烯基型 • High strength 高黏结强度 • Low exotherm 低放热 • General purpose 通用型	• Medium viscosity 中等黏度 • Thixotropy 具摇变度	60*	5	48 - 52	5800 - 6200	3 - 6	0.1 - 3	1.1

* 2% Butanox® M-50 at 25°C ** 1.5% Butanox® M-50 at 25°C *** 1% Butanox® M-50 at 30°C **** BS ISO 527-2



ETERSET® Product 产品代号	Characteristics 特性	Viscosity 黏度	Working time 操作时间 (mins)	Fixture time 夹固时间 (hours)	Tensile strength 抗拉强度 (MPa)****	Tensile modulus 抗拉模量 (MPa)****	Tensile elongation 断裂延伸率 (%)****	Typical bond thickness 胶层/填充厚度 (mm)	Density 密度 (g/ml)
2968PT-689	• Vinyl ester 乙烯基型 • High performance 高效能 • Low exotherm 低放热 • DNV approval DNV挪威船级社认证 • FRP, wood, core materials 适用玻璃钢、木材、芯材之黏结	• High viscosity 高黏度 • Thixotropy 具摇变度	60*	8	19 - 22	600 - 900	50 - 60	0.2 - 10	1.05

* 2% Butanox® M-50 at 25°C ** 1.5% Butanox® M-50 at 25°C *** 1% Butanox® M-50 at 30°C **** BS ISO 527-2

Operating practice

1. Make sure that the adhesive is at room temperature before use, and working temperature should be 10 - 30°C.
2. Bonding surfaces should be clean, dry, and free of contamination. WAX on FRP must be removed. Sandpapering should be carried out if needed.
3. EP-C can be alternatively applied to improve long term bond durability when adhesive is used for adhering aluminium and stainless steel assemblies.
4. Combining adhesive and MEKPO in the correct ratio (1~2.5 wt%) and mix properly.
5. Once the adhesive is applied, the bonded parts should be held in contact and do not use mechanical forces until the part has developed handling strength.
6. The provided information contained in this document is based upon tests or experience of Eternal Materials, but the accuracy or completeness of such information is not guaranteed.

操作实践:

1. 使用前请确认结构胶产品处于室温环境下, 以及操作温度介于10 - 30摄氏度。
2. 黏结物表面需要清洁、干燥、无污染; 玻璃钢表面需要除蜡; 若有需要可以做打磨处理。
3. 可以视需求额外使用EP-C做为金属接着之底涂, 来增加铝、钢金属部件黏结的耐久性与可靠性。
4. 将MEKPO硬化剂 (1~2.5 wt%)加入结构胶产品并均匀混合。
5. 涂胶后, 粘合部位要保持密合, 避免碰撞或移动过程中的不当外力, 直到该部位具有初始黏结强度。
6. 本文中提供的信息是基于长兴材料公司的测试或经验, 因客户现场施工环境及条件多变, 具体数据以实际情况为准。

Curing at room temp. !

室温固化 !

Easy to operate !

操作更简便 !

Less VOC !

更少 VOC !

More reliable !

性能更可靠 !

ETERSET® is isophthalic or vinyl ester structural adhesive designed for structural bonding of many substrates, such as FRP, stainless steel, carbon steel, aluminium, balsa and core materials. The following table show adhesion strengths* when bonding various substrates with different **ETERSET®** products.

