Masonry in the Fast World of BIM
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IKERD
People | Building | Clarity
Major Take Away

“Everything should be made as simple as possible, but not one bit simpler.”

Albert Einstein
BIM Forum Level of Development
Level of Development Specification

Scope cannot address all of BIM
There is NO LOD of a whole model.
LOD does not always match design phase.
2008 - American Institute of Architects (AIA) First Published definition for 100, 200, 300 & 400 in 2008 E202.
2009-10 LOD 350 was authored and first presented at Autodesk University sessions by Ikerd.
2011 - BIM Forum LOD Taskforce formed
2013 – BIM Forum published the first LOD Spec ratifying LOD 350
Guide, Instructions and Commentary to the 2013 AIA Digital Practice Documents

AIA Document E203™—2013, Building Information Modeling and Digital Data Exhibit
AIA Document G201™—2013, Project Digital Data Protocol Form
AIA Document G202™—2013, Project Building Information Modeling Protocol Form
LOD 100

The Model Element may be graphically represented in the Model with a symbol or other generic representation, but does not satisfy the requirements for LOD 200. Information related to the Model Element (i.e. cost per square foot, tonnage of HVAC, etc.) can be derived from other Model Elements.

**BIMForum Interpretation:** LOD 100 elements are not geometric representations. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.
LOD 200

The Model Element is graphically represented within the Model as a generic system, object, or assembly with approximate quantities, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

BIMForum Interpretation: At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.
LOD 300

The Model Element is graphically represented within the Model as a **specific system**, object or assembly in terms of quantity, size, shape, location, and orientation. Non-graphic information may also be attached to the Model Element.

**BIMForum Interpretation:** The quantity, size, shape, location, and orientation of the element as designed can be **measured directly from the model without referring to non-modeled information** such as notes or dimension call-outs.
The Model Element is graphically represented within the Model as a specific system, object, or assembly in terms of quantity, size, shape, location, orientation, and **interfaces with other building systems**. Non-graphic information may also be attached to the Model Element.

**BIMForum Interpretation:** Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include **such items as supports and connections**. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
LOD 400: Fabrication Assemblies

The Model Element is graphically represented within the Model as a specific system, object or assembly in terms of size, shape, location, quantity, and orientation with detailing, fabrication, assembly, and installation information. Non-graphic information may also be attached to the Model Element.

BIMForum Interpretation: An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
Cold Formed Metal Framing (CFMF) BIM

C1010 — Interior Wall (Cold-Form Metal Framing)

100  See 1010

200  See 2010

300  See 3010

Cold formed metal framing is developed with sufficient elements that support the fabrication of the CFMF system.

Image notes:
1) Connection content is development in the wall elements. This includes but is not limited to fasteners, clips, and other related hardware.
2) Cladding and sheathing are not shown for clarity in this image.
LOD 200
LOD 350
LOD 400
LOD Specification
Masonry LOD 100

• Symbol

**BIMForum Interpretation:** LOD 100 elements are **not geometric representations**. Examples are information attached to other model elements or symbols showing the existence of a component but not its shape, size, or precise location. Any information derived from LOD 100 elements must be considered approximate.
Masonry LOD 200

- Approximate

**BIMForum Interpretation**: At this LOD elements are generic placeholders. They may be recognizable as the components they represent, or they may be volumes for space reservation. Any information derived from LOD 200 elements must be considered approximate.
Masonry LOD 300

- Specific system

**BIMForum Interpretation:** The quantity, size, shape, location, and orientation of the element as designed can be **measured directly from the model without referring to non-modeled information** such as notes or dimension call-outs.
Masonry LOD 350

- Interfaces with other building systems

**BIMForum Interpretation:** Parts necessary for coordination of the element with nearby or attached elements are modeled. These parts will include such items as supports and connections. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
Masonry LOD 400

• Detailing, fabrication, assembly, and installation information

**BIMForum Interpretation:** An LOD 400 element is modeled at sufficient detail and accuracy for fabrication of the represented component. The quantity, size, shape, location, and orientation of the element as designed can be measured directly from the model without referring to non-modeled information such as notes or dimension call-outs.
Contributors

