DUR-A-FLEX
INNOVATION FROM THE FLOOR UP

POLY-CRETE MDB SYSTEM

With Flintshot Broadcast, Shop Floor Grout Coat and Armor Top Topcoat

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DUR-A-FLEX
INNOVATION FROM THE FLOOR UP

PRODUCT DATA SHEET

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POLY-CRETE MDB

DESCRIPTION

POLY-CRETE MDB is a 100% solids aromatic cementitious urethane system with a broadcast aggregate. This system is typically installed at a nominal ¼ inch thickness. POLY-CRETE MDB uses a natural quartz aggregate. A topcoat of DUR-A-FLEX epoxy, urethane or methyl methacrylate is applied depending on performance requirements.

BENEFITS

- VOC Compliant
- CA 01350 Air Quality Compliant
- ADA Compliant
- Leed Credit Points Available
- Meets USDA, FDA and CFIA Standards
- National Floor Safety Institute (NFSI) Certified
- Hygienic - Does Not Harbor Bacteria
- High Chemical Resistance
- High Abrasion Resistance
- No priming required
- Wide Service Temperature Range,-100 to 220 F
- Can Be Applied To 7-14 Day Old Concrete

LIMITATIONS

This product is best suited for application in temperatures between 60°F and 85°F. Substrate must be clean, sound and dry.

TYPICAL USES

POLY-CRETE MDB is designed to protect concrete, polymer reinforced screeds, and water resistant plywood from chemical attack, corrosion, impact and thermal shock. It is also unaffected by freeze/thaw cycles.

- Aesthetic Considerations
- Wet Areas
- Commercial Kitchens and Restaurants
- Meat/Poultry and Dairy Processing
- Pharmaceutical Plants
- Processing Areas
- Exterior Applications

COLORS

Refer to the Color Selection Chart's wide range of standard colors; special color matches may be available.

PACKAGING/STORAGE

POLY-CRETE MD is available in pre-measured kits that cover 32 sq.ft. at 3/16 inch for ¼ inch finished thickness after broadcast. POLY-CRETE MDB must be stored dry. Do not use partial bags of aggregate. Do not allow resins to freeze. Every POLY-CRETE product will be shipped with a lot number on the label. The first two digits indicate the year; the second two show the month, the third two will be the day. The shelf life is 6 months from the date on the label in the original unopened container.

SURFACE PREPARATION

This product requires preparation in order to perform as expected. Surface must be profiled, clean, dry, oil free and sound. It is recommended that the perimeter edges of the floor area and doorways be keyed to produce a cross section ¼ inch deep by ¼ inch wide running at 6 inches away from and parallel to doorways, drains and walls. Please refer to the master Surface Preparation Guide on our website for more information.

APPLICATION METHOD

POLY-CRETE MDB should be applied to a properly prepared area at the required thickness using a steel bladed trowel, pin-rake, "V"-notched trowel or cam rake. The freshly placed material is then spike rolled into which the proper size quartz aggregate is broadcast to excess. Allow a minimum of 8 hours for the Base Coat to cure before sweeping, sanding or vacuuming. Apply the desired pigmented coat(s) to achieve the required finish. Use T.C. aggregates for better flow and leveling performance. POLY-CRETE COLOR-FAST or POLY- CRETE TF PLUS may be used to topcoat POLY-CRETE MDB systems. DUR-A-GLAZE NOVOLAC is also appropriate to use as a topcoat for POLY-CRETE MDB systems. **Refer to Poly-Crete MDB Application Instructions.**

GUIDE SPECIFICATIONS

This product is part of the DUR-A-FLEX family of polymer systems. Please contact DUR-A-FLEX for complete three part guide specs.

DRAWINGS AND DETAILS

Standard CAD drawings and details are available for coves, drains, breaches, transitions, etc. Please refer to the master Drawings and Details guide for actual drawings.

JOINT GUIDELINES
Refer to the Joint Guidelines for complete details on our website.

MOISTURE CONCERNS
Normal limits for moisture vapor transmission for Poly-Crete floor systems are 20 lbs./1,000 sq. ft./24 hour using the calcium chloride test per ASTM F-1869 or 99% relative humidity using in-situ Relative Humidity Testing per ASTM F-2170. Please refer to the Floor Evaluation Guidelines at www.dur-a-flex.com for complete details.

CHEMICAL RESISTANCE
Excellent resistance to organic and inorganic acids, alkalis, fuel and hydraulic oils, aromatic and aliphatic solvents.

CLEANING
Regular scrubbing will maintain these systems in serviceable condition. However, certain textures and service environments require specific procedures. Please refer to the master Cleaning Guide on our website for more information.

	Poly-Crete COLOR-FAST	DUR-A-GLAZE NOVOLAC	SHOP FLOOR w/ ARMOR TOP	POLY-CRETE TF PLUS
Cure Time @ 70°F Full Service	3 Days	24 hours	See application instructions	3-5 Days
Mix Ratio (by volume)	3 Component Kit	1 part hardener, 2 parts resin	See application instructions	3 Component kit
Working time @ 70°F	20 minutes	30 minutes	See application instructions	15 minutes
Adhesion to Concrete	> 400 psi, concrete fails before loss of bond	>400 psi, concrete fails before loss of bond	>400 psi, concrete fails before loss of bond	>400 psi, concrete fails before loss of bond
Heat Resistance Limit	220°F	250°F	200°F	220°F
Available Colors	Blue, Green, Charcoal, Grey, Dark Grey, Red, Chestnut	Medium Grey, Tile Red, Charcoal Grey, Slate Grey, Concrete Grey, Clear	See standard color chart	See Poly-Crete standard color chart

Physical Property	Test Method	Poly-Crete COLOR-FAST	DUR-A-GLAZE NOVOLAC	SHOP FLOOR w/ ARMOR TOP	POLY-CRETE TF PLUS
Hardness (Shore D)	ASTM D-2240	65 D	86-90 D	75-80 D	85 D
Compressive Strength	ASTM C-579	7,800 psi	14,000 psi	12,500 psi	7,250 psi
Tensile Strength	ASTM D-638	4,200 psi	2,500 psi	4,000 psi	750 psi
Impact Resistance	ASTM D-3134	Pass	Pass	Pass	Pass
Flexural Strength	ASTM D-790	5,076 psi	5,500 psi	6,250 psi	4,400 psi
Abrasion Resistance CS-17 Wheel 1000 GM Load 1,000 Cycles		ASTM D-4060 30 mg loss	ASTM D-1044 75 mg loss	ASTM D-4060 4 mg loss (gloss finish, with grit)	ASTM D-4060 50 mg loss
Static Coefficient of Friction*	ANSI B101.1	>0.6	>0.6	>0.6	>0.6
Dynamic Coefficient of Friction - Wet*	ANSI A326.3	>0.42	>0.42	>0.42	>0.42
VOC Content		0 g/L	0 g/L	0 g/L	0 g/L
Indoor Air Quality		CA 01350 Compliant	CA 01350 Compliant	CA 01350 Compliant	CA 01350 Compliant
Water Absorption	ASTM D-570	0.04%	0.05%	0.04%	0.04%

*Dur-A-Flex flooring systems can be built to meet or exceed the requirements of Static or Dynamic Coefficient of Friction testing per installation. Contact your Dur-A-Flex territory sales manager or tech representative for more information on alternative textures, grit/grip additives, or smooth coatings for your specific environment. A sample should always be obtained and tested prior to purchase for any non-slip flooring system.

IMPORTANT!

Before using DUR-A-FLEX products, read and understand its accompanying Safety Data Sheet & Application Instructions for important safety information.

STANDARD TERMS AND CONDITIONS OF SALE, INCLUDING STANDARD WARRANTY APPLY - VISIT **DUR-A-FLEX.COM** FOR THE LATEST VERSION

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POLY-CRETE MDB

IMPORTANT! Read these instructions carefully several days prior to starting your work. Seek answers to any questions you may have before you begin. DUR-A-FLEX, Inc. maintains a Technical Staff that will be glad to answer your questions and give you advice pertaining to your particular installation. Large areas will require two or more mixers.

POLY-CRETE MDB is a 100% solids aromatic cementitious urethane system with a broadcast aggregate. This system is installed at ¼" thick. POLY-CRETE MDB uses a natural quartz aggregate.

NOTE: Do not apply at a temperature below 60°F (16°C) or above 85°F (29°C). Do not apply to unreinforced sand cement screeds, asphalt or bitumen substrates, glazed tile or nonporous brick and tile, magnesite, copper, aluminum, polyesters, metal, or elastomeric membranes.

MOISTURE CONCERNS

Normal limits for moisture vapor transmission for Poly-Crete floor systems are 20 lbs./1,000 sq. ft./24 hour using the calcium chloride test per ASTM F-1869 or 99% relative humidity using in-situ Relative Humidity Testing per ASTM F-2170. Please refer to the Floor Evaluation Guidelines at www.dur-a-flex.com for complete details.

STORAGE CONDITIONS

POLY-CRETE MDB must be stored dry. Exposure of the aggregate to moisture for an extended period will cause lumps. Do not allow resins to freeze. Frozen (crystallized) hardener must be heated above 100°F to melt crystals. The shelf life is 6 months from the date on the label in the original unopened container.

SURFACE PREPARATION

Surface should be profiled, clean, dry, oil free and sound, Shot Blasting or grit blasting are the preferred preparation methods. Please refer to the master Surface Preparation Guide on our website for more information. It is essential that the perimeter edges of the floor area adjoining the walls, drains, adjacent to any doorways, machinery pedestals and either side of day work joints, be keyed to produce a cross section 1/4" deep by 1/4" wide running 6" away from, and parallel to the wall. Never feather edge POLY-CRETE MDB, always terminate in keyway groove at doorways and exposed edges. Refer to architectural drawings for details. Do not apply at temperatures below 60°F or above 85°F.

NOTE: For each application of material and before mixing, mark your batches to ensure you achieve your spread rate targets. This is best accomplished by dividing your target spread rate by the width of the area being coated (or your planned wet edge). Example: If your spread rate is 100 square feet and your area is 20 feet wide you would make a mark every 5 feet (100 divided by 20 = 5).

MIXING AREA

Select a convenient mix area as close as possible to the application area and protect the surface from spillage by covering with a layer of cardboard and/or a sheet of plastic. Be generous with the amount of space allocated for this function. Do not mix this product in direct sunlight or when temperatures exceed 85ºF. Exposure to high temperatures will greatly reduce the working time of this product.
DO NOT MIX UNTIL READY FOR IMMEDIATE USE.

PRIMING

Priming or sealing of the substrate is not required. On oily concrete slabs, HI-SPEED Detergent/Degreaser is recommended. Very porous substrates may be pre-primed with POLY-CRETE TF PLUS(allow to cure a minimum of 6 hours @70°F) to prevent resins from being absorbed prematurely by substrate outgassing. Priming is required when broadcasting F60 sand.

APPLICATION METHOD

POLY-CRETE MDB is applied by "Pin Rake" or ½" V-notched trowel or cam rake or "trowel method", and is typically applied at a thickness of 3/16". With broadcast and topcoat, POLY-CRETE MDB has a finished nominal system thickness of 1/4". Lay out installation in sections to allow full width to be finished in 15 minutes (@70°F) or less to assure absence of placement lines. (Approximately 15 feet for single mixes and 15-30 feet for double batches.)

