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# ICC-ES Report

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# ESR-2660

Reissued 10/2016  
This report is subject to renewal 10/2018.

**DIVISION: 03 00 00—CONCRETE**

**SECTION: 03 41 00—PRECAST STRUCTURAL CONCRETE**

**REPORT HOLDER:**

**SPANCRETE MANUFACTURER’S ASSOCIATION**

**POST OFFICE BOX 828  
WAUKESHA, WISCONSIN 53187**

**EVALUATION SUBJECT:**

**SPANCRETE PRESTRESSED DECK UNITS**



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# ICC-ES Evaluation Report

**ESR-2660**

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**DIVISION: 03 00 00—CONCRETE**  
**Section: 03 41 00—Precast Structural Concrete**

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**EVALUATION SUBJECT:**

**SPANCRETE PRESTRESSED DECK UNITS**

**1.0 EVALUATION SCOPE**

**Compliance with the following code:**

2006 *International Building Code*® (IBC)

**Properties evaluated:**

- Structural
- Fire resistance

**2.0 USES**

Spancrete deck units are precast, pretensioned, hollow-core concrete slabs used as alternatives to the reinforced concrete slabs defined in Section 1901.2 of the IBC. Spancrete elements are intended to be used to form a continuous horizontal deck system for floors or roofs to resist all applied vertical and horizontal loads.

**3.0 DESCRIPTION**

**3.1 General:**

Spancrete units are produced in thicknesses of 4, 6, 8, 10 and 12 inches (102, 152, 203, 254 and 305 mm). The 4-inch (102 mm) slabs are available only in 40- and 48-inch widths (1016 and 1219 mm). All other thicknesses are available in 40-, 48- and 96-inch widths (1016, 1219 and 2438 mm). Two types of units are available, Ultralite and Standard. Ultralite units have a larger core area compared to the Standard units. The Standard unit is produced in thicknesses of 4, 6, 8, 10 and 12 inches (102, 152, 203, 254 and 305 mm), and the Ultralite in thicknesses of 8, 10 and 12 inches (203, 254 and 305 mm). Typical cross sections are shown in Figures 1 and 2.

**3.2 Material:**

Slab units are produced from zero-slump normal-weight concrete mixtures placed by a machine that deposits,

compacts and finishes the concrete in three immediately successive layers by an extrusion process and in one complete operation, resulting in a monolithic slab section. The length of a completed slab is the complete length of the casting. The units are moist-cured by irrigation through the cores of the slabs or by use of curing blankets. After curing, the units are saw-cut to required lengths which provide for transfer of prestress forces. Reinforcement consists entirely of longitudinal prestressing strands. The strands conform to ASTM A 416 and are seven-wire low relaxation strands of either 250 or 270 ksi (1.72 or 1.86 GPa) ultimate strength. The strand diameters range from 1/4 inch to 1/2 inch (6 mm to 13 mm).

**4.0 DESIGN AND INSTALLATION**

**4.1 Vertical Loading:**

Design, analysis and detailing of Spancrete are according to rational methods of design and analysis of precast, prestressed concrete members in accordance with Section 1901.2 of the IBC. When bonded toppings are employed, the topping may be considered to act with the Spancrete to form a composite member when design is in accordance with Chapter 17 of ACI 318-05.

**4.2 General and Lateral Loading:**

Spancrete units for each individual project or use must be designed in accordance with the requirements of the project for span, dimension, loading and other conditions peculiar to the specific proposed use. The units are produced, plant-cut and prepared for each project, according to the approved design, in the plants of producers recognized as approved fabricators by the International Accreditation Service, Inc. Spancrete elements are intended to be used to form a continuous horizontal deck system for floors or roofs to resist all applied vertical and horizontal loads, by grouting of keyways provided in the edge joints of the deck units. This yields shear values as specified in Section 17.5 of ACI 318-05 (IBC) when used in conjunction with a reinforced structural concrete topping bonded to the units, without the use of mechanical ties. Topping design must comply with applicable requirements of ACI 318-05. The nominal horizontal shear strength developed by the poured-in-place structural concrete topping and the Spancrete unit must be computed in accordance with Section 17.5.3 of ACI 318. The grouted keyways can develop a maximum nominal shear value of  $40b_v d$  (pounds) for loads applied in a vertical direction normal to the Spancrete units without topping. Where bracing for lateral forces is provided by other methods or parts of a structure, units may be installed without topping, using suitably designed and

