TEXAS DEPARTMENT OF INSURANCE

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PRODUCT EVALUATION Effective August 1, 2006
FR-02

The following product has been evaluated for compliance with the wind loads specified in the International Residential Code (IRC) and the International Building Code (IBC). This product shall be subject to reevaluation 3 years after the effective date.

This product evaluation is not an endorsement of this product or a recommendation that this product be used. The Texas Department of Insurance has not authorized the use of any information contained in the product evaluation for advertising, or other commercial or promotional purpose.

This product evaluation is intended for use by those individuals who are following the design wind load criteria in Chapter 3 of the IRC and Section 1609 of the IBC. The design loads determined for the building or structure shall not exceed the design load rating specified for the products shown in the limitations section of this product evaluation. This product evaluation does not relieve a Texas licensed engineer of his responsibilities as outlined in the Texas Insurance Code, the Texas Administrative Code, and the Texas Engineering Practice Act.

R-Control Structural Insulated Panels (SIPs) as manufactured by:

AFM Corporation
211 River Ridge Circle, #102
Burnsville, Minnesota 55337
(800) 255-0176
www.r-control.com

will be acceptable as an alternative residential construction method in designated catastrophe areas along the Texas Gulf Coast when constructed in accordance with this product evaluation.

PRODUCT DESCRIPTION

R-Control Structural Insulated Panels (SIPs) are factory-built structural insulated panels that are used as structurally insulated wall, roof, and floor panels in buildings. The SIPs are fabricated to fit each specific design situation and are subsequently assembled on the job site to form the structural shell. The SIPs consist of oriented strand board (OSB) facings with an expanded polystyrene (EPS) core. The OSB is bonded to the EPS core with structural grade adhesive. The SIPs may be used as load-bearing and nonload-bearing wall and roof components as well as floor components. The SIPs core thickness is available from 3 ½ " to 11 ¼ ". The SIPs are available in widths from 4 feet to 8 feet and in lengths from 8 feet to 24 feet.

The top and bottom plates of the SIPs are dimension lumber that is sized to match the EPS core thickness of the SIPs. The dimension lumber top and bottom plates are secured to the OSB face panels with Do-All-Ply® adhesive/sealant and fasteners.

R-Control SIPs are connected to each other at the panel edges using splines which may consist of dimension lumber, engineered wood products, or pre-fabricated beams which have been evaluated by AFM for use with the SIPs. The SIPs are connected together with the splines using fasteners and Do-All-Ply® adhesive/sealant.

Product Identification: Each R-Control SIP shall bear the manufacturer's name and the label of the inspection agency, Underwriters Laboratories, Inc.

INSTALLATION REQUIREMENTS

General: Structures built using the R-Control SIPs shall be designed by a Texas licensed professional engineer. Requirements for the design of the SIPs shall be based on the tables and details specified in this evaluation report and the manufacturer's installation requirements. The tables presented in this evaluation report are for the design of the SIPs for walls, roof, and floors. The design of chords, struts, and connections (such as the attachment of diaphragms to chords and struts, the attachment of the SIPS to the foundation, and the hardware required to resist uplift, shear, and the overturning of the shearwall segments) shall be designed separately. Design drawings shall include instructions for the connection and installation of the panels. The design drawings shall be sealed and dated by the design engineer. The design drawings shall reference the appropriate edition of the wind load standard (ASCE 7) used based on the current building specifications adopted by the Texas Department of Insurance. The basic wind speed and the Building Exposure used for the design shall also be referenced.

Design loads: Design wind loads for the SIPs shall be determined using the wind load requirements for the structure as specified in the building specifications adopted by the Texas Department of Insurance. All loads on the SIPs shall not exceed the allowable loads specified in load design charts.

Load Design Charts: Allowable axial, transverse, racking, header, and diaphragm loads for the SIPs shall be as specified in Tables 1-9 of this evaluation report and as specified in the R-Control Load Design Charts for SIPs (Structural Insulated Panels), dated November 2004. NOTE: The requirements specified in the tables in this evaluation report shall govern if there are any conflicts between the manufacturer's Load Design Charts and the tables and figures in this evaluation report.

Foundation: The foundation is considered to be part of the structure and shall be considered part of the design for the structure. If the foundation is not designed by the engineer responsible for the design of the SIP system, then the design plans shall indicate such. As a minimum, the design plans shall indicate how the SIP system is to be anchored to the foundation. If the foundation is included as part of the design, then the design plans shall include all details and specifications related to the design of the foundation to resist the specified wind loads and shall indicate how the structure is to be anchored to the foundation.

Roof Coverings: The design plans shall indicate the requirements for the roof coverings. The roof coverings shall comply with the building specifications adopted by the Texas Department of Insurance. For roof coverings other than asphalt shingles, the design plans shall specify the design pressure requirements for the roof covering. The roof covering shall be installed as required to resist wind pressure.

Exterior wall coverings: Exterior wall coverings shall be installed as required to resist wind pressure. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressure requirements for the exterior wall coverings.

Windows, doors, garage doors, and skylights: Products shall be installed as specified in evaluation reports to resist wind pressure. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressured requirements for the products. The design plans shall indicate if the products are required to be windborne debris resistant. Windborne debris resistant products shall be installed as specified in evaluation reports to resist wind pressure and windborne debris.

Shutters: The design plans shall indicate if shutters are required. Products shall be installed as specified in evaluation reports or the building specifications adopted by the Texas Department of Insurance as required to resist wind pressure and windborne debris. Products shall comply with the building specifications adopted by the Texas Department of Insurance. The design plans shall specify the design pressures requirements for the shutters.

INSTALLATION REQUIREMENTS (Continued)

Note: A set of sealed plans, manufacturer's installation instructions, R-Control Load Design Charts for SIPs (Structural Insulated Panels), dated November 2004, and this product evaluation report shall be available to the inspector at the job site at all times. All fasteners shall be corrosion resistant as specified in the International Residential Code (IRC), the International Building Code (IBC), and the Texas Revisions.

Wall - Unity Equation

The equation shown below is to determine design suitability. The equation takes into account the ultimate load for a panel subjected to both axial load and transverse (bending) load conditions.

$$\frac{Design\ Axial\ Load}{Allowable\ Axial\ Load} + \frac{Design\ Transverse\ Load}{Allowable\ Transverse\ Load} \leq 1$$

Note: Refer to Table 1 for Wall Axial Loading
Refer to Table 3 for Transverse Loading

Table 1
Wall Axial Loading [1,2,3,4]
(See Detail SIP-101TX)

R-Control Structural Insulated Panel			
	Panel Height	7/16" OSB Thickness	
		EPS Core Thickness	
		3 ½" Core	5 ½" Core
Axial Load (plf)	8'-0"	2,750	4,000
	10'-0"	2,500	3,500
	12'-0"	2,000	3,000
	14'-0"	-	2,750
	16'-0"	-	2,500

[1] Maximum allowable axial load is limited to the loads tabulated for axial condition alone.

[2] Ultimate failure load divided by safety factor of 3.0.

[3] Values based on a maximum height-to-width ratio of 3 ½ :1.

[4] 2X top plate joints shall be staggered a minimum of 1 foot from panel joints.

