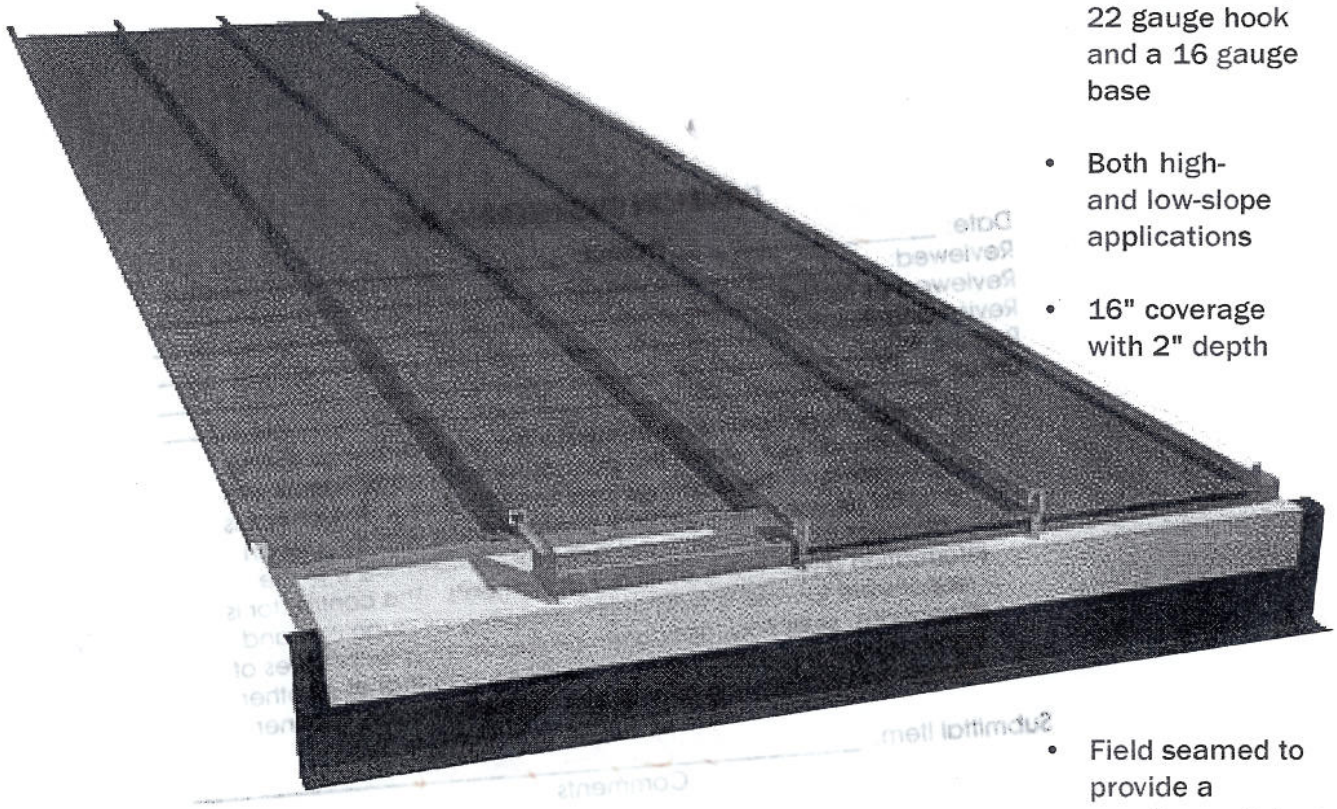
VP ROOF SYSTEMS

STYLE	FEATURES
SLR ROOF	ARCHITECTURAL AND STRUCTURAL STANDING SEAM ROOF SYSTEM WITH LOW SLOPE CAPABILITIES Dammon # 22



- Thermally responsive galvanized panel clips combining a 22 gauge hook and a 16 gauge base
- Both high- and low-slope applications
- 16" coverage with 2" depth
- Field seamed to provide a weather resistant joint
- Includes ThermalBlock

For a roof that combines good looks, flexibility and strength, choose SLR. Using factory installed sealant, galvanized clips and field seaming, this roof system provides unsurpassed performance and leak resistance.

Project NAME: Stennis Riverine
Contract: N69450-05-D-0096
BREW Proj.: 3013-70
Submittal: 13125-03
Reviewed
Reviewed by: J. Collins
DATE: 2/12/09

VP BUILDINGS
VARCO PRUDEN

BROADMOOR, L.L.C.

I hereby agree that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number N69450-05-D-0096, is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

Robert Wells E.S.C.S
DQC Manager — Date

QC Officer — Date 5/8/09

DAMMON ENGINEERING INC

Date: 5-8-09
Reviewed: X
Reviewed as Noted:
Revise and Resubmit:
Rejected:
Other:
Project: STEWARTS ROOF

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. This contractor is responsible for confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his or her work with that at all other trades and performing all in a safe and satisfactory manner.

Submittal Item: SL R ROOF
Comments

- Comply with NRCA Manual

SLR PANELS FORM A SINGLE-UNIT MEMBRANE ROOF COMBINING STRENGTH, DURABILITY AND GOOD LOOKS

SLR ROOF

For a roof that combines good looks, flexibility and strength, VP ś SLR Standing Seam Roof delivers an attractive and versatile solution.

SLR panels are standard in either 24 gauge steel or 22 gauge steel with a 2 inch standing seam. The panel is 16" wide and is available in lengths up to 42'. The panel includes a factory installed sealant bead in the side joint for increased weathertightness.

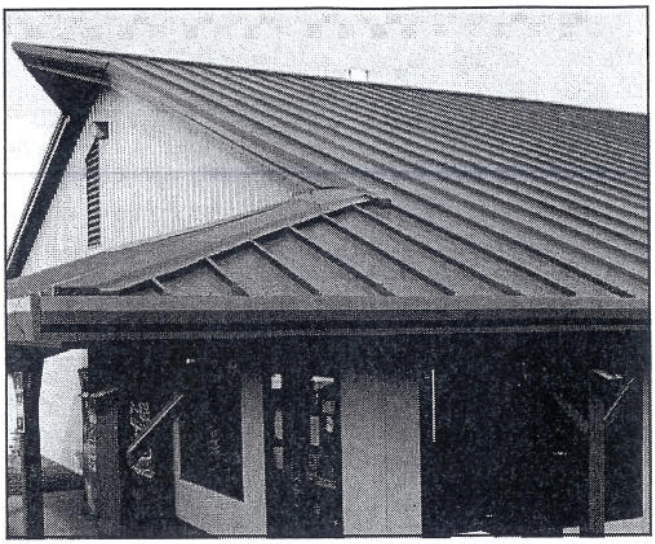
SLR panels are field-machine seamed in place, yielding a single unit membrane. The panels are installed with thermally responsive galvanized panel clips combining a 22 gauge hook and a 16 gauge base. These clips allow for thermal movement 1 "in either direction. SLR ś concealed clips attach the panels to structural members and minimize the need for through-the-roof fasteners. SLR can be installed over a variety of substrates or open framing. Roof slopes can be as low as 1/4:12.

SLR Roofs can accommodate up to 6 inches of fiberglass blanket insulation for high levels of energy efficiency.

All gauges of SLR Roof are available with KXL finish in 13 standard colors as well as a variety of custom colors.

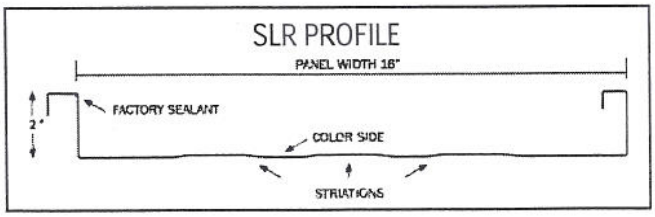
The KXL paint system is a PVDF finish applied to the Galvalume® surface to give a long-life color that resists fading and chalking. KXL is a 1 mil nom. PVDF finish with a 70% Kynar®500 or Hylar®5000 standard.

UL 90 wind uplift rating is available with supports at 5'-0" on center. SLR is also US Army Corps of Engineers approved for wind uplift resistance. ThermalBlock is included.



FEATURES

- Roof slope as low as 1/4" in 12"
- Field seamed to provide a weather resistant joint
- 16" coverage with 2" depth
- UL 90 rated system
- US Army Corps of Engineers approved per CEGS 07416
- 24 & 22 gauge Galvalume® steel



NOTE: ALL PANELS FORMED FROM LIGHT GAUGE METAL MAY EXHIBIT WAVINESS, ALSO KNOWN AS "OIL CANNING," COMMONLY OCCURRING IN, BUT NOT RESTRICTED TO, FLAT PORTIONS OF A PANEL. THIS INHERENT CHARACTERISTIC IS NOT A DEFECT OF MATERIAL OR MANUFACTURING AND IS NOT CAUSE FOR REJECTION.

VP BUILDINGS
VARCO PRUDEN

The Ultimate Building Solution

VP Buildings
3200 Players Club Circle
Memphis, TN 38125
1-800-238-3246 • vp.com
2077 Revised 9/05

IAS

FM APPROVED

QUALITY CERTIFICATION METAL BUILDINGS

Dammon # 32

Dow Building Solutions

1 PRODUCT NAME
THERMAX™ Sheathing

2 Manufacturer

The Dow Chemical Company
Building Solutions
200 Larkin
Midland, MI 48674
1-866-583-BLUE (2583)
Fax 1-989-832-1465
www.dowbuildingsolutions.com

3 Product Description

THERMAX™ Sheathing is a non-structural, rigid board insulation consisting of a glass-fiber-reinforced polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum foil facers on both sides. The glass-fiber reinforcement, along with chemical modifications, contributes to improved fire performance and dimensional stability. THERMAX Sheathing can be installed exposed to the interior without a thermal barrier.

BASIC USE

THERMAX™ Sheathing is specially designed to have a Class A fire rating and can be used in a range of concealed and exposed applications, above and below grade. Because of its improved fire performance, THERMAX Sheathing is especially appropriate for hourly rated assemblies. THERMAX Sheathing also has approval in exterior multistory steel stud walls with brick cladding. See IBC Section 2603.5.

SIZES

Width and length:
4' x 8', 4' x 9', 4' x 10'
Edge treatments:
Square edge, shiplap

Product thicknesses and R-values are shown in Table 1. Not all products are available in all parts of the country. Additional product sizes are available by custom order.

TABLE 1

THERMAX™ Sheathing R-Values	
Nominal Foam Thickness, in.	Stabilized R-Value[1, 2]
0.5	3.3
0.75	5.0
1.0	6.5
1.25	8.1
1.55	10.1
1.75	11.4
2.0	13.0
2.5	15.8
3.0	19.0
3.5	22.1
4.0	25.2

(1) R means resistance to heat flow. The higher the R-value, the greater the insulating power. Stabilized R-values @ 75°F mean temperature determined in accordance with ASTM C518.
(2) R-values expressed in ft²•h•°F/Btu.

Consult your Dow representative about other sizes and lead-time requirements.

4 Technical Data

APPLICABLE STANDARDS

THERMAX™ Sheathing meets ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board, Type I, Class 2, which includes:

- C203 – Standard Test Methods for Breaking Load and Flexural Properties of Block-Type Thermal Insulation
- C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics
- D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging
- E96 – Standard Test Method for Water Vapor Transmission of Materials
- D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

Project Name: Stennis Riverine
Contract: N69450-05-D-009C
Bldg Proj.: 3013-70
Submittal: 13125-07
Reviewed
Reviewed by: J. Collins
Date: 2/17/09

32

DAMMON ENGINEERING INC

Date: 5-8-09 **Project:** STORAGE ROOF

Reviewed: X

Reviewed as Noted: _____

Revise and Resubmit: _____

Rejected: _____

Other: _____

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Submittal Item: THERMAX SHEATING

Comments

BROADMOOR, L.L.C.

I hereby agree that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number N69450-05-D-0096, is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

Date 5.8.09

DQC Manager

Date 5/8/09

QC Official

TABLE 2

Physical Properties of THERMAX™ Sheathing	
Property and Test Method	**Value**
Compressive Strength[1], ASTM D1621, psi, min.	25.0
Flexural Strength, ASTM C203, psi, min.	55.0
Dimensional Stability, ASTM D2126, % linear change, max.	0.1
Water Absorption, ASTM C209, % by volume, max.	0.05
Water Vapor Permeance, ASTM E96, perms, max.	<0.03
Maximum Use Temperature, °F	250

(1) Vertical compressive strength is measured at 10 percent deformation or at yield, whichever occurs first.

PHYSICAL/CHEMICAL PROPERTIES

THERMAX™ Sheathing exhibits the properties and characteristics indicated in Table 2 when tested as represented.

For chemical resistance properties of THERMAX Sheathing, see Table 3.

ENVIRONMENTAL DATA

THERMAX™ Sheathing is manufactured with hydrocarbon blowing agents, which have no ozone depletion potential.

FIRE PROTECTION

THERMAX™ products should be used only in strict accordance with product application instructions. THERMAX products, when used in a building containing combustible materials, may contribute to the spread of fire. For more information, consult MSDS and/or call Dow at 1-866-583-BLUE (2583). In an emergency, call 1-989-636-4400.

CODE COMPLIANCES

THERMAX™ Sheathing complies with the following codes:

- International Residential Code (IRC) and International Building Code (IBC); see ICC-ES NER-681
- FM 4880 – Wall-Ceiling Construction Metal-Faced – Class 1 Fire Rated to Max. 30' High, 4.25" Thick, 4' Wide, When Installed as Described in the Current Edition of FMRC Approval Guide
- THERMAX products are classified by Underwriters Laboratories Inc. (UL)
- UL 1256 – Fire Test of Roof Deck Constructions, Roof Deck Construction No. 120 and No. 123
- UL 723 (ASTM E84) Surface Burning Characteristics of Building Materials
- The following designs are 1, 2, 3 or 4 hour wall rated assemblies as listed in the UL Fire Resistance Directory: U026, U324, U325, U326, U330, U354, U355, U460, U902, U904, U905, U906, U907, V454
- Fire Performance Evaluation of an Exterior Masonry Wall System Incorporating THERMAX Insulation Tested in Accordance With NFPA 285, 1998 Edition (UBC 26.9, intermediate scale – multistory testing)

TABLE 3

Chemical Resistance of THERMAX™ Sheathing	
Acid, inorganic	Not recommended
Acid, organic	Excellent
Alcohol	Excellent
Asphalt, water-based	Good
Bases (caustics)	Poor
Brines and other salts	Excellent
Cements and mortar	Poor
Gases, carbon dioxide (CO_2)	Excellent
Gasoline	Excellent
Hydrocarbons	Excellent
Insecticides	Excellent
Kerosene	Excellent
Mineral oil USP	Excellent
Naphtha	Excellent
Paints, alcohol-based	Excellent
Paints, water-based	Excellent
Polyglycols, including propylene glycol	Excellent
Water[1]	Excellent

(1) Water may cause discoloration of aluminum facers. This does not impact the R-value of dry, core insulation.
NOTE: This table should be used as a guide only. For design purposes, specific test data on the intended application may be needed.

- FMVSS No. 302 – Flammability of Interior Materials – Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses (Docket No. 3-3; Notice 4)
- Miami-Dade NOA 02-0703.02 Interior Insulation on CMU Block
- Miami-Dade NOA 02-0703.03 Insulated Wall
- Miami-Dade NOA 02-0703.05 Insulated Roof Assembly

Contact your Dow sales representative or local authorities for state and local building code requirements and related acceptances.

5 Installation

Boards of THERMAX™ Sheathing are lightweight and can be sawed or cut with a knife. They install quickly to walls and ceilings – inside and outside of purlins, trusses or bar joints. Butt joints must be installed over structural members. "Best practice" recommendations for high-humidity environments include continuously sealing the surface of the insulation at all joints with a Dow joint closure system.

Contact a local Dow representative or access the literature library at www.dowstyrofoam.com/architect for more specific instructions.

6 Availability

THERMAX™ Sheathing is manufactured in several locations and is distributed through an extensive network. For more information, call 1-800-232-2436.

7 Warranty

Fifteen-year limited thermal warranty.

8 Maintenance

Not applicable.

9 Technical Services

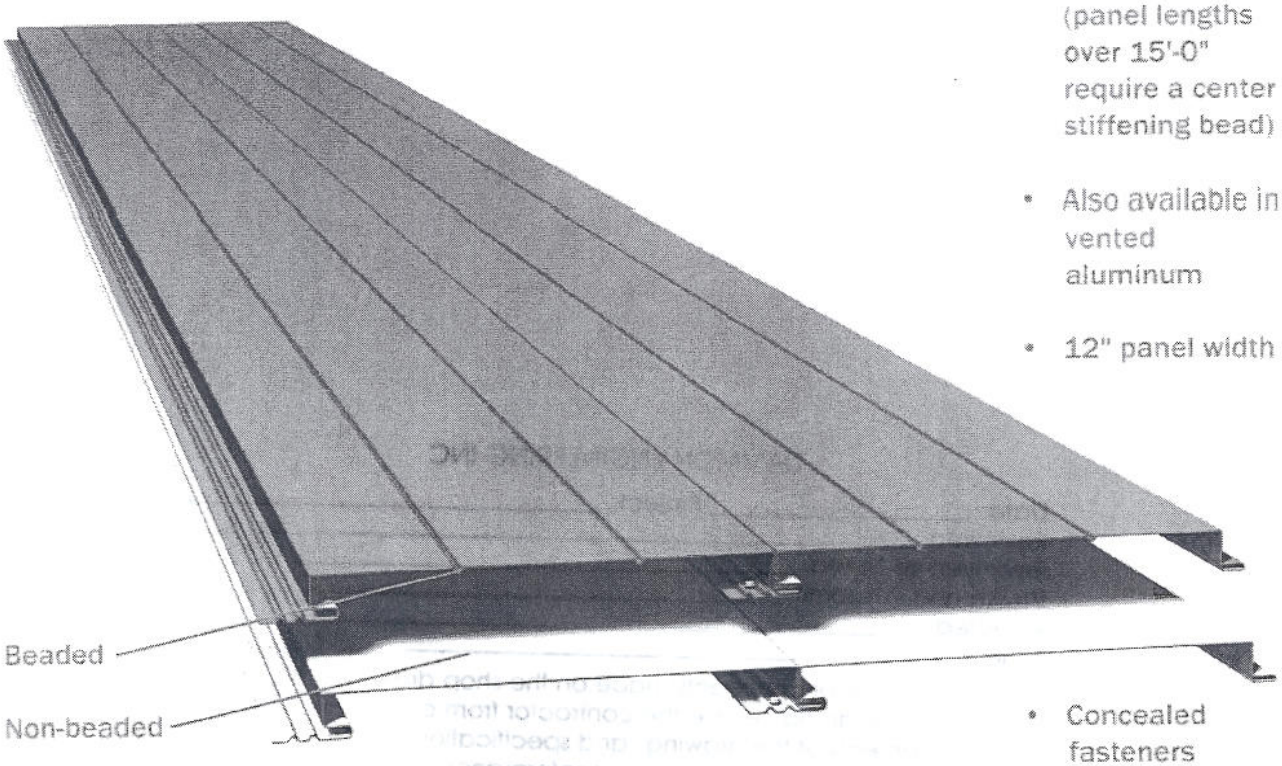
Dow can provide technical information to help address questions when using THERMAX™ Sheathing. Technical personnel are available to assist with any insulation project. Call 1-866-586-BLUE (2583).

10 Filing Systems

- www.dowbuildingsolutions.com
- www.sweets.com

VP ROOF PANELS

STYLE	FEATURES
FP-12 SOFFIT	THIS FLUSH PANEL OFFERS THE FINISHING TOUCH FOR BUILDING SOFFITS. Dammon #33



- Lengths from 2'-0" to 30'-0" (panel lengths over 15'-0" require a center stiffening bead)
- Also available in vented aluminum
- 12" panel width
- Concealed fasteners

Provides an attractive, architectural appearance for buildings, entrances, covered walkways or anywhere a smooth finish is required.

Project Name: Stennis Riverine
Contract: N62450-05-D-0096
BRM Proj.: 3013-70
Submittal: 13125-08
Revised
Reviewed by: J. Collins
Date: 2/17/09

VP BUILDINGS
VARCO PRUDEN

BROADMOOR, L.L.C.

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Robert Vile B.E.C.S. 5/18/09
DQC Manager Date

John W. Culbs 5/18/09
QC Official Date

DAMMON ENGINEERING INC

Date: 5-8-05 Project: Stennis ROF

Reviewed: X

Reviewed as Noted: _____

Revise and Resubmit: _____

Rejected _____

Other: _____

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Submittal Item: 30FF17

Comments

VP'S FLUSH PANEL SOFFITS OFFER A DECORATIVE TREATMENT FOR WALKWAYS AND ENTRANCES

FP-12 SOFFIT

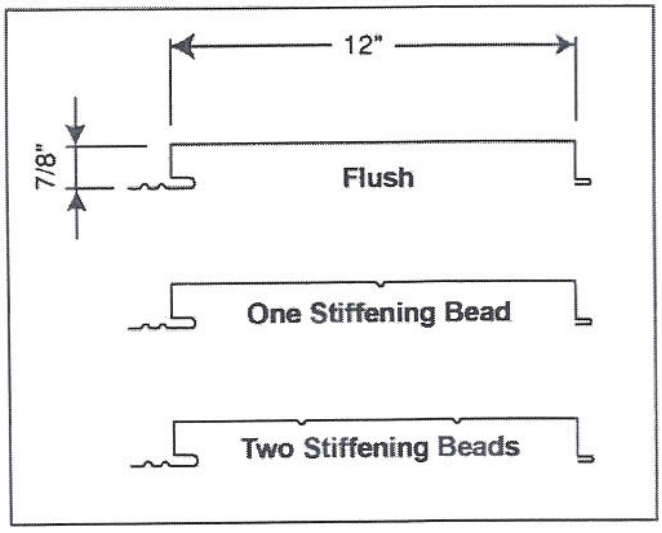
FP-12 a concealed-fastener panel, offers a high quality and low maintenance option for providing a smooth, flush appearance on your building. Manufactured to install easily, the FP-12 panel incorporates a hidden fastener attachment and advanced side joint design. The panel can be installed over open framing and offers superior wind disengagement resistance performance. Also, the 7/8" profile depth of panel allows for field application of sealant, if required for the installation.

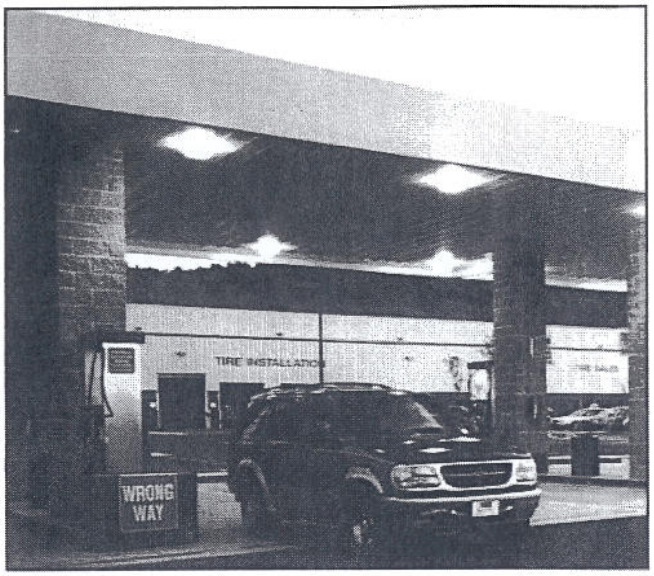
These 12" wide panels are available in lengths from 2' to 30'. FP-12 can be rolled in a selection of profile appearances including:

- Smooth face (12" flat – limited to applications less than 15')
- One stiffening bead (6"/6")
- Two stiffening beads (4"/4"/4")

Besides giving the FP-12 panels a high-tech appearance, the grooved "stiffening beads" optimize the panel performance in applications with panel lengths 15'-0 or greater.

FP-12 is available in standard 24 gauge or optional 22 gauge; PVDF finish and offered in 15 Architectural panel colors. FP-12 is also available in a .032 aluminum in Cool Regal White or Cool Parchment in either vented or unvented.





FEATURES

- Choose solid steel or vented aluminum
- Concealed fasteners
- Flush in appearance
- 12" wide coverage with lengths from 2'-0" to 30'-0" (Note: panel lengths over 15'-0" require a center stiffening bead)

NOTE: ALL PANELS FORMED FROM LIGHT GAUGE METAL MAY EXHIBIT WAVINESS, ALSO KNOWN AS "OIL CANNING," COMMONLY OCCURRING IN, BUT NOT RESTRICTED TO, FLAT PORTIONS OF A PANEL. THIS INHERENT CHARACTERISTIC IS NOT A DEFECT OF MATERIAL OR MANUFACTURING AND IS NOT CAUSE FOR REJECTION.

VP BUILDINGS
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VP Buildings
3200 Players Club Circle
Memphis, TN 38125
1-800-238-3246 • www.vp.com
2049 Revised 5/06

APPROVED ROOF ASSEMBLIES

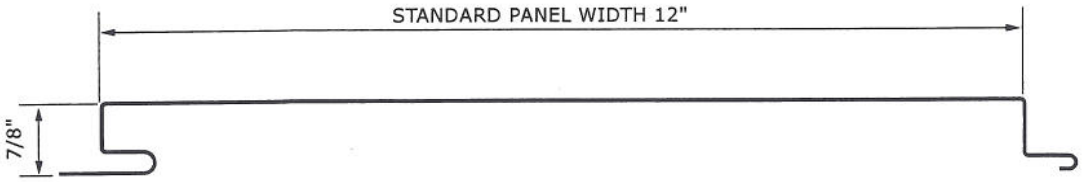
QUALITY CERTIFICATION METAL BUILDINGS

Flush Panel

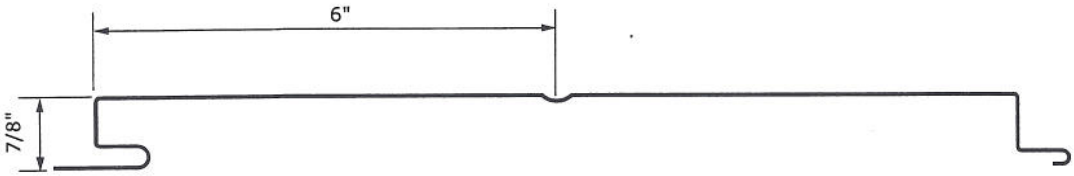
Contents Section

2D Soffit / Wall Panels

< RETURN TO TABLE OF CONTENTS



FP-12-0



FP-12-1

FP-12-2

AVAILABLE MATERIAL & THICKNESS

STEEL = 24 GA. OR 22 GA.

