



# Structural Adhesives Guide

## 结构胶产品型录



**ETERSET®**

**ETERBOND®**

*Eternal Materials* 长兴材料

## Structural Adhesive Overview

### 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	<ul style="list-style-type: none"> <li>• Isophthalic 间苯型</li> <li>• Lightweight 轻质型</li> <li>• Low exotherm 低放热</li> <li>• FRP, wood, foam core materials 适用玻璃钢、木材、泡沫芯材之黏结</li> </ul>	<ul style="list-style-type: none"> <li>• Medium viscosity 中等黏度</li> <li>• Thixotropy 具摇变度</li> </ul>	30*	4	18 - 20	1700 - 2300	7 - 10	1 - 8	0.9
2977PT	<ul style="list-style-type: none"> <li>• Isophthalic 间苯型</li> <li>• Reinforced with 3 mm glass fibres 含3毫米短玻纤丝强化</li> <li>• General purpose 通用型</li> </ul>	<ul style="list-style-type: none"> <li>• High viscosity 高黏度</li> <li>• High thixotropy 高摇变度</li> </ul>	30**	4	43 - 50	2400 - 2900	6 - 9	3 - 5	1.2
2978PT	<ul style="list-style-type: none"> <li>• Isophthalic 间苯型</li> <li>• Ultra-lightweight 超轻质型</li> <li>• Low exotherm 低放热</li> <li>• DNV approval DNV 挪威船级社认证</li> <li>• FRP, foam core materials, balsa 适用玻璃钢、泡沫芯材、轻木之黏结</li> </ul>	<ul style="list-style-type: none"> <li>• Low viscosity 低黏度</li> <li>• Thixotropy 具摇变度</li> </ul>	60***	8	8 - 10	300 - 500	7 - 10	1 - 6	0.7

\* 2% Butanox® M-60 at 25°C    \*\* 1.5% Butanox® M-60 at 25°C    \*\*\* 1% Butanox® M-60 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.



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)
2958PT-60	<ul style="list-style-type: none"> <li>Vinyl ester 乙烯基型</li> <li>High strength 高黏结强度</li> <li>Low exotherm 低放热</li> <li>General purpose 通用型</li> </ul>	<ul style="list-style-type: none"> <li>Medium viscosity 中等黏度</li> <li>Thixotropy 具摇变度</li> </ul>	60*	5	48 - 52	5800 - 6200	3 - 6	0.1 - 3	1.1
2968PT-689	<ul style="list-style-type: none"> <li>Vinyl ester 乙烯基型</li> <li>High performance 高效能</li> <li>Low exotherm 低放热</li> <li>DNV approval DNV挪威船级社认证</li> <li>FRP, wood, core materials 适用玻璃钢、木材、芯材之黏结</li> </ul>	<ul style="list-style-type: none"> <li>High viscosity 高黏度</li> <li>Thixotropy 具摇变度</li> </ul>	60*	8	19 - 22	600 - 900	50 - 60	0.2 - 10	1.05

\* 2% Butanox® M-60 at 25°C    \*\* 1.5% Butanox® M-60 at 25°C    \*\*\* 1% Butanox® M-60 at 30°C    \*\*\*\* BS ISO 527-2

操作实践:

- 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。
- 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。
- 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。
- 将MEKPO硬化剂 (1~2.5 wt%)加入结构胶产品并均匀混合。
- 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。
- 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.

