



# NEO<sup>™</sup>

## Gypsum-based Casting System

### Product Overview

duoMatrix<sup>™</sup> NEO<sup>™</sup> is a new gypsum based polymer system that has superior physical and performance properties compared to regular gypsum products. It is an easy-to-use version of our popular Matrix-G product, with the dry components (PART A) “pre-measured” for easy measuring and mixing with PART B – latex liquid. The mix ratio of NEO<sup>™</sup> is a convenient 2A:1B by volume.

duoMatrix<sup>™</sup> NEO<sup>™</sup> is easy to use and can be cast solid, laid up by hand with chopped fiber or sprayed. Fully cured pieces can be painted, sanded, machined and polished. duoMatrix<sup>™</sup> NEO<sup>™</sup> can be used to make lightweight pieces that are very strong and water-resistant. NEO<sup>™</sup> is also flame resistant (*UL-94V-O Flame Rated*). Applications include 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).

### Technical Overview

<b>Mix Ratio:</b> 100 Parts A (Powder) to 50 Parts B (liquid) by weight or volume.	<b>Color:</b> White
<b>Pot Life:</b> 6 minutes if mechanically mixing*. 15 minutes if mixing by hand (at room temperature – depending on mass). *See step three of the “Mixing” Section.	
<b>Demold:</b> 60 minutes (depending on mass and environmental temperature).	
<b>Density:</b> 99 lbs./ft. <sup>3</sup> (1.584 gms./cc)	<b>Compressive Strength:</b> 6,500 – 9,500 psi (457 - 668 kgs./cm. <sup>3</sup> )
<b>Specific Volume:</b> 17.45 cu. in./lb.	<b>Freeze/Thaw Resistance:</b> 300 cycles
<b>Tensile Strength:</b> 3,300 – 5,500 psi (232 – 387 kgs./cm. <sup>3</sup> )	<b>Flexural Strength:</b> 7,500 – 9,800 psi (527 - 689 kgs./cm. <sup>3</sup> )
<b>Impact Resistance:</b> (175 in.lb./in. <sup>2</sup> (12.3 cm.kg/cm. <sup>2</sup> ))	<b>Water Absorption:</b> 0.25% weight after 24 hour water soak.

Values were obtained using United States Gypsum FGR 95 Alpha Gypsum. Maximum values were obtained using up to 14% glass fibers. Values were obtained after 14 day air cure.

**DO NOT ALLOW PART B - LATEX TO FREEZE!!** Material that has frozen will appear as a gel. Do not use.

### Preparation

**Environment** - Materials should be stored and used in a warm, dry environment (72° F / 23° C). Colder temperatures will slow the working/cure time, while warmer temperatures will reduce working times. Humid conditions will cause PART A components to lose effectiveness. **DO NOT ALLOW PART B - LATEX TO FREEZE!!** Material that has frozen will appear as a gel. Do not use and discard.

**Mold Preparation** - If casting or laying up into a urethane rubber mold, first apply a release agent such as Universal Mold Release or Ease Release 200, or, if the casting is to be painted, use Ease Release 1700 as the release agent to the mold surface. Maxtrix NEO may be released from wood or from another Matrix surface using Sonite<sup>™</sup> Wax or Vaseline. If using a silicone rubber mold (Mold Max Silicone), the rubber does not require any advance preparation.

## *Dispensing*

## *Mixing*

To minimize dust inhalation, we recommend that you **wear a NIOSH approved dust mask** while weighing and mixing components. Use only clean, dry measuring and mixing vessels and stirring utensils.

**Step 1** – Shake or Stir Part B – liquid latex well. Dispense required amount into mixing container.

**Step 2** – Dispense required amount of Part A – Powder (twice the volume of Part B) into measuring container. Gradually sift powder contents into Part B – liquid latex.

**Step 3** – Using a *power mixer* (drill with a “jiffy mixer” or “squirrel cage” mixer attachment available from your local hardware store), mix until dry powder is *thoroughly dispersed* into latex (min. 60 seconds) and lumps disappear - mixture should have a creamy consistency. Pot life will be about 6 minutes. **If hand mixing** with a paddle, mix *vigorously* until lumps disappear and mixture takes on a creamy consistency. Pot life will be about 12 minutes.

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

## *UL-94V-O Flame Rating Compliance*

In order to meet UL-94V-O flame resistance requirements, **NEO<sub>tm</sub>** components should be mixed 100A:40B by weight using an accurate gram scale. Combine components as directed above.

## *Pouring Methods*

After thoroughly mixing components, the mixture is ready to be poured into a mold. For best results:

Pour mixture in lowest point and let mixture seek its level.

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

1. Brush a face coat of mixed material onto the surface of the mold. 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 mold. Be aware of your working time – allow for enough time to apply surface coat and pour remaining material.

## *Further Reducing Entrapped Air . . .*

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** – Required: Vacuum Chamber and Vacuum Pump - Prior to pouring material into mold, 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 mold.
2. **Pressure** – Required: Pressure Vessel and Compressor. After mixture is poured into mold, place mold in a pressure vessel and subject mixture to 60 PSI (4.2 kg/cm<sup>2</sup>) air pressure for one hour.

