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# Ultraplan<sup>®</sup> M20 Plus

**Quick-Setting, High-Compressive-Strength Underlayment**



## DESCRIPTION

*Ultraplan M20 Plus* is an HCT™ (High-Hydrated Cement Technology) calcium-aluminate-based, quick-setting, self-leveling, self-drying material. It is specially formulated for the resurfacing and restoration of interior horizontal surfaces as a high-compressive-strength underlayment with maximum resistance to wheel tracking and indentations experienced in softer underlayments. *Ultraplan M20 Plus* is suitable for use as a commercial wear topping in warehouse and alternate light industrial applications where an exceptional flat and smooth concrete surface is desired.

## WHERE TO USE

- *Ultraplan M20 Plus* can be used for fast-track resurfacing and construction of horizontal wear surfaces. This light gray product is designed to accept industrial/commercial sealers and coatings (verify compatibility and follow manufacturers' instructions).
- *Ultraplan M20 Plus* can be used for quick-turnaround leveling, smoothing and repairing of interior floors before the installation of floor coverings. Ceramic tile and natural stone can be installed in as little as 3 to 4 hours after application. Floor coverings – carpet, vinyl sheet goods, vinyl tile, vinyl composition tile (VCT), homogenous PVC, rubber, engineered wood plank, and polymer floor coatings and toppings – can be installed 16 to 24 hours after application.
- *Ultraplan M20 Plus* may be used as a finish topping. However, due to the nature of polymer-modified cementitious materials, variations in color, stainability and general finish should be expected. Make an adequately sized mockup before the installation to ensure the acceptability of variation

that is created by finishing. However, despite these steps, MAPEI makes no representation in regards to variations in color or consistency of finish. Depending on raw materials, fine spots may be visible and material surface may prevent reactive stains from taking to the product with consistency.

If a high-performance decorative topping is desired for staining or diamond polishing, use MAPEI's *Ultratop*®. *Ultraplan M20 Plus* is not recommended as a surface for diamond polishing.

- *Ultraplan M20 Plus* is tough enough for light industrial warehouse floors and loading docks subject to continual light vehicular and foot traffic (see "Limitations" section).

## LIMITATIONS

- Do not install over substrates containing asbestos.
- *Ultraplan M20 Plus* is quite fluid once mixed and can be installed easily from 1/8" to 2" (3 mm to 5 cm) in a single lift. For rubber-wheel traffic, the minimum thickness is 3/8" to 2" (10 mm to 5 cm).
- *Ultraplan M20 Plus* has a compressive strength greater than 2,800 psi (19,3 MPa) after 1 day and 5,000 psi (34,5 MPa) after 28 days.
- The cured surface of *Ultraplan M20 Plus* accepts most penetrating hardeners and densifiers and a wide variety of sealers, as well as epoxy and urethane coatings. (Perform mockup tests to verify optimal time for sealing or coating.)
- *Ultraplan M20 Plus* may exhibit slight color change from one manufacturing location to another, and from lot to lot. To minimize this effect, apply *Ultraplan M20 Plus* from the same manufacturing location and

# Ultraplan® M20 Plus

in consecutive batch numbers on a single floor when used as a topping.

- Before application of *Ultraplan M20 Plus*, always properly prepare the surface and prime it with the appropriate MAPEI primer. See MAPEI's "Primers for Self-Leveling Materials" product selection guide and the respective current TDS for the desired primer.
- *Ultraplan M20 Plus* is for use in dry, interior areas only. For exterior use or for areas subject to prolonged exposure to moisture, use an exterior-rated MAPEI topping or screed mortar.
- *Ultraplan M20 Plus* can only be used between the temperatures of 50°F and 95°F (10°C and 35°C). In cooler conditions, use indirect auxiliary heaters to maintain ambient and substrate temperatures within the required range. Ensure that auxiliary heaters are exhausted externally, particularly if they give off carbon monoxide and other noxious fumes that could contaminate a prepared surface and be a health hazard. Maintain this temperature range for at least 72 hours after applying *Ultraplan M20 Plus*. For temperatures above 85°F (29°C), follow ACI hot-weather application guidelines to ensure a successful installation.
- Provide for expansion and control joints where specified, including the perimeter of the room, columns, supports and equipment pedestals. Do not bridge expansion and control joints. Ensure that such joints are honored completely through the *Ultraplan M20 Plus* and primer. Where control or expansion joints do not exist in the substrate, provide for them in the system.
- When used as a topping, *Ultraplan M20 Plus* is intended for foot traffic, rubber-wheeled forklift traffic and similar uses. Steel-wheeled and small-wheeled (high-point-loading) as well as hard-wheeled traffic, or dragging sharp or heavy metal objects over the floor, will cause indentations, gouging or similar damage. *Ultraplan M20 Plus* is not suitable for such excessive service conditions, heavy manufacturing, chemical or industrial applications. In these cases, specify a topping designed for the specific environment.
- Failure to honor existing joints may lead to the formation of hairline or larger cracks in the underlayment, as well as disbonding of the underlayment.

