



Photo: Equipment Development Co., Inc.

## Grinding

*The rotation of one or more abrading stones or discs applied under pressure at right angles to the concrete surface.*

### Method summary

This method may be used on horizontal, vertical and overhead surfaces to remove deposits or coatings, and to reduce or smooth surface profile. The grinding stone or disc is applied under pressure and moved across the surface until the desired effect is achieved. Grinding may be used on almost any substrate and is suitable for both interior or exterior applications. Efficiency considerations may limit coating removal applications to film thicknesses less than 6 mils (150  $\mu\text{m}$ ).

**Purpose.** Grinding is used on concrete surfaces to reduce or smooth slight surface irregularities and to remove mineral deposits and thin coatings.

**Limitations.** Grinding is not recommended for the following applications:

- Preparation of previously sealed or coated surfaces for recoating—unless followed by acid etching or shotblast.
- Surface profile is required.
- Removal of chlorinated rubber, acrylic, or other soft coatings or finishes.

- Removal of tile or carpet adhesives.
- Occupied work space (unless rigorous dust control methods are used).
- Surfaces of unknown composition.

**Removal.** Removal is practically restricted to surface protrusions and coatings less than 6 mils (150  $\mu\text{m}$ ) thick. May be used to remove noncombustible or non-heat degenerating coatings. Method will successfully remove rigid epoxy, polyurethane, and methacrylate coatings. Grinding may also be used to remove efflorescence, rust, and other oxidized deposits.

**Pattern.** Small hand-held grinders are likely to produce gouging and a circular, grooved pattern. Large walk-behind units fitted with aggressive media should eliminate gouging, but are likely to impart a circular pattern. Larger units using fine stones should not produce any detectable pattern.

**Profile.** ICRI CSP 1-3

Grinding produces a smooth surface. Other methods may be used in conjunction with grinding to produce required profile.

**Accessibility.** Most surfaces, including edges, are accessible. Portable equipment ranges from small hand-held grinders to walk-behind units with multiple discs. Access to corners and tight configurations is restricted by the arc of the grinding disc.

**Environmental Factors.** Dry grinding will produce a fine airborne dust which may be minimized with dust control attachments. Debris generated by this method will contain fine particles of any material or contaminant being removed. Materials likely to require special protective measures and handling include tile mastics, which may contain asbestos; lead-based paints; and PCB's which may have been absorbed by concrete in the vicinity of electrical equipment. Wet grinding, which may be selected to eliminate airborne dust, will produce a slurry residue. Slurry constituents from some materials may be considered toxic. Plans to collect and properly dispose of slurry and rinse water must be considered. Grinding soft, easily charred materials will generate smoke which may be considered hazardous.

Preparation should include plans to adequately protect occupants and workers. Noise and vibration levels are considered to be low.



## Execution

**Equipment.** Appropriate selection of a grinder depends on the location and size of the area, specific removal requirements, and accessibility. They are available in electric, pneumatic, or gas-driven models. Sizes range from hand-held grinders to walk-behind machines. Rotation speeds vary from 1,000 to 9,000 rpm.

**Materials.** The grinding medium (stone or disc) is the consumed material, and will vary with job specific application requirements:

- Size: diameter ranges from 4 – 18 inches (100 – 450 mm).
- Composition: varies from very fine polishing media to aggressive cutting media with wet or dry diamonds.
- Shape: flat, cone-shaped, or cup disc.

**Labor.** Low to medium skill required.

**Down time.** Minimal. Setup requires very little time unless dust protection includes draping and taping. Changing stones or discs is quick. Frequency of replacement will depend on the composition of the stone or disc, substrate, and material being removed.

**Cleanup.** Grinding will leave a fine powdered residue of the removed material. The residue generated can be swept, rinsed with water, or vacuumed.

**Production rates.** Productivity will vary depending on grinding media selected and the type of material being

removed. Estimated rates are:

- Hand-held units: 20 ft<sup>2</sup>/hr (2 m<sup>2</sup>/hr)
- Walk-behind units: 800 ft<sup>2</sup>/hr (75 m<sup>2</sup>/hr)

## Standards & specifications

As required by the specifications of the manufacturer or customer.

Visual inspection to verify profile objectives. The prepared surface should be free of bond-inhibiting barriers and demonstrate sufficient strength for the proposed application. ACI 515.1R describes methods and criteria for judging surface cleanliness and strength (see ref. page 41).

## Safety

- Eye protection: Required.
- Personal protective equipment: Heavy gloves, steel-toed boots. Skin should be protected by clothing and barrier creams. Dust may produce alkali burns or allergic skin reaction.
- Respiratory protection: Required. Process will generate airborne dust. Mask should be approved for silica and other airborne dusts, and fit tightly to contours of face. If material being ground contains toxic substances, additional protection may be required.
- Hearing protection: Recommended.