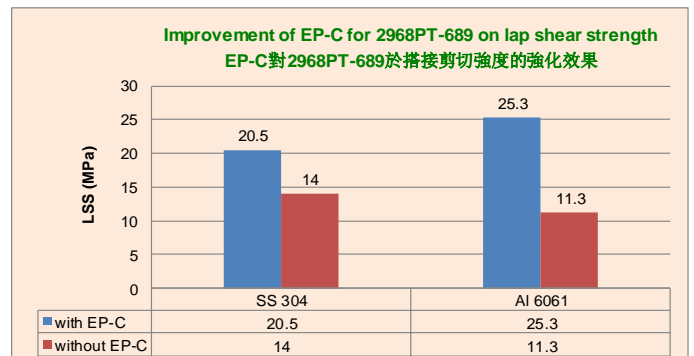
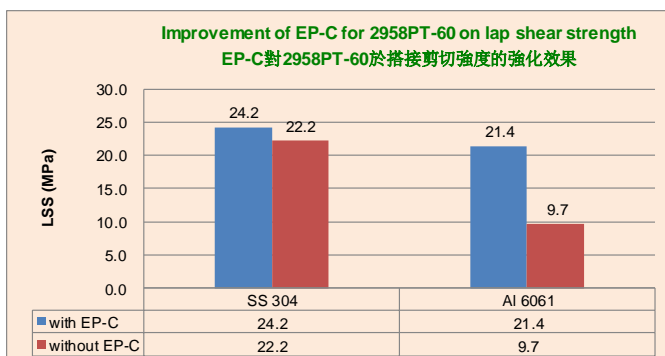
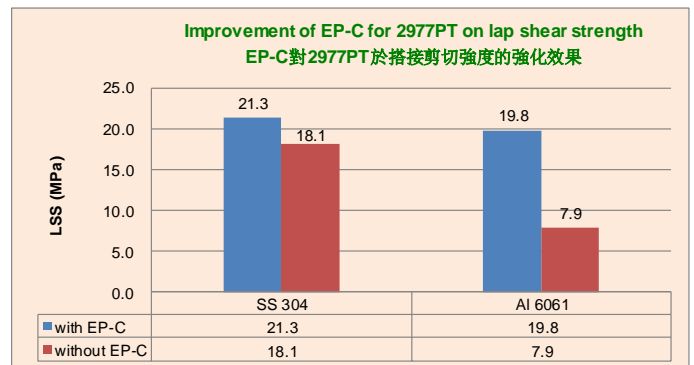
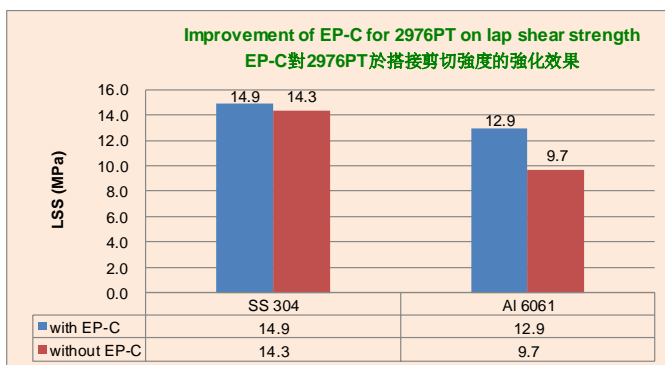
ETERSET® 是设计用于结构性黏结多种异材料的间苯型或乙烯基型结构胶，举凡玻璃钢、不锈钢、碳钢、铝、轻木以及芯材，都可以做有效的黏结；下表列出 ETERSET® 结构胶系列产品于不同基材下的搭接剪切强度数据。

	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**	14	10	> 7**
ETERSET® 2977PT	> 13**	> 5**	18	8	-
ETERSET® 2978PT	-	-	-	-	> 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 是一种化学底塗和表面调整剂，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）做为表面清潔劑來使用。此外，EP-C 也能增進黏結部件於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強化效果。



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。

## Primer Overview 底涂产品系列

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 <sup>2</sup> )
2968-C	<ul style="list-style-type: none"> <li>Elastomer modified vinyl ester 弹性体改质乙烯基型</li> <li>Increase adhesion strength on metal and concrete 增加与金属或混凝土的接着强度</li> <li>Great toughness and elongation 优异的韧性与延伸率</li> <li>Excellent chemical resistance 优异的耐腐蚀性</li> </ul>	350 - 450	15*	80	0.4
2974	<ul style="list-style-type: none"> <li>Modified vinyl ester 改质乙烯基型</li> <li>Increase adhesion strength on metal 增加与金属的接着强度</li> <li>Excellent chemical and heat resistance 优异的耐腐蚀性与耐热性</li> </ul>	200 - 300	20 - 25**	115	0.3
2960P-200	<ul style="list-style-type: none"> <li>Modified vinyl ester 改质乙烯基型</li> <li>Prepromoted 预促进型</li> <li>Increase adhesion strength on concrete 增加与混凝土的接着强度</li> <li>Excellent chemical and heat resistance 优异的耐腐蚀性与耐热性</li> </ul>	150 - 250	20***	115	0.3
2968P-60	<ul style="list-style-type: none"> <li>Elastomer modified vinyl ester resin 弹性体改质乙烯基型</li> <li>Prepromoted 预促进型</li> <li>Increase adhesion strength on metal and concrete 增加与金属或混凝土的接着强度</li> <li>Great toughness and elongation 优异的韧性与延伸率</li> <li>Excellent chemical resistance 优异的耐腐蚀性</li> </ul>	350 - 450	30****	80	0.4
EP-C	<ul style="list-style-type: none"> <li>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</li> <li>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</li> <li>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</li> </ul>	3	NA	NA	0.1

