

Using the SMITH Concrete Shaver

The SMITH FS350 Concrete Shaver is used to manage corrective concrete surface failure issues. Consisting of a 38cm (15")-wide stacked diamond impregnated shaving drum – powered by an electric motor with a vacuum port for dust extraction – the FS350 is a model in the FS3 Series built by SMITH Manufacturing in Pompano Beach, Florida. The series consists of the walk-behind FS300, the self-propelled FS350, and the FS390 surface preparation drum-style machines with skid attachment, powered by electric, gas or hydraulics for use with a scarifier flail cutter at low RPM, or as a diamond shaver at high RPM.

The concrete shaver can be used for preparing:

- (1) Spalled Floors or Failing Slurry Caps
- (2) Reducing concrete risers, deflections, or curled joints
- (3) Profiling for new overlays
- (4) Leveling uneven surfaces or floor undulations
- (5) Shaving off failed coatings, coverings or overlays
- (6) Exposing aggregate to seal, densify, or polish
- (7) Cleanup for coatings or polishing

Corrective Actions for typical Concrete Problems

Most surface failures can be prevented through proper surface preparation to assure surface is sound with moisture vapor barriers set and bond tested before flooring system is installed. Since these steps are difficult to manage, there will always be a need to repair a failed concrete surface and turn it into a sound floor.

There are many factors that contribute to existing concrete surface failures such as traffic, weather, moisture, expansive soils, improper installation methods and unknown material types and thickness make it difficult to identify the correct treatment and cost to ensure uniform, quality maintenance practices.

There are many methods used to remove protective and decorative industrial surface coatings as well as thin set and hi-build flooring systems. Epoxies, urethanes, polyureas, sealers, paints, ceramics, grouts and mastics are just some of the systems contractors discover on the job. Shot blasting, scarifying, diamond grinding, shaving or chemicals are some of the tools used with varying success.

Which tool is best? Selecting the right equipment, cutter tools, and removal methods will assure repairs are completed correctly, cost-effectively and last. Selecting the tool that is fastest and most cost effective remains the "Holy Grail" in surface-prep and selecting the wrong method will determine job success or failure. Experienced contractors bring multiple style machines to each job since they frequently uncover a variety of floor toppings at various thickness on every job. The right removal tool mainly depends on the material type and coating thickness that has to be removed. The most common surface preparation method in use are planetary diamond grinding. This grinding process is ideally suited to polish a concrete surface but requires frequent passes and

many hours to level surfaces. To reduce this time, contractors are now using Concrete Shavers, especially when reducing high spots over 3/16".

Concrete Diamond Shavers are the newest tool offering that help flooring contractors reduce their labor, equipment and material costs significantly over traditional diamond grinding or scarification.

Shavers look like traditional concrete scarifiers except the equipment does not have a drum outfitted with flailing cutters, but a series of stacked diamond blades assembled on a drum that can rotate at 3600 RPM. The diamond drum rotates more than 2X faster than a traditional scarifier drum because vibration is virtually eliminated. The diamond drum is stacked with ganged blades all at the same diameter to achieve an even surface grind and can be set up to shave, cut or groove depending upon the surface. The stacked diamond drum can be configured with blades next to each other to shave thin materials or the blades set with spacing gaps to cut deeper passes. The diamond blades have segments with varying hardness diamond filled matrix formulated to cut soft, medium or hard concrete depending upon surface hardness. The blades can be 1/8" or 1/4" blade segment widths which may or may not influence removal cut speeds depending upon surface levelness and materials being cut. Typical cut depths of stacked blades, depending upon the material and surface is up to 1/8" per pass. Removal rate on a medium hard concrete surface can be up to 1000' per hour, depending upon if the shaver is used to shave or groove.



