



North American
ADHESIVES®

NA 400 Self-Leveler

Self-Leveling Underlayment for Interior Floors



PRODUCT DESCRIPTION

NA 400 Self-Leveler is a high-compressive-strength, cement-based underlayment and repair mix that is easy to pour and that seeks its own level. It is ideal for leveling, smoothing and repairing interior floors up to 1" (2,5 cm) in a single application. NA 400 is extremely convenient: Just mix with water and pour over the floor substrate. Its fast cure time allows tile to be installed after just 24 hours.

USES

- For residential and commercial applications
- For leveling, smoothing and repairing interior floors before the installation of floor coverings
- For interior concrete and engineer-approved floors
- Fluid once mixed, NA 400 can easily be installed from 1/8" to 1" (3 mm to 2,5 cm) thick in a single pour.
- Ceramic tile and natural stone can be installed 24 hours after application.
- After 2 to 3 days, NA 400 can accept installation of such floor coverings as carpet, vinyl sheet goods, vinyl tile, vinyl composition tile (VCT), homogenous PVC, rubber and engineered wood plank.
- NA 400 is compatible with a wide variety of floor-covering adhesives, epoxy adhesives, polyurethane adhesives, and tile and stone installation mortars.
- NA 400 also can provide an ideal level substrate for cement and epoxy terrazzo flooring systems.

SUBSTRATE REQUIREMENTS

- All substrates must be structurally sound, stable and solid.
- Thoroughly clean the surface of any substance that could interfere with the bond of the installation material, including dirt, paint, tar, asphalt, wax, oil, grease, latex compounds, sealers, curing compounds, form release agents, laitance, loose toppings, foreign substances and adhesive residue.

- Concrete surfaces must be mechanically profiled and prepared by shotblasting, sandblasting, water jetting, scarifying, diamond grinding or other engineered-approved methods (reference International Concrete Repair Institute [ICRI] concrete surface profile [CSP] #3 standards for acceptable profile height).
- After cleaning and mechanically profiling the substrate, test for MVER. See "About MVER*".
- Concrete substrate and ambient room temperatures must be between 50°F and 85°F (10°C and 29°C) before application. Temperatures must be maintained within this range for at least 72 hours after the installation of NA 400.
- Fill in deep areas, holes and cracks with appropriate concrete-restoration materials, especially when installing on a second-story floor or above where fluid material could leak to a floor below (contact Technical Services for details).
- When going over plywood, performance is improved when using a lath or diamond mesh. Ensure that specifications meet the requirements of ASTM C847 and that the product is installed according to Tile Council of North America (TCNA) F185 guidelines on top of the primed surface before NA 400 is applied. Differential or excessive movement within the plywood substrate may lead to hairline cracks at plywood joints.

Tile Council of North America (TCNA) Statement on Deflection Criteria

Floor systems, including the framing system and subfloor panels, over which tile will be installed should be in conformance with the IRC [International Residential Code] for residential applications, the IBC [International Building Code] for commercial applications, or applicable building codes.

Note: The owner should communicate in writing to the project design professional and general contractor the "intended use" of the tile installation, in order to enable the project design professional and general contractor to make necessary allowances for the expected live load, concentrated loads, impact loads, and dead loads including

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the weight of the tile and setting bed. The tile installer shall not be responsible for any floor framing or subfloor installation not compliant with applicable building codes, unless the tile installer or tile contractor designs and installs the floor framing or subfloor.

Consult Technical Services for installation recommendations regarding substrates or conditions not listed.

SUITABLE SUBSTRATES

- Concrete that is fully cured, properly prepared, sound, dimensionally stable, is at least 28 days old and free from hydrostatic pressure. See "About MVER*".
- Ceramic tile, VCT, cement and epoxy terrazzo, and thin layers of old cutback adhesive residue that are properly prepared, bonded, free of dirt and dust, and primed with *NA 310* Self-Leveler Primer
- Engineer-approved plywood subfloors or oriented strand board (OSB) subfloors in accordance with the most recent edition of the TCNA's F185 specification. Plywood subfloors must be properly prepared, bonded, and free from dirt and dust.
- Do not install *NA 400* over particleboard, chipboard, Masonite, Luan, metal, asbestos, gypsum-based patching materials or any other non-dimensionally stable materials.

Note: Always install several correctly located test areas to ensure compatibility, bond strength and performance of the complete flooring system.

