



## RESIN TRANSFER (RTM) AND COLD COMPRESSION MOLDING

USING EC-440 OR EC-439  
CASTING SYSTEMS

APPLICATION GUIDE

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### STRUCTURAL GUIDE FOR CASTING LOW VOLUME PRODUCTION MOLDS USED FOR THE MANUFACTURING PROCESSES OF RESIN TRANSFER MOLDING (RTM) AND COLD COMPRESSION MOLDING AS COMMONLY PRACTICED BY TOOLING ENGINEERS.

#### PATTERN

The pattern or model must support weight without deflection. Do not assume that the pattern has an adequate positive draft. A minimum positive draft of 3 degrees is needed for rigid cast tooling. It is important to double-check these tolerances.

Any hardware that will be needed on the mold surface (pins, knock-outs, inserts, etc.) must be located firmly against the pattern and encapsulated with the casting system.

Properly prepare your pattern with an appropriate mold release or parting agent such as ADTECH Mold Release MR #1 to release the pattern surface. Follow up with a light spray coat of Adtech Mold Release MR #2 PVA for added insurance.

#### FRAME

A steel perimeter reinforcement frame is welded together. Common frame materials are steel C-BEAM or 3/4" to 1" steel plate. Plan frame dimensions to allow for a 4" to 6" mold flange and a 4" to 6" cast thickness between highest point on the pattern and top of the frame. The 4" formula is generally used when forming shallow depth parts.

Concrete rebar (3/8" or 1/2") is welded into the frame on 10" to 16" spacing, running the length and width of the mold. Spacing of rebar from the mold surface is a minimum of 1". It is important to note that any male detail protruding more than 2" from the general contour needs a rebar structure.

#### TEMPERATURE CONTROL

Maintaining mold surface temperature is generally accomplished by using 1/4" i.d. soft copper tubing spaced on 3" centers across the mold length and manifolded outside the mold into square steel tubing. Spacing of copper lines from mold surface is generally 2" or greater. It is important to note there should be no contact between the copper lines and re-bar. A 1/2" gap is recommended between the two. Also, copper lines should have a light coat of Adtech Mold Release MR #1 applied before casting.

#### SPRUE

The sprue will need to be modified to extend the 4" to 6" casting thickness and will need a durable mechanical locking detail feature.

#### CASTING THE MOLD

1. Catalyze ES-221 and brush coat a 0.015" to 0.020" inch thickness over pattern surface and allow to tack.
2. Repeat step 1 and allow to tack.
3. Thoroughly mix 20 pounds of EC-440 resin with 6 pounds of EC-440 hardener. Blend this mixture with one pail of N-61 Powder Filler (41.6#). Make sure all of the powder is resin coated.

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- Use a portion of this mixture to brush on a generous coating over the ES-221. It is critical to apply this mixture during the tack stage of the ES-221.

NOTE: If a hi-temp epoxy laminate has been used to reinforce the surface the slurry coat should be applied to the laminate during its tack stage to assure a strong chemical bond.

- Lower and align steel perimeter frame on pattern flange and clamp firmly in place. You may need to seal the outside joint with a polyester product such as ADTECH P-26, or a 5 minute epoxy paste adhesive such as ADTECH EA-624 to prevent any leaks of the casting system between the frame/flange joints.
- With the remaining contents of the catalyzed EC-440 / N-61 mixture (from step 3), blend with 50 to 100 pounds of N-6 Coarse Bulk Filler and begin pouring your mold. Do not wait for the coating mixture applied in step #4 to tack.
- Continue to cast your mold using the following batch mixture. Fill the mold to within 1/8" of the frame top. This mixture yields 1.34 cubic feet:

**20# EC-440 resin + 6# EC-440 hardener + 1 pail N-61 Powder (41.6#) + 3 bags/pails (150#) N-6 Bulk Filler.**

Pail batches can be mixed with a heavy duty industrial drill and a pail size Jiffy Mixer. After you have mixed resin + hardener + powder in one pail, divide that mixture equally into 3 empty pails before adding the coarse bulk filler. The easiest way to mix when making large pours is to use a portable concrete mixer.

- When the cast begins to gel you can top off the remaining 1/8" using the EC-440 Resin/Hardener blended with a machineable aluminum grain filler such as ADTECH N-20 Aluminum Grain.
- Post-cure and demold schedules are listed on the EC-440 Product Bulletin.

NOTE: Use your temperature control unit to heat condition the mold internally. Do not oven cure.

### **ESTIMATING MATERIAL USAGE**

#### **Using 5-Gallon Pails:**

1 EC-440 pail resin/hardener kit  
2 pails N-61 powder filler  
6 bags/pails N-6 coarse bulk filler  
**(Total yield = 2.68 cubic feet)**

#### **Using 55-Gallon Drums:**

1 EC-440 drum resin/hardener kit  
22 pails N-61 powder filler  
66 bags/pails N-6 coarse bulk filler  
**(Total yield = 29.5 cubic feet)**

**NOTE: When casting with Adtech Epoxy Casting System EC-439 and N-60 Powder Filler please refer to the EC-439 Product Bulletin for mixing instructions and estimating guide.**

### **PLEASE REFERENCE THE FOLLOWING PRODUCT DATA BULLETINS**

EC-440 Epoxy Mast Cast System (or optional EC-439 Epoxy Mast Cast System)  
N-61 Ceramic Powder Mixture (use N-60 package when casting with EC-439 System)  
N-6 Ceramic Bulk Filler  
ES-221 Black High-Temp Polishable Epoxy Surface Coat  
Mold Releases MR#1 and MR#2