NA 400

North American ADHESIVES®

Self-Leveling Underlayment

GOOD	BETTER	BEST

PRODUCT DESCRIPTION

A high-strength, cement-based, regular-setting, self-leveling underlayment that can be poured or pumped onto indoor concrete and other engineer-approved subfloors.

Designed to mix with water only, *NA 400* has outstanding flow properties to quickly level, smooth and repair indoor floors from 1/8" to 1" (3 mm to 2,5 cm) in a single application. Various floor coverings – such as ceramic and vinyl tile, stone, carpet and engineered wood plank – can then be installed over the resulting surface.

USES

- Use over indoor residential or commercial cured and stable concrete floors, or adequately designed wood-frame floor systems.
- Use as a quick, effective means for converting rough and/or uneven subfloors to a level surface ideal for receiving cement-based or other floor-covering systems.
- *NA 400* accepts a wide range of floor-covering adhesives, epoxy adhesives and polyurethane adhesives, as well as dry-set or polymer-modified mortars.

SUBSTRATE REQUIREMENTS

- All supporting surfaces must be structurally sound, solid and stable. Substrates must also be dry, clean and free of dust, oil, grease, tar, paint, wax, curing agents, primers, sealers, release agents and any other substance that may reduce or prevent adhesion.
- Concrete substrates must be at least 28 days old, completely cured and free of moisture-related problems. Concrete surfaces must be mechanically profiled and prepared by shotblasting, scarifying or other engineer-approved methods (reference ICRI CSP 2 to 3 standards for acceptable profile height).
- Apply *NA 400* when the ambient and substrate temperature are between 50°F and 95°F (10°C and 35°C). Temperature must be maintained within this range for at least 72 hours after the *NA 400* installation.
- Fill in deep areas, holes and cracks with appropriate concrete restoration materials, especially when installing on a second-story floor (or higher) where fluid material could leak to a lower floor. Contact Technical Services for details.
- 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. Do not install *NA 400* on substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m^2) per 24 hours using a calcium chloride test (reference ASTM F1869).
- The maximum allowable MVER is always determined by the complete installed system, 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

TECHNICAL QUICK REFERENCE

Product characteristics at 73°F (23°C) and 50% relative humidity

Before mixing	
Physical state	Powder
Color	Gray
Flammability	Flame spread: 0 Fuel contribution: 0 Smoke development: 0
Shelf life	6 months in original, unopened paper bag in a dry, covered area
Packaging	50 lbs. (22,7 kg)
After mixing	
Water ratio	5 to 5.28 U.S. qts. (4,73 to 5,0 L) water per 50 lbs. (22,7 kg) of *NA 400*
Density	About 128 lbs. per cu. ft. (2,1 kg per L)
pH	> 11
Application temperature range (ambient and substrate)	50°F to 95°F (10°C to 35°C)
Working time	10 to 15 minutes
Final set at 73°F (23°C)	4.5 hours*
Cure time before walking on	About 3 to 4 hours*
Cure time before installing ceramic tile or natural stone	Typically 24 hours*
Cure time before installing impervious floor covering (depending on temperature and humidity)	Up to 1/4" (6 mm) thick: Typically 24 hours* 1/4" to 1/2" (6 to 12 mm) thick: Typically 2 to 3 days*
Cleanup (tools, equipment)	With water while material wet. Mechanically remove once cured.
After installation	
Compressive strength – ASTM C109	
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	
1 day	> 500 psi (3,45 MPa)
7 days	> 850 psi (5,86 MPa)
28 days	> 1,050 psi (7,24 MPa)
Pull-out strength (Direct Tensile Bond test – rupture in concrete substrate)	
3 days	> 260 psi (1,79 MPa)
7 days	> 300 psi (2,07 MPa)
28 days	> 350 psi (2,41 MPa)

THICKNESS AND APPROXIMATE COVERAGE** based on a 50-lb. (22,7 kg) bag

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. (0,55 m^2)

** Cure times vary depending on jobsite temperature and humidity.*

*** Coverages shown are for estimating purposes only. Actual coverages may vary according to substrate condition, thickness variations and application practices.*

HEALTH AND SAFETY

Consult the Material Safety Data Sheet (MSDS) for safe-handling instructions.

recommendations for MVER, retained moisture content and adhesive selections. For substrates with an MVER exceeding 5 lbs. per 1,000 sq. ft. (2,27 kg per 92,9 m^2) per 24 hours per a calcium chloride test (reference ASTM F1869), install a suitable moisture-reduction barrier before installing *NA 400*.

