TECTUM INC.
The Noise Control Solution

TECTUM INC.
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Roof Deck Solutions

The Noise Control Solution

3

03500/TEC

TECTUM INC.

The Noise Control Solution

Structural Roof Deck Systems

3

035113/TEC

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TECTUM INC.
The Noise Control Solution

Roof Deck 3

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The Noise Control Solution

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TECTUM INC.

The Noise Control Solution

About Tectum Inc.

Keeping a lid on noise for over 55 years.

Tectum Interior Products. Where noise is a challenge, Tectum offers a full range of wall and ceiling systems that are attractive, proven, tough, and recommended by Acoustical Consultants.

That's because Tectum products combine beauty and performance in a way no other acoustical product can. They're durable (with a lifetime warranty), and they're manufactured using only renewable wood and other natural materials. They contain no asbestos, and never have.

Tectum acoustical products enhance the environments you design by decreasing the noise.

For more information about Tectum's full line of interior products, visit our Web site at www.tectum.com or contact us at 888-977-9691.

1-888-977-9691

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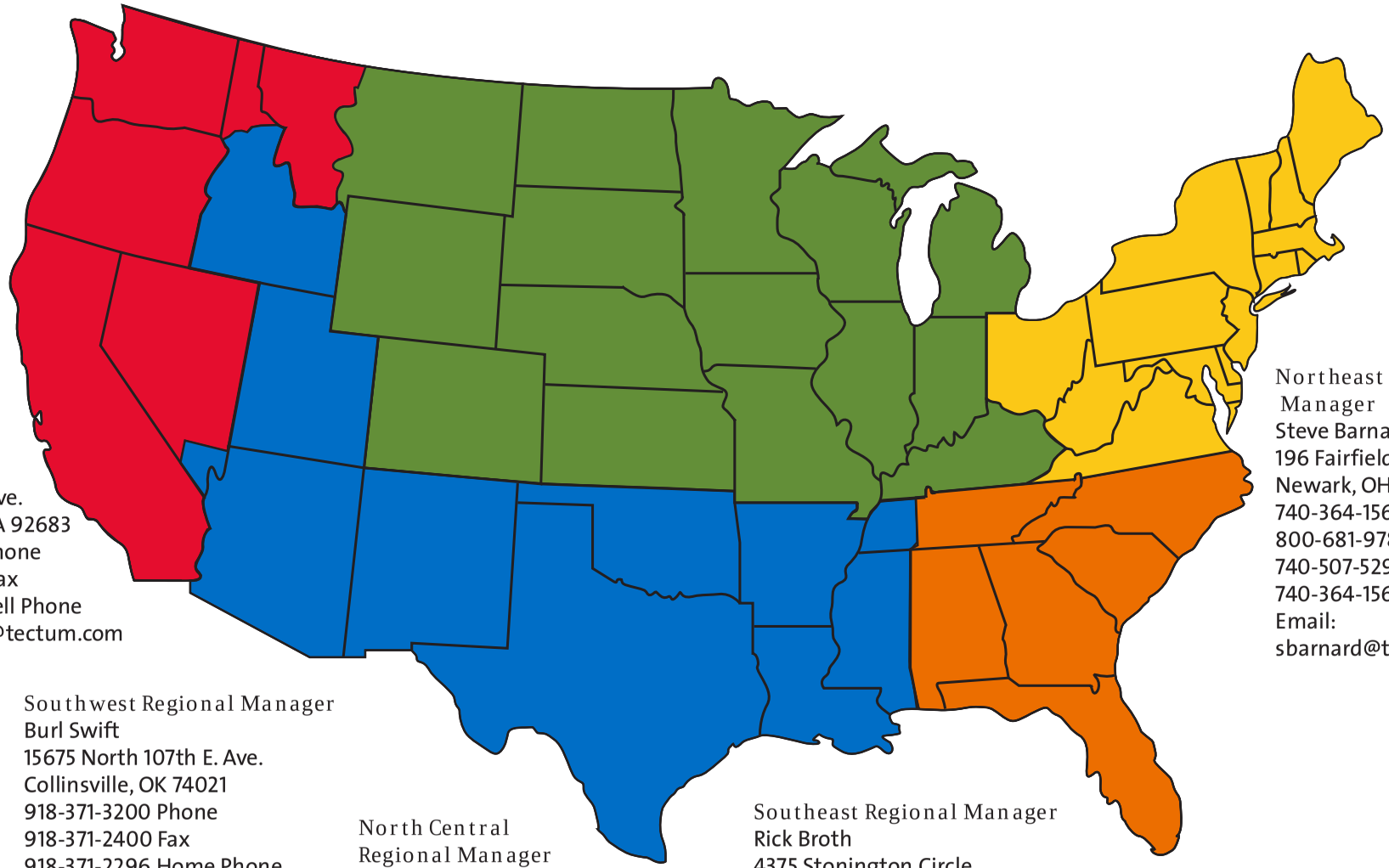
TECTUM REGIONAL SALES MAP



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Call your regional sales manager to earn AIA/CES credit and learn more about all Tectum products.

TECTUM INC
The Noise Control Solution

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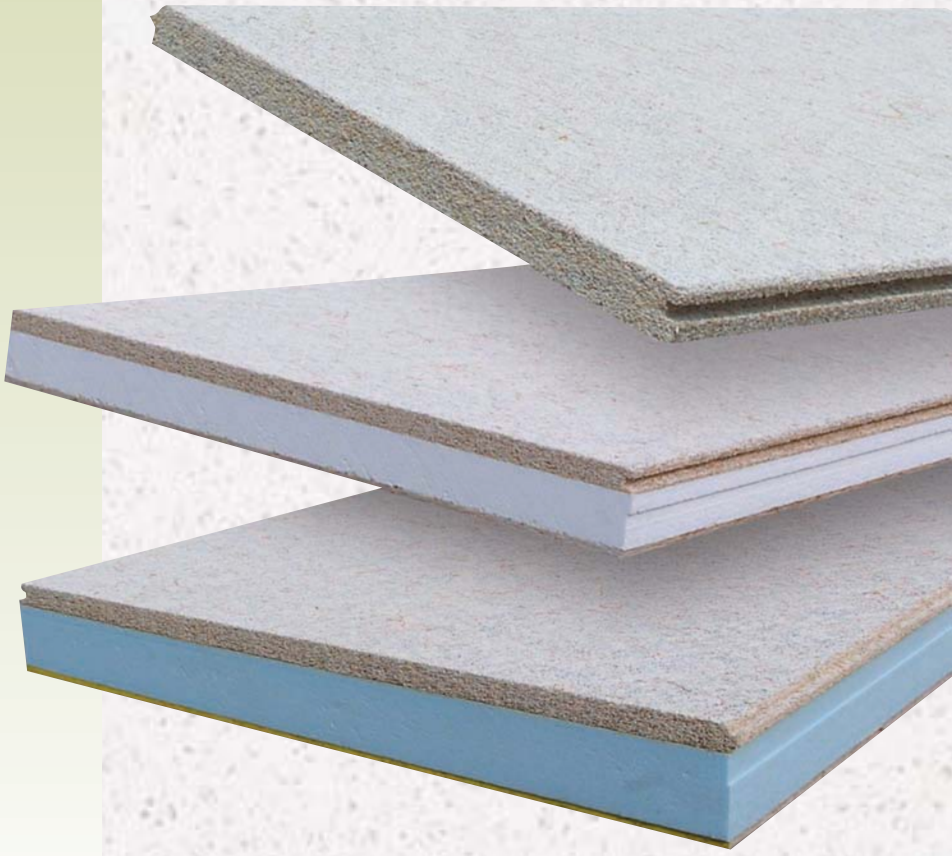
THE ULTIMATE STRUCTURAL SYSTEM

JANUARY 2010

Roof Deck Systems

Palm Valley High School, Palm Valley, California.



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Tectum panels are made from renewable and sustainable raw materials.

ROOF DECK PANELS

Tectum™ panels are composed of aspen wood fibers (excelsior) bonded with an exclusive inorganic hydraulic cement and are formed by a continuous process under heat and pressure. Tectum panels combine several materials to create a decorative product that provides excellent sound absorption, abuse resistance, insulation and a textured interior finish. These panels are structurally sound and lightweight and can be used either alone or as the underside of a composite panel to form a limited combustible roof deck system. A silicone treatment to the panel resists water and water migration. There are no urea formaldehydes or CFCs in any Tectum product or composite.

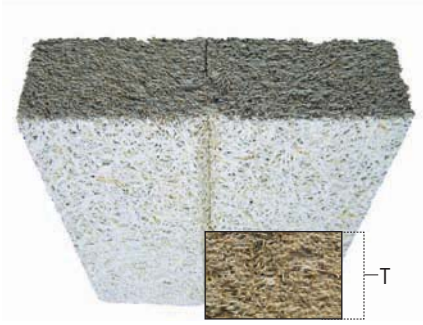
Tectum roof deck panels are available in natural (color may vary), white or custom colors.

NOTE: There is no asbestos, nor has there ever been any asbestos, used in Tectum products.

TECTUM I

Tectum I roof deck is typically used in low slope applications and provides a thermal barrier for field-applied foam plastics. It is compatible with virtually all roof installation materials. Underside exposed joints have attractive beveled edges. LS (long span) panels available with steel channel reinforcement.

The Tectum I roof deck system consists of standard TECTUM panels in either plank or tile configurations. *See pgs. 3* and *5 for more about Tectum Roof Deck Systems.*

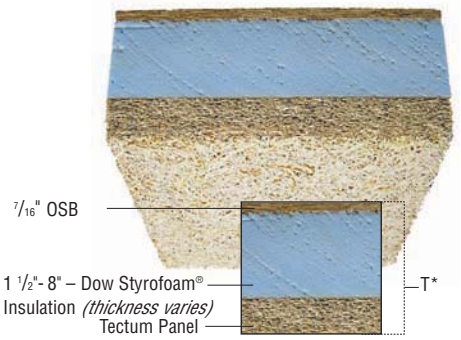


T= 2", 2 ½", 3"

TECTUM III

The Tectum III roof deck panel is a composite of a 1 ½" or thicker Tectum I substrate, Dow Styrofoam® brand XPS (extruded polystyrene) insulation 1 ½" to 8" thick and 7/16" OSB (oriented strand board) sheathing with a slip-resistant surface *(see pg. 3)*. Components are bonded with code-listed structural adhesives.

Tectum III panels are typically used in sloped applications where insulation and a nailable surface are required.

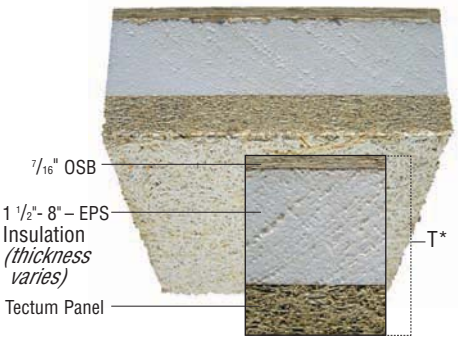


T= 3 ½", 4", 5", 6", 7", 8", 9", 10"
*Based on 1 ½" Tectum Panel

TECTUM E

The Tectum E roof deck panel is a composite of a 1 ½" or thicker Tectum I substrate, EPS (expanded polystyrene) insulation and 7/16" OSB sheathing with a slip-resistant surface *(see pg. 3)*. Components are bonded with code-listed structural adhesives.

The EPS core exceeds the requirements of ASTM C-578 Type I and bears the UL classification mark.

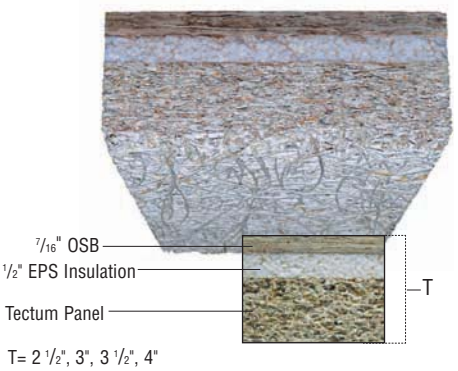


T= 3 ½", 4", 5", 6", 7", 8", 9", 10"
*Based on 1 ½" Tectum Panel

TECTUM NS

The Tectum NS (nailable surface) roof deck panel is a composite of a 1 ½" or thicker Tectum substrate, ½" thick EPS (expanded polystyrene) insulation and 7/16" OSB sheathing with a slip-resistant surface *(see pg. 3)*. Components are bonded with code-listed structural adhesives.

Tectum NS Panels are typically used in sloped applications where minimal insulation is required, such as outdoor pavilions.



T= 2 ½", 3", 3 ½", 4"

TECHNICAL DATA

With various edge treatments, Tectum panels are used as the substrate for all Tectum roof deck systems. Tectum **roof plank** panels have T&G long edges and square ends. Plank is designed to span structural supports. Tectum **roof tile** systems have rabbeted long edges and either square or T&G ends. Tiles span between structural tees. Tees span between supports.

LIMITATIONS – TECTUM I, III, E, NS

When designing for high-humidity applications such as pools or ice arenas, please contact the Tectum Inc. technical department for assistance and Tectum IIIP use detail.

COMBUSTIBILITY

WARNING: All foam insulation should be adequately protected. Styrofoam brand and EPS insulation are combustible and may constitute fire hazards if improperly used or installed. Use only as directed by the specific instructions for these products. Styrofoam brand and EPS insulation contain a flame retardant additive to inhibit accidental ignition from small fire sources. During shipping, storage, installation and use, this material should not be exposed to flame or other ignition sources.

THERMAL PERFORMANCE FOR TECTUM PANELS

TECTUM THERMAL PERFORMANCE

Panel Type	Substrate Thickness (Inches)	Insulating Foam Thickness	Total Panel Thickness (Inches)	R-Value for Tectum Substrate	Heat Flow Up*	Heat Flow Down*	Weight PSF
Tectum I Roof Deck	2"	N/A	2"	3.50	4.62	5.01	3.5
	2 1/2"	N/A	2 1/2"	4.38	5.50	5.89	4.5
	3"	N/A	3"	5.25	6.37	6.76	5.3
Tectum III Roof Deck	1 1/2"	1 1/2"	3 1/2"	10.63	11.92	12.31	4.4
	1 1/2"	2"	4"	13.13	14.42	14.81	4.4
	1 1/2"	3"	5"	18.13	19.42	19.81	4.6
	1 1/2"	4"	6"	23.13	24.42	24.81	4.8
	1 1/2"	5"	7"	28.13	29.42	29.81	4.9
	1 1/2"	6"	8"	33.13	34.42	34.81	5.1
	1 1/2"	7"	9"	38.13	39.42	39.81	5.3
	1 1/2"	8"	10"	43.13	44.42	44.81	5.4
Tectum E Roof Deck	1 1/2"	3/4"	2 3/4"	6.02	7.31	7.70	4.2
	1 1/2"	1 1/2"	3 1/2"	8.91	10.20	10.59	4.2
	1 1/2"	2"	4"	10.83	12.12	12.51	4.3
	1 1/2"	3"	5"	14.68	15.97	16.36	4.4
	1 1/2"	4"	6"	18.53	19.82	20.21	4.4
	1 1/2"	5 1/4"	7 1/4"	23.34	24.63	25.02	4.5
	1 1/2"	6 1/2"	8 1/2"	28.16	29.45	29.84	4.6
	1 1/2"	7"	9"	30.08	31.37	31.76	4.7
	1 1/2"	8"	10"	33.93	35.22	35.61	4.8
Tectum NS Roof Deck	1 1/2"	1/2"	2 1/2"	5.06	6.35	6.74	4.1
	2"	1/2"	3"	5.93	7.22	7.61	5.1
	2 1/2"	1/2"	3 1/2"	6.81	8.10	8.49	6.1
	3"	1/2"	4"	6.18	7.47	7.86	6.9

Notes for Thermal Performance Data:

* Includes air films and roofing

** R-values based on the following k-factors:

k for Tectum Panels is .57

k for Dow Styrofoam is .20

k for Expanded Polystyrene (EPS) is .26

DOW STYROFOAM® INSULATION

Property	Test	Result
Water Vapor Permeability*	E96-80	0.6
Compressive Strength	D1621-04a	40 lb. sq. in. Min. 20 lb./sq. in.
Water Absorption	D2842-06	1% by Volume
Linear Coef. of Thermal Expansion (in/in°F)		3.5 x 10^5
Thermal Resistance		R=5.0/inch

** Styrofoam brand insulation qualifies as a vapor retarder as defined by ASHRAE Fundamentals Handbook 1989.*

EPS INSULATION

Property	Test	Result
Nominal Density		1.0 lb./ft^3
Thermal Resistance (R-Value*)	C177/C518	4.17 @ 40°F
Per Inch of Thickness		3.85 @ 75°F

** Typical tested R-values based on data from BASF Corp. and Huntsman Chemical Co.*

OSB SHEATHING*

Property	Result
Internal Bond	50 p.s.i.
Average Roofing Nail Withdrawal	50 lbs.
Average Roofing Staple Withdrawal	137 lbs.
Average Screw Withdrawal*	355 lbs.
Maximum Linear Expansion (50 to 90% RH)	0.20%

** Structural Board Association Note: OSB meets the requirements of PS2-04 performance standard for wood-based structural use panels.*

TECTUM ROOF DECK DESIGN GUIDELINES

DESIGN LOAD DATA**

Span in inches based on nominal 3" wide structural support members Deflection L/240 or less.
Contact Tectum Inc. for recommended spans when used in high-humidity applications.

System	Thickness***	Wt. (psf)***	Product	24"	30"	36"	38"	40"	42"	44"	48"	50"	52"	54"	60"	66"	72"	84"	96"
Plank	2"	3.5	I	130	75	50	45	40	35										
	2 1/2"	4.5	I	150	120	80	70	60	50	45	35								
	3"	5.3	I	200	125	102	91	82	74	65	50	45	40	35					
LS	2"	3.8	I	130	75	75	75	70	64	57	50	45	40	35					
Plank	2 1/2"	4.7	I	150	120	120	120	114	103	93	77	70	65	60	50	35			
	3"	5.5	I	200	125	125	125	125	120	115	110	104	96	88	71	58	50		
Comp.	3 1/2"	4.4	III	200	180	165	150	135	125	115	95	85	75	70	60	55	50		
Plank	4"	4.4	III		200	195	175	155	140	120	110	100	95	85	70	60	50	35	
T-III*	5"	4.6	III						200	175	135	125	115	105	85	70	60	50	35
	6", 7"	4.8, 4.9	III								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.1, 5.3, 5.4	III												200	165	136	100	75
NS	2 1/2"	4.1	NS	200	125	100	90	80	74	65	50								
Plank	3"	5.1	NS	200	195	135	120	110	100	90	75	70	65	60	50				
	3 1/2", 4"	6.1, 6.9	NS		200	195	175	155	140	120	110	100	95	85	70	60	50		
E	2 3/4"	4.2	E	200	125	100	90	80	74	65	50								
Plank	3 1/2"	4.2	E	200	150	135	120	110	100	90	75	70	65	60	50				
	4"	4.3	E	200	180	165	150	135	125	115	95	85	75	70	60	55	50	35	
	5"	4.4	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
	6", 7"	4.4, 4.5	E								200	180	170	160	150	125	105	75	60
	8", 9", 10"	4.6, 4.7, 4.8	E												200	165	130	100	75

* Contact Tectum Inc. when designing high-humidity environments such as pools and ice arenas.

** All published design loads are based on minimum safety factor of four. For example, 50 psf design load has an ultimate load of 200 psf.

*** Thickness and weight are nominal. For loads greater than 200 lbs., contact Tectum Inc.

DIAPHRAGM DESIGN DATA

TECTUM ROOF DECK FASTENER SPACING SCHEDULE

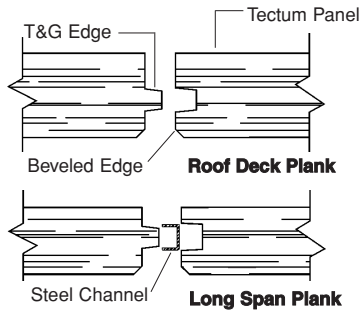
Type	Panel Size	Test No.	Joist	Span[4]	Fasteners	Field Spacing[2]	Perimeter	Adhesive[1,3]	Grout	ULT/ LF	DSN/ LF
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	No	None	825	275
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	T&G+Joist	None	1350	450
T-I LS	2 1/2"x31"x120"	94-30037D	Wood	60"	3 3/4" 14 Gauge Scr/2"w	2/Joist/Panel	10" o.c. sides + ends	T&G+Joist	None	1170	389
T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 1/4" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3" x 31" x 144"	02-030070B	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G + Joist	None	1631	542
T-I Tile	2"x23 1/2"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
T-I Tile	2"x31 1/2"x95"	88-3113-1	Steel	96"	168 Ts/112 x Ts	32" o.c.	168 Ts	No	4 Sides	575	200
T-I RT/TG	2"x31 1/2"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
T-I Tile	2"x31 1/2"x95"	94-30037H	Steel	96"	000-5-14-2+S-25/2"w	2/Joist	10 1/2" o.c.	Joist	Long Edge	835	278
T-I Tile[5]	2"x31 1/2"x96"	02-030070A	Steel	96"	218 Ts/3 1/4" 14 Gauge/2"w	2/Joist/panel	12" o.c. sides + ends	Joist	Long Edge	1530	509
T-III Plank	3 1/2"x47"x144"	94-30037A	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1068	355
T-III Plank	3 1/2"x47"x120"	94-30037B	Wood	60"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1093	363
T-III Plank	5"x47"x144"	94-30037E	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	320
T-III Tile	3 1/2"x47 1/2"x96"	95-30060	Steel	96"	000-3-14-3 1/2"+14GA/1 1/2"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 1/2"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
T-E Plank/	5"x47"x96"		Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	8" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

NOTES: 1. Adhesive is to meet the requirements of AFG-01. A 3/8" bead of adhesive is to be used. Approximately 50 lin. ft. of adhesive per quart tube.
2. All panels were installed with staggered ends except Tectum I tile with 168 bulb tees and Tectum III tile on truss tees.
3. Specific adhesive used on test assemblies was Miracle Construction adhesive SFA-66.
4. Values over wood joists are conservative when supports are steel.
5. Visit our Web site to download technical bulletin T-77 for more information. Call for assistance when designing and detailing this Tectum roof deck system.

TECTUM I PLANK, TILE, CTD AND TECTUM IIIP

TECTUM PANEL SIZES

TECTUM I ROOF DECK PLANK AND LONG SPAN PLANK



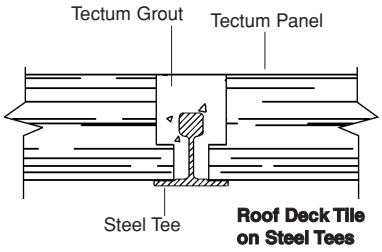
Tectum **Roof Plank** with a T&G edge is available in all Tectum roof deck systems.

Tectum **Long Span Plank**, available only in Tectum I panel, uses a 16 gauge galvanized steel channel for increased spans.

These products are typically used in low-slope applications.

Edge Detail	Thickness	Width x Length	Tectum Panels
T&G Sides w/ Square Ends	All	23" x 48 - 144"	I, III, E, NS

ROOF DECK TILE

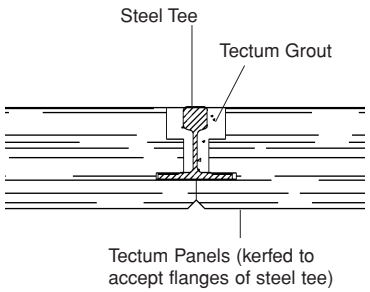


Tectum **Roof Deck Tile** uses any of the Tectum panels to span between steel bulb tees.

The rabbeted edges of Tectum tile rest on steel tee flanges. Spaces between tile and tees are filled with Tectum grout for excellent anchorage and wind uplift resistance. Custom lengths allow roof design with no exposed end joints.

Edge Detail	Thickness	Width x Length	Tectum Panels
Rabbeted Sides w/ Square Ends	All	23 ½" x 48 - 144"	I, III, E, NS
	All	31 ½" x 48 - 144"	I
	Over 2 ½"	47 ½" x 48 - 144"	I, III, E, NS
Rabbeted Sides w/ T&G Ends	All	23 ½" x 48 - 96"	I
	All	31 ½" x 48 - 96"	I
	Over 2 ½"	47 ½" x 48 - 96"	I, III, E, NS

TECTUM I – CTD

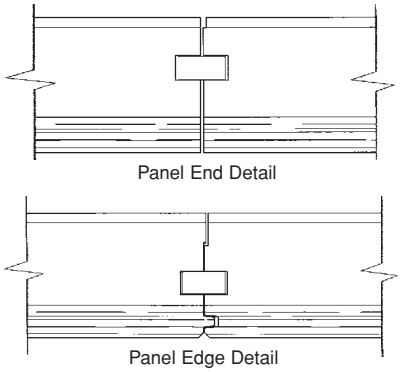


Tectum I – CTD (Concealed Tee Deck) system uses a 3" thick Tectum I panel kerfed to accept a maximum size #218 bulb tee. The flanges of the steel tee are concealed in the body of the Tectum panel.

The Tectum CTD system allows spans up to 10' without visible edge support.

Edge Detail	Thickness	Width x Length	Tectum Panels
Beveled Kerfed & Rabbeted	3"	31 ½" x 48 - 144"	I

TECTUM IIIP*



Tectum IIIP roof deck has an edge detail specifically designed for use over high-humidity applications such as swimming pools and ice arenas. This detail, when properly sealed with urethane adhesive, provides for a continuous vapor retarder from panel to panel in all directions.

* Contact Tectum Inc. when designing high-humidity environments such as pools and ice arenas.

Edge Detail	Thickness	Width x Length	Tectum Panels
T & G sides with spline	5" up to 10"	47" x 48 - 144"	IIIP

PRODUCT SELECTOR

	TECTUM I PLANK	TECTUM III/E/NS	TECTUM LS	ROOF DECK – LWIC	TECTUM I – CTD
SPANS					
Up to 48"	✔	✔	✔	✔	✔
Up to 72"		✔	✔	✔	✔
Up to 96"		✔			✔
Up to 120"	✔ (Bulb tee and tile)				✔
DIAPHRAM/SHEER					
Up to 312 dsn/lf	✔	✔	✔	✔	✔
Up to 389 dsn/lf	✔	✔	✔	✔	
Up to 450 dsn/lf	✔	✔		✔	
Up to 542 dsn/lf		✔		✔	
Up to 786 dsn/lf		✔			
ACOUSTICS (NRCs)					
Up to .60	✔	✔	✔	✔	
Up to .70	✔		✔	✔	
Up to .80	✔		✔	✔	✔
R-VALUE					
Up to 5.25	✔	✔	✔	✔	✔
Up to 44		✔			
NAILABLE SURFACE		✔		✔*	
SLOPED APPLICATION		✔			

* Special fasteners for roofing felt attachment

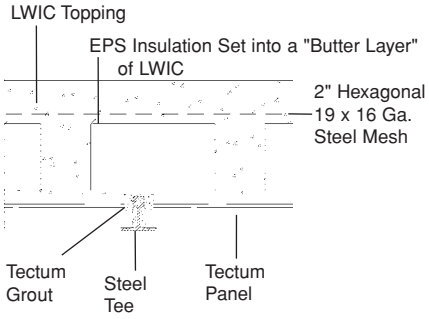
TECTUM ROOF DECK – LIGHTWEIGHT INSULATING CONCRETE

Tectum Roof Deck – LWIC System uses Tectum roof plank and tile to provide a unique and structural substrate for LWIC (Lightweight Insulating Concrete) topping. This system can be used over steel or wood structural systems.

The porous nature of Tectum decks allows the LWIC to dry from the underside of the LWIC slurry. The result is a structural, acoustical deck with permanent insulation. The deck can be re-roofed without costly replacement and disposal of the existing insulation.

This roof deck system has proven long lasting and economical for flat and low slope roof decks. It is an ideal solution in areas where higher allowable shear values are required.

Structure of Tectum Roof Deck with LWIC



▲ ***Installation of lightweight insulating concrete over a Tectum I roof deck.***

TECTUM ROOF DECK DESIGN DATA

ROOF DECK TILE SYSTEMS LOAD CHARACTERISTICS – psf

Tile Thickness	Wt. (psf)	Product	Spacing of Bulb Tees*** 24" Nom.	32" Nom.	48" Nom.	Span*
1 1/2"	2.4	I	50	–	–	**
2"	3.5	I	90	50	–	**
2 1/2"	4.5	I, NS	140	80	–	**
3"	5.3	I, NS	150	100	50	**
3 1/2"	4.4	III, E, NS	150	–	70	**
4"	4.6	III, E, NS	150	–	100	
5"	5.0 + up	III, E	150	–	120	

* Spans up to 12" as determined by size of bulb tee.

** Spans must be determined from subpurlin manufacturer's design catalog. The limiting design load is the smaller span capacity of the design loads for either the Tectum panel or the bulb tee. See bulb tee spacing at right.

*** Special tile widths available to fit existing bulb tee spacings.

SUBPURLINS SPACING [2]

Nom. Tile Width	Actual Tile Width[3]	Bulb Tee Spacing 112[4]	158[4]	168[4]	178[4]	218[4]	228[4]
24"	23 1/2"	24"	24"	24"	24"	24"	24 1/2"
32"	31 1/2"	31 3/4"	31 3/4"	31 3/4"	32"	32"	32 1/4"
48"[1]	47 1/2"	47 3/4"	47 3/4"	47 3/4"	48"	48"	48"

1. Available in 3" Tectum I only or Tectum II/E any thickness.
2. See manufacturers' literature for additional selection data on bulb tee.
3. See *** below, in Technical Support Data.
4. Special order schedule dependent upon accumulated orders.

TECHNICAL SUPPORT DATA

TOTAL SAFE UNIFORM LOAD – psf

Style Bulb Tees***	Weight	MOI* in	Height	SPAN** 5'0"	5'6"	6'0"	6'6"	7'0"	7'6"	8'0"	8'6"	9'0"	9'6"	10'0"	10'6"	11'0"	11'6"	12'0"
158[1]	1.68	0.0170	1 5/8"	92	76	64	54	47										
168[1]	1.87	0.291	2"		109	91	78	67	58	51								
178[1]	2.15	0.353	2"			119	101	87	76	66	59	52						
218	3.19	0.598	2 1/8"					119	103	91	80	72	64	58	52	48		
228[1]	3.87	0.868	2 5/16"							129	114	102	91	82	74	68	64	57

* Moment of Inertia based on tees acting alone.

** Spans are based on three-span condition, 32" nominal spacing. For 24" nominal spacing, multiply total safe uniform load by a factor of 1.32, for 48" nominal multiply by .67. For two-span condition, multiply total safe uniform load by .88, for single-span condition multiply by .64.

*** Only 218 Bulb tees are distributed by Western Fireproofing of Kansas, Kansas City, MO, 800-659-6577. Call for complete information. The designer/specifier is urged to check theoretical deflection of any section, under the loads, and support conditions which are expected to be encountered.

1 Historical information. Not available for new construction.

◀ *Tectum III project installation.*

TECTUM ROOF DECK DESIGN GUIDELINES

SOUND AND NOISE CONTROL–TECTUM I, E, III

The unique open texture of the Tectum roof deck system provides an effective acoustical treatment demonstrated by tests in accordance with ASTM Test Method C423. The use of a Tectum roof deck may eliminate the necessity of using other acoustical treatments such as lay-in tile ceilings or acoustical baffles. Tectum roof deck compares favorably with products designed exclusively for sound absorption.

EXPANSION

Tectum roof deck, when tested from 70°F (21°C)–50% RH to 90°F (32°C)–90% RH has maximum linear expansion of 0.2 of 1%.

Tectum plank does not require expansion or control joints to compensate for temperature-induced movement. However, when designing and locating control joints, engineers should consider the linear expansion of Tectum plank due to changes in relative humidity, as well as the recommendations of manufacturers of adjoining materials which may have potential for expansion/ contraction due to temperature changes.

VENTILATION REQUIREMENTS

The ventilation recommendations of the current edition of the ASHRAE Handbook of Fundamentals and Guide and Data Book should be followed. In particular, adequate ventilation should be provided to remove construction moisture. Where Tectum roof deck is concealed by a suspended ceiling, venting must be provided. Ventilation may be mechanically induced by drawing some return air through the ceiling openings and across the plenum area into the return air duct or by providing a sufficient number of ceiling grilles to promote uniform gravity air movement through the plenum area.