\* 2% Butanox® M-60, 0.5% Co-6%, 0.3% DMA at 25 °C    \*\* 1.5% Butanox® M-60, 0.5% Co-6% at 25 °C    \*\*\* 1.2% Butanox® M-60 at 25 °C    \*\*\*\* 2% Butanox® M-60 at 25 °C





# ETERSET<sup>®</sup> Marine Filler / Fairing Compound

## 船舶补土胶 / 修补材

ETERSET<sup>®</sup> 2971PT is lightweight, vinyl ester resin marine filler and fairing compound. It is designed for applications above or below the waterline in the marine industry, or in any composite application require chemical resistance. ETERSET<sup>®</sup> 2971PT is easily to be sanded without brittleness, and has good adhesion to FRP. Also, the unique lightweight formula design makes it has good impact strength.

ETERSET<sup>®</sup> 2971PT 是轻质乙烯基树脂型船舶补土胶与修补材。它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<sup>®</sup> 2971PT 易于打磨而不硬脆，对玻璃钢具有良好的附着力。此外，独特的轻量化配方设计使其具有良好的冲击强度。

### Marine Filler / Fairing Compound 船舶补土胶 / 修补材

ETERSET <sup>®</sup> 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)	
2971PT	<ul style="list-style-type: none"> <li>• Vinyl ester 乙烯基型</li> <li>• Easy to spread and sand 良好的涂覆性与打磨性</li> <li>• Good adhesion 覆着力佳</li> <li>• Good chemical resistance 耐腐蚀性佳</li> <li>• Low shrinkage 低收缩</li> </ul>	110,000 - 150,000	20*	1.5	
		Tensile strength 抗拉强度 (MPa)	Tensile modulus 抗拉模量 (MPa)	Tensile elongation 断裂延伸率 (%)	Density 密度 (g/cm <sup>3</sup> )
		14 - 17	900 - 1300	4 - 7	0.55

