



# MADISON CHEMICAL INDUSTRIES INC.

## APPLICATION INSTRUCTION BULLETIN

### **GEMTHANE® “S”**

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## INTRODUCTION

Madison's GemThane® “S” is a “Single-Component-Plus-Catalyst” polymer designed to be used as a heavy duty industrial coating where the service requires resistance to chemicals, abrasion, constant moisture, steam cleaning, immersion or vehicular traffic. GemThane® “S” is resin rich, low VOC and solvent dispersible. When cured, the product is inert and suited for direct dry food contact. This Mix-and-Apply polyurethane resin product is available with different catalysts offering a variety of set-times and working times (“pot life”). Once the catalyst is stirred into and mixed with GemThane® “S”, the catalyzed product can be applied using airless spray equipment, a roller or brush.

## STORAGE AND HANDLING OF PRODUCT

This product is not paint. It consists of resins which chemically cure when catalyzed and which, in their liquid form, will react adversely with ambient humidity and moisture. Key precautions are “clean, dry, sheltered, room temperature”. Care should be taken in handling of containers to prevent puncture, freezing, excessive heat (temperatures over 90°F or 32°C), unnecessary opening or other action which may lead to product degradation or contamination of contents.

At the time of use, remove only the amount of product needed for immediate consumption and carefully reseal the balance. Clean rim of can or pail to ensure ease of re-opening, as GemThane® “S” will cure when exposed to air and make re-opening of container difficult. The guaranteed shelf life of the unopened material is 6 months from date of manufacture, but product may remain acceptable for up to two (2) years. Before using older material or if you are unsure of the age of the product, consult a Madison Representative to determine usability.

## SURFACE PREPARATION

**General** – This section applies to ALL substrates. The surface must be free of moisture, dust, oil and other contaminants. If necessary, degrease by scrubbing with warm water and an industrial cleaner/degreaser or use a warm water high pressure wash (1,000 p.s.i. or greater) with an industrial cleaner/degreaser injection. Moisture and high humidity (over 85%) will accelerate cure, potentially in such a way as to degrade the final cured film or impair adhesion to substrate. Do not coat if dew or condensation is present or if stormy weather is imminent. For heavy duty applications, measure dew point and proceed only if the substrate temperature is more than 3°C (5°F) above the dew point temperature during surface preparation and coating application. This is especially important with metal substrates, as condensation will form more readily than on wood or concrete. If the appropriate testing equipment is not available, dew point can be obtained from the weather channel or the internet.

On previously painted surfaces, remove loose coating, then test for compatibility and adhesion. If the substrate appears incompatible in any way or if adhesion is poor, completely remove prior coating.

**Metal** - On galvanized metal substrates, simply apply GemThane® GemBond™ to create adhesion similar to near-white blasting. For best results with non-galvanized metal roughen surface by sanding, grinding or power wire brushing then treat the surface with GemThane® GemBond™ Surface Conditioner/Adhesion Promoter (refer to GemThane® GemBond™ Application Instruction Bulletin) to achieve optimum adhesion between substrate and



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coating. Check adhesion; if inadequate or if corrosion is present apply GemThane® Aluminized Primer (moderate service) or GemThane® UltraPrime™ (heavy duty) before applying GemThane® "S". For immersion service and other critical applications, blast to a near-white surface with a 2.5 mil profile and prime with GemThane® UltraPrime™. Welds and corners require extra "stripe" coating. Avoid thinning product if possible.

For general use, roughen surface by sanding, grinding or power wire brushing. Check adhesion of prior coating (if any) by cutting an "X" in the coating and trying to disbond the coating with a sharp knife; if adhesion is inadequate, remove all suspect prior coating and prime surface with GemThane® Aluminized Primer™ before applying GemThane® "S".

**Concrete** - Newly-poured concrete *must* be fully cured (typically 28 days but do a test area after 14).

**Atmospheric service** - The use of GemBond™ or FerroGrip™ will eliminate the need to sandblast or acid etch the concrete. After removing "spent" GemBond™ or FerroGrip™ by power wash or floor scrubber, allow the surface to dry at which time it is ready to be coated. Alternatively, either a brush blast with standard sandblasting equipment or "scarifying" using Blastrack™ equipment or similar, is recommended to remove laitance. Depending on porosity, concrete may need to be filled. Where bug-eyes exist, Madison PrepCrete™ should be used to fill same before proceeding. To fill smaller holes, use a thin mixture of PrepCrete™ or GemThane® MG 220™ Epoxy Sealer/Coating. On concrete floors, use GemThane® MG 201™ Penetrating Epoxy Sealer for best long term results. As a less-desirable alternative, thin first coat of GemThane® "S" with 10% to 20% of VR-2 Reducer™ before applying to prepared concrete surface. Concrete block can be coated directly using GemThane® "S" but, for a pinhole-free result, treat with Madison PrepCrete™ first.

