

evaluation scope

Compliance with the following codes:

BOCA National Building Code/1999

- # Section 106.4 Alternative materials and equipment
- # Section 1214.2 Air-Borne Noise
- # Section 1301.1 General
- # Section 1704.3 Labeling
- # Section 1909.1 Design of formwork
- # Section 2603.2 Labeling
- # Section 2603.3 Surface burning characteristics
- # Section 2603.4.1.4 Attics and crawl spaces

description

SmartBlock™ SF and VWF Forms are intended as permanent modular formwork for use in construction of plain and reinforced concrete walls and components including: grade beams, piers, step foundation walls, stem walls, retaining walls, basement walls, loadbearing and nonloadbearing interior walls, loadbearing and nonloadbearing exterior walls, sound barrier walls, fences, landscape walls, and exposed conditions within a crawl space.

The SF and VWF forms are modular blocks 40 inches (1 m) long, and 10²/₃ or 12³/₄ inches (273 to 324 mm) tall. Each block has two opposing faces of 2 pcf expanded polystyrene (EPS), 1³/₄ to 2¹/₈ inches (44 to 54 mm) thick. The void created by these faces is filled with concrete and required reinforcing steel. The EPS is manufactured from beads, which are manufactured by BASF Corporation (NER-479) and Huntsman Chemical Corporation (NER-384). The resulting minimum thickness of the concrete is 6¹/₂ inches (165 mm). See Figure 1 of this report.

The opposing faces of the VWF form units are connected with field-installed red (12 inch), blue (10 inch), or yellow (8 inch) polypropylene plastic ties, depending upon the nominal wall thickness being assembled. VWF form units are available in two models (21040 & 21240), which are identical except for the spacing of the plastic ties, as illustrated in Figures 2 and 3 of this report. Separate end pieces are used to close form ends. The resulting thickness of concrete is 7³/₄, 5³/₄ and 3³/₄ inches (197, 146 and 95 mm) respectively.

conditions of use

This report is limited to the applications and products as stated. BOCA-ES intends that the report be used by the code official to determine that the subject of the report complies with the code requirements specifically addressed, provided the product is installed in accordance with the following conditions:

American Conform Industries, Inc. shall provide the user of this report with complete instructions on the installation of SmartBlock™ SF and VWF. Where manufacturer's installation instructions differ from this report, this report shall be null and void. Information within the manufacturer's installation instructions that is not specifically evaluated herein is beyond the scope of this report.

SmartBlock™ SF and SmartBlock™ VWF shall be constructed to a maximum unfilled height of 10 feet. Maximum concrete pour rates shall be as indicated in Table 1 of this report.

Maximum size aggregate for the SmartBlock™ SF and VWF shall be 3/8 inch.

When the SmartBlock™ system is used to form exterior walls, the type of construction shall be limited to Type 5.

Exception: Installations complying with Section 2603.6.8 of the *BOCA National Building Code/1999*.

The SmartBlock™ SF and VWF shall be separated from the interior of the building by a thermal barrier of 1/2-inch gypsum board or equivalent approved material, attached in an approved manner, in accordance with Section 2603.4 of the *BOCA National Building Code/1999*.

Exception: On the interior side of crawl spaces, SmartBlock™ SF and VWF material does not require an ignition barrier, as required by Section 2603.4.1.4 of the *BOCA National Building Code/1999*, to separate it from the interior when all of the following conditions exist:

- ! Entry is made only for service of utilities;
- ! There are no interconnected spaces intended for human occupancy;
- ! The air in the crawl space or attic is not circulated to other parts of the building; and,

(Continued on next page)

DIVISION 03 CONCRETE

Section 03130 Permanent Forms

MANUFACTURER:

**American Conform
Industries, Inc.
1820 South Santa Fe
Santa Ana, CA 92705**

EVALUATION SUBJECT:

**SMARTBLOCK™ SF AND
VWF FORMS**

Research Report

95•46

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conditions of use*(Continued)*

