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INDUSTRIAL FLOORING TECHNOLOGY SERIES

#8 WHY FLOORS FAIL

Ok so you, our your customer, paid a lot of money for a nice heavy duty floor coating or topping and it's not working out so well …One might even say its failing… so what's to do??

Right !! Yell at the flooring guy! There that makes you feel better!.. But now to that darn floor problem. What makes these especially problematical is that repairs often necessitate the customer shutting down for work to be done. Down time expenses can sometimes be more than the repair expense.

There are reasons for the problem(s) and with a little deductive reasoning you can figure out what is happening and come up with a remedy. The better part of our business in the past 30 years has been existing facility work. Of this over half is removing a failing surface, recoating warn surfaces, or upgrading a surface that is too minimal for the areas use. We are obliged to figure out what went wrong in order to determine what needs to be done next. Perhaps our experience, methodology and perspective will be useful.

If you are specifying surfaces, supervising surface installation or buying a surface, it's smart to know what is happens, how things can go wrong, how to avoid these and what to do if you have a problem

Here is a handy reference.

DEFINE FAILURE

So exactly what is happening? There are several different "failure" modes, sometimes happening together:

A. WEAR – it is wearing through or wearing faster than you think is reasonable. The surface is not thick enough or the material is insufficiently wear resistant. If you don't keep the floor clean, the dirt acts as an abrasive and "sands" the floor in use.
B. BUBBLES- There are bubbles in the floor surface. This is moisture vapor coming up and bubbling or dislodging the surface from below.
C. EROSION- the surface is being eaten up by chemicals – insufficient chemical resistance of the polymer is the reason.
D. COLOR CHANGE- the color is changing or yellowing all over or in spots. Chemical attack or UV light degrading is the reason. If the later, top coat with a good aliphatic urethane which won't yellow.
E. CHIPPING OFF- large pieces are delaminating and coming off the concrete. This is caused by poor surface preparation, moisture vapor problems, not using a primer to securely attach the surface, improper mixing or something wrong with the top of the concrete.
F. CHUNKS COMING OFF- big pieces of floor are coming off leaving holes. Probably from too thin a system breaking under impact, a starved resin system, or a problem with the concrete.
G. BREAKING OF THE SURFACE- it crumbles or breaks in use. The surface was not made with sufficient resin to make it strong.

Situation MVT wrong surface not enough wrong . Not tough concrete

	Problems	prep or no primer	resin used	system	enough	problems
Wear	no	no	no	maybe	no	no
Bubbles	definately	maybe	no	no	no	maybe
Erosion	no	no	maybe	yes	no	no
Color change	no	no	no	yes	no	no
Chipping off	maybe	maybe	maybe	maybe	maybe	maybe
Chunks	maybe	could be	could be	maybe	maybe	maybe
Breaking	maybe	maybe	possible	maybe	could be	could be

UNDERSTAND THE POSSIBLE CAUSES

MVT: MOISTURE VAPOR TRANSMISSION COMING THOUGH THE CONCRETE

Check for this first. (See #1 MVT.) For ALL new construction a dome type MVT test is essential.(1) If MVT is not checked ahead of time, doing the work can be VERY risky. A firm specification disallowing the use of chloride accelerators in the concrete mix is also essential. If the MVT levels are high, nearly any system, regardless of the installation method, can fail and either chip or peel off. Often the MVT is high during installation because the rush of getting the floor done (The floor is usually the last of the construction jobs and the customer is in a hurry to use the facility.), and later after delamination occurs, the MVT levels are low because the concrete had time to dry. It is a GREAT idea to require documentation of the concrete MVT levels BEFORE the installation, know what it means and INSIST that be it low enough for a successful installation. Very often continuing high MVT levels are due to the use of chlorides in the concrete mixture. This may or may not be correctable and if it is, it's likely to be expensive

REMEDY: Run a proper MVT test to see if this is the problem. Run core test evaluations. The results will direct you to the remedy.

INCORRECT OR INSUFFICIENT SURFACE PREPARATION

In general ALL the surface has to be" CLEAN ENOUGH TO EAT OFF OF", sound, strong, and absent of any laintenance, efflorescence or weak concrete. The degree of preparation needs to match the area's use, especially when heavy impact, abuse and thermal shock are likely..

If you peel off a section of floor and the under surface is dirty this is your answer. If there is a powdery surface on the underside of the peel-off layer, the surface was applied over a weak or insufficiently prepared concrete surface.

