

Powerhold™ Self-Leveling Underlayment

PC-5K



Portland cement-based poured underlayment

- Ideal over concrete and wood subfloors
- Fast application, fast-setting allows for quick return of normal trade traffic
- Smooth, crack-resistant surface
- May assist in obtaining LEED® credits

Description

Powerhold™ PC-5K Self-Leveling Underlayment is a fast-applying Portland cement-based floor underlayment formulated for interior use over concrete and wood subfloors. Providing a minimum compressive strength of 5000 psi (after 28 days drying time), Powerhold PC-5K Self-Leveling Underlayment is mixed with water at the job site to yield a smooth and monolithic surface of up to 2 in. thick (deep fills up to 5 in.). A 1/4-in.-thick underlayment weighs approximately 2.6 lbs./sq. ft. and has an approximate dry density of 125 lbs./cu. ft. Floor covering can be installed in 2 to 3 days, depending on underlayment thickness and drying conditions. Powerhold PC-5K Self-Leveling Underlayment may assist in obtaining LEED credits 5.1 and 5.2.

VOC Emissions

Powerhold PC-5K self-leveling underlayment is defined as a “Low Emitting” material per California Department of Public Health CDPH/EHLB/Standard Method Version 1.1, 2010 (CA Section 01350) for school classroom, single-family residence, and private-office modeling scenarios, and meets USGBC’s LEED v4 emission requirements.

Installation

Subfloor Preparation

All subfloors must be structurally sound, stable and solid. If there is any question about the structural soundness of the subfloor, consult with the engineer on the project or request the services of a professional structural engineer.

Subfloors must be clean and free of dirt, tar, wax, oil, grease, latex compounds, sealers, curing compounds, release agents, asphalt, water-soluble adhesives, paint, chemicals, loose old cementitious products, joint compounds from drywall installation or any other contaminant which might prevent proper bonding of underlayment to concrete. Seal off floor drains before starting to pour underlayment to prevent drain pipes from clogging.

A weak or degraded concrete surface layer must be removed mechanically to provide a solid base. To decide whether mechanical preparation of substrate is required or not, the concrete substrate must be thoroughly assessed for its quality and tensile strength over the entire pour area. The assessment of concrete tensile strength must be made in its existing state without the removal of any foreign material that may be present on the concrete surface. Simple visual appearance of concrete substrate as strong and solid does not necessarily guarantee that the concrete substrate is free of impurities and has the right tensile strength.

The tensile bond strength of the concrete subfloor over which Powerhold PC-5K Self-Leveling Underlayment is being applied must be a minimum of 175 psi when tested per the ASTM C1583 standard.

Concrete exhibiting signs of laitance (a layer of weak material on the concrete surface either visible or invisible), scaling, spalling, crumbling or delamination must be mechanically removed to achieve a solid and clean substrate. Prior to installation of the underlayment, mechanically profile concrete subfloor to between CSP 3 and CSP-5, in accordance with the industry standards as outlined in International Concrete Repair Institute (ICRI) *Technical Guideline No. 310.2 Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays*. Use mechanical removal methods such as shot blasting, scarifying or diamond grinding to clean and prepare the concrete subfloor contaminated with adhesives, asphalt or oil. Shot blasting is the preferred method of mechanically profiling and preparing the concrete subfloor for the application of Powerhold PC-5K Self-Leveling Underlayment.

