Sprinkler Installation for APA Performance Rated I joists Quiz

Instructions **Fee $60**

1. Print these pages and Click Here for the **necessary** installation reference materials.
2. Answer the **Simple questions** that follow the reference materials in a consecutive order.
3. Circle the correct answers and transfer the answers to the answer sheets (see last 3 pages).
4. After answering the simple questions you will become familiar with the new code changes.
5. Page down to the last page for the verification form, answer sheets and mailing instructions.

6 hour course for:

1. Automatic Fire Sprinkler Contractor.
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3. Automatic Fire Sprinkler System Tester
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1. All designs should be checked by a design professional to assure the adequacy of the _____.
    a. hangers
    b. fasteners
    c. capacity of the I-joist
    d. all of the above
2. Chapter ___ of NFPA 13, Standard for the Installation of Sprinkler Systems, lists the approved fasteners for use in wood and other materials.
    a. 8
    b. 9
    c. 10
    d. none of the above
3. Approved fastener for the installation of sprinkler systems includes _____.
    a. lag screws
    b. drive screws
    c. bolts
    d. all of the above
4. Approved fastener for the installation of sprinkler systems includes _____.
    a. wood screws
    b. nails
    c. none of the above
    d. both a or b
5. NFPA 13R, Standard for the Installation of Sprinkler Systems in Residential Occupancies up to and including _____ Stories in height.
    a. 3
    b. 4
    c. 5
    d. none of the above
6. Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes, Section 3-4, requires only that pipes supported by structural members be supported by methods comparable to those required by local _____ codes.
    a. building
    b. heating
    c. plumbing
    d. all of the above

7. _____ would be the Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.
    a. NFPA 13
    b. NFPA 13R
    c. NFPA 13D
    d. all of the above
8. The design load capacities shown in diagrams are based on an assumed maximum span between pipe supports of ___ feet unless otherwise specified.
    a. 8
    b. 10
    c. 12
    d. 15
9. The design load capacities shown in diagrams are based on an assumed the schedule 40 pipe is_____ filled with water.
    a. temporarily
    b. permanently
    c. ½
    d. ¾
10. The design load capacities shown in diagrams are based on an allowance is made for a short-term additional load of _____ pounds.
    a. 100
    b. 150
    c. 200
    d. 250
11. A duration-of-load factor of ____ is used for permanent loads.
    a. 0.9
    b. 1.6
    c. 1.33
    d. all of the above
12. A duration-of-load factor of ____ is used for short-term loads.
    a. 0.9
    b. 1.6
    c. 1.33
    d. all of the above
13. A duration-of-load factor of ____ is used for seismic loads.
    a. 0.9
    b. 1.6
    c. 1.33
    d. all of the above
14. For seismic loads on bracing, spacing of braces depends on _____.
    a. pipe size
    b. length of pipe runs
    c. the seismic design category.
    d. all of the above

15. For installations in_____, lag screw, wood screw and bolt design assumptions are based on the use of AF&PA National Design Specification (NDS) design methods and design capacities for Spruce-Pine-Fir No. 2 with a specific gravity of 0.42.

a. lumber
b. I-joist flanges
c. none of the above
d. both a & b

16. Oriented strand board (OSB) webs are assumed to be _____ inch thick with a design specific gravity of 0.50 per Table ll.3.2B of NDS or APA Panel Design Specification, Form D5l0.

a. ¼
b. 3/8
c. 7/16
d. ½

17. Wood I-joist design tables are designed on an assumed uniform load and automatically includes the added weight of the sprinkler system.

a. true
b. false

18. NPPA l3, Section 9.1.5.7.1, limits the use or coach screws to piping __ inches or less in diameter.

a. 2
b. 3
c. 4
d. none of the above

19. NPPA l3, Section 9.1.5.7.1, requires the coach screws to have a minimum diameter of ___".

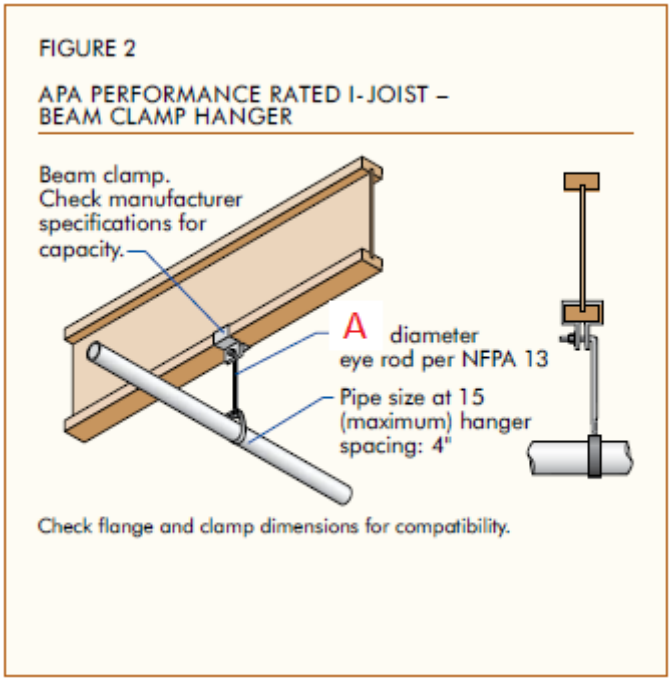
a. ¼
b. 5/16
c. 3/8
d. none of the above

20. NPPA l3, Section 9.1.5.7.1, requires the coach screws threaded portion to penetrate the wood member at least ____".

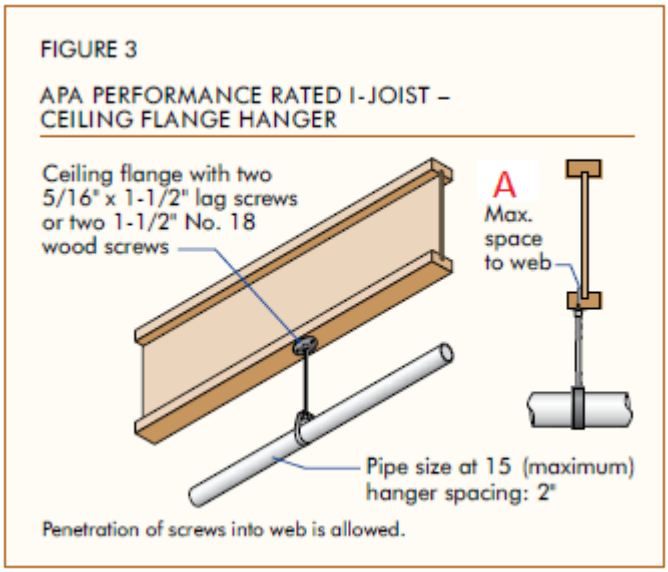
a. 1
b. 2
c. 3
d. 4

21. When the flange, carries a load, the design assumption is that the flange, can safely carry up to ____ pounds per foot of load which must be considered as part of the structural design or the I-joist.