SUITABLE SUBSTRATES (indoor, properly prepared)

- Group 1 exterior-grade plywood and/or oriented strand board (OSB) that is 5/8" (16 mm) minimum thickness and a minimum of 19" (48 cm) on center. Installation requirements (finished flooring, load, use and/or deflection) may first require the application of diamond lath or diamond mesh (meeting ASTM C847) over the primed surface before applying *NA 400*. Differential or excessive movement within the substrate may lead to cracks.
- Cement backer units, concrete mortars and leveling coats, ceramic tile, vinyl composition tile (VCT), cement terrazzo and thin layers of old cutback adhesive residue that are well-bonded and dimensionally stable. Surfaces must be properly prepared, bonded, primed, and free from dirt and dust.
- Install several correctly located test areas to ensure compatibility, bond strength and performance of the complete flooring system. Contact Technical Services for installation recommendations regarding substrates or conditions not listed.

LIMITATIONS

- Do not install over substrates containing asbestos.
- Before installing *NA 400*, properly prepare the surface and prime with *NA 310* primer. For details, see Technical Data Sheet (TDS) for *NA 310*.
- Use between 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. For temperatures above 85°F (29°C), follow ACI hot-weather application guidelines to ensure a successful installation.
- For indoor use in dry areas only.
- Do not use as a wear surface.
- Let *NA 400* cure: At least 24 hours before installing ceramic tile or natural stone; 2 to 3 days before installing carpet, vinyl sheet goods, vinyl tile, VCT, homogenous PVC, rubber and engineered wood plank. Thicker applications may require additional cure time.
- Do not install *NA 400* over particleboard, chipboard, Masonite, Luaun, metal, asbestos, gypsum-based patching materials or any other nondimensionally stable materials.

PRIMING

Substrates must be primed with *NA 310* all-purpose primer for self-leveling underlayments before applying *NA 400*. Review the TDS for *NA 310* to ensure the correct primer application for a given substrate. This mandatory initial step ensures positive bond line adhesion as well as uniform surface consistency. Do not apply primer over standing water.

MIXING

General Mixing

1. Mix full-bag quantities only.
2. Into a clean mixing container, pour 5 to 5.28 U.S. qts. (4,73 to 5,0 L) of cool, clean potable water per 50-lb. (22,7-kg) bag of *NA 400*. The mixing ratio must remain consistent. Do not overwater the final mixture.
3. Add *NA 400* powder while mixing for about 2 minutes to a homogenous, lump-free consistency.
4. Pour entire contents of the mixing container on the floor surface as quickly as possible after mixing. Do not let mixture sit in container. For best results, work in teams to provide a constant flow of material.
5. Wash hands and tools with water immediately after mixing.

Barrel Mixing

1. Per the mixing ratio of Step 2 in the "General Mixing" section, mix using a high-speed mixer (> 850 rpm) with an "egg-beater" type of mixing paddle.
2. Mix to a homogenous, lump-free consistency (for about 2 minutes).

Pump Mixing

1. *NA 400* can be mechanically mixed, using the mixing ratio in Step 2 of the "General Mixing" section, 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). 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. Apply to a small test area before general application to ensure a successful installation. Note: Choose all appropriate safety equipment before use. Refer to MSDS for more information.

APPLICATION

1. Before installation, read all instructions thoroughly. To prevent drafts, close doors, windows and turn off HVAC systems to prevent drafts during application and for 3 to 4 hours afterward until floor is cured. Protect areas from direct sunlight.
2. Before installation, test all materials on a small sample area to ensure desired results.
3. Make sure concrete substrate and ambient room temperatures are between 50°F and 95°F (10°C and 35°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.
4. Application of *NA 400* over large areas can be made easier and more efficient by using conventional piston, rotor-stator or underlayment type of pumps (contact Technical Services for recommendations).
5. For best results, work as a team to provide a continuous flow of wet material to avoid creating a cold joint.
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 area of the pour.
7. *NA 400* has an approximate flow time of 15 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.
8. Immediately after placing the *NA 400*, spread the material with a gauge rake. After achieving the desired depth, smooth the surface with smoother or porcupine roller to obtain an even surface. Do not overwork the material.
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 typically 2 to 3 days after application. Protect the surface from contaminants until the final flooring installation is complete. Applications up to 1" (2,5 cm) and in cooler temperatures may require extra curing time before the installation of covering surfaces.
10. If the application will be deeper than 1" (2,5 cm) in a single pour, consult Technical Services.

EXPANSION AND MOVEMENT JOINTS

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

CURING AND PROTECTION

- Store in dry, cool conditions on site.
- *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 installation. Turn off all forced ventilation and radiant-heating systems. Protect for up to 24 hours after completion.
- Avoid high abrasion and heavy loads for at least 3 to 4 hours after installation, depending on temperature and humidity conditions.
- Protect 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.
- Protect the surface from contamination and water intrusion that may affect the bond of the flooring installation.

IMPORTANT NOTICE

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.**

For the most current product data, visit www.na-adhesives.com.

North American ADHESIVES®

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