* **About MVER:** Always consult the floor-covering or coating manufacturer's recommendations regarding the maximum allowable moisture vapor emission rate (MVER) and retained moisture content in the substrate. Test for MVER using calcium chloride test reference ASTM F1869. For substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m²) per 24 hours, using a calcium chloride test (reference ASTM F1869), install a suitable moisture-reduction barrier before installing *NA 400*. Apply a small test area to ensure compatibility with the moisture-reduction barrier before general installation. Once the barrier is cured, apply *NA 310* before the application of *NA 400*. 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 available 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.

See North American Adhesives' "Surface Preparation Requirements" document at www.na-adhesives.com.

LIMITATIONS

- Not recommended for:
 - Exterior applications.
 - Installation over substrates containing asbestos.

- Do not bridge expansion and control joints. Provide for expansion and control joints where specified, including the perimeter of the room, columns, supports and equipment pedestals.
- Before application of *NA 400*, always properly prepare the surface and prime with *NA 310*. See the Technical Data Sheet for *NA 310* at www.na-adhesives.com.
- Do not apply *NA 310* over standing water.
- Substrate and ambient temperatures must be between 50°F and 85°F (10°C and 29°C).

MIXING

Consult the Safety Data Sheet for safe-handling instructions.

General mixing

1. Mix water and *NA 400* powder to a mixing ratio of 5 to 5.28 U.S. qts. (4,73 to 5,0 L) water per 50-lb. (22,7-kg) bag of *NA 400*. The mixing ratio must remain consistent. Do not overwater material.
2. Into a clean mixing container, pour the required amount of cool, clean potable water. If available water is not cool, chill water to 70°F (21°C).
3. Add *NA 400* powder while slowly stirring.

Barrel mixing

1. Using the mixing ratio in the "General mixing" instructions, mix using a high-speed mixer (at about 1,100 rpm) with an "egg-beater" mixing paddle.
2. Mix to a homogenous, lump-free consistency (about 2 minutes). Do not overmix. Overmixing or moving the mixer up and down during the mixing process could trap air, which could shorten the pot life or cause pinholing during application and curing.

Pump mixing (for experienced installers)

1. *NA 400* can be mechanically mixed, using the mixing ratio in the "General mixing" instructions, with a continuous mixer and pump (with at least 140 ft. [42,7 m] of hose) or with a batch mixer and pump (with at least 110 ft. [33,5 m] of hose). The mixer and pump must be in good working condition. Periodic cleaning of pumping equipment is required per the manufacturer's instructions. Be sure to pressure-test the rotor and stator for proper 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.
2. Apply to a small test area before general application to ensure a successful installation.

APPLICATION

1. Read all installation instructions thoroughly before installation.
2. Before, during and 24 hours after installation, close doors and windows, and turn off HVAC systems to prevent drafts during application and until the floor is cured. Protect areas from direct sunlight.



3. Make sure that the concrete substrate and ambient room temperatures are between 50°F and 85°F (10°C and 29°C) before application. Temperatures must be maintained within this range for at least 72 hours after the installation of *NA 400*. In cooler conditions, use indirect auxiliary heaters to maintain the 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.
4. Application of *NA 400* over large areas can be made easier and more efficient by using conventional piston, rotor-stator or underlayment-type pumps (contact Technical Services for recommendations).
5. For best results, work as a team to provide a continuous flow of wet material to avoid trapping air or creating a cold joint between mixed batches.
6. Set the width of the pour at a distance that is ideal for maintaining a wet edge throughout placement. Quickly pour or pump *NA 400* onto the properly prepared and primed surface in a ribbon pattern. If a wet edge cannot be maintained, reduce the width of the pour.
7. *NA 400* has an approximate flow time of up to 10 minutes at 73°F (23°C), is self-leveling and can be applied from 1/8" to 1" (3 mm to 2,5 cm) in a single application. Temperature and humidity affect the working time, flowability and setting time. Apply enough material to adequately cover all high spots.
8. Immediately after placing *NA 400*, spread the material with a gauge rake. After achieving the desired depth, smooth the surface with a smoother to obtain an even surface. Do not overwork the material, which could trap air.
9. *NA 400* hardens and is ready to accept installation of ceramic tile and natural stone in 24 hours. Suitable floor coverings – such as carpet, vinyl sheet goods, vinyl tile, VCT, homogenous PVC, rubber and engineered wood plank – can be installed 2 to 3 days after application. Protect the surface from contaminants until the final flooring installation is complete. Applications of greater depths (more than 1" [2,5 cm]) and in cooler temperatures may require extra curing time before the installation of covering surfaces.
10. **For experienced installers:** *NA 400* may be extended with 1/4" to 3/8" (6 to 10 mm) of clean, saturated surface-dry (SSD) aggregate on the primed surface at no more than half of the total pour depth. Pour *NA 400* over washed and dry aggregate, and rake aggressively to ensure full contact and bond with the substrate. Immediately pour a second coat of *NA 400* at 1/4" (6 mm) over the raked aggregate to provide a smooth, level surface. Alternately, one may add aggregate (up to 30% by weight) directly to *NA 400* when mixing; in this case, add the aggregate after reaching a homogenous mix of *NA 400* and water. Note: Use only clean and dry, nonreactive aggregates.

