



Making Wood Connections Work for Two-Hour Fire Walls Webinar Q&A

This document includes questions submitted by attendees during the live webinar, *Making Wood Connections Work for Two-Hour Fire Walls*, held on July 25, 2018, along with presenter responses. In some cases, duplicate questions have been combined and noted as such. Please send any additional technical questions to AskSimpson@strongtie.com.

Question	Answer
Code Definitions and Requirements	
1 Isn't there a difference between two hour fire walls, and 2 hour fire rated walls?	A 2-hour fire rated wall includes all wall types with a 2-hour rating. A 2-hour fire wall is more specific and has the requirement of maintaining its independence and integrity regardless if the floors or roof adjacent fail.
2 What is difference in Type IIIA and IIIB?	Type III-A requires more fire resistance in some elements. For example, in Table 601 interior walls need to be 1 hour rated in A but not B. A couple other differences in that table as well.
3 What is the code reference for the load-bearing wall 100plf?	In the definitions in Section 202. It's under "Walls, Load-Bearing" on page 39 in 2015 IBC.
4 I would like a clarification – how would the provisions of the 2015 IBC Section 706.2 Structural Stability be compliant with this solution for a "Fire Wall"? I see how this would work with a Fire Partition and a Fire Barrier.	The typical application for use in Type III construction would be a "Fire Barrier" because the wall would not have structural stability without the floor to stabilize it, as there is only a floor on one side. A Fire Wall application may be at an interior area separation wall which there is framing on both sides of the wall. So if one side burns away, the floor framing on the other side is there to provide stability. On a lot of multi-family projects the walls are double 2x4 walls with an air space, primarily for sound. That also helps meet the fire requirements since the framing and wall on one side could burn away and the other wall is still there. Although I suppose technically that's not a fire wall but two independent fire barriers.
5 Just wanted to reaffirm that a 2x lumber (DF #2) is rated for 1 hour fire separation.	The nominal char rate in Chapter 16 NDS is 1.5 in/hour. However, the effective char rate for 1 hour is slightly lower, so I believe you need 1.8" to get 1-hour or use an FRT ledger/rim to get 1½" to work. You would need to confirm the FRT value with the supplier.

- 6 Could you explain the char rate again and how it is used for fire rating determination.
- NDS Chapter 16 and AWC Tech Note 10 have nominal char rate definitions and equations to calculate effective char rate and required char depth for up to 2-hour resistance. So you calculate the thickness of wood required to achieve the desired rating and provide at least that thickness to ensure the fire will not char thru the wood in that time. If you are designing heavy timber, you oversize the beam/post by the required char depth. Although there are more details to it in the AWC Tech Note that need to be considered. Remember this is a tool to rate char of a “standard” fire, thus a comparison tool to compare to other similarly rated systems. Actual fires and conditions will, of course, vary intensity from the standard.
- 7 Is it acceptable to use non-FRT material in Exterior Bearing wall of Type III? Shouldn't the material be Non-Combustible?
- The IBC reference is below. Non-combustible is required, but fire-retardant-treated is also permitted in the section. So non-FRT would not be allowed for the wood framing in Type III.
- 602.3 Type III. Type III construction is that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code. Fire-retardant-treated wood framing complying with Section 2303.2 shall be permitted within exterior wall assemblies of a 2-hour rating or less.

Installation

- 8 On an interior wall with hangers both sides, is the plywood subfloor (diaphragm) permitted to be continuous over the wall, or is it discontinued by the wall sheathing?
- That is up to the local jurisdiction. The vast majority of the time the decking is continuous to the outside face of the wall plates. The type of detailing that is being discussed is for a fire barrier, not a code-defined fire wall.
- 9 In the Kansas City area many municipalities allow duplexes and townhomes be constructed without sprinklers if they install a two-hour fire wall between units. This looks like it would work well for floor framing. Do you have anything for roof trusses?
- We have not determined what that need is yet. For some projects the DG series may be useable if the truss or rafter has full, flat bearing on the seat. However, we do not have a dedicated roof/rafter version of this hanger.



