

1. GENERAL

1.1 SUMMARY

- A. Section Includes: Products and procedures for processing bonded abrasive polished concrete floors using multi-step wet/dry mechanical process, and accessories indicated, specified, or required to complete polishing.

1.2 REFERENCE STANDARDS

A. Terminology:

1. For a floor to be acknowledged as having been created according to the Husqvarna SUPERFLOOR™ process, the surface needs to have been refined using solely Husqvarna equipment, tooling and chemicals following the specified well-defined SUPERFLOOR process for achieving the desired characteristics. Also the end result must comply with the defined expected specifications, see section 1.5. Finally, the operator must be a certified Husqvarna SUPERFLOOR™ contractor.
2. Husqvarna SUPERFLOOR™ is a process for creating a mechanically refined, polished and diffusion open concrete surface with defined resulting surface metrics (Ra, DOI and GU), that meets the daily demands on a professional floor surface for the industry, retail as well as public sector.
3. Polished Concrete: The act of changing a concrete floor surface, with or without aggregate exposure, to achieve a specified “finished gloss” level.
4. Bonded abrasive polished concrete: The multi-step operation of mechanically grinding, honing, and polishing a concrete floor surface with bonded abrasives to cut a concrete floor surface and to refine each cut to the maximum potential to achieve a specified level of finished gloss.
5. This specification does not cover other polished surfaces as toppings, terrazzo floors or resin surfaces.

B. Standards:

1. ASTM 5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image Gloss of Coating Surfaces
2. ASTM D523 – Standard Test Method for Specular Gloss
3. ANSI A326.3-2017 (Dynamic Coefficient Friction of Hard Surface Flooring)
4. DIN EN ISO 4287 - Geometrical Product Specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters.
5. CSDA-ST-115 - Measuring Concrete Micro Surface Texture.

C. Other references:

1. CPC Appearance Chart and Aggregate Exposure Chart for polished concrete, as defined by the Concrete Polishing Council (CPC), a specialty council of the American Society of Concrete Contractors (ASCC)

NOTE TO SPECIFIER: FINAL RESULTS OF THE POLISHING PROCESS ARE HIGHLY DEPENDENT UPON THE QUALITY OF THE CONCRETE, MIX DESIGN, FINISHING TECHNIQUES, AND CURING METHODS. IT IS HIGHLY RECOMMENDED THAT BOTH NEW CONSTRUCTION AND RENOVATION PROJECTS ADHERE TO THE SUBPARAGRAPHS BELOW TO ENSURE DESIRED EXPECTATIONS.

2. FIELD CONDITIONS

A. Recommended concrete quality:

NOTE! Concrete floors are designed according to requirements depending on activity and load. **The designer is always responsible** for ensuring the requirements are met regarding reinforcement and concrete quality as well as dimensioning. Always according to local standards when applicable.

If no consideration is taken to the requirements of dimensioning for activity or load, consider the below specifications as a guideline for placing a concrete slab optimal for grinding and polishing, see Husqvarna's "Concrete and Casting recommendations for SUPERFLOOR"

- Apply curing methods / procedures to minimize shrinkage, cracks and pores
- Concrete quality minimum C25/30 (equal to a 3500 psi concrete mix).
- No admixtures (if at all possible)
- W/C ratio: <0,55
- Slump: < S4 (<210mm or 8,3")
- Finish to Floor Flatness (F_F) > 50
- Floor Levelness (F_L): n/a
- Place, strike off, pan/consolidate, finish with troweling using steel or combo blades to meet above spec.

B. Field Mock-up:

Before starting an Husqvarna SUPERFLOOR™ project, **always provide a field mock-up** to verify selections made under submittals and to demonstrate aesthetic effects of polishing. See recommended surface specifications for each SUPERFLOOR process under section H. Note: The recommended specifications are general recommendations/objectives but might vary some depending on specific floor characteristics. It is important that contractor and customer agree upon specifications prior to work.