EXPANSION AND CONTROL JOINTS

- Provide for expansion and control joints where specified, including the perimeter of the room, columns, supports and equipment pedestals. If expansion and control joints do not exist in the substrate, provide for them in the system.
- Do not bridge the substrate's expansion and control joints. Ensure that such joints are honored completely through *NA 400* and *NA 310*.
- Cut joints in *NA 400* at least 1/4" (6 mm) wide within 24 hours of placement.

CLEANUP

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

PROTECTION

- *NA 400* is self-curing; do not use a damp-curing method or curing and sealing compounds.
- Protect *NA 400* from excessive heat or draft conditions during curing. Turn off all forced ventilation and radiant-heating systems. Protect for up to 24 hours after completion.
- Avoid walking on the installed surface for at least 24 hours after installation, depending on temperature and humidity conditions.
- Protect the installation from traffic, dirt and dust from other trades until *NA 400* has completely cured and the final flooring has been installed.
- Do not expose *NA 400* to rolling dynamic loads, such as forklifts or scissor lifts, for at least 72 hours after installation.

NA 400 Self-Leveler

Product Characteristics	
NA 400 (before mixing)	
Physical state	Powder
Packaging Bag: 50 lbs. (22,7 kg)	Product code #040050000
Color	Gray
Shelf life	1 year in original, unopened plastic film bag in dry, covered area. If the product is in a paper bag, the shelf life is 6 months. Protect from moisture, freezing and excessive heat.
VOCs (Rule #1168 of California's SCAQMD)	0 g per L
NA 400 (mixed)	
Mixing ratio	5 to 5.28 U.S. qts. (4,73 to 5,0 L) of water per 50 lbs. (22,7 kg) of powder
Cured density	About 128 lbs. per cu. ft. (2,1 kg per L)
pH	11
Application temperature range	50°F to 85°F (10°C to 29°C)
Pot life at 73°F (23°C)	1 hour
Flow time at 73°F (23°C)	Up to 10 minutes
Final set at 73°F (23°C)	4 to 5 hours
Dry time before installation of floor coverings at 70°F (21°C)	24 hours after application is complete

Data relating to NA 400 (material and hardening conditions at 73°F [23°C] and 50% relative humidity, mixed with 5.1 U.S. qts. [4,83 L] water)	
Laboratory Tests	Results
Compressive strength – ASTM C349	
1 day	> 1,250 psi (8,62 MPa)
7 days	> 2,700 psi (18,6 MPa)
28 days	> 4,200 psi (29,0 MPa)
Flexural strength – ASTM C348 (CAN/CSA-A23.2-8C)	
1 day	> 500 psi (3,45 MPa)
7 days	> 570 psi (3,93 MPa)
28 days	> 1,050 psi (7,24 MPa)
Pull-out strength (Direct Tensile Bond test – rupture in concrete substrate) (CAN/CSA-A23.2-6B)	
3 days	> 260 psi (1,79 MPa)
7 days	> 300 psi (2,07 MPa)
28 days	> 350 psi (2,41 MPa)

Provide for heated storage on site and deliver all materials at least 24 hours before work begins.

Approximate Coverage* per thickness for a 50-lb. (22,7-kg) bag	
Thickness	Coverage
1/8" (3 mm)	48 sq. ft. (4,46 m ²)
1/4" (6 mm)	24 sq. ft. (2,23 m ²)
1/2" (12 mm)	12 sq. ft. (1,11 m ²)
1" (2,5 cm)	6 sq. ft. (0,56 m ²)

* Coverage/thickness data shown are given for estimating purposes only. Actual jobsite coverage may vary according to substrate conditions, type of equipment, thickness applied and application methods used.



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Refer to the Safety Data Sheet for specific data related to health and safety as well as product handling. For the most current product data and warranty information, visit www.na-adhesives.com.



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.**