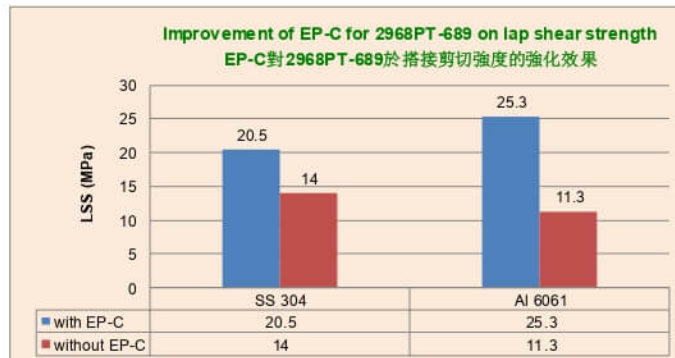
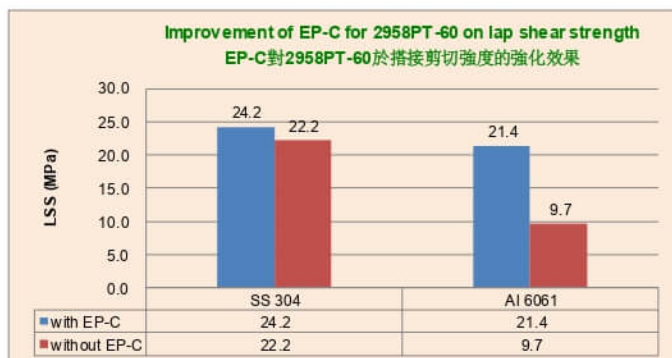
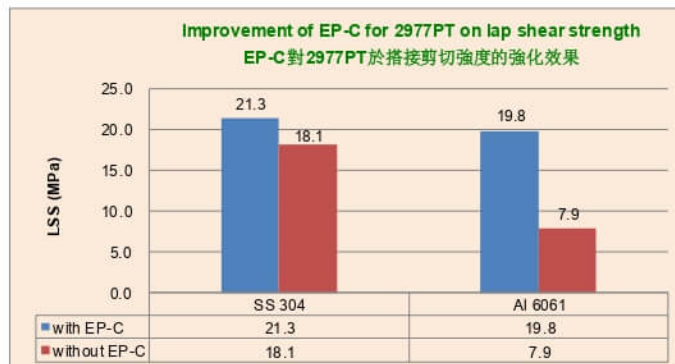
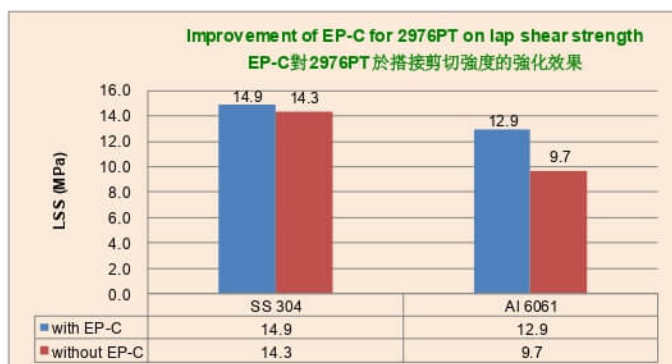
ETERSET® 是设计用于结构性黏结多种异材料的间苯型或乙烯基型结构胶，举凡玻璃钢、不锈钢、碳钢、铝、轻木以及芯材，都可以做有效的黏结；下表列出 **ETERSET®** 结构胶系列产品于不同基材下的搭接剪切强度数据。

	FRP 玻璃钢	Marine Ply 船舶木合板	Stainless steel 不锈钢	Aluminium 铝	PVC Foam PVC泡沫板
ETERSET® 2976PT	10	> 5**	15	10	> 7**
ETERSET® 2977PT	> 13**	> 5**	17	8	-
ETERSET® 2978PT	-	-	5	-	> 7**
ETERSET® 2958PT-60	> 12**	> 5**	22	10	-
ETERSET® 2968PT-689	> 12**	> 5**	14	10	-

*Samples are tested according to ASTM D1002 and D3163. Unit of lap shear strength : MPa **Substrate failure

ETERSET® EP-C is a chemical primer and conditioner which can improve long term bond durability of **ETERSET®** structural adhesives when used for adhering aluminium or stainless steel assemblies. Also, routine solvent cleaning can be replaced by using **EP-C**. Primer **EP-C** allows the adhesive to produce a bond which can resist long term exposure to salt water. The following figures show the improvement of **EP-C** for **ETERSET®** structural adhesives.