ALUMINUM = .032

PERFORATED ALUMINUM = .032

AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

PANEL PROFILE

FP-0

REV. 05/01/02

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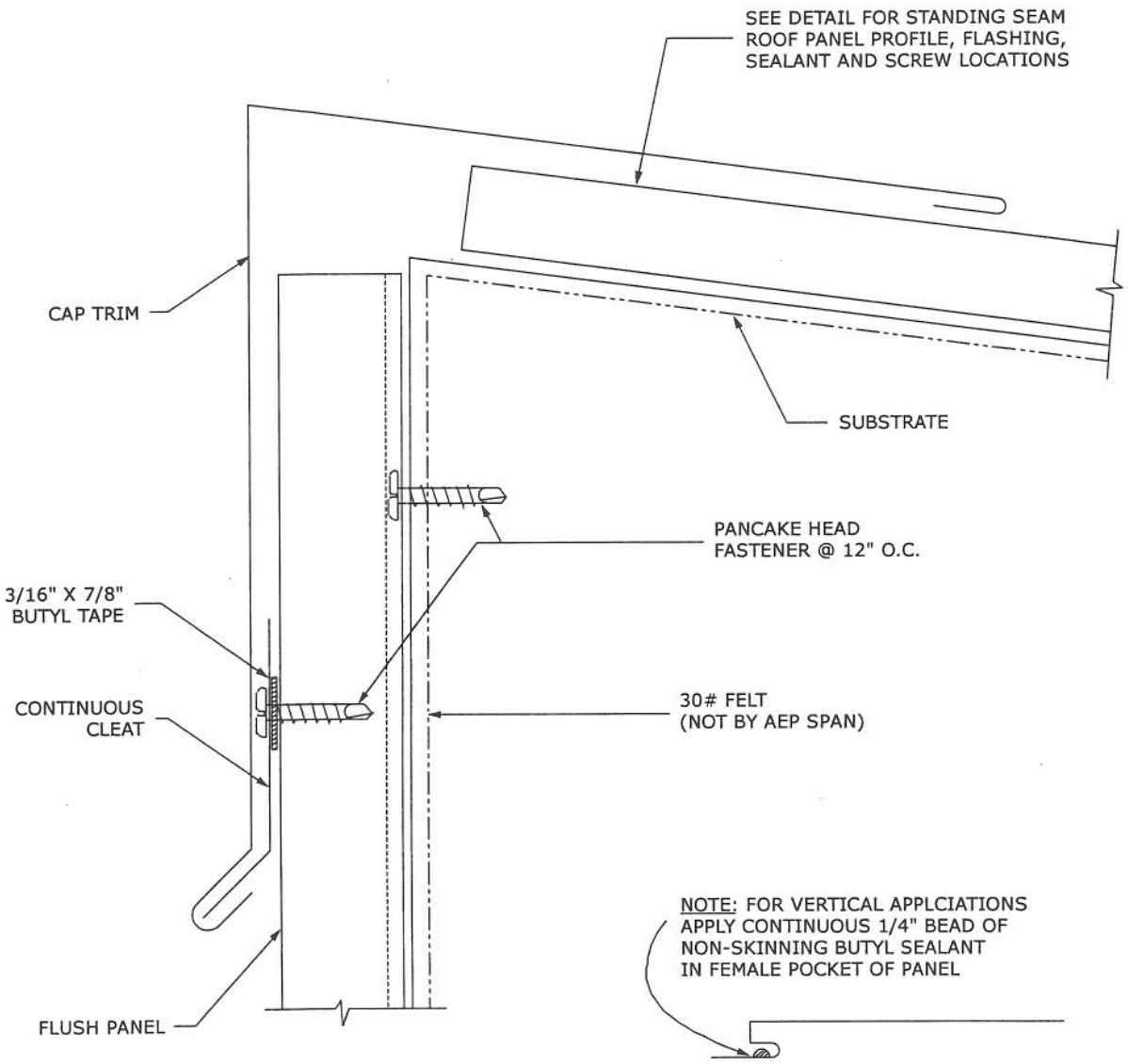

AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

HIGH EAVE

FP-1

REV. 05/01/02

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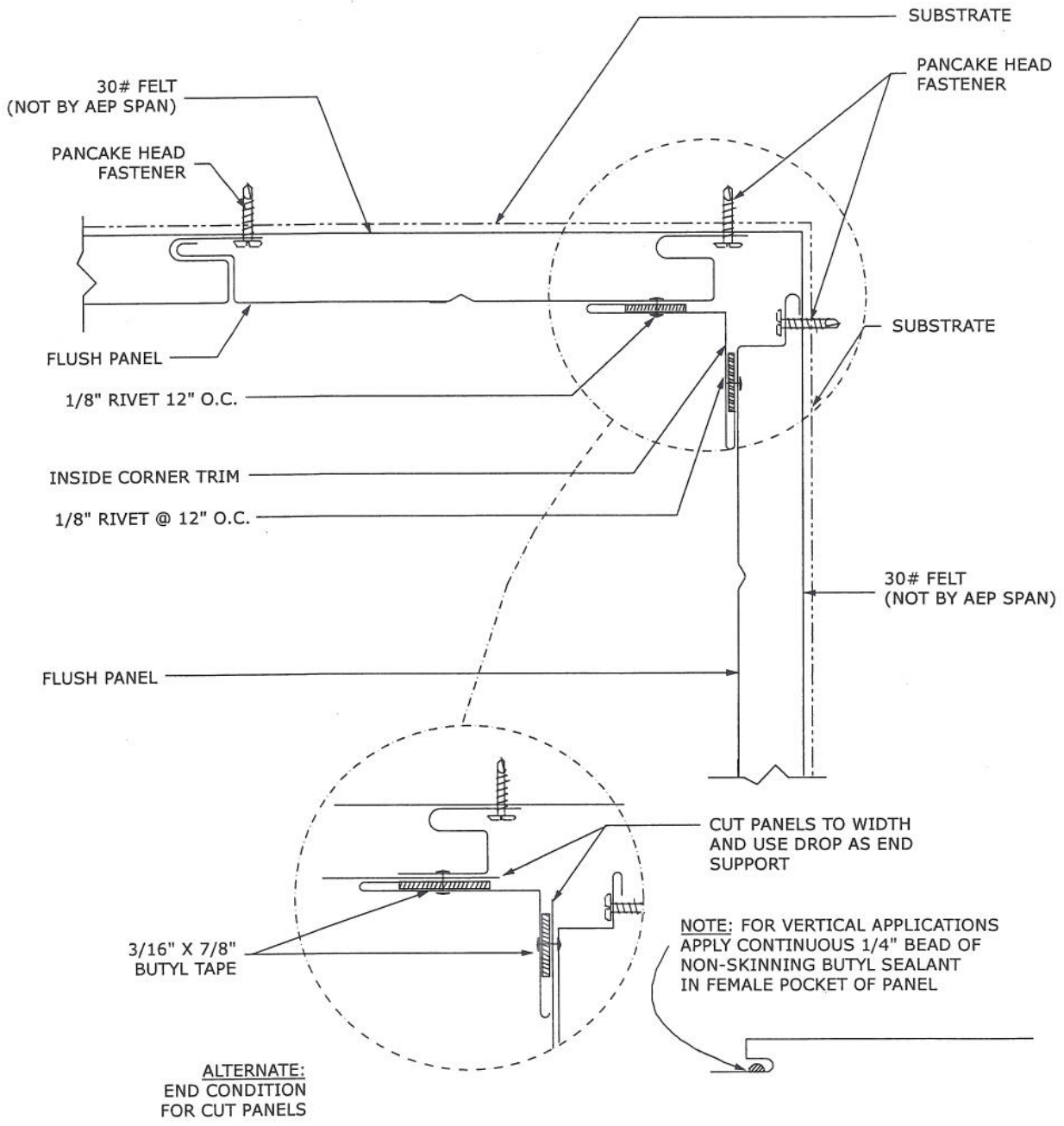

AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

INSIDE CORNER

FP-2

REV. 05/01/02

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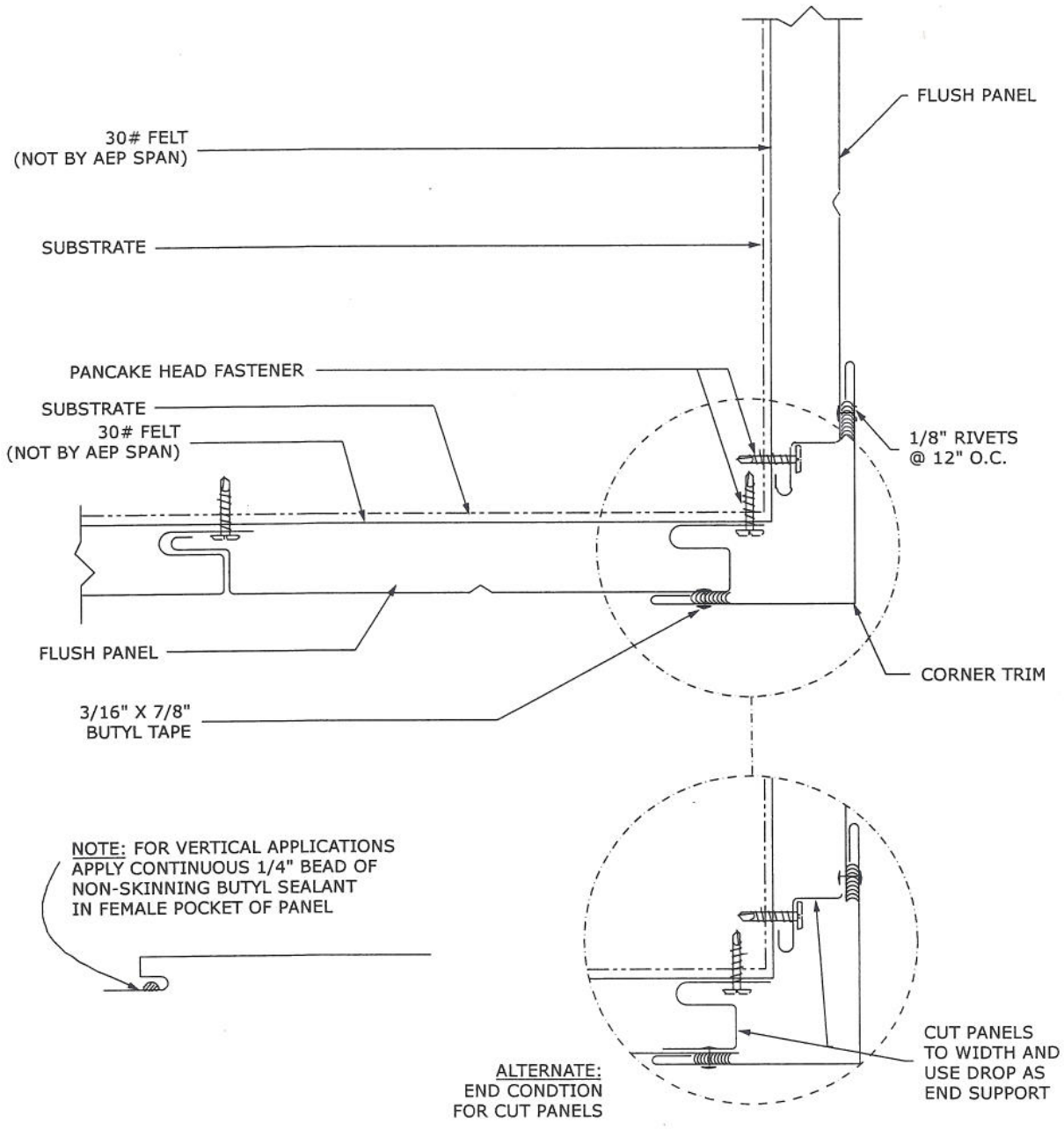

AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

OUTSIDE CORNER

FP-3

REV. 05/01/02

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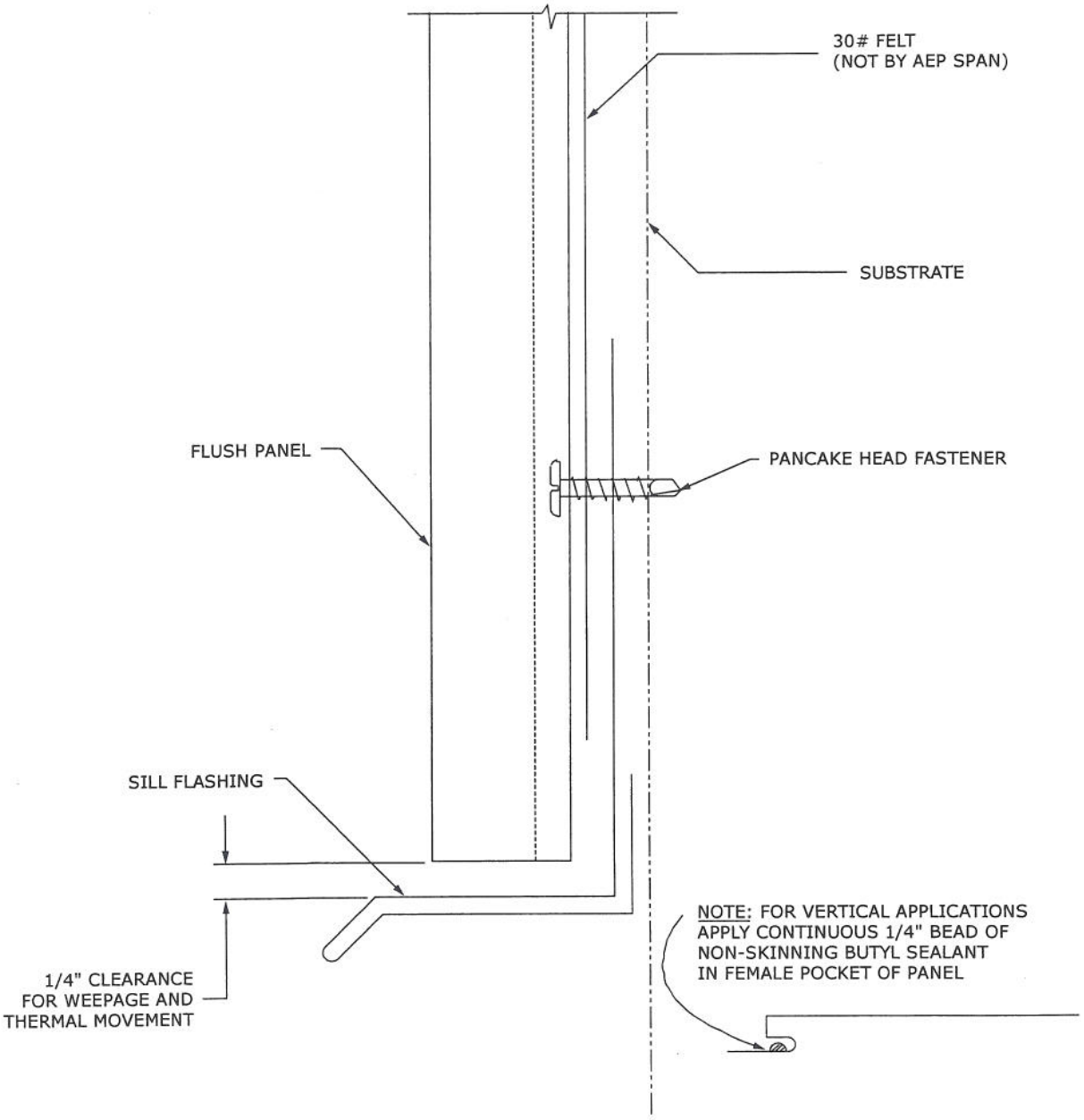

AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

PANEL SILL

FP-4

REV. 05/01/02

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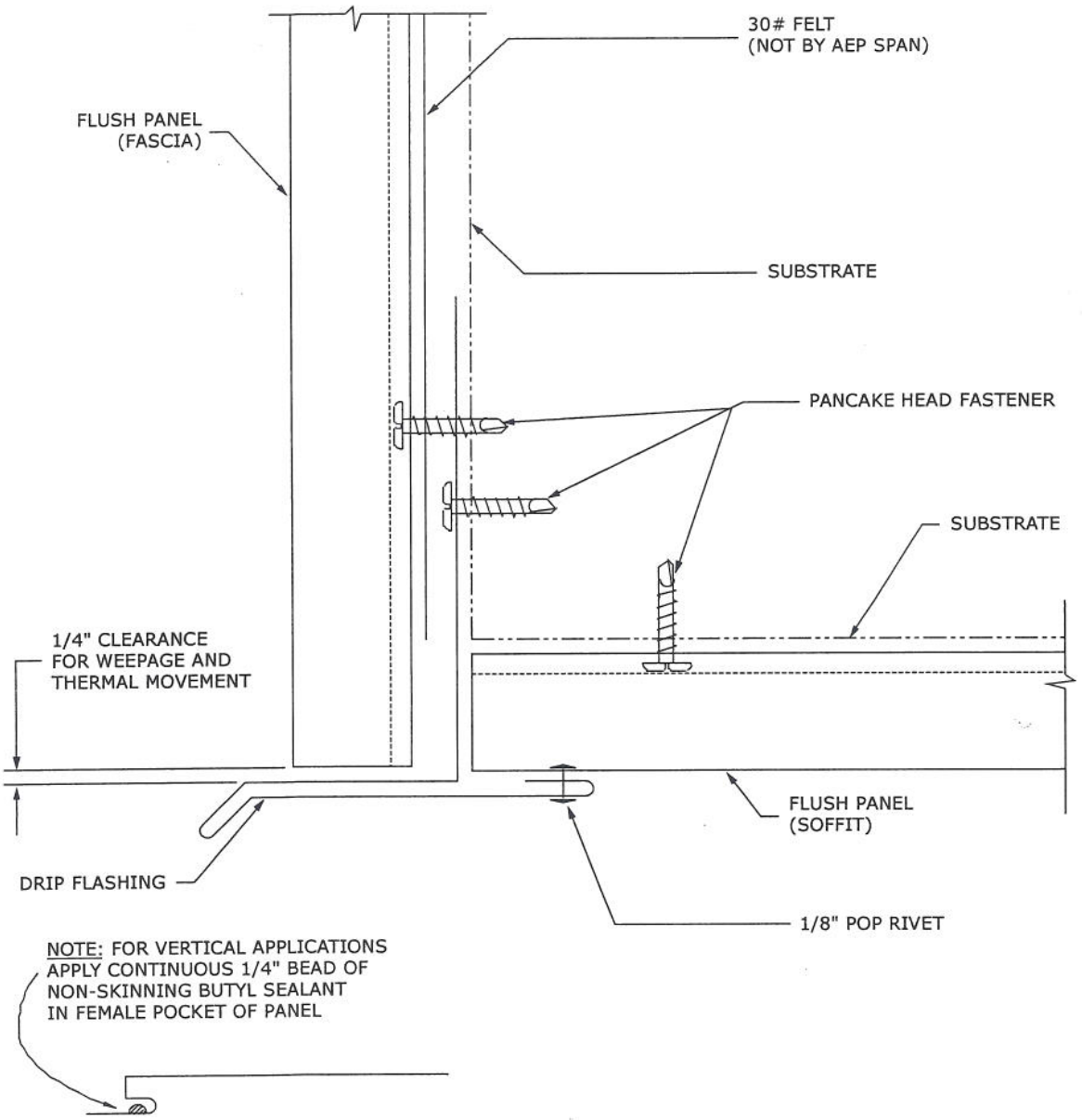


AEP SPAN
Engineered Solutions in Metal

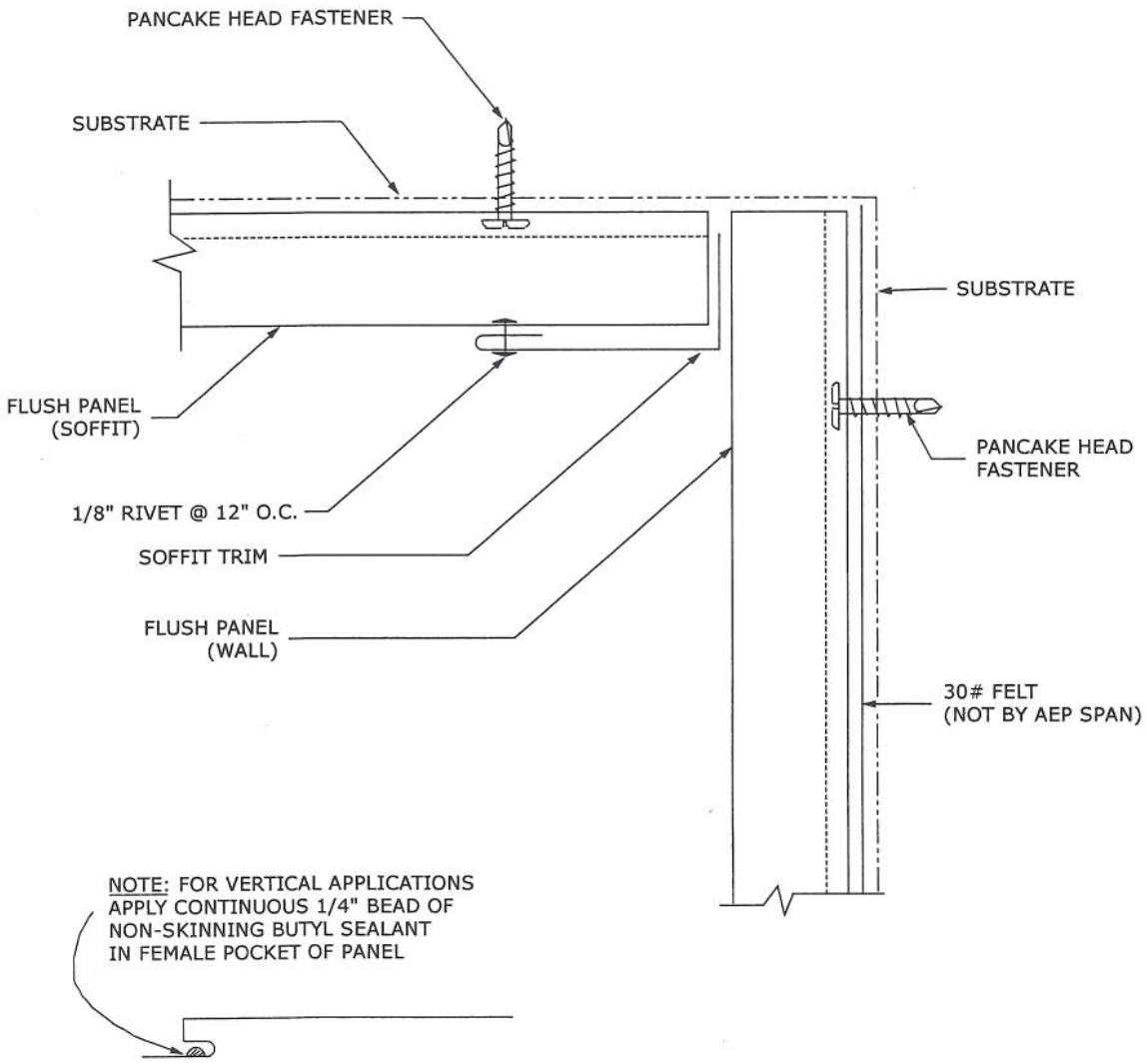
FLUSH-PANEL

FASCIA –
SOFFIT TRANSITION

FP-5

REV. 05/01/02

< RETURN TO TABLE OF CONTENTS



AEP SPAN
Engineered Solutions in Metal

FLUSH-PANEL

SOFFIT –
WALL TRANSITION

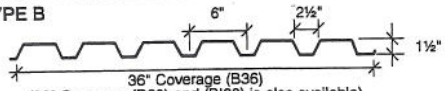
FP-6

REV. 05/01/02

B, BI, BA, BIA Deck Uplift

Note:
Fy = 40 ksi

TYPE B



36" Coverage (B36)
(30" Coverage (B30) and (BI30) is also available)

TYPE BI

36" Coverage (BI36)

(Uniform Total Load, psf/Load Producing L/240 or 1", psf)

Span Condition	Gage	Span 5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"
Single	22	122/84	100/63	84/49								
	20	154/105	127/79	107/61	91/48							
	18	205/152	169/114	142/88	121/69	104/56	91/45	80/37				
	16	262/200	217/150	182/116	155/91	134/73	117/59	103/49	91/41	81/34		
Double	22	119/202	99/152	83/117	71/92	61/74						
	20	144/253	120/190	101/146	86/115	74/92	65/75					
	18	200/367	166/276	140/212	120/167	103/134	90/109	79/90	70/75	63/63	56/53	
	16	256/481	213/361	179/278	153/219	132/175	115/142	102/117	90/98	80/82	72/70	65/60
Triple	22	148/158	123/119	103/92	88/72	76/58						
	20	179/198	148/149	125/115	107/90	92/72	81/59					
	18	248/287	206/216	174/166	149/131	128/105	112/85	99/70	88/58	78/49	70/42	
	16	317/376	263/283	222/218	190/171	164/137	144/111	126/92	112/77	100/64	90/55	81/47

ASD

(Uniform Total Load, psf/Load Producing L/240 or 1", psf)

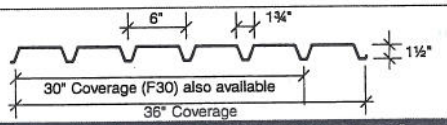
Span Condition	Gage	Span 5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"
Single	22	193/84	159/63	134/49								
	20	243/105	201/79	169/61	144/48							
	18	324/152	268/114	225/88	192/69	165/56	144/45	127/37				
	16	415/200	343/150	289/116	246/91	212/73	185/59	162/49	144/41	128/34		
Double	22	188/202	156/152	132/117	112/92	97/74						
	20	228/253	189/190	159/146	136/115	118/92	103/75					
	18	316/367	263/276	221/212	189/167	163/134	143/109	125/90	111/75	99/63	89/53	
	16	405/481	336/361	283/278	242/219	209/175	183/142	161/117	142/98	127/82	114/70	103/60
Triple	22	233/158	194/119	163/92	140/72	121/58						
	20	282/198	235/149	198/115	169/90	146/72	128/59					
	18	391/287	325/216	275/166	235/131	203/105	177/85	156/70	139/58	124/49	111/42	
	16	500/376	416/283	351/218	301/171	260/137	227/111	200/92	177/77	158/64	142/55	129/47

LRFD

Areas marked with this symbol exceed SDI recommended maximum spans. (see database)

F Deck Uplift

TYPE F



30" Coverage (F30) also available
36" Coverage

Web crippling is considered at gravity loads but is not considered a limit state during uplift. Fasteners must be designed separately for uplift and/or diaphragm shear.

