



**SBCCI PUBLIC SAFETY TESTING AND EVALUATION SERVICES INC.**

900 Montclair Road, Suite A; Birmingham, Alabama 35213-1206

a Participating Member of the NES, Inc.

Evaluation Reports are the opinion of the Committee on Evaluation, based on the findings, and do not constitute or imply an approval or acceptance by any local community. The Committee, in review of the data submitted, finds that in their opinion the product, material, system, or method of construction specifically identified in this report conforms with or is a suitable alternate to that specified in the Standard Codes, **SUBJECT TO THE LIMITATIONS IN THIS REPORT.**

The Committee on Evaluation has reviewed the data submitted for compliance with the *Standard Building Code*® and the *CABO One and Two Family Dwelling Code* and submits to the Building Official or other authority having jurisdiction the following report. The Committee on Evaluation, SBCCI PST & ESI and its staff are not responsible for any errors or omissions to any documents, calculations, drawings, specifications, tests or summaries prepared and submitted by the design professional or preparer of record that are listed in the Substantiating Data Section of this report. Portions of this report were previously included in SBCCI PST & ESI Evaluation Report #9633. Copyrighted © 1997 SBCCI PST & ESI

REPORT NO.: 9740

EXPIRES: See current SBCCI PST & ESI EVALUATION REPORT LISTING

CATEGORY: FRAMING SYSTEMS

SUBMITTED BY:

BLOCK JOIST COMPANY, LLC  
109 RALSTON ROAD  
RICHMOND, VIRGINIA 23229

**1. PRODUCT TRADE NAME**

Block Joist™ Floor and Roof Systems: 16-inch and 24-inch systems.

**2. SCOPE OF EVALUATION**

- Structural
- Fire Resistance (16-inch system only)

**3. USES**

The Block Joist™ Floor and Roof Systems are used as floor and roof systems.

**4. DESCRIPTION**

**4.1 General**

Block Joist floor and roof systems consist of concrete masonry units oriented with the flat faces in a horizontal plane, the blocks being supported on the lower chords of specially designed open web steel joists which are spaced at 16 3/4 inches (425.4 mm) on center for the 16-inch system and 24 3/4 inches (628.6 mm) for the 24-inch system. Reinforcing bars are required within the space between the ends of the webs of the blocks and the webs of the joists when fire resistance rating is being provided in accordance with this report. W1.7 deformed reinforcing wires are placed parallel at right angles to the joists within preformed or saw cut grooves, 1/2 inches (12.7 mm) wide by 3/4 inches (19.1 mm) deep, in the top (horizontal) face of the block. These wires extend across the full width of the assembly. Grout, consisting of portland cement, masonry sand and water is poured into the spaces containing the joists and into the grooves to fully encase the joists, the reinforcing bars and the wires, resulting in a smooth top surface for the entire assembly. See Figure 1 at the end of this report for a typical illustration of a partially constructed Block Joist floor assembly.

**4.2 Structural Design**

The Block Joist floor and roof systems are used as simply supported reinforced concrete one-way slabs in a manner similar to that set forth in ACI 318. For applications where fire resistance is not required by the applicable code, flexural tensile stresses are resisted by the lower chords of the joists. In applications where fire resistance is required by the applicable code, flexural tensile stresses are resisted by steel reinforcing bars installed within the space between the ends of the webs of the blocks and the webs of the joists, the contribution of the lower chords being neglected. Flexural compressive stresses are resisted by the concrete masonry units, the grout, and the top chords of the joists. Shear stresses are resisted by the steel joists. Stiffness of

the floor and roof system is computed based on the properties of the "cracked" section of concrete. Bearing design is based on the capacity of the supporting material. End anchorage design is based on design forces present in the application involved, with typical details developed by the Block Joist Company serving as minimum requirements.

Superimposed loads shall not exceed those noted in Tables 1, 2, 3, or 4, as applicable, at the end of this report. Tables are based on limiting deflections caused by superimposed loads to span/360.

Openings between the joists which are located in the first quarter of the span and not exceeding 16 inches (406.4 mm) in length parallel to the joists do not diminish the load capacity of the system. Openings between the joists which are located in the center half of the span and do not exceed 16 inches (406.4 mm) in length parallel to the joists are permitted provided the total design load on the system does not exceed 74% of the total load capacity noted in the load tables (dead weight of the system plus the allowable superimposed loads noted in the tables). For applications not meeting these conditions, the joists adjacent to the opening shall be designed in accordance with the Steel Joist Institute's *Standard Specifications for Open Web Steel Joists, K-Series*. For applications involving openings in which the width of the opening exceeds the clear distance between the joists, 13 5/8 inches (346.1 mm) and 21 5/8 (549.3 mm) for the 16-inch and 24-inch systems respectively, independent framing shall be provided to meet the requirements of the applicable code.