detailed shear- and bearing-resisting elements to prevent displacement in any direction, including separation or shearing at the side joints of the units. When the concrete topping and Spancrete unit are used as a composite member, either the topping or the plank system must be designed and detailed to resist lateral forces. Shear values set forth in Table 1911.2 of the IBC are applicable for bolts grouted into the cores with the specified embedment.

#### **4.3 Fire-resistance-rated Construction:**

Fire-resistance ratings for the Standard and Ultralite units are set forth in Table 1. Grade A and Grade B, as listed in Table 1, are hard rock concrete using normal-weight aggregate considered to be carbonate and siliceous, respectively. Fire-resistance ratings may be calculated in accordance with IBC Section 721.2.2.

#### **4.4 Installation:**

Spancrete elements are delivered to the jobsite to be erected into their final position in accordance with the manufacturer's installation instructions. The units are designed to fit tight to the adjacent unit but there may be a gap between the units in order to provide erection tolerances.

#### **5.0 CONDITIONS OF USE**

The Spancrete Prestressed Deck Units described in this report comply with, or are suitable alternatives to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

- 5.1** Fabrication of the Spancrete Prestressed Deck Units is outside the scope of this report. For approved fabricators, see specific fabricator reports and listings of the International Accreditation Service, Inc.
- 5.2** The units must be designed in accordance with Section 1901.2 of the IBC for prestressed concrete and composite members.
- 5.3** Construction complies with this report.
- 5.4** Structural plans, details and calculations for each project must be submitted to, and approved by, the code official having jurisdiction over the site. Calculations must be prepared by a registered design professional when required by the statutes of the jurisdiction in which the project is to be constructed.

#### **6.0 EVIDENCE SUBMITTED**

Reports of structural tests, and of small- and full-scale fire tests in accordance with ASTM E 119.