A. POLY-CRETE MDB is supplied in pre-measured units consisting of one pail of resin, one pail of hardener and one bag of aggregate (powder) - a mixed kit yields ~32 sq ft of coverage. Pour resin into a 5-gallon pail; scrape bottom and sides to assure that all pigment is

transferred. The resin and hardener should be pre-blended for approximately 30 seconds. A Bird Cage mixer is **not recommended** for this product, however a low speed <500 rpm high torque power drill and a 5-inch spiral mixing blade may be used. Gradually add aggregate until a homogeneous mix is attained. (Approximately 1 minute) THOROUGH BLENDING IS MANDATORY. A properly mixed batch applies easier and has a uniform surface appearance. Incomplete mixing will cause an inconsistent finish or possible blistering. Have three mixing buckets that are rotated to assure minimum time between mixes. To avoid irregular curing or blisters, regularly clean the mixing blade and pail to avoid combining fresh material with older batches. Material should be applied directly onto the wet edge immediately after mixing.

B. Pour the entire batch onto the floor and spread with a 24" pin rake set at 1/8" inch higher than the applied thickness of the screed. For a 3/16" thick floor set rake to ¼". To avoid transition lines between mixes, it is very important that the material is poured directly onto the wet edge.

C. When applying on level or surfaces sloped up to ¼"/foot, the product is used as supplied. For more steeply sloped surfaces such as ramps that are up to ¾"/foot, adding 1 gallon of Q11 (Q-Rok #3) to each mix will prevent sagging while still providing a uniform surface after pinrolling.

D. Check pin rake every 1,000 sq feet for pin wear. Adjust or have new rake ready to avoid interruption in process.

E. Trowel edges, drains and around equipment supports with an even pressure and a low angle trowel in a sweeping motion to complete troweling. This ensures that new batches of material are blended together with no transition lines for continuity of finish.

F. Immediately roll and then cross roll with a 15/16" spiked roller to eliminate lines and help release air.

G. Spike Rolling must be completed immediately after leveling of material to eliminate any residual roller marks in the finished surface (Within 12 minutes of mixing @ 70° F).

H. The aggregate must be broadcast UP into the air while dispersing evenly and vertically at an approximate rate of 1 pound per sq. ft. into the wet surface. Apply at a rate of two mixes behind the wet edge, ensuring that the surface is completely covered. Broadcasting should be completed within 15 minutes of mixing each batch. Do not spike roller areas that have been broadcast.

The time window at which MDB is broadcast is extremely critical:

- **at 80°-90° F you have 12 minutes in which to complete broadcast**
- **at 70°- 80° F you have 15 minutes in which to complete broadcast**
- **at 55° - 65° F you have 17 minutes in which to complete broadcast**
- **Too early and the surface may become uneven**
- **Too late and the aggregate may not penetrate into the matrix surface.**
- **Allow to cure for a minimum of 8hrs (@70°F) Remove excess aggregate by brush. (Do Not Sand)**

JOINT GUIDELINES

Refer to the Joint Guidelines for complete details on our website.

PREPARATION OF PLYWOOD FOR APPLICATION OF POLY-CRETE MDB

1. Plywood should be new and free of contamination (clean and dry). Marine grade plywood is recommended.
2. Installations over existing concrete or substrates with a possible chance of moisture contamination transfer should be isolated using a polyethylene vapor barrier; all joints should be taped according to manufacturer's instructions. Raised platforms should have consideration for airbricks in outside walls to reduce the risk of excessive dampness.
3. It is recommended that 2 layers of plywood be installed offset at joints to reduce flexing between joists. Plywood should be at least ¾" thick.
4. Plywood should be positively fastened with high quality construction adhesive and recessed screws at 6" on center screw pattern.
5. Bandage joints using a mixture of ELAST-O-COAT 100% solids epoxy and NO SAG #1, embedding a minimum of 8" of Close weave fiberglass matting into the wet resin.
6. All key ways should be installed by the use of a Skill type saw with a ¼" wide blade set to ¼" deep. (Concrete diamond cutting blades will burn and not cut wood)
7. Any drain detail must be keyed a minimum 2 inches away from the drain edge with the outside exposed edge removed to a slope using a wood chisel. Doorway thresholds should be treated in a similar way to allow a smooth transition for the termination of the material.
8. Detail such as cold joints should also be cut using a Skil saw detail as per concrete CAD drawing detail.
9. Plywood should be thoroughly vacuumed prior to installation.

TOPCOAT INSTRUCTIONS

POLY-CRETE COLOR-FAST, DUR-A-GLAZE NOVOLAC or POLY-CRETE TF PLUS is used to top coat POLY-CRETE MDB systems. Refer to POLY-CRETE COLOR-FAST, DUR-A-GLAZE NOVOLAC, or TF PLUS Application Instructions.

CURE

Allow a minimum of 8 hours cure before light foot traffic at 70°F, and a minimum of 24 hours is required at 60°F. Additional time must be allowed for heavier loads or lower temperatures. Contact the DUR-A-FLEX Technical Department for more information.

LIMITATIONS

Exposure to ultraviolet light will change the color of POLY-CRETE MDB (blue and grey). Sunlight and metal halide lighting will cause yellowing without affecting the performance.

IMPORTANT!

Before using DUR-A-FLEX products, read and understand its accompanying Safety Data Sheet.

STANDARD TERMS AND CONDITIONS OF SALE, INCLUDING STANDARD WARRANTY APPLY - VISIT **DUR-A-FLEX.COM** FOR THE LATEST VERSION

CAUTION! As with all chemical products, individuals may have different reactions to exposure to specific products. This is dependent upon many factors, including the individual's personal characteristics, the size of the installation, the ventilation available, the intensity of the exposure or the length of the exposure. Individuals may experience discomfort during the installation process of one product, but not another.

In some cases this is experienced as a skin irritation and in others it is experienced as an inhalant irritation. Typically, it disappears once the exposure is eliminated. In some cases people can become "sensitized" to a product and experience the discomfort every time there is exposure without Personal Protective Equipment ("PPE").

To protect yourself from various exposures or discomfort during the mixing and application of our products, we recommend covering exposed skin including, using gloves, long sleeves, safety glasses and a respirator such as the 3M 8577 P95 Universal Disposable Carbon Respirator or a cartridge respirator.
Use only as directed. KEEP OUT OF REACH OF CHILDREN.

Do not reseal moisture-contaminated hardener. This will result in carbon dioxide generation or possible violent rupture of container.

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FLINTSHOT, Q-ROK, F-60 QUARTZ AGGREGATE

DESCRIPTION

DUR-A-QUARTZ FLINTSHOT is a naturally rounded, translucent quartz aggregate produced specially for seamless polymer flooring applications. The very hard quartz granules are sieved for a selected size range.

DUR-A-QUARTZ Q-ROK is an aggregate produced specifically for seamless polymer flooring where a high degree of slip resistance is desired. The base material is a naturally formed, semi-angular, very hard quartz granule. The material is cleaned, dried and sieved for a selected size range.

DUR-A-QUARTZ F-60 is a naturally-rounded, whole grain sand sized for consistent particle size and distribution. It is commonly used as a filler in troweled or self-leveling aggregate blends.

SIEVE ANALYSIS

(Typical Analysis- Not Specifications)

U.S. Mesh	FLINTSHOT QUARTZ	Q-ROK QUARTZ	F-60	SPECIAL BOND
16	-	40	-	-
-	-	-	-	-
20	<1	55	-	-
30	23	3	-	-
40	70	1	1	3.0
50	6	<1	22	21.5
70	<1	-	38	34.1
100	-	-	30	28.3
140	-	-	8	11.0
200	-	-	1	1.9
270	-	-	-	0.1

HARDNESS 6.5 - 7 on Moh's Mineral Scale

POROSITY less than 2.0%

MOISTURE CONTENT less than 0.5%

PACKAGING

Flintshot, Q-Rok, F-60 available in 50lb. bags only

CAUTION

Follow the Hazardous Materials Identification System labeling guide for proper personal protective equipment to use when handling this product. Use only as directed. KEEP OUT OF REACH OF CHILDREN. Before using any Dur-A-Flex products, be sure the Safety Data Sheet is read and understood.

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SHOP FLOOR

DESCRIPTION

SHOP FLOOR Epoxy Flooring is a combination of pigmented DUR-A-GLAZE SHOP FLOOR, a 100% solids epoxy and Flintshot, a natural quartz sand. The epoxy and the quartz aggregate are fused together during application into a monolithic surface that is extremely durable, thickness ranges from 1/16"-1/4". SHOP FLOOR Epoxy Flooring is similar in application technique, durability and chemical resistance to the time tested DUR-A-QUARTZ Epoxy Flooring. It is available in three different textures; standard non-skid, orange peel and smooth.

BENEFITS

- Low Odor
- Meets USDA, FDA, OSHA standards
- Superior Adhesion
- Superior Chemical Resistance
- Easy Maintenance

LIMITATIONS

This product is best suited for application in temperatures between 60º F and 95º F. Substrate must be clean, sound and dry.

LIGHT COLOR SHOP FLOOR MUST BE APPLIED OVER A PIGMENTED PRIMER, MATCHING BROADCAST, AND/ OR PIGMENTED GROUT COAT - FAILURE TO DO SO WILL RESULT IN BLOTCHY OR STREAKY COLOR OF THE FINAL SYSTEM.

TYPICAL USES

SHOP FLOOR Epoxy Flooring is designed for use wherever USDA, OSHA, FDA and EPA standards must be met. It can be applied on most sound substrates including concrete, quarry tile, brick pavers, plywood floors, etc. It is ideally suited for heavy-duty industrial applications, particularly in areas requiring durability, easy maintenance, a high degree of sanitation, and high acid and chemical resistance. SHOP FLOOR Epoxy Flooring will protect a new concrete floor from industrial abuse and harsh chemical spillage, and it will restore deteriorated concrete into a better than new condition. Typical areas of application:

- Laboratories
- Traffic Aisles
- Machine Shops
- Walk In Coolers
- Clean Rooms
- Manufacturing Areas
- Fire Stations
- Pharmaceutical Plants
- Mechanical Rooms
- Animal Care Areas

COLORS

SHOP FLOOR is available in 15 standard colors. The color *White is only available for use with the DUR-A-GARD S/L 100 mil system.* Please refer to the Standard Color Chart on our website. Custom colors are available upon request.

PACKAGING

SHOP FLOOR is available in 1-gallon cans, 5-gallon pails, and 50-gallon drums. Flintshot quartz sand is available in 50 lb bags.

SURFACE PREPARATION

This product requires preparation in order to perform as expected. Substrate must be profiled, clean, sound, and dry. Substrate must be primed with DUR-A-SHIELD, DUR-A-GLAZE WB PRIMER, DUR-A-GLAZE MVP, or ELAST-O-COAT. Please refer to the Surface Preparation Guide on our website for more information.

APPLICATION METHOD

SHOP FLOOR is applied by the broadcast method. When recommended spread rates are followed, a Flintshot double broadcast produces a nominal 1/8" thick finish. See the full Application Instructions for further details on installation.

GUIDE SPECIFICATIONS

This product is part of the DUR-A-FLEX family of polymer systems. Please contact DUR-A-FLEX for complete three part guide specs.

DRAWINGS AND DETAILS

Standard CAD drawings and details are available for coves, drains, breaches, transitions, etc.

JOINT GUIDELINES

Refer to the Joint Guidelines for complete details on our website.

MOISTURE CONCERNS

Please refer to the Floor Evaluation Guidelines at www.dur-a-flex.com for complete details.

CHEMICAL RESISTANCE

This product is resistant to many common chemicals. Please refer to the master Chemical Resistance Chart on our website for actual resistance to specific chemicals/reagents.

CLEANING

This product is considered to be a low maintenance flooring solution; however, certain textures and service environments require specific procedures. Please refer to the master Cleaning Guide on our website.

