Section	
Name	Product Application Notes – NMP 1700 Series.
Last Updated	08/04.
Aim	Document the complete application procedure for NMP 1700 series.
Scope	Covers surface preparation and application, as well as issues concerning coverage rates and temperature effects of NMP series.
References	

NMP 1700 Series - NMP 1710/15/20/25/30

The NMP 1700 series are based on a unique blend of liquid epoxy polymer and amine curing agents that are able to displace water from wet surfaces to form a permanent bond. The formulation is solvent-free to ensure safety and maximum performance, and is non-hazmat, which permits uncomplicated shipping, storage and handling. All of them are reinforced with Kevlar fibres to enhance the strength , wear, chip and flexural properties of the coatings, and increase viscosity management (allowing easy spreading and non-string application to minimise diver and equipment contamination)

The NMP 1700 series provides permanent protection even under the most extreme conditions. It uses advanced, non-hazmat raw materials to provide heavy-duty product that is as safe and eco-friendly as possible – NMP 1720 is potable water approved.

The cured films are extremely hard, glossy and very tough. Application is easily made by brush (NMP 1710/1715), paint pad, putty knives and other straight edged tools, and the products may be used in water temperatures above 5^{o}C.

1 Surface Preparation

As always, thorough and complete surface preparation is the key ingredient to problem-free coating solutions. For detailed preparation notes on every surface, consult the Surface Preparation section of NMP's application manual. For detail preparation notes on underwater surfaces, consult the Underwater Application section of the manual. The following is a generic procedure that will be effective in most applications: degrease to remove oils, fats etc., grind or blast to remove damaged substrate and establish a good mechanical profile, rinse clean and leave dust-free.

1. New concrete – allow to age under proper curing conditions for at least 28 days. Remove surface laitance by thorough acid etching, abrasive blasting or other appropriate methods to expose firm and clean substrate. A simple layer of surface dust can negate bonding and result in a peeling coat.

2. Old concrete – remove oily or greasy contamination using an appropriate method. Proper surface cleaning/preparation cannot be overly stressed. Shot blasting, high-pressure water jetting (5,000psi), detergents etc. are recommended. Surface appearances can be deceiving – don't just assume a clean, highly bondable surface as a single layer of dust can eventually cause delamination.

3. Coated concrete – carefully examine the condition of the existing coating. If the coating is intact and tightly adherent, it may be prepared for coating by detergent/water scrubbing using standard janitorial equipment. Rinse thoroughly, dry, and then proceed with the regular surface preparation and application. Note: The NMP 1700 series are extremely strong coatings and will transmit tearing stress to a weaker under layer that may then fail. The NMP 1700 resins contain no solvents that may weaken any existing coatings. If the existing coating shows poor adhesion to the substrate it must be removed by abrasive blasting. If the underlying surface is contaminated it must be cleaned using the above procedures.

4. Concrete Repair – the NMP line of epoxies include several concrete patching products and concrete resurfacing mortars. For small areas, contractors often mix EM agg into NMP 1335 to create an epoxy mortar (see NMP 1335 data sheet). Generally, users will find that non-epoxy concrete patching kits and products will work under our epoxy coating system and can be purchased locally. However, these products often require long periods before they can be coated, whereas NMP epoxy mortars can be coated within several hours.

5. Metallic substrates – are best prepared by air/abrasive blasting. Small areas may be cleaned using power grinders, however this method is not practical for large jobs or for tight clearances.

The methods of surface preparation shown below are arranged in order of increasing efficiency. It must be noted that although abrasive blasting is the preferred method of surface preparation it is often not possible to do this in small applications.

- Wire brushing – is not recommended except in the smallest areas where vigorous brushing can be made to remove most contamination. The NMP 1700 series is compatible with most types of existing coatings and may be applied to sound old coatings that have been cleaned and roughened by vigorous wire brushing.

- Grinding – can work well in small areas provided sufficient attention can be afforded to all areas receiving the coating. Grinding is especially useful in localised repairs above or below water.

- Needle gunning – had been used successfully above and below water provided the area is small enough to receive complete attention.