Concrete subfloors receiving cementitious underlayment systems must be cured properly (generally for a minimum of 28 days) prior to underlayment installation. Subfloor moisture vapor emission rate (MVER) exceeding 5 lbs./1000 sq. ft./24 hours per ASTM F1869 must be treated with an appropriate moisture mitigation system that either limits the flooring systems' moisture vapor exposure to acceptable levels, or completely stops the vapor transmission through the top of the subfloor. Powerhold PC-5K Self-Leveling Underlayment is not a vapor barrier. Transmission of excessive moisture vapors from the concrete subfloor through Powerhold PC-5K Self-Leveling Underlayment can interfere with floor-covering adhesives and compromise their performance. Apply an industry recognized moisture mitigation system, such as USG Durock™ Brand RH-100™ Moisture Vapor Reducer, per manufacturer recommendations to achieve an MVER value of 5 lbs./1000 sq. ft./24 hours or less. Ensure compatibility of the moisture mitigation system with the Powerhold PC-5K Self-Leveling Underlayment by a test application in small areas. If sand broadcasting is not required during the installation of the moisture mitigation system, the surface must be primed with Powerhold 900P primer prior to application of Powerhold self-leveling underlayments. Contact Powerhold Technical Services at 844 USG.FCDA (844 874.3232) for further information regarding suitable moisture mitigation products and systems for use with Powerhold PC-5K Self-Leveling Underlayment.

Fill deep areas and holes prior to final application. Contact Powerhold Technical Services for further information.

Cracks in the existing concrete subfloor must be inspected to determine if the crack is due to typical concrete "shrink" or if it is a result of a structural movement. In the case of the latter, remediation of the crack must be addressed or eventually the crack will telegraph through Powerhold PC-5K Self-Leveling Underlayment. Repair all existing cracks in old and new concrete to minimize and control their ability to telegraph through the layer of Powerhold PC-5K Self-Leveling Underlayment. Remove the weak concrete along the length of the cracks by chiseling or other suitable means. Remove accumulated dust and debris from the crack cavities using a vacuum or other suitable means. Various cracks present in the concrete subfloor including shrinkage cracks must be filled with a suitable commercially available crack-fill epoxy adhesive designed for concrete flooring applications. To ensure superior resistance to crack growth, use injection epoxy crack-repair techniques per industry guidelines to repair cracks that are active or deep. Note that repair of existing cracks in the concrete subfloor only subdues, but does not completely prevent their ability to telegraph through Powerhold PC-5K Self-Leveling Underlayment. Growth of existing cracks or formation of new cracks in the concrete subfloor can lead to cracks telegraphing through Powerhold PC-5K Self-Leveling Underlayment. Respect existing expansion and control joints (see Notes/Limitations #8, pg. 6).

Powerhold PC-5K Self-Leveling Underlayment can be applied with metal lath over engineer-approved, APA-Rated exterior glue plywood or oriented strand board (OSB) (i.e., APA-Rated Exterior or Exposure 1 panels) wood subfloors following the Tile Council of North America's F185-14 specification at a minimum 1/2 in. depth. Subfloor must be properly prepared and primed with Powerhold™ 900P Primer. See *Notes/Limitations* #21, pg. 7 for subfloor deflections.

Powerhold PC-5K Self-Leveling Underlayment can be installed over non-water-soluble adhesives on concrete only. The adhesive residue must first be tested to make certain it is non-water-soluble. Any water-soluble adhesive residues must be mechanically removed down to clean concrete. Non-water-soluble adhesive residues should be prepared to a thin, well-bonded residue using the "wet-scraping" technique as recommended by the Resilient Floor Covering Institute (rfci.com) to remove thick areas and adhesive build-up, as well as any areas that are weak or not well bonded to the concrete. Any existing patches below the adhesive must be completely removed.

Powerhold PC-5K Self-Leveling Underlayment will set in approximately 2 hours under normal conditions. Light foot traffic can occur approximately 2 – 4 hours after set; normal trade traffic can resume the next day. After Powerhold PC-5K Self-Leveling Underlayment is firmly set, provide adequate ventilation to ensure uniform drying of the installed Powerhold PC-5K Self-Leveling Underlayment. High ambient humidity and higher thicknesses will delay the drying process. Protect floors from heavy trade traffic loads (i.e. loaded drywall carts, heavy tool cabinets, etc.) with plywood.

