



# Sprinkler System Installation Guide



## For RedBuilt™ Open-Web Trusses and Red-I™ Joists

- Multiple Details for Supporting Sprinkler Pipe
- Options to Add Carrying Capacity
- For Use with RedBuilt™ Products **Only**



# Welcome to RedBuilt

RedBuilt is an exciting business offering building solutions for a broad range of commercial and custom residential applications. In addition to pioneering unique manufacturing technologies, RedBuilt provides world-class service and technical support for architects, specifiers and builders.

RedBuilt gives you access to reliable, innovative products, including RedBuilt™ open-web trusses, Red-I™ joists, and RedLam™ LVL beams and headers. And we keep things simple: You'll work with just one service-oriented supplier to get all these products—plus the support you need to build smarter.

**RedBuilt:** A family of brand-name building products... a source for innovative ideas and solutions... a supplier that's simpler to do business with.

## SPRINKLER SYSTEM INSTALLATION GUIDELINES

### Guide Assumptions

- The details in this guide are intended for use with RedBuilt™ products only.
- The connections shown in the details will support the sprinkler pipes indicated or the loads shown, provided that the required loads have been included in the original design of the RedBuilt™ open-web truss or Red-I™ joist system.
- The hangers and installation methods shown in this guide are in accordance with the following design specifications:
  - NFPA 13 requires that hangers shall be designed to support five times the weight of the water-filled pipe plus 250 lbs at each point of piping support. Standard ferrous hardware referred to in NFPA 13/13R, such as U-hooks, eye rods, and steel trapezes, or accepted proprietary hardware, are the responsibility of others.
  - NFPA 13 requires that sprinkler piping shall be substantially supported from the building structure, which must support the weight of the water-filled pipe plus a minimum 250 lb temporary load applied at the point of hanging. Fasteners, such as lag screws and machine bolts, and structural wood hanger blocks are designed to support the weight of the water-filled pipe plus a temporary 250 lb load using values from the 2012 National Design Specification® For Wood Construction (NDS®).
- Assumed loads for water-filled steel pipes at 15' on-center spacing are as follows:

Pipe Diameter	2"	2½"	3"	3½"	4"	5"	6"
Load (lbs)	77	118	162	202	246	352	475

- Assumed loads for water-filled CPVC pipes are as follows:

Pipe Diameter	1"	2"	3"
Load (lbs)	4	18	48
Support O.C. Spacing	6'	8'	10'

- Earthquake bracing details (EQ1–EQ6 on pages 6 and 10) require that the system designer specify the frequency of the bracing.
- All wood hanger blocks are to be minimum No. 2 grade spruce-pine-fir or equivalent, unless otherwise noted.
- For options beyond the scope of this publication, contact your RedBuilt representative.

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### ABOUT THIS GUIDE

This guide offers technical information and details for installing sprinkler systems in RedBuilt™ open-web trusses and Red-I™ joists. The information in this guide is intended for use with RedBuilt™ products ONLY.

Cutting or drilling oversized holes in the webs or flanges of RedBuilt™ open-web trusses and Red-I™ joists can weaken the structural integrity of the member to the point where it will need to be repaired or replaced, sometimes at great expense. Proper installation of the allowed fasteners is equally important to the structural integrity of the open-web truss and Red-I™ joist.

## Allowable Holes and Fasteners

The tables at right show the largest fastener and lead hole sizes allowed in RedBuilt™ open-web trusses and Red-I™ joists. All holes and attachments made to the underside of a chord or flange shall be centered. See detail 1 on page 4 and detail 28 on page 9.

### Self-Tapping Screws

Pre-drilled holes shall be used for screw systems with self-tapping or thread-cutting properties.

### Drive Screws

Drive screws are not allowed in RedBuilt™ open-web trusses or Red-I™ joists.

### Lag screws

Lag screws shall be installed in prebored lead holes with a wrench. **Do not** drive lag screws with a hammer.

Follow tables on this page for proper choice and installation of fasteners.

Follow tables on page 11 when cutting holes through Red-I™ joist webs.

## Lead Hole Sizes

Fastener Type	Fastener Size	Approximate Lead Hole Size
Nails	0.162" diameter and larger	75% of nail diameter
Wood Screws	Larger than #8	70% of root diameter ( $\frac{1}{8}$ " for #18)
Machine Bolts	All	Bolt diameter + $\frac{1}{32}$ " to $\frac{1}{16}$ "
Lag Screws	$\frac{1}{4}$ " diameter	$\frac{1}{8}$ " <sup>(1)</sup>
	$\frac{3}{8}$ " diameter	$\frac{3}{16}$ " <sup>(1)</sup>
	$\frac{1}{2}$ " diameter	$\frac{1}{4}$ " <sup>(1)</sup>
	$\frac{5}{8}$ " diameter	$\frac{5}{16}$ " <sup>(1)</sup>

(1) Lead hole size applies to the threaded part of the lag screw. For the unthreaded length of the screw, the lead hole is equal to the shank diameter.

## Largest Hole and Fastener

RedBuilt™ Product	Hole Size		Fastener Size	
	Side	Top or Bottom	Side	Top or Bottom
Red-L™, Red-W™ truss	Not allowed	$\frac{1}{4}$ " <sup>(1)</sup>	16d (0.162" x 3 $\frac{1}{2}$ ") nail	$\frac{3}{8}$ " lag <sup>(2)</sup>
Red-S™ truss	Not allowed	$\frac{3}{16}$ "	16d (0.162" x 3 $\frac{1}{2}$ ") nail	$\frac{3}{8}$ " lag <sup>(2)</sup>
Red-M™, Red-H™ truss	$\frac{1}{4}$ " <sup>(1)</sup>	$\frac{1}{4}$ " <sup>(1)</sup>	16d (0.162" x 3 $\frac{1}{2}$ ") nail, $\frac{1}{4}$ " lag <sup>(2)</sup> , $\frac{1}{4}$ " bolt <sup>(2)</sup> , #18 screw <sup>(2)</sup>	16d (0.162" x 3 $\frac{1}{2}$ ") nail, $\frac{3}{8}$ " lag <sup>(2)</sup> , $\frac{7}{16}$ " bolt <sup>(2)(3)</sup>
Red-I™ Joist Flange	Not allowed	$\frac{3}{16}$ "	10d (0.148" x 3") nail	$\frac{1}{4}$ " lag <sup>(2)(4)</sup>
Red-I™ Joist Web	See table on page 11	—	—	—

(1) May be increased to  $\frac{1}{2}$ " if the location is a minimum of 6" away from a truss pin or any knot larger than  $\frac{1}{4}$ " diameter.