SOUND ABSORPTION

		SOUND ABSORPTION COEFFICIENTS (HZ)						
THICKNESS	MTG.	125	250	500	1000	2000	4000	NRC
1 ½"	A	.07	.22	.48	.82	.64	.96	.55
2"	A	.15	.26	.62	.94	.64	.92	.60
2 ½"	A	.20	.31	.72	.84	.77	.90	.65
3"	A	.21	.41	1.00	.75	1.00	.97	.80
3 ½" (1 ½" + 1 ½") Tectum III	A	.16	.23	.49	.78	.88	.88	.60
2" Tectum 2" EPS	A	.19	.34	.71	1.00	.83	.93	.70
2 ½" Tectum 2" EPS	A	.28	.38	.82	.91	.90	.92	.75
3" Tectum 2" EPS	A	.22	.48	1.02	.79	.99	.97	.80

R VALUES OF FIELD-APPLIED INSULATION TO TECTUM I

REQUIRED TO PREVENT CONDENSATION WITHIN THE TECTUM I DECK (2", 2 ½" or 3")

JANUARY OUTSIDE MEAN TEMPERATURE		INSIDE RELATIVE HUMIDITY AT 70°F					
°F	°C	10%	20%	30%	40%	50%	60%
-20	-29	R-2	R-5	R-8	R-12	R-18	R-26
-10	-23	R-1	R-4	R-7	R-10	R-15	R-22
0	-18	_	R-3	R-5	R-8	R-12	R-19
+10	-12	–	R-2	R-4	R-6	R-10	R-16
+20	-7	–	–	R-2	R-4	R-7	R-12
+30	-1	–	–	–	R-2	R-5	R-9
+40	+4	–	–	–	–	R-2	R-5

UPLIFT RESISTANCE OF TECTUM SCREW ASSEMBLIES

USED WITH TECTUM I, E, NS, III PLANK

SPAN	PLANK WIDTH	FASTENERS PER FRAME INTERSECT	UPLIFT RESISTANCE** (psf)	PRODUCTS
36"	31"	2	150	I, LS
36"	47"	2	100	I, LS, NS, E, III
36"	47"	3	150	I, LS, NS, E, III
42"	31"	2	133	I, LS
42"	47"	2	89	I, LS, NS, E, III
42"	47"	3	133	I, LS, NS, E, III
48"	31"	2	117	I, LS
48"	47"	2	77	I, LS, NS, E, III
48"	47"	3	116	I, LS, NS, E, III
60"	31"	2	92	LS
60"	31"	3	138	LS
60"	47"	2	60	NS, E, III
60"	47"	3	90	NS, E, III
72"	31"	2	77	LS
72"	31"	3	116	LS
72"	47"	2	50	NS, E, III
72"	47"	3	75	NS, E, III
72"	47"	4	100	NS, E, III
96"*	47"	2	50	E, III
96"*	47"	3	75	E, III
96"*	47"	4	100	E, III

* Single Span
** A safety factor of 2 has been used to determine uplift resistance. Screws to be a minimum of 1" longer than panel thickness.

TECTUM ROOF DECK PANELS AT WORK

Tectum Roof Deck Systems are delivering attractive noise- and abuse-resistance in thousands of installations every day. Chosen for superior performance, Tectum delivers the best in commercial design, longevity and acoustical function to schools and civic applications throughout the country.

The Eye Surgical Association, Lincoln, Nebraska. ▶

Lake Chautauqua High School, Chautauqua, New York. ▲

LIMITED WARRANTY

We at Tectum Inc. believe the information and recommendations herein to be accurate and reliable and the products mentioned herein are fit for the recommended purposes. However, as use conditions are not within its control, Tectum Inc. does not guarantee results from use of such products or other information herein.

Tectum Inc. assumes full responsibility for its products and systems when installed and erected by an approved contractor in accordance with the published recommendations at the time of the purchase. No responsibility will be assumed for other applications not referred to in the literature. Liability is limited to a refund of the purchase price or replacement of the material.

As governmental regulations and use conditions may change, it is the buyer's responsibility to determine the appropriateness of the seller's products for the buyer's specific end uses.

Call the Tectum technical department when designing for high-humidity environments. ▶

MANUFACTURER

TECTUM INC.
For over a half century, the commercial and institutional construction industry has depended on Tectum Inc.'s unique, cost-effective solutions to meet their acoustical challenges. Easy to work with and install, Tectum acoustical roof deck treatments are not only sound absorbing, they are tough enough to stand up to architectural structural demands.

Painted or unpainted, they provide an attractive acoustical finish for the interior. Manufactured at the Tectum Inc. plant in Newark, Ohio, Tectum performance products have stood the test of time. Today, Tectum panels are combined with other construction materials to form composite panel deck systems. These systems provide superior roof deck solutions that are fully compatible with most other roofing products.

Tectum E installed over steel. ▲

TECTUM ROOF DECK INSTALLATION GUIDELINES

INSTALLATION INSTRUCTIONS
Tectum panels may be installed over steel, wood and concrete framing and are applicable to flat or pitched roof construction. Maximum joist spacings are shown in the load tables on page 4. Tectum panels should have sufficient length to span multiple purlin spacings whenever possible. They must be laid with staggered ends and must be mechanically attached to all framing members of substrate per recommendations. Support is required at all transitions. Tectum panels can easily be cut, to fit irregular spaces, with tools used to cut wood.

Tectum tile is available with rabbeted edges and square ends. Maximum spans are determined by the size and spacing of the bulb tee.
If the ends of Tectum tile do not fall on the structural member, a lightweight cross tee or T&G ends must be used to conceal the end joints. Spaces between the tile and tees are filled with Tectum grout at least to the top of the tee. The remaining void should be filled with a foam filler strip.

ROOFING OVER TECTUM I, III, E AND NS
Tectum I panels are designed to accept all field-applied insulations and roofing membranes.

Tectum III and Tectum E panels are ideal roof deck bases for shingle, standing seam, slate or tile roofs. Slate and tile roofs may require a field-applied second layer of OSB or plywood. Tectum III and Tectum E can be used for single-ply or built-up systems.

Use of solvent-based adhesives for attachment of roofing to Tectum III, E and NS deck is not permitted.

Representatives of roofing systems manufacturers should be consulted for recommendations on the specification and system best suited to the deck and conditions pertinent to each roof. ***Attaching shingles to Tectum I is not recommended.***

VAPOR RETARDER
Styrofoam brand insulation used in the Tectum III panel qualifies as a vapor retarder under the ASHRAE Handbook definition, with Perm ratings of 1.0 or less.

ATTACHING INSULATION TO TECTUM ROOF DECK
For more information about attaching additional insulation to a Tectum roof deck, contact Tectum Inc. to request Bulletin T-38 or visit our website at www.tectum.com.

ATTACHING ROOFING FELT TO TECTUM I ROOF DECK
Tube-Lok roofing nails are available from Simplex Nails, Inc., Americus, GA, 1" up to 6 1/2". E.S. Roofing nails are available from E.S. Products Inc., Bristol, RI.

FASTENING TECTUM PLANK TO WOOD JOIST
14-gauge screw with 2" diameter washers for Tectum I panels and 5/8" diameter head 14-gauge screws for Tectum III, E and NS. A minimum 1 1/2"-penetration is required.

FASTENING TECTUM PLANK TO STEEL JOIST
To attach a Tectum I roof deck, use 14-gauge or Tectum S-25 screws with 2" washers. The washers and screws are available from Tectum Inc. Screws should be located approximately 6" from edges and 1" from ends. When using 14-gauge screws, pre-drill with a 7/32" drill bit.

For Tectum composite panels, use TruFast HD self-drilling screws with a 5/8" diameter head, or 14-gauge screws with 1 1/2" diameter washers. When using 14-gauge screws, pre-drill with a 7/32" drill bit.

CODE COMPLIANCE AND CERTIFICATIONS

CODE COMPLIANCE/STANDARDS

- **International Code Council Evaluation Service**
  ICC-ES Report ESR-1112
- **New York City Board of Standards & Appeals**
  Calendar No. L391-52-SM.
- **FM Approved CLASS I Roof Deck. (Tectum I decks)**
- **Underwriters' Laboratories – Canada**

UNDERWRITERS LABORATORIES, CLASS 90 WIND UPLIFT RESISTANCE. Tectum I, III and E plank have been tested in roof assemblies in accordance with standard UL 580, resulting in UL Class 90 uplift resistance.

Design No. NM504–Tectum I Tile–Nominal 2" on bulb tees, not to exceed 7'1".

Design No. NM511–Tectum Tile–Nominal 2" to 3". T&G on bulb tees, spans not to exceed 8'.

Design No. NM512–Tectum Tile–with filler strips on bulb tees, spans not to exceed 7'6".

Design NM517–Tectum III T&G plank on bar joist 48" o.c.

Design 474 & 475 Tectum E/III plank on steel 84".

Design 451 Tectum E/III plank/tile on steel 96".

Underwriters' Laboratories – Canada

RATED ASSEMBLIES FIRE ENDURANCE TEST ASTM E 119-HOURLY RATED SYSTEMS

Tested in roof/ceiling assemblies. Tectum products are used in achieving the following:

2-HR U.L. Design No. P402–Tectum plank 2" (50.8mm) thick on steel joists with metal lath and perlite plaster ceiling.

2-HR U.L. Design No. P403–Tectum plank 3" (76.2mm) thick on steel joists with metal lath and perlite plaster ceiling.

1 or 1 1/2 HR U.L. Design P253–Tectum Plank 2 1/2" and 3" thick with listed acoustical ceiling.

1 HR U.L. Design P675–Tectum Formboard 2" thick with gypsum concrete and truss tee subpurlins.

1 HR U.L. Design P678–Tectum Formboard 2" thick with vermiculite or perlite concrete on bulb or truss tee subpurlins.

THERMAL BARRIER

Tectum panels 1 1/2" or thicker are a thermal barrier for foam plastic insulation.

SURFACE BURNING CHARACTERISTICS

3" Tectum Roof Deck*

Flame Spread Index	5
Flame Spread Index (30 min)	5
Smoke Developed Value	5

8" Tectum III Panels**

Flame Spread Index	5
Smoke Developed Value	10

The flame spread did not progress more than 10 1/2 ft. during the 30-minute test.

* United States Testing Co. Inc. No. 090168
** Underwriters' Laboratories of Canada

LIGHT REFLECTION

Typical Range:
Natural–60%.
Field painted white–70%.

PAINTING

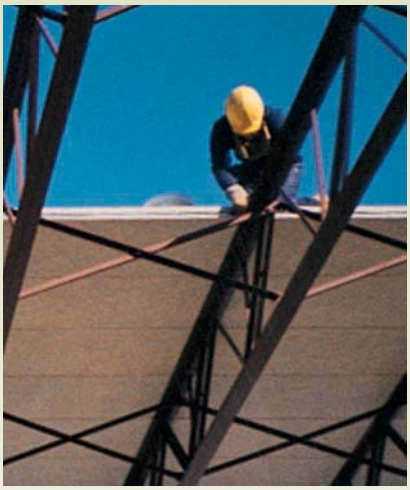
Tectum panels can be field painted up to six times. For details, see Marketing Bulletin M-77, available at www.tectum.com.

GENERAL INFORMATION

Specifications subject to change without notice. Tectum Inc. assumes no responsibility for typographical errors. The tables contained herein are provided for your convenience. Design information should be verified.

OTHER CATALOGS IN SWEET'S CATALOG FILE:

Tectum Acoustical Ceilings, Walls, and Special Applications
Sweet's Section:
098400/TED
Buyline 7499



TECTUM INC

P.O. Box 3002
Newark, OH 43058-3002
Phone: 888-977-9691
Fax: 800-832-8869
Email: info@tectum.com

More information about available Tectum products and specifications available online at **www.tectum.com**.

TECTUM PRODUCTS AND LEED

The Leadership in Energy and Environmental Design (LEED*) Green Building Rating System represents the U.S. Green Building Council's effort to provide a national standard for what constitutes a "green building." Through its use as a design guideline and third-party certification tool, LEED aims to improve occupant well-being, environmental performance and economic returns of buildings using established and innovative practices, standards and technologies.

Tectum Inc. fully endorses the LEED Green Building Rating System. A number of our representatives are LEED-Accredited Professionals and members of local USGBC Chapters.

Tectum panels are made from sustainable domestic, renewable raw materials. The wood is harvested from new forest growth that reaches maturity in 15 – 20 years. Tectum Inc. only purchases excelsior from companies that are part of the Sustainable Forestry Initiative (SFI).

Our products may contribute to the following LEED credit areas:

EA Prerequisite 2: Fundamental Energy Performance
EA Credit 1: Optimized Energy Performance
MR Credits 2.1 and 2.2: Construction Site Waste Management
MR Credits 4.1 and 4.2: Recycled Content
MR Credit 7: Certified Wood
EQ Prerequisite 3: Minimum Acoustical Performance
EQ Credit 3.1 and 3.2: Construction IAQ Plans
EQ Credit 4.1: Low-Emitting Materials, Adhesives and Sealants
EQ Credit 4.4: Low-Emitting Materials, Composite Wood & Agrifiber Products
EQ 10: Mold Prevention (LEED for Schools)
EQ Credit 11: Low-Impact Cleaning and Maintenance Equipment Policy (LEED for Schools)
ID 1 - 1.4: Innovation in Design

Tectum products are listed in the GreenSpec Directory** published by Building Green from the editors of *Environmental Building News*. Tectum Roof Deck is noted on page 69, section 3511, and Tectum Interior Products are listed on page 230, section 9512.

For complete information about Tectum products and LEED, please see our Marketing Bulletins M-81 (Tectum Products and LEED Certification) and M-83 (Tectum Products and LEED Q & A) or our Environmental Statement. All of these materials are available online at www.tectum.com.

*Trademark of The U.S Green Building Council
**Trademark of Building Green, Inc.

TECTUM INC
The Noise Control Solution

A UNIQUE ACOUSTICAL PRODUCT

September 2006

Acoustical Products Used in Schools, Churches, and Recreation Centers

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Tectum panels are made from renewable and sustainable raw materials.

TECTUM ACOUSTICAL PRODUCTS

For over half a century, the commercial and institutional design and construction industry has depended on Tectum's unique, cost-effective solutions to meet their acoustical challenges. Easy to work with and install, Tectum acoustical wall and ceiling treatments are not only sound absorbing, they are tough enough to stand up to abuse. Painted or left natural, they provide an attractive, durable finish in any interior application. Manufactured at the Tectum Inc. plant in Newark, Ohio, Tectum performance products stand the test of time. Today, Tectum Inc. has new products using the standard Tectum panel in conjunction with other materials. Now, the architect, acoustical engineer, designer or building owner has a variety of acoustical products to choose from to create a different look or add character to any project.

Tectum acoustical panels are composed of aspen wood fibers, bonded with an exclusive inorganic hydraulic cement binder, and formed in a continuous process under heat and pressure. Physical characteristics usually obtained only with a combination of several separate building materials are found in Tectum products: insulation, excellent sound absorption, abuse resistance, a decorative textured interior finish...all in a structurally strong yet lightweight product that carries a Class A/I flame spread rating.

THERE IS NO ASBESTOS, NOR HAS THERE EVER BEEN ANY ASBESTOS, USED IN TECTUM PRODUCTS.

Tectum is a registered trademark of Tectum Inc.

Chautauqua Lake Schools
Chautauqua, NY
Tectum V-Line Wall & Ceiling Panels

Newark YMCA
Newark, OH
Tectum E Roof Deck

www.tectum.com e-mail: info@tectum.com Phone: 888-977-9691 Fax: 800-832-8869

TECTUM INC
The Noise Control Solution

TECTUM PRODUCTS IN SCHOOLS & UNIVERSITIES

Palm Valley School
Rancho Mirage, CA
Tectum III Roof Deck Panels

Carlisle County High School
Bardwell, KY
Tectum V-Line Ceiling Panels

Cedarville University
Cedarville, OH
Tectum Acoustical Wall Panels

Tampa Preparatory School
Tampa, FL
Tectum Acoustical Ceiling & Wall Panels

TECTUM PRODUCTS IN CHURCHES & WORSHIP FACILITIES

St. Michael the Archangel
Overland Park, KS
Tectum E Roof Deck

Mother of God Monastery
Watertown, SD
Tectum Wall Panels

St. Margaret's Episcopal Church
Lawrence, KS
Tectum Clouds

www.tectum.com e-mail: info@tectum.com Phone: 888-977-9691 Fax: 800-832-8869

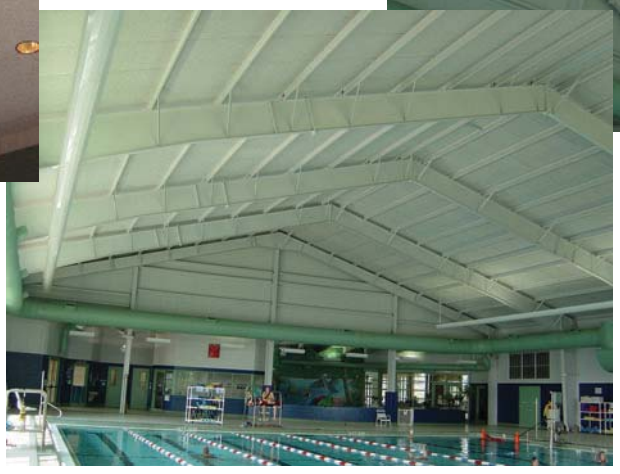
TECTUM PRODUCTS IN ARENAS & SPECIALTY APPLICATIONS

Ohio University
Convocation Center
Athens, OH
Tectum Structural Roof Deck
Tectum Wall Panels

Harlem Ballet Studio
Harlem, NY
Tectum Wall Panels

Thornberry Country Club
Oneida, WI
Tectum Ceiling Panels

Lorain County Metro Park
LaGrange, OH
Tectum Structural Roof Deck



09/06 Pub. #T122

www.tectum.com e-mail: info@tectum.com Phone: 888-977-9691 Fax: 800-832-8869

TECTUM PRODUCTS IN ARENAS & SPECIALTY APPLICATIONS

Chautauqua Lake Schools
Chautauqua, NY
Tectum Fabri-Tough Wall Panels

East Lawrence Activity Center
Lawrence, KS
Tectum I Roof Deck

Lawrence Indoor Aquatic Center
Lawrence, KS
Painted Tectum Wall Panels

TECTUM INC.
The Noise Control Solution

A UNIQUE ACOUSTICAL PRODUCT

Acoustical Products for Schools & Universities

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Tectum panels are made from renewable and sustainable raw materials.

TECTUM INC
The Noise Control Solution

ACOUSTICAL • CEILINGS • WALLS • SPECIAL APPLICATIONS

For over half a century, the commercial and institutional design and construction industry has depended on Tectum's unique, cost-effective solutions to meet their acoustical challenges. Easy to work with and install, Tectum acoustical wall and ceiling treatments are not only sound absorbing, they are tough enough to stand up to abuse. Painted or left natural, they provide an attractive, durable finish in any interior application. Manufactured at the Tectum Inc. plant in Newark, Ohio, Tectum performance products have stood the test of time.

Today, Tectum Inc. has new products using the standard Tectum panel in conjunction with other materials. Now, the architect, acoustical engineer, designer or building owner has a variety of acoustical products to choose from to create a different look or add character to any project.

Tectum acoustical panels are composed of aspen wood fibers, bonded with an exclusive inorganic hydraulic cement binder, and are formed in a continuous process under heat and pressure. Physical characteristics usually obtained only with a combination of several separate building materials are found in Tectum products: insulation, excellent sound absorption, abuse resistance, a decorative textured interior finish...all in a structurally strong yet lightweight product that carries a Class A/I flame spread rating.

Note: Thickness dimensions throughout this brochure are nominal.

THERE IS NO ASBESTOS, NOR HAS THERE EVER BEEN ANY ASBESTOS, USED IN TECTUM PRODUCTS.

Tectum is a registered trademark of Tectum Inc.

ACOUSTICAL CEILINGS FOR CHURCHES & WORSHIP FACILITIES

Tectum Ceiling panels combine a unique textured beauty with superior abuse resistance and high acoustical performance. These wood fiber panels combine several functions that truly set them apart for use in the education market.

The panels are available in a wide range of sizes. They can be cut easily and shaped with standard woodworking tools, and installed in standard grid systems.

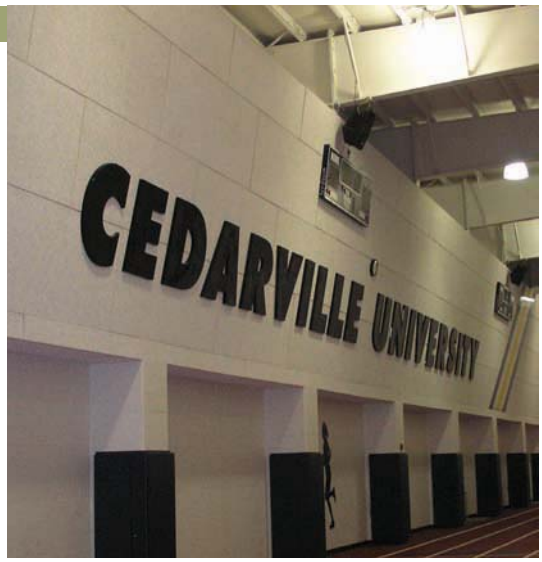
Tectum ceiling panels are available in natural color, painted white or custom colors. They can be painted up to six times without losing their acoustical properties.

Tectum decorative and acoustical panels can take repeated abuse and still retain their appearance. Tectum ceiling panels have remained the product of choice for over 50 years for any school or university where noise is a problem.

Tectum ceiling panels meet the requirements of ASTM E-1264 Type XIV pattern L; Class A.

FEATURES

- Reduces noise – NRC up to 1.00
- Class A/Class I interior finish
- Durability – tough, abuse resistant
- Lifetime warranty against breakage
- Flexible – easy to use
- Economical – longer life span
- Can be field painted six times.
- Nationwide distribution – local stocks
- Proven performance – over 50 years
- Also available in metric sizes
- R-Value is 1.75/inch
- Light reflectance up to .75



TECTUM CEILING TILE ACOUSTICAL PERFORMANCE

SOUND ABSORPTION COEFFICIENTS

Panel Type	125	250	500	1000	2000	4000	NRC	Mounting
1" x 24" x 24" Lay-in	.40	.43	.35	.48	.60	.93	.45	E-400
1 1/2" x 24" x 24" Lay-in	.44	.43	.33	.49	.66	.77	.50	E-400
2" x 24" x 24" Lay-in	.48	.46	.36	.55	.74	.79	.55	E-400
1" x 24" x 24" Lay-in panel with 6 1/4" Fiberglass Backing	1.01	.89	1.06	.97	.93	1.13	.95	E-400

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ACOUSTICAL WALL PANELS

Tectum Interior Wall Panels offer an effective, permanent and attractive solution for any undesirable noise in any school gymnasium, auditorium or music room. They are abuse resistant yet lightweight and easily installed in an existing building for effective sound control. Furring strips installed horizontally (when using vertical panels) are recommended and should be a maximum of 24" o.c. when using 1" thick panels.

SIZES

Tectum wall panels are available 1", 1 1/2" and 2" thick in widths of 23 3/4", 31 3/4" and 47 3/4" with long edges beveled. 1 1/2" and 2" panels are also available with T&G edges in widths of 23", 31" and 47" for interlocking continuous paneling. 4' to 12' lengths are available.

FINALÉ WALL PANELS

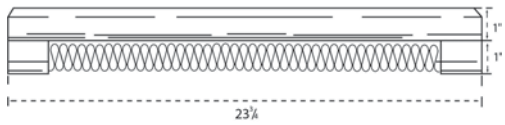
Tectum Finalé panels make installation as easy as 1-2-3. Whenever your school calls for absorption of undesirable noises, Tectum Finalé is the answer. With a high NRC of .75 to 1.00.

Tectum Finalé is your one-step answer to abuse-resistant acoustics. The Finalé system consists of Tectum wall panels, Tectum furring strips on all four sides and SoniCor core united in a single product.

SIZES

Tectum Finalé wall panels are available in various thicknesses. Widths of 23 3/4", 31 3/4" and 47 3/4" with beveled edges. Up to 12' lengths are available in 1' increments.

Product Detail



Finalé

FABRI-TOUGH WALL PANELS

Control noise efficiently, economically and attractively in any classroom with the Fabri-Tough wall panel system.

Efficiently because Tectum panels are known for sound absorption. Economically because these panels are competitively priced and will last longer than ordinary, solf-base panels. Attractively because they come in your choice of fabric colors that coordinate with popular contract furnishings.

Depending on mounting, the Fabri-Tough wall panel system can provide NRC's from .50 to .90.

SIZES

They are available 1" thick, 2'x4' up to 10'. Fabri-Tough wall panels can be field cut to desired size. They have a flame spread of 25 or less under the ASTM E84 test method. For panels to be used in recessed areas, some field adjusting may be necessary.

FINALÉ FABRI-TOUGH WALL PANELS

Abuse-resistant Tectum Finalé Fabri-Tough panels have a greater noise absorption than their sister panel, Fabri-Tough. Finalé Fabri-Tough panels combine 1" Tectum panels along with 1" Tectum furring with the cavity filled with a SoniCor core. The face of the panel is then wrapped with a durable fabric, making the panel one of the highest NRC abuse-resistant panels available.

SIZES

Tectum Finalé Fabri-Tough wall panels are available in a variety of fabric colors. They are 24" wide with lengths of 4', 5', 6', 7', 8', 9' and 10'. The overall thickness of the panels is 2".

Choose from a variety of different fabric colors to match any school or university's colors or décor.

TECTUM I STRUCTURAL ROOF DECK

Tectum I is typically used in low slope applications, perfect for theater construction. It is compatible with virtually all roof installation materials. Underside exposed joists have attractive beveled edges. LS (long span) panels available with 16 gauge galvanized steel channel for increased spans (*See Roof Deck Systems Sweets catalog 03500/TEC for more about Tectum Roof Deck Systems).*

The unique open texture of the Tectum roof deck system provides an effective acoustical treatment demonstrated by tests in accordance with ASTM Test Method C423. The use of a Tectum roof deck may eliminate the necessity of using other acoustical treatments such as lay-in tile ceilings or acoustical baffles. Tectum roof deck compares favorably with products designed exclusively for sound absorption.

Tectum III & E STRUCTURAL ROOF DECK

Tectum III Roof Deck panel is a composite of a 1 1/2" or thicker Tectum substrate, Dow Styrofoam brand XPS (extruded polystyrene) insulation 1 1/2" to 8" thick and 7/16" OSB sheathing with slip-resistant surface.

Tectum III panels are typically used in sloped applications where insulation and a nailable surface are required.

Tectum E Roof Deck panel is a composite of a 1 1/2" or thicker Tectum substrate, EPS (expanded polystyrene) insulation 1/2" to 8" thick and 1/16" OSB sheathing with slip-resistant surface. Components are bonded with code-listed structural adhesives.

The EPS core exceeds the requirements of ASTM C-578 Type I and bears the UL classification mark.

ACOUSTICAL WALL PANEL TECHNICAL INFORMATION

TECTUM WALL PANEL ACOUSTICAL PERFORMANCE

	SOUND ABSORPTION COEFFICIENTS							
Panel Type	125	250	500	1000	2000	4000	NRC	MOUNTING
1"	.06	.13	.24	.45	.82	.64	.40	A
1"	.07	.15	.36	.65	.71	.81	.45	D-20
1"	.16	.43	1.00	1.05	.79	.98	.80	C-20
1"	.32	.70	1.09	.93	.76	.94	.85	C-40
1 1/2"	.07	.22	.48	.82	.64	.96	.55	A
1 1/2"	.15	.26	.62	.83	.70	.91	.60	D-20
1 1/2"	.24	.57	1.17	.87	.93	.87	.90	C-20
1 1/2"	.40	.84	1.18	.84	.94	.88	.95	C-40
2"	.15	.26	.62	.94	.62	.92	.60	A
2"	.15	.36	.74	.82	.82	.92	.70	D-20
2"	.24	.67	1.14	.87	1.06	.96	.95	C-20
2"	.42	.89	1.19	.85	1.08	.94	1.00	C-40

TECTUM FINALÉ ACOUSTICAL PERFORMANCE

1"	.05	.16	.30	.57	.94	.70	.50	A
1"	.13	.19	.45	.86	.80	.84	.60	D-20
1"	.30	.77	1.11	.98	.79	.95	.90	C-40
1" + 1" Furring & SoniCor	.15	.39	.85	.98	.78	.93	.75	A
1 1/2" + 1" Furring & SoniCor	.18	.56	1.07	.92	.86	.89	.85	A

TECTUM FINALÉ FABRI-TOUGH ACOUSTICAL PERFORMANCE

1"	.33	.59	.90	.98	.85	.93	.85	A

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TECTUM INC.
The Noise Control Solution

A UNIQUE ACOUSTICAL PRODUCT

Acoustical Products for Churches & Worship Facilities

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Tectum panels are made from renewable and sustainable raw materials.

ACOUSTICAL • CEILINGS • WALLS • SPECIAL APPLICATIONS

For over half a century, the commercial and institutional design and construction industry has depended on Tectum's unique, cost-effective solutions to meet their acoustical challenges. Easy to work with and install, Tectum acoustical wall and ceiling treatments are not only sound absorbing, they are tough enough to stand up to abuse. Painted or left natural, they provide an attractive, durable finish in any interior application. Manufactured at the Tectum Inc. plant in Newark, Ohio, Tectum performance products have stood the test of time.

Today, Tectum Inc. has new products using the standard Tectum panel in conjunction with other materials. Now, the architect, acoustical engineer, designer or building owner has a variety of acoustical products to choose from to create a different look or add character to any project.

Tectum acoustical panels are composed of aspen wood fibers, bonded with an exclusive inorganic hydraulic cement binder, and are formed in a continuous process under heat and pressure. Physical characteristics usually obtained only with a combination of several separate building materials are found in Tectum products: insulation, excellent sound absorption, abuse resistance, a decorative textured interior finish...all in a structurally strong yet lightweight product that carries a Class A/I flame spread rating.

Note: Thickness dimensions throughout this brochure are nominal.

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ACOUSTICAL CEILINGS FOR CHURCHES & WORSHIP FACILITIES

Tectum Ceiling panels combine a unique textured beauty with superior abuse resistance and high acoustical performance. These wood fiber panels combine several functions that truly set them apart for use in the church market.

The panels are available in a wide range of sizes. They can be cut easily and shaped with standard woodworking tools, and installed in standard grid systems.

Tectum ceiling panels are available in natural color, painted white or custom colors. They can be painted up to six times without losing their acoustical properties.

Tectum decorative and acoustical panels can take repeated abuse and still retain their appearance. Tectum ceiling panels have remained the product of choice for over 50 years for any church, multi-purpose room or worship center where noise is a problem.

Tectum ceiling panels meet the requirements of ASTM E-1264 Type XIV pattern L; Class A.

FEATURES

- Reduces noise – NRC up to 1.00
- Class A/Class I interior finish
- Durability – tough, abuse resistant
- Lifetime warranty against breakage
- Flexible – easy to use
- Economical – longer life span
- Can be field painted six times.
- Nationwide distribution – local stocks
- Proven performance – over 50 years
- Also available in metric sizes
- R-Value is 1.75/inch
- Light reflectance up to .75

TECTUM CEILING TILE ACOUSTICAL PERFORMANCE

SOUND ABSORPTION COEFFICIENTS

Panel Type	125	250	500	1000	2000	4000	NRC	Mounting
1" x 24" x 24" Lay-in	.40	.43	.35	.48	.60	.93	.45	E-400
1 1/2" x 24" x 24" Lay-in	.44	.43	.33	.49	.66	.77	.50	E-400
2" x 24" x 24" Lay-in	.48	.46	.36	.55	.74	.79	.55	E-400
1" x 24" x 24" Lay-in panel with 6 1/4" Fiberglass Backing	1.01	.89	1.06	.97	.93	1.13	.95	E-400

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ACOUSTICAL WALL PANELS

Tectum Interior Wall Panels offer an effective, permanent and attractive solution for any undesirable noise in a place of worship. They are abuse resistant yet lightweight and easily installed in an existing building for effective sound control. Furring strips installed horizontally (when using vertical panels) are recommended and should be a maximum of 24" o.c. when using 1" thick panels.

SIZES

Tectum wall panels are available 1", 1 1/2" and 2" thick in widths of 23 3/4", 31 3/4" and 47 3/4" with long edges beveled. 1 1/2" and 2" panels are also available with T&G edges in widths of 23", 31" and 47" for interlocking continuous paneling. 4' to 12' lengths are available.

FINALÉ WALL PANELS

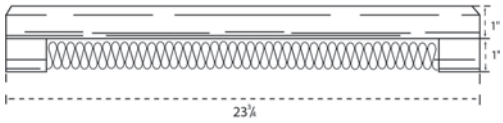
Tectum Finalé panels make installation as easy as 1-2-3. Whenever your place of worship calls for absorption of undesirable noises, Tectum Finalé is the answer. With a high NRC (noise reduction coefficient) of .75 to 1.00.

Tectum Finalé is your one-step answer to abuse-resistant acoustics. The Finalé system consists of Tectum wall panels, Tectum furring strips and SoniCor core united in a single product.

SIZES

Tectum Finalé wall panels are available in various thicknesses. Widths of 23 3/4", 31 3/4" and 47 3/4" with beveled edges. Up to 12' lengths are available in 1' increments.

Product Detail



FABRI-TOUGH WALL PANELS

Control noise efficiently, economically and attractively in church or multi-purpose rooms with the Fabri-Tough wall panel system.

Efficiently because Tectum panels are known for sound absorption. Economically because these panels are competitively priced and will last longer than ordinary, soft-base panels. Attractively because they come in your choice of fabric colors that coordinate with popular contract furnishings.

Depending on mounting, the Fabri-Tough wall panel system can provide NRC's from .50 to .90.

SIZES

They are available 1" thick, 2'x4' up to 10'. Fabri-Tough wall panels can be field cut to desired size. They have a flame spread of 25 or less under the ASTM E84 test method. For panels to be used in recessed areas, some field adjusting may be necessary.

FINALÉ FABRI-TOUGH WALL PANELS

Abuse-resistant Tectum Finalé Fabri-Tough panels have a greater noise absorption than their sister panel, Fabri-Tough. Finalé Fabri-Tough panels combine 1" Tectum panels along with 1" Tectum furring with the cavity filled with a SoniCor core. The face of the panel is then wrapped with a durable fabric, making the panel one of the highest NRC abuse-resistant panels available.

SIZES

Tectum Finalé Fabri-Tough wall panels are available in a variety of fabric colors. They are 24" wide with lengths of 4', 5', 6', 7', 8', 9' and 10'. The overall thickness of the panels is 2".

Choose from a variety of different fabric colors to match any worship center's décor.

TECTUM I STRUCTURAL ROOF DECK

Tectum I is typically used in low slope applications, perfect for theater construction. It is compatible with virtually all roof installation materials. Underside exposed joists have attractive beveled edges. LS (long span) panels available with 16 gauge galvanized steel channel for increased spans (*See Roof Deck Systems Sweets catalog 03500/TEC for more about Tectum Roof Deck Systems).*

The unique open texture of the Tectum roof deck system provides an effective acoustical treatment demonstrated by tests in accordance with ASTM Test Method C423. The use of a Tectum roof deck may eliminate the necessity of using other acoustical treatments such as lay-in tile ceilings or acoustical baffles. Tectum roof deck compares favorably with products designed exclusively for sound absorption.