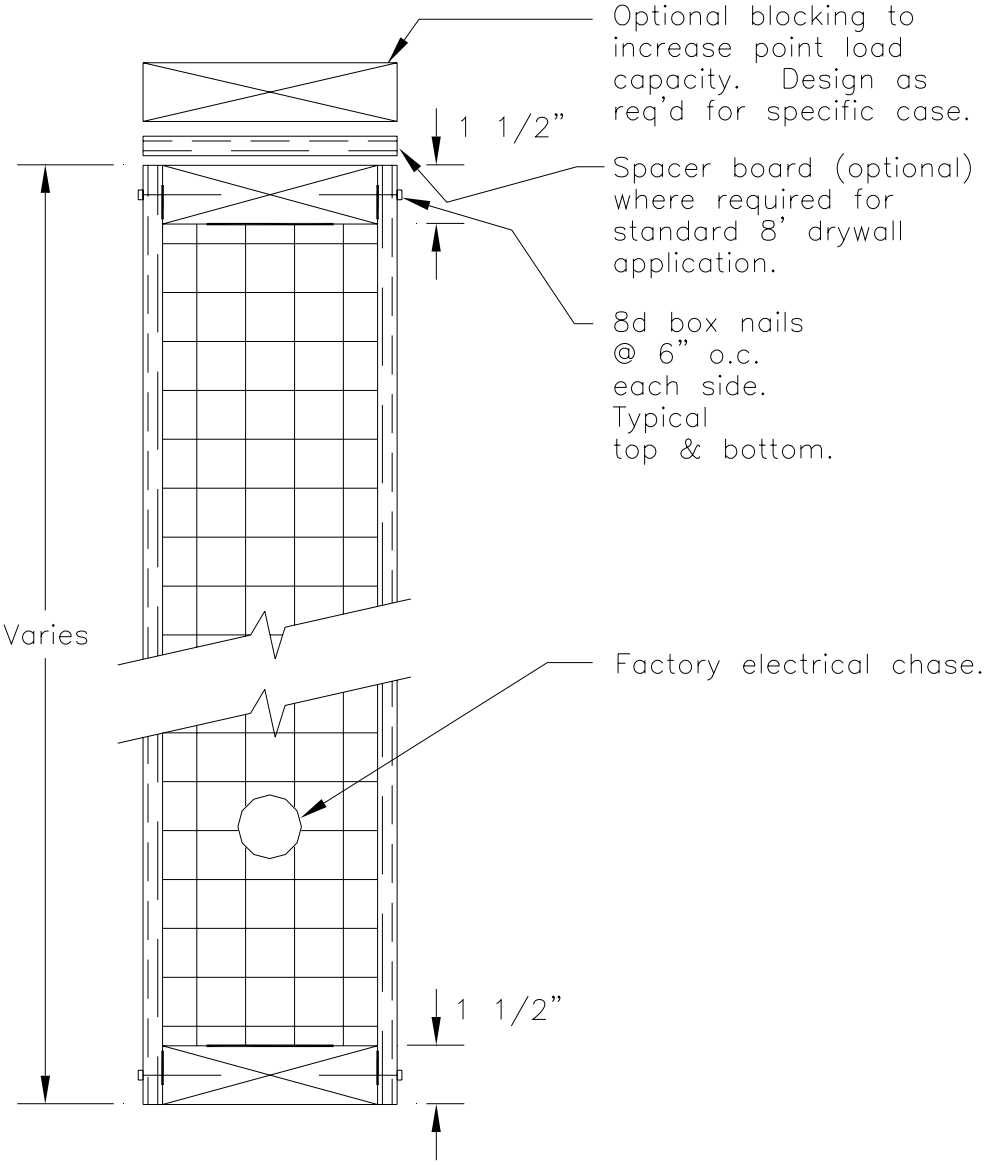
Table 2
Shear Loading [1,3]
(See Detail SIP-101TX)

R-Control Structural Insulated Panel			
	Panel Height	7/16" OSB Thickness	
		EPS Core Thickness	
		3 ½" Core	5 ½" Core
Racking Shear	See Note 2	335 plf	335 plf

[1] Vertical boundaries (Each end of shearwall segments) require double studs, minimum Douglas Fir-Larch No. 2. Shearwall segments must be anchored to resist overturning.

[2] Maximum height-to-width ratio for shearwalls is 3 ½ :1.

[3] 2X top plate joints shall be staggered a minimum of 1 foot from panel joints.



NOTE: OSB skins must be fully supported by foundation system.

NOTE: Use minimum grade SPF #2 or engineered equivalent for 2x plating.

SECTION

Scale: NTS

Updated 7-6-06

R-Control® SIP	
TITLE: Plate Connections	NO. SIP-101TX

Table 3

Transverse Loading (psf) [2]
(See Details SIP-102TX and SIP-102gTX)

R-Control Structural Insulated Panels							
Panel Height		7/16" OSB Thickness					
		EPS Core Thickness					
		3 1/2" Core			5 1/2" Core		
Deflection		L/360	L/240	L/180	L/360	L/240	L/180
Transverse Load (psf)	8'	28	40 [1]	40 [1]	42	61 [1]	61 [1]
	10'	20	30	32 [1]	32	48	49 [1]
	12'	15	22	27 [1]	26	38	41 [1]
	14'	-	-	-	21	31	35 [1]
	16'	-	-	-	17	26	31 [1]

[1] Limited to ultimate failure load divided by a safety factor of 3.0.

[2] 2X top plate joints shall be staggered a minimum of 1 foot from panel joints.