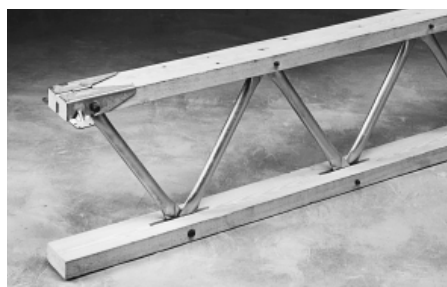
(2) Requires prebored lead hole—see **Lead Hole Sizes** table.

(3) May be limited by applicable hole size.

(4)  $\frac{3}{8}$ " lag allowed when joist flange width is greater than 1 $\frac{3}{4}$ ".

- Only one hole may be drilled in any cross section of any chord or flange.

## OPEN-WEB TRUSS DESCRIPTIONS



### Red-L™ and Red-W™ Trusses

#### Top and Bottom Chords:

- Red-L™ trusses: 1 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " MSR lumber
- Red-W™ trusses: 1 $\frac{1}{2}$ " x 4 $\frac{3}{4}$ " MSR lumber



### Red-S™ Trusses

#### Top and Bottom Chords:

- Double 1 $\frac{1}{2}$ " x 2.3" RedLam™ LVL



### Red-M™ and Red-H™ Trusses

#### Top and Bottom Chords:

- Red-M™ trusses: Double 1 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ " MSR lumber
- Red-H™ trusses: Double 1 $\frac{1}{2}$ " x 5 $\frac{1}{2}$ " MSR lumber

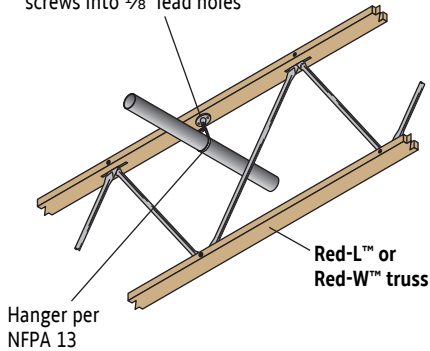
Preservative-treated open-web trusses are not available.

# OPEN-WEB TRUSS SPRINKLER DETAILS

## ALL REDBUILT™ OPEN-WEB TRUSSES

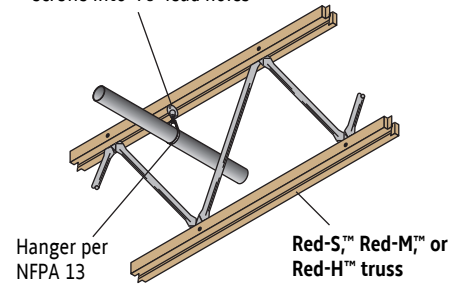
### 1 Ceiling Flange

Two-screw ceiling flange with two #18 x 1½" wood screws into ⅛" lead holes



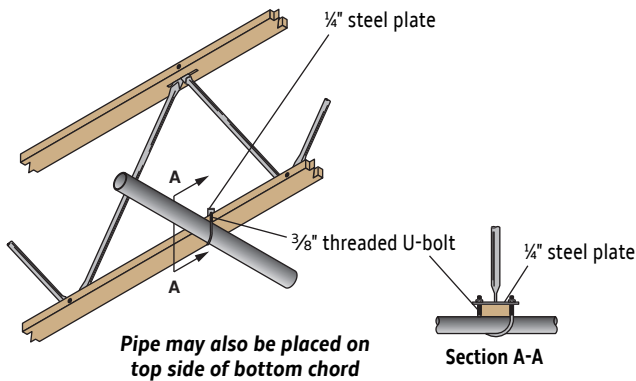
- For Red-L™ and Red-W™ trusses, screws must line up along the center of the chord, ± ½" tolerance.
- For all double chord trusses, one screw must be positioned in the center of each chord, ± ¼" tolerance.
- Flange may be attached to the top or bottom chord.
- If installing through a gypsum board ceiling, increase the fastener length by the gypsum board thickness.