#### **7.0 IDENTIFICATION**

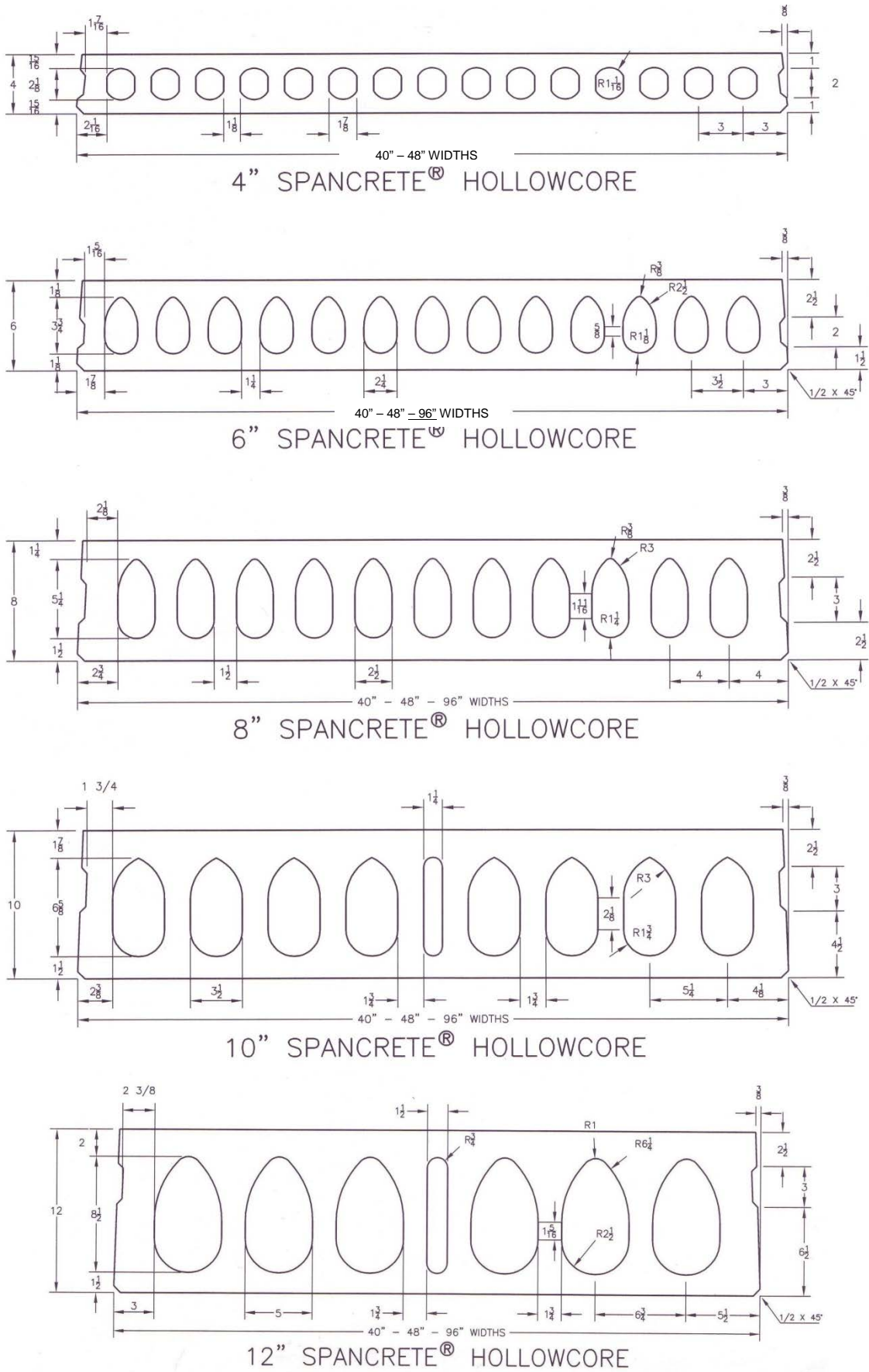
The units are identified by their configuration as indicated in Figures 1 and 2.

TABLE 1

THICKNESS OF SPANCRETE UNIT (in inches)	TOPPING REQUIRED (in inches)	TIME PERIOD RATING (Hours)	CONCRETE COVER ON STRAND (in inches)
<b>Grade "B" Hardrock Concrete Cover on Strand</b>			
6-8-10-12	None	1	1¼
4	2	1	1¼
8-10-12	None	2	1¾
<b>Grade "A" Hardrock Concrete Cover on Strand</b>			
6-8-10-12	None	1	1
4	2	1	1
6	2	2	1½
8-10-12	None	2	1¾
8-10-12	None	3	2
<b>Lightweight Concrete Cover on Strand</b>			
4	None	1	¾
6-8-10-12	None	1	¾
4-6	2	2	1½
8-10-12	None	2	1¾
6	2	3	1½
8-10-12	None	3	1½
8-10-12	2	4	2
<b>Grade "B" Hardrock Concrete Spancrete with ½" Vermiculite "MK" Soffit</b>			
4-6-8-10-12	None	1	1¼
4-6	2	2	1¼
8-10-12	None	2	1¼
6-8-10-12	2	3	1¾
10-12	None	3	1¾
<b>Grade "A" Hardrock Concrete Spancrete with ½" Vermiculite "MK" Soffit</b>			
4-6-8-10-12	None	1	1
4-6	2	2	1
4-6	2	3	1½
8-10-12	None	2	1
8-10-12	None	3	1½
8-10-12	2	4	2
<b>Lightweight Strand Cover with ½" Vermiculite "MK" on Soffit</b>			
4-6-8-10-12	None	1	¾
4-6	2	2	¾
4-6	2	3	1¾
8-10-12	None	2	¾
8-10-12	None	3	1¾
8-10-12	2	4	1½

<sup>1</sup>Fire-resistive rating for Ultralite slabs apply only to 8-, 10- and 12-inch-thick units.

