

## Dalchem - Alpha Gypsum System

**Preparation:** Dalchem Alpha Gypsum is a versatile gypsum based polymer system that has superior physical performance characteristics

**Properties:** The mix ratio of Alpha System is a convenient 2 or 3 parts of gypsum to 1 part polymer by volume or weight depending on thickness required.

Alpha System is easy to use and can be cast solid, laid up by hand with chopped fibre or sprayed. Fully cured pieces can be painted, sanded, machined and polished. Alpha System can be used to make lightweight pieces that are very strong and water-resistant. The finished parts are also flame resistant.

**Applications:** Making architectural elements, reproducing sculpture and special effects. Vibrant colors are possible by adding pigments. Metal powders (bronze, pewter, brass, etc.) can be added to give the look of real metal castings at a fraction of the cost. You can duplicate the look of marble or ceramic by adding inexpensive fillers.

Crushed stone can be added to simulate the effect of carved stone (sand blasting or abrading required).

<b>Colour:</b>	White
<b>Specific Gravity:</b>	1.6 gms./cc
<b>Pot Life</b>	25 minutes if mechanically mixing*. 45 minutes if mixing by Hand
<b>Demould Time:</b>	60 minutes (depending on mass and environmental temperature).
<b>Application:</b>	Optimum @ 25°C
<b>Mix Ratio:</b>	2:1 by Volume or by weight (More gypsum will thicken the mixture if needed)
<b>Shelf life:</b>	12 month from Date of Manufacture
<b>Tensile strength</b>	232 – 387 kgs./cm <sup>3</sup>





<b>Impact Resistance</b>	12.3 cm.kg/cm.2
--------------------------	-----------------

<b>Flexural Strength</b>	527 - 689 kgs./cm.3
--------------------------	---------------------

**Water Absorption:** 0.25% weight after 24 hour water soak.

Values were obtained using FGR 95 and Alpha D8812 polymer. Maximum values were obtained using up to 14% glass fibres. Values were obtained after 14 day air cure.

**Step 1** – Shake or Stir D8812 polymer liquid well. Dispense the required amount into mixing container.

**Step 2** – Add required amount of gypsum powder (twice or three times the volume of D8812) into measuring container.

**Step 3** – Using a power mixer (drill with a “jiffy mixer” available from Dalchem, mix until dry powder is thoroughly dispersed into D8812. Minimum 60 seconds and when lumps disappear). Mixture should have a creamy consistency. Pot life will be about 25 minutes. If hand mixing with a paddle, mix vigorously until lumps disappear and mixture takes on a creamy consistency. Pot life will be about 45 minutes.

**Note:** Using a power mixer is easier and gives better results than hand mixing.

After thoroughly mixing components, the mixture is ready to be poured into a mould. For best results: Pour mixture in lowest point and let mixture seek its level.

#### **For Open Faced Moulds That Are Highly Detailed:**

1. Brush a face coat of mixed material onto the surface of the mould. This helps to break surface tension and ultimately reduce air bubbles.

2. After a face coat is applied, the remaining mixture is slowly poured into the mould. Be aware of your working time – allow for enough time to apply surface coat and pour remaining material.

Air bubbles are sometimes a concern with polymer-modified gypsums and will vary depending on conditions.

#### **There are additional steps you can take to help reduce entrapped air:**

1. Vacuuming Material – (Requires a Vacuum Chamber and Vacuum Pump) - Prior to pouring material into mould, place mixing vessel in vacuum chamber and subject mixture to 29 hg vacuum for 1 minute. Mixture will bubble, rise, break and fall. After mixture falls, remove from chamber and pour into mould.

2. Pressure – (Requires Pressure Vessel and Compressor) - After mixture is poured into mould, place mould in a pressure vessel and subject mixture to 4.2 kg/cm<sup>2</sup> air pressure for one hour.

This product can be used to make architectural components. With the addition of fibreglass matting or chopped fibres, “lay up” to make elements that are thin, lightweight and exceptionally strong. For exterior use, apply a sealer or paint the part.

Chopped fibreglass is most commonly used for this application. Chop Strand Mat is most commonly used for making large architectural panels.

**Hand Lay up Using Fibreglass Matting**, Mix Alpha System and brush a surface or “gel” coat into a mould. Let cure 15 – 20 minutes or until Alpha System gels.

Mix another batch and dip fibreglass matting into liquid. Squeeze out excess and lay over previous layer.

After a uniform coating is attained, apply another layer of matting and brush again. Apply a minimal amount of Alpha System – just enough to wet out the surface. Repeat as necessary until (1 cm.) thickness is achieved.



The composite mixture over the face mix should have a minimum thickness of 1 cm, and contain 5% - 10% glass fibre reinforcement.

If More Working Time Is Required, Alpha System can be slowed with the addition of a retarder.

Contact Dalchem for more information: [sales@dalchem.com.au](mailto:sales@dalchem.com.au)

Another technique for making strong, lightweight elements is to mix chopped fibre directly into the Alpha System, chopped fibre takes much less time than layering chopped strand mat.

**How to Proceed:** An accurate gram scale to weigh components is necessary. The chopped fibre is added as a percentage of the total weight. Fibre can be added in concentrations of 3% to 12%. For best results, 6% chopped fibre should be added. Mix Alpha System and brush a surface or "gel" coat into mould. Let cure 15 - 20 minutes or until material gels. Next, weigh out 100 Parts of gypsum powder, 50 Parts of D8812 liquid and 9 parts of chopped fibre.

Mix all parts thoroughly and apply mixture with gloved hand or spatula over gel coat. Another application may be required to achieve 1 cm thickness.

**Sealing Elements For Outdoor Display** - Parts made with the Dalchem Alpha System are not recommended for long term external exposure. Contact Dalchem for more information on sealing parts and the use of moisture resistant additives

**Reproducing The Look Of Metal** - (bronze, brass, copper, etc.) Alpha System allows you to achieve the look of a real bronze at a fraction of the cost. For making solid castings, the following proportions will work well. Bronze powder should be pre-mixed with the gypsum powder prior to mixing. Adding a dark pigment (black or dark brown) to the dry mix will also give the final casting added definition and dimension. Parts by Weight: Gypsum (100 Parts) + Metal Powder (150 Parts) + D8812 (50-70 Parts)

Suitable metal powders (bronze, copper and brass) are available from Dalchem.

Mix a small initial batch and brush mixture as a gel coat over mould surface. Let cure for 15 - 20 Minutes. Mix a second batch without bronze powder (Standard Mix). Dip fibreglass matting into liquid. Squeeze out excess and lay over previous layer. Repeat until 1 cm thickness is attained.

**Post Finishing** - To bring out the metallic finish, buff with steel wool or sand paper (400 grit). Patina coloring can then be done using cupric nitrate (green) or ferric nitrate (yellow). Casting should then be sealed with wax or clear acrylic spray to prevent oxidation.

**Reproducing the look of real stone** - Mixing in washed river sand, powdered granite or other aggregate will create realistic stone effects (with appropriate post-finishing techniques). Parts by Weight: Mix Gypsum (100 Parts) + Sand/Granite (200 Parts), D8812 (50 Parts)

Mix a small initial batch and brush mixture as a gel coat over mould surface. Let cure for 15 - 20 Minutes. Mix a 2nd batch using no sand - (Standard Mix). Dip fibreglass matting into liquid. Squeeze out excess and lay over previous layer. Repeat until 1 cm thickness is attained.

**Post Finishing** - To bring out the stone finish, buff with wet Scotchbrite abrasive pad. Sandblasting will also work well.