\* 2% Perkadox<sup>®</sup> CH-50 at 25°C

**Easy to spread !**

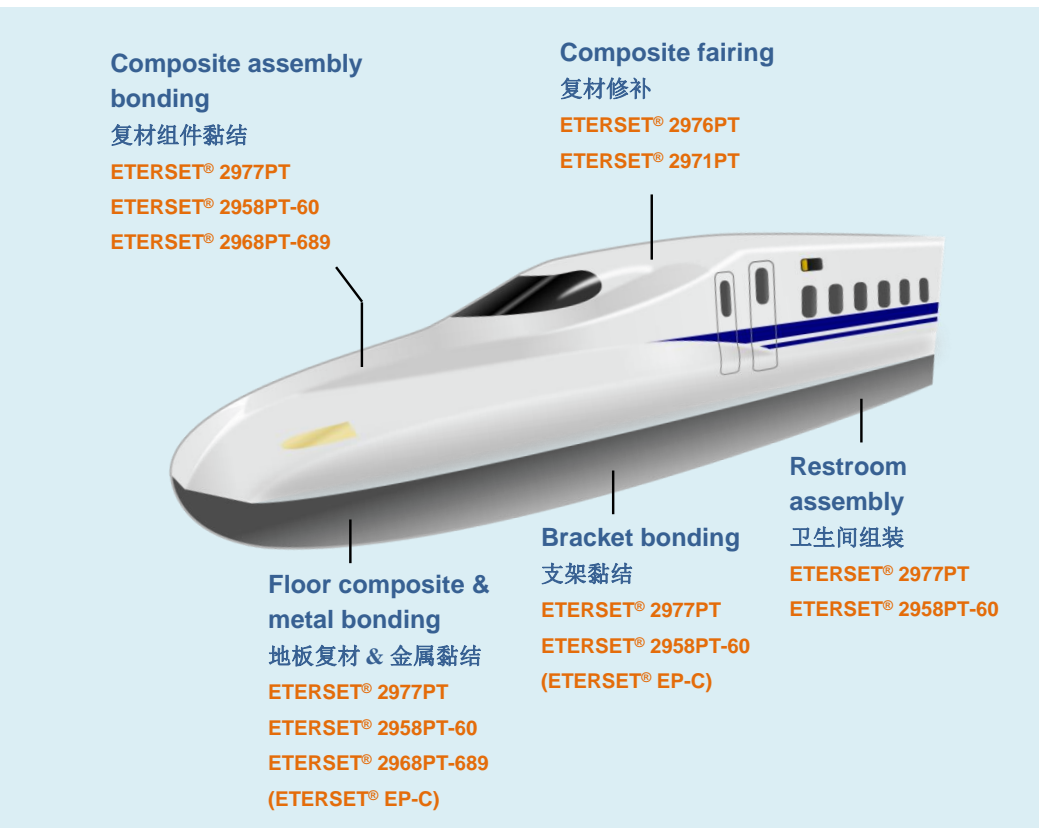
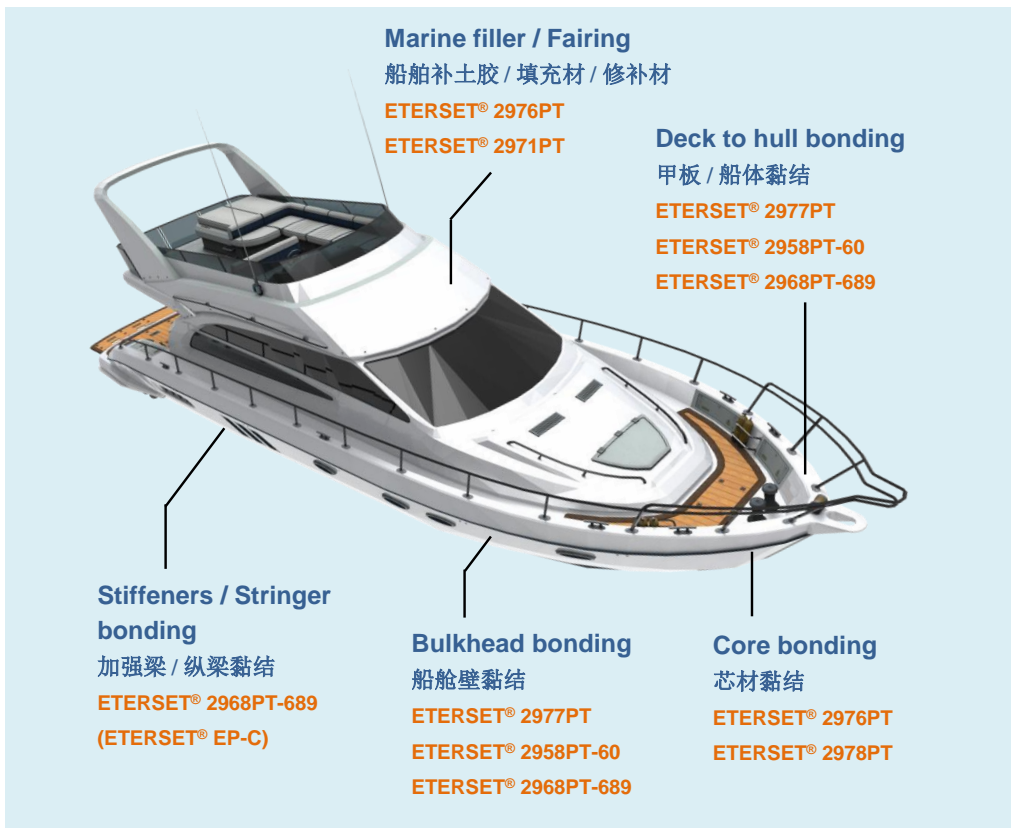
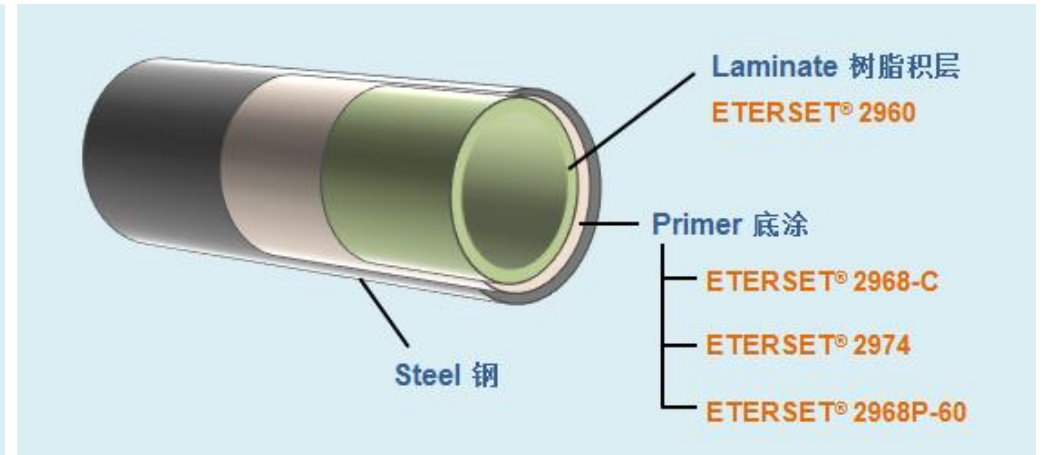
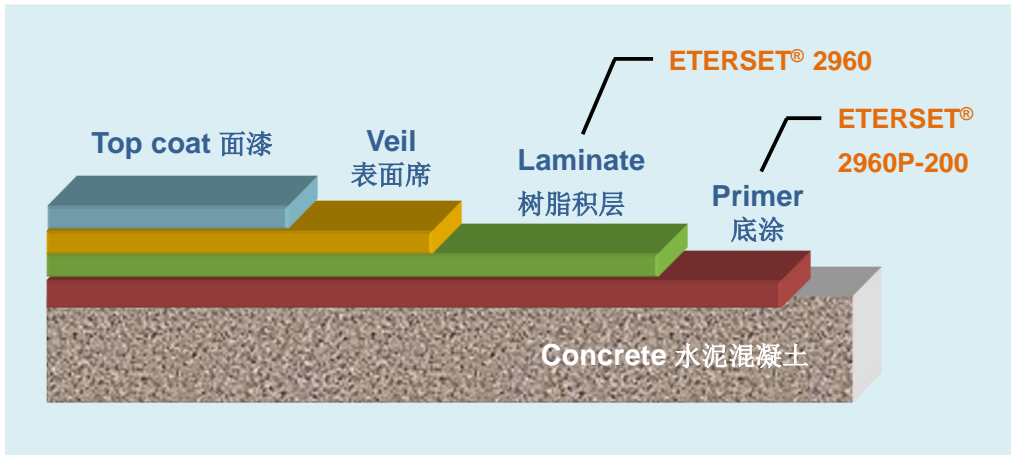
**Easy to sand !**