SPECIAL PURPOSE FORMULATIONS

DUR-A-GLAZE #4 "Regular" – For most typical installations under normal conditions.

DUR-A-GLAZE #4 "Fast" – Use for intermediate coats in room temperature areas where fast turnaround is desired.

DUR-A-GLAZE #4 "Water Clear" - Ideal for top - coating quartz floors. Has excellent color retention. May be used in warm temperatures when longer pot life is required.

SHOP FLOOR TECHNICAL INFORMATION		
Physical Property	**Test Method**	**Result**
Hardness (Shore D)	ASTM D-2240	75-80
Compressive Strength	ASTM D-695 ASTM C-579	17,500 psi 12,500 psi
Tensile Strength	ASTM D-638 ASTM C-307	4,000 psi 2,600 psi
Tensile Elongation	ASTM D-638	7.50%
Flexural Strength	ASTM D-790 ASTM C-580	6,250 psi 4,500 psi
Flexural Modulus of Elasticity	ASTM D-790	6.2×10^5
Coefficient of Linear Expansion	ASTM D-696	2×10^{-5}
Bond Strength to Concrete	ASTM D-4541	400 psi substrate fails
Indentation	ML D-3134	.025 MAX
Impact Resistance	ML D-3134	Pass
Water Absorption	ASTM D-570	0.04%
Heat Resistance Limitation		140°F - 200°F
Flammability	ASTM D-635	Self Extinguishing
Flame Spread/NFPA 101	ASTM E-84	Class B
Abrasion Resistance CS-17 Wheel, 1000g load, 1000 cycles	ASTM D-4060	10 mg loss
Static Coefficient of Friction#	ASTM D-2047	>0.6
Dynamic Coefficient of Friction - Wet#	ANSI/NFSI B101.1	>0.42
VOC Content		8 g/L

* Pot life is shorter at higher temperature. Do not use below 55°F or above 95°F.

** Fast Hardener is to be used for applications between 40°F and 55°F.

#Dur-A-Flex flooring systems can be built to meet or exceed the requirements of Static or Dynamic Coefficient of Friction testing per installation. Contact your Dur-A-Flex territory sales manager or tech representative for more information on alternative textures, grit/grip additives, or smooth coatings for your specific environment. A sample should always be obtained and tested prior to purchase for any non-slip flooring system.

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ARMOR TOP™

DESCRIPTION
ARMOR TOP is a two, three or four component aliphatic urethane protective coating. It was formulated for high traffic areas to protect against chemicals and wear. It is available in either a clear or pigmented, gloss or satin finish, and with or without high wear resistant aluminum oxide (grit).

BENEFITS
- VOC- 0 g/L clear (pigmented - see Tech Info)
- Low Odor
- Light Stable
- Excellent Abrasion Resistance, 3 to 4 times better than other urethanes; 9 times better than epoxies
- Excellent Chemical Resistance

TYPICAL USES
It is designed to be used as a final topcoat over DUR-A-FLEX epoxy systems.

COLORS
ARMOR-TOP is available clear or in 15 standard colors. Please refer to the Standard Color Chart on our website. Custom colors are available upon request.

LIMITATIONS
ARMOR TOP should not be applied more than 3 mils wet. During application, DO NOT use 9 inch rollers and make sure that the floor temperature and materials are between 60°F and 80°F. Do not coat floor if moisture is present. Do not coat floor unless floor temp is more than 5 degrees over the dew point. Do not apply if RH >80%. Do not apply ARMOR TOP over epoxies cured with FAST hardener. ARMOR TOP should be pigmented when applied over pigmented systems. Dry Time is slower when Relative Humidity is less than 30%. For vertical applications, two coats are required – the second coat must be applied within 24 hours of the first. Do not apply Armor Top clear with Armor Top grit on a smooth floor (like Dur-A-Gard, ReFLEXions, etc.) as roller lines may be visible.

For applications where humidity is less than 30% use ARMOR TOP LH. This is available in gloss finish only. Tack-free time is approximately 6 hours. All other data remains the same as standard ARMOR TOP gloss.

APPLICATION INSTRUCTIONS
Refer to the Armor Top Application Instructions on our website for details.

KIT SPREAD RATES	Standard	LH
Gloss Clear (w/grit)	575 SF/kit	650 SF/kit
Gloss Clear (no grit)	550 SF/kit	625 SF/kit
Gloss Pigmented (w/grit)	700 SF/kit	775 SF/kit
Gloss Pigmented (no grit)	675 SF/kit	750 SF/kit

	Standard
Satin Clear (w/grit)	775 SF/kit
Satin Clear (no grit)	750 SF/kit
Satin Pigmented (w/grit)	850 SF/kit
Satin Pigmented (no grit)	825 SF/kit

NOTE: Armor Top is sold in kits only. Spread rates vary due to differences in gloss and satin kit sizes.

MOISTURE CONCERNS
Please refer to the Floor Evaluation Guidelines in the Contractor's Center of our website.

JOINT GUIDELINES
Refer to the Joint Guidelines for complete details on our website.

PACKAGING
ARMOR TOP is available in kits only.

CLEANING
This product is considered a low maintenance flooring solution; however certain textures and service environments do require certain procedures. Please refer to the master Cleaning Guide on our website.

CAUTION
Follow the Hazardous Materials Identification System labeling guide for proper personal protective equipment to use when handling this product. Use only as directed. **KEEP OUT OF REACH OF CHILDREN.**

ARMOR-TOP TECHNICAL INFORMATION			
VOC		Clear - 0 g/L Pigmented <100 g/L, except for safety red and tile red which are <120 g/L	
% Solids by Weight % Solids by Volume		95.2 92.5	
Tensile Strength	ASTM 2370	7,000 psi	
Hardness	ASTM D 3363	>4H	
Taber Abrasion Resistance A&B 1000g load, 1000 cycles, CS-17 wheel after full cure	ASTM D 4060	Satin Finish with grit - 8 mg loss no grit - 12 mg loss	Gloss Finish with grit - 4 mg loss no grit - 10 mg loss
Adhesion	ASTM D-4541	Substrate Failure	
UV Resistance		Excellent	
Static Coefficient of Friction	ASTM D-2047	>0.6	
60° Gloss	ASTM D-523	Satin: 50 +/-10 Gloss: 75 +/-10	
Mixed Viscosity (Brookfield, 25°C, CPS)		500	
Flash Point, Closed cup test		110°F	
Pot Life, 70°F, 50% RH		45 minutes	
Working time on floor, 70°F, 50% RH		Armor Top Satin: 10 minutes Armor Top Gloss: 10 minutes	
Recoat Window		<24 hours	
Tack Free Time (hrs.) 90°F, 80% RH 90°F, 50% RH 90°F, 35% RH		Armor Top Satin 1 hour 2 hours 4 hours	Armor Top Gloss 1-3/4 hours 3-1/2 hours 5 hours
75°F, 80% RH 75°F, 50% RH 75°F, 35% RH		1 hour 3 hours 5 hours	2 hours 4 hours 6 hours
60°F, 80% RH 60°F, 50% RH 60°F, 35% RH		2 hours 3 hours 6 hours	2-1/4 hours 4 hours 7 hours
Return to Service		24 hours	
Full Chemical Resistance		7 days	

DUR-A-FLEX
INNOVATION FROM THE FLOOR UP

STANDARD COLORS

These colors apply to Epoxy, Methacrylate (MMA), Accelera, Thin Mil Urethane topcoats, Add-A-Color field mixed pigments, and Dur-A-Glaze #4 Field Pigment Packs.

WHITE**

IVORY*

BEIGE

LIGHT GREY

MEDIUM GREY

SLATE GREY

CONCRETE GREY

CHARCOAL

SMOKE BLUE

CARAMEL*

SAFETY RED*

TILE RED

BRIGHT YELLOW†

GREEN#†

BLACK#

CUSTOM COLORS AVAILABLE

Due to chemical composition, thickness, application methods and job site conditions, individual colors may vary across product lines.

Colors may be affected by age, heat and exposure to sunlight. Opacity can vary between products. Please request an actual color sample of the system that you are considering to confirm the most accurate representation.

*Not available in MMA **Not available in Shop Floor #Not available in Armor Top
†Not available in Dur-A-Glaze #4 Field Pigment Packs

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SURFACE PREPARATION GUIDELINES

DUR-A-FLEX, INC. has developed this document to help Facility Owners, Architects, Engineers, Specification Writers, and Contractors gain a better understanding of the importance of a properly prepared substrate, and the methods to achieve an appropriate bond. This document is intended to be a general guideline, for specific jobsite information, please contact your local DUR-A-FLEX Representative.

There are many satisfactory methods of preparing a substrate to receive a DUR-A-FLEX flooring system. The preparation method is typically chosen based on service requirements, time allowed for entire process and accessibility.

PERSONAL PROTECTION EQUIPMENT

It is the responsibility of the surface preparation contractor and the flooring contractor to insure that all personnel are properly protected from hazards. DUR-A-FLEX is committed to promoting awareness regarding these potential hazards. All DUR-A-FLEX products are rated according to the Hazardous Material Identification System (HMIS). OSHA regulations specify when, where and how workers are to be protected. These regulations and the local OSHA officials should be consulted as necessary to insure proper protection, compliance with the law, and to avoid liability issues. Safety and health issues should be addressed prior to the start the job.

TESTING

MOISTURE CONCERNS

Please refer to the Floor Evaluation Guidelines in the Contractor's Center of our website to assist in determining the condition of the concrete.

Testing For An Existing Sealer

Test to see if the floor is "sealed" by pouring a small amount of muriatic acid on the floor in several spots. If it "froths" instantly, the floor is not sealed. If the acid doesn't froth immediately, a sealer and/or paint is present and must be removed by scarifying, steel shot blasting or other mechanical methods.

Salt Contamination Testing

Salt contaminated slabs that contain steel reinforcement are very susceptible to corrosion of the reinforcing steel. As the steel corrodes it expands causing cracking, delamination of concrete and any toppings bonded to it and eventually, structural failure of the slab. Obvious signs of chloride or salt contamination are spalled concrete with exposed, rusted reinforcing steel. Testing is recommended to determine the depth of contamination and the extent of corrosion activity. A Litmus Test for pH will determine the presence of chloride or acid contamination, if the pH is below 10.

Bond Test

The purpose of the bond test is to make sure preparation method is adequate for the primer to bond to the substrate. The test is done only when applying MMA systems. For more information on bond test refer to CRYL-A-PRIME data sheet on our website @ www.dur-a-flex.com.

REMOVAL AND REPAIR

ASTM D 4258-83 Standard practice for surface cleaning concrete for coating.
This practice includes surface cleaning of concrete to remove grease, dirt, and loose material prior to the application of coatings. Procedures include vacuum cleaning, air blast cleaning, water cleaning, detergent water cleaning, and steam cleaning.

Removal of bond inhibiting contaminants
This includes, but is not limited to removal of oils, grease, wax, sealers, curing compounds, laitance, salts and any other hydrocarbon based materials. This will ensure that a good bond takes place between the resinous flooring and the concrete substrate.

Removal of Adhesives, Mastics and Membranes
In many retrofit projects, existing tile, VCT or sheet goods are being replaced with polymer flooring systems. Removal of the floor finish will often leave a layer of some type of mastic, adhesive or membrane. In thin applications these materials can often be totally cleaned up by shotblasting the concrete. In thicker applications, the steel shot will tend to bounce, requiring additional preparation with the use of scarifying equipment or possibly even the use of chemical strippers. Wherever possible, consult the DUR-A-FLEX Tech Service Department or your local DUR-A-FLEX Flooring Contractor and schedule a site visit to investigate the best removal methods.