Tectum III & E STRUCTURAL ROOF DECK

Tectum III Roof Deck panel is a composite of a 1 1/2" or thicker Tectum substrate, Dow Styrofoam brand XPS (extruded polystyrene) insulation 1 1/2" to 8" thick and 7/16" OSB sheathing with slip-resistant surface.

Tectum III panels are typically used in sloped applications where insulation and a nailable surface are required.

Tectum E Roof Deck panel is a composite of a 1 1/2" or thicker Tectum substrate, EPS (expanded polystyrene) insulation 1/2" to 8" thick and 7/16" OSB sheathing with slip-resistant surface. Components are bonded with code-listed structural adhesives.

The EPS core exceeds the requirements of ASTM C-578 Type I and bears the UL classification mark.

ACOUSTICAL WALL PANEL TECHNICAL INFORMATION

TECTUM WALL PANEL ACOUSTICAL PERFORMANCE

	SOUND ABSORPTION COEFFICIENTS							
Panel Type	125	250	500	1000	2000	4000	NRC	MOUNTING
1"	.06	.13	.24	.45	.82	.64	.40	A
1"	.07	.15	.36	.65	.71	.81	.45	D-20
1"	.16	.43	1.00	1.05	.79	.98	.80	C-20
1"	.32	.70	1.09	.93	.76	.94	.85	C-40
1 1/2"	.07	.22	.48	.82	.64	.96	.55	A
1 1/2"	.15	.26	.62	.83	.70	.91	.60	D-20
1 1/2"	.24	.57	1.17	.87	.93	.87	.90	C-20
1 1/2"	.40	.84	1.18	.84	.94	.88	.95	C-40
2"	.15	.26	.62	.94	.62	.92	.60	A
2"	.15	.36	.74	.82	.82	.92	.70	D-20
2"	.24	.67	1.14	.87	1.06	.96	.95	C-20
2"	.42	.89	1.19	.85	1.08	.94	1.00	C-40
TECTUM FINALÉ ACOUSTICAL PERFORMANCE								
1"	.05	.16	.30	.57	.94	.70	.50	A
1"	.13	.19	.45	.86	.80	.84	.60	D-20
1"	.30	.77	1.11	.98	.79	.95	.90	C-40
1" + 1" Furring & SoniCor	.15	.39	.85	.98	.78	.93	.75	A
1 1/2" + 1" Furring & SoniCor	.18	.56	1.07	.92	.86	.89	.85	A
1 1/2" + 2" Furring & SoniCor	.30	1.03	1.23	.89	1.06	.97	1.05	A
TECTUM FINALÉ FABRI-TOUGH ACOUSTICAL PERFORMANCE								
1"	.33	.59	.90	.98	.85	.93	.85	A

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TECTUM INC
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A UNIQUE ACOUSTICAL PRODUCT

January 2010

Environmental Statement

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Tectum panels are made from renewable and sustainable raw materials.

TECTUM: A GREEN PRODUCT

Long before the environmental practices of business were scrutinized, Tectum Inc. was manufacturing sustainable building products in an environmentally safe, non-toxic process. Since 1949, Tectum panels have been made from renewable wood sources, magnesium from sea water, and recovered magnesium waste. The panels contain no toxic binders, no asbestos or formaldehyde, and are naturally degradable in a landfill.

Composition of Tectum Panels

The wood fibers (excelsior) used in Tectum panels come from Wisconsin Aspen trees. The Wisconsin Aspen is a self-propagating type tree. When cut, a new tree will begin to grow back from its root structure. In addition, all Wisconsin Aspen used for Tectum is air-dried. No drying kilns are used. The wood is stored in ranks to age naturally. No chemicals are used in the production of any excelsior purchased by Tectum Inc.

Tectum Inc. only purchases excelsior from a single source that is affiliated with both the Forest Stewardship Council (FSC) and the Sustainable Forestry Initiatives (SFI) programs. These programs are a comprehensive system of objectives and performance measures that integrate the perpetual growing and harvesting of trees with the protection of wildlife, plants, soil and water quality. All loggers are trained to adhere to FSC and SFI principles.

Magnesium oxide is mixed with magnesium sulfate (Epsom salts) to form the primary binder. Tectum Inc. manufactures the magnesium sulfate solution on site using waste material that has been generated since production began in 1949. The secondary binder is composed of sodium silicate and calcium carbonate (limestone). All of the water used in the manufacture of Tectum is captured and recycled.

Durability

Tectum Inc. offers a Limited Lifetime Warranty on all Tectum products. While many other building materials have replacement rates greater than twenty percent, replacement of Tectum acoustical panels is seldom required. Tectum panels can also receive up to six coats of spray-applied paint with no loss in acoustical value, increasing the life span of the panels.

When recommended installation procedures are observed, Tectum panels can be removed and re-installed, or installed in other areas.

Disposal

Tectum panels are a non-hazardous waste and can be safely deposited in landfills. As an alternative, the panel waste has been successfully added to compost and used as a soil amendment. No packaging is required to transport Tectum panels eliminating the need for packaging disposal.

Tectum panels provide acoustical treatment when abuse resistance is also a priority. The panels are manufactured in an environmentally friendly process from sustainable raw materials and can be renewed by repainting and reused by demounting. They will last for years, and waste may be safely deposited in landfills. Tectum products continue to meet the needs of owners, architects and building industry professionals who require green building products.

John Heinz National Wildlife Refuge
Tinicum, PA

Carl W. Kroening Interpretive Center
Minneapolis, MN

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TECTUM PRODUCTS AND LEED*

The LEED* building rating system has been established to evaluate every aspect of the construction process and building components used in new and existing buildings. While the main emphasis is on energy efficiency, conservation and the overall "health" of the building, the use of "green" products contributes favorably to the overall rating of a building.

Tectum Inc. fully endorses the LEED Green Building Rating System. A number of our representatives are LEED Accredited Professionals and members of local USGBC Chapters. Our products contribute to the following credits of the LEED rating system:

***EA Prerequisite 2*: Fundamental Energy Performance** - Tectum Structural Roof Deck Systems provide high R-Values. Installations have few thermal shortcuts providing very complete R-value coverage.

***EA Credit 1*: Optimized Energy Performance** - Tectum Structural Roof Deck Systems provide high R-Values up to R-43.

***MR Credits 2.1 and 2.2*: Construction Site Waste Management** - Tectum products are typically cut to 1'-0" length increments at the factory reducing or eliminating field cuts and waste at the site. Tectum products are shipped without the need for boxing and minimal if any crating, reducing packaging for minimal site waste. Tectum products are biodegradable and can be composted or ground up for soil amendment, eliminating landfill needs.

***MR Credits 4.1 and 4.2*: Recycled Content** - The Tectum Finale Wall Panel has 40% Post Industrial recycled content by weight and 9% Post Consumer recycled content by value. Tectum Fabri-Tough Wall Panels have 33% Post Industrial recycled content by weight as the Hytex Acoustical Fabric is 100% recycled material. Fabri-Tough Wall Panels have 27% Post Consumer recycled content by value.

***MR Credit 7*: Certified Wood** - Tectum products are made from Wisconsin Aspen wood fibers, harvested in Wisconsin by American Excelsior Company. American Excelsior Company is FSC and SFI certified. A Chain-Of-Custody letter (SW-COC-002249) is available upon request.

***EQ Prerequisite 3*: Minimum Acoustical Performance** - (LEED For Schools) Tectum products are manufactured primarily as an acoustical product. Tectum products apply directly to this strategy by providing abuse-resistant acoustical solutions. Tectum products can be field painted up to six times without degrading acoustical performance, offering a life-of-the-building, long service life, low maintenance acoustical solution.

***EQ Credit 3.1 and 3.2*: Construction IAQ Plans** - Tectum products can be field painted if required, but do not need to be painted for use. Tectum may contribute to this strategy by eliminating the need for field painting. If field painting is desired, Tectum products do not require priming. Consult Tectum Bulletin M-77 for field painting information.

***EQ Credit 4.1*: Low-Emitting Materials, Adhesives and Sealants** - Tectum products do not contain VOC's.

***EQ Credit 4.4*: Low-Emitting Materials, Composite Wood & Agifiber Products** - Tectum products contain no Urea Formaldehyde.

***EQ 10*: Mold Prevention (LEED for Schools)** - Tectum products do not support the growth of mold or bacteria. Tested per ASTM D3273, three Tectum product samples scored a 10, 9 & 9 out of a possible 10. Tectum products are available with an anti-microbial paint if desired.

***EQ Credit 11*: Low-Impact Cleaning and Maintenance Equipment Policy (LEED for Schools)** - Tectum products contribute favorably to this strategy as they are extremely abuse-resistant and intended for life-of-the-building service. Tectum products can be cleaned using a vacuum cleaner or a broom and do not require special cleaning supplies.

TECTUM PRODUCTS AND LEED* CONTINUED

***ID 1 - 1.4*: Innovation in Design** - Tectum Composite Structural Roof Decks may qualify for this strategy as they provide structural roof deck, finished ceiling, acoustics, thermal value and nailable roofing substrate in one quick-to-install panel. Use of Tectum Structural Roof Deck Systems provide the synergy of four trades into one product, reducing construction time, shipping miles and energy, as the panels are factory-assembled and shipped complete and ready for installation.

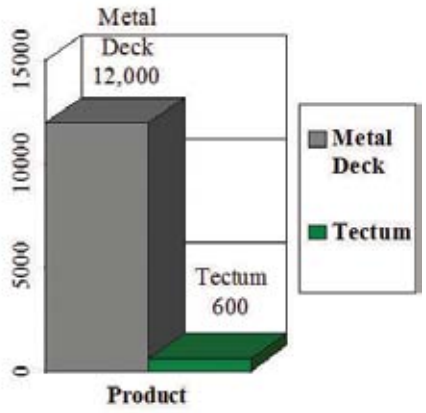
Tectum™ products are listed in the GreenSpec Directory** published by Building Green from the editors of Environmental Building News. Tectum™ Roof Deck is noted on page 69, section 3511 and Tectum™ Interior Products are listed on page 230, section 9512.
*Trademark of The U.S Green Building Council
**Trademark of Building Green, Inc.

TECTUM PRODUCTS CARBON FOOTPRINT

A **CARBON FOOTPRINT** is "the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organization, event or product." An individual, nation or organization's carbon footprint is measured by undertaking a GHG emissions assessment.

Tectum Products vs. Steel Roof Deck

- Tectum products require approximately **600 BTU's** of energy per square foot of material produced.
- Steel decking requires approximately **12,000 BTU's*** of energy per square foot of material produced.
- **Tectum products are 20 times more energy efficient to produce than steel.** This reduces the need for fossil fuels and the CO_2 produced by burning those fuels.



*American Iron and Steel Institute, October, 2005

AIR QUALITY TESTING - CALIFORNIA'S SECTION 01350 FOR THE CLASSROOM

The Tectum cementitious 3-in. thick wood fiber product was monitored for emissions of total volatile organic compounds (TVOC), individual volatile organic compounds (IVOC), formaldehyde and other aldehydes over the test period. Air samples were collected following installation of the floor assembly in the chamber. Measurements were made and predicted exposures were calculated according to California's Section 01350 protocol. As specified in this protocol, results at 96 hours, after 10 days of conditioning, were compared to (one-half) the current Chronic Reference Exposure Levels (Chronic RELs), as adopted from the California OEHHA list, February 2005 (3). All identified VOCs were also compared to the California-EPA OEHHA Proposition 65 list (4) and the California-EPA Air Resource Board list of Toxic Air Contaminants (TACs) (5).

Ventilation Rate	Room Volume	Surface Area Product Covers
Classroom		
0.90 air changes per hour (ach)	12.19 m x 7.32 m x 2.59 m = 231.07 m^3 (40 x 24 x 8.5 ft. = 8,160 $ft.^3$)	94.6 m^2

TEST RESULTS

The Tectum cementitious wood fiber product meets the IAQ emission requirements of California's Section 01350 for the classroom. Test available upon request from Tectum Inc.

FUNGUS RESISTANCE TEST: ENGINEERING REPORT No. 31106-1JJ

Object

Subject three (3) samples of Tectum natural to a Fungus Resistance Test in accordance with ASTM D3273.

Conclusions

Post-exposure examination found minimal fungal growth on the front surface of the samples and moderate growth on the back surfaces. The three test units had an ASTM D3273 rating of 10, 9, 9 on the front surfaces with a 10 rating being the total absence of mold.

TEST REQUESTED

Subject the test samples to a Fungus Test in accordance with ASTM D 3273-94 "Standard Test Method: Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."

The fungus used in the test shall be: (1) Aureobasidium pullulans, (2) Aspergillus niger, and (3) Penicillium. The test soil shall be greenhouse-grade potting soil containing 25% peat moss. The test soil shall be spread across the bottom of the test cabinet. The soil shall be inoculated with mold suspensions prepared using the three fungi. Allow 2 weeks of continuous operation for the mold to sporulate and equilibrate with the environment before starting the test. Viability of the mold growth can be checked by placing several agar plates in the cabinet. Mold growth should be medium-heavy to heavy and cover the complete surface of the agar plate.

The test specimens shall be suspended vertically with the bottom of each specimen approximately 3 inches above the surface of the inoculated soil. There shall be sufficient spacing between test units to allow free air movement. The samples shall be incubated at 90°F ±2°F and 95% to 98% relative humidity for 7 weeks. The test articles shall be inspected every week and mold growth recorded.

RESULTS

The final rating in the following table is in accordance with ASTM D3273-94. An ASTM rating of 10 is the total absence of mold growth. (For more information on mold growth on Tectum products or to request a copy of the test results, please contact Tectum Inc.)

Sample	% Fungal Growth on Front Face	Final ASTM Rating on Front Face
1	5%	10
2	10%	9
3	10%	9

FUNGUS RESISTANCE TEST: ENGINEERING REPORT No. 31106-1KK

Object

Subject three (3) samples of Tectum painted white to a Fungus Resistance Test in accordance with ASTM D3273.

Conclusions

Post-exposure examination found minimal fungal growth on the front surface of the samples and medium growth on the back surfaces. The three test units had an ASTM D3273 rating of 9, 9, 9 on the front surfaces with a 10 rating being the total absence of mold.

TEST REQUESTED

See Page 5 Above (TEST REQUESTED).

RESULTS

The final rating in the following table is in accordance with ASTM D3273-94. An ASTM rating of 10 is the total absence of mold growth. (For more information on mold growth on Tectum products or to request a copy of the test results, please contact Tectum Inc.)

Sample	% Fungal Growth on Front Face	Final ASTM Rating on Front Face
1	10%	9
2	10%	9
3	10%	9

CRAILO TECTUM B.V. IN AMSTERDAM FUNGI TEST

The following are the results of a test performed by Crailo Tectum B.V. in Amsterdam to determine the growth of fungi on Tectum panels.

After 10 weeks of exposure at 23oC and 70 - 75% R.A., no growth of fungi had been observed (magnification 8x) on the surface of the Tectum panels, both natural and coated with paint.

Sample Number	Mass increase (%) after 10 weeks 23 oC/ 70 - 75% R.A.	Visual inspection (Magnification 8x) On growth of fungi of the Tectum panels After 10 weeks exposure
A, natural	14.0	None
B, natural	12.1	None
C, painted white	11.2	None
D, painted white	9.9	None

ECOSPUN - HYTEX FABRICS FOR FABRI-TOUGH WALL PANELS

Fabri-Tough Wall Panels are manufactured with a non-woven fabric facer produced by Hytex Industries, Inc. Hytex Industries, Inc. is committed to providing environmentally-sensitive products to the commercial interiors market.

Ecospun is a high-quality polyester fiber made from 100% certified recycled plastic PET bottles. It can go into any textile product such as clothing, blankets, carpets, wall coverings, auto interiors, home furnishings and craft felt. Fabrics made from Ecospun fiber are chemically and functionally nearly identical to those made from non-recycled fabrics. The difference is that Ecospun fiber is made without depleting the Earth's natural resources. With properties such as strength, softness, shrinkage-resistance and colorfastness, market applications for Ecospun are expanding every day.

Hytex fabrics are Ecospun, produced with no PVC (polyvinyl chloride) or chlorene, no VOC's or plasticizers, no ODS's (ozone depleting substances), heavy metals or formaldehyde.

John Heinz National Wildlife Refuge at Tinicum, PA, required "green" building products. They turned to Tectum Inc. for aesthetically pleasing acoustic wall and ceiling panels.

- Two million plastic bottles are used in the U.S. every ten minutes and 51 billion plastic bottles go into landfills annually.
- The 51 billion plastic bottles in U.S. landfills end-to-end would wrap around the earth 5 times.
- It will take 700 years before plastic bottles in landfills start to decompose.
- Less than 30% of plastic bottles in the U.S. are actually recycled.
- Currently only 11 U.S. states have direct deposit.

Happy Feet Plus in Clearwater Fl. is the first retail GOLD certified LEED building in the country. Tectum roof deck helped contribute to the 39 overall points that Happy Feet earned.

01/10 Pub. #T121

www.tectum.com e-mail: info@tectum.com Phone: 888-977-9691 Fax: 800-832-8869

MARKETING BULLETIN

M81

Tectum™ Products and LEED*

Rev. Dec. 2008 TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The Leadership in Energy and Environmental Design (LEED*) Green Building Rating System represents the U.S. Green Building Council's effort to provide a national standard for what constitutes a "green building." Through its use as a design guideline and third-party certification tool, LEED aims to improve occupant well-being, environmental performance and economic returns of buildings using established and innovative practices, standards and technologies.

The LEED* building rating system has been established to evaluate every aspect of the construction process and building components used in new and existing buildings. While the main emphasis is on energy efficiency, conservation and the overall "health" of the building, the use of "green" products contributes favorably to the overall rating of a building.

Tectum Inc. fully endorses the LEED Green Building Rating System. A number of our representatives are LEED-Accredited Professionals and members of local USGBC Chapters. Our products contribute to the following credits of the LEED rating system:

***EA Prerequisite 2*: Fundamental Energy Performance** - Tectum Structural Roof Deck Systems provide high R-Values. Installations have few thermal shortcuts, providing very complete R-value coverage.

***EA Credit 1*: Optimized Energy Performance** - Tectum Structural Roof Deck Systems provide high R-Values up to R-43.

***MR Credits 2.1 and 2.2*: Construction Site Waste Management** - Tectum products are typically cut to 1" length increments at the factory, reducing or eliminating field cuts and waste at the site. Tectum products are shipped without the need for boxing and minimal if any crating, reducing packaging for minimal site waste. Tectum products are biodegradable and can be composted or ground up for soil amendment, eliminating landfill needs.

***MR Credits 4.1 and 4.2*: Recycled Content** - The Tectum Finalé Wall Panel has 40% Post Consumer recycled content by value and 8% Post Consumer recycled content by weight. Tectum Fabri-Tough Wall Panels have 8% Post Consumer recycled content by weight as the Hytex Acoustical Fabric is 100% recycled material. Fabri-Tough Wall Panels have 23% Post Consumer recycled content by value. Finalé Fabri-Tough has 19% Post Consumer recycled content by value. Tectum E has 11% recycled content by value, as the EPS core is 60% recycled material.

***MR Credit 7*: Certified Wood** - Tectum products are made from Wisconsin Aspen wood fibers, harvested in Wisconsin by American Excelsior Company. American Excelsior Company is FSC and SFI certified. A chain-of-custody letter is available upon request.

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TECTUM INC.
The Noise Control Solution

***EQ Prerequisite 3*: Minimum Acoustical Performance** - (LEED For Schools) Tectum products are manufactured primarily as an acoustical product. Tectum products apply directly to this strategy by providing abuse-resistant acoustical solutions. Tectum products can be field painted up to six times without degrading acoustical performance, offering a life-of-the-building, long service life, low maintenance acoustical solution.

***EQ Credit 3.1 and 3.2*: Construction IAQ Plans** - Tectum products can be field painted if required, but do not need to be painted for use. Tectum may contribute to this strategy by eliminating the need for field painting. If field painting is desired, Tectum products do not require priming. Consult Tectum Bulletin M-77 for field-painting information.

***EQ Credit 4.1*: Low-Emitting Materials, Adhesives and Sealants** - Tectum products do not contain VOC's.

***EQ Credit 4.4*: Low-Emitting Materials, Composite Wood & Agifiber Products** - Tectum products contain no Urea Formaldehyde.

***EQ 10*: Mold Prevention (LEED for Schools)** - Tectum products do not support the growth of mold or bacteria. Tested per ASTM D3273, three Tectum product samples scored a 10, 9 & 9 out of a possible 10. Tectum products are available with an anti-microbial paint if desired.

***EQ Credit 11*: Low Impact Cleaning and Maintenance Equipment Policy (LEED for Schools)** - Tectum products contribute favorably to this strategy as they are extremely abuse-resistant and intended for life-of-the-building service. Tectum products can be cleaned using a vacuum cleaner or a broom and do not require special cleaning supplies.

***ID 1 - 1.4*: Innovation in Design** - Tectum Composite Structural Roof Decks may qualify for this strategy as they provide structural roof deck, finished ceiling, acoustics, thermal value and nailable roofing substrate in one quick-to-install panel. Use of Tectum Structural Roof Deck Systems provide the synergy of four trades into one product, reducing construction time and shipping miles and energy, as the panels are factory-assembled and shipped complete and ready for installation.

It is very important to note that Tectum products are listed in the GreenSpec Directory** published by Building Green from the editors of Environmental Building News. Tectum Roof Deck is noted on page 69, section 3511 and Tectum Interior Products are listed on page 230, section 9512.

*Trademark of The U.S Green Building Council
**Trademark of Building Green, Inc.

MARKETING BULLETIN

M 83

Tectum Products and LEED Q & A

November 2007

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Where are Tectum products manufactured? Where are Tectum products materials harvested?

Tectum products are manufactured in Newark, OH. Tectum products main raw material (Aspen wood fiber) is harvested in Rice Lake, WI.

Are Tectum products purchased from FSC and SFI certified harvesters?

Tectum products are made of Wisconsin Aspen wood fibers, harvested in Wisconsin by American Excelsior Company. American Excelsior Company is FSC and SFI certified. A chain-of-custody letter is available upon request. Aspen wood fibers make up 44% of the total Tectum product.

Are Tectum products manufactured from rapidly renewable resources?

Aspen wood fiber (Populous Tremuliodes) has a 15-year lifecycle and is not considered rapidly renewable under LEED 2.2. However, this species does not require replanting after harvesting as new growth stems from existing root systems.

Are there any VOCs (Volatile Organic Compound) in Tectum products?

No, there are no VOCs in Tectum products. Tectum panels contain no toxic binders, no asbestos and are completely formaldehyde free.

Are Tectum products recyclable?

Tectum products are biodegradable and can be composted or ground up for use as soil amendment.

What are Tectum products recycled content (Post Consumer and Post Industrial)?

The Tectum Finalé Wall Panel has 40% Post Consumer recycled content by value and 8% Post Consumer recycled content by weight. Tectum Fabri-Tough Wall Panels have 8% Post Consumer recycled content by weight as the Hytex Acoustical Fabric is 100% recycled material. Fabri-Tough Wall Panels have 23% Post Consumer recycled content by value. Finalé Fabri-Tough has 19% Post Consumer recycled content by value. Tectum E has 11% recycled content by value as the EPS core is 60% recycled material.

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M 85 MARKETING BULLETIN

Tectum™ Products Carbon Footprint vs. Steel Roof Deck

January 2009

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

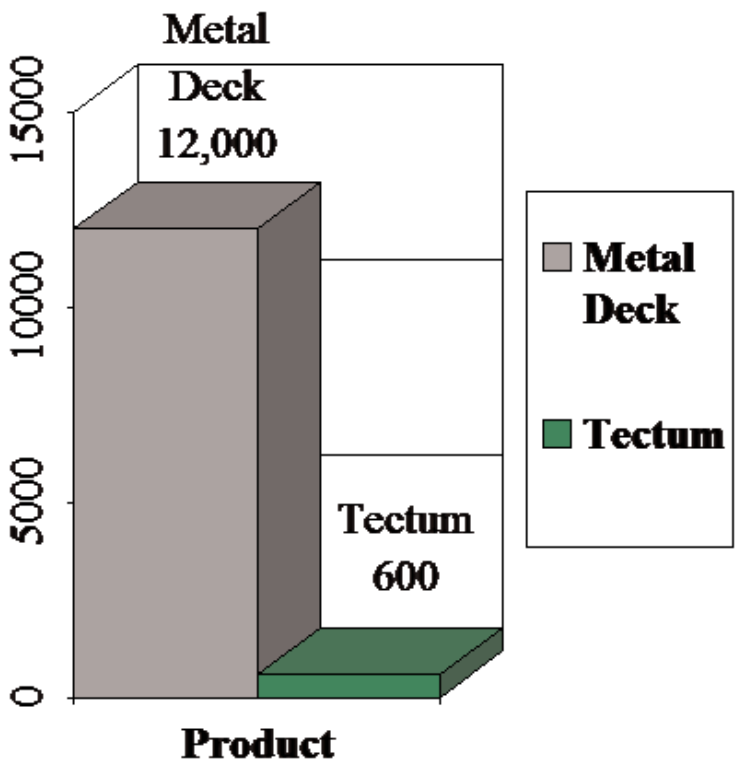
A **CARBON FOOTPRINT** is "the total set of GHG (greenhouse gas) emissions caused directly and indirectly by an individual, organization, event or product." An individual, nation or organization's carbon footprint is measured by undertaking a GHG emissions assessment.

One ton of lumber used in construction results in the release of 30 kg of carbon and the storage of 250 kg of carbon. One ton of steel used in construction results in the release of 700 kg of carbon and the storage of 0 kg of carbon.

Tectum Products vs. Steel Roof Deck

Tectum products are produced from new growth Wisconsin Aspen trees harvested every 15-20 years. After harvesting, Aspen trees repropagate from the existing root structure. During this process, Aspen trees filter carbon dioxide from the atmosphere, reducing greenhouse gases.

- Tectum products require approximately **600 BTU's** of energy per square foot of material produced.
- Steel decking requires approximately **12,000 BTU's*** of energy per square foot of material produced.



- **Tectum Products are 20 times more energy efficient to produce than steel.** This reduces the need for fossil fuels and the CO_2 produced by burning those fuels.

** American Iron and Steel Institute,* October, 2005

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MARKETING BULLETIN

M67

AIA/CES Learning Units

Rev. April 2006

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Tectum Inc. is a basic provider of AIA/CES Learning Units.

What is an AIA/CES?

It is the continuing education system developed by the AIA to record professional learning as mandatory requirements for architectural membership.

Many states and the national AIA require 36 Learning Units per year for architect membership. It is believed that all states will adopt the 36 Learning Units per year requirement within the next few years.

The Tectum Inc. lunch program title is "Cementitious Wood Fiber Products." Tectum Inc. is following the guidelines of general education theme. The box lunch presentation must last at least 50 minutes to qualify for one learning unit.

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Products

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TECTUM Roof Deck Systems

With various edge treatments, Tectum panels are used as the substrate for all Tectum roof deck systems. Tectum roof plank panels have T&G long edges and square ends. Plank is designed to span structural supports. Tectum roof tile systems have rabbeted long edges and either square or T&G ends. Tiles span between structural tees. Tees span between supports.

LIMITATIONS - TECTUM I, III, E, NS

When designing for high-humidity applications such as pools or ice arenas, please contact the Tectum Inc. technical department for assistance.

COMBUSTIBILITY

Warning: All foam insulation should be adequately protected. Styrofoam brand and EPS insulation are combustible and may constitute fire hazards if improperly used or installed. Use only as directed by the specific instructions for these products. Styrofoam brand and EPS insulation contain a flame retardant additive to inhibit accidental ignition from small fire sources. During shipping, storage, installation and use, this material should not be exposed to flame or other ignition sources.

TECTUM I

Tectum I is typically used in low slope applications and provides a thermal barrier for field-applied foam plastics. It is compatible with virtually all roof installation materials. Underside exposed joints have attractive beveled edges. LS (long span) panels available with steel channel reinforcement.

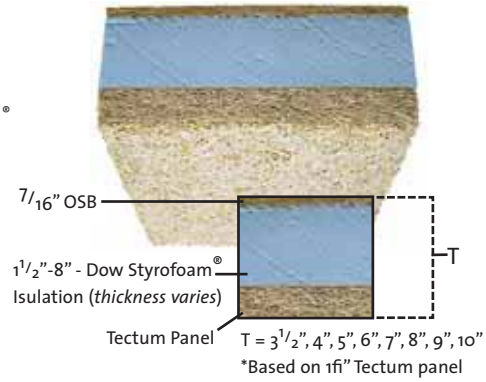
The Tectum I roof deck system consists of standard TECTUM panels in either plank or tile configurations.

T = 2", 2 1/2", 3"

TECTUM III

The Tectum III roof deck panel is a composite of a 1 1/2" or thicker Tectum substrate, Dow Styrofoam® brand XPS (extruded polystyrene) insulation 1 1/2" to 8" thick and 7/16" OSB (oriented strand board) sheathing with a slip-resistant surface. Components are bonded with code-listed structural adhesives.

Tectum III panels are typically used in sloped applications where insulation and a nailable surface are required.



T = 3 1/2", 4", 5", 6", 7", 8", 9", 10"
*Based on 1fi" Tectum panel

TECTUM INC.
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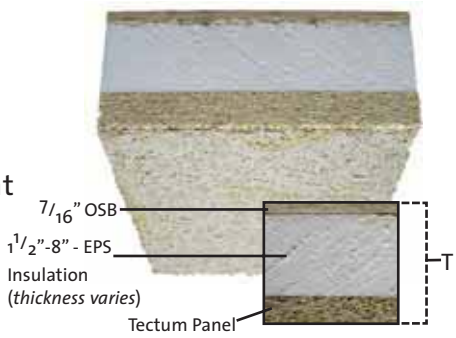
Tectum panels are composed of aspen wood fiber (excelsior) bonded with an exclusive inorganic hydraulic cement and are formed by a continuous process under heat and pressure. Tectum panels combine several materials to create a decorative product that provides excellent sound absorption, abuse resistance, insulation and a textured interior finish. A silicone treatment to the panel resists water and water migration. There are no urea formaldehydes or CFCs in any Tectum product.

NOTE: There is no asbestos, nor has there ever been any asbestos, used in Tectum products.

TECTUM E

The Tectum E roof deck panel is a composite of a $1^{1}/_{2}$" or thicker Tectum substrate, EPS (expanded polystyrene) insulation and $^{7}/_{16}$" OSB sheathing with a slip-resistant surface. Components are bonded with code-listed structural adhesives.

The EPS core exceeds the requirements of ASTM C-578 Type I and bears the UL classification mark.



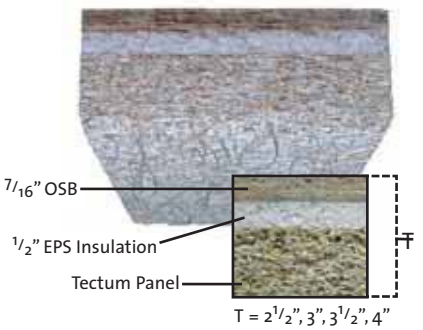
T = $3^{1}/_{2}$", 4", 5", 6", 7", 8", 9", 10"

*Based on $1^{1}/_{2}$" Tectum panel

TECTUM NS

The Tectum NS (nailable surface) roof deck panel is a composite of a $1^{1}/_{2}$" or thicker Tectum substrate, $^{1}/_{2}$" thick EPS (expanded polystyrene) insulation and $^{7}/_{16}$" OSB sheathing with a slip-resistant surface. Components are bonded with code-listed structural adhesives.

Tectum NS Panels are typically used in sloped applications where minimal insulation is required, such as outdoor pavilions.



T = $2^{1}/_{2}$", 3", $3^{1}/_{2}$", 4"

DIAPHRAGM DESIGN DATA

TECTUM ROOF DECK FASTENER SPACING SCHEDULE

Type	Panel Size	Test No.	Joist	Span[4]	Fasteners	Field Spacing[2]	Perimeter	Adhesive[1,3]	Grout	ULT/ LF	DSN/ LF
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	No	None	825	275
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	T&G+Joist	None	1350	450
T-I LS	2 $^{1}/_{2}$"x31"x120"	94-30037D	Wood	60"	3 $^{1}/_{2}$" 14 Gauge Scr/2"w	2/Joist/Panel	10" o.c. sides + ends	T&G+Joist	None	1170	389
T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 $^{1}/_{2}$" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 $^{1}/_{4}$" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3"x 31"x144"	02-030070B	Wood	72"	4 $^{1}/_{2}$" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1631	542
T-I Tile	2"x23 $^{1}/_{2}$"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
T-I Tile	2"x31 $^{1}/_{2}$"x95"	88-3113-1	Steel	96"	168 Ts/112 x Ts	32" o.c.	168 Ts	No	4 Sides	575	200
T-I RT/TG	2"x31 $^{1}/_{2}$"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
T-I Tile	2"x31 $^{1}/_{2}$"x96"	94-30037H	Steel	96"	000-5-14-2+S-25/2"w	2/Joist	10 $^{1}/_{2}$" o.c.	Joist	Long Edge	835	278
T-I Tile[5]	2"x31 $^{1}/_{2}$"x96"	02-030070A	Steel	96"	218 Ts/3 $^{1}/_{4}$" 14 Gauge/2"w	2/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	1530	509
T-III Plank	3 $^{1}/_{2}$"x47"x144"	94-30037A	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1068	355
T-III Plank	3 $^{1}/_{2}$"x47"x120"	94-30037B	Wood	60"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1093	363
T-III Plank	5"x47"x144"	94-30037E	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	320
T-III Tile	3 $^{1}/_{2}$"x47 $^{1}/_{2}$"x96"	95-30060	Steel	96"	000-3-14-3 $^{1}/_{2}$"+14GA/1 $^{1}/_{2}$"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 $^{1}/_{2}$"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	$^{7}/_{16}$"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
T-E Plank/	5"x47"x96"		Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	8" o.c. sides + ends	T&G+Joist	None		
Overlay	$^{7}/_{16}$"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

NOTES:
1. Adhesive is to meet the requirements of AFG-01. A $^{3}/_{8}$" bead of adhesive is to be used. Approximately 50 lin. ft. of adhesive per quart tube.
2. All panels were installed with staggered ends except Tectum I tile with 168 bulb tees and Tectum III tile on truss tees.
3. Specific adhesive used on test assemblies was Miracle Construction adhesive SFA-66.
4. Values over wood joists are conservative when supports are steel.
5. Visit our Web site to download technical bulletin T-77 for more information. Call for assistance when designing and detailing this Tectum roof deck system.

