

CCS™ BONDER LIQUID LWL

BONDER - LONG POT LIFE, STRUCTURAL EPOXY

ADHESIVE BONDING AGENT



TECHNICAL DATA SHEET FOR PROFESSIONAL CONTRACTOR USE ONLY

DESCRIPTION

CCS™ Bonder Liquid LWL is a liquid two-component, long pot life, low exotherm structural epoxy adhesive designed for application on horizontal surfaces and in vertical, downward oriented holes. Primary uses include the structural bonding of plastic (fresh) concrete and other construction materials, e.g., hardened concrete, masonry, stone, steel, and wood to themselves or each other and anchoring bolts, dowels, and rebar into vertical, downward oriented holes in concrete, masonry, or stone. The product is ideally suited for applications requiring significant manual labor (due usually to restricted access to the substrate) and when a long cure time is not a constraint. It offers vastly superior bond strength compared to acrylic/PVA emulsion bonding agents. It is used for filling small and large voids, with and without aggregate extension. It is also used for repairing delaminations of hardened concrete to hardened concrete or delamination of topping slabs. It can be used for bonding external steel reinforcement for changes in design loads and K-Bracing for seismic reinforcement. Its long working time makes it ideal for placing with plural and single component spray rigs. It bonds to dry and damp substrates; wet substrates must be free of standing water. No SiO₂ (silica sand fillers are used as a low-cost filler or to control viscosity) is used in the manufacturing of CCS™ Bonder Liquid LWL. It contains no VOC's (volatile organic compounds).

- Meets - ASTM C881, Type I, II, IV and V, Grade 2, Class C and AASTHO M235, Type I, II, IV and V, Grade 2, Class C.
- Meets - ACI 548.13-14 Specification for Bonding Fresh Concrete to Hardened Concrete with a Multi-Component Epoxy Adhesive.

FEATURES

The physical properties of the product allow its use in applications requiring resistance to creep and stress relaxation, maintenance of mechanical properties at high ambient temperatures, and highload bearing strength. Exceptional substrate wetting and water displacement properties ensure excellent adhesion under adverse application conditions, e.g., cold, wet concrete.

TYPICAL USES

- Bonding plastic (fresh) Portland cement concrete to hardened concrete.
- Bonding rigid construction materials to themselves or each other.
- Suitable for horizontal surface bonding of anchor bolts, dowels, and rebar to concrete, masonry, and stone.
- Adjustable viscosity and working time by blending of compatible products, such as CCS™ Bonder Paste LWL.

LIMITATIONS

The recommended minimum substrate temperature during installation and for cure is 50°F (10°C).

- For installation and cure temperatures down to 40°F (4°C) or when a faster cure is needed, use CCS™ Bonder Liquid SWL.
- The maximum in-service temperature should be 20°F (-7°C) below the HDT in bonding applications subjected to substantial and sustained shear stresses that may cause creep.
- When bonding plastic (fresh) containing resinous admixtures, establish the suitability of the concrete mix before actual use.
- Do not add solvents or otherwise thin this product.

TECHNICAL DATA

7 days 73°F (23°C) unless otherwise indicated. Compressive strength of cement mortar 4,500 psi (13.0 MPa).

PHYSICAL PROPERTIES		TEST METHOD	VALUE
Mix Ratio by Volume			2:1
Mix Ratio by Weight			100:35
Color	Part A Part B Mixed	Visual	White Black Blue Gray
Weight per Gallon	Part A Part B Mixed	ASTM D1475	12.1 lbs. (5.5 kg) 7.9 lbs. (3.9 kg) 10.7 lbs. (4.9 kg)
Viscosity Poise, 50°F (10°C)	Part A Part B Mixed	ASTM D2393	300 10 70
Viscosity Poise, 73°F (23°C)	Part A Part B Mixed	ASTM D2393	105 4 30
Viscosity Poise, 105°F (41°C)	Part A Part B Mixed	ASTM D2393	35 1 10
Gel Time, 1 Quart	50°F (10°C) 73°F (23°C) 105°F (41°C)	ASTM C881	4.4 Hours 1.4 Hours 0.5 Hours
Open Time	50°F (10°C) 73°F (23°C) 105°F (41°C)	AASHTO T237	5 Hours 4 Hours 0.7 Hours
Cure Time Hard Dry	50°F (10°C) 73°F (23°C) 105°F (41°C)	AASHTO T237	14 Days 7 Days 3 Days



