

# FLAKELINE®200 SERIES

(211,222GF,222HT,  
232,242,251,252)

CEILCOTE®

Corrosion Control Products

## DESCRIPTION:

Flakeline 200 Series materials are catalyzed, flake filled pigmented polyester and vinyl ester coatings which are normally spray applied in two coats to achieve a total film thickness of 30-50 dry mils. This thick durable film provides exceptional protection against corrosive environments. It is applied to properly prepared steel and concrete substrates.

Flakeline 222GF, 232, 242, 252 and may be applied by brush, spray or roller.

Flakeline 222HT must be sprayed.

Flakeline 211 and 251 are short pot life, rapid cure formulations which must be applied only with plural, component spray equipment.

Installation procedures contained in this bulletin are as specific as possible but cannot cover all variations in field conditions. Supervisors experienced in installing Flakeline 200 Series materials may deviate slightly from published procedures. This is done to give better installation by using the most up-to-date methods to fit field and service conditions.

## EQUIPMENT:

### For Surface Preparation:

- Abrasive or Gritblasting
- Blastrac (Horizontal)
- Scarification or other mechanical means
- If none of these methods are acceptable consult Master Builders

### For Mixing:

- Volume measure for liquid (1 qt. or 1 gal.)
- Volume measure for Hardener (cubic centimeters or ounces)
- 5 gal pail if mixing with drill
- Drill motor
- Blade (Jiffy Type) or other suitable types

### For Application:

- Spray equipment - conventional or airless
- Paint rollers and brushes
- Clean buckets
- Wet film thickness gage
- Surface thermometer

## PROJECT PREPARATION:

**Environmental Conditions** - For all application steps, the surface temperature, air temperature and material temperature should be between 50°F (10°C) and 110°F (43°C).

Do not apply if the relative humidity is more than 90% or the surface temperature is less than 5% above the dew point of the air in the work area.

## SURFACE PREPARATION:

**Steel** - For immersion service clean to "White Metal" in accordance with SSPC SP-5-89 or NACE No. 1. For immersion all fillet and edge welds shall be rounded to 1/8" minimum. Welds shall be continuous and smooth but not necessarily flush with adjacent surface. Surface weld defects such as crevices or depressions shall be filled by rewelding. Ripples shall be blended to a smooth finish but not necessarily flush with the adjacent surface. All weld spatter shall be removed by chipping or grinding prior to blasting.

Gritblasting with clean, sharp abrasive or approximately 12-40 mesh size to achieve a minimum anchor profile of 3 mils as defined by the Profile Tape method or the Keane-Tator Visual Comparator. Centrifugal blasting with angular metal grit is satisfactory so long as the grit remains free of oil. Steel shot is not recommended.

For non-immersion, such as fumes or occasional spillage, use a "Near White" sandblast SSPC SP-10-89 or NACE No. 2. Flakeline 200 must be applied to cleaned surfaces within 8 hours and before rusting occurs. P-370 Metal Primer should be applied within 8 hours to prevent rusting if the Flakeline 200 is not applied immediately.

Refer to Spec. 3-2.2 for full details of constructing steel tanks to receive monolithic linings.

**Concrete** - Surfaces should be sandblasted to provide a clean, roughened surface. New or uncontaminated surfaces may be sandblasted or acid etched with a 1 part hydrochloric acid to 2-3 parts water solution, thoroughly rinsed and dried. Acid etching is the least desired method of surface preparation and should only be used as a last resort. All concrete surfaces must be primed with P-380 Concrete Primer or P-380 C (Conductive) Primer.

**Surface Preparation, continued**

**New Concrete** - New concrete must be thoroughly cured. All form oils, curing solutions and laitance must be completely removed. Prepared surfaces must be clean, dry and firm. Refer to ASTM D-4263

All oils, grease, dirt, old coatings, or chemical contaminants must be removed by surface preparation. Contaminated concrete may require solvent cleaning, sandblasting, or in some instances may be unsuitable for coating.

All fins or projections should be struck flush, all holes, pits, voids, and cracks must be filled. For non-immersion service use fast set cements for filling such as "Thorite" (Standard Dry wall Products, New Eagle, Pennsylvania). Fill holes and strike material flush so no Thorite remains on outside concrete surface.

