

## CONCRETE PREPARATION

### MOISTURE TESTING FOR CONCRETE SLABS

Moisture Vapor Transmission (MVT) is the number one cause of coatings failures across the board. It is imperative that the moisture content be checked prior to installing any and all coating systems. This is usually done during the bidding process, which will tell you if moisture is a concern and needs to be remedied. Left unchecked, moisture in the concrete can lead to premature delamination, peeling, and bubbling of resinous coatings.

### TRAMEX CME 4 MOISTURE METER – STANDARD RESIDENTIAL TESTING

Intégrité Coatings recommends the Tramex CME 4 Moisture Meter to test garage slabs and other residential applications. It is a non-invasive meter that does not require any drilling or waiting for results. Place the meter on a level concrete floor and push down, this will give you an accurate reading inside the concrete, not just on the surface. This particular moisture meter will read between 0-6 % moisture content. Any readings “maxing out” the dial will indicate definite moisture problems.

If the moisture meter reads more than 5.0% moisture content, Intégrité Coatings requires application of one of our **Intégrité Coatings Moisture Stopping Primers** to create a vapor barrier. This will stop vapor drive and provide a better, stronger substrate for coatings. Of the two versions that are available, the standard **Intégrité Coatings Moisture Stopping Primer** will be the “cure-all,” meaning that it will resolve nearly all problems related to MVT. However, this can raise the installation cost substantially so Intégrité Coatings recommends testing with calcium chloride tests to get a cumulative number in lbs./1000sf/24 hours and determine if the **Intégrité Coatings Moisture Stopping H2O Primer** is a suitable solution. The **H2O** version will hold back 6 lbs. of vapor drive when applied as a single coat. If two coats are applied it will hold back up to 12 lbs. Any results higher than that will require shot-blasting of the concrete and installation of the standard **Intégrité Coatings Moisture Stopping Primer** to resolve the issue.

- ❖ **If excessive Moisture Vapor Transmission (MVT) is a concern as shown in the tests, there are costs involved with the remediation products and those need to be passed on to the customer.**
- ❖ **Moisture results will be required for warranty coverage. Always document the condition of the concrete you are coating.**

### CALCIUM CHLORIDE TESTING – STANDARD COMMERCIAL TESTING

The calcium chloride vapor emission test was developed over 40 years ago to quantify the volume of water vapor radiating from a concrete slab surface over time. This test is directly specified by the vast majority of the Commercial Floor Covering Industry as the primary measure of moisture acceptability for floor covering installation. Use this test to record the amount of moisture that emits from 1,000 square feet of slab surface in 24 hours. The result is expressed as "pounds" which is the equivalent weight of water, emitted as vapor, over 1,000 square feet in 24 hours. Always record a copy when reporting results using this test. Calcium chloride testing requires the use of a gram-weight scale with a gradation of 1/10th (0.1) gram. The calcium chloride container is weighed before and after exposure to the concrete slab. It is highly recommended that the test be weighed prior to, and directly after exposure on the same scale. This is a very sensitive and highly accurate test when conducted properly. The acceptable level for standard Intégrité Coatings coatings will be at or below the 3 lbs/1000 sf/24 hrs range. Any readings found to be higher than this will constitute the installation of an **Intégrité Coatings Moisture Stopping Primer**.

- ❖ **To apply for warranty coverage, Intégrité Coatings requires the use of calcium chloride testing and documented results for any jobs over 2000 sq. Ft. In both commercial and residential applications.**

### REMOVAL OF CONCRETE CONTAMINATION AND OIL

Contamination of the concrete can cause premature failure of the coating system, usually in the form of delamination. Contamination can happen during the placement process, but is normally introduced to the concrete from other sources during regular use. Examples of such contamination are fats, oils, dirt from boots, building materials, spillage, or residue from cooking. Other sources of contamination may be present on aged concrete surfaces. Dust, dirt, grease, oil, chalk, chemicals, etc, are examples of the contamination that must not be forced deeper into the concrete or spread over a larger area during removal. A single approach or combination of different cleaning methods may be utilized to remove the contamination. Floor cleaners such as **Intégrité Coatings Degreaser** can help to break the contamination down enough



to be flushed away with water or a pressure washer. Short term cleaning programs using **Intégrité Coatings Eco Clean** can gradually eliminate excessive grease and grime in floors. Grinding or shot blasting can remove the top layer of the concrete which will in turn take the contamination with it and leave the floor clean and acceptable for coating. However, the surface can be in such severe condition that the affected area may have to be removed and replaced with new concrete. The simple test of pouring water on the surface, known as the “water break test” can quickly show if a floor is contaminated.