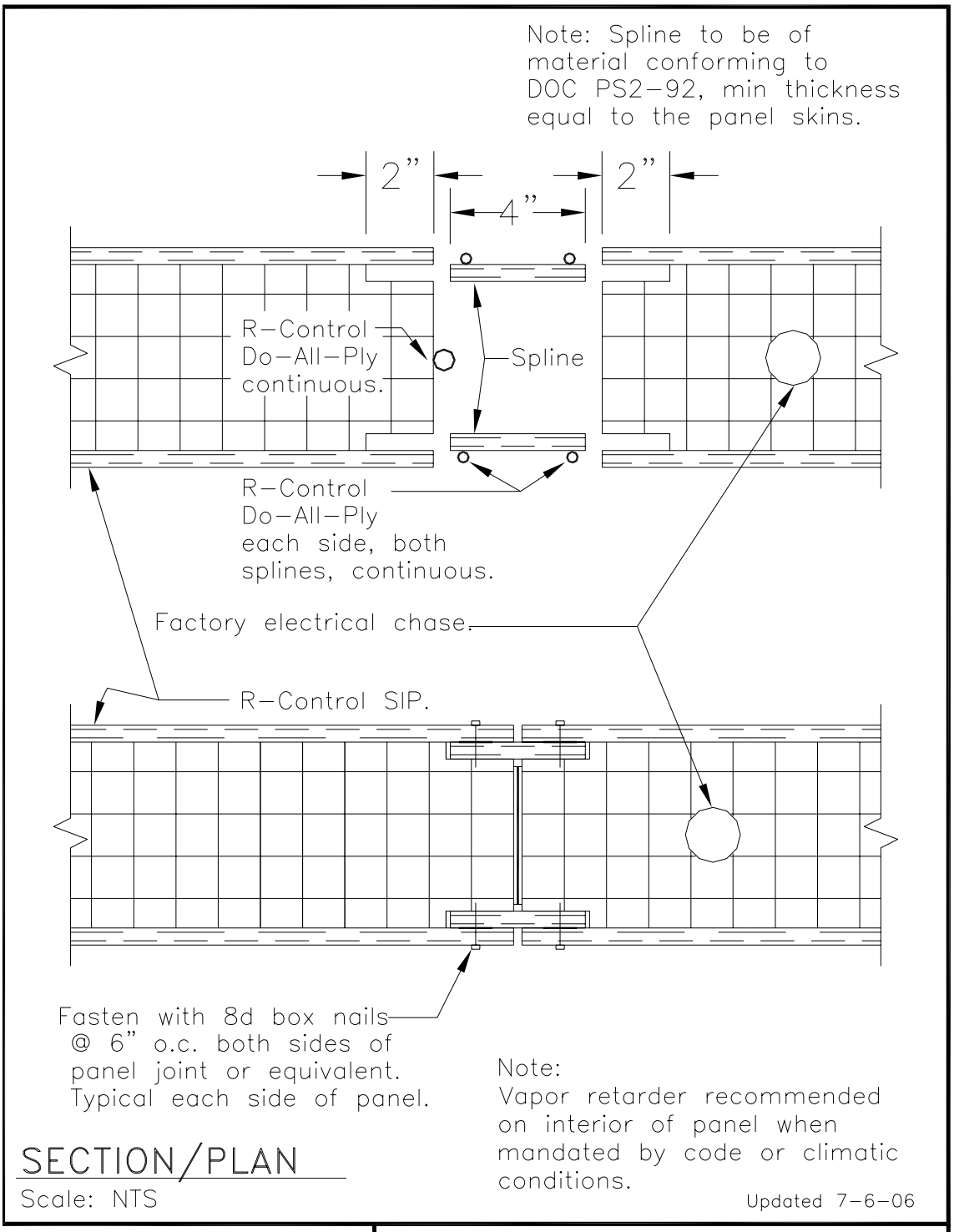
Table 4

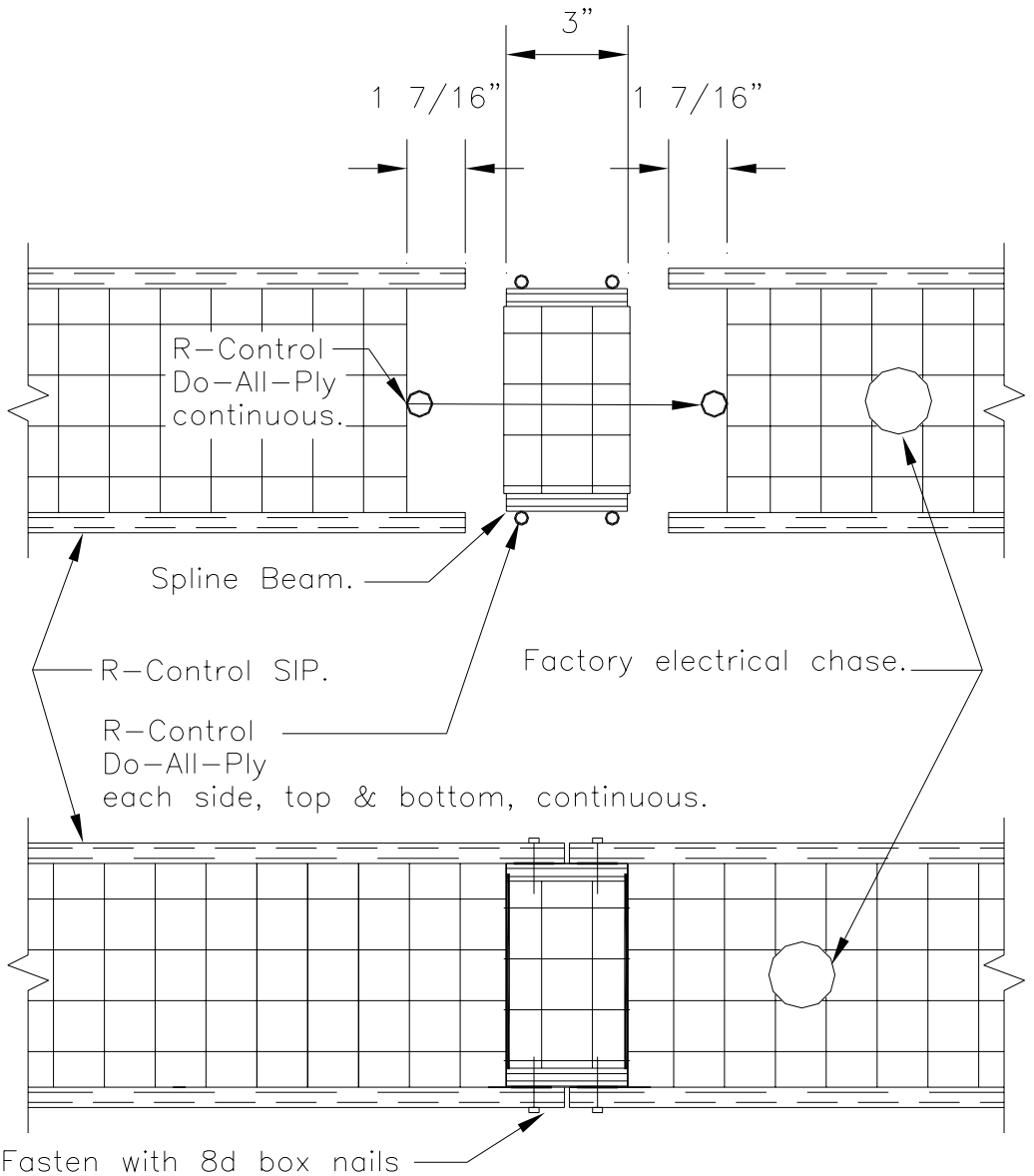
Transverse Loading (psf) [2]
(See Details SIP-102TX and SIP-102gTX)

R-Control Structural Insulated Panels																
Roof or Floor Panel Span		7/16" OSB Thickness														
		EPS Core Thickness														
		3 1/2" Core			5 1/2" Core			7 1/4" Core			9 1/4" Core			11 1/4" Core		
Deflection		L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180
Transverse Load (psf)	4'	65	80 [1]	80 [1]	89	122 [1]	122 [1]	92	136 [1]	136 [1]	107	136 [1]	136 [1]	104	136 [1]	136 [1]
	6'	40	53 [1]	53 [1]	58	81 [1]	81 [1]	64	96 [1]	96 [1]	75	96 [1]	96 [1]	73	96 [1]	96 [1]
	8'	28	40 [1]	40 [1]	42	61 [1]	61 [1]	51	76 [1]	76 [1]	61	76 [1]	76 [1]	60	76 [1]	76 [1]
	10'	20	30	32 [1]	32	48	49 [1]	44	64 [1]	64 [1]	54	64 [1]	64 [1]	55	64 [1]	64 [1]
	12'	-	-	-	-	-	-	40	56 [1]	56 [1]	51	56 [1]	56 [1]	55	56 [1]	56 [1]

[1] Limited to ultimate failure load divided by a safety factor of 3.0.

[2] Floor panels limited to Group R Occupancies.


Note: Spline to be of material conforming to DOC PS2–92, min thickness equal to the panel skins.
2"
4"
2"
R–Control Do–All–Ply continuous.
Spline
R–Control Do–All–Ply each side, both splines, continuous.
Factory electrical chase.
R–Control SIP.
Fasten with 8d box nails @ 6" o.c. both sides of panel joint or equivalent. Typical each side of panel.
Note: Vapor retarder recommended on interior of panel when mandated by code or climatic conditions.
SECTION/PLAN
Scale: NTS
Updated 7–6–06
R–Control® SIP
TITLE: Spline Connection Surface Spline
NO. SIP–102TX



Note:
Vapor retarder recommended on interior of panel when mandated by code or climatic conditions.

SECTION/PLAN

Scale: NTS

Updated 7-6-06

R-Control® Panel

TITLE: Block Spline Connection	NO. SIP-102gTX

Table 5

Transverse Loading (psf) [2,3,4,5]
(See Details SIP-102dTX and SIP-108TX)

R-Control Structural Insulated Panels													
Roof, Wall or Floor Panel Span		7/16" OSB Thickness											
		EPS Core Thickness											
		5 1/2" Core			7 1/4" Core			9 1/4" Core			11 1/4" Core		
Deflection		L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180
Transverse Load (psf)	10'	53	79	105[1]	89	109[1]	109[1]	150	174[1]	174[1]	177[1]	177[1]	177[1]
	12'	40	59	79	65	91[1]	91[1]	111	145[1]	145[1]	148[1]	148[1]	148[1]
	14'	30	45	60	48	72	78[1]	84	124[1]	124[1]	115	127[1]	127[1]
	16'	24	35	47	37	55	68[1]	65	98	109	89	111	111[1]
	18'	19	28	37	28	42	57	51	77	97[1]	70	99[1]	99[1]
	20'	15	22	30	22	33	44	41	61	82	56	84	89[1]
	22'	NP	NP	NP	NP	NP	NP	33	49	66	45	68	81[1]
	24'	NP	NP	NP	NP	NP	NP	27	40	54	37	55	74

