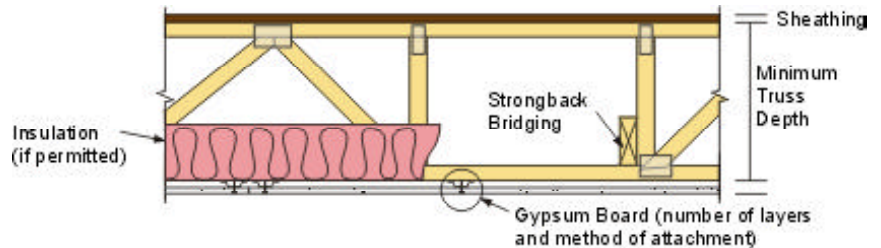




Fire Resistance Rated Truss Assemblies

A fire resistance rating may be mandated by code for some of the assemblies where metal plate connected wood trusses are used. The ratings of these assemblies are determined in accordance with the American Society of Testing & Materials' Standard Methods for Fire Tests of Building Construction and Materials (ASTM E119).

Figure 1: Generic fire rated assembly listing construction elements



Sources of Information

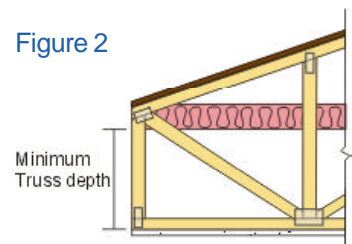
Fire rated assemblies are listed in the *Fire Resistance Design Manual*, published by the Gypsum Association (GA); the *Fire Resistance Directory*, published by Underwriters Laboratories, Inc. (UL); the *Directory of Listed Building Products*, published by Intertek Testing Services (ITS) formally known as Warnock Hersey (WH); Factory Mutual (FM); and the PFS Corporation. These assemblies are available to any building designer for specification where a rated assembly is required.

Modifications or Substitutions to Rated Assemblies

Changes should be reviewed with the building designer and code official, preferably with the assistance of a professional engineer. This review is required because the final performance of the assembly is a result of the composition and interaction of the materials used in the construction of the assembly. Some general rules-of-thumb for changes to rated truss assemblies are:

- ◆ The truss depths and lumber sizes listed are minimums. Deeper trusses and larger lumber sizes aid in fire endurance and are therefore permitted.
- ◆ Rated assemblies with parallel chord trusses in floor/ceiling applications may also be used for roof/ceiling applications as long as the minimum depth at end bearing is maintained.
- ◆ Even if insulation is specified as an element of the assembly, it does not have to be installed to meet the intent of the assembly. That is why many assemblies show insulation as optional.
- ◆ However, if an assembly is NOT rated with insulation, the assembly must be modified to accommodate insulation. There are two ways to do this:
 - ◆ Increase the depth of either flat or pitched assembly by the depth of the proposed insulation and install this insulation above the original depth of the assembly (See Figure 2).
 - ◆ For certain assemblies in UL and GA, addition of any depth of insulation at any location in the assembly is permitted as long as another layer of gypsum board is installed at the ceiling. See the UL and GA guides for more information.
- ◆ Some rated assemblies are tested using specific branded products. Substitutions may not be made without approval. An assembly using generic products may be available.

Figure 2









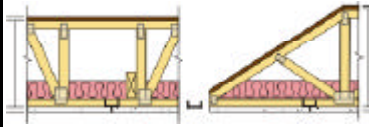





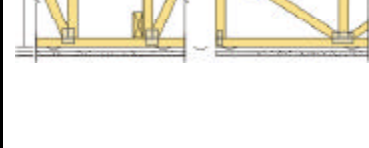
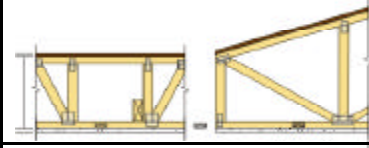

The following tables are only summaries of the fire rated assembly reports. Users must consult the listed agency's documentation for complete information. Test reports are available from reporting agencies or WTCA where indicated.

