

<b>DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT</b> <b>Housing - Federal Housing Commissioner</b>		<b>STRUCTURAL ENGINEERING</b> <b>BULLETIN NO. 1101 Rev. 6</b> (Supersedes issue dated May 25, 2000)
<b>TO: DIRECTORS, SINGLE FAMILY HOCs</b> <b>DIRECTORS, MULTIFAMILY HUBs</b>		<b>ISSUE DATE</b> August 30, 2006
		<b>REVIEW DATE</b> August 30, 2009
<b>SUBJECT:</b>	<b>1. Item Description</b> Shop Fabricated Foam Core Sandwich Panels	
	<b>2. Name and address of Manufacturer</b> Korwall Industries, Inc. 326 N. Bowen Road Arlington, TX 76012	

This Structural Engineering Bulletin (SEB) should be filed with other SEBs and related Bulletins on materials or products as required by prescribed procedures.

The technical description, requirements and limitations expressed herein do not constitute an endorsement or approval by the Department of housing and Urban Development (HUD) of the subject matter, and any statement or representation, however made, indicating approval or endorsement by HUD is unauthorized and false, and will be considered a violation of the United States Criminal Code, 18 U.S.C. 709.

**NOTICE: THIS BULLETIN APPLIES TO DWELLING UNITS BUILT UNDER HUD HOUSING PROGRAMS. NON-HUD-INSURED UNITS MAY OR MAY NOT BE IN CONFORMINTY WITH THE REQUIREMENTS OF THE HUD MINIMUM PROPERTY STANDARDS.**

Any reproduction of this Bulletin must be in its entirety and any use of all or any part of this Bulletin in sales promotion or advertising is prohibited.

**1 General:**

This Bulletin sets forth specific requirements under the Technical Suitability of Products Program for determining the eligibility of housing to be constructed under HUD mortgage insurance, or other HUD housing programs.

**2. Scope:**

This Bulletin applies only to the structural features of this method of construction. Final determination of eligibility is made by the appropriate HUD Field Office. Other factors considered by the Field Office will be valuation, location, architectural planning and appeal, mechanical equipment, thermal characteristics, and market acceptance. Consideration is also necessary to determine whether a specific property will qualify under the specific HUD program, when constructed according to the method outlined in this Bulletin, and where the structure is to be located.

In geographical areas subject to hurricanes, earthquakes, or other severe conditions affecting dwelling structures, the HUD Office shall require additional safeguards in proposed designs, when necessary.

3. Minimum Property Standards (MPS):

Compliance with HUD MPS will be determined by the HUD Office on the same basis as submissions involving conventional construction, except for the special features described in this Bulletin.

4. Inspection:

Field compliance inspections covering conventional items of construction and any special features covered in this Bulletin shall be made in accordance with prescribed procedures.

The appropriate HUD Office shall furnish a copy of a HUD field inspection report to Headquarters, FHA Standards, Office of Manufactured Housing Programs, when there is:

- a. Evidence of noncompliance with portions of the system of construction described in this Bulletin.
- b. Faulty shop fabrication, including significant surface defects.
- c. Damage to shop fabricated items or materials due to improper transportation, storage, handling, or assembly.
- d. Unsatisfactory field workmanship or performance of the product or system.
- e. Any significant degradation or deterioration of the product or evidence of lack of durability or performance.

Periodic plant inspections will be made by HUD designated representatives or State Agency personnel in accordance with their prescribed procedures. Factory inspection reports shall be submitted to HUD Headquarters, upon request.

5. Certification:

The manufacturer named in this Bulletin shall furnish the builder with a written certification stating that the product has been manufactured in compliance with the HUD Minimum Property Standards (MPS), except as modified by this Bulletin. The builder shall endorse the certification with a statement that the product has been erected in compliance with HUD MPS, except as modified by this Bulletin, and that the manufacturer's certification does not relieve the builder, in any way, of responsibility under the terms of the Builder's Warranty required by the National Housing Act, or under any provisions applicable to any other housing program. This certification shall be furnished to the HUD Office upon completion of the property.

OUTLINE DESCRIPTION, CATEGORY II CONSTRUCTION:

GENERAL:

Shop fabricated foam core sandwich roof, exterior wall, and floor panels for one- and two-story dwellings are furnished in this method of construction. Panels consist of waferboard or plywood skins and polystyrene foam cores. Panels are transported to the building site where they are assembled with conventional construction.

Conventional construction may include various types of interior and exterior finish materials. All materials and methods of installation shall be in accordance with HUD Minimum Property Standards (MPS), Use of Materials Bulletin (UM), and Materials Releases (MR), except as may be specially noted herein. Plumbing, heating and electrical systems are field installed.

This Bulletin is based on a structural review of Korwall Industries, Inc. (The Manufacturer), panels for one- and two-story dwellings. Foundation design and nonstructural items (such as architectural, plumbing, heating and electrical features) are not covered by this Bulletin.

SPECIFICATIONS:

Form HUD-92005, "Description of Materials" specifying only the structurally related items (Nos. 1 to 12, 14, 26 and 27), as originally submitted for technical suitability determination, describes the materials that shall be used in construction of housing units under this system of construction. Form HUD-92005, furnished with each application for use under HUD housing programs, shall include as a minimum the same structural materials.

DRAWINGS:

The following drawings by Korwall Industries, Inc. shall be considered an integral part of this Bulletin:

<u>Drawing No.</u>	<u>Date</u>	<u>Description</u>
8822	3/01/85	Panel Details
Figure 1	2/22/84	Panel Details
Page 2	1/07/86	Through Sections
S2	1/07/87	Framing Details

The Builder shall submit construction drawings to the HUD Office with each application under HUD housing programs, which shall include the same or similar structural features as shown on the drawings listed above. Copies of these listed drawings shall also be furnished to the HUD Office by the Builder upon request.

