Metkon Application Note

Application: Cold Mounting Applications

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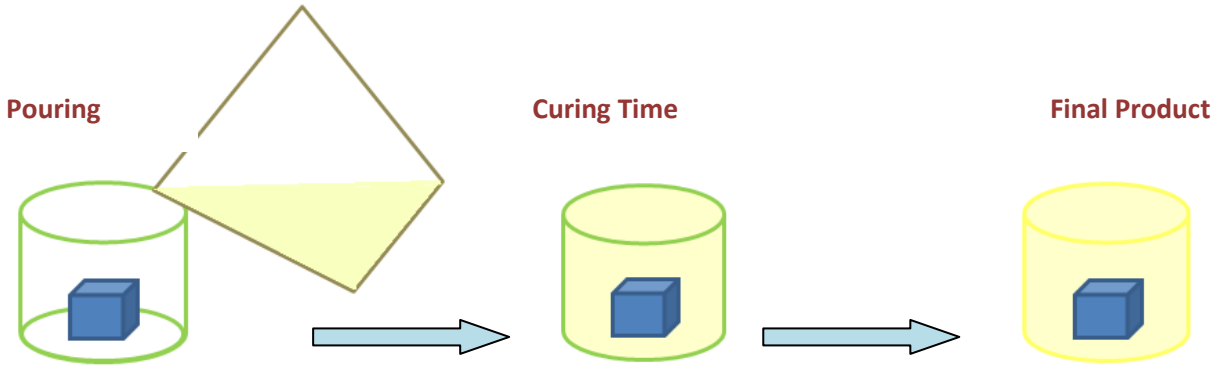
metkon® METALLOGRAPHY

Metallographic specimens are typically "mounted" using a hot compression thermosetting resin. In the past, phenolic thermosetting resins have been used, but modern epoxy is becoming more popular because reduced shrinkage during curing results in a better mount with superior edge retention. A typical mounting cycle will compress the specimen and mounting media to 4,000 psi (28 MPa) and heat to a temperature of 350 °F (177 °C). When specimens are very sensitive to temperature, "cold mounts" may be made with a two-part epoxy resin. Mounting a specimen provides a safe, standardized, and ergonomic way by which to hold a sample during the grinding and polishing operations.

Some examples for cold mounting which can be damaged in hot mounting processes

Cold mounting process, pouring the mixture of powder or liquid mould material and hardener on to sample. When mixture become fully solid and hard, It takes form of mold. Mold can be standart size or different size as requested.

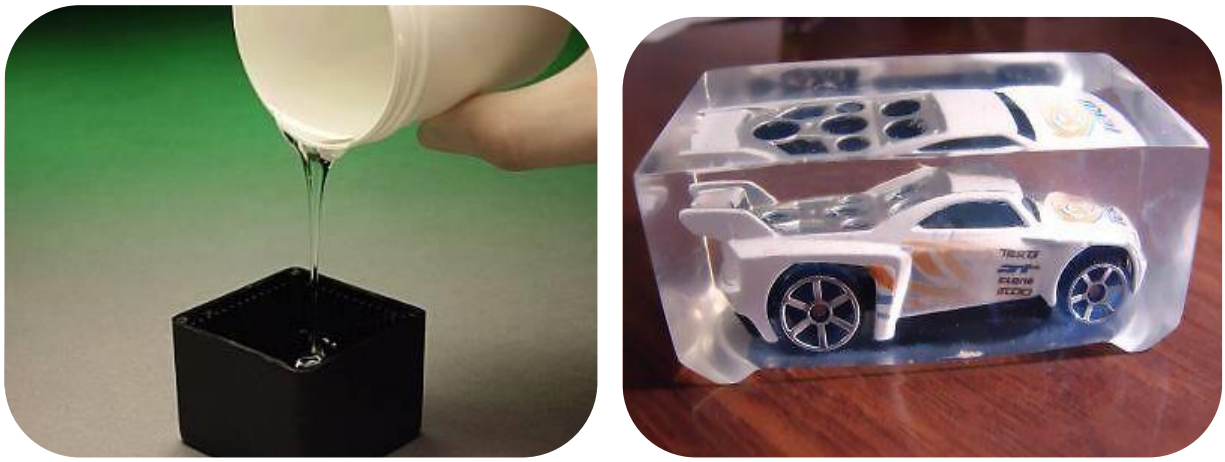


Cold mounting process

Cold molding products in general are separated based epoxy and acrylic. Acrylic products can cure in a short time (~ 10-15 min.) different colors, hardness, properties (transparent, conductive, soluble ... etc.). Exothermic reaction generates heat up to 80 to 100 ° C during the curing process . Therefore, the sample to be molded must ensure that resistance to these temperatures.