Two-screw ceiling flange with two #18 x 1½" wood screws into ⅛" lead holes



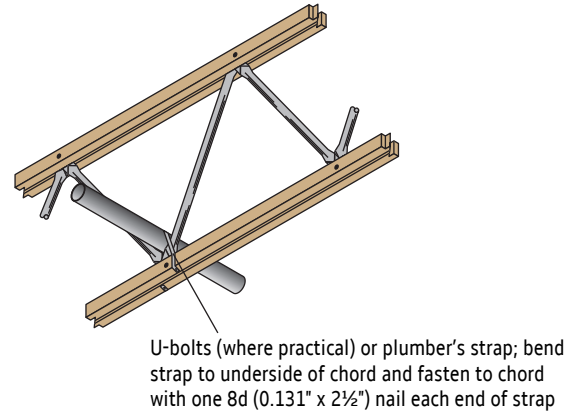
**Maximum pipe size: 2"**

### 2 U-Bolt with Steel Plate



**Pipe size at maximum hanger spacing: 2"**

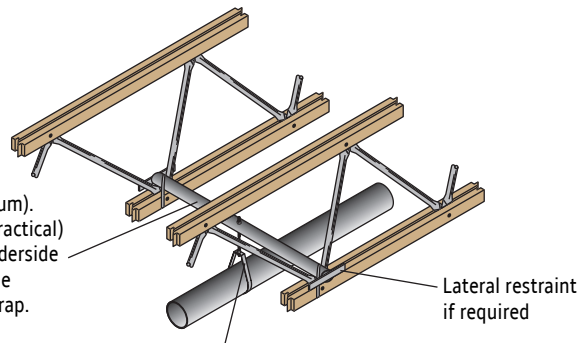
### 3 Strap or Inverted U-Bolt



**Pipe size at maximum hanger spacing: 3" (may be increased with special truss design)**

### 4 Pipe Trapeze with Hanger Rod

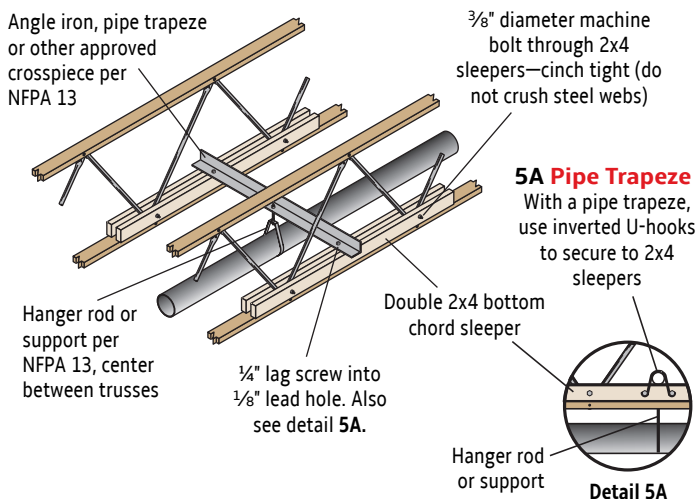
Pipe trapeze per NFPA 13 (3" maximum). Secure snugly with U-bolts (where practical) or plumber's strap; bend strap to underside of chord and fasten to chord with one 8d (0.131" x 2½") nail each end of strap.



**Pipe size at maximum hanger spacing: 4" (may be increased to 6" with special truss design)**

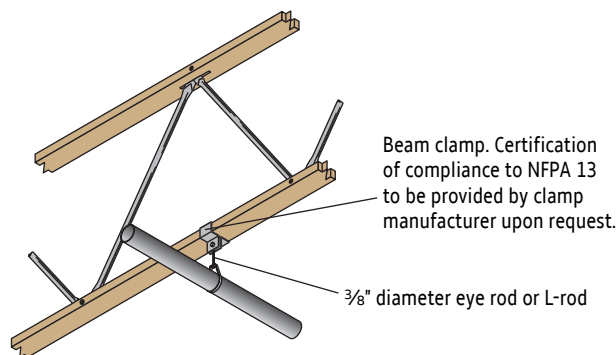
## RED-L™, RED-W™, AND RED-S™ TRUSSES

### 5 Trapeze on Sleepers



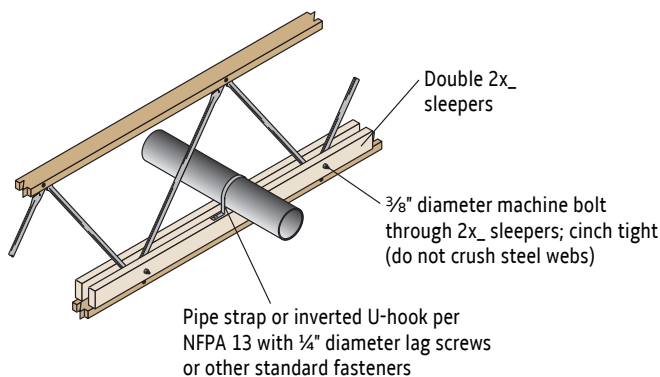
Pipe size at maximum hanger spacing: 6"

### 6 Beam Clamp (For Red-L™ trusses only)



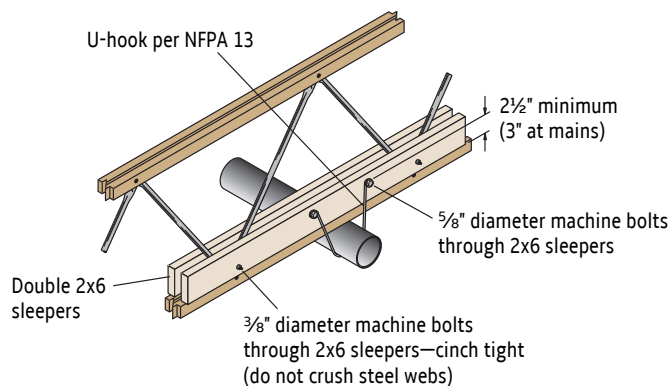
Pipe size at maximum hanger spacing: 2" (may be increased to 4" with special truss design)

### 7 Strap or Inverted U-Hook on Sleepers



Pipe size at maximum hanger spacing is 3". With special truss design, may be increased to 4" with 2x4 sleeper and 6" with 2x6 sleeper.

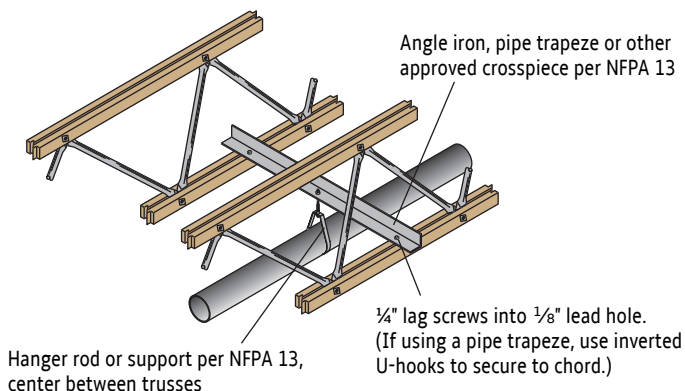
### 8 U-Hook on Sleepers



Pipe size at maximum hanger spacing is 3". With special truss design, may be increased to 6".