## SUITABLE SUBSTRATES

- Properly prepared, sound, dry, dimensionally stable, fully cured concrete at least 28 days old. Consult the floor-covering or coating manufacturer's recommendations regarding the maximum allowable moisture vapor emission rate (MVER) and retained moisture content in substrate. For substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m<sup>2</sup>) per 24 hours using a calcium chloride test (reference ASTM F1869), install a suitable MAPEI moisture-reduction barrier.

Note: The maximum allowable MVER is always determined by the complete system installed, including primers, underlayments/toppings, floor coverings and sealers. The wide variety of substrate conditions, floor coverings and adhesives requires careful analysis of the intended final floor use, as well as compliance with each manufacturer's recommendations for MVER, retained moisture content and adhesive selections. Always install several correctly located test areas to ensure compatibility, bond strength and performance of the complete flooring system. (Test areas may need extended conditioning time to ensure desired performance.)

- Engineer-approved plywood subfloors may be resurfaced with *Ultraplan M20 Plus*. Subfloors must be properly prepared, bonded, and free from dirt and dust (see Step 8 in the "Surface Preparation" section).
  - Ceramic tile, VCT installations over 1 year old, cement terrazzo and small amounts of old cutback adhesive residue that are well-bonded and dimensionally stable. Surfaces must be properly prepared, bonded, primed, sound, stable, and free from dirt and dust.
  - Steel decking that is sound, stable, free of bond-breaking materials and properly primed with a suitable MAPEI bonding agent or epoxy primer utilizing the sand broadcast method may be surfaced with *Ultraplan M20 Plus*.
- Note: To ensure installation success, install properly located test areas to verify substrate compatibility, bond strength and suitability of the system for its intended use.
- Do not install *Ultraplan M20 Plus* over particleboard, chipboard, oriented strand board (OSB), Masonite, Lauan, metal, asbestos, gypsum-based patching materials or any other nondimensionally stable materials.

Consult MAPEI's Technical Services Department for installation recommendations regarding substrates and conditions not listed.

## SURFACE PREPARATION

1. All substrates must be indoor, structurally sound, stable, solid and dry. The maximum allowable deflection of the supporting surface must not exceed L/360 (or L/720 for installations involving natural stone or their agglomerates) when exposed to live or dead load. *Ultraplan M20 Plus* may not be used where consistently exposed to water, or where intermittently or permanently high levels of MVER are present. The presence of water or a high MVER will compromise the performance of the flooring system.
2. Thoroughly clean the surface of all substances that could interfere with the bond of the installation material or product performance. These include, but are not limited to, dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, sealers, curing compounds, form release agents, laitance, loose toppings, foreign substances and adhesive residue.

