



**POLYURETHANE CASTING  
SYSTEMS FOR  
INDUSTRIAL APPLICATIONS**



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## SOFT URETHANE ELASTOMERS

The Shore A-40 and A-50 urethane systems that are described here are tough, soft, highly resilient polyurethane elastomers that have good handling characteristics and cured properties. These high physical properties make them ideally suited for applications such as bumpers, pads, flexible molds or soft parts where a high degree of flexibility & toughness is required. Their relatively high tensile strengths make them good performers for masking or holding fixtures where the tooling needs to be stretched to apply and remove. These two systems are very low in viscosity, so they mix and pour with great ease. They will duplicate the finest surface detail without trapping air. They are very clear, and light amber in tint, so they can be easily pigmented if desired, for a broad range of finished part colors.

<b>PT7240</b>	Amber soft, very resilient Shore A-40 system with a low mixed viscosity, high tear strength, good tensile strength and abrasion resistance.
<b>PT7250</b>	Light amber soft Shore A-50 urethane with very good balance of properties for easy handling and good performance in a variety of uses.

## MID-RANGE HARDNESS URETHANES

The systems described here are tough elastomeric urethanes in the middle range hardness, for flexible materials that have good handling and cured properties. These slightly harder elastomers in the 60 – 80 Shore A hardness range perform very well in light metal forming dies such as brake form pads. Their slightly tougher nature, compared to softer materials, makes them ideal for applications such as very tough high strength flexible molds, and they produce durable, abrasion resistant shapes and parts, cutting pads, fixtures and flexible parts. All four systems are light colored materials that can be easily pigmented if desired. They release air very well and pour easily.

<b>PT7260</b>	A snappy and resilient 60 Shore A elastomer with excellent cured properties.
<b>PT7265</b>	Tough, durable medium viscosity Shore A-65 urethane elastomer with excellent tensile strength, high elongation, and high abrasion resistance.
<b>PT7275</b>	A 75 Shore A system with outstanding high elongation and very high tear strength for this hardness.
<b>PT7280</b>	A quick curing Shore A-80 material with very good toughness, high tensile strength and elongation.

## HARD ELASTOMERIC URETHANES

These 95 Shore A and 60 Shore D hardness elastomers are workhorse metal forming materials. In some instances, they can produce successful tooling for forming applications where nothing else works! They are also used extensively in the foundry, where they are capable of outlasting metal patterns in many applications. The Shore A-90 and Shore A-95 urethane systems described here are harder flexible elastomers with very tough cured properties that make excellent metal forming tooling and are useful in many other demanding industrial applications. Forming dies, die springs, stripper pads, patterns, gears and tough parts are all applications in which these two elastomers excel. The two Shore D-60 urethane systems are exceptionally tough, hard elastomers that have cured characteristics which make them well suited for some very demanding industrial uses. Both of these systems have very high tensile & tear strengths and excellent elongation, so tooling or parts made with these materials are very durable. With very good resistance to abrasion, they are ideal for the production of foundry tools and patterns.

<b>PT7290</b>	A tough urethane tooling elastomer with a longer working time and low viscosity which is very easy to mix and cast.
<b>PT7295</b>	An excellent metalworking elastomer with very high cured properties, low shrinkage, good elongation & outstanding tensile strength & abrasion resistance.
<b>PT7660</b>	Tough tooling elastomer that is ideal for demanding foundry and industrial applications. It has a fast cure for quicker tool production.
<b>PT7665</b>	This system has a longer working time and very low shrinkage which makes it ideal for larger patterns and tools. Cured material machines well for casting a near-net shape, and then machining the pattern to final dimensions.

## RIGID URETHANE ELASTOMERS

These very hard systems – 75 to 85 Shore D – are plastic-like in appearance, yet provide the inherent toughness and durability of engineering elastomers. They work very well in tooling applications such as patterns, molds and fixtures. They are ideal for the fabrication of high strength rigid parts such as seals, bushings and prototype items. PT7985, with a hardness of Shore D-85 works very well in difficult metal forming jobs.

