technical reference

Tips - Common questions answered

Question - I do want my coating to stick, but I need a "showroom" quality look - how can we achieve this?

Answer - Easy, shotblast as usual then diamond grind afterwards. It will not need much diamond grinding, but you will have an excellent surface.

Question - How can I be sure that oils, silicones, concrete release agents, curing agents are removed?

Answer - To be as sure as possible try the water droplet test. Touch a drop of clean water to the surface; do it in many spots over the floor. If it quickly spreads and absorbs into the surface you can be reasonably sure. If it sits as a bead on the surface, don't apply the coating/overlay until it doesn't bead. Re-blast the surface.

Question - I know shotblasting does give good adhesion, but I can see "tram lines" when I've finished coating.

Answer - Common problem, but it can be usually fixed. An exception may be if the slab is very soft due to the slab being damaged by rain or by the contractor having added water to the concrete.

There are several things that can cause "tram lines":

a) The most common problem is using oversized shot! Bigger shot is not faster (except when removing thick paint). Unless you need to take off 2mm or 3mm in one pass, the fastest blast speed and best finish is with a small shot. Why? Because a shotblaster will throw the same number of kilograms of shot per minute whether you use large or small shot. The difference is that with S460 shot there is 121,000 impacts per kilogram, S280 shot will deliver 550,000 impacts, thats 450% more impacts of exactly the right force to put a coating over!

b) Adjust the control cage so that the heaviest blast is in the centre - be fanatical about getting this right - it will pay dividends!

c) Don't use a mixture of shot sizes - especially if there is a big difference in size. Big shot may tend to land to the left and small shot tend to land to the right, for example.

d) Overlapping too much causes overblasting in lines.

e) Some brands of machines don't have quite the right geometry and will always blast slightly heavier one side. For the same reason, don't rotate blast wheel in the wrong direction of any machine.

SHOT BLASTING vs. OTHER METHODS

Acid Etching

- Hard to control
- Limitations not understood
- Not effective on coated or oil soaked floors
- Takes several days to dry floor
- Disposal is expensive

Grinding

- Removes surface contaminants & coatings
- Good for detailing around edges of floors
- Grinders can be made dust free
- Provide an etch on the concrete surface

Scarification

- Useful for heavy removal of overlayments
- Less controllable, providing a rough edge or grooving on the surface

FLOOREX'S Surface Preparation Guide can help you choose the right equipment to get your job done right!

Any Questions? Call FLOOREX!

1800 356 673

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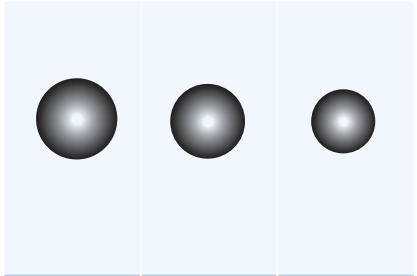
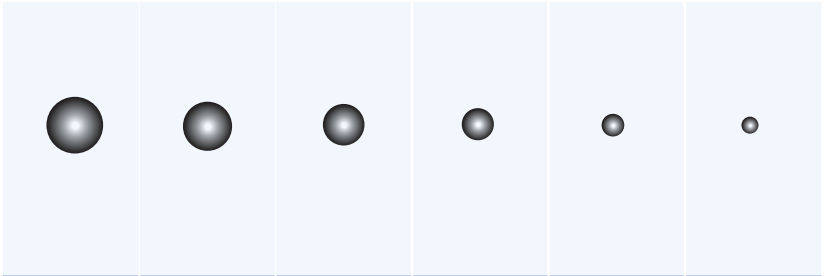
AVERAGE NUMBER OF IMPACTS PER POUND OF SHOT



S-780	S-660	S-550
11,400	19,200	32,000



S-460	S-390	S-330	S-280	S-230	S-170
55,000	93,000	153,000	250,000	420,000	1,200,000

Use these abrasives in Blastrac machines

S-110	S-70
3,400,000	12,000,000

Sometimes S-110 used for cosmetic purpose

Any Questions? Call FLOOREX!

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FLOOREX®

SIX SIMPLE STEPS TO SUCCESSFUL MIXING WITH PORTAMIX HIPPO

1. **Use correct size paddle:** WKD 400mm helix for 4 or 5 bag mixes
   WK 200mm helix for 2 to 3 bag mixes

If it splashes or if the top of the paddle is not completely immersed, it will not mix properly.

2. **Put all the water** in first - be accurate

3. **Mixer on Low speed** except for the last bag

4. **"Fluff" in one bag** at a time - it may take 15 seconds per bag.
Failure to fluff in product means it will take longer to get all the lumps mixed.