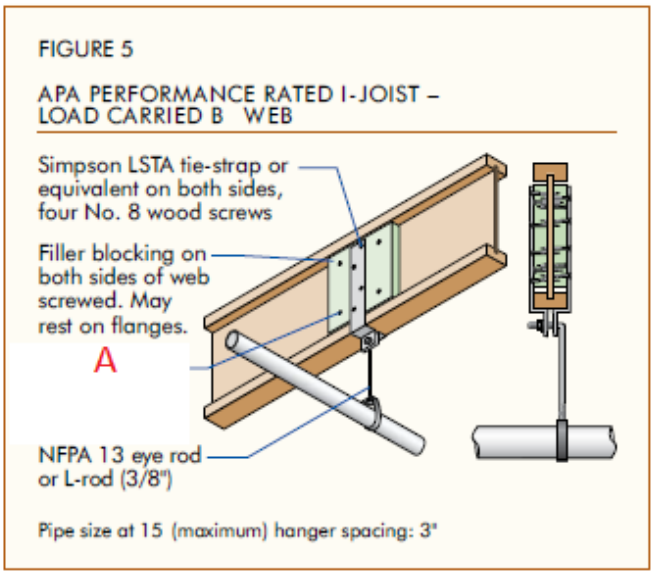
a. 225
b. 275
c. 325
d. 375



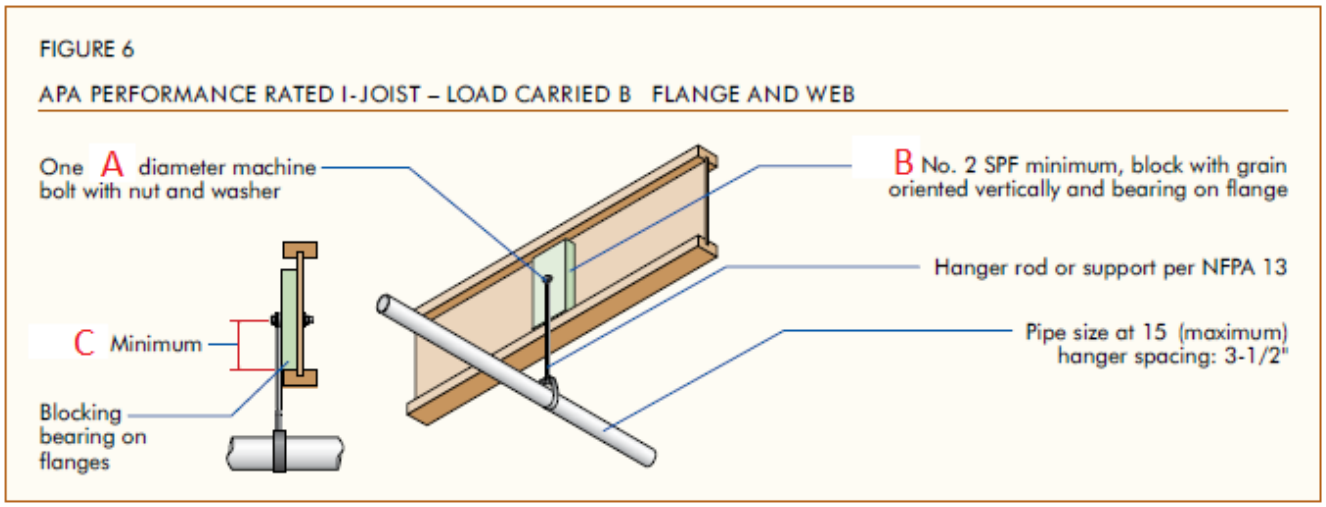
22. "A" in the above figure must be a minimum diameter of ____"
    a. ¼
    b. 5/16
    c. 3/8
    d. 7/16



23. "A" in the above figure must have a maximum spacing to web of ____"
    a. ¼
    b. 5/16
    c. 1/2
    d. 7/16



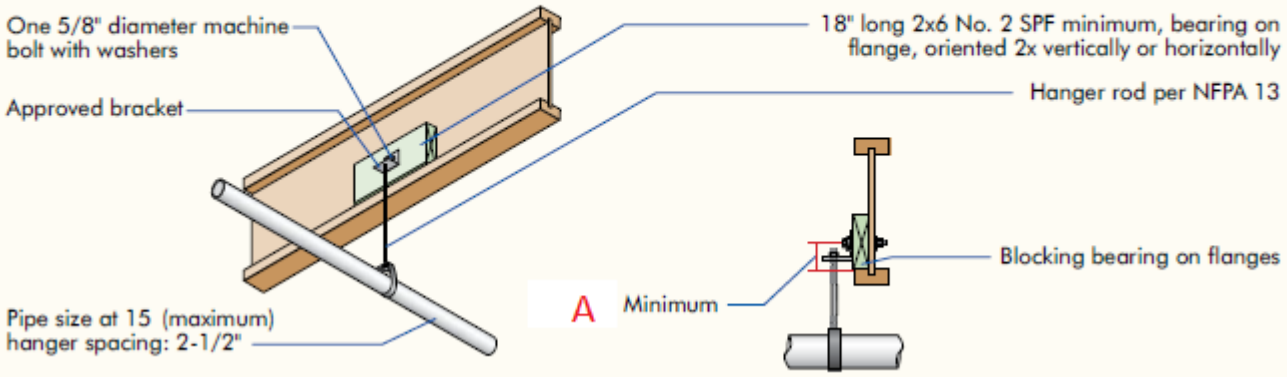
24. "A" in the above figure requires the use of four 3" (No. 8) ____ on each side?
    a. nails
    b. through bolts
    c. screws
    d. 7/16