ETERSET® EP-C 是一种化学底涂和表面调整剂，当用于粘合铝或不锈钢组件时，可以提高 **ETERSET®** 结构胶系列产品的长期黏结耐久性。另外，**EP-C** 可以替代常规的溶剂 (如酒精、丙酮) 做为表面清洁剂来使用。此外，**EP-C** 也能增进黏结部件于长期暴露于海水情况下的抗腐蚀性。下图显示了 **EP-C** 对 **ETERSET®** 结构胶系列产品的黏结强化效果。



ETERSET 2976PT or 2977PT series

Chamfer filling

倒角填缝



Bonding foam to FRP

玻璃钢与发泡芯材的黏结



Fixing FRP hull mold

玻璃钢合模



Upper mold

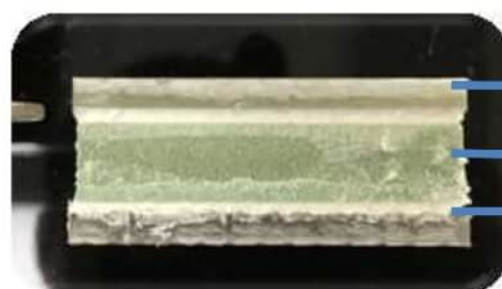




ETERSET 2978PT series

Ultra-light structural adhesive for bonding foam core materials to FRP

超轻量结构胶于玻璃钢与发泡芯材的黏结



FRP
玻璃钢

Foam core
发泡芯材

2978PT

ETERSET 2958PT and 2968PT series

Bonding metal to FRP and wood

金属与玻璃钢、木材的黏结

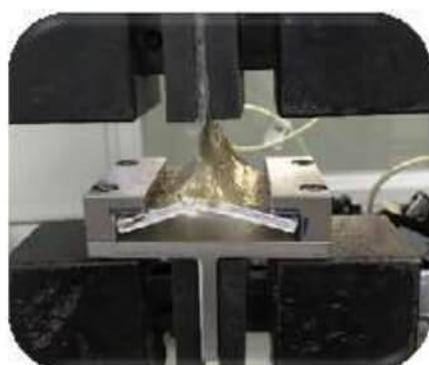


Bonding internal
parts of trains

动车、列车内部件接着

Large deformation at
high adhesion
strength

高接着强度且高变形量



ETERSET® Primers are modified vinyl ester resin. The use of ETERSET® Primers on metal or concrete surface prior to FRP lamination can offer excellent interlaminar bonding to metal or concrete substrates and subsequent laminate structures. Also, ETERSET® Primers has excellent chemical and heat resistance across a broad range of acids, bases and organic chemicals. ETERSET® Primers can be used for hand-lay up, RTM, filament winding and all other industrial FRP applications.

ETERSET® 底涂系列产品是改质型乙烯基树脂所构成。在金属或混凝土表面做玻璃钢积层之前，使用 ETERSET® 底涂系列产品，可以为金属或混凝土基材以及随后的积层玻璃钢结构，提供出色的层间接着性。此外，ETERSET® 底涂系列产品在各种酸、碱和有机化学品中，具有优异的耐化学性和耐热性。ETERSET® 底涂系列产品可用于手糊、RTM、纤维缠绕和其它玻璃钢相关的所有工业。

