



# **COR-TUF UHPC** *the future of concrete*

*Providing form and function is an architectural dream!*

*Providing strength and resiliency is an engineering dream!*

**Cor-Tuf Ultra-High Performance Concrete (UHPC)** offers both as an elegant solution to contemporary design and construction.

An affordable solution for architectural and structural designs, providing the ability to develop complex shapes with exceptional strength and durability.

## **Cor-Tuf UHPC offers unique advantages and higher performance levels**

**Advantages include:** strength, ductility, flexibility, durability, toughness, impact resistance, dimensional stability, freeze / thaw resistance, impermeability, corrosion resistance, abrasion resistance, aggressive environment resistance, chemical resistance, increased useful life, and more!

### **Benefits of Cor-Tuf UHPC include:**

- ✓ Construct thin sections for complex structural forms
- ✓ Potential elimination of primary and/or secondary reinforcement (rebars)
- ✓ Precise replication of architectural details
- ✓ Precast pouring of larger/longer structural elements
- ✓ Injection or extrusion techniques
- ✓ Pre-and post-tensioning components
- ✓ Self-consolidation, off-site manufacturing
- ✓ Tilt-up construction
- ✓ Reduced maintenance

The very high compressive strength of Cor-Tuf with pre-stressed solutions and integrated fiber (fiber reinforced polymer mini-bars and basalt fibers) allows for longer spans and thinner panels without supports.

Combining design, construction and expertise produces extreme benefits. **Cor-Tuf brings a technologically advanced solution** and is easy to use in design and construction.

**Cor-Tuf UHPC** and related products are produced and distributed by a network of affiliated manufacturers and pre-casters. Selected specifically for their ability to produce Cor-Tuf according to a strict production process and the highest quality control, they complete customized training for their particular environment, local conditions and available raw material.

**Strict Cor-Tuf quality control measures ensure the excellence of the final product.**

Successful projects are characterized by a high degree of coordination, cooperation, and commitment by a team of owners, designers (engineers and architects), material suppliers, manufacturers, fabricators, contractors, researchers, and people from technical societies and government agencies.

## **Long-Term Field Durability of UHPC at Treat Island, Maine**

UHPC has demonstrated a durability and resistance to natural forces unknown to previous concrete products. A study of untreated UHPC by the University of New Brunswick, Canada evaluated the impact upon UHPCs (similar to Cor-Tuf), which were placed at the mid-tide level of a marine exposure site at Treat Island, Maine in 1995.

The concrete specimens were inspected annually and measurements taken to detect external deterioration and internal consistency. Samples were retrieved after 5 to 15 years of exposure for testing at the UNB labs.

The University of New Brunswick's lab testing consisted of compressive and flexural strengths, static modulus of elasticity, electrical properties, chloride profiling, corrosion activity of reinforcing steel (if present), and micro-structural evaluation of the concrete.

The results of the tests showed the samples tested were impervious to water, had negligible surface damage and had resisted 12 (now 20) years of freeze/thaw cycles and storms (over 1000 cycles).

# Cor-Tuf Technical Information

**Cor-Tuf is a superior UHPC that develops exceptional strength and ductility** dramatically higher than regular concrete. Its nominal strength, as shown in the table below, is generally 10 times the compressive strength of standard concrete. Additional mix techniques can be applied to raise that to in excess of 50,000 psi. Such mixes are typically suitable for applications requiring anti-ballistic resistance and protection of humans and sensitive property.

**The tensile properties of Cor-Tuf are derived from the fiber integrated into the concrete mix.** This can be varied from polyester to fiberglass bars, basalt, steel and stainless steel with escalating results in strength. The benefits of this strength are the potential to reduce structural designs engineered with regular concrete and significantly increased durability.

Re-engineering of standard concrete wall panel design with **Cor-Tuf has demonstrated a reduction of 25% to 33% in wall thickness** can be achieved – often without the need for rebar. This produces a reduction in material, weight and footing requirement for buildings. Which translates to reduced cost and increased efficiency in construction.

In addition, a considerable increase in the longevity of the application in turn increases the durability of any application. **The estimated longevity of Cor-Tuf is 50 to 75 years.**

Compressive Strength – 14 days	20,000 PSI
Compressive Strength – Fully cured, 28 days*	30,000 PSI
Tensile Strength	1,700 PSI
Modulus of Elasticity	6,000,000 PSI

\* (deviation +/- 10%)



**Cor-Tuf has the ability to be molded into any design, texture and shape.** This means that period specific designs or demands for surface texture, color or shape can be provided. As a cast or molded material, Cor-Tuf can be poured into any mold that creates the appearance desired by the architect – masonry, wood siding, board & batted, textured concrete, etc. **Cor-Tuf can be precast into any concrete shape or cast-in-place** in response to the particular project design.

Cor-Tuf initially hardens in 2-3 hours and can be handled in about 8 hours following a pour. The cure time varies with temperature and humidity, but generally produces half-strength in 5-7 days. Full curing is in 28 days and results in the final strength noted in the table. Additional strength can be obtained with supplemental techniques that include the use of increased temperature, steam or both during curing, depending on the application.

**Cor-Tuf also is very adhesive enabling it to stick to other components or other concrete in application.** This makes it very adaptable for retrofit or modification of existing structures including parking garage decks, bridge decks, spalled structural members, building columns/walls to improve strength or protection and other applications.

**Cor-Tuf is moisture resistant** and impervious to environmental compromise from salts, chemicals and other hazards. As a result, the products of Cor-Tuf will not deteriorate, allow water through the cured material or be compromised by typical hazards encountered in the field.

**Cor-Tuf truly is “the future of concrete”.**