(Uniform Total Load, psf/Load Producing L/240 or 1", psf)

Span Condition	Gage	Span 4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
Single	22	140/133	111/94	90/68	74/51						
	20	170/164	134/114	109/84	90/63	76/49					
	18	230/246	182/173	147/126	122/95	102/73	87/57	75/46			
Double	22	129/321	102/226	83/164	68/124	58/95	49/75				
	20	158/395	125/278	102/202	84/152	71/117	60/92	52/74			
	18	217/593	172/416	140/303	116/228	97/176	83/138	72/111	62/90	55/74	49/62
Triple	22	160/251	127/176	103/129	85/97	72/74	61/59				
	20	197/309	156/217	127/158	105/119	88/92	75/72	65/58			
	18	270/464	214/326	174/238	144/178	121/137	103/108	89/87	78/70	68/58	61/48

ASD

(Uniform Total Load, psf/Load Producing L/240 or 1", psf)

Span Condition	Gage	Span 4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
Single	22	222/133	175/94	142/68	117/51						
	20	269/164	213/115	172/84	142/63	120/49					
	18	364/246	288/173	233/126	193/95	162/73	138/57	119/46			
Double	22	204/321	161/226	131/164	108/124	91/95	78/75				
	20	250/395	198/278	161/202	133/152	112/117	96/92	82/74			
	18	344/593	272/416	221/303	183/228	154/176	131/138	113/111	99/90	87/74	77/62
Triple	22	253/251	201/176	163/129	135/97	114/74	97/59				
	20	311/309	247/217	201/158	166/119	140/92	119/72	103/58			
	18	428/464	339/326	275/238	228/178	192/137	164/108	141/87	123/70	108/58	96/48

LRFD

LOAD TABLES

Project Name: Stennis Riverine
Contract: N69450-05-D-0096
BRM Proj.: 3013-70
Submittal: 13125-10
Reviewed
Reviewed by: J. Collins
Date: 2/17/09

BROADMOOR, L.L.C.

I hereby agree that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number N69450-05-D-0096, is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

Robert Hite 5.8.09

DQC Manager Date

Jeffrey M Cutts 5/8/09

QC Officer Date

DESIGN ENGINEERING INC

Date: 5-8-09 Reviewed Stennis Corr

Reviewer _____

Reviewed as Noted X

Revise and Resubmit _____

Rejected _____

Other: _____

Corrections or comments made on the shop drawings during this review do not relieve the Contractor from compliance with requirements of the drawings and specifications. This check is only for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades and performing his work in a safe and satisfactory manner.

Submittal Item _____ Pick up per

3

Roof Deck Design Example Problem

THE NOMINAL ROOF SNOW LOAD (S) FOR A BUILDING HAS BEEN DETERMINED TO BE 35 psf. 20 psf IS TO BE INCLUDED AS A CONSIDERATION OF MAINTENANCE LOAD FROM WORKERS (L_r). THE DEAD LOAD (D) IS 10 psf. A WIND UPLIFT LOAD (W) IS 30 psf. RAIN SURCHARGE IS NOT REQUIRED. ANY LATERAL EARTHQUAKE LOAD WOULD BE CONSIDERED IN THE DIAPHRAGM DESIGN. FOR FLEXURE, (E) = 0. THE DECK IS IN A THREE (OR MORE) SPAN CONDITION AND THE SPAN IS 6'-6". LOAD COMBINATIONS GIVEN APPLY TO THIS EXAMPLE. SEE ASCE 07-05 OR GOVERNING CODE FOR ALL OTHER NOMINAL LOADS.

Load Combinations On This Roof

LRFD

1. 1.4D
2. 1.2D + 1.6L + 0.5(L_r or S)
3. 1.2D + 1.6(L_r or S) + (0.5*L or 0.8W)
4. 1.2D + 1.6W + 0.5*L + 0.5(L_r or S)
5. 1.2D + 1.0E + 0.5*L + 0.2S
6. 0.9D + 1.6W
7. 0.9D + 1.0E

ASD

1. D
2. D + L
3. D + (L_r or S)
4. D + .75L + .75(L_r or S)
5. D + (W or 0.7E)
6. D + .75(W or 0.7E) + .75L + .75(L_r or S)
7. .6D + W
8. .6D + .7E

Load Definitions

D = dead load
E = earthquake load
L = live load due to occupancy
L_r = roof live load
S = snow load
W = wind load

* The 0.5 multiplier is acceptable for this occupancy per exception Note 1 of ASCE 07-05, section 2.3.2.

LRFD

The governing load combinations are 3 and 6, (1.2D + 1.6S + 0.5L) where L=0, and (0.9D + 1.6W), which total **68 psf and -39 psf** respectively. The deflection load is S = **35 psf.** The B deck LRFD load tables show that three span 22 gage deck can carry a factored gravity load or an uplift load of 140 psf based on stress and 72 psf based on a live load deflection of span/240. **140>68 O.K.; 72>35 O.K.; -140>-39 O.K.; -72>-30 for simplicity O.K.**

ASD

The governing load combinations are 3 and 7, D + (L_r or S)) and (.6D + W), which total **45 psf** (for stress) and **-24 psf** respectively. The B deck ASD load table shows that three span 22 gage B deck can carry a gravity load or an uplift load of 88 psf based on stress and 72 psf based on a live load deflection of span/240. **88>45 O.K.; 72>35 O.K.; -88> -24 O.K.; -72>-24 O.K.**

Note the deflection values are exactly the same for both ASD and LRFD. The gage choice is the same regardless of the analysis used. Fasteners must be designed for uplift and/or diaphragm shear.
Final check: Maximum multi span limits is 6'9" which is O.K. If FM class 1 construction is required, then the maximum span is 6'0" and 20 gage deck would be required.

Uplift Load Example Problem

The uplift resistance U, in psf, can be calculated for a given fastener pattern by the equation: $U = \frac{kP}{CL}$

Where P is obtained from the chart of tensile strength of arc spot (puddle) welds for the listed gage and weld size. (k) is the equivalent number of connectors from the table below, C is the deck cover width and L is the deck span measured at center lines. (k) defines the weighted resistance of welds across the cover width. It is acceptable to include a reaction coefficient in the denominator, e.g. (1.1) for a multi-span condition.

A 22 gage 1 ½" deep deck is fastened with a 36/4 pattern (12" o.c.). The deck span is 6'-6". Calculate the resisting uplift using ASD for 5/8" (0.625) diameter welds and for #12 screws with a head diameter of 0.430. Supports are joists, so pull out is not a concern.

WELDS:

From the Tensile Strength of Arc Spot (Puddle) Welds for A653 SS40 (galvanized) Chart (see page 20), P=1460 lbs., C = 3 feet; k = 2.7 (k reflects prying reduction at side lap.)

Interior support

$U_n = \frac{2.7\ (1460)}{3 \times 6.5} = 202$ psf

Exterior support

$U_n = \frac{2.7\ (1460)}{3\ (6.5/2)\ 2} = 202$ psf

Note: End prying factor of 2 is applied at all exterior supports and is critical for single span. The same end prying factor of 2 may be used for screws.

Safety Factor $\Omega_u = 2.5$

U = 202/2.5 = 80.86 ≈ 81 psf
> 24 psf (includes allowance for DL)

SCREWS:

From Wind Uplift Values for Screws, pull over nominal value @ 22 gage base deck material with screw head $d_w = 0.430$ is (see page 19):

P = 990 lbs.

$U_n = \frac{3.0\ (990)}{3 \times 6.5} = 152.31$ psf

(k reflects no required prying reduction at side laps.)

Note: See uplift tables for flexural limits. If the roof deck resists diaphragm shear due to wind, the interaction of uplift and shear at support fasteners reduces diaphragm shear resistance. See the interaction design tool on the CMC Joist & Deck website.

Safety Factor $\Omega_u = 3.0$

U = 152.31/3 = 50.77 ≈ 51 psf > 24 psf

Weld Pattern	C	Welds (k)	Screws (k)
24/4	2	2.7	3
30/3	2.5	1.7	2
30/4	2.5	2.7	3
30/6	2.5	4.7	5
36/4	3	2.7	3
36/5	3	3.7	4
36/7	3	5.7	6

EXAMPLE PROBLEMS

Wind Uplift Values for Screws

DECK TO STRUCTURAL STEEL, OPEN WEB STEEL JOISTS, GAGE FRAMING

Pull Out Nominal Strengths, P_{not}, Lbs.

Screw pull out from structural steel framing or from steel joists rarely controls. Pull out is a definite possibility when light gage framing is used. The table shows pull out values for A653 steel (galvanized) with 40, 50 and 80 ksi yields. The tensile strength, F_u = 62 ksi, is used for determining nominal strength of Grade 80 steel per AISI section A2.3.2. **The lesser of pull out and pull over controls connection design.**

$P_{not} = 0.85\, t_2\, d\, F_{u2}$ t_2 (steel thickness receiving the screw point & engaging the threads) F_{u2} = tensile strength on that material

Screw	Size(d)	F_u	Grade	1/4"	3/16"	10	1/8"	12	14	16	18	20	22	24	26	28
				0.2500	0.1875	0.1345	0.1250	0.1046	0.0747	0.0598	0.0474	0.0358	0.0295	0.0239	0.0179	0.0149
#10	0.190	55	40						664	531	421	318	262			
#10	0.190	65	50						784	628	498	376	310			
#10	0.190	62	80						748	599	475	358	295	239	179	149
#12	0.216	55	40	2525	1893	1358	1262	1056	754	604	479	362	298			
#12	0.216	65	50	2896	2238	1605	1492	1248	891	714	566	427	352			
#12	0.216	62	80	2846	2134	1531	1423	1191	850	681	540	408	336	272	204	170
1/4"	0.250	55	40	2922	2191	1572	1461	1223	873	699	554	418	345			
1/4"	0.250	65	50	3453	2590	1858	1727	1445	1032	826	655	494	407			
1/4"	0.250	62	80	3294	2470	1772	1647	1378	984	788	624	472	389	315	236	196

Table uses the SDI decimal thickness for gage. Note that actual support frame, t_2, gage thickness may differ from the SDI thickness. The safety factor for pull out (ASD) is 3. The ϕ factor (LRFD) is 0.5. Consult screw manufacturer for proper thread and drill point types at each support thickness. Threads must engage full thickness for table to apply. Shaded area equals 80% of screw breaking strength to avoid brittle failure. #10 screws not recommended for steel thickness in crossed out areas. F_u and F_y for hot rolled shapes will vary from this table. Linear interpolation for F_u is acceptable - see page 160.

Pull Over Nominal Values, P_{nov}, Lbs.

Pull over strength generally controls the uplift values of screws. The roof deck range is 16 to 22; the form deck typical gages are 24, 26, 28. Form deck is typically high strength (SS Grade 80) and uses Fu = 62 ksi in design.

$P_{nov} = 1.5\, t_1\, d_w\, F_u$; $d_w \le .5$" t_1 (steel thickness contacting screw head)

	Gage						
	16	18	20	22	24	26	28
0.400	1870	1480	1120	920	890	670	550
0.415	1940	1530	1160	960	920	690	580
0.430	2010	1590	1200	990	960	720	600
0.480	2240	1780	1340	1100	1070	800	670
0.500	2330	1850	1400	1150	1110	830	690

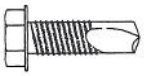
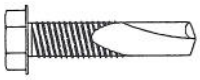
The table pullover strengths lbs., are based on F_u = 52 ksi (A1008 steel) for 16 through 22 gage, and 62 ksi for 24 through 28 gage. The safety factor for pull over is 3. The ϕ factor (LRFD) is 0.5. If A653 (galvanizing) is provided, the designer may linearly prorate the capacity using the F_u listed in the Pull Out table.

Screw Breaking Nominal Strength, Kips.

Breaking values are obtained from screw manufacturer. This table contains representative numbers.

Screw Data				
Screw Size	d (dia.)	d_w (nom. head dia.)	Avg. tested tensile strength	
10	0.190	0.415 or 0.400	2.56	
12	0.216	0.430 or 0.400	3.62	
1/4"	0.250	0.480 or 0.520	4.81	

Typical Screw Types

Self Drilling, Self Tapping	Diam. - threads per inch - screw length	Drill Point	Usage
	#10 - 16 x 3/4"	Type 1	Side lap
	#12 - 14 x 3/4"	Type 3	Side lap
	#12 - 24 x 7/8"	Type 4	SUPPORTS drilling and fastening metal up to 5/16" thick
	#12 - 24 x 1 1/4"	Type 5	drilling and fastening metal up to 1/2" thick

SCREWS

Tensile Strength of Arc Spot (Puddle) Welds

$P_n = 0.8 (F_u / F_y)^2 \times t (d - t) \times F_u$

The weld tensile strengths, in pounds, shown in the table cover the range of properties and thickness for roof deck. Weld washers are recommended for thickness less than 22 gage. The AISI's **North American Specification For The Design Of Cold-Formed Steel Structural Members** 2007 is the basis of the table. The strengths are the nominal (ultimate) values. For LRFD apply a ϕ factor of 0.60, and for ASD use a safety factor, Ω, of 2.5. Isolated (non repetitive) applications require $\phi = 0.50$, and $\Omega = 3.0$. Follow AWS D1.3 procedures for arc puddle welding. A minimum electrode strength of 60 ksi is required. The clear distance between the weld edges and the end of the deck must be greater than or equal to the weld visible diameter. Follow the local codes for design loads, load combinations, and load factors. If no code exists, use ASCE 7.

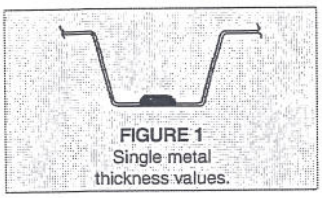


FIGURE 1
Single metal thickness values.

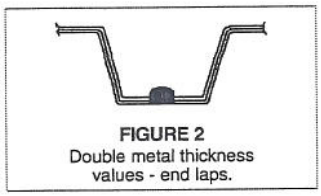


FIGURE 2
Double metal thickness values - end laps.

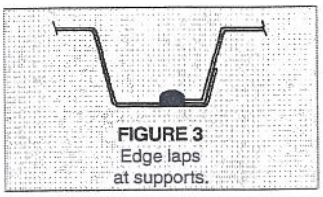


FIGURE 3
Edge laps at supports.

Steel	Gage	Visible Weld Diameter (Inches)											
		Figure 1				Figure 2				Figure 3			
		0.5	0.625	0.75	1	0.5	0.625	0.75	1	0.5	0.625	0.75	1
A653 Grade 40 Fy = 40 ksi Fu = 55 ksi	22	1150	1460	1770	2380	2160	2780	3390	4540	810	1020	1240	1670
	20	1380	1750	2130	2870	2550	3300	4040	4540	970	1230	1490	2010
	18	1780	2280	2770	3760	2030	4110	4540	4540	1250	1590	1940	2630
	16	2190	2810	3430	4540	1370	3140	4540	4540	1530	1970	2400	3180
A1008 Grade 40 Fy = 40 ksi Fu = 52 ksi	22	980	1240	1490	2010	1830	2350	2870	3900	680	860	1050	1410
	20	1170	1480	1800	2430	2160	2790	3410	4060	820	1040	1260	1700
	18	1510	1920	2340	3170	2030	3530	4060	4060	1060	1350	1640	2220
	16	1850	2380	2900	3950	1370	3140	4060	4060	1300	1660	2030	2770
A653 Grade 50 Fy = 50 ksi Fu = 65 ksi	22	1220	1540	1870	2520	2290	2930	3580	4060	850	1080	1310	1760
	20	1460	1850	2250	3030	2700	3480	4060	4060	1020	1300	1570	2120
	18	1890	2410	2930	3970	2030	4060	4060	4060	1320	1680	2050	2780
	16	2310	2970	3630	4060	1370	3140	4060	4060	1620	2080	2540	2840
Grade 80 Fy = 60 ksi Fu = 62 ksi	22	740	930	1130	1520	1380	1770	2160	2560	510	650	790	1060
	20	880	1120	1350	1830	1620	2100	2560	2560	620	780	950	1280
	18	1140	1450	1760	2390	2030	2560	2560	2560	800	1020	1230	1670
	16	1390	1790	2190	2560	1370	2560	2560	2560	980	1250	1530	1790

Tensile Strength of Arc Spot (Puddle) Welds Through Weld Washers

Weld washer table values are based on the AISI Specification and use $F_y = 33$ ksi and $F_u = 48$ ksi for resistance limits through the 16 gage washer. Washers have 3/8" holes. The table is based on Structural Steel Grade 80 deck and considers pullover of the deck around the washer. The edge lap value is based on (Figure 3 or 3B) and applies a 0.7 prying factor to the lesser of the single or double sheet resistance. The table waives the minimum weld effective diameter of 3/8" at supports. LRFD values are Factored Nominal and ASD values are allowable resistance. LRFD table strength already includes the controlling ϕ factor. Limit states for weld washers in tension have variance in ϕ and Ω factors. This is why the controlling factored resistance is shown. The weld shear strength, pounds, is based on the value presented in the SDI Diaphragm Design Manual 3rd Ed. When welds are used as part of a diaphragm, the system ϕ and Ω factors will apply.

	Gage	Visible Weld Diameter (Inches)					
		Figure 1		Figure 2		Figure 3, 3B	
		0.5	0.625	0.5	0.625	0.5	0.625
LRFD	28	1529	1529	1314	2338	920	1070
	26	1541	1837	1207	2446	845	1286
	24	1424	2209	1006	2155	704	1509
ASD	28	1006	1006	876	1559	613	704
	26	1027	1208	805	1630	563	846
	24	950	1472	670	1437	469	1006

Factored Nominal Tensile Strength of Welds Through 16 Gage Weld Washers - LRFD

Allowable Tensile Strength of Welds Through 16 Gage Weld Washers - ASD.

Shear Strength of Welds Through 16 Gage Weld Washers		
Gage	Factored LRFD ϕ = 0.60	Allowable ASD Ω = 2.65
28	679	427
26	873	549
24	1319	829

FIGURE 3B

Shear Strength of Arc Spot (Puddle) Welds

See the diaphragm tables for the nominal shear strength of welds, Q_f, or consult Section E2.2 of the AISI Specifications. If shear is caused by diaphragm action use the system factors shown in the diaphragm tables. Otherwise consult the AISI Specifications for the appropriate safety and resistance factors.

WELDS

Roof Construction Fire Ratings

U.L Design	Hours
P201	1
P202	1
P203	¾
P204	1
P206	1
P210	1
P211	1
P214	1
P215	2
P216	1
P219	2
P225	1,1½
P227	1,1½
P230	1, 1½
P231	1,1½
P235	1
P237	2
P238	1
P241	2
P246	1
P250	1,1½
P251	1,1½,2
P254	1
P255	1
P257	1
P259	1,1½
P261	1
P264	1
P266	1½,2
P267	1
P269	1,1½
P301	1,1½,2
P303	1
P404	1½,2
P405	3
P407	2
P409	2
P410	2
P411	2
P503	2
P508	1
P509	1
P510	1,1½
P511	1
P512	1
P513	1½
P514	1, 2
P515	1
P518	1
P519	1, 2
P520	2
P521	1,1½,2
P525	1, 1½, 2
P526	1, 1½
P527	1, 1½
P528	1
P529	1, 1½
P532	1, 1½, 2
P536	1, 1½, 2
P540	1
P541	1
P542	1

U.L Design	Hours
P543	2
P546	1
P701	¾ ,1,1½,2
P709	1,1½,2
P710	1
P711	1,1½,2
P712	1,1½,2,3
P713	1,1½,2,3
P714	1,1½,2
P717	1,1½,2
P718	2
P719	1,1½,2,3
P720	2
P721	1
P722	1,1½,2,3
P723	1,1½,2,3
P725	1,1½,2
P726	1,1½,2
P727	1,1½,2,3
P728	1½,2
P729	2
P730	1,1½,2,3
P731	1,1½,2,3
P732	1,1½,2,3
P733	1,1½,2,3
P734	1,1½,2
P735	1
P736	1,1½,2
P738	1,1½,2
P739	1,1½,2
P740	1,1½,2
P741	1,1½,2
P742	1,1½,2
P743	1,1½,2
P801	1,1½,2
P811	1,1½,2,3
P815	1,1½,2
P816	1,1½,2
P819	1,1½,2
P824	1
P825	1,1½,2
P826	1,1½,2,3
P827	1,1½,2
P828	1,1½,2
P901	1,1½,2
P902	1,1½,2
P903	1
P907	1,1½,2
P908	1,1½,2
P919	1,1½
P920	1,1½,2
P921	1,1½,2
P922	1,1½,2
P923	1,1½,2
P925	1,1½,2
P926	1,1½,2
P927	1,1½,2
P928	1,1½,2
P929	1,1½,2
P930	1,1½,2
P936	1,1½,2
P937	1,1½,2

Roof - ceiling fire rated assemblies listed in the Underwriters Laboratory, Inc. Fire Resistance Directory, follow this numbering code: P2xx have suspended acoustical ceilings with an exposed grid system; P3xx have mineral or fiber board applied to the underside of the deck; P4xx have suspended gypsum board; P7xx and P8xx have **spray applied fire resistive material (SFRM)** applied to the steel deck; P9xx assemblies have no SFRM applied to the deck although it is still required on the beams or the joists. The P9xx ratings (with steel deck) in the directory are all with insulating concrete. Individual designs in each of the categories can have a variety of insulation systems: insulating boards of various materials, vermiculite or perlite or cellular concrete, foamed plastic, and combinations of these. Some designs in the P2xx, P4xx, P5xx, and P9xx series allow galvanized form type products but not fluted roof deck. Roof deck may be painted or galvanized when used in designs that include suspended ceilings (Designs P2xx, P4xx, P5xx and P9xx). **Please note that the deck is only one component of the fire rated assembly. Be sure to check the U.L. Fire Resistance Directory for all details of construction.**

All of the designs describe the steel deck in generic terms. Some show, in addition to the general description, a list of classified products. CMC Joist & Deck or United Steel Deck, Inc. is specifically listed in some assemblies but, even if not specifically named, CMC Joist & Deck can meet the general requirements with one or more of our deck products and therefore can supply the required deck component for the assembly.

It is also important to note that U.L. will allow the substitution of heavier (thicker), deeper and stronger members than shown in the assembly requirements. However the designer should review the details of the assembly to check span limits, spacing considerations, and connection requirements. When U.L. calls for the use of welding washers, the washers can be eliminated for deck that is 22 gage or thicker.

Galvanized deck should be used for constructions that require the use of sprayed-on fire protection material. Designs marked with an (■) allow the use of classified painted roof deck with SFRM. Designers must note in the roof deck project specification that spray proofing is required over painted deck. **CMC Joist & Deck is not responsible for the adhesive ability of any SFRM, or for any treatment, cleaning, or preparation of the deck surface required for the adhesion of SFRM.** Consult the SFRM manufacturer for application directions and limitations.

This listing is based on the Underwriters Laboratories *Fire Resistance Directory*, 2007 Edition

FIRE RATINGS

ANSI/SDI-RD1.0 Standard for Steel Roof Deck

1. General

1.1 Scope:

A. This Specification for Steel Roof Deck shall govern the materials, design, and erection of cold formed steel deck used for the support of roofing materials, design live loads and SDI construction loads.

B. Commentary shall not be considered part of the mandatory document.

1.2 Reference Codes, Standards and Documents:

A. Codes and Standards: For purposes of this Standard, comply with applicable provisions of the following Codes and Standards:

1. American Iron and Steel Institute (AISI) Standard - *North American Specification for the Design of Cold-Formed Steel Structural Members,* 2001 Edition with Supplement 2004
2. American Welding Society - ANSI/AWS D1.3 Structural Welding Code/Sheet Steel - 98 Structural Welding Code - Sheet Steel
3. American Society for Testing and Materials (ASTM) A653 (A653M)-06, A924 (A924M)-06, A1008 (A1008M)-06
4. American Society of Civil Engineering (ASCE) – SEI/ASCE7-05
5. Underwriters Laboratories (UL) Fire Resistance Directory - http://www.ul.com/database 2006

B. Reference Documents: Refer to the following documents:

1. SDI Manual of Construction with Steel Deck - MOC2-2006
2. SDI Standard Practice Details - SPD2-2001
3. SDI Position Statement - Field Painting of Steel Deck-2004
4. SDI Diaphragm Design Manual - DDM03-2004

2. Products

2.1 Material:

A. Sheet steel for galvanized deck shall conform to ASTM A653 (A653M) Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).