<b>PT7705</b>	Bright white low viscosity system with a long working time and good room temperature cures. This material works very well for hand pouring prototype plastic models and parts where the handling characteristics allow easy filling of complicated molds.
<b>PT7985</b>	Hard durable red tooling elastomer with good heat resistance and excellent resistance to abrasion. It is ideal for foundry patterns with thin cross-section areas, as it will not deflect under heat or pressure.

## REPLICAST FAST-SETTING URETHANE TOOLING SYSTEMS

The REPLICAST line of products consists of hard, rigid, fast setting general purpose urethane systems for the rapid production of temporary and short-run tooling, various jigs and fixtures, as well as rigid, durable shapes and parts.

<b>REPLICAST 112</b>	A three component system consisting of a fast-setting resin and hardener and non-metallic bulk filler. The user can adjust the finished casting properties by varying the amount of the PA0738 bulk filler that is incorporated into the mix.
<b>REPLICAST 609</b>	The REPLICAST 600 Series is a line of highly filled fast setting urethane tooling compounds. They have low shrinkage and good cured stability for a wide variety of general purpose industrial tooling applications. REPLICAST 609 has a faster setting time, and castings can be demolded a little sooner than with REPLICAST 612. REPLICAST 612 should be used for larger castings, & when the lowest shrinkage is required.
<b>REPLICAST 612</b>	

## PRODUCT SPECIFICATIONS and SELECTED MECHANICAL PROPERTIES\*

Product	Color	Mix Ratio, By Weight	Pot Life @ 77°F	Cured Hardness	Specific Gravity	Tensile Strength	Elongation @ Break
<b>SOFT URETHANE ELASTOMERS</b>							
<b>PT7240</b>	Light Amber	100 : 75	25 min.	40 Shore A	1.057	800 psi	525 %
<b>PT7250</b>	Light Amber	100 : 70	20 min.	50 Shore A	1.056	775 psi	450 %
<b>MID-RANGE HARDNESS URETHANES</b>							
<b>PT7260</b>	Light Amber	100 : 55	20 min.	60 Shore A	1.06	1,400 psi	500 %
<b>PT7265</b>	Light Amber	100 : 53	35 min.	65 Shore A	1.042	1,300 psi	660 %
<b>PT7275</b>	Light Amber	100 : 30	30 min.	75 Shore A	1.048	2,550 psi	755 %
<b>PT7280</b>	Light Amber	100 : 80	25 - 30 min.	80 Shore A	1.05	2,785 psi	800 %
<b>HARD ELASTOMERIC URETHANES</b>							
<b>PT7290</b>	Amber	100 : 64	40 - 45 min.	90 Shore A	1.055	3,581 psi	920 %
<b>PT7295</b>	Black	100 : 50	45 - 50 min.	95 Shore A	1.10	4,000 psi	225 %
<b>PT7660</b>	Amber	100 : 44	26 min.	60 Shore D	1.06	6,014 psi	646 %
<b>PT7665</b>	Tan	100 : 60	110-120 min.	60 Shore D	1.09	5,005 psi	554 %
<b>RIGID URETHANE ELASTOMERS</b>							
<b>PT7705</b>	White	100 : 100	30 - 40 min.	75 Shore D	1.10	5,000 psi	20 %
<b>PT7985</b>	Red	100 : 88	30 - 35 min.	85 Shore D	1.13	11,400 psi	6.7 %
<b>REPLICAST FAST-SETTING URETHANE TOOLING SYSTEMS</b>							
<b>REPLICAST 112 A/B (No Filler)</b>	Off-White	100 : 100	3 - 4 min.	75 Shore D	1.07	4,900 psi	30 %
<b>REPLICAST 112 A/B/Filler ( 1 : 1 : 2 )</b>	Cream	100:100:200 (By Volume)	11 min.	76 Shore D	1.48	3,000 psi	.95 %
<b>REPLICAST 609</b>	Metallic Gray	100 : 100	6 min.	83 Shore D	1.82	3,030 psi	1.0 %
<b>REPLICAST 612</b>	Metallic Gray	100 : 100	10 min.	84 Shore D	1.71	4,500 psi	2.0 %

\*Individual Product Bulletins are available for download at our web site ( [www.ptm-w.com](http://www.ptm-w.com) ). They contain complete handling guidelines, packaging information, and additional cured properties.