#### **‘WATER BREAK TEST’ FOR DETECTING CONTAMINATION ON CONCRETE**

A thin layer of clean water needs to be applied over the surface to be tested. A sprayer/sprinkler/hose can be used to apply the water. Apply the water to the concrete until it forms a thin layer on the surface with no breaks present in the layer. Any beading (similar to rain drops on a polished car) or breaks in the water film indicate contamination is present. This contamination should be removed via cleaning, grinding or abrasive blasting.

#### **DEGREASING**

**Intégrité Coatings Degreaser** can be used to remove areas of light to medium areas of contamination. It can be applied full strength or diluted with water to chemically break down oils, grease, and chemical spills during the cleaning/prepping process. Repeated applications may be required to achieve an acceptable finish suitable for coating. Allowing the **Intégrité Coatings Degreaser** to soak in for extended periods of time (30-60 minutes) can reduce the amount of scrubbing needed to clean the floor. Always remember to flush with adequate amounts of clean water to remove residue that may be on the surface. The concrete should be allowed to dry thoroughly before coating. This drying process can be expedited using flat squeegees to accumulate the water or using a shop-vac to suck it up.

- ❖ **Intégrité Coatings Degreaser is usually applied to contaminated areas immediately upon arrival to the jobsite. This will allow adequate time to clean the floor, scrub thoroughly, flush with clean water, and allow the floor to dry before coating.**
- ❖ **It will always be best to refer to the “water break test” during the flushing of the cleaned surface. If you notice that water is beading up and not absorbing into the concrete, another application of the Intégrité Coatings Degreaser may be necessary to completely remove the contamination. Basically if water cannot absorb into the concrete, then neither will a coating system.**

#### **CLEANING PROGRAMS**

**Intégrité Coatings Eco Clean** should be used for floors that are scheduled to be coated and require extra attention due to long term misuse and heavy saturations of oil and grease. These could be locations such as mechanic shops, commercial kitchens, or processing plants. A one-time cleaning with a strong degreaser may not be sufficient to remove all the contamination. A cleaning program utilizing **Intégrité Coatings Eco Clean** as a daily floor treatment for weeks or even months leading up to the installation of a floor coating will ensure that all contamination has been removed and the coating will adhere properly. **Intégrité Coatings Eco Clean** is relatively cheap and can replace the customer’s standard cleaners before and after the installation to help maintain the high quality finish of an Intégrité Coatings floor.

#### **CURING OF NEW CONCRETE FLOORS**

Concrete floors are initially very alkaline having a pH of 13 to 14. A curing period of at least 30 days before coating is required for the concrete to react and become less alkaline. This curing period also allows the initial high moisture content to drop or normalize. PH testing paper and DISTILLED WATER (pH neutral) can be used to verify the alkalinity levels to make sure that, when adequately cured, the pH of the concrete is around 7 or 8. In the event that the pH has been determined not to have dropped sufficiently, additional curing time and/or the use of the **Intégrité Coatings Moisture Stopping Primer** will be necessary.

#### **CURING AGENTS**

The optimum method of curing concrete is by keeping it wet for as long as possible, usually 7 – 10 days after pouring. If concrete can’t be wet or moisture cured; curing agents are often used. If the wet cure is improper or inadequate, the concrete will have a tendency to crack more than normal and carbonate more extensively. Curing agents may be used to seal concrete surfaces and retain water during hydration. These agents may range from oils to chlorinated rubbers to moisture tolerant epoxies. Normally these products are not compatible with the coatings that are to be applied and must be removed prior to surface preparation.