B. Sheet steel for cold rolled plus painted deck shall conform to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa). Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

C. Sheet steel for accessories shall conform to ASTM A653 (A653M) Structural Quality for structural accessories, ASTM A653 (A653M) Commercial Quality for non-structural accessories, or ASTM A1008 (A1008M) for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

D. The deck type (profile) and thickness (gage) shall be as shown on the plans.

2.2 Tolerance:

A. Uncoated thickness shall not be less than 95% of the design thickness as listed in Table 2.2.1:

Table 2.2.1

Gage No.	Design Thickness		Minimum Thickness	
	in.	mm.	in.	mm.
22	0.0295	0.75	0.028	0.71
21	0.0329	0.84	0.031	0.79
20	0.0358	0.91	0.034	0.86
19	0.0418	1.06	0.040	1.01
18	0.0474	1.20	0.045	1.14
17	0.0538	1.37	0.051	1.30
16	0.0598	1.52	0.057	1.44

B. Panel length shall be within plus or minus 1/2 inch (12 mm) of specified length.

C. Panel cover width shall be no greater than minus 3/8 inch (10 mm), plus 3/4 inch (20 mm).

D. Panel camber and/or sweep shall be no greater than 1/4 inch in 10 foot length (6 mm in 3 m).

E. Panel end out of square shall not be greater than 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

A. Galvanizing shall conform to ASTM A653 (A653M).

B. Painted with a shop coat of primer shall be applied to steel sheet conforming to ASTM A1008 (A1008M).

C. The finish of the steel roof deck shall be suitable for the environment of the structure.

2.3 Finish:

Commentary: The primer coat is intended to protect the steel for only a short period of exposure in ordinary atmospheric conditions and shall be considered an impermanent and provisional coating. Field painting of prime painted deck is recommended especially where the deck is exposed. (See SDI *Field Painting of Steel Deck*).

In corrosive or high moisture atmospheres, a galvanized finish is desirable in a G60 (Z180) or G90 (Z275) coating. In highly corrosive or chemical atmospheres or where reactive materials could be in contact with the steel deck, special care in specifying the finish should be used.

2.4 Design:

A. The deck shall be selected by the designer to provide the load capabilities shown on the drawings (design live and dead loads and the SDI construction loads).

1. The section properties of the steel roof unit deck shall be computed in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*
2. Allowable Stress Design (ASD): Bending stress shall not exceed 0.60 times the yield strength with a maximum of 36 ksi (250 MPa) under the combined dead and design live loads.
3. Load and Resistance Factor Design (LRFD): The load factors are defined in the governing code. ASCE 7 (See section 1.2.A.5) shall be used in the absence of a governing code. The resistance factors and nominal resistances shall be determined in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*
4. Deck Deflection: Deflection of the deck shall not exceed 1/240 of the span (centerline to centerline) or 1 inch (25 mm), whichever is less, under the uniformly distributed design live load. All spans are to be considered center-to-center of supports.

Commentary: The adequacy of deck edge support details should be reviewed by the designer. At the building perimeter or any other deck termination or direction change, occasional concentrated loading of the roof deck could result in temporary differences in deflection between the roof deck and the adjacent stationary building component. Supplemental support such as a perimeter angle may be warranted.

5. Suspended Loads: All suspended loads shall be included in the analysis and calculations for stress and deflection.

Commentary: The designer must take into account the sequence of loading. Suspended loads may include ceilings, light fixtures, ducts or other utilities. The designer must be informed of any loads applied after the roofing has been installed.

6. Construction and Maintenance Loads: Deck shall be selected by the designer to provide a minimum 30 lbs/sq.ft. (1.44 kPa) construction load. Span lengths shall be governed by a maximum stress of 0.7 Fy and a maximum deflection of 1/240 of the span with a 200-pound (0.89 kN) concentrated load at midspan on a 1 foot (300 mm) wide section of deck. If the designer contemplates loads of greater magnitude, spans shall be decreased or the thickness of the steel deck increased as required. All loads shall be distributed by appropriate means to prevent damage to the completed assembly during construction.
7. Cantilever loads: The cantilever span shall be determined by the lowest value considering, (a) construction phase load of 10 psf (0.48 kPa) on adjacent span and cantilever, plus 200 pound load (0.89 kN) at end of cantilever with a stress limit of 0.7 Fy (ASD), (b) a service load of 45 psf (2.15 kPa) on adjacent span and cantilever, plus 100 pound load (0.44 kN) at end of cantilever with a stress limit of 0.6 Fy (ASD), or (c) with service loads, a deflection limitation of 1/240 of adjacent span for interior span and deflection limitation at end of cantilever of 1/120 of overhang.

Commentary: Under Construction and Maintenance Loads, and Cantilever Loads, 0.7 Fy maximum stress was selected to unify the ASD and LRFD values. Apply a load factor of 1.4 to 200 pound load when LRFD is used.

8. Diaphragm Shear Capacity: Roof deck shear capacity shall be determined in accordance with the SDI *Diaphragm Design Manual* or from tests conducted by an independent professional engineer.

Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI *Diaphragm Design Manual.* If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

B. Load Tables: Uniform loads determined for published tables shall be based on equal adjacent two and three span conditions and on single spans. Appropriate combinations of shear and bending shall be made to determine the published loads. Lengths of 1-1/2 inches (38 mm) for end bearing and 4 inches (100 mm) for interior bearing shall be used to check web crippling. Deflection coefficients shall be 0.013 for single spans, 0.0054 for double spans and 0.0069 for triple spans.

Commentary: For deck layouts that provide more than three equal spans, the user can apply the loads published for three spans. Published uniform load tables do not apply for adjacent spans that differ in length by more than 10%.

2.5 Accessories:

A. Ridge and valley plates, and flat plates at change of deck direction shall be furnished as shown on plans to provide a flat (finished) surface for the application of roof insulation and roof cover.

B. Sump pans shall be furnished to receive roof drains as shown on plans. Holes for drains are to be field cut (by others) in the field.

C. Mechanical fasteners or welds shall be permitted for deck and accessory attachment.

3. Execution

3.1 Installation/General:

A. Support framing and field conditions shall be examined for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection shall be followed.

B. Deck panels and accessories shall be installed according to the SDI *Manual of Construction with Steel Deck*, placement plans, and requirements of this Section.

C. Deck panels shall be placed on structural supports and adjusted to final position with ends aligned, and attached securely to the supports immediately after placement in order to form a safe working platform. All deck sheets shall have adequate bearing and fastening to all supports to prevent slip off during construction. Deck ends over supports shall be installed with a minimum end bearing of 1-1/2 inches (38 mm). Deck areas subject to heavy or repeated traffic, concentrated loads, impact loads, wheel loads, etc. shall be adequately protected by planking or other approved means to avoid overloading and/or damage.

D. Lapped or Butted Ends: Deck ends shall be either lapped or butted over supports. Gaps up to 1 inch (25 mm) shall be permitted at butted ends.

E. Deck units and accessories shall be cut and neatly fit around scheduled openings and other work projecting through or adjacent to the decking.

Commentary: It is the responsibility of the designer to designate holes/openings to be decked over in compliance with applicable federal and state OSHA directives. Care should be taken to analyze spans between supports at openings, when determining those holes/openings to be decked over. When a framed opening span exceeds the maximum deck span limits for construction loads, the opening must be detailed around instead of decked over. (Minimum roof construction load 30 lbs/sq ft (1.44kPa), unless job specific requirements dictate otherwise).

F. Trades that subsequently cut unscheduled openings through the deck shall be responsible for reinforcing these openings based upon an approved engineered design.

3.2 Installation/Anchorage:

A. Roof deck units shall be anchored to steel supporting members including perimeter support steel and/or bearing walls by arc spot welds of the following diameter and spacing, fillet welds of equal strength, or mechanical fasteners. Anchorage shall provide lateral stability to the top flange of the supporting structural members and resist the following minimum gross uplifts; 45 pounds per square foot (2.15 kPa) for eave overhang; 30 pounds per square foot (1.44 kPa) for all other roof areas. The dead load of the roof deck construction shall be deducted from the above forces.

1. All welding of deck shall be in accordance with ANSI/AWS D1.3, *Structural Welding Code - Sheet Steel.* Each welder shall demonstrate an ability to produce satisfactory welds using a procedure such as shown in the SDI *Manual of Construction with Steel Deck*, and/or as described in ANSI/AWS D1.3.
2. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches (0.7 mm). Welding washers shall be a minimum thickness of 0.0598 inches (16 gage, 1.50 mm) and have a nominal 3/8 inch (10 mm) diameter hole.
3. Where welding washers are not used, a minimum visible 5/8 inch (15 mm) diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material at end laps and shall have good fusion to the supporting members.
4. Weld spacing: Ribs of panels shall be welded at each support. Space additional welds an average of 12 inches (300 mm) apart but not more than 18 inches (460 mm).
5. When used, fillet welds shall be at least 1-1/2 inches (38 mm) long.
6. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, shall be permitted in lieu of welding to fasten deck to supporting framing if fasteners meet all project service requirements. When the fasteners are powder actuated or pneumatically driven, the load value per fastener used to determine the maximum fastener spacing is based on a minimum structural support thickness of not less than 1/8 inch (3 mm) and on the fastener providing a minimum 5/16 inch (8 mm) diameter bearing surface (fastener head size). When the structural support thickness is less than 1/8 inch (3 mm), powder actuated or pneumatically driven fasteners shall not be used, but screws are acceptable.

Commentary: Mechanical fasteners (screws, powder or pneumatically driven fasteners, etc.) are recognized as viable anchoring methods, provided the type and spacing of the fastener satisfies the design criteria. Documentation in the form of test data, design calculations, or design charts should be submitted by the fastener manufacturer as the basis for obtaining approval.

7. For deck units with spans greater than 5 feet (1.5 m), side laps and perimeter edges of units between span supports shall be fastened at intervals not exceeding 36 inches (1 m) on center, using one of the following methods:
   a. #10 self drilling screws.
   b. Crimp or button punch.
   c. Arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or minimum 1 inch (25 mm) long fillet weld.

Commentary: The above side lap spacing is a minimum. Service loads or diaphragm design may require closer spacing. Good metal to metal contact is necessary for a good side lap weld. Burn holes are to be expected.

B. Accessory Attachment:

1. Accessories shall be anchored to supporting members by arc spot welds or self drilling screws at 12 inches (300 mm) maximum intervals or as shown on design drawings.

Form Deck General Information

TABLES

The most common use of form deck is to support concrete fills but they can be used for a variety of structural applications. Therefore, two sets of tables are shown. The **Uniform Load tables are** for the deck as the sole load carrying member; ASD and LRFD tables both show **stress load/deflection load** in psf. The loads are uniformly applied and the deflection limit is 1/180 of the span. It is acceptable to ignore the contribution of insulation fill and to use the load tables for the appropriate form deck. When BV or NV is used, the tables are shown in the roof deck section. The **Concrete Slab tables** show the slab capacities for structural (normal weight) concrete with draped mesh placed over the various form decks. The effects of the deck profile are considered in determining the slab load values. The transformed moment of inertia (I) is provided for deflection checks. Diaphragm tables are available in the Diaphragm section of the catalog.

DESIGN CONSIDERATIONS – SLABS ON FORM DECK

The live loads shown in the tables are the loads that the reinforced concrete slab can carry. Live loads are based on unshored galvanized deck. See the maximum recommended unshored span tables and the corresponding notes. If uncoated form is used, or if shoring is used, the load shown in the table must either be reduced by the weight of the slab (the quick method) or, more precisely, by solving the equation:

$M = 1.2M_{DL} + 1.6M_{LL}$.

M_{DL} is the moment caused by the slab weight.

Load values shown in the tables are for continuous (3 or more) spans; $-M = WL^2/12$ for spans less than 10 feet, or $WL^2/10$ for spans greater than 10 feet, and $+M = WL^2/16$ per ACI 318 (see page 85). In most cases negative moments control. Load values for end spans, dual spans, single spans, or for unequal adjacent spans should be appropriately reduced to compensate for increased moment coefficients; use the tabulated factored design moments to determine the allowable design loads. A design tool is also available on the CMC Joist & Deck website to determine these uniform loads. All slab tables included in this section are for 3,000 psi concrete and utilize a phi factor of 0.9. Consult ACI 318 for the appropriate phi factor if the concrete exceeds 4,000 psi.

Example 1:

Check the end span of a 4" slab with welded wire mesh 6 x 6 - W4.0 x W4.0; the slab is continuous over 4' spans. The UFX deck is to be unshored and is galvanized.

End span: $+M = WL^2/11$

From the UFX table: $+M = 10.785$ kip in.

$W(4)^2(12)/11 = 10.785(1000)/1.6$

$W = 386$ psf

-M at the first interior support controls and the table value of W = 368 psf is therefore the limiting load.

Example 2:

Use the same parameters of the previous example to check a single span – the mesh is not draped but is placed on top of the deck.

$+M = W(4)^2(12)/8 = 10.785(1000)/1.6$

$W = 281$ psf

Example 3:

A 4" slab on UFX is spanning 6'; the mesh is 6 x 6 - W4.0 x W4.0. The deck was shored during construction. Determine the allowable live load.

Quick Method: The table shows W = 163 psf

The slab weighs 40 psf. The live load is then:

$W_{LL} = 163 - 40 - 1$(deck weight) $= 122$ psf

Precise Method: $M = 9408$ lb inches $= WL^2/12$

$M_{DL} = 1.2(40+1)(6)^2(12)/12 = 1771$ lb inches

$9408 = 1771 + 1.6W_{LL}(6)^2(12)/12$

$W_{LL} = 133$ psf

In the slab capacity tables, shear has been checked for uniform loads. The factored nominal shear force is:

$$\phi V_n = 0.75 \times 2 \times (f'_c)^{.5} \times A_c$$

(A_c is the area of concrete as defined by SDI – see the **Content of Composite Deck Tables on page 29** for further explanation of A_c.)

The table values are based on $f'_c = 3000$ psi and, for the reinforcing steel (welded wire fabric), $F_y = 60{,}000$ psi.

values in the table represent uniform live loads greater than 400 psf. Loads higher than this limit are usually caused by concentrated loads such as those caused by fork lift trucks. When heavy concentrated loads are to be considered, the slab system, including supports, should be given additional analysis.

Slab span to depth ratios are limited to 24. Spot checks have shown that the tabulated (live) loads would not cause a deflection greater than L/360. **In no case should the table values be used to predict slab performance using randomly placed fibers in lieu of wire mesh. Fibrous admixtures are not to be considered as primary reinforcement.**

In some short span layouts, the galvanized form deck is capable of carrying all of the required loading without considering the concrete slab strength. For these cases a minimum of 6 x 6-W1.4 x W1.4 is recommended for crack control.

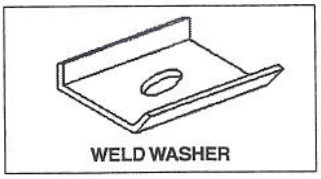
CONCRETE AND PLACING CONCRETE

To prevent leakage at side laps, concrete should be placed in the opposite direction to which the sheets were erected so that the concrete flow is away from the lap rather than into the lap. Care should be taken during pouring operations not to allow heavy concentrated loads or equipment to be placed on the steel forms. When buggies are used to deliver the concrete, the runways should be planked to avoid local damage. Concrete admixtures containing calcium chloride (or other salts) should not be used over steel forms.

FASTENING

Welding patterns 1 and 2 on page 73 represent minimum acceptable fastening that will allow slabs to be designed on a continuous basis and also stabilize joists. More frequent fastening may be required to satisfy diaphragm or fire rating requirements. Consult the U.L. Fire Resistance Directory for specific details on fire rated constructions. Diaphragm values can be obtained from the SDI Diaphragm Design Manual or in the diaphragm section of the catalog.

Welding washers are recommended for attaching deck lighter than 22 gage to structural steel (or joists). Welding washers are not recommended for attaching deck that is 22 gage or heavier. Welding washers are never recommended for attaching side laps except at supports. Welding washers furnished by CMC Joist & Deck are 16 gage with 3/8" diameter holes. The welder strikes an arc, burns a hole through the sheet and builds a plug weld from the joist (or beam) into the washer. Fasteners other than welds are acceptable to CMC Joist & Deck providing that the designer has checked all of the design parameters of the fasteners.



WELD WASHER

FINISHES

Form deck is commonly available in two finishes, galvanized (conforming to ASTM A653) and uncoated (black – conforming to ATSM A1008). Galvanized steel should always be specified for carrying non-structural insulating concrete fills. Painted form deck is available on special order. Use galvanized deck for vented deck or when spray fireproofing is required.

VENTED DECK

GENERAL INFORMATION

Project Name: Stennis Riverstone
Contract: N69450-05-D-0096
Brm Proj.: 3013-70
Submittal: 13125-09
Reviewer
Reviewed by: J. Collins
Date: 2/17/09

3X

BROADMOOR, L.L.C.

I hereby agree that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number N69450-05-D-0096, is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

R. Bart Vick 5.8.09

DQC Manager Date

J. W. Collins 5/8/09

QC Officer Date

DAMMON ENGINEERING INC

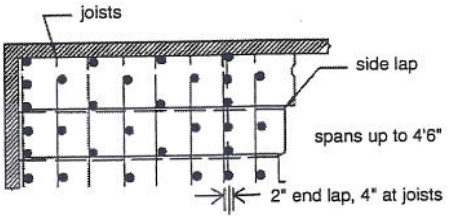
Date: 5.8.09 **Project:** Stennis RAP
Reviewed: X
Reviewed as Noted:
Revise and Resubmit:
Rejected:
Other:

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. This contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating his or her work with that of all other trades and performing all in a safe and satisfactory manner.

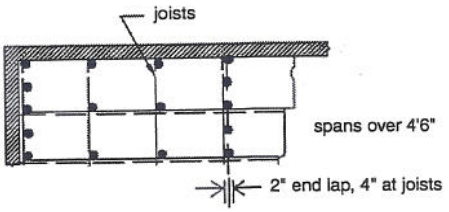
Submittal Item: Metal Deck

Comments

Details

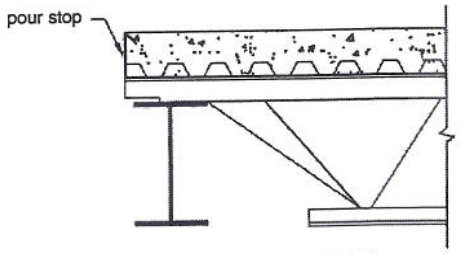


MINIMUM WELD PATTERN #1

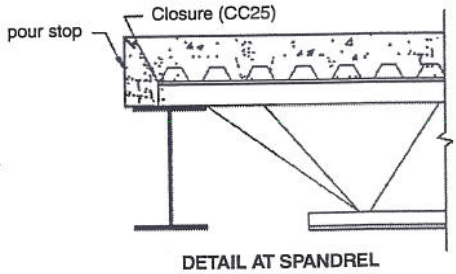


MINIMUM WELD PATTERN #2

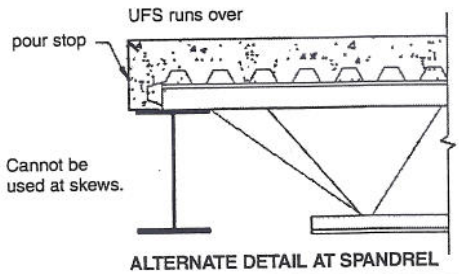
Note: dots represtend welds. Fasten side laps at 36" o.c. (max) if span exceeds 5'0".



DETAIL AT SPANDREL



DETAIL AT SPANDREL



ALTERNATE DETAIL AT SPANDREL

Suggested Form Deck Specifications

1. Material

DECK

Steel form deck shall be as manufactured by CMC Joist & Deck. Steel shall conform to one of the following:
(1) ASTM A1008 SS grade 80 (for uncoated UFS, UF1X, UFX, and UF2X);
(2) ASTM A653 SS grade 80 (for galvanized UFS, UFSV, UF1X, UF1XV, UFX, UFXV, UF2X, and UF2XV);
(3) ASTM A1008 SS grade 40 (for painted or uncoated B or Inv. B deck);
(4) ASTM A653 SS grade 40 (for galvanized B, BV, Inv. B, N, NV, LF2X, LF3X, or LS deck);
(5) ASTM A653 SS grade 33 or grade 40 (for galvanized HPD deck).

VENTING – (if required – V at end of product name indicates availability.)
Deck shall be galvanized and provide a minimum venting area of XX percent based on the projected horizontal area. (Maximum area available for NV is 0.5%, all others are 1.5%. Venting area requirements should be obtained from the concrete manufacturer.) The form deck section of the catalog includes load tables for both vented and non-vented form deck. With insulating fill it is acceptable to ignore the contribution of the fill. When BV or NV is used, use the load table in the roof deck section. However, insulating fill manufacturers have determined load capacities of various combinations of fill and deck both with and without foamed plastic insulations boards. Refer to the fill manufacturer's literature for more specific loading limitations. Some dripping and deck staining is to be expected at vents.

2. Design

The section properties of the steel form units shall be calculated in accordance with the AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
For Allowable Stress Design (ASD) of forms:
(1) Bending stress for UFS(V), UF1X(V), UFX(V), or UF2X(V) shall not exceed 36 ksi; or
(2) Bending stress for B (V), Inv. B, N(V), LF2X, LF3X, LS, or grade 40 HPD shall not exceed 24 ksi;
(3) Bending stress for grade 33 HPD shall not exceed 20 ksi;
(4) Deck used as a form for structural concrete slabs shall meet SDI construction loading criteria.

For LRFD:
(1) The steel yield stress for UFS(V), UF1X(V), UFX(V), or UF2X(V) is 60 ksi.
(2) Deck used as a form for structural concrete shall meet SDI construction loading criteria.
Note: Shoring impacts slab live load capacity.
See the form deck general information section.

3. Tolerances

The standard tolerance for deck sheet lengths is plus or minus 1/2". Base steel thickness tolerance is minus 5% as per SDI and AISI.

4. Installation

Steel Deck shall be erected and fastened in accordance with the project's specifications, the approved erection layouts, and the SDI Manual of Construction with Steel Deck. Place form deck sheets end to end and maintain alignment. **In order to form a working platform, immediately fasten sheets to the supports.** Place sheets with edges up and end lapped or butted at the ends over supports; nest side laps one-half corrugation. Minimum bearing on supports of deck ends shall be 1 1/2" unless otherwise shown.

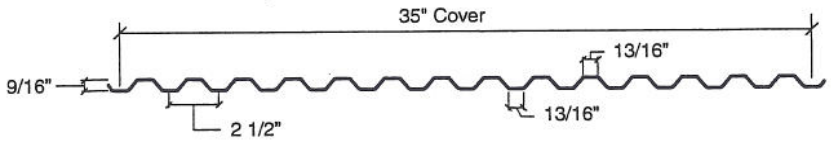
Welding washers are required for attaching deck lighter than 22 gage to structural steel (or joists). *Welding washers are not recommended for attaching deck that is 22 gage or heavier. Welding washers are never recommended for attaching side laps except at supports.* Welding washers, when required, shall be furnished by CMC Joist & Deck. For thicknesses 22 gage and greater, arc puddle welds shall be at least 5/8 inch in diameter, or elongated, having an equal perimeter. Support arc puddle welds shall be ¾ inch in diameter or elongated arc seam welds having equal perimeter when either the combined thickness at end laps exceeds 20/18 or the single thickness is equal to or greater than 12 gage. Side laps are to be fastened at a maximum spacing of 36" on center for spans greater than 5'0". Fasten side laps at 12" on center at cantilevers. *Welds or screws are acceptable for side lap connections, however welds are not recommended for thickness 22 gage and less.* HPD side laps are to be fastened at 24" on center with 1" minimum butt welds. All sheets from opened bundles must be fastened before the end of the working day; bundles must be left secured to prevent wind blowing the individual sheets.

5. Site Storage

Steel deck delivery should be scheduled to arrive at the jobsite as required for erection. If site storage is needed, the bundles of deck (either painted, uncoated, or galvanized) shall be stored off the ground with one end elevated to provide drainage, and shall be protected against condensation with a ventilated waterproof covering.