3. Concrete surfaces must be mechanically profiled and prepared by shotblasting, sandblasting, water-jetting, scarifying, diamond-grinding or other engineered-approved methods (reference ICRI CSP 3 standards for acceptable profile height).
4. After cleaning and mechanically profiling the substrate, test for MVER (calcium chloride test reference ASTM F1869). *Ultraplan M20 Plus* is an underlayment for use with other finished floor systems (such as resilient, VCT and ceramic). Always follow manufacturers' recommendations regarding the maximum allowable moisture content and MVER before installation. See the first paragraph in the "Suitable Substrates" section in this TDS.
5. Fill in deep areas, holes and cracks with appropriate concrete restoration materials, especially when installing on a second-story floor or higher where fluid could leak to a floor below. Use an appropriate MAPEI substrate-patching material for deep repairs and fast-track applications.
6. Always prime the prepared surface with a MAPEI primer before the application of *Ultraplan® M20 Plus*. See MAPEI's "Primers for Self-Leveling Materials" product selection guide.
7. When installing *Ultraplan M20 Plus* as a topping, prime the surface with a MAPEI 100%-solids epoxy bonding agent or primer utilizing the sand broadcast method.
8. *Ultraplan M20 Plus* can be used over subfloors of engineer-approved plywood or OSB in accordance with the F185 specification from the most recent edition of the Tile Council of North America's Handbook. Subfloors must be properly prepared, bonded, and free from dirt and dust. When applying MAPEI underlayments to plywood flooring, installation requirements (finished flooring, load, use and/or deflection) may require the utilization of *Mapelath* or diamond mesh (meeting the requirements of ASTM C847) on top of the primed surface before the application of the underlayment. In all cases, one can anticipate better performance when utilizing lath, particularly over OSB. Refer to the current *Mapelath* TDS for installation instructions. Differential or excessive movement within a plywood substrate may lead to hairline cracks at plywood joints.
9. For *Ultraplan M20 Plus* to be installed over properly prepared ceramic tile, VCT, cement or epoxy terrazzo, or small amounts of old outback adhesive residue, the surface must be properly prepared, bonded, free of dirt and dust, and primed. Prime with the appropriate primer; see MAPEI's "Primers for Self-Leveling Materials" product selection guide.

## MIXING

### General mixing

- Into a clean mixing container (typically a pail measuring at least 5 U.S. gals. [18.9 L]), pour the required amount of cool, clean potable water. If available water is not cool, chill to 70°F (21°C). Add *Ultraplan M20 Plus* powder while slowly stirring. Mix water and *Ultraplan M20 Plus* powder at a mixing ratio of 5.5 to 5.8 U.S. qts. (5,20 to 5,49 L) of water per 50-lb. (22,7-kg) bag of *Ultraplan M20 Plus*.

Upon combining all of the water and the single bag of *Ultraplan M20 Plus*, begin mixing material together with a high-speed drill (at about 800 rpm) to a homogenous, lump-free consistency. This typically takes from 90 to 120 seconds.

Properly mixed *Ultraplan M20 Plus* should not exhibit bleed or signs of water marks from the smoother on the finished surface. The mixing ratio must remain consistent. For warm-weather mixing and application, follow ACI guidelines. Do not overwater material. For best results, use the *MAPEI Self-Leveling Tool Kit*.

### Barrel mixing

- Using the appropriate mixing ratio above, mix using a high-speed mixer (at about 1,200 rpm) with an "egg-beater" mixing paddle. Typically, this mixing procedure involves two bags of *Ultraplan M20 Plus* with the correct water ratio referenced above per bag. Mix to a homogenous, lump-free consistency for about 90 to 120 seconds. Do not overmix. Overmixing or moving the mixer up and down during the mixing process could cause air entrapment, which could shorten the pot life or cause pinholing during application and curing.

### Pump mixing

- *Ultraplan M20 Plus* can be mechanically mixed, using the appropriate mixing ratio above, with a continuous mixer and pump (with at least 140 ft. [42,7 m] of hose) or a batch mixer and pump (with at least 110 ft. [33,5 m] of hose). Adhere to the pump manufacturer's specifications. Mixer and pump must be in good working condition, and periodic cleaning of pumping equipment is required per the manufacturer's instructions. Pressure-test the rotor and stator pump before mixing. Use a mesh screen "sock" at the end of the hose to catch any foreign material that could enter the hopper of the mixer. To ensure a suitable mix and flow, test mixed material from the pump hose's end in a small test area before general application.

Note: Cool-weather conditions may require longer mixing or additional hose length to ensure the best product performance.

Note: Choose all appropriate safety equipment before use. Refer to MSDS for more information.