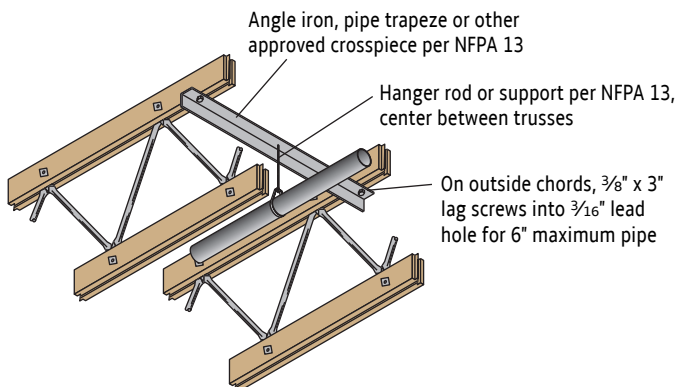
## RED-M™ AND RED-H™ TRUSSES

### 9 Trapeze with Hanger Rod—Bottom Chord



Pipe size at maximum hanger spacing: 2 1/2" (may be increased to 6" with special truss design)

### 10 Trapeze with Hanger Rod—Top Chord

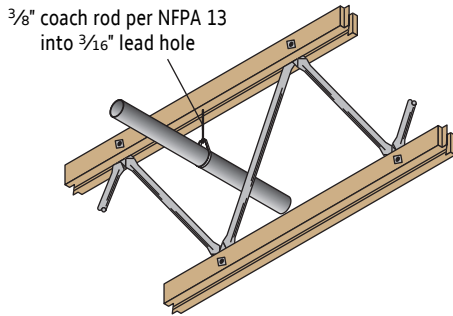


Pipe size at maximum hanger spacing: 2 1/2" (may be increased to 6" with special truss design)

# OPEN-WEB TRUSS SPRINKLER DETAILS

## RED-M™ AND RED-H™ TRUSSES, *continued*

### 11 Coach Screw into Chord



#### General Notes

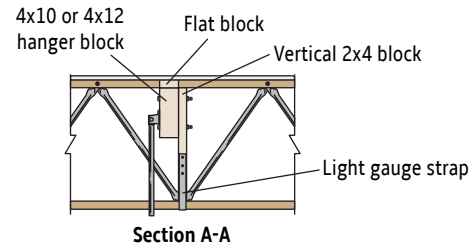
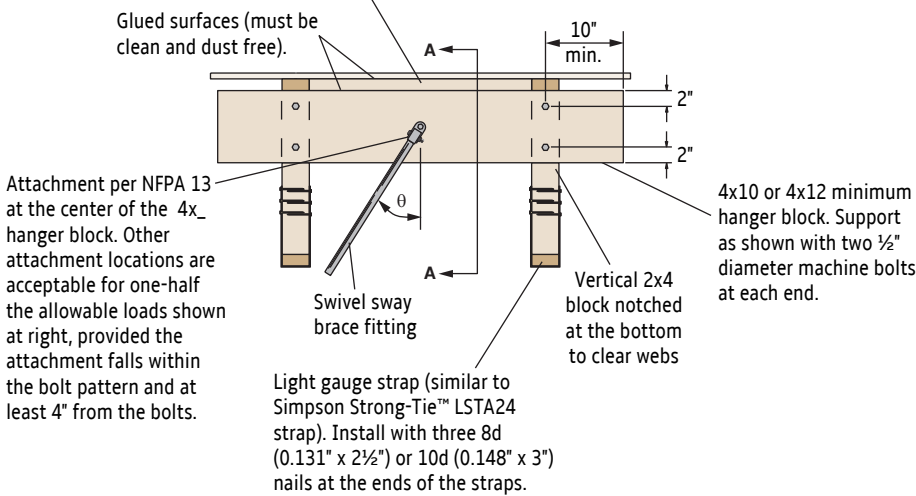
- May be attached to top or bottom chord.
- Minimum coach rod penetration is 3".
- Rods shall be centered in the chords;  $\pm 1/4$ " tolerance on double chord trusses.
- If installing through a gypsum board ceiling, increase the fastener length by the gypsum board thickness.

Maximum pipe size: 2" (may be increased to 2 1/2" with special truss design)

# OPEN-WEB TRUSS SEISMIC DETAILS

## EQ1 For Loads Perpendicular To Open-Web Trusses Only

Flat block. Glue top and bottom surfaces with four 1/4" beads of elastomeric floor adhesive that meets ASTM D3498 (AFG-01) requirements. Follow manufacturer's recommendations.

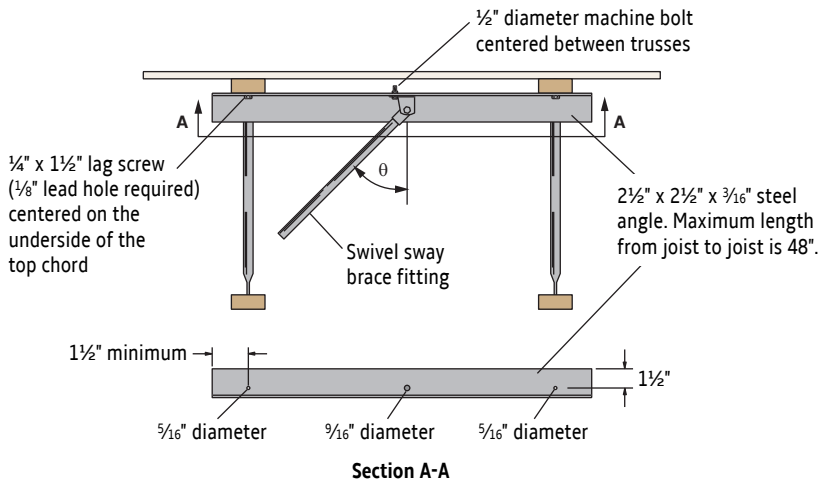


#### Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical ( $\theta$ )		
30°	45°	60°
675	1,170	2,030

- Loads are based on the controlling connection to the truss.
- The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).
- Loads include a 1.60 duration factor adjustment.