TECTUM INC.
The Noise Control Solution

P.O. Box 3002
Newark, OH 43058

105 S. 6th St.
Newark, OH 43055

Pub. #T105

T 76 TECHNICAL BULLETIN

Component Selection for Tectum™ Composite Decks

Rev. April 2006

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Tectum III and E roof decks were developed to meet a need in the market for a product that was acoustical, lightweight, insulative, and would accommodate steep roofing materials. These decks are made from three components. Each component needed to meet specific design and physical property requirements, as well as the composite.

The Tectum substrate that was selected was one and one half inch thick. This thickness was selected because it meets the requirements for a thermal barrier, it is lightweight, it has good acoustical properties, and has excellent strength as a panel facing material.

The cores chosen were polystyrene, both extruded and molded. The extruded foam (Dow Styrofoam brand insulation) has excellent properties of dimensional stability, insulation value, and water resistance. Molded polystyrene meeting the requirements of C578 Type I was selected as a lower cost core with dimensional stability, insulation value, and is available in the sizes and thicknesses required.

Other cores were considered and some testing and evaluation conducted. Of these other insulations, phenolic lacked the properties needed for use in a composite panel. It has been taken off the market in the United States because of other problems associated with its use.

Polyisocyanurates, both cut from bun stock and foam in place were evaluated. While the cut from bun stock had stability, it lacked flexibility in sizes and was not cost competitive. Foam in place products have one very severe problem associated with their use. Shrinkage after manufacture can be in the order of one percent, or about an inch in eight feet. The polyiso industry considers this acceptable. Shrinkage of the foam core of a composite panel results in stresses on the panel that can result in foam line stresses, bowing of panels and in some instances core shear. To compensate for this a thicker substrate is required to reduce the bowing effect to an acceptable level. This adds unnecessary weight to the panels.

The top surface selected was waferboard panels that met the model code requirements for sheathing. Waferboard was replaced by oriented strand board (OSB) as the industry improved their products. OSB remains the choice because of availability is sizes required for panels and its acceptance by the model codes.

The panels are then laminated together using code recognized structural laminating adhesives. The adhesives meet the same requirements as those used in the glue laminated lumber industry.

All of the component products are manufactured under code recognized quality control programs as well as the assembly of the composite panels. High quality, lightweight panels listed by model code evaluation services is the result.

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

JOB PROFILE

MILWAUKEE ROAD DEPOT – MINNEAPOLIS, MN

Contractor:
Structural Wood Corp.

Architect: Shea Architects

Structural Engineer:
Mattson McDonald

Design: Independent Consulting Engineers

Sales Agent:
Rose/Fleischaker Assoc.

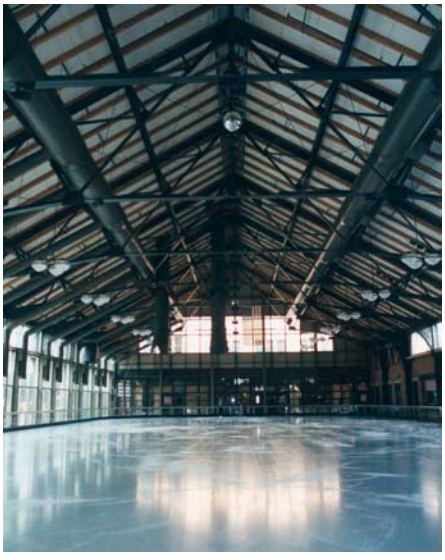
"I coudn't be more pleased that we're moving forward with the renovation of this wonderfully historic treasure. CSM, MCDA and Shea Architects have done a wonderful job capturing the potential of the Milwaukee Road Depot. This complex will be a vibrant link between downtown Minneapolis and our thriving riverfront for years to come"

-Minneapolis Mayor Sayles Belton

The Milwaukee Road Depot Railroad Station is one of the last long-span truss-roofed sheds surviving in the nation, and the only one remaining in the upper Midwest. The depot was built in 1899, and in 1978 it was placed on the national register of historic places, went out of business, and has sat vacant ever since. At its peak in 1920, the Milwaukee Road Depot serviced 29 trains daily. In 1992, the MCDA purchased the depot and its surrounding seven blocks to preserve and rehabilitate it. Plans were made in accordance with economic and historical guidelines, for the depot to house an ice skating rink, restaurant and hotel. The original steel trusses were refinished and left in place.

Tectum III™ Roof Deck was chosen and installed over the ice skating rink. The train shed was developed into an enclosed rink specifically designed for figure skating. With its glass walls, brick and ice surfaces, sound was certain to be reflected so much that people couldn't hear each other. Tectum™ Roof Deck provided the solution. With its great sound-absorption qualities and rough texture, Tectum Roof Deck provided great acoustics and maintained the outdoor "feel" of the train shed construction. Advantages provided by Tectum III are vapor barrier and insulation qualities to exceed the State of Minnesota's energy code and maintain the ice at an optimum level. Further, Tectum III provided a nailable surface to attach the emissivity barrier installed to protect the ice sheet from infrared rays. Also, the Tectum Roof Deck made it possible to attach the architectural roofing system, 24-gauge steel Petersen Aluminum Corp. Snap Clad.

Approximately 65,802 sq. ft. of six-inch Tectum III covers the 700-foot long train shed. Tectum panels are manufactured from sustainable raw materials.



TECTUM INC
The Noise Control Solution
P.O. BOX 3002 NEWARK, OH 43058 • 105 S. 6TH ST. NEWARK, OH 43055

TECTUM ROOF DECK DESIGN GUIDELINES

DESIGN LOAD DATA**

Span in inches based on nominal 3" wide structural support members Deflection L/240 or less.
Contact Tectum Inc. for recommended spans when used in high-humidity applications.

System	Thickness***	Wt. (psf)***	Product	24"	30"	36"	38"	40"	42"	44"	48"	50"	52"	54"	60"	66"	72"	84"	96"
Plank	2"	3.5	I	130	75	50	45	40	35										
	2 1/2"	4.5	I	150	120	80	70	60	50	45	35								
	3"	5.3	I	200	125	102	91	82	74	65	50	45	40	35					
LS	2"	3.8	I	130	75	75	75	70	64	57	50	45	40	35					
Plank	2 1/2"	4.7	I	150	120	120	120	114	103	93	77	70	65	60	50	35			
	3"	5.5	I	200	125	125	125	125	120	115	110	104	96	88	71	58	50		
Comp.	3 1/2"	4.4	III	200	180	165	150	135	125	115	95	85	75	70	60	55	50		
Plank	4"	4.6	III		200	195	175	155	140	120	110	100	95	85	70	60	50	35	
T-III	5"	5.0	III						200	175	135	125	115	105	85	70	60	50	35
	6", 7"	5.2	III								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	III												200	165	136	100	75
NS	2 1/2"	4.7	NS	200	125	100	90	80	74	65	50								
Plank	3"	5.6	NS	200	195	135	120	110	100	90	75	70	65	60	50				
	3 1/2", 4"	6.4	NS		200	195	175	155	140	120	110	100	95	85	70	60	50		
E	2 3/4"	4.4	E	200	125	100	90	80	74	65	50								
Plank	3 1/2"	4.5	E	200	150	135	120	110	100	90	75	70	65	60	50				
	4"	4.6	E	200	180	165	150	135	125	115	95	85	75	70	60	55	50	35	
	5"	5.0	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
	6", 7"	5.2	E								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	E												200	165	130	100	75

** All published design loads are based on minimum safety factor of four. For example, 50 psf design load has an ultimate load of 200 psf.
*** Thickness and weight are nominal. For loads greater than 200 lbs., contact Tectum Inc.

DIAPHRAGM DESIGN DATA

TECTUM ROOF DECK FASTENER SPACING SCHEDULE

Type	Panel Size	Test No.	Joist	Span[4]	Fasteners	Field Spacing[2]	Perimeter	Adhesive[1,3]	Grout	ULT/ LF	DSN/ LF
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	No	None	825	275
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	T&G+Joist	None	1350	450
T-I LS	2 1/2"x31"x120"	94-30037D	Wood	60"	3 3/4" 14 Gauge Scr/2"w	2/Joist/Panel	10" o.c. sides + ends	T&G+Joist	None	1170	389
T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 1/4" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3" x 31" x 144"	02-030070B	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G + Joist	None	1631	542
T-I Tile	2"x23 1/2"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
T-I Tile	2"x31 1/2"x95"	88-3113-1	Steel	96"	168 Ts/112 x Ts	32" o.c.	168 Ts	No	4 Sides	575	200
T-I RT/TG	2"x31 1/2"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
T-I Tile	2"x31 1/2"x95"	94-30037H	Steel	96"	000-5-14-2+S-25/2"w	2/Joist	10 1/2" o.c.	Joist	Long Edge	835	278
T-I Tile[5]	2"x31 1/2"x96"	02-030070A	Steel	96"	218 Ts/3 1/4" 14 Gauge/2"w	2/Joist/panel	12" o.c. sides + ends	Joist	Long Edge	1530	509
T-III Plank	3 1/2"x47"x144"	94-30037A	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1068	355
T-III Plank	3 1/2"x47"x120"	94-30037B	Wood	60"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1093	363
T-III Plank	5"x47"x144"	94-30037E	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	320
T-III Tile	3 1/2"x47 1/2"x96"	95-30060	Steel	96"	000-3-14-3 1/2"+14GA/1 1/2"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 1/2"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
T-E Plank/	5"x47"x96"		Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	8" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

NOTES: 1. Adhesive is to meet the requirements of AFG-01. A 3/8" bead of adhesive is to be used. Approximately 50 lin. ft. of adhesive per quart tube.
2. All panels were installed with staggered ends except Tectum I tile with 168 bulb tees and Tectum III tile on truss tees.
3. Specific adhesive used on test assemblies was Miracle Construction adhesive SFA-66.
4. Values over wood joists are conservative when supports are steel.
5. Visit our Web site to download technical bulletin T-77 for more information. Call for assistance when designing and detailing this Tectum roof deck system.

JOB PROFILE

PALM VALLEY SCHOOL – RANCHO MIRAGE, CA

Architect: Alfred H. Cook,
Palm Desert, CA

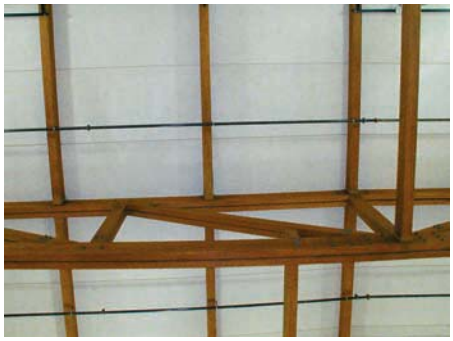
General Contractor:
D. Melilli Co.,
Palm Desert, CA

Framing Contractor:
Tandem West Group,
Palm Desert, CA
(Installed Tectum III)

The Palm Valley School is an independent, coeducational, non-denominational college preparatory school which offers a comprehensive academic curriculum to qualified students in preschool through twelfth grade. The school emphasizes a traditional academic offering which is complemented by strong arts, athletic and other co-curricular programs.

The environment at the school is defined by high expectations, respect for each child's character and ability, and constant support and encouragement. Dedicated teachers and individualized attention make possible the educational excellence for which the Palm Valley School has become known.

Founded in 1952, The Palm Valley School sits in an area where triple digit temperatures can occur nine months per year. When a new gymnasium was planned, acoustics and thermal efficiency were both top priorities. Seven-inch thick Tectum III panels were selected for the new roof. These panels, installed over truss joists, met the structural requirements for the project, including diaphragm, vertical loading, uplift resistance, and R-values for the roof system, while providing superior acoustics in the space.



The edges of the roof were designed with some challenging rolling hips. The Tectum™ panels were able to conform with no problems. The natural wood appearance of Tectum panels complements the heavy timber trusses perfectly.

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	5"	5.0	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
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	8", 9", 10"	5.5	E												200	165	130	100	75

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T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 1/4" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3" x 31" x 144"	02-030070B	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G + Joist	None	1631	542
T-I Tile	2"x23 1/2"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
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T-I RT/TG	2"x31 1/2"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
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T-III Tile	3 1/2"x47 1/2"x96"	95-30060	Steel	96"	000-3-14-3 1/2"+14GA/1 1/2"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 1/2"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
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Overlay	7/16"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

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JOB PROFILE

BOTTINEAU LIBRARY – MINNEAPOLIS, MN

Architect: RSP Architects Limited

Tectum Distributor: Structural Wood, Inc.

Project Architect: Paul Whitenack

Project Manager: Bryan Gatzlaff

General Contractor: Lund-Martin, Chris Loberg

In 1957, the Logan Park library was moved to Second Street Northeast and renamed Pierre Bottineau. The 12,000-square-foot library occupies several buildings that were constructed near the turn of the century as part of the Grain Belt Brewery campus. It consists of three basic elements: a new addition that houses the children's library, a restored masonry shell that formerly housed the brewery's millwright shop which was converted to the library's office and administrative area, and a steel-framed structure that was originally the brewery's wagon shed, now converted to house the main book and periodical collections.

This small but busy library enjoys the support and patronage of neighborhood residents. Its staff works closely with nearby schools and an early education center, hosting six to eight weekly classes. Pierre Bottineau is the only community library where the circulation of juvenile materials is decidedly over half of the total number of items checked out. The library's bilingual Spanish storybooks and programs are popular with a growing Hispanic community.

The Tectum™ decking was used in the wagon-shed area, which is the main portion of the library. The existing steel trusses were restored and strengthened in order to carry the Tectum and to conform to current codes. Tectum was able to span the existing purlin and truss bays, while improving the acoustical performance of the space and fitting into the building's aesthetic and budget requirements.

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	8", 9", 10"	5.5	III												200	165	136	100	75
NS	2 1/2"	4.7	NS	200	125	100	90	80	74	65	50								
Plank	3"	5.6	NS	200	195	135	120	110	100	90	75	70	65	60	50				
	3 1/2", 4"	6.4	NS		200	195	175	155	140	120	110	100	95	85	70	60	50		
E	2 3/4"	4.4	E	200	125	100	90	80	74	65	50								
Plank	3 1/2"	4.5	E	200	150	135	120	110	100	90	75	70	65	60	50				
	4"	4.6	E	200	180	165	150	135	125	115	95	85	75	70	60	55	50	35	
	5"	5.0	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
	6", 7"	5.2	E								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	E												200	165	130	100	75

** All published design loads are based on minimum safety factor of four. For example, 50 psf design load has an ultimate load of 200 psf.
*** Thickness and weight are nominal. For loads greater than 200 lbs., contact Tectum Inc.

DIAPHRAGM DESIGN DATA

TECTUM ROOF DECK FASTENER SPACING SCHEDULE

Type	Panel Size	Test No.	Joist	Span[4]	Fasteners	Field Spacing[2]	Perimeter	Adhesive[1,3]	Grout	ULT/ LF	DSN/ LF
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	No	None	825	275
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	T&G+Joist	None	1350	450
T-I LS	2 1/2"x31"x120"	94-30037D	Wood	60"	3 3/4" 14 Gauge Scr/2"w	2/Joist/Panel	10" o.c. sides + ends	T&G+Joist	None	1170	389
T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 1/4" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3" x 31" x 144"	02-030070B	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G + Joist	None	1631	542
T-I Tile	2"x23 1/2"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
T-I Tile	2"x31 1/2"x95"	88-3113-1	Steel	96"	168 Ts/112 x Ts	32" o.c.	168 Ts	No	4 Sides	575	200
T-I RT/TG	2"x31 1/2"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
T-I Tile	2"x31 1/2"x95"	94-30037H	Steel	96"	000-5-14-2+S-25/2"w	2/Joist	10 1/2" o.c.	Joist	Long Edge	835	278
T-I Tile[5]	2"x31 1/2"x96"	02-030070A	Steel	96"	218 Ts/3 1/4" 14 Gauge/2"w	2/Joist/panel	12" o.c. sides + ends	Joist	Long Edge	1530	509
T-III Plank	3 1/2"x47"x144"	94-30037A	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1068	355
T-III Plank	3 1/2"x47"x120"	94-30037B	Wood	60"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1093	363
T-III Plank	5"x47"x144"	94-30037E	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	320
T-III Tile	3 1/2"x47 1/2"x96"	95-30060	Steel	96"	000-3-14-3 1/2"+14GA/1 1/2"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 1/2"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
T-E Plank/	5"x47"x96"		Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	8" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

NOTES: 1. Adhesive is to meet the requirements of AFG-01. A 3/8" bead of adhesive is to be used. Approximately 50 lin. ft. of adhesive per quart tube.
2. All panels were installed with staggered ends except Tectum I tile with 168 bulb tees and Tectum III tile on truss tees.
3. Specific adhesive used on test assemblies was Miracle Construction adhesive SFA-66.
4. Values over wood joists are conservative when supports are steel.
5. Visit our Web site to download technical bulletin T-77 for more information. Call for assistance when designing and detailing this Tectum roof deck system.

JOB PROFILE

HAPPY FEET PLUS – CLEARWATER, FLORIDA

Product: Tectum E Roof Deck

Design & Construction:
Green Building Design: First Florida Contracting, Clearwater, Florida

Engineer: ROGAL-TGA Consulting Engineers, Safety Harbor, Florida

Installing Subcontractor:
Universal Timber Structures, Auburndale, Florida

Leed Certification:
39 total points earned; Gold Certified Building

The Happy Feet Plus store in Clearwater, FL, is the only retail outlet in the nation to earn a gold certification from the Leadership in Energy and Environmental Design (L.E.E.D.) system created by the U.S. Green Building Council. It features solar panels, a 5,000-gallon rainwater collection cistern and a Tectum E Roof Deck. A building needs 26 points to be certified, but Happy Feet Plus earned 39 points, giving it one of 53 gold ratings in the country.

The store is the first Happy Feet facility built from the ground up, making it possible to follow green building standards during construction.

The Tectum E Roof Deck provides many advantages to the owners of Happy Feet Plus. It is widely known that Tectum™ products are "green," which contributed to the 39 overall points that the Happy Feet Plus facility earned. Tectum E Roof Decks add to the structural integrity of the building while improving the acoustics within the space. The components of the Tectum E Roof Deck (Tectum substrate, 7" EPS foam core and OSB nailable surface) provided for a perfect system to which the roof was attached, providing an overall combination of acoustics and structural components for a green building.

TECTUM INC
The Noise Control Solution
P.O. BOX 3002 NEWARK, OH 43058 • 105 S. 6TH ST. NEWARK, OH 43055

TECTUM ROOF DECK DESIGN GUIDELINES

DESIGN LOAD DATA**

Span in inches based on nominal 3" wide structural support members Deflection L/240 or less.
Contact Tectum Inc. for recommended spans when used in high-humidity applications.

System	Thickness***	Wt. (psf)***	Product	24"	30"	36"	38"	40"	42"	44"	48"	50"	52"	54"	60"	66"	72"	84"	96"
Plank	2"	3.5	I	130	75	50	45	40	35										
	2 1/2"	4.5	I	150	120	80	70	60	50	45	35								
	3"	5.3	I	200	125	102	91	82	74	65	50	45	40	35					
LS	2"	3.8	I	130	75	75	75	70	64	57	50	45	40	35					
Plank	2 1/2"	4.7	I	150	120	120	120	114	103	93	77	70	65	60	50	35			
	3"	5.5	I	200	125	125	125	125	120	115	110	104	96	88	71	58	50		
Comp.	3 1/2"	4.4	III	200	180	165	150	135	125	115	95	85	75	70	60	55	50		
Plank	4"	4.6	III		200	195	175	155	140	120	110	100	95	85	70	60	50	35	
T-III	5"	5.0	III						200	175	135	125	115	105	85	70	60	50	35
	6", 7"	5.2	III								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	III												200	165	136	100	75
NS	2 1/2"	4.7	NS	200	125	100	90	80	74	65	50								
Plank	3"	5.6	NS	200	195	135	120	110	100	90	75	70	65	60	50				
	3 1/2", 4"	6.4	NS		200	195	175	155	140	120	110	100	95	85	70	60	50		
E	2 3/4"	4.4	E	200	125	100	90	80	74	65	50								
Plank	3 1/2"	4.5	E	200	150	135	120	110	100	90	75	70	65	60	50				
	4"	4.6	E	200	180	165	150	135	125	115	95	85	75	70	60	55	50	35	
	5"	5.0	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
	6", 7"	5.2	E								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	E												200	165	130	100	75

** All published design loads are based on minimum safety factor of four. For example, 50 psf design load has an ultimate load of 200 psf.
*** Thickness and weight are nominal. For loads greater than 200 lbs., contact Tectum Inc.

DIAPHRAGM DESIGN DATA

TECTUM ROOF DECK FASTENER SPACING SCHEDULE

Type	Panel Size	Test No.	Joist	Span[4]	Fasteners	Field Spacing[2]	Perimeter	Adhesive[1,3]	Grout	ULT/ LF	DSN/ LF
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	No	None	825	275
T-I Plank	3"x31"x96"	88-3113-1	Steel	48"	S-25/2" Washer	3/Joist/Panel	16" o.c.	T&G+Joist	None	1350	450
T-I LS	2 1/2"x31"x120"	94-30037D	Wood	60"	3 3/4" 14 Gauge Scr/2"w	2/Joist/Panel	10" o.c. sides + ends	T&G+Joist	None	1170	389
T-I LS	3"x31"x144"	94-30037D	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	860	286
T-I LS	2"x31"x96"	94-30270	Wood	48"	3 1/4" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	321
T-I LS[5]	3" x 31" x 144"	02-030070B	Wood	72"	4 1/2" 14 Gauge Scr/2"w	2/Joist/Panel	12" o.c. sides + ends	T&G + Joist	None	1631	542
T-I Tile	2"x23 1/2"x143"	88-3113-1	Steel	72"	112 Ts/112 x Ts	24" o.c.	112 Ts	No	4 Sides	925	313
T-I Tile	2"x31 1/2"x95"	88-3113-1	Steel	96"	168 Ts/112 x Ts	32" o.c.	168 Ts	No	4 Sides	575	200
T-I RT/TG	2"x31 1/2"x96"	91-3222	Steel	96"	000-5-14-2+S-25/2"w	32"o.c.+2/Joist	S-25@16"+3/End	T&G+Per	Long Edge	696	231
T-I Tile	2"x31 1/2"x95"	94-30037H	Steel	96"	000-5-14-2+S-25/2"w	2/Joist	10 1/2" o.c.	Joist	Long Edge	835	278
T-I Tile[5]	2"x31 1/2"x96"	02-030070A	Steel	96"	218 Ts/3 1/4" 14 Gauge/2"w	2/Joist/panel	12" o.c. sides + ends	Joist	Long Edge	1530	509
T-III Plank	3 1/2"x47"x144"	94-30037A	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1068	355
T-III Plank	3 1/2"x47"x120"	94-30037B	Wood	60"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1093	363
T-III Plank	5"x47"x144"	94-30037E	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	964	320
T-III Tile	3 1/2"x47 1/2"x96"	95-30060	Steel	96"	000-3-14-3 1/2"+14GA/1 1/2"w	3/Joist/Panel	12" o.c. sides + ends	Joist	Long Edge	939	312
T-E Plank	4"x47"x144"	94-30037C	Wood	72"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1042	346
T-E Plank	5"x47"x168"	98030199	Wood	84"	6" 14 Gauge Sip Scr	3/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	1012	336
T-E Plank	5"x48"x96"	94030321	Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	12" o.c. sides + ends	T&G+Joist	None	604	201
T-III Plank/	5"x47"x144"		Wood	72"	6" 14 Gauge Scr/1 1/2"w	6/Joist/Panel	6" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x144"	92-3777	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	2363	786
T-E Plank/	5"x47"x96"		Wood	96"	6" 14 Gauge Sip Scr	4/Joist/Panel	8" o.c. sides + ends	T&G+Joist	None		
Overlay	7/16"x48"x96"	98030262	OSB	—	2"x16 Gauge Staples	8"@24" Centers	4" o.c. sides + ends	Per&24"o.c.	None	1315	437

NOTES: 1. Adhesive is to meet the requirements of AFG-01. A 3/8" bead of adhesive is to be used. Approximately 50 lin. ft. of adhesive per quart tube.
2. All panels were installed with staggered ends except Tectum I tile with 168 bulb tees and Tectum III tile on truss tees.
3. Specific adhesive used on test assemblies was Miracle Construction adhesive SFA-66.
4. Values over wood joists are conservative when supports are steel.
5. Visit our Web site to download technical bulletin T-77 for more information. Call for assistance when designing and detailing this Tectum roof deck system.

JOB PROFILE

SWISS VILLAGE - ARTHUR & GLORIA MUSELMAN WELLNESS PAVILION - BERNE, IN

Owner: Swiss Village, Inc.
Berne, IN

Product: Tectum IIIP Roof Deck

Architect & Engineer:
Fanning Howey
Celina, OH

General Contractor:
Limberlost
Construction, Inc.
Geneva, IN

The Arthur and Gloria Muselman Wellness Pavilion opened its doors to residents of Swiss Village along with area residents who purchased membership on Friday, January 16, 2009. The ultimate goal of the 21,202 square foot wellness pavilion is to provide the citizens of the southern part of Adams County with the facilities, equipment, and programs to promote an enhanced quality of life.

Facilities include an aquatic center, strength building fitness area, floor exercise space and a game room along with a lounge area.

A Tectum IIIP Structural, Acoustical Roof Deck was selected as the structural deck for the natatorium area. A Tectum IIIP Roof Deck provides a thermal barrier while controlling reverberation throughout the space.

Reflective lighting was used throughout the natatorium taking advantage of the light-reflective properties of Tectum products.

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TECTUM ROOF DECK DESIGN GUIDELINES

DESIGN LOAD DATA**

Span in inches based on nominal 3" wide structural support members Deflection L/240 or less.
Contact Tectum Inc. for recommended spans when used in high-humidity applications.

System	Thickness***	Wt. (psf)***	Product	24"	30"	36"	38"	40"	42"	44"	48"	50"	52"	54"	60"	66"	72"	84"	96"
Plank	2"	3.5	I	130	75	50	45	40	35										
	2 1/2"	4.5	I	150	120	80	70	60	50	45	35								
	3"	5.3	I	200	125	102	91	82	74	65	50	45	40	35					
LS	2"	3.8	I	130	75	75	75	70	64	57	50	45	40	35					
Plank	2 1/2"	4.7	I	150	120	120	120	114	103	93	77	70	65	60	50	35			
	3"	5.5	I	200	125	125	125	125	120	115	110	104	96	88	71	58	50		
Comp.	3 1/2"	4.4	III	200	180	165	150	135	125	115	95	85	75	70	60	55	50		
Plank	4"	4.6	III		200	195	175	155	140	120	110	100	95	85	70	60	50	35	
T-III	5"	5.0	III						200	175	135	125	115	105	85	70	60	50	35
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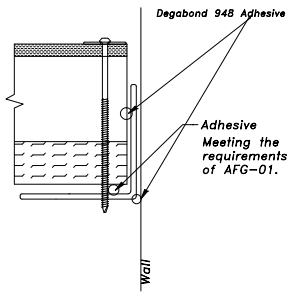
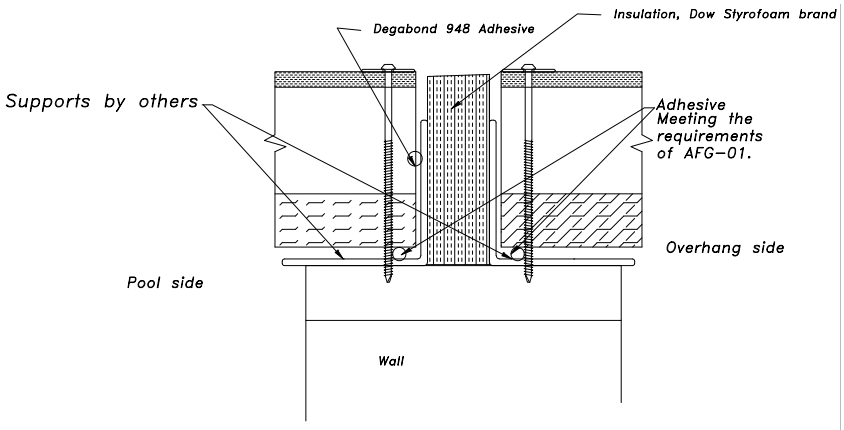
	8", 9", 10"	5.5	III												200	165	136	100	75
NS	2 1/2"	4.7	NS	200	125	100	90	80	74	65	50								
Plank	3"	5.6	NS	200	195	135	120	110	100	90	75	70	65	60	50				
	3 1/2", 4"	6.4	NS		200	195	175	155	140	120	110	100	95	85	70	60	50		
E	2 3/4"	4.4	E	200	125	100	90	80	74	65	50								
Plank	3 1/2"	4.5	E	200	150	135	120	110	100	90	75	70	65	60	50				
	4"	4.6	E	200	180	165	150	135	125	115	95	85	75	70	60	55	50	35	
	5"	5.0	E		200	195	175	155	140	120	110	100	95	85	70	65	60	45	
	6", 7"	5.2	E								200	180	170	160	150	125	105	75	60
	8", 9", 10"	5.5	E												200	165	130	100	75

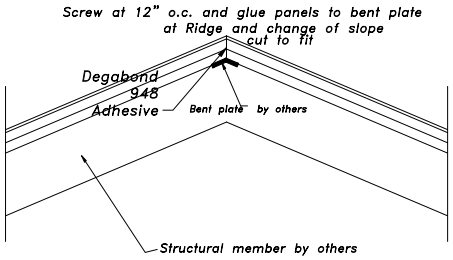
** All published design loads are based on minimum safety factor of four. For example, 50 psf design load has an ultimate load of 200 psf.

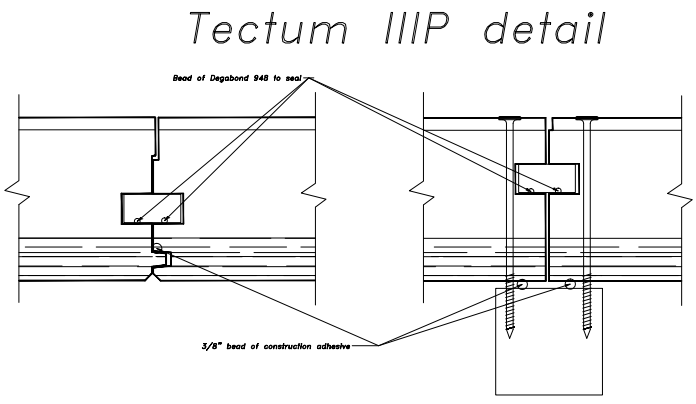
*** Thickness and weight are nominal. For loads greater than 200 lbs., contact Tectum Inc.

Tectum IIIP Details









TECTUM INC.

The Noise Control Solution

Performance

T 53 TECHNICAL BULLETIN

Acoustical Testing on Identical Gymnasiums with Tectum™ III Roof Deck and Steel Roof Deck

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tests were conducted by Niemoeller Associates inc. on three school gymnasiums of equal dimensions and construction for the roof deck products. The results are as follows:

Gymnasium I - Mark Twain School

4,000 square feet perforated metal roof deck

Frequency	125	250	500	1000	2000	4000	NRC
Per Iso (20) data	0.3	0.51	0.38	0.28	0.57	0.81	0.45
Per Iso (30) data	0.23	0.59	0.43	0.32	0.66	0.83	0.5

Overall NRC 0.45 Published Lab Results NRC 0.85

Gymnasium II - Gundlach School

4,000 square feet perforated metal deck with 90 1" x 2' x 4' hanging baffles.

Frequency	125	250	500	1000	2000	4000	NRC
Per Iso (20) data	0.39	0.59	0.42	0.39	0.67	0.82	0.5
Per Iso (30) data	0.44	0.69	0.48	0.43	0.91	1	0.6

Overall NRC 0.55 Published Lab Results NRC 1.00

Gymnasium III - Cupples School

4,000 square feet TECTUM III Roof Deck

Frequency	125	250	500	1000	2000	4000	NRC
Per Iso (20) data	0.25	0.38	0.33	0.28	0.76	1.18	0.45
Per Iso (30) data	0.26	0.43	0.35	0.31	0.94	1.34	0.5

Overall NRC 0.45 Published Lab Results NRC 0.55

Complete test data available upon request.

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TECTUM INC.
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MARKETING BULLETIN

M70

Must Acoustics for Classrooms

Rev. April 2006

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ANSI Announces New School Standards

During the summer of 2002, the American National Standards Institute (ANSI) published new acoustical standards for schools and places of learning. The acoustical needs of performance and public meeting spaces have long been recognized by architects and designers. The new standard, Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools (S12.60-2002), applies to all facilities and spaces where learning takes place including every classroom, music room, gymnasium, pool, conference room, office, speech clinic, and health care room. In addition, these standards not only apply to primary and secondary education, but also to colleges and universities, business and professional education, and adult education facilities.

