



Introduction

General Introduction

MASTER® brand fast reproducing plastics represent a carefully selected collection of high performance state-of-the-art plastics for making patterns, prototypes and models. These epoxy resins, urethanes, polyurethane elastomers and fast setting resins possess an exceptional array of outstanding physical properties such as the ability to accurately duplicate intricate details, low shrink, abrasion resistance and machinability, among others. Collectively, these properties make Kindt-Collins plastics ideally suited for use as patterns, prototypes, models and other related applications.

In addition to our own proprietary plastics such as Dyna-Cast®, Multi-Cast® and Master Cast®, the Kindt-Collins Company also represents the best offerings of popular and respected brands including Ad-Tech, H.B. Fuller and Hapco. Our exceptional selection makes Kindt-Collins your single best source for everything you need in high performance fast reproducing thermoset plastics and knowledgeable, professional selection and application assistance.

Overall Properties

Our plastics possess a wide range of general properties that make them well suited for a multitude of applications. These features include: Long pot life; low shrink; low exothermic reaction; easy to use; machinability; abrasion resistant; moisture insensitive; odor free. In addition, Kindt-Collins' plastics readily "knit" to themselves allowing parts to be easily repaired, and prototypes or multi-components to be built in sections.

Typical Uses

The outstanding range of physical properties of Kindt-Collins fast reproducing polyurethane elastomers and epoxy resins make them ideal for use as models, prototypes and patterns. The ability of MASTER plastics to accurately capture intricate details is the secret to their use as exact models of complicated, finely detailed parts.

Our thermoset plastics are also ideal for making parts or molds for product evaluation, display or demonstration purposes.

Fast Reproducing Plastics

Kindt-Collins has a complete line of fast reproducing plastics to meet every challenge: Dyna-Cast and a series of Master Cast products. These plastics have a long pot life and allow the worker ample time to make a quality part, impossible with quick setting plastics that transform from a liquid to a solid in a very short time.

Urethanes

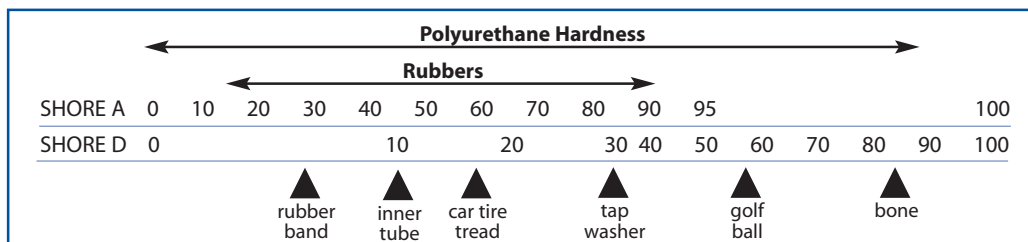
These products are available in a variety of hardnesses and can be softer than a pencil eraser to as hard as a bone. They adhere readily to metal that has been primed and are made in a variety of colors including amber, black, blue, brown, red and white.

Epoxy Resins

The hardness of most epoxies typically falls in a Shore D Hardness range of 60 to 90. In addition, most epoxies will also readily adhere to nearly any material such as wood, other plastics, metals, glass and ceramics.

Technical Reference Information

Hardness Chart



Viscosity Chart (at room temperature)

Viscosity In Centipoise:	Consistency Similar To:	Viscosity In Centipoise:	Consistency Similar To:
1	= Water	25,000	= Chocolate Syrup
500	= No. 10 Motor Oil	50,000	= Catsup
2,500	= Pancake Syrup	250,000	= Peanut Butter
10,000	= Honey	1,000,000	= Paste-Caulking Consistency

If in doubt as to the proper plastic to use, call our Customer Service Department toll free at 1-800-321-3170. Our experienced personnel will be glad to assist you in the proper selection of our products.



Master™ Dyna-Cast

For Making Prototypes, Models and Patterns

Models and Prototypes

This easy-to-mix two-part reproducing plastic material is the ideal way to make a few models or prototypes without the cost of expensive tooling. Now you can produce a limited number of parts for evaluation, product development or for display and demonstration purposes prior to investing thousands of dollars for tooling for a production run.