## EQ2 For Loads Parallel or Perpendicular to Open-Web Trusses

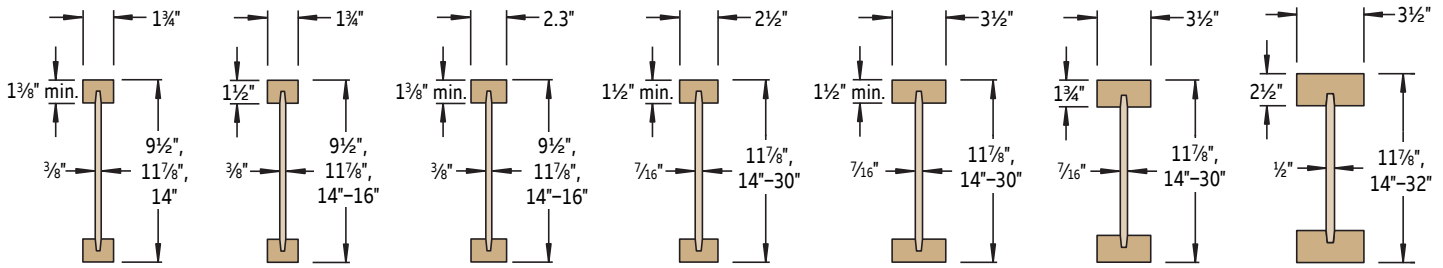


#### Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical ( $\theta$ )		
30°	45°	60°
305	390	430

- Loads are based on the controlling connection to the truss.
- Loads include a 1.60 duration factor adjustment.

# RED-I™ JOIST DESCRIPTIONS



## Red-I45L™

1 3/8" (min.) x 1 3/4"  
RedLam™ LVL  
flanges with  
3/8" OSB web

## Red-I45™

1 1/2" x 1 3/4"  
RedLam™ LVL  
flanges with  
3/8" OSB web

## Red-I58™

1 3/8" (min.) x 2.3"  
RedLam™ LVL  
flanges with  
3/8" OSB web

## Red-I65™

1 1/2" (min.) x 2 1/2"  
RedLam™ LVL  
flanges with  
7/16" OSB web

## Red-I90™

1 1/2" (min.) x 3 1/2"  
RedLam™ LVL  
flanges with  
7/16" OSB web

## Red-I90H™

1 3/4" x 3 1/2"  
RedLam™ LVL  
flanges with  
7/16" OSB web

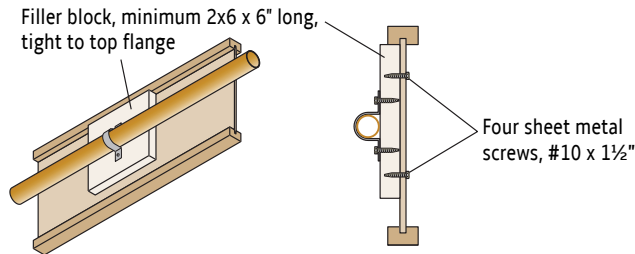
## Red-I90HS™

2 1/2" x 3 1/2"  
RedLam™ LVL  
flanges with  
1/2" OSB web

For load capacities, bearing details, and other information, contact your RedBuilt representative

# RED-I™ JOIST SPRINKLER DETAILS (CPVC PIPE)

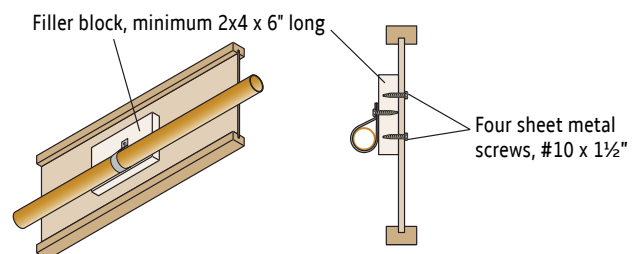
## 12 Surface-Mount Hanger with Double Fastener



Maximum Pipe Diameter	3"
Filler Block Material	DF or SPF

Install per NFPA 13 and manufacturer's instructions

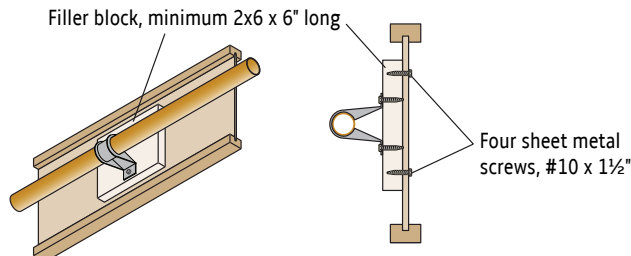
## 13 Surface-Mount Hanger with Single Fastener