Removal of Existing Seamless Floor

Like mastics and adhesives, the need to remove an existing seamless floor will occasionally arise. There has been much progress made in the development of equipment for removal of resurfacers. Typically, removal requires a heavy grinder with "rotating heads". These heads can be outfitted with different "teeth" or carbide "blades" for removal of a particular type of overlay.

REASONS FOR SURFACE PREPARATION

Surface preparation of a concrete substrate is required to remove surface laitance to create a surface profile and porosity for adhesion of polymer floor systems.

METHODS OF SURFACE PREPARATION

Care should be taken to define the degree of abrasion required for the coating system so that the concrete will not be eroded beyond what is necessary. All concrete surfaces should be abraded to remove laitance and contaminants. The following Table describes the required profiles according to the ICRI guidelines for various coating systems.

Coating	Coating Thickness	Concrete Surface Profile (CSP)
Sealers	3 mil	CSP 2-3
High-Build	10-40 mil	CSP 3-4
Self Leveling	50 mils-1/8"	CSP 4-5
Polymer Overlay	1/8-1/4"	CSP 5-7

Shotblasting
Shotblasting is the recommended method of surface preparation of concrete for most polymer floor installations. Shotblast equipment utilizes an alloy wheel spinning at high speeds to throw small steel particles at the substrate in a controlled, dry, 99% dust-free operation. This process removes surface contamination, adds profile and vacuums the concrete clean in one process. The size and angularity of shot, along with the travel speed of the unit, can be adjusted to determine the degree of the surface profile. Because shotblasting is a dry preparation process, it allows the installation to begin immediately after completion of prep (surface must be dry before blasting). Shotblasting will also identify weak areas in the surface of the concrete. **NOTE:** When selecting shotblast preparation for thin film coating systems (under 20 mils) be aware that a blast pattern or track lines may be visible.

Diamond Grinding
Diamond grinding should only be used in areas inaccessible to shotblasting and then only with coarse diamond wheel.

Scarifying
Scarifying is primarily used for the removal of deteriorated concrete, coatings and polymer flooring systems.

Hand Tool
Hand tool preparation consists of the use of mechanical tools and equipment designed to abrade or chip away the surface of the concrete. Common tools available include chipping hammers, hand held diamond grinders and concrete crack chasing saws. These tools are typically used to make keyways, prepare edges against walls and columns.

TYPES OF SUBSTRATES

Regular Concrete
Regular concrete surface must be prepared with a steel shot-blast machine, scarifier or diamond grinder. Floors with oil, grime and grease should first be cleaned with Simoniz 969 Cleaner/Degreaser before preparing. Allow floor to dry. Good ventilation, fans and/or auxiliary heat will accelerate drying time. Do not use oil fired portable heaters.

Replacement of Structurally Deteriorated Concrete
Replacement of structurally deteriorated concrete must be done in accordance with The International Concrete Repair Institute (ICRI) Bulletin. Patching material must be a DUR-A-FLEX approved patching material. Make sure of minimum cure time before installation of resinous flooring. DUR-A-FLEX flooring Contractors should be contracted whenever possible to complete these repairs appropriately.

Fiber Filled Concrete
Fiber filled concrete must be burned with a propane weed burner, swept and vacuumed perfectly clean and then primed. When primer has completely cured, the floor must be sanded and tack ragged (This step may not be necessary for thick resurfacing systems).

Quarry/Ceramic Tile
Quarry/Ceramic tile have been successfully resurfaced on many projects without removal of tile and setting bed. A site investigation along with cores through the entire slab will help identify the type of setting bed, the existence of any waterproofing membranes, additional toppings, or other unusual existing conditions. Water trapped within the floor will create long-term sanitation and performance problems.

If the tile is well bonded and placed over an unsaturated latex setting bed, the floor may be resurfaced as follows: Surface must be mechanically abraded with a steel shot-blast machine, scarifier or diamond grinder and vacuumed perfectly clean. "Tack rag" area to remove dust and to soften surface. Apply DUR-A-FLEX recommended Poly-Crete or Hybri-Flex systems or DUR-A-GLAZE TIECOAT II or CRYL-A-PRIME P-101 with CRYL-A-BOND MT primer to the entire area immediately and allowed to cure.

Existing Epoxy Coating/Resurfacer
Existing seamless floors may be resealed or resurfaced from time to time due to excessive wear or the need to change the appearance or skid-resistance of the floor. The existing floor should first be cleaned and degreased with EZ-CLEAN floor cleaner/degreaser. It must then be mechanically abraded with a floor-sanding machine or a steel shot blast machine to totally remove gloss. Vacuum perfectly clean. "Tack rag" area to remove dust and to soften surface. Apply DUR-A-GLAZE TIE-COAT II to entire area immediately followed by subsequent epoxy coatings.

Plywood
The plywood substrate must be sound and non-flexing under the expected load. Typical plywood substrate must be exterior or marine grade, new, clean, and smooth finish (NO KNOTS).

Two layers with staggered joints are required. Plywood should be positively fastened to the existing surface with a high quality construction adhesive as well as a 6" screw pattern.

For further information on plywood substrates, please contact your local sales representative or DUR-A-FLEX technical department.

Walls
For Dur-A-Wall Applications:

Block wall: Apply Dulux (ICI) block filler to fill pores over new or existing concrete block following manufacturer's instructions.

Drywall: Drywall must be finished to a level #4 or #5 finish prior to coating. Prime with ICI GRIPPER Multipurpose primer or GLIDDEN GRIPPER primer. Substrate will affect final appearance of wall coating.

Cast in place Concrete and Ceramic Tile:
Use DUR-A-GLAZE RAPID PATCH for cracks, holes, spalls, and voids in concrete up to ¼" thick. **Multiple applications of filler material maybe necessary. Sand or grind between coats to achieve a smooth surface.**

NOTE: Tile and block grout lines may "mirror through" the finished system even though the surface is smooth.

CRACKS AND JOINTS

Refer to Joint Guidelines for complete joint details on our website in the Contractor Center section @ www.dur-a-flex.com.

Use DUR-A-GLAZE RAPID PATCH for cracks, holes, spalls, and voids in concrete up to ¼" thick.

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FLOOR EVALUATION & GUIDELINES

Flooring problems on concrete from vapor emission, dew point, alkalinity; pH, etc. cause millions of dollars in repair and replacement costs annually. By recognizing potential problems, testing for and mitigating them, steps can be taken to ensure a long lasting, successful flooring installation.

What is Moisture Vapor Emission?
Water is added to turn cement, sand and aggregate into a concrete slab. There is a critical volume of water needed to "hydrate" the concrete and an excess volume of water used to make the concrete pour-able and workable. It is this excess that can emit from the slab. Moisture is also a concern when the concrete slab has no vapor retarder installed, or the vapor retarder has been punctured.

How does moisture move through the slab?
Capillary moisture: ground water touches the bottom of the concrete slab, and wicks into the concrete through microscopic bleeder water channels until it reaches the coating surface. As the water comes through the slab, it brings calcium/sodium salts with it that can degrade the bond line and cause the coating to delaminate.

Osmotic Moisture: actual water vapor transmission through the concrete slab condenses again at the bond line and causes the same problem as in the capillary moisture case. This can happen when the water table is far below the slab with an improperly installed or missing vapor barrier. Three conditions are needed for osmosis to occur: a semi-permeable membrane, which can be the polymer primer or the upper layers of the slab, a gradient of ionic activity (soluble salts, which are indigenous to concrete), and a source of moisture vapor. If any one of these three things is removed, osmosis cannot occur.

Hydrostatic: the surrounding water table is higher than the concrete slab on grade. Because water seeks its own level, it is forced through the slab under pressure. Both the pressure and the water cause the coating to delaminate.

The volume of moisture that can pass through a slab depends on the porosity of the slab. Porosity is a direct result of the water/cement ratio in the concrete mix design. As the water/cement ratio increases, the porosity of the concrete increases exponentially.

What is the traditional failure mode because of "moisture" problems? There are two ways a polymeric floor can fail: (1) the floor system was never able to bond properly at the time of installation or (2) there were factors present at the time of installation to cause the bond to fail. Symptoms of failure on an already installed floor may include bubbles, blisters and/or delamination.

What causes a polymeric floor to fail?
Traditional theory has focused primarily on moisture failure such as capillary and hydrostatic, however more recent research has found that although moisture plays a role, it may not be the only factor. In reality, the presence of ionic compounds in the concrete can also play a role. Specific ionic components of the surface chemistry of the slab (the top 0 - 3/16"(5mm)), when present at certain levels, can cause a failure to occur.

Concrete defects resulting from alkaline-silicate reaction (ASR) or alkaline-aggregate reaction (AAR) within the slab may also contribute to floor failure.

How do I test my floor?
Dur-A-Flex has developed a chart to assist you with identifying the moisture limits for each type or Dur-A-Flex resin/flooring system. If you are planning to use our Epoxy or MMA, Dur-A-Flex recommends using in-situ Relative Humidity Testing per ASTM F-2170 as a quantitative test method. Although traditional calcium chloride testing may be used, RH differs in that it is not significantly impacted by ambient temperature and relative humidity conditions in the building and thus likely to provide more accurate readings. The use of calcium chloride testing on lightweight concrete on elevated decks is not recommended.

In cases where a product can tolerate high levels of moisture such as Poly-Crete, Hybri-Flex or Dur-A-Glaze MVP, Dur-A-Flex may recommend that cores be taken and analyzed to determine the levels of ionic components (salts) in the slab. Dur-A-Flex offers in-house core testing using ion-chromatography technology. Refer to the Dur-A-Flex Core Analysis Program on our website for more information.

Note: Test results from cores taken after osmotic blistering has already occurred may not be accurate due to the ionic components transferring from the substrate to the blisters.

Dur-A-Flex Floor Evaluation Guidelines

Resin system	EPOXY	MMA	URETHANE		HYBRIDS	MITIGATION
Product Group	Dur-A-XXX, Shop Floor	Cryl-A-Flex	ACCELERA™	Poly-Crete®	Hybri-Flex®	Dur-A-Glaze MVP Primer
Calcium Chloride (CaCl) - lbs. maximum per 1,000 SF per 24 Hrs. (per ASTM F1869)	3	5 (with bond test)	3	20*	20*	20*
Relative Humidity (RH) - % maximum (per ASTM F2170)	75%	85% (with bond test)	75%	99%*	99%*	99%*

	* POLY-CRETE, HYBRI-FLEX and DUR-A-GLAZE MVP
Old Concrete (>1 yr. old)	Core analysis testing is recommended to rule out the potential for osmotic blistering caused by higher than normal levels (see below) of soluble ion (salt) deposits at or near the surface. Refer to the Dur-A-Flex Core Analysis Program.
New Concrete (<1 yr. old)	Core testing is not required if NO concrete curing compounds, hardeners, or densifiers were used. The use of any of these products may cause soluble ion (salts) deposits at or near the surface to exceed normal levels (see below), potentially producing conditions for osmotic blistering. In these cases Dur-A-Flex recommends a core analysis to determine if these levels are suitable for an installation. Refer to the Dur-A-Flex Core Analysis Program.

The following data is based on testing of a concrete substrate profiled per Dur-A-Flex Surface Preparation Guidelines and free of any contaminants that could increase levels of the soluble ions listed. This data is to be used as a guide only. Please contact your local Dur-A-Flex Sales Representative or the Dur-A-Flex Technical Departments for a thorough analysis of your results.