SPECIFICATIONS

UFS, UFSV - F_y = 80 ksi											
Section Properties						ASD			LRFD		
Metal Thickness		Wt. (psf)	I_p (in⁴)	S_p (in³)	S_n (in³)	V (lbs)	R_{be} (lbs)	R_{bi} (lbs)	ϕV (lbs)	ϕR_{be} (lbs)	ϕR_{bi} (lbs)
Gage	Inches										
28	0.0149	1.00	0.011	0.036	0.037	1320	670	800	2010	1020	1180
26	0.0179	1.00	0.014	0.045	0.047	1580	930	1140	2410	1430	1690
24	0.0239	1.00	0.019	0.063	0.063	2100	1570	1980	3190	2390	2950
22	0.0295	1.50	0.023	0.078	0.078	2580	2290	2960	3920	3500	4400
20	0.0358	2.00	0.028	0.094	0.094	3110	3240	4260	4730	4950	6340



UFS, UFSV

UNIFORM TOTAL LOAD / Load that Produces L/180 Deflection, psf											
	Gage	Span Condition	Span								
			2'0"	2'6"	3'0"	3'6"	4'0	4'6"	5'0"	5'6"	6'0"
ASD	28	Single	216 / 120	138 / 62	96 / 36	71 / 22	54 / 15	43 / 11	35 / 8	29 / 6	24 / 4
		Double	217 / 290	140 / 148	98 / 86	72 / 54	55 / 36	44 / 25	35 / 19	29 / 14	25 / 11
		Triple	269 / 227	174 / 116	122 / 67	90 / 42	69 / 28	54 / 20	44 / 15	37 / 11	31 / 8
	26	Single	270 / 153	173 / 78	120 / 45	88 / 29	67 / 19	53 / 13	43 / 10	36 / 7	30 / 6
		Double	275 / 369	178 / 189	124 / 109	91 / 69	70 / 46	55 / 32	45 / 24	37 / 18	31 / 14
		Triple	341 / 289	221 / 148	154 / 86	114 / 54	87 / 36	69 / 25	56 / 18	46 / 14	39 / 11
	24	Single	378 / 208	242 / 106	168 / 62	123 / 39	94 / 26	75 / 18	60 / 13	50 / 10	42 / 8
		Double	369 / 501	238 / 256	166 / 148	122 / 93	94 / 63	74 / 44	60 / 32	50 / 24	42 / 19
		Triple	456 / 392	296 / 201	207 / 116	152 / 73	117 / 49	93 / 34	75 / 25	62 / 19	52 / 15
	22	Single	468 / 252	300 / 129	208 / 75	153 / 47	117 / 31	92 / 22	75 / 16	62 / 12	52 / 9
		Double	456 / 606	295 / 310	206 / 180	152 / 113	116 / 76	92 / 53	75 / 39	62 / 29	52 / 22
		Triple	564 / 474	366 / 243	256 / 141	189 / 88	145 / 59	115 / 42	93 / 30	77 / 23	65 / 18
	20	Single	564 / 306	361 / 157	251 / 91	184 / 57	141 / 38	111 / 27	90 / 20	75 / 15	63 / 11
		Double	550 / 738	355 / 378	248 / 219	183 / 138	140 / 92	111 / 65	90 / 47	74 / 35	62 / 27
		Triple	680 / 577	441 / 296	308 / 171	227 / 108	175 / 72	138 / 51	112 / 37	93 / 28	78 / 21
LRFD	28	Single	342 / 120	219 / 62	152 / 36	112 / 22	85 / 15	68 / 11	55 / 8	45 / 6	38 / 4
		Double	343 / 290	222 / 148	155 / 86	114 / 54	87 / 36	69 / 25	56 / 19	46 / 14	39 / 11
		Triple	425 / 227	275 / 116	192 / 67	142 / 42	109 / 28	86 / 20	70 / 15	58 / 11	49 / 8
	26	Single	428 / 153	274 / 78	190 / 45	140 / 29	107 / 19	84 / 13	68 / 10	57 / 7	48 / 6
		Double	435 / 369	281 / 189	196 / 109	145 / 69	111 / 46	88 / 32	71 / 24	59 / 18	49 / 14
		Triple	538 / 289	349 / 148	244 / 86	180 / 54	138 / 36	109 / 25	89 / 18	73 / 14	62 / 11
	24	Single	599 / 208	383 / 106	266 / 62	195 / 39	150 / 26	118 / 18	96 / 13	79 / 10	67 / 8
		Double	583 / 501	376 / 256	263 / 148	194 / 93	149 / 63	118 / 44	95 / 32	79 / 24	66 / 19
		Triple	720 / 392	467 / 201	327 / 116	241 / 73	185 / 49	147 / 34	119 / 25	98 / 19	83 / 15
	22	Single	741 / 252	474 / 129	329 / 75	242 / 47	185 / 31	146 / 22	119 / 16	98 / 12	82 / 9
		Double	721 / 606	466 / 310	325 / 180	240 / 113	184 / 76	146 / 53	118 / 39	98 / 29	82 / 22
		Triple	891 / 474	578 / 243	405 / 141	299 / 88	229 / 59	182 / 42	147 / 30	122 / 23	102 / 18
	20	Single	893 / 306	572 / 157	397 / 91	292 / 57	223 / 38	176 / 27	143 / 20	118 / 15	99 / 11
		Double	869 / 738	562 / 378	392 / 219	289 / 138	222 / 92	175 / 65	142 / 47	118 / 35	99 / 27
		Triple	1074 / 577	697 / 296	487 / 171	360 / 108	276 / 72	219 / 51	177 / 37	147 / 28	123 / 21

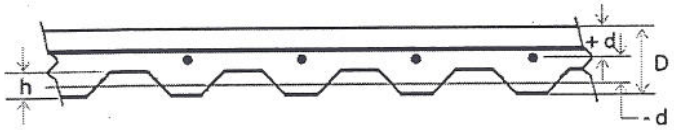
NOTES:
Vented deck with 1.5% maximum open area is available for use with insulating fills. It is acceptable to ignore the contribution of the insulating fill and use the load table above, however, insulating fill manufacturers have determined load capacities of various combinations of fill and deck both with and without foamed plastic insulation boards. Refer to the fill manufacturer's literature for more specific loading limitations.
R_{be} is the bearing capacity at an **exterior** condition based on 1 1/2" of bearing. R_{bi} is the bearing capacity at an **interior** condition based on 3" of bearing.

UFS, UFSV

Profile Considerations

Draped Mesh Slabs: Deck depth = h; Total Slab Depth = D; Wire diameter = w.

D = 2.5" to 3"
+ d = (D - h)/2
- d = (D - h)/2 + h/2 = D/2
TOP COVER = 0.75"

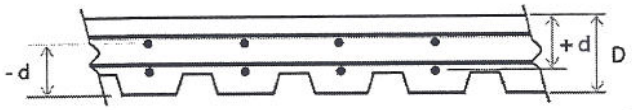


D > 3"
- d = (D - h/2 - 3w/2 - 0.75")
+ d = (D - h - w/2)
TOP COVER = 0.75"

(Mesh is draped, not layered.)

UFS, UF1X and UFX-36 have a b width of 12" for both positive and negative bending. For D < 3" place the mesh in the center of the concrete that is above the ribs. For D > 3", mesh is draped, not layered.

- d = (D - 0.75 - 3w/2)
+ d = (D - h - w/2)
TOP COVER = 0.75"

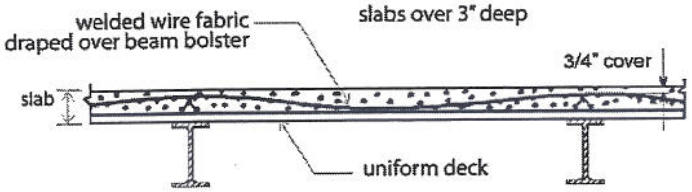


(Mesh is draped, not layered.)

Inverted B and UF2X have a b width of 12" for positive bending. For negative bending the b width for Inverted B deck is 7.5"; for UF2X the negative bending b width is 6". For D > 3" mesh is draped, not layered.

Minimum concrete cover is 1 1/2"

DRAPED MESH



FORM DECK - weights and volumes

Total Slab Depth		UFS	UF1X	UFX	INV. B	UF2X	LF2X	LF3X
		C_v = .0234	C_v = .0417	C_v = .0547	C_v = .0781	C_v = .0833	C_v = .0833	C_v = .1250
2.5"	Wt	27						
	Vol.	0.185						
3.0"	Wt	33	30	28				
	Vol.	0.226	0.208	0.195				
3.5"	Wt	39	36	34	36			
	Vol.	0.268	0.250	0.237	0.245			
4.0"	Wt	45	42	40	41	36	36	
	Vol.	0.310	0.292	0.279	0.286	0.250	0.250	
4.5"	Wt	51	48	46	48	42	42	36
	Vol.	0.352	0.333	0.320	0.328	0.292	0.292	0.250
5.0"	Wt	57	54	52	54	48	48	42
	Vol.	0.393	0.375	0.362	0.370	0.333	0.333	0.292
5.5"	Wt	63	60	59	60	54	54	48
	Vol.	0.435	0.417	0.404	0.411	0.375	0.375	0.333
6.0"	Wt	69	66	65	66	60	60	54
	Vol.	0.476	0.458	0.445	0.453	0.417	0.417	0.375
6.5"	Wt	75	73	71	72	67	67	60
	Vol.	0.518	0.500	0.487	0.495	0.458	0.458	0.417
7.0"	Wt	81	79	77	78	73	73	66
	Vol.	0.560	0.542	0.528	0.536	0.500	0.500	0.458

The weights are shown in pounds per square foot and are based on 145 pcf concrete. Volumes are in ft.^{3} per ft.^{2}. C_v is the volume of concrete required to fill the ribs. Multiply the volume shown in the table by 144 to find the gross area of concrete in in^2/ft.

SLAB DESIGN DATA

Note:
f'c = 3 ksi

Concrete slabs on UFS form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 2'0"	2'3"	2'6"	2'9"	3'0"	3'3"	3'6"
2.5"	6 x 6 - W1.4 x W1.4*	0.969	1.250	1.423	1.848	1.633	0.319	289	228	185	153	128	109	94
	6 x 6 - W2.0 x W2.0*	0.969	1.250	2.008	2.615	1.633	0.327	###	323	262	216	182	155	133
	6 x 6 - W2.9 x W2.9	0.969	1.250	2.856	3.737	1.633	0.338	###	###	374	309	260	221	191
3.0"	6 x 6 - W1.4 x W1.4*	1.219	1.500	1.801	2.226	1.959	0.580	348	275	223	184	155	132	114
	6 x 6 - W2.0 x W2.0*	1.219	1.500	2.548	3.155	1.959	0.592	###	390	316	261	219	187	161
	6 x 6 - W2.9 x W2.9*	1.219	1.500	3.639	4.520	1.959	0.609	###	###	###	374	314	267	231
3.5"	6 x 6 - W2.9 x W2.9*	2.842	2.181	8.721	6.652	2.286	1.106	###	###	###	###	###	394	339
	6 x 6 - W4.0 x W4.0	2.825	2.131	11.865	8.868	2.286	1.162	###	###	###	###	###	###	###
4.0"	6 x 6 - W2.9 x W2.9*	3.342	2.681	10.287	8.218	2.613	1.694	###	###	###	###	###	###	###
	6 x 6 - W4.0 x W4.0*	3.325	2.631	14.025	11.028	2.613	1.780	###	###	###	###	###	###	###

Concrete slabs on UF1X form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 2'0"	2'6"	3'0"	3'6"	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"
3.0"	6 x 6 - W2.0 x W2.0*	1.000	1.500	2.075	3.155	1.972	0.467	###	277	192	141	108	85	69	57	48	
	6 x 6 - W2.9 x W2.9	1.000	1.500	2.954	4.520	1.972	0.482	###	394	274	201	154	122	98	81	68	
3.5"	6 x 6 - W4.0 x W4.0	2.388	1.913	9.975	7.923	2.300	0.925	###	###	###	###	309	245	198	164	138	117
	4 x 4 - W2.9 x W2.9	2.404	1.962	10.893	8.817	2.300	0.946	###	###	###	###	344	272	220	182	153	130
	4 x 4 - W4.0 x W4.0	2.388	1.913	14.709	11.631	2.300	1.001	###	###	###	###	###	359	291	240	202	172
4.0"	6 x 6 - W4.0 x W4.0	2.888	2.413	12.135	10.083	2.629	1.467	###	###	###	###	394	311	252	208	175	149
	4 x 4 - W2.9 x W2.9	2.904	2.462	13.242	11.166	2.629	1.500	###	###	###	###	###	345	279	231	194	165
	4 x 4 - W4.0 x W4.0	2.888	2.413	17.949	14.871	2.629	1.590	###	###	###	###	###	###	372	307	258	220
4.5"	4 x 4 - W2.9 x W2.9	3.404	2.962	15.591	13.515	2.958	2.225	###	###	###	###	###	###	338	279	235	200
	4 x 4 - W4.0 x W4.0	3.388	2.913	21.189	18.111	2.958	2.362	###	###	###	###	###	###	###	374	314	268
5.0"	4 x 4 - W4.0 x W4.0	3.888	3.413	24.429	21.351	3.286	3.336	###	###	###	###	###	###	###	###	371	316
5.5"	4 x 4 - W4.0 x W4.0	4.388	3.913	27.669	24.591	3.615	4.534	###	###	###	###	###	###	###	###	###	364
6.0"	4 x 4 - W4.0 x W4.0	4.888	4.413	30.909	27.831	3.944	5.977	###	###	###	###	###	###	###	###	###	###

Concrete slabs on UFX-36 form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 3'6"	4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"
3.0"	6 x 6 - W2.0 x W2.0*	0.844	1.500	1.738	3.155	1.946	0.390	118	91	72	58	48	40				
	6 x 6 - W2.9 x W2.9	0.844	1.500	2.465	4.520	1.946	0.405	168	128	101	82	68	57				
3.5"	6 x 6 - W4.0 x W4.0	2.075	1.756	8.625	7.248	2.271	0.776	370	283	224	181	150	126	107	92		
	4 x 4 - W2.9 x W2.9	2.092	1.806	9.425	8.083	2.271	0.794	###	316	249	202	167	140	120	103		
	4 x 4 - W4.0 x W4.0	2.075	1.756	12.684	10.618	2.271	0.835	###	###	328	265	219	184	157	135		
4.0"	6 x 6 - W4.0 x W4.0	2.575	2.256	10.785	9.408	2.595	1.267	###	368	290	235	194	163	139	120	105	92
	4 x 4 - W2.9 x W2.9	2.592	2.306	11.774	10.432	2.595	1.295	###	###	322	261	216	181	154	133	116	102
	4 x 4 - W4.0 x W4.0	2.575	2.256	15.924	13.858	2.595	1.368	###	###	###	346	286	241	205	177	154	135
4.5"	4 x 4 - W2.9 x W2.9	3.092	2.806	14.123	12.781	2.920	1.961	###	###	394	320	264	222	189	163	142	125
	4 x 4 - W4.0 x W4.0	3.075	2.756	19.164	17.098	2.920	2.077	###	###	###	###	353	297	253	218	190	167
5.0"	4 x 4 - W4.0 x W4.0	3.575	3.256	22.404	20.338	3.244	2.982	###	###	###	###	###	353	301	259	226	199
5.5"	4 x 4 - W4.0 x W4.0	4.075	3.756	25.644	23.578	3.568	4.103	###	###	###	###	###	###	349	301	262	230
6.0"	4 x 4 - W4.0 x W4.0	4.575	4.256	28.884	26.818	3.893	5.463	###	###	###	###	###	###	397	342	298	262

Concrete slabs on UF2X form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"
4.0"	6 x 6 - W2.0 x W2.0*	1.919	3.007	4.060	6.326	2.629	1.365	167	135	112	94	80	69	60	53		
	6 x 6 - W2.9 x W2.9	1.904	2.962	5.785	8.921	2.629	1.422	238	193	159	134	114	98	86	75		
4.5"	6 x 6 - W4.0 x W4.0	2.388	3.413	9.975	14.064	2.958	2.128	###	333	275	231	197	170	148	130	115	103
	4 x 4 - W2.9 x W2.9	2.404	3.462	10.893	15.463	2.958	2.170	###	363	300	252	215	185	161	142	126	112
	4 x 4 - W4.0 x W4.0	2.388	3.413	14.709	20.588	2.958	2.291	###	###	###	340	290	250	218	192	170	151
5.0"	6 x 6 - W4.0 x W4.0*	2.888	3.913	12.135	16.224	3.286	2.943	###	###	334	281	239	206	180	158	140	125
	4 x 4 - W2.9 x W2.9	2.904	3.962	13.242	17.812	3.286	3.000	###	###	365	307	261	225	196	172	153	136
	4 x 4 - W4.0 x W4.0	2.888	3.913	17.949	23.828	3.286	3.171	###	###	###	###	352	304	265	233	206	184
5.5"	4 x 4 - W2.9 x W2.9*	3.404	4.462	15.591	20.161	3.615	4.020	###	###	###	350	298	257	224	197	174	156
	4 x 4 - W4.0 x W4.0	3.388	4.413	21.189	27.068	3.615	4.253	###	###	###	###	###	345	301	264	234	209
6.0"	4 x 4 - W4.0 x W4.0	3.888	4.913	24.429	30.308	3.944	5.557	###	###	###	###	###	387	337	296	262	234
6.5"	4 x 4 - W4.0 x W4.0	4.388	5.413	27.669	33.548	4.272	7.103	###	###	###	###	###	###	373	328	290	259
7.0"	4 x 4 - W4.0 x W4.0*	4.888	5.913	30.909	36.788	4.601	8.914	###	###	###	###	###	###	###	359	318	284

SLAB TABLES

Note:
f'c = 3 ksi

Concrete slabs on B-INV form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 4'0"	4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"
3.5"	6 x 6 - W2.0 x W2.0*	1.919	2.507	4.060	5.280	2.348	1.039	206	163	132	109	92	78	67			
	6 x 6 - W2.9 x W2.9*	1.904	2.462	5.785	7.426	2.348	1.081	290	229	186	153	129	110	95			
4.0"	6 x 6 - W4.0 x W4.0	2.388	2.913	9.975	12.040	2.739	1.700	###	372	301	249	209	178	154	134	118	
	4 x 4 - W2.9 x W2.9	2.404	2.962	10.893	13.274	2.739	1.735	###	###	332	274	230	196	169	147	130	
	4 x 4 - W4.0 x W4.0	2.388	2.913	14.709	17.653	2.739	1.829	###	###	###	365	306	261	225	196	172	
4.5"	6 x 6 - W4.0 x W4.0*	2.888	3.413	12.135	14.200	3.143	2.441	###	###	355	293	247	210	181	158	139	123
	4 x 4 - W2.9 x W2.9	2.904	3.462	13.242	15.623	3.143	2.488	###	###	391	323	271	231	199	174	153	135
	4 x 4 - W4.0 x W4.0	2.888	3.413	17.949	20.893	3.143	2.630	###	###	###	###	363	309	266	232	204	181
5.0"	4 x 4 - W2.9 x W2.9*	3.404	3.962	15.591	17.972	3.560	3.432	###	###	###	371	312	266	229	200	176	155
	4 x 4 - W4.0 x W4.0	3.388	3.913	21.189	24.133	3.560	3.630	###	###	###	###	###	357	308	268	236	209
5.5"	4 x 4 - W4.0 x W4.0	3.888	4.413	24.429	27.373	3.992	4.850	###	###	###	###	###	###	349	304	267	237
6.0"	4 x 4 - W4.0 x W4.0	4.388	4.913	27.669	30.613	4.437	6.311	###	###	###	###	###	###	390	340	299	265
6.5"	4 x 4 - W4.0 x W4.0*	4.888	5.413	30.909	33.853	4.895	8.033	###	###	###	###	###	###	###	376	331	293

Concrete slabs on LF2X form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 4'6"	5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"
4.0"	6 x 6 - W2.0 x W2.0*	1.919	3.007	4.060	6.326	2.300	1.365	167	135	112	94	80	69	60	53		
	6 x 6 - W2.9 x W2.9*	1.904	2.962	5.785	8.921	2.300	1.422	238	193	159	134	114	98	86	75		
4.5"	6 x 6 - W4.0 x W4.0	2.388	3.413	9.975	14.064	2.680	2.128	###	333	275	231	197	170	148	130	115	103
	4 x 4 - W2.9 x W2.9	2.404	3.462	10.893	15.463	2.680	2.170	###	363	300	252	215	185	161	142	126	112
	4 x 4 - W4.0 x W4.0	2.388	3.413	14.709	20.588	2.680	2.291	###	###	###	340	290	250	218	192	170	151
5.0"	6 x 6 - W4.0 x W4.0*	2.888	3.913	12.135	16.224	3.081	2.943	###	###	334	281	239	206	180	158	140	125
	4 x 4 - W2.9 x W2.9	2.904	3.962	13.242	17.812	3.081	3.000	###	###	365	307	261	225	196	172	153	136
	4 x 4 - W4.0 x W4.0	2.888	3.913	17.949	23.828	3.081	3.171	###	###	###	###	352	304	265	233	206	184
5.5"	4 x 4 - W2.9 x W2.9*	3.404	4.462	15.591	20.161	3.502	4.020	###	###	###	350	298	257	224	197	174	156
	4 x 4 - W4.0 x W4.0	3.388	4.413	21.189	27.068	3.502	4.253	###	###	###	###	###	345	301	264	234	209
6.0"	4 x 4 - W4.0 x W4.0	3.888	4.913	24.429	30.308	3.944	5.557	###	###	###	###	###	387	337	296	262	234
6.5"	4 x 4 - W4.0 x W4.0	4.388	5.413	27.669	33.548	4.406	7.103	###	###	###	###	###	###	373	328	290	259
7.0"	4 x 4 - W4.0 x W4.0*	4.888	5.913	30.909	36.788	4.888	8.914	###	###	###	###	###	###	###	359	318	284

Concrete slabs on LF3X form deck

Slab	Mesh	+d	-d	+ϕM	-ϕM	ϕV	I_{av}	UNIFORM UNFACTORED SERVICE LIVE LOADS, PSF Spans, feet 7'6"	8'0"	8'6"	9'0"	9'6"	10'0"	10'6"	11'0"	11'6"	12'0"
5.0"	6 x 6 - W4.0 x W4.0	1.888	3.913	7.815	16.224	2.739	2.827	116	102	90	80	72	65				
	4 x 4 - W2.9 x W2.9	1.904	3.962	8.544	17.812	2.739	2.877	127	111	99	88	79	71				
	4 x 4 - W4.0 x W4.0	1.888	3.913	11.469	23.828	2.739	3.023	170	149	132	118	106	96				
5.5"	4 x 4 - W2.9 x W2.9	2.404	4.462	10.893	20.161	3.088	3.829	161	142	126	112	101	91	82	75		
	4 x 4 - W4.0 x W4.0	2.388	4.413	14.709	27.068	3.088	4.029	218	192	170	151	136	123	111	101		
6.0"	4 x 4 - W4.0 x W4.0	2.888	4.913	17.949	30.308	3.451	5.235	266	234	207	185	166	150	136	124	113	104
6.5"	4 x 4 - W4.0 x W4.0	3.388	5.413	21.189	33.548	3.827	6.661	314	276	244	218	196	177	158	144	132	121
7.0"	4 x 4 - W4.0 x W4.0	3.888	5.913	24.429	36.788	4.217	8.328	362	318	282	251	226	204	174	158	145	133
7.5"	4 x 4 - W4.0 x W4.0*	4.388	6.413	27.669	40.028	4.621	10.259	###	360	319	285	255	231	189	172	158	145
8.0"	4 x 4 - W4.0 x W4.0*	4.888	6.913	30.909	43.268	5.039	12.473	###	###	357	318	285	258	204	186	170	156

Notes:

1. Refer to the maximum unshored span tables on page 84 to verify that the desired span is acceptable.
2. Tables are based on unshored conditions using galvanized deck. If shoring is required or if the deck is uncoated, refer to the design considerations section of the Form Deck General Information for additional requirements regarding load capacity. Tables provide middle of floor capacities. See the design tool on the CMC Joist & Deck website for perimeter and other options.
3. Tables are based on 145 pcf concrete and a 3 or more span condition.
4. Slab, +d, and -d are in inches.
5. +ϕM and -ϕM are in kip inches (per foot of width) and apply to NW and LW structural concrete.
6. * means A_s does not meet ACI criterion. (.0018 A_c for temperature steel) See reinforcement properties on page 85.
7. I_{av} is the weighted average of the cracked and uncracked I in the positive and negative region and is based on the equation for E_c in ACI-08 318. $[I_{av} = (I_c + I_{uc})/4 + (-I_c/2)]$ and is based on NW concrete.
8. ϕV is based on NW concrete. Multiply by 0.75 for LW concrete.
9. ### means the calculated live loads exceed the SDI maximum of 400 psf.
10. Blank cells indicate that the calculated live loads are less than 40 psf or the span-to-depth ratio exceeds 24.