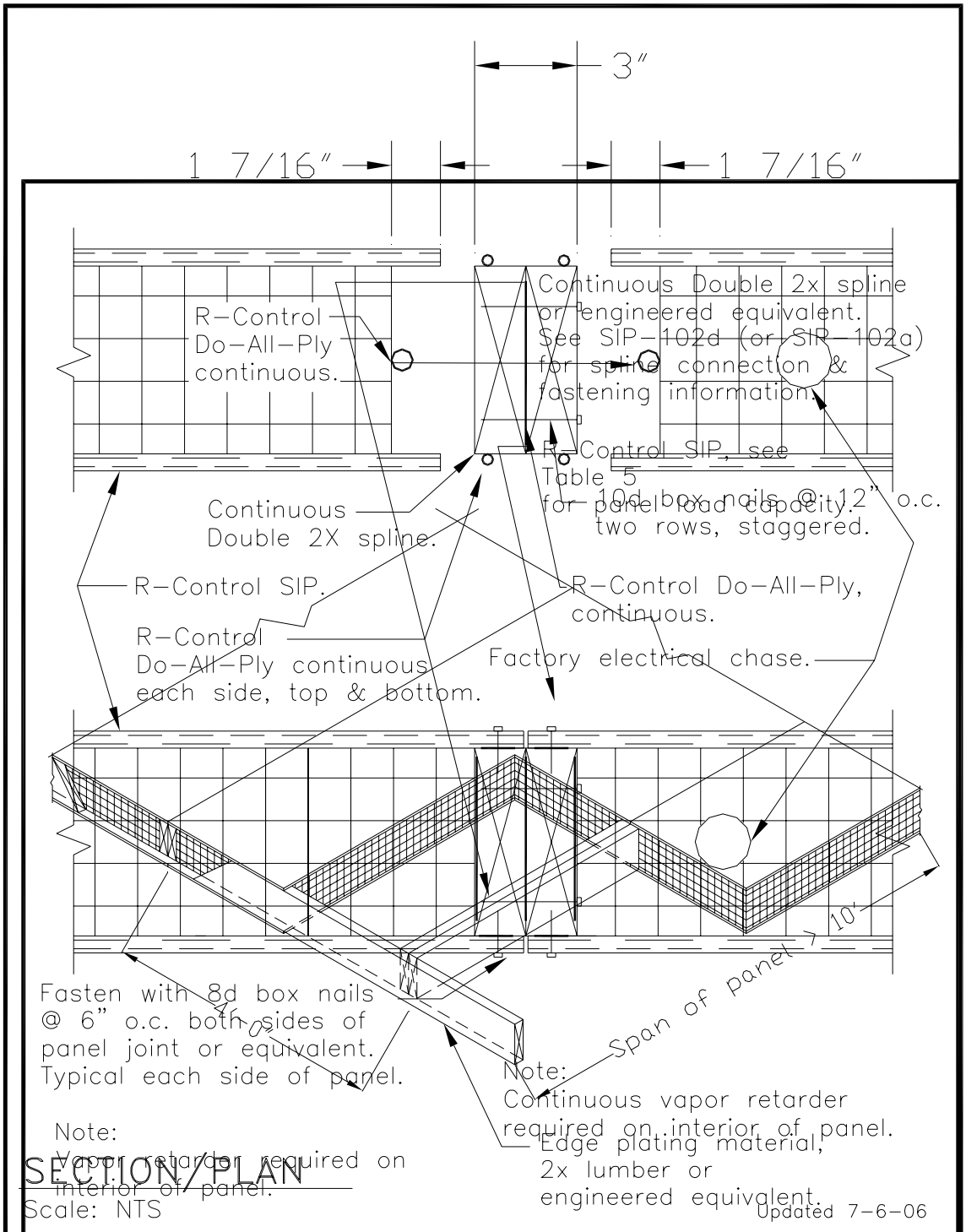
[1] Limited to ultimate failure load divided by a safety factor of 3.0.

[2] Roof, wall, and floor panels are framed with continuous doubled nominal 2 inch lumber in the spanning direction. Spaced 4 feet on center, and single nominal 2 inch lumber at panel ends. Lumber is minimum SPF No. 2 grade. Panels below heavy line require Douglas Fir-Larch, No. 2 grade.

[3] Top facing thickness for floor panels is 3/4 inch, minimum. As an option, minimum 7/16 inch top facing may be overlaid with a minimum 7/16 inch flooring perpendicular to the panels.

[4] 2X top plate joints shall be staggered a minimum of 1 foot from panel joints.

[5] Minimum edge bearing for roof and floor panels is 1 1/2".



SECTION/PLAN
Scale: NTS

Updated 7–6–06

ISOMETRIC PLAN
Scale: NTS

R–Control® SIP

TITLE: Spline Connection Double 2x	NO. SIP–102dTX

Updated 7–6–06

R–Control® SIP

TITLE: Floor/Roof Panel Connection	NO. SIP–102aTX

Table 6

Transverse Loading (psf) [2,3,4,5]
(See Details SIP-102bTX and SIP-108aTX)

R-Control Structural Insulated Panels										
Roof or Floor Panel Span		7/16" OSB Thickness								
		EPS Core Thickness								
		7 1/4" Core			9 1/4" Core			11 1/4" Core		
Deflection		L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180
Transverse Load (psf)	10'	81[1]	81[1]	81[1]	118[1]	118[1]	118[1]	131[1]	131[1]	131[1]
	12'	63	68[1]	68[1]	98[1]	98[1]	98[1]	109[1]	109[1]	109[1]
	14'	49	58[1]	58[1]	73	84[1]	84[1]	87	93[1]	93[1]
	16'	38	51[1]	51[1]	55	74[1]	74[1]	69	82[1]	82[1]
	18'	30	45[1]	45[1]	42	63	65[1]	55	72	72
	20'	24	37	40[1]	33	49	59[1]	45	65	65
	22'	NP	NP	NP	26	39	49[1]	37	55	57[1]
	24'	NP	NP	NP	21	31	41	30	46	48[1]