Compressive Yield Strength	ASTM D695	9,000 psi (62.1 MPa)
Compressive Modulus	ASTM D695	315,000 psi (2,170 MPa)
Flexural Strength	ASTM D790	9,450 psi (65.2 MPa)
Flexural Modulus	ASTM D790	405,000 psi (2,790 MPa)
Heat Deflection Temp	ASTM D648	120°F (48.9°C)
Bond Strength Diagonal Tension	Dry	900 psi (6.2 MPa)
	Damp	1,350 psi (9.3 MPa)
Bond Pull-Off Strength to Concrete	ASTM C1583	400 psi (2.8 MPa)
Tensile Strength	ASTM D638	5,400 psi (37.2 MPa)
Elongation at Break	ASTM D638	2 %

PACKAGING & COLORS

Standard package sizes of Part A + Part B are 3, 15, and 150-gallon (11.36, 56.79 and 567.9 l.) kits.

The standard color of the mixed components is concrete blue-gray. Custom colors are available and may require minimum quantities and/or slightly higher cost.

SHELF LIFE

Three years minimum in unopened, original containers when stored between 50°F (10°C) and 90°F (32°C) in a dry place away from direct sunlight. Remixing of each component may be required upon prolonged storage.

CHEMICAL RESISTANCE

CCS™ Bonder Liquid LWL has excellent resistance to a wide range of commonly encountered chemicals including acids and bases, aircraft and automotive fluids, petroleum fuels, cutting oils, etc. It has limited resistance to hydrocarbon solvents. Performance is a function of the specific chemical and concentration, ambient and solution temperatures, exposure times, and housekeeping procedures. For information on specific chemicals and exposure conditions, contact a ChemCo Systems Technical Representative.

SURFACE PREPARATION

Substrate surfaces must be dry or damp, sound and free of all bond-inhibiting substances. Prepare surfaces in accordance with International Concrete Repair Institute, ICRI Guideline No. 310.2R Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair, Concrete Surface Profile, CSP 2 to CSP 4. The concrete surfaces should have a minimum strength of 250 psi (1.72 MPa) in direct tension per ASTM C1583 Standard Test Method for Tensile Strength of Concrete Surfaces and

the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method). Steel surfaces should be cleaned to "white metal" according to SSPC-SP 5/NACE No. 1 White Metal Blast Cleaning is a standard used for white metal blast cleaning put forth by the SSPC (Society for Protective Coatings) and NACE (National Association of Chemical Engineers) international standards.

MIXING

CCS™ Bonder Liquid LWL is a two-component adhesive. The resin to hardener (Part A : Part B) mix ratio is 2:1, by volume. Premix the individual components before drawing from bulk packaging. Wear safety glasses and clean neoprene rubber gloves when handling the material. Transfer the appropriate quantities of Part A and Part B into a mixing container. Use quantities that can be applied before the pot life of the material expires. Blend thoroughly using a Jiffy mixer blade attached to a low speed (350-750 rpm) electric or pneumatic drill. Proper mixing will take 2-3 minutes.

INSTALLING

Pour mixed material onto the prepared substrate and spread to the specified coverage with a V-notch trowel, squeegee, or paint roller. For large areas, spray application of the material is recommended. When mating two solid surfaces, apply a bonding agent to both surfaces. Allow all coated substrate surfaces to rest for 5-10 minutes before pouring fresh concrete or mating with another surface. In plastic to hardened concrete bonding applications, the bond line should be at least 15 mils (0.38 mm). Lightweight concrete may require a second coat of epoxy adhesive. In other bonding applications, bond line thickness is less critical but should be at least 4 mils (0.1 mm) above the peaks of the surface profile. For additional application information, see ACI 503R, Chapter 7, Applying Epoxy Compounds.

