



# PT5760 High Temperature Infusion Resin System

## DESCRIPTION

PT5760 A/B is a two-part epoxy system using the latest resin technology, designed for infusing composite tools for service temperatures of 400° F. and above. This product is ideal for the vacuum-assisted resin transfer molding (VARTM) process, due to its low viscosity, excellent wet-out properties, and long working time. PT5760 A/B offers high heat resistance and mechanical properties, and will provide durable, dimensionally stable, high-temperature infused tools.

## PRODUCT SPECIFICATIONS

	PT5760-A	PT5760-B For Infusion	PT5760-B1 For Backup Tie-In	ASTM Method
Color	Amber	Amber Clear	Amber Clear	Visual
Viscosity,	1,660 cps	80 cps	1,800 cps	D2392
Specific Gravity, gms./cc	1.17	0.96	0.98	D1475
Mix Ratio, By Weight; By Volume	100 : 45 By Weight; 100 : 55 By Volume		100 : 46 By Weight	PTM&W
Pot Life, 4 fl.oz. Mass @ 77°F	6-7 hours		3.4 hours	D2471

## HANDLING and CURING

An upgrade to the B side of PT5760 has resulted in added safety, improved properties, higher heat resistance, extra toughness, and curing benefits. The 6-7 hour gel time will develop to a hardness of 72 Shore D in 17 hours at a sustained shop temperature of 73°F. This time frame can be reduced by heating the mold: At 120°F the resin will gel hard in 5-6 hours, and at 150°F will gel hard in 3-4 hours. Vacuum should remain applied until full gel has been achieved. The 1000 cps mixed viscosity is measured at 77°F (25°C), so if infusing below that temperature, additional in-line plumbing considerations may be necessary, particularly for large square footages or thicker laminates. Infusing below 70°F is not recommended. For best results, warming the mold to 90°F-120°F will allow for better flow and fiber penetration. The resin may also be warmed, but gel time will be affected. Using the 10°C rule as your guide, for every 10°C (roughly 18°F) up or down in temperature, you will “half or double” the pot life. Viscosity works very similarly; thinner with heat, thicker when cold. Cold resin and/or fabric is not conducive to good infusions! Refer to the Typical Mechanical Properties section under Mixed Viscosity for viscosities at various temperatures. For tooling or parts, before any step cure is started, we highly recommend an overnight low temperature soak at 120°F - 125°F for a duration of 12-14 hours. This will “set” the resin sufficiently and establishes a baseline Tg (heat resistance) which is important for two important reasons: (1) It allows for safe removal of the tool or part from the mold enabling a more stable final post step-cure. (2) It establishes a Tg that will “lead” the oven temperature as the step-cure ensues. Any back-up or supporting structures should be tied-in with the B1 hardener prior to this low temperature soak, otherwise it should be repeated once attached.\*

Inasmuch as PTM&W Industries, Inc. has no control over the use to which others may put the material, it does not guarantee that the same results as those described herein will be obtained. The above data was obtained under laboratory conditions, and to the best of our knowledge is accurate. The information is presented in good faith to assist the user in determining whether our products are suitable for his application. No warranty or representation, however is intended or made, nor is protection from any law or patent to be inferred, and all patent rights are reserved. Before using, user shall determine the suitability of the product for his intended use, and user assumes all risk and liability whatsoever in connection therewith. In no event will PTM&W Industries, Inc. be liable for incidental or consequential damages. Buyer's sole and exclusive remedy in such instances shall be limited to replacement of the purchase price.

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### General Information:

Infusing at a temperature of 120°F and holding for 17 hours, will produce a Tg onset of 176°F. Removal of peel ply and flow media can be difficult after heat is applied and the resin toughens. Generally, the “greener” a laminate is (no heat, overnight RT cure), the easier the peel ply and flow media will come off. When removing flow media and peel ply in this green state, although hard, care should be taken as the laminate may exhibit a glassy condition, making it susceptible to delamination, as the resin will be more brittle. Safety glasses and gloves should be worn. If infusing at temperatures above 90°F and particularly 120°F and higher, it is recommended a high-quality peel ply is used for easiest removal of flow media that is filled with toughened resin.

\* **BACKUP TIE-IN METHOD** – Because of the long pot life of PT5760, we recommend using the PT5760 Part A resin with the Part B1 hardener for tying-in backup structure. This resin/hardener combination has a faster gel time than when using the Part B hardener, and will cure hard overnight at 72°F or higher shop temperatures. Depending upon fabric being used for tie-ins, it may be desirable to add a small amount of fumed silica (Cab-O-Sil or equivalent) to the resin/hardener mixture to minimize drainage on vertical surfaces.

### Post Cure:

After the tool or part has been through the 120°F soak it can be removed from the pattern for free-standing final post cure. Some parts may need support or fixturing and tooling should have as much surface area as possible in contact with a level floor or surface. Step curing can be achieved using one of two methods:

1. Raise temperature to 120°F and set ramp rate at ½°F per minute (30°F per hour). Allow temperature to rise continuously until the final temperature has been reached (25°F above service temperature) and hold at final temperature for 2 hours. Turn off oven and allow to cool slowly.
2. Raise temperature to 120°F and set ramp rate at 2-3°F per minute dwelling at 50°F increments for 1-2 hours each. Hold at 25°F above service temperature for 2 hours. Turn off oven and allow to cool slowly.