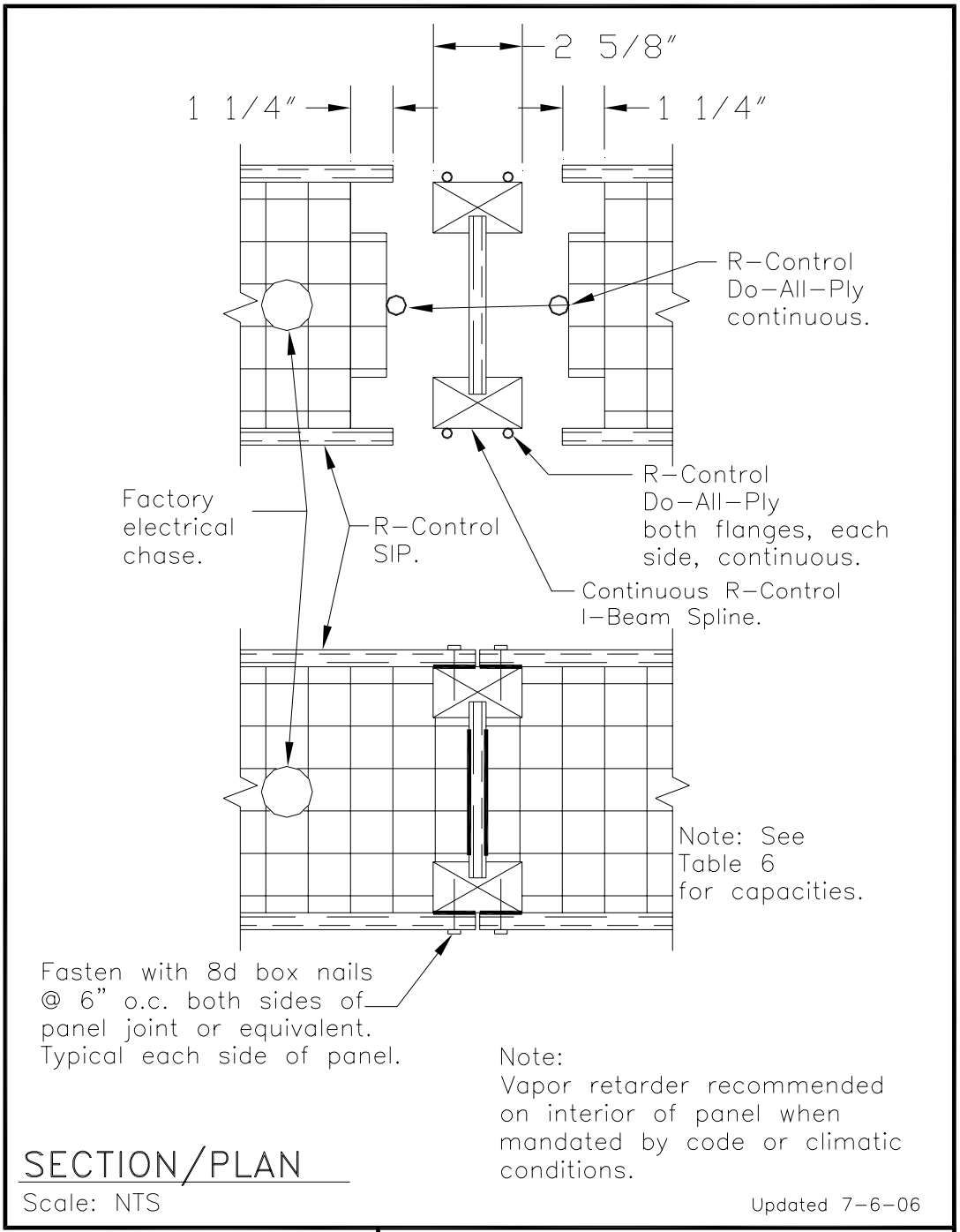
[1] Limited to ultimate failure load divided by a safety factor of 3.0.

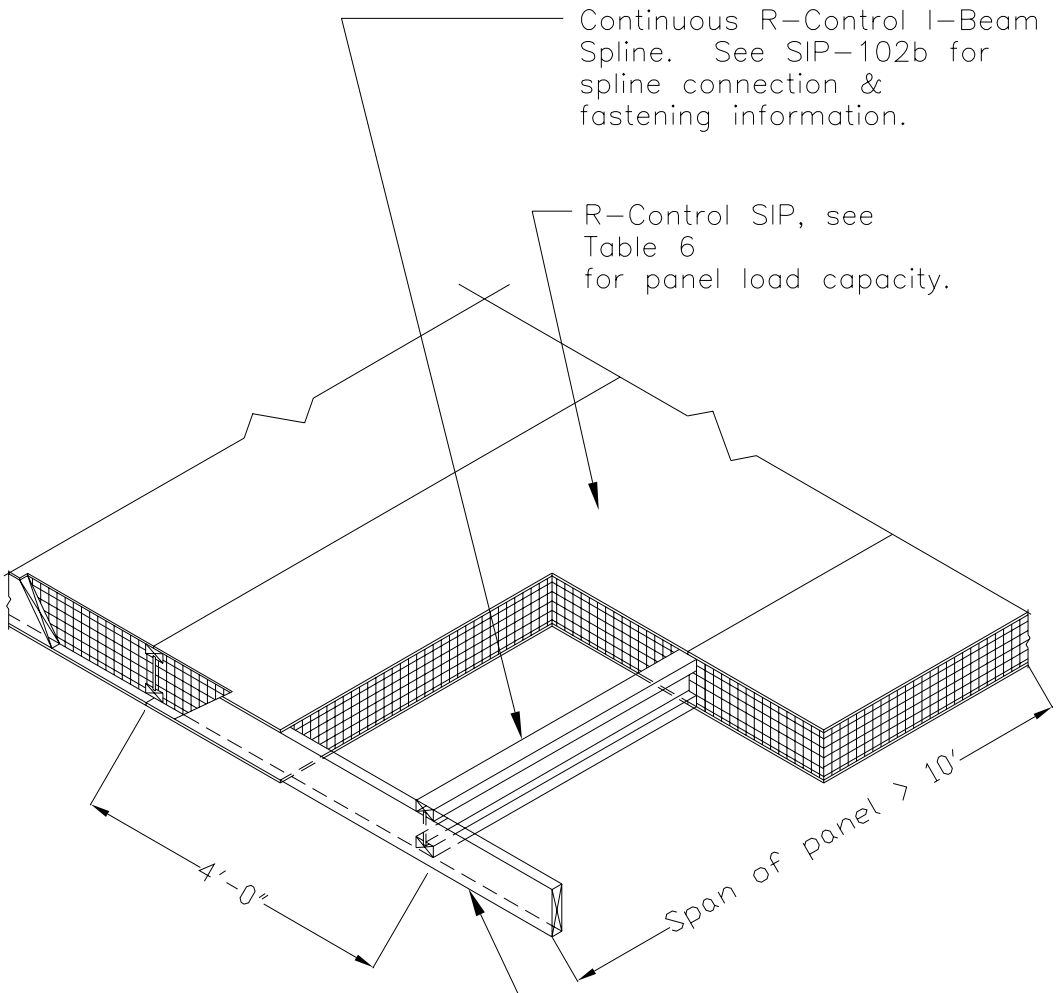
[2] Panels require continuous wood I-beams installed in the spanning direction spaced 4 feet on center.

[3] Top facing thickness for floor panels is 3/4 inch, minimum. As an option, minimum 7/16 inch top facing may be overlaid with a minimum 7/16 inch flooring perpendicular to the panels.

[4] Wood I-joist is SWI-T-34 recognized in ICC-ES legacy report PFC-4801.

[5] Minimum edge bearing for roof and floor panels is 1 1/2".


2 5/8"
1 1/4"
1 1/4"
R-Control
Do-All-Ply
continuous.
R-Control
Do-All-Ply
both flanges, each
side, continuous.
Factory
electrical
chase.
R-Control
SIP.
Continuous R-Control
I-Beam Spline.
Note: See
Table 6
for capacities.
Fasten with 8d box nails
@ 6" o.c. both sides of
panel joint or equivalent.
Typical each side of panel.
Note:
Vapor retarder recommended
on interior of panel when
mandated by code or climatic
conditions.
SECTION/PLAN
Scale: NTS
Updated 7-6-06
R-Control® SIP
TITLE: Spline Connection
I-Beam Spline Connection
NO.
SIP-102bTX



Note:
Vapor retarder recommended on interior of panel when mandated by code or climatic conditions.

ISOMETRIC PLAN

Scale: NTS

Updated 7–6–06

R–Control® SIP	
TITLE: Floor/Roof Panel Connection	NO. SIP–108aTX

Table 7

Transverse Loading (psf) [2,3,4]
(See Details SIP-102cTX and SIP-108bTX)

