NEO®

Polymer Modified Gypsum

UL-94V-O Flame Rated

Product Overview

duoMatrix® **NEO®** is a versatile polymer modified gypsum system that has superior physical and performance properties compared to regular gypsum products. Part A is a powder and Part B is a liquid. The mix ratio of **NEO®** is a convenient 2A:1B by volume.

duoMatrix® **NEO®** 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® **NEO®** can be used to make lightweight pieces that are very strong and water-resistant. NEO® also conforms to the Underwriter Laboratories guidelines for flame resistant materials and has received a flame rating of ***UL-94V-O.***
Applications include making architectural elements, reproducing sculpture and creating theme effects. Coloring material is possible by adding concrete iron oxide powder 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

Mix Ratio: 100 Parts A (Powder) to 50 Parts B (liquid) by weight or volume. **Color**: White
Pot Life: 6 minutes if mechanically mixing*. 15 minutes if mixing by hand (at room temperature).
*See step three of the "Mixing" Section.
Demold: 60 minutes (depending on mass and environmental temperature).

Density: 99 lbs./ft.^{3} (1.584 gms./cc)
Specific Volume: 17.45 cu. in./lb.
Tensile Strength: 3,300 – 5,500 psi (232 – 387 kgs./cm^3)
Impact Resistance: (175 in.lb./in.^{2} (12.3 cm.kg/cm.^{2})
Compressive Strength: 6,500 – 9,500 psi (457 - 668 kgs./cm.^{3})
Freeze/Thaw Resistance: 300 cycles
Flexural Strength: 7,500 – 9,800 psi (527 - 689 kgs./cm.^{3})
Water Absorption: 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 / 22° 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. This product has a limited shelf life and should be used as soon as possible. **Because no two applications are quite the same, a small test application to determine suitability for your project is recommended if performance of this material is in question.** Wear safety glasses, long sleeves and rubber gloves to minimize contamination risk.

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® Wax or Vaseline. If using a silicone rubber mold (Mold Max® Silicone), the rubber does not require any advance preparation.

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®** 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/cm2) 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 "layed 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® **NEO**® and brush a surface or "gel" coat into a mold. Let cure 15 – 20 minutes or until duoMatrix® **NEO**® 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® **NEO**® – 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® NEO® can be slowed by adding a retarder. Contact Smooth-On technical department for more information: sales@smooth-on.com

Hand Lay Up Technique Using Chopped Glass

Another technique for making strong, lightweight elements is to mix chopped fiber directly into the duoMatrix® **NEO**® standard mix. Generally, ¾" "AR" grade chopped fiber works best. "E" grade can also be used. Adding chopped fiber takes much less time than layering chopped matte.

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® **NEO**® 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.

Slowing NEO® With Matrix Retarder - You can extend the working time of NEO® by adding a very small amount of ***"Matrix® Retarder"*** to the mix. For best results, the retarder must be added to water, mixed well and then pre-mixed with NEO® – Part B (liquid) before mixing with Part A (powder).

Step 1: Make A Liquid Concentrate: Add 1 teaspoon of Matrix® Retarder to 1-cup water and mix well.
Step 2: Add 1 teaspoon of **Concentrate** to Part B - liquid and mix well.
Step 3: Add Part A – powder as directed above

Guide: Add 1 teaspoon of concentrate for every pound (0.45 kg.) of total NEO mix – A+B.

If "drill" mixing - this method will extend the working time from about 6 minutes to 45 minutes.
Demold time will slowed from 1 hour to 4 hours.

Sealing Elements For Outdoor Display - Because duoMatrix® **NEO**® system substantially reduces the water absorption rate (0.25%) of alpha gypsums, elements made with duoMatrix® **NEO**® 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.

Reproducing The Look Of Metal (bronze, brass, copper, etc.) is a common application for duoMatrix® **NEO**® 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® **NEO**® 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 2nd 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 2nd 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*™ abrasive pad. Sandblasting will also work well.

Tel. (610) 252-5800 Fax. (610) 252-6200 Website: www.smooth-on.com

duoMatrix, Inc. * 2000 Saint John St. * Easton, PA. 18042 * USA 030109