Epoxy products have very good adhesion and penetration into the sample as well as the characteristics of the advantages of low curing temperature. However, according to acrylic products, cured in a long time. This value according to the type of epoxy can be from 8 to 16 hours. Epoxy resin mixture curing time can be accelerated and the processing time can be reduced to 2-3 hours by putting a heater on the mold (50-60 ° C).

However, In this method sample should be checked regularly, based on the necessity of mold heater overheating. Otherwise, the curing process will be much faster and air bubbles will occur in the sample which will not have time for way out of sample. In addition, samples can collapse or gaps may occur.



Car toy mounted with epoxy

Long solidification time of epoxy products allows them to penetrate well, especially in the gaps. Molding can be performed under vacuum in order to facilitate this process. In this way, the air bubbles due to the gaps will have been eliminated.

APPLICATION REQUIREMENTS

Cold mounting process is used to mold temperature and the pressure-sensitive or fragile materials.

Cold mounting process is suitable for heat and pressure sensitive ceramics, petrographic and porosity. VACUMET with epoxy resins are used. Slow solidified transparent epoxy material porosity makes it possible to more easily observed.

	Order Code	Description
Equipment Used	25 06	VACUMET
Mould Form	29-555	Ø40 mm. (1pc.)
Consumables& Accessories	GR 0726	Vacumet Consumables Kit
	29-501 + 29-502	**DMT 35** Cold Mounting Pwdr.(1000g)+Hardener(500ml)[Light Green]
	29-513 + 29-514	**DMT CON** Cold Mounting Pwdr.(1000g)+Hardener(500ml)[Black]
	29-515 + 29-516	**DMT ACE** Cold Mounting Pwdr. (1000g)+Hardener(500ml)[Green]
	29-511 + 29-512	**DMT 20** Acrylic Mountin Pwdr.(1000gr) + Hardener(500ml) [Transparent]
	29-505 + 29-506	**EPOCOLD-R/H** Epoxy Resin (1000ml) + Hardener(200ml)

METKON Cold mounting products and some samples

Cold Mounting Process (Epoxy)

Samples to be molded is placed within the mold form. Samples with irregular shapes(too thin or vertical form) can be supported with plastic or metal clip.

5 to 1 ratio of epoxy resin and hardener (5 parts resin 1 part hardener) should be mixed. The resulting mixture is homogenized with gentle stirring so as not to form bubbles provided with a spatula. If it is necessary can be waited until eliminate big air bubbles.

Finally, the sample mixture was poured into the mold form and ready for the Vacumet device.

Samples were placed under vacuum of about 600 mmHg Vacumet devices for 10-12 min. Air bubbles Occur as a result of waiting, during the mixing to burst the bubbles on the surface; vacuum device should be turned off every 2-3 minutes for 5 seconds.

Sudden change in pressure removes air bubbles in the sample and provides a clearer view due to penetration of the resin in the gaps.

Samples removed from Vacumet should be wait for 8 hours at room temperature.If hot working is possible for the sample, oven or hot plate at 50 ° C can reduce curing time to 2 hours.

Cold Mounting Process(Acrylic)

Transactions with epoxy mounting method is substantially the same for acrylic as well. 2 Part acrylic powder (DMT ACE, DMT 35, DMT 20) and 1 Part hardener in liquid form (2 parts of powder 1 by volume) or as DMT CON 1 part powder and 1 part hardener should be mixed for 30 to 60 seconds.

Acrylic products reaction is very fast during the mixing process. when the viscosity of the mixture begins to be decreased, pouring must be done.

The sample should be wait at room temperature for 5-15 minutes until the reaction complete and then sample will be ready.

COLD MOUNTING

Mounting Material:	Curing Time:	Compounds:	Mixing Ratio Volume:	Mixing Time:	Peak Temperature:	Color:
EPOCOLD	8 Hour	Two liquids	Resin: 5 Part - Hardener: 1 Part	3 Min.	40-60°C	Clear, Transparent
DMT 20	10 Min.	Powder/Liquid	Resin: 2 Part - Hardener: 1 Part	4-5 Min.	80-87°C	Semi Transparent
DMT 35	5 Min.	Powder/Liquid	Resin: 2 Part - Hardener: 1 Part	2-3 Min.	75-80°C	Light Green, Black
DMT CON	18 Min.	Powder/Liquid	Resin: 1 Part - Hardener: 1 Part	5 Min.	100-105°C	Black
DMT ACE	6 Min.	Powder/Liquid	Resin: 2 Part - Hardener: 1 Part	6 Min.	82-88°C	Green, Transparent

The samples obtained by the mounting process are shown below.

EPOCOLD

Epoxy Resin;

Curing Time ~8 hours

Color: Transparent

DMT CON

Acrylic

Curing Time ~20 mins.

Color: Black

DMT 35

Acrylic

Curing Time ~5 mins.

Color: Light Green

DMT ACE

Acrylic

Curing Time ~6 mins.

Color: Green Transparent

DMT 20

Acrylic

Curing Time ~15 mins.

Color: Half Transparent

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