Tools	<ul style="list-style-type: none">– Mixing drum (15 gallons)– Gage rake– Smoother/spreader– Studded shoes– Measuring bucket– Mixing drill type 2 through 7 – as outlined in the <i>Technical Guidelines</i>, prepared by the International Concrete Repair Institute, <i>Pictorial Atlas of Concrete Repair Material Mixing Equipment</i> (Guideline No. 320.5R-2014)– Mixing paddle type 2, 3, 4, 8, or 9 – as outlined in the <i>Technical Guidelines</i>, prepared by the International Concrete Repair Institute, <i>Pictorial Atlas of Concrete Repair Material Mixing Equipment</i> (Guideline No. 320.5R-2014)– 1 in. x 2 in. brass or plastic cylinder– 12 in. x 12 in. x ¼ in. Plexiglas® sheet– Minimum 2 in. putty/drywall taping knife– Ruler or tape measure
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Priming	<p>Use Powerhold 900P Primer for preparing the concrete or wood subfloor prior to application of Powerhold PC-5K self-leveling underlayment. Proper use of the primer enhances the bond of the underlayment and effectively seals the subfloor and prevents formation of pinholes, domes and craters in Powerhold PC-5K self-leveling underlayment due to the upward migration of air bubbles from the subfloor. Refer to <i>Powerhold 900P Primer</i> submittal (PH5) at powerhold.com for installation instructions and application rates.</p> <p>Floors to be primed must be dry, structurally sound and clean. Remove any dirt, tar, wax, oil, grease, latex compounds, sealers, curing compounds, release agents, asphalt, water-soluble adhesives, paint, chemicals, loose topping, joint compounds from drywall installation or any other contaminant that might interfere with development of good bond.</p> <p>For primer application, the temperature of the Powerhold primer, the subfloor and the room must be maintained between 50°F and 95°F for a period of 48 hours before and after application.</p>
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Barrel Mixing	<p>When opening bags, use engineering controls, including local exhaust, to reduce exposure to dust. Wear NIOSH-recommended respirator if needed. It is important that the mixing water for the total number of bags to be mixed is in the barrel prior to adding the dry material.</p> <p>Determine the number of bags needed. Add 4.5 to 5.0 quarts (4.25 to 4.75 liters) of cool, clean potable water for each bag (50 lbs.) of Powerhold PC-5K Self-Leveling Underlayment powder to the dry mixing barrel. Next, slowly add one bag to the barrel while mixing. Mix for 30 seconds, making sure that all material is wetted out thoroughly. Slowly add the second and any additional bags to the mixing barrel while continuing to mix. Make sure the barrel sides are thoroughly scraped free of dry powder and that there is no unmixed material on the bottom of the barrel. Mix for an additional 90 seconds and ensure the material is homogeneous and lump free.</p> <p>Perform a slump test on the material before application. See <i>Test Procedures</i> for instructions.</p> <p>Do not add additional water until the 2 minute mixing cycle has been completed. Do not overwater the material. If additional water is required, add no more than 0.4 quarts per bag and mix for 30 seconds or until mix is homogeneous. Do not over mix (more than 3 minutes), as this may induce air into the material.</p> <p>The presence of bleed water on the surface and/or material segregation (settling of sand) indicates overwatering. Adjust the amount of water added to the mix to prevent bleed water and material segregation.</p>
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Continuous Mixer and Pump

Powerhold PC-5K Self-Leveling Underlayment can be mechanically mixed with a continuous mixer and pump or with a batch mixer and pump, similar to type G as found in section 5.0 of the *Technical Guidelines*, prepared by the International Concrete Repair Institute, *Pictorial Atlas of Concrete Repair Material Mixing Equipment* (Guideline No. 320.5R-2014). Mixer and pump must be clean, calibrated and in good working condition. Pressure test the rotor and stator assembly to ensure proper pumping. Use the mixture proportions specified in the *Barrel Mixing* section to prepare the material. When opening bags, use engineering controls including local exhaust to reduce exposure to dust. Wear NIOSH-recommended respirator if needed. Do not overwater the material.