### **SURFACE HARDENERS/HARDENED SURFACES**

Surface hardeners may be added to provide harder, more abrasion resistant finish. It is difficult to distinguish floors that have been treated from concrete with no hardeners. Where a hardener has been used, surface profiling needs to be more aggressive to expose the pores underlying the hardened concrete. This will ensure good coating penetration and adhesion is achieved. Metal trowel finishing can also sometimes create a hard dense surface that is difficult to clean and profile. This will be more common in commercial buildings but is also seen in high end residential garages and basements. Shot-blasting and/or diamond abrasive grinding will be the preferred methods of preparation on these types of floors. Acid etching may not be aggressive enough to provide the proper profile for adhesion of the coatings.

### **SURFACE PREPARATION BEFORE COATING NEW FLOORS**

Remove efflorescence/laitance from substrate to be coated. Laitance and efflorescence are two terms that are often confused with each other, although they are distinctly different. Laitance occurs during the concrete placement, finishing and curing process. Efflorescence occurs much later after the concrete has cured and settled. For any coatings operation, checking for and remedying all issues with latency and efflorescence will lead to long term coating adhesion. If these things are overlooked, problems with delamination and peeling can occur in the future.

### **LAITANCE**

Laitance is a weak, non-durable layer of material containing cement and fines from aggregates. It is brought by bleeding water to the top of over-wet concrete at the time of pouring. Unlike efflorescence it is virtually invisible to the untrained eye. The amount of laitance is generally increased by over-working or over-manipulating the surfaces of the concrete by finishing staff. This layer of weak "skin" may not be adhered well to the concrete properly, and should be removed prior to coating. Failure to remove the laitance will prevent good adhesion to the coatings. Such "coating failures" normally have a thin layer of cement or fines adhered to the back of the "failed" coating. In fact this is a concrete failure rather than a coating failure. Laitance is usually eliminated mechanically, as thin layers are best removed by abrasive blasting and/or diamond grinding. Acid etching can be used when laitance is limited to surface deposits, provided that no significant surface profile is required for the coating application. With thick layers of laitance, filling materials may be required to restore the concrete to its original dimensions.

### **ACID ETCHING**

Concrete is alkaline, therefore it can be cleaned and etched with acid. For the acid to work properly, grease, oil, waterproofing materials and other surface contaminants must be removed. Etching is necessary on all concrete floors to ensure proper adhesion of the coating to the slab. Protective Equipment including gloves, safety glasses, rubber boots, and respirators must be used at all times when using acids to open the pores of the concrete. To start the process, slowly add one quart of **Intégrité Coatings Safe Etch Solution** to 2-3 quarts of water in a plastic watering can or bucket. Working in a 10' x 10' section, pour the etching solution on the floor and scrub in with a stiff bristle broom. The etching solution should bubble and turn white for about 4-5 minutes while being scrubbed. If the solution does not bubble it means that there is a sealer on the floor and mechanical grinding will be necessary to complete the preparation. Continue the process of pouring the solution out in sections and scrubbing it in with a broom until the entire floor has been etched. When all sections are completed, rinse three times with clean water and scrub with a stiff bristle broom while rinsing. A wet/dry vacuum should be used to accumulate excess water. To speed up the process, use a floor squeegee to push all excess water to the center of the floor then vacuum up. Do not leave pooled water on the floor. Let the floor dry at least 3-4 hours.

❖ It is **IMPERATIVE** that the floor be **COMPLETELY** dry before applying any coatings. Failure to follow this warning will create application issues and possible product failure.

### **GRINDING USING DIAMOND ABRASIVES**

Machines with diamond impregnated metal segments on steel discs are used commonly on floor surfaces to remove the top layer of the concrete and profile the surface prior to coating. Care must be taken not to allow high points or edges to form when preparing the surface. Usually running a machine in one direction then coming back perpendicular across the first series of cuts prevents this. There are a number of varying segments that are designed to be used for different types of concrete and coatings removal. Using the right type of diamonds is essential to quick, efficient and cost effective concrete preparation. The acceptable profile for applying Intégrité Coatings will be a 20-30 grit diamond ground surface. These diamonds will leave the surface rough and the pores of the concrete open.