These standards were developed in response to a parent petition for equal access to learning under the Americans with Disabilities Act (ADA). Although compliance with the standards is voluntary at this stage, all design professionals involved with schools and places of learning will need to exercise caution. Should one of your clients be sued for failure to provide an appropriate acoustical environment for learning under the ADA, at issue will be why these new national standards were not followed.

The new standards address exterior noise ingress, such as traffic, aircraft, industrial noise, schoolyard noise, and ground maintenance noise. They also address interior noise issues such as mechanical systems and the ability of walls, floors, and ceilings to appropriately handle sound within the room and to insulate the room from other source of noise and vibration. Primary criteria considered included background noise, reverberation time, noise isolation between adjacent spaces, and impact isolation between floors.

These standards not only apply to the design phase, but also include site visits and post-construction conformance testing. While the entire standard and its implications should be understood by design professionals, Annex E of the standard specifically provides guidance on "good architectural practices" and procedures to verify conformance to the standard.

The new standards are effective immediately for new design and construction and for major renovation to existing facilities. Many design professionals will have education projects that are currently in the design or construction process or ones that are pending. If this is the case for you, you should inform your clients of the new standards and the need to comply with them.

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TECTUM INC.
The Noise Control Solution

M 12 MARKETING BULLETIN

Sound Reduction & Reverberation Calculations

Rev. March 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Example Calculation - Sound Reduction by Increased Absorption

Given: Factory Building - Average Sound Level 92 dBA.
Concrete Block (painted) Building 140' x 50' x 20' high
Concrete Floor
Roof Deck - 2" TECTUM™ Roof Deck or $1^1/_2$" Steel Deck
Wood Doors - 1 of 240 s.f. and 2 of 24 s.f. each
16 Windows - 12 s.f. each
Machinery, etc. - absorption 150 sabins
Personnel - 12 men

To Find Calculated Reduction in Sound Level

1. List average absorption coefficient or NRC for each material (see pg 3 and 4).
NRC = The average of the four middle frequencies

		NRC
a.	Block Walls (painted)	0.07
b.	Concrete Floor	0.02
c.	2" TECTUM Roof Deck	0.60
	or $1^1/_2$" Regular Steel Deck	0.01
d.	Doors	0.09
e.	Windows	0.16
f.	People - Average absorption about 4 sabins each	

2. Total Absorption (in Sabins) is equal to the Surface Area x the Absorption Coefficient

	Item	Area	Abs. Coeff.	Sabins
a.	Block Walls	7500 s.f.	0.07	525
b.	Concrete Floor	7000	0.02	140
c.	2" TECTUM Roof Deck	7000	0.60	4200
	or $1^1/_2$" Regular Steel Deck	7000	0.04	280
d.	Doors	288	0.09	26
e.	Windows	184	0.16	29
f.	People - 12 x 4 Sabins each			48
	Total Sound Absorption with TECTUM Roof Deck			5248
	Total Sound Absorption with Steel Deck			1048

3. Calculated Change in Sound Level

$$= 10 \text{ Log } 10 \frac{5248}{1048} = 10 \text{ Log } 10 \quad = 5.01$$

$$= 10 (0.690)$$

$$= 6.9 \text{ or } 7 \text{ dB}$$

TECTUM INC.
The Noise Control Solution

4. Sound Level with TECTUM Roof Deck = 92 - 7 = 85 dB

5. Other Roof Decks. Similar calculations show that 2" TECTUM roof deck would be 5 dBA quieter than plywood and 6 dBA quieter than precast concrete.

6. The use of TECTUM sound absorbent wall panels can reduce the noise level still further. They can be mounted on the walls adjacent to the production equipment or may be used around a particularly noisy machine.

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Tectum Inc.
REVERBERATION TIME CALCULATION SHEET

Job:_____ Date:_____

_____

_____

Type of Room (Gymnasium, Auditorium, Pool, Deck, Sanctuary, etc.) _____

Room Dimensions: L = _____ W = _____ H = _____

Room Volume: (Vol. = L x W x H) _____ x _____ x_____ = _____ Cu. Ft. = V

	Type of Material	Absorption Coefficient	Area Sq. Ft.	Total Absorption
Ceiling	_____	_____	_____	_____
Floor	_____	_____	_____	_____
Walls	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
Other	_____	_____	_____	_____
Surfaces	_____	_____	_____	_____
	_____	_____	_____	_____

Total Existing Absorption (add all totals above) =_____ sabins = A

Estimated Existing Reverberation Time, $T = \frac{0.05 \times V}{A}$ = _____ seconds = T

Desired Reverberation Time, DT = _____seconds (you pick this)

Absorption Required, $AR = \frac{0.05 \times V}{DT}$ = _____sabins = AR

Estimated Add'l Units of Absorption Needed AU - Absp. Req (AR) - Exist. Absp. (A)

AU = AR - A = _____ = _____ sabins

Estimated TECTUM* Panel Required for Additional Absorption Needed _____

_____

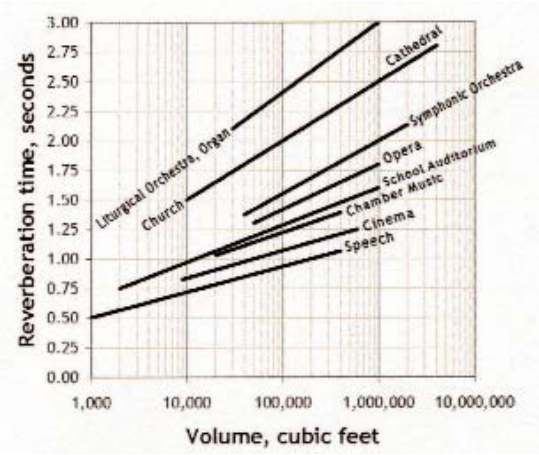
CAUTION: Actual field results may vary from estimated and calculated values. Calculations are based on recognized acoustical principles. Contact an acoustical consultant for additional information.

Reverberation

When the vocalist cuts off his note, the sound at the source will end immediately. The time delay in the ending of the direct sound from this note at the listener's position will be a function of the distance between the vocalist and the listener.

However, the sound waves which are already in the room will continue to travel back and forth between room surfaces, and a listener will hear them as a continuation, or echo, of the sound after it has stopped at the source. The sound waves lose energy by absorption at each successive reflection, and since this energy is no longer supplied by the source, the sound will die out gradually.

This prolongation of the sound after the source has stopped, due to continued multiple reflection, is termed reverberation. If sound dies out very slowly, a room is described as "live" or "excessively reverberant," and if it dies out very rapidly, a room is called "dead."



Recommended Optimum Reverberation Times for Various Room Uses.

Reverberation is an important factor governing hearing conditions and it has an important bearing on the "noisiness" of working areas.

Of special importance is its effect on the understanding of speech. If sound dies out very slowly in an auditorium used for speaking, the prolongation of each speech sound causes an overlapping and confusion of successive words or syllables which may render intelligibility extremely difficult or impossible. In rooms where quiet surroundings are desired, reverberation is annoying because it prolongs distracting noises.

Reverberation Time

The amount of reverberation in a room is measured by its reverberation time. This is defined as the number of seconds required for the energy of the reverberant sound in the room to die out to one millionth (or 1/10) of the value it had at the moment the source was cut off, which is the time it takes the sound to decay 60 dB.

The reverberation time is a basic acoustical property of a room which depends only on its dimensions and the absorbing properties of its surfaces and contents. In a typical room with normal acoustical treatment, the reverberation time is essentially the same throughout the room, regardless of the position of either the source or the listener; however, for unusual room designs, this may not be true.

The reverberation time as just defined corresponds roughly to the number of seconds which a sound of "average" initial loudness can be heard by a person with normal hearing acuity before it dies out to inaudibility under completely quiet conditions. This may vary typically from a fraction of a second in a very dead room to the order of 5 to 15 seconds in a very live room. Unfortunately in real life situations, most sounds are not of "average" initial loudness, and the background is never completely quiet. Therefore, it is difficult to roughly estimate reverberation time of a space by a subjective observation.

The reverberation time of a room, like the reflected sound energy, varies inversely with the room absorption, as defined above. However, reverberation time also varies directly with the volume and geometry of the room, being in general longer in large rooms and rooms with oblique angled surfaces. This follows from the fact that in a large room sound on the average travels farther between room surfaces, and therefore reflections and the accompanying absorption occur less frequently. Other complications occur in real life. Room shape can also enter into the picture. Long hallways or large rooms with low ceilings have grossly different reflection patterns than spaces that are more nearly cubic in shape.

Coefficients of General Building Materials and Furnishings

Complete tables of coefficients of the various materials that normally constitute the interior finish of rooms may be found in the various books on architectural acoustics. The following short list will be useful in making simple calculations of the reverberation in rooms.

Absorption Coefficients of Interior Finishes	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
			Coefficients				
Brick (unglazed), unpainted	0.03	0.03	0.03	0.04	0.05	0.07	0.04
Same, painted	0.01	0.01	0.02	0.02	0.02	0.03	0.02
Carpet, heavy on concrete	0.02	0.06	0.14	0.37	0.60	0.65	0.30
Same on 40oz. Hairfelt or foam rubber	0.80	0.24	0.57	0.69	0.71	0.73	0.55
Same with impermeable latex on 40oz. Hairfelt or foam rubber	0.08	0.27	0.39	0.34	0.48	0.63	0.37
Concrete Block, coarse unpainted	0.36	0.44	0.31	0.29	0.39	0.25	0.36
Same, Painted	0.10	0.05	0.06	0.07	0.09	0.08	0.07
Fabric, velour 10oz. Per sq. yd. hung straight							
In contact with wall	0.03	0.04	0.11	0.17	0.24	0.35	0.15
10oz. Per sq. yd. draped to half area	0.07	0.31	0.49	0.75	0.70	0.60	0.55
18oz. Per sq. yd. draped to half area	0.14	0.35	0.55	0.72	0.70	0.65	0.60
Floor - concrete or terrazzo	0.01	0.01	0.02	0.02	0.02	0.02	0.02
Asphalt, rubber or cork tile on concrete	0.02	0.03	0.03	0.03	0.03	0.02	0.02
Wood	0.15	0.11	0.10	0.07	0.06	0.07	0.08
Wood parquet in asphalt on concrete	0.04	0.04	0.07	0.06	0.06	0.07	0.06
Glass - Large panes heavy duty glass	0.18	0.06	0.04	0.03	0.02	0.02	0.04
Ordinary window glass	0.35	0.25	0.18	0.12	0.07	0.04	0.15
Gypsum board, 1/2" nailed to 2x4's 16" o.c.	0.29	0.10	0.05	0.04	0.07	0.09	0.06
Marble or glazed tile	0.01	0.01	0.01	0.01	0.02	0.02	0.01
Openings, stage (depending on furnishings)			0.25 - 0.75				
Deep balcony, upholstered seats			.5 - 1.00				
Grills, ventilating			.15 - .50				
Plaster, gypsum or lime smooth finish on tile or brick	0.01	0.02	0.02	0.03	0.04	0.05	0.03
Plaster, gypsum or lime, rough finish on lath	0.14	0.10	0.06	0.05	0.04	0.03	0.06
Same with smooth finish	0.14	0.10	0.06	0.04	0.04	0.03	0.06
Plywood paneling 3/8" thick	0.28	0.22	0.17	0.09	0.10	0.11	0.14
Water surface as in a swimming pool	0.01	0.00	0.01	0.02	0.02	0.03	0.01
Air sabins per 1000 cubic feet at 50% RH				0.90	2.30	7.20	
Steel (Metal Roof Deck)							0.01

Absorption of Seats and Audience

Values given are in Sabins per square foot of seating area or per unit

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC
Audience seated in uphostered seats per sq. ft. of floor area	0.60	0.74	0.88	0.96	0.93	0.85	0.88
Unoccupied upholstered seats (cloth) per sq. ft. of floor space	0.49	0.66	0.80	0.88	0.82	0.70	0.79
Unoccupied upholstered seats (leather) per sq. ft. of floor space	0.44	0.54	0.60	0.62	0.58	0.50	0.58
Wooden pews occupied per sq. ft. of floor area	0.57	0.61	0.75	0.86	0.91	0.86	0.78
Chairs, metal or wood seats each unoccupied	0.15	0.19	0.22	0.39	0.38	0.30	0.29
People = 4 Sabins each							

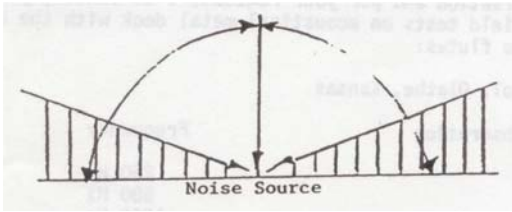
T 12 TECHNICAL BULLETIN

Comparing Tectum™ to Acoustical Steel Deck
(Types N.B. and S. with Perforated Ribs)

Rev. April 2006

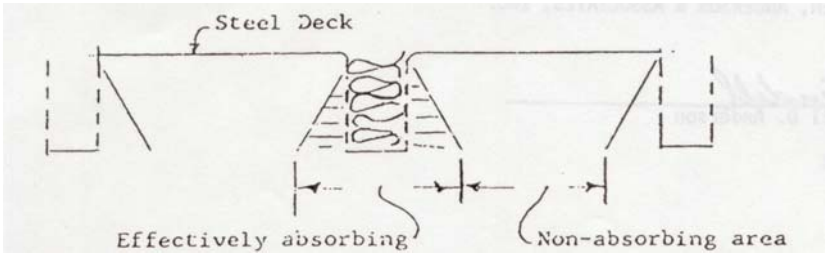
TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Roof Deck has an exceptional record for performance as an acoustical sound absorber. Tectum Roof Decks have been used for over fifty (50) years in gymnasiums, coliseums, civic centers, auditoriums, and multi-purpose arenas. Tests by independent testing agencies have verified Tectum's performance as an excellent absorbing material. Owners and people using the building constructed with Tectum testify to their satisfaction with Tectum in reducing noise. Tectum's flat surface, with its complex texture of inter-connected openings absorbs sound energy effectively and efficiently. For a flat absorptive surface, such as Tectum, all of the area is absorptive; whatever the angle of impingement; but it is particularly effective at normal or near normal impingement, as true of high ceilings or roof decks in the above buildings. Sound energy striking against (or impinging) the Tectum is absorbed. The following drawing illustrates that in a truly random field, all impinging energy lies within an 1800 semi-circle.



The most common acoustical steel decks the perforations are punched openings in the ribs. In a typical ribbed metal deck, even in a random field, only about one-half of the surface presented to the sound is absorptive. In a high building, the field is not random, but more or less "normal" or at right angles to the flat surface. The impinging sound energy tends to balloon and glance off the ribbed style acoustical deck. Thus, only one-half or less of the roof deck area is absorptive. Giving the perforated area an NRC of 75, the effective NRC of the roof is only 37.5 - just about what field tests show.

The type H and NF flat plate acoustical steel deck is as effective as Tectum. However, the price is considerably higher and as a result not used as often.



The attached letter of Coffeen, Anderson & Associates, Inc. dated 2/8/77 and St. Louis Public Schools dated 11/19/91 reports their findings on field tests conducted on the Olathe High School in Olathe, Kansas and Laclede School and Hemsted School gyms in St. Louis, Missouri, which substantiates the above information.

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TECTUM INC.
The Noise Control Solution

Coffeen, Anderson & Associates, Inc. CONSULTANTS IN ACOUSTICS
5400 WEST 61ST PLACE MISSION, KANSAS 66205 (913) 236-6800

February 8, 1977

Mr. Bob Rudd
1915 Prior Avenue North
St. Paul, Minnesota 55113

RE: Acoustical Metal Deck

Dear Bob:

Per our telephone conversation and per your request, I am sending you data we have obtained from field tests on acoustical metal deck with the openings on the sides of the flutes:

Olathe High School, Olathe, Kansas

Coefficient of absorption	Frequency
0.36	250 Hz
0.25	500 Hz
0.25	1000 Hz

On other tests made in gymnasiums and similar large spaces, this deck has generally provided coefficients of absorption up to 0.30 at the mid-frequencies of 500 and 1000 hertz based on our calculations and assumption of coefficients for other surfaces in the rooms tested like block walls, concrete floors, wood floors, bleachers, etc. We have therefore used 0.30 as as an acceptable coefficient of absorption for an average of 500 and 1000 hertz.

Very truly yours,

COFFEEN, ANDERSON & ASSOCIATES, INC.

Wendell D. Anderson

WDA:ct

T 67 TECHNICAL BULLETIN

Comparing Noise Reduction Coefficients of Acoustical Steel Deck to Tectum™ Roof Decks

Rev. April 2006

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It is important to have a basic knowledge of the competitors roof deck system and how they advertise and promote the products performance.

TYPES OF ACOUTICAL STEEL DECKS

Acoustical steel decks (perforated tin) are identified by different manufacturers as either type B, B1A, BW or N, 3NA or N1A (wide ribbed roof decks).

Acoustical steel decks advertise to absorb up to 90 percent of the sound. How do they get 90 percent absorption with a metal surface - or do they? The acoustical data must be carefully analyzed. The literature (See attached) from the manufacturer states in their footnotes that 1 7/8" or 2" of glass fiber roof insulation was used in each test in addition to the glass fiber normally placed in the flutes. The fiberglass is supposed to be installed by a second party - the roofing contractor.

CELLULAR DECKS ACOUSTICAL DATA

A second type of metal deck is the cellular deck. The cellular deck has a flat perforated surface. The typical thickness ranges from 1 1/2" to 3" with 5.71²/cell to 17.82"²/cell. The acoustical data for the cellular deck gives you insight into the effectiveness of the B and N systems. The cellular type deck without insulation has an NRC .15 to .30 as a result of the airspace. The addition of fiberglass insulation raises the NRC to .65 to a maximum of .80.

ACOUSTICAL PERFORMANCE MUST BE BASED ON THE SYSTEM

Why the difference? The difference is that 2" fiberglass roof insulation used in the test and the size of the test chamber. Seldom, if ever, is an acoustical steel roof deck (perforated tin) installed with a 2" rigid fiberglass roofing insulation - it is too expensive. In addition, codes may require a thermal barrier to protect the insulation and the roofing materials and a 5/8" or thicker gypsum panel must be installed over the deck. Where humidity is a problem, a vapor retarder would be required in addition, which would further negate the effect of the 2" fiberglass rigid insulation.

PERFORATIONS ON VERTICAL SURFACES PERFORM LESS EFFICIENTLY

The type B or N surfaces perforation in the flutes performs less efficiently than perforations in the flat plate cellular metal deck. At certain angles of incident the sound waves do not enter the perforations. Therefore, these decks reflect more sound. See Tectum Inc. Technical Bulletins T-12 and T-53 for additional information.

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TECTUM INC.
The Noise Control Solution

THE MOST EFFECTIVE ACOUSTICAL ROOF DECK SYSTEM

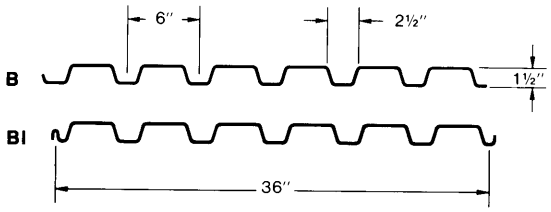
Tectum Roof Deck systems continue to outperform all structural acoustical roof decks including the acoustical steel deck (perforated tin). Note: The acoustical tests published on page four in the Tectum Inc. catalog are attached. They address the actual methods and systems used in roof deck construction. Field tests have verified the consistent performance of TECTUM roof deck systems. An NRC up to 1.00 on specific systems can be frequencies of 125 and 250 hertz are obtainable (.69 to 1.17 absorption). Steel deck absorption values for greater that 1000 hertz consistently are lower (less absorption) than any TECTUM roof deck system. A natural white surface is available and the TECTUM roof decks can be painted up to seven times without the loss of the acoustical performance. The first coat of paint often fills some perforations in a steel deck. This reduces the noise absorption effectiveness of the acoustical steel deck.

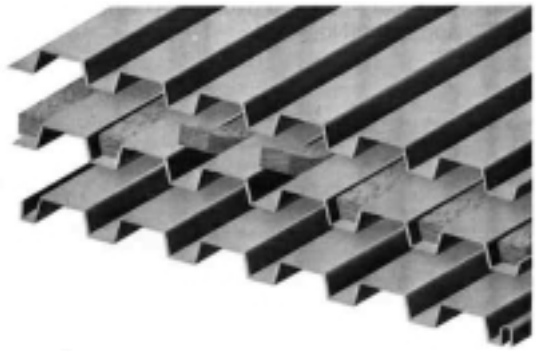
Call Tectum Inc. or the local representative for additional information.

REFERENCED ATTACHED: Page 3 & 4 - Vulcraft Acoustical Deck
Page 5 - Wheeling Roof Deck Acoustical Information
Page 6 - United Steel Deck Acoustical Information

1.5 B, BI, BA, BIA

Maximum Sheet Length 42'-0
Extra Charge for Lengths Under 6'-0
Factory Mutual Approved (No. 0C847.AM, 0G1A4.AM, and 3Y1A6.AM) **
ICBO Approved (No.3415)





SECTION PROPERTIES

Deck Type	Design Thick.	Weight (PSF) Ptd.	Weight (PSF) Galv.	I in^4/ft	Sp in^3/ft	Sn in^3/ft	Fy KSI
B24	0.0239	1.36	1.46	0.121	0.120	0.131	60
B22	0.0295	1.68	1.78	0.169	0.186	0.192	33
B21	0.0329	1.87	1.97	0.192	0.213	0.221	33
B20	0.0358	2.04	2.14	0.212	0.234	0.247	33
B19	0.0418	2.39	2.49	0.253	0.277	0.289	33
B18	0.0474	2.72	2.82	0.292	0.318	0.327	33
B16	0.0598	3.44	3.54	0.373	0.408	0.411	33

ACOUSTICAL INFORMATION

Deck Type	Absorption Coefficient 125	250	500	1000	2000	4000	Noise Reduction Coefficient*
1.5BA, 1.5BIA	.11	.20	.63	1.04	.66	.36	.65

* Source: Riverbank Acoustical Laboratories — RAL™ A94–185. Test was conducted with 1.5 inches of 1.65 pcf fiberglass insulation on 3 inch EPS Plaza deck for the SDI.

Type B (wide rib) deck provides excellent structural load carrying capacity per pound of steel utilized, and its nestable design eliminates the need for die-set ends.

1" or more rigid insulation is required for Type B deck.

Acoustical deck (Type BA, BIA) is particularly suitable in structures such as auditoriums, schools, and theatres where sound control is desirable. Acoustic perforations are located in the vertical webs where the load carrying properties are negligibly affected (less than 5%).

Inert, non-organic glass fiber sound absorbing batts are placed in the rib openings to absorb up to 65% of the sound striking the deck.

Batts are field installed and may require separation.

VERTICAL LOADS FOR TYPE 1.5B

No. of Spans	Deck Type	Max. SDI Const. Span	Allowable Total (Dead + Live) Uniform Load (PSF) Span (ft.-in.) C. to C. of Support 5'-0	5'-6	6'-0	6'-6	7'-0	7'-6	8'-0	8'-6	9'-0	9'-6	10'-0
1	B 24	4'-8	66	52	42	36	30	27	24	21	20		
	B 22	5'-7	91	71	57	47	40	34	30	27	24	22	20
	B 21	6'-0	104	81	64	53	44	38	33	29	26	24	22
	B 20	6'-5	115	89	71	58	48	41	36	31	28	25	23
	B 19	7'-1	139	107	85	69	57	48	41	36	32	29	26
	B 18	7'-8	162	124	98	79	65	55	47	41	36	32	29
	B 16	8'-8	206	157	123	99	81	68	58	50	44	39	34
2	B 24	5'-10	126	104	87	74	64	55	47	41	36	32	29
	B 22	6'-11	102	85	71	61	52	46	40	35	32	28	26
	B 21	7'-4	118	97	82	70	60	52	46	41	36	33	29
	B 20	7'-9	132	109	91	78	67	59	51	46	41	36	33
	B 19	8'-5	154	127	107	91	79	69	60	53	48	43	39
	B 18	9'-1	174	144	121	103	89	78	68	60	54	48	44
	B 16	10'-3	219	181	152	130	112	97	86	76	68	61	55
3	B 24	5'-10	130	100	79	65	54	45	39	34	31	27	25
	B 22	6'-11	128	106	89	76	65	57	50	44	39	34	31
	B 21	7'-4	147	122	102	87	75	65	56	49	42	38	34
	B 20	7'-9	165	136	114	97	84	72	61	53	46	41	36
	B 19	8'-5	193	159	134	114	98	84	71	61	53	47	41
	B 18	9'-1	218	180	151	129	111	96	81	69	60	52	46
	B 16	10'-3	274	226	190	162	140	119	100	85	73	64	56

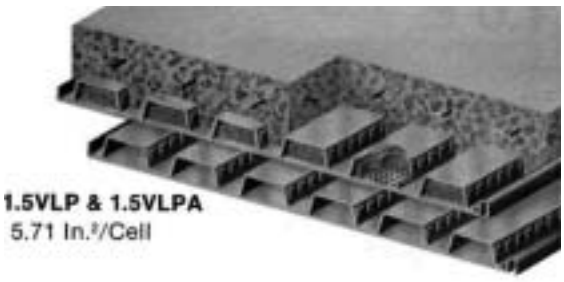
Notes:
1. Load tables are calculated using sectional properties based on the steel design thickness shown in the Steel Deck Institute (SDI) Design Manual.
2. Loads shown in the shaded areas are governed by the live load deflection not in excess of 1/240 of the span. A dead load of 10 PSF has been included.
3. ** Acoustical Deck is not covered under Factory Mutual

CELLULAR DECK

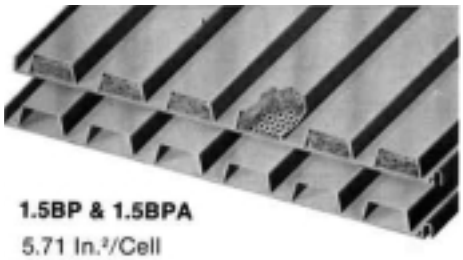
Galvanized Only
For: Electrified Raceways — Canopies — Long Spans
Heavy Forms — Flat Acoustical Ceilings

Vulcraft Cellular Units are approved by U.L. for use as Electrical Raceways.

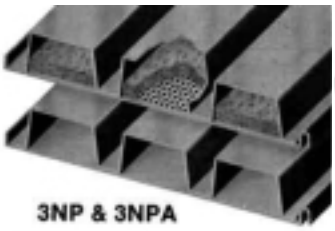
NOTE:
Insulation not installed by Vulcraft.



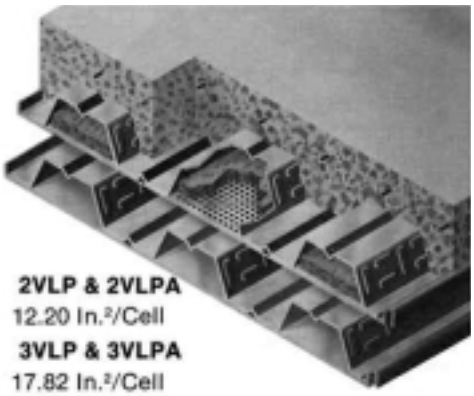
1.5VLP & 1.5VLPA
5.71 In.²/Cell



1.5BP & 1.5BPA
5.71 In.²/Cell



3NP & 3NPA
17.43 In.²/Cell



2VLP & 2VLPA
12.20 In.²/Cell

3VLP & 3VLPA
17.82 In.²/Cell

ACOUSTICAL DATA

Deck Type	Absorption Coefficients 125	250	500	1000	2000	4000	Noise Reduction Coefficient	RAL™ Test No.
1.5BPA	0.34	0.42	0.36	0.22	.017	0.17	0.30 W/O Insulation	A85-154
3NPA	0.40	0.38	0.47	0.19	0.11	0.17	0.30 W/O Insulation	A85-156
1.5VLPA	0.09	0.11	0.25	0.14	0.16	0.28	0.15 W/O Insulation	A86-317
2VLPA	0.12	0.24	0.20	0.14	0.07	0.18	0.15 W/O Insulation	A86-319
3VLPA	0.33	0.31	.030	0.14	0.09	0.01	0.20 W/O Insulation	A86-321
1.5BPA	0.38	0.49	0.63	0.98	0.74	0.54	0.70 W/ Insulation	A85-155
3NPA	0.48	0.56	0.98	0.92	0.72	0.58	0.80 W/ Insulation	A85-157
1.5VLPA	0.14	0.21	0.61	0.99	0.69	0.27	0.65 W/ Insulation	A86-318
2VLPA	0.31	0.41	0.94	0.88	0.56	0.44	0.70 W/ Insulation	A86-320
3VLPA	0.40	0.56	1.07	0.78	0.57	0.35	0.75 W/ Insulation	A86-322

W/Insulation indicates rigid insulation in the cells. Source: Riverbank Acoustical Laboratories.

SECTION PROPERTIES

Deck Type	Hat/Pan Gage	Design Thickness Hat	Pan	Wt PSF	I in^4/ft	SP in^3/ft	SN in^3/ft
1.5VLP and 1.5BP	20/20	.0358	.0358	3.83	.357	.301	.394
	20/18	.0358	.0474	4.36	.388	.310	.413
	18/20	.0474	.0358	4.47	.483	.446	.510
	18/18	.0474	.0474	5.00	.527	.458	.532
	18/16	.0474	.0598	5.56	.567	.468	.556
	16/18	.0598	.0474	5.68	.668	.631	.657
	16/16	.0598	.0598	6.24	.722	.664	.685
2VLP	20/20	.0358	.0358	3.59	.675	.417	.426
	20/18	.0358	.0474	4.10	.726	.425	.441
	18/20	.0474	.0358	4.16	.841	.585	.554
	18/18	.0474	.0474	4.67	.902	.595	.572
	18/16	.0474	.0598	5.22	.960	.606	.589
	16/18	.0598	.0474	5.28	1.083	.741	.709
	16/16	.0598	.0598	5.83	1.153	.754	.731
3VLP	20/20	.0358	.0358	3.75	1.484	.650	.657
	20/18	.0358	.0474	4.26	1.594	.662	.681
	18/20	.0474	.0358	4.36	1.840	.904	.853
	18/18	.0474	.0474	4.88	1.980	.922	.883
	18/16	.0474	.0598	5.43	2.103	.936	.910
	16/18	.0598	.0474	5.54	2.365	1.146	1.094
	16/16	.0598	.0598	6.09	2.517	1.166	1.128
3NP	20/20	.0358	.0358	4.30	1.465	.610	.976
	20/18	.0358	.0474	4.83	1.583	.624	1.017
	18/20	.0474	.0358	5.08	1.979	.892	1.266
	18/18	.0474	.0474	5.61	2.152	.913	1.315
	18/16	.0474	.0598	6.18	2.308	.933	1.367
	16/18	.0598	.0474	6.45	2.750	1.257	1.626
	16/16	.0598	.0598	6.98	2.962	1.285	1.682

Note: These Deck Types are only manufactured at the Nebraska Plant.

Acoustical Steel Roof Deck

Wheeling Roof Deck

Designed to serve as a sound-absorbing ceiling as well as a structural roof deck, Wheeling's acoustical roof deck is identical to its standard deck counterpart, except the webs of fluted profiles are perforated and the bottom plate of cellular deck is perforated. The perforation pattern is 5/32" diameter holes staggered 3/8" on center. Structural properties are negligibly affected by the web perforations in fluted deck or bottom plate perforations in cellular deck (less than 5%).

The sound absorbing elements consist of rolls of glass fiber, furnished by Wheeling, which are placed in the ribs between the perforated webs on the job site by the roofing contractor. Sound absorbing glass fiber elements are factory installed in cellular roof decks. Stand off clips, elevating the glass fiber in cellular decks are available only as a special order.

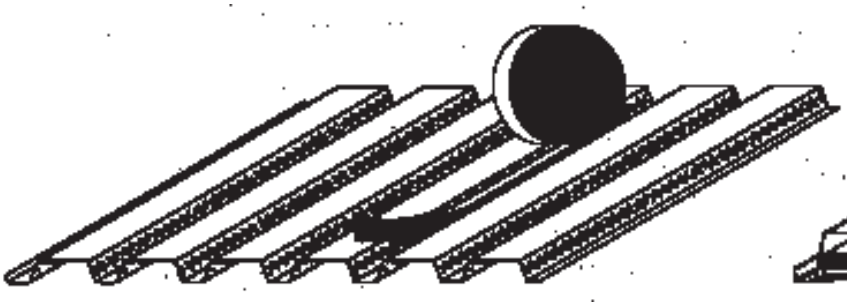
When painted acoustical deck is preferred, shop-applied primer over galvanized is recommended.

Sound Absorption Data

Panel Profile	Absorption Coefficient						NRC	Glass Fiber Roof Insulation
	125 HZ	250 HZ	500 HZ	1,000 HZ	2,000 HZ	4,000 HZ		
BW-A	.53	.95	1.02	.96	.55	.30	.85	1-7/8"
N-A	.93	1.26	1.09	.90	.56	.37	.95	2"
1-1/2" Cellular-A	.20	.33	.74	1.00	.57	.41	.65	2"
3" Cellular-A	.46	.64	1.12	.99	.76	.58	.90	2"

Performance values are based upon tests conducted by Riverbank Acoustical Laboratories.

Acoustical tests conducted by Riverbank Acoustical Laboratories for the Steel Deck Institute with 3" EPS Plaza Deck Form Roof Insulation found the NRC values to be .65 for 1-1/2" WR Deck and .70 for 3" DR Deck.



ACOUSTICAL ROOF DECK

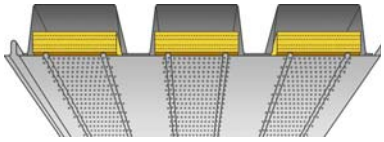
CELLULAR ACOUSTICAL ROOF DECK

USD United Steel Deck, Inc.