Patterns

Dyna-Cast is an economical way to make patterns. The product allows more time for the worker to produce a part than quick setting plastics that transform from a plastic liquid to a solid in only minutes or seconds. Even when the original patterns are destroyed or lost, you can make a low-cost duplicate, providing a sample of the part to be duplicated is available.

This special urethane-based product is low-shrinking, has low viscosity and will reproduce intricate shapes and surface configurations. With a long pot life (approximately five minutes) and gel period (approximately eight to ten minutes), it provides ample time for the worker to produce a part, compared with quick setting plastics that transform from a plastic to a solid in only a few minutes. The two-part liquid product is easily blended and mixed at a 1 to 1 ratio.

Shelling with Dyna-Cast™

MASTER Dyna-Cast, because of its special characteristics, can be formed into a skin or shell over a master pattern or core stick. The application of this plastic quickly and easily creates inexpensive, close-tolerance molds for pattern duplication of temporary core boxes.

Dyna-Cast is an ideal material for this use because of its longer pot life. Unlike other "quick-setting" plastics it does not transform from a liquid to a solid in just a few minutes. The setting process goes through an eight to ten minute gel cycle where it can be brushed, trowelled or scraped onto vertical sidewalls. The adaptation of these techniques is easily developed and in one or two attempts a technician can become an expert.



Physical Properties

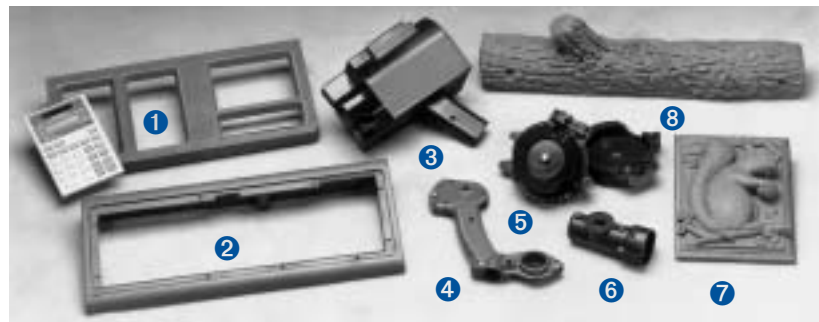
Mixing ratio (by weight or volume)	1:1
Pot life (70°F)	5 min.
Shrinkage (inch/inch)	0.0007"
Hardness (Shore D)	85-90
Density (pounds per cubic inch)	.059
Tensile strength	9000 psi
Flexural strength	2,300 psi
Flexural modulus	273,000 psi
Compression strength	16,000 psi
Water absorption (ASTM D-570)	0.14%
Viscosity (CPS)	1,850
Color	Blue-Green
Volume (cubic inches per pound)	16

Advantages

- Can be painted any color ... **available in white or green**
- Will knit to itself (parts are easy to repair or alter)
- Easy to pour in thin sections
- Non-oil based, will not exude oil
- Low water absorption
- Physically strong—minimum shrinkage
- Excellent viscosity

Description	Contents (Pounds)		Catalog Number
	Part A	Part B	
5 Pound Unit	2-1/2	2-1/2	960-DFGU
20 Pound Unit	10	10	960-DTGU
20 Pound Unit	10	10	960-DTWU
100 Pound Unit	50	50	960-DPGU
Part A Only	2-1/2	—	960-DFGA
	10	—	960-DTGA
Part B Only	—	2-1/2	960-DFGB
	—	10	960-DTGB

- 1) Bezel Prototype
- 2) Keyboard Cover Prototype
- 3) Magnetic Resonance Housing Prototype
- 4) Hot Wire Handle Prototype
- 5) Scintillation Counter Prototype
- 6) Prototype for above
- 7) Vacuum Form Squirrel Mold
- 8) Vacuum Form Log Mold



To order specify catalog number and quantity desired.

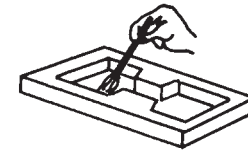
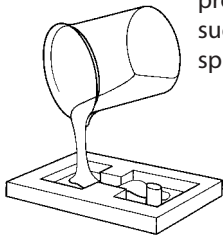
Shelling with Dyna-Cast Step by Step

Mixing Instructions for Dyna-Cast™ and Multi-Cast™

Step 1. Stir parts of A and B separately with a Hanson or Jiffy Mixer (see Page 31) as illustrated. Note: Clean mixer thoroughly between mixes.