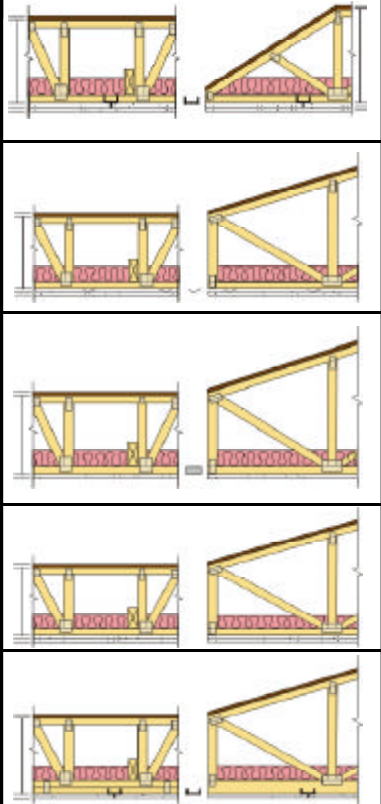
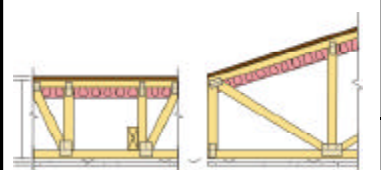

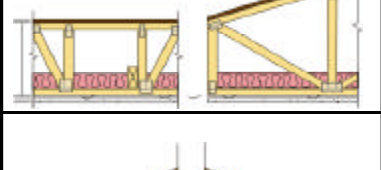
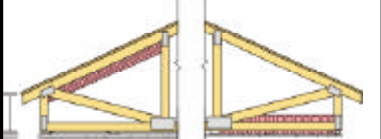
Certifying Agencies

GA = Gypsum Association
 NER = National Evaluation Service Report
 PFS = PFS Corporation
 UL = Underwriters Laboratory
 WH = Warnock Hersey International, Ltd.

Symbols

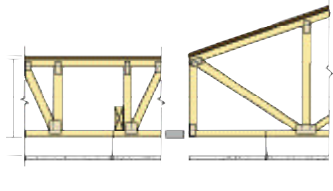
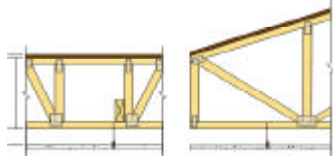
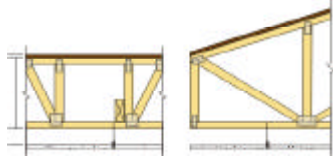
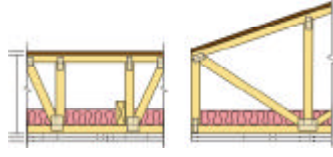
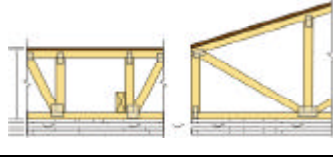
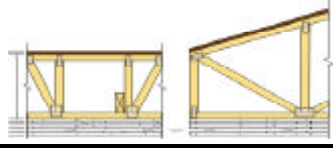
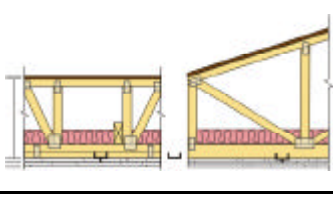
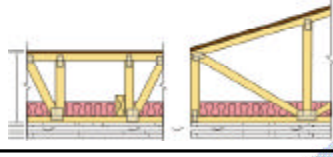
 = Wood blocking at gypsum board joints
 = FR-Quik Channel Sets™ by Alpine Engineered Products
 = Furring channel
 = Resilient channel
 = TrusGard Protective Channel™ by Truswal Systems
 = Insulation (see full report for installation details)