AGGREGATE EXTENSION

All tools and equipment must be cleaned before mixing the materials. One gallon of neat CCS™ Bonder Liquid LWL yields 231 cubic inches, which can be extended with uniform size sand that has been washed, kiln dried, and bagged.

- Add up to two gallons of aggregate to one gallon of epoxy for a pourable aggregate extension, which yields approximately 500 cubic inches. Use 20 – 60 US Sieve Mesh, aggregate should be round or tending toward round for best flowability.
- Add up to five gallons of aggregate to one gallon of epoxy which yields approximately 1,100 cubic inches of epoxy mortar.
- For troweling or patching use a flooring mortar tri-blended aggregate, with the larger aggregate angular in shape.

Note: ChemCo Systems can recommend pre-coated aggregate when it is required for safety reasons.

SAFETY

This bulletin does not accompany the product when sold. For hazard warnings, safe handling, and first aid instructions, CAREFULLY READ THE SAFETY DATA SHEETS AND CONTAINER WARNING LABELS.

Part A: Liquid epoxy resin, HMIS Health Hazard Rating- 2 (Moderate Hazard). Warning! Causes eye and skin irritation. May cause an allergic skin reaction. Harmful if swallowed. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. Avoid prolonged or repeated contact with skin.

Part B: Liquid epoxy hardener, HMIS Health Hazard Rating-2 (Moderate Hazard). Contains alkaline amines, Warning! Causes eye and skin irritation, may cause allergic skin and respiratory reactions. Corrosive, do not get in eyes or skin or on clothing. Avoid breathing vapor. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Keep away from heat and open flame.

CLEAN-UP / DISPOSAL

All tools and equipment must be cleaned before the mixed material cures. Cleaning can be facilitated with a solvent such as acetone or heavy-duty detergents. Cured material may be removed from equipment and tools by soaking in an epoxy stripper.

BIO-BASED RAW MATERIALS

CCS™ Bonder Liquid LWL, Part A (resin) and Part B (curing agent) are based on eco-friendly renewable and sustainable functionalized raw materials from oleochemicals chemistry from non-food plant sources.

TECHNICAL SUPPORT

Additional information, technical assistance, and management services are also available from a ChemCo Systems Technical Consultant at sales@chemcosystems.com or 650-261-3790.

The properties listed in this bulletin are typical and descriptive of the product and should not be used for specification purposes. For specification preparation, reference the specification of this product available from ChemCo Systems.

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PROJECT NOTES



Limited Warranty: Please read all information in the General Guidelines, Technical Data Sheets, Guide Specifications and Safety Data Sheets (SDS) before applying material. These products are for professional use only and preferably applied by professionals who have prior experience with ChemCo Systems materials or have undergone training in application of ChemCo Systems materials. Published technical data and instructions are subject to change without notice. Contact your local ChemCo Systems representative or visit our website for current technical data, instructions, and project specific recommendations.

ChemCo Systems warrants its products to be free of manufacturing defects and that they will meet ChemCo Systems' current published physical properties. Seller's and manufacturer's sole responsibility shall be to replace that portion of the product which proves to be defective. There are no other warranties by ChemCo Systems of any nature whatsoever expressed or implied, including any warranty of merchantability or fitness for a particular purpose in connection with this product. ChemCo Systems shall not be liable for damages of any sort, including remote or consequential damages resulting from any claimed breach of any warranty whether expressed or implied. ChemCo Systems shall not be responsible for use of this product in a manner to infringe on any patent held by others. In addition, no warranty or guarantee is being issued with respect to appearance, color, fading, chalking, staining, shrinkage, peeling, normal wear and tear or improper application by the applicator. Damage caused by abuse, neglect and lack of proper maintenance, acts of nature and/or physical movement of the substrate or structural defects are also excluded from the limited warranty. ChemCo Systems reserves the right to conduct performance tests on any material claimed to be defective prior to any repairs by owner, general contractor, or applicator.

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