Step 2. Coat corebox, mold or pattern with a proper release separator such as a good silicone spray, or a proper wax.



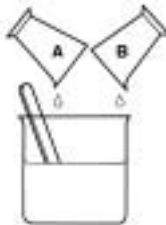
Apply by brushing sealer and release agent to master pattern.

Step 2. Initially mix just enough Dyna-Cast (1:1) to cover the master pattern as you would with paint. Then, while the plastic is in its most liquid form (first five minutes) pour it over the entire surface and, while it is still liquid, use a brush to cover the entire surface. The liquid plastic will puddle in the low areas.



Blend and mix enough two-part Dyna-Cast (1:1) to cover master pattern.

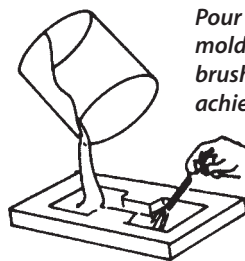
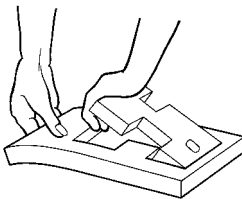
Step 3. Mix equal amounts by weight or volume of parts A and B. Stir vigorously for 30 seconds with a Hanson or Jiffy Mixer as in Step 1. Pour the mixture over corebox or pattern from a reasonably high altitude. Do not scrape the residue from the pouring container into the mold as any unmixed material may cause soft spots. Working time after material is blended (pot life) is: Dyna-Cast 4-6 minutes and Multi-Cast 3-5 minutes. This time will vary with temperature.



Step 3. As the liquid begins to thicken (in the next 8 to 10 minutes) drag the puddled material back up on the high spots, concentrating on covering outside radii and sharp corners. When the Dyna-Cast becomes too thick to work, stop and immediately mix a second batch. Allow the new mix to thicken slightly in the cup and apply over the first coat, again concentrating on the hard-to-cover areas. When the second coat becomes too thick to work, set in any ribs that might be needed for internal support.

Step 4. Allow to set at room temperature without disturbing material:

- For Dyna-Cast, 90 minutes
- For Multi-Cast, 30 minutes



Pour Dyna-Cast mixture over entire mold surface and spread evenly with brush. Repeat process as necessary to achieve a minimum thickness of 3/16".

Step 5. Demold. Part is ready for use.

Here are illustrations and explanations on the use of Dyna-Cast. Your job may vary, but the techniques are the same. Size of the work is of little consequence as the larger the job the more practical this procedure becomes.

As in any molding process, develop a parting line or affix the pattern to a flat plate.

Step 1. Prepare pattern with a sealer and a release agent. If master pattern is plastic or wood, seal with PVA or thinned Clear Kincote coating. Allow to dry overnight. If master pattern is wood, apply two coats of paste wax and two coats of appropriate release agent. If master pattern is plastic, apply one coat of paste wax and two coats of

Step 4. Mix a third batch and tie-in the ribs. With three applications the surface thickness should be 3/16" (minimum) and thicker in the low areas. The entire procedure should take less than 30 minutes. Allow two hours from the initial pour before demolding.



No striations exist between layers.



Master™ Fast-Reproducing Plastics

The MASTER family of fast-reproducing plastics consists of two component thermosets which will cast to replicate the most intricate details and shapes. Parts created from these high performance plastics can be easily machined, polished and are moisture resistant. All three MASTER plastics presented here can be easily mixed by weight or volume.

Master™ Cast 710 – Aluminum Filled

Because of its low exothermic reaction and low linear shrink properties, MASTER Cast 710 will cast to pick up the most intricate details and shapes. It can be easily machined and then polished to look like aluminum.