Maximum Pipe Diameter	2"
Filler Block Material	DF or SPF

Install per NFPA 13 and manufacturer's instructions

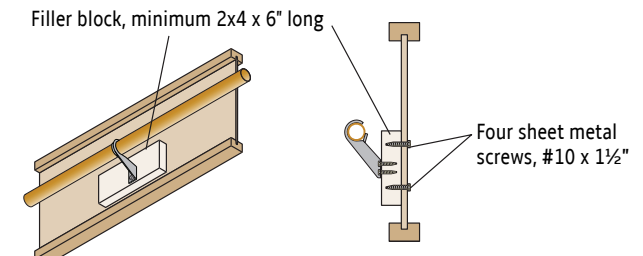
## 14 Offset Hanger



Maximum Pipe Diameter	2"
Filler Block Material	DF or SPF

Install per NFPA 13 and manufacturer's instructions

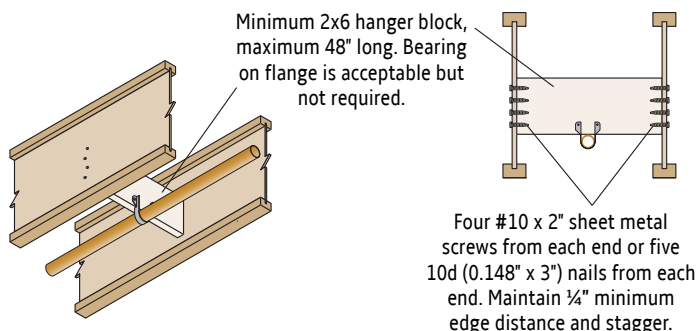
## 15 Double Offset Hanger



Maximum Pipe Diameter	1"
Filler Block Material	DF or SPF

Install per NFPA 13 and manufacturer's instructions

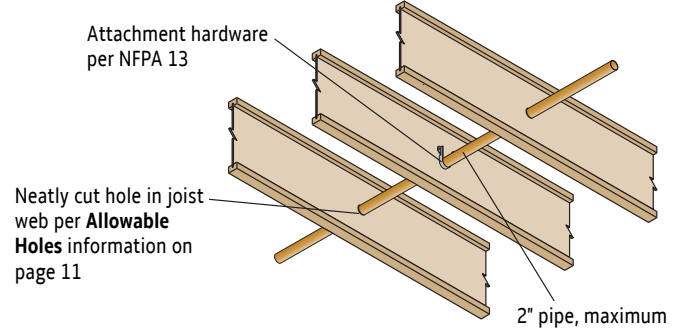
## 16 Face-Mount Hanger



Maximum Pipe Diameter	2"
Filler Block Material	DF or SPF

Install per NFPA 13 and manufacturer's instructions

## 17 Hanger at Web Hole

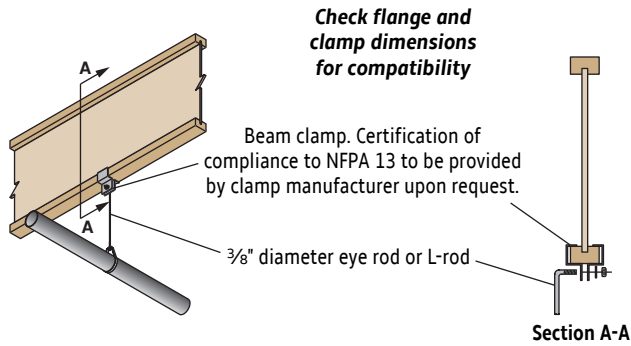


Maximum pipe diameter is 2". Install per NFPA 13 and manufacturer's instructions.

# RED-I™ JOIST SPRINKLER DETAILS

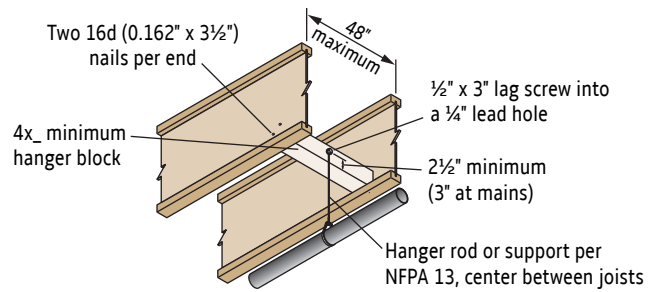
## ALL RED-I™ JOISTS

### 18 Beam Clamp



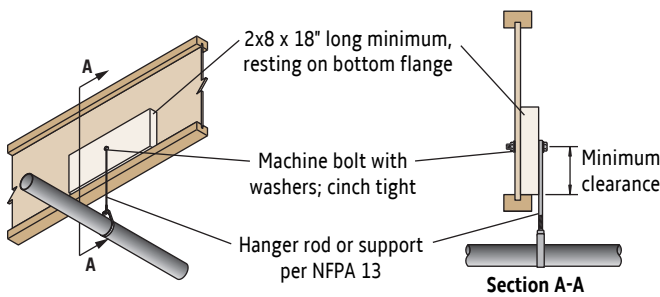
Maximum pipe size: 4"

### 19 Rod with Hanger Block



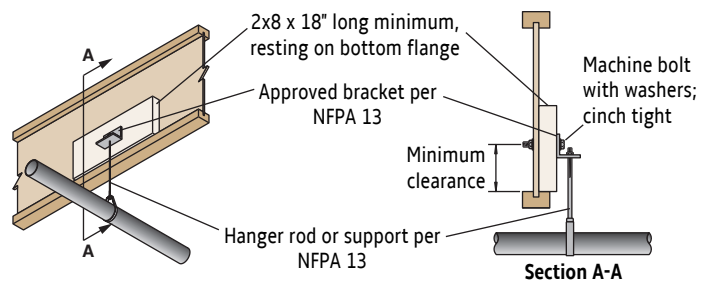
Maximum pipe size: 3" with 1/2" x 3" lag screw

### 20 Rod with Side Bolt



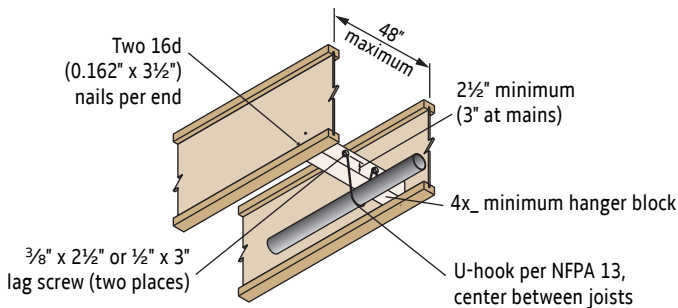
Pipe Size	Machine Bolt Diameter	Minimum Clearance
Up to 2"	3/8"	2 1/2"
2 1/2" to 3"	1/2"	3"

### 21 Rod with Side Bracket



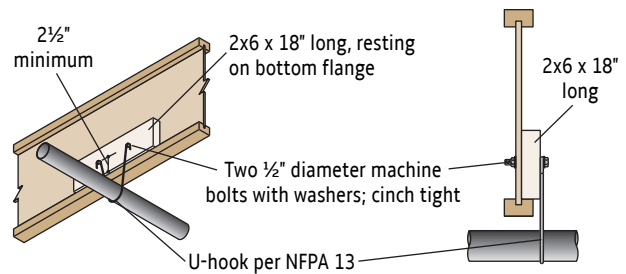
Pipe Size	Machine Bolt Diameter	Minimum Clearance
Up to 2"	1/2"	3"

### 22 U-Hook with Hanger Block



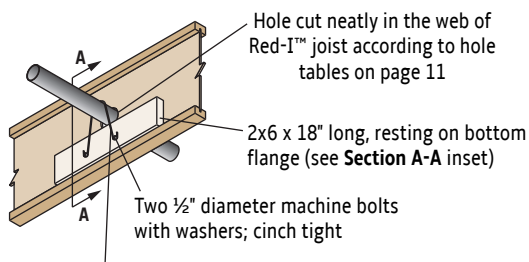
Maximum pipe size: 3 1/2" with 3/8" x 2 1/2" lag screw; 4" with 1/2" x 3" lag screw