**Immersion service** - Previously painted concrete must be abrasive blasted. In all cases, seal concrete with GemThane® MG 201™ penetrating epoxy before applying GemThane® "S". For rough or pitted concrete floors, a self-leveling base coat, such as GemThane® MG 220™ may be used. Vertical surfaces such as poured-in-place concrete and concrete block can usually be coated as-is; however, for a pinhole-free result, fill bug-eyes with a cementitious grout such as Madison PrepCrete®, let dry for 2 or more days and then coat the entire surface with GemThane® MG 201™ or heavier-bodied GemThane® MG 220™ self-priming base coat before applying GemThane® "S".

**Wood** – On most new wood, a thorough sanding with 80 to 100 grit sandpaper is required to open the pores of the wood (square-pad vibrating power sander is best or use a belt sander on large surfaces). When coating smooth composites such as MDF, use a finer grade of sandpaper (start with 100-120 grit). Do not coat green or damp wood. Ensure that all dust and debris is thoroughly removed from the surface prior to coating. For best results, use 10–20% VR-2 Viscosity Reducer™ in the first coat of GemThane® "S", then apply subsequent coat(s) full strength. Alternatively, seal wood with GemThane® MG 201™ Penetrating Epoxy before proceeding with topcoat (this is the preferred option where wood will have pedestrian traffic or similar direct contact). For previously painted surfaces, see "General" above. On old wood, painted or not, pressure wash at 1,000 p.s.i. or greater with GemBond™ or industrial degreaser injection, then sand thoroughly and wipe clean with VR-2 Reducer™ to eliminate saw dust before proceeding.

Where GemThane® "S" is being used over an existing coating, roughen substrate by brush blast or coarse sandpaper to achieve a minimum 2 mil angular profile (.002" or 50 microns). Before applying the coating, the surface must once again be rendered clean, dry and free of any traces of foreign contaminants using dry compressed air or other effective means.

## PREPARING GEMTHANE® "S" FOR USE

Containers of GemThane® "S" and the catalyst provided with it may build up pressure over time. To avoid any sudden escape of gas, open the containers carefully and allow the gas to escape slowly.

GemThane® "S" is a paint-like polyurethane resin coating. The cure is activated by adding a catalyst at a rate of 5% (about 8 oz. per gallon or .2 litres for each 4 litres of coating). There are 3 catalyst choices: C4 gives the fastest cure and the greatest film build (i.e., sag resistance on vertical surfaces) but pot life is only about 30 minutes; C7 is somewhat slower (45 to 60 minute pot life) and gives a balance of cure and film build vs. pot life; C10 gives a pot life of two to four hours, but the cure-to-touch time is up to an hour longer and the film build per coat will be about

1/3 less than when the product is catalyzed with C4. Before starting, make sure that sufficient catalyst is on hand. C10 is the catalyst shipped with the product unless our Customer Service Team has instructions to the contrary.

Power stir the container of GemThane® “S” slowly for two to three minutes, ensuring that pigments are fully dispersed. Add 5% catalyst and stir again for about the same length of time. Catalyze only what will be used within the pot life. Pot life is deemed to have expired when viscosity of product has doubled. After that time, the product is still liquid but, having partially polymerized, may not achieve adequate adhesion.

On first coat over absorbent substrates such as wood and brick, you may add up to 15% VR-2 Reducer™ to increase penetration. On subsequent coats, we do not recommend thinning of product. GemThane® “S” may be used immediately upon completion of mixing; no waiting period is required.

**NOTE:** *The VR-2 Reducer™ is intended primarily for clean-up. Thin first coat only as necessary to optimize penetration. Intermediate and topcoats will perform best if applied with little or no Reducer. When spraying the technician may want to use GemThane® VR-1 Reducer™. It evaporates at about three times the rate, thus allowing greater film builds.*

**IMPORTANT:** *Reseal unused portions of containers immediately for future use. Be sure that screw cap lids and paint can rims are cleaned with Reducer in order to ensure ease of reopening.*

## APPLICATION PROCEDURES

For best results, GemThane® “S” should be applied in a thin coat (i.e. less than 10 wet mils under normal environmental conditions). Multiple coats may be needed to achieve required thickness. Too thick of a film build could result in foaming, sagging, pimpling, blistering, pinholing or other surface defects.

