

CLEARWAY PLASTICS Limited

vinamold[®]

**Hot Melt
Compounds**

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INTRODUCTION

Vinamold Hot Melt Compounds are meltable vinyl compositions used for the preparation of flexible moulds as alternatives to silicone rubbers, polyurethanes, and rubber latex, in the casting of concrete, gypsum, polyester resins and glass fibre laminates. Because **vinamolds** are essentially craft materials, few tools and only simple equipment are required. Once the behaviour of **vinamold** is understood, skill in producing even complicated moulds is rapidly acquired. In use **vinamold** is melted by heating, poured over the article to be copied, then allowed to cool.

GRADES AVAILABLE

For identification purposes **vinamold** is supplied in different colours – yellow, white, red and blue. The 4 colours represent 3 different hardnesses (flexibilities): yellow is the hardest, red the softest, and white/blue intermediate. Where there is a possibility of pigment migration into a light coloured article from red **vinamold**, the same grade is available unpigmented. Differences between the 4 **vinamold** types can be summarised as:

Yellow:

Melting temperature 150–170°C (302–338°F). Pouring temperature 140–150°C (284–302°F).

Use:

a) where extremely thin sections are involved which could droop under their own weight.

b) where large moulds are required which should not deform under their own weight. The greater hardness of yellow **vinamold** minimises deflection in a) and creep in b).

White:

Melting temperature 170°C (338°F). Pouring temperature 170°C (338°F).

Use:

Combining flexibility with toughness, for moulds to be used in making concrete articles. Has best resistance

to damage through rough treatment. For polyester resin casting, white **vinamold** is preferred to the other types on account of its better resistance to heat rise (exotherm) during setting (cure) and reduced attack by the fire retardant additives present in some polyester resins.

Red (and Natural):

Melting temperature 150–170°C (302–338°F). Pouring temperature 140–150°C (284–302°F).

Use:

General purpose type, and for glass fibre reinforcement (GRP) laminates.

Blue:

Melting temperature 150–170°C (302–338°F). Pouring temperature 140–150°C (284–302°F).

Use:

General purpose medium flexibility.

GENERAL PROPERTIES AND PRECAUTIONS

(See "Safety Notes")

Volume/weight relationship. For calculation purposes the specific gravity of all 4 **vinamold** grades may be taken as 1.0, so that 1kg equals 1 litre, or 1 lb equals 27.5 cu. ins.

Re-use. Unlike some other flexible mould materials, **vinamolds** are thermoplastic, that is to say they melt on heating and re-melt on re-heating. Worn or obsolete moulds may therefore be cleaned and re-used many times over, an obvious economic advantage.

DIMENSIONAL STABILITY

Water. **Vinamold** materials are not affected by water nor by high humidity.

Temperature. Maximum ambient temperature 80°C (176°F).

Storage Life. Unused materials – indefinite. Moulds – many months, subject to careful handling.

Mould Surface Fidelity. Exceptionally fine detail is possible.

Mould Surface Durability. Depends on careful handling and fineness of surface detail. The number of times a mould can be used may be as many as 100.

Resistance to Solvents. Fine surface detail will be damaged by exposure to organic solvents especially acetone, MEK, tetrahydrofuran, benzene, xylene and toluene. Many adhesives, paints, and paint removers use such solvents.

Resistance to Detergents. For cleaning dusty mould surfaces detergents should be well diluted. Strong detergents may extract some of the mould release agents incorporated in the **vinamold**.

Mould Lubrication. Generally the lubricants incorporated in **vinamold** are sufficient. Additional lubricants, if used should first be tested to ensure that no surface damage is likely to occur.

Miscibility of Vinamold Grades. All grades are miscible in any proportions to arrive at intermediate flexibilities.

Physical Form. 25 kg slabs.

MELTING VINAMOLD

The more care and control exercised in melting **vinamold** the more times the material can be re-used. The thermostatically controlled melting equipment described in leaflet HMC-05 is preferred.

Alternative simple melters can be constructed in the form of air or sand baths, utilising vessels (for example cans) one inside the other with a gap all round of at least 12.5mm (½ in.). It is recommended to restrict the volume of melted **vinamold** in these simple devices to 5 kg (11 lbs.).