## PRODUCT APPLICATION

1. Read all installation instructions thoroughly before installation.
2. Before installation, close doors and windows, and turn off HVAC systems to prevent drafts during application and until floor is cured. Tape gaps and cracks under doors and around windows to prevent drafts. Adjust ventilation system to prevent air movement across surface. Protect areas from direct sunlight.
3. Make sure concrete substrate and ambient room temperatures are between 50°F and 95°F (10°C and 35°C) before application. In large applications, allow for indirect air circulation to dissipate humidity created by leveler application. Temperatures must be maintained within this range for at least 72 hours after the installation of *Ultraplan M20 Plus*. In cooler conditions, use indirect auxiliary heaters to maintain ambient and substrate temperatures within the required range. For temperatures above 85°F (29°C), follow ACI hot-weather application guidelines to ensure a successful installation. Review the seventh bulleted point in the "Limitations" section of this TDS.
4. For the best results, work as a team to provide a continuous flow of wet material, which will help to prevent trapping air or creating a cold joint.
5. Set the width of the pour at a distance that is ideal for maintaining a wet edge throughout placement, and in consideration of expansion joints. Quickly pour or pump *Ultraplan M20 Plus* onto the properly

prepared and primed surface in a ribbon pattern. If a wet edge cannot be maintained, reduce the width of the pour.

6. *Ultraplan M20 Plus* has an approximate working time of 15 minutes at 73°F (23°C), and is recommended for application at depths of 1/4" to 2" (6 mm to 5 cm). *Ultraplan M20 Plus* can be applied in small areas from 1/8" (3 mm) (or at least 1/2" [12 mm] for vehicular rubber-wheeled traffic) to 2" (5 cm) in a single application. Apply enough material to adequately cover high spots.
  7. Shortly after placing the *Ultraplan® M20 Plus*, spread the material with a MAPEI Gauge Rake to assist in gauging out the *Ultraplan M20 Plus* to the desired depth. After achieving the desired depth, smooth the surface with a MAPEI Smoother to obtain an even surface.
  8. For extended applications, pre-place 1/4" to 3/8" (6 to 10 mm) clean, nonreactive aggregate over the primed surface at no more than half of the total pour depth. Pour *Ultraplan M20 Plus* over placed aggregate, and rake aggressively to ensure full contact and bond with substrate. Immediately pour 1/4" (6 mm) of *Ultraplan M20 Plus* over the raked aggregate to provide a smooth, level surface. Alternately, aggregate (up to 30% by weight) can be added directly to *Ultraplan M20 Plus* during mixing.  
  
Note: Use only clean, stable aggregates. Do not use limestone or other potentially reactive aggregates for extension.
  9. Protect the surface from contaminants until the final flooring installation is complete. Sealers and coatings will protect the surface, serving as a wear surface protecting the *Ultraplan M20 Plus* from contaminants and optimizing surface integrity.
  10. *Ultraplan M20 Plus* quickly hardens, within 2 to 3 hours and is ready to accept installation of ceramic tile and natural stone in as little as 3 to 4 hours (moisture-sensitive stone may require more curing time). Floor coverings – such as carpet, vinyl sheet goods, vinyl tile, VCT, homogenous PVC, rubber and engineered wood plank – can typically be installed 16 to 24 hours after application. Protect the surface from contaminants until the final flooring installation is complete. All the above statements are subject to real-time jobsite temperatures and humidity conditions.
3. Avoid walking on the installed surface for at least 2 to 3 hours after installation, depending upon temperature and humidity conditions.
  4. Protect *Ultraplan M20 Plus* from traffic, dirt and dust from other trades until the final floor sealer or coating has been installed and completely cured. *Ultraplan M20 Plus* should not be left as an exposed surface. Always cover with a final abrasion-resistant coating (sealer) or finish.
  5. Do not expose *Ultraplan M20 Plus* to rolling dynamic loads, such as fork lifts or scissor lifts, for at least 48 hours after installation.
  6. *Ultraplan M20 Plus* can be sealed or coated 24 hours after application. Follow the sealer or coating manufacturer's recommendations. Test all surface treatments on a small sample area, before application, to ensure the desired results. Verify that the moisture content meets the floor-covering and coating manufacturers' specifications.

## CLEANUP

Wash hands and tools with water promptly before material hardens. Cured material must be mechanically removed.