THERMAL SHOCK

If the surface will be subjected to thermal shock as perhaps from a hot water pressure washer or the emptying of a hot water jacket of a tank on to the floor, you can thermally shock the floor off the concrete. A 160F temperature differential abruptly applied to a polymer surface on concrete causes the polymer and the concrete to expand at a differential rate to the extent that a sheer force of up to 5000 psi can be applied to the floor/concrete interface. This literally rips the floor off the concrete. Failure is often noticed sometime later, after the weakened surface is in use and the floor comes off in chunks. Scabbling or milling attaches the surface more securely to the stronger rock within the concrete and should be used as the preparation method if thermal shock is expected.

If thermal shock is taking off the surface, completely remove the surface, scabble or mill down to the rock within the concrete and reinstall a surface.

NO PRIMER

Several of our primers were pull tested by CTL in Chicago and. the results showed that the primers increased the top surface tensile strength from 350 PSI – typical of concrete – to over 1000psi. A floor surface has a strong stone layer within the concrete, a weak "cream" layer, and a strong top surface applied as a floor.

It's sensible to strengthen the weak cream layer, or remove it and attach to the rock in the concrete, to give the strongest floor surface attachment possible.

If you can remove a piece of floor easily and there is concrete attached to the under surface, it's VERY likely that a primer was not used. It really should have been. I disagree with specifications that do not call for a primer. A 100% solids layer of epoxy over shot blasted concrete, might not stay attached in a heavy use environment. In one machine shop we removed 60,000 of failing 100% solids floor topping, installed without a primer, 6 months previously. The MVT level was 5.75. The previous contractor had disappeared. The repair was expensive. Use a primer. It's cheap insurance.

Even a primed floor can fail if the MVT level is high enough. Moisture can dislodge concrete from in, around and under the primer. The repair is to remove the surface an install one correctly. A % chlorides test of a concrete core might be smart. If the MVT level is high either remove the surface and let it dry or install a MVT barrier surface.. Then install the surface you desire. Otherwise replace the concrete. Both choices can be expensive.

NOT ENOUGH RESIN USED- STARVED SYSTEM

In troweled systems as a rule of thumb a mixture of 3 parts sand to 1 part resin (say 100% solids epoxy) makes a mix that a "filled" system which is a bit like oatmeal. It is a LOT of trouble to trowel but may be screeded into hole relatively easily. To make the material trowelable more sand is added. A nice blend is 4-5 parts sand to one part epoxy. (Naturally this depends on the viscosity of the epoxy and the gradation of the sand used. As a rule of thumb 33% of a sand mix is voids needing filling.) Of course the more sand used the less epoxy is used, for the thickness of the floor, AND the less expensive is the material cost of the floor. This is considered a starved surface. I t leaves voids in the floor surface, weakening it. We have seen systems that have been 10 parts sand to 1 part epoxy.

To disguise this, a thickened top layer is often put on over this starved matrix. Often this construction lasts the year warranty period and then starts to fall apart. Sometimes when this thin top surface is breached, chemicals can get into the starved interior matrix and turn it to mush. This cost to the installer is good, but this system is really flimsy, easily breaks under even light impact, comes off easily and chunks crumble in your hand. You probably have no recourse against the installer. They probably installed the called upon thickness but with not enough polymer in it to give a good surface. It is possible to ascertain the % epoxy used but if there is no specification what's the point? Buyer beware again.

The only remedy is to remove and replace. Ideally use a multilayer laminate such as our POLYMITE which, by its construction, REQUIRES the right amount of resin for the aggregate used, and eliminates any voids in the surface construction.

INCORRECT SYSTEM

There is a trade off between cost and the surface performance you desire and need. There are minimum surface thickness and constructions in various situations that need to be considered. Install something below this minimum to save money up front and you can expect a failure or repair in the reasonably near future. Usually because the surface is not strong enough, it has the wrong, or too insufficient chemical resistance, or it's not tough enough. You really do get what you pay for and there are NO new wonder surfaces around for bargain prices.

NOT STRONG ENOUGH

This usually means that the surface is breaking off. If the area has high impact expectations a thicker surface is necessary. In a heavy-duty truck repair facility a 1/16" thick surface is routinely breaking off. A minimum ¼ " thick surface is needed to spread the impact over a larger area and so stay attached. Scabbling or milling so as to attach to the rock in the concrete ought to be considered as the strongest construction.

