Fosroc Polyurea WPE110 Application Guide

constructive solutions

Introduction

Fosroc Polyurea WPE110 is a spray-applied, 100% solids, flexible, two-component, rapid curing pure Polyurea system, designed as a waterproofing and protective coating. It combines the advantages of seamless coating with very long life cycles and high durability.

The system offers excellent surface properties and overall physical properties and is used as anti-corrosion, waterproof and protective membrane for concrete and steel in a wide range of environmental conditions.

Principles of Application

Fosroc Polyurea WPE110 is designed for application through heated, plural component, high pressure airless spray equipment capable of supplying material at the spray gun at a minimum of 2000 psi spray pressure and material temperature of 55-65°C. It has been successfully sprayed through Graco E-10HP and Graco Reactor E-XP2 machines using Graco Fusion AP and Graco Fusion CS Guns.

Properties

Typical physical properties @ 21°C unless stated otherwise

Solids by Volume:	100%
VOC content (SCAQMD 304-91):	11.15g / litre
Mix ratio by volume	1:1
Viscosity A component @ 25°C:	500-600 cPs
Viscosity B component @ 21°C:	750-950 cPs
Tensile Strength (ASTM D412):	14.8 MPa
Tear strength (ASTM D624C):	60 - 65 N/mm
Elongation (ASTM D412):	>350%
Shore D (ASTM D2240):	40
Abrasion resistance (ASTM C501 1kg, H18 wheels):	95 mg / 1000 cycles
Water Vapour Transmission (E96-05 (B)):	4.30g/m².24h
Water Absorption (AS 3558.1):	<1%
Cure time, walkable	2 minutes

Equipment Specification

Drum Heaters

Flexible 1000W adjustable band heaters can be used to condition materials in drums to the optimum temperature.

Transfer System

The proportioner should be supplied by transfer pumps of at least 2:1 ratio. Normally a 3m (10' foot) long 19mm (3/4") I.D., 500 psi rated, nylon lined transfer hose connects each pump to the proportioner. There should also be a screen filter of about 40 mesh in place between the transfer pump and the proportioner.

Proportioning Pump

A plural (1:1) proportioning pump capable of developing a minimum of 2000 psi pressure.

Materials Heaters

Material heaters are necessary in the system to reduce and maintain material viscosities at optimum levels. These primary heaters are usually mounted on the proportioner and are connected in line after the proportioning pump. These heaters should be capable of raising the temperature of the material 30°C at the flow rate during normal application. They should be rated to withstand the maximum pressures the system can develop. These heaters function better in the system if they are controlled accurately by a thermostat incorporated into the heater.

Heated Hose Assembly

Nylon lined hoses for each component rated for the proportioning pumps maximum pressure are used to transfer the material under pressure from the pump to the spray gun.

These hoses should be heated and controlled thermostatically by temperature controls at the proportioner. The hose heat should be capable of maintaining the material temperature set by the primary heaters to the spray gun.

The hose assembly is usually insulated with flexible pipe insulation and the air line necessary for the operation of the spray gun is incorporated into the package. These hoses are usually 10mm (3/8") I.D. with the air feed hose to the gun being 6mm (1/4") hose. A sort section of hose assembly (3-15') of 6mm (1/4") hose is usually attached to the gun end of the hose to aid in the manoeuvring of the spray gun in application. This assembly should also be heated.

Spray Gun

Plural component spray gun utilizing impingement mixing and a mechanical purge. Further, the spray gun should be designed to spray coatings with a flat spray pattern and be rated for the proportioning pumps maximum pressure. The Graco Fusion AP and Graco Fusion CS guns have been found to be suitable.

Material Protection

Moisture vapour entering the resin drum through the small bung hole, which is normally used as a vent, can cause unwanted blowing or microcellular structure in the spray film. Moisture vapour entering the isocyanate drum can cause formation of solid contaminants. A nitrogen gas purge system slightly pressures the container and prevents air from entering the container.

As an alternative method, a desiccant dryer system will remove most of the moisture from the air as it passes through the desiccant to equalise the pressure in the container as material is used.

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Other Equipment

Mixing is not normally required for either component of Polyurea WPE110. If pigment is added to the resin component an agitator of 1/2 HP or greater should be used to thoroughly mix the material prior to and during any application to keep the pigment in suspension. The agitator should be designed for the container in which it will be used.

Procedure

Pre-conditioning

Both components should be maintained prior to any application at an optimum temperature of 30 +/-5°C. This may mean heating the material in the drum if the surrounding ambient temperature is much below 25°C. This will allow the preheaters to reach and maintain the proper application temperatures of the materials.

Thinning

Absolutely no solvent should be allowed to come in contact with or be added to 100% solids coatings. Viscosity can be reduced by an increase of temperature.

Start Up Procedure

For new equipment, individual components should be connected as previously described. Be sure to lubricate all pumps as per manufacturer's instructions. Use plasticiser for the wet cups. Check and clean all fluid filters. Check and clean all air traps and filters. Check electrical system to insure proper power requirements are satisfied and there is complete continuity in all circuits. For existing equipment thoroughly clean the system including the line filters. Flush the system and fill (using transfer pumps) with inert plasticiser such as Mesamoll, DINP or DIDP and test by slowly bringing the unit up to full pressure and heat.