### **METAL BOND SEGMENTS**

**Hard Metal Bond** - These are used on soft, chalky, and porous concrete as well as broom finished and rough concrete.

**Medium Metal Bond** - Used for general purpose concrete

**Soft Metal Bond** - Used for hard, Steel-troweled and/or burnished slabs.

**Super Soft Metal Bond** – Used for extremely hard, power-troweled and/or sealed slabs. These will be the best choice for removing Cure 'N Seal compounds (acrylic sealers)

**PCDs** - Used strictly for coatings, mastic, and glue removal. These diamonds are not to be used for regular preparation of fresh concrete.

### **ABRASIVE BLASTING**

Blasting methods and equipment are quite varied. The common methods of are:

**Dry abrasive blasting.**

**Wet abrasive blasting.**

**Centrifugal wheel (shot blasting).**

Blasting removes any loose contamination (including laitance) from the surface and exposes sound, tightly adhered underlying concrete/aggregate. Care must be taken when selecting what abrasive size and type of blasting method to utilize. Access to the surfaces being prepared, cleanup of spent abrasive, dust, etc. need to be considered when utilizing this method of preparation. Shot blasting, while very efficient and inexpensive may leave too rough a profile for some Intégrité Coatings coatings. Contact a local Intégrité Coatings Representative for more information and job site specific recommendations.

### **HEALTH HAZARDS**

Mold/mildew/fungal growth can occur on coated or uncoated concrete surfaces with weathering. The growths are more pronounced in damp, cool areas, usually on the southern faces of structures. The organisms are best killed by washing with 5-10% sodium hypochlorite in an aqueous, non-ammoniated detergent solution. Appropriate PPE (Personal Protective Equipment) must be used, and care taken to ensure no contact with the chemical and eyes/skin occurs. Always wear the correct filters in approved respirators when removing or cleaning mold from concrete. If using mechanical abrading methods such as diamond grinding or shot blasting, attaching a HEPA rated vacuum system to the equipment can reduce air- born dust and debris. It is still recommended to wear a NIOSH approved respirator during the preparation process to avoid breathing in concrete dust and debris.

### **FINAL CLEANING**

Always use a high power vacuum and/or leaf blower to remove any latent dust and debris from the surface prior to installing any coatings. It may also be necessary to close doors, heating ducts, windows, etc. to make sure that nothing blows into the wet coatings. A little extra attention in this department can go a long way and lead to consistent quality finished floors.

# CONCRETE REPAIR MATERIALS

## FORTIFICATION FORMULA

Intégrité Coatings Fortification Formula is used to repair cracking, spalling, pitting, low spots and edge damage during the preparation phase of installing coatings. This material will be used to overfill the damage in the concrete and then be profiled using diamond grinders to create a flush surface ready for coating. Proper preparation for filling of cracks and spalling is essential for long term adhesion of the Intégrité Coatings Fortification Formula to the concrete being repaired.

## CRACK REPAIR

Chase all cracks with a crack-chasing blade (v-shaped diamond) on a hand grinder to open and prepare the crack for filling. This will leave the crack at about a 1/4" wide and clean the sidewalls of the concrete.

- ❖ This is an essential step for long term adhesion of the Intégrité Coatings Fortification Formula to the concrete. Oil, grease, etc. could have seeped into the crack and if the edges are not chased out the material has minimal chances of staying in place.
- ❖ Chasing the cracks will also create a space that is large enough to support a "full body" of repair material and allow it to gain maximum strength.
- ❖ Vacuum the chased out cracks to remove any loose dust prior to filling with sand or Fortification Formula. Dry silica sand can be used to fill in voids where the liquid filler would simply soak in down the crack. If using sand as a backer, always use your finger to strike the sand off at about 1/4" down from the top of the substrate. The Intégrité Coatings Fortification Formula will soak into the sand at the same time it is bonding to the concrete, creating a strong filler that will literally "weld" the concrete back together.
- ❖ **DO NOT MIX WITH "PLAY SAND" OR SAND WITH MOISTURE IN IT.**
- ❖ **BEFORE USE EVERY DAY, ALWAYS MIX BOTH PART A AND PART B WELL BEFORE COMBINING.**

## EDGE REPAIR

When cracks run to the edge of the slab or an area has been broken off due to structural damage, use Intégrité Coatings Fortification Formula mixed with dry silica sand to fully repair the damage before coating. Below are a few tips on how to properly prepare the concrete to accept the repair material.