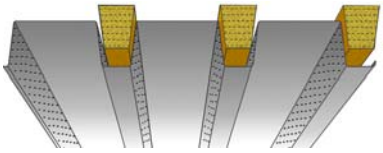
DECK DESIGN DATA SHEET #45

YOU'LL LIKE WHAT YOU HEAR WHEN YOU SPECIFY USD'S ACOUSTIC ROOF DECK.

SUMMARY OF ACOUSTIC TEST DATA FOR STANDARD DECK CONSTRUCTIONS



CELLULAR TYPE (NCAS SHOWN)



STANDARD TYPE (NSA SHOWN)

ASTM C423 ACOUSTIC TEST REPORT	PRODUCT	FREQUENCY/SOUND ABSORPTION COEFFICIENT						NRC
		125	250	500	1000	2000	4000	
A76-125 (Non-Polyencapsulated)	BA, BIA	0.47	0.93	1.06	0.96	0.56	0.23	0.90
A76-124 (Non-Polyencapsulated)	NSA, NIA	0.59	1.00	1.05	0.95	0.60	0.34	0.90
A02-246 (Polyencapsulated)		0.84	1.08	1.03	0.79	0.44	0.35	0.85
A79-181 (Non-Polyencapsulated)	JA	0.83	0.99	0.97	0.78	0.53	0.43	0.80
A02-245 (Polyencapsulated)		1.09	1.14	1.12	0.78	0.56	0.50	0.90
A02-239 (Polyencapsulated)	HA6	1.15	1.10	1.02	0.61	0.52	0.40	0.80
A00-94 (Non-Polyencapsulated)	HA7.5	1.12	1.03	0.87	0.63	0.58	0.63	0.80
A02-241 (Polyencapsulated)		1.39	1.16	0.94	0.58	0.46	0.44	0.80
A02-237 (Non-Polyencapsulated)	BCAS	0.44	0.58	0.71	0.96	0.87	0.58	0.80
A03-108 (Polyencapsulated)		0.40	0.58	0.79	1.08	0.80	0.55	0.80
A02-238 (Non-Polyencapsulated)	NCAS	0.89	0.67	1.12	1.04	0.83	0.67	0.90
A03-107 (Polyencapsulated)		0.65	0.74	0.89	1.05	0.73	0.46	0.85
A04-007 (Non-Polyencapsulated)	JCAS	1.00	1.00	1.09	0.94	0.78	0.74	0.95
A03-129 (Non-Polyencapsulated)	HCA6S	1.23	1.01	1.10	0.88	0.84	0.75	0.95
A03-127 (Non-Polyencapsulated)	HCA7.5S	1.35	1.04	1.08	0.77	0.83	0.71	0.95

NOTE:

This table presents the acoustic test results for our Standard Products & Insulation Systems. Non-standard system test results are available for some products and normally include a variation in either insulation density or thickness, or deck perforation pattern. The standards are preferred. Contact the Summit, NJ office if greater performance is necessary.

The noise reduction coefficient (NRC) is the average of the sound absorption values for the 250, 500, 1000, & 2000 Hertz frequencies. The average is rounded to the nearest .05.

Polyencapsulated - Fiberglass insulation is enclosed in polyethylene. Normally specified in zones of high humidity.

See our website or catalog for product descriptions.

Insulation is shop installed in cellular decks.

Insulation is field installed in standard deck - normally by the roofing contractor.

We offer a wide array of acoustic deck products which offer significant noise reduction. *Call us on your next job.* JUST KEEP IT QUIET!

For further information on any of our products or for the nearest NJB sales representative, contact us at:

Nicholas J. Bouras, Inc.
Home Office
25 DeForest Avenue
Summit, NJ 07901
1.800.631.1215
www.njb-united.com

NICHOLAS J. BOURAS, INC. Sales/Engineering/Detailing

UNITED STEEL DECK, INC. Manufacturers of steel floor and roof decking

THE NEW COLUMBIA JOIST COMPANY Manufacturers of open web steel joists/joist girders & specialty trusses

PRIOR COATED METALS, INC. Coil Coating/Leveling/Slitting

ABA TRUCKING CORPORATION Steel Transportation

BOURAS INDUSTRIES INC.

HUDSON, CO • HARTFORD, CT • JACKSONVILLE, FL • WESTMONT, IL • INDIANAPOLIS, IN • BOSTON, MA • COLUMBIA, MD • DETROIT, MI
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MARKETING BULLETIN

M71

Tectum™ Roof Deck vs. Acoustical Steel Deck

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Does acoustical (perforated) steel deck provide honest NRC values? Answer: No.

Can there be a model code violation involved with typical specifications of acoustical (perforated) steel deck? Answer: Yes.

A detail drawing is shown on reverse side which describes these problems.

I. Shows acoustical steel deck which does meet codes and does provide published NRC's. The problem is rigid fiberglass roof insulation, 1 7/8" thick or greater, is not specified in today's architectural community.

II. Typical specifications substitute isocyanurate insulations because of cost/R. Foam plastic insulation (Iso) without a thermal barrier is a violation of all model codes and a fire hazard. NRC values are also compromised.

III. To comply with code, a thermal barrier (such as 1/2" gypsum board) is placed between the acoustical steel deck and the Iso. Resulting NRC's are again severely compromised and the cost of the system increases.

Tectum Roof Decks provide honest NRC's and meet all model code requirements.

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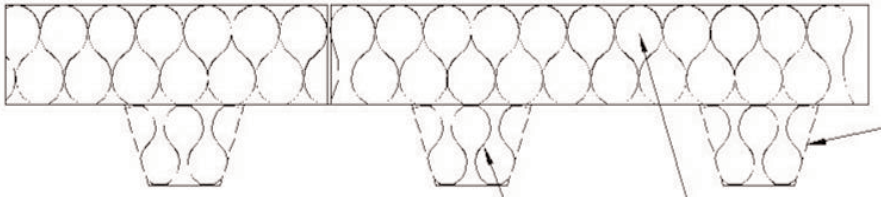
I. ACOUSTICAL STEEL DECK AS TESTED



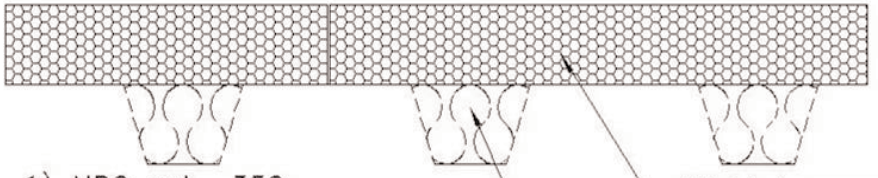
Type BA Steel Deck

1) NRC tested at .85
2) Thermal Barrier not required (no foam plastics)

1-7/8" Rigid Fiberglass Roof Insulation

Fiberglass batt insulation in flutes

II. ACOUSTICAL STEEL DECK TYPICAL INSTALLATION

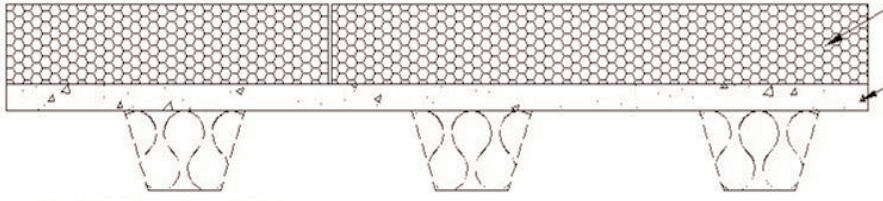


1) NRC est. .35?
2) Code violation
3) No thermal barrier or alt. tests

Rigid Isocyanurate Foam(various thickness)

Fiberglass batt insulation in flutes

III. ACOUSTICAL STEEL DECK CODE COMPLIANT



Thermal Barrier
(1/2" Gypsum board or equivalent)

1) NRC est. .35?
2) Meets code requirements

REVISIONS			
NO.	DATE	BY	REMARKS

TECTUM

Steel Deck(BA) Installations

DATE 4/1/98 SCALE none DRAWING NUMBER

DRWN: LDB CHECKED:

APPROVED:

CAD FILE: stdeckac

T 68

TECHNICAL BULLETIN

Tectum™ Roof Deck Sound Absorption

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

SOUND ABSORPTION

Absorption Coefficients Hz

Thick.	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	NRC
1 1/2”	0.21	0.07	0.18	0.22	0.22	0.28	0.29	0.48	0.51	0.70	0.82	0.92	0.77	0.64	0.59	0.76	0.96	0.87	0.55
2"	0.25	0.15	0.19	0.24	0.26	0.33	0.44	0.62	0.71	0.91	0.94	0.87	0.70	0.64	0.74	0.95	0.92	0.92	0.60
2 1/2”	0.05	0.20	0.26	0.26	0.31	0.45	0.56	0.72	0.91	0.98	0.84	0.74	0.72	0.77	1.00	0.87	0.90	0.99	0.65
3"	0.14	0.21	0.26	0.35	0.41	0.58	0.73	1.00	1.08	0.92	0.75	0.68	0.83	1.00	0.92	0.99	0.97	0.99	0.80
3 1/2” (1 1/2" +1 1/2”) Tectum III	0.11	0.16	0.15	0.11	0.23	0.30	0.38	0.49	0.53	0.65	0.78	0.89	0.98	0.88	0.75	0.72	0.88	1.10	0.60
2" Tectum 2" EPS	0.14	0.19	0.17	0.26	0.34	0.44	0.56	0.71	0.89	1.01	1.00	0.96	0.89	0.83	0.90	1.02	0.93	1.01	0.70
2 1/2” Tectum 2" EPS	0.26	0.28	0.22	0.32	0.38	0.50	0.63	0.82	0.97	1.02	0.91	0.86	0.87	0.90	1.03	0.94	0.92	1.02	0.75
3" Tectum 2" EPS	0.26	0.22	0.24	0.39	0.48	0.67	0.87	1.02	1.02	0.91	0.79	0.79	0.90	0.99	0.94	0.99	0.97	0.97	0.80

Note: All tests administered with Mounting Style A.

TECTUM INC.
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TECHNICAL BULLETIN

T 41

Tectum™ III Relative Humidity Upper Limits

Rev. April 2006

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Inside relative humidity must be considered when designing a structure. Materials chosen for construction must be able to withstand the environment in which they are erected. Tectum III may be used in buildings with high relative humidity providing proper design criteria are followed.

It is important that free water does not continually or repeatedly soak the Tectum product. This can occur by a break in the roofing membrane. It can also occur by condensation of water vapor in the Tectum substrate. The solution for a break in the roofing membrane is simply repairing the leaks. The condensation of water vapor is more difficult to understand. The following examples illustrate the use of 3-1/2" Tectum III under various high humidity conditions and how the relative humidity effects the Tectum product.

Example #1

Mean outside temperature is 0°F
Mean inside temperature is 70°F
Inside relative humidity is 49%
From Relative Humidity-Dew Point Tables (See Figure 2), the dew point is 50°F.
The winter R-value of 3-1/2" Tectum is 11.75
The temperature differential is 70°F - 0°F = 70°F
The insulation value below E (See Figure 1) is 0.61 + 2.63 = 3.24
The temperature at E is 70° - ((3.24/11.75) x 70°) where 70° is the inside temperature.

The ratio of the temperature differential at Point E is 3.24/11.75

70° - ((3.24/11.75) x 70°) = 70° - 19.30° = 50.7°F

At this temperature, the water is still in the vapor stage. The dew point temperature would be reached in a lower level of the Styrofoam[1]. Styrofoam prevents rapid moisture migration[2]. The water vapor does not penetrate the foam to condense as water in the Styrofoam in the Tectum base.

Example #2

Outside temperature is 90°F
Inside Temperature is 75°F
Outside relative humidity is 50%
From Relative Humidity-Dew Point Tables (See Figure 2), the dew point is 78°F.
The summer R-value of 3-1/2" Tectum III is 12.14
The temperature differential is 90° - 75° = 15°F.

The temperature at F is 75° + ([90° - 75°] x ((.92/12.14)) = 76.1°F

The temperature at E is 75° + ([90° - 75°] x ((.92 + 2.63)/12.14) = 79.4°F

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The dew point temperature for the outside temperature and humidity falls in the Tectum layer but the BUR and the Styrofoam brand insulation are vapor retarders[2]. The water vapor does not penetrate to the Tectum in sufficient quantities to cause condensation.

Example #3

Mean outside temperature is 10°F
Mean inside temperature is 70°F
Inside Relative Humidity is 65%
From Relative Humidity-Dew Point Tables, (See Figure 2), the dew point is 57°F.
The temperature differential is 70° - 10° = 60°F
The R-value below the Tectum foam (E) interface is 0.61 + 2.63 = 3.24

The temperature at E is 70° - ((3.24/11.75) x 60°) = 53.5°F

The temperature at F is 70° - ((.61/11.75) x 60°) = 66.9°F

Water vapor will condense to free water in the Tectum under these conditions.

If we increase the Styrofoam to 3", the total R of the Tectum III system becomes 19.25

The temperature at E becomes 70° - ((3.24/19.25) x 60°) = 59.9°F

The water vapor does not penetrate the foam to condense as water in the Styrofoam[2].

Care must be taken to prevent break or gaps in the system as this could cause condensation in the Tectum at the joints.

[1] Trademark of The Dow Chemical Company

[2] Perm rating 0.6, water, absorption 1% by volume

FIGURE 2

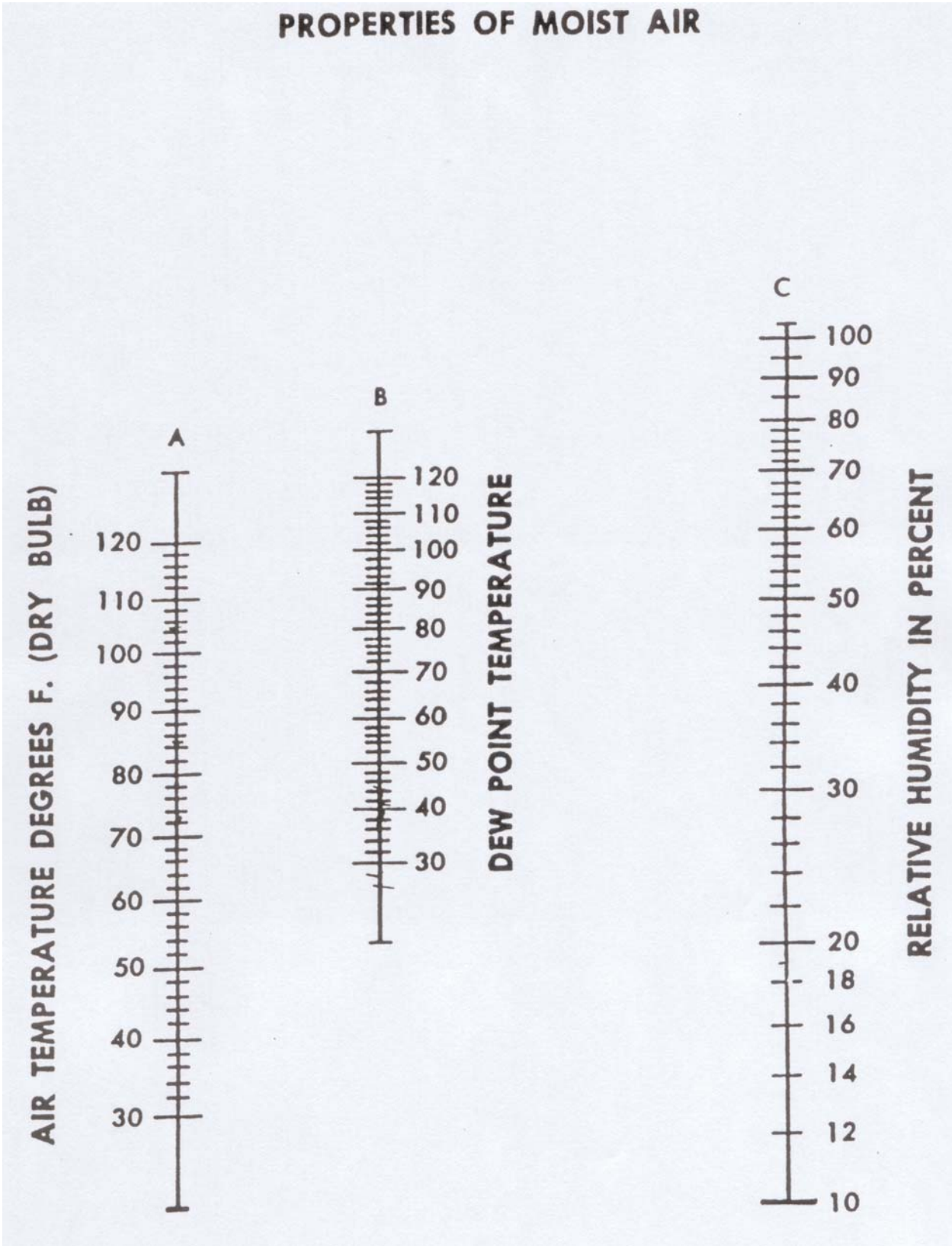
PROPERTIES OF MOIST AIR
AIR TEMPERATURE DEGREES F. (DRY BULB)
A
120
110
100
90
80
70
60
50
40
30
B
120
110
100
90
80
70
60
50
40
30
DEW POINT TEMPERATURE
C
100
90
80
70
60
50
40
30
20
18
16
14
12
10
RELATIVE HUMIDITY IN PERCENT

FIGURE 3

A
B
C
D
E
F
G
R-Values
Outside Air Surface
0.17 wint
0.25 sum
BUR
0.24
SB
0.60
Styr. f. am Insulati. n
1-1/2"
7.50
1-1/2" Tectum
substrate
2.63
Inside Air Surface
0.61 wint
0.92 sum
A – Outside Air
B – Outside Air Surface/BUR interface
C – BUR/SB interface
D – SB/Styr. f. am Brand Insulati. n interface
E – Styr. f. am Brand Insulati. n/Tectum substrate interface
F – Tectum substrate/Inside Air interface
G – Inside Air
Composite R-Value
11.75 winter
12.14 summer

T3 TECHNICAL BULLETIN

Dew Point and Tectum™ Panels

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Dew Point is defined as the temperature at which air becomes over saturated with moisture and the moisture condenses. A dew point is not the same as humidity alone.

A dew point of concern in a building results when the condensation from high inside humidities and low outside temperatures cause a dew point within the exterior building products. Tectum panels have been used for many years in very high humidity areas such as swimming pools and natatoriums without problems when they are properly designed. Tectum III panels have a built-in vapor retarder with the Dow Styrofoam** insulation.

A dew point that results from inside/outside temperature differences, with moisture, can create problems with any roof deck including Tectum roof deck unless a vapor retarder is present with additional insulation above the vapor retarder. The objective is to add a vapor retarder and additional insulation to Tectum panels so that the dew point (condensation) does not occur within the Tectum panels and moisture does not penetrate the insulation and condense.

The amount of insulation to be used is determined by the inside/outside January temperatures and the relative humidity expected in the building. A chart is available in the current roof deck catalog showing the amount of insulation required to keep the dew point out of the Tectum deck. For example, the outside temperature at 12° F, an average mean temperature in January in Minnesota, with an inside temperature at 70° F and with a humidity of 30 percent in the building; a vapor retarder and a minimum insulation of R-7 should be added to Tectum I panels. Tectum III panels should be used if a high vapor drive is anticipated.

Every building has a certain amount of humidity. However, it becomes a problem only when the inside humidity and the outside temperature combine to cause condensation in the deck or insulation.

Proper design prevents a dew point from occurring within the roof deck system by designing for the average mean January temperature in the area, the likely normal humidity percentage inside and the probable inside temperature.

** Trademark of the Dow Chemical Company

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

T 57 TECHNICAL BULLETIN

Tectum™ Roof Deck Ventilation Requirements

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Roof Decks may be used in conjunction with a suspended ceiling. Ventilation to the outside of the building must be provided in the ratio of 1/300 square feet of area for the plenum.

Vents should be provided at the exterior and on all sides of the building, wherever practical. Ridge vents are recommended on sloped roofs. Local building codes should be consulted to verify that all ventilation requirements of the code are being met.

DO NOT vent shower rooms, cavity walls, exhaust fans and similar areas into the plenum.

A building should be designed to have adequate ventilation on an individual basis just as the structural steel is designed for each structure. Ventilation requirements should not be neglected in order to reduce construction costs.

Tectum Inc. recommends that the architect consult a mechanical engineer for ventilation requirements where humidity and temperatures higher than normal are anticipated.

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TECTUM INC.
The Noise Control Solution

MGA

Michael Garrison Associates

January 19, 2006

Mr. John J. Dames
North Central Regional Manager
Tectum, Inc.
7470 Whitehall Colonial Lane
St. Louis, MO 63119-4421

TO WHOM IT MAY CONCERN:

I am writing to express my sincere appreciation for the consistently high quality of product, excellent value and great support service that Tectum has provided to MGA and our church clients over the past 10 years. As acoustical consultants, it is our job to know and work with a variety of manufactures of acoustical products; we consider Tectum to be among the very best.

I would like to point out two products in particular that have contributed significantly to the success of our projects:

1. Tectum Roof Deck has become for us a foundational element to achieve an acceptable baseline acoustical environment for churches that engage in a contemporary style of worship – not only for auditorium-type spaces, but especially for multi-purpose assembly/activity facilities. This completely avoids the undesirable metallic resonance produced by typical metal roof decks in the presence of loud music. Brownsburg Christian Church, for example, completed their 1,000-seat main assembly space just outside of Indianapolis in November 2001, where acoustic "clouds" were suspended below the Tectum roof deck with great results. [See attached photo.]
2. Tectum Finale with Fabri-Tough Wall Panels provide great value as compared to other acoustically absorptive products, not only because of favorably low cost by comparison, but also because of unmatched durability. These panels were a key part of the overall (and very successful) acoustical design for Southland Christian Church's 3,000-seat Lexington, KY multi-purpose main assembly space completed in October 2001. [See attached photo.]

We are always pleased to specify these and other Tectum products to our church clients, knowing that we can rest assured that the end results will meet, or exceed our expectations.

Sincerely,

Michael R. Garrison
Principal Consultant

255 West Fallbrook Avenue, Suite 101 • Fresno, CA 93711 • 559•434•7000 • Fax: 559•434•7001 • www.mgawest.com
California Contractors License #778327

MANTEL TETER : ARCHITECTS

building **relationships** designing **solutions**

W. DWIGHT TETER, AIA
RODNEY R. FAGER, AIA
DAVID E. EVANS, AIA

January 25, 2006

Tectum Inc.
7470 Whitehall Colonial Lane
St. Louis, MO 63119-4421

Attn: John J. Dames
North Central Regional Manager

Re: Letter of Recommendation

Dear John,

I am always happy to endorse Tectum and their family of products as a highly effective and economical solution to meeting the acoustical needs within our designed facilities. Since our primary design specialty is religious facilities, sound, and the absence of it, is usually a critical design directive!

Our firm has been designing churches since 1961 and using Tectum in several applications over the years. Applications such as roof deck solutions to eliminate any chance of metal deck popping and flange buckling and acoustical wall panels or ceiling panels to control the acoustical environment of a space. These panels are extremely useful in spaces where acoustics are important to the client, yet abuse resistance is also a factor of concern.

We recently completed a church project for Pleasant Valley Baptist Church in Liberty, Missouri where Tectum ceiling and wall panels were used in their recreational facility. We also just completed and dedicated a brand new church campus for Community Covenant Church in Lenexa, Kansas where Tectum roof deck panels were used to eliminate any concern over popping metal roof decks. This project included a 1,000 seat Sanctuary, several classrooms, offices, and a gymnasium.

I highly recommend the consideration and use of Tectum panels. We have always found their products to be of high quality, versatile, and their technical staff very knowledgeable when assistance is needed.

Sincerely,

David E. Evans, AIA
President

4016 WASHINGTON STREET, SUITE 200
KANSAS CITY, MISSOURI 64111
T: 816.931.5600 F: 816.531.7537 www.mta-kc.com

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Chesterfield, MO 63005-1227
www.sebco.net

January 25, 2006

Mr. John Dames
Central Region Manager
Tectum, Inc.
7470 Whitehall Colonial Lane
St. Louis, MO 63119-4421

Re: Tectum Recommendation

Dear Mr. Dames,

It has been a pleasure to work with Tectum going back almost 25 years.

We have installed all types of Tectum Roof Decks on numerous church and/or school projects with excellent acoustics, finished ceiling, abuse resistance, as well as a suitable substrate for the finished roofing product.

In addition, we have installed Tectum Roof Decks over Wood, Steel and Concrete supports and in numerous slope applications.

The ability to offer the client almost any type of finished roofing product makes Tectum an excellent substrate.

We have also incorporated Tectum Interiors on many projects on walls ceilings, clouds and other curtain applications. Just like the roof deck, the interior products offer economical, practical, and proven performance for our clients. Installation is very easy and fast which is very important.

Material and accessories are all available thru Tectum in most cases and lead times are very reasonable.

Tectum also offers "Green" architecture which is gaining a lot of momentum.

We make every effort to promote Tectum whenever possible and look forward to another 25 years with Tectum!

If any other questions, please give us a call.

Sincerely,

Scott Brumbach/RB

Scott Brumbach
President
Sebco Companies, Inc.

S: Tectum/2006 Correspondence/Recommendation Letter

Titsch & Associates Architects, Inc.

March 8, 2006

Stephen A. Smith, Sr. Sales Representative
Tectum, Inc. - Florida Regional Office
1725 Tall Pine Circle
Safety Harbor, FL 34695

Dear Stephen:

Without question Tectum Roof Deck Systems are the ultimate solutions where the need is both structural and acoustical. For more than 40-years we have used Tectum on commercial projects, utilizing its structural and acoustical qualities, and also benefitting from the insulation value, durability to abuse and appearance characteristics. Tectum is unique, giving you five advantages in one.

Our design of exposed construction and Tectum roof deck for the multi-purpose room at Riverside Church has been so successful, the Southwest Florida Symphony held their annual concert there. The sound absorbing ability of Tectum is responsible for Riverside Church and the Symphony to acclaim the room to be the ideal performance hall.

Sincerely,

TITSCH & ASSOCIATES ARCHITECTS, INC.

Dave

David A. Titsch, NCARB, AIA
Architect

DAT:kf

(239) 936-4875 ■ FAX (239) 275-4151 ■ Lic. # AA0003606
13710-2 Ben C. Pratt/Six Mile Cypress ■ Fort Myers, Florida 33912
Email: staff@t-a-architects.com

LITTLEFIELD
ARCHITECTURE
Architects · Planners · Interiors

11674 Baptist Church Road • St. Louis, Missouri 63128 • 314.843.8453 • F 314.843.9656
archla@sbcglobal.net

January 26, 2006

Mr. John Dames
Tectum, Inc.
7470 Whitehall Colonial Lane
St. Louis, MO 63119-4421

Dear John:

It was good to hear from you. Yes, we have been most satisfied working with your company and your associates.

The two largest projects to date where we have used your products have been most successful. Peace Lutheran Church was completed about three years ago and First Baptist Church of DesLoge is bidding

We have no problem recommending your company to any one.

Sincerely,

LITTLEFIELD ARCHITECTURE

John W. Littlefield
President

JWL:ylp

THE Western FIREPROOFING COMPANY OF KANSAS. INC.

Loadmaster • Tectum • Elastizell Lightweight Concrete • Siplast Roof Insulation • Gypsum Roof Decks
Maxxon (Gyp-Crete) & Elastizell Floor Underlayments
Operable & Accordion Partitions

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1501 Westport Road
KANSAS CITY, MISSOURI 64111
PHONE: (816) 561-7667
FAX: (816) 561-1911

OKLAHOMA CITY OFFICE
5601 NW 72nd, Suite 178F
OKLAHOMA CITY, OKLAHOMA 73132
PHONE: (405) 720-9313
1-800-659-6577

February 2, 2006

Mr. John Dames
TECTUM, INC.
7470 Whitehall Colonial Lane
St. Louis, MO 63119-4421

RE: LETTER OF RECOMMENDATION

Dear John:

Western Fireproofing has represented Tectum for over 40 years. I don't believe we represent a product that performs as well as Tectum and provides great value for an owner. We do a tremendous amount of churches with Tectum for the acoustical value and also for the fact that it eliminates the metal deck in these applications which creates a quiet system and eliminates any popping sounds from the metal deck. We often times, will use acoustical wall panels in gymnasiums and sanctuaries also to help absorb sound.

I strongly recommend and endorse Tectum products as we feel they are very high quality product and one which the owner is always satisfied with.

Sincerely,

WESTERN FIREPROOFING COMPANY OF KANSAS, INC.

A. L. Bontrager

A.L. Bontrager
/ALB/jz

Wm. H. O. Kroll & Associates, Inc.
Engineers Consulting In Acoustics
5217 West Mill Road • Minnetonka, Minnesota 55345
Phone 952-934-9494 • FAX 952-934-1300

5 November, 2004

Tectum Inc.
PO Box 3002
Newark, OH 43058-3002

For Mr. Steve Udolph - Marketing Manager

Dear Sir:

After years of singing the praises for Tectum in the form of recommendations to my clients, I do now take the time to thank you for having the product available.

I am an engineer with a specialty in acoustics - sound, noise and vibration - one with a track record of over 1,000 projects in some thirty states from New York to California. At this time with the press of a heavy backlog of projects along with the stress of deadlines, it is really nice to be able to confidently recommend a product such as Tectum to our clients.

Things going for Tectum, to wit: a consistent performance in terms of durability, fire rating, withstanding microscopic growth, predictable acoustical characteristics, reasonable in cost and specially so for Tectum Finale, a good sound absorber at a wide range of frequencies and a great cost of labor savings at installation. For really low frequency needs, we oft times recommend one inch Tectum board as an outer, durable layer over furred-out three to six inch fiberglass or cellulose batts.

My office over the years has recommended Tectum products on an average of at least once per week to out clients. Do keep up with the good work.

Very truly yours,

Wm. H. O. Kroll, P.E.

Tectum Inc.
P.O. Box 3002
Newark, OH 43058-3002

February 27, 2009

To Whom it May Concern,

Tectum Tonico ceiling panels and Standard Tectum wall panels were installed in the McColl Pond Environmental Learning Center in Savage, Minnesota during construction in 2008.

We are applying for Leed Certification for the project, and to use Tectum for Leed credit MR 7, Certified Wood, we need to verify the percentages of wood versus other components in the finished panel.

I'd like to add that your website is one of the few that provides Leed information in an organized and in-depth manner adequate to fill out Leed Letter Templates and actually achieve certification. Well presented information like yours streamlines the Leed documentation effort and helps put more dollars in our client's pockets - which they will hopefully use to buy more Tectum and other green building materials! I hope you will consider adding the requested information to your Tectum Products and LEED Q&A Bulletin.

Your help is greatly appreciated, as are your fine products!

Thank you,

Brandon Sigrist, Leed AP
Partners & Sirny Architects
Minneapolis, MN 55404
bsigrist@partnersandsirny.com
612-341-1070 ext. 217

TECTUM INC.

The Noise Control Solution

Accessories

MARKETING BULLETIN

M 38

Tectum™ Accessories

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Inc. offers and stocks a full line of accessories for its Interior Wall & Ceiling Panels and Structural Roof Deck product lines. These products can be top-loaded on material shipments from the Tectum Inc. plant.

1. **CODE LISTINGS**

Code listings are often based on tests conducted on the product in conjunction with the standard Tectum accessories. Product acceptance by authorities having jurisdiction is jeopardized by using accessories that are not tested or may not meet Tectum specifications. Often times, maintaining a sufficient volume of accessories to assure a supply becomes a problem. To meet the structural requirement of most codes, it is important to use Tectum accessories.

2. **TECTUM WARRANTY DEPENDS UPON APPROVED ACCESSORIES**

The Tectum warranty may be forfeited if substitutes are used for Tectum accessories. It is important to convey to the contractor the importance of using approved materials as accessories when specified as the fastening or part of the structural support system.

3. **SUBSTITUTE ACCESSORIES**

If you contemplate or have used substitutes for Tectum accessories in the past, we suggest that you provide tests by a recognized testing facility to certify that these accessories meet specification requirements, if the structural integrity or fastening system is part of the warranty. Test results should be submitted to Tectum Inc. and a certificate of acceptance will be issued to reinstate the warranty.

4. **ACCESSORIES AVAILABILITY**

Accessories are now available and priced by the piece, pound, or unit. The price list states the minimum quantity you should order. Tectum Inc. will maintain a stock of accessories and will have them available for use with Tectum products. Standard lead times will apply to most accessories.

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

T 38 TECHNICAL BULLETIN

Mechanical Fasteners for Retro-Fit and the Addition of Insulation to Tectum™ Roof Deck

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Inc. does not recommend the use of toggle bolts. Structural properties and appearance of roof deck is jeopardized by using toggle bolts as they provide a thermal bridge that can cause condensation and wet areas around the bolt.

As an acceptable alternative to toggle bolts, there are a number of fasteners available for fastening rigid insulation to Tectum Roof Deck.

Several manufacturers have developed fasteners for attaching rigid insulation and mechanically attaching membranes to Tectum Roof Decks. Many of the decks, where the fasteners are required, have been in place many years and are being upgraded with insulation and new roofing membranes. Each fastener has advantages or limitations when compared to the others. Some of the areas to consider in selecting the most acceptable fastener on any project are the withdrawal resistance, cost, availability, ease of installation, thermal conductance and equipment required for installation.

The fasteners listed below may be considered for this type of application. For re-roofing old Tectum Roof Decks, any fastener or system that is selected must be field tested to determine the pullout resistance and maximum spacing based on the uplift requirements. This is not an endorsement or recommendation for any of the fasteners listed. Other fasteners not listed could be considered on their performance in tests and field pullouts.