## CURING

1. *Ultraplan M20 Plus* is self-curing; do not use a damp-curing method, or curing or sealing compounds.
2. Protect *Ultraplan M20 Plus* from excessive heat and draft conditions during curing, turning off all forced ventilation and radiant-heating systems. Protect the installation for up to 24 hours after completion.

## Product Performance Properties

Laboratory Tests	Results
<b>Ultraplan M20 Plus (before mixing)</b>	
Physical state	Powder
Color	Light gray
Flammability	Flame spread: 0 Fuel contribution: 0 Smoke development: 0
VOCs (Rule #1168 of California's SCAQMD)	0 g/L
<b>Ultraplan M20 Plus (mixed)</b>	
Mixing ratio	Water to <i>Ultraplan M20 Plus</i> (powder) = 5.5 to 5.8 U.S. qts. per 50 lbs. (5,20 to 5,49 L per 22,7 kg)
Density	128 lbs. per cu. ft. (2,06 kg per L)
pH	11
Application temperature range	50°F to 95°F (10°C to 35°C)
Working time	About 15 minutes
Final set	2 to 3 hours
Time required before installation of tile and stone	3 to 6 hours, depending on temperature and humidity
Time required before installation of floor covering or coating	16 to 24 hours, depending on temperature and humidity
Compressive strength – ASTM C109 (CAN/CSA-A5)	
1 day	> 2,800 psi (19,3 MPa)
7 days	> 4,000 psi (27,6 MPa)
28 days	> 5,000 psi (34,5 MPa)
Flexural strength – ASTM C348 (CAN/CSA-A23.2-8C)	
1 day	> 715 psi (4,93 MPa)
7 days	> 1,145 psi (7,90 MPa)
28 days	> 1,280 psi (8,83 MPa)
Pullout strength (rupture of concrete) (CAN/CSA-A23.2-6B)	
7 days	> 360 psi (2,48 MPa)
28 days	> 440 psi (3,03 MPa)

## Shelf Life and Application Properties

Shelf life	6 months in original bag in a dry, heated and covered area
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## CSI Division Classifications

Concrete Topping	03 53 00
Cast Underlayment	03 54 00

## Packaging

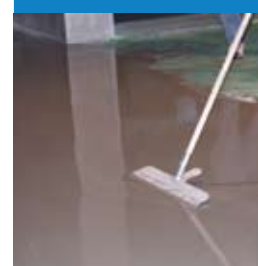
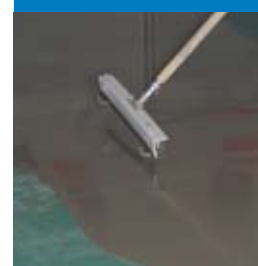
Product Code	Size
19250000	Bag: 50 lbs. (22,7 kg)

## Approximate Product Coverage per thickness for a 50-lb. (22,7-kg) bag

Thickness	Yield
1/8" (3 mm)	48 sq. ft. (4,46 m <sup>2</sup> )
1/4" (6 mm)	24 sq. ft. (2,23 m <sup>2</sup> )
1/2" (12 mm)	12 sq. ft. (1,11 m <sup>2</sup> )

\* Coverage shown is for estimating purposes only. Actual jobsite coverages may vary according to substrate conditions, type of equipment, thickness applied and applications methods used.

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## RELATED DOCUMENTS

Product Selection Guide: Primers for Self-Leveling Materials	RGC0609*
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\* At [www.mapei.com](http://www.mapei.com)

Refer to MAPEI's Material Safety Data Sheet (MSDS) for specific data related to VOCs health and safety, and handling of product.

## STATEMENT OF RESPONSIBILITY

Before using, user shall determine the suitability of the product for its intended use and user alone assumes all risks and liability whatsoever in connection therewith. **ANY CLAIM SHALL BE DEEMED WAIVED UNLESS MADE IN WRITING TO US WITHIN FIFTEEN (15) DAYS FROM DATE IT WAS, OR REASONABLY SHOULD HAVE BEEN, DISCOVERED.**

We proudly support the following industry organizations:



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For the most current **BEST-BACKED™** product data and warranty information, visit [www.mapei.com](http://www.mapei.com).

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