Normal Soluble Ion Levels in Substrate (parts per millions)

Sodium (Na)	~200-800 ppm
Potassium (K)	~200-800 ppm
Chloride (Cl)	~10-100 ppm
Sulfate (SO4)	~1500-5500 ppm

Pre-installation Acceptable Soluble Ion Levels in Substrate by Product (combined Na, K, Cl):

Epoxy, MVP, MMA , ACCELERA	1600 ppm
Poly-Crete SLB, MD, HF (w/topcoats), Hybri-Flex E, M or A	3200 ppm
Poly-Crete MD, HF (no topcoats)	4800 ppm

In all cases, Dur-A-Flex, Inc. products must be applied as per Dur-A-Flex Application Instructions on structurally sound and clean areas in which the concrete meets acceptable industry standards as defined in ACI Committee 201 Report, "Guide to Durable Concrete." Dur-A-Flex shall not be liable for bond failures caused by deficiencies in the substrate including, but not limited to, the presence of ionic compounds or soluble salts, alkali silicate reaction, alkali aggregate reaction, shale-pop, and other expansive reactions of aggregates and reinforcements. Dur-A-Flex recommends all concrete be tested for quality by a licensed petrographer.

Dur-A-Flex Chemical Resistance Data

This data is based on the application of listed materials to the top surface of the flooring

		Epoxies				Urethanes					Acrylics
Chemical Name	% Conc.	Dur-A-Gard	Glaze #4	Novolac	Ultra Clear	Armor Top	ACCELERA	Poly-Thane 2 HS	Poly-Crete HF, MD, TF Plus	Poly-Crete Color Fast	MMA
Acetic Acid	10%	R	R	R	R	R	R	R	R	R	R
Acetic Acid	30%	D	D	R	R	S	S	D	R	S	D
Acetic Acid	50%	N	N	R	N	S	S	D	D	S	N
Acetic Acid,3%, and Propionic Acid		R	R	R	R	R	R	R	R	R	R
AC-103	100%	R	R	R	D	R	D	R	R	D	R
Acetone		N	N	N	N	R	R	R	R	R	N
ACP-99 Ketone		N	N	D	N			R			N
Alum	48%	N	N	R	N			D	D		R
Aminoethanolamine		S	S	S	S			S	R		S
Ammonia	30%	R	R	R	R	R	R	R	R	R	R
Ammonium Hydroxide	30%	R	R	R	R	R	R	R	R	R	D
Antifreeze		R	R	R	R	R	R	R	R	R	R
Aromatic 100		D	D	R	D			R	D		
Aromatic hydrocarbons-Super Hiflash 100		D	D	R	D			R	D		
Avance Grease Cutter		D	R	R	R	R	R	R	DS	D	R
Avance Pot and Pan Detergent		R	R	S	R	R	R	R	DS	R	R
Benzene		N	N	D	N		R	R	N		N
Benzyl Alcohol	Photo	D	D	R	D	R	N	R	D	D	N
Betadine	10%	S	DS	DS	DS	S	R	S	S	S	S
Boric Acid	4%	R	R	R	R			R	R		R
Brake Fluid, DOT 3		D	D	D	D	R	S	R	D	N	R
Butanol/Methyl Cellosolve		N	N	D	N			R	N		N
Butyl Alcohol		D	D	R	D			R	D		N
Butyl Carbitol		D	D	R	D			R			N
Butyl Cellosolve		N	N	D	N			R			N
Butyl Cellosolve acetate		N	N	D	N			R			N
Carbon Tetrachloride		R	R	R	R			R			N
Caustic Soda solution		R	R	R	R	R	R	R	R	R	R
Chlorine Bleach 2000		R	D	R	D	R	R	R	S	R	R
Chromic Acid	10%	S	S	S	DS	S	S	S	S	S	S
Chromic Acid	40%	N	N	S	N	R	R	DS	DS		DS
ChloraPrep One-Step	2%	S	R	S	S	S	R	R	S	S	R
CIP 100 Cleaner	100%	D	R	R	R	R	R	R	R	R	R
CIP 200 Cleaner	100%	DS	DS	DS	DS	D	DS	DS	DS	DS	DS
CIP 220 Cleaner	100%	N	N	N	N	DS	R	R	S	S	R
CIP 300 Cleaner	100%	R	R	R	R	R	R	R	R	R	R
Citric Acid	10%	R	R	R	R	R		R	R	R	R
Citric Acid	20%	R	R	R	R	R		R	R	R	R
Citric Acid	50%	N	N	R	N	R		R	R	R	R
Clorox	10%	R	R	R	R	R	R	R	R	R	R
Coffee		S	S	R	S	R	R	R	R	R	R
Cola	90C	N	N	DS	N	S	S	S	S	S	S
Cola	RT	D	D	R	D	R	R	R	R	R	R
Copper Sulfate		S	S	S	S			S	S		S
Coulter Tru Color Wright Stain		S	S	S	S	S	S	S	S	S	S
Cupric Chloride		S	S	S	S			S	S		S
Cyclohexanone		D	D	R	D			R	D		R
Detergent, heavy duty		R	R	R	R	R		R	R	R	R
Diacetone alcohol		N	N	D				R			N
Diesel		R	R	R	R	R	R	R	R	R	R
Dimethyl ethanol amine		S	S	S	S			S			
Dimethylamineborane		S	S	S	S			S			
DMF		N	N	N	N	R	R	R	N	S	S
Docosanic Acid (in ethanol)	2.50%	N	N	R	N			R	N		
Drano- (sodium hydroxide and aluminum)		D	D	R	D	R		R	R	R	
DuraPrep	2%	N	DS	N	DS	DS	DS	DS	S	S	DS
Eco-lab AC-3 Cleaner		N	N	R	N	DS	S	DS	DS	N	S
Eco-Lab Wash & Walk 14278		S		S		S			S	N	
Eco-Lab Neutral Disinfectant Cleaner (NDC)	100%	R	DS	DS	DS	R	R	R	DS	DS	R
Eco-Lab Neutral Disinfectant Cleaner (NDC)	0.5oz/Ga	R	DS	R	DS	R	R	R	DS	DS	R
EEP solvent		N	N	D	N	R		R	N	D	N
Enforce LP (6000 ppm)		R	S	R	R	D	R	R	D	D	R
Envirocid	100%	N	N	N	N	N	S	DS	S	N	N
Ethanol	95%	N	N	D	N	R	R	R	D		D
Ethyl Acetate	99%	N	N	D	N			R	D	D	D
Excellerate Cleaner		R	S	R	R	R	R	R	R	R	R
Fluoboric Acid		D	D	R	D			R			
Formaldehyde	37%	DS	DS	S	DS	S	S	S	S	S	S
Gasoline		R	R	R	R	R	R	R	R	R	R
Glycol Ether		N	N	D	N			R		R	R
Heating Oil-Home		R	R	R	R	R	R	R	R	R	R
Heptanoic Acid	96%			D		S				N	
Hexane		N	N	D	N	R	R	R	R	R	R
Hibiclens	4%	R	R	S	S	R	S	R	R	S	R
Hydraulic fluids		R	R	R	R	R	R	R	R	R	R
Hydrochloric Acid	5%	S	S	R	S	R	R	R	R	R	R
Hydrochloric Acid	20%	S	S	S	S	S	R	S	S	S	S
Hydrochloric Acid	37%	N	N	S	N	S	S	DS	S	DS	S

Key: **R** = Resists degradation and staining **S** = Stains but resists degradation **D** = Degrades and stains unless cleaned from surface within 24 hours
DS = Stains and must be cleaned from the surface within 24 hours to avoid coating degradation **N** = Not resistant - degraded the coating immediately

DUR-A-FLEX
INNOVATION FROM THE FLOOR UP

Dur-A-Flex Chemical Resistance Data

This data is based on the application of listed materials to the top surface of the flooring

		Epoxies				Urethanes					Acrylics
Chemical Name	% Conc.	Dur-A-Gard	Glaze #4	Novolac	Ultra Clear	Armor Top	ACCELERA	Poly-Thane 2 HS	Poly-Crete HF, MD, TF Plus	Poly-Crete Color Fast	MMA
Hydrofluoric Acid	10%	N	N	S	N	N		DS	DS	DS	DS
Hydrofluoric Acid	40%	N	N	N	N	N		N	N	N	N
Hydrofluosilic Acid	30%	R	R	R	R	S		R	R	R	R
Hydrogen Peroxide	25%	D	D	R	D	S	S	R	R	R	R
Hydrogen Peroxide	50%	N	N	R	D	S	S	R	R	N	R
Hydrogen Peroxide (VHP)	560ppm			R		S	R	R			R
Io-Star		DS	S	S	S	S	S	S	S	S	S
Iodine Tincture	2%	S	S	S	S	S	S	S	S	S	S
Isopropanol		D	D	R	D	R	R	R	D	R	D
Isopropyl Acetate	99%	D	D	R	D			R	D		N
Jet Fuel		R	R	R	R	R	R	R	R	R	R
Kennel Care (Provet Logic Floor Cleaner)	100%	R	R	R	R	R	R	R	R	R	R
Lactic Acid	10%	N	N	R	N	R	S	N	R	R	R
Lactic Acid	30%	N	N	R	N	D	DS	N	R	D	R
Lactic Acid	88%	N	N	R	N	N	N	N	R	D	R
Magnesium Hydroxide		R	R	R	R			R	R		R
MEK		N	N	N	N	R	R	D	N	D	N
Methacrylate Monomer		D	D	D	D	R	R	D	N	N	N
Methanol		N	N	N	N	R	R	R	N	D	N
Methyl Cellosolve		N	N	N	N			R		D	N
Methyl dipropasol solvent		N	N	R	N			R		D	N
Methylene chloride		N	N	N	N			N	N	D	N
MIBK		N	N	D	N	R	R	R	N	N	N
Mineral Oil		R	R	R	R	R	R	R	R	R	R
Mineral Spirits		D	D	R	D	R	R	R	R	R	R
Monoethanolamine		S	S	S	S			S			
Motor Oil		R	R	R	R	R	R	R	R	R	R
Mustard, yellow		S	S	S	N	S	R	S	S	S	R
Nickel chloride		S	S	S	S	S	S	S	S	S	S
Nickel Sulfate		S	S	S	S	S	S	S	S	S	S
Nitric Acid	10%	DS	DS	R	DS	S	S	DS	S	S	S
Nitric Acid	20%	DS	DS	R	DS	DS	N	S	S	S	S
Nitric Acid	30%	N	N	R	N	N	N	S	S	S	DS
Nitric Acid	40%	N	N	R	N	N	N	N	DS	S	N
Nitric Acid	70%	N	N	D	N	N	N	N	N	N	N
Nitric Acid	98%	N	N	N	N	N	N	N	N	N	N
Oleic Acid		R	R	R	R	R	R	R	R	R	R
Oxalic Acid	10%	R	R	R	R	R	R	R	R	R	R
Peppermint Oil	100%	R	R	R	R	S	R	R	R	R	
Peracetic Acid, 39% in Acetic acid	3%	S	D	S	S	D	R	D	S	S	R
Phenolic Paint stripper waste	1-5%	D	D	R	D			R			N
Phosphoric Acid	7%	N	N	R	N	R	R	S	R	R	R
Phosphoric Acid	25%	N	N	R	N	R	R	S	R	R	R
Phosphoric Acid	85%	N	N	R	N	N	N	N	N	N	DS
Phosphorous Trichloride	100%	N	N	D	N			R			N
PM Solvent		N	N	D	N	R	R	R	S	D	N
Polyester Resin		D	D	R	D			R			D
Polyester resin in styrene		D	D	R	D			R			N
Polyphosphates		R	R	R	R			R	R		R
Potassium Cyanide		S	S	S	S			S			S
Potassium Hydroxide	45%	R	R	R	R	R	R	R	R	R	R
Potassium Permanganate	solid	S	S	S	S			S	S		S
Propionic Acid	100%	D	D	R	D			R			N
Propyl Acetate	100%	R		R		R	R	R	R	R	N
Propyl Cellosolve		N	N	D	N			R	N		
Propylene Glycol		R	R	R	R	R	R	R	R	R	R
Propylene glycol ether		N	N	R	N	R	R	R	D	D	R
Red Wine Vinegar		R	S	S	DS	R	R	R	R	D	R
Remedy		R	S	D	R	R	R	R	S	R	R
Sani Clean		DS	S	S	DS	S	S	S	S	S	R
Silver Cyanide		S	S	S	S			S			
Silver Nitrate	5%	S	S	S	S	S	R	R	S	S	S
Silver Nitrate	20%	S	S	S	S	S	S	S	S	S	S
Skydrol		D	D	R	D	R	DS	R		R	R
Sodium Chloride		R	R	R	R	R	R	R	R	R	R
Sodium Hydroxide	50%	R	R	R	R	R	R	R	R	R	R
Sodium Hypochlorite, 10-15%	5%	R	R	R	R	D	R	R	R	R	R
Sodium Hypochlorite, 10-15%	15%	D	D	R	D	D	R	R	S	S	R
Sodium Hypochlorite, 10-15%	50%	D	D	D	D	D	R	R	S	S	R
Sodium Hypochlorite, 10-15%	100%	DS	DS	D	D	D	D	R	S	S	R
Sodium Persulfate		S	S	S	S			S	S		S
Spartan, Inspector's Choice, 6ozs/gal	5%	R	S	R	S	R	R	R	R	R	R
Spartan, Sparclean Sure Step, 2ozs/gal	1.50%	R	R	R	R	R	R	R	S	N	R
Spearmint Oil		DS	D	R	D	S	S	R	S	N	N
Spor-Klenz	0.30%	S	S	R	S	S	R	R	R	R	R
Star San		DS	S	S	DS	S	S	S	S	S	R
Stride		R	S	R	S	R	R	R	S	S	R
Stoddard solvent		N	N	D	N			R	N		N

