

CROSSFIELD PRODUCTS CORP.
Miracote® Product Line
CHEMICAL RESISTANCE and REFERENCE CHARTS

INTRODUCTION

Crossfield Products Corp.'s (herein the Company) Chemical Resistance Charts are intended to serve as a guideline only, since actual in-service conditions usually vary from the laboratory conditions where the test data was developed. The variations are due to differing conditions, therefore, the Company cannot assume liability for use or guarantee performance. Resistance to over 250 different chemicals or concentrations appear in each Chart, which represent only a fraction of the known chemicals or combinations of chemicals.

Site conditions vary because of changes in concentration (water evaporation), combinations, temperature, duration of exposure, contaminants, housekeeping and cleaning technique, etc., therefore, it is recommended that "actual testing" be performed with each of the specific reagents, as well as the specific method of cleaning. Prior to final selection of a chemical resistant system, it is recommended by the Company that testing be performed under actual conditions, since the complexity of many end use environmental circumstances and potential cross contaminants can influence actual performance.

When seeking assistance in the selection of the proper product(s) or system(s) from the Company, the Company may require samples of the actual reagents, environmental use and exposure conditions, cleaning, biocides or biostats, disinfectants, cleaning equipment, MSDS, etc., as well as any other relevant information that might influence the performance of the chemical resistant system, including:

1. Commercial name of all reagents under consideration for use in the area
2. Concentration of each reagent
3. Ambient temperature and substrate surface temperature
4. Temperature of reagent as it contacts the surface
5. Temperature of the surface at time of contact
6. Combination of chemicals that will react with each other on the surface
7. Frequency of spills
8. Elapsed time between spillage until clean up and neutralization occur

Note: The Company reserves the right to refuse to test chemicals it deems harmful.

UNDERSTANDING CHEMICAL RESISTANCE

Generally, chemical resistance is considered a functional concern, rather than an aesthetic concern. The ASTM tests and the Company's in-house proprietary tests are designed to evaluate the functional effect of exposure, which do not include an aesthetic evaluation of resistance to staining or discoloration.

CROSSFIELD PRODUCTS CORP.

Miracote® Product Line

CHEMICAL RESISTANCE and REFERENCE CHARTS

Functional chemical resistance is determined by the materials ability to resist chemical attack, which is normally measured by weight gain or loss and by volume gain or loss, and by gain or loss of hardness.

TYPES OF TEST PERFORMED

- A. ASTM C868 Standard Test Method for Chemical Resistance of Protective Lining
- B. ASTM C267 Standard Test Method for Chemical Resistance of Mortars, Grouts, and Monolithic Surfacing and Polymer Concretes
- C. ASTM D1308 Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes
- D. Crossfield Products Corp. Proprietary Testing

PIGMENTED SYSTEMS

Neat unpigmented resin and hardener systems generally have superior chemical resistance to pigmented systems, since pigments normally have less chemical resistance than the neat (unpigmented and unfilled) liquids. When considering a pigment system to enhance chemical resistance of the selected system, the Company usually recommends that the system be topcoated with one or more chemical resistant clear coatings.

TEMPERATURE

Chemical resistant testing, unless otherwise indicated, is performed under Laboratory conditions at 75⁰F +/- 2⁰F (24⁰C +/- 1⁰C). Temperature has a significant effect on chemical reactivity and the aggressiveness of the chemical. Changes in temperature, evaporation rate and humidity can affect the performance of a chemical resistant system. Generally, as a rule of thumb, chemical reactivity doubles or halves with a temperature increase or decrease of 18⁰F (10⁰C).

Typically, there is a correlation between the temperature of a chemical reagent and its reactivity. The higher the temperature, the greater the chemical reactivity and the more the aggressiveness of the chemical. Correspondingly, most chemical resistant coating and flooring surfacings will begin to soften as the temperature is increased and they will lose their chemical resistances, as well as a market reduction in their mechanical and physical properties.

CROSSFIELD PRODUCTS CORP.

Miracote® Product Line

CHEMICAL RESISTANCE and REFERENCE CHARTS

LONG TERM PERFORMANCE

The Company's chemical resistant systems are formulated to protect substrates from a variety of specific corrosive reagents and environmental combinations.

For long-term successful performance of a chemical resistant system, the following information should be implemented:

FREQUENCY OF MAINTENANCE

Frequency of housekeeping-maintenance may vary depending on chemical, concentration, combination, etc. Good housekeeping is always required, including the removal of deleterious chemicals, which normally requires neutralization. Caution should be exercised not to allow the system to be exposed to chemical attack for excessive durations or combinations of chemicals or physical abuse that exceeds the ratings contained in the Company's Chemical Resistance Guideline and System Recommendations.