1. Mock-up shall be representative of work to be expected.

C. Damage and Stain Prevention: Take precautions to prevent damage and staining of concrete surfaces to be polished.

2.1 POLISHING EQUIPMENT

A. Field Grinding and Polishing Equipment:

1. Husqvarna professional floor grinder, such as DURATIQ series or Husqvarna PG series 500 and above, a ride-on Husqvarna power trowel, or combinations hereof.
2. Husqvarna matching professional dust extractor such as the D60, D80, T7500, T1000 or alike.
3. If wet grinding, honing, or polishing, use slurry extraction equipment suitable for slurry removal and containment prior to proper disposal.

B. Edge Grinding and Polishing Equipment:

1. Husqvarna 270EG professional floor edge grinder and polisher, and/or handheld grinder.

- C. Diamond Tooling: Abrasive tools that contain industrial grade diamonds within a bonded matrix (such as metallic, resin, ceramic, etc.) that are attached to rotating heads to refine the concrete substrate. (see husqvarnacp.com for a detailed current overview)
1. Husqvarna EZ Tool system
 2. Husqvarna Redi Tool system
 3. Husqvarna Abrasive Pads: Diamond impregnated cleaning pads such as Hiperclean, or alike
 4. Husqvarna HIPERTROWEL system

3. EXECUTION

3.1 PREPARATION

A. Cleaning New Concrete Surfaces:

1. Prepare and clean concrete surfaces.
2. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, paint splatter, and other contaminants incompatible with liquid applied products and polishing.

3.2 POLISHING CONCRETE FLOORS

THE FOLLOWING PARAGRAPH AND SUB-SUBPARAGRAPHS ARE APPLICABLE WHEN SPECIFYING HUSQVARNA SUPERFLOOR PROCESSES. BUT PARTS THEREOF MIGHT BE OMITTED DEPENDING ON WHAT SUPERFLOOR PROCESS IS BEING SPECIFIED. SEE HUSQVARNA'S "GRINDING GUIDE HTC SYSTEM" FOR WHAT PARAGHARPHS ARE APPLICABLE IN EACH SUPERFLOOR PROCESS.

- A. Perform all polishing procedures to ensure consistent characteristics from wall to wall.
- B. Initial **Grinding** (to flatten the floor and expose the required amount of aggregate): Usually performed up to the second last metal bonded step, i.e. step 4 Brown Metal, #80 grit if using the EZ Tool system. Expected Ra readings after completion <math><6 \mu\text{m}</math> / <math><235 \mu\text{inch}</math>.
1. Select appropriate metal bonded diamond tool series diamond tooling by testing, for example by using Moh's hardness test to gauge abrasion resistance of concrete.
 2. Use approved Husqvarna Grinder with selected diamond tooling.
 3. Begin grinding in one direction using sufficient equipment and diamond tooling to meet specified aggregate exposure class.
 4. Make sequential passes with each pass perpendicular to previous pass using finer grit tool with each pass, up to Step 4 Brown Metal (#80 grit) metal bonded tooling.
 5. Achieve maximum refinement with each pass before proceeding to finer grit tools.
 6. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

7. Continue grinding until achieving specified Aggregate Exposure. (See section H – Aggregate exposure)

- C. **Grouting:** Treat Surface Imperfections according to project agreement using a GM grouting product from the “Husqvarna Floor Grouting System” range. Husqvarna grouting products are specifically formulated for pore filling of pin-holes and micro cracks in concrete surfaces.

If necessary, fill surface imperfections including, but not limited to, holes, surface damage, small and micro cracks, air holes, pop-outs, and voids with grout to eliminate micro pitting in finished work.

Follow the application instructions printed on the front label for the chosen grouting product. For example, Husqvarna GM 3000 is usually engaged after Step 4 Brown Metal #80 grit by pouring out the grouting product onto the floor, then directly grinding it “down” into the floor until dry, using Step 5 Black Metal #150 grit.

- D. **Densification:** Apply a CURE concrete hardener from the “Husqvarna Floor Hardening System” according to project agreement. All Husqvarna CURE densifiers provides a solution capable of increasing the abrasion- and scratch resistance of concrete, while adding basic stain resistance, limiting efflorescence and dustproofing the surface.