Under no circumstances should oil be used in place of sand or air – hot oil can cause serious burns and can easily ignite.

Whether thermostatic or simple melters are used the practice for melting is the same – cut the material into small pieces, melt a small quantity, then add further pieces, melt these, add more pieces and so on.

Excessive fumes during melting indicate overheating which will be followed by discolouration of the **vinamold**, and eventual decomposition to a charred and unusable state.

MOULD MAKING

There are essentially 3 types of mould for which **vinamold** can be used:

- A. Open moulds for flat articles.
- B. One part moulds for simple non-flat articles.
- C. Two part moulds for complex articles.

For ease in understanding the mould making descriptions, the various terms are defined:

Master. The original article which it is desired to copy.

Replica. A copy of the master. Several replicas may be used to simultaneously make a number of **vinamold** moulds for quantity production.

Casting. The final article taken out of the **vinamold** mould, made from concrete, gypsum, etc.

Wall. Raised part of an open mould which decides the final area and depth of the mould.

Case. A container for the **vinamold** mould, designed to give support to prevent distortion during the eventual casting process.

Cone Funnel. Device for pouring melted **vinamold** steadily into the mould cavity. Typical proportions for a cone funnel – top opening diameter 1, bottom exit diameter 0.5, height 3 – 6.

Riser. It is necessary to be sure that the mould cavity has completely filled, the most positive means being a visual check. For this purpose a riser is incorporated in the mould system to allow melted **vinamold** to fill the mould then rise to a level as high as, or slightly higher than the top of the mould cavity. The riser may be a simple hole in the top of the case but is preferably a second cone funnel placed opposite the one used for filling. Melted **vinamold** fills the first cone funnel, then the mould, then rises up the second funnel. Pouring is stopped when the **vinamold** can be seen to have risen high enough.

Air Vents. Holes which allow air to escape from the highest points in the mould cavity, so ensuring **vinamold** fills mould cavity 100%. Air vent diameter minimum 3mm (1/8 in.).

Mould Cavity. The space between the master or replica, and the wall (or case). Equivalent to the **vinamold** mould mass.

Register. The two halves of a split mould must fit together perfectly to prevent the final article exhibiting the effects of misalignment. When the halves match 100% they are said to be registered. A means of assuring this is by the use of pins, pegs or other register devices on one part of the mould case, which locate into matching holes or depressions in the other part of the mould case.

Guides. Pins or pegs in one part which fit into corresponding pockets, rings, sleeves, or holes in the second part to ensure register of a two part mould.

A. OPEN MOULD

For the production of gypsum ceiling tiles, concrete paving slabs, concrete commemorative plaques and decorative features (e.g. bank emblems) in bas-relief or high relief.

Step 1. Fix master or replica on a flat board.

Step 2. Using clay, wood or other suitable medium make a wall all round 25mm (1 in.) higher than the highest point of the master/replica. Depending on the proportions of the master/replica leave a space of from 25mm (1 in.) to 150mm (6 in.) all round between the wall and master.

Step 3. Pour melted **vinamold** slowly and steadily over the master/replica until level with the top of the containing wall.

Step 4. Leave 8 hours to cool.

Step 5. Lift the **vinamold** mould carefully off the master and turn over.

Note: For convenience in handling make a box round the **vinamold** mould.

The mould is ready for use.

B. ONE PART MOULD

For the production of concrete building components; bollards; simple animal/human figures in gypsum; pre-production samples in polyester resin etc.

Step 1. Secure master/replica on a base board.

Step 2. Cover master/replica in clay to a thickness of about 20mm (¾ in.). The clay represents the thickness of the final **vinamold** mould i.e. the mould cavity.

Step 3. Using gypsum reinforced with hessian, or polyester reinforced with glass fibre, build up a case of a suitable thickness relative to the size of the master/replica (up to 25mm/1in.) incorporating a fixing flange (see Step 4) and allow to set. Mark position of case on base board.

Step 4. Remove case and extract all the clay. Return case to pre-marked position on base board and fix down with screws, bolts etc., through fixing flange.