#### 4.3 Materials

**4.3.1** For the 16-inch system, concrete masonry units shall be two-core, nominal 8 inch (203 mm) thick blocks. For the 24-inch system, concrete masonry units shall be three-core, nominal 8 inch (203 mm) thick blocks having a nominal length of 24 inches (610 mm). The blocks shall conform to the following specifications:

1. ASTM C 90, *Standard Specification for Load-Bearing Concrete Masonry Units*, with the compressive strength of at least 9 of 10 units being 1900 psi (13.1 MPa) or above. The 10th unit shall have a compressive strength of at least 1700 psi (11.7 MPa).
2. Block dimensions, configuration, and types used in various applications shall conform with the requirements of Figure 2 at the end of this report.
3. Blocks used in the construction of assemblies requiring a fire resistance rating shall conform to the following additional requirements: blocks shall be lightweight concrete blocks conforming to the additional requirements set forth in Figure No. 3.

**4.3.2** Except for configuration, the steel joists for the Block Joist System are manufactured in general conformance with the Steel Joist Institute's *Standard Specifications for Open Web Steel Joists, K-Series*. The joists are 7 inches (1778 mm) deep. Their top chord consists of two 1 inch wide by 1/4 inch thick (25.4 mm x 6.35 mm) steel bars oriented vertically, one welded to each side of 1/2 inch (12.7 mm)

diameter steel bar web members in accordance with the Block Joist Company's quality control manual for the joists. Filler plates are placed and welded between the steel bars of the top chord as set forth in the quality control manual for the joists. The bottom chords consist of 3/16 inch (4.76 mm) thick by 3 inch (76.2 mm) wide steel plates oriented flat and welded to the web members in accordance with the quality control manual for the joists. Panel spacings are 8 to 16 inches (203.2 to 406.4 mm) at end panels and 16 inches (406.4 mm) thereafter. A bottom chord panel point occurs at each support. For the 16-inch system, joists having spans under 18 feet (5.49 m) utilize steel conforming to ASTM A 36 while joists having spans 18 feet (5.49 m) and greater utilize steel conforming to either ASTM A 242 or ASTM A 572 (having a minimum yield stress of 50,000 psi [345 MPa]). However, joists used in the construction of assemblies requiring a fire resistance rating shall be ASTM A 36, regardless of span. For the 24-inch system, joists utilize steel conforming to ASTM A 36, ASTM A 242, or ASTM A 572, provided the design loads do not exceed the allowable load capacity noted in Table 4. Bottom chords shall be shop painted unless the joists are to be galvanized. Shop painting of top chords and webs is not required. Bridging is not required.

**4.3.3** Reinforcing steel shall conform to ASTM A 615, ASTM A 616, or ASTM A 617 and shall be Grade 60. The bars are either #4 or #5 in size, depending on the design load.

**4.3.4** Steel wires shall conform to ASTM A 82 and shall be W1.7 in size, containing deformations conforming to Section 3.2.1.1.2 of ACI 530.1/ASCE 6/TMS 602.

**4.3.5** Grout shall consist of approximately one part by volume of portland cement conforming to Type I, II, or III of ASTM C 150, 2-1/2 parts of masonry sand conforming to ASTM C 144, and approximately 10 gallons (37.85 L) of water per 94-lb (42.6 kg) bag of portland cement, depending on the fineness and moisture content of the sand. Grout shall have a "flow" of 10 to 12 seconds when tested in the following manner: calibrate a standard 2-quart (1.88 L) funnel by determining the depth of the water required for a "flow" of 8 seconds. Fill the funnel to that depth with the grout and measure the time, in seconds, required for the grout to evacuate the funnel, i.e., the "flow". Minimum compressive strength shall be 2500 psi (17.2 MPa) at 28 days. Unit weight shall be  $110 \pm 3$  pcf ( $1762 \pm 48.1$  kg/m<sup>3</sup>).

**4.3.6** Bearing pads shall be 1/8 inch (3.2 mm) thick tempered hardboard conforming to the ANSI/AHA A135.4 or 1/8 inch (3.2 mm) thick multi-monomer, non-leaching plastic (Korolath) strips having a compressive strength of at least 8000 psi (55.2 MPa) and a flow no greater than 1% at 1000 psi (6.9 MPa) for 10,000 hours at 73° F (22.8°C). Use of tempered hardboard bearing pads is limited to areas such as interior walls where there is no exposure to moisture. Tempered hardboard bearing pads are not permitted on exterior walls, in crawlspaces where they are less than 18 inches (460 mm) above the exposed ground located within the periphery of the building over the crawl space or unexcavated areas, or other similar conditions.

#### 4.4 Fire Resistance

The 16-inch Block Joist System has been tested in accordance with ASTM E 119. Assemblies are available which will provide fire resistance ratings up to 3 hours. See Section 5.3 below for descriptions of fire rated assemblies covered by this report.