25. "A" in the above figure requires the use of one ____" bolt?
    a. 3/8
    b. 1/2
    c. 5/8
    d. 7/16
26. "B" in the above figure would require a minimum blocking of ____?
    a. 2 x 2
    b. 2 x 4
    c. 2 x 6
    d. all of the above
27. The minimum distance for "C" in the above figure would be ____ inches?
    a. 2
    b. 3
    c. 3.5
    d. 5.5

FIGURE 7

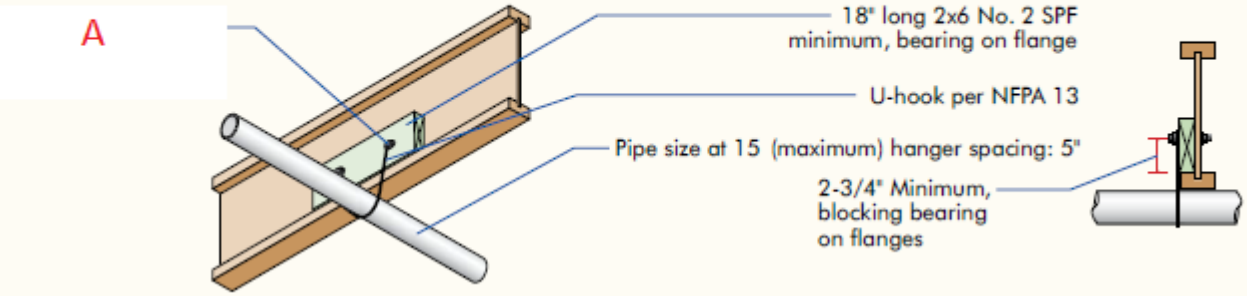
APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B FLANGE AND WEB



28. The minimum spacing for "A" in the above figure would be ____ inches?
    a. 2
    b. 2 1/2
    c. 2 ¾
    d. 3

FIGURE 8

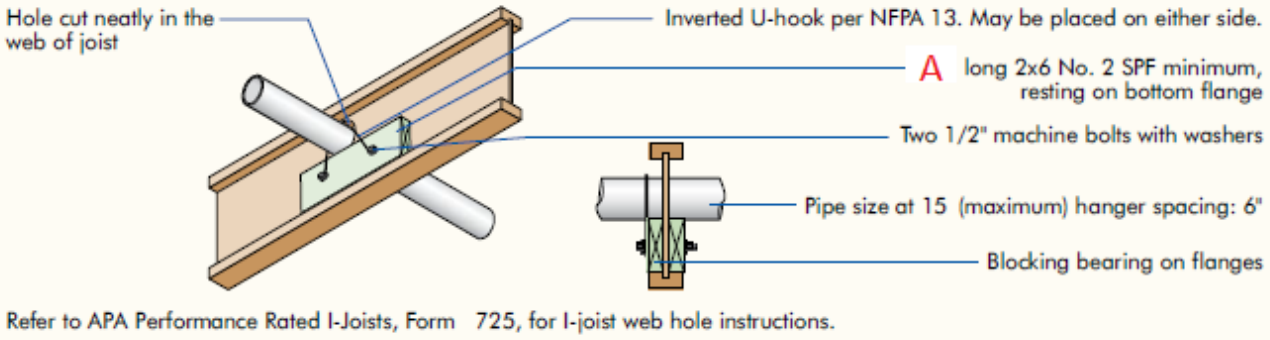
APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B FLANGE AND WEB



29. The minimum requirement for "A" in the above figure would be?
    a. one ½" diameter machine bolt with nuts and washers
    b. two 3/8" diameter machine bolts with nuts and washers
    c. two 1/2" diameter machine bolts with nuts and washers
    d. none of the above

FIGURE 10

APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B FLANGE AND WEB

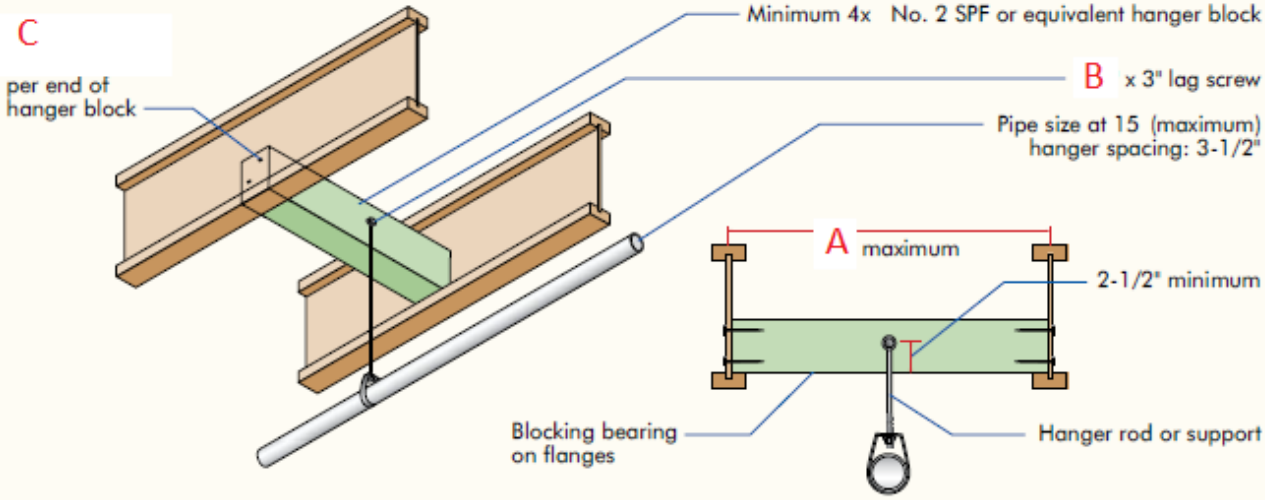


Refer to APA Performance Rated I-Joists, Form 725, for I-joist web hole instructions.