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| 10 | Does the hanger need to resist fire in these assemblies? Is intumescent paint required? | For the 2-hour rating of the wall, the hanger does not need to have fire resistance. If you're talking about the floor/ceiling assembly the hanger would have to be part of the rating. However, to our knowledge, floor/ceiling fire tests are typically done without hangers. In many 1-hour rated assemblies, the 5/8" gypsum ceiling provides much of the rating. Intumescent paint is not required on Simpson Strong-Tie hangers. |
| 11 | With the Solid Rim Board is the fire board run thru the wall over the Rim Board. What about the bearing capacity [crushing] of the gypsum board? | The only horizontal gypsum wallboard is the ceiling. It typically terminates at the wall. Therefore there is no crushing. |
| 12 | Is fire caulk required around the hanger at any locations? | For the DG and DGH hangers, there is no caulking required. For the DGB only, use two beads of heat resistant caulk on either side of the top flange as shown in our Intertek listing. They are applied on the top face of the wall. |
| 13 | Do you need to fire caulk around the notch in the drywall around the hanger?

<i>(Similar)</i>
Back to the slot...No fire caulk required? | No caulking is required around the notch if the cutout is no more than 1/4" wider than the hanger. |
| 14 | What is the remedy for over-notching the drywall? | Use an intumescent fire caulk. |
| 15 | I am concerned about the slot in the drywall around the hanger. Doesn't this affect the rating? | The notch that is cut in the drywall around the hanger does not reduce the 2-hour rating for the wall. In fact, that is the entire purpose of running ASTM test E814. The required drywall notches were part of the fire test and are fully described in our design which is found in our literature and in the Intertek Directory. Please feel free to contact Simpson if you have any questions about that. |

- 16 Are special inspections required for the fire caulking installation? Does this go on the structural plans?
- The only caulking required is for the DGB hanger. You could refer to the Intertek Design SST-WPCF 120-01; or you could add a note that reads "For DGB hangers only, add two 1/4" x 6" beads of heat resistant caulking along the top of the wall on each side of the hanger's top flange. No caulking required for DG or DGH hangers." This should not require special inspections but check with your jurisdiction.
- 17 The product looks great. I appreciate the gap in the hanger to accommodate 2-5/8" layers of DW. Does the hanger carry the joist load without bearing back on the drywall?
- The hangers were load tested without drywall installed, so they achieve full load without drywall.
- 18 Is it possible to add a second drywall layer to ceiling and that way claim no drywall is needed on the wall thru floor assembly?
- This would be subject to interpretation. Some may deem the 2-hour requirements are met if you contain the fire within the occupied area, which the wall and ceiling would do. Some have expressed concerns with the fire starting in the ceiling space, in which case you would not have a rating thru the floor assembly.
- In my presentation, I discussed similar examples where you extend just one layer through the floor space and use the ceiling to get the 2nd hour of resistance. Similar concerns with a fire starting in the ceiling space, although in those examples there is a one-hour rating thru the floor assembly.
- 19 The standoff distance of the heavier hangers seems like it can place the double top plate in torsion. Is exterior sheathing required prior to install of the hanger to prevent rolling of the top plate?
- As the top-plate rotates, it compresses against vertical face of the hanger to resist much of the top plate roll. Other sources of torsion restraint are available in the floor sheathing, wall sheathing, and load from wall above. Neither supplemental connectors nor exterior sheathing were used during testing to achieve the information published and shouldn't be required. However, if the designer feels it is appropriate they can specify an additional restraint.
- 20 Any additional bracing requirements at bottom of member or hangers?
- No additional bracing is required.
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| 21 Is there any concern about the horizontal layer of drywall between the bearing walls crushing or causing instability? | Depending on the detailing of the ceiling/wall corner, the ceiling drywall could be on top of the wall drywall. The maximum deflection from a joist hanger is typically 1/8". I expect that some very light crushing could occur at the joint, which is taped. This type of drywall installation has probably been done a million times and I have not heard of any crushing problems. If this does not answer your question, please contact us at AskSimpson@strongtie.com to discuss. |
| 22 Are I joist web filler needed in hanger? | Currently, web stiffeners are required until we get test results for "without web stiffeners." |