ETERSET® Product 产品代号	Characteristics 特性	Viscosity 黏度 (cP)	Working time 操作时间 (mins)	HDT 热变形温度 (°C)	Coverage 覆盖面积 (Kg/m ²)
2968-C	- Elastomer modified vinyl ester 弹性体改质乙烯基型 - Increase adhesion strength on metal and concrete 增加与金属或混凝土的接着强度 - Great toughness and elongation 优异的韧性与延伸率 - Excellent chemical resistance 优异的耐腐蚀性	350 - 450	15*	80	0.4
2974	- Modified vinyl ester 改质乙烯基型 - Increase adhesion strength on metal 增加与金属的接着强度 - Excellent chemical and heat resistance 优异的耐腐蚀性与耐热性	200 - 300	20 - 25**	115	0.3
EP-60	- Modified vinyl ester 改质乙烯基型 - Prepromoted 预促进型 - Increase adhesion strength on concrete 增加与混凝土的接着强度 - Excellent chemical and heat resistance 优异的耐腐蚀性与耐热性	150 - 250	20***	115	0.3
EP-C	- Conditioner 非反应型表面调整剂、无需硬化剂 可代替酒精、丙酮做为表面清洁剂使用 - Improve long term bond durability for adhering aluminium and stainless steel assemblies 可增加铝、钢金属部件黏结的耐久性与可靠性 - Produce a bond which can resist long term exposure to salt water 可增加铝、钢金属部件黏结的耐海水腐蚀性	3	NA	NA	0.1

* 2% Butanox® M-50, 0.5% Co-6%, 0.3% DMA at 25°C ** 1.5% Butanox® M-50, 0.5% Co-6% at 25°C *** 1.2% Butanox® M-50 at 25°C