## PRODUCT LINE DESCRIPTION

The epoxy and polyurethane products for prototyping applications listed here combine ease of handling with superior cured physicals to provide prototype and production parts with many beneficial properties. The proper choice from these products will allow the user to duplicate the properties of a number of engineering plastics with low-cost tooling in a very short time. They cover a broad range of applications, both rigid and flexible, and include high performance materials for clear casting as well as excellent fire retardant systems.

## HIGH-IMPACT and CLEAR MATERIALS

<b>PT5409</b>	PT5409 has excellent toughness and impact strength and has a clean, plastic-like feel when cured. It is the perfect choice for producing thin-walled parts that combine good appearance with superior performance. The translucent nature of PT5409 allows it to be tinted and pigmented to a broad range of rich colors.
<b>PT8902</b>	This urethane system is designed to allow you to produce the toughest parts available for prototype applications! It is a low viscosity urethane system with a very useable pot life. PT8902 forms an extremely tough white, opaque solid when cured. PT8902 has a notched Izod impact strength of over 2.0 !
<b>PT8925</b>	Transparent, water-white urethane casting system that is very useful for the production of tough, impact resistant clear parts. Three hardeners are available for producing various size parts from thin-walls to mass castings. PT8925 parts are water-clear and exhibit no distortion. The cured parts have excellent toughness and durability.
<b>PT8928</b>	An easy to use transparent urethane system that is ideal for producing thin-walled parts that have good color stability, even in outdoor applications. Fills thin cross sections easily with no air entrapment, and produces very tough clear good-looking parts.

## MATERIALS FOR MACHINE DISPENSE and HAND POUR APPLICATIONS

<b>PT8907 &amp; PT8909</b>	Fast material for machine dispensing. Provides tough, durable parts with high impact strength. Two hardeners: Hardener B for fast demold at room temperature, and Hardener B1 for larger parts. A buff colored version is available-the part number is PT8909.
<b>PT8908</b>	Fast material for machine dispensing. This is a modification of our PT8907, with a longer pot life and lower mixed viscosity, to allow the casting of larger parts. It develops strength quickly, and allows fast demold times for more cycles per day. PT8908 is not brittle in thin sections, and its heat resistance is very good.
<b>PT8914</b>	Hardness and modulus matched for replicating the look, feel and performance of PE and PP parts.
<b>PT8917, PT8918 &amp; PT8919</b>	1 to 1 By Volume ratio systems for easy use in machines or cartridges. Black (PT8917) and White (PT8919) versions have good color and opacity. Translucent PT8918 version readily accepts dyes and pigments for colored parts. All three have good impact resistance and toughness, and high heat resistance.
<b>PT8939</b>	Tough fast material for machine dispensing. Produces bright white parts with good opacity that are very strong and durable.
<b>PT8948 &amp; PT8949</b>	These companion materials have been designed specifically for hand pouring or mechanized casting of larger parts. They have volumetric ratios that readily allow convenient dispensing through twin-tube mixers. They have low viscosities for easy degassing and filling complicated molds. PT8948 cures to a translucent solid, and PT8949 cures to a brilliant opaque white, but since no pigments are used in either system, they can easily be tinted or colored.

## FIRE RETARDANT MATERIALS

<b>PT8952</b>	Fire retardant system with unique handling and cured properties. PT8952 has a very low mixed viscosity, for easy filling of complicated molds. It is a performance companion to the new PT8902 high impact system, with the added benefit of excellent fire retardant characteristics. UL Listed for UL 94 V-0 at 0.1" thickness (UL File No. E238713).
<b>PT8955</b>	Hard, tough fire retardant system for hand pour or vacuum casting applications. Plenty of time to mix, deair and pour complicated parts that can be demolded fairly quickly. UL Listed for UL 94 V-0 at 0.1" thickness (UL File No. E238713).
<b>PT8959</b>	Fast gelling fire retardant system for machine or cartridge dispensing uses. Low mixed viscosity allows easy filling of thin mold areas. Fast demold times for quick mold turnaround. UL Listed for UL 94 V-0 at 0.12" thickness (UL File No. E238713).