### 23 U-Hook with Filler Block

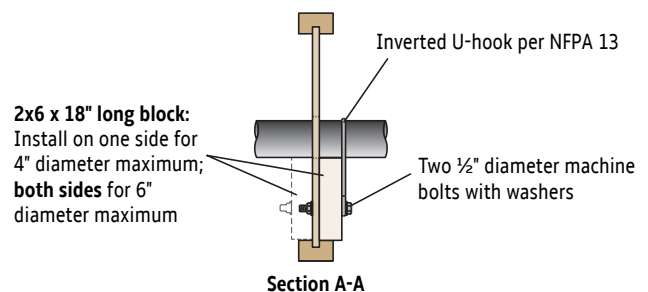


Pipe size at maximum hanger spacing: 4"

### 24 Pipe Through Joist



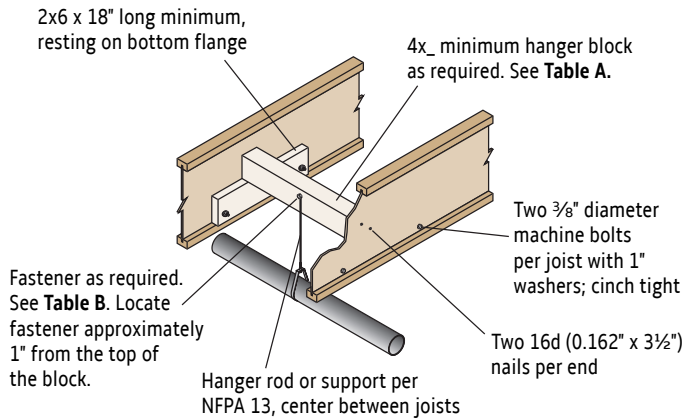
Inverted U-hook per NFPA 13; may be placed as shown or flat against web on the opposite side



Pipe size at maximum hanger spacing: 4" with block on one side; 6" with blocks on both sides.

## ALL RED-I™ JOISTS

### 25 Rod with Hanger and Filler Block



**Table A**

Distance Between Red-I™ Joists	Wood Hanger Block Size
32" or less	4x4 <sup>(1)</sup>
48"	4x6
96"	4x8

(1) For sprinkler main lines, wood hanger block size is 4x6 for 32" or less spacing.

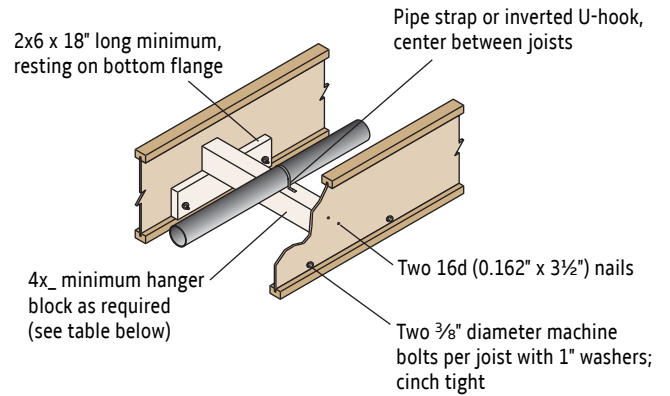
**Table B**

Pipe Size	Fastener
3"	1/2" x 3" lag
5"	1/2" machine bolt
6" <sup>(1)</sup>	5/8" machine bolt

(1) Requires minimum No. 2 grade Douglas fir or southern pine hanger block.

Pipe size at maximum hanger spacing: See Table B

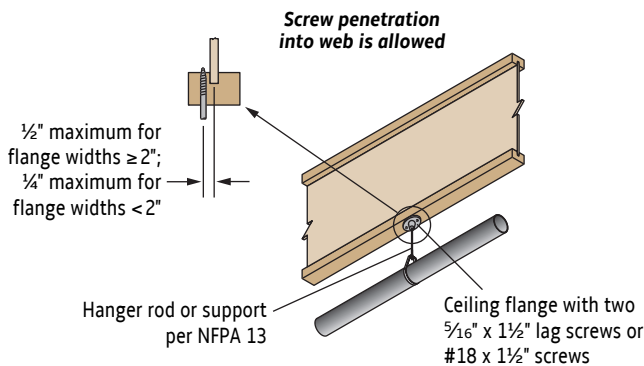
### 26 Pipe on Support Member



Distance Between Red-I™ Joists	Wood Hanger Block Size
32" or less	4x4
48"	4x6
96"	4x8

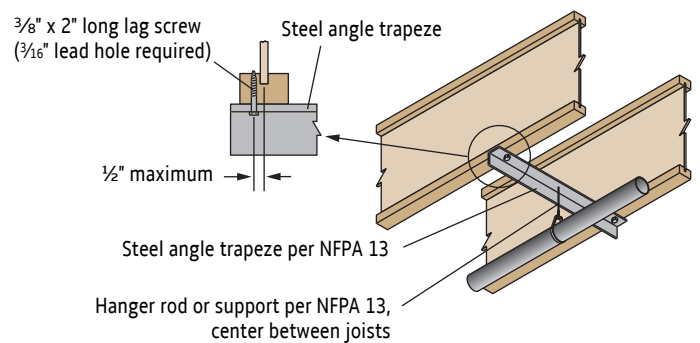
Pipe size at maximum hanger spacing: 6"

### 27 Ceiling Flange



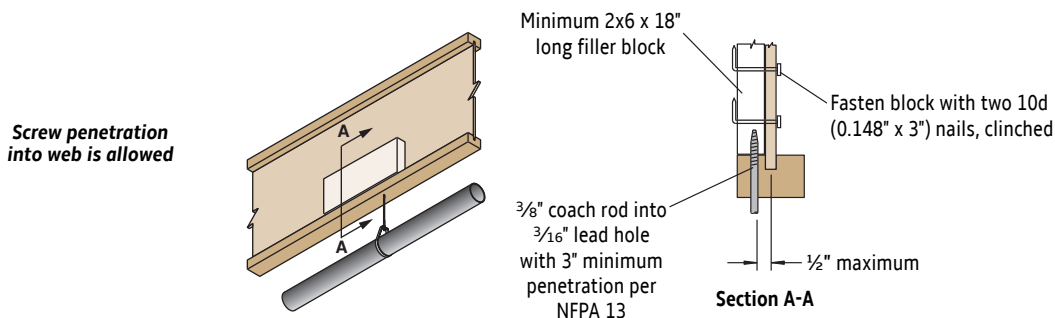
Maximum pipe size: 2"

### 28 Rod with Steel Angle Trapeze



Pipe size at maximum hanger spacing is 4". Center pipe support between joists.