ETERSET® Marine Filler / Putty / Fairing Compound

船舶补土胶 / 修补材

P.7

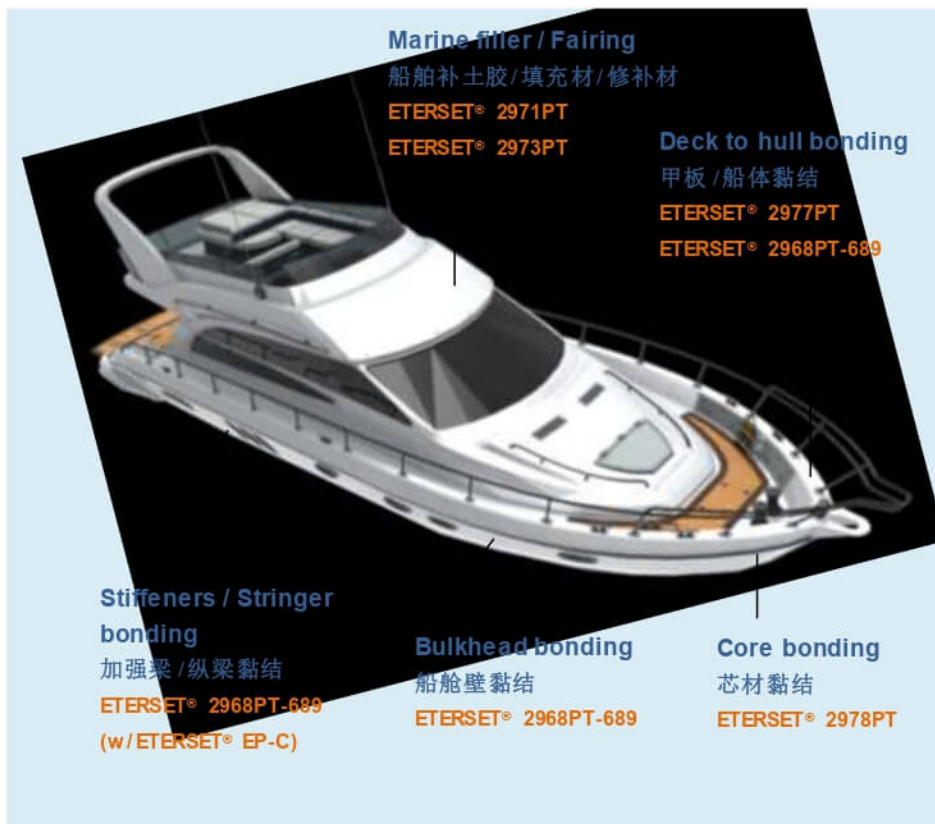
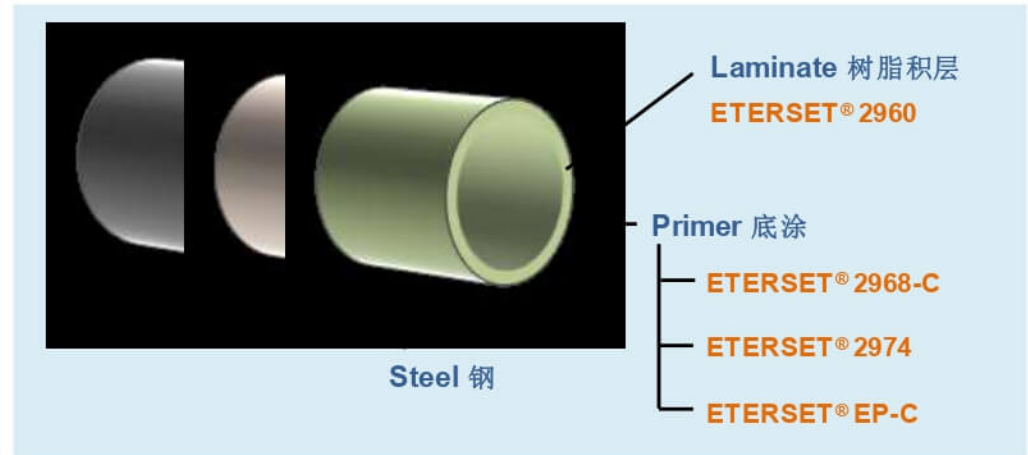
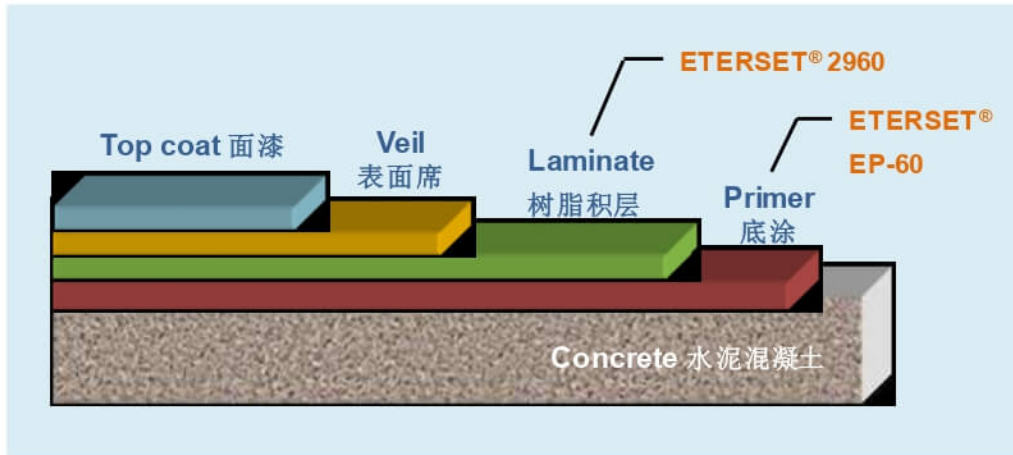
ETERSET® 2971PT and 2973PT are putty (also filler or fairing compound) for marines, yachts and boats. Both of ETERSET® 2971PT and 2973PT are vinyl ester resin products while ETERSET® 2971PT has unique lightweight formula design. They are designed for applications above or below the waterline in the marine industry, or in any composite application require chemical resistance. ETERSET® 2971PT and 2973PT are easily to be sanded without brittleness and has good adhesion to FRP.