30. The minimum requirement for "A" in the above figure would be ____ inches?
    a. 12
    b. 16
    c. 18
    d. 24

FIGURE 11

APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B FLANGES

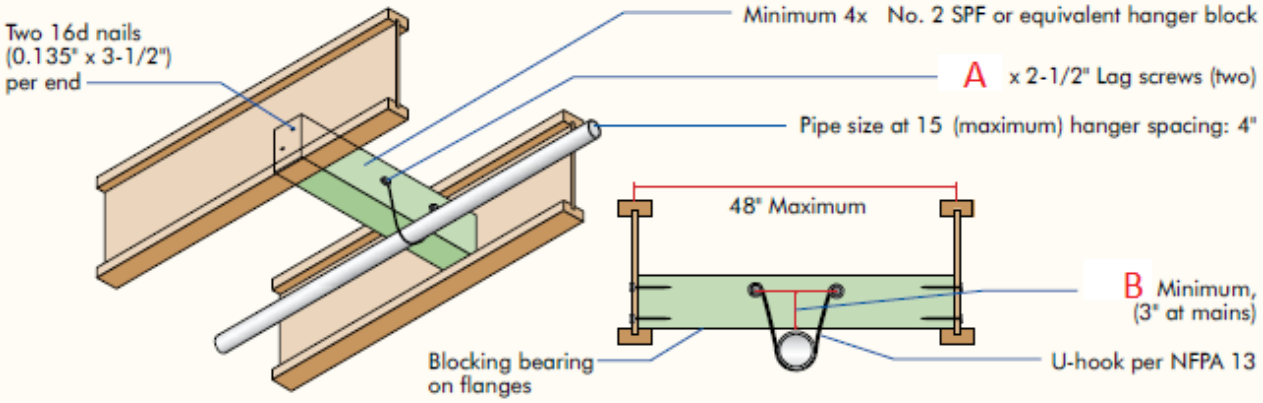


31. The maximum spacing for "A" would be ____ inches in the above figure?
    a. 32
    b. 48
    c. 20
    d. 24
32. The minimum requirement for "B" would be ____ inches in the above figure?
    a. 3/8
    b. 1/2
    c. 5/8
    d. 7/16
33. The minimum requirement for "C" would be ____ in the above figure?
    a. two 16d screws
    b. two 16d nails

c. two 10d nail
d. both a & b

FIGURE 12

APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B FLANGES



34. The minimum requirement for "A" would be ____ inches in the above figure?
    a. 3/8
    b. 1/2
    c. 5/8
    d. 7/16
35. The minimum requirement for "B" would be ____ inches in the above figure?
    a. 2 3/8
    b. 2 1/2
    c. 2 5/8
    d. 2 7/16

FIGURE 13

APA PERFORMANCE RATED I-JOIST – LOAD CARRIED B WEB AND FLANGES

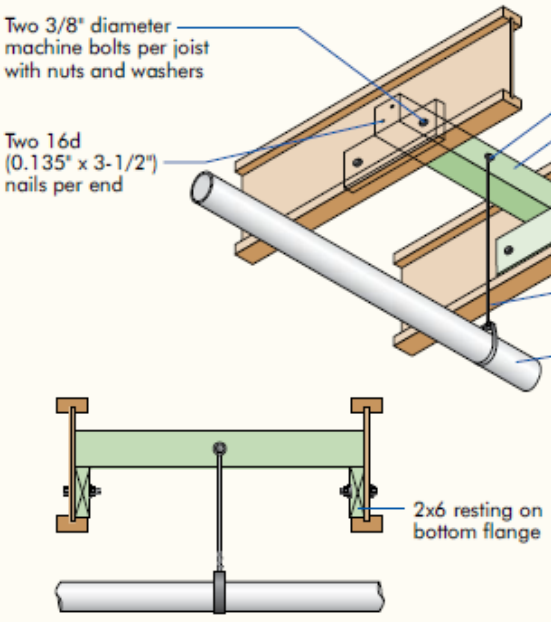


TABLE 13a

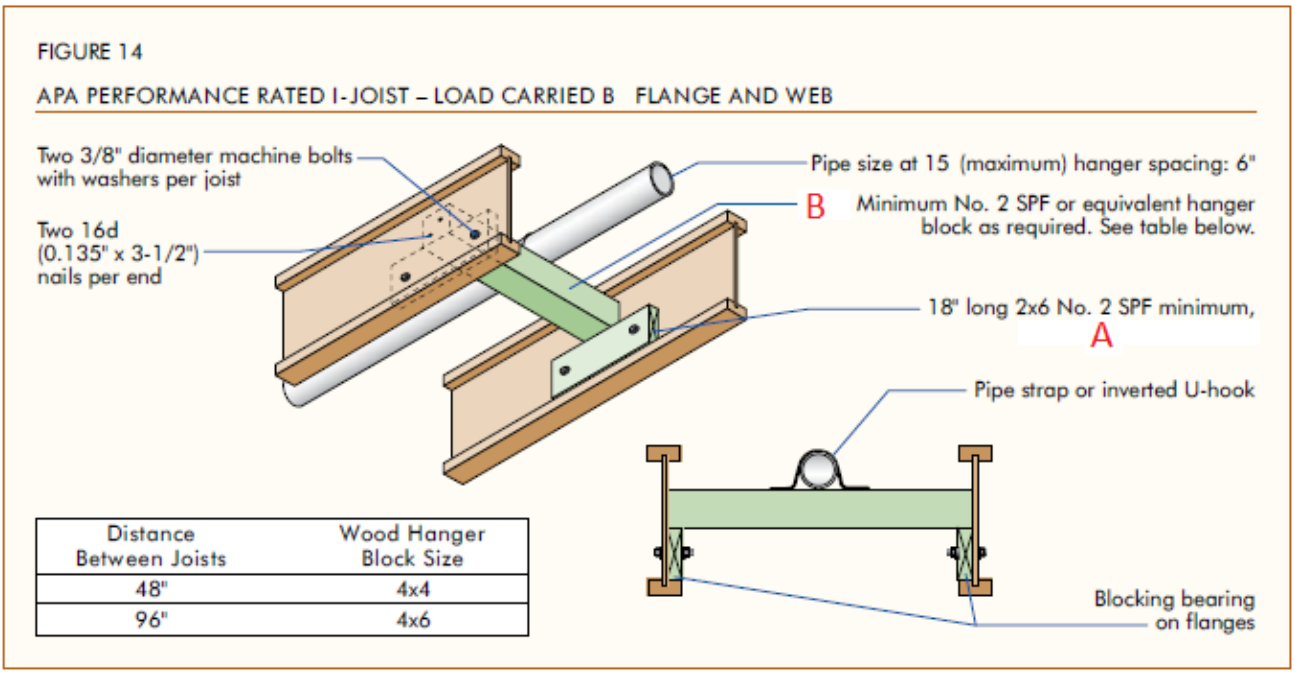
Distance Between Joists	Wood Hanger Block Size (nominal)
A	4x4
B	4x6