- ! Additional thicknesses of foamed plastic are not installed over the exposed forms.
- # Use of SmartBlock™ SF and VWF has not been evaluated for use as a component of a fire-resistance rated assembly.
- # R-values of systems utilizing the SmartBlock™ SF and VWF shall be limited to those indicated in Table 2 of this report.
- # When SmartBlock™ is utilized to provide sound transmission control between dwelling units or between dwelling units and public or service areas in accordance with Section 1214.2 of the *BOCA National Building Code/1999*, the following shall apply:
 - ! The concrete formed by SmartBlock™ shall be minimum 6 in. thick;
 - ! Concrete density shall be 150 pcf, and shall fill the entire void within the SF unit; and
 - ! Minimum 1/2 inch thick of gypsum wallboard conforming to ASTM C36, shall be installed on each exterior face of the SF unit and caulked with nonhardening sealant at its entire perimeter.

items requiring verification

The following items are related to the use of the report subject, but are not within the scope of this evaluation. However, these items are related to the determination of code compliance:

- U Design calculations and details verifying the ability of the walls, formed by SmartBlock, to carry all superimposed loads placed upon them as required by Chapter 16 of the *BOCA National Building Code/1999*. These documents shall be prepared by an individual competent and qualified in the application of the structural design principles involved. The individual shall possess the registration of license in accordance with the professional registration laws of the state in which the project is constructed.
- U Compliance with the *BOCA National Building Code/1999*, and the American Concrete Institute's *Building Code Requirements for Structural Concrete*, 1995 (ACI 318-95), for concrete design and construction, including but not limited to the following:
 - ! Concrete consolidation. Vibration shall be used for consolidation only.
- U Special inspections in accordance with Section 1705.4 of the *BOCA National Building Code/1999*, to include, but not be limited to: concrete, reinforcing steel and formwork materials, installation of reinforcing steel, formwork installation and bracing, and concreting operations.
- U Weather-resistant covering, in accordance with Chapter 14 of the *BOCA National Building Code/1999*, when the SmartBlock™ SF and VWF are exposed to the exterior.
- U Waterproofing or dampproofing in accordance with Section 1813.0 of the *BOCA National Building Code/1999*, and the application of materials to SmartBlock™ including, but not limited to the following:
 - ! Compatibility of applied materials with the EPS. The EPS

is not compatible with organic solvents such as hydrocarbons, chlorinated hydrocarbons, ketones and esters.

- ! Use of coal tar pitch and emulsions is not permitted.
- ! Hot applications of materials shall not be in excess of 200 degrees F.

- U Installation method for the attachment of interior and exterior finishes.
- U Installations complying with Section 2603.6.8 of the *BOCA National Building Code/1999*, for buildings other than Type 5 construction.
- U Fireblocking in accordance with Section 721.0 of the *BOCA National Building Code/1999*. SmartBlock has not been evaluated as a fireblocking. Therefore, approved fireblocking shall be installed in place of SmartBlock at locations where fireblocking is required, such as but not limited to, ceiling and floor or roof levels in concealed wall spaces.
- U Method of rodent and insect infestation and penetration protection, for installations of the SmartBlock SF units that retain earth.

information submitted

- # Portland Cement Association Publication No. RD066, entitled *Sound Transmission Loss Through Concrete and Concrete Masonry Walls*, by Albert Litvin and Harold W. Belliston, dated 1978, containing results of testing of 6 in. and 8 in. plain concrete in accordance with ASTM E90.
- # Project No. 19-020-2, dated February 19, 1992, prepared by Edward L. Pack, PE., containing results of an engineering analysis regarding the sound transmission characteristics of the SmartBlock system.
- # ITL, Inc., Report No. TR0746, dated March 24, 1992, prepared by R.A. Bouvier, containing results of hydrostatic burst testing.
- # Calculations, dated December 1, 1996, signed and sealed by Douglas J. Schoonover, PE., containing calculations to determine allowable concrete flow rates. See Table 1 of this report for a summary of the results.
- # Southwest Research Institute Project No. 01-7522-405, dated June 1996, signed by Alex B. Wenzel, containing results of crawl space fire tests, which indicate that the contribution to fire and fire spread of the 2 pcf EPS material manufactured by Huntsman was less than that of R-11 fiberglass insulation, when applied to the foundation wall.
- # Southwest Research Institute Project No. 01-7788-205, dated February 1996, signed by Alex B. Wenzel, containing results of crawl space fire tests, which indicate that the contribution to fire and fire spread of the 2 pcf EPS material manufactured by BASF was less than that of R-11 fiberglass insulation, when applied to the foundation wall.
- # Report entitled, *Description of the R and U Value Determinations for a Test Wall, 701/20 × 793/40 × 97/80, Composed of (American) Conform's EPS Forms Filled with Concrete*, prepared by H.F. Poppendiek and R.J. Whaley of Geoscience Ltd., dated March 1992, reporting the R value of the SF form units in accordance with the procedures of ASTM C 236.