ETERSET® 2971PT 以及 2973PT 是乙烯基树脂型船舶补土胶与修补材。它们被设计用于船舶工业在水线上或水线下的应用，或任何需要耐化学性的复合材料应用。ETERSET® 2971PT 以及 2973PT 都易于打磨而不硬脆，对玻璃钢具有良好的附着力。

ETERSET® Product 产品代号	Characteristics 特性	Viscosity 黏度 (cP)	Working time 操作时间 (mins)	Sandable time 可打磨时间 (hours)	Tensile strength 抗拉强度 (MPa)	Tensile modulus 抗拉模量 (MPa)	Tensile elongation 断裂延伸率 (%)	Shore D hardness 邵D硬度	Density 密度 (g/cm ³)
2971PT	• Vinyl ester 乙烯基型 • Easy to spread and sand 良好的涂覆性与打磨性 • Good adhesion 覆着力佳 • Good chemical resistance 耐腐蚀性佳 • Low shrinkage 低收缩 • Low water absorption 低吸水率 • Ultra-lightweight 超轻质型	65000 - 130000	25*	1.5	10	1400	0.7	64	0.7
2973PT	• Vinyl ester 乙烯基型 • Easy to spread and sand 良好的涂覆性与打磨性 • Good adhesion 覆着力佳 • Good chemical resistance 耐腐蚀性佳 • Low shrinkage 低收缩 • Low water absorption 低吸水率	100,000 - 200,000	20*	1	11	2300	2.3	75	1.5

* 2% Perkadox® CH-50 at 25°C

Easy to spread ! 易涂覆 , Easy to sand ! 易打磨 , Low dust ! 低粉尘



Composite assembly bonding
复材组件黏结
ETERSET® 2977PT
ETERSET® 2958PT-60
ETERSET® 2968PT-689

Composite fairing
复材修补
ETERSET® 2971PT
ETERSET® 2973PT



ETERBOND® EP104, EP126, EP130, EP181 series are room temperature curing, thixotropic, two-part epoxy structural adhesives with 1:1 mixing ratio. The epoxy structural adhesives have high lap shear strength, toughness, and are suitable for bonding various metals (i.e., steel, aluminium, copper), FRP, engineering thermoplastics, and among others, they also have good adhesion to rubber.

ETERBOND® EP104, EP126, EP130, EP181 系列产品是常温固化,具有触变性的双组分环氧树脂型结构胶,混合比为 1 : 1。此环氧结构胶产品具有高搭接剪切强度和韧性,适用于粘接各种金属, FRP 组件, 工程塑料; 而其中特别的是, 对于橡胶具有很好的黏结能力。