Maximum Span Table for Multispan Conditions

	Slab Depth	CMC Joist & Deck Profile																
		UFS					UF1X				UFX				UF2X			
		28	26	24	22	20	26	24	22	20	26	24	22	20	24	22	20	18
Normal Weight Concrete (145 pcf)	2.50"	3'0"	3'8"	4'9"	5'1"	5'5"	5'1"	6'9"	7'8"	8'3"								
	3.00"	2'11"	3'6"	4'6"	4'9"	5'1"	4'10"	6'4"	7'2"	7'8"	5'11"	7'8"	8'8"	9'4"				
	3.50"	2'10"	3'4"	4'3"	4'6"	4'10"	4'7"	6'0"	6'9"	7'3"	5'7"	7'3"	8'2"	8'9"	9'9"	11'3"	11'7"	13'0"
	4.00"	2'9"	3'3"	4'0"	4'4"	4'7"	4'5"	5'9"	6'5"	6'11"	5'4"	6'10"	7'9"	8'4"	9'3"	10'7"	11'1"	12'5"
	4.50"	2'8"	3'1"	3'11"	4'2"	4'5"	4'3"	5'6"	6'2"	6'8"	5'1"	6'6"	7'5"	8'0"	8'9"	10'1"	10'6"	12'0"
	5.00"	2'7"	3'0"	3'8"	4'0"	4'3"	4'1"	5'3"	5'11"	6'5"	4'11"	6'3"	7'1"	7'8"	8'4"	9'7"	10'1"	11'7"
	5.50"	2'6"	2'11"	3'7"	3'10"	4'1"	3'11"	5'1"	5'9"	6'2"	4'9"	6'0"	6'10"	7'5"	8'0"	9'2"	9'9"	11'4"
	6.00"	2'5"	2'10"	3'6"	3'9"	4'0"	3'10"	4'11"	5'6"	6'0"	4'7"	5'10"	6'8"	7'2"	7'8"	8'10"	9'5"	10'11"
	6.50"	2'5"	2'9"	3'5"	3'8"	3'11"	3'9"	4'9"	5'4"	5'10"	4'5"	5'8"	6'5"	7'0"	7'4"	8'6"	9'1"	10'8"
	7.00"	2'4"	2'9"	3'4"	3'6"	3'9"	3'7"	4'8"	5'3"	5'8"	4'4"	5'5"	6'3"	6'9"	7'1"	8'3"	8'10"	10'4"
Light Weight Concrete (115 pcf)	2.50"	3'2"	3'10"	5'0"	5'6"	5'10"	5'4"	7'2"	8'3"	8'10"								
	3.00"	3'1"	3'8"	4'9"	5'2"	5'6"	5'1"	6'9"	7'8"	8'3"	6'3"	8'2"	9'4"	10'0"				
	3.50"	3'0"	3'6"	4'7"	4'10"	5'2"	4'10"	6'5"	7'3"	7'10"	5'11"	7'9"	8'9"	9'5"	10'6"	11'11"	12'3"	13'8"
	4.00"	2'10"	3'5"	4'4"	4'8"	4'11"	4'8"	6'2"	6'11"	7'5"	5'8"	7'4"	8'4"	9'0"	9'11"	11'5"	11'9"	13'1"
	4.50"	2'9"	3'4"	4'2"	4'5"	4'9"	4'6"	5'11"	6'7"	7'2"	5'6"	7'1"	7'11"	8'7"	9'6"	10'10"	11'4"	12'8"
	5.00"	2'9"	3'3"	4'0"	4'4"	4'7"	4'4"	5'8"	6'4"	6'10"	5'3"	6'9"	7'8"	8'3"	9'1"	10'5"	10'10"	12'3"
	5.50"	2'8"	3'2"	3'11"	4'2"	4'5"	4'3"	5'6"	6'2"	6'8"	5'1"	6'6"	7'5"	8'0"	8'8"	10'0"	10'6"	11'11"
	6.00"	2'7"	3'1"	3'9"	4'0"	4'4"	4'1"	5'4"	6'0"	6'5"	4'11"	6'4"	7'2"	7'9"	8'4"	9'7"	10'1"	11'8"
	6.50"	2'6"	3'0"	3'8"	3'11"	4'2"	4'0"	5'2"	5'9"	6'3"	4'9"	6'1"	6'11"	7'6"	8'1"	9'4"	9'10"	11'5"
	7.00"	2'6"	2'11"	3'7"	3'10"	4'1"	3'11"	5'0"	5'8"	6'1"	4'8"	5'11"	6'9"	7'4"	7'10"	9'0"	9'6"	11'1"

Notes:

1. Spans are based on SDI construction loading and LRFD method.
2. Quick selection table uses the lesser of the 2 or 3 span condition and truncates all span lengths down to the nearest inch.
3. Blank cells indicate that the SDI 1 1/2" cover requirement is not met for the slab depth.
4. **Maximum unshored spans for LF2X and LF3X are the same as for the 2" and 3" Lok Floor. Refer to the maximum unshored span tables in the composite deck section.**
5. Minimize time between deck installation and concrete placement or plank heavy traffic areas, especially for 28 and 26 gage product.

Form Deck Maximum Cantilevers

	Slab Depth	CMC Joist & Deck Profile																
		UFS					UF1X				UFX				UF2X			
		28	26	24	22	20	26	24	22	20	26	24	22	20	24	22	20	18
Normal Weight Concrete (145 pcf + 5 pcf for rebar)	2.50"	9"	11"	1'2"	1'5"	1'8"	1'4"	1'10"	2'3"	2'8"								
	3.00"	8"	10"	1'1"	1'4"	1'7"	1'3"	1'9"	2'2"	2'7"	1'6"	2'1"	2'7"	3'2"				
	3.50"	8"	10"	1'1"	1'4"	1'6"	1'3"	1'8"	2'1"	2'5"	1'6"	2'0"	2'6"	3'0"	2'11"	3'7"	4'3"	5'5"
	4.00"	8"	10"	1'1"	1'3"	1'6"	1'2"	1'7"	2'0"	2'4"	1'5"	1'11"	2'4"	2'10"	2'9"	3'4"	4'0"	5'2"
	4.50"	8"	10"	1'0"	1'3"	1'5"	1'2"	1'7"	1'11"	2'3"	1'5"	1'10"	2'3"	2'9"	2'8"	3'3"	3'10"	4'10"
	5.00"	8"	9"	1'0"	1'2"	1'5"	1'2"	1'6"	1'10"	2'2"	1'4"	1'10"	2'2"	2'8"	2'6"	3'1"	3'8"	4'8"
	5.50"	8"	9"	1'0"	1'2"	1'4"	1'1"	1'6"	1'10"	2'1"	1'4"	1'9"	2'2"	2'6"	2'5"	3'0"	3'6"	4'5"
	6.00"	7"	9"	1'0"	1'2"	1'4"	1'1"	1'6"	1'9"	2'1"	1'4"	1'9"	2'1"	2'6"	2'4"	2'10"	3'5"	4'4"
	6.50"	7"	9"	1'0"	1'2"	1'4"	1'1"	1'5"	1'9"	2'0"	1'3"	1'8"	2'1"	2'5"	2'4"	2'10"	3'4"	4'2"
	7.00"	7"	9"	11"	1'1"	1'4"	1'1"	1'5"	1'9"	2'0"	1'3"	1'8"	2'0"	2'5"	2'3"	2'9"	3'3"	4'1"

Notes:

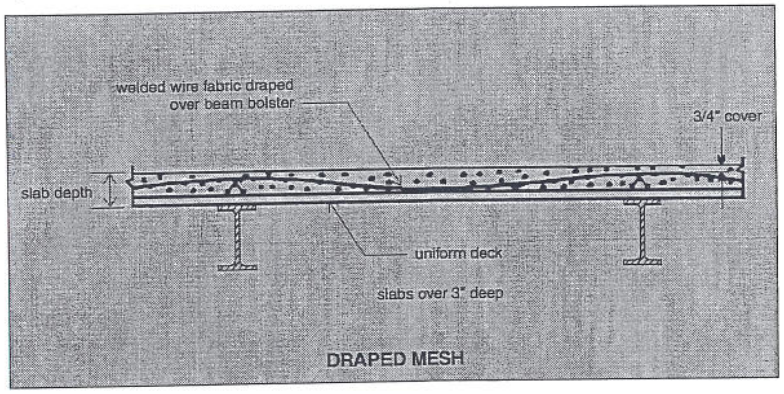
1. This table is based on 145 pcf concrete with an additional 5 pcf to account for a significant amount of rebar at the cantilever.
2. Table uses the SDI single span loading combinations and loading including a concentrated load at the end.
3. Table is LRFD based. Factored resistance values are shown in the slab load tables.
4. Cantilever deflection limits are: cantilever/90 and 3/4 inch.
5. Web crippling considers 3 inch bearing for UFS, UF1X, and UFX and 5 inch bearing of UF2X. It also considers a backspan of two times the cantilever. SDI concentrated load is located over the beam.
6. Blank cells indicate that the SDI 1 1/2" cover requirement is not met for the slab depth.
7. **Maximum cantilevers for LF2X and LF3X are the same as for the 2" and 3" Lok Floor. Refer to the maximum cantilever table in the composite deck section. When Inverted B deck is used as a form, use the cantilever tables for B-LOK on page 60.**
8. **Fasten side laps at 12" on center maximum at the catilever. Deck must be fastened at back spans before any construction loading is applied.**

FORM DECK MAX SPANS AND CANTILEVERS

Reinforcement Properties

Welded Wire Fabric used in this manual**					
Conventional (USA)	Metric (International)	Wire Area (A_s)		Wire Diameter	
		in²/ft	mm²/m	inches	mm
6 x 6 - W1.4 x W1.4	152 x 152 - MW9.1 x MW9.1	0.028	59.3	0.134	3.39
6 x 6 - W2.0 x W2.0	152 x 152 - MW12.9 x MW12.9	0.040	84.7	0.160	4.05
6 x 6 - W2.9 x W2.9	152 x 152 - MW18.7 x MW18.7	0.058	122.8	0.192	4.88
6 x 6 - W4.0 x W4.0	152 x 152 - MW25.8 x MW25.8	0.080	169.4	0.226	5.73
4 x 4 - W1.4 x W1.4	102 x 102 - MW9.1 x MW9.1	0.042	88.9	0.134	3.39
4 x 4 - W2.0 x W2.0	102 x 102 - MW12.9 x MW12.9	0.060	127.0	0.160	4.05
4 x 4 - W2.9 x W2.9	102 x 102 - MW18.7 x MW18.7	0.087	184.2	0.192	4.88
4 x 4 - W4.0 x W4.0	102 x 102 - MW25.8 x MW25.8	0.120	254.0	0.226	5.73

** Values taken from the Wire Reinforcement Institute Standard.



REBAR - Area of steel per foot of width							
Bar No.	Dia.	Wt. (plf)	Spacing, inches				
			4	6	8	10	12
3	3/8"	0.38	.33	.22	.17	.13	.11
4	1/2"	0.67	.60	.40	.30	.24	.20
5	5/8"	1.04	.93	.62	.47	.37	.31
6	3/4"	1.50	1.32	.88	.66	.53	.44
7	7/8"	2.04	1.80	1.20	.90	.72	.60
8	1"	2.67	2.37	1.58	1.19	.95	.79
9	1 1/8"	3.40	3.00	2.00	1.50	1.20	1.00

ACI Coefficients

		THREE OR MORE SPANS						TWO SPANS				ONE SPAN	
ACI Coefficients													
moment wl²	+ M	0.091		0.063		0.063		0.091		0.091		0.125	
	- M		0.10		0.091		0.091		0.111				
		- M: SPANS 10' OR LESS											
	+ M		0.083		0.083		0.083		0.083				
shear wl	V	0.5	0.58	0.5	0.5	0.5	0.5	0.5	0.58	0.58	0.5	0.5	0.5

Notes:

1. These coefficients should not be used where (a) the larger of two adjacent spans exceed the shorter by more than 20 percent; (b) slabs are not uniformly loaded; (c) the unit live load exceeds three times the unit dead load.
2. The values to be used for clear span length (l) in determining negative moments should be the average of the two adjacent clear spans.
3. For positive moments and for shears, the clear span of the particular span should be used.
4. Most codes permit different coefficients for the negative moment for spans equal to or less than 10 feet.

SLAB AND REINFORCEMENT DATA

RESTRAINED ASSEMBLY RATINGS (HOURLY)

	U.L Design No	Concrete Cover and Type	CMC Joist & Deck Product
1	D780	2 1/2" NW,LW	UFS,UFX
	D903	3" NW, 2 3/4" LW	H6, H7.5, J, LS4.5, LS6, LS7.5 fluted; HC6, HC7.5, JC cellular
	G205	2 1/2" NW	UFS, UF1X, UFX
	G208	2" NW	UFS, UF1X, UFX
	G255	2 1/2" NW	UFS
	G256	2 1/2" NW	UFS, UF1X, UFX
	G262	2 1/2" NW	UFS, UF1X, UFX (24 ga. min.)
	G264	2 1/2" NW	UFS, UF1X, UFX
	G501	2" NW	UFS
	G531	2 3/16" NW	UFX (24 ga. min.)
	G534	1 1/2" LW	UFS
	G540	2" NW, LW	UFS, UF1X, UFX
	G542	2" NW, LW	UFS, UF1X, UFX
	G543	2" NW, LW	UFS, UF1X, UFX
	G546	2" NW, LW	UFS, UF1X, UFX
	G548	2 1/2" NW	UF1X (22 ga. min.)
	G701	2 1/2" NW, LW	UFS
	G703	3 1/8" NW, 2 3/8" LW	UFX
	G705	2 1/2" NW, LW	UFS
	G707	3 1/8" NW, 2 3/8" LW	UFX
	G708	2 1/2" NW, LW	UFS
	G709	2 1/2" NW, LW	UFS
	G710	2 1/2" NW, LW	UFS
	G801	2 1/2" NW, LW	UFS
	G805	3 1/8" NW, 2 3/8" LW	UFX
1 1/2	D780	2 1/2" NW,LW	UFS,UFX
	D903	3 1/2" NW, 3" LW	H6, H7.5, J, LS4.5, LS6, LS7.5 fluted; HC6, HC7.5, JC cellular
	G203	2" NW	UFS
	G204	2 1/2" NW	UFS
	G205	2 1/2" NW	UFS, UF1X, UFX
	G208	2" NW	UFS, UF1X, UFX
	G211	2 1/2" NW	UFS, UFX (24 ga. min)
	G213	3" NW	UFS, B
	G228	2 1/2" NW	UFS
	G229	2" NW	UFS
	G231	2 1/2" NW	UFS
	G236	2 1/2" NW	UFS
	G243	2" NW	UFS
	G244	3" NW	UFS
	G262	2 1/2" NW	UFS, UF1X, UFX (24 ga. min.)
	G264	2 1/2" NW	UFS, UF1X, UFX
	G267	2 1/2" NW	UFS, UF1X, UFX (24 ga. min.)
	G268	2 1/2" NW	UFS
	G502	2" NW	UFS
	G508	2" NW	UFS
	G509	2" NW	UFS
	G530	2 1/2" NW, LW	UF1X (24 ga. min.)
	G531	2 3/16" NW	UFX (24 ga. min.)
	G701	2 1/2" NW, LW	UFS
	G703	3 7/8" NW, 2 7/8" LW	UFX
	G705	2 1/2" NW, LW	UFS
	G707	3 7/8" NW, 2 7/8" LW	UFX
	G708	2 1/2" NW, LW	UFS
	G709	2 1/2" NW, LW	UFS
	G801	2 1/2" NW, LW	UFS
	G805	3 7/8" NW, 2 7/8" LW	UFX
2	D780	2 1/2" NW, LW	UFS,UFX
	D903	4 1/4" NW, 3 1/2" LW	H6, H7.5, J, LS4.5, LS6, LS7.5 fluted; HC6, HC7.5, JC cellular
	G008	2 1/2" NW	UFS
	G023	2 1/4" NW	UFS
	G028	2 1/2" NW	UFS
	G031	2 1/2" NW	UFS, UF1X, UFX
	G036	2 1/2" NW	UFS
	G203	2 1/2" NW	UFS
	G204	2 1/2" NW	UFS
	G205	2 1/2" NW	UFS, UF1X, UFX
	G208	2 1/2" NW	UFS, UF1X, UFX
	G209	3" NW	UFS
	G211	2 1/2" NW	UFS, UFX (24 ga. min.)
	G213	3" NW	UFS, B
	G227	2 1/2" NW	UFS
	G228	2 1/2" NW	UFS
	G229	2 1/2" NW	UFS
	G231	2 1/2" NW	UFS
	G236	2 1/2" NW	UFS
	G243	2 1/2" NW	UFS
	G244	3" NW	UFS
	G250	2 1/2" NW	UFS
	G255	2 1/2" NW	UFS
	G256	2 1/2" NW	UFS, UF1X, UFX
	G258	2 1/2" NW	UF1X, UFX
	G268	2 1/2" NW	UFS

RESTRAINED ASSEMBLY RATINGS (HOURLY)

	U.L Design No	Concrete Cover and Type	CMC Joist & Deck Product
2 cont'd	G503	2 1/2" NW	UFS
	G504	2 1/2" NW	UFS
	G505	2" NW	UFS
	G510	2 1/2" NW	UFS
	G515	2 3/4" NW	UFS
	G521	2 1/2" NW	UFS
	G523	2 1/2" NW	UFS, BL
	G529	2 1/2" NW, LW	UFS, BL
	G530	2 1/2" NW, LW	UF1X (24 ga. min.)
	G531	2 3/16" NW	UFX (24 ga. min.)
	G531	2 1/2" LW	UFS
	G533	2" LW	UFS
	G538	2 1/2" NW	UFS
	G540	2" NW, LW	UFS, UF1X, UFX
	G542	2" NW, LW	UFS, UF1X, UFX
	G545	2" NW, LW	UFS, UF1X, UFX
	G546	2" NW, LW	UFS, UF1X, UFX
	G547	2 1/2" NW	UFS, B, UF2X,LF2X, LF3X fluted or cellular
	G554	2 7/16" NW, LW	UFX (24 ga. min.)
	G701	2 1/2" NW, LW	UFS
	G703	4 5/8" NW, 3 3/8" LW	UFX
	G705	2 1/2" NW, LW	UFS
	G707	4 5/8" NW, 3 3/8" LW	UFX
	G708	2 1/2" NW, LW	UFS
	G709	2 1/2" NW, LW	UFS
	G710	2 1/2" NW, LW	UFS
	G801	2 1/2" NW, LW	UFS
	G805	4 5/8" NW, 3 3/8" LW	UFX
3	D753	2 3/4" NW, LW	UFS, UF1X, UFX
	D776	2 3/4" NW, LW	UFS, UF1X, UFX
	D780	2 1/2" NW, LW	UFS,UFX
	D863	2 3/4" NW, LW	UFS, UF1X, UFX
	D903	4" LW	H6, H7.5, J, LS4.5, LS6, LS7.5 fluted;
	G033	3 1/2" NW	UFS, UF1X, UFX
	G036	3 1/4" NW	UFS
	G205	3" NW	UFS, UF1X, UFX
	G211	3" NW	UFX (24 ga. min.)
	G213	3 1/2" NW	UFS, B
	G229	3 1/4" NW	UFS
	G256	3 1/2" NW	UFS, UF1X, UFX
	G268	2 5/8" NW	UFS
	G512	2 1/2" NW	UFS
	G523	3" NW	BL
	G529	2 3/4" NW	UFS, BL
	G547	3" NW	B, UF2X; LF2X, LF3X fluted or cellular
	G701	2 3/4" NW, LW	UFS
	G703	2 3/8" NW	UF2X, B, LF2X, LF3X (22 ga. min.)
	G705	2 3/4" NW, LW	UFS
	G707	2 3/8" NW	UF2X, B, LF2X, LF3X (22 ga. min.)
	G708	2 3/4" NW, LW	UFS
	G709	2 3/4" NW, LW	UFS
	G710	2 3/4" NW, LW	UFS
	G801	2 3/4" NW, LW	UFS
	G805	2 3/8" NW	UF2X, B, LF2X, LF3X (22 ga. min.)
4	G401	2 1/2" NW	UFS

The table shows constructions that are normally used for floors. For roofs see U.L. Pxxx and page 23 of this manual. For composite floors see U.L. Dxxx and page 63 of this manual. In general, heavier and deeper form members may be used without compromising the fire rating; however, concrete cover must remain and any beam and joist spacing restrictions still apply. **In all cases the U.L. Fire Resistance Directory should be consulted for concrete densities, fastening requirements, and all details of construction.** Some ratings have the concrete cover vary with the span - particularly the 700 numbers. This table was prepared using the 2007 U.L. Fire Resistance Directory.

FIRE PROTECTION CODE	
U.L. #	
000-099	Concealed Grid
200-299	Exposed Grid
400-499	Suspended Plaster
500-599	Suspended Gypsum Board
700-799	Spray Applied Fire Resistive Material
800-899	

FIRE RATINGS

ANSI/SDI-NC1.0 Standard for Non-Composite Steel Floor Deck

1. General

1.1 Scope:

A. This Specification for Non-Composite Steel Floor Deck shall govern the materials, design, and erection of cold formed non-composite steel deck used as a form for reinforced concrete slabs.

Commentary: In the past, most of the steel decking used in the manner this specification covers was referred to as "centering," however, various roof deck units have successfully been used as non-composite forms. This specification is intended to also include these applications.

B. Commentary shall not be considered part of the mandatory document.

1.2 Reference Codes, Standards and Documents:

A. Codes and Standards: For purposes of this standard, comply with applicable provisions of the following Codes and Standards:

1. American Iron and Steel Institute (AISI) Standard - *North American Specification for the Design of Cold-Formed Steel Structural Members,* 2001 Edition with Supplement 2004
2. American Welding Society - ANSI/AWS D1.3 Structural Welding Code/Sheet Steel - 98 Structural Welding Code - Sheet Steel
3. American Society for Testing and Materials (ASTM) A653 (A653M)-06, A924 (A924M)-06, A1008 (A1008M)-06
4. American Society of Civil Engineering (ASCE) -SEI/ASCE7-05
5. American Concrete Institute (ACI) Building Code Requirements for Reinforced Concrete – ACI 318-05
6. Underwriters Laboratories (UL) Fire Resistance Directory - http://www.ul.com/database2006

B. Reference Documents: Refer to the following documents:

1. SDI White Paper - Designing with Steel Form Deck-2003
2. SDI Manual of Construction with Steel Deck - MOC2-2006
3. SDI Standard Practice Details - SPD2-2001
4. SDI Diaphragm Design Manual - DDMO3-2004

2. Products

2.1 Material:

A. Sheet steel for galvanized deck shall conform to ASTM A653 (A653M) Structural Quality, with a minimum yield strength of 33 ksi (230 MPa).

B. Sheet steel for uncoated deck shall conform to ASTM A1008 (A1008M) with a minimum yield strength of 33 ksi (230 MPa). Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

Commentary: Materials are offered in A653 (A653M) grade 80 steel (galvanized) or ASTM A1008 (A1008M) grade 80 steel (uncoated). This steel has a minimum yield strength of 80 ksi (550 MPa) and is generally over 90 ksi (620 MPa). The AISI specifications allow a maximum allowable stress of 36 ksi (250 MPa) for this material.

C. Sheet steel for accessories shall conform to ASTM A653 (A653M) Structural Quality for structural accessories, ASTM A653 (A653M) Commercial Quality for non-structural accessories, or ASTM A1008 (A1008M) for either structural or non-structural accessories. Other structural sheet steels or high strength low alloy steels are acceptable, and shall be selected from the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

D. The deck type profile and thickness (gage) shall be as shown on the plans.

2.2 Tolerance:

A. Uncoated thickness shall not be less than 95% of the design thickness as listed in Table 2.2.1:

Table 2.2.1

Gage No.	Design Thickness		Minimum Thickness	
	in.	mm.	in.	mm.
28	0.0149	0.38	0.014	0.35
26	0.0179	0.45	0.017	0.43
24	0.0238	0.60	0.023	0.57
22	0.0295	0.75	0.028	0.71
20	0.0358	0.91	0.034	0.86
18	0.0474	1.20	0.045	1.14
16	0.0598	1.52	0.057	1.44

B. Panel length shall be within plus or minus 1/2 inch (12 mm) of specified length.

C. Panel cover width shall be no greater than minus 3/8 inch (10 mm), plus 3/4 inch (20 mm).

D. Panel camber and/or sweep shall be no greater than 1/4 inch in 10 foot length (6 mm in 3 m).

E. Panel end out of square shall not be greater than 1/8 inch per foot of panel width (10 mm per m).

2.3 Finish:

A. Galvanizing shall conform to ASTM A924 (A924M) and/or ASTM A653 (A653M).

B. Uncoated (black) shall conform to ASTM A1008 (A1008M).

C. Painted with a shop coat of primer paint (one or both sides) shall be applied to steel sheet conforming to ASTM A1008 (A1008M).

D. The finish on the steel non-composite floor deck shall be suitable for the environment of the structure.

Commentary: The uncoated finish is, by custom, referred to as "black" by some users and manufacturers; the use of the word "black" does not refer to paint color on the product. When galvanized material is used to support a reinforced concrete slab, the slab dead load is considered to be permanently carried by the deck. For any permanent load carrying function, a minimum galvanized coating conforming to ASTM A653 (A653M), G30 (Z090) is recommended.

2.4 Design:

A. Deck used as a form for structural (reinforced) concrete slab:

1. The section properties of the steel floor deck unit shall be computed in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

2. Allowable Stress Design (ASD): Bending stress shall not exceed 0.60 times the yield strength, nor exceed 36 ksi (250 MPa) under the combined loads of wet concrete, deck weight, and the following construction live loads: 20 pounds per square foot (1 kPa) uniform load or 150 pound concentrated load on a 1'-0" (300 mm) wide section of deck (2.2 kN per m). The interaction of shear and bending shall be considered in the calculations. (See Figure 1 - Attachment NC1)

3. Load and Resistance Factor Design (LRFD): The load combination for construction are as shown in Attachment NC1. Load factors shall be in accordance with ASCE 7. (See Section 1.2.A.5) The resistance factors and nominal resistances shall be in accordance with the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

Commentary: The loading shown in Figure 1, Attachment NC1 is representative of the sequential loading of wet concrete on the form. The 150 pound load (per foot of width) is the result of distributing a 300 pound man over a 2 foot (600 mm) width. Experience has shown this to be a conservative distribution. The metric equivalent of the 150 pound load is 2.2 kN per meter of width. For single span deck conditions, the ability to control the concrete placement may be restricted and a factor of 1.5 is applied to the concrete load to address this condition; however, in order to keep this 50% load increase within a reasonable limit, the increase is not to exceed 30 psf (1.44 kPa). Whenever possible, the deck shall be multi-span and not require shoring during the concrete placement procedure.

4. Deck Deflection: Calculated deflections of the deck shall be based on the load of the wet concrete, as determined by the design slab thickness and the weight of the steel deck, uniformly loaded on all spans, and shall be limited to 1/180 of the clear span or 3/4 inch (20 mm), whichever is smaller. Calculated deflections shall be relative to supporting members.

Commentary: The deflection calculations do not take into account construction loads because these are considered temporary loads. The deck is designed to always be in the elastic range so removal of temporary loads should allow the deck to recover. The structural steel also deflects under the loading of the wet concrete.

The designer is urged to check the deflection of the total system, especially if composite beams and girders are being used. If the designer wants to include additional concrete loading on the deck because of frame deflection, the additional load should be shown on the design drawings or stated in the deck section of the job specifications.

2.4 Design:

5. Minimum Bearing: Minimum bearing lengths shall be determined in accordance with the web crippling provisions of the *North American Specification for the Design of Cold-Formed Steel Structural Members;* the uniform loading case of wet concrete, plus the weight of the steel deck, plus 20 psf (1 kPa) construction load shall be used.

Commentary: Experience has shown that 1-1/2 inches (38 mm) of bearing is sufficient for non-composite floor decks. If less than 1-1/2 inches (38 mm) of end bearing is available, or if high support reactions are expected, the design professional should check the deck web crippling capacity. The deck must be adequately attached to the structure to prevent slip off.