- # Calculations prepared by Thomas C. Campbell, P.E., dated March 11, 1992, establishing the R values for the three VWF wall systems based on *ASHRAE Fundamentals*, 1989, Chapter 22. See Table 2 of this report for a summary of the results.
- # Letter, dated December 3, 1996, by Douglas J. Schoonover, P.E., indicating that the testing performed in accordance with ASTM C 236, as listed above, was performed under his direct supervision, and that the material tested was representative of the SmartBlock product described in this report.
- # American ConForm Industries Standard Operation Procedures, dated July 1994, containing procedures for the manufacture of SmartBlock.
- # Underwriters Laboratories, File No. R13265, dated April 23, 1998, issued October 15, 1998, signed by representatives of American Conform and Underwriters Laboratories, containing procedures for in-house plant inspections and product labeling.

application for permit

To aid in the determination of compliance with this research report, the following represents the minimum level of information to accompany the application for permit:

- # The language “See BOCA Evaluation Services, Inc. Research Report No. 95-46 ” or a copy of this report;
- # Details, notes and calculations of concrete design and construction as required by the *BOCA National Building Code/1999* and ACI 318-95, prepared by a qualified individual as indicated in this report.

- # Concrete aggregate size and weight;
- # Air temperature at which the concrete is to be poured and rate of placement;
- # Unfilled height of the SmartBlock™ SF and VWF systems;
- # Details of steel reinforcement at openings with the Smart-Block™ SF and VWF systems;
- # Details of thermal barriers;
- # Details of interior and exterior finishes, when utilized; and
- # Details of waterproofing, dampproofing, and adhesive materials, when utilized.

identification

- # SmartBlock™ shall be marked at the plant with the identifying language “See BOCA Evaluation Services, Inc., Research Report No. 95-46.”
- # Additionally, each pallet of SmartBlock™ units shall be labelled with the authorized listing mark of the third-party inspection agency, Underwriters Laboratories (NER-QA403). The label shall indicate the product's identification and fire performance characteristics (flame spread and smoke-developed ratings).

**Table 1
ALLOWABLE CONCRETE POUR RATES (vertical feet/hour)**

Ambient Temperature (EF)	SmartBlock™ SF	SmartBlock™ VWF
40	1.5	2.5
50	2	3
60	2.5	4
70	3	4.5
80	3.5	5
90	4	6

Notes:

1. Concrete mixing and placement shall be in accordance with Section 1908 of the *BOCA National Building Code/1999*.
2. Concrete density shall be 150 pcf, and shall fill the entire void within the SF unit.

**Table 2
SMARTBLOCK™ R VALUES**

Form Type/Concrete Thickness	R Value (h•ft²•EF/Btu)
SmartBlock™ SF	17.5
SmartBlock™ VWF/3.75 in.	19.4
SmartBlock™ VWF/5.75 in.	19.5

SmartBlock™ VWF/7.75 in.	19.7
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Notes:

1. Concrete mixing and placement shall be in accordance with Section 1908 of the *BOCA National Building Code/1999*.
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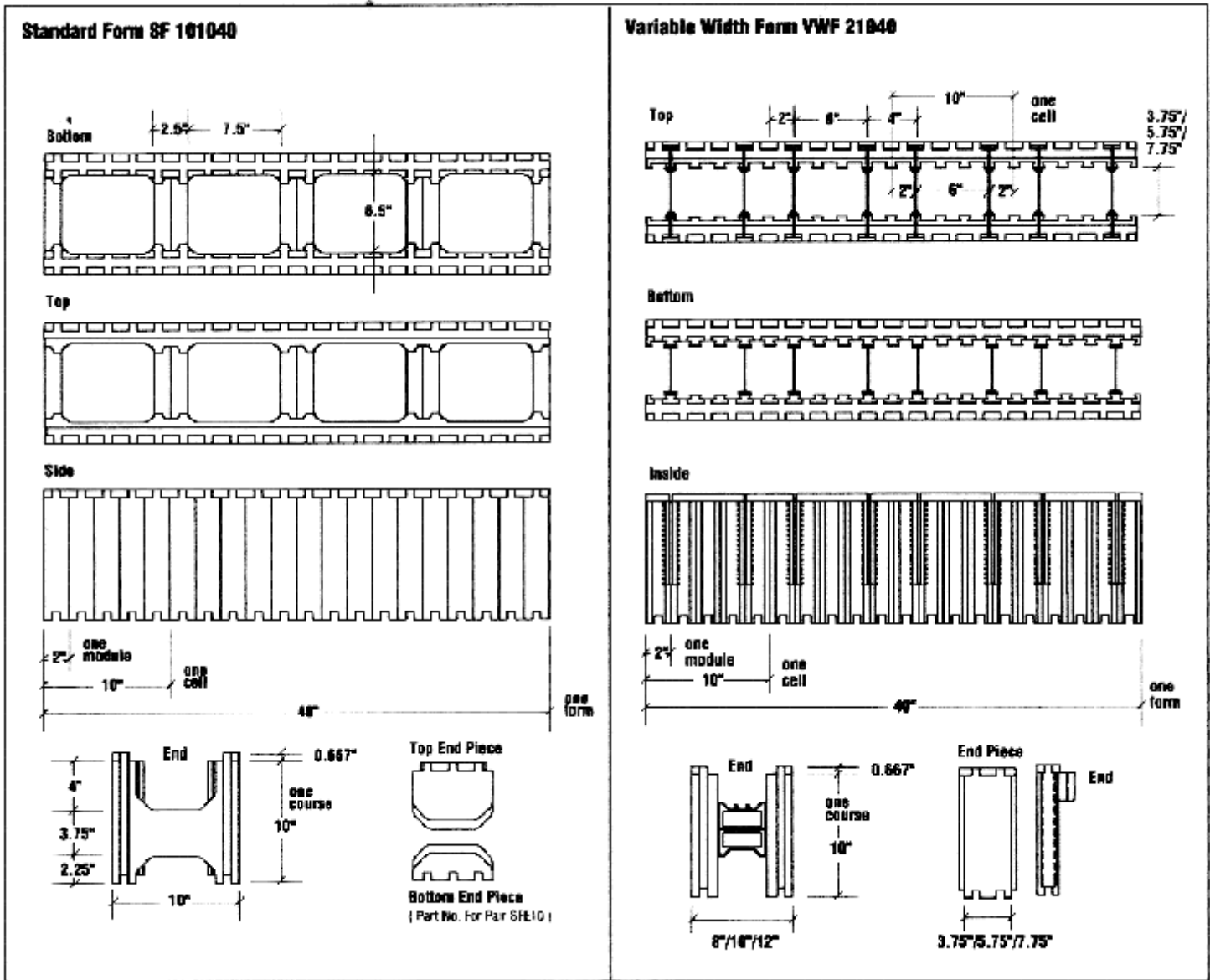


Figure 1*

Figure 2*

*THESE DRAWINGS ARE FOR ILLUSTRATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR USE AS CONSTRUCTION DOCUMENTS FOR THE PURPOSE OF DESIGN, FABRICATION OR ERECTION.