## FLEXIBLE URETHANE SYSTEMS FOR PROTOTYPE PARTS

<b>PT8442</b>	A 40 Shore A system with the lowest mixed viscosity of these four systems. Has good tensile strength and high elongation and rebound characteristics.
<b>PT8452</b>	A 50 Shore A system with low viscosity that has low shrinkage, high tear strength and good abrasion resistance.
<b>PT8462</b>	A 60 Shore A system of medium viscosity that has high tensile strength and very good tear strength and rebound characteristics.
<b>PT8472</b>	A 70 Shore A system that has tough cured properties. Excellent tensile strength and elongation, extremely high tear strength and very good abrasion resistance.

## PRODUCT SPECIFICATIONS and SELECTED MECHANICAL PROPERTIES\*

Product	Color	Cured Hardness	Specific Gravity	Izod Impact Strength	Tensile Strength	Flexural Strength	Glass Transition Temperature ( T <sub>g</sub> )
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### HIGH-IMPACT and CLEAR MATERIALS

<b>PT5409</b>	Translucent	83 Shore D	1.047	1.17	8,300 psi	14,000 psi	192°F
<b>PT8902</b>	White	85 Shore D	1.15	2.1	10,010 psi	15,575 psi	213°F
<b>PT8925</b>	Water Clear	80-85 Shore D	1.14	0.75	10,080 psi	13,576 psi	166°F
<b>PT8928</b>	Water Clear	83-85 Shore D	1.05	0.78	9,615 psi	12,890 psi	144°F

### MATERIALS FOR MACHINE DISPENSE and HAND POUR APPLICATIONS

<b>PT8907</b>	Black	79 Shore D	1.143	1.1	5,805 psi	8,300 psi	326°F
<b>PT8909</b>	Buff						
<b>PT8908</b>	Black	75 Shore D	1.08	1.13	5,407 psi	6,579 psi	298°F
<b>PT8914</b>	Buff	75 Shore D	1.11	0.9	4,510 psi	4,441 psi	286°F
<b>PT8917</b>	Black	85 Shore D	1.16	0.82	8,420 psi	11,212 psi	259°F
<b>PT8918</b>	White						
<b>PT8919</b>	Translucent						
<b>PT8939</b>	Bright White	84 Shore D	1.14	1.1	8,605 psi	14,758 psi	366°F
<b>PT8948</b>	Translucent	80-82 Shore D	1.11	0.46	10,514 psi	14,438 psi	286°F
<b>PT8949</b>	White	70-75 Shore D	1.08	0.42	7,263 psi	9,428 psi	212°F

### FIRE RETARDANT MATERIALS

<b>PT8952</b>	Translucent	85 Shore D	1.17	1.6	10,650 psi	15,445 psi	211°F
<b>PT8955</b>	White	85 Shore D	1.205	0.76	7,480 psi	14,333 psi	192°F
<b>PT8959</b>	Light Cream	86 Shore D	1.18	0.68	9,030 psi	14,401 psi	227°F

Product	Color	Cured Hardness	Specific Gravity	Tensile Strength	Elongation	Tear Strength	Bashore Rebound
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### FLEXIBLE URETHANE SYSTEMS FOR PROTOTYPE PARTS

<b>PT8442</b>	Light Amber	40 Shore A	1.057	800 psi	525 %	180 pli	65 %
<b>PT8452</b>	Light Amber	50 Shore A	1.056	775 psi	450 %	165 pli	64 %
<b>PT8462</b>	Light Amber	60 Shore A	1.061	1,400 psi	500 %	195 pli	60 %
<b>PT8472</b>	Light Amber	70 Shore A	1.065	1,375 psi	400 %	340 pli	60 %

\*Individual Product Bulletins are available for download at our web site ( [www.ptm-w.com](http://www.ptm-w.com) ). They contain complete handling guidelines, packaging information, and additional cured properties.