## ***Making Architectural Elements – Hand Lay-Up Technique***

This product can be used to make architectural elements - both interior and exterior. With the addition of glass fibers in the form of fiberglass matting or chopped fibers, can be “laid up” to make elements that are thin, lightweight and exceptionally strong. For exterior use, applying a sealer or painting the element is recommended.

Chopped fiberglass (such as Matrix Chopped Glass available from Smooth-On or your Smooth-on distributor) is most commonly used for laying good for this application. Chop Strand Mat (3/4 ounce or 22 gram available at a fiberglass supply house) is most commonly used for making large architectural panels.

### **Hand Lay Up Using Fiberglass Matting . . .**

Mix duoMatrix<sub>tm</sub> NEO<sub>tm</sub> and brush a surface or “gel” coat into a mold. Let cure 15 – 20 minutes or until duoMatrix<sub>tm</sub> NEO<sub>tm</sub> gels.

Mix another batch and dip fiberglass 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 duoMatrix<sub>tm</sub> NEO<sub>tm</sub> – just enough to wet out the surface. Repeat as necessary until 3/8” (1 cm.) thickness is attained.

The composite mixture over the face mix should have a minimum thickness of 3/8” (1 cm) and contain 5% - 10% glass fiber reinforcement.

***If More Working Time Is Required, Matrix<sub>tm</sub> “Retarder” is available for extending the working time.***

### **Hand Lay Up Technique Using Chopped Glass**

Another technique for making strong, lightweight elements is to mix chopped fiber directly into the duoMatrix<sub>tm</sub> NEO<sub>tm</sub> standard mix. Generally, 3/4” “AR” grade chopped fiber works best. “E” grade can also be used. Adding chopped fiber takes much less time than layering chopped matting.

**How To Proceed . . . An accurate gram scale to weigh components is necessary.** The chopped fiber is added as a percentage of the total weight. Fiber can be added in concentrations of 3% to 12%. For best results, 6% chopped fiber should be added.

Mix duoMatrix<sub>tm</sub> NEO<sub>tm</sub> and brush a surface or “gel” coat into mold. Let cure 15 – 20 minutes or until material gels. Next, weigh out 100 Parts of Part A powder, 50 Parts of Part B – latex liquid and 9 parts of chopped fiber. Mix all parts thoroughly and apply mixture with gloved hand or spatula over gel coat. Another application may be required to attain 3/8” (1 cm) thickness.

### **For Exterior Use, Apply A Sealer . . .**

Because duoMatrix<sub>tm</sub> NEO<sub>tm</sub> system substantially reduces the water absorption rate (0.25%) of alpha gypsums, elements made with duoMatrix<sub>tm</sub> NEO<sub>tm</sub> are suitable for exterior use. Elements must, however, be sealed with a suitable sealer such as "Thorough Seal" brand sealer or Sherwin Williams "Terrazzo Sealer". Elements can also be painted with an outdoor acrylic paint.

## Making “Cold Cast Bronze” Elements

Reproducing the look of bronze is a common application for duoMatrix<sub>tm</sub> NEO<sub>tm</sub> because you can achieve the look of real bronze at a fraction of the cost. For making solid castings, the following proportions will work well. -325 mesh bronze powder is recommended and should be pre-mixed with duoMatrix<sub>tm</sub> NEO<sub>tm</sub> Part A – Powder prior to adding Part B - Latex. **An accurate gram scale is necessary.** *SO-Strong Tints* – Adding a dark pigment (black or dark brown) to the dry mix will give the final casting added definition and dimension.

### Parts By Weight

Part A Powder	+	Bronze Powder	+	SO-Strong Pigment	=	Mix Thoroughly	+	Part B Latex
100		150		0.25		-		50 – 70*

[\*50 parts latex for a brush-on consistency and 70 parts latex for pourable consistency]

Metal powders (bronze, copper and brass) are available from Smooth-On or your Smooth-On distributor.

Mix a small initial batch using 50 parts latex and brush mixture as a gel coat over mold surface. Let cure for 15 – 20 minutes. Mix a 2<sup>nd</sup> batch using no bronze powder – 2A:1B. Dip fiberglass matting into liquid. Squeeze out excess and lay over previous layer. Repeat until 3/8” (1 cm.) thickness is attained.

**Post Finishing** - To bring forth 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.

## Making Stone-Like Elements

Reproducing the look of real stone is also a common application. Mixing in play sand (sand sold for children’s playgrounds), powdered granite or other aggregate will yield realistic stone effects (with appropriate post-finishing technique). As an example, the following is offered using common play sand. Again, an accurate gram scale is necessary.

### Parts By Weight

Part A Powder	+	Playsand	=	Mix Thoroughly	+	Part B Latex
100		200		-		50

Mix a small initial batch using 50 parts latex and brush mixture as a gel coat over mold surface. Let cure for 15 – 20 minutes. Mix a 2<sup>nd</sup> batch using no sand – 2A:1B. Dip fiberglass matting into liquid. Squeeze out excess and lay over previous layer. Repeat until 3/8” (1 cm.) thickness is attained.

**Post Finishing** - To bring forth the stone finish, buff with wet Scotchbrite<sub>tm</sub> abrasive pad. Sandblasting will also work well.

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