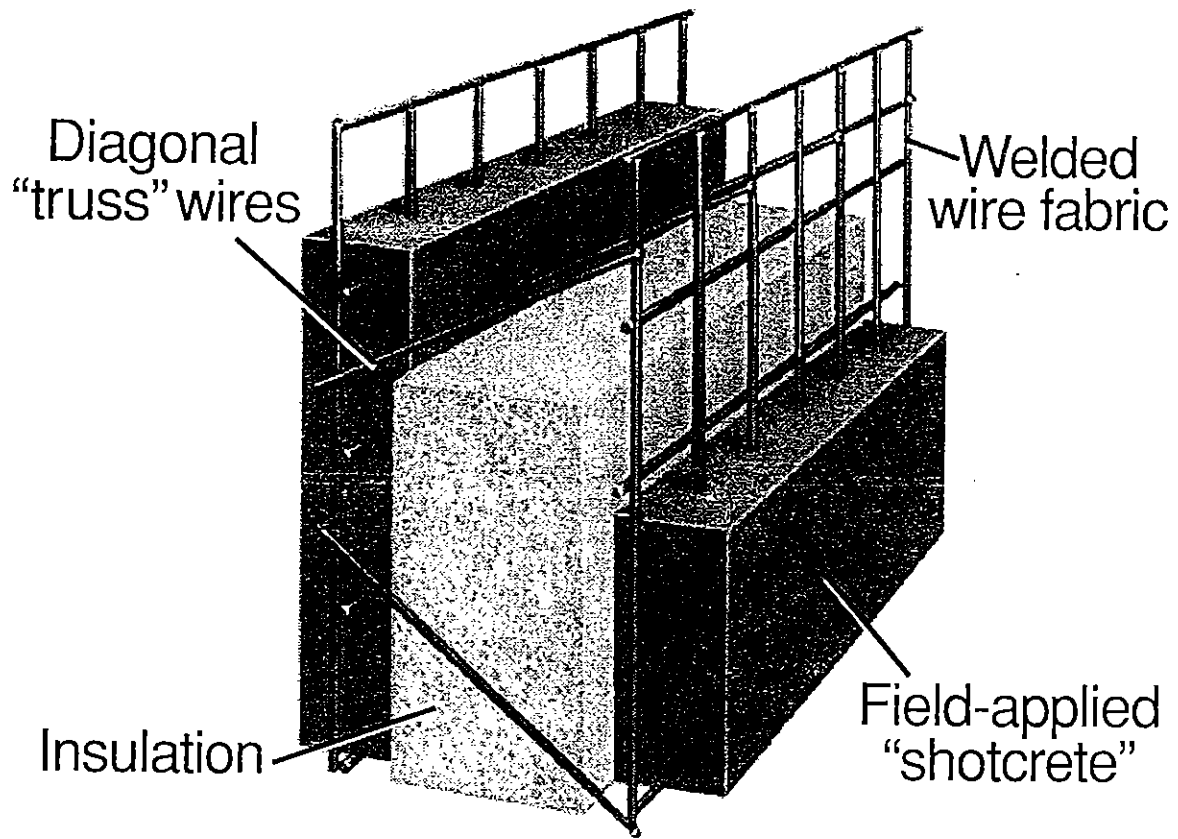


SPECIFICATIONS  
FOR  
3-D PANEL  
3-D PANEL SYSTEM



"FORMLESS CONCRETE CONSTRUCTION"

## STRUCTURAL SPECIFICATIONS ICS 3-D PANEL SYSTEM

### PART 1 - DESCRIPTION

The shop-fabricated 3-D panels consist of a three dimensional welded wire space frame utilizing a truss concept for stress transfer and stiffness. Each surface of the wire space frame has a 2 inch square welded mesh pattern of longitudinal and transverse wires of the same diameter (gauge 11, 12.5 or 14).

Individually welded internal strut wires or diagonals extend through the panel core between each surface. These galvanized strut wires are welded continuously in the required spacing so they form, with the welded wire fabric, into a triangulated truss system which greatly increases the panel strength.

When welded in place, these strut wires pierce through a modified expanded polystyrene core placed between the two layers of welded wire fabric, maintain the required distance apart and provide the shear transfer between the panel surfaces.

The modified expanded polystyrene core (minimum density 0.9 pounds per cubic foot) is held ½" or ¾" from each face of the wire frame to permit the wire to be embedded in an application of approximately 1" - 2" thick concrete mixture with 2,500 psi minimum.

### GUIDELINE SPECIFICATIONS FOR ICS 3-D PANELS

#### PART 2 - SCOPE

2 - 1 The Contractor Shall:

- A. Furnish all labor, materials, equipment, supervision and services necessary for the installation of the ICS 3-D Panel Building System in accordance with these specifications and applicable drawings. The 3-D panels shall be manufactured only by ICS 3-D Panel Works, Inc., and marketed only by ICS 3-D Panel Works, Inc. or their authorized representatives.
- B. Fully coordinate the 3-D panel building system with the other structural, mechanical, electrical and architectural components of the building or structure.

#### PART 3 - TYPICAL SPECIFICATION

3 - 1 Codes: All panel and mesh fabrication shall be in strict accordance with the ICS 3-D Panel Works, Inc. Manufacturing Practice and Quality Assurance Procedures. Structural and fire characteristics shall meet the requirements of the Southern Building Code Congress International, Inc. (SBCCI), the Standard Building Code (SBC), the Council of American Building Code Officials (CABO), the International Conference of Building Officials (ICBO), Building Officials and Code Administrators International, Inc. (BOCA) and Uniform Building and Mechanical Codes (UBC).

3 - 2 Design:

- A. All design shall be in accordance with that specified in the ICS 3-D Panel Works, Inc. literature. Concrete design shall be in accordance with ACI 318-71 or ACI 506R-85 and ACI 506.2-77 (Revised 1983). Steel design shall be in accordance with the American Institute of Steel Construction Specification for Design Fabrication and Erection of Structural Steel. Calculations for loads and loading conditions shall be based on Chapter 12 of the Standard Building Code. The calculations shall confirm that the panel loads do not exceed those allowed by Section IV of the Southern Building Code Congress International, Inc. Report No. 9019.

- B. Modified expanded polystyrene should be designed in accordance with American Society of Testing and Materials C578-87a (formerly HH-I-524C).

3 - 3 Qualifications:

- A. All materials used in fabrication and methods of fabrication shall comply with the requirements of the ICS 3-D Panel Works, Inc. Manufacturing Practice and Quality Assurance Procedure.
- B. All field erection, including panel splice fabrication, shall comply with the Instructions for Installing 3-D Panel System.

3 - 4 Plans: The manufacture's published installation instructions plus the plans and specifications shall be strictly adhered to and a copy of these instructions shall be available at all times on the job site installation.

3 - 5 Storage: 3-D construction panels can be stored out of doors on well drained flat surfaces without protective covering. However, due to their light weight, care must be taken to prevent damage from winds. Care must be taken not to store any objects on top of the panels that would break the welds, puncture the polystyrene or warp the panels. Improper storage could result in subsequent alignment problems.

#### PART 4 - PRODUCTS

4 - 1 Materials:

The ICS 3-D Panel consists of a three-dimensional welded wire space frame, integrated with a modified expanded polystyrene insulation core. Each panel consists of the following:

- A. Type I expanded polystyrene foam core with a minimum density of 0.9 pounds per cubic foot; a flame spread index of 25 or less and a smoke developed rating of 450 or less when tested in accordance with ASTM E84; a potential heat of 6,000 BTU/sq. ft. or less when tested in accordance with NfiPA259. Thicknesses of panels can vary.
- B. The reinforcement module (RIM) is manufactured with highly automated equipment. The welded wire fabric conforms to ASTM A185. The diagonal cross wires, as well as wire used in the fabrication of the welded wire fabric, conform to ASTM A82. Different configurations of RIM are manufactured depending on the end use.

#### PART 5 - PERFORMANCE CHARACTERISTICS

5 - 1 Sizes:

- A. Panels are 4 feet wide and can be produced in lengths from 8 feet to 25 feet in increments of 8". Panel thickness ranges from 3¼ " to 5¼" depending on thickness of polystyrene specified.
- B. Dimensional tolerance - the tolerances shall comply with values listed in the manufacturers quality assurance procedures.

Note: Overall length            ± ¼" - 12' L or less,    ± ½" - 12' L or more  
Overall width                ± ⅛"  
Overall thickness            ± ¼"  
Location of truss wires within units    ± ½"

5 - 2 Structural Testing:

Testing values of each panel shall meet or exceed those loads stated on Manufacturer's Load Design Charts. These charts were developed from results of tests conducted in accordance with ASTM E-72 and with provisions of ACI-318.

5 - 3 Fire Resistance:

Based on fire resistance calculations and the results of the Modified E-108 Fire Test performed at Southwest Research Institute (SW RI Project No. 01-2601-407) the following fire resistance ratings may be assigned to the 3-D panels provided carbonate shotcrete is applied:

	<u>Fire Resistance</u>	<u>Polystyrene Core</u>	<u>Concrete Each Side</u>
Standard Panel	1½ Hrs.	2½"	1½"
Light Panel	1½ Hrs.	1½"	1½"
Maximum Panel	1¾ Hrs.	2½"	1¾"
2 Hour Section	2 Hrs.	2½"	2"
3 Hour Section	3 Hrs.	2½"	2½"
4 Hour Section	4 Hrs.	2½"	3¼"

**PART 6 - INSTALLATION**

6 - 1 Erection:

- A. Prior to erection the contractor or his representative shall inspect the site and report to the construction manager any condition that may affect the proper installation of the panels. Installation should not proceed until these conditions are corrected.
- B. 3-D Panel installation shall be carried out in strict accordance with the latest edition of the Manufacturer's Instructions for 3-D Panel System Erection. For any field deviation from standard load design, values shall be calculated and approved and signed or sealed by a qualified architect/engineer.

6 - 2 Concreting Practice:

Concrete can be applied by several methods; however, all concrete shall meet a minimum of 2,500 psi. All shotcrete construction, including materials, equipment, preliminary preparation, proportioning, shotcrete placement, curing and quality control shall comply with ACI 506R-85 Guide to Shotcrete.

6 - 3 Testing:

- A. An important aspect of quality control is the physical testing of the concrete during and after placement. ACI 506.2 describes in full the procedures to be followed in construction testing.
- B. Normal testing ages for compressive strength are 7 and 28 days; however, shorter periods may be required under particular application or conditions.