# **GENERAL HANDLING INSTRUCTIONS**

## **for**

# **POLYURETHANE PRODUCTS**

**PTM&W Industries' urethane systems are safe to use when proper ventilation and housekeeping are utilized. Like other chemical products, workers should handle these liquid resins and hardeners with caution and care. Any of our systems may irritate the skin and eyes of some people after repeated or extended contact with liquid or vapors. Prevention rather than cure is the best approach when handling these industrial products.**

## **INFORMATION**

**First read the material safety data sheets (MSDS) for the resin and hardener. These documents contain safety precautions and handling information for the specific product they cover. Do not use any of these types of products until the MSDS have been read and understood.**

## **STORAGE**

**All urethanes are, to some degree, moisture sensitive during handling and storage. While our polyurethane products have been formulated to be as resistant to moisture as possible, it is best to reseal opened containers with a dry nitrogen cap. This will insure dry material between uses.**

## **HANDLING**

**Always treat industrial chemicals such as polyurethanes with caution and avoid improper exposure to the chemicals in use. Protective clothes such as shop coats, coveralls, or aprons should always be used and kept clean. The use of latex surgical gloves and plastic aprons keeps skin contact to a minimum during use and help to prevent being contaminated by old spills.**

## **VENTILATION**

**Adequate ventilation is absolutely necessary in the workplace. Proper ventilation minimizes the breathing of vapors. It is best to have the fumes drawn across the work, away from the worker. When ventilation is not possible, face masks with filters or self contained respiration units should be used.**

## **CLEANLINESS**

**Tools and equipment should be kept clean from resin and hardener spills as they tend to get on your clothing - oftentimes when you are not aware of it. Spills should be removed as soon as possible with a safe solvent or resin emulsifier, and then wash with soap and water. Covering work areas and floors with waxed kraft paper helps in containing spills and in cleaning up after.**

## **PERSONAL CONTACT**

**Frequent or prolonged skin contact with materials used in polyurethane systems can, in some people, cause contact skin dermatitis. Dermatitis can be held to a minimum or eliminated entirely by using proper techniques and equipment.**

**Prevention of skin contact is the most important step. The use of latex surgical gloves and plastic aprons keeps skin contact to a minimum. Use protective skin cream before working with resins and hardeners. Always wash with warm soapy water before breaks, lunch, and end of shift. If these materials are on the skin, do not use solvents, as they remove the skin oils and actually promote skin problems. A resin emulsifier followed by warm soapy water wash is best. Eye contact with resins or hardeners requires flushing with large quantities of water. It is best to then be examined by a physician as soon as possible.**



# ACCESSORY PRODUCTS FOR TOOLING AND PRODUCTION APPLICATIONS

## PRODUCTS

PTM&W provides a variety of accessory tools and materials for tooling and production processes. They include:

<b>RELEASE AGENTS</b>	
<b>PA0801</b>	Non-silicone paste wax for room temperature or elevated temperature applications. Easy to apply, works equally well on metal or composite tooling. Can be used to release epoxies, polyurethanes, polyesters, and most adhesives based on those materials. Service temperature to 375° F.
<b>PA0810</b>	A green water/alcohol solution of water soluble, film forming PVA for use as a parting agent for separation between polyester or epoxy resins and various mold surfaces. Used with PA0801 paste wax for easy, effective production release in a variety of applications.
<b>PA0828</b>	Rich silicone release for tooling or production uses. PA0828 is the best all purpose release for metal and plastic molds - easy release every time! Also an effective lubricant.
<b>PA0868</b>	Modified silicone release designed to provide glossy surface finish and easy release from the mold. PA0868 is especially effective for releasing thermosetting urethane elastomers from either epoxy or metal tooling. PA0868 can be removed from the parts easily with soap and water, thereby avoiding the use of potentially dangerous solvent cleanup.

<b>BULK FILLERS</b>	
<b>PA0738</b>	Hydrated alumina bulk filler for use with epoxy and polyurethane casting resins. Economical, it provides lower overall cost castings. Generally, the addition of PA0738 lowers the exotherm of the casting and thereby lowers the cured shrinkage. Castings made with a high content of PA0738 are very easy to machine or work with hand tools.
<b>PA0703</b>	An aluminum needle bulk filler. PA0703 is a high purity aluminum product with an elongated needle-like configuration. This unique shape is designed to give optimum packing density and particle distribution when mixed with a high temperature epoxy resin to construct a reinforcing backup structure. The ability to provide high filler loading provides excellent heat transfer and compressive strength to the casting.