GemThane® “S” will cure at any ambient temperature from 15°F(-10°C) to 120°F (50°C). As discussed above, the temperature of the substrate surface must be at least 5°F (3°C) above the dew point temperature at all times. Under such conditions, it may be able to proceed by simply heating the substrate prior to coating application, and/or reducing by half the film thickness per coat.

Under sub-freezing conditions, curing of GemThane® “S” may take 12 hours or more, but the finished protective film will be perfectly normal regardless of ambient temperature when applied.

**In cold weather, keep ingredients warm for ease of pouring, mixing and applying.**

Brushing and rolling are the recommended methods of applying GemThane® “S” on wood, concrete and other rough surfaces; working the first coat into the substrate helps adhesion. GemThane® “S” is compatible with most paint brushes of all grades. Apply at least two coats; thin the first with VR-2 Reducer™ to promote penetration but do not reduce the final coats. If pimpling occurs or coating is unable to fill all the holes in the substrate, the user should prime with GemThane® MG201™ Penetrating Epoxy or our higher viscosity MG220™ Epoxy Coating. Both are solvent-free. On steel, airless spray is the most usual method of application. Do not thin the coating if possible. Start with 2000 p.s.i. fluid pressure and a .017 tip and adjust to suit.

For optimum intercoat adhesion, recoat when previous layer is tacky to the touch. Recoating is recommended within 4-8 hours (depending on catalyst chosen and environmental conditions) to ensure the best intercoat adhesion. If recoat time is exceeded, sand previous coat with 80 to 120 grit sandpaper until gloss has disappeared over entire coated area, then apply second coat.

## TESTING AND INSPECTION

In industrial applications, formal testing is often specified. This usually relates to: holiday-free, visual inspection, adhesion, coating thickness and touchup. In less critical maintenance situations, the usual checks are visual (appearance and thickness) and adhesion (cut an “X” in the coating and attempt to pry from surface with a utility knife).

For industrial users, testing for holidays is usually performed in accordance with NACE RP 01-88. For coating thicknesses greater than 20 mils, use a wet sponge holiday tester; for thicker coatings, use a high voltage spark tester set at 100 volts per mil. Let coating reach substantial cure (approximately 24 hours) before putting into service. Contact Madison for guidance with regard to methodology for other tests.

## CLEAN UP

Once the containers are opened, both GemThane® "S" and its catalysts are sensitive to contamination by ambient humidity and moisture. Keep containers tightly sealed; when using product, scoop out what is needed and re-seal the balance immediately (clean rim of can first).

For clean-up of equipment, use GemThane® VR-2 Reducer™. Other solvents may react with GemThane® "S". When cleaning a spray gun, circulate solvent for 15 minutes or more. With sponge rollers and economy-grade brushes, you may prefer simply to dispose of same since labour and Reducer required to clean same may exceed value of the roller or brush.

To dispose of unused material, catalyze and allow it to cure; as the cured product is inert and non-toxic, it can be disposed of as ordinary waste.

## HEALTH AND SAFETY

Generally, the user should take the same precautions as with any two-component polyurethane or epoxy, for example marine and automotive coatings. When brushed or rolled, product contains no detectible levels of monomeric isocyanates (a potential irritant found in some polyurethanes). However, the product contains strong industrial solvents, the fumes from which will cause temporary respiratory discomfort, particularly in confined spaces. Product has no known long term adverse effect. GemThane® "S" is flammable and is intended for outdoor use only. Do not use indoors except in a controlled well-ventilated environment. If spilled on skin or elsewhere, remove GemThane® "S" immediately with VR-2 Reducer™ or with rubbing alcohol as product will become extremely solvent resistant and difficult to remove when it begins to cure. Long pants, a long-sleeve shirt and disposable rubber gloves are recommended. If product is accidentally swallowed, do not induce vomiting, as this will cause additional throat irritation; contact physician. MSDS available upon request. The finished product is inert and environmentally friendly and leftover material can be disposed in the same manner as ordinary paint.

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