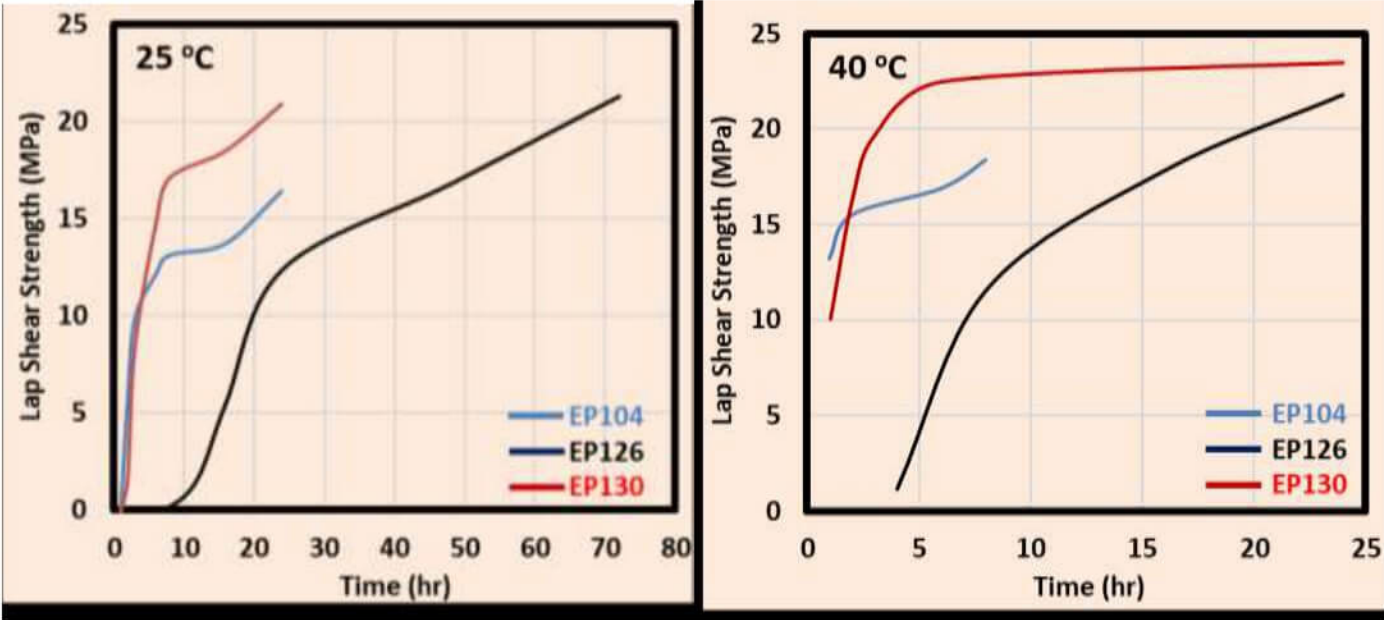
Epoxy Structural Adhesives 环氧结构胶产品系列							
ETERBOND® Product 产品代号	Characteristics 特性	Colour 颜色	Mixing ration by weight 重量混合比例	Density 密度 (g/cm ³)	Viscosity 黏度 (cP)	Working time 操作时间 (mins)	Lap shear strength 搭接剪切强度 (MPa)
EP104	- Curing at room temperature 常温固化 - Excellent lap shear strength 优异的搭接剪切强度	Adhesive : Off-white Activator : Black 主剂 : 本白 硬化剂 : 黑	1 : 1	Adhesive : 1.1 - 1.2 Activator : 1.2 - 1.3 主剂 : 1.1 - 1.2 硬化剂 : 1.2 - 1.3	Adhesive : 35,000 - 450,000 Activator : 30,000 - 350,000 主剂 : 35,000 - 450,000 硬化剂 : 30,000 - 350,000	15 - 20	15 - 20*
EP126	- Gap filling properties 具填缝功能 - Approaching developed handling strength quickly 可快速达到基本黏结强度		1 : 1			50 - 90	20 - 25*
EP130	Great adhesion between concrete and rubber 对混凝土与橡胶的接着有良好的效果		1 : 1			25 - 45	20 - 25*
EP181	General purpose 通用型		1 : 1			20 - 35	18 - 23*

* Stainless steel 304, ASTM D1002

Adhesion Properties 接着性能

The changes of lap shear strength with time under different curing temperature conditions after ETERBOND® EP102, EP104, and EP125 series are applied.

ETERBOND® EP102, EP104, and EP125 系列产品施胶后, 于不同硬化温度条件下, 搭接剪切强度随时间的变化。



ETERBOND® MS series are silane modified one-component sealant. It can be cured into a soft and flexible product by reacting with water vapor in the air. The surface drying time and curing time depend on the humidity and temperature, and the curing time also depends on the depth of the sealing part. ETERBOND® MS series does not contain solvents, isocyanates, silicones and PVC, has good substrate adhesion, and is compatible with appropriate coating systems. ETERBOND® MS series also has good UV resistance, so it can be used for internal and external components.

ETERBOND® MS 是一種使用膠槍操作的矽烷改性單組分密封膠，可通過與空氣中的水氣反應，固化成軟韌有彈性之產品。表乾時間和固化時間取決於濕度和溫度，以及固化時間也取決於密封部件的深度。ETERBOND® MS 不含溶劑、異氰酸酯、有機矽和 PVC，具有良好的基材附著力，並兼容於適當的塗料體系。ETERBOND® MS 也具有良好抗 UV 性能，因此可使用於內部和外部之部件。