TABLE 13b

Pipe Size	Fastener
C	3/8" bolt
D	1/2" bolt
E	3/4" bolt

Steel side member F thick minimum

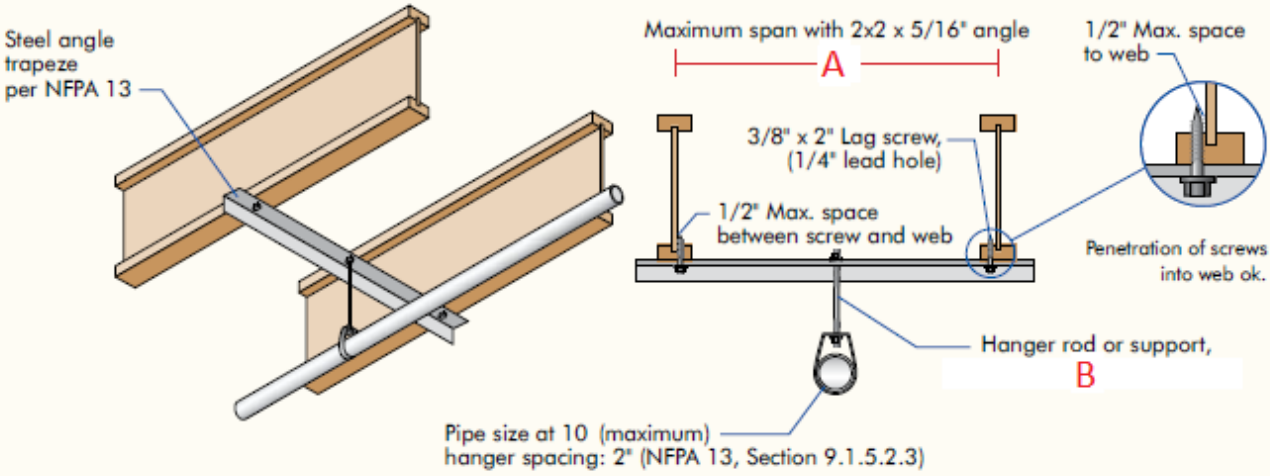
36. The maximum spacing for “A” would be ____ inches in the above figure ?
    a. 32
    b. 48
    c. 96
    d. 24
37. The maximum spacing for “B” would be ____ inches in the above figure ?
    a. 32
    b. 48
    c. 96
    d. 24
38. “___” in the above figure would allow a pipe size up to 5”
    a. C
    b. D
    c. E
    d. none of the above
39. The steel side member must be a ___” thick minimum in the above figure.
    a. 1/16
    b. 1/8
    c. 3/16
    d. 1/4
40. “___”in the above figure would allow a pipe size up to 6”
    a. C
    b. D
    c. E
    d. none of the above



41. The letter “A” in the above figure requires the 18” long 2 x 4 No. 2 SPF to be supported by the top flange.
    a. true
    b. false
42. The letter “B” in the above figure requires a wood member to be 2x minimum lumber.
    a. true
    b. false

FIGURE 15

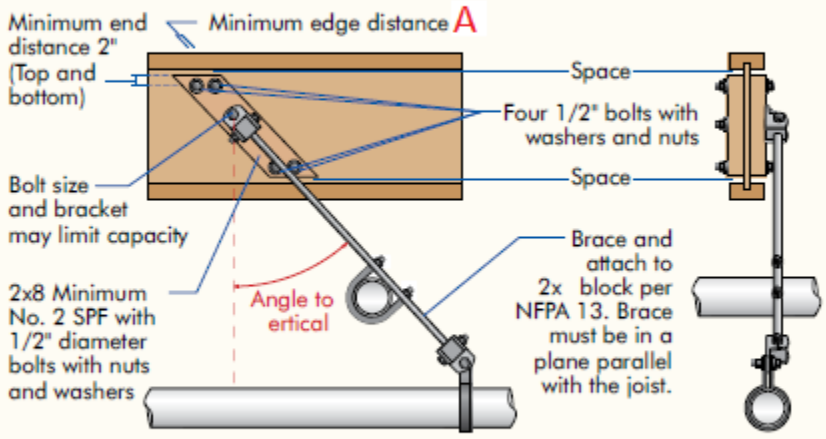
APA PERFORMANCE RATED I-JOIST – TRAPE E HANGER



43. The maximum span for "A" in the above figure would be ____ inches.
    a. 24
    b. 32
    c. 48
    d. 60
44. The letter "B" in the above figure requires the pipe to be centered.
    a. true
    b. false

FIGURE 16a

APA PERFORMANCE RATED I-JOIST – BOLTED DIAGONAL SEISMIC BRACE



Allowable load: lb/brace

Blocking Condition	Angle to 30	ertical 45	60
2x on one side	400	560	690
2x on both sides	510	720	880

With 3-1/2" end distance, 1/2 tabulated values with 2" end distance.