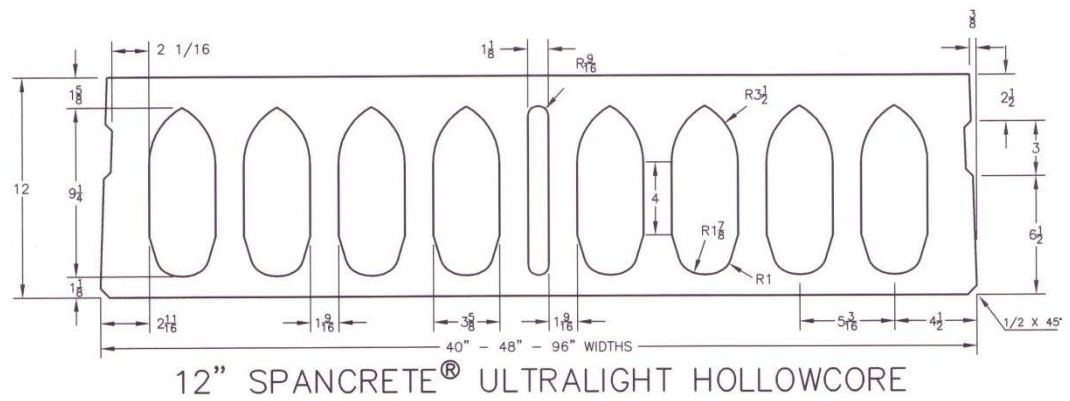
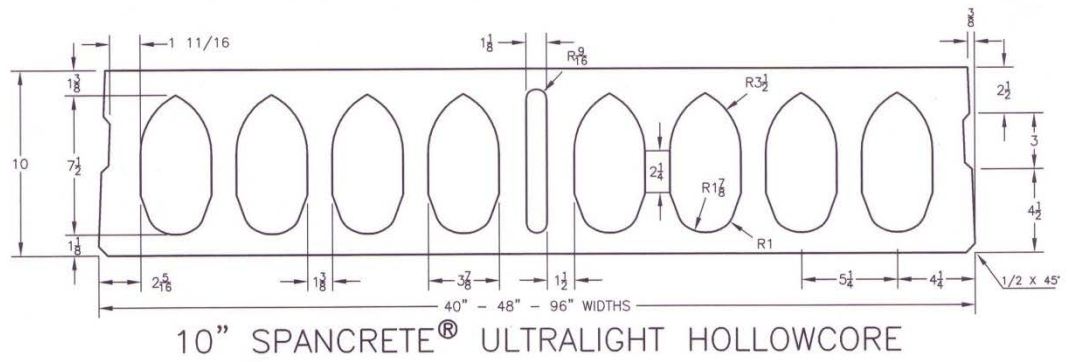
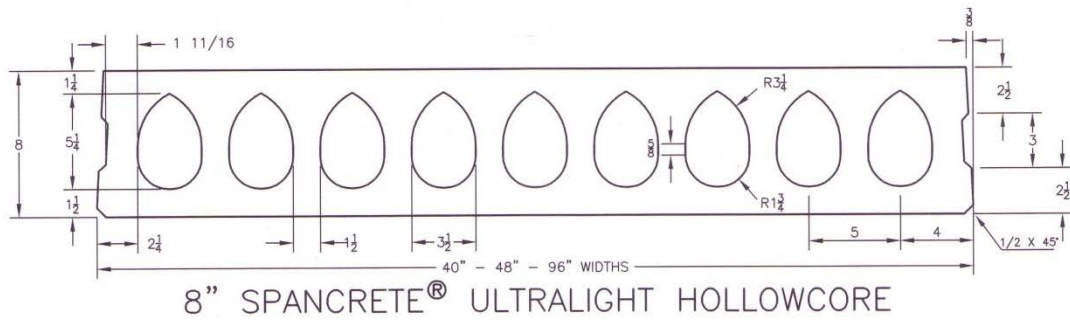
For SI: 1 in. = 25.4 mm.



For SI: 1 in. = 25.4 mm.

FIGURE 1—STANDARD SPANCRETE DECK UNITS





For SI: 1 in. = 25.4 mm.

FIGURE 2—ULTRALITE SPANCRETE DECK UNITS