Key: **R** = Resists degradation and staining **S** = Stains but resists degradation **D** = Degrades and stains unless cleaned from surface within 24 hours
DS = Stains and must be cleaned from the surface within 24 hours to avoid coating degradation **N** = Not resistant - degraded the coating immediately

Dur-A-Flex Chemical Resistance Data

This data is based on the application of listed materials to the top surface of the flooring

		Epoxies				Urethanes					Acrylics
Chemical Name	% Conc.	Dur-A-Gard	Glaze #4	Novolac	Ultra Clear	Armor Top	ACCELERA	Poly-Thane 2 HS	Poly-Crete HF, MD, TF Plus	Poly-Crete Color Fast	MMA
Styrene		N	N	D	N			R	N		N
Sulfonic Acid	70%	N	N	DS	N	DS				N	
Sulfuric Acid	10%	S	S	S	S	S	S	DS	S	S	S
Sulfuric Acid	30%	N	N	S	N	DS	S	DS	S	N	S
Sulfuric Acid	50%	N	N	S	N	N	DS	DS	S	N	DS
Sulfuric Acid	98%	N	N	DS	N	N	N	N	N	N	N
Tannic Acid	20%	S	S	S	S			S	S		
Tartaric Acid	10%	R	R	R	R	R	R	R	R	R	R
Terpene Fraction of Spearmint Oil	100%	R	R	R	R	R	R	R	R	R	R
Toluol	100%	N	N	N	N			R		D	
Top Guard		R	D	R	S	R	D	R	S	S	R
Transmission Oil	100%	R	R	R	D	R	R	R	R	R	R
Trichloroethane (1,1,1)	100%	D	D	R	D			R			
Trichloroethylene	100%	N	N	N	N	R		R	N	D	
Triethanolamine (TEA)	100%	DS	DS	S	DS			DS	R		
Triethanolpentamine (TEPA)	100%	DS	DS	S	DS			DS			
Triethanoltetramine (TETA)	100%	DS	DS	S	DS			DS			
Turbo Charge II NP		R	R	R	R	R	R	R	R	R	R
Urine		R	R	R	R	R	R	R	R	R	R
Vesphene II ST	2 oz./2 gal. water	R	DS		DS	R	R	R	DS	DS	DS
White Vinegar		R	R	R	R	R	R	R	R	R	R
Virex		R	R	R	S	R	R	R	R	S	R
Vortexx (2600 ppm)		S	S	N	S	D	R	R	D	D	R
Water		R	R	R	R	R	R	R	R	R	R
Wine, Red		R	S	R	DS	S	R	R	R	S	R
Xylene		D	D	R	D	R	R	R	D	D	N

Key: **R =** Resists degradation and staining **S** = Stains but resists degradation **D** = Degrades and stains unless cleaned from surface within 24 hours
DS = Stains and must be cleaned from the surface within 24 hours to avoid coating degradation **N** = Not resistant - degraded the coating immediately

All data is based on room temperature exposure. Please check with the Dur-A-Flex Technical Department for elevated constant temperature or thermal shock exposure. Coatings were tested using ASTM D1308 spot test covered method up to 7 days. Test results are valid only for the tested conditions and cannot accurately predict performance in actual use settings. Combinations of above substances were not tested with other substances and the effects of a combination of substances cannot be determined from these results. THE DATA ARE PROVIDED "AS IS," WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NONINFRINGEMENT. THE ENTIRE RISK OF USE OF THE DATA SHALL BE WITH THE USER.
Rev 1

CLEANING GUIDELINES

WHY CLEAN YOUR FLOOR?

Appearance: Your floor will look its best when it is clean. By establishing a scheduled cleaning program, the floor will continue to look and perform as it did when it was first installed.

Safety: No matter how aggressive the texture of your floor, if it is not cleaned properly, it can present a slip hazard. Emulsifying, rinsing and drying your floor properly will reduce the risk of a slip and fall incident.

Note: Wet environments need to be kept dry as possible to prevent slip and falls. Proper signage, non-slip shoes, floor fans, and walk-off mats will help prevent slip and falls in any facility

Service Life: The lifetime of your floor will depend upon how well you clean it. In aggressive use areas (i.e. kitchens and machine shops) contaminants such as oil, dirt, and grease work with water and bacteria to break down the floor.

FLOOR CLEANING PROCESS & TOOLS

The best way to clean a Dur-A-Flex floor is to use the recommended cleaning product and follow a six-step process. (Equipment needs vary between small and medium/large floor areas.)

Process	Small Area	Medium/Large Area
Sweep floor thoroughly	Broom, Dust Mop	Floor Sweeper, Broom
Apply cleaning product on floor surface	Deck Brush, Foamer/Sprayer	Automatic Floor Scrubber, Foamer/Sprayer
Dwell - allow cleaning product time to emulsify foreign material	10-15 Minutes	10-15 Minutes
Agitate to aid in the release of foreign materials	Deck Brush, Rotary Floor Machine	Automatic Floor Scrubber, Rotary Floor Machine
Remove cleaning product from the floor	Squeegee (Soft Neoprene) Wet Vacuum	Automatic Floor Scrubber
Rinse the floor with clean water and remove	Wet Vacuum, Squeegee (Soft Neoprene)	Automatic Floor Scrubber

NOTES

- **Wax strippers should never be used on a Dur-A-Flex Floor**
- **Never use Enzyme based cleaners on a Dur-A-Flex Floor**
- **DO NOT use "No-Rinse" cleaners as the chemical concentration can increase in the residual film left behind**
- **Combinations of chemicals can result in staining or degradation if not properly rinsed and removed**
- Never use a mop to clean a floor that is greasy or oily.
- Make sure the pads or brushes on the automatic scrubber are in good shape. Pads should be non-abrasive white, tan or red 3M cleaning pads or equivalent. Brushes should be nylon non-abrasive Malish 8129 series or equivalent soft to medium flex nylon bristle brush.
- When using a deck brush, choose a medium/stiff bristle.
- When using a floor cleaning machine, a pad is recommended for use on smooth floor systems, while a soft to medium flex nylon bristle brush is recommended for broadcast floor systems or smooth floor systems with added texture.
- When removing solution with a squeegee, use a soft, neoprene squeegee. **Do Not** use a water spray to remove cleaning solution from the floor because it will over-dilute the solution and cause grease and oil to fall back onto the floor.
- Spills should be cleaned up immediately to prevent staining and as a safety precaution.
- Surfaces should be adequately protected when moving heavy equipment across the floor.
- Through proper training and education, unnecessary wear of the floor (such as forklift spin and skid-marks) can be avoided.

RECOMMENDED CLEANING PRODUCTS

Determining the correct cleaning product for your Dur-A-Flex floor is based upon the amount and type of soiling the floor receives. We have divided these into four types, and recommended a cleaning product for each instance:

Application	Typical Areas	Product	Product Description
Traffic Areas (Light soils)	Hallways, Healthcare Facilities, Labs, Dining Areas, Schools	EZ-CLEAN	EZ-CLEAN is a heavy-duty alkaline floor cleaner designed to remove protein or crude based soils
Moderate/Heavy (Protein soils)	Grocery Stores, Restaurant Kitchens, Animal Care, Food/Beverage Processing	EZ-CLEAN	
Moderate/Heavy (Crude soils)	Manufacturing/Industrial, Machine/ Automotive Service Centers, Warehouses	SIMONIZ 969	SIMONIZ 969 is a heavy duty, highly alkaline floor cleaner designed to remove machine and crude oil from concrete
Rubber Tire Marks	Forklift Tire Spin	TIRE MARK REMOVER	TIRE MARK REMOVER is a heavy duty cleaner designed to remove rubber skid marks from polymer type floors as well as hard steel troweled floors

The above Dur-A-Flex cleaning products may be ordered directly from Dur-A-Flex Customer Service at 1-800-253-3539 or via email at orders@dur-a-flex.com

WHEN TO CLEAN YOUR FLOOR

Dur-A-Flex floors are designed for and used in heavy traffic areas that typically accumulate foreign matter. Because of this, the recommended maintenance schedule for most areas is once or twice daily cleaning and regular “touch-ups” for spills. Less frequent cleaning of these areas results in a buildup of foreign matter, which diminishes the appearance, safety and service life of the floor.

Our CRYL-A-FLEX MMA products develop to full cure in one hour, and full cure for most epoxy and urethane systems is 7 days at 68°F. The lower the room temperature -the longer the cure time. Avoid chemical spills and full traffic during cure period. Premature exposure may cause permanent staining or discoloration. Do Not use abrasive cleaning methods during the first week after installation.

WALL CLEANING PROCESS

1. Application – Apply EZ-CLEAN, follow cleaner guidelines for dilution rate, use with hot water while using a deck brush, foamer/sprayer or power washer.
2. Scrub walls with deck brush
3. Rinse walls with clean water

For further technical assistance regarding this guide, please call Dur-A-Flex, Inc. Technical Services: (800) 253-3539 or e-mail Contact_Us@Dur-A-Flex.com

DUR-A-FLEX
INNOVATION FROM THE FLOOR UP

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East Hartford, CT 06108

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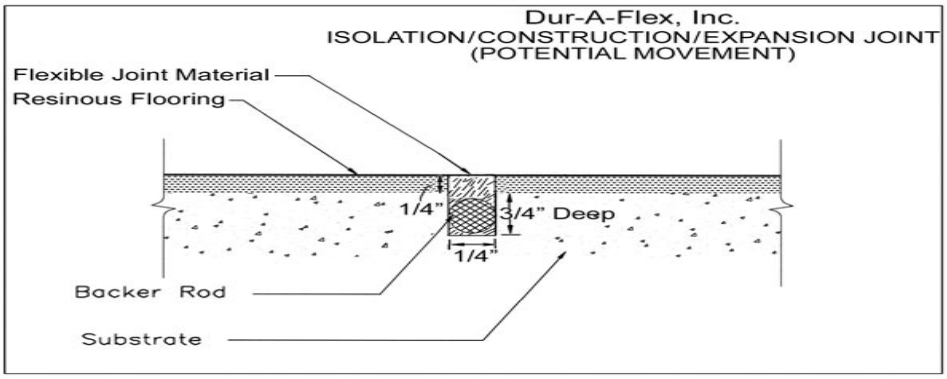
The two basic joint types are Moving (dynamic) and Non-Moving (static).