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Selecting when to shave or groove depends upon the surface being removed and the new materials being applied. Shavers actually slice small pieces of the coating off at a very high rate, minimizing erratic surface and micro-fractures that loosen soundly attached aggregates. Shaving reduces the resistance on the machine and allows for maximum cutting pressure. A Shaving drum has diamond blades stacked next to each other so as not to produce a groove when shaved. To groove or cut thick materials or concrete surfaces, the diamond blades on this same drum can be spaced to cut a groove narrow to wide dependent upon the overlay material type and thickness. After the surface is cut longitudinally and/or diagonally, they can then be lifted using a secondary operation of scraping, scarifying, scabbling, or chiseling. ⚙️








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Features and Configuration

- *Weight: 224 kg (495 lbs)*
- *Shaving drum width: 38 cm (15 in.)*
- *Requires 230 or 480-volt, 3-phase power; 27 amps minimum*
- *Self-propelled, variable speed (1 to 8 m/min) with forward and reverse*
- *Cutting depth varies from 0 to 1.3 cm (0.5 in.)*
- *Can shave within 7.5 cm (3 in.) from a wall/floor interface or other obstruction*
- *Contains an extraction port that can be used in conjunction with a vacuum extraction system for dust-free operation*
- *The design for mounting the blades on the drum results in low vibration levels.*
- *The shaving drum can be fitted with a variety of stacked diamond-impregnated blades, depending on the surface finish required, the blades that can be configured with or without spacing gaps.*

TYPICAL CONCRETE PROBLEMS RESOLVED WITH A DIAMOND CONCRETE SHAVER (SHAVING)

PROBLEM	SOLUTION
 <p>Spalled Floor or Failing Slurry Cap</p>	A SHAVER helps manage the removal process through a uniform consistent cut depth that minimizes erratic surface and micro-fractures that loosen soundly attached aggregates. Scarifiers, scabblers and shot-blasters are unable to achieve consistent depth and textures that will raise the cost for using more overlay material. A SHAVER can cut up to as much as 5/16"/pass with a 1/8"/pass ensures a precise cut, extends the life of the blades, and improves machine performance, service life and surface finish.
 <p>Concrete Risers, Deflections, or Curled Joints</p>	Scarifiers are a typical choice for small deflections or high spot riser or curled joints. If the deflection is severe and the final surface is to be polished, the fastest choice is a concrete SHAVER. A SHAVER outfitted with full, no spaced, stacked drum allows control of the cutting depth for a level, smooth surface for final coatings or polishing step.
 <p>Profiling for overlays</p>	Profiling methods include scarifying, shot blasting, diamond grinding, and sanding. Dry-cut Shaving without water using a vacuum to collect airborne dust and removed residues is a preferred cost-effective removal method since the thin shaved surface leaves no remaining micro-fractures, no dust, leaving a CSP2-3 texture that maximizes bonding of thin-set coatings. Thin shaving reduces the consumption of the surface coatings
 <p>Uneven surfaces or floor undulations</p>	A SHAVER can level the surface quicker than a Grinder because it can penetrate into surfaces deeper and at faster speeds than a Grinding Disc. Using a SHAVER before the Grinder reduces the labor time it takes to achieve floor flatness. The cutting drum can be outfitted with job specific diamond bond, grit and spacing specification to match the surface being cut and final texture required.
 <p>Failed Coatings, Contaminants, Coverings or Overlays</p>	The SHAVER drum can be configured in a variety of a diamond blade grooving spacing patterns for longitudinal cuts into the surface to help facilitate a cost-effective removal solution of concrete contaminants, coatings and overlays, depending upon the materials and cut depths. Common grooving configurations are 1/2", 3/4", 1" on centers. The SHAVER can control the RPM blade speeds and cutting depth to assure best removal performance and tool life.
 <p>Exposing Aggregate to Seal, Densify, or Polish</p>	A SHAVER significantly reduces the amount of time needed to expose the aggregate in the concrete slab vs traditional diamond grinding. The concrete shaver can remove up to 5/16" (81 cm) and aggregate exposure at speeds up to 700SF/hour (65 m2). Diamond grinding to expose aggregate is at 150 SF/hour (14 m2).
 <p>Cleanup for Coatings or Polishing</p>	When a Scarifier, Shotblaster, Scraper or scabblers cannot work fast enough, a SHAVER with stacked, non-spaced diamond blade configuration will leave a smooth cleaned surface for toppings or polishing.