Design / Load Reductions / Testing

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| 23 Is wood panel sheathing permitted under the wall sheathing for use in shear wall applications?

(Similar)
What's the typical reduction factor for typical face-mounted hangers capacity when they are attached over wood structural panel sheathing or drywall

(Similar)
What's the typical load reduction factor for the face-mounted hanger over wood sheathing and drywall?

(Follow-up)
Sorry, just to be clear, one of the previous questions asked about face mount hanger, but I think he meant the DG hanger capacity when installed over plywood. Did you say reduced allowable loads will be published for this case - DG hangers installed over plywood/OSB sheathed wall, which reduces the top flange bearing on the top plate in order to keep the gap for two layers of drywall. Thank you. | We have allowable loads for DG and DGH hangers installed over wood structural panel sheathing available on the product pages . Reductions are (roughly) 5-10%, but specific values are available in an engineering letter: https://embed.widencdn.net/pdf/plus/ssttoolbox/cfzhz2t6wd/L-C-DGDGHOSB18.pdf

The hanger is not intended to be installed over drywall, but can be installed over the sheathing. |
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| 24 | The more a hanger stands off a wall the more moment from the loads get into the framing along with shear. How do you deal with that? | The vertical offset causes a moment in the hanger. The resisting moment is supplied by a couple made from two horizontal forces: 1) nails in shear at the top flange, and 2) bearing of the hanger against the wall which occurs against the face of the wall top plates. |
| 25 | How does the DG hangers work with wall tieback forces on exterior applications. Does the hanger transfer axial loads to the joists / diaphragm? | These hangers are not designed to resist externally applied horizontal forces. This is typical of most joist hangers. |
| 26 | How does fire wall fire rating works for an integrated concrete -wood structure, residential or commercial? | I'm not sure about the question. However, if the requirement for the structure is for a typical wood stud wall with two layers of 5/8" gypsum wallboard in order to get a 2-hour rating, then this hanger should provide the solution. |
| 27 | If the hanger is supporting a heavy timber beam with a 1 hour rating, I presume we would have to protect the hanger to achieve the one hour. | Yes. The hanger is tested to show that it does not reduce the fire rating of the 2-hour wall that it is attached to. But the hanger itself would need to be protected to achieve a 1-hour rating. This is typically handled with the ceiling gypsum board, but it sounds like you may have exposed framing. |
| 28 | Is the top wood plate calculated for bending and torsion, due to eccentricity? | No calculation. However, tested on double top plate with simulated stud supports at 16"o.c. Nothing on the back side of the top plates. |
| 29 | If you have hangers on both sides do they need to be offset or is this dependent upon the width of the top plates? | Hangers may be installed offset or back-to-back (no offset) on a 2x6 wall. |
| 30 | Is there a horizontal separation requirement for hangers on opposite sides of the wall? | There is no particular spacing requirement. However, if they are installed back-to-back the wall needs to be a 2x6 wall. The DG top flanges will be separated by about 1/2" and the DGH has a special nested cut that gives about 1/8" separation. |