5. **Put onto high speed** before you put in the last bag. Often only 30 seconds is needed the last bag, before the mix is ready.

6. **When mixing the last bags in** the products will form a whirlpool and the whole mix will be in motion.

Any Questions? Call FLOOREX!

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Basic Area and Volume Formulae

RECTANGLE

Area = Length x Width

TRIANGLE

Area = 1/2 x Base x Perpendicular Height

CIRCLE

Area = O x radius^2

CYLINDER

Area = (ends not included) = O x radius x Height
Volume = O x radius^2 x Height

CONE

Area = (excluding base) = O x radius x slant height

Volume = 1/3 x O x radius^2 x Height

$$\text{slant height} = \sum \overline{\text{radius}^2 \text{ x height}^2}$$

SPHERE

Area = 4 x O x radius^2

Volume = 4/3 x O x radius^3

Conversion Factors

Imperial to Metric

Length

thousandth of inch (thou or mil)	x 25.4 = µm
inches (in)	x 25.4 = mm
feet (ft)	x 0.3048 = m

Area

square inches (in²)	x 645.16 = mm²
square feet (ft²)	x 0.0929 = m²

Volume

cubic inches (cu in)	x 16.38716 = cm³ or mL
cubic feet (cu ft)	x 0.028317 = m³
cubic feet (cu ft)	x 28.3701 = L
US gallons (gal)	x 3.7854 = L
quart (qt)	x 0.9464 = L
fluid ounces (fl oz)	x 29.57 = mL

Speed - Velocity

feet per minute (ft/min)	x 0.00508 = m/s
feet per second (ft/s)	x 0.03048 = m/s

Flow Rate

cubic feet per minute (CFM)	x 0.47195 = L/s
cubic feet per minute (CFM)	x 0.028317 = m³/min
cubic feet per minute (CFM)	x 1.69902 = m³/hr
US gallons per minute (gpm)	x 3.7854 = L/min

Weight Mass

pounds (lb)	x 0.4536 = kg

Bulk - Density

pounds per cubic foot (lb/cuft)	x 16.0185 = kg/m³
pounds per cubic foot (lb/cuft)	x 0.016019 = kg/L

Pressure

pounds per square inch (psi)	x 6.8947 = kPa
pounds per square inch (psi)	x 0.0068947 = MPa
pounds per square inch (psi)	x 0.068947 = bar

Vacuum

inches of mercury (in. Hg)	x 3.38638 = -kPa
inches of mercury (in. Hg)	x 13.596 = H^2O

Power

horsepower (hp)	x 0.7457 = kW

Temperature

degrees Fahrenheit (ºF)	- 32, then x 0.5555 = ºC

Metric to Imperial

Length

microns (µm)	x 0.03937 = thou or mil
millimetres (mm)	x 0.03937 = in
metres (m)	x 3.28083 = ft

Area

square millimetres (mm²)	x 0.00155 = in²
square metres (m²)	x 10.7639 = ft²

Volume

cubic centimetres (cm³)	x 0.061023 = cu in
cubic metres (m³)	x 35.3145 = cu ft
litres (L)	x 0.035315 = cu ft
litres (L)	x 0.26417 = US gal
litres (L)	x 1.05668 = qt
millilitres (ml)	x 0.03381 = fl oz

Speed - Velocity

metres per second (m/s)	x 196.85 = ft/min
metres per second (m/s)	x 3.28083 = ft/s

Flow Rate

litres per second (L/s)	x 2.11887 = CFM
cubic metres per minute (m³/min)	x 35.3145 = CFM
cubic metres per hour (m³/min)	x 0.58857 = CFM
litres per minute (L/min)	x 0.26417 = US gpm

Weight Mass

kilograms (kg)	x 2.2046 = lb

Bulk - Density

kilograms per cubic metre (kg/m³)	x 0.062428 = lb/cuft
kilograms per litre (lkg/L)	x 62.4277 = lb/cuft

Pressure

kilopascals (kPa)	x 0.0145 = psi
megapascals (MPa)	x 145.04 = psi
bar (bar)	x 14.504 = psi