<b>ACCESSORY PRODUCTS</b>	
<b>Tooling Brushes</b>	2-Inch Wooden handle brushes with 3/4" blunt-cut solvent resistant bristles designed specifically for hand laminating and surface coat application. The 100% Pure China bristles have excellent chemical resistance, so the brushes can be used with solvent-containing systems if desired. The bristles are firmly locked into the ferrule, so they will not pull out during use and contaminate the material being applied.
<b>Squeegees</b>	Durable 3" x 5" plastic squeegees for spreading thick resins and for laminating. The high density plastic composition allows easy cleanup in common shop solvents. Cured resin pops off the flexible squeegees. Dual tapered sides and rounded corners allow use with thin fabrics with minimum snags. These squeegees are equally useful for graphics applications or other projects.
<b>Epoxy Color Dispersions</b>	Epoxy-based, opaque color pastes for pigmenting epoxies and some polyurethanes: PA0501 - Black   PA0502 - White   PA0503 - Red   PA0504 - Green PA0505 - Blue   PA0506 - Yellow   PA0507 - Orange   PA0508 - Brown
<b>Urethane Color Pastes</b>	Opaque color pastes made especially for use with urethanes, with compatible raw materials and additives to minimize moisture contamination: PA0518 - Black   PA0538 - Red   PA0598 - Tan

# PRODUCT DIRECTORY

**In addition to the polyurethane tooling and prototyping materials featured in this brochure, PTM&W Industries manufactures an extensive line of epoxy-based products and other materials for a wide variety of industrial uses. These materials are grouped in the following product lines. Literature and technical assistance on these products are available for the asking.**



This product line consists of high performance epoxy systems for both room temperature and high temperature service applications. Included in these products are tooling surface coats with easy handling and application characteristics. There are both filled and unfilled epoxy laminating systems for tools, parts and fixtures. A number of casting systems with non-metallic or metal fillers provide tough durable cast tooling and/or fixtures.



Vacuum-Assist Resin-Transfer Method (VARTM) is the procedure of infusing a resin matrix into plies of dry fabric, under vacuum, to make composite laminates. In this process, dry plies of fabric are laminated onto a hard mold surface along with release plies, flow media, vacuum lines, and resin distribution lines, with the entire laminate placed under a vacuum bag. Infusion resin/hardeners are batch-mixed and sucked into the laminate, by vacuum, through resin distribution lines. VARTM-type resin systems are identified by very low mixed viscosities and longer working times. Resin infusion for tooling has a number of advantages over using prepreg tooling materials: much lower material costs; easier ply positioning; less chance of delamination; no autoclave required; room-temperature demold; free-standing post cure; no refrigerated storage and long shelf life. Resin infusion for production parts offers the same advantages as for tooling. This process is usually reserved for large structures such as boats or composite car bodies and others.



The PTM&W Poly Filler line of polyester filler pastes are unique high performance products that have been extensively used in a broad range of industrial applications very successfully for many years. These are high quality fillers which use the best raw materials for the purpose. They are smooth viscosity products that are very easy to apply, and exhibit very low shrinkage, for quicker repairs with minimal rework.



The Wyn-Stik product line consists of epoxy and polyurethane systems designed for the protection and/or repair of concrete, clay pipe and composite materials in the construction-related industry. Included in these products are paste and liquid adhesives and repair materials with high bond strengths and the capabilities to adhere to casually prepared surfaces, for quick field repairs. There are also epoxy and polyurethane coatings and primers for brush, trowel or spray application that have excellent resistance to harsh chemical environments. These materials have been utilized in the construction industry for many years, and have proven to be reliable, high-performance products that provide years of strength and protection.



We manufacture a wide variety of structural adhesives for industrial applications. Listed here are a number of stock products that include a broad range of properties. Many of our adhesives are tailored to specific uses and individual applications. If you have a requirement that cannot be fulfilled by these standard products, let us select or design a high performance adhesive that works for you.

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