CONCRETEDEFENSE.COM

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

INDUSTRIAL FLOORING TECHNOLOGY SERIES- #5 WEAR AND ABRASION RESISTANCE

"Wears like iron!", "The best around!", "Lasts for years!" "Toughest Epoxy available!" We have all heard such generalizations and unsupported superlatives from industry reps. While these might diminish the propane cost for a balloon ride they do nothing to help you make a good decision on what product system to use. We need to get specific.

WHAT IS ABRAISION RESISTANCE

Abrasion resistance of coatings is measured by tabor abrasion. The coating is applied to a 4'x4' metal square with a hole in the center. Once the material has fully cured this square is put on a turn table and a standardized, rotating abrasion wheel, called a CS-17 wheel, is put on the square with a 1000 gram weight on top of it. The turn table is now rotated 1000 times- think old style record player. The weight after the rotations is subtracted from the weight before and the difference is in mg. The weight lost is a measure of abrasion resistance. The less weight lost, the greater the abrasion resistance and the better the "wear" in service. There are other measures but this one gives the most direct information for expected service wear. A simple hardness measure is NOT enough. See Tabor Table included.

In specifying materials you also balance off odor during installation, the ease of recoatability, cost, light fastness, and impact resistance in heavy use environment.

HOW TO IMPROVE ABRSION RESISTANCE

This is simple, put in some tough stuff. Quartz is a common additive. 3M color quarts floors have been around for years. For best results they are a double broadcast of about 1/8" thickness and are comparable in cost to hard tile surfaces. This quartz has a 7.5 on the Moho scale (a diamond is a 10) and since the wear is predominantly on the quartz, not the coating, it wears very well. Similarly for a heavy duty built up floor the larger 3M type roofing granules so the same thing. This also give an angularity for some slip resistance when used as a broadcast medium.

If you want better wear you can substitute steel shot or some other harder media for the quartz. Naturally this will increase cost. So if you want a surface that "WEARS LIKE IRON" we can give this to you.

SO WHAT DO YOU NEED OR SO HOW MUCH IS ENOUGH

You need to consider the environment the material will be in and how clean it is kept. If the surface is cleaned of abrasive grit- sand and dirt for example- on a regular basis the service life of the floor about doubles from a situation where cleaning is minimal or absent. Recoating of an automotive service floor, coated with 2 coats of our #1300 EPOXY- a 12 mil system, went from 2 years to 5 years when the parking lot outside was paved over and the floor was washed clean daily. One customer with this 2 top coat system in a light warehouse/assembly environment cleans daily and now after 7 years, looks very good and STILL does not need a recoat… Rats!

Fork truck traffic is often considered heavy duty. It is NOT, in so far as abrasion goes. This is pretty light duty. Foot scuffing at a work station is heavy duty- think sand paper. One dealer coated 80,000 sqft for production floors and aisles with our #1300 EPOXY, at Speed Queen a number of years ago. After two years

the aisles looked like new. The surface was warn though in spots by the time clock, by the cigarette machine, by some work stations, and under the some tables in the lunch room.

One good idea is to put a layer of 100% solids epoxy under the top coats. If this is slightly a different color wear sport are easily seen for recoating. We call this construction our Isofloor system.

WEAR VS PEELING

Wearing through a coating over time is natural. This is obvious as a spot where the concrete shows and the coating edge is warn down to nothing along the perimeter. Cleaning and recoating is all that is necessary. If the spot has a coating edge that is a significant bump then you have peeling or delamination. Before repairs can be done, we need to determine if this area will peel back. Put a flat blade screw driver or pen knife blade under the edge and pry gently. If the material pops off easily you have delamination and we recommend total removal and redoing the surface. This is relatively expensive vs a simple recoat. (Why does this happen? High MVT – see #1 in this series- is the most usual culprit. Next comes poor or incomplete preparation, and lastly the absence of a primer to make the concrete surface tougher.)

The short of it is if a thicker surface peels off, its service life is less than a thinner surface that stays attached and simply wears. The present value cost of the thicker surface, especially if it needs to be removed and re done, is WAY more than a simple coating that only needs periodic recoating.

Peeling can also happen if the underlying concrete breaks. We had a situation where heavily loaded steel wheeled carts were taking off the floor coating. We were asked for a "tougher" product. A little arithmetic showed that the point loading on the wheels could exceed 6000 psi. The floor was a 3500 psi concrete floor. The concrete top was being crushed. A heavy duty topping was installed and the problem ended.

HOW DO YOU KNOW

This is also pretty simple. You ask for a list of customer references for this system, from prior years, and you call and ask how things are doing. You also NEED to ask what it takes to recoat the system. If the abrasion resistance is spectacular but repair and recoating is near to impossible, or amazingly costly and only done by "trained professionals", you might want to consider a more user friendly system.

Tom Hennessy ChE
I hope this helps.

Georgeism #22
Get up each day and go to work even if you don't like it

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TABOR ABRASION

Coating wear is commonly measured with a TABOR abrasion apparatus. The material is coated on a metal disc, air dried 7 days @ 70F, and subjected to 1000 revolutions of wear with a CS-17 (type of abrasive) wheel and reported as mg (milligrams) of dried coating weight lost. **The fewer mg lost the more abrasive resistant the coating is.** As a general rule enamel paints have a Tabor of 300+, average epoxies have a TABOR of 40-70, and most urethanes have a Tabor of 20-40. Exceptional and higher performance coatings have a TABOR below 20. When considering a floor coating take into account both the wear factor, the TABOR ABRASION, the thickness of the applied coating, any chemical resistance requirements, recoatability and of course, cost. WE INVITE COMPARISONS.

MATERIAL	TABOR- mg lost
CD PRODUCTS: #2300 ARISTOTHANE Water based urethane coating	5.6
CD PRODUCTS: #2200 URETHANE Moisture cure aliphatic urethane coating	18
CD PRODUCTS: #2400 POLYESTER URETHANE Color matchable aliphatic urethane	24
CD PRODUCTS: #1300 EPOXY Solvent resistant epoxy and general use coating	31
CD PRODUCTS #4100 EPOXY Light fast, general chem resistant 100% solids epoxy	32
CD PRODUCTS: #3100 (90) EPOXY High build 100% solids epoxy	33
CD PRODUCTS: #5100 EPOXY Novolac, 100% solids epoxy, for strong chemical exposure	40
CD PRODUCTS: #1400 EPOXY General chemical resistant epoxy coating	44
CD PRODUCTS: #1401 EPOXY Novolac epoxy coating for strong chemical exposure	50
CD PRODUCTS: NUPRIME EPOXY Moisture vapor blocking epoxy primer	86
CD PRODUCTS #1013 EPOXY PRIMER Water tolerant epoxy primer	317