For immersion service fill voids with a polyester mortar made by mixing 1 gal. or catalyzed 380 Concrete Primer and adding 2 1/2 gals. (approximately 9 lbs.) of Ceilcote S-11 Powder to make a thick paste. Adjust working thickness by adding more or less powder. Fill voids, allow to cure hard (4-8 hrs) and refill shrinkage cracks if necessary. Allow to cure 8 hours before priming.

**Storage** - Flakeline liquids, primer liquids and hardeners should be stored in a cool place and away from flames. Most liquids may gel after 3-6 months from date of manufacture when stored at 70°F; faster at higher temperatures. Flakeline 222G, GF, HT, 232 and 242 liquid should be used within 2 months of manufacture. Expiration dates are printed on the containers. Powders are stable indefinitely at all temperatures if kept dry.

**Batch Sizes** - The size of batch will depend somewhat upon the ambient temperature and the method of application. A chart giving the ratios on mixing hardeners to liquid is contained on container labels.

**APPLICATION:**

**Primer** - Concrete - Apply 1 coat of P-380 Concrete Primer. Refer to P-380 Technical Data Sheet. For spark testing use P-380 C Conductive Primer.

**Steel** - Priming with P-370 Steel Primer is usually recommended for immersion. Refer to P-370 Technical Data Sheet.

**DO NOT THIN**

**Mixing** - When batch mixing, catalyze no more material than can be applied within the pot life period. Available working time, temperature, and complexity or the area to be coated will determine how much material should be catalyzed at one time. Stir material thoroughly. Mechanical agitation is recommended.

**Pot Life** - Variations in hardener quantity, temperature, and humidity will increase or decrease pot life and curing times. Before placing freshly catalyzed material into pressure pot, remove all remaining material and wipe out pot since old material will reduce pot life of freshly mixed material.

Flush pot and lines thoroughly after every 3 to 4 batches if temperature is below 80°F. **CAUTION** - material hardens quickly when pot life time is exceeded, especially in warm weather. Keep material cool and shield pot from direct sunlight in hot weather. Pot life can be extended by keeping material cool before mixing and immersing pot in ice water during hot weather.

Brush roll or spray apply at 20-32 mils wet film thickness to achieve 15-25 mils DFT per coat. Two coats are normally required.

**Airless Spray** - Airless Spray - Spray tip must be .036" or larger to pass flake pigments. Pump must be capable of at least 3.5 gpm.

**Conventional Air Spray:**

Equipment	Binks	Devilbiss
Gun	18 or 2001	JGA or MBC
Fluid Tip	68	D or AC
Fluid Needle	68 or 568	D or AC
Air Cap	68 PE or PB	64 or 62
Pressure Pot (Fig A)	85 - 5402	QM-5748
Pump (Fig B)	4:1 or 8:1	4:1 or 8:1
Material Hose	Use solvent resistant 1/2" I.D.	Use solvent resistant 1/2" I.D.
Air Hose	Minimum 5/16" I.D.	Minimum 5/16" I.D.

Turn atomizing air off and material pressure on. Regulate fluid pressure to provide adequate material from nozzle (approximately 2 ft. stream). Regulate atomizing air to provide good break-up and even spray pattern without excessive over spray. Apply two wet coats, overlapping 30-50% on each spray pass while keeping the gun at a 90° angle to the surface. Proper application will provide a uniform but slightly rippled "orange peel" surface.

When using the pressure pot system (Fig.A), keep the pressure pot at approximately the same level as the spray gun. Maximum recommended hose length is 25 feet. For longer hose lengths and faster production rates use a 4:1 or 8:1 pump in place of the pressure pot (Fig B).

Minimum air requirements for the above equipment is 25 CFM at 100 psi. MIX ONLY QUANTITIES OF MATERIAL WHICH CAN BE APPLIED WITHIN THE POT LIFE LIMITATIONS.

**Recoat** - The basecoat (first coat) should be recoated as soon as possible. Some vinyl ester materials have a short recoat window especially in direct sunlight and at higher temperature (4 hours); This applies to Flakeline 222, 232 and 282.

### **Application, continued**

Flakeline 212, 242 and 252 have a recoat window of two(2) weeks. Generally in normal construction one would recoat the next day. When in doubt use styrene sensitivity test, dampen rag with styrene and rub on primer or basecoat and see if material becomes tacky. If so you may recoat. If not, mechanical abrasion will be required.

