



CONCAST

Fibercrete®

PRECISELY ENGINEERED HIGH STRENGTH CONCRETE



TRENCH SYSTEM SPECIFICATIONS

Concast Trench System Specifications

GENERAL SPECIFICATIONS FOR CABLE TRENCH

1. TECHNICAL SCOPE

- 1-A.** These specifications cover any precast Fibercrete® (G.F.R.C.) and/or concrete cable trench system manufactured by Concast Incorporated in Zumbrota, Minnesota. The manufacturer must have experience in design and fabrication of these products and also the facilities for fabricating them with the quality specified herein and without delay to the agreed upon schedule.
- 1-B.** The trench system shall be designed and constructed to provide a serviceable life and warranty of 35 years when installed outdoors in full sunlight and without any protection from the weather at any location in the continental United States or Canada.
- 1-C.** The Supplier shall design, construct, perform dimensional and quality control tests, and prepare the trench for truck shipment. Shipping and delivery responsibilities shall be defined in the project specific purchase documents. The Supplier shall provide all necessary documentation as stated in this specification.

2. DIMENSIONS AND DESIGN

- 2-A.** Drawings shall be made available for engineering approval and field installation. Final drawings will include individual details, the layout, a complete BOM (Bill of Materials), and installation guidelines. Electronic individual component drawings in PDF format are available upon request. Standard part drawings shall be available online.
- 2-B.** The tolerances of the dimensions of each trench component shall not exceed +/-1/4". These tolerances apply to the components when ready for shipping, when set on a flat and level surface with no loads applied to it.
- 2-C.** Fiber and steel reinforced concrete components shall be non-flammable.
- 2-D.** The precast components are designed to conform to requirements stated in ASTM C857-07 "Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures, ASTM C858-07 "Specifications for Underground Precast Concrete Utility Structures".
- 2-E.** Provisions, such as cast-in threaded inserts, must be offered for lifting traffic rated trench channels. Mounting holes must be adequately reinforced to avoid damaging the channel, and to provide an ultimate strength of at least 5 times the part weight when the unit is lifted in accordance with the manufacturer's instructions.

3. PERFORMANCE AND MATERIALS

- 3-A.** Cement shall conform to ASTM C150-07 "Specification for Portland Cement".
- 3-B.** Course and fine aggregates shall conform to ASTM C33 "Specification for Concrete Aggregates".
- 3-C.** Preparation of concrete shall conform to ASTM A94 "Specification for Ready-Mix Concrete" & ACI 304 "Guide for Mixing, Transporting and Placing Concrete".
- 3-D. LAY-UP GFRC - FIBERCRETE®**
 - 3-D.1** Composed of cement mortar reinforced by alkali resistant glass fiber, and deformed high tensile welded wire. It is fabricated via the Concast spray lay-up method which incorporates a minimum of 4 percent volume A.R. glass fibers.
 - 3-D.2** Conforms to AIA Masterspec Section 03491 for Glass Fiber Reinforced Concrete and quality control procedures per PCI# MNL-130-91.

3-E. PREMIX GFRC - FIBERCRETE®

3-E.1 Composed of cement mortar reinforced by alkali resistant glass fiber, and a deformed prefabricated high tensile welded steel wire. It is fabricated via casting into steel forms.

3-E.2 A.R. Glass is required to prevent glass deterioration if in contact with any poured cement or grout foundation.

3-E.3 Shall obtain a minimum compressive strength of 6000 PSI at 28 days of age.

3-F. MICRO-CONCRETE

3-F.1 Precast concrete trench components shall be cast into steel forms using Type I/II Portland Cement.

3-F.2 Concrete shall contain 6% entrained air (plus or minus 1%)

3-F.3 Shall obtain a minimum compressive strength of 7500 PSI at 28 days of age.

3-G. REINFORCEMENT

3-G.1 Steel reinforcing bars shall conform to ASTM A615 "Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement".

3-G.2 Steel reinforcing wires shall conform to ASTM A496 "Specification for Steel Wire, Deformed for Concrete Reinforcement".

3-G.3 Steel reinforcing weld wire cages shall conform to ASTM A497 "Specification for Steel Welded Wire Fabric, Deformed for Concrete Reinforcement".

3-H. With equipment installed; the trench system shall be capable of withstanding temperature variations of -40° Fahrenheit to 149° Fahrenheit without cracking, splitting, or otherwise deforming. Material shall be have been tested and conform to ASTM C666/C666M-03.

3-I. When required, site-specific, PE stamped, seismic calculations shall be provided.