**DESIGN AND CONSTRUCTION REQUIREMENTS:**

**Design Loads (Allowable Superimposed Loads):** The method of construction described in this Bulletin is based on the following allowable Superimposed Load Tables:

Uniform Load	Span	Deflection/Span Ratio (short-term load test)
<b>3 ½" Wall Panels</b>		
3,190 plf Compression (axial) load	--	--
27.5 psf Transverse (lateral) load	8'	L/480
<b>5 ½" Roof Panels</b>		
58.0 psf	10'	L/286
39.0 psf	12'	L/240
24.5 psf	14'	L/240
<b>7 ½" Roof Panels</b>		
75.0 (1) psf	10'	L/360
65.0 (1) psf	12'	L/300
51.0 (1) psf	14'	L/240
34.0 (1) psf	16'	L/240
24.0 (1) psf	18'	L/240
<b>7 ½" Floor Panels</b>		
54.0 psf	12'	L/360
<b>11 ¼" Roof Panels</b>		
90.0 (1) psf	10'	L/750
75.0 (1) psf	12'	L/626
56.5 (1) psf	14'	L/530
43.5 (1) psf	16'	L/457
34.0 (1) psf	18'	L/410
27.5 (1) psf	20'	L/370
<b>11 ¼" Floor Panels</b>		
56.5 (1) psf	14'	L/525

- (1) Design load limitations: Foam core roof and floor panels under significant long-term sustained loads may be subject to creep-deflection or creep-rupture. Panel Loads noted (1) are less than short-term load test. These allowable design loads should be increased only when they are verified by appropriate creep-deflection and creep-rupture tests and engineering analysis.

Framing of Loadbearing Walls: Wood-to-wood connections shall be provided between bearing walls and roof/ceiling or floor construction. Floor covering, including carpeting and vinyl tile, shall not be continued under loadbearing walls.

Roof Construction: Trussed rafters shall be designed and constructed in accordance with ANSI/TPI 1-1995 Standard (American National Standards Institute and Truss Plate Institute). "Design Specification for Metal Plate Connected Wood Construction."

FIRE PROTECTION:

The polystyrene foam core shall have a flame spread rating of not more than 75, and a smoke development rating of not more than 450 when tested in accordance with ASTM E 84. All interior ceiling and wall surfaces are covered with 1/2" thick gypsum wallboard or equivalent material with a 15 minute finish (fire) rating. Floor finish shall be a minimum of 5/8" (5/16" + 5/16") blandex or plywood.

MANUFACTURING PLANT:

Housing units covered under this Bulletin will be produced in the following plant:

Korwall Industries, Inc.  
326 N. Bowen Road  
Arlington, TX 76012  
(817) 277-6741

The Ft. Worth HUD Office or HUD designated representatives will inspect this plant in accordance with prescribed procedures.

QUALITY CONTROL:

The HUD designated representatives or State Agency (in Category III States) personnel, in whose jurisdiction the manufacturing plant is located, reviews and approves plant fabrication procedures and quality control program to ensure compliance with HUD approved plans and specifications. The quality control program shall include field erection or supervision by Korwall Industries, Inc.

RECORD OF PROPERTIES:

The manufacturer shall provide a list of the first ten properties in which the component or system described in this Bulletin is used. The list shall include the complete address, or description of location, and approximate date of installation or erection. Failure of the manufacturer to provide HUD with the above information may result in cancellation of this Bulletin.

NOTICE OF CHANGES:

The manufacturer shall inform HUD in advance of changes in production facilities, transportation, field erection procedures, design, or of materials used in this product. Further, the manufacturer must inform HUD of any revision to corporate structure, change of address or change in name or affiliation of the prime manufacturer. Failure of the manufacturer to notify HUD of any of the above changes may result in cancellation of this Bulletin.

EVALUATION:

This SEB shall be valid for a period of three years from the date of initial issuance or most recent renewal or revision, whichever is later. The holder of this SEB shall apply for a renewal or revision 90 days prior to the Review Date printed on this SEB. Submittals for renewal or revision shall be sent to:

U. S. Department of Housing and Urban Development  
FHA Standards, Office of Manufactured Housing Programs  
451 7<sup>th</sup> Street, SW, Room 9168  
Washington, DC 20410-8000

Appropriate User Fee shall be sent to:

U. S. Department of Housing and Urban Development  
Miscellaneous Income – Technical Suitability of Products Fees  
Bank of America  
P. O. Box 198762  
Atlanta, GA 30384-8762

The holder of this SEB may apply for revision at any time prior to the Review Date. Minor revisions may be in the form of a supplement.

If the Department determines that a proposed renewal or supplement constitutes a revision, the appropriate User Fee for a revision will need to be submitted in accordance with Code of Federal Regulations 24 CFR 200.934, "User Fee System for the Technical Suitability of Products Program", and current User Fee Schedule.

CANCELLATION:

Failure to apply for a renewal or revision shall constitute a basis for cancellation of the SEB. HUD will notify the manufacturer that the SEB may be canceled when:

- 1 conditions under which the document was issued have changed so as to affect production of, or to compromise the integrity of the accepted material, product, or system,
2. the manufacturer has changed its organizational form without notifying HUD, or
- 3 the manufacturer has not complied with responsibilities it assumed as a condition of HUD's acceptance.

However, before cancellation, HUD will give the manufacturer a written notice of the specific reasons for cancellation, and the opportunity to present views on why the SEB should not be canceled. No refund of fees will be made on a canceled document.

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This Structural Engineering Bulletin is issued solely for the captioned firm, and is not transferable to any person or successor entity.

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