Loads include a B duration of load factor (DOL) adjustment.

Do not use this detail for loads perpendicular to the joist.

Make connection in top half of block, centered at least C from the end of the block.

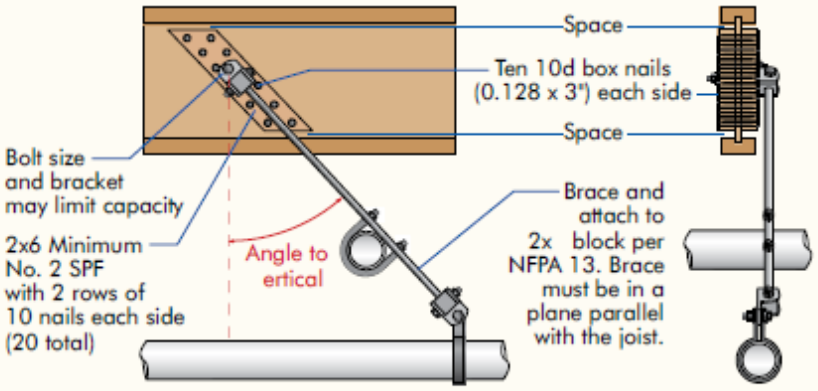
The direction of the wood grain in the block is approximately parallel with the brace.

45. Minimum edge distance for "A" in the above figure would be?
    a. 1"
    b. 2"
    c. 3"
    d. 4"

46. The letter “B” above represents a duration of load factor adjustment of ____?
    a. 0.9
    b. 1.6
    c. 1.33
    d. both b & c
47. The letter “C” in the above figure requires ___” from the end?
    a. 1”
    b. 2”
    c. 3”
    d. 4”

FIGURE 16b

APA PERFORMANCE RATED I-JOIST – NAILED DIAGONAL SEISMIC BRACE



Allowable load: lb/brace

Blocking Condition	Angle to ertical 30	45	60
2x on one side	420	590	730
2x on both sides	560	800	980

Loads include a 1.33 DOL adjustment.

Do not use this detail for loads perpendicular to the joist.

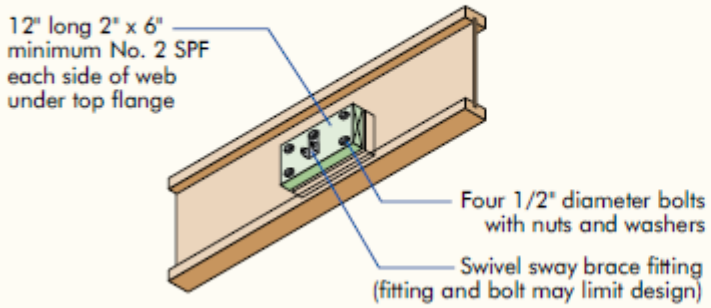
Make connection in top half of block, centered at least 4" from the end of the block.

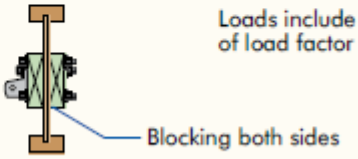
The direction of the wood grain in the block is approximately parallel with the brace.

48. The figure above details _____ diagonal seismic bracing.
    a. bolted
    b. screwed
    c. glued
    d. none of the above
49. The allowable load with 2x blocking on both sides and angle to ertical of 60 would be _____?
    a. 590
    b. 800
    c. 980
    d. 730
50. The 2 x 6 blocking in the above figure requires ___ nails on each side?
    a. 10
    b. 15
    c. 20
    d. nails not allowed

FIGURE 17a

APA PERFORMANCE RATED I-JOIST – BOLTED 2 BLOC ING





Allowable load: lb/brace

Angle to ertical		
30	45	60
510	720	880

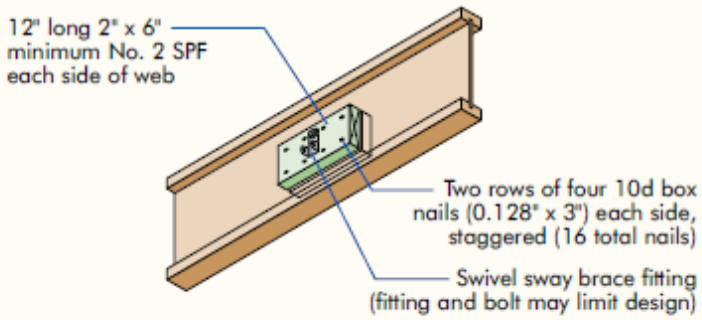
Loads include a 1.33 duration of load factor adjustment.

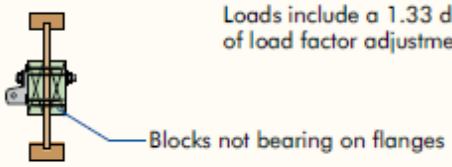
See Figures 16a and 16b for angle to vertical.

51. The figure above requires blocking only on one side.
    a. true
    b. false

FIGURE 17b

APA PERFORMANCE RATED I-JOIST – NAILED 2 BLOC ING





Allowable load: lb/brace

Angle to ertical		
30	45	60
420	590	730

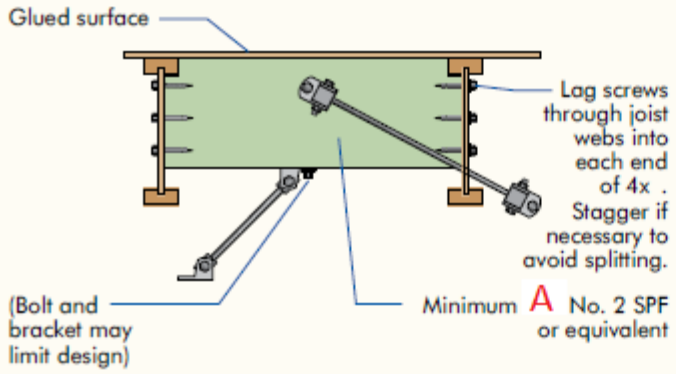
Loads include a 1.33 duration of load factor adjustment.