**Low dust !**

**易涂覆 !**

**易打磨 !**

**低粉尘 !**



ETERBOND® EP102, EP104, EP125 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® EP102, EP104, EP125 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，对于橡胶也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 ratio by weight 重量混合比例	Density 密度 (g/cm <sup>3</sup> )	Viscosity 黏度 (cP)	Working time 操作时间 (mins)	Lap shear strength 搭接剪切强度 (MPa)
EP125	<ul style="list-style-type: none"> <li>Curing at room temperature 常温固化</li> <li>Excellent lap shear strength 优异的搭接剪切强度</li> <li>Gap filling properties 具填缝功能</li> </ul>	Adhesive : Off-white Activator : Black	1 : 1	Adhesive : 1.1 - 1.2 Activator : 1.2 - 1.3	Adhesive : 100,000 - 300,000 Activator : 70,000 - 150,000	80 - 120	20 - 25*
EP104	<ul style="list-style-type: none"> <li>Approaching developed handling strength quickly 可快速达到基本黏结强度</li> <li>Great adhesion between concrete and rubber 对混凝土与橡胶的接着有良好的效果</li> </ul>		1 : 1			主剂 : 1.1 - 1.2 硬化剂 : 1.2 - 1.3	主剂 : 100,000 - 300,000 硬化剂 : 70,000 - 150,000
EP102	<ul style="list-style-type: none"> <li>General purpose 通用型</li> </ul>	主剂 : 本白 硬化剂 : 黑	1 : 1	主剂 : 1.1 - 1.2 硬化剂 : 1.2 - 1.3	主剂 : 100,000 - 300,000 硬化剂 : 70,000 - 150,000	5 - 10	20 - 25*

\* Stainless steel 304, ASTM D1002

ETERBOND® EP012, EP012P, EP040H series are one-component, thixotropic, heat activated epoxy structural adhesives which have excellent T-peel strength, thermal shock resistance, fatigue endurance, and wet/heat aging resistance. The products are suitable for bonding various metals and FRP.