Additional Contributors

In addition, we’d like to thank the many contributors from all sectors of the industry who helped make this specification possible, including:

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http://bimforum.org/LOD
Exterior Cladding Systems –
Most Common Water Leakage and QC Issues

Veneer Systems
– Brick Masonry
– Cultured Stone
– Metal Panels

Barrier Systems
– Exposed Steel Framing
– Exterior Insulation and Finish System (EIFS)

Glazed Systems
– Curtain Walls
– Ribbon Windows
– Punched Openings
– Storefronts
Veneer Cladding Systems – Masonry Flashing

Base Flashing Detail

Self-adhering flashing membrane w/ end dams at terminations

Must use primer

Prefer metal drip flashing at front edge and termination bar at top edge

Apply mastic along top edge

Top edge should extend above top of mortar net
Veneer Cladding Systems – Masonry Flashing

Lintel Flashing Detail
Similar to base flashing
Prefer sheet metal box end dam with membrane flashing liner.

End dam front edge must be encapsulated in sealant joint
Veneer Cladding Systems – Masonry Flashing

Missing End Dams

Will not usually be visible in finished construction

Missing end dams at shelf angles that abut window jambs will allow water infiltration to the interior
Veneer Cladding Systems – Masonry Flashing

End Dams at Brick Returns

Requires special consideration to direct water to exterior

End dams must be installed prior to brick and adjacent framing
Veneer Cladding Systems – Masonry Flashing

End Dams at Brick Returns

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End dams must be installed prior to brick and adjacent framing
Veneer Cladding Systems – Masonry Flashing

Framing Anchors at Head

Confirm that anchor fasteners will not penetrate flashing

Requires coordination between glazing and masonry subcontractors
Veneer Cladding Systems – Masonry Flashing

Framing Anchors at Head

Shop drawings for condition shown actually showed fasteners penetrating into brick cavity

Requires coordination between glazing and masonry subcontractors
Glazed Systems – Arched and Sloped Framing Members

Special Drainage Design is Required

- Weep holes along length of arch are ineffective, all drainage will occur at ends

- Weep holes along length of sloped members are ineffective, all drainage will occur at bottom end
Exterior Joint Sealants – Joint Configurations

Perimeter Joint Width

– Minimum joint width is governed by protruding elements

– Installer should have rejected the opening, or modified framing, depending on field measurement clause
Exterior Joint Sealants – Joint Configurations

Perimeter Joint Position

Substrate must return adequately behind face of frame to provide support for backer rod, and adequate surface area for sealant adhesion
Incomplete Work –
A clear sign that the completed work is not being checked
Incomplete Work –

A clear sign that the completed work is not being checked
Jobsite Mock-Ups
STEP 01

BASE COLD FORMED METAL STUDS
STEP 02

SHEATHING IN ROUGH OPENING.
SHEATHING EACH SIDE OF METAL STUDS
STEP 03

WATER PROOFING (STO GOLD) APPLIED TO OUTSIDE SHEATHING LAYER
STEP 04

WATER PROOFING APPLIED AROUND ROUGH OPENING (STO GOLD MESH W/ FIBER REINFORCING)
STEP 6

SILL PAN SEAL
STEP 7

SILL PAN INSTALLED
STEP 8

SEAL AROUND END DAM
STEP 9

WINDOW INSTALLED
STEP 10

DRY LINE SEAL
STEP 11

EPS INSULATION
STEP 12

BASE COAT
STEP 13
FINISH COAT
JAM & CORNER
CD-BIM Sample Model
NISD CD-BIM.com LOD Sample Model
NISD CD-BIM.com LOD Sample Model
NISD CD-BIM.com LOD Sample Model
NISD CD-BIM.com LOD Sample Model
DD- Overview
DD- Framing
DD – Elevator Pit
CD - Framing
CD - Framing
CD - Framing
CD - Framing
CD – Elevator
CD – Roof Joist
Certificate of Development in BIM

CD-BIM.com Part 1
Certificate of Development in BIM

CD-BIM.com Part 2

Masonry