- ❖ For a **broken off section of the front lip of a slab**, it will be necessary to gouge the concrete to create small "nooks and crannies" for the Intégrité Coatings Fortification Formula to soak into and adhere properly. To do so, use the crack chaser blade on a hand grinder to score lines in the face of the concrete. Do this at varying angles to create a rough, jagged surface – the more angular surfaces the better.
- ❖ **FAILURE TO SCORE THE CONCRETE CAN LEAD TO PREMATURE DELAMINATION OF THE INTÉGRITÉ COATINGS FORTIFICATION FORMULA AFTER A SEASON CHANGE WHEN MOISTURE HAS A CHANCE TO PENETRATE THE CONCRETE AND FREEZE/THAW OR EXPAND AND CONTRACT.**
- ❖ For **cracks that run to the edge of the slab**, always use the crack chaser blade on a hand grinder to chase the crack out to the face of the slab. Be careful not to score too far and damage the driveway, abutting slabs, pavers, or walls, etc.

Because Intégrité Coatings Fortification Formula is a Polyurea repair material that does not bond to plastic, use plastic sheeting in the form of **FOR SALE** signs or something similar to form up and create a barrier that defines the repair area. This type of plastic sheeting will be readily available at local hardware stores, is very cheap, and can be re-used for future repairs. Small pieces of these plastic forms should be held in place using shims, 10" putty knives, scraps of lumber, duct tape, or any other available objects that are heavy enough to hold them in place while the repairs cure.

- ❖ **USE DRY SILICA SAND AROUND THE EDGES TO CREATE A DAMN SO THAT THE MATERIAL DOES NOT FLOW OUT THE SIDES. THIS SAND CAN BE RECOVERED AND RE-USED FOR FUTURE REPAIRS. THE AREA SHOULD ALWAYS BE VACUUMED THOROUGHLY BEFORE ANY RE-PROFILING.**

- ❖ Following the mixing instructions below, blend equal amounts of Part A and Part B thoroughly then pour in place. Use minimal quantities so that there is just enough to overfill the crack without having material pool up and/or pour over the edges of the plastic form.

## SPALL REPAIR / LOW SPOTS

Spalling is damage caused by salt penetration into the concrete and a chemical reaction that breaks down the surface creating pits, holes, and an overall rough surface on the slab. This can also be caused by water penetration and freezing, thus forcing the brittle concrete away from the surface. As Intégrité Coatings are not typically installed as “high build”, this type of damage could show through the final finish if not repaired during the preparation phase of installing a coating. Intégrité Coatings Fortification Formula should be used to overfill spalled concrete, and after re-profiling is complete the surface will be smooth, level, and acceptable for coating. Below are the proper procedures to make sure that the Intégrité Coatings Fortification Formula both bonds to the concrete surface and allow successive coatings to adhere.

- ❖ Spalling repair should only be attempted once the floor has been ground over using a planetary grinder with diamond tooling, or shot blasting has prepared the surface. This will knock down the high spots in the concrete and begin the process of leveling the floor.
- ❖ Oil spots and contamination should be cleaned and removed using the **Intégrité Coatings Degreaser** or **Intégrité Coatings Eco Clean** and allowed to completely dry before moving forward. Moisture left in the concrete will cause the Intégrité Coatings Fortification Formula to bubble and outgas as it cures.
- ❖ For low spots, also known as “bird baths” it will be important to gouge the surface to create grooves and jagged edges for the filler to grab a hold of. Always create a rough surface before applying any fill material.
- ❖ Thoroughly vacuum the surface to remove any latent dust and debris in the low spots.
- ❖ Following the mixing instructions below, blend equal amounts of Part A and Part B thoroughly then pour in place. For large areas it will be best to mix large volumes (up to 32 oz. at a time) and use a putty knife to spread the material and fill in all the voids. Always remember to overfill the affected areas so that everything will be flat after re-profiling. Dry silica sand can be used as a filler to make the Intégrité Coatings Fortification Formula spread farther, and should be mixed in while combining the two liquid components.
- ❖ **NEVER MIX MORE THAN 1 PART LIQUID (A + B) TO 1 PART SAND. EXAMPLE: (12 oz. PART A) + (12 oz. PART B) + (24 oz. DRY SILICA SAND BY VOLUME).**
- ❖ Use the Intégrité Coatings Fortification Formula with sand mixture to fill the majority of the void in the concrete. It will always be best to use a batch of Intégrité Coatings Fortification Formula without sand to apply the final layer over the repair. This mix will be thinner and self-level better without having to trowel it in place. The end result will be a large, flooded area that can be ground flat once cured.