ETERBOND® EP012, EP012P, EP040H 系列产品是加热固化，具有触变性的单组分环氧树脂型结构胶，具有优异的 T 型剥离强度、抗热冲击性能、耐疲劳性和耐湿热老化性。该产品适用于粘接各种金属以及 FRP 制品。

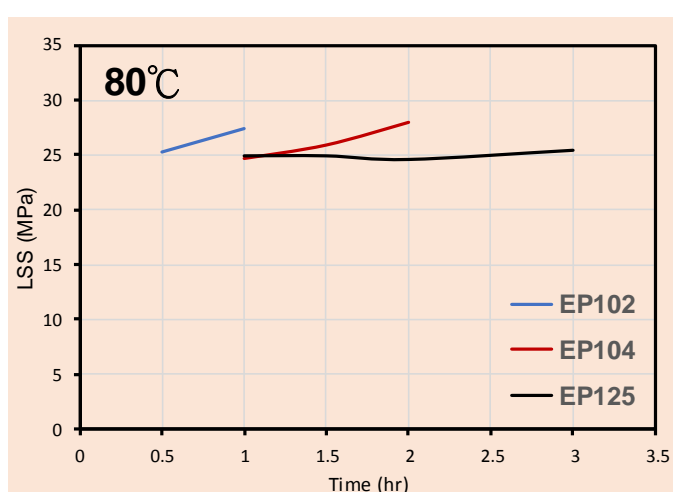
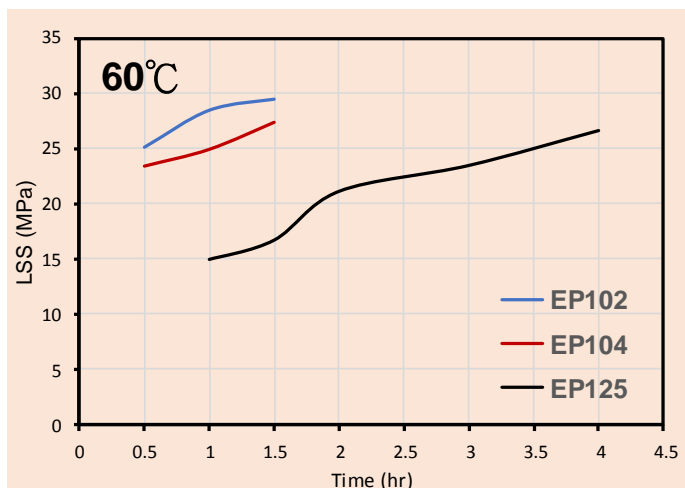
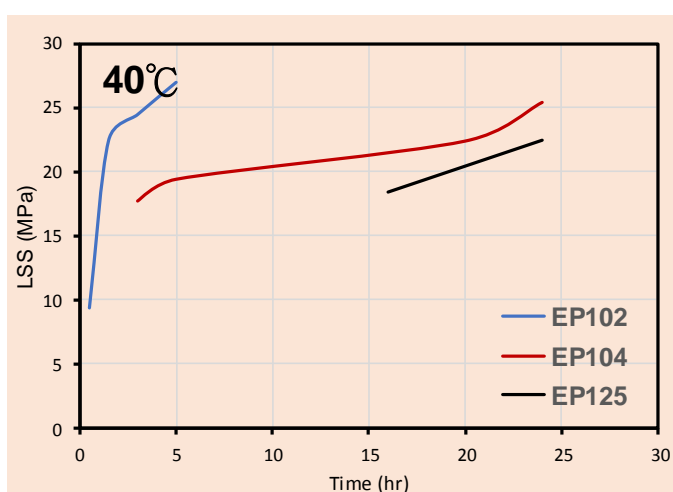
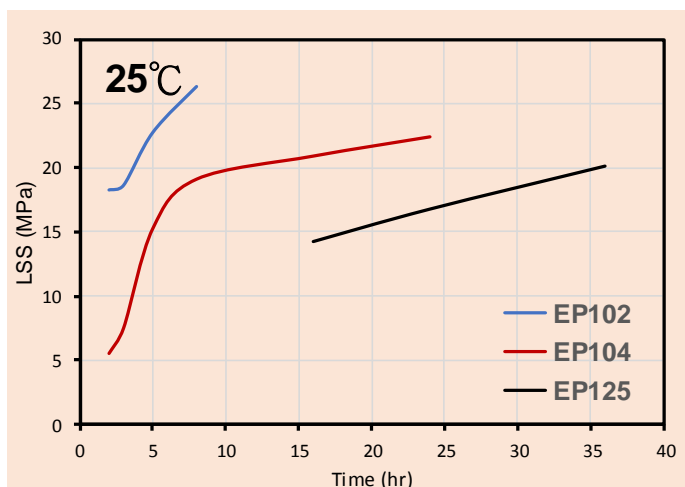
Epoxy Structural Adhesives 环氧结构胶产品系列							
ETERBOND® Product 产品代号	Characteristics 特性	Colour 颜色	Density 密度 (g/cm <sup>3</sup> )	Glass Transition Temperature 玻璃转变温度 (°C)	Lap shear strength 搭接剪切强度 (MPa)	Gel time 胶化时间 (mins)***	CTE (µm/m·°C)
EP012	<ul style="list-style-type: none"> <li>Heat activated 加热固化</li> <li>One component 单液型</li> <li>Excellent lap shear strength and T-peel strength 优异的搭接剪切强度与 T 型剥离强度</li> </ul>	Off-white 本白	1.1 - 1.2	130 - 140	30 - 35*	2 - 3	< T <sub>g</sub> : 8 - 18 > T <sub>g</sub> : 130 - 140
EP012P	<ul style="list-style-type: none"> <li>Thermal shock resistance and wet/heat aging resistance 抗热冲击以及耐湿热老化</li> <li>Fatigue resistance 耐疲劳性</li> <li>Gap filling properties 具填缝功能</li> </ul>	Gray 灰	1.1 - 1.2	130 - 140	30 - 35*	2 - 3	< T <sub>g</sub> : 65 - 75 > T <sub>g</sub> : 165 - 175
EP040H	<ul style="list-style-type: none"> <li>ISO 4210 approval 通过 ISO 4210 认证</li> </ul>	Gray 灰	1.1 - 1.2	145 - 155	30 - 35**	20 - 25	-