- E. Husqvarna CURE densifier is usually applied after the last metal bonded step, which is Step 5 Back Metal 150 grit for the EZ Tool System *)

1. Remove all dust and debris from concrete surface.
2. Use Husqvarna approved densifier such as the Husqvarna CURE+, CURE (K) or CURE (L). Spray it onto the floor. Use pad applicator fitted with microfiber pad to spread evenly on surface. Product does not need vigorous scrubbing-in and will not form a gel. As product is absorbed into surface, apply additional product as needed until floor starts to reject the product. Keep floor moist for 15-20 minutes, spreading with mop to avoid leaving puddles. Allow to fully dry (usually takes approx. 8-12hrs). Then continue with the next step (honing) in the polishing process.

When properly applied, the densification process will create a floor with higher density, lower porosity, less dusting and improved wear resistance; which is key to producing a high quality floor according to the Husqvarna SUPERFLOOR process.

* **Note.** Timing for application and choice of densification and grouting is greatly determined by the surface profile and how well the tools are responding. A too soft concrete substrate would hinder the tool from achieving the wanted surface refinement – applying grouting and/or densifying would then assist the tooling to achieve the required surface refinement before continuing the process.

- F. **Honing:** By honing we mean “fine grinding” using resin bonded diamond tools (or hybrid transitional tools) aggressive enough to successfully remove the coarse scratches left from the metal bonded tools but also fine enough to prepare the floor for final polishing. The honing steps ranges from #100 grit to #400 grit which is from Step 5 Black Resin to Step 7 Red Resin for the EZ Tool System.

Expected Ra readings after completion <math><2,5 \mu\text{m}</math> / <math><100 \mu\text{ inch}</math>.

1. Use approved Husqvarna Grinder with selected Husqvarna Resin tooling.

2. Hone concrete in one direction beginning with a tool sufficient to remove all scratches from previous step and make as many sequential passes required to refine surface, each pass perpendicular to previous pass. Make sure you reach maximum refinement with each pass before proceeding to finer grit tooling. Continue up to the specified step according to your chosen Husqvarna SUPERFLOOR process.
3. Apply additional densification when necessary. We recommend additional application on the first two Honing steps to optimize surface texture and final appearance. Only light sprayed in front of the machine and grinded down when wet. No sequential curing or hardening time necessary.
4. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

- G. **Polishing:** (To optimize the flatness and shine of the polished floor)
The Husqvarna polishing steps ranges from #800 grit to #3000 grit which is from Step 8 White Resin to Step 10 Green Resin for the EZ Tool System.

Expected Ra readings after full completion <math><0,4 \mu\text{m}</math> / <math><16 \mu</math> inch with a GU and DOI >50. For the highly polished Husqvarna SUPERFLOOR processes GOLD and PLATINUM, the expected surface refinement values are often met already after #1500 grit meaning you can then stop there.

- H. Polish until Ra readings, Gloss and DOI are according to project agreement.

NOTE! Always measure surface texture readings prior to the application of any sealer/guard/cleaning agent.

1. Use approved Husqvarna Grinder with Husqvarna Resin tooling.
2. Begin polishing in one direction starting with Step 8 White Resin tooling.
3. Make sequential passes with each pass perpendicular to previous pass using finer grit tooling with each pass.
4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
5. Clean floor thoroughly after each pass using dust extraction equipment properly fitted with squeegee attachment or walk behind auto scrubber suitable to remove all visible loose debris and dust.