Vacuum

kilopascals (-kPa)	x 0.2953 = in. Hg
inches of water (H^2O)	x 0.07355 = In. Hg

Power

kilowatts (kW)	x 1.341 = hp

Temperature

degrees Celsius (ºC)	x 1.8, then +32 = ºF

Conversion Tables

PRESSURE

psi to bar, kPa (MPA)

psi	bar	kPa
40	2.8	276
50	3.4	345
60	4.1	414
70	4.8	483
80	5.5	552
90	6.2	621
100	6.9	689
110	7.6	758
120	8.3	827
130	9.0	896
140	9.6	965
150	10.3	1034
1000	68.9	6.9
1500	103	10.3
2000	138	13.8
2500	172	17.2
3000	207	20.7
3500	241	24.1
4000	276	27.6
5000	345	34.5
6000	414	41.4
7000	483	48.3
8000	552	55.2
9000	621	62.1
10000	689	68.9
20000	1380	137
30000	2070	206
35000	2410	241
40000	2760	275
50000	3450	344

bar, kPa (MPA), to psi

bar	kPa	psi
1	100	14.5
2	200	29
3	300	43.5
4	400	58
5	500	72.5
6	600	87
7	700	101.5
8	800	116
9	900	130.5
10	1000	145
11	1100	159.5
12	1200	174
100	10	1450
200	20	2900
250	25	3626
300	30	4351
350	35	5076
400	40	5800
500	50	7250
600	60	8700
700	70	10150
800	80	11600
900	90	13050
1000	100	14500
1500	150	21750
2000	200	29000
2500	250	36260
3000	300	43500
3500	350	50760
4000	400	58000

TEMPERATURE

degrees Fahrenheit ºF	degrees Celsius ºC
-20	-28.9
-10	-23.3
-4	-20
0-Zero	-17.8
10	-12.2
14	-6.7
30	-1.1
32	0-Zero
40	4.4
50	10
59	15
68	20
70	21.1
80	26.7
86	30
90	32.2
100	37.8
104	40
122	50
140	60
158	70
176	80
194	90
212	100
230	110
248	120
266	130
284	140
300	148.9

Conversion Tables

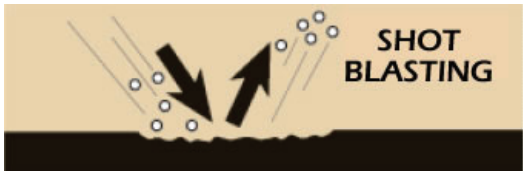
VENTILATION FLOW RATES

CFM	Litres/min	m³/min	m³hr	m³/min to CFM		m³hr to CFM	
500	14,159	14.16	849.5	15	529.7	1000	588.6
1000	28,317	28.32	1699	25	882.9	2000	1177
2000	56,634	56.63	3398	50	1765	3000	1766
3000	84,951	84.95	5097	75	2648	4000	2354
4000	113,270	113.3	6796	100	3531	5000	2943
5000	141,590	141.6	8495	125	4414	7500	4414
6000	169,900	169.9	10,194	150	5297	10,000	5886
7000	198,220	198.2	11,893	200	7062	12,500	8828
8000	226,540	226.5	13,592	250	8829	15,000	11,770
9000	254,850	254.9	15,291	300	10,590	20,000	11,770
10000	283,170	283.2	16,990	400	14,130	25,000	14,710
15000	424,760	424.8	25,485	500	17,660	30,000	17,660
20000	566,340	566.3	33,980	600	21,190	35,000	20,600
25000	707,930	707.9	42,476	700	24,720	40,000	23,540
30000	849,510	849.5	50,971	800	28,250	45,000	26,490
35000	991,100	991.1	56,466	900	31,780	50,000	29,430
40000	1,132,700	1133	67,961	1000	35,310	60,000	35,310
45000	1,274,300	1274	76,456	1250	44,140	75,000	44,140
50000	1,415,900	1416	84,951	1500	52,970	100,000	58,860
75000	2,123,800	2124	127,427	2000	70,630	125,000	73,570
100000	2,831,700	2832	169,902	2500	88,290	150,000	88,290

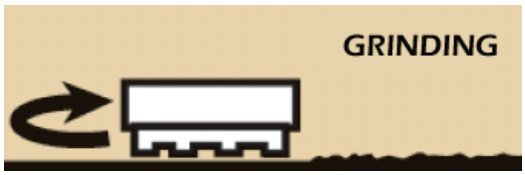
COMPRESSED AIR SUPPLY FLOW RATES

CFM	Litres/second	litres/second	CFM
100	47.2	35	74.2
150	70.8	40	84.8
200	94.4	50	106
250	118	75	159
300	142	100	212
350	165	125	265
400	189	150	318
450	212	175	371
500	236	200	424
600	283	250	530
700	330	300	636
900	425	350	742
1000	472	400	848
1200	566	500	1059
1400	661	600	1271