Curing condition : \* 165°C, 45 mins ; \*\* 180°C, 30 mins ; ASTM D1002  
 \*\*\* 1g, 150°C



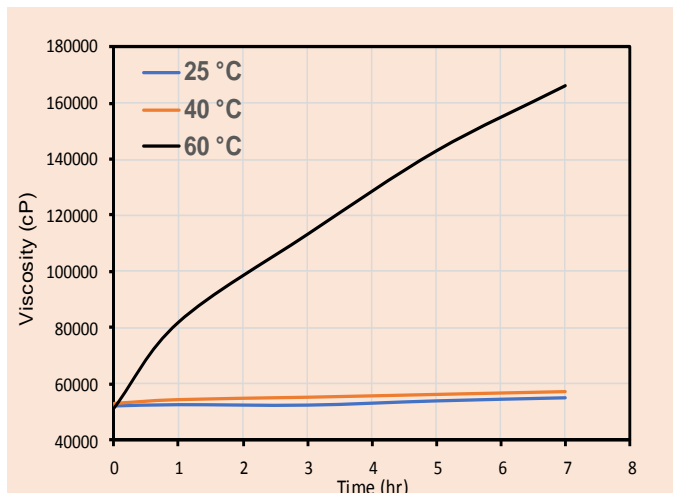
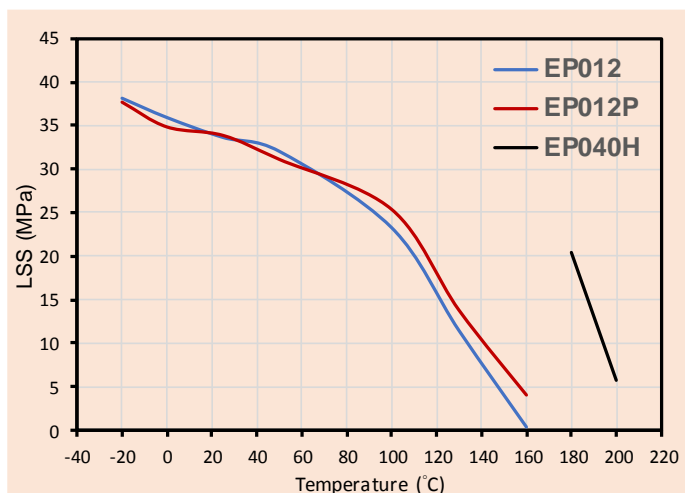
The changes of lap shear strength with time under different curing temperature conditions after ETERBOND® EP102, EP104, and EP125 series are applied.