Moving Joints

Construction, Expansion and Isolation joints are considered moving joints which allow horizontal and vertical movement between the slab and adjoining structures, such as walls and columns, helping to minimize cracking where the two meet.

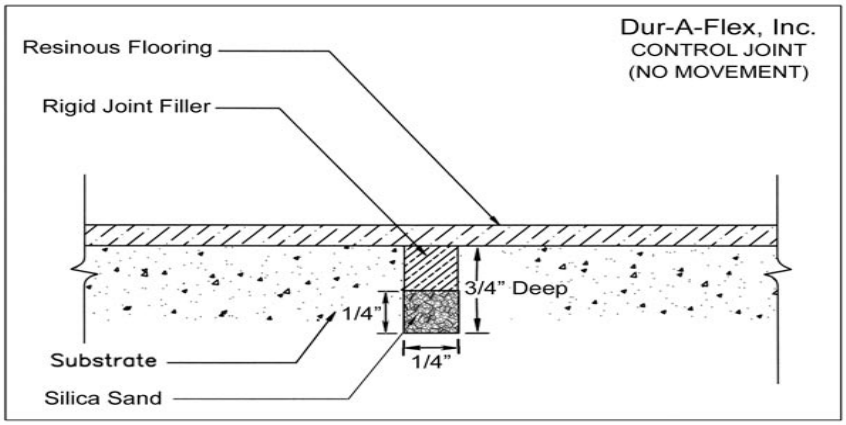


Prior to filling moving joints Dur-A-Flex, Inc. recommends "honoring" these joints by making a saw cut through the finished floor system at a depth of ¾" deep and ¼" wide with a diamond blade saw attached to a vacuum. A bond breaker such as backer rod (closed cell) must be added to the bottom of the joint.
Be sure to mark the location of the joints prior to the installation of the finished floor.

Potential cracking and or stress/stretch lines (white lines) may occur on all resinous floor systems over or on either side of moving joints if the joints are not saw cut and properly filled. Also if there is a variance of temperature of 20 degrees or more from the time the joint is filled and coated to its operational temperature, hairline cracking could occur even on non-moving joints.

Non-Moving Joints

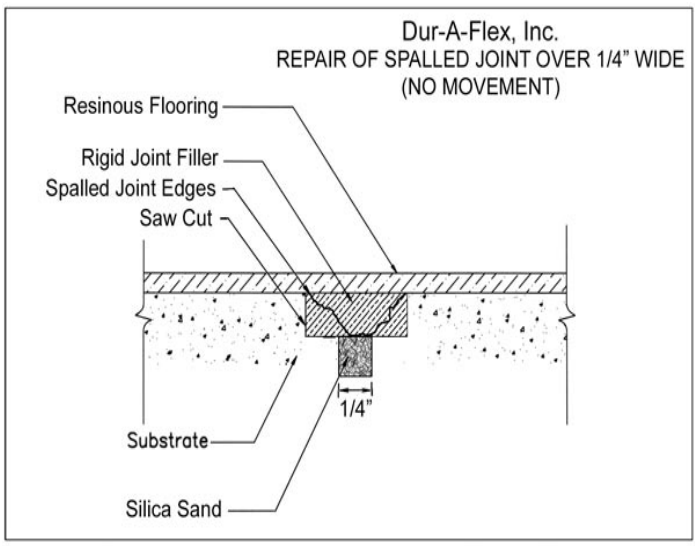
Control and or Contraction joints are considered non-moving joints which accommodate shrinkage and relieve internal stresses during the curing process of the concrete.

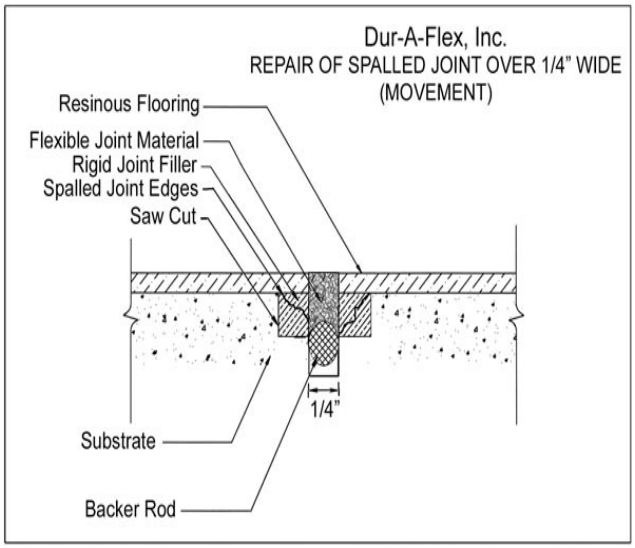


Prior to filling non-moving joints be sure to prepare them by removing all laitance, debris and sealers to a depth of ¾"deep and ¼" wide with a diamond blade saw attached to a vacuum. A bond breaker such as silica sand (30-40 mesh) at ¼" deep may be added to the bottom. This will stop the joint material from seeping if the concrete is cracked through.

Repair of damaged/spalled joints

Saw cut each side of spalled area and chip out the center with a chipping hammer or consider the use of a series of blades to reach the proper width. If using multiple blades, the center blade should reach the depth of the original joint and the outer blades should achieve a cut creating a "T" shape after cutting.





Installation Timing

The American Concrete Institute (ACI) recommends that filling of industrial floor joints be deferred 60-90 days after floor slab pour or as long as possible. This is to allow control and construction joints time to open closer to their ultimate width through the concrete shrinkage process. (In freezer/cooler areas, floor should be stabilized at ultimate operating temperature for 7 days prior to installation).

Prior to treatment of joints be sure to contact the facilities owner or manager to determine how long the concrete has cured as well as the location of moving and non-moving joints.

Refer to table below to determine what product is used where:

JOINTS	TYPE	BOND BREAKER	JOINT MATERIAL (1/4 inch wide)	JOINT MATERIAL (over ¼ inch wide)
Non-moving (Static)	Control/Contraction	Silica Sand (30-40 mesh) at 1/4" deep	• Epoxy flooring systems use Glaze #4 with Cab-O-Sil (No-Sag #2): Typical mix is 1 pint Glaze #4 hardener, 1 quart Glaze #4 resin, 3 quarts Cab-O-Sil (No-Sag #2) • Poly-Crete HF, MD and SL flooring systems typically cover and fill this size crack/joint • MMA flooring systems use MMA S/L Filler Mix	• Epoxy flooring systems use Glaze #4 with Dur-A-Crete. • Poly-Crete flooring systems use Poly-Crete MD or WR • MMA flooring systems use SL Filler Mix or Cryl-A-Tex.
Moving (Dynamic)	Expansion/Construction/ Isolation	Backer Rod 2 X wider than joint	Flexible joint material (Metzger/Mcguire, Versaflex or equivalent)	Flexible joint material (Metzger/Mcguire, Versaflex or equivalent)

References:

ACI 224 "Joints in Concrete Construction"
ASTM Standards "C 1193-0 and C-920-02"
National Ready Mixed Concrete Association "Concrete in Practice"
Metzger/McGuire, Inc.
SSPC

Dur-A-Flex, Inc.
TERMS AND CONDITIONS OF SALE

1. Contract Terms. These Terms and Conditions of Sale ("Terms") constitute the agreement between the parties, to the extent not prohibited by applicable law. Acceptance of Buyer's order and all sales by Dur-A-Flex, Inc. ("DAF") are expressly conditioned on these Terms. Buyer's acceptance of products is agreement to these Terms . DAF hereby rejects all terms and conditions of Buyer. Modifications, including any terms and conditions in Buyer's purchase order are not binding on DAF unless DAF agrees to the modifications in writing.

2. Payment Terms. Payment terms are net 30 days from the earlier of the date of invoice or date of shipment, unless specified otherwise. Goods exported from the USA may be subject to a down payment, with the balance payable through an Irrevocable Letter of Credit established through and confirmed by a bank acceptable to DAF. DAF shall have the right, in its sole discretion, to require payment before shipment or payment via letter of credit in the event that it determines that Buyer is delinquent in payment or will exceed credit limit. Overdue accounts shall bear simple interest at the rate of 1.5% per month (18% per annum) from the date of the invoice. Buyer shall pay all costs of collection of money due DAF, including attorney fees.

3. Delivery Terms. Delivery terms are F. O. B. DAF's plant, unless specified otherwise. As a convenience, DAF may prepay freight charges, and such charges may be added to the Buyer's invoice as a separate line item or reflected in the agreed price of the product. DAF may make partial shipments of Buyer orders, which shipments may be separately invoiced and shall be paid for when due, without regard to subsequent shipments. Delay in shipment or delivery of any particular portion of an order shall not relieve the Buyer of its obligation to accept the balance of the order. Regardless of the party paying freight charges, all risk of loss or damage in transit will be borne by the Buyer unless specified otherwise. Shipments shall be subject to overrun of 20% without penalty. Shipments of total quantities ordered must be taken within 10 business days of the order date, except that total quantities back-ordered are to be fully released and accepted within 6 months of the date of the order, unless otherwise agreed in writing. If not released as stated above, DAF reserves the right to charge all applicable and ancillary fees and/or carrying costs. Buyer agrees that an order shall in no event be subject to cancellation except by prior written consent of DAF, and then only when DAF is fully reimbursed for work performed, materials used and material which has been ordered specifically for Buyer's order and cannot be returned.

4. Delivery Dates. Delivery dates are estimated at the date that DAF accepts the Buyer's order. DAF shall endeavor to make deliveries within a reasonable time to the estimated delivery dates, but such dates are estimates of approximate dates of delivery, not a guarantee of a particular day of delivery. DAF shall not be liable to the Buyer for any damages, whether incidental, consequential or otherwise, for failure to fill orders, delays in delivery or any error in the filling of orders. Special or expedited delivery expenses will be charged to Buyer.

5. Design Components. It is the Buyer's responsibility to approve colors and decoration at the DAF's premises prior to commencement of a new production run, failing which the Buyer shall have no claim against the DAF for color variation or any other decoration defects whatsoever.

6. Taxes. Any tax imposed by Federal, State or other governmental authority on the sale of merchandise and service referred to in this order acknowledgment or invoice shall be paid by the Buyer in addition to the purchase price.

7. Standard Warranty and Limitations of Remedies and Liability covering all DAFs' goods. Dur-A-Flex, as a manufacturer of goods, stands behind its products by warranting that, subject to the limitations below, for a period of 1 year from shipment, its products are in conformity with its published specifications, subject to standard tolerances for variations, except that color cannot be warranted as to uniformity of shade or conformity to samples. If Dur-A-Flex determines a product does not meet this warranty, it will replace it, refund the purchase price or give a credit to the purchaser, at its sole option, as Buyer's sole remedy.

   Our products are intended for use by customers with skill in the industry. Technical recommendations on use of Dur-A-Flex products can only be based on present experience and knowledge and reliability of data provided regarding a site. However, many factors beyond the control of Dur-A-Flex can affect the products. Thus, customers must satisfy themselves of suitability of the product for site conditions.