6. Diaphragm Shear Capacity: Diaphragms without concrete shall be designed in accordance with the SDI *Diaphragm Design Manual,* or from tests conducted by an independent professional engineer.

Commentary: Calculations of diaphragm strength and stiffness should be made using the SDI *Diaphragm Design Manual.* If testing is used as the means for determining the diaphragm strength and stiffness, then it should follow the AISI TS 7-02 test protocol.

B. Concrete Slab Design:
   1. General: The design of the concrete slabs shall be done in accordance with the ACI *Building Code Requirements for Reinforced Concrete.* The minimum concrete thickness above the top of the deck shall be 1-1/2 inches (38 mm). Randomly distributed fibers or fibrous admixtures shall not be substituted for welded wire fabric tensile reinforcement.

Commentary: In following the ACI requirements for temperature reinforcement, the designer may eliminate the concrete area that is displaced by the deck ribs. For slabs with total depth of 3 inches (75 mm) or less, the reinforcing mesh may be considered to be at the center of the concrete above the deck. (Refer to the SDI *Designing with Steel Form Deck* for slab design information) If uncoated or painted deck is used as the form, the load from concrete slab weight must be deducted from the calculated capacity of the reinforced concrete slab. If galvanized form is used, the load from the slab weight is considered to be permanently carried by the deck and need not be deducted from the live load. If temporary shoring is used, the load of the slab must be deducted from the calculated capacity of the reinforced slab, regardless of the deck finish. Except for some diaphragm values, the deck should not be assumed to act compositely with the concrete even though strong chemical bonds can, and do, develop.

   2. Concrete: Concrete design shall be in accordance with the applicable sections of the ACI *Building Code Requirements for Reinforced Concrete.* Minimum compressive strength (f'c) shall be 3 ksi (20 MPa) or as required for fire ratings or durability. Admixtures containing chloride salts shall not be used.

Commentary: The use of admixtures containing chloride salts is not allowed because the salts will corrode the steel non-composite floor deck.

   3. Cantilever Loads: When cantilevered slabs are encountered, top reinforcing steel shall be proportioned by the designer. For construction loads, the deck shall be designed for the more severe of (a) deck plus slab weight plus 20 psf (1kPa) construction load on both cantilever and adjacent span, or (b) deck plus slab weight on both cantilever and adjacent span plus a 150 pound (665N) concentrated load per foot of width at end of cantilever. The load factors shall be in accordance with ASCE7. Resistance factors for bending, shear, and interior bearing shall be by the *North American Specification for the Design of Cold-Formed Steel Structural Members.*

      The maximum cantilever deflection as a form, under deck plus slab weight, shall be a/90 where "a" is the clear cantilever length, and shall not exceed 3/4 inch (19 mm).

      Side laps shall be attached at the end of the cantilever and a maximum spacing of 12 inches (300 mm) on center from cantilever end. Each corrugation shall be fastened

at both the perimeter support and the first interior support. The deck shall be completely attached to the supports and at the side laps before any load is applied to the cantilever. Concrete shall not be placed on the cantilever until after placement on the adjacent span.

2.5 Accessories:

A. Pour stops, column closures, end closures, cover plates, and girder fillers shall be the type suitable for the application. Pour stop minimum gages shall be in accordance with the Steel Deck Institute. (See *Pour Stop Selection Table*, Attachment NC2)

B. Mechanical fasteners or welds shall be permitted for deck and accessory attachment.

3. Execution

3.1 Installation/General:

A. Support framing and field conditions shall be examined for compliance with requirements for installation tolerances and other conditions affecting performance of work of this section. All OSHA rules for erection shall be followed.

B. Deck panels shall be installed on a concrete support structure only after concrete has attained 75% of its specified design strength.

C. Deck panels and accessories shall be installed according to the SDI *Manual of Construction with Steel Deck*, placement plans, and requirements of this Section.

D. Temporary shoring, if required, shall be installed before placing deck panels. Temporary shoring shall be designed to resist a minimum uniform load of 50 psf (2.4 kPa), and loading indicated on Attachment NC1. Shoring shall be securely in place before the floor deck erection begins. The shoring shall be designed and installed in accordance with the ACI *Building Code Requirements for Reinforced Concrete*, and shall be left in place until the slab attains 75% of its specified design strength and a minimum of seven (7) days.

E. Deck panels shall be placed on structural supports and adjusted to final position with ends aligned, and attached securely to the supports immediately after placement in order to form a safe working platform. All deck sheets shall have adequate bearing and fastening to all supports to prevent slip off during construction. Deck ends over supports shall be installed with a minimum end bearing of 1-1/2 inches (38 mm). Deck areas subject to heavy or repeated traffic, concentrated loads, impact loads, wheel loads, etc. shall be adequately protected by planking or other approved means to avoid overloading and/or damage.

Commentary: Staggering deck ends is not a recommended practice. The deck capacity as a form and the load capacity of a non-composite deck/slab system are not increased by staggering end joints, yet layout and erection costs are increased.

F. Lapped or Butted Ends: Deck ends shall be either lapped or butted over supports. Gaps up to 1 inch (25 mm) shall be permitted at butted ends.

G. Deck units and accessories shall be cut and neatly fit around openings and other work projecting through or adjacent to the decking.

Commentary: It is the responsibility of the designer to designate holes/openings to be decked over in compliance with applicable federal and state OSHA directives. Care should be taken to analyze spans between supports at openings when determining those holes/openings to be decked over.

When a framed opening span exceeds the maximum deck span limits for construction loads, the opening must be detailed around instead of decked over. (Minimum construction load 50 lbs./sq. ft. (2.4 kPa), unless specific requirements dictate otherwise). When a framed hole/opening in floor deck is shown and dimensioned on the structural design drawings, pour stop (screed) angle is required to top of slab. When specified, cell closure angles will be provided at the open ends of deck 1-1/2 inches (38 mm) deep or deeper, in standard 10 feet (3 m) lengths to be field sized, cut and installed. Typically, non-composite floor decks that are less than 1-1/2 inches (38 mm) deep do not require or use cell closure. Alternate means to dam concrete may be used in lieu of cell closure, at the discretion of the installer, if approved by the project engineer.

3.1 Installation/General:

When a hole/opening is not shown and dimensioned on the structural design drawings, no provisions for concrete retainage will be provided by the metal deck manufacturer/ supplier. Metal floor decking holes and openings to be cut after the concrete pour shall not be field cut until concrete has reached 75% of its design strength and a minimum seven (7) days.

H. Trades that subsequently cut unscheduled openings through the deck shall be responsible for reinforcing these openings based upon an approved engineered design.

3.2 Installation/Anchorage:

A. Form deck units shall be anchored to steel supporting members including perimeter support steel and/or bearing walls by arc spot puddle welds of the following diameter and spacing, fillet welds of equal strength, or mechanical fasteners.

1. All welding of deck shall be in accordance with ANSI/AWS D1.3, *Structural Welding Code - Sheet Steel.* Each welder shall demonstrate an ability to produce satisfactory welds using a procedure such as shown in the SDI *Manual of Construction with Steel Deck,* or as described in ANSI/AWS D1.3.

2. Welding washers shall be used on all deck units with metal thickness less than 0.028 inches (0.7 mm). Welding washers shall be a minimum thickness of 0.0598 inches (16 gage, 1.50 mm) and have a nominal 3/8 inch (10 mm) diameter hole.

3. Where welding washers are not used, a minimum visible 5/8 inch (15 mm) diameter arc puddle weld shall be used. Weld metal shall penetrate all layers of deck material at end laps and shall have good fusion to the supporting members.

4. Weld spacing: Fastening pattern shall allow slabs to be designed on a continuous basis.

5. When used, fillet welds shall be at least 1-1/2 inch (38 mm) long.

6. Mechanical fasteners, either powder actuated, pneumatically driven, or screws, shall be permitted in lieu of welding to fasten deck to supporting framing if fasteners meet all project service requirements. When the fasteners are powder actuated or pneumatically driven, the load value per fastener used to determine the maximum fastener spacing shall be based on a minimum structural support thickness of not less than 1/8 inch (3 mm) and on the fastener providing a minimum 5/16 inch (8 mm) diameter bearing surface (fastener head size). When the structural support thickness is less than 1/8 inch (3 mm), powder actuated or pneumatically driven fasteners shall not be used, but screws are acceptable.

Commentary: Mechanical fasteners (powder actuated, screws, pneumatically driven fasteners, etc.) are recognized as viable anchoring methods, provided the type and spacing of the fastener satisfies the design criteria. Documentation in the form of test data, design calculations, or design charts should be submitted by the fastener manufacturer as the basis for obtaining approval.

7. For deck units with spans greater than five feet (1.5 m), side laps and perimeter edges of units between span supports shall be fastened at intervals not exceeding 36 inches (1 m) on center, using one of the following methods:
   a. #10 self drilling screws.
   b. Crimp or button punch.
   c. Arc puddle welds 5/8 inch (15 mm) minimum visible diameter, or minimum 1 inch (25 mm) long fillet weld.

Commentary: The above side lap spacing is a minimum. Service loads or diaphragm design may require closer spacing or larger side lap welds. Good metal to metal contact is necessary for a good side lap weld. Burn holes are to be expected.

B. Accessory Attachment:

1. Pour Stop and Girder Fillers: Pour stops and girder fillers shall be fastened to supporting structure in accordance with the SDI *Standard Practice Details, and Attachment NC2.*

2. Floor Deck Closures: Column closures, cell closures, and Z closures shall be fastened to provide tight fitting closures at open ends of ribs and sides of decking. Fasten cell closures at changes of direction of floor deck units unless otherwise directed.

Commentary: Cell closures are generally not used on form deck of 1-5/16 inch (33 mm) depth or less.

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CMC Joist & Deck

CMC Joist & Deck Arkansas
Highway 32 North, P.O. Box 2000
Hope, AR 71802-2000
(870) 777-8777 - (800) 643-1577
Fax: (800) 237-7571

CMC Joist & Deck Florida
14099 SE 44th Ave
Starke, FL 32091
(904) 964-4851 - (800) 706-6476
Fax: (800) 613-0279

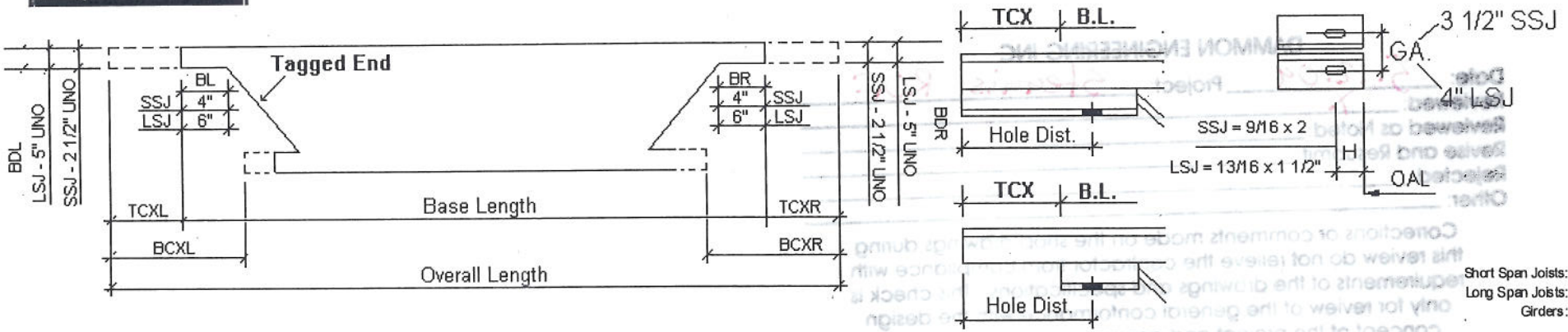
CMC Joist & Deck Iowa
1120 Commercial Street
Iowa Falls, IA 50126
(641) 648-7567 - (888) 290-6875
Fax: (877) 228-1751

CMC Joist & Deck Juarez
6248 Edgemere Blvd., PMB #107
El Paso, TX 79925
(915) 298 5050
Fax: (915) 298-4040

CMC Joist & Deck Nevada
8200 Woolery Way
Fallon, NV 89406
(775) 867-2130 - (888) 643-1577
Fax: (800) 867-2140

CMC Joist & Deck Pennsylvania
2093 Old Route 15
New Columbia, PA 17856
(570) 568-6761
Fax: (570) 568-1001

CMC Joist & Deck South Carolina
2059 Congaree Road
Eastover, SC 29044
(803) 796-5910 - (800) 763-0026
Fax: (800) 774-0131



Short Span Joists: 178
Long Span Joists: 0
Girders: 0

Joist Bill of Materials

Mark	Qty	Joist Type	OAL (ft-in)	TCXL Length (ft-in)	TCXL Type	TCXR Length (ft-in)	TCXR Type	Base Length (ft-in)	Seat BDL (ft-in)	Seat BDR (ft-in)	BCXL Length (ft-in)	BCXL Type	BCXR Length (ft-in)	BCXR Type	Punch Seats HLE (ft-in)	Punch Seats HRE (ft-in)	Seat Ga(L) Ga(R) (ft-in)	Special	Reference Notes [Special] - (Loads)
J1	2	14KS	17'- 2 5/8"					17'- 2 5/8"	2 1/2"	2 1/2"									
J2	94	14KS	18'- 9 1/2"	6"	R			18'- 3 1/2"	2 1/2"	2 1/2"									
J3	10	14KS	18'- 9 1/2"	6"	R			18'- 3 1/2"	2 1/2"	2 1/2"						1 1/4"	3 1/2"		[1]
J4	4	14KS	18'- 3 1/8"					18'- 3 1/8"	2 1/2"	2 1/2"						1 1/4"	3 1/2"		[1]
J5	5	14KS	11'- 6 1/2"	6"	R			11'- 1/2"	2 1/2"	2 1/2"									
J6	2	14KS	18'- 3 1/8"					18'- 3 1/8"	2 1/2"	2 1/2"									
J7	2	14KS	17'- 2"					17'- 2"	2 1/2"	2 1/2"									
J8	2	14KS	17'- 10 7/8"					17'- 10 7/8"	2 1/2"	2 1/2"									
J9	47	14KS	17'- 11 1/2"					17'- 11 1/2"	2 1/2"	2 1/2"									
J10	6	14KS	17'- 11 1/2"					17'- 11 1/2"	2 1/2"	2 1/2"					1 1/4"	1 1/4"	3 1/2"		[1]
J11	1	14KS	11'- 6 1/2"	6"	R			11'- 1/2"	2 1/2"	2 1/2"						1 1/4"	3 1/2"		[1]
J20	3	14KS	18'- 9 1/2"	6"	R			18'- 3 1/2"	2 1/2"	2 1/2"									(1)

Job Name:	8026914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	1	Of:	1	Time:	Tue. 11:26 AM

BROADMOOR, L.L.C.

I hereby agree that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with contract number N69450-05-D-0096, is in compliance with the contract documents, can be installed in the allocated spaces, and is submitted for Government approval.

Robert Wilson 5.12.09

DQC Manager Date

QC Officer Date

DAMMON ENGINEERING INC

Date: 5.12.09 **Project:** Stennis ROF

Reviewed: X

Reviewed as Noted:

Revise and Resubmit:

Rejected:

Other:

Corrections or comments made on the shop drawings during this review do not relieve the contractor from compliance with requirements of the drawings and specifications. This check is only for review of the general conformance with the design concept of the project and general compliance with the information given in the contract documents. This contractor is responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades and performing all in a safe and satisfactory manner.

Submittal Item: Joists

Comments

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May 08, 2009 8:46 AM

CMC Joist & Deck

CMC Joist & Deck Arkansas
Highway 32 North, P.O. Box 2000
Hope, AR 71802-2000
(870) 777-8777 - (800) 643-1577
Fax: (800) 237-7571

CMC Joist & Deck Florida
14099 SE 44th Ave
Starke, FL 32091
(904) 964-4851 - (800) 706-6476
Fax: (800) 613-0279

CMC Joist & Deck Iowa
1120 Commercial Street
Iowa Falls, IA 50126
(641) 648-7567 - (888) 290-6875
Fax: (877) 228-1751

CMC Joist & Deck Juarez
6248 Edgemere Blvd., PMB #107
El Paso, TX 79925
(915) 298 5050
Fax: (915) 298-4040

CMC Joist & Deck Nevada
8200 Woolery Way
Fallon, NV 89406
(775) 867-2130 - (888) 643-1577
Fax: (800) 867-2140

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Load Notes

Load Note Number	Marks	Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Dist1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Dist2 (ft-in)	Reference	Remarks
(1)	J20	DL	TC	Uni	GY	100.0	5'- 0"	100.0	13'- 7 1/2"	LOL	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	1	Of:	1

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Shop Bill Notes

Shopbill Note Number	Predefined Number	Joist Marks	Pre-Fab	Top Chord Cutout	Bottom Chord Cutout	Mid-Web Cutout	End Web Cutout	Rigging Table	Base Plates	Weld Plt	Paint	Deck	Recap Sheets	Inspect	Shop Bill Note
[1]	54	J3 J4 J10 J11												X	Danger Tag Required

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Notes

Shopbill Note Number	Predefined Number	Joist Marks	Shop Bill Note
[1]	54	J3 J4 J10 J11	Danger Tag Required

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
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Bridging Groups

Bridging Group Number	Master Mark	Minimum Total Rows	Minimum Rows X	X Clip Type	Reference Line	Slave Mark	Reference Offset (ft-in)	Panel Master	Fixed Location1 (ft-in)	Fixed Location2 (ft-in)	Fixed Location3 (ft-in)
1	J1	2			L						
					L	J2					
					L	J3					
					L	J4					
					L	J6					
					L	J7					
					L	J8					
					L	J9					
					L	J10					
					L	J20					
2	J5	1			L						
					L	J11					

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
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Keypunch Parameters: Job-Level

Units

U.S. SMI

Minimum Crimp Depth

1'- 6"

Minimum Material Size

	Min Thick	Min Mat	Max Width
TC			
BC			
Brng. Seat			
Prim. Web			
Sec. Web			
Weight			
TC = BC?	No		

Base Area Loads

	Joists	Girders
DL	50.0	
CL	5.0	
LL	100.0	
SL		
Gross Uplift		
Wp		
Spacing	2'- 0"	
Self-Weight	No	No
LL Reduction	No	No

Seat Lengths

Short Span	4"
Long Span	6"
Girder	6"

Welds

SJI

Top Chord Support

Yes

Tag End

Left

Girder Loads

LL	
WL	
SL	

Deflection

	Live	Total
Joist Span	360.0	240.0
Cantilever	120.0	0.0
TCX	120.0	0.0

Assign Same Name to Identical Bundles

No

Joist Top Chord Holes

Size	n/a		
Spacing	n/a	K	
Gauge	n/a	LH	
Staggered	n/a	Girder	

Hole Gauges

	Seat Gauge	Slot Length	Slot Width
K	3 1/2"	2"	9/16"
LH	4"	1 1/2"	13/16"
Girder	5"	1 1/2"	13/16"

Default Girder Hole Gauges

Top Chord Angle Size	Half Gage
<= 2 1/2"	2"
Between	2 1/4"
>= 5"	2 1/2"

Camber

Radius 3600'- 0"

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Design Parameters: Job-Level

Stress

Stress Ratio	1.01
Yield Stress	50.0
Maximum Tensile Stress	65.0
Ultimate Tensile Stress	65.0

Standard Joist Bridging

TC Standard	Yes
TC Optimized	No
BC Standard	Yes
BC Optimized	No

Horizontal Seat Load

Percentage Axial Load	100.0 %
Load in KIPS	n/a
Percentage End Reaction	n/a

Chord Gap

Angle Web	1"
Rod Web	1/2"

OSHA Column Joists

Phi-Connect: NA	0.0
Phi-Connect: Zero BCXs	1.0
Phi-Connect: One BCX	1.0
Phi-Connect: Two BCXs	1.0

Design Codes

Design Code Value	SJI
ASD-LRFD	ASD

Girder Horizontal Leg Bending

Joist Reaction	70.0
Joist EOT	1/4"
Joist Seat Width	4 1/4"

Load Combination Building Codes

Building Code	IBC2006
ASD - LRFD	ASD
Roof - Floor	Roof

Design Constants

	K	LH	Girder	KCS	H
Minimum Shear	25.0	25.0	25.0	25.0	50.0
Stress Reversal	0.0	0.0	25.0	100.0	0.0
Available Weld	100.0	100.0	100.0	90.0	100.0
Chord Shear	Yes	Yes	Yes	Yes	Yes
Chord Kx	1.0	0.75	1.0	1.0	1.0
TC End Panel Kx	1.0	1.0	1.0	1.0	1.0
Chord Ky	0.94	0.94	1.0	0.94	1.0
Chord Kz	1.0	0.75	1.0	1.0	1.0
Web Kx	1.0	0.75	1.0	1.0	1.0
Web Ky	1.0	1.0	1.0	1.0	1.0
End Web Kx	1.0	0.75	1.0	1.0	1.0
First Web Kx	1.0	1.2	1.2	1.0	1.0
Web Kz	1.0	1.0	1.0	1.0	1.0
TC Bridge	145.0	170.0	575.0	145.0	145.0
TC Inter	90.0	90.0	90.0	90.0	90.0
TC End	120.0	120.0	120.0	120.0	120.0
Type Comp	200.0	200.0	200.0	200.0	200.0
Type Tensile	240.0	240.0	240.0	240.0	240.0
TC Brace Force	0.5	0.5	2.0	0.5	0.5
TC Bend Panel	2'- 0"	0'- 0"	0'- 0"	2'- 0"	2'- 0"
TC Bend	550.0	0.0	0.0	550.0	550.0
EP Reduction	0.9	1.0	1.0	0.9	0.9

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Design Loads

J1

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 2 5/8"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	17'- 5/8"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	17'- 5/8"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	17'- 5/8"	LOL	Standard load from designation

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Design Load Combinations

J1

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 2 5/8"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.55	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.35	No	LL	Deflection Case

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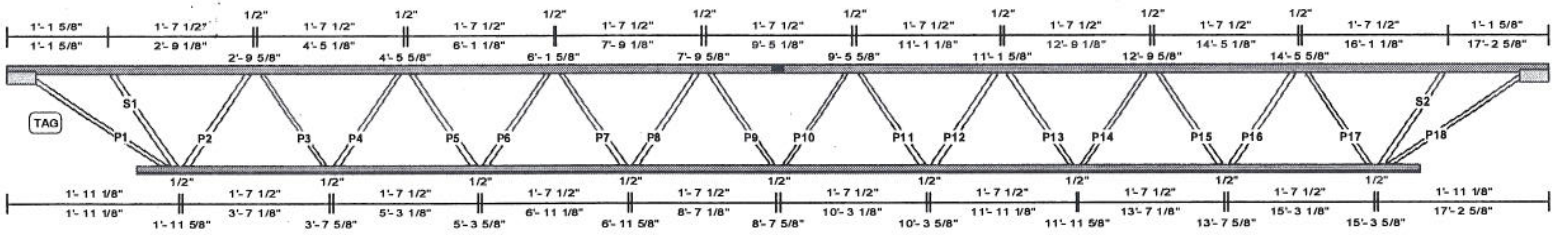
Design Summary

J1



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.99
BC	2	L1X1X.109		0.79
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	1/2 RD	2.3	0.87
S1	1	9/16 RD	0.2	0.14
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.56
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.13
P8	1	1/2 RD	0.4	0.38
P9	1	1/2 RD	0.4	0.13
P10	1	1/2 RD	0.4	0.13
P11	1	1/2 RD	0.4	0.38
P12	1	1/2 RD	0.4	0.13
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.56
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.78
S2	1	9/16 RD	0.2	0.14
P18	1	1/2 RD	2.3	0.87

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

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Design Loads

J2

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	8"	10.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
CL0	TC	Uni	GY	10.0	0"	10.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	8"	100.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
DL0	TC	Uni	GY	100.0	0"	100.0	8"	LOL	Standard load from design parameters - left TCO
LL	TC	Uni	PY	200.0	8"	200.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
LL0	TC	Uni	PY	200.0	0"	200.0	8"	LOL	Standard load from design parameters - left TCO

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Design Load Combinations

J2

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.7	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
2.1	1.000	Yes			No	DL+DL0+LL+LL0+CL+CL0	
29	1.000	Yes	LL	-0.45	No	LL	Deflection Case
29.1	1.000	Yes	LL	-0.45	No	LL+LL0	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3	Time:	Tue, 11:26 AM

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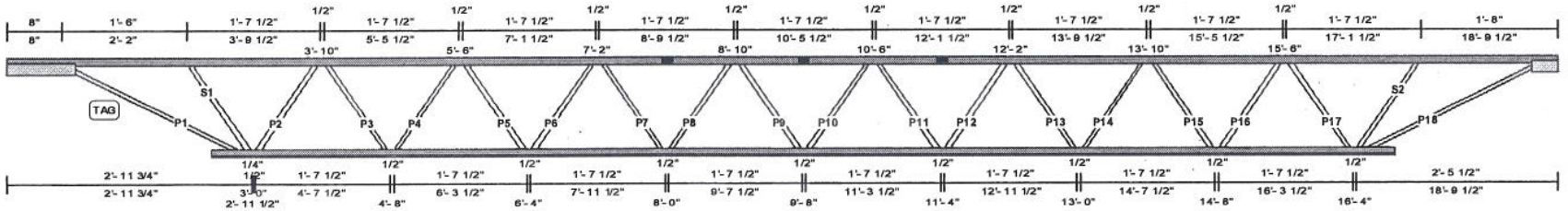
Design Summary

J2



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		1.00
BC	2	L1X1X.109		0.90
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	9/16 RD	2.6	0.88
S1	1	9/16 RD	0.3	0.20
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.22
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.5	0.15
P8	1	1/2 RD	0.5	0.43
P9	1	1/2 RD	0.5	0.15
P10	1	1/2 RD	0.5	0.43
P11	1	1/2 RD	0.5	0.43
P12	1	1/2 RD	0.5	0.15
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.57
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.77
S2	1	9/16 RD	0.3	0.20
P18	1	9/16 RD	2.6	0.88