### 29 Coach Screw Into Flange

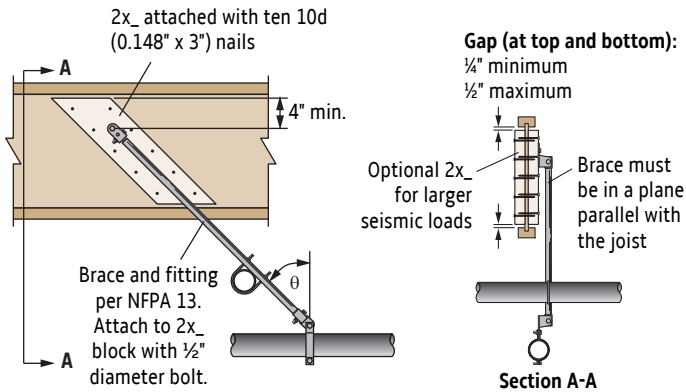


Maximum pipe size: 2"

# RED-I™ JOIST SEISMIC DETAILS

## FOR LOADS PARALLEL OR PERPENDICULAR TO JOISTS

### EQ3 Swivel Sway Brace (Parallel Loads Only)

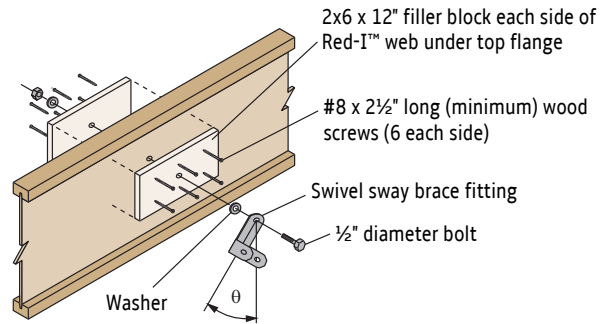


#### Allowable Horizontal Seismic Loads (lbs)

Blocking Condition	Angle to Vertical ( $\theta$ )		
	30°	45°	60°
2x_ on one side	440	505	595
2x_ on both sides	730	830	960

- Loads are based on the controlling connection to the joist.
- Loads include a 1.60 duration factor adjustment.
- Loads may be increased when using Douglas fir blocking.
- Bolt threads must not start before passing through joist web.

### EQ4 Swivel Sway Brace with Filler Blocks

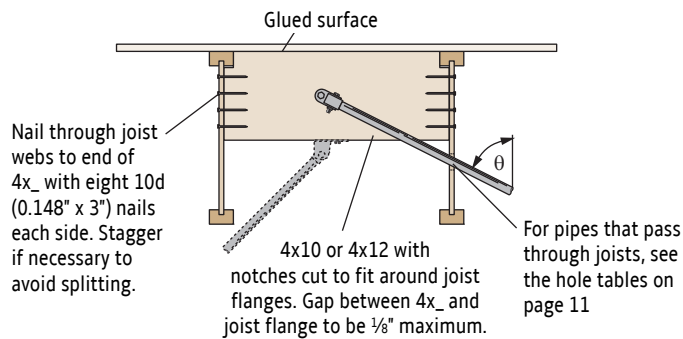


#### Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical ( $\theta$ )		
30°	45°	60°
555	620	690

- Loads are based on the controlling connection to the joist.
- Loads include a 1.60 duration factor adjustment.

### EQ5 Nailed Blocking Panel



#### Allowable Horizontal Seismic Loads (lbs)

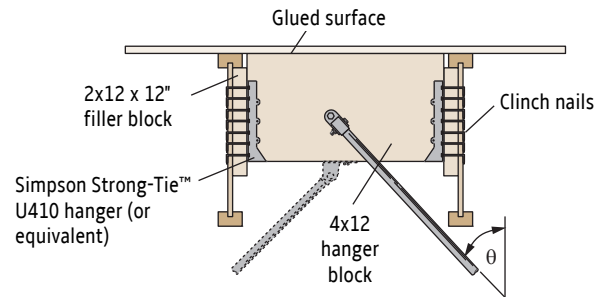
Angle to Vertical ( $\theta$ )		
30°	45°	60°
340 <sup>(1)</sup>	590 <sup>(2)</sup>	600

- (1) 400 if connection is centered on the 4x\_  
 (2) 600 if connection is centered on the 4x\_  
 • Loads are based on the controlling connection to the joist.  
 • The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).  
 • Loads include a 1.60 duration factor adjustment.

#### General Notes

- For loads parallel to the joists, make attachment to the hanger block in the upper half of the block.
- Glue surfaces with elastomeric floor adhesive that meets ASTM D3498 (AFG-01) requirements. Follow manufacturer's recommendations. Glued surfaces must be clean and dust free.
- Make attachment per NFPA 13 near the center of the 4x block. Fastener must be at least 7 diameters from the end of the block and 4 diameters from all other edges.

### EQ6 Blocking Panel in Hangers



#### Allowable Horizontal Seismic Loads (lbs)

Angle to Vertical ( $\theta$ )		
30°	45°	60°
400	690	1,195

- Loads are based on the controlling connection to the joist.
- The capacity of the brace fastener to the wood block may limit the capacity of the detail (see NFPA 13).
- Loads include a 1.60 duration factor adjustment.

#### General Notes

- Before installing in hangers, glue the top face with four 1/4\"/>
- Attach hanger and filler block by nailing through the hanger, block and Red-I™ joist web with ten 10d (0.148\"/>
- For loads parallel to the joists, make attachment to the hanger block in the upper half of the block.
- Make attachment per NFPA 13 near the center of the 4x block. Fastener must be at least 7 diameters from the end of the block and 4 diameters from all other edges.





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### CONTACT US

**1.866.859.6757**

**[www.redbuilt.com](http://www.redbuilt.com)**

**200 E. Mallard Drive, Boise, ID 83706**

**P.O. Box 60, Boise, ID 83707**