	Category	Illustration	Construction	Report Number
45-Minute Rating	45-Min		24" oc, min 15" depth flat, min 19-1/2" depth 3/12" min pitched FR-Quik Channel Sets™ 1 layer 5/8" Type C gypsum Sheathing min 15/32"	FR-SYSTEM 4™ NER-392, 1991
	Floor or Roof with insulation		Nominal 2x3, 24" oc, min 10" depth Truswal metal truss plates 1 layer 5/8" Type X gypsum Sheathing min 3/4"	WH TSC/FCA 45 - 02
	Floor or Roof suspended ceiling system		Nominal 2x3 24" oc, min 10" depth Truswal metal truss plates Fire rated suspended ceiling min 7-1/2" below truss Sheathing min 3/4"	WH TSC/FCA 45 - 04
1-Hour Rating	1-Hour		24" oc, min 12" depth 2 layers 1/2" Type X gypsum Sheathing min 15/32"	GA - FC5512
	Floor or Roof		24" oc, min 12" depth 2 layers 1/2" Type C gypsum Sheathing min 23/32"	UL - L542
			24" oc, min 12" depth Furring channel 24" oc, alt resilient channel 16" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 3/4"	GA - FC5515 GA - FC5516
			24" oc, min 12" depth Furring channel 24" oc, alt resilient channel 16" oc 1 layer 5/8" Type C gypsum Sheathing min 23/32"	UL - L528 UL - L534
			24" oc, min 14-1/4" depth Wood blocking secured with metal clips 1 layer 5/8" proprietary Type X gypsum Sheathing min 23/32"	GA - FC5517, TPI/WTCA FC-392 PFS 86 -10 (Report Available)
			Nominal 2x3, 24" oc, min 16" depth FR-Quik Channel Sets™ 1 layer 5/8" proprietary Type X gypsum Sheathing min 23/32"	NER - 392 WTCA FR-SYSTEM 1™

Category	Illustration	Construction	Report Number
1-Hour		Nominal 2x3, 24" oc, min 15" depth flat, min 19-1/2" depth 3/12" min pitched FR-Quik Channel Sets™ 2 layers 1/2" Type X gypsum Sheathing min-15/32"	NER - 392 WTCA FR-SYSTEM 3™
Floor or Roof with insulation		Nominal 2x3, 24" oc, min 10" depth Truswal metal truss plates Resilient channel 24" oc 1 layer 5/8" Type C gypsum Sheathing min 5/8"	WH TSC/FCA 60-02
		Nominal 2x3, 24" oc, min 10" depth Truswal metal truss plates TrusGard Protective Channels applied to bottom chord of each truss 1 layer 5/8" Type C gypsum Sheathing min 5/8"	WH TSC/FCA 60-06
		Nominal 2x3, 24" oc, min 10" depth Truswal metal truss plates 2 layers 1/2" Type X gypsum Sheathing min 5/8"	WH TSC/FCA 60-10
		24" oc, min 10" depth includes 2" min nominal shield member FR-Quik Channel Sets™ 1 layer 5/8" Type C gypsum Sheathing min 23/32"	FR-SYSTEM 5™ NER-392, 1991
	Floor or Roof suspended ceiling light fixtures and insulation (Note 1)	8" oc, min 16" depth Fire rated suspended ceiling system Purlins spaced 24" oc Sheathing min 23/32"	NER - 399 (See WTCA Handbook) (Report Available)
Floor or Roof with damper, duct, fixtures, insulation and metal trim (Note 1)		24" oc, min 18" depth Resilient channel 16" oc 1 layer 5/8" Type C gypsum Sheathing min 15/32"	UL - L546
		24" oc, min 18" depth Resilient channel 12" oc 1 layer 5/8" Type C gypsum Sheathing min 23/32"	UL - L550
		24" oc, min 18" depth Resilient channel 12" oc 1 layer 5/8" Type C gypsum Sheathing min 23/32"	UL - L558
Pitched Roof with duct or damper and insulation (Note 1)		24" oc, min 5-1/4" depth with upper insulation, 3" depth with lower insulation Resilient channel 16" oc, 12" oc with insulation 1 layer 5/8" Type C gypsum Sheathing min 15/32"	UL - P522 UL - P531