For new equipment decide which side will contain the isocyanate component and which side will contain the polyol. Mark all isocyanate pumps, inlets, outlets, heaters, hose fittings, and gun inlets "A side". Mark all polyol pumps, inlets, outlets, hose fittings, and gun inlets "B side". Retain this identification and use only as indicated to avoid cross contamination.

Turn on the heaters and bring the system up to temperature then purge the system of plasticiser (using the transfer pumps) with the coating material. This may result in the loss of 1-2 litres of each component.

Fully pressure the system and test spray to ensure proper operation. Always spray off the project first to check proper operation and cure of materials. Observe the material and film; make additional or final equipment adjustments, then proceed with the project.

Spraying

Using a 50% overlap to insure an evenly coated surface. Spray continuously as much as possible and minimise triggering the gun.

Anytime there is even a small change in pressure, spray pattern, color or consistency of the material, the sprayer should stop immediately and troubleshoot the equipment.

Filters should be checked periodically for any build-up of material. If the whip hose is unheated, the material that is contained in the whip will cool down during extended periods when not spraying. This material will not be the proper temperature and will not yield a quality pattern or product. Spray off the project until this material is cleared and the warmer material sprays properly. The temperature of the material near the gun can be checked by inserting a small thermometer in the hose jacket along the hoses. Generally, the material temperature is higher by 3-6°C than the reading on the thermometer.

Shutting down the equipment

If you are simply shutting down for a short period such as overnight, the material may be left in the system under pressure so as not to waste materials:

1. Shut off the transfer pumps and proportioner and turn off the heaters (disconnect air and power supply).
2. Depressurize the system so that a maximum of 1000 PSI remains on the fluid system.
3. Shut off all in-line valves at proportioner and gun.
4. Remove, disassemble, and thoroughly clean the spray gun and store.
5. Nitrogen purge and blanket any partially filled coating containers and seal tightly.
6. You may leave the transfer pumps wetted out in their respective materials.

If all the material was used, then the transfer pumps should be wiped clean and placed in a sufficient amount of plasticizer to cover the lower portion of the pump.

If you anticipate not using the equipment for more than two or three days, then the material should be flushed from the entire system. In this case, a different set of procedures is followed:

1. Turn off the heaters, hose heat, and any drum heaters.
2. Remove the transfer pumps from their respective materials and wipe them clean Place them in separate pails of the plasticizer to be used to flush the system.

3. Thoroughly flush the entire system with appropriate the system.The proportioner can be used with caution to assist in the flushing process.

4. Recycle clean plasticizer through the entire system until no colour or evidence of material is left.

5. Remove and clean filters, reassemble.

6. Insure that the entire system is pressurized to 200-500 psi with plasticizer upon final shut down.

7. Shut off all air and power supplies.

8. Plug or cap any open inlets or outlets.

9. Clean gun and tip thoroughly and store.

10. Be sure to nitrogen purge and seal any partially filled material containers and store at room temperature indoors.

Equipment Clean-Up

MEK or Dibasic Ester may be used for general clean-up of equipment and hoses. For soaking of contaminated metal parts use NMP(N-Methyl Pyrrolidone). Allow unit to cool before cleaning.

Caution: Prior to introducing any 100% solids coating, plasticizer such as Mesamoll, DINP or DIDP must be used to flush the system. The system must be free of solvent to avoid any potential foaming of the coating resulting from the reaction of solvent with the solvent-less coating.

Additional Guidelines

Substrate Preparation

Substrates should be clean and basically dry. This material will spray satisfactorily on cold substrates. Further, the substrate should be free of grease, oil, dirt or other contaminants which will interfere with proper adhesion and/or coating quality.

Application Temperatures

Minimum recommended material and substrate temperatures are 24°C and 2°C respectively.

Maximum recommended substrate temperature is 50°C.

Cure Time and Recoat Time

The applied material will become tack-free within 30 to 60 seconds of spraying. Development of a full cure may take up to 24 hours. Material may be recoated when tack-free. Older coatings should be lightly abraded to remove any oxidised material and cleaned thoroughly prior to recoat.

Storage and Handling

The resin has a nominal storage life of 12 months at a recommended temperature of 20-30°C.

The isocyanate should be kept properly closed and stored indoors in a well-ventilated area under normal factory conditions. Storage at room temperature (20-30°C) also provides a convenient viscosity for handling. Storage at low temperatures (below 10°C) is not recommended because it may lead to some crystallisation; this material must therefore be protected from frost.

If crystallisation does occur, the material should be heated to 70-80°C to melt it and should then be thoroughly agitated before use, to ensure homogeneity. Drum heaters may be used with the heat setting at low.

The material should be agitated to uniformly distribute the heat. On no account should the material be heated above 80°C during melting. Storage temperatures above about 50°C are not recommended since they can accelerate the formation of insoluble solids and also increase the rate of viscosity increase on extended storage.

Under the recommended storage conditions and in properly sealed containers, the isocyanate has a nominal storage life of 12 months. If either component is opened and partially used, it should be purged with nitrogen or desiccated air and resealed or refilled into smaller containers to their maximum volume.

General information

Safety

All necessary measures should be adopted in accordance with the requirements of all Health & Safety Acts or other nationally recognised legislation. In particular, lighting, ventilation and protective clothing shall be adequate for the safe and proper execution of the work.

Before work commences, refer to the product data sheet and Safety Data Sheet (SDS).

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