#### 4.5 Quality Control

The joists are manufactured for the Block Joist Company by qualified fabricators to meet the requirements set forth in Block Joist Company's *"Plant Quality Control Manual for the 7 Inch Block Joists"*. Other components of the system shall conform to their appropriate specifications as noted above in Section 4.3.

### 5.0 INSTALLATION

#### 5.1 General

Block Joist Company's published installation instructions shall be strictly adhered to and shall be at the construction site at all times during installation. Should there be any conflicts between these instructions and this report, the provisions of this report shall govern.

#### 5.2 Construction Sequence

The general construction sequence is as follows:

**5.2.1** Erect bearing walls or beams to proper elevation at each end of each span.

**5.2.2** Saw cut grooves, 1/2 inch (12.7 mm) wide by 3/4 inches (19.1 mm) deep, in the top of concrete masonry units if they are not precut into the block. Remove all debris from the grooves prior to setting of the blocks.

**5.2.3** Set Block Joists in accordance with approved plans at approximately 16.75 inches (425.4 mm) on center for the 16-inch system and 24.75 inches (628.6 mm) on center for the 24-inch system. Use 1/8 inch (3.2 mm) thick tempered hardboard or plastic bearing pads when bearing on masonry or concrete. For bearing on steel, no bearing pads are needed, but steel shims are employed in situations where steel joists need to be adjusted in elevation or leveled. Minimum bearing length shall be 3-1/4 inches (82.6 mm) when bearing on solid masonry and 2 inches (50.8 mm) when bearing on concrete or steel. When supported on steel, unless end anchorage is provided by other means, the ends of the joists shall be attached thereto in accordance with the Steel Joist Institute's *Standard Specifications for Open Web Steel Joists, K-Series*. When supported on concrete or masonry construction, end anchorage is provided by means of W1.7 deformed steel wires (See Section 4.3.4) or No. 3 reinforcing bars placed along side of the top chord of the joists and bent down into the walls and grouted in a manner similar to the way the W1.7 transverse wires are anchored to nonbearing walls. At intermediate supports, end anchorage of the joists is provided by means of 2 ft (610 mm) long pieces of the W1.7 deformed steel wires placed across the

butt joints over intermediate supports in order to tie adjacent bays together. End anchorage details noted in this report are minimum requirements. Actual anchorage details employed shall be checked by the engineer to verify that detail proposed for a given application provides required resistance to all design forces at the joint.

**5.2.4** Set one block at each end between each pair of joists. This assures proper spacing of joists and braces ends of the interior joists. Brace the exterior joists throughout their length to prevent outward displacement. If there are no walls or beams available for this purpose, use temporary ties across the assembly.

**5.2.5** Using a carpenter's level on the top of the blocks, shim the joists on masonry or concrete at each end to achieve a level surface. Weld joists to steel beams, if required by erection drawings.

**5.2.6** Set the Block Joist blocks between the joists starting at one end, completing a row parallel to the bearing wall or beam before setting the next row tight against the first row, and continuing across the span. Keep grooves in the tops of the blocks aligned parallel to the bearing.

**5.2.7** Lay continuous W1.7 deformed reinforcing wires across the full width of the assembly in the grout grooves, bending them down over the last joist at each side of the span or extending them into the nonbearing wall, as required. Lap splices shall be not less than 8 inches (203.2 mm) in length.

**5.2.8** When a fire resistance rating is required, insert #4 or #5 reinforcing bars from the bearing end of the assembly between the joist and the first web of the block, size and number depending on required structural capacity (See Tables 1 and 2). Bars which are precut to the appropriate length shall be inserted from the ends of the blocks where the face shell is thinnest. Splices of reinforcing bars are not permitted.

**5.2.9** Pour the grout which was specified in Section 4.3 above into the longitudinal joint containing the joists until the joists are completely encased in the grout. At the time of grouting, the joists, reinforcing steel and steel wire shall be free of mud, oil or other nonmetallic coatings that decrease bond.

**5.2.10** Wet the top surface of blocks.

**5.2.11** Pour the grout on the blocks and spread it with a wide squeegee using diagonal strokes to fill the transverse grooves containing the W1.7 deformed wires, without scouring the grout from the grooves.

**5.2.12** Cover the entire top surface with polyethylene to cure the grout. The system shall not be subject to freezing conditions during the time the grout is gaining its required strength.

5.2.13 Do not remove the polyethylene sheets or apply loads until the grout has obtained a compressive strength of at least 1650 psi (11.4 MPa).

5.2.14 After the grout has obtained a compressive strength of at least 1650 psi (11.4 MPa), a topping of lightweight or normal weight concrete is required in some fire resistance applications and optional otherwise.

### 5.3 Fire Resistance (16-inch system only)

In applications where a fire resistance of not more than 2 hours is required, construction of fire rated assemblies shall be in accordance with the Figure 3. A concrete topping is not required. Superimposed loads shall not exceed those noted in Table 1 and steel shall be ASTM A 36.