Step 5. Remove case from base board and prepare case with 2 (minimum) cone funnels by making holes 25–50mm diameter as near base board level as practicable. Cone funnel holes should be opposite each other, or equispaced if more than 2. Height of the funnels must be such that filling and riser funnels will level at about 150mm (6 in.) above the highest point of the mould cavity. The cone funnels should, of course, be tight fits in the entry/riser holes in the case to prevent leakage of molten **vinamold** during filling. Depending of complexity the cavity should be provided with air vents, one at the uppermost point at each part of the cavity.

Step 6. Pour **vinamold** slowly and steadily to prevent air bubbles entering and causing porosity in the mould. Air should dissipate back through the filling cone funnel. When **vinamold** is seen to be flowing out of the air vents these should be plugged to prevent unnecessary spillage. Stop pouring when **vinamold** fills all funnels.

Step 7. Allow to cool for 8 hours.

Step 8. Pull out cone funnels, cut off **vinamold** at entry/riser holes. Remove case, mould, and master/replica, leave **vinamold** in case.

The mould is ready to use.

C. TWO PART MOULD (SPLIT MOULD)

For the production of statuettes, busts, complex technical articles.

Step A. Select natural plane(s) (vertical, horizontal, diagonal or combination) along which to split the mould.

Step B. Follow Steps 1 – 7 as for one part mould, to make first part as far as selected split line.

Step C. Plan register and guide pin system, then support first part in a convenient position. Repeat procedure to Step 3 as for one part mould, incorporating register system. Apply release agent to glass fibre edge.

Step D. Again follow Steps, 4, 5, 6, 7 described for one part mould. After removing clay (Step 4 – one part mould) treat first **vinamold** surface with release agent – talc or shellac.

Step E. Separate mould parts, remove master/replica.

Step F. With reference to the master/replica, select and make a hole at the most appropriate (concealed) position through which to fill the mould with gypsum, concrete etc., and the best attitude (angle) for mould filling.

Step G. Fill mould, allow to set and check for air entrapment. Provide air vents as indicated.

CORRECTION OF VINAMOLD MOULD FAULTS

Small faults, due to air bubbles, tears, or deficiencies in the master, can be corrected by carefully touching up with a hot blade. Small pieces of **vinamold** can be fused into the mould surface to take up cavities.

PREPARATION OF MASTERS

N.B. If a Master is rare, valuable, or delicate take extra care in Sealing and Pre-warming. If in doubt as to the possible effect of sealing materials or heat please consult us. We will advise you to the best of our ability, but we can accept no responsibility for damage to masters howsoever caused.

Porous Dry Clay or Gypsum. Seal surface*.

Wood. Experiment with surface sealer*. Epoxy resin may be used as a sealer to prevent bubble formation in **vinamold** due to air and moisture from the wood.

Concrete or Stone. Fill pores by soaking with water. Allow surface to dry superficially prior to pouring **vinamold**.

Metal. No sealing is necessary. A thin film of mineral or vegetable oil will facilitate removal from the **vinamold**.

Porcelain and Glass. Carefully pre-warm to prevent breakage when **vinamold** is poured over the masters.

Clay. (Modelling or Natural). No preparation needed.

GRP. Pre-heat for 30–60 minutes at 30–40 C° (80–100°F) to ensure full cure and freedom from volatiles.

EXAMPLES OF APPLICATIONS FOR VINAMOLD HOT MELT COMPOUNDS

Construction Industry

Prefabricated concrete panels.
Decorative panels, coats-of-arms, company emblems.

Interior Decoration

Ceiling and wall embellishments - patterns, cornices, friezes.

Period decorative effects – furniture, mirror surrounds.

False beams; wood, stone, and brick simulation panels.

Doors, plaques, armorial crests. Especially effective in bronze and aluminium filled polyester resins.

Suspended ceiling, acoustic and thermal insulating tiles.

Used in homes, bars, restaurants, hotels, banks, ships' saloons, civic buildings, colleges, etc.

Tourist Souvenirs

Replicas of antique items, figurines, doll heads, masks, historical replicas.

Educational/Museums/Arts and Crafts

Three dimensional topographical maps, biology models, sculpture replicas, fossil casts.

Some more unusual applications of **vinamold** are in life-size human figures, utilising the flesh-like consistency of the material; isostatic pressure transfer (acting as a solid hydraulic medium).

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