Another type of product used to attach insulation to Tectum Roof Decks is foam adhesive.

The inclusion of another manufacturer's products in our literature does not indicate an endorsement or guarantee. The use, application, and installation must conform to that individual manufacturer's instructions and literature.

The following is a list of fastener manufacturers:

1)	Buildex - Polymer Gyptec	800-BUILDEX
2)	Creative Construction Components - Peel Rivot	800-634-5979
3)	Olympic Fasteners	800-633-3800
4)	Power Fastening Inc. - Powerlite	914-235-6300
5)	Firestone Building Products	800-428-4442
6)	TruFast	800.443.9602

The following is the foam adhesive manufacturer:

1)	Insta-Foam Products Inc. - Insta-Stik	800-800-3626

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

M73 MARKETING BULLETIN

Roof Deck Attachment - TrueFast* Self Drilling Screws

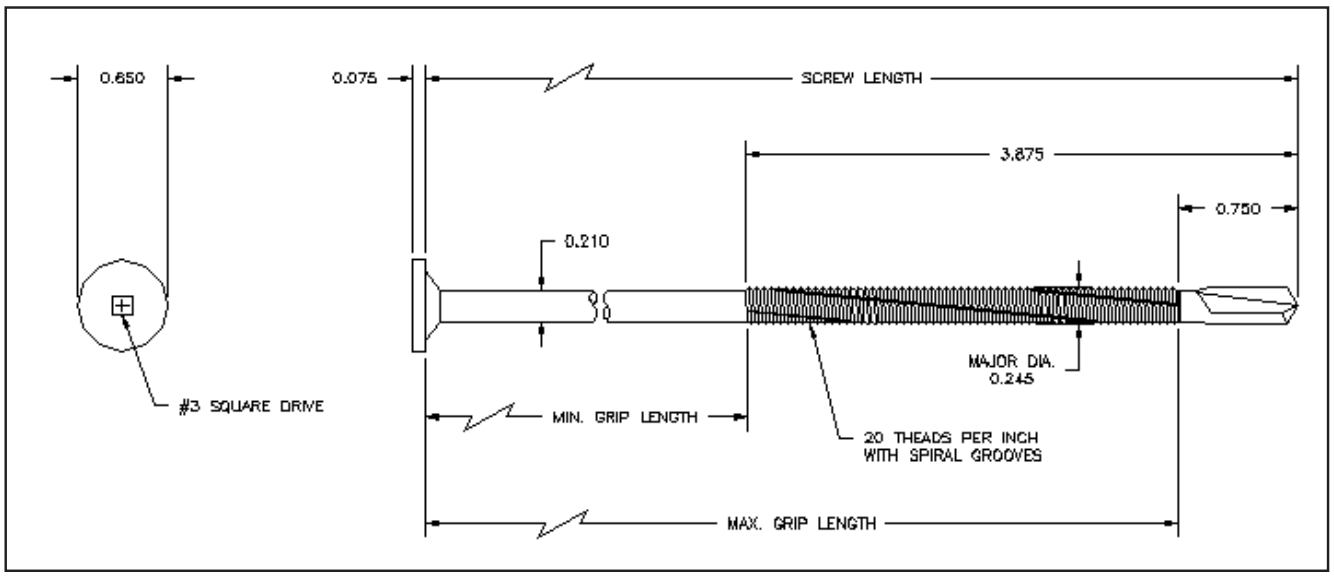
Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Installation Instructions: Fasteners should be installed using a maximum 2500 rpm screw gun having a minimum 6.5 amp motor. When fastening structural insulated panels to thick bar joists, it may be necessary to reduce speed of screw gun (i.e. 1500 rpm) to facilitate drilling. Fasteners should never be struck with a hammer during installation.

SCREW SELECTION GUIDE		
Screw Length	**Min. Grip Length**	**Max. Grip Length**
6"	2 1/8"	5 1/4"
8"	4 1/8"	7 1/4"
9 3/4"	5 7/8"	9"
11 3/4"	7 7/8"	11"
13 3/4"	9 7/8"	13"

Physical Property	Substrate	Mean Ultimate Test Value
Shear Strength		3200 lbs.
Head Pull-Through Resistance	12" x 12" x 6" thick SIP Panel 7/16" OSB skins with EPS core	800 lbs.
Pull-Out Resistance	16 ga. 13 ga.	1000 lbs. 1500 lbs.



* Trademark of TruFast

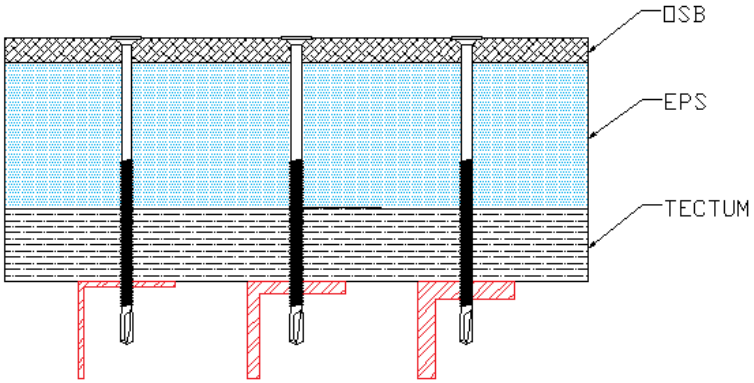
™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

SIP HD DRILL TIMES

Using Tectum Panel

Angle Iron Thickness	1/8"	1/4"	3/8"
Time (sec)	5	8	37
	6	10	16
	5	8	57
	4	8	12
	5	8	24
	5	7	14
	5	10	14
	4	8	27
	5	12	24
	5	12	20
	6	10	15
	6	10	12
	5	10	18
	5	12	24
	4	16	16
	6	10	18
	7	13	15
	5	9	16
	5	11	25
	5	9	23
	4	12	17
	4	9	15
	5	24	16
	5	13	18
	6	11	27
	6	8	12
	5	15	25
	4	16	14
	3	11	13
	4	9	15
	5	11	18
	5	13	15
	4	12	20
	8	7	27
	4	9	19
	4	11	16
	4	11	14
	5	21	17
	4	10	22
	5	13	31
	4	15	26
	3	9	14
	5	12	16
	6	10	20
	5	14	20
Average Time	**4.9**	**11.3**	**19.9**
Max Time	**8**	**24**	**57**
Min Time	**3**	**7**	**12**



#14

#3 Phillips drive, 10 tpi, drill point

For insulation and membrane attachment to wood, steel, and structural concrete roof decks

- **Available pre-assembled to plastic Dekflat plate for insulation attachment and to seam plates for roof cover attachment.**
- **10 threads per inch for ease of installation in concrete roof decks.**
- **Low profile truss head can be used for clip attachment in applications where head height is important.**
- **Deep #3 recess provides for ultimate bit engagement.**
- **The Dekfast reduced drill point provides for ultimate pull-out values by producing a minimum opening. Thread engagement is superior as compared to standard drill points.**

Application

#14 Dekfast Fasteners

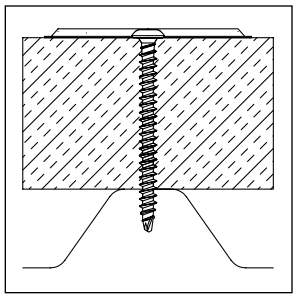
Insulation board to roof deck

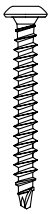
Materials:

- Steel thickness from 22 ga (.028 in.) through 18 ga (.045 in.): Min penetration: 3/4"
- Plywood: Min thickness: 3/4" FR treated; min through penetration: 1/4"
- Wood 2x (1-1/2" thick): Min penetration: 1"
- Structural concrete: Min penetration: 1"

Use with:

- Dekfast 2-7/8" hex plates
- Dekfast 3" round plastic Dekflat plates
- Other attachment elements approved by the roofing system manufacturer for use with its products





Head: #3 Phillips
Head Height: .118" max
Head Dia: .448" max
Thread Major Dia: .238"
Shank Dia: .180"

Strength (lbs ult.):
Tensile: 3600
Torsional: 110 in-lbs min
Shear: 2630

Pull-out: (lbs avg.):
22 ga: 540
20 ga: 630
18 ga: 900
4000 psi concrete (1" penetration): 850
3/4" plywood (through penetration): 590
2x dimensional lumber (1" penetration): 605

Notes

Dimensions are nominal inches unless noted. Steel roof decks include all FM-approved 18-20-22 ga. FM-approved wood decks include 3/4" FR plywood and 2x dimensional lumber. Structural concrete to be predrilled with standard 3/16" carbide bit to minimum 1/2" deeper than fastener penetration.

Selection

Length	Part No. Phillips Head #14-10	Steel	Wood	Concrete	Carton Wt. (lbs)	Carton Qty.	Skid Qty.
1-1/4"	A7210-999B	Up to 1/2"	Up to 1/4"	Up to 1/4"	12	1,000	60,000
2"	A7216-999B	Up to 1-1/4"	Up to 1-1/4"	Up to 1"	15	1,000	60,000
3"	A7224-999B	Up to 2-1/4"	Up to 2"	Up to 2"	24	1,000	60,000
4"	A7232-999B	1-1/4" to 3-1/4"	1-1/4" to 3"	2" to 3"	30	1,000	60,000
5"	A7240-999B	1-1/4" to 4-1/4"	1-1/4" to 4"	3" to 4"	38	1,000	40,000
6"	A7248-999B	2-1/4" to 5-1/4"	2-1/4" to 5"	4" to 5"	47	1,000	40,000
7"	A7256-999B	3-1/4" to 6-1/4"	3-1/4" to 6"	5" to 6"	27	500	30,000
8"	A7264-999B	4-1/4" to 7-1/4"	4-1/4" to 7"	6" to 7"	31	500	30,000
9"	A7272-999B	5-1/4" to 8-1/4"	5-1/4" to 8"	7" to 8"	34	500	12,000
10"	A7280-999B	6-1/4" to 9-1/4"	6-1/4" to 9"	8" to 9"	37	500	12,000
11"	A7288-999B	7-1/4" to 10-1/4"	7-1/4" to 10"	9" to 10"	42	500	12,000
12"	A7296-999B	8-1/4" to 11-1/4"	8-1/4" to 11"	10" to 11"	44	500	12,000

Approvals

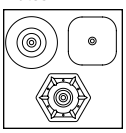
Dekfast fasteners are Factory Mutual approved for attachment of insulation board and/or roof cover to roof deck. Refer to FM Approval Guide and Supplements for current FM approved insulation fastening patterns. #14 fasteners exceed Factory Mutual corrosion-resistance Standard 4470.

Installation

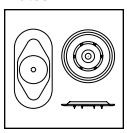
Tools: 2000–2500 rpm screw guns and #3 hardened Phillips bit. For structural concrete, 3/16" carbide bit and 1500 rpm max screw guns, or hammerdrills in the hammer mode.

Options

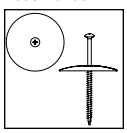
Insulation Plates



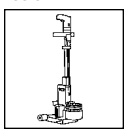
Membrane Plates



Assemblies



Installation Tools



Drill Bits

Coatings

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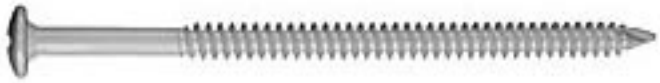
Fastener Coating System

Light Grey, Blue and Black Sentri XP Coating

Sentri™ XP is the most scientifically advanced coating system in the flat roof market today. Sentri XP is a specially formulated cathodic epoxy made up of small particles that are electrically driven and compressed onto each fastener, providing the ultimate in corrosion resistance coupled with increased lubricity for ease of installation. Each Sentri XP color exceeds 30 cycles of virtually rust-free performance in Kesternich testing.

Color

SFS intec is the first fastener manufacturer to introduce color to the flat roof market. An increased pigment configuration not only provides our customers with the ability to identify installed fasteners, but also increases the corrosion resistance as well. Current fastener color selection is light grey, blue, and black.



Light Grey Sentri™ XP

The latest SFS achievement in superior coating technology, light grey is less noticeable on the underside of raw galvanized steel and painted white decking. This is a valuable cost savings for applications where the underside of the deck will be exposed, such as in "big box" type retail stores and modern warehouses. Light Grey Sentri XP, used on all #12 fasteners, eliminates the need for white fasteners in these applications. There is not a lighter e-coating used in the flat roof market today that compares with Sentri XP light grey for combined corrosion resistance and aesthetic appearance.

Blue Sentri™ XP

Used on all #15 fasteners, Blue Sentri XP testing typically exceeds 50 Kesternich cycles. Currently, it has the highest corrosion resistance performance in the e-coated roof fastener business.

Black Sentri™ XP

Used on all #14 fasteners, Sentri XP black exceeds 30 Kesternich cycles and has been the benchmark coating that others in the industry strive to match.

Vertical Integration

Our in-house e-coat system is just another example of SFS' commitment to total control of our manufacturing process. We invite our customers to compare the quality, flexibility and service of SFS with that of any competitor, worldwide.

©2004 SFS intec, Inc.

ITW Buildex

POLYMER GYPTEC™

Reliable Mechanical Fastening of Insulation and Single-Ply Membrane to Gypsum and all Cementitious Wood Fiber Roof Decks (Cementious, Insulrock, Permadeck, etc).

Product Features

- Unique locking tabs lock the fastener to the plate, preventing back-out and pop-up.
- Tapered thread design increases thread surface area, providing excellent pull-out and back-out resistance.
- Large root diameter provides increased torsional strength, minimizing fastener breakage during installation.
- Internal 1/4" square drive assures fast, easy installation.
- Non-penetrating ... threads into deck material, not through it. Will not affect underside appearance.
- Round head design provides smooth surface at contact point with membrane, minimizing membrane abrasion.

Product Specifications

Diameter ..... 11/16"
Head Style ..... Internal 1/4" Square Drive
Material ..... Glass Reinforced Nylon
Installation ..... Heavy duty variable speed screwgun. (Installation in gypsum requires a 7/16" pre-drilled pilot hole.)

Plates

	Plate	Part No.	Material	Features
	3" Square Insulation Polymer GypTec Insulation	6237906	Galvalume	Unique design locks fastener to plate minimizing back-out and pop-up.
	2" Round Seam Polymer GypTec	6340904	Galvalume	Unique design locks fastener to plate minimizing back-out and pop-up.

POLYMER GYPTEC™ GYPSUM AND TECTUM DECK FASTENING

PRODUCT REPORT NO. 040702

Installation Guidelines

- A pullout test to determine the integrity of the roof deck is required for all Polymer GypTec installations.
- Polymer GypTec fasteners should be installed using a heavy duty variable speed screwgun. Installation at a low rpm is recommended.
- Minimum recommended embedment for Polymer GypTec fasteners is 1-1/2" into the deck material. The Polymer Gyp Tec fasteners should never penetrate the underside of the deck.
- To install Polymer GypTec fasteners into cementious deck, simply position and drive the fastener through the plate into the deck. In Gypsum and some cementitous wood fiber decks, pre-drilling a pilot hole is required. (Depending on substrate hardness, a 7/16", 1/2" or 9/16" pilot hole will be required.) The pilot hole should be 1/4" to 1/2" deeper than the required embedment into the deck.
- Fasteners should be spaced using a pattern specified by the insulation or membrane manufacturer.
- The fastener is fully seated when the head is tight against the Polymer GypTec plate. The fastener should not be overdriven as to cause the plate sur face to deflect more than 1/16".
- Overdriven Polymer GypTec fasteners will significantly reduce fastener and plate performance and/or cause the fasteners to strip-out. Underdriven fasteners will not distribute the load over the plate properly.

Polymer GypTec Selector Guide

Internal 1/4" square drive fastener assures easy installation of insulation and single-ply membrane to gypsum and cementitious wood fiber roof decks.

Part No.	Length	Drive Needed	Box Qty	Box Wt.(lbs.)
6223906	2-3/4"	1/4"SQ DR	500	12.5
6224906	3"	1/4"SQ DR	500	13.4
6225906	3-1/2"	1/4"SQ DR	500	15.3
6226906	4"	1/4"SQ DR	500	17.4
6227906	4-1/2"	1/4"SQ DR	500	20.5
6228906	5"	1/4"SQ DR	500	20.9
6229906	5-1/2"	1/4"SQ DR	500	22.1
6230906	6"	1/4" SQ DR	500	23.9
6231906	6-1/2"	1/4" SQ DR	500	26.0
6232906	7"	1/4" SQ DR	500	27.4
6233906	7-1/2"	1/4" SQ DR	250	14.6
6318910	1/4" Square Drive			

Pullout Values

In Cementious

Depth	1-1/2"	1-3/4"	2"
Lbs.	338	400	422

In Poured Gypsum

Depth	1-1/2"	1-3/4"	2"
Lbs.	350	443	518

NOTE: Test results were obtained under ideal laboratory conditions. The integrity of individual roof decks can vary widely, and will have significant impact on Polymer GypTec pull-out values. Appropriate safety factors should be applied to pull-out test results, and fasteners should be spaced accordingly.

ITW Buildex

FM APPROVED MIAMI-DADE

For engineering assistance or the name of your nearest ITW Buildex distributor call toll-free **800 BUILDEX**.

1349 West Bryn Mawr Ave.
Itasca, IL 60143
800-BUILDEX Fax: 630-595-3549
www.itwbuildex.com

Polymer GypTec™ is a trademark of ITW Buildex and Illinois Tool Works, Inc.

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OMG ROOFING PRODUCTS

800.633.3800 413.789.0252 413.821.0417(FAX)
153 Bowles Road Agawam, MA 01001
e-mail: info@olyfast.com www.olyfast.com

NTB®-1HWW
WITH LOCKING WIRE BARBS

AMERICAN MADE · AMERICAN MADE · FM APPROVED · METRO-DADE

PRODUCT DESCRIPTION

The OMG NTB-1HWW is a glass-filled nylon auger fastener with a 1" head and locking wire barbs. It is designed to secure insulation and single-ply membrane to gypsum, all cementitious wood fiber decks (Permadeck, Insulrock, Tectum®, etc.) and certain lightweight concrete decks. Wire barbs prevent back out and increase pullout resistance in marginal decks.

The NTB-1HWW may be used with a 3" steel plate for insulation attachment. For single-ply membrane attachment, use a 2" steel plate (with barbs), or batten bar. The NTB-1HWW is available in 2 1/2" to 10" lengths.

The NTB-1HWW is Factory Mutual and Dade County approved.

APPLICATION

The OMG NTB-1HWW can be installed into Tectum® decks without predrilling. A pilot hole is required for gypsum, lightweight concrete and some cementitious wood fiber. Use a 7/16", 1/2" or 9/16" drill bit. Diameter of drill bit is determined by pullout test results. Hole depth must be 1/2" deeper than embedment. Minimum fastener embedment into the deck should be 1 1/2"
(2" recommended). The NTB fastener should never penetrate the underside of the deck. The most effective method of engaging the wire barbs during installation is with the NTB Eliminator drill attachment. The use of a 3" plate is required when securing insulation.
Note: Prior to job bid, contact OMG to perform a pullout test to determine drill bit size and the pullout values. Also, care must be taken not to overdrive the fastener causing subsequent damage to the insulation facer.

PHYSICAL DATA

The data below is constant for each OMG NTB-1HWW.

Head Size: 1" Diameter
Head Style: Double Internal Hex Drive
Major Thread Diameter: .750
Thread: 3.5 T.P.I. Buttress
Material: Glass-Filled Nylon

Cat. No.	Length	Packaging	Weight
NTB1025WW	2½"	500	15 lb
NTB1030WW	3"	500	18 lb
NTB1035WW	3½"	500	19 lb
NTB1040WW	4"	500	21 lb
NTB1045WW	4½"	500	23 lb
NTB1050WW	5"	500	26 lb
NTB1055WW	5½"	500	28 lb
NTB1060WW	6"	500	30 lb
NTB1065WW	6½"	500	31 lb
NTB1070WW	7"	500	32 lb
NTB1075WW	7½"	500	34 lb
NTB1080WW	8"	250	18 lb
NTB1085WW	8½"	250	19 lb
NTB1090WW	9"	250	20 lb
NTB1095WW	9½"	250	21 lb
NTB1100WW	10"	250	22 lb

Fast Facts

The OMG NTB-1HWW with 1" head and locking wire barbs is a glass-filled nylon auger fastener designed to secure insulation and single-ply membrane to gypsum, all cementitious wood fiber, Tectum® and certain lightweight concrete decks.

FEATURES & BENEFITS

- Locking wire barbs:
  – Prevent back out
  – Increase pullout resistance in marginal decks
- Thread design & large root diameter:
  – Increase pullout resistance
  – Increase side shear strength
- Made from glass-filled nylon which:
  – Eliminates corrosion
  – Eliminates thermal bridging and condensation
  – Yields high tensile strength
- The OMG NTB-1HWW is F.M. and Dade County approved.

PLATES & ACCESSORIES

Use a 3" steel plate, 2" steel plate (with barbs), or batten bar. See Plates section.
Use an NTB Eliminator drill attachment. See Accessories section.
Use a carbide tip drill bit for gypsum, lightweight concrete and some cementitious wood fiber applications.

NTB®-1HWW
WITH LOCKING WIRE BARBS

SPECIFICATIONS

The fastener will be an OMG NTB-1HWW Fastener with a 1" head, locking wire barbs and a major thread diameter of .750. The OMG NTB-1HWW will be used with a Factory Mutual approved, OMG steel plate or pressure bar. The fastener must be Factory Mutual approved and made in America.

APPLICATION

The OMG NTB-1HWW Fastener must penetrate the deck a minimum of 1 1/2" (2" recommended). The fastener must not penetrate the underside of the deck. The most effective method of engaging the wire barbs during installation is with the NTB Eliminator drill attachment.

The OMG NTB-1HWW can be installed into Tectum® decks without predrilling. A pilot hole is required for gypsum, lightweight concrete and some cementitious wood fiber decks (Permadeck, Insulrock, etc.). Use a 7/16", 1/2" or 9/16" carbide tip drill bit. Diameter of drill bit is determined by pullout test results. Hole depth must be 1/2" deeper than embedment.

Note: Prior to job bid, contact OMG to perform pullout test to determine drill bit size and the pullout values. Also, care must be taken not to overdrive the fastener, causing subsequent damage to the insulation facer. Fastener must be tight enough so that the plate doesn't turn.

PHYSICAL DATA

Head Style: Double Internal Hex Drive Head Size: 1" Thread: 3.5 T.P.I.

Major Thread Diameter: .750 Material: Glass-Filled Nylon Packaging: 250, 500/carton

NTB-1HWW LENGTH SELECTION PROCEDURE

1. If applicable, determine thickness of existing roofing material.
2. Add thickness of new insulation.
3. Add 1 1/2" minimum fastener penetration.

NOTE: When predrilling, allow extra 1/2".

4. If odd size requirement, always size up in length, not down. See example.

Example

Existing Roofing:	1 3/4"
New Insulation:	1/2"
Min. Embedment:	1 1/2"
Total Fastening	3 3/4"
Range:	

The proper NTB-1HWW for this example is 4". **(2" minimum embedment for all FM applications.)**

Existing Roofing:	
New Insulation:	
Min. Embedment:	1 1/2"
Total Fastening	
Range:	

Use this format to calculate your correct fastener size.

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153 BOWLES ROAD AGAWAM, MA 01001
E-MAIL: INFO@OLYFAST.COM

FastenMaster HeadLok™

HEAVY DUTY FLATHEAD FASTENER

The HeadLok is a specialized, flat head fastener engineered for a wide range of panel applications including:

- Structural Insulated Panels
- Prefabricated Wall Panels
- Nailboard

HeadLok Fastener Benefits:

- Three point styles available for fast installation into wood, corrugated steel and structural steel substrates.
- Aggressive thread for holding power and withdrawal strength.
- Chamfer under head for increased strength.
- Extra large wafer head dramatically increases pull-through resistance and eliminates the need for additional washers.

Introducing the Spider™ Drive

Patent pending drive system developed especially for the HeadLok. The eight-lobed design offers the highest level of positive bit engagement and drivability.

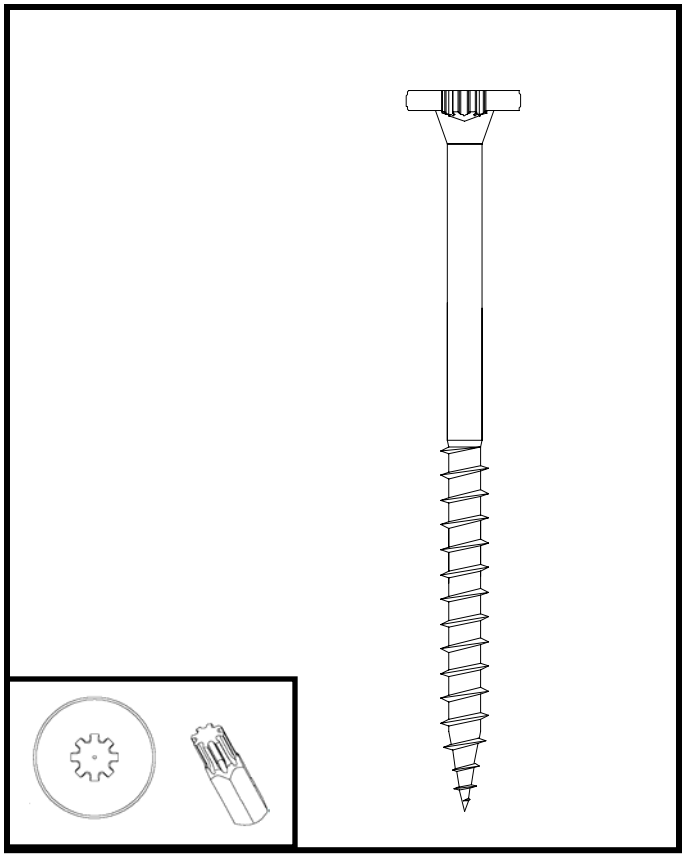
5 free driver bits are included in every package.

Installation Directions

- Install HeadLok using a high torque, low rpm, ½" corded or 18 volt cordless drill.
- Bring underside of washer head flat to surface.
- Do not overdrive.
- No pre-drilling required.

ACQ Tested and approved

Call for free samples or additional information.



SKU	LENGTH	QTY	DRIVER BITS
FMHL**158-500	1 5/8"	500	5
FMHL**278-500	2 7/8"	500	5
FMHL**003-250	3"	250	5
FMHL**312-250	3 1/2"	250	5
FMHL**004-250	4"	250	5
FMHL**412-250	4 1/2"	250	5
FMHL**05-250	5"	250	5
FMHL**512-250	5 1/2"	250	5
FMHL**006-250	6"	250	5
FMHL**612-250	6 1/2"	250	5
FMHL**007-250	7"	250	5
FMHL**712-250	7 1/2"	250	5
FMHL**008-250	8"	250	5
FMHL**812-250	8 1/2"	250	5
FMHL**009-250	9"	250	5
FMHL**912-250	9 1/2"	250	5
FMHL**010-250	10"	250	5
FMHL**011-250	11"	250	5
FMHL**012-250	12"	250	5
FMHL**013-250	13"	250	5
FMHL**014-250	14"	250	5
FMHL**015-250	15"	250	5
FMHL**016-250	16"	250	5
FMHL**014-250	18"	250	5

Replace ** with two letter code for point style

Point Style	Code	Application
Gimlet Point	GM	Wood Only
Spade Point	SP	Wood, 18-24 Gauge Steel
Drill Point	DP	14 Guage - 1/4" Steel

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www.olyfast.com

OlyLok™
LOCKING IMPACT NAIL

For Attaching Base Ply, Recovery Board and Insulation to Wood Fiber/Poured Gypsum Decks

SPECIFICATIONS

COMPOSITION

Factory preassembled components consisting of:

Tube: Precision formed from Galvanized (G-90) coated steel to prevent corrosion. The tube is shaped to easily penetrate decking and existing membranes.

Disk: Precision formed from Galvalume (AZ-55) coated steel to prevent corrosion. Securely clamped to the tube, 2.7" diameter, rib reinforced to resist cupping.

Locking Staple: Precision formed from high tensile steel wire. Coated to prevent corrosion.

TECHNICAL DATA

Approvals: Factory Mutual and Metro-Dade County Approved.

Fastening Pattern: Consult Factory Mutual or Metro-Dade County requirements for recommended patterns in normal, exposed, and hurricane areas.

Field Testing: On-site withdrawal testing should always be performed to evaluate the ability of the roofing substrate to satisfactorily accept and retain fasteners. Such testing may alter fastener selection and modify applicable fastening patterns.

The OlyLok should always be embedded into the structural roof deck to a depth of at least 1".

INSTALLATION

Installation Tools: There are two tools that must be used to install the OlyLok Locking Impact Nail. The OlyLok Driver is for installing base sheet and recovery board to the substrate. For securing ISO or EPS to the substrate use the OlyLok Insulation Tool, which has a larger impact area. Consult OMG for the specific driver for your application.

Method: Drive fastener perpendicular to roof deck seating cap flush with roofing surface. Once tube is set, drive the locking staple thru the tube/disk unit into the deck until the top of the staple is flush with the cap (see illustration).

Operation: When locking staple is driven, its dual wire legs diverge anchoring the fastener in place (see illustration). Uplift resistance may vary depending on the density and integrity of the substrate.

Packaging: 1.4", 1.8", 2.8", and 3.8" OlyLoks packaged 500 per carton.
4.8" OlyLoks packaged 250 per carton.

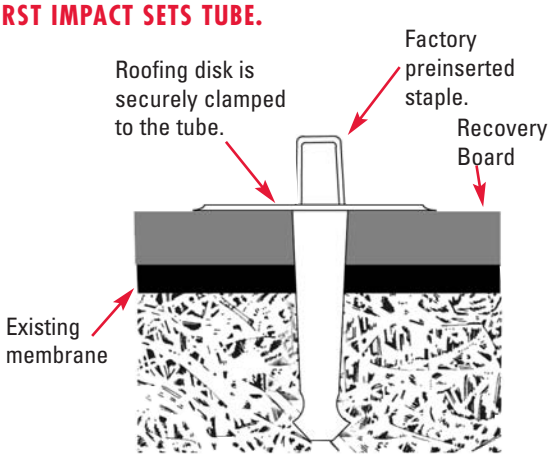
MADE IN THE U.S.A.

FM APPROVED

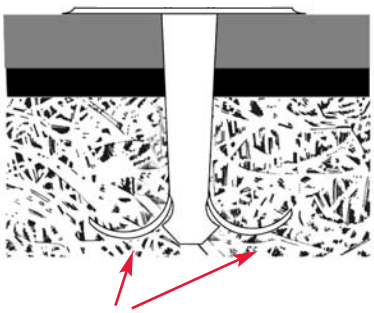
UL®

METRO-DADE

FIRST IMPACT SETS TUBE.

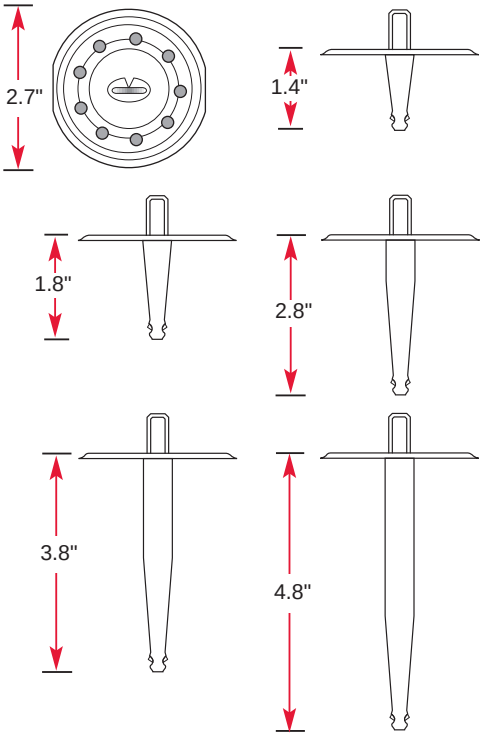


SECOND IMPACT ACTUATES STAPLE.



As locking staple is driven, its dual wire legs diverge anchoring the fastener in place.

5 LENGTHS



OlyLok™
LOCKING IMPACT NAIL

OMG, INC.
153 Bowles Road, Agawam, MA 01001 413·789·0252
800·633·3800 info@olyfast.com www.olyfast.com

USING THE OLYLOK

Fastener density and spacing vary depending on applicable uplift requirements. Local codes, governing approval bodies, membrane manufacturers, and individual roofdeck manufacturers all may have specific requirements that need to be addressed prior to beginning any roofing project. **The OlyLok should always be embedded into the structural roof deck to a depth of at least 1".** The following illustrates typical Factory Mutual recommended fastening patterns widely accepted by membrane and roofdeck manufacturers.

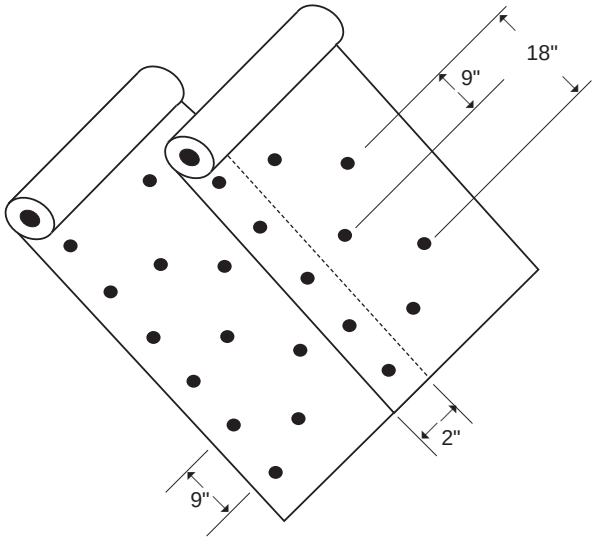
Fastening Guide 1

Base Ply Attachment for built-up or modified bitumen roof covers.