Description	Contents (Pounds)		Catalog Number
	Part A	Part B	
5 Pound Unit	2-1/2	2-1/2	962-710FU
20 Pound Unit	10	10	962-710TU
Part A Only	2-1/2	—	962-710FA
	10	—	962-710TA
Part B Only	—	2-1/2	962-710FB
	—	10	962-710TB

Physical Properties

Surface hardness (Shore D) @ 24 hrs.83
 Shrinkage in./in.0001"
 Pot life/minutes (70°F)5 min.
 Reproduction detailExcellent
 Viscosity (CPS) - mixed @ 70°F2,000
 Ratio1:1 PBW or PBV
 Flexural strength3,600 psi
 Compressive strength15,500 psi
 ColorGray
 Mixing ratio (by weight or volume)1:1
 Volume (cubic inches per pound)16

To order specify catalog number and quantity desired.

Master™ Cast 783 – Low Viscosity

MASTER Cast 783 is another in the family of outstanding fast reproducing, two-component, thermosetting plastics. It can, because of its superior properties, replace epoxies in many instances.

Description	Contents (Pounds)		Catalog Number
	Part A	Part B	
5 Pound Unit	2-1/2	2-1/2	962-783FU
20 Pound Unit	10	10	962-783TU
Part A Only	2-1/2	—	962-783FA
	10	—	962-783TA
Part B Only	—	2-1/2	962-783FB
	—	10	962-783TB

Physical Properties

ColorBlue
 Mixing ratio (by weight or volume)1:1
 Gel time8 min.
 Demold Time60-90 min.
 Viscosity (CPS)1,500
 Density (pounds per cubic inch)064
 Hardness (Shore D)85
 Flexural strength5,000 psi
 Flexural modulus580,000 psi
 Tensile strength3,000 psi
 Compression strength7,500 psi
 Shrinkage (in./in.)0002"
 Volume (cubic inches per pound)16

To order specify catalog number and quantity desired.

Multi-Cast™ – Original Fast Cast

MASTER Multi-Cast is abrasion resistant, moisture sensitive and has very low exothermic reaction and shrinkage. It knits to itself. Because it has a non-oil base, it will not exude oil.

Description	Contents (Pounds)		Catalog Number
	Part A	Part B	
5 Pound Unit	2-1/2	2-1/2	960-MFU
20 Pound Unit	10	10	960-MTU
Part A Only	2-1/2	—	960-MFA
	10	—	960-MTA
Part B Only	—	2-1/2	960-MFB
	—	10	960-MTB

Physical Properties

Mixing ratio (by weight or volume)1:1
 Pot life (70°F)5 min.
 Shrinkage (inch/inch)0.0002"
 Hardness (Shore D)85
 Density (pounds per cubic inch)059
 Tensile strength9,600 psi
 Flexural strength2,400 psi
 Flexural modulus273,500 psi
 Compressive strength16,900 psi
 Water absorption0.14%
 Viscosity (CPS)2,100
 ColorBlack
 Volume (cubic inches per pound)16

See Page 7 for mixing instructions (identical with Dyna-Cast).



Master™ Cast 720 and 721

Two Part Thermosetting Plastic System

MASTER Cast 720 and 721 offer unique features and benefits for the casting industry. Developed for a diverse range of applications, they are ideal for patterns and core boxes, vacuum form molds, jigs and fixture, prototype and tracing models.

These two component plastics are easily mixed by weight or volume on a 1:1 ratio without the use of a scale. They have virtually no shrinkage (<.0005) and a Shore D Hardness in the 80 to 85 range. Compressive Strength psi (ASTM D-695) is in the 6000 range. A long pot life permits ample time for mixing and pouring.

Each formula incorporates the most advanced chemistry and latest technology to deliver the performance you've come to expect from the Kindt-Collins Company.



To order specify catalog number and quantity desired.