See Figures 16a and 16b for angle to vertical.

52. The above figure requires ____ 10d nails total?
    a. 10
    b. 12
    c. 16
    d. 20

FIGURE 18a

APA PERFORMANCE RATED I-JOIST – BRACING BLOC BETWEEN JOISTS – LAG SCREWS



Allowable load: lb/brace

Connections	Angle to 30	45	ertical 60
Three 1/2" x 2-1/2" lags each side	340	490	600
Three 5/8" x 2-1/2" lags each side	440	620	760

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 1.33 DOL adjustment.

For loads parallell to the joist, make attachment to the hanger block in the upper half of the blo ck.

Glue surfaces with approved elastomeric floor adhesive ASTM D 3498 (AFG-01). Follow manufacturer s recommendations. Glued surfaces must be clean and dust free.

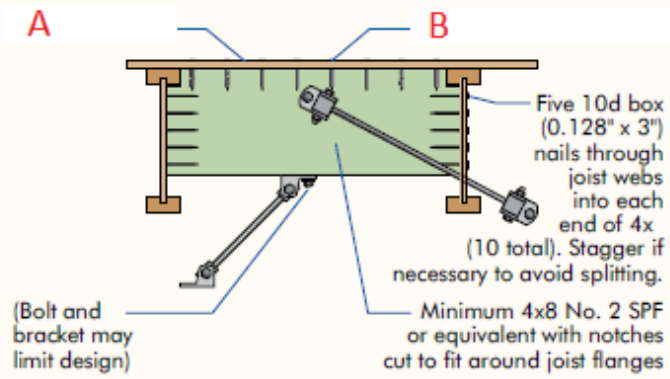
Make attachment per NFPA 13 near the center of the 4x8 block.

See Figures 16a and 16b for angle to vertical.

53. The letter "A" above figure requires a minimum size of ____?
    a. 2 x 8
    b. 4 x 6
    c. 4 x 8
    d. none of the above
54. Three 5/8" x 2 ½" lag screws on each side would allow a load of ____ at an angle of 30?
    a. 600
    b. 440
    c. 620
    d. 760

FIGURE 18b

APA PERFORMANCE RATED I-JOIST – BRACING BETWEEN JOISTS – NAILS AND WOOD SCREWS



Allowable load: lb/brace

Connections	Angle to 30	45	ertical 60
Eight No. 10 x 3" wood screws	450	630	770

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 1.33 DOL adjustment.

For loads parallell to the joist, make attachment to the hanger block in the upper half of the block.

Glue surfaces with approved elastomeric floor adhesive ASTM D 3498 (AFG-01). Follow manufacturer s recommendations. Glued surfaces must be clean and dust free.

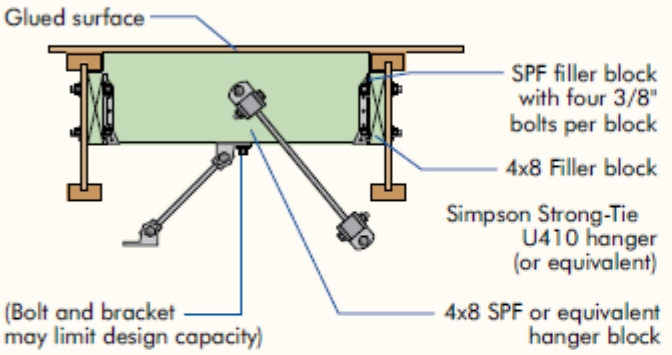
Make attachment per NFPA 13 near the center of the 4x8 block.

See Figures 16a and 16b for angle to vertical.

55. The letter “A” in the above figure represents a nail surface.
    a. true
    b. false
56. The letter “B” in the above figure represents ____ No 10 x 3” wood screws.
    a. 6
    b. 7
    c. 8
    d. all of the above

FIGURE 19

APA PERFORMANCE RATED I-JOIST – BRACING BLOC ON METAL HANGERS



Allowable load: lb/brace

Connections	Angle to ertical 30	45	60
3/8" x 2-1/2" bolts in filler blocks	680	960	1180

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 1.33 DOL adjustment.

Hanger capacity may limit design – see manufacturer s recommendations

Before installing hangers, glue the top face with four 1/4" beads of approved elastomeric floor adhesive ASTM D3498 (AFG-01). Follow manufacturer s recommendations.

Attach hanger and filler block by nailing through the block and joist web.

Install hanger block on hanger per manufacturer s recommendations.

For loads parallel to the joist, 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.

See Figures 16a and 16b for angle to vertical.

57. The filler block in the above figure requires ___ bolts per block?
    a. 2
    b. 3
    c. 4
    d. 6

TABLE A

SCHEDULE 40 PIPE SIZES, SPANS AND WEIGHTS (NFPA 13)

Nominal Size (in.)	Max. Dist. Between Hangers[a] (ft)	Hanger Load at Max. Spacing: (Pipe Plus Water) (lb/hanger)	Conc. Load Requirement per hanger for Design[c] (lb)	Short-term Design Load[c],[d],[e] (lb per hanger)
1	12	25	250	275
1-1/4	12	35	250	285
1-1/2	15	54	250	304
2	15	77	250	327
2-1/2	15	118	250	368
3	15	162	250	412
3-1/2	15	202	250	452
4	15	246	250	496
5	15	352	250	602
6	15	476	250	726
8[f]	15	716	250	966

Notes:

(a) Maximum distance between hangers: NFPA 13, Table 9.2.2.1(a).

(b) Piping weights: NFPA 13 per Automatic Sprinkler Systems Handbook, Table 9.3.5.6.

(c) For design-capacity requirements: NFPA 13, A9.2.1.3 (1 x weight of water-filled pipe PLUS 250 lb).

(d) Minimum bolt & lag screw sizes for side loads: NFPA 13, Table 9.1.5.3.1 (3/8" for pipes to 2" diameter, 1/2" for pipes to 6" diameter and 5/8" for pipes to 8" diameter).