Class I-60, I-75, or I-90 Windstorm Classification.

An FMRC Approved base ply is fastened in the field of the roof with OlyLok installed 9" on center in the 2" wide base ply side laps and 18" on center staggered in 2 rows, equally spaced, between the base ply side laps.

When fastening meter-wide material with this pattern, expect to use approximately 86 fasteners per square (100 ft.^{2}).



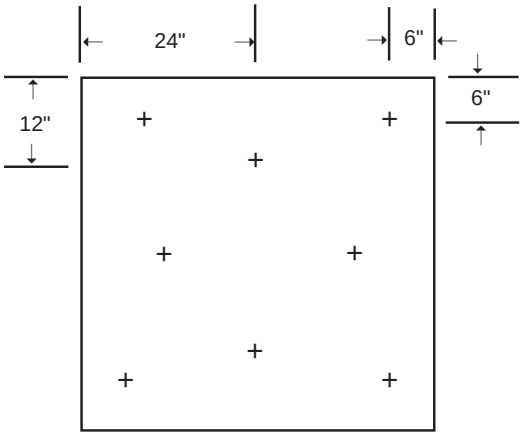
Fastening Guide 2

Recovery board and Insulation attachment under built-up and modified bitumen roof covers.

Class I-90 Windstorm Classification.

An FMRC Approved Recovery Board/Insulation suitable for use with minimum 3 ply built-up or modified membranes is attached with 8 OlyLok fasteners per 4'x 4' board in a diamond in a box pattern.
(1 fastener per 2 ft.^{2})

Consult FMRC for a complete listing of approved recovery boards/insulations.



8 Fasteners

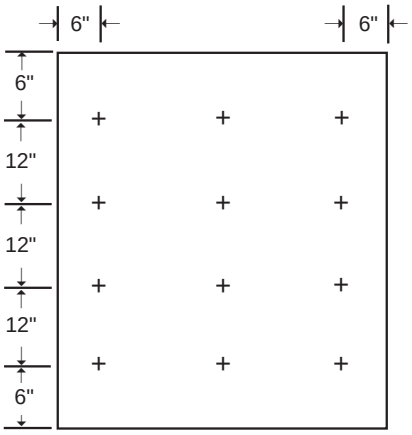
Fastening Guide 3

Recovery board and insulation attachment under fully adhered single ply membranes.

Class I-90 Windstorm Classification.

An FMRC Approved Recovery Board/Insulation suitable for use with fully adhered single ply membranes is attached with 12 OlyLok fasteners per 4'x 4' board in 4 rows of 3 fasteners per row.
(1 fastener per 1.33 ft.^{2})

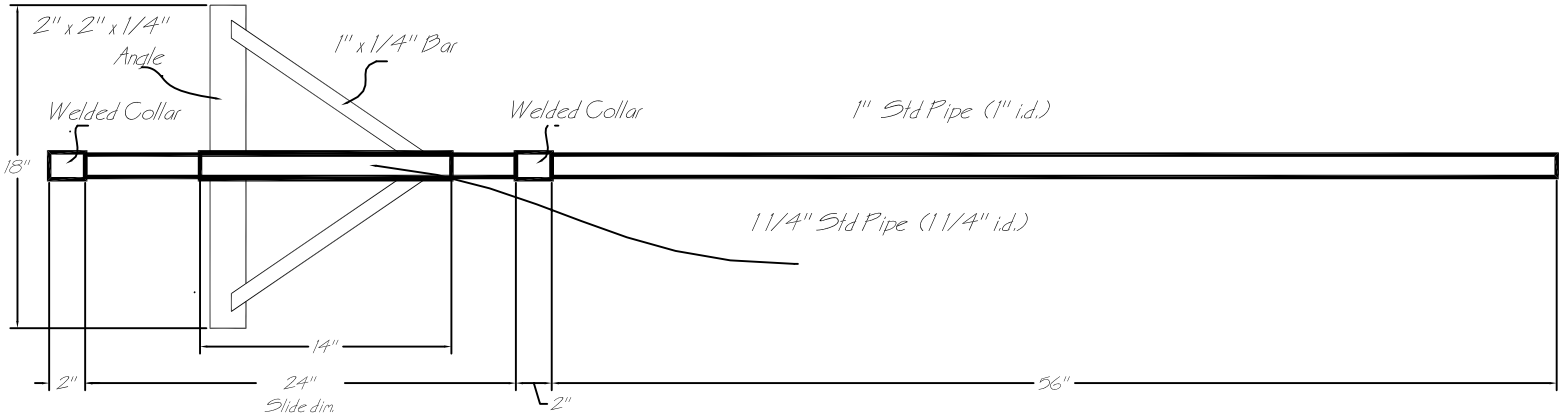
Consult FMRC for a complete listing of approved recovery boards/insulations.



12 Fasteners

Engineering drawing for the construction of a slide Hammer

SLIDE HAMMER



REVISIONS			
NO.	DATE	BY	REMARKS
1	7/13/2006	LDB	Notes

TECTUM

Slide Hammer

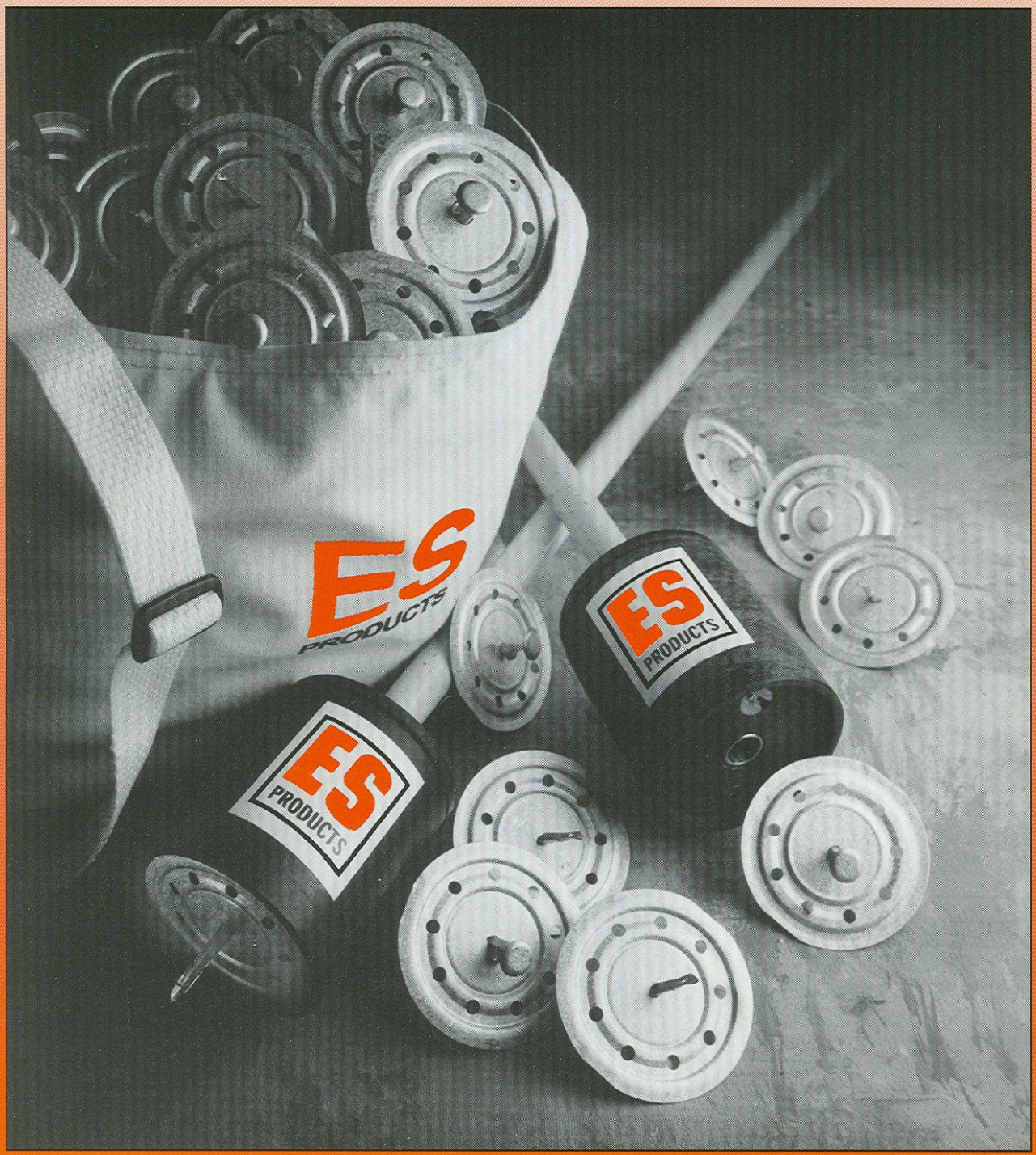
DATE 4/1/97 SCALE none DRAWING NUMBER

DRWN: LDB CHECKED:

APPROVED:

CAD FILE: slideham

A SURE HIT EVERY TIME, IN FASTENER INSTALLATION



ES Products' Insuldeck Driver
The Right Tool

Insuldeck Loc-Nail base ply fasteners must be driven perpendicular to the roofing surface. The Insuldeck Driver assures straight positive fastener installation.

With the pivoting motion required to swing a hand hammer, you are never certain that the fastener will be driven straight. Loss of withdrawal resistance may result from improper fastener installation.

The vertical driving action of the Insuldeck Driver assures consistent application of fasteners with less worker fatigue and prevents overdriving. Use of the Insuldeck Driver allows the roofer to install fasteners from a standing position.Getting up off the hands and knees speeds production and limits back strain.

Use of the accompanying oversized nail pouch means fasteners are always at hand.

RUGGED, SIMPLE AND EFFECTIVE

The ES Products' Insuldeck Driver is a durable tool designed with only two moving components and built to withstand the abuses of roofing. Features include:

- Heavy-duty 3/4" steel driving shaft which incorporates a 4 1/2" vinyl handle with finger grips.
- Large 3" diameter, wear resistant polyethylene driving head assures that fasteners are driven flush and prevents overdriving which damages the base sheet.
- Steel tube in driving head prevents wear and positively guides fastener during application.
- Super strength Alnico-2 gripping magnets positively hold fastener and disk unit.

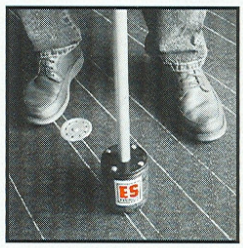
A SURE HIT

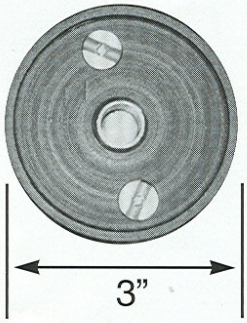
Choosing the right fastener for your roofing application is only half the job. If the fastener isn't installed correctly, you might as well have left it in the box.

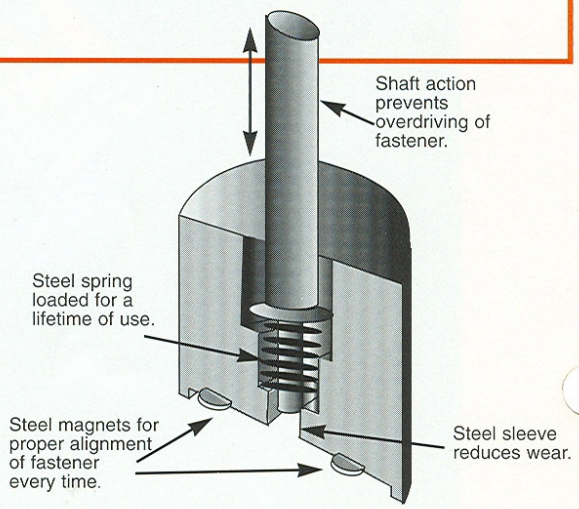
When driving Insuldeck Loc-Nail base ply fasteners into structural wood fiber roof decks (Tectum), the best results are achieved when the fastener is installed with a single impact. The multiple blows required when using a hand hammer may be off center, crookedly applied or bent fasteners being the result. With the Insuldeck Driver, you can apply fasteners with the speed and force required to penetrate the roofdeck without damage.

MAINTENANCE

To assure that the Insuldeck Driver performs as intended, a minimum of maintenance is required. By keeping the driver head clean, consistent positive application is assured.







ES PRODUCTS
280 Franklin Street ▪ Bristol, RI 02809 ▪ 401-253-8600 ▪ Fax 401-253-8896

M 78 MARKETING BULLETIN

Anti-Microbial Paint

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum panels have long been known for their resistance to fungi, mold, and microbial growth. This property was reported nearly fifty years ago. The resistance is due to the composition of the panels. The inorganic binder with a high magnesium salt content reduce, or in most applications, totally prevent the growth of fungus, a leading cause of indoor air pollution in some buildings.

Many other similar building products, such as mineral fiber ceilings and drywall, require the application of special paints or coatings to increase their resistance to fungi. These products, unless specially treated, can contribute to poor indoor air quality.

Tectum panels resist fungal growth and the problems associated with this growth. Tectum panels have been tested for the growth of fungi. Laboratory report LB92-244.RAP* stated "After 10 weeks of exposure at 230 C and 70-75% R.A. no growth of fungi has been observed (magnification 8x) on the surface of the Tectum panels, both natural and coated with paint." Engineering Report No. 31106-1JJ and Engineering Report No. 31106-1KK detail Fungus Resistance Tests.

Sample Number	Mass Increase (%) after 10 Weeks 23°C/ 70 - 75% R.A.	Visual inspection (magnification 8x) On growth of fungi of the Tectum panels After 10 weeks exposition
A, natural	14.0	None
B, natural	12.1	None
C, white	11.2	None
D, white	9.9	None

Tectum Inc., in association with Sherwin Williams, will offer a painted product that has an anti-microbial agent added to the paint. This will be available for specific jobs as required by the architectural specifications.

* Source: Centrum Voor Onderzoek & Technisch Advies
Test Report Available on Request

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

"FUNGUS RESISTANCE TEST"
Performed by: Environ Laboratories LLC
Engineering Report No. 31106-1JJ

1.1 Object

Subject three (3) samples of Tectum Natural to a Fungus Resistance Test in accordance with ASTM D3273.

1.2 Conclusions

Post-exposure examination found minimal fungal growth on the front surface of the samples and moderate growth on the back surfaces. The three test units had an ASTM D3273 rating of 10, 9, 9 on the front surfaces with a 10 rating being the total absence of mold.

3.0 TEST REQUESTED

Subject the test samples to a Fungus Test in accordance with ASTM D 3273-94 "Standard Test Method: Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber."

The fungus used in the test shall be: (1) *Aureobasidium pullulans*, (2) *Aspergillus niger*, and (3) *Penicillium*. The test soil shall be greenhouse-grade potting soil containing 25% peat moss. The test soil shall be spread across the bottom of the test cabinet. The soil shall be inoculated with mold suspensions prepared using the three fungus. Allow 2 weeks of continuous operation for the mold to sporulate and equilibrate with the environment before starting the test. Viability of the mold growth can be checked by placing several agar plates in the cabinet. Mold growth should be medium-heavy to heavy and cover the complete surface of the agar plate.

The test specimens shall be suspended vertically with the bottom of each specimen approximately 3 inches above the surface of the inoculated soil. There shall be sufficient spacing between test units to allow free air movement. The samples shall be incubated at 90°F ±2°F and 95% to 98% relative humidity for 7 weeks. The test articles shall be inspected every week and mold growth recorded.

4.3 RESULTS

The final rating in the following table is in accordance with ASTM D3273-94. An ASTM rating of 10 is the total absence of mold growth. (For more information on mold growth on Tectum products or to request a copy of the test results, please contact Tectum Inc.)

Sample	% Fungal Growth on Front Face	Final ASTM Rating on Front Face
1	5%	10
2	10%	9
3	10%	9

"FUNGUS RESISTANCE TEST"
Performed by: Environ Laboratories LLC
Engineering Report No. 31106-1KK

1.1 Object

Subject three (3) samples of Tectum Painted White to a Fungus Resistance Test in accordance with ASTM D3273.

1.2 Conclusions

Post-exposure examination found minimal fungal growth on the front surface of the samples and medium growth on the back surfaces. The three test units had an ASTM D3273 rating of 9, 9, 9 on the front surfaces with a 10 rating being the total absence of mold.

3.0 TEST REQUESTED

See Page 3 (TEST REQUESTED).

4.3 RESULTS

The final rating in the following table is in accordance with ASTM D3273-94. An ASTM rating of 10 is the total absence of mold growth. (For more information on mold growth on Tectum products or to request a copy of the test results, please contact Tectum Inc.)

Sample	% Fungal Growth on Front Face	Final ASTM Rating on Front Face
1	10%	9
2	10%	9
3	10%	9

M 79 MARKETING BULLETIN

Vented Overlayment Panels for Tectum™ Composite Panels

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The vented overlayment panel is a four by eight foot sheet of seven-sixteenth inch OSB with attached spacers to provide a three-quarter inch space for airflow. The spacers are not continuous and permit airflow in any direction. This panel can be used over any of the Tectum composite decks when ventilation under the roofing is required.

These panels are attached to the top surface of Tectum composite panels with Climate Coated Screws available from Tectum Inc. spaced at twelve inches on center. In a typical installation the end joints of the overlayment panels would be staggered and the joints not directly over the joints of the composite panels.

The use of this type of product reduces the temperature of the roofing materials. There are several instances where the use of a vented overlayment panel is recommended or required. Tectum Inc. requires a vented overlayment panel when the roof is a copper roof with smooth or flat (in plane) areas. See Technical Bulletin T-74. They are also required when heat transfer through the deck under winter conditions has a potential to cause ice dams from melting of snow and the freezing of water at the overhangs. Higher R-value panels reduce this potential. Also some shingle manufacturers require ventilation over insulated decks for their warranties.

This bulletin replaces bulletin M-65 dated 10-95

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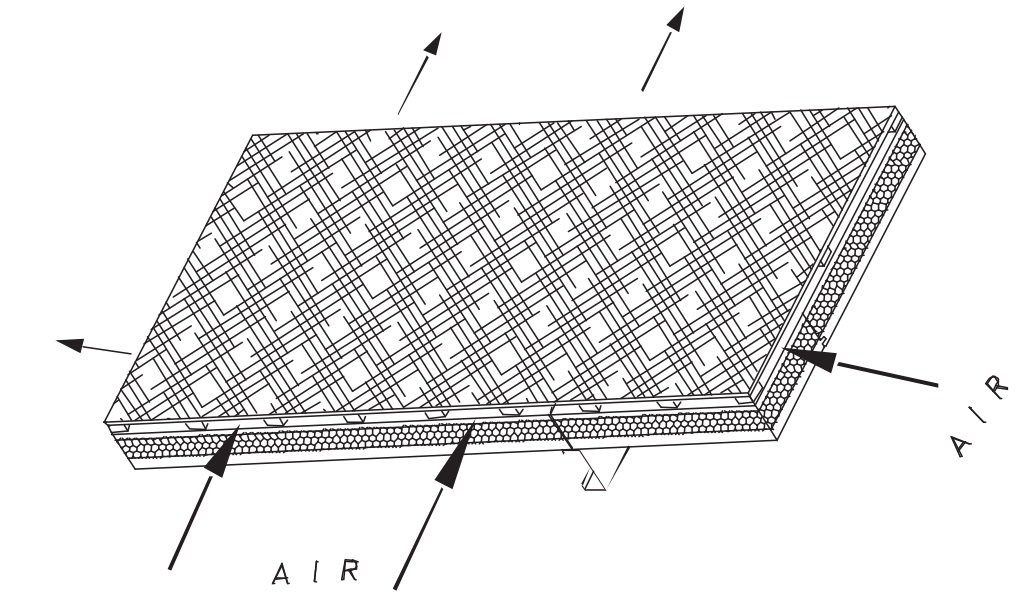
TECTUM INC.
The Noise Control Solution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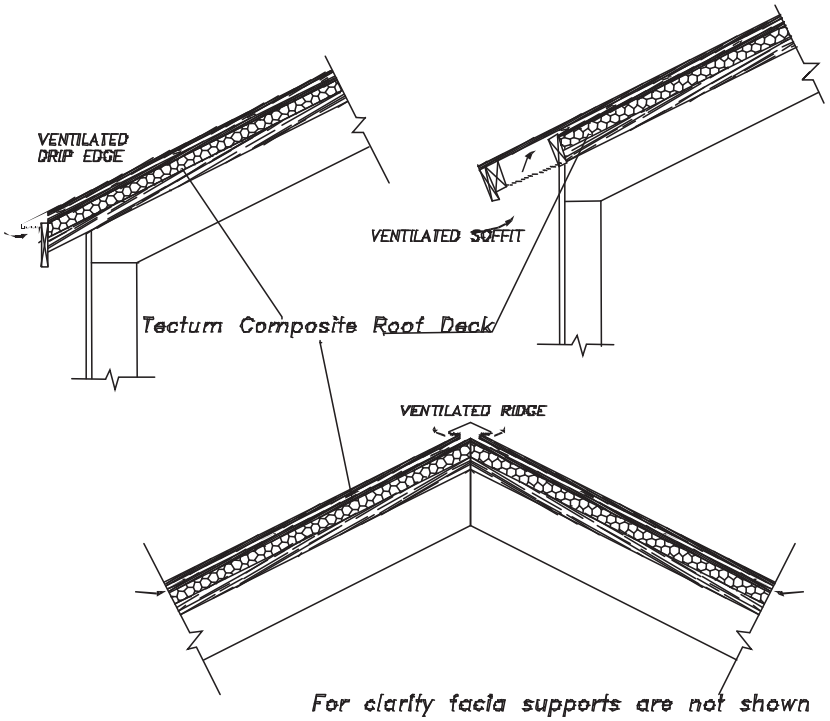
VENTILATED DRIP EDGE
VENTILATED SOFFIT
Tectum Composite Roof Deck
VENTILATED RIDGE
For clarity facia supports are not shown

TECTUM INC.

The Noise Control Solution

Specifications

Tectum Inc.
105 South Sixth Street
Newark, OH 43055
Phone: (888) 977-9691
Phone: (740) 345-9691
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www.tectum.com

This MANU-SPEC™ utilizes the Construction Specifications Institute (CSI) *Manual of Practice*, including *MasterFormat*™, *SectionFormat*™ and *PageFormat*™. A MANU-SPEC is a manufacturer-specific proprietary product specification using the proprietary method of specifying applicable to project specifications and master guide specifications. Optional text is indicated by brackets [ ]; delete optional text in final copy of specification. Specifier Notes typically precede specification text; delete notes in final copy of specification. Trade/brand names with appropriate symbols typically are used in Specifier Notes; symbols are not used in specification text. Metric conversion, where used, is soft metric conversion.

This MANU-SPEC specifies a roof deck and form system. This product is manufactured by Tectum Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 03510
CEMENTITIOUS ROOF DECK
(CEMENTITIOUS WOOD FIBER PLANK)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cementitious wood fiber plank roof deck and form system, including [Bulb-tee] [Or] [And] [Truss-tee] subpurlins.

Specifier Note: Revise paragraph below to suit project requirements. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the paragraph below. Add section numbers and titles per CSI *MasterFormat* and specifier's practice. In the absence of related sections, delete paragraph below.

B. Related Sections:

1. Division 5 Sections: Steel Framing.
2. Division 6 Sections: Wood Framing.
3. Division 7 Sections: Roofing.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard. It is a listing of all references used in this section.

1.02 REFERENCES

A. ASTM International:

1. ASTM C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
4. ASTM D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
5. ASTM D2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
6. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

B. Underwriters Laboratories, Inc. (UL):

1. UL 580 Standard for Safety for Tests for Uplift Resistance of Roof Assemblies.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide roof deck assembly designed and tested according to the following:

1. Underwriters Laboratories UL 580 (UL Class 90 Design): [Design No. NM504] [Design No. NM511] [Design No. NM512] [Design No. NM517] [Design No. NM533] [Design No. 474] [Design No. 475] [Design No. 451].

B. Performance Requirements:

1. Provide a roof deck system that has been manufactured, fabricated and installed to provide deflection of [Less than L/240 at design load] [Specify required maximum deflection.].

Specifier Note: Retain subparagraph below for Tectum I decks.

2. Comply with requirements of Factory Mutual Class I Roof Deck.

Specifier Note: Article below includes submittal of relevant data to be furnished by Contractor before, during or after construction. Coordinate this article with Architect's and Contractor's duties and responsibilities in Conditions of the Contract and Division 1 Submittal Procedures Section.

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation instructions.

C. Shop Drawings: Provide drawings indicating locations and spacing of planks and purlins.

D. Samples: Submit selection and verification samples as follows:

1. Set of 12 inch (305 mm) square samples for each wood fiber deck unit required, showing full range of exposed texture to be expected in completed work.

2. Labeled set of all accessories required for a complete installation.

E. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Upon request, submit certified test reports from recognized test laboratories.

2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

F. Closeout Submittals: Submit the following:

1. Warranty documents specified herein.

Specifier Note: Article below should include statements of prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 Quality Assurance Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

B. Regulatory Requirements and Approvals: [Comply with requirements below.] [Specify applicable requirements of regulatory agencies.].

1. Building Officials and Code Administrators International, Inc. (BOCA):

a. BOCA Research Report No. 86-39.

2. Southern Building Code Congress International (SBCCI):

a. SBCCI Report 9506B.

3. International Conference of Building Officials (ICBO):

a. ICBO Research Report No. 1116.

4. New York City Board of Standards and Appeals:

a. Calendar No. L391-52-SM.

C. Certifications: [Specify requirement for certifications.].

Specifier Note: Retain paragraph below if preinstallation meeting is required.

D. Preinstallation Meetings: [Specify requirements for meeting.].

Specifier Note: Article below should include specific protection and environmental conditions required during storage. Coordinate article

below with Division 1 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1. Provide labels indicating brand name, deck style, plank size and plank thickness.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1. Prevent soiling, physical damage or wetting.

2. Store cartons open at each end to stabilize moisture content and temperature.

Specifier Note: Retain article below when requiring compliance with thermal performance warranty. Coordinate article with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section. Use this article to require special or extended warranty or bond covering the work of this section.

1.07 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

Specifier Note: Coordinate subparagraph below with manufacturer's warranty requirements.

1. Warranty Period (Thermal for Tectum III): 15 years beginning with date of substantial completion.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 ROOF DECK AND FORM SYSTEMS

Specifier Note: Paragraph below is an addition to *CSI SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

A. Manufacturer: Tectum Inc.

1. Contact: 105 South Sixth Street, Newark, OH 43055; Telephone: (888) 977-9691, (740) 345-9691; Fax: (800) 832-8869; E-mail: info@tectum.com; website: www.tectum.com.

B. Proprietary Systems. Cementitious deck formboard systems, including the following configurations:

Specifier Note: Retain one or more of the configurations below to suit project requirements.

1. Tectum Roof Deck Tile.

2. Tectum Roof Deck Plank.

3. Tectum Concealed Tee Deck.

Specifier Note: Edit Article below to suit project requirements. If substitutions are permitted, edit text below. Add text to refer to Division 1 Project Requirements (Product Substitutions Procedures) Section.

2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

2.03 ROOF DECK PANEL COMPONENTS

A. Proprietary Products. Cementitious deck formboard products, including the following:

Specifier Note: Tectum I Roof Deck Panels consist of standard Tectum Panels in either plank or tile configuration. Tectum I is typically used in low slope applications and provides a thermal barrier for field applied foam plastics.

1. Tectum I Roof Deck Panels:

a. Material: Aspen wood fibers bonded with inorganic hydraulic cement.

b. Nominal Panel Thickness: [1½ inches (38 mm)] [2 inches (51 mm)] [2½ inches (64 mm)] [3 inches (76 mm)].

Specifier Note: Tectum NS is typically used in sloped applications where minimal insulation is required.

2. Tectum NS Roof Deck Panels:
    a. Material: Aspen wood fibers bonded with inorganic hydraulic cement, bonded to EPS foam insulation, bonded to top surface of 7/16 inch (11.1 mm) oriented strand board (OSB).
    b. Nominal Panel Thickness: [2½ inches (64 mm)] [3 inches (76 mm)] [3½ inches (89 mm)] [4 inches (102 mm)].
    c. OSB meets Voluntary Product Standard PS2-92 Performance Standard for Wood-Based Structural-Use Panels.

Specifier Note: Tectum III roof deck panel is typically used in sloped applications where insulation and a nailable surface are required.

3. Tectum III Roof Deck Panels:
    a. Material: Aspen wood fibers bonded with inorganic hydraulic cement, bonded to Styrofoam brand foam insulation, bonded to top surface of 7/16 inch (11.1 mm) oriented strand board (OSB).
    b. Nominal Panel Thickness: [3½ inches (89 mm)] [4 inches (102 mm)] [5 inches (127 mm)] [6 inches (152 mm)] [7 inches (178 mm)] [8 inches (203 mm)] [9 inches (229 mm)] [10 inches (254 mm)].
    c. Insulation Water Vapor Permeability (ASTM E96): 0.6 perm (34 ng/(Pa × s × m^2)).
    d. Insulation Compressive Strength (ASTM D1621): 40 psi (276 kPa).
    e. Insulation Water Absorption (ASTM D2842): 1% by volume.
    f. Insulation Linear Coefficient of Thermal Expansion: 3.5 × 10E5 in/in/deg F.
    g. Insulation Thermal Resistance: R-value R5 per inch.
    h. EPS Core Compliance (ASTM C578): Exceeds Type IV.
    i. OSB meets Voluntary Product Standard PS2-92 Performance Standard for Wood-Based Structural-Use Panels.

Specifier Note: Tectum E roof deck panel is typically used in sloped applications where insulation and a nailable surface are required.

4. Tectum E Roof Deck Panels:
    a. Material: Aspen wood fibers bonded with inorganic hydraulic cement, bonded to expanded polystyrene (EPS) foam insulation, bonded to top surface of 7/16 inch (11.1 mm) oriented strand board (OSB).
    b. Nominal Panel Thickness: [Specify 2¾ inches - 10 inches (70 - 254 mm).].
    c. OSB meets Voluntary Product Standard PS2-92 Performance Standard for Wood-Based Structural-Use Panels.
    d. EPS Core Compliance (ASTM C578): Exceeds Type I.
    e. EPS Classification: Bears UL classification mark.
    f. EPS Nominal Density: 1.0 pcf (16.02 kg/m^3).
    g. EPS Thermal Resistance (ASTM C177, ASTM C518 at 40 degrees F (4 degrees C)): 4.17 per inch.
    h. EPS Thermal Resistance (ASTM C177, ASTM C518 at 75 degrees F (24 degrees C)): 3.85 per inch.

Specifier Note: Specify subordinate or secondary items that aid and assist primary products specified above or are necessary for preparation or installation of those items.

Specifier Note: Coordinate accessories below with manufacturer’s literature.

2.04 ACCESSORIES

A. Provide accessories as follows:
    1. Bulb-Tee Subpurlins:
        a. Material: Steel.
        b. Style: [218] [As indicated on drawings] [Specify style.].
        c. Manufacturer: Western Fireproofing Co., Kansas City, MO.
    2. Tectum Grout:
        a. Material: Gypsum cement grout, ready for mixing with potable water.
    3. Tectum Screws:
        a. Material: Steel.
        b. Type: [14 gauge with 2 inch (51 mm) diameter washer] [14 gauge with 5/8 inch (15.9 mm) head] [Tectum S-25 with 2 inch (51 mm) diameter washer, 2 15/16 inch (75 mm) length] [Tectum S-25 with 2 inch (51 mm) diameter washer, 3 7/16 inch (87 mm) length] [Tectum S-25 with 2 inch (51 mm) diameter washer, 3 15/16 inch (100 mm) length].

4. Low VOC Adhesive – For use over swimming pools and similar high humidity environments or as the construction adhesive for any LEED Certified Project.
    a. Manufacturer: BASF
    b. Type: BASF DegaBond 948
5. Construction Adhesive:
    a. Manufacturer: Miracle Construction Adhesive.
    b. Type: Adhesive SFA-66.

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the roof deck panel manufacturer.

3.02 EXAMINATION

A. Site Verification of Conditions:
    1. Verify that site conditions are acceptable for installation of roof deck panel system.
    2. Do not proceed with installation of roof deck panel system until unacceptable conditions are corrected.

Specifier Note: Coordinate article below with manufacturer's recommended installation requirements. Retain language applicable to project and to the products specified in Part 2. Consult Tectum Inc. and manufacturer of roofing system for technical information and recommendations.

3.03 INSTALLATION

A. Roof Deck Tile Installation:
    1. Furnish subpurlins in lengths to span 3 purlins.
    2. Position subpurlins within plus or minus 1/16 inch (1.6 mm) of manufacturer's recommended spacing and securely position by means of templates during welding.
    3. Weld tees at every crossing point over support members with a ¾ inch (19.1 mm) long fillet weld on alternate sides of the flange. Weld both sides of flange at all tee ends.
    4. Mix and place grout in accordance with manufacturer's printed instructions. Remove excess grout once initial set has been achieved.
    5. Do not allow foot traffic on tile panels until after grout has set.
B. Roof Deck Plank Installation:
    1. Place planks on joists with square cut ends butted tightly together.
        a. Stagger end joints.
        b. Tectum panels must be supported by bent plates (steel or other support) at all transitions of the roof. This includes but is not limited to the ridge, valleys, perimeter and panel direction change. Panels must have a minimum of 1 inch bearing and should be glued and screwed at these transitions.
        c. Panel ends must fall over structural supports and have a minimum of 1 inch bearing.
    2. Secure planks to joists with screws and spacing recommended by plank manufacturer.
    3. Do not allow foot traffic on planks until after screws are installed.
    4. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.
C. Roof Deck Long Span Plank Installation:
    1. Cut plank neatly to abut parapets, around openings and penetrations.
    2. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.
D. Roof Deck Formboