CONFORM® - Code Compliance

International Building Code 2018

CONFORM® is a pre-finished, permanent formwork for cast-in-place concrete wall construction. A concrete wall with CONFORM consists of a non-combustible concrete wall, an interior face with a combustible finish and an exterior face with a combustible finish that may include polyurethane insulation (CONFORM CF8i). The concrete wall may be a bearing or non-bearing wall and may be steel reinforced concrete or plain concrete.

There are many different types of buildings and occupancies where this wall conforms to the requirements of the 2018 International Building Code (IBC), USA. The following is a summary of code articles that may be applicable depending on the building type and occupancy.*(1)*

Types of Construction

602.1 Construction Classification - General

Concrete walls with CONFORM formwork are permitted for Type I, II, III, IV and V construction in accordance with Table 601 and 602, provided that the fire resistance rating, as per 703.2, is not less than specified.

603.1.7 Combustible Material in Type I and II Construction

CONFORM is an allowable combustible material permitted in Type I and II construction since the interior wall finishes are in accordance with Section 803.

Fire-Resistance Ratings and Fire Tests

703.2 Fire Resistance Ratings

Concrete walls with CONFORM CF6, CF8 or CF8i formwork meet the requirements for a 2-hr fire-resistance rating. A load bearing concrete wall with CONFORM CF6 formwork was tested in conformance with ASTM E119 (UL263) (CAN/ULC-S101) for a 2-hr fire-resistance rating. *(8)*

Based on the ASTM E119 (UL263)(CAN/ULC-S101) test, fire consultant, Locke MacKinnon Domingo Gibson & Associates Ltd. (LMDG) determined that concrete walls with CONFORM CF6, CF8 and CF8i formwork meet the requirements for a 2-hr fire-resistance rating. *(9)*

703.5.2 Noncombustibility Tests - Composite Materials

Concrete walls with CONFORM comply with the requirements for noncombustible construction in Types I, II, III and IV construction. The walls have a structural base of concrete, that is a noncombustible material. The CONFORM surface is less than 0.125" thick and has a Flame Spread Index (FSI) not more than 25 when tested in accordance with ASTM E84 (UL723). *(2)*

714. Penetrations

Fire stopping shall be provided as required where through penetration items such as pipes, conduits or cables penetrate the CONFORM wall. At the penetration, the combustible finish CONFORM PVC material, shall be removed where any fire stop materials are required to overlap the faces of the concrete wall.

718.5 Combustible Materials in Concealed Spaces in Type I or II Construction

Exposed CONFORM is permitted in a concealed space as permitted by 718.5.1, and 718.5.3 of the IBC and Section 602 of the International Mechanical Code.

Interior Finishes

803.1.1 Interior Wall and Ceiling Finish Materials

CONFORM is a Class A material, for exposed interior wall finishes. CONFORM tested in accordance with ASTM E84, indicated that the Flame Spread Index (FSI) is not more than 25 and the Smoke Developed Index (SDI) is not more than 450. *(2)*

Exterior Walls

1403.2 Weather Protection

Concrete walls with CONFORM may be left exposed to the exterior without any additional water resistive barrier. An exterior wall envelope with CONFORM resisted water penetration when tested in accordance with ASTM E331. *(4)*

1406.2.1 Combustible Exterior Wall Coverings - Ignition Resistance

CONFORM complies with the requirements for exterior wall coverings where the fire separation distance is 5 feet or less. CONFORM was tested in accordance with NFPA 268 and did not exhibit sustained flaming. CONFORM may be used with any fire separation distance.*(5)*

Damp proofing and Waterproofing

1805.2 Damp proofing

For below grade installations, CONFORM formwork provides damp proofing for the concrete wall. A concrete wall with CONFORM was tested to resisted water penetration under hydrostatic pressure. *(10)*

Foam Plastic Insulation

2603.3 Surface Burning Characteristics

The polyurethane foam in CONFORM CF8i formwork, tested in accordance with ASTM E84, indicated that FSI is not more than 25 and SDI is not more than 450. *(3)*

2603.4 Thermal Barrier

The polyurethane foam in CONFORM CF8i formwork is separated from the interior of the building by the 6" concrete wall which meets the requirements of ASTM E119 (CAN/ULC-S101) for a 15-minute fire rating. *(8)*

If the insulated face of the CONFORM CF8i formwork is exposed to an adjacent space in a building, for example an insulated exterior wall face extending below a low roof, it must be protected by an approved thermal barrier of ½" gypsum wallboard on light gauge steel framing or by another equivalent thermal barrier tested in accordance with NFPA 275 and meeting both the Temperature Transmission Fire Test and the Integrity Fire Test.

2603.5 Exterior Walls of Buildings of Any Height

Exterior walls with insulated CONFORM CF8i formwork comply with the requirements for Types I, II, III and IV construction.

2603.5.1 Fire-Resistance Rated Walls

A load bearing concrete wall with CONFORM CF6 formwork was tested in conformance with ASTM E119 (CAN/ULC-S101) and meets the requirements for a 2 hr fire rating. *(8)*

Based on a ASTM E119 (CAN/ULC-S101) test, fire consultant, Locke MacKinnon Domingo Gibson & Associates Ltd. (LMDG) determines that walls with CONFORM CF8i formwork meet the requirements for a 2 hr fire rating. *(9)*

2603.5.2 Thermal Barrier

The exterior insulation in CONFORM CF8i formwork is separated from the interior of the building by the cast-in-place concrete and meets the requirements of IBC 2603.4.1.1. *(8)*

2603.5.3 Potential Heat

The polyurethane foam in CONFORM CF8i formwork was tested in conformance with NFPA 259 and meets the requirements of this section. *(6a) (6b)*

2603.5.4 Flame Spread and Smoke-Developed Indexes

The polymer facing and the polyurethane foam in CONFORM CF8i formwork tested in accordance with ASTM E84 indicated that FSI is not more than 25 and Smoke Developed Index SDI is not more than 450. *(2) (3)*

2603.5.5 VERTICAL AND LATERAL FIRE PROPOGATION

A concrete wall with the insulated CONFORM CF8i formwork was tested in accordance with NFPA 285 and complies with the acceptance criteria. *(7)*

2603.5.6 Label Required

The components of CONFORM CF8i formwork are labeled in compliance with this section.

2603.5.7 Ignition

CONFORM CF8i formwork was tested in accordance with NFPA 268 and did not exhibit sustained flaming. *(5)*

Structural Requirements

1901.2 Plain and Reinforced Concrete

Cast-in-place, structural concrete walls constructed using CONFORM formwork shall be designed in accordance with IBC Chapter 19 and ACI 318 "Building Code Requirements for Structural Concrete" and by a Professional Engineer skilled in such designs and licensed to practice under the appropriate legislation.

References:

(1) "CONFORM" Compliance with International Building Code, 2009 Edition by Leber Rubes Inc., File No. 2006-461, June 23, 2009.

(2) ASTM E84, Surface Burning Characteristics of CONFORM CF4 Concrete Filled by Exova, Report No. 10-002-698(A3), December 6, 2010.

(3) ASTM E84, Surface Burning Characteristics of "FE244 / FE800 (HFC-134a Blown)" Insulation by Exova, Report No. 09-002-946(A), January 20, 2010.

(4) ASTM E331, Water Penetration Test on a Vinyl/Concrete Wall with Installed Fixed Vinyl Window" by Intertek ETL SEMKO, Report No. 3077903-1, January 27, 2006.

(5) NFPA 268, Plastic Concrete Form Wall Assembly, Standard Test Method for Determining Ignitibility of Exterior Wall Assemblies using a Radiant Heat Energy Source by Southwest Research Institute, Project No. 01.10933.01.704, January 2005

(6a) NFPA 259, "FE-244S Foam", Standard Test Method for Potential Heat of Building Materials by Southwest Research Institute, Project No. 01.10934.01.605a, March 2005.

(6b) NFPA 259, "Royalloy B", Standard Test Method for Potential Heat of Building Materials by Southwest Research Institute, Project No. 01.10934.01.605b, March 2005.

(7) NFPA 285, Royal Building Technologies RBS8i Wall System, Intermediate-Scale Multistorey Test Procedure by Southwest Research Institute, Project No. 01.11604.01.003, February 2006.

(8) ASTM E119 (CAN/ULC-S101-M89), Standard Methods of Fire Endurance Tests of Building Construction and Materials by Underwriters' Laboratories of Canada, File No. CR2598, April 22, 1997.

(9) Fire Resistance Evaluation - Royal Building Systems by Locke MacKinnon Domingo Gibson & Associates Ltd. (LMDG), File No. 97-172, August 26, 1997.

(10) Below Grade Water Resistance, Evaluation of Water Tightness of the Royal Basement Wall System by Trow Ltd., Report No. BR-06542-C/BSR, August 26, 1997.

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