   Dur-A-Flex is not an installer and therefore does NOT warrant or guarantee:
   1. The work of any person or company installing its goods;
   2. Failure of the product due to an installer not following the product Application Instructions;
   3. Failure of the product due to improper design by the engineer or architect;
   4. Failure of the product due to misuse, abuse, alteration, improper storage or handling, or not using or cleaning the product in the manner in which it was intended and in accordance with instructions provided by Dur-A-Flex;
   5. Bond failure of the product caused by deficiencies in the substrate including, but not limited to, the presence of ionic compounds or soluble salts, alkali silicate reaction, alkali aggregate reaction, shale-pop, and other expansive reactions of aggregates and reinforcements;

Dur-A-Flex's sole liability, and Customer's exclusive remedy, for breach of any warranty as expressly limited, at Dur-A-Flex's option, is to replace material at the original FOB point or refund of the purchase price. A written notice of claim for breach of warranty must be delivered to Dur-A-Flex within sixty (60) days of observation and no more than one (1) year after delivery of the product. Dur-A-Flex shall be allowed reasonable opportunity to investigate the claim and inspect the product. In no event may Customer recover damages exceeding the price paid by the Customer for the specific goods as to which the claim is made, whether based on contract, tort, or any other theory.

DUR-A-FLEX MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. DUR-A-FLEX SHALL NOT BE LIABLE FOR, and CUSTOMER WAIVES ALL CLAIMS FOR, PROSPECTIVE PROFITS OR SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR ANY OTHER DAMAGES OR REMEDIES NOT SPECIFICALLY PROVIDED ABOVE, WHETHER BASED ON NEGLIGENCE, BREACH OF WARRANTY, STRICT LIABILITY IN TORT OR ANY OTHER CAUSE OF ACTION. ALL WARRANTIES ARE NULL AND VOID IF CUSTOMER HAS NOT PAID IN FULL IN ACCORDANCE WITH DUR-A-FLEX'S PAYMENT TERMS.

Dur-A-Flex, Inc. will not be liable for, and the Customer shall defend, indemnify and hold harmless (including without limitation costs and attorney's fees) Dur-A-Flex, Inc. from, any loss, damage or injury to persons or property, or claim thereof, resulting from (A) Customer's or any third party's or end user's handling, storage, transportation, resale, application or other use of the goods, or in combination with other substances, or otherwise or (B) selection or recommendation by Dur-A-Flex, Inc. of any applicator or other contractor.

Any controversy or claim arising out of or relating to the within Warranty, terms and conditions shall be settled by arbitration in accordance with the commercial arbitration rules of the American Arbitration Association, and judgment upon the award rendered by the arbitrator may be entered in any court having jurisdiction thereof. Venue for the arbitration shall be in Hartford, Connecticut.

8. Specifications. Buyer accepts DAF's standard product specifications. Buyer waives all claims relating to products sold by DAF unless notice thereof is received in writing by the DAF within 30 days after delivery of the products which are the subject of the claim(s). In no event shall DAF be liable for any defective good if examination discloses that the good has been taxed beyond its normal capacity or the defective condition of such good was caused by misuse, abuse, improper installation or application, improper maintenance or repair, alteration, accident or negligence in use, storage, transportation or handling.

9. Safety. USE OF THE GOODS OR MERCHANDISE SUPPLIED BY DAF IN OR WITH SUBSTANCES WHOSE CHEMICAL OR OTHER COMPOSITION OR CHARACTERISTICS ARE INCOMPATIBLE WITH SUCH GOODS OR MERCHANDISE IS A MISUSE BY BUYER OF SUCH GOODS OR MERCHANDISE. ALL RESPONSIBILITY TO TEST AND OTHERWISE ASSURE COMPATIBILITY IS ASSUMED BY THE BUYER, WHETHER OR NOT DAF MAY PERFORM ANY TESTS FOR COMPATIBILITY (WHICH TESTING IS NOT A DUTY OF DAF) AND REGARDLESS OF THE RESULTS OF ANY SUCH TEST, DAF MAKES NO REPRESTATION OR WARRANTY, EXPRESS OR IMPLIED, THAT ANY TESTS BY DAF ARE ADEQUATE OR SUFFICIENT FOR BUYERS PURPOSES, AND BUYER AGREES NOT TO HOLD DAF RESPONSIBLE FOR SUCH ADEQUACY OR SUFFICIENCY. Upon request by Buyer, DAF will provide applicable information (including but not limited to Material Safety Data Sheets) concerning the safety and health aspects of its goods. Buyer agrees to communicate such information to Buyer's employees, agents, contractors and customers, and to require such persons to further communicate such information to all persons that they may reasonably foresee will be exposed to or handle such goods.

10. Non-conforming Goods. If Buyer provides DAF with notice within ten (10) days of learning of a possible warranty breach and reasonable opportunity to inspect: DAF may, at its option, either repair or replace said nonconforming goods or repay the price thereof. If DAF requests the return of the nonconforming goods, no obligation for breach of warranty shall arise unless the goods have been returned to DAF within thirty (30) days after such request is made. Buyer's failure to provide timely notice shall constitute a waiver of its claims. The aforesaid obligations of DAF to repair or replace defective or nonconforming goods or repay the purchase price thereof is expressly agreed by the parties to be the limit of DAF's liability and Buyer's sole and exclusive remedy for warranty.

11. Damages. IN NO EVENT WILL DAF BE LIABLE FOR LOSS OF USE OR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSS OR EXPENSE ARISING IN CONNECTION WITH THIS ORDER. DAF's maximum liability shall not in any case exceed the contract price for the goods claimed to be defective or unsuitable.

12. Indemnification. BUYER ASSUMES ALL RISKS AND AGREES TO INDEMNIFY AND HOLD DAF HARMLESS AGAINST ALL CLAIMS AND LIABILITY (INCLUDING LIABILITY BASED ON A CLAIM THAT DAF IS NEGLIGENT OR STRICTLY LIABLE) ARISING AS A RESULT OF USE OR POSSESSION OF THE GOODS SUPPLIED UNDER THE TERMS OF THIS CONTRACT. Any advice furnished by DAF, as to any use of the goods by Buyer, is offered "as is" without warranty of any kind, is gratuitous and shall not affect the limitations on DAF's warranties or Buyer's agreement to indemnify. Buyer acknowledges that this Agreement is for the purchase of goods, not services, and that DAF shall therefore have no liability to Buyer for any harm or loss caused by advice received by Buyer from any of DAF's agents or employees. If a claim is brought against DAF by an agent or employee of Buyer, Buyer agrees to defend, indemnify and hold DAF harmless from and against any and all liability, loss, damages, and expense relating to the claim.

Dur-A-Flex, Inc.
TERMS AND CONDITIONS OF SALE Cont'd

13. Setoff**.** DAF shall have the right to set-off all amounts due to it against payments owed by it whether arising out of this or any other contract between DAF and Buyer, its subsidiaries, or affiliates.

14. Force Majeure. Neither party shall be liable to the other party or any other person for any failure or delay in the performance of any obligation hereunder, except for payment obligations, due directly or indirectly to events beyond its reasonable control, including but not limited to, fire, storm, flood, earthquake, explosion, accident, acts of the public enemy, terrorism, wars, riots and public disorders, epidemics, sabotage, strikes, lockouts, labor disputes, labor shortages, work slowdowns, stoppages or delays, shortages, embargoes or failure or delay of energy, materials, decoration, art work, printing plates, supplies or equipment, transportation embargoes or delays, Acts of God, breakdowns in machinery or equipment, acts or regulations or priorities of federal, state, provincial, or local governments or branches or agencies thereof, and government contracts or shipments to fulfill government contracts.

15. Entire Agreement, Governing Law. There are no terms or conditions with respect to this contract, which are not specified herein. These terms and conditions constitute the complete and exclusive agreement between the parties concerning the subject matter thereof and supersede all prior representations, statements and promises made by DAF which are not expressly stated herein. Irrespective of the place of execution or performance the purchase order shall be governed by and construed in accordance with the laws of the State of Connecticut and all actions arising out of this contract shall be brought in the State of Connecticut.

16. Price Changes. Notwithstanding the price on the order, DAF reserves the right to modify the price in accordance with any change in labor, applicable law, exchange rate for exports, fuel surcharges where DAF pays for shipping or raw material costs, which have been instituted at or before the date of shipment. Where packaging other than standard packaging is necessary, the expense will be charged to the Buyer. DAF reserves a security interest in any goods sold to the extent of the invoiced amount to secure payment of Buyer's obligation. If Buyer defaults, it agrees to make the goods available so that DAF may peaceably repossess. A copy of the invoice may be filed with the appropriate office at any time as a financing statement. At DAF's request, Buyer will execute any instrument DAF requires to perfect its security interest.

17. Returns. Product returns will not be accepted for replacement or credit without prior written authorization from DAF and a returned material authorization (RMA) number, in accordance with DAF's current return policy. A return authorization number must be requested from DAF through the Regional Sales Manager. Merchandise returned is not to exceed the quantity authorized. A minimum 20% restocking fee will be applied. All returns must have freight prepaid. No cash on delivery for freight will be accepted. Credit will be issued only after merchandise is inspected by DAF. Damaged, opened or partially used products will not receive credit. Materials returned beyond 90 days of original ship date will not receive credit. Custom colors, pigmented MMA and Poly-Crete Aggregates are not eligible for return. Credit will not be issued for returns without an RMA number displayed on the pallet and bill of lading.

18. Credit. All orders are subject to approval of the credit department. DAF shall have the right, at DAF's sole discretion, to modify, change or withdraw credit terms at any time without notice and to request guarantees, security or payment in advance for any order or from any Buyer.

19. Nondisclosure. All non-public information provided by DAF to Buyer ("Information") shall be DAF's exclusive property. Information shall be used by Buyer only for installation of DAF products, kept confidential, and returned promptly at DAF's request. Buyer shall not disclose Information to third parties without DAF's consent. These obligations shall survive the cancellation/termination/completion of the sale.

20. Intellectual Property. DAF retains its intellectual property rights, title and interest in and to trademarks, trade names, logos, copyrights, patent rights, trade secrets and other proprietary rights ("IP"). Purchaser obtains no license under Seller's IP (other than as necessary to apply the Products) or any rights to use, or make any representations regarding, any of Seller's IP. Purchaser has no rights to sublicense or otherwise transfer any of Seller's IP rights to third parties. Purchaser shall not disparage any of Seller's IP rights.

21. **GENERAL (**a) Assignment and Delegations**:** Buyer will not assign any rights or delegate any duties under the Agreement without the written consent of DAF. (b) Statute Of Limitations**:** any action of any kind under this contract must be brought within one (1) year of the date of delivery. (c) Modification and Termination**:** This contract shall not be modified or terminated unless expressly agreed by both parties in writing. No waiver or any default hereunder shall be deemed a waiver of the obligation of future compliance, and any provision waived shall remain in full force and effect. In addition to its other remedies, DAF may cancel any unfulfilled part of the contract without any liability and without notice if Buyer fails to pay amounts due or Buyer shall become bankrupt, insolvent, makes an assignment for the benefit of creditors or a receiver is appointed for Buyer, or Buyer is acquired or sold in whole or in part. (d) Sole Agreement: Unless otherwise agreed in writing, this constitutes the entire agreement between DAF and Buyer, and supersedes any previous agreement, representation or warranty, whether express or implied, regarding the goods. Buyer acknowledges that no representations, understandings, conditions, or agreements have been made or relied upon other than those specifically stated in this Agreement.