In applications where a fire resistance of not more than 3 hours is required, construction of fire rated assemblies shall be in accordance with the Figure 3. A concrete topping is required. Superimposed loads shall not exceed those noted in Table 2 and steel shall be ASTM A 36.

### 5.4 Field Quality Control

Quality control at site shall be conducted in accordance with the "Quality Control Manual for Installation of the Block Joist System". Except for one and two family dwelling projects where inspections are the responsibility of the contractor, the project owner shall employ one or more special inspectors to provide inspections and reports in accordance with the manual.

## 6. SUBSTANTIATING DATA

- 6.1 Block Joist Company's Description of the Block Joist System.
- 6.2 Block Joist Company's installation instructions entitled "Installation Instructions for the Block Joist System", dated December 20, 1995.
- 6.3 Block Joist Company's Quality Control Manuals entitled:
- "Plant Quality Control Manual for the 7 Inch Block Joist", dated March 14, 1996, signed by Edward M. Beck for Law Engineering and by Thomas a. Banks for TRB Supply Company.
  - "Quality Control Manual for the Installation of Block Joist Systems", dated June 10, 1997.
- 6.4 Structural calculations and load tables, prepared by the Consulting Engineers Group, signed and sealed by Armand H. Gustafarro, P.E.
- 6.5 Structural calculations prepared by HABCO, signed and sealed by Phillip T. Hodge, P.E.
- 6.6 Manufacturer's chronology of testing conducted.
- 6.7 Analysis of load tests, prepared by the Consulting Engineers Group, signed and sealed by Armand H. Gustafarro, P.E.
- 6.8 Report of structural tests conducted at the University of Virginia, prepared by Dunbar, Milby and Williams Consulting Structural Engineers, dated June

16, 1995, signed and sealed by Denwood T. Milby, P.E.

- 6.9 Report of tests conducted at Concrete Structures, Inc., prepared by Dunbar, Milby and Williams Consulting Structural Engineers, dated October 21, 1992, signed by Steven M. Applegate, P.E.
- 6.10 Report of tests conducted in accordance with ASTM E 119, prepared by Underwriters Laboratories Inc., File R15237, Project 94NK1705, dated November 11, 1995, signed by Sadek W. Mansour and Daniel J. Kaiser.
- 6.11 Report of puncture penetration and compression load testing conducted on concrete masonry units, prepared by Froehling & Robertson, Inc., F&R File No. W60-151, dated May 17, 1995, signed by Christopher A. Workman, P.E.
- 6.12 Report on structural testing of the 24-inch Block Joist System, prepared by the NCMA Research and Development Laboratory and the Consulting Engineers Group, Inc., Lab Project No. 96-244, dated October 23, 1996, signed by Robert D. Thomas, and signed and sealed by Armand H. Gustafarro, P.E.

## 7. CODE REFERENCES

*Standard Building Code* - 1994 Edition with 1996 Revisions

Section 103.7	Alternate Materials and Methods
Section 701	General (Fire Resistant Materials and Construction)
Chapter 16	Structural Loads
Chapter 17	Structural Tests and Inspections
Chapter 19	Concrete
Chapter 21	Masonry
Chapter 22	Steel

*CABO One and Two Family Dwelling Code* - 1995 Edition with 1996 and 1997 Amendments

Section 108	Alternate Materials and Systems
Section 301	Design Criteria
Chapter 5	Floors
Chapter 8	Roof-Ceiling Construction

## 8. COMMITTEE FINDINGS

The Committee on Evaluation in review of the data submitted finds that, in their opinion, the Block Joist Floor and Roof System as described in this report conforms with or is a suitable alternate to that specified in the *Standard Building Code* and the *CABO One and Two Family Dwelling Code* or Supplements thereto.

## 9. LIMITATIONS

- 9.1 Plans, specifications, calculations, and a copy of this report shall be submitted to the authority having jurisdiction when applying for a permit. Design and construction shall conform to the requirements of this report. Design loads shall be determined per Chapter 16 of the *Standard Building Code* and shall not exceed those allowed by this report. When

- required by the code, the plans, specifications, and calculations shall be signed and sealed by a registered engineer or architect.
- 9.2 The structural evaluation included in this report is limited to simple span joist applications where the joist system is subject to uniform gravity loads only. An evaluation of the Block Joist System for diaphragm capacity or for conditions where negative design moments will result (net uplift loads, balconies, cantilevers, overhangs, etc.) is not included.
- 9.3 This report does not include an evaluation of the manufacture of the concrete block units. Documentation shall be submitted to the building official demonstrating that block units conform to Section 4.3.1 of this report.
- 9.4 Use of the Block Joist System shall be limited to applications having a slope no greater than 1/4 inch per foot.
- 9.5 The Block Joist System shall not be used in applications where its top is exposed to weather. In roof and similar applications, the top of the system shall be protected from exposure to weather by an approved roof covering or other equivalent means of weather protection.
- 9.6 During construction, loads placed on the Block Joist System shall be limited and means shall be provided to distribute concentrated loads so that the load capacity of any joist is not exceeded. Loads shall not be placed on the system until the grout has attained a strength of 1650 psi (11.4 MPa).