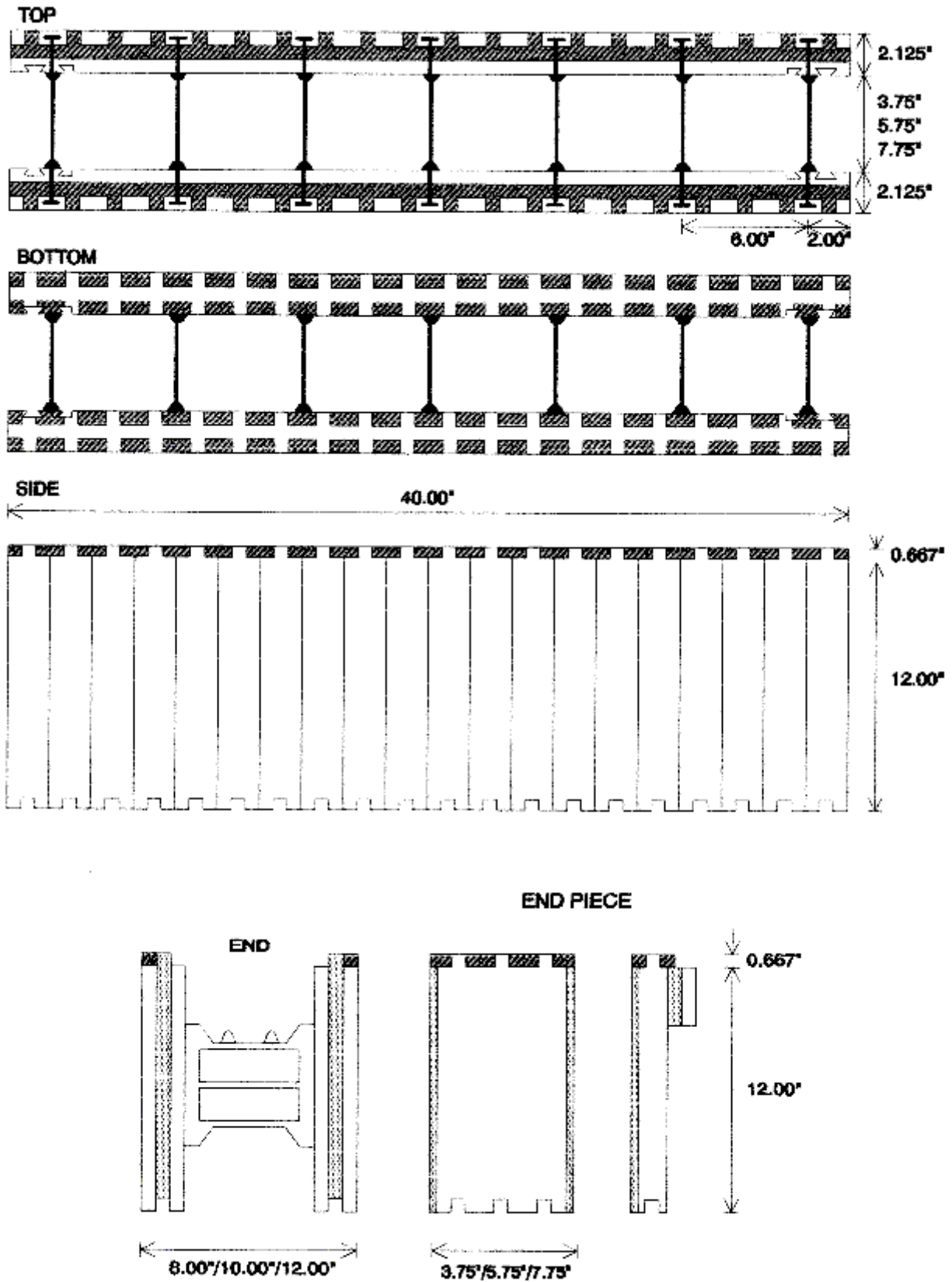


Figure 3*
Variable Width Form VWF 21240

NOTICE TO REPORT USERS

This report is subject to annual certification. Reports that are not certified shall not be used or referred to. To determine the status of certification of this report, contact BOCA Evaluation Services, Inc., or consult the latest edition of the *BOCA International Product Evaluation Listing* published periodically in the BOCA magazine.

This report is subject to the conditions listed herein and to the specific product, data and test reports submitted by the applicant requesting this report. Independent test were not performed by BOCA Evaluation Services, Inc. and BOCA-ES specifically does not make any warranty, either expressed or implied, as to any findings or other matter in this report or as to any product covered by this report. Evaluation reports are not to be construed as representing aesthetics or any other attributes not specifically addressed nor as an endorsement or recommendation for the use of the report subject. This disclaimer includes, but is not limited to, merchantability.

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if you have any information on the performance of the product described herein which is contrary to this report.