THE FOLLOWING PARAGRAPH IS APPLICABLE WHEN PROJECT AGREEMENT INCLUDES STAIN PROTECTED SURFACES

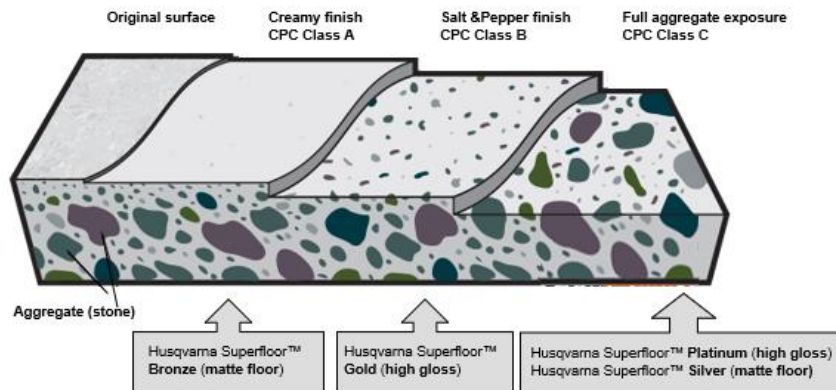
I. **Stain Protection:**

1. Apply a GUARD product from the “Husqvarna Floor Protection System” range according to project agreement. The Husqvarna GUARD products are all providing stain protection to concrete floors and natural stone, restricting the absorption of water, oil, fats and dirt. Stains are kept at the surface level, which simplifies maintenance and extends the lifespan of the floor. The PREMIUM-range is the primary choice when creating a SUPERFLOOR since diffusion-openness is fully preserved
2. Uniformly apply and remove excessive liquid according to users instructions.

RETAIN THE FOLLOWING THREE SUBPARAGRAPHS FOR CLASS OF AGGREGATE EXPOSURE.

NOTE TO SPECIFIER: AGGREGATE EXPOSURE LEVELS ARE DEPENDANT UPON CONCRETE MIX DESIGN AND FLOOR FLATNESS (F_F). REVIEW SPECIFIED AGGREGATE EXPOSURE DURING PRE INSTALLATION CONCRETE CONFERENCE.

- J. Final Polished Concrete Floor Aggregate Exposure:
 - A. Aggregate Exposure: Fine / Sand Aggregate Finish
 (Correlating to the CPC Aggregate exposure class A “Cement Fines”)
 Remove not more than 1/16 inch (1.5 mm) of concrete surface by grinding and polishing resulting in majority of exposure displaying fine aggregate with no, or small amount of, medium aggregate at random locations.
Correlating to the SUPERFLOOR BRONZE finish.
 - B. Aggregate Exposure: Medium Aggregate Finish
 (Correlating to the CPC Aggregate exposure class B “Fine Aggregate”)
 Remove not more than 1/8 inch (3 mm) of concrete surface by grinding and polishing resulting in majority of exposure displaying medium aggregate with no, or small amount of, large aggregate at random locations.
Correlating to the SUPERFLOOR GOLD finish
 - C. Aggregate Exposure: Large Aggregate Finish
 (Correlating to the CPC Aggregate exposure class C “Coarse Aggregate”)
 Remove not more than 1/4 inch (6 mm) of concrete surface by grinding and polishing resulting in majority of exposure displaying large aggregate with no, or small amount of, fine aggregate at random locations. Please note that there can be no guarantees for aggregate exposure as this is dependent upon the composition of the concrete slab, regardless of new installation or renovation project.
Correlating to the SUPERFLOOR SILVER and PLATINUM finish



RETAIN THE APPLICABLE SUBPARAGRAPHS FOR LEVELS OF FINISHED SURFACE SPECS (GLOSS, DOI, Ra) AND AGGREGATE EXPOSURE WHEN SPECIFYING THE DESIRED HUSQVARNA SUPERFLOOR CONCEPT

K. Final Polished Concrete Floor Appearance:

1. Husqvarna SUPERFLOOR™ **PLATINUM**

Large aggregate / High gloss appearance:

- a. Procedure: Recommended 8 steps with full refinement of each diamond tool with minimum one application of densifier.
- b. Surface Measurement: Determine the Specular gloss, DOI and surface roughness by incorporating the following recommendations/objectives.

NOTE! Always measure the below surface readings prior to the application of any sealer/guard/cleaning agent.