Notes

1. Assemblies include ducts, dampers, lighting or other fixtures in the tested assembly. See full report for details.

	Category	Illustration	Construction	Report Number
1-Hour Rating	1-Hour		Nominal 2x3, 24" oc, min 10" depth Truswal truss plates TrusGard Protective Channels applied to bottom chord of each truss Fire rated suspended ceiling min 7-1/2" below the truss Sheathing min 3/4"	WHTSC/FCA 60-08
	Floor or Roof suspended ceiling & fixtures (Note 1)		Nominal 2x3, 24" oc, min 10" depth Truswal truss plates Fire rated suspended ceiling min 7-1/2" below the truss Sheathing min 3/4"	WHTSC/FCA 60-04
			24" oc, min 12" depth Steel runner system dropped 7-1/2" 1 layer 5/8" Type C gypsum Sheathing min 23/32"	UL - L529
1.5-Hr Rating	1.5-Hours		Nominal 2x3, 24" oc, min 10" depth Truswal truss plates 2 layers 5/8" Type X gypsum Sheathing min 3/4"	WHTSC/FCA 90-02
2-Hour Rating	2-Hours		24" oc, min 12" depth Resilient channel 24" oc 3 layers 5/8" Type C gypsum Sheathing min 23/32"	Calculated Assembly (Report Available)
	Floor or Roof		24" oc, min 18" depth Resilient channel 24" oc 4 layers 5/8" Type X gypsum Sheathing min 23/32"	UL- L556 showing alternate truss configuration
		Floor or Roof with insulation		Nominal 2x3, 24" oc, min 16" depth includes 2" min nominal shield member FR-Quik Channel Sets™ Alt include resilient channel 24" oc 2 layers 5/8" proprietary Type X gypsum Sheathing min 23/32" +1/4" underlayment
			24" oc, min 9-1/4" depth Resilient channel 16" oc 3 layers 5/8" Type C gypsum Sheathing min 23/32"	FR-SYSTEM 6™ NER-392, 1991

Notes

1. Assemblies include ducts, dampers, lighting or other fixtures in the tested assembly. See full report for details.

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Truss Technology IN BUILDING

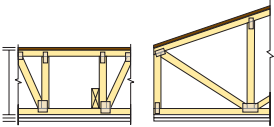
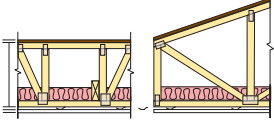
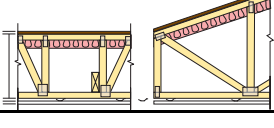
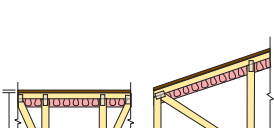
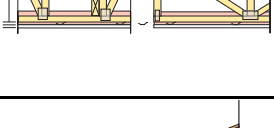
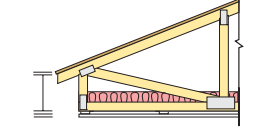
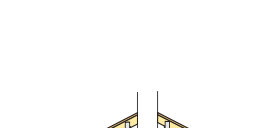
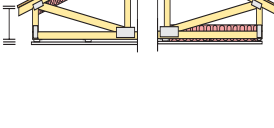
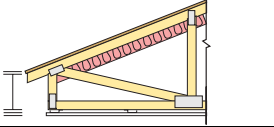
An informational series designed to address the issues and questions faced by professionals in the building construction process.

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The following tables are only summaries of the fire rated assembly reports. Users must consult the listed testing agency's documentation for complete information.

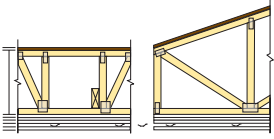
Additional 1-Hour Assemblies:

1-Hour Rating	Category	Illustration	Construction	Report Number
	Floor or Roof		24" oc, min 9-1/4" depth 2 layers 5/8" Type X gypsum Sheathing min 1/2" glued & nailed	GA FC 5406/5408 GA RC 2601/2602 (see also ER 1632)
	Floor or Roof with insulation, optional damper Note 1		24" oc, min 18" depth Resilient channel 12" oc 1 layer 5/8" Type X gypsum Sheathing min 23/32" glued & nailed	GA FC 5514 (based on UL L550 & L558)
	Floor or Roof with insulation, duct and damper Note 1		Nominal 2x4 24" oc, min 18" depth Resilient channel 16" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 23/32" glued & nailed	UL L562 (similar to UL L546)
			24" oc, min 18" depth Resilient channel 16" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 23/32" glued and nailed	UL L521 (similar to UL L546 & L550)
			24" oc, min 18" depth Resilient channel 16" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 23/32" glued & nailed	UL L563 (similar to UL L546 & L550)
	Pitched Roof With insulation optional duct & damper Note 1		24" oc, min depth not stated Resilient channel 12" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 15/32" glued & nailed	GA RC 2603 (based on UL P533, P522, P531)
			24" oc, min 5-1/4" depth with upper insulation, 3" depth with lower insulation Resilient channel 12" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 15/32" glued & nailed	UL P533 ^{2,3}
			24" oc, min 5-1/4" depth with upper insulation, 3" depth with lower insulation Resilient channel 16" oc, or 12" with insulation 1 layer 5/8" proprietary Type X gypsum Sheathing min 15/32" glued & nailed	UL P544 ^{2,3}
			24" oc, min 5-1/4" depth Resilient channel 16" oc 1 layer 5/8" proprietary Type X gypsum Sheathing min 15/32" glued & nailed	UL P538 ^{2,3}

Notes:

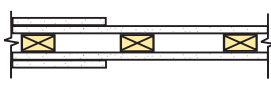
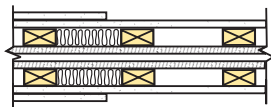
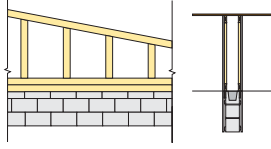
1. Assemblies include ducts, dampers, lighting or other fixtures in the tested assembly. See full report for details.
2. UL P522 listing does NOT require sheathing to be glued.
3. Truss plate thickness in some Pxxx assemblies erroneously list 0.040, others correctly list 0.0356. Check for latest version.

Additional 2 Hour Assemblies:

2-Hour Rating	Category	Illustration	Construction	Report Number
	Floor or Roof		24" oc, min 18" depth Furring channel 24" oc 4 layers 5/8" Type X gypsum Sheathing min 3/4" nailed	GA FC 5751 GA RC 2751 (based on UL L556)

Attic Separation Assemblies:

If a fire rated assembly, rather than draftstopping, is required within concealed attic spaces, the following details show approved one-hour and two-hour rated assemblies that may be used in the roof cavity and that may be constructed with gable end frames or trusses.

Attic Separation	Rating	Illustration	Construction	Report Number
	1 hour		Nominal 2x3 or 2x4 flat 24" oc single wall 1 layer 5/8" Type X each side at non-bearing 2 layers 5/8" Type X each side at bearing Optional max 1" batt insulation Optional sprayed insulation	UL U338
	1 hour		Nominal 2x3 or 2x4 flat 24" oc double wall 1 layer 5/8" Type X each side non-bearing 2 layers 5/8" Type X each side bearing Optional max 1" batt insulation Optional sprayed insulation	UL U339
	2 hour		2 nominal 2x4 16" oc parallel chord trusses 6-3/8" apart 1 layer of 5/8" gypsum 1 side each truss to ceiling cavity Optional insulation in wall cavity Roof sheathing min. 15/32" See assembly details for block wall construction	UL L554

Errata to TTB Fire Endurance 020201:

GA – FC5512 sheathing minimum should be 19/32" instead of 15/32"
 NER – 392 WTCA FR-SYSTEM 1 gypsum should be Type C instead of Type X
 UL L550 & L558 gypsum should be proprietary type X instead of Type C

URLs to view or download assembly details:

- UL (Underwriters Laboratories) - www.ul.com
- WH (Warnock Hersey Intertek - ETL SEMKO) - www.intertek-etlsemko.com
- GA (Gypsum Association) – www.gypsum.org
- WTCA (Wood Truss Council of America) – www.woodtruss.com