BONDING AGENTS AND ADHESIVES

Master Format #: 03 05 00

DURAL 452 GEL

ASTM C881 COMPLIANT, NON-SAG, HIGH MODULUS EPOXY ADHESIVE

EUCLID CHEMICAL

PACKAGING

0.66 gal (2.5 L) unit
Code: 002DG 01
2 gal (7.6 L) unit
Code: 002DG 02
4 gal (15 L) unit
Code: 002DG 04
10 gal (38 L) unit
Code: 002DG 10
22 oz (600 mL) dual cartridge (case of 12)
Code: 002DG 95

CLEAN UP

Clean tools and application equipment immediately with acetone, xylene, or MEK. Clean spills or drips with the same solvents while still wet. Hardened DURAL 452 GEL will require mechanical abrasion for removal.

SHELF LIFE

2 years in original, unopened package

SPECIFICATIONS AND COMPLIANCES

- Complies with ASTM C881 Types I, II, IV, and V, Grade 3, Class C
- Meets the requirements of AASHTO M 235

DESCRIPTION

DURAL 452 GEL is a two-component, 100% solids, DOT non-corrosive, moisture insensitive, high strength epoxy adhesive and binder for numerous applications. This high modulus, structural gel is perfect for bonding applications that require a non-sag adhesive.

PRODUCT CHARACTERISTICS

FEATURES/BENEFITS

- Exceptional adhesion to construction materials
- Easy to use 1:1 mix ratio by volume
- Moisture insensitive
- Superior strength

PRIMARY APPLICATIONS

- Bonding of concrete, masonry, steel, or wood
- Anchoring bolts, dowels, or pins
- Pick-proof sealant for jails/prisons and kennels
- Seals cracks and sets ports prior to injection
- Mix with sand to create a repair mortar

APPEARANCE

Part A liquid is gray in color and Part B liquid is black in color.

COVERAGE

For anchoring, 1 neat gal (3.8 L) yields 231 in^3 (3,785 cm^3) of epoxy. 1 gal (3.8 L) of neat DURAL 452 GEL epoxy mixed with 1 gal (3.8 L) of dry 20/40 mesh silica sand will yield approximately 368 in^3 (6,030 cm^3) of mortar.

Note: Coverage rates are approximate. Actual coverage depends on temperature, texture, and substrate porosity.

TECHNICAL INFORMATION

The following are typical values obtained under laboratory conditions. Expect reasonable variation under field conditions.

Test Method	Test Property	Result
ASTM C881	Consistency	1/8" (3.2 mm)
ASTM C881	Gel Time	30 minutes
ASTM C882	Bond Strength	2 days: 2,500 psi (17.2 MPa) 14 days: 3,250 psi (22.4 MPa)
ASTM D570	Water Absorption	24 hours: 0.2%
ASTM D648	Heat Deflection Temperature	120 °F (50 °C)
ASTM D2240	Hardness, Shore D	1 day: 87.2 7 days: 88.2 14 days: 91.1
ASTM D2566	Linear Coefficient of Shrinkage	0.002
ASTM D695	Compressive Yield	7 days: 10,250 psi (70.7 MPa)
ASTM D695	Compressive Modulus	7 days: 600,000 psi (4,137 MPa)

Reinforcing Steel				Threaded Rod			
Rebar Diameter	Hole Diameter	Embedment Depth	Pull-Out Strength*	Rebar Diameter	Hole Diameter	Embedment Depth	Pull-Out Strength*
#4: 1/2"(13 mm)	5/8"(16 mm)	4.5"(11.4 cm)	16038 lbf (71.3 kN)	3/8" (10 mm)	1/2" (13 mm)	3.5" (8.9 cm)	6388 lbf (28.4 kN)
#5: 5/8"(16 mm)	3/4"(19 mm)	5.5"(14.0 cm)	27378 lbf (121.8 kN)	1/2" (13 mm)	5/8" (16 mm)	4.5" (11.4 cm)	13103 lbf (58.3 kN)
#6: 3/4"(19 mm)	7/8"(22 mm)	6.5"(16.5 cm)	34504 lbf (153.5 kN)	5/8" (16 mm)	3/4" (19 mm)	5.5" (14.0 cm)	26665 lbf (118.6 kN)
#7: 7/8"(22 mm)	1"(25 mm)	7.5"(19.1 cm)	45771 lbf (203.6 kN)	3/4" (19 mm)	7/8" (22 mm)	6.5" (16.5 cm)	34180 lbf (152.0 kN)
#8: 1"(25 mm)	1 1/8"(29 mm)	9"(22.9 cm)	55625 lbf (247.4 kN)	7/8" (22 mm)	1" (25 mm)	7.5" (19.1 cm)	42914 lbf (190.9 kN)
-	-	-	-	1" (25 mm)	1 1/8" (29 mm)	9.5" (24.1 cm)	57794 lbf (257.1 kN)

*Direct tension pull-out strengths were obtained at 7 days, in accordance with ASTM E488.