3-J. Concrete properties will vary depending upon the particular formulation of the concrete mix design. Customized properties can be achieved by using nonstandard ingredients, by changing or adding reinforcements, and by tailoring the overall mix design.

3-K. METAL COMPONENT PERFORMANCE

3-K.1 All galvanized steel covers, hardware, and embedments shall meet the following requirements:

- Steel Deck Plating - ASTM A786 | Steel Sheet - A1011 HSLAS Gr 50
- Steel Angles & Flats - ASTM A-36 | Galvanized Covers - ASTM 123
- Galvanized Hardware - ASTM 153

3-K.2 All stainless steel hardware and embedments shall meet the following requirements:

- Stainless Steel Angles & Flats Type 304 - ASTM A276
- Stainless Steel Sheet Type 304 - ASTM A-240

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3-K.3 All aluminum covers, hardware, and embedments shall meet the following requirements:

- Aluminum Flats 6061-T6511 - ASTM B221 | Aluminum Sheet Smooth 5052-H32 - ASTM B209
- Aluminum Deck Plating 3003 - ASTM B209 or 6061 - ASTM B632
- Aluminum Angles 6061-T6 - ASTM B308 | Aluminum Channels 6061-T6 - ASTM B308

4. ALL CONCAST TRENCH SYSTEMS

- 4-A.** Trench systems shall consist of precast reinforced concrete channel sections with removable cover sections and end plates assembled to form a completely enclosed trench.
- 4-B.** Trench channels shall have an inside depth of 12", 16", or 24" which excludes the cover and floor thickness.
- 4-C.** Trench channels have an interior minimum width of 10, 20, 24, 30, 40, or 50 inches. All channels shall be available with open or solid bottom configurations.
- 4-D.** The channel design is such that it is self-supporting and can be set above grade level if required.
- 4-E.** All channels to be of one-piece design and shall be furnished in standard 4 or 8 foot lengths. Special lengths under 8' long must be made available when needed in a trench run layout. Channel sections must be designed to interlock via male/female end joints.
- 4-F.** A universal channel shall be provided for ells, tees, crosses, and reducers. Special angled channels are used for turns in the trench run, for elevation changes, or transitions from pedestrian rated to traffic rated channel.

5. PEDESTRIAN RATED TRENCH SYSTEMS

- 5-A.** All Pedestrian trench systems are designed to support at least 200 PSF live load. Not intended for vehicle traffic.
- 5-B.** Pedestrian channels are to be constructed with spray up Fibercrete® and the standard covers are cast Fibercrete®.
- 5-C.** Pedestrian channel covers must be made available in aluminum, Fibercrete®, galvanized steel, ventilated galvanized steel; they are sized to permit manual removal by a single person using the Concast, Inc. lifting tool to engage the lifting slots in the cover.

6. TRAFFIC RATED TRENCH SYSTEMS

- 6-A.** All Light Traffic trench systems shall meet AASHTO H-10 light equipment requirement of supporting 16,000 lb./axle load.
- 6-B.** All Heavy Traffic trench systems shall meet AASHTO H-20 heavy equipment requirement of supporting 32,000 lb./axle load.
- 6-C.** All HTSG40 trench systems shall meet AASHTO H-40 heavy equipment requirement of supporting 64,000 lb./axle load.
- 6-D.** Covers for traffic rated trench shall be constructed of either precast steel reinforced concrete or fabricated hot-dipped galvanized steel. They are all designed to meet their corresponding channel's AASHTO requirements. Lightweight Fibercrete® covers shall be available for LT channels.

- 6-E. Provisions, such as cast-in threaded inserts, must be offered for lifting traffic rated channel. Mounting holes must be adequately reinforced to avoid damaging the part and to provide an ultimate strength of at least 5 times the channel weight when it is lifted in accordance with the manufacturer's instructions.
- 6-F. All steel reinforcement is held inside the concrete part using rebar chairs. These chairs ensure a proper concrete coverage of 3/4" minimum over all areas of steel reinforcement.

7. INSTALLATION REQUIREMENTS

- 7-A. When the bottom of the excavation is soft, or where in the opinion of the soils engineer unsatisfactory foundation conditions exist, the contractor shall over excavate to a depth to ensure a proper foundation as directed by the soils engineer. The excavation can then be brought back up to the prescribed grade with a thoroughly compacted granular material.
- 7-B. All trench excavations shall be backfilled to restore pre-existing conditions or to the final grade as specified by the owner.
- 7-C. All backfill material shall be a granular material as required by the soils engineer. Trench shall be designed to have no limitations of backfill height.
- 7-D. Installation guidelines shall be made available online.



P.O. Box 69
1010 North Star Drive
Zumbrota, MN 55992-0069