- 9.7 The use of tempered hardboard bearing pads is limited to areas that are not exposed to moisture. Tempered hardboard bearing pads are not permitted on exterior walls, in crawlspaces where they are less than 18 inches (460 mm) above the exposed ground located within the periphery of the building over the crawl space or unexcavated areas, or other similar conditions.
- 9.8 This report does not include an evaluation of the 24-inch Block Joist for fire resistance.

## 10. IDENTIFICATION

All steel joists used in the Block Joist system shall be identified by a label which includes the Block Joist Company's name and/or trademark, the joist fabricator's name and date of fabrication, the mark of the third party QA agency (Law Engineering, Inc.), the initials or seal of SBCCI Public Safety Testing and Evaluation Services, Inc. (SBCCI PST & ESI), and the number of this report for field identification. When used in fire resistant rated assemblies, the joist label shall also bear the classification mark of Underwriter's Laboratories Inc. (NER-QA403). Other components of the system shall be suitably identified as conforming to their appropriate specifications as noted in this report.

The phrase "Refer to this Evaluation Report for Code compliance" shall be printed in the manufacturer's literature and installation instructions referencing this Evaluation Report number.

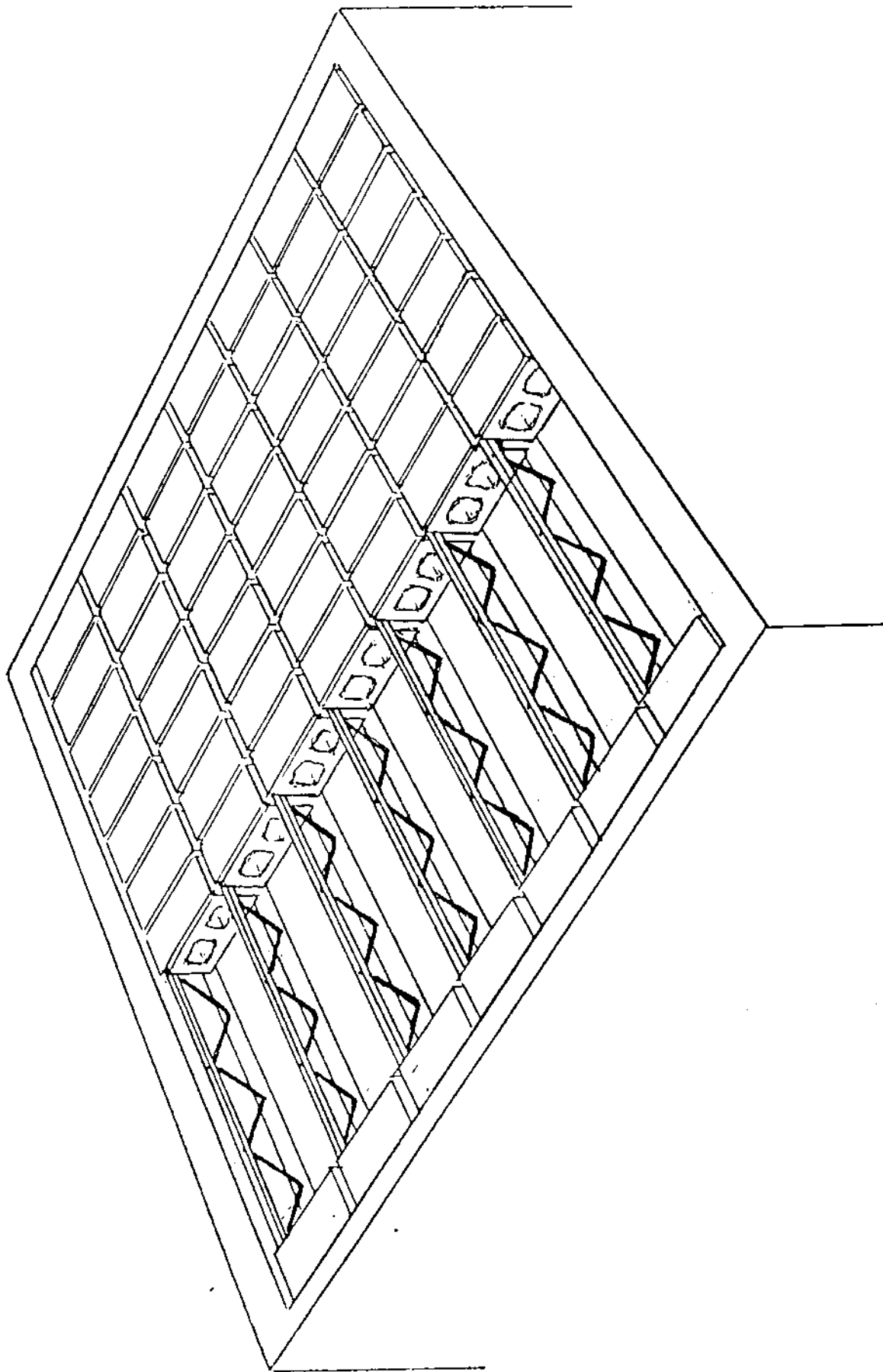
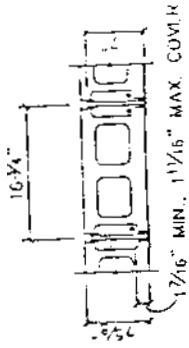