Description	Contents (Pounds)		Catalog Number	Catalog Number
	Part A	Part B		
Five Pound Unit	2-1/2	2-1/2	962-720FU	962-721FU
Twenty Pound Unit	10	10	962-720TU	962-721TU
Part A Only	2-1/2	—	962-720FA	962-721FA
	10	—	962-720TA	962-721TA
Part B Only	—	2-1/2	962-720FB	962-721FB
	—	10	962-720TB	962-721TB

Master™ Cast 720 Physical Properties

- Color
- Part AYellow
- Part BLight Brown
- MixedYellow
- Mixing ratio (by weight or volume)1:1
- Mixed viscosity (CPS)1,200
- Volume yield (cubic in./pound)16
- Gel time at 77°F (400 gms)4 to 5 min.
- Demold time15 to 30 min.
- Hardness (Shore D)80-85
- Shrinkage in./in. (24 hours)<.0005
- Specific gravity (g./cubic cm.)1.7
- Compressive strength (ASTM D-695)6,000 psi
- Flexural strength (ASTM D-790)5,400 psi
- Flexural modulus (ASTM D-790)906,000 psi
- Tensile strength (ASTM D-638)3,100 psi
- Young's Modulus (ASTM D-638)887,000 psi
- Izod impact strength (ft. lb./in.) (ASTM D-256)0.78
- Heat deflection (°F) temperature at
264 psi (ASTM D-648)127
- Coefficient of linear (in./in/°F) thermal expansion
(ASTM D-696)2.88 x 10⁻⁵

Master™ Cast 721 Physical Properties

- Color
- Part ABurgundy
- Part BLight Brown
- MixedBurgundy
- Mixing ratio (by weight or volume)1:1
- Mixed viscosity (CPS)1,200
- Volume yield (cubic in./pound)16
- Gel time at 77°F (400 gms)6 to 8 min.
- Demold time60 min.
- Hardness (Shore D)80-85
- Shrinkage in./in. (24 hours)<.0005
- Specific gravity (g./cubic cm.)1.7
- Compressive strength (ASTM D-695)6,000 psi
- Flexural strength (ASTM D-790)5,000 psi
- Flexural modulus (ASTM D-790)864,000 psi
- Tensile strength (ASTM D-638)3,000 psi
- Young's Modulus (ASTM D-638)763,000 psi
- Izod impact strength (ft. lb./in.) (ASTM D-256)0.54
- Heat deflection (°F) temperature at
264 psi (ASTM D-648)125
- Coefficient of linear (in./in/°F) thermal expansion
(ASTM D-696)2.88 x 10⁻⁵

Pattern Making Plastics



Master™ Cast 770

Master™ Cast 770 RTV Silicone Rubber

MASTER Cast 770 Silicone Rubber and the hardener make up a two component, pourable mold making compound that cures at room temperature to a flexible, high strength rubber.

MC 770 features:

- High elongation and tear resistance
- Cures in contact with virtually all types of master pattern and molding materials
- Cures at room temperature to optimum physical properties
- Color contrast between base compound and the curing agent, permitting easy visualization of thorough mixing
- Convenient 10:1 mixing ratio
- Long pot life and low surface tension, permitting void free casts
- Yields 26 in.³ per pound



Size	Catalog Number
2 Pound	96277002U
10 Pound	96277010U
50 Pound	96277050U

Other RTV silicone rubbers are available.

Physical Properties

Color	Typical Uncured Properties (after addition of curing agent)					Typical Cured Properties (after 48 hours @ 25C (77F), 50% R.H.)					
	Mix Ratio (by weight)	Initial Viscosity (cps)	Pot Life (hrs)	Coverage cc/kg (in ³ /lb)	Strip Time (hrs)	Durometer (Shore A)	Temperature Resistance (°F) Intermittent	Tensile Strength (lb/in ²)	Elongation %	Tear Strength (lb/in)	Shrinkage %
Activator Blue Base	10:1	50,000	1.5-2.5	928 (26)	16-18 @ 25C (77F)	27	-60 to 350	525±25	300±25	120±10	0.10

Liquid Molding Compounds

Liquid Molded™ parts have properties similar to Injection and Compression Molded parts. Liquid Molding™ is a low cost,

low pressure, room temperature liquid. Liquid Molding™ is ideal for part volumes of 1-10,000 parts per year.

Tuffalloy 4200 Series

Tuffalloy 4200 is a series of Liquid Molding Compounds with thermoplastic properties. High impact, high heat distortion, low viscosity and excellent physical properties are presently available. Tuffalloy 4200 Series can be pressure cast, vacuum cast or open cast.