- 1) Reflection Clarity, i.e. Distinctness of Image (DOI) according to ASTM D5767: Not less than 50
Similar to US CPC Appearance Level 3 or above.
- 2) Reflective Sheen Reading, i.e. Specular Gloss (GU) according to ASTM D523: Not less than 50
- 3) Surface Profile Reading, i.e. Roughness Average (Ra):
Maximum Ra measurement 0.4 µm /16 µ inches

2. Husqvarna SUPERFLOOR™ **GOLD**

Fine to medium Aggregate/ High gloss appearance:

- a. Procedure: Recommended 7 steps with full refinement of each diamond tool with minimum one application of densifier. Starting tool not coarser than #80 grit Metal (Step 4 Brown Metal if using the EZ Tool system.)
- a. Surface Measurement: Determine the Specular gloss, DOI and surface roughness by incorporating the following recommendations/objectives.

NOTE! Always measure the below surface readings prior to the application of any sealer/guard/cleaning agent.

- 4) Reflection Clarity, i.e. Distinctness of Image (DOI) according to ASTM D5767: Not less than 50
Similar to US CPC Appearance Level 3 or above.
- 5) Reflective Sheen Reading, i.e. Specular Gloss (GU) according to ASTM D523: Not less than 50
- 6) Surface Profile Reading, i.e. Roughness Average (Ra):
Maximum Ra measurement 0.4 µm /16 µ inches

3. Husqvarna SUPERFLOOR™ **SILVER**

Large aggregate/ Low gloss (matte) appearance:

- a. Procedure: Recommended 4 steps with full refinement of each diamond tool with minimum one application of densifier.
- b. Surface Measurement: Determine the Specular gloss, DOI and surface roughness by incorporating the following recommendations/objectives.

NOTE! Always measure the below surface readings prior to the application of any sealer/guard/cleaning agent.

- 7) Reflection Clarity, i.e. Distinctness of Image (DOI) according to ASTM D5767: *Not applicable*
 Similar to US CPC Appearance Level 2 or below.
- 8) Reflective Sheen Reading, i.e. Specular Gloss (GU) according to ASTM D523: *Not applicable*
- 9) Surface Profile Reading, i.e Roughness Average (Ra):
 Maximum Ra measurement 4 µm /150 µ inches

4. Husqvarna SUPERFLOOR™ **BRONZE**
 Fine/Sand aggregate finish / Low gloss (matte) appearance

- b. Procedure: Recommended 2 steps with full refinement of each diamond tool with minimum one application of densifier. Starting tool not coarser than #80 grit Resin (Step 4 Brown Resin if using the EZ Tool System).
- c. Surface Measurement: Determine the Specular gloss, DOI and surface roughness by incorporating the following recommendations/objectives.

NOTE! Always measure the below surface readings prior to the application of any sealer/guard/cleaning agent.

- 10) Reflection Clarity, i.e. Distinctness of Image (DOI) according to ASTM D5767: *Not applicable*
 Similar to US CPC Appearance Level 2 or below.
- 11) Reflective Sheen Reading, i.e. Specular Gloss (GU) according to ASTM D523: *Not applicable*
- 12) Surface Profile Reading, i.e Roughness Average (Ra):
 Maximum Ra measurement 4 µm /150 µ inches

5. SUMMARY of the recommended surface specifications for Husqvarna SUPERFLOOR™ processes*.

The recommended specifications below are general recommendations/objectives but might vary some depending on specific floor characteristics. It is important that contractor and customer always agree upon specifications prior to work, see section 2B for more guidance.

Recommended Husqvarna SUPERFLOOR surface specs

<p>Gold Ra: <0,4µm (16µin) GU: >50 DOI: >50 CPC Class B</p>	<p>Platinum Ra: <0,4µm (16µin) GU: >50 DOI: >50 CPC Class C</p>
<p>Bronze Ra: <4,0µm (150µin) GU: n/a DOI: n/a CPC Class A</p>	<p>Silver Ra: <4,0µm (150µin) GU: n/a DOI: n/a CPC Class C</p>

* For a complete process overview, see Husqvarna's "GRINDING GUIDE HTC SYSTEM"

3.3 FIELD QUALITY CONTROL

A. Concrete hardness

Mohs scale of mineral hardness.

