



# PT5409

## EPOXY CASTING SYSTEM FOR DURABLE PARTS

### DESCRIPTION

PT5409 is a two-component epoxy casting system designed for producing prototype and production parts of all types. When cured, PT5409 is quite tough, and has a plastic-like feel and appearance. These features make PT5409 a good material for use in casting complicated, thin-walled parts that combine good appearance with superior performance.

PTM&W's 8900 Series of polyurethane casting systems are excellent products for producing these types of parts as well, but PT5409 has added benefits that should be considered for certain applications. First, PT5409 generally has a higher heat resistance than the urethanes. It can therefore be used with confidence in applications where the part will be subjected to above ambient temperatures at which most urethanes might soften and deform. Second, PT5409 is tougher in very thin sections than the 8900 Series urethanes, so it can be used to make complicated, thin wall castings that will hold up to handling and abuse better than the urethanes. Third, it is easy to tint PT5409 with pigments to produce colored parts. The urethanes are usually limited to light pastel shades because of their color change during cure, so the greater range of colors available with PT5409 is an advantage of its use.

The standard resin, PT5409W, cures to an off-white, translucent material, and is the resin to use when "color casting" with pigments. A black version of this resin, PT5409S, is available by special order, for opaque, rich black castings.

### HARDENER SELECTION

PT5409 resin is offered with a choice of three hardeners, to provide different working times for specific part thicknesses. PT5409 B is a 25 to 30 minute pot life hardener that is intended for wall thicknesses of 1/8 inch average or less. In these thinner sections, PT5409 B provides the optimum balance of cure time and minimum shrinkage. PT5409 B-1 and B-2 are slower setting hardeners that have been designed to allow casting thicker walled parts and maintain a minimum of shrinkage. The 50 to 55 minute pot life of PT5409 B-1 and 80 to 90 minute pot life of PT5409 B-2 also allow more time to cast larger masses, and more complicated parts before gelation takes place.

### PRODUCT SPECIFICATIONS

	PT5409-A	PT5409-B	PT5409-B1	PT5409-B2	ASTM Method
Color	Off-White	Amber	Amber	Amber	Visual
Viscosity,	14,000 cps	200 cps	200 cps	200 cps	D2392
Specific Gravity, gms./cc	1.07	0.98	0.98	0.96	D1475
Mix Ratio		100 : 30	100 : 28	100 : 28	PTM&W
Pot Life, 4 fl.oz. Mass @ 77°F @ 140°F		25 - 30 min. 5 - 7 min.	45 - 60 min. 10 - 12 min.	2 - 3 hours 40 - 45 min.	D2471

### HANDLING and CURING

PT5409 must be heat cured for best performance, and to provide the toughness needed in thin cast sections. It can be mixed and cast at room temperature, but it is usually processed hot to lower the mixed viscosity for easier pouring and mold filling. Typically the material is heated to 125°F to 140°F, at which its viscosity is substantially lowered, and poured or injected into a similarly heated mold for curing. The ideal cure temperature range is 175°F to 200°F. At these temperatures, the material will cure in 2 to 3 hours. Curing at other temperatures is possible with adjustments made according to the temperature chosen. For example, @ 150°F, the material will cure in 16 to 18 hours, and, at 125°F, it should be cured for at least 24 hours. In all instances, cure time with PT5409 B-1 will be about 25% longer than with PT5409 B, and that of PT5409 B-2 will be about 50% longer.

### SPECIAL INFORMATION

When using pigments to color cast, it is sometimes desirable to make a master batch of pigmented material to be used as needed. If this is done, always add the pigments to the resin, and take care to insure that the dyes or pigments are clean and dry, so the master batch will not be affected by contaminants during storage.

## TYPICAL MECHANICAL PROPERTIES

	PT5409 A/B	PT5409 A/B1	PT5409 A/B2	ASTM Method
Mix Ratio, By Weight	100 : 30	100 : 28	100 : 28	PTM&W
Mixed Viscosity, centipoise, @ 77°F @ 140°F	2,650 cps 600 - 700 cps	2,700 cps 600 - 700 cps	1,450 cps 400 - 500 cps	D2393
Shrinkage, Mold #2, Volume .344 gl. inch / inch inch / foot	.0022 * .0264 *	.0022 * .0264 *	.0019 * .0228 *	D2566
Specific Gravity, grams, cc	1.047	1.049	1.042	D1475
Density, lb./cu. Inch	.0378	.0379	.0377	D792
Specific Volume, cu. in./lb.	26.4	26.3	26.5	
Tensile Strength, psi	8,300 psi	8,580 psi	8,500 psi	D638
Tensile modulus, psi	250,000 psi	325,000 psi	305,200 psi	
Flexural Strength, psi, 2 inch span	14,000 psi	14,455 psi	14,200 psi	D790
Flexural Modulus, psi	412,000 psi	414,000 psi	412,000 psi	
Elongation	10.5 %	10 %	11 %	D412
Compressive Strength, psi	11,750 psi	12,410 psi	12,000 psi	D695
Compressive Modulus, psi	490,000 psi	525,700 psi	507,250 psi	
Izod Impact Strength, ft.lbs./inch of Notch, Method A, Notched	0.85	0.85	0.85	D256
Bashore Rebound	52 %	50 %	51 %	D2632
Glass Transition Temperature, DMA: T <sub>g</sub> (Peak)	192°F	202°F	189°F	D4065
Heat Deflection Temperature, @ 264 psi Load	194°F	204°F	191°F	D648
Coefficient of Thermal Expansion, Range 50°C to 100°C	4.3 x 10 <sup>-5</sup> in./in./ °F	4.3 x 10 <sup>-5</sup> in./in./ °F	4.3 x 10 <sup>-5</sup> in./in./ °F	D696

\* Note: The shrinkage values listed were derived by the ASTM test method D2566, which used a half-cylinder mold that is 10 inches long with a .875 inch radius. This is a thicker cross section than PT5409 is designed to be used for, and therefore, the actual in-service shrinkage results will be lower, and will depend on the actual part configuration. The values listed here will serve to compare PT5409 with the 8900 Series polyurethanes and other standard products' test results, to aid in properly designing the mold and subsequent part.

## PACKAGING WEIGHTS

	Gallon Kit	Pail Kit	Drum Kit	Full Drum
PT5409 Resins	8 lb.	40 lb.	480 lb.	480 lb.
PT5409 Hardeners	2.4 lb.	12 lb.	4 Pails @ 36 lb.	435 lb.
Kit	10.4 lb.	52 lb.	624 lb.	---

## SAFETY and HANDLING

PTM&W urethane 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 urethane 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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