- 31 The footnotes for the load tables specify a reduced load capacity for joists spaced less than 16 inches on center. Is the load governed by the capacity of the top plate?
- Correct. There is a certain amount of torsion induced into the top plate. We tested for 16"o.c. Presumably the reduction would be linearly proportional to a reduced spacing. At this time we do not take advantage of increased spacings.
- 32 Is there a load reduction for studs spaced at 24 inches?
- There would be no reduction due to hanger torsion but you would have to calculate the gravity load to see if the top plates still work.
- 33 Are there any connectors that can be used on a 1 1/2" nailer that eliminate the reduction in capacity?
- The reduced capacity is due to needing shorter nails to fit in the thinner nailer. Testing with 10dx1 1/2 nails showed a 5% decrease in load for DG and DGH hangers. These reductions are mentioned in footnote 7 of the load table on our DG flier available here:
<https://embed.widencdn.net/pdf/plus/ssstoolbox/29xkd0wae2/F-C-DGHANGER18.pdf>
- 34 Are there reductions for installing off FRT lumber plates?
- FRT suppliers publish reduction factors for fasteners installed in their material that are tabulated in their evaluation reports as comparison of treated to untreated allowable loads. Some manufacturers list separate lateral and withdrawal adjustment factors for fasteners, others also provide a "connectors" factor. If the FRT supplier has reduction factors, the hanger allowable loads should be reduced by the connector reduction factor (if provided) or by the lower of the lateral and withdrawal adjustment factor, if no connector factor is provided.
- 35 Do any of these have UL or FM tests?
- Regarding the DG series hangers, the third party agency used for testing was Intertek. No testing was done by UL or FM. Intertek, formerly Warnock Hersey, is a well-established agency.
- 36 Any testing done to determine deformation, or failure, of the hanger during the fire test with a floor load applied?
- That type of test has not been done.
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Canadian Use / Limit State Design

- 37 For the load-rated fire wall hanger, is there product literature for Canadian design (LSD, NBCC, CSA, etc.)? Yes, the DG/DGH/DGB series hangers are in the Canadian Edition of the Wood Construction Connectors Catalogue on page 254-255. You can access the catalogue here: <https://www.strongtie.com/resources/literature/wood-construction-connectors-catalog-cn>
- 38 Is your product listed for use in Canada? There is not a Canada-specific approval.

Miscellaneous

- 39 What makes a fire rated hanger different than any other hanger? Just to clarify, the hanger itself is not a fire-rated hanger. The hanger has been evaluated in its use in a rated 2-hour wall assembly. However, what makes the DG series different than most other joist hangers is the short cantilever section through the drywall notch which allows it to NOT require notching into the wall cavity.
- 40 Can this series of hangers be used with a single layer of drywall? These hangers can be used with single layer systems, as the drywall is not required to achieve the allowable loads. For single layer, we have much more economical hanger solutions in the technical bulletin T-C-TFWALL16: <https://embed.widencdn.net/pdf/plus/ssttoolbox/z2fko79u8q/T-C-TFWALL16.pdf>
Although the standard hangers installed over drywall require the drywall to be installed first.
- 41 Are these the only hangers/ methods that Simpson provides for 2hr rated approved walls? No. We also have the DU/DHU/DHUTF series hanger which installs **over** the drywall using SDS screws into the wall top plates. The information can be found in our Wood Construction Connectors Catalog (C-C-2017) on page 196-197, or on our website.
- 42 Is the DHUTF hanger still available? Yes, the DU/DHU/DHUTF series hanger is still available.



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- 43 What is a relative cost comparison between a typical truss hanger and a DG? Costs vary substantially around the country and different suppliers. However, I think in general, these DG series hangers would be on the order of 3x to 4x the cost of a typical Simpson hanger used for supporting trusses.
- 44 How does the price of this product compare to top chord bearing of trusses? I don't really know except to expect that using hangers is more expensive. Using hangers is probably the least intrusive method of connection that is practical. I don't know if building departments accept the top chord bearing truss as part of a 2-hour assembly or if FRT top chords would be required.
- 45 Just wondering if you may have city of LA approval? Yes. Coverage under the LABC and LARC are included as a supplement in our ICC-ES ESR-2553: http://www.icc-es.org/reports/pdf_files/ESR-2553.pdf