The Tuffalloy 4200 Series are available in four speeds:

- 15 minute working life – 6 hour demold
- 7 minute working life – 2 hour demold
- 2 minute working life – 4-6 minute demold with heated molds, 8-20 minutes at room temperature
- 1 minute working life – 3-4 minute demold with heated molds, 4-10 minutes at room temperature

Advantages:

- Thermoplastic type properties
- Fast cycle time
- Excellent physical properties
- Prototype and full production with the same properties
- 1:1 mix ratio

Ultralloy Series

The Ultralloy series of liquid molding compounds are designed to be used with Liquid Molding, open casting, pressure casting or vacuum casting processes. Ultralloy compounds are tough, fast cycling, low cost and easy to use. Ultralloy can be used with silicone, epoxy, urethane, polyester or aluminum molds. Low cost molds and fast cycle times are two key attributes of Ultralloy.

Unlike most plastics, Ultralloy can be molded in thick and thin sections, and in small and large masses, without a marked effect in shrinkage.

Ideal for prototypes and short runs of plastic parts, Ultralloy can be molded in inexpensive molds, reducing total part cost, for short run programs, for low cost, high performance parts, in less than 10,000 parts per year volumes.

Advantages:

- Low viscosity
- 1:1 mix ratio
- Low shrinkage
- Available in two speeds
- Fast cycle times
- Simple



RAPIDSHOT

Automatic Meter/Mix Dispensing System for Liquid Molding Compounds



RAPIDSHOT by Hapco is a low cost, convenient meter/mix dispensing gun system for both 1:1 and 2:1 volume ratio liquid molding compounds. It is the ideal way to quickly and reliably dispense two component compounds such as Ultralloy, Tuffalloy, Hapflex and similar compounds for filling molds and similar tasks.

The **RAPIDSHOT** system offers users a proven means of dramatically improving work throughput in addition to cost savings versus slow and time consuming hand proportioning/mixing.

The **RAPIDSHOT** system uses convenient disposable plastic cartridges and disposable **RAPIDSHOT** mixers. The cartridges are easily filled using a unique plunger and plunger plug system. Partially used cartridges can also be easily resealed, stored and used at a future date.

Sold as a kit, each **RAPIDSHOT** "Shotpac" includes all components necessary to assemble 12 complete cartridges (not including the **RAPIDSHOT** mixer).

ORDERING INFORMATION

In order to assure you purchase the proper **RAPIDSHOT** Kit configuration for your specific application, contact Kindt-Collins for ordering assistance.

Pattern Making Plastics



Ratioing Two-Part Plastics

When mixing two-part plastics, it is important that proper ratios of resin and hardener are used so that you can ensure consistent results and maximize physical properties. When mixing epoxy resins, the mixed ratio should be within 5% of correct weight and with tooling urethanes within 2%.

In most every case, the first number shown in the ratio is the resin (Part A) and the second number, the hardener (Part B). For example, if your ratio is 100:30, this means that for every 100 parts of resin you must add 30 parts of hardener to obtain the proper proportion.

Below is the formula for obtaining the correct ratio for mixing two-part plastics by weight (obtaining ratio by volume is rarely done):

$$D \text{ (Density)} \times V \text{ (Volume)} = M \text{ (Mass)}$$

or

$$D \times V = M$$

Example: Ratio is 80:10 (80 parts resin to 10 parts hardener).
Density of material is .061 per cubic inch (Density).
Item is a rectangle 2" x 10" x 12" which is 240 cubic inches (Volume).

Equation would then be:

$$.061 \text{ (Density)} \times 240 \text{ (Volume)} = 14.64 \text{ lbs. total weight.}$$

To find the proper amount of resin and hardener, use the following formula:

Resin or hardener ratio
divided by total parts
(in this case $80 + 10 = 90$)
multiplied by total weight

so

To find the proper amount of resin using the 80:10 ratio:

$$80 \div 90 \times 14.64 = 13.01 \text{ lbs resin}$$

To find the proper amount of hardener:

$$10 \div 90 \times 14.64 = 1.63 \text{ lbs. hardener}$$

Therefore the ratio is:

13.01 lbs. resin
1.63 lbs. hardener
14.64 total pounds

These weights shown are exact. It is suggested that you mix an excess amount to allow for plastic left in mixing container, risers, runners, etc. being sure the proportions of resin and hardener remain the same ratio.