Prior to pumping Powerhold PC-5K Self-Leveling Underlayment slurry, the hose must be conditioned with water. Add clean water to the pump well and turn pump on until water has reached the end of the hose. Turn pump off, drain water, pump and hose. Pump and hose are now ready to accept Powerhold PC-5K Self-Leveling Underlayment slurry. Check the consistency, flow behavior and uniformity of the mixed material exiting at the end of the hose. Perform a slump test on the material before application. See *Test Procedures* for instructions. Adjust the water flow rate to ensure that the mixed material is free of bleed water and material segregation (settling of sand). Use a mesh screen sock at the end of the hose to capture any large hardened particles that could become loose from the mixer or the hose.

Ensure that the minimum length of the slurry hose is equal to or greater than 100 feet. If the continuous mixer and pump are not operational for about 15 minutes, clean the entire system with water to maintain smooth and consistent equipment performance upon restart.

Test Procedures Slump Test

Set Plexiglas sheet on a level, stable surface, away from foot traffic. Ensure that the 1 in. x 2 in. cylinder is clean and dry. Place the cylinder in the middle of the Plexiglas sheet. Pour the Powerhold PC-5K slurry into the cylinder slightly overfilling it. Screed off the excess material from the top of the poured cylinder, away from the Plexiglas sheet. Lift the cylinder up smoothly to form the patty. Do not shake any excess slurry from the cylinder. Wait 1 minute and measure the patty in 2 directions 90° apart and calculate the average of the 2 measurements +/- 1/8 in. Ensure that the average patty diameter is within the 5.75 in. to 6.75 in. range.

Application

During application and until the Powerhold PC-5K Self-Leveling Underlayment is firmly set (typically the first 2 hours immediately following the pour), close all doors, windows and other openings in the building and turn off HVAC systems to prevent air drafts. Protect installation areas from direct sunlight exposure for at least 24 hours. After 24 hours, the HVAC system can resume, as well as the use of doors, windows and other openings.

The Powerhold PC-5K product—either mixed or in powdered form, subfloor and room temperature must be between 50 °F and 95 °F at the time of application and for 72 hours after installation of Powerhold PC-5K Self-Leveling Underlayment. For temperatures above 95 °F, follow the American Concrete Institute (ACI) *Hot Weather Concrete* guidelines to ensure proper installation. If available water is not cool, chill water to 70°F (21°C).

When uncertain or unknown construction conditions are present on the job site, it is recommended to pour a small test area before conducting full installation. The test area must also include finish flooring to establish suitability of the complete system for intended use.

Powerhold PC-5K Self-Leveling Underlayment has a flow time of approximately 15 – 20 minutes at 70 °F. At higher temperatures the flow time is shortened; at lower temperatures the flow time is extended. Work as a team to obtain a satisfactory installation. Ensure continuous flow of slurry and promptly spread the Powerhold PC-5K Self-Leveling Underlayment to desired thickness and finish using a gage rake and a smoother. Perform these operations promptly to avoid trapping air bubbles, prevent formation of cold joints and achieve a satisfactory finish surface.

Apply the Powerhold PC-5K Self-Leveling Underlayment in an even ribbon along the short dimension of the room or area to be poured. Maintain a continuous wet edge. If pouring the Powerhold PC-5K Self-Leveling Underlayment against an edge that has been allowed to set, the edge of the previous pour should be treated with Powerhold 900P Primer.

Deep Fill Application

Contact Powerhold Technical Services for information.

Floor-Covering Installation

- Powerhold PC-5K Self-Leveling Underlayment can typically accept foot traffic 2 to 4 hours after initial set time.
- Floor covering can be installed in 2 to 3 days, depending on underlayment thickness and drying conditions.
- Check with floor-covering and adhesive manufacturers for installation guidelines and suitability of their manufactured products over Powerhold PC-5K Self-Leveling Underlayment.
- Protect the surface of Powerhold PC-5K Self-Leveling Underlayment from contaminants and water until installation of floor covering is accomplished.
- Perform field bond test to determine adhesive/flooring performance over Powerhold PC-5K Self-Leveling Underlayment. Install floor covering with adhesive and perform field bond test approximately 72 hours after installation.
- Follow floor-covering manufacturers' recommendations for surface sealing requirements. If the floor-covering or adhesive manufacturer requirements are more stringent, their requirements take precedence.