## MIXING OPTIONS

- ❖ Over a mix bin or garbage can, pour out equal amounts of Part A and Part B in two separate paper Dixie cups. Mix the two cups back and forth about 10 times, or for 10-15 seconds to combine and blend the components.
- OR**
- ❖ Using small calibrated mixing containers, combine equal amounts of Part A and Part B and blend thoroughly with a paint stick or drill with paddle style mixer for about 20-30 seconds. **DRY SILICA SAND** can be added to the mix to thicken it up, acting as both a filler to increase the volume and also to lessen the chances of the material flowing and sinking into deep cracks.
  - ❖ **FORTIFICATION FORMULA WILL REACT IMMEDIATELY UPON MIXING AND SHOULD BE PLACED WITHIN 1 MINUTE TO GUARANTEE ADHESION.**
  - ❖ Pour the mixed material into the repair area and overfill to ensure a level surface after grinding. If using Dixie cups for mixing, always pinch the top of the cup to create a small pour spout for better accuracy when pouring.
  - ❖ If sand is added to the mixture it may be beneficial to use a putty knife to move the filler into place. Any material that is not “in the crack” could be considered waste, as it will eventually be ground off to profile the Intégrité Coatings Fortification Formula and the slab.

## **RE-PROFILING ONCE CURED**

When the Intégrité Coatings Fortification Formula has cured - usually after about 15 minutes - it will be light grey in color and hard to the touch. It is a ready to grind when it is resistant to finger nail marking. Grind the Intégrité Coatings Fortification Formula flush with the slab using a diamond cup wheel on a hand grinder and make sure the repaired area is smooth and level. Take care not to remove additional concrete that could potentially form a low spot on the floor. Just grind enough to remove the overfill and leave the floor / repair area flat.

- ❖ **ALWAYS REMEMBER TO GRIND PERPENDICULAR TO ANY CRACKS THAT WERE FILLED, AND FAN OUT THE REPAIR 12" TO ELIMINATE ANY TOOL MARKING. GRINDING IN-LINE WITH THE REPAIR CAN CAUSE A TROUGH TO FORM, WHICH ENDS UP LOOKING WORSE THAN THE CRACK AND CAN SHOW THROUGH THE COATING. THIS WILL BE VERY IMPORTANT ON SOFTER CONCRETE FLOORS AND FLOORS THAT ARE NOT LEVEL.**

## **FAST PATCH**

Intégrité Coatings Fast Patch is a two-component epoxy putty that can be used to fill minor cracks, spalls, and low spots as well as vertical cracks and slab damage. While not as fast drying as the Intégrité Coatings Fortification Formula, it does not have to reach full cure and be profiled prior to coating. This makes it the optimal choice for new installers filling hairline cracks, pits and small surface flaws. Intégrité Coatings Fast Patch is the quickest, easiest way to make repairs without the use of any extra equipment.

## **MIXING – MIX RATIO IS 1A:1B**

- ❖ Snap a wooden paint stick in half to use for stirring the two components.
- ❖ Remove the lid from the part A quart can and use the paint stick to stir the material prior to use. Then scoop out a small amount of material onto a piece of scrap cardboard to use as a mixing station. Replace the lid to avoid contamination.
- ❖ Repeat the procedure using the part B quart can, making sure to add the same amount of material as the part A.
- ❖ Mix the materials on the cardboard together for at least 2 minutes until a uniform color is achieved.
- ❖ Use a small putty knife, plastic squeegee, or similar tool to fill in cracks, holes, pits, etc. and remove the excess. For large holes, deep cracks and heavily damaged areas it is suggested to use the Intégrité Coatings Fortification Formula instead of the Intégrité Coatings Fast Patch.
- ❖ Once all the repairs have been made, the floor is ready to coat. Avoid stepping in the wet/semi-dry Intégrité Coatings Fast Patch during the coating process as it will take a full 8-12 hours to cure completely.