(e) Nails are not acceptable for fastening hangers, NFPA 13, Section 9.1.5.5.

(f) Schedule 30 pipe.

58. According to table A above an eight inch diameter pipe would require an ___ inch bolt?
    a. 3/8
    b. 7/16
    c. ½
    d. 5/8

TABLE B

MINIMUM LAG SCREW AND BOLT SIZES FOR USE WITH SIDE LOAD

Pipe Size (in.)	Minimum Lag Screw and Bolt Diameter[a] (in.)	Minimum Lag Screw Length[a] (in.)	Lag Screw Predrill Dia.[b] (in.)	Maximum Bolt Hole Dia.[c] (in.)
Up to 2	3/8	2-1/2	9/64	7/16
2-1/2 to 6	1/2	3	1/4	9/16
to 8	5/8	3	11/32	11/16

(a) NFPA 13, Table 9.1.5.3.1.

(b) NFPA 13, 9.1.5.3.3, predrill all holes for lag screws 1/8" less than root diameter.

(c) NFPA 13, 9.1.5.3.4.

TABLE C

MINIMUM EDGE DISTANCE: LAG SCREWS AND BOLTS[a]

Lag Screw and Bolt Diameter[a] (in.)	Min. Edge Dist. Parallel to Grain: Unloaded Edge (in.)	Min. Edge Dist. Perp. to Grain: Loaded Edge (in.)	Min. Edge Dist. Perp. to Grain: Unloaded Edge (in.)
3/8	9/16	1-1/2	9/16
1/2	3/4	2	3/4
5/8	15/16	2-1/2	15/16

(a) NDS, Section 11.5.

59. (Table C) The minimum above edge distance for a half inch bolt parallel to grain and unloaded is ___ inch?

a. 9/16
b. ¾
c. 15/16
d. none of the above

TABLE D

LOAD CAPACITY: FASTENERS WITH 3/8" OSB SIDE MEMBERS[a]

Lag Screw Diameter[a],[c] (in.)	Penetration into Main Member (in.) Lateral Load Capacity[b] (lb) 1	1-1/2	2	Withdrawal Capacity[d] (lb/in.)
3/8	61	90	91	235
1/2	77	111	129	291
5/8	90	128	164	344
Bolt Diameter[a] (in.)	**1**	**1-1/2**	**2**	
3/8	87	127	131	
1/2	104	149	174	
5/8	119	170	218	
Wood Screw[c] Size No.	**1**	**1-1/2**	**2**	**Withdrawal Capacity[d] (lb/in.)**
16	55	73	–	135
18	59	81	–	148
20	63	89	–	161

(a) NDS Section 11.3.1.

(b) Side Member 3/8" OSB, SG Main Member = 0.42, DOL = 1.0, Load Perpendicular to Grain, Single Shear.

(c) End Grain Factor, C_{eg} = 0.67.

(d) Per **threaded** inch: full length of lag screws and wood screws is not threaded.

60. (Table D) The above 18 wood screw that penetrates into the main member 2" would have a lateral load capacity of _____ lbs.?

a. 73
b. 89
c. 63
d. none of the above

TABLE E

LOAD CAPACITY: FASTENERS WITH 1/8" STEEL SIDE MEMBER[a]

Lag Screw Diameter[c] (in.)	Penetration into Main Member (in.) Lateral Load Capacity[b] (lb)					
	1	1-1/2	2	2-1/2	3	3-1/2
3/8	88	115	135	–	–	–
1/2	112	143	179	217	225	–
5/8	131	165	205	248	292	331
Bolt Diameter[c] (in.)	**1**	**1-1/2**	**2**	**2-1/2**	**3**	**3-1/2**
3/8	125	163	205	246	–	–
1/2	150	192	241	292	345	391
5/8	174	219	272	329	388	448
Wood Screw[c] Size No.	**1**	**1-1/2**	**2**	**2-1/2**	**3**	**3-1/2**
16	79	105	113	–	–	–
18	84	112	125	–	–	–
20	90	118	144	–	–	–

(a) NDS Section 11.3.1.

(b) Side Member 1/8" ASTM 436 Steel, SG Main Member = 0.42, DOL = 1.0, Load Perpendicular to Grain, Single Shear.

(c) End Grain Factor, C_{eg} = 0.67.

61. (Table E) A ½ inch lag screw that penetrates into the main member 2" would have a lateral load capacity of _____ lbs.?

a. 135
b. 188
c. 205
d. none of the above

Sprinkler Installation for APA Performance Rated I joists Quiz-Answer Sheet

1	a	b	c	d	21	a	b	c	d	41	a	b	c	d
2	a	b	c	d	22	a	b	c	d	42	a	b	c	d
3	a	b	c	d	23	a	b	c	d	43	a	b	c	d
4	a	b	c	d	24	a	b	c	d	44	a	b	c	d
5	a	b	c	d	25	a	b	c	d	45	a	b	c	d
6	a	b	c	d	26	a	b	c	d	46	a	b	c	d
7	a	b	c	d	27	a	b	c	d	47	a	b	c	d
8	a	b	c	d	28	a	b	c	d	48	a	b	c	d
9	a	b	c	d	29	a	b	c	d	49	a	b	c	d
10	a	b	c	d	30	a	b	c	d	50	a	b	c	d
11	a	b	c	d	31	a	b	c	d	51	a	b	c	d
12	a	b	c	d	32	a	b	c	d	52	a	b	c	d
13	a	b	c	d	33	a	b	c	d	53	a	b	c	d
14	a	b	c	d	34	a	b	c	d	54	a	b	c	d
15	a	b	c	d	35	a	b	c	d	55	a	b	c	d
16	a	b	c	d	36	a	b	c	d	56	a	b	c	d
17	a	b	c	d	37	a	b	c	d	57	a	b	c	d
18	a	b	c	d	38	a	b	c	d	58	a	b	c	d
19	a	b	c	d	39	a	b	c	d	59	a	b	c	d
20	a	b	c	d	40	a	b	c	d	60	a	b	c	d
										61	a	b	c	d

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