

**DESCRIPTION:**

DUCON® is a patented ultra-high-performance force protection and strengthening system. DUCON® combines an infuseable, ultra-high-performance grout integrated into a dense multi-layered, bi-directional steel MicroMat® System. The resulting high-performance composite has:

- Extremely high energy absorption characteristics
- Ductility characteristics similar to steel
- Very high flexural, shear, and compressive strengths

**GENERAL APPLICATIONS:**

DUCON® is the product of choice for close-range blast mitigation and high security applications, providing both structural strengthening and hardening capabilities.

DUCON® can be used for the retrofit of existing structures and for new structures. It can be cast in place on-site through a variety of methods or produced off-site in a variety of precast structural and/or architectural shapes that facilitate construction and provide high-quality decorative surfaces and textures.

**PHYSICAL PROPERTIES:**

MicroMat® System	Ductile Steel	High Strength Steel
Wire Type	ASTM A1008	ASTM A1008
Wire Diameter	0.039 in (1 mm)	0.039 in (1 mm)
Wire Spacing	1/4–1/2 in (6–12 mm)	1/4–1/2 in (6–12 mm)
Yield Strength	40 ksi (276 MPa)	44 ksi (303 MPa)
Ultimate Strength	54 ksi (372 MPa)	60 ksi (414 MPa)
Ultimate Strain	30%	18%

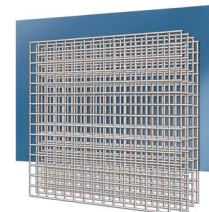
Infuseable, Ultra-High-Performance Grout	Range (psi)	Range (MPa)
Compressive Strength (ASTM C109)	6,000–16,000 psi	41 MPa–110 MPa
Tensile Strength (ASTM C496)	700–1,149 psi	4.8–7.9 MPa
Flexural Strength (ASTM C348)	1,500–2,565 psi	10.3–17 MPa

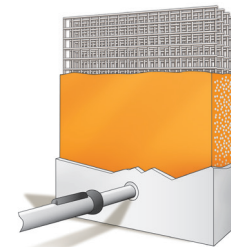
DUCON® (Composite)*	Range (psi/ksi)	Range (MPa/GPa)
Compressive Strength (ASTM C39)	13,000–20,000 psi	89–138 MPa
Elastic Modulus (ASTM C469)	3,200–4,900 ksi	22,060–22.1–33.8 GPa
Tensile Strength (ASTM C496)	1,300–2,000 psi	8.9–13.8 MPa
Flexural Strength (ASTM C293)	2,300–11,000 psi	16–76 MPa

\*1- Steel volume fraction 3-7%

2- Mechanical properties can be adjusted by changing steel grade and volume fraction



MicroMat® System



Self-Infusing Grout into MicroMat® System



DUCON® Composite

**SPECIFIC USES:**

- Blast mitigation with less than 10 ft standoff
- Blast mitigation for contact charges
- Retrofit to resist spalling and breaching
- Members requiring high level of ductility
- Surfaces requiring resistance to fragmentation
- Flexural and shear upgrade of beams and slabs
- Axial strengthening and confinement of columns
- Seismic retrofit of columns
- Thin structural overlays
- Lightweight architectural façade panels

**ADVANTAGES:**

- Performance characteristics (energy absorption, strength, and ductility) provide the highest level of force protection for close-range blast applications
- Ability to adjust the design and physical properties to meet project requirements
- High-performance properties versus thickness ratio (i.e. thin strengthening layer)
- Can be applied in thicknesses as thin as 1/2"
- Ease of constructability allows use in a wide variety of design requirements, geometries, and orientations
- Flexibility in application methods (both in-situ and precast)
- Extremely ductile
- Abrasion resistant

**SURFACE PREPARATION:**

- For bonded applications, existing concrete surfaces receiving DUCON® should be roughened to achieve 1/8" to 1/4" amplitude, depending on the application.
- Concrete surface profiling should be achieved using mechanical chipping, abrasive, or hydro-blasting.

**MIXING:**

Mix pre-bagged cementitious material with appropriate amounts of water and admixtures using an appropriate mixer for a minimum of five (5) minutes. Mix to a uniform consistency. Thorough mixing and proper proportioning of water is very important (see Installation Guide for details)

**Cold-Weather Placement:** When the air temperature falls below 45°F (7°C) at time of placement, consult STRUCTURAL TECHNOLOGIES, LLC (STL) for proper action. Protect work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Do not use calcium chloride, salt, or other materials containing anti-freeze agents or chemical accelerators unless approved by the manufacturer. Typical strength development for DUCON® is based on temperature conditions of 70°F (21°C). Strength gain at temperatures below 70°F (21°C) can be reduced, especially at early ages.

**Hot-Weather Placement:** Maintain mixture temperature below 90°F (32°C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is included in the total amount of mixing water.

**PRODUCT APPLICATION:**

Before placing grout, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed. Do not add water to grout during delivery, at project site, or during placement.

**Enlargement:**

Place the grout by pumping it into the formwork using ports and valves. The forms may be pressurized depending on the nature of the job. Forms must be sufficiently tight to prevent loss of material during pumping and after placement.

**Overlay:**

Grout must be placed in a uniform manner by pouring.

**Precast Elements:**

Prior to placing grout, the arrangement must be inspected for compliance with the shop drawings. Records should be kept to

substantiate the manufacturer's certificate of compliance. Vibrators should be used to compact the grout. Particular attention and care should be paid to vibrating the grout around the inserts and adjacent to the corners and edges. Grout must be placed in a uniform manner and properly spread over the area before commencing vibration.

**STORAGE:**

Store material in a cool, dark space. Low humidity is recommended. Store at 40° to 100°F (4° to 38°C). Store rows flat, not on ends, at temperatures below 100°F (38°C).

**HANDLING:**

Use approved personal protection equipment at all times. Particle mask is recommended for possible airborne particles. Safety glasses are recommended to prevent eye irritation. Wear chemical-resistant clothing/gloves/goggles. Ventilate area. In absence of adequate ventilation, use properly fitted NIOSH respirator.

**FIRST AID:**

In case of skin contact with cementitious materials, wash thoroughly with soap and water. For eye contact, flush immediately with plenty of water for at least 15 minutes, and contact a physician. For respiratory problems, move person to fresh air source.

**CLEAN UP:**

Remove all surplus material, equipment, and debris from the site on completion of the work. In case of spillage, scoop or vacuum into appropriate container, and dispose of in accordance with current, applicable local, state, and federal regulations. Leave the site clean.

**PACKAGING:**

- Cement-sand mixture – 50 lb moisture-resistant bags
- Wire – rolls of 5 ft wide x 500 ft long

**VOC CONTENT:**

This product contains 0 g/L or 0 lbs/gallon VOC.

STRUCTURAL TECHNOLOGIES, LLC's products are covered by an exclusive one (1) year replacement or refund limited warranty for defects in material that were in existence at the time of completed installation/application of the product or eighteen months from delivery, whichever is earlier. Disclaimers for implied and statutory warranties are included. Actual warranty language is provided in conjunction with the sales of the products and is available upon request.

User shall determine the suitability of the products for the intended use and assume all risks and liability in connection therewith.