- High-pressure water blasting – is effective provided the water pressure is high enough to remove all contamination. Pressures in excess of 5,000psi will be required to remove tight contamination such as marine growth on steel and concrete. The nozzle must be held close in to ensure effectiveness since its efficiency falls off rapidly as it leaves the surface.

- Abrasive blasting high-pressure water (on metallic surfaces) – is the preferred method of preparation. Abrasive blasting with high-pressure water is particularly effective underwater and may be accomplished with most commercial equipment down to 18 HP 2,500psi units with venturi sand injection.

2 Coverage

The premium range of 1700 series products (NMP 1710/20/30) are available in 8L kits, whereas the mid-range line (NMP 1715/25) have two size options – 4 or 14L kits. Each kit consists of a pre-measured container of epoxy base and a pre-measured container of curing agent. The two components are added in the supplied ratio and mixed thoroughly.

Coverage rates can be affected by the condition of the surface being coated, eg porosity. The recommended film thicknesses of the products, together with the theoretical coverage rates they correspond to, are presented below:

NMP 1710 – 600 microns @ 1.66sq.m/L.
NMP 1715 – 600 microns @ 1.66sq.m/L.
NMP 1720 – 800 microns @ 1.25sq.m/L.
NMP 1725 – 800 microns @ 1.25sq.m/L.
NMP 1730 – 800 microns @ 1.25sq.m/L.

Practical coverage rates will be marginally less depending on the losses that occur during application, eg localised excess film thicknesses, losses in brushes, spreaders etc.

3 Temperature

Temperature will exert a considerable influence on the rate of curing of chemically cured coatings such as the NMP epoxy coatings. In broad terms, curing times will double for a 10^{o}C decrease in temperature and half for a 10^{o}C increase. The table below contains the curing schedules for the NMP 1700 series products at 25^{o}C. Temperature will also affect viscosity (heated epoxies will have reduced viscosity) and hence the maximum vertical application thickness achievable by the NMP 1700 series product (without sag).

Product	Pot Life	Set - Touch	Set - Hard	Full Cure
NMP 1710	45 mins	6 hrs	15 hrs	7 days
NMP 1715	45 mins	6 hrs	15 hrs	7 days
NMP 1720	45 mins	6 hrs	15 hrs	7 days

NMP 1725	45 mins	6 hrs	15 hrs	7 days
NMP 1730	45 mins	6 hrs	15 hrs	7 days

4 Application

Read the MSDS before use and wear the appropriate protective clothing.

4.1 General Application

The NMP 1700 series are epoxy pastes that are designed for application by a brushing (NMP 1710/15), spreading or smearing process. This method of application can give much improved productivity compared to the traditional “patty-cake” method of application and also results in a smoother, thinner film. Although the NMP 1700 series may be applied through a pressure roller or brush supplied by a 1/1 plural mixing unit, it is generally more useful to “hot-pot” the product in small batches. The following application tools are effective:

- Brushes (NMP 1710/15) – are useful in a combination spreading/brushing motion. To be effective they have to be stiff – extra stiffness in a standard brush can be obtained by either cutting off half the bristles, or wrapping duct tape around half of the bristles at the handle end.

- Painters Mitts or “Fuzzy” Gloves – mitts worn over a rubber glove. The NMP 1700 range of products can be lifted from their pail and simply smeared onto the surface with good results. This method works especially well for pipes or irregular shaped surfaces.

- Spreaders – such as plastic, straight-edged spreaders used for applying wall joint compound are ideal for large, flat areas. These are available at all hardware stores for little cost.

- Customised Spreaders – spreaders can be customised by wrapping carpet scraps around a plywood base and stapling in place. A 20cm x 10cm spreader with a handle on top makes an excellent tool for applying larges volumes of product. The carpet serves as a cushion and reservoir to smooth out the application, especially over welds.

Lift the product from its pail and apply to the surface. Under some circumstances, it will be found that two or three passes over the surface may be required for the 1700 series to “reach down” and adhere strongly. This can happen when the surface is contaminated and a couple of sweeps over the surface is required to clean and condition it for coating.

For application instructions when using the NMP 1700 series underwater, consult the Underwater Application section of the manual.