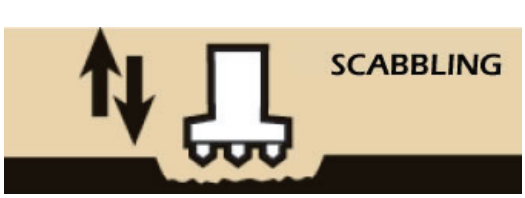
CONCRETE FLOOR PREPARATION GUIDE



Shot Blasting is a one-step surface preparation technique that removes, cleans and profiles the surface in a single application. It can effectively remove laitance, paint, old coatings, dirt and other contaminants that are in or on concrete. This process will prepare new concrete or steel for coating applications and will enhance and improve the bond for any type of coating system. Shot Blasting is a dust-free method of surface abrasion in which thousands of steel shot particles are propelled at the surface removing the top layer and contaminants and bounce back into the system to be recycled. The steel shot profiles the surface, while contaminants are removed by the dust collection recovery system. Fine (S280-300) Shot is recommended for most coatings preparation.
Profile CSP 3 to 7. SURFACE DAMAGE RISK - LOW



Diamond Grinders use horizontally rotating discs to level, smooth or clean the top surface of a concrete slab. Some Grinders come with a multi-accessory disc that can be loaded with long lasting Dyma-Certs™ grinding stones or star wheels to level rough surfaces, remove sealers, paints, mastics or glues from concrete slabs. Primarily designed to work the top surface of a floor over large areas, grinders can also be used effectively to level uneven joints or high spots of 1-3mm. Grinders provide contractors a smother finish than scarifiers or scabblers. Profile CSP-2. SURFACE DAMAGE RISK - LOW

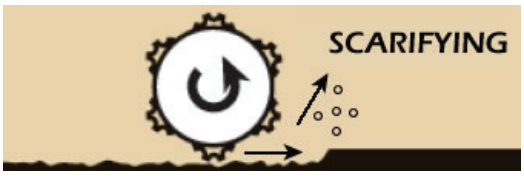


What a Scabbler can do

Scabblers use compressed air to hammer piston mounted bits onto the concrete surface. They tend to roughen the concrete surface more than grinding or scarifying. A Chip-Deck Scabbler can remove up to 6mm of concrete surface in a single pass. A typical removal rate for a machine with a 12 inch working width is 20 to 25 square metres per hour at 3 to 6mm depth. Profile CSP 8-9. SURFACE DAMAGE RISK - VERY HIGH

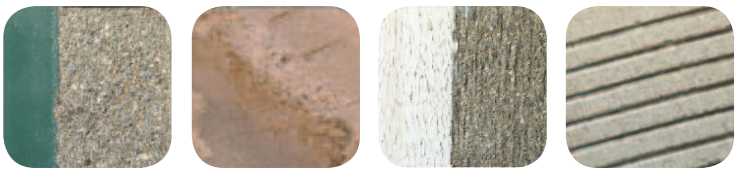
CONCRETE FLOOR PREPARATION GUIDE

Chisel Scralers are air-powered hand tools that use a rapid hammering action that would ordinarily require maunual scrapers. Various accessories are available for chisel scalers, enablig contractors to easily remove tile, grout, ice, fibreglass, concrete, asphalt, roofing shingles, or hardened deposits. Minimum air is needed to operate these tools ~ only 6-8 CFM at 80 TSI ~ or 12 - 15 CFM at 90 TSI. For larger projects, engine powered ride-on scrapers are used for high productivity and rapid removal of tiles, wood, parquetry carpets and glues. Electric Chisel Scrapers also available

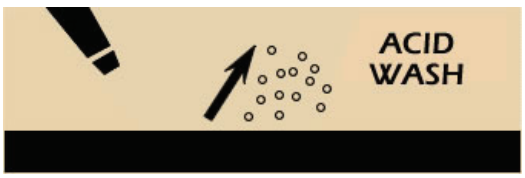


Scarifying machines impact a cutting wheel to the concrete or steel surface. Tungsten or hardened steel flails strike the surface leaving a clean, roughened or textured surface. Scarifiers are also referred to as planers, milling machines, rotary cutters or simply surface-preparation machines. Scarifiers allow you to control the depth of the cut more precisely than with scabblers. These versitile machines have various styles of interchangeable cutter assemblies that can be used for cleaning, grinding and light or heavy milling. Production rates range from 35 to 150 square metres per hour (dependant on machine size and horsepower). CSP 6-9. SURFACE DAMAGE RISK - MEDIUM/HIGH

What a Scarifier can do



Clean **Levelling** **Remove** **Groove**



Acid etching of concrete floors is mainly used for light duty applications as the weakly bonded laitance layer is not totally removed. Acid etching does not remove surface contaminants, which must be removed before the acid etching process. Diluted acid is applied to the concrete floor which reacts with concrete surface. The resultant surface must be thoroughly high pressure washed at approximately 3000PSI to etch the surface and remove the acid solution. Vacuum and allow to properly dry for at least 48 hours. Ensure acid is totally neutralised before applying coating. Acid washing is not considered suitable if concrete has any oil, grease or curing agents. Not suitable for vertical or overhead surfaces. It may be the preferred method for food preparation areas. Profile CSP-1.