Fig. 1 Partly built BLOCK JOIST™ floor.



**TABLE 1.**  
**ALLOWABLE SUPERIMPOSED UNIFORM LOAD, psf, FOR 2-HOUR FIRE RATING**  
**16-in. BLOCK\* JOIST\*\* SYSTEM FOR VARIOUS SPANS**

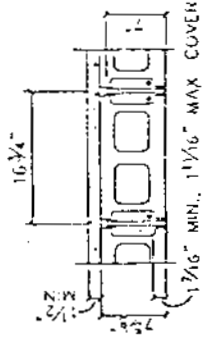
Reinforcing Bars per Joist	Span, ft																
	8 or Less	9	10	11	12	13	14	15	16	17	18†	19†					
1 #4	188	141	107	81	62	47	35	26									
1 #5	306	233	182	143	114	91	73	59	47	37	29						
2 #4	312**	256	200	159	127	102	83	67	54	44	35	27					

Note: To determine if non-uniform or concentrated loads can be accommodated, contact the Block Joist Company.

\* 8 x 8 x 16-in. block must weigh 30 lb or less.

† Loads for spans 18 ft or longer are shown for interpolation purposes only.

\*\* Governed by shear capacity



**TABLE 2.**  
**ALLOWABLE SUPERIMPOSED UNIFORM LOAD, psf, FOR 3-HOUR FIRE RATING**  
**16 IN. BLOCK\* JOIST\*\* SYSTEM FOR VARIOUS SPANS (1 1/2" CONCRETE TOPPING)†**

Reinforcing Bars per Joist	Span, ft																
	8 or Less	9	10	11	12	13	14	15	16	17							
1 #4	173	125	91	65	46	31											
1 #5	290	218	166	127	98	76	58	43	31	21							
2 #4	292**	241	184	143	111	87	67	51	39	28							

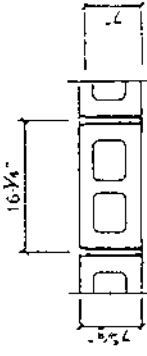
Note: To determine if non-uniform or concentrated loads can be accommodated, contact the Block Joist Company.

\* 8 x 8 x 16-in. block must weigh 30 lb or less.

† For concrete toppings thicker than 1 1/2" deduct 6 psf from the tabulated safe superimposed load for each additional 1/2" of topping.

TABLE 3.

ALLOWABLE SUPERIMPOSED UNIFORM LOAD, psf, FOR NON-COMBUSTIBLE  
16-in. BLOCK\* JOIST™ SYSTEM FOR VARIOUS SPANS



Average Block Weight lb	Span, ft									
	12 or Less	13	14	15	16	17	18†	19†	20†	
30 or Less	186**	159	131	109	91	76	64	53	44	
30 to 35	180**	154	126	104	86	71	59	48	39	
35 to 40	174**	149	121	99	81	66	54	43	34	

Note: To determine if non-uniform or concentrated loads can be accommodated, contact the Block Joist Company.

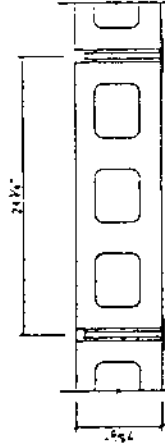
\* 8 x 8 x 16-in. block

† Joists 18 ft or longer are made of steel with a yield stress of 50 ksi.

\*\* Governed by shear capacity

TABLE 4.

ALLOWABLE SUPERIMPOSED UNIFORM LOAD, psf, FOR NON-COMBUSTIBLE  
24-in. BLOCK JOIST™ SYSTEM FOR VARIOUS SPANS



Joist Yield Stress	Span, ft																	
	10 or Less	11	12	13	14	15	16	17	18	19	20							
36 ksi	195	155	125	101	82	67	55	44	36	29	22							
50 ksi	280	225	184	151	126	105	88	74	62	52	44							

