

## Product Specification Sheet

### *Ductal Infrastructure, Ultra High Performance Concrete (UHPC)*

#### 1. Product overview

**Ductal Infrastructure** is a flowable, self-consolidating ultra-high performance concrete (UHPC) mix with steel fiber reinforcement. It is the signature UHPC product line that offers a combination of high strength, high durability, excellent crack control, and good flowability. Refer to additional Ductal Infrastructure literature for other applications, placement techniques, and safety information.

#### 2. Applications

Ductal Infrastructure is suitable for use in a wide variety of structural applications, particularly where superior mechanical strength, resistance, and enhanced durability are desired. This product is particularly useful for installations in congested areas due to its flowable, self-consolidating consistency. Common applications include:

- Closure pours between precast elements
- Links slabs and expansion joint headers
- Beam end and bearing encasements
- Column and abutment jacketing
- Protection of hydraulic and marine structures
- Slender precast elements

#### 3. Compositions and Materials

Ductal Infrastructure consists of Ductal Premix, Steel Fibers, and Liquid Admixture(s).

#### 4. Packaging

Premix available in 50 lb., 600 lb., and 2460 lb. bags. Fibers supplied in 44 lb. bags. Admixtures are supplied in 5 gallon pails or 246 gallon bulk totes.

#### 5. Features & Benefits

- Extended Service life
- High level of durability against abrasion and environmental conditions
- Very low permeability to liquid and chloride ingress
- High Mechanical Strengths
- High level of Ductility
- Excellent Crack Control

#### 6. Applicable Standards & Compliance

- ASTM C1856 / C1856M
- U.S. Buy America Compliant (23 CFR Part 635.410)
- ASTM A820 / A820M - 04, Type I cold drawn wire
- ISO 9001:2015

#### 7. Physical/Chemical Properties

|  | <i>Ductal Infrastructure</i> | <i>Ductal Infrastructure, Accelerated</i>         |
|--|------------------------------|---|
| Color / Appearance                           | Dark Gray Powder             |   |
| Material Rheology                            | Self-Consolidating           |   |
| Density                                      | 150 pcf (+/- 5 pcf)          |   |
| Static Flow, ASTM C1437*                     | 7-9 inches                   |   |
| Dynamic Flow, ASTM C1437*                    | 8-10 inches                  |   |
| Working Time                                 | 90 minutes                   | 45 minutes  |
| Time of Setting, ASTM C191*                  | 8 hours                      | 4 hours   |
| Compressive Strength (12 Hour), ASTM C39*    | N/A                          | 6,000 psi (or up to 12,000 psi with applied heat) |
| Compressive Strength (24 Hour), ASTM C39*    | 8,000 psi                    | 12,000 psi  |
| Compressive Strength (48 Hour), ASTM C39*    | 12,000 psi                   | 14,000 psi  |
| Compressive Strength (72 Hour), ASTM C39*    | 14,000 psi                   | 16,000 psi  |
| Compressive Strength (7 Day), ASTM C39*      | 17,000 psi                   | 18,000 psi  |
| Compressive Strength (28 Day), ASTM C39*     | 21,000 psi                   | 21,000 psi  |
| Compressive Strength (56 Day), ASTM C39*     | 22,000 psi                   | 22,000 psi  |
| Tensile Strength (28 Days), ASTM C496        | 800 psi                      |   |
| Flexural Strength Ratio (Pp/P1), ASTM C1609* | 1.4                          |   |
| Modulus of Elasticity (28 Days), ASTM C469*  | 7,000 ksi                    |   |

|  |                            |
|--|----------------------------|
| Long-term Shrinkage (90 Days), ASTM C157*                          | <500 microstrains          |
| Chloride Ion Penetrability (56 Days), ASTM C1202* (without fibers) | <100 coulombs (negligible) |
| Freeze-Thaw Resistance (300 Cycles), ASTM C666A*                   | RDM > 98                   |

\* as modified by ASTM C1856

## 8. Installation

### Preparation

Concrete surfaces to be in contact with Ductal materials should be sound, have a roughened or exposed aggregate finish with 1/4 in. (6 mm) average amplitude, and be pre-wetted to a saturated surface-dry (SSD) condition prior to placement. All dirt, oil, grease, dust, or other bond inhibiting materials shall be removed to ensure optimal bond strength. Formwork should be watertight to ensure the self-consolidating material does not leak during placement. Forms should be lined or coated to prevent absorption of water from fresh material and to prevent bonding to forms.

### Batching

Ductal materials are typically batched onsite using high-shear mixers. Refer to our Standard Operating Procedures and Ductal Safety Guidelines for more information. Ice may be required to control mix temperature, dependent on ambient conditions.

### Placing

Ductal materials should be placed within the product's working time. Ductal Structure is self-consolidating and does not require vibration. Vibration should be avoided to prevent material segregation from occurring. Immediately after placement, top forms and/or impermeable coverings shall be placed over the material to allow for proper curing. Contact a Ductal Representative for more information about adjusting to temperature, alternate placement methods, or other site conditions.

### Finishing

Ductal materials are typically placed slightly higher than the desired finish grade and then ground flush after curing. The material should be cured until a minimum compressive strength of 10,000 psi (70 MPa) is achieved. Forms should not be removed until curing is complete.

## 9. Safety Precautions

Ductal shall be stored, mixed, placed and disposed of in accordance with provided Standard Operating Procedures, Ductal Safety Guide and local regulation. If questions remain after document review, please reach

out to a Ductal Representative for clarification and/or guidance.

## 10. Storage

All materials should be stored in a dry environment and/or be thoroughly covered to prevent pre-mature exposure to moisture. Materials that have been exposed to moisture should be discarded. Materials should be stored between 40-95°F (4-35°C).

Premix may be stored for up to one year in the original, unopened packaging with proper storage

## 11. Availability

Ductal® Steel Fibers for Ultra High Performance Concrete (UHPC) are available throughout most of the United States.

## 12. Warranty

Upon request, Holcim (US) can provide Material Certification Reports demonstrating that Ductal Steel Fibers for Ultra High Performance Concrete meet applicable ASTM and Buy America Act standards. Holcim (US) will not guarantee finish work, having no control over use of this product. Holcim (US) shall not be responsible for the condition of fibers after delivering to the jobsite or distributor.

## 13. Manufacturer

Holcim (US) Inc.  
8700 West Bryn Mawr Ave., Suite 300  
Chicago, IL 60631  
Product Hotline: 888-646-5246  
Corporate Phone: 734-529-2411  
Corporate Fax: 734-529-4110  
Web: [www.holcim.us/ductal](http://www.holcim.us/ductal)

## 14. Corporate Statement

Results may differ based upon statistical variations depending upon mixing methods and equipment, raw materials, formulae, manufacturing procedures, temperature, application methods, test methods, actual site conditions and curing conditions. This data sheet provides no guarantee or commitment that the values set forth above will be achieved in any particular application of Ductal®. Ductal® is a registered trademark and may not be used without permission.

For other Holcim products and solutions, visit [www.materialsthatperform.com](http://www.materialsthatperform.com)

## 15. Contact information

For more information about our products and solutions, please visit: [www.MaterialsThatPerform.com/ductal-uhpc](http://www.MaterialsThatPerform.com/ductal-uhpc) or contact us: <https://www.holcim.us/ductal>.