It's worth noting that occasionally polyester and vinyl ester systems come off the concrete easily. One thing that makes these systems different from epoxy, is that they do shrink when cured. Normally 2 ounces of catalyst per gal of resin is used but often to speed up the installation more catalyst is added. This often shrinks the surface disproportionately to the amount of catalyst used: e.g. 2 % might give 1% shrinkage and 4% might give 5% shrinkage and 5% might give 9% shrinkage etc. If the necessity is to have a very fast to use installation the temptation is to use more catalyst. This causes the surface to shrink and potentially shrink too much and pop itself off the concrete. There is a food plant west of Appleton where 5000 sqft of a ¼" thick vinyl ester laminate floor was prepared and installed in less than 2 days. I think I could get most of it off in an afternoon with a flat blade screwdriver.

NOT CHEMICAL RESISTANT ENOUGH

When you check the chemical resistance data of various products, I recommend you check the tables with a discerning eye towards detail. All too often the chemical resistance data for a product shows a list of chemicals along one side as acid, salt, alkali, bleach and then " good, recommended, not recommended" or some such and this really doesn't say anything. The Ashland Chemical Co., chemical resistance chart shows the concentration of the chemical tested VS 15 year immersion of the specific polyester at the temperature indicated. This chart indicates no effect on the polymer for the duration of the test. This is a terrific chemical resistance chart and ought to be a model for others. Any resistance chart that does not specify the chemical, its %, the duration of the test and the quantitative effects on the sample is subjective and considerably worthless.

If a chart says "good acid resistance", what does this mean? Is the material ok against lemon juice immediately wiped up or good for 15 years immersion in hydrofluoric acid? You really don't know. So often we see a surface, which is "R", recommended for this or that class of chemical, only to find high concentrations of a stronger version for a short time destroys it. The same goes for " resists xxx". You need to know what specifically for how long and what happens. This type of chart is quite common for penetrating silicate type "sealers". Vague resistance data often gives false hope of a long and satisfactory lifetime of service. "Resists" oil and staining, for instance usually means nearly nothing. It likely resists staining for perhaps ½ of an eye blink then it stains galore and permanently.

If technical data sheets or the material salesman are not specific, either they don't know what they are doing or are intentionally fooling you. This data is available. It just may not be presented to you. Virtually ALL basic resins suppliers have chemical resistance tests done with different formulations. Ask that it be presented. The adage let the buyer beware applies here.

The remedy might be as simple as re toping the area with a more chemical resistant material if the underlying surface is securely attached. Otherwise total removal and replacement is necessary.

NOT TOUGH ENOUGH

This is usually an abrasion or impact situation. The thickness or the starved resin situation was addressed. See the write up on wear resistance and check tabor abrasion. If a resin has a tabor abrasion reading of 50 it will wear twice as fast as one with a tabor of 25. Simple

A VERY obvious problem is that the floor was not installed thick enough. If a surface is specified at ¼" and 1/8" is installed no one will know how thick it is by looking at it form on top and the surface is likely to fail . The specifications NEED to have provisions for the architect to randomly check floor thickness samples throughout the floor.

Sometimes a repair is as simple as putting a tougher top surface- a wear layer- over the surface. Aggregate wears longer than resin. A surface filled with quartz will have its wear on the quartz and not on the resin. This will of course wear longer. We offer a surface with steel shot laminated into high wear resistant and impact resistant resin. This is a REALLY tough floor.

PROBLEMS WITH UNDERLYING CONCRETE

1. Concrete problems: if the top of the concrete – the "cream" is not properly bonded to the rock within it, then anything on top of the concrete can come off. Often this is obvious in that failed pieces have a significant layer of concrete attached to it, or the holes left in the concrete are well below the layer of the floor surface on top. If the concrete has been "carbonated" during cure it is weak and it needs to be totally removed, via significant, grinding, shot blasting, or milling, to get a bond to secure concrete.

   Sometimes a penetrating sealer is put in the top surface to "harden it". This usually doesn't work because it does not attach this weak layer to the strong interior of the concrete. This "strengthened" layer comes off along with whatever is put over it. Often this happens from impact or thermal shock. Again ask why the contractor went ahead if the top of the concrete was insubstantial. If they were directed to do so, to you ought to ask for a warranty sign-off sheet.