## STORAGE GUIDELINES

The shelf life of PT5760 Part A is 6 months when stored at 70°F or lower. Lower temperatures will prolong shelf life, while storage at higher temperatures will shorten shelf life. The shelf life of PT5760 Parts B & B1 is 12 months when stored dry in the original containers from 60°F to 90°F. Both resin and hardener components must be protected from moisture. Reseal opened containers with a dry nitrogen purge after each use.

## PACKAGING WEIGHTS

	Gallon Kit	Pail Kit	Drum Kit
PT5760 Part A	7 lb.	37 lb.	475 lb.
PT5760 Part B	3.2 lb.	16.6 lb.	214 lb.
PT5760 Part B1	3.25 lb.	17 lb.	219 lb.
A/B Kit	10.2 lb.	53.6 lb.	689 lb.
A/B1 Kit	10.25 lb.	54 lb.	694 lb.

## TYPICAL MECHANICAL PROPERTIES

	PT5760 A / B <sup>(1)</sup>		ASTM Method
Color	Amber		Visual
Mixed Viscosity, centipoise, @ Rm. Temp. @ 90°F @ 100°F @ 120°F	1,050 cps 540 cps 400 cps 270 cps		D2393
Pot Life, 4 fl. Oz. Mass, @77°F	6 - 7 hours		D2471
Cured Hardness, Shore D	90 Shore D		D2240
Cured Specific Gravity, grams, cc	1.096		D1475
Density, lb./cu. Inch lb. / gallon	0.0396 9.12		D792
Specific Volume, cu. in./lb.	25.25		
<b>CAST SAMPLES</b>	<b>Cast Samples</b>		
Tensile Strength, psi, (MPa)	7,625 psi (52.6 MPa)		D638
Elongation at Break, %	1.80%		
Tensile modulus, psi, (MPa)	429,491 psi (2,961 MPa)		
Flexural Strength, psi, (MPa)	17,821 psi (122.9 MPa)		D790
Flexural Modulus, psi, (MPa)	475,118 psi (3,276 MPa)		
<b>LAMINATED SAMPLES</b>	<b>7781 Glass Fabric<sup>(2)</sup></b>	<b>5 Harness Satin Carbon Fabric<sup>(3)</sup></b>	
Tensile Strength, psi, (MPa)	40,094 psi (276.4 MPa)	84,694 psi (583.9 MPa)	D638
Elongation at Break, %	1.53%	1.01%	
Tensile modulus, psi, (MPa)	2,772,020 psi (19,112 MPa)	9,720,472 psi (67,018 MPa)	
Flexural Strength, psi, (MPa)	63,631 psi (438.7 MPa)	115,882 psi (799.0 MPa)	D790
Flexural Modulus, psi, (MPa)	3,057,938 psi (21,083 MPa)	7,304,718 psi (50,363 MPa)	
Compressive Strength, psi, (MPa)	29,232 psi (201.5 MPa)		D695
Compressive Modulus, psi, (MPa)	556,045 psi (3,834 MPa)		
Glass Transition Temp., DMA: E' (Onset) Tg (Peak)	395°F (202°C) 452°F (233°C)		D4065
Coefficient of Thermal Expansion, Range 50°C to 100°C	4.0302 x 10 <sup>-5</sup> in./in./ °F		D696

(1) Properties in this bulletin were derived with specimens prepared with the following cure cycle: Overnight @ 150°F, followed by an oven post cure of 1 Hour each at 200°F, 250°F, 300°F, 350°F, and 2 hours @ 400°F.

(2) Infused Samples Consisting of 12 Plies 7781 Glass Fabric, 0°, 90° Orientation, with 32.5% Resin Content..

(3) Infused Samples Consisting of 6 Layers 6K 5 Harness Satin Carbon Fabric, 0°, 90° Orientation, with 31% Resin Content.

## SAFETY and HANDLING

PTM&W epoxy products are made from raw materials carefully chosen to minimize or even eliminate toxic chemicals, and therefore offer the user high performance products with minimum hazard potential when properly used. Generally, the PTM&W epoxy resins and hardeners will present no handling problems if users exercise care to protect the skin and eyes, and if good ventilation is provided in the work areas. However, breathing of mist or vapors may cause allergenic respiratory reaction, especially in highly sensitive individuals. As such, avoid contact with eyes and skin, and avoid breathing vapors. Wear protective rubber apron, clothing, nitrile rubber gloves, face shield or other items as required to prevent contact with the skin. In case of skin contact, immediately wash with soap and water, followed by a rinse of the area with vinegar, and then a further wash with soap and water. The vinegar will neutralize the hardener and lessen the chances of long term effects. Use goggles, a face shield, safety glasses or other items as required to prevent contact with the eyes. If material gets into the eyes, immediately flush with water for at least 15 minutes and call a physician. Generally, keep the work area as uncluttered and clean as possible, and clean up any minor spills immediately to prevent accidental skin contact at a later time. Keep tools clean and properly stored. Dispose of trash and empty containers properly. Do not use any of these types of products until Material Safety Data Sheets have been read and understood.

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