Field testing: Use approved measuring device, such as “Moh’s hardness scratch test kit”

B. Surface Profile Readings, Roughness Average (Ra):

DIN EN ISO 4287 - Geometrical Product Specifications (GPS) - Surface texture: Profile method - Terms, definitions and surface texture parameters.

CSDA-ST-115 - Measuring Concrete Micro Surface Texture

Field testing: Use approved measuring device, such as the mobile surface roughness tester “**MarSurf PS10**”

C. Specular Gloss (GU):

ASTM D523 – Standard Test Method for Specular Gloss.

Field testing: Use approved measuring device, such as the mobile surface quality Gloss, Haze and DOI meter “**Rhopoint IQ**”.

D. Distinction of Image (DOI):

ASTM 5767 - Standard Test Method for Instrumental Measurement of Distinctness-of-Image Gloss of Coating Surfaces.

Field testing: Use approved measuring device, such as the mobile surface quality Gloss, Haze and DOI meter “**Rhopoint IQ**”.

E. Coefficient of friction

ANSI A326.3-2017 (Dynamic Coefficient Friction of Hard Surface Flooring).

Field Testing: Engage a certified **BOT3000E** tribometer operator to perform field testing to determine if polished concrete floor finish complies with specified dynamic coefficient of friction from a floor slipperiness risk point of view.

Or use any other device necessary to comply with other specified slip resistance standards, for example the BS EN 14231 “Natural Stone Test Method” using the British Pendulum Test equipment.

3.4 CLOSEOUT ACTIVITIES

A. PROTECTION

Covering: After completion of polishing, protect polished floors from subsequent construction activities with protective covering.

A newly produced SUPERFLOOR is sensitive to water being left on the surface, because during the grinding process we expose again fresh concrete that might not have been fully carbonized. This exposes again lime that, will mix with surface water and create a corrosive (alkaline) solution that will risk creating etch marks if left unattended.

For newly ground concrete floors we recommend to avoid letting residual water in the form of pools/rivulets dry out/evaporate as this can cause a reaction in the form precipitation or permanent variations in the surface. The resistance increases with time and after approx. 2 months, reactions are not likely.

However, large quantities of liquids should not be left to dry on the floor because a polished SUPERFLOOR is not a sealed floor. It is still diffusion open, which is one of the benefits with these floors, to allow for ground moisture to evaporate.

B. MAINTENANCE

Husqvarna certified SUPERFLOOR Contractor shall provide Owner's designated personnel with proper Husqvarna SUPERFLOOR polished concrete maintenance guideline.

RETAIN ONE OF THE FOLLOWING TWO SUBPARAGRAPHS FOR PROPER MAINTENANCE PROCEDURES.

Maintenance Procedures

Daily cleaning with machine cleaning.

- a) Dry mop the floor.
- b) Fill the tank of the auto scrubber (scrubber dryer) with clean water and mount a diamond impregnated cleaning pad, Husqvarna HIPERCLEAN #3000 grit pad, Twister Blue pad or alike, on the pad holder. (Ensure proper function of the machine prior to scrubbing).
- c) Machine clean the floor at a speed of 3-5 km/h (2-3,5 mph)
- d) After cleaning – Rinse the pad thoroughly and check if the color is gone. Color gone – Replace with new Diamond impregnated cleaning pad.
- e) For extra high gloss, use a high speed burnisher (<3500 RPM) with a dry Diamond impregnated cleaning pad, like Husqvarna HIPERCLEAN pad or alike

Daily cleaning without machine cleaning

- a) Dry mop the floor.
- b) Mop with hot water and a cleaning agent from the “Husqvarna Cleaning System”, such as CLEAN & PROTECT using a cotton mop.
- c) Rinse and repeat as needed until water removed from floor appears clean.
- d) Use a ultra-high speed burnisher (>3500 rpm) with clean and dry Diamond impregnated cleaning pad, like Husqvarna HIPERCLEAN or alike.

END OF SECTION