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ABOCAST 4 - 4

TDS 850318

CASTING EPOXY FOR TOOLING

2-COMPONENT MACHINABLE COMPOUND FOR MOLDS, PATTERNS, LARGE AND SMALL CASTINGS

Available with several different hardeners, each with different properties

SUGGESTED USES:

Standard casting compound for **molds or patterns of any size**, that can be machined with common metal working tools, **engraving and reproduction molds**.

Basic casting and adhesive material for **prototypes, fixtures, vacuum-form molds**, blow molds, stretch press dies, **urethane foam molds**, structural and art models, **foundry patterns, core boxes**, hammer forms, drop hammer dies.

Structural and art models, composite structures, multilayer castings, encapsulation molds, infrared barriers, radiation shields, research and analytical embedments.

CHARACTERISTICS of ABOCAST 4-4 and three of the available hardeners:

<u>ABOCAST 4-4:</u>	Metal-filled, high viscosity Epoxy compound. 14 Lbs/Gallon approx.
<u>ABOCURE 50-3:</u>	Low-viscosity, slow room-temperature hardener. 7.8 Lbs/Gal.
<u>ABOCURE 50-12:</u>	Low-viscosity, fast room-temperature hardener. 8.2 Lbs/Gal.
<u>ABOCURE 50-17:</u>	Medium-viscosity, high temperature hardener. 9.8 Lbs/Gal.

Reference diagram (pbw = parts by weight):

ABOCAST 4-4, pbw:	100	100	100
ABOCURE 50-3, pbw:	20		
ABOCURE 50-12, pbw:		5	
ABOCURE 50-17, pbw:			10

Pot life, 1 Lb @ 25°C:	2-3 hrs.	30-45 min.	5-8 hrs.
Curing cycles: (opt: optional post-cure)	8-48 hrs @ r. temp. + opt: 2-4 hrs @ 80-110°C.	2-8 hrs @ r. temp. + (option) 2-4 hrs 80-120° C.	24 hrs @ r. t. + 2 hrs @ 100°C + 2hrs @ 120° + (opt.) 2 hrs @ 150°
Deflection temp.:	65-70°C, after r. t. 93° after postcure	70° after r. t. cure 115° after postcure	120 -130°C 160° after postcure
Hardness, Shore D:	>85	>90	>90
Compressive Strength:	12500 psi	15700 psi	28200 psi
Tensile Strength: Flexural	5200 psi	7200 psi	8400 psi
Strength:	7200 psi	8800 psi	10700 psi
Elongation at break:	3.6%	1.8%	1%
Main advantages:	Easy ratios Long pot life Large castings Low exotherm	Fast. Best rigid, chemical and heat properties of room temperature Standard systems	Longest pot life. Best Properties and largest Casting among Standard systems
Main drawbacks:	Slow for thin castings <1 inch lower chemical resistance	Fast for thick Castings >1 inch Precise ratios	Need heat cure Precise ratios

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The above shown properties are only typical test results, not the maximum or minimum values obtainable. Results depend on numerous user factors that may vary unpredictably: types of molds, mixing methods, ambient temperatures, air entrapment, curing cycles, curing temperatures, mold materials, moisture, inserts, added fillers... For instance, the following averaged parameters are common to the above described materials, but highly influenced by the above mentioned factors:

Shrinkage: 0.001 inches/inch, **Coefficient of Thermal Expansion:** 30-35 x 10⁻⁶, **Thermal Conductivity:** 14-16 x 10⁻⁴, **Water Absorption:** 0.1-0.5% (24-200 hours).

These three systems are described together because the **industry considers them the basic tooling compounds**. They provide the most versatile and reliable answer for most casting projects. Most tooling shops stock at least one of them or their equivalents.

INSTRUCTIONS FOR USE:

ABOCAST 4-4/ABOCURE 50-3 is the **easiest to use** in this series, because the ABOCAST/ABOCURE ratios are variable and not critical. That is: 18 to 50 pbw ABOCURE can be mixed with 100 ABOCAST. The more ABOCURE is used, the more flexible the cured product will be, but at the expense of chemical, heat resistance and hardness. The **slow reactivity and slow exotherm permit large castings**, thicker than 1 inch, even thicker than 5-6 inches in metal molds. On the other hand, thinner sections may take too long to harden without the help of some heating.

ABOCAST 4-4/ABOCURE 50-12 offers the **maximum hardness, chemical and heat resistance obtainable with a room-temperature curing epoxy**. It is a standard for small castings up to 0.5-1 inch thick. Many use it also for large castings by pouring successive layers.

ABOCAST 4-4/ABOCURE 50-17 is the industry's standard for **very high heat and chemical resistance**, high strength and hardness. This system can be used for single-pouring **castings of over 10 gallons**, or thicker than 8-10 inches.

ABOCAST/ABOCURE mixing must be thorough, or "soft spots" may result. Paddles, spatulas or power mixers are all adequate if properly used.

The mold, or pattern, must be coated with a **release agent** like **ABHESIVE 15B** (solvent system) or **ABHESIVE 7902-2** (water system).

The **viscosity** of all 3 systems is like molasses. It can be **drastically reduced by heating** ABOCAST (before blending with ABOCURE) to 40-70°C (104-158°F). This reduces air bubbles. **Vacuum** is also used to eliminate bubbles. **Spraying a light alcohol mist** breaks the bubbles on the cast surface.

Hardening is exothermic (heat generating) and accelerated by heat. Thus, **large castings harden much faster** because they retain more heat, which accelerates the process in a chain reaction. Post curing completes the reaction after hardening and occurs without exotherm. **Heat postcure optimizes the end properties**.

For cleaning tools, surfaces, and diluting the above described materials we recommend the **ABOSOLV** solvent. For non-critical applications, small quantities of it (less than 5-6%) can be used to thin the casting resin, but do not use this method without first testing it for each case.

The above information is the result of accurate laboratory and field tests. However, no guaranty is offered, as uses and applications are beyond our control. Specifications are subject to state-of-the-art changes.