For further details on installation requirements, specifications and the most up-to-date product information, please see powerhold.com.

Notes/Limitations

1. Do not use in exterior applications.
2. Powerhold PC-5K Self-Leveling Underlayment can be used as a wear surface with a tested decorative, protective coating system. Coating systems must be tested for adhesion to Powerhold PC-5K Self-Leveling Underlayment. The bond test and performance of coatings is the responsibility of the coating manufacturer. Contact Powerhold Technical Services for further information regarding decorative coating options.
3. Do not install where continuous exposure to moisture is a possibility.
4. Do not install over dimensionally unstable, improperly prepared, weak subfloors. Tensile strength of concrete over which Powerhold PC-5K Self-Leveling Underlayment is installed must be a minimum of 175 psi as tested per the ASTM C1583 standard.
5. Do not install over concrete subfloor less than 28 days old. For untreated (without an approved moisture mitigation system) concrete subfloors less than 28 days old, contact Powerhold Technical Services.
6. For below-grade applications, contact Powerhold Technical Services.
7. Do not use over sound mat.
8. Do not use over expansion or isolation joints. Continue all movement joints in the concrete slab up through the layer of underlayment. In areas where the expansion or isolation joints are not present in the floor or where the concrete slab has developed systematic cracks in response to slab movement, consult with an engineer on the project or request services of a professional structural engineer to provide such joints as part of the system in accordance with engineering requirements and industry standards.
9. Existing cracks in the new and old concrete must be repaired with an appropriate crack repair material in accordance with industry recommendations prior to installation of the underlayment. Note that repair of existing cracks in the concrete subfloor only subdues, but does not completely prevent their ability to telegraph through Powerhold PC-5K Self-Leveling Underlayment. Growth of existing cracks or formation of new cracks in the concrete subfloor can lead to cracks telegraphing through the poured underlayment.

10. When the MVER exceeds 5 lbs./1000 sq. ft./24 hours, treat the concrete subfloor with an industry recognized moisture mitigation system, such as USG Durock RH-100 Moisture Vapor Reducer, in all areas of use where potential for moisture problems may exist. Powerhold PC-5K Self-Leveling Underlayment is not a vapor or moisture barrier. Transmission of excessive water vapors or moisture from the concrete subfloor through the Powerhold PC-5K Self-Leveling Underlayment can interfere with floor-covering adhesives and compromise their performance.
11. For on-grade applications, use an industry recognized moisture mitigation system, such as USG Durock RH-100 Moisture Vapor Reducer, over concrete. Moisture mitigation system may not be needed if a vapor retarder is installed below the concrete slab in accordance to industry specifications and practice (ASTM E1745, ASTM E1993, ASTM E1693) and the MVER value of the concrete slab is below 5 lbs./1000 sq.ft./24 hours.
12. Do not use acid etching as a method of cleaning and preparing the concrete subfloor.
13. Do not use oil-based sweeping compounds to clean and prepare the concrete subfloor. Use of such sweeping compounds leaves an oil film on the surface of the concrete that will interfere with the underlayment's bond development. Use vacuum, compressed air or a dry broom to remove the dust and debris and prepare the subfloor for Powerhold PC-5K Self-Leveling Underlayment application.
14. Do not use adhesive-removing chemicals or solvents to eliminate contaminants from the concrete subfloor. Use of such chemicals can transport oil, grease, and other contaminants further into the concrete pores. These chemicals can be released back to the surface at a later time to interfere with the floor-covering adhesives thus compromising the bond performance with Powerhold PC-5K Self-Leveling Underlayment. Mechanically removing the organic adhesives, asphalt, coal-tar based adhesives and other oil-based contaminants is the sole recommended method of preparing the subfloor for application of Powerhold PC-5K Self-Leveling Underlayment.
15. Do not apply over subfloors containing asbestos. Do not mechanically remove organic adhesives, asphalt, coal-tar based adhesives or other materials containing asbestos—contact an asbestos abatement professional.
16. Do not overwater or over mix.
17. Do not add any chemical additives or polymers to Powerhold PC-5K Self-Leveling Underlayment.
18. Do not use wet curing or curing compounds because Powerhold PC-5K Self-Leveling Underlayment is self-curing.
19. Do not mix with other cementitious products or self-leveling materials.
20. Do not apply Powerhold PC-5K Self-Leveling Underlayment over wood subfloor without metal lath. Differential or excessive movement of the wood subfloor may lead to development of cracks in Powerhold PC-5K Self-Leveling Underlayment at the wood subfloor joints and adjacent areas.
21. Structure shall be designed so that deflection does not exceed L/240 from combined dead and live loads and L/360 from live loads. Certain floor coverings such as marble, limestone, travertine and wood may have more restrictive deflection limits. Consult the appropriate floor-covering manufacturer.