Failure to maintain proper housekeeping can result in chemical changes in the reagent, such as, acid concentrations will increase when the water carrier or other dilutants evaporate. Generally, the higher the acidic concentration the more aggressive the acid, thus proper housekeeping is required to remove the potentially problematic chemical.

DISCOLORATION

Discoloration, such as dye, blemish, loss of gloss, spotting, staining, tarnishing, etc. may occur. Discoloration and its variation may not affect functional performance. However, it may affect appearance. Use of unpigmented products/systems may minimize discoloration. Use of certain colored pigments products or systems may mask discolorations.

TESTING

Additional testing may be required; consult with the Company prior to specifying, installing or exposure.

CLEANING, SANITIZING CLEANING and DISINFECTING PROCEDURES

Cleaning and sanitizing techniques, solutions, disinfecting compounds and other chemicals used, such as biocides, can affect the color, gloss, texture and performance of a chemical resistant product. As a precautionary step, the Company recommends that the end-user test their cleaning, disinfecting, etc., compounds on a sample or small finished area to determine if they will affect the performance or appearance of chemical resistant product. This test should be performed utilizing the intended cleaning technique and equipment prior to cleaning the entire surface area. As an example, some cleaning agents intended for

CROSSFIELD PRODUCTS CORP.

Miracote® Product Line

CHEMICAL RESISTANCE and REFERENCE CHARTS

use on adjacent surfaces, such as stainless steel, might be harmful to organic surfaces. Care must be taken to avoid contact.

The mechanical cleaning equipment and techniques need to be evaluated for compatibility with the chemical resistant system prior to use and must be used in accordance with the end user's written instructions.

If no deleterious affects are observed during the test, the procedure can be continued. If the cleaning and disinfecting compounds or cleaning techniques damage the product, modification of the cleaning materials and/or techniques will be required. Contact the Company for a technical service representative for additional information.

STEAM CLEANING

In most cases, steam cleaning at 212⁰F (100⁰C) may be used, provided that the wand and hoses are insulated and the direct contact temperature does not exceed 180⁰F (82⁰C) for a prolonged period of time, keeping the wand and hoses in constant motion across the surface during the course of cleaning.

CLEANING EQUIPMENT

Floor scrubber and buffing equipment with non-destructive and non-abrasive brushes and pads may be used to remove accumulation of dirt on the chemical resistant system. Micro scratching from cleaning equipment and techniques may reduce gloss. Check with the Manufacturer for a sealer or polish recommendation to restore the lost luster.

SLOPE TO DRAIN and TRENCHES

Sloping to properly functioning drains or trenches is critical and must be maintained at all times. Puddling or standing chemicals should be avoided to elude premature degradation of the system.

PERFORMANCE REVIEW

Methodical and judicious review of the entire area will detect potential integrity loss from unusual spillage or abusive damage, which could result in serious problems if not detected in their incipit stage.

If repairs are required, the Owner shall notify the installing Contractor and the Company immediately to prevent further damage to the system and/or the substrate. Regardless of the origin of the problem, remedial repairs should be executed without delay by the Contractor and the installing Contractor must be given free and unencumbered access to the area in need of repair.

CROSSFIELD PRODUCTS CORP.
Miracote® Product Line
CHEMICAL RESISTANCE and REFERENCE CHARTS

CHANGE IN USE

Change in the usage, chemical exposure or method of maintenance might have a negative affect. The Company and the installation Contractor should be advised and asked to assess the ability of the system to resist the new exposure conditions.

KEY TO CHEMICAL RESISTANCE CHART

<u>RATING</u>	<u>RATING DESCRIPTION</u>
R	Recommended for Secondary Containment (72 Hour Exposure) with Proper Clean Up.
S	Recommended for Intermittent Contact Splash and Small Spillage, without puddling or covering, with proper cleanup. Not Recommended for Immersion or Fumes, proper housekeeping required to clean up spills.
F	Fumes only, Not Recommended for Other Exposures
N	Not Recommended
d	Discoloration, including dye, blemish, loss of gloss, spotting, staining and tarnishing may occur. Discoloration and its variation may not affect functional performance.
t	Staining and Chemical Resistance Testing Required/Desired check list. Consult the Company prior to specification, installation or exposure. The "Test" column exists for use by the Specifier or End User to request uncured (liquid and powder) or cured samples for testing at their facility or designated laboratory to determine chemical resistance, stain resistance, etc. of specific chemicals. Contact the Company and make arrangements for "specific test specimen".

TESTED ITEMS and PROCEDURE

Normally, only the polymer product is tested rather than the system it is used in. This is done because many products are used in several systems, which would make the Chart longer and more complicated than necessary.