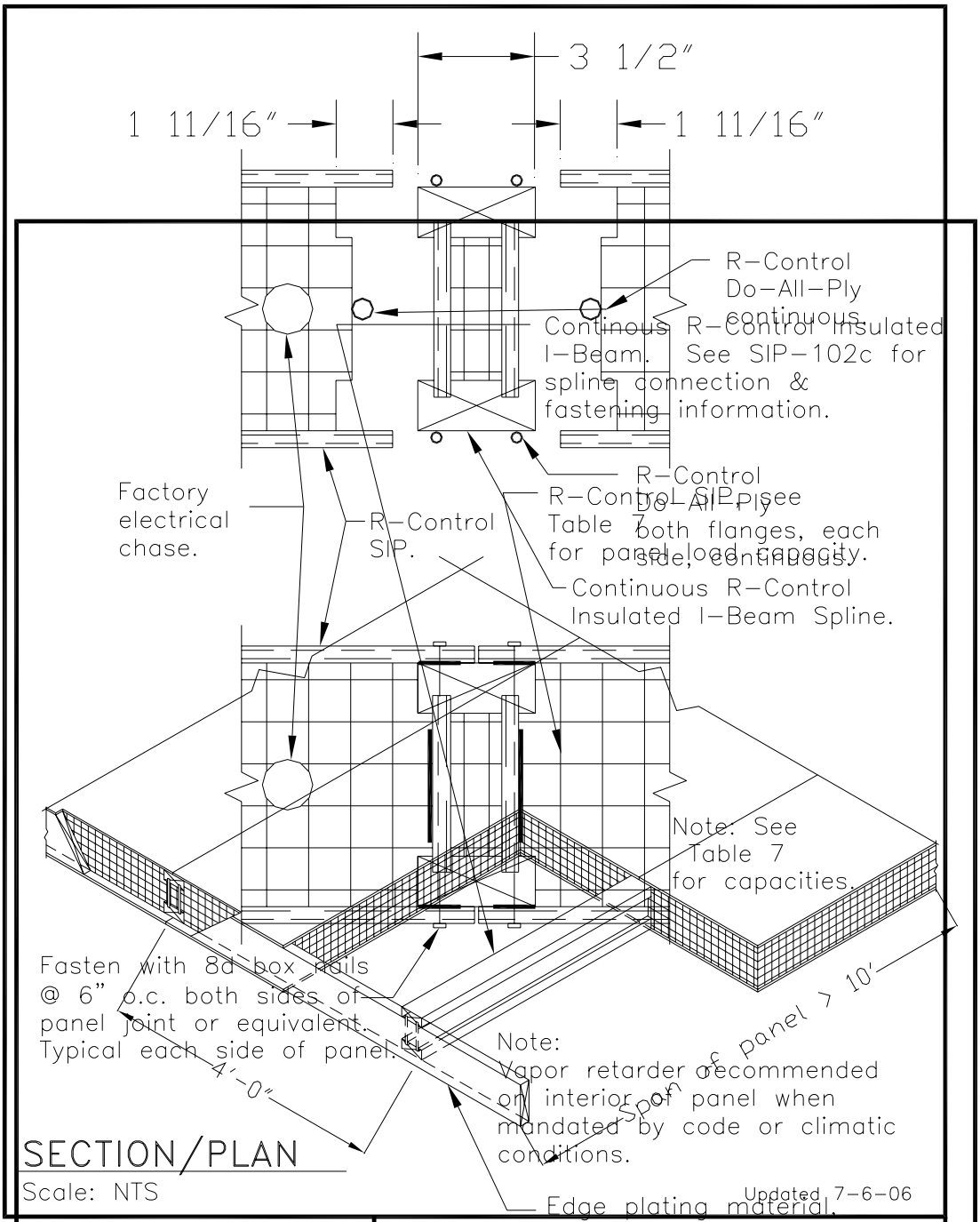
R-Control Structural Insulated Panels													
Roof or Floor Panel Span		7/16" OSB Thickness											
		EPS Core Thickness											
		5 1/2" Core			7 1/4" Core			9 1/4" Core			11 1/4" Core		
Deflection		L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180	L/360	L/240	L/180
Transverse Load (psf)	10'	76	114	132[1]	101	151	158[1]	117	138[1]	138[1]	149[1]	149[1]	149[1]
	12'	57	79	96[1]	72	109	132[1]	88	115[1]	115[1]	124[1]	124[1]	124[1]
	14'	38	57	70[1]	54	80	107[1]	68	98[1]	98[1]	106[1]	106[1]	106[1]
	16'	28	42	54[1]	40	61	81	53	80	86[1]	76	93[1]	93[1]
	18'	21	32	42	31	47	62	42	64	64[1]	64	83[1]	83[1]
	20'	16	24	32	24	36	49	34	51	52[1]	50	74[1]	74[1]
	22'	NP	NP	NP	NP	NP	NP	28	42	43[1]	40	60	62[1]
	24'	NP	NP	NP	NP	NP	NP	23	34	36[1]	33	49	52[1]

[1] Limited to ultimate failure load divided by a safety factor of 3.0.

[2] Panels require continuous insulated spline beams installed in the spanning direction, spaced 4 feet on center.

[3] Top facing thickness for floor panels is 3/4 inch, minimum. As an option, minimum 7/16 inch top facing may be overlaid with a minimum 7/16 inch flooring perpendicular to the panels.

[4] Minimum edge bearing for roof and floor panels is 1 1/2".



SECTION/PLAN

Scale: NTS

Updated 7-6-06

Note:
Vapor retarder recommended on interior of panel when mandated by code or climatic conditions.

ISOMETRIC PLAN

Scale: NTS

Updated 7-6-06

R-Control® SIP

TITLE:	NO.
Spline Connection Insulated I-Beam Spline	SIP-102cTX

R-Control® SIP

TITLE:	NO.
Floor/Roof Panel Connection	SIP-108bTX

Table 9

Wall Header Loading (plf) [2,3,4]

(See Details SIP-112TX, SIP-113TX, SIP-114TX, and SIP-115TX)

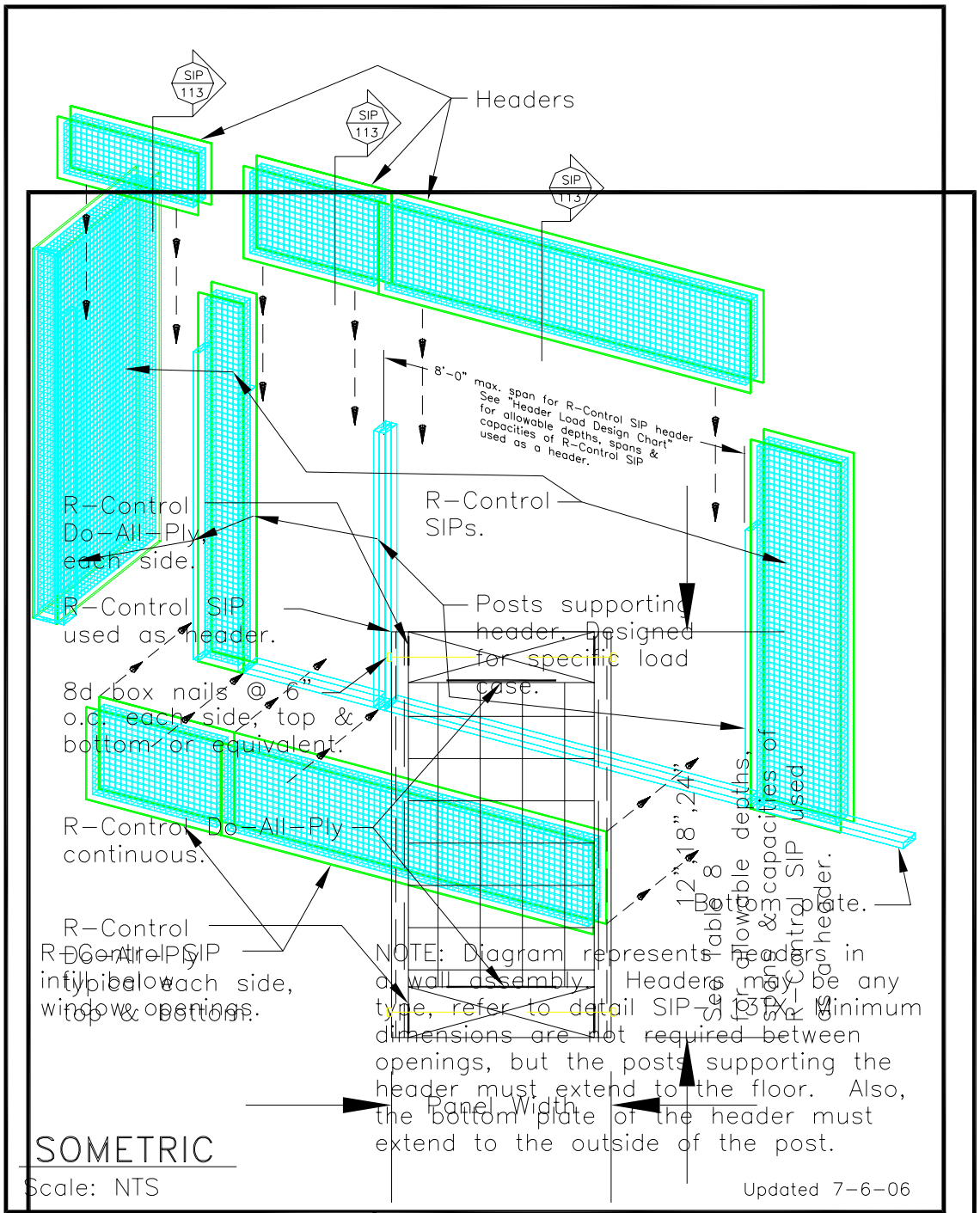
R-Control Structural Insulated Panels										
Header Span		Header Depth								
		12 inches			18 inches			24 inches		
Deflection		L/480	L/360	L/240	L/480	L/360	L/240	L/480	L/360	L/240
Header Load (plf)	4’	524	703	708 [1]	762	773 [1]	773 [1]	837 [1]	837 [1]	837 [1]
	6’	319	374 [1]	374 [1]	466 [1]	466 [1]	466 [1]	557 [1]	557 [1]	557 [1]
	8’	218	248 [1]	248 [1]	351 [1]	351 [1]	351 [1]	455 [1]	455 [1]	455 [1]