DIRECTIONS FOR USE

Surface Preparation: The surface must be structurally sound, dry, clean and free of grease, oil, curing compounds, soil, dust and other contaminants. Surface laitance must be removed. Concrete surfaces must be roughened and made absorptive, preferably by mechanical means, and then thoroughly cleaned of all dust and debris. If the surface was prepared by chemical means (acid etching), a water/baking soda or water/ammonia mixture, followed by a clean water rinse, must be used for cleaning, in order to neutralize the substrate. Allow substrate to dry before application. Route cracks and blow dust/debris from them with oil-free compressed air. Following surface preparation, the strength of the surface can be tested if quantitative results are required by project specifications. An elcometer or similar tensile pull tester may be used in accordance with ASTM D4541, and the tensile pull-off strength should be at least 250 psi (1.7 MPa). When DURAL 452 GEL is being mixed to a mortar consistency and then used to perform patching and repairs, provide a CSP of 3 to 5 in accordance with ICRI 310.2. When coating steel, all contamination should be removed and the steel surface prepared to a "near white" finish (SSPC SP10) using clean, dry blasting media.

Mixing: Mix bulk units of DURAL 452 GEL using a low-speed drill and a mixing paddle. Pre-mix Part A and Part B separately for approximately 1 minute each. Combine Part A and Part B in a 1:1 ratio by volume, then mix thoroughly for 3 to 5 minutes. To make DURAL 452 GEL mortar, gradually add clean, dry, 20/40 mesh silica sand to previously mixed DURAL 452 GEL epoxy and mix thoroughly for 3 to 5 minutes. The mix ratio of aggregate to mixed epoxy is approximately 1:1 by volume, but can be modified depending on the desired consistency of the mortar.
Scrape the bottom and sides of the containers at least once during mixing. Do not scrape bottom or sides of the container once mixing operations have ceased; doing so may result in unmixed resin or hardener being applied to the substrate. Unmixed resin or hardener will not cure properly. Do not aerate the material during mixing. To keep aeration to a minimum, the recommended mixing paddles are #P1 or #P2 as found in ICRI Guideline 320.5R-2014.

Application: Bonding fresh concrete to hardened concrete: Apply by brush, roller, or squeegee to the prepared, existing concrete substrate. Place fresh concrete onto the DURAL 452 GEL while it is still tacky. The open time is typically 3 to 4 hours at 75 °F (24 °C). The open time is reduced at warmer temperatures. If the DURAL 452 GEL loses tackiness or exceeds open time, abrade the surface of the epoxy, wipe surface clean, re-apply DURAL 452 GEL, and proceed. DO NOT PLACE CONCRETE OVER DRIED EPOXY. **Bonding hardened concrete to hardened concrete:** Apply by spatula, brush, or trowel. Ensure the surfaces to be joined have uniform coatings of DURAL 452 GEL. For optimum results, the bond line should not exceed 1/8" (3.2 mm). Join surfaces and hold or clamp firmly until the epoxy gels. Ideally, a small amount of adhesive should exude from the joint. Surfaces must be mated while the adhesive is still tacky. **Anchoring bolts, dowels, pins:** DURAL 452 GEL can be used neat or as a mortar to grout vertically-aligned anchors (into a horizontal substrate) or horizontally-aligned anchors (into a vertical substrate). The anchor hole should be free of all debris before grouting. The optimum hole size is 1/16" (1.6 mm) annular space (1/8" (3.2 mm) larger diameter than anchor diameter). Depth of embedment is typically 10 to 15 times anchor diameter. **Patching and repairs:** Apply DURAL 452 GEL neat as a primer coat to the prepared concrete surface. Mix the DURAL 452 GEL into an epoxy mortar and apply to the area by trowel or spatula in lifts of 1" to 1-1/2" (25 to 38 mm) before the neat primer coat becomes tack free. Allow each lift to reach initial set before applying subsequent lifts.

Setting ports & sealing cracks: Place a small amount of mixed DURAL 452 GEL on the back of the port and carefully place it centered over the crack. Be careful to not fill the hole of the injection port. Place neat DURAL 452 GEL over the face of the cracks to be pressure injected, and around each injection port. Allow DURAL 452 GEL to sufficiently harden before injecting, to prevent blowouts. **Pick-proof sealant:** Apply a bead of DURAL 452 GEL to the joints and areas being sealed. Strike off the epoxy with a rounded spatula, or similarly rounded tool, to finish.

PRECAUTIONS/LIMITATIONS

- These instructions do not dictate mechanical surface preparation required prior to ready-mix concrete toppings. This product is not intended to excuse or replace proper mechanical surface preparation. Please refer to ACI 302 Section 4.3.2 and Table 4.1, along with the project engineer for guidance on proper surface preparation for ready-mix concrete toppings.
- Store DURAL 452 GEL indoors, protected from moisture, at temperatures between 50 °F and 90 °F (10 °C and 32 °C)
- Surface and ambient temperature during applications should be between 50 °F and 90 °F (10 °C and 32 °C)
- Material temperatures should be at least 50 °F (10 °C) and rising
- Working time and cure time will decrease as the temperature increases, and will increase as the temperature decreases
- Install cartridges of DURAL 452 GEL with a high quality, professional grade gun with a gear ratio of at least 26:1 for ease of application and best results
- Do not thin DURAL 452 GEL
- DURAL 452 GEL will discolor upon prolonged exposure to ultraviolet light and high-intensity artificial lighting.
- DURAL 452 GEL is not to be used as a finished/aesthetic coating
- Do not use DURAL 452 GEL for overhead anchoring
- Maximum application thickness of DURAL 452 GEL mortar is 1.5" per lift.
- In all cases, consult the product Safety Data Sheet before use

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