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
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Design Loads

J3

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	8"	10.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
CL0	TC	Uni	GY	10.0	0"	10.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	8"	100.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
DL0	TC	Uni	GY	100.0	0"	100.0	8"	LOL	Standard load from design parameters - left TCO
LL	TC	Uni	PY	200.0	8"	200.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
LL0	TC	Uni	PY	200.0	0"	200.0	8"	LOL	Standard load from design parameters - left TCO

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Load Combinations

J3

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.7	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
2.1	1.000	Yes			No	DL+DL0+LL+LL0+CL+CL0	
29	1.000	Yes	LL	-0.45	No	LL	Deflection Case
29.1	1.000	Yes	LL	-0.45	No	LL+LL0	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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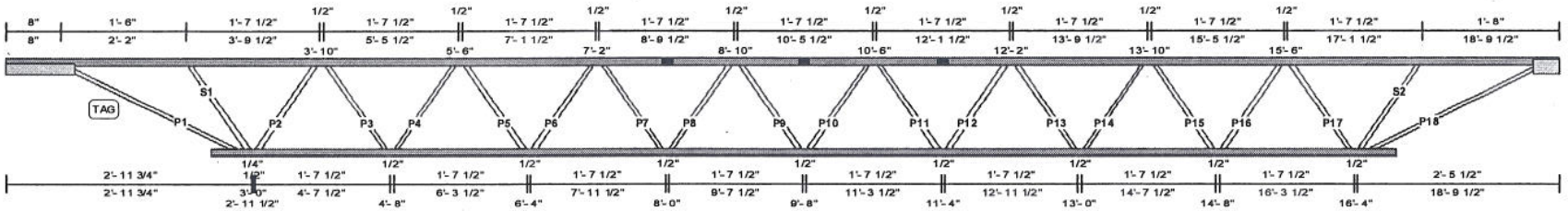
Design Summary

J3



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		1.00
BC	2	L1X1X.109		0.90
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L2X2X.163		
P1	1	9/16 RD	2.6	0.88
S1	1	9/16 RD	0.3	0.20
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.22
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.5	0.15
P8	1	1/2 RD	0.5	0.43
P9	1	1/2 RD	0.5	0.15
P10	1	1/2 RD	0.5	0.43
P11	1	1/2 RD	0.5	0.43
P12	1	1/2 RD	0.5	0.15
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.57
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.77
S2	1	9/16 RD	0.3	0.20
P18	1	9/16 RD	2.6	0.88

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Loads

J4

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/8"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	18'- 1 1/8"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	18'- 1 1/8"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	18'- 1 1/8"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date: Apr. 21, 2009
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Design Load Combinations

J4

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/8"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.7	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.45	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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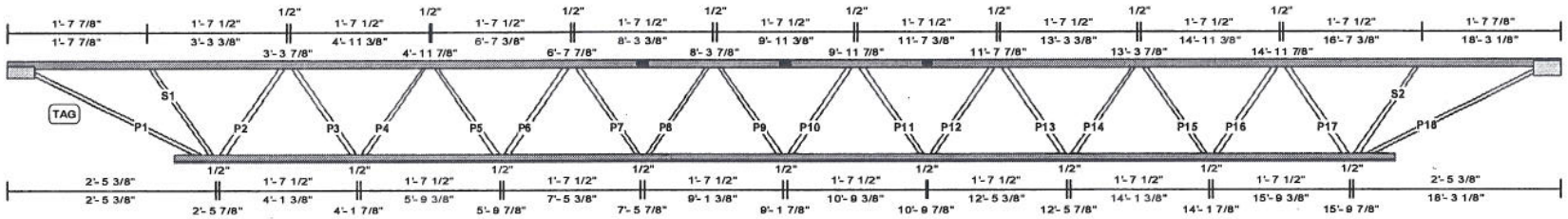
Design Summary

J4



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		1.00
BC	2	L1X1X.109		0.89
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L2X2X.163		
P1	1	9/16 RD	2.6	0.87
S1	1	9/16 RD	0.3	0.20
P2	1	9/16 RD	1.1	0.77
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.14
P8	1	1/2 RD	0.4	0.40
P9	1	1/2 RD	0.4	0.14
P10	1	1/2 RD	0.4	0.14
P11	1	1/2 RD	0.4	0.40
P12	1	1/2 RD	0.4	0.14
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.57
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.77
S2	1	9/16 RD	0.3	0.20
P18	1	9/16 RD	2.6	0.87

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Loads

J5

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 11'- 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	8"	10.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
CL0	TC	Uni	GY	10.0	0"	10.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	8"	100.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
DL0	TC	Uni	GY	100.0	0"	100.0	8"	LOL	Standard load from design parameters - left TCO
LL	TC	Uni	PY	200.0	8"	200.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
LL0	TC	Uni	PY	200.0	0"	200.0	8"	LOL	Standard load from design parameters - left TCO

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	1	Of:	3

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Design Load Combinations

J5

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 11'- 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.12	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
2.1	1.000	Yes			No	DL+DL0+LL+LL0+CL+CL0	
29	1.000	Yes	LL	-0.08	No	LL	Deflection Case
29.1	1.000	Yes	LL	-0.08	No	LL+LL0	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3

Date:	Apr. 21, 2009
Time:	Tue. 11:26 AM

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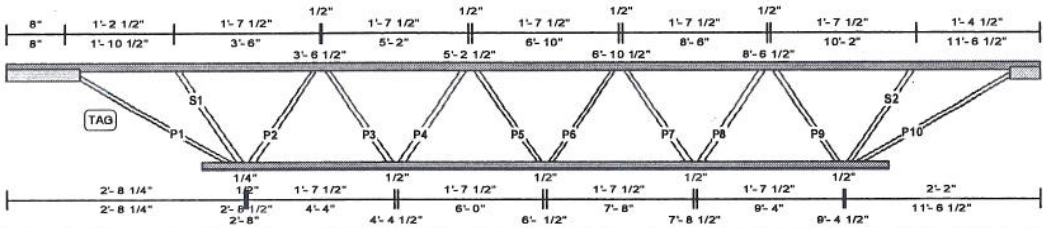
Design Summary

J5



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.53
BC	2	L1X1X.109		0.31
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	1/2 RD	1.6	0.58
S1	1	1/2 RD	0.3	0.28
P2	1	1/2 RD	0.6	0.63
P3	1	1/2 RD	0.3	0.10
P4	1	1/2 RD	0.3	0.29
P5	1	1/2 RD	0.3	0.09
P6	1	1/2 RD	0.3	0.27
P7	1	1/2 RD	0.3	0.29
P8	1	1/2 RD	0.3	0.10
P9	1	1/2 RD	0.6	0.62
S2	1	1/2 RD	0.3	0.28
P10	1	1/2 RD	1.6	0.58

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Loads

J6

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/8"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	18'- 1 1/8"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	18'- 1 1/8"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	18'- 1 1/8"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date: Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked: MAG	Shopbilled: MAG	Sheet: 1	Of: 3	Time: Tue. 11:26 AM

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Design Load Combinations

J6

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/8"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.7	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.45	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3	Time:	Tue. 11:26 AM

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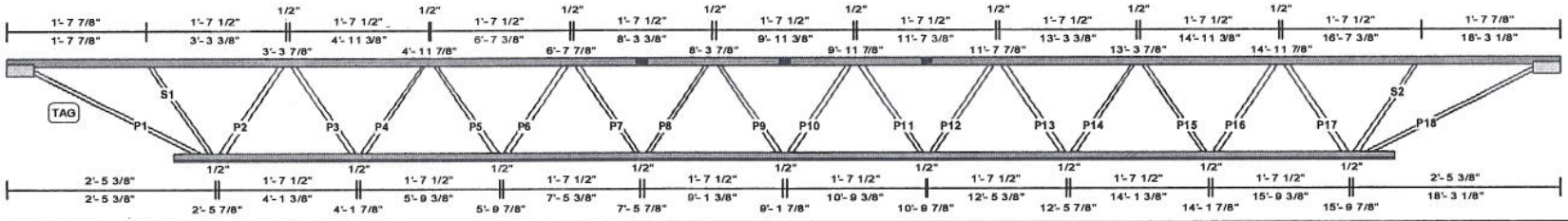
Design Summary

J6



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		1.00
BC	2	L1X1X.109		0.89
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	9/16 RD	2.6	0.87
S1	1	9/16 RD	0.3	0.20
P2	1	9/16 RD	1.1	0.77
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.14
P8	1	1/2 RD	0.4	0.40
P9	1	1/2 RD	0.4	0.14
P10	1	1/2 RD	0.4	0.14
P11	1	1/2 RD	0.4	0.40
P12	1	1/2 RD	0.4	0.14
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.57
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.77
S2	1	9/16 RD	0.3	0.20
P18	1	9/16 RD	2.6	0.87

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
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Design Loads

J7

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	17'- 0"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	17'- 0"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	17'- 0"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date: Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked: MAG	Shopbilled: MAG	Sheet: 1	Of: 3	Time: Tue. 11:26 AM

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Design Load Combinations

J7

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.54	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.35	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3	Time:	Tue. 11:26 AM

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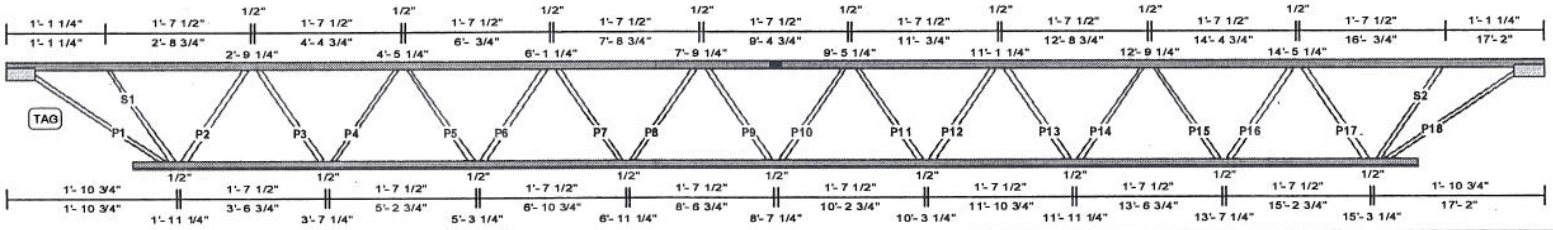
Design Summary

J7



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.98
BC	2	L1X1X.109		0.79
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	1/2 RD	2.3	0.86
S1	1	9/16 RD	0.2	0.14
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.56
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.13
P8	1	1/2 RD	0.4	0.38
P9	1	1/2 RD	0.4	0.13
P10	1	1/2 RD	0.4	0.13
P11	1	1/2 RD	0.4	0.38
P12	1	1/2 RD	0.4	0.13
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.56
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.78
S2	1	9/16 RD	0.2	0.14
P18	1	1/2 RD	2.3	0.86

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Loads

J8

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 10 7/8"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	17'- 8 7/8"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	17'- 8 7/8"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	17'- 8 7/8"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked: MAG	Shopbilled: MAG	Sheet: 1	Of: 3	Time:	Tue. 11:26 AM

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Design Load Combinations

J8

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 10 7/8"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.64	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.41	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3	Time:	Tue. 11:26 AM

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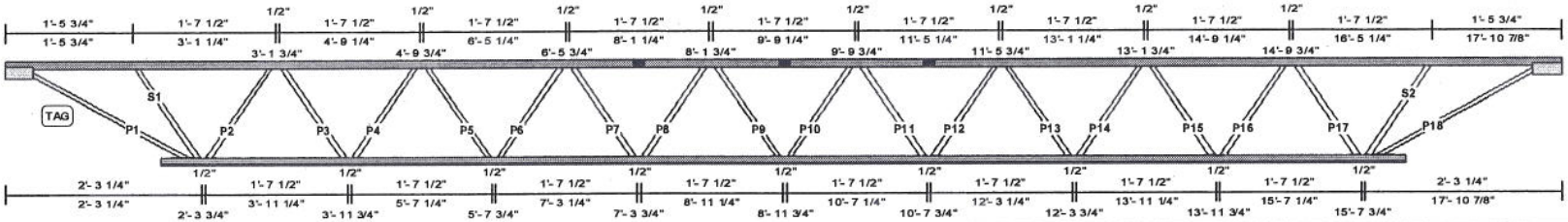
Design Summary

J8



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.95
BC	2	L1X1X.109		0.86
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	9/16 RD	2.4	0.81
S1	1	9/16 RD	0.3	0.18
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.14
P8	1	1/2 RD	0.4	0.39
P9	1	1/2 RD	0.4	0.14
P10	1	1/2 RD	0.4	0.14
P11	1	1/2 RD	0.4	0.39
P12	1	1/2 RD	0.4	0.14
P13	1	1/2 RD	0.6	0.60
P14	1	1/2 RD	0.6	0.21
P15	1	9/16 RD	0.8	0.57
P16	1	9/16 RD	0.8	0.25
P17	1	9/16 RD	1.1	0.78
S2	1	9/16 RD	0.3	0.18
P18	1	9/16 RD	2.4	0.81

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	3	Of:	3	Time:	Tue, 11:26 AM

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Design Loads

J9

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 11 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	17'- 9 1/2"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	17'- 9 1/2"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	17'- 9 1/2"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE Mils: 1.5	Date: Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked: MAG	Shopbilled: MAG	Sheet: 1 Of: 3	Time: Tue. 11:26 AM

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Design Load Combinations

J9

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 11 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.65	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.42	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	2	Of:	3

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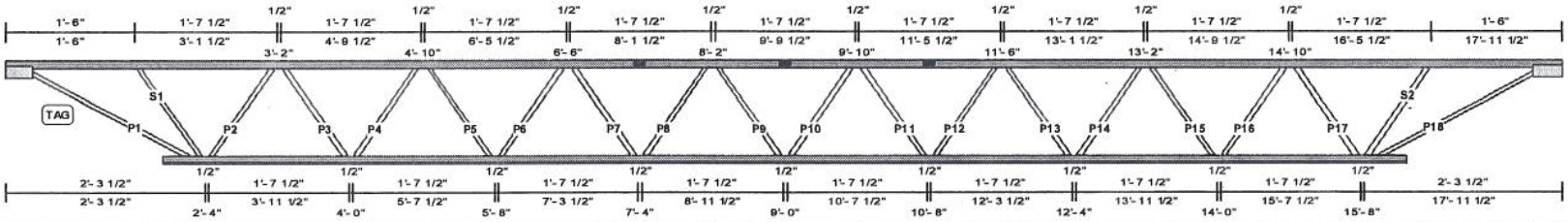
Design Summary

J9



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.96
BC	2	L1X1X.109		0.86
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	9/16 RD	2.4	0.82
S1	1	9/16 RD	0.3	0.18
P2	1	9/16 RD	1.1	0.78
P3	1	9/16 RD	0.8	0.25
P4	1	9/16 RD	0.8	0.57
P5	1	1/2 RD	0.6	0.21
P6	1	1/2 RD	0.6	0.60
P7	1	1/2 RD	0.4	0.14
P8	1	1/2 RD	0.4	0.39
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S2	1	9/16 RD	0.3	0.18
P18	1	9/16 RD	2.4	0.82

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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Design Loads

J10

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 11 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	2"	10.0	17'- 9 1/2"	LOL	Standard load from designation
DL	TC	Uni	GY	100.0	2"	100.0	17'- 9 1/2"	LOL	Standard load from designation
LL	TC	Uni	PY	200.0	2"	200.0	17'- 9 1/2"	LOL	Standard load from designation

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date: Apr. 21, 2009
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Design Load Combinations

J10

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 17'- 11 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.65	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
29	1.000	Yes	LL	-0.42	No	LL	Deflection Case

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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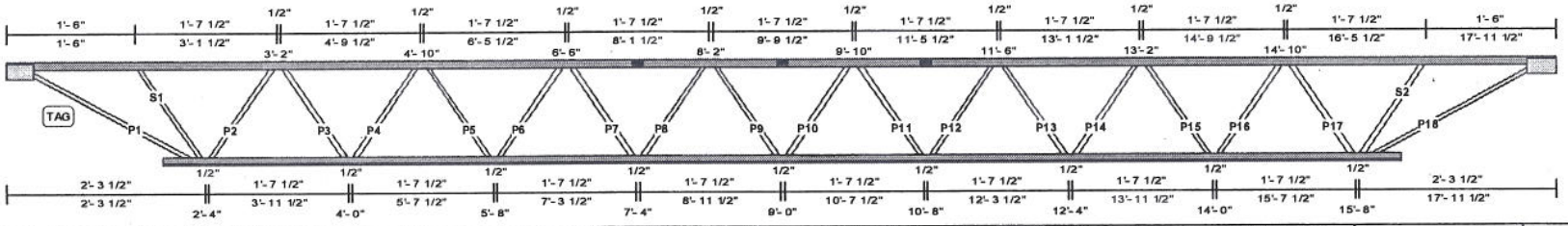
Design Summary

J10



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.96
BC	2	L1X1X.109		0.86
BPL	2	L2X2X.163		
BPR	2	L2X2X.163		
P1	1	9/16 RD	2.4	0.82
S1	1	9/16 RD	0.3	0.18
P2	1	9/16 RD	1.1	0.78
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P4	1	9/16 RD	0.8	0.57
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Member	Piece Qty	Material	Weld Length	Max Stress Ratio

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Design Loads

J11

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 11'- 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	8"	10.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
CL0	TC	Uni	GY	10.0	0"	10.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	8"	100.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
DL0	TC	Uni	GY	100.0	0"	100.0	8"	LOL	Standard load from design parameters - left TCO
LL	TC	Uni	PY	200.0	8"	200.0	11'- 4 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
LL0	TC	Uni	PY	200.0	0"	200.0	8"	LOL	Standard load from design parameters - left TCO

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date: Apr. 21, 2009
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Design Load Combinations

J11

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 11'- 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.12	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
2.1	1.000	Yes			No	DL+DL0+LL+LL0+CL+CL0	
29	1.000	Yes	LL	-0.08	No	LL	Deflection Case
29.1	1.000	Yes	LL	-0.08	No	LL+LL0	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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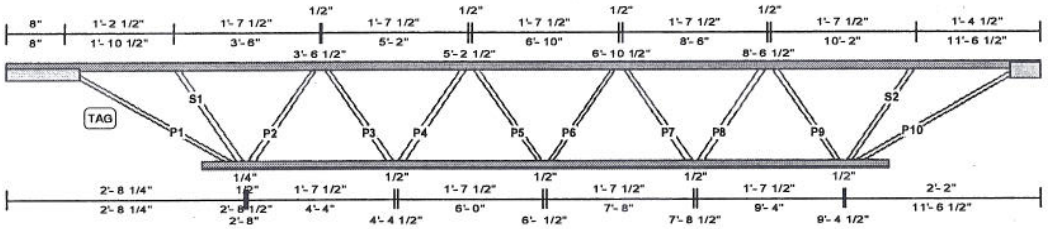
Design Summary

J11



Member	Piece Qty	Material	Weld Length	Max Stress Ratio
Depth: 14.0				
Moment of Inertia: 41.19				
TC	2	L1-1/4X1-1/4X.109		0.53
BC	2	L1X1X.109		0.31
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L2X2X.163		
P1	1	1/2 RD	1.6	0.58
S1	1	1/2 RD	0.3	0.28
P2	1	1/2 RD	0.6	0.63
P3	1	1/2 RD	0.3	0.10
P4	1	1/2 RD	0.3	0.29
P5	1	1/2 RD	0.3	0.09
P6	1	1/2 RD	0.3	0.27
P7	1	1/2 RD	0.3	0.29
P8	1	1/2 RD	0.3	0.10
P9	1	1/2 RD	0.6	0.62
S2	1	1/2 RD	0.3	0.28
P10	1	1/2 RD	1.6	0.58

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5
Location:	Biloxi, MS US	Description:	FOR FAB	Checked:	MAG	Shopbilled:	MAG	Sheet:	3	Of:	3

Date: Apr. 21, 2009
Time: Tue. 11:26 AM

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CMC Joist & Deck Arkansas
Highway 32 North, P.O. Box 2000
Hope, AR 71802-2000
(870) 777-8777 - (800) 643-1577
Fax: (800) 237-7571

CMC Joist & Deck Florida
14099 SE 44th Ave
Starke, FL 32091
(904) 964-4851 - (800) 706-6476
Fax: (800) 613-0279

CMC Joist & Deck Iowa
1120 Commercial Street
Iowa Falls, IA 50126
(641) 648-7567 - (888) 290-6875
Fax: (877) 228-1751

CMC Joist & Deck Juarez
6248 Edgemere Blvd., PMB #107
El Paso, TX 79925
(915) 298 5050
Fax: (915) 298-4040

CMC Joist & Deck Nevada
8200 Woolery Way
Fallon, NV 89406
(775) 867-2130 - (888) 643-1577
Fax: (800) 867-2140

CMC Joist & Deck Pennsylvania
2093 Old Route 15
New Columbia, PA 17856
(570) 568-6761
Fax: (570) 568-1001

CMC Joist & Deck South Carolina
2059 Congaree Road
Eastover, SC 29044
(803) 796-5910 - (800) 763-0026
Fax: (800) 774-0131

Design Loads

J20

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Category	Chord	Type	Direction	Load1 (lbs, ft-lbs, plf, psf)	Distance1 (ft-in)	Load2 (lbs, ft-lbs, plf, psf)	Distance2 (ft-in)	Reference	Remarks
CL	TC	Uni	GY	10.0	8"	10.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
CL0	TC	Uni	GY	10.0	0"	10.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	8"	100.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
DL0	TC	Uni	GY	100.0	0"	100.0	8"	LOL	Standard load from design parameters - left TCO
LL	TC	Uni	PY	200.0	8"	200.0	18'- 7 1/2"	LOL	Standard load from design parameters - excluding TCO(s)
LL0	TC	Uni	PY	200.0	0"	200.0	8"	LOL	Standard load from design parameters - left TCO
DL	TC	Uni	GY	100.0	5'- 0"	100.0	13'- 7 1/2"	LOL	

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed: MAG	Designed: MAG	Paint: GRAY OXIDE	Mils: 1.5	Date:	Apr. 21, 2009
Location:	Biloxi, MS US	Description:	FOR FAB	Checked: MAG	Shopbilled: MAG	Sheet: 1	Of: 3	Time:	Tue. 11:26 AM

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New Columbia, PA 17856
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Eastover, SC 29044
(803) 796-5910 - (800) 763-0026
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Design Load Combinations

J20

Mark Type: 14KS Tributary Width: 2'- 0" Base Length: 18'- 3 1/2"

Load Combination	Stress Ratio	Top Chord Support	Deflection	Calculated Deflection	Camber	Multiplier - Category Formula	Remarks
2	1.000	Yes	TL	-0.75	No	DL+LL+CL	Basecase - IBC2006, ASD, Roof
2.1	1.000	Yes			No	DL+DL0+LL+LL0+CL+CL0	
29	1.000	Yes	LL	-0.4	No	LL	Deflection Case
29.1	1.000	Yes	LL	-0.4	No	LL+LL0	

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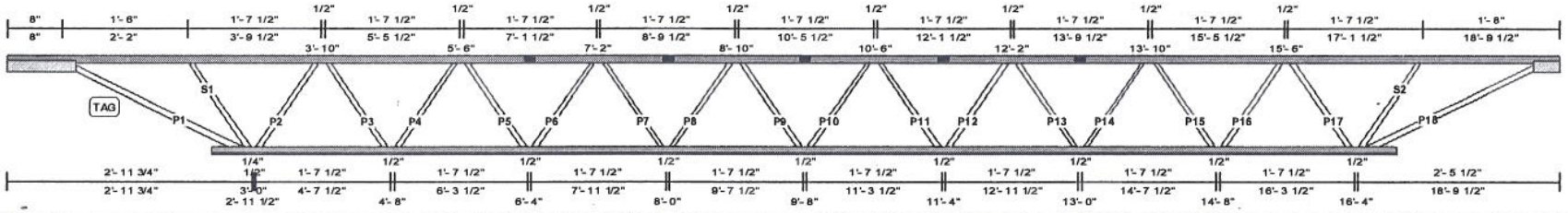

Member	Piece Qty	Material	Weld Length	Max Stress Ratio
		Depth: 14.0		
		Moment of Inertia: 46.79		
TC	2	L1-1/4X1-1/4X.125		0.94
BC	2	L1X1X.125		0.98
BPL	2	L1-1/2X1-1/2X.109		
BPR	2	L1-1/2X1-1/2X.109		
P1	1	5/8 RD	2.7	0.83
S1	1	5/8 RD	0.3	0.14
P2	1	5/8 RD	1.2	0.66
P3	1	5/8 RD	0.9	0.26
P4	1	5/8 RD	0.9	0.51
P5	1	1/2 RD	0.8	0.28
P6	1	1/2 RD	0.8	0.79
P7	1	1/2 RD	0.5	0.18
P8	1	1/2 RD	0.5	0.50
P9	1	1/2 RD	0.5	0.50
P10	1	1/2 RD	0.5	0.28
P11	1	1/2 RD	0.5	0.50
P12	1	1/2 RD	0.5	0.18
P13	1	1/2 RD	0.8	0.80
P14	1	1/2 RD	0.8	0.29
P15	1	5/8 RD	0.9	0.50
P16	1	5/8 RD	0.9	0.26
P17	1	5/8 RD	1.1	0.65
S2	1	5/8 RD	0.3	0.14
P18	1	5/8 RD	2.7	0.82

Member	Piece Qty	Material	Weld Length	Max Stress Ratio

Job Name:	8028914	Job Number:	49-09-0482-01	Detailed:	MAG	Designed:	MAG	Paint:	GRAY OXIDE	Mils:	1.5	Date:	Apr. 21, 2009
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