**Special Catalyst Spray Equipment** - Special spray equipment is required when using the short pot life materials such as Flakeline 211 and 251. This equipment injects catalyst into the liquid at the spray gun, thereby eliminating pot life and allowing rapid recoat times (30 minutes @ 70°F).

The use of Binks Super slave pump plural component spray rig (part #103-1415 SQ) is recommended when used with the Binks 18NC or 18NCD spray gun and Air/Catalyst Integrator. (ACI) Valve (Part#102-3370). Refer to page 5 for diagram of equipment.

**For Airless** - Air assist plural component spraying, use the Binks Century Gun (102-2400) along with the Binks Super Slave Pump.

Minimum air requirements for equipment (#103-1415SQ) is 60 CFM at 100 psi.

For further information on the use of Flakeline 200 Series Coatings with this equipment consult your local Master Builders representative.

**Touch Up and Repair** - Touch up and repair can be accomplished using grinders, sanders, or sandblasting down to metal/concrete surface and feathering the coating back 1-2 inches. Use the above recommended application techniques and procedures for touch up and repair.

**Testing** - Allow to cure completely (fingernail hard) before testing. Visually inspect for color variation due to inadequate hardener and test with fingernail for obvious soft spots. Check dry film thickness with magnetic dry film gauge after reaching full hardness (steel only). For immersion service test coating for pinholes and holidays by using a DC spark tester at a maximum of 3,000 volts.

### **CLEAN UP:**

Use T-410 Solvent, xylene or lacquer thinner for cleaning equipment and hoses before material hardens. **DO NOT USE ACETONE SOLVENTS FOR CLEANING.** It can react with Hardener No. 2 and 3 to produce flammable crystals.

### **SAFETY:**

Flakeline 200 Liquids contain polyester and vinyl ester resins and styrene monomer which are flammable liquids. Heat, sparks, flame, welding, or other flame hazards must not be permitted in working areas. Use grounded, non-sparking tools, equipment and shoes in enclosed areas where high vapor concentrations could occur and cause explosive hazards.

Provide sufficient ventilation in tanks or enclosed areas to provide an air change each 6 minutes and keep vapor concentrations below 50 ppm. If concentrations exceed 50 ppm, use absorptive respirators or fresh air masks. Use two men on enclosed jobs; one man outside for safety. If affected by inhalation, move to fresh air. Continue ventilation until product is cured - usually 4 hours @ 70°F. For open areas, use an absorptive respirator if fumes become objectionable. (Explosive limits of styrene are 1.1% or 11,000ppm).

Wear eye protection when mixing or handling hardener. Eye contact results in irritation and may cause corneal injury. Flush eyes immediately with water for 15 minutes (seconds count) and **CONSULT PHYSICIAN IMMEDIATELY**. Prolonged skin contact will cause mild irritation and may result in superficial burns. Wash skin with soap and water. Contaminated clothing should be removed and wash before re-wearing. Do not take internally. If swallowed, **DO NOT INDUCE VOMITING - CALL A PHYSICIAN IMMEDIATELY**.

Hardener No. 2,2R,3C and 3R are Organic Peroxide materials. Peroxides must be retained in original plastic bottles until used. Store at temperatures below 100°F to avoid decomposition. Refer to safety instructions on Hardener labels before using.

**WARNING** - CONTACT WITH METALS OTHER THAN STAINLESS STEEL, TEMPERATURES ABOVE 140°F, OR CONTAMINATION OF THE HARDENER BY ANY OTHER MATERIAL CAN CAUSE VIOLENT HARDENER REACTIONS. Use caution when handling to insure that Hardeners contact only the original plastic container or stainless steel until mixing with the Flakeline Liquid.

Flakeline Hardeners No.2,2R,3C and 3R have YELLOW Flakeline labels and must never be combined with Flakeline Hardeners using RED labels. They will react violently if mixed or spilled together. Do not store or ship packages with YELLOW labels with packages containing RED labels.

**NOTE:** Department of Transportation diamond shipping labels are not color coded as per the warning above.

**FOR INDUSTRIAL AND PROFESSIONAL USE ONLY**

**FLAKELINE® 200 SERIES INSTALLATION PROCEDURES**

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