PREPARATION METHOD SELECTION CHART

STEP 1) To use this chart, determine the duty and application expected of the floor from Table 1. Then select the typical coating that will suit the application.

STEP 2) Determine the surface profile required for this coating and the machine that delivers the nest result from Table 2.

STEP 3) Table 3 indicates the range od profile attainable by the various surface preparation methods.

TABLE 1

DUTY	TRAFFIC	APPLICATIONS	TYPICAL COATING TYPES
Light	Pedestrian only	Office, Wet areas	Sealers, seamless, thin roll-on or spray coatings
Medium	Pedestrian, cars, soft wheel trolleys	Laboratories, Showrooms	Seamless, roll-on, spray, Self levelling epoxies
Heavy	Forklifts, pallet trucks, hard wheel	Warehouse, Bakeries, Abbatoirs	Roll-on, Self-levelling, trowel-on epoxy screeds

TABLE 2

COATING TYPE	PROFILE	ACID ETCH	DIAMOND GRIND	SHOTBLAST	SCARIFIER
Sealer	CSP-1 Very light	***	****	**	*
Seamless	CSP-2 Light	**	****	***	*
Roll-on / Spray Epoxies	CSP-2-3 Light	**	****	****	**
Self Levelling	CSP-3-5 Medium	*	****	****	***
Trowel-on epoxy screeds	CSP-3-5 Medium	*	***	****	***
Cement Screeds	CSP-3-9 Heavy	*	***	****	****

TABLE 3

	CSP-1	CSP-2	CSP-3	CSP-4	CSP-5	CSP-6	CSP-7	CSP-8	CSP-9
Acid Etch									
Diamond Grind									
Shotblast									
Scarifier									

WHAT IS LAITANCE?

Laitance is the weak, milky layer of cement and sand fines that rise to the surface especially with over-wet concrete and mixes with bleed water, usually as a result of premature finishing or trowelling.

WHY REMOVE LAITANCE?

The life of a coating on a concrete floor is dependant on proper adhesion to the concrete. If a coating is applied directly to the laitance layer (which is inherently weak) floor traffic from trolleys, forklifts or other machinery will cause disbonding of the coating.
By removing the laitance layer, coatings can firmly adhere to the concrete substrate giving longer service life.

SURFACE PROFILE GUIDE

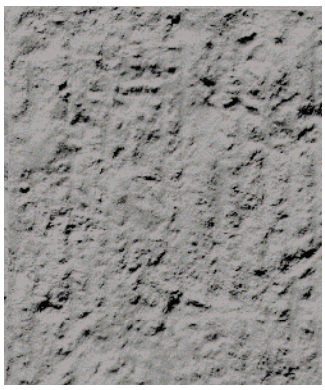
CSP 1 - Acid Etched

CSP 2 - Grinding

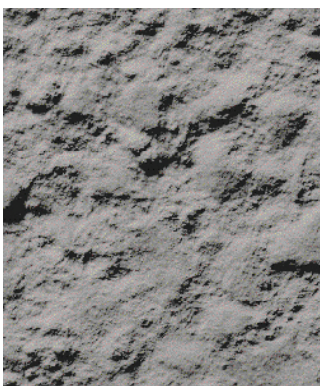
CSP 3 - Light Shotblast

CSP 4 - Light Scarification

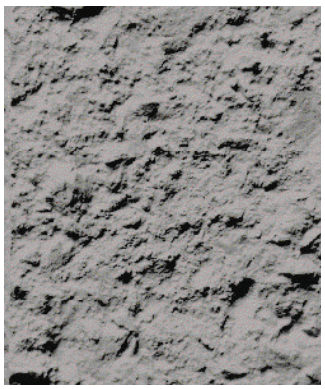
CSP 5 - Medium Shotblast



CSP 6 - Medium Scarification



CSP 7 - Heavy abrasive blast



CSP 8 - Scabbled

CSP 9 - Heavy Scarification