[1] Limited to ultimate failure load divided by a safety factor of 3.0.

[2] Supports and connections shall be designed for each installation.

[3] Top and bottom plates shall be Douglas Fir-Larch No. 2.

[4] See details SIP-112TX, SIP-113TX, SIP-114TX, and SIP-115TX.



SOMETRIC
Scale: NTS

Updated 7-6-06

R-Control® SIP

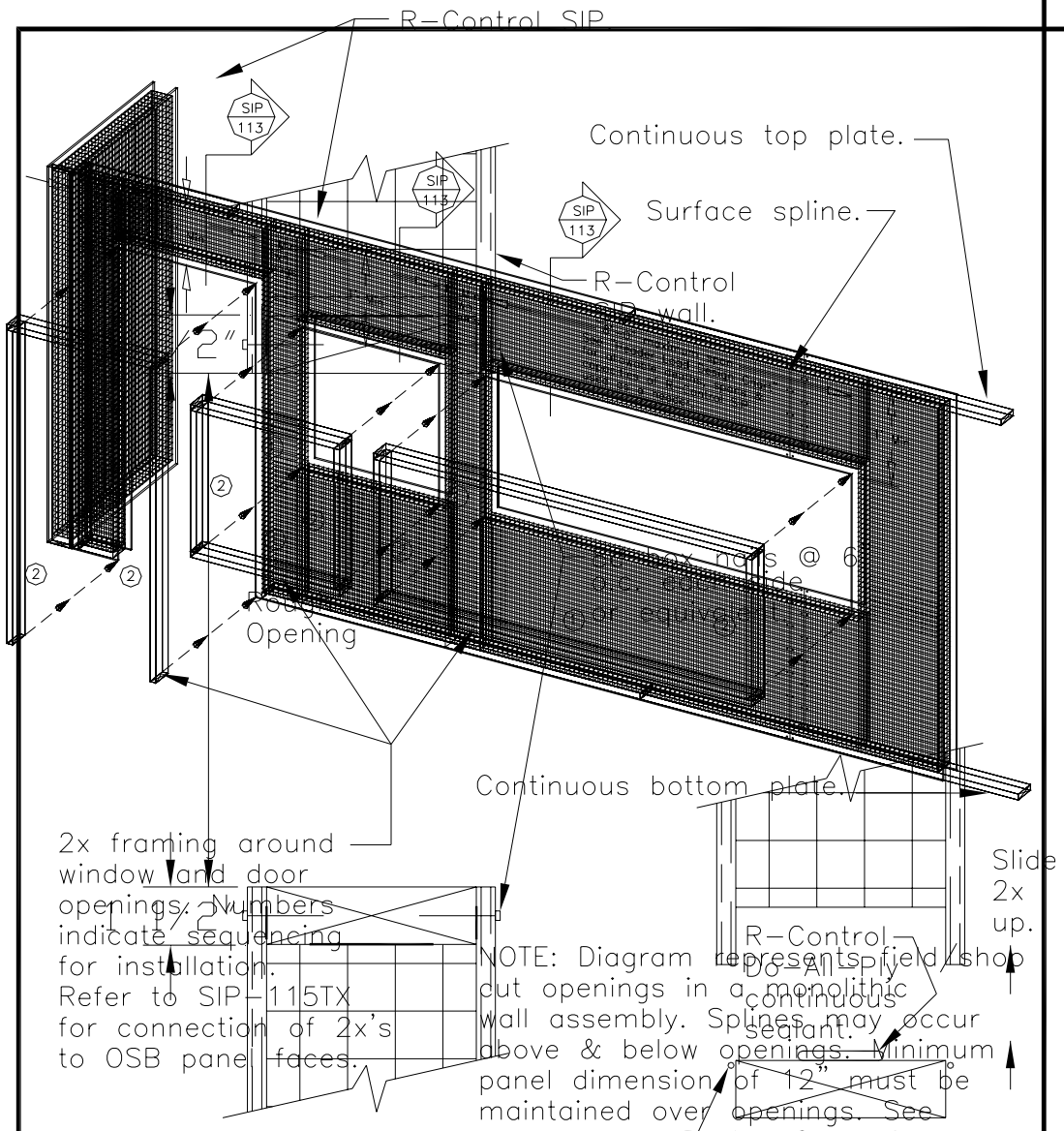
TITLE:	NO.
Headers	SIP-112TX

SECTION
Scale: NTS

Updated 7-6-06

R-Control® SIP

TITLE:	NO.
Header sections (R-Control Panel)	SIP-113TX



ISOMETRIC

Scale: NTS

Note: This detail is applicable for horizontal or vertical panels.

SECTION

Scale: NTS

Updated 7-6-06

R-Control® SIP

TITLE: SIP used as Header (surface spline condition)	NO. SIP-114TX

Updated 7-6-06

R-Control® SIP

TITLE: Openings in Panels	NO. SIP-115TX

Table 9

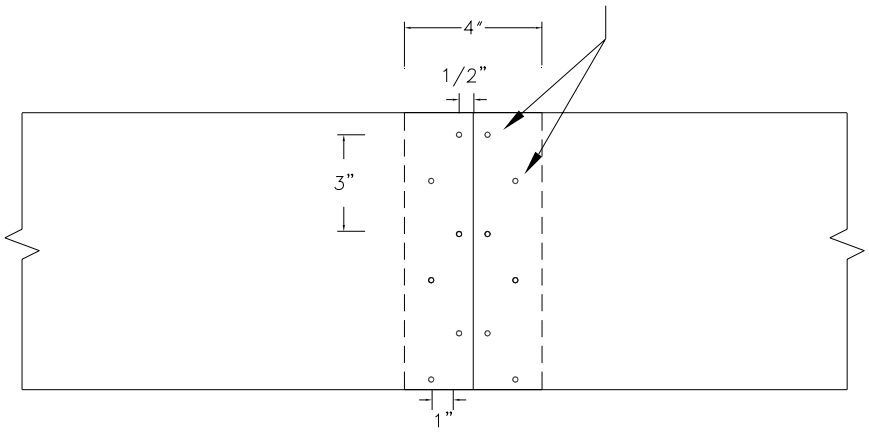
Roof/Floor Diaphragm Loading [1]
(See Connection Details SIP-139a, SIP-140TX, and SIP-141TX)