2. Settling problems: If the compaction of the base under the floor is insecure and the slab moves or cracks, the top surface often breaks. This is not a floor surface failure it's a construction problem and might more properly be addressed by repairing the under surface- mud jacking etc might be considered. You might want to seek an outside PE(1) for consultation.

3. The floor is not flat. Usually the top surface or coating applied follows the contour of the concrete. See #2 FLOOR FLATNESS. If the specifications are minimal or absent the flooring guy usually cannot correct a flatness or slope problems without a LOT of additional time and expense over and above his quote and only VERY qualified contractors can do anything at all. Correcting slope or flatness problems in the concrete might be 5 -10 times as expensive as the original floor topping cost. It's VERY good insurance to hire a competent concrete placement company, have well defined specifications, and to check as to whether these have been met before accepting the work.

4. Other problems: There is any number of potential concrete problems often as a result of incorrect batch specification or field changes in the blend. A core test and a proper petrographic analysis (2) is recommended. The results will give direction to any possible repairs. Always check for chlorides % when doing a core test.

OTHER THINGS

It is a good idea if the floor guy determines if the system specified is sufficient for the intended use AND to find out what might have been missed in the specification determination. Simply relying on someone else's specification and then giving a warranty is not always wise. Do some investigation on your own. We once went through extensive chemical resistance testing of the process chemicals presented to us for a "dry floor" processing area in a food plant. A month after we were done we found that there was SIGNIFICANT erosion in one area of the floor. After checking we found that the customer was using raw nitric acid to clean his equipment and this was eating up the floor. He said it wasn't a process chemical but a cleaner so he didn't mention it… AAAAAGGGGGGHHHHHHH!!!!! ..Floor guy beware!

TIPS

1. If the bids come in all within a few % of each other and one is WAY low, be suspicious. This one will more often than not cause you a problem. Being required to always take the lowest bit may not be wise.
2. ALWAYS disallow chlorides to speed up concrete cure.
3. ALWAYS require a dome type MVT test and in force the material supplied recommended level before work can commence. Keep a record of the MVT test as a part of the construction documents
4. ALWAYS specify floor flatness and floor levelness using F numbers. Run an independent check if necessary to ascertain if this specification was met.
5. When specifying floor thickness, specify that tests will be made to check thickness.
6. Use a contractor who has installed the specified system successfully in the past and check references.
7. INSIST on quantative chemical resistance data when this is important.
8. Specify a heavy duty preparation method if thermal shock or heavy impact resistance is important
9. Know what tabor abrasion means and look for data to support that this is a good wearing system
10. Insist that the surface be frequently cleaned after use to keep wear to a minimum.
11. Read over this list and ask the expected installer a few questions especially about MVT. If the installer is puzzled, perhaps seek a different installer.
12. Check prior installations of this system in similar use situations.
13. Strongly suggest that a vapor retarding barrier be installed under the concrete.
14. Consider strongly a floor surface report to be part of the construction documents– see attachment- required from the flooring contractor.
15. Have a well engineered soil preparation and compaction specification. If the soil under the slab sinks the slab is likely to break and anything put on the slab is likely to break alng with it. (3)

OVERVIEW

A. Right system, right installation =usually a successful floor

B. Right system, wrong installation= failure

usually it peels off the floor due to excessive moisture vapor coming through the surface,
poor surface preparation= i.e. dirt, lack of a primer to properly anchor the system to the concrete, starved sand matrix or too thin of a system vs that specified.

C. wrong system, right application = failure

usually because some parameter of the area's use was not fully considered. Beware of "Value Engineering"
the surface is a light duty surface in a heavy-duty environment, so floor shows excessive wear, floor breaks off, or chemicals eat up the floor.

D. Wrong system wrong application= nearly anything can go wrong. It's best to ask for references for this system as done by this applicator in similar conditions to that presented. This often happens if cost is a factor and someone "value engineers" the area and puts in a system significantly less than the area needs or it's put in incorrectly to save on installation labor.

In one cheese plant where thermal shock was routine, we had, long term, 100% success with a 5/16" thick polyester system over which we laminated a fiberglass layer for additional strength. In a new section "value engineered" by others the system specified was a 1/8" thick epoxy system. We declined to bid. The floor subsequently failed quickly, allowed hot process water to get under it, and so black mold developed. The repair was expensive.