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。



The hot strength and hot stability at various temperatures of ETERBOND® EP012, EP012P, and EP040H series are as shown in below left and right figures, respectively.

ETERBOND® EP012, EP012P, and EP040H 系列产品在不同温度下的热强度和热稳定性, 分别如左下图和右下图所示。



# ETERBOND® Acrylic Structural Adhesives 丙烯酸结构胶产品 P.9

ETERBOND® AC series are room temperature curing, two-part acrylic structural adhesives with 10:1 mixing ratio. The acrylic structural adhesives have excellent lap shear strength, impact resistance, peel strength and fatigue endurance. ETERBOND® AC series can be used for structural bonding of metals without primers, and of composites and thermoplastics with little or no surface preparation.

ETERBOND® AC 系列产品是常温固化的双组分丙烯酸结构胶，体积混合比为 10 : 1。丙烯酸结构胶具有优异的搭接剪切强度、抗冲击性、抗剥离强度和耐疲劳性。ETERBOND® AC 系列产品无需底涂即可用于金属的结构黏结，也可用于复合材料和热塑性塑料，而且几乎不需要表面处理。

Acrylic Structural Adhesives 丙烯酸结构胶产品系列							
ETERBOND® Product 产品代号	Characteristics 特性	Colour 颜色	Mixing ratio by volume 体积混合比例	Viscosity 黏度 (cP)	Working time 操作时间 (mins)	Fixture time 夹固时间 (mins)	Typical bond thickness 胶层/填充厚度 (mm)
AC901	<ul style="list-style-type: none"> <li>Curing at room temperature 常温固化</li> <li>Excellent shear and peel strength 优异的抗剪与抗剥离强度</li> </ul>		10 : 1		5 - 7	13 - 18	0.3 - 10
AC902	<ul style="list-style-type: none"> <li>High toughness and good fatigue resistance 高韧性与优异的耐疲劳性</li> <li>Structural bonding of metals without primers 黏结金属无需底涂</li> </ul>	Adhesive : Off-white Activator : Black	10 : 1	Adhesive : 70,000 - 100,000 Activator : 50,000 - 80,000	10 - 13	28 - 33	0.3 - 10
AC903	<ul style="list-style-type: none"> <li>Bonding thermoplastic and composite assemblies with little or no surface preparation 黏结热塑/固性塑料或复合材料仅需简单的表面处理，或甚至不需要</li> </ul>	主剂 : 本白 硬化剂 : 黑	10 : 1	主剂 : 70,000 - 100,000 硬化剂 : 50,000 - 80,000	15 - 18	43 - 48	0.3 - 10

ETERBOND® AC series are supplied in ready-to-use 490-ml cartridges or 5-gallon (20-liter) pails.

## Suitable substrates 可黏接的材料

Metal : stainless steel, aluminum, carbon steel\* ; Plastic : ABS, PVC, PC, PMMA

Composite : epoxy-based, Polyester-based, Vinylester-based ( \*Primer suggested )

金属：不锈钢、铝、碳钢\*；塑料：ABS、PVC、PC、PMMA；复合材料：环氧树脂型、聚酯树脂型、乙烯基树脂型(\*建议使用底涂)

## Not recommended 无法黏接的材料

zinc/galvanized coated metals, copper, polyolefins ( PP, PE ), silicon ( PDMS ), fluorocarbon ( PTFE ) and other low-surface-energy materials. 锌/镀锌板、铜、PP、PE、PDMS、PTFE 以及其它低表面能材料

	ETERBOND® AC901	ETERBOND® AC902	ETERBOND® AC903
Stainless steel*	19 - 21	18 - 20	18 - 20
Aluminium*	19 - 21	18 - 20	18 - 20
FRP**	> 10	> 10	> 10
ABS**	> 6	> 6	> 6
PVC**	> 8	> 8	> 8
PMMA**	> 8	> 8	> 8
T-peel***	45 - 55	43 - 53	43 - 53

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



# Structural Adhesives

长兴结构胶

ETERSET®

ETERBOND®

## ETERNAL MATERIALS



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