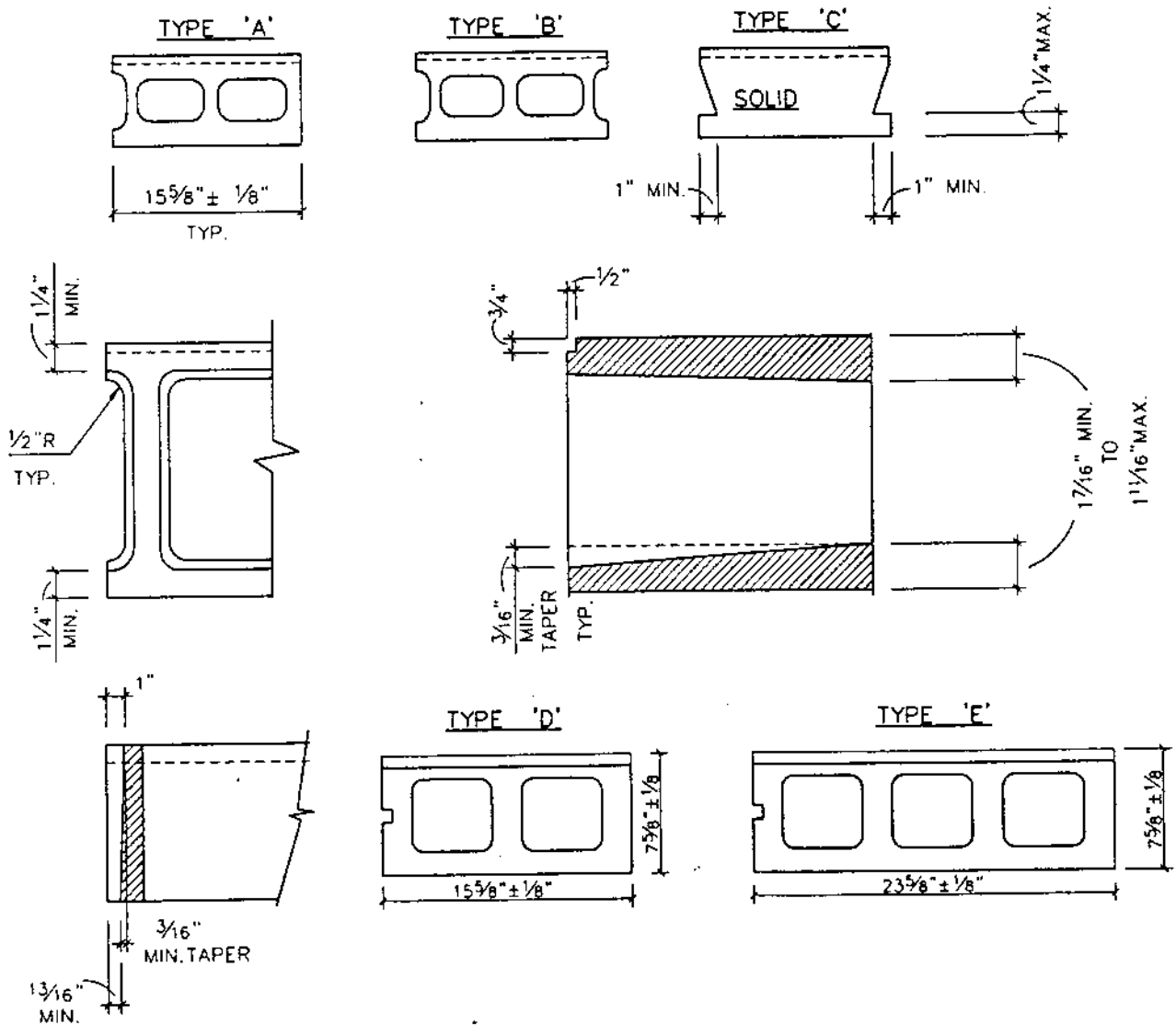
Note: To determine if non-uniform or concentrated loads can be accommodated, contact the Block Joist Company.

Block is 8 x 8 x 24-in. Maximum block weight shall be 42 lbs.

