

ICC-ES Evaluation Report

ESR-2152

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DIVISION: 03 00 00—CONCRETE

Section: 03 41 10—Precast Concrete Design

REPORT HOLDER:

CONCRETE TECHNOLOGY CORPORATION
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EVALUATION SUBJECT:

ULTRA-SPAN PRECAST, PRESTRESSED HOLLOW-CORE SLAB

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (2009 IBC)
- 2009 *International Residential Code*® (2009 IRC)
- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)

Properties evaluated:

- Structural
- Fire resistance

2.0 USES

The ULTRA-SPAN Hollow Core Slab is used in floors and roofs for buildings of all types of construction, retaining walls and structures permitted under the IRC when an engineering design, complying with IRC Section R301.1.3, is submitted.

3.0 DESCRIPTION

ULTRA-SPAN is a precast, prestressed hollow-core concrete slab, nominally 48 inches (1219 mm) in width, available in thicknesses ranging from 6 to 12.5 inches (152.4 to 318 mm) and various lengths limited by methods of transportation.

4.0 DESIGN AND INSTALLATION

4.1 Slab Design:

Slabs are designed for each project according to spans, loading, deflection, shear and required fire-resistance construction. Plans and calculations must be submitted to the code official for approval. The design must conform to Chapter 19 of the IBC for prestressed concrete members.

The normal-weight or lightweight concrete must have a minimum 28-day design compressive strength of 5,000 psi (34.5 MPa). At the time of strand release, the concrete must have a minimum compressive strength of 3,000 psi for strands 0.375 inch in diameter (9.5 mm) or less, and 3,500 psi (24.1 Mpa) for 0.4375-, 0.500-, and 0.6-inch-diameter (11.1, 12.7 and 15.2 mm) strands. Slabs are designed to be supported on minimum 2¹/₂-inch wide (±¹/₂-inch) (64 mm ± 12.7 mm) end bearings. The shear value between grouted adjacent units must not exceed 40 psi (0.28 MPa). Where topping is used, the composite design complies with Chapter 17 of ACI 318.

4.2 Lateral Design:

For lateral forces, the following two methods may be used for design of diaphragms:

1. A structural concrete topping slab with reinforcement designed to resist the applied lateral loads.
2. The provisions of Section 11.6 of ACI 318-08 or Section 11.7 of the ACI 318-05 may be used to design shear friction reinforcement to resist the applied forces with the coefficient of friction reduced in accordance with Section 11.6.4.3 of ACI 318-08 or Section 11.7.4.3 of ACI 318-05, where structural lightweight concrete slabs and/or topping are considered. By this method, the slabs may be designed as a lateral-load diaphragm without topping slab, under the following conditions:
 - a. Shear in the longitudinal direction of the slabs must be transferred between slabs by grouted keys with shear friction reinforcement placed across the ends as required by design.
 - b. Shear in the direction perpendicular to the slabs must be transferred between slabs and end beams by placing reinforcing bars in the grout keys at the supports, or by bars cast into voids as required by design.

4.3 Fire-resistance-rated Construction:

See Table 1 for fire-resistance rating of slab units.

5.0 CONDITIONS OF USE

The ULTRA-SPAN precast, prestressed hollow-core slabs described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1** The ULTRA-SPAN precast, prestressed hollow-core slab must be identified and installed in accordance

with this report and the manufacturer's instructions. In the event of a conflict between the instructions in this report and the manufacturer's instructions, this report governs.

- 5.2 Plans and calculations must be submitted to the code official for approval and must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is constructed.
- 5.3 Where a fire-resistance rating is required, the prestressing strand protection and concrete slab thickness must comply with Table 1.
- 5.4 The units are fabricated by Concrete Technology Corporation in Tacoma, Washington, under a quality control program with inspections conducted by Ross Bryan Associates (AA-703).

6.0 EVIDENCE SUBMITTED

- 6.1 Reports of fire-resistance tests in accordance with ASTM E 119, product characteristics and descriptive material.
- 6.2 Reports of structural tests in accordance with the ACI code.
- 6.3 A quality control manual.

7.0 IDENTIFICATION

The ULTRA-SPAN slabs are identified by a stamp or imprint bearing the manufacturer's name (Concrete Technology Corporation), the product type, the name of the inspection agency (Ross Bryan Associates), and the evaluation report number (ESR-2152).

TABLE 1—UNRESTRAINED AND RESTRAINED² FIRE-RESISTANCE RATINGS

THICKNESS (inches)	MINIMUM STRAND COVER		MINIMUM TOPPING		HOURS
	Normal (inches)	Lightweight (inches)	Concrete ¹ (inches)	Gypsum (inch)	
6, 8, 10, 12, 12.5	1	³ / ₄	0	0	1
6, 8, 10, 12, 12.5	1 ¹ / ₂	1 ¹ / ₈	0	0	2
6	2 ²	1 ¹ / ₂	1 ³ / ₄	1	3
6-8 core	2 ²	1 ¹ / ₂	1	1 ¹ / ₂	3
5 ¹ / ₂ -8 core	2 ²	1 ¹ / ₂	1 ¹ / ₂	1 ¹ / ₂	3
7 ¹ / ₂ -10	2 ²	1 ¹ / ₂	0	0	3
7 ¹ / ₈ -10 core	2 ²	1 ¹ / ₂	0	0	3
12, 12.5	2 ²	1 ¹ / ₂	0	0	3

For **SI**: 1 inch = 25.4 mm.

¹Topping may be replaced by an equal thickness of concrete added to slab during fabrication.

²For restrained assemblies, minimum strand cover may be reduced to 1¹/₂ inches.