R-Control Structural Insulated Panel			
7/16" OSB Thickness	Spacing of R-Control Screw Fasteners [2] at Supported Edges (minimum 1 5/8" penetration		
	3 inches	4 inches	6 inches
	Spacing of spline fasteners (8d box or 6d common) at unsupported edges – top side of panel only – two staggered rows of fasteners on each side of joint		
	3 inches	3 inches	3 inches
	850 plf [1]	750 plf [1]	500 plf [1]

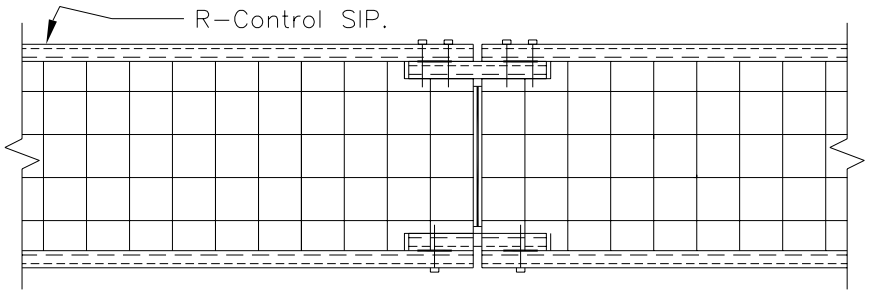
[1] Spline is 7/16" OSB x 4.

[2] R-Control Screw Fasteners (minimum No. 14, 5/8: diameter head).

Top Spline:
Fasten with 8d box or 6d common nails in two rows 3" o.c. both sides of joint.



PLAN
Scale: NTS



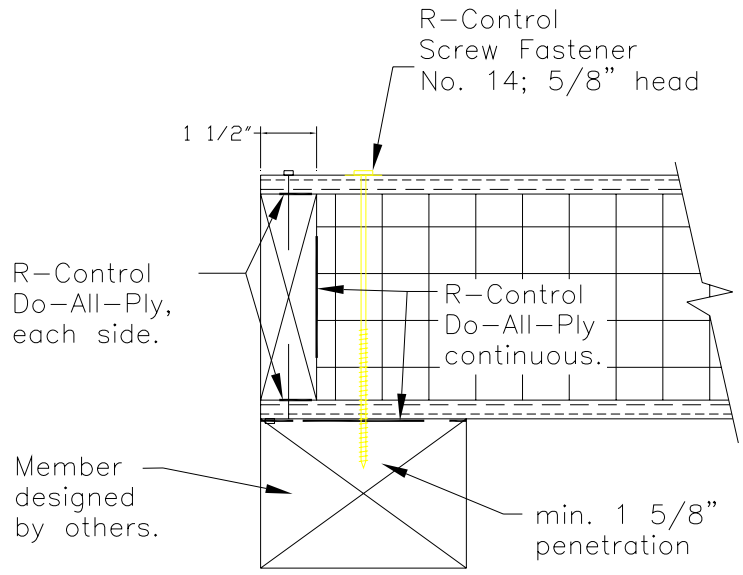
Bottom Spline:
Fasten with 8d box or 6d common nails 6" o.c. in single row both sides of joint

Note: Spline to be of material conforming to DOC PS2-92

SECTION
Scale: NTS

Updated 7-1-02

R-Control® SIP	
TITLE: Diaphragm Connection – Splines	NO. SIP-139a

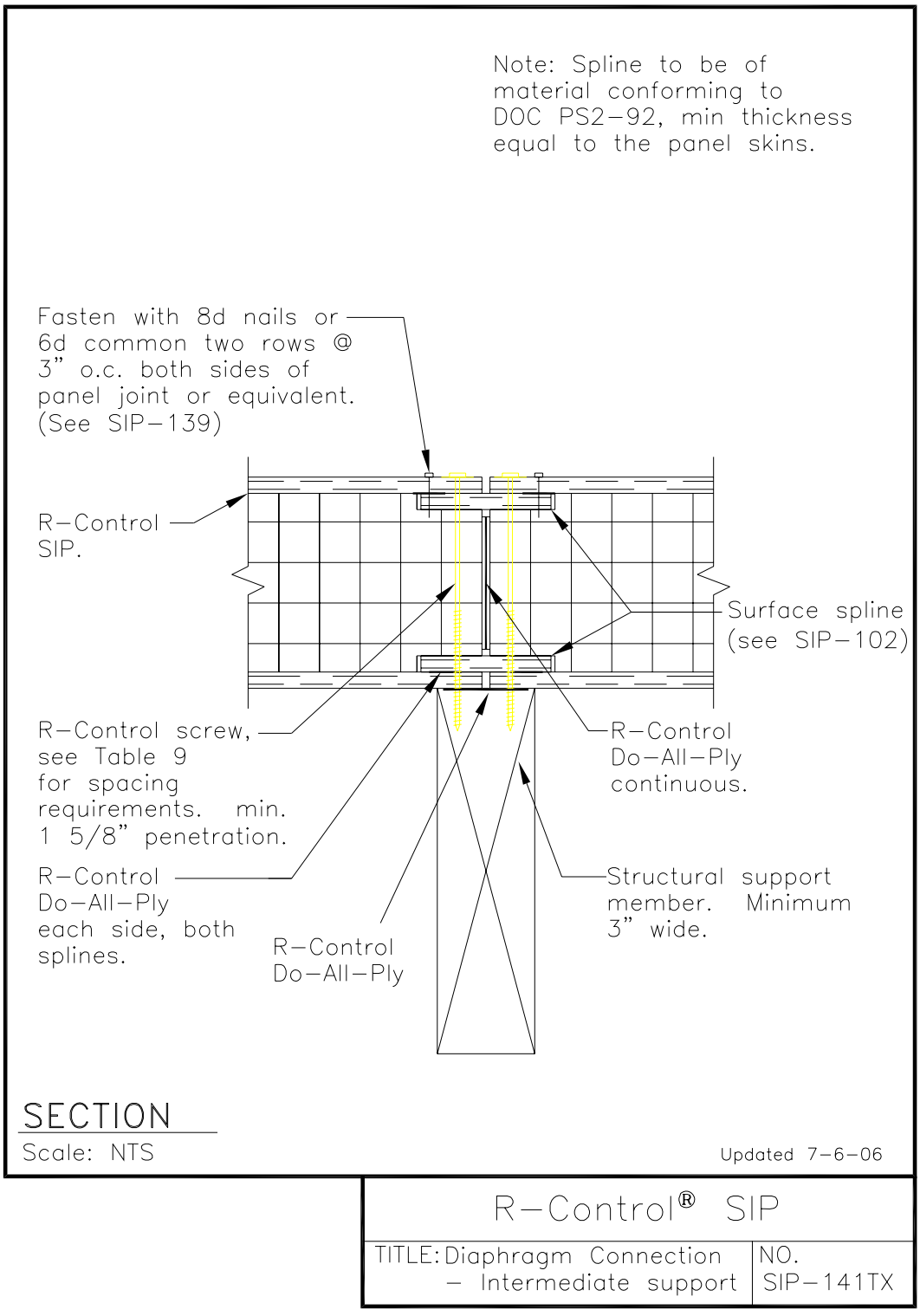


SECTION

Scale: NTS

Updated 7–6–06

R–Control® SIP	
TITLE: Diaphragm Connection – Support Member	NO. SIP–140TX


Note: Spline to be of material conforming to DOC PS2-92, min thickness equal to the panel skins.
Fasten with 8d nails or 6d common two rows @ 3" o.c. both sides of panel joint or equivalent. (See SIP-139)
R-Control SIP.
Surface spline (see SIP-102)
R-Control screw, see Table 9 for spacing requirements. min. 1 5/8" penetration.
R-Control Do-All-Ply continuous.
R-Control Do-All-Ply each side, both splines.
R-Control Do-All-Ply
Structural support member. Minimum 3" wide.
SECTION
Scale: NTS
Updated 7-6-06
R-Control® SIP
TITLE: Diaphragm Connection - Intermediate support
NO. SIP-141TX