FIGURE NO. 2 - Critical Dimensions of Blocks Used in the Block Joist™ System

I. For Fire Rated Assemblies (Load Tables 1 and 2):

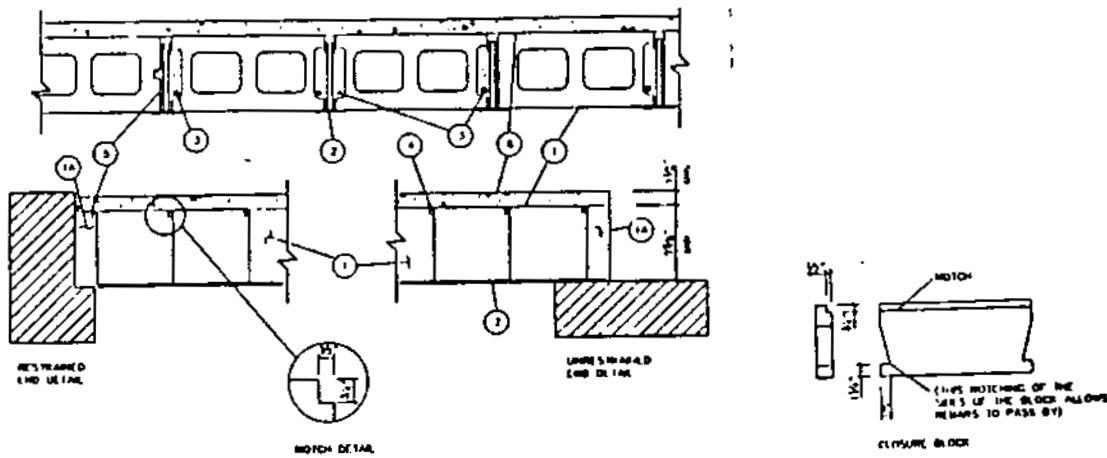
- Type A - For assemblies with only one reinforcing bar per Block Joist™, blocks with end flanges on only one end may be used.
- Type B - For assemblies with two reinforcing bars per Block Joist™, blocks with end flanges on both ends must be used. Type B blocks may also be used for assemblies with one reinforcing bar per joist, and, to save grout, every other block can be a standard or sash block.
- Type C - When solid blocks are used as end closures, they must provide space for the reinforcing bars to pass by without changing the elevation of the bars.



II. For Non-Combustible Assemblies (Load Tables 3 and 4):

Standard blocks with flat ends or sash blocks (Types D and E) slotted at one flat end with a sash groove require less grout than blocks with end flanges and are normally preferred over Types A and B. Solid end closures do not have to be notched to provide space for reinforcing bars in non-combustible applications.

**FIGURE NO. 3 - Design No. K907 - 16 inch Block Joist System**  
 Restrained Assembly Ratings - 2 and 3 Hr (See Item 6)  
 Unrestrained assembly Ratings - 2 and 3 Hr (See Item 6)



1. Concrete Blocks\* - Various shapes, Classification D-2 (2h) Two core units of curved or flat end types measuring nom 8 x 8 x 16 in. Solid blocks nom 2 x 8 x 16 in., and 4 x 8 x 16 in. Blocks supported on bottom plate of steel joists. Blocks are notched and cut at corners to provide for passage of cement-sand grout (Item 5) into joints at joist location and for filling the voids surrounding the reinforcing bars (Item 3) to allow for their full embedment and cover.

See Concrete Blocks (CAZT) category in 1995 Underwriters Laboratories Fire Resistance Directory for list of eligible manufacturers.

- 1A. Closure Blocks\* - Lightweight masonry solid blocks, ASTM C90 precut to shape. Thickness ranging from 1-5/8 to 3-5/8 in.

See Concrete Blocks (CAZT) category in 1995 Underwriters Laboratories Fire Resistance Directory for list of eligible manufacturers.

2. Steel Forming Members\* - Steel forming members (ASTM A36) intended to support blocks during construction. Noncomposite steel joists 7 in. deep, spans ranging between 6 and 19 ft. Joists spaced at 16.67 in. in OC. Min bearing 2 in. on steel and concrete, 3 1/4 in. on solid masonry.

Block Joist Co.

3. Reinforcing Steel - Nos. 4 and 5, Grade 60. Reinforcing steel inserted into the voids between blocks, then covered with cement-sand grout filled inside through the end joints of the blocks at the steel joist locations. Reinforcing steel is designed in accordance with ACI Building Code Requirements to develop the required floor capacity to support its self weight as well as the superimposed vertical loads without any contribution from the steel forming members. (See Tables 1 and 2.)
4. Wire Reinforcement - For lateral bracing of the block-joist floor. W1.7 (0.148 in. diam) wire placed inside the pre-cut grooves at the sides of the blocks perpendicular to the steel joists. The wire ends may be spliced at the centerline of the floor and elsewhere overlapping 8 in. min. The outer ends of the wire folded and placed 4 in. down between the top plates of the joists.
5. Cement-Sand Grout - Consisting of 2-1/2 parts of masonry sand (ASTM C144) and 1 part of Portland Cement Type I by bulk volume, mixed with 10 gal of water per bag of cement. Min 2500 psi compressive strength and 100 plus or minus pcf unit weight. Grout poured over the entire floor to fill the joints between the concrete blocks, the steel joists covering the wire reinforcement, and the void space around the reinforcing steel, to secure embedment and cover for the reinforcement.
6. Concrete Topping - For 3 h ratings, min thickness 1-1/2 in. Normal weight or lightweight aggregate, min 3000 psi compressive strength, and 100 to 153 pcf unit weight.

\*Bearing the UL Classification Marking

11. PERIOD OF ISSUANCE

SEE CURRENT SBCCI PST & ESI EVALUATION REPORT LISTING FOR STATUS OF THIS EVALUATION REPORT.

For information on this report contact:  
 Gary G. Nichols, P.E.  
 205/599-9800