E. Refer to "SYSTEMS THAT WORK BY LOCATION" and "SURFACE PREPARATION" bulletins to check what works, where..

(1) Currently there are people who believe a RH% test within the concrete is the right way to determine concrete dryness for coating or toppings application. They may be right, but to date I have seen no information that suggests this gives more reliable or valid information then the dome. Also, I have seen no correlation between this test and the dome test. We have done hundreds of dome tests since 1992 and have had good experience with them predicting floor attachment success. Until I get a very compelling reason to switch, I will stick with this test.

(2) We also do a fair amount of consulting, though consider a professional PE testing lab if legal presentations are expected. We know of one nearby who we could recommend.

(3) We certainly don't want to suggest we are competent to write engineering specifications for under slab conditions, though we can give examples of what might be considered good specifications.

Tom Hennessy ChE
I hope this helps

CHEMICAL ENVIRONMENT	CONCENTRATION %	TEMPERATURE (°F) FOR RESIN TYPES					
		HETRON[1] 92/99P	HETRON 197/197A	AROPOL 7240/7334	HETRON 700	HETRON 800	HETRON 922, FR992/980
Sodium Ferricyanide	Sat'd	220	250/200	180/150	220	—	210/220
Sodium Ferrocyanide	Sat'd	—/220	180	180/150	220	—	210/220
Sodium Fluoride[3]	All	—	—	—	—	—	180
Sodium Fluoride: Potassium Fluoride: Sodium Hydroxide: Potassium Hydroxide[3]	4:0.8:0.5:0.4 @ 150°F	—	NR	—	—	—	180
Sodium Fluorosilicate[3]	All	—	—	—	—	—	150
Sodium Hexametaphosphate	Sat'd	—	150*	—	150	150	150*
Sodium Hydrogen Phosphate	—	—	200	—	—	—	—
Sodium Hydrosulfide	15-65	—	160	—	—	—	—
Sodium Hydrosulfide	45	—	160	—	140	140	140
Sodium Hydrosulfide: NaOH	15:15	—	—	NR	140	140	140
Sodium Hydroxide	0.5	—	—	100/—	—	—	—
Sodium Hydroxide	1	140/180	—	LS125/NR	150	—	180
Sodium Hydroxide	5	NR/180	—	NR	150	150	180
Sodium Hydroxide	10	NR/—	NR	NR	150	150	150
Sodium Hydroxide	15	NR/—	NR	NR	150	150	150
Sodium Hydroxide	25	NR/—	NR	NR	150	212	150
Sodium Hydroxide	50	NR/—	NR	NR	200	212	180
Sodium Hydroxide: CCl_4: Aluminum Chloride	— @ 160°F	—	—	—	NR	—	—
Sodium Hydroxide: Cresylic Acid	5:12	—	—	—	—	—	180
Sodium Hydroxide: Ethylene Diamine: Diethylene Triamine: Water	10:10:10:70	—	—	—	NR	140	—
Sodium Hydroxide (10% exposure time): H_2SO_4 Paste (90% exposure time), Sulfide Reduction Process	5:20	—	150	—	—	—	—
Sodium Hydroxide: NaHS	15:15	—	—	NR	140	140	140
Sodium Hydroxide Neutralization of Acidic Organics	@ 160°F	—	—	—	NR	—	—
Sodium Hydroxide Neutralization of Acidic Toluene, Naphtha	@ 160°F	—	—	—	NR	—	—
Sodium Hydroxide Scrubbing Cl_2 Blow Gas	20	—	—	NR	LS120	NR	LS120
Sodium Hydroxide Scrubbing Cl_2, ClO_2	5	—	—	NR	120	NR	120
Sodium Hydroxide: Sodium Thiosulfate & Sulfide	30:2	NR	NR	NR	—	160	—
Sodium Hypochlorite (Stable)[4,5,7]	2	125/—	125	—	125	90	150*/150
Sodium Hypochlorite (Stable)[4,5,7]	5¼	125/NR	125	120/NR	125	NR	150*/180
Sodium Hypochlorite (Stable)[4,5,7]	10	100/NR	120	100/NR	120	NR	150*/150
Sodium Hypochlorite (Stable)[4,5,7]	15	NR	110	NR	120	NR	150*/[illegible]
Sodium Hypochlorite Reactor, [illegible]	15	—	—	—	—	—	100
Sodium Hypochlorite Reactor, 10% Excess NaOH	15	—	—	—	—	—	120
Sodium Hypochlorite Vapors	Above 5¼	150/—	—	—	—	140	150
Sodium Lauryl Sulfate	100	—	100	—	100	—	180
Sodium: Magnesium: Calcium Chloride Solution	12:2:10	—	150	—	—	—	—
Sodium meta-arsenite	50	—	130	—	—	—	—
Sodium Methacrylate, pH 10 - 10.5	25	—	180	—	—	—	—
Sodium Monophosphate	Sat'd	—/150	—	180/150	—	—	210/220
Sodium Nitrate	Sat'd	220	250/200	180/150	220	—	210/220
Sodium Nitrite	Sat'd	180/—	180	180/150	220	—	210/220
Sodium Nitrite: Sodium Chloride: Sulfuric	8:8:20	—	180	—	—	—	—
Sodium Oxalate	Sat'd	—	—	—	—	225	—
Sodium Persulfate	20	—	—	—	—	—	120
Sodium Persulfate: Copper: Sulfuric	3:30 gpl :<1	—	165	—	—	—	165/—
Sodium Phosphate, Mono, pH 1-3	5-10	—	200	—	—	—	—
Sodium Phosphate-Phosphoric Acid Scrap Liquor, pH 1-3	—	—	200	—	—	—	—
Sodium Polyacrylate, pH 9 - 10.5	25	—	180	—	180	—	150
Sodium Silicate[3]	6	—	160	90/NR	160	160	210/220
Sodium Silicate, pH 12[2]	—	—	200	NR	200*	—	—
Sodium Sulfate	All	90/180	220/200	175/150	220	250	210/220
Sodium Sulfate: Boric Acid with 0.25% Sulfuric, 0.03% H_2O_2, 100 ppm Iron, 3000 ppm Chloride, Temperature Cycled[16]	25:15	—	205/200	—	205	—	205*
Sodium Sulfate: Carbonate: Bicarbonate: Fluoride Fumes; Electrostatic Precipitator	3:0.5:0.1:0.1	—	185*	—	185	—	185
Sodium Sulfate: Sodium Sulfite: Sodium Bisulfite	15:15:15	—	165	—	—	—	—
Sodium Sulfate: Sulfuric, CS_2 Saturated	5:3	—	140/—	—	—	—	—
Sodium Sulfhydrate	15	—	160	—	140	140	140
Sodium Sulfhydrate	65	—	160	NR	—	—	—
Sodium Sulfhydrate	45	—	160	NR	140	140	140
Sodium Sulfhydrate: NaOH	15:15	—	—	NR	140	140	140
Sodium Sulfide	10	90/—	140	80/NR	120	220	210/220
Sodium Sulfide	Sat'd	NR/90	NR	NR	120	220	210/220
Sodium Sulfide: Sulfur	21:1.5 @ 180°F	NR/—	NR	NR	—	—	—

See page 11 for footnotes.

†See page 8 for list of trademarks and product names.

CD
CONCRETEDEFENSE.C
OM

PRODUCTS, INC.

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Epoxy & fiberglass flooring, seamless fiberglass wall systems, sealers, high performance coating systems, and industrial cleaners

PRODUCT BULLETIN
#1300 SRE FLOOR COATING

DESCRIPTION

#1300 chemical resistant floor epoxy coating is a clear, high gloss, epoxy amine adduct product supplied as a 50% solution possessing several key features: very high gloss, short cure time, cures at 20F. Excellent general chemical and outstanding solvent resistance.
AVAILABLE IN STANDARD COLORS

USE

The #1300 system may be used anywhere a tough, hard, high gloss system is desired. It's chemical resistance makes it a good choice where a broad range of chemical splashes and exposure conditions will be encountered. It's outstanding solvent resistance makes it a good choice in printing plants, garages, and aircraft hangers.

SPECIFICATIONS

? Tabor abrasion	30 mg loss
? Film Hardness	3H+
? Volume solids clear	50%
? Volume solids pigmented	70%
? Potlife	3 hours
? Adhesion	EXCELLENT
? Gloss	90+
? Dry Film color-clear	Gardner 2

CHEMICAL RESISTANCE

Exceeds 1000 double rubs: MEK, MIBK, Methelene Chloride, Methanol, NP Acetate, IP AcetatePerchloroethelene, Skydol, Tertrahydrofuran.
7 days immersion/no effect: Xylol, MEK, D Water, 10 % Sulfuric Acid, 10% HCL, 10% Ammonium Hydroxide Skydrol, jet fuel
7 days immersion/some effect: Glychol, Ether EB softens, 10% Nitric Acid stains, Tire marking
1 year immersion no effect
gasoline, normal propyl acetate, normal propyl alcohol, isopropyl alcohol, methanol, ethanol

OUR #1300 SRE FLOOR COATING TDS GIVES A VERY GOOD INDICATION OF THIS PRODUCTS USEFULNESS IN A CHEMICAL ENVIRONMENT. IT'S MORE FOR SOLVENT RESISTANCE THAN ACID RESISTANCE

THIS IS A CHEMICAL RESISTANCE CHART FROM A TDS FOR A COMMON FLOOR HARDINEER. THIS SEEMS IMPRESSIVE UNTIL YOU READ "CAN BE USED TO INCREASE RESISTANCE FROM…" STATEMENTS LIKE THIS REALLY TELL YOU NOTHING

Chemical Resistance

ACI Standard 302.1R-89 magnesium fluorosilicate hardeners can be used to increase concrete resistance to attack from the following chemicals:

Aluminum sulfate
Ammonium chloride
Barium hydroxide
Beef fat
Calcium hydroxide
Calcium nitrate
Carbon dioxide
Carbonic acid
Castor oil
Coal tar oils
Cottonseed oil
Creosote
Cresol
Distillers slop
Ethylene glycol
Ferric chloride
Ferric sulfate
Ferrous chloride
Ferrous sulfate
Fish oil
Fruit juices
Glucose
Glycerine
Hydrogen sulfide
Iodine
Lactic acid, 25%
Lead refining solutions, 10%
Lignite oils
Machine oils
Magnesium chloride
Magnesium sulfate
Manganese sulfate
Manure
Mash, fermenting
Mercuric chloride
Mercurous chloride
Mine water, waste
Mineral oil
Molasses
Mustard oil
Nickel sulfate
Oleic acid, 100%
Olive oil
Paraffin
Phenol, 25%
Phosphoric acid, 85%
Pickling brine, 10%
Poppy seed oil
Potassium aluminum sulfate, 10%
Potassium carbonate
Potassium chloride
Potassium dichromate
Potassium persulfate
Potassium sulfate
Rapeseed oil
Sea water
Silage
Sodium bromide
Sodium carbonate
Sodium chloride
Sodium dichromate
Sodium nitrite
Sodium sulfate, 10%
Sodium sulfite, 10%
Sodium thiosulfate
Soybean oil
Sugar
Sulfite liquor
Tallow and tallow Oil
Tannic acid
Tanning liquor, 10%
Tobacco
Walnut oil
Zinc chloride
Zinc sulfate

CONCRETE SLAB TEST REPORT

(This form may be reproduced as required) Sheet _____ of _____

Concrete Slab Test Reports are required to be performed prior to installation of any finished flooring materials (VCT, rubber, carpet, wood, monolithic, or sheet gym floors, etc.) and shall provide the basis of acceptance of the slab conditions by both the finish flooring manufacturer and installer. A test report shall be provided for each room/area. Submit report directly to Architect prior to any installations. Include additional copies of this form as necessary. Additional copies of form are also to be submitted as project close-out requirements as specified in the General Requirements.

PROJECT NAME ____
PROJECT LOCATION ____
FLOORING CONTRACTOR ____
TESTS PERFORMED BY (name) ____________________________________
DATE TEST PERFORMED ___________ **TIME TEST PERFORMED**_________
____

Room Name and No. (from plans) ____

- Moisture Test (specify type of test and result) ______________________________

____

- Alkalinity Test (specify type of test and resultant pH) _________________________

____

- Evidence of curing/sealing/hardening compound present? Yes ____ No _____
- Other tests (as required by flooring mfg.'s & results) _______________________

____

- Overall slab condition/observations _____________________________________

____

- Remedial action required (if costs incurred, indicate party responsible) _________

____

Room Name and No. (from plans) ___________________________________

- Moisture Test (specify type of test and result) ____________________________

____

- Alkalinity (specify type of test and resultant pH) __________________________

____

- Evidence of curing/sealing/hardening compound present? Yes_____ No ______
- Other tests (as required by flooring mfg's & results)________________________

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- Overall slab condition/observations _____________________________________

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- Remedial action required (if costs incurred, indicate party responsible) _________

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