MS Adhesives MS胶产品系列									
ETERBOND® Product 产品代号	Characteristics 特性	Colour 颜色	Density 密度 (g/cm³)	Shore A Hardness 邵A硬度	Tensile strength 抗拉强度 (MPa)	Elongation 延伸率 (%)	Skin Formation time 觸乾時間 (mins)	Lap shear strength on SS304/AI6061 搭接剪切强度 (MPa)	Typical bond thickness 胶层/填充厚度 (mm)
MS808	- One-component moisture cure 1K 單液濕氣固化 - General purpose 通用型 - Solvent free 無溶劑 - Good adhesion 附着力佳 - Good chemical solvent resistance 耐溶劑性佳 - Good UV resistance 抗紫外線佳 - Low shrinkage 低收縮 - Excellent Elongation 延伸率佳	Off-white/ Black 白/黑	1.5	40-45*	2.0-2.5**	450 - 650**	15-30	2.4/2.7***	0.2-2.0

*ISO 888 ** ASTM D412 / ISO 37 (speed 500 mm/min) ***ASTM D1002 / ISO 4587 (bond thickness=0.2 mm, speed 1.3 mm/min)

Applicable material 適用材質

Metal: Carbon steel, stainless steel, galvanized steel, aluminum alloy, copper, copper; **Plastic:** PVC, PC*, PMMA*, ABS*; **Other:** Glass, tempered glass, FRP, concrete*.

金屬：碳鋼、不鏽鋼、鍍鋅鋼、鋁合金、銅、紅銅；塑料：PVC, PC*, PMMA*, ABS*, 其它：玻璃、強化玻璃、FRP、水泥*。

Not applicable material 不適用材質

PP, PE

* Applicable, but unable to reach CF, it is recommended to use with primer. 可黏，但無法達到 CF，建議搭配底塗使用。

MS Adhesives MS胶 产品系列	
Substrate	ETERBOND® MS808 Strength (MPa)
Polycarbonate	1.04 (AF)
Poly(methylmethacrylate)	1.67 (AF)
Polyvinyl Chloride	1.48 (AF)
Acrylonitrile Butadiene Styrene	1.49 (AF)
Copper	1.70 (AF)
Brass	2.46 (CF)
Stainless steel	1.99 (CF)
Aluminum 6061	1.74 (AF)
Fiber reinforced plastics	2.58 (CF)
Galvanized steel	1.93 (CF)
Carbon steel	1.68 (AF)
Tempered glass	1.94 (CF)
Concrete	0.88 (CF)

Samples are tested according to ASTM D4541 (Aluminum dolly+substrate) Unit of pull-off strength: MPa (Speed: 1 MPa/s)

AF: Adhesive failure CF: Cohesive failure

ETERBOND® UP702 is a prepromoted unsaturated polyester stone glue with high thixotropic. It has no fluidity under static conditions and has fluidity under high shear force. UP702 is suitable for non-horizontal or vertical surface construction and can be hardened at room temperature. It is mainly used for natural stone bonding, repairing or seamless processing. ETERBOND® AC502 is an acrylic stone glue used for artificial stone bonding or repairing. Color paste or stone powder can be added into both of them according to the color of the stone so as to adjusted the color be similar to the materials to be bonded.

ETERBOND® UP702 为含摇变剂不饱合聚酯石材胶，静置状态下不具流动性，在高剪切力下具有流动性，适合在非水平面或垂直面施工，室温下可硬化。主要用于天然石材拼接、修补或是无缝处理，可依石材色泽添加色膏或石粉，调整至与待黏结材料颜色接近。ETERBOND® AC502 为压克力石材胶，用于人造石材拼接或是修补用，可依石材色泽添加色膏或石粉，调整至与待黏结材料颜色接近。

ETERSET® Product 产品代号	Characteristics 特性	Viscosity 黏度 (cP)	Working time 操作时间 (mins)
UP702	• Suitable for natural stone 适用于天然石 • Orthophthalic 邻苯型 • Fast curing 快速固化 • High thixotropic 高摇变度 • Good chemical resistance 耐腐蚀性佳 • Easy to adjust color 易于调色	200,000 - 400,000 (Paste 胶态)	5-10*

* 2% Butanox® M-50 at 25°C ** 1% Perkadox® CH-50 at 25°C