Product Data

Powerhold PC-5K Self-Leveling Underlayment is sanded at the factory. Job site addition of sand is not recommended and will void the warranty. Powerhold PC-5K Self-Leveling Underlayment is mixed with water to yield a self-leveling slurry.

Approximate Compressive Strength ASTM C109 (modified): 2200 – 2600 psi² at 24 hours
5000 minimum psi² at 28 days

Approximate Dry Density: 120 – 130 lbs./cu. ft.²

Mixing Ratio: 4.5 – 5.0 quarts (4.25 to 4.75 liters) of water per 50 lb. bag

Approximate Coverage: 23 square feet per bag at ¼ in. thickness

Approximate Flow Time: 15 – 20 minutes at 70 °F

Approximate Final Set ASTM C191: 60 – 100 minutes²

Approximate Walkable (light foot traffic): 2 – 4 hours (after set)

Approximate Flexural Strength ASTM C348: minimum 1000 psi²

Surface pH Range ASTM F710: 11 – 12²

Thickness Range: Featheredge – 2 in.

Packaging: 50 lb. multiwall paper bags

Notes

1. ASTM C109 modified refers to air-drying as opposed to damp curing.
2. Results published herein were achieved under controlled laboratory conditions. Actual field results may differ due to environmental conditions, inconsistent proportioning of field applied water and Powerhold PC-5K Self-Leveling Underlayment, as well as differences in mixing/pumping equipment.

Storage

Powerhold PC-5K Self-Leveling Underlayment should be stored in an enclosed shelter providing protection from damage and exposure from the elements. During winter, dry mix material should be stored in a heated room before application, as deeply cooled material may increase the risk that some additives may not dissolve during mixing. If temperature is too high, premature setting may occur. Remove damaged or deteriorated materials from the job site. Powerhold PC-5K Self-Leveling Underlayment has a shelf life of 12 months from the manufactured date.

Submittal Approvals

Job Name	
Contractor	Date

Product Information

See powerhold.com for the most up-to-date product information.

LEED Information

For the most up-to-date information on LEED rating systems, project certification and the U.S. Green Building Council, please visit usgbc.org.

DANGER

Causes skin irritation. Causes serious eye damage. May cause an allergic skin reaction. May cause cancer by inhalation of respirable crystalline silica. Do not handle until all safety precautions have been read and understood. Avoid breathing dust. Use only in a well-ventilated area, wear a NIOSH/MSHA-approved respirator. Wear protective gloves/protective clothing/eye protection. If swallowed, inhaled, or skin irritation occurs get medical attention. If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses and continue rinsing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated

clothing before reuse. Dispose of in accordance with local, state, and federal regulations. For more information call Product Safety: 800-507-8899 or see the SDS at powerhold.com **KEEP OUT OF REACH OF CHILDREN.**

Trademarks

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Notice

We shall not be liable for incidental or consequential damages, directly or indirectly sustained, nor for any loss caused by application of these goods not in accordance with current printed instruction or for other than the intended use. Our liability is expressly limited to replacement of

defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or

reasonably should have been discovered.

Safety First!

Follow good safety/industrial hygiene practices during installation. Wear appropriate personal protective equipment. Read SDS and literature before specification and installation.



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