

UP-FX Poly is an ultra-high performance fiber reinforced-concrete (UHPFRC) developed at Polytechnique Montreal, containing Portland cement, finely graded sand, steel fibers and other carefully selected components. UP-FX Poly is fabricated with a pre-blended, pre-packaged material, liquid admixtures and steel fibers.

FEATURES & BENEFITS

- Ultra-high compressive, tensile, flexural and shear strengths allowing significant reduction of concrete element sections, concrete volumes and reinforcing steel, resulting in a lightweight and slender structural element profile
- Superior impact and abrasion resistant characteristics
- Superior resistance to cracking caused by shrinkage, thermal stresses and other conditions
- Very high energy absorbing capacity (toughness)
- Ultra-compact material with very low porosity and permeability
- Superior resistance to freeze-thaw cycling and salt scaling
- Superior resistance to sulfate attack
- Excellent bond to parent concrete without requiring a bonding agent
- Self-consolidating material with superior wash-out resistance
- Designed with natural normal-density non-reactive fine aggregate to eliminate potential alkali-aggregate reactivity (AAR)
- All KING products are manufactured using ISO 9001:2015 Certified Processes

OPTIONAL FEATURES & BENEFITS

STEEL FIBER CONTENT

- UP-F2 Poly** contains steel fiber at a dosage of 2% by volume.
- UP-F3 Poly** contains steel fiber at a dosage of 3% by volume.
- UP-F4 Poly** contains steel fiber at a dosage of 4% by volume.

See the Technical Data section for more information regarding the influence of the steel fiber dosage on the mechanical properties of UP-FX Poly.

USES

- Precast structural elements such as slabs, parapets, girders and piles
- Construction of field-cast connections and shear pockets for precast concrete bridge decks
- Structural repair and reinforcement of existing elements such as slabs, girders, piles, abutment walls, bridge decks and other concrete structures
- Construction of field-cast vertical and horizontal overlays to extend the service life of new or existing concrete surfaces
- Seismic retrofit of bridge piles

PROCEDURES

Surface Preparation: All surfaces to be in contact with UP-FX Poly must be free of dust, oil, grease, rust or any other foreign substances that may interfere with the bond of the material. For concrete repair applications, remove all delaminated or unsound concrete providing a roughened surface and a minimum of 25 mm (1 inch) clearance behind any corroded reinforcing steel. The perimeter of the repair area should be saw-cut a minimum of 20 mm (3/4 inch). Clean the area to be repaired with potable water, leaving the concrete saturated but free of standing water (SSD).

Mixing: Mixing UP-FX Poly requires a high shear mixer and qualified personnel on-site. Please contact your KING Technical Representative to obtain mixing procedures and technical support on-site.

Placing: Mix, substrate and formwork temperatures should be maintained between 15 °C (59 °F) and 25 °C (86 °F). In cold weather, hot water may be used to increase mix temperature and avoid lengthy set-times. Do not place UP-FX Poly when ambient temperature is below 5 °C (40 °F). Refer to ACI 306, "Guide to Cold Weather Concreting".

In warm weather, ice water may be used as mix water to cool mix temperature and avoid short working time. When ambient temperature is above 30 °C (86 °F), refer to ACI 305, "Guide to Hot Weather Concreting".

Place material according to the instructions provided by your KING Technical Representative.

CURING

Curing is essential to optimize the mechanical properties and durability parameters of UP-FX Poly and to minimize shrinkage. Immediately, after placement, cover surface with plastic sheets or non-absorptive form panels to avoid any evaporation for the first 24 hours followed by a wet cure until the material has reached 7 days of age. The material's surface must be in full contact with the plastics sheets or non-absorptive form panels.

Curing procedures will vary depending on the specific type of application, the project requirements and the curing temperature. Refer to the curing instructions provided by your KING Technical Representative.

TECHNICAL DATA*

The following data is representative of typical values achievable under laboratory conditions. Results in the field may vary.

UP-FX POLY PRODUCTS

	UP-F2 POLY	UP-F3 POLY	UP-F4 POLY
MASS DENSITY ASTM C 39			
	2350 kg/m ³ (147 lb/ft ³)	2400 kg/m ³ (150 lb/ft ³)	2450 kg/m ³ (153 lb/ft ³)
FLOW ASTM C 1437 (MODIFIED)			
	215 mm ± 35 mm (8½ inches ± 1¾ inches)		
COMPRESSIVE STRENGTH ASTM C 39			
	4 Day 85 MPa (12300 psi)		
	28 Day (Design Value) 100 MPa (14500 psi)		
	28 Day 120 MPa (17400 psi)		
TENSILE STRENGTH			
28 Day (Design Value)	5.5 MPa (800 psi)	7.0 MPa (1015 psi)	8.5 MPa (1230 psi)
28 Day	8.0 MPa (1160 psi)	9.5 MPa (1380 psi)	11.0 MPa (1595 psi)

MODULUS OF ELASTICITY

ASTM C 469

28 Day (Design Value)	32 GPa (4640 ksi)
28 Day	37 GPa (5370 ksi)

FREEZE-THAW RESISTANCE

ASTM C 666

100%
(Excellent durability factor)

SALT-SCALING RESISTANCE

ASTM C 672

50 Cycles	0.02 kg/m ² (0.004 lb/ft ²)
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CHLORIDE ION PENETRABILITY

ASTM C 1202

28 Day	32 Coulombs
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*The following data was obtained under laboratory conditions with UP-FX Poly premix bags, potable batching water, liquid admixtures and steel fibers conditioned to 21 °C (70 °F). Higher or lower temperatures can respectively accelerate or delay setting time and compressive strength gain.

COMPONENTS

- UP-FX Poly premix
- Steel fibers
- Liquid admixtures
- Potable water

STORAGE AND SHELF LIFE

Components should be stored in a dry, covered area, protected from the elements and from freezing. Unopened bags have a shelf life of 6 months.

SAFETY PROCEDURES

UP-FX Poly contains Portland cement and very thin steel fibers. The steel fibers in UP-FX Poly should be handled carefully to prevent any damage to skin or clothing. Normal safety-wear such as rubber gloves, dust mask and safety glasses used to handle conventional cement based products should be worn. Safety Data Sheets are available upon request.

Warranty: This product is designed to meet the performance specifications outlined in this product data sheet. If the product is used in conditions for which it was not intended, or applied in a manner contrary to the written recommendations contained in the product data sheet, the product may not reach such performance specifications. The foregoing is in lieu of any other warranties, representations or conditions, expressed or implied, including, but not limited to, implied warranties or conditions of merchantable quality or fitness for particular purposes, and those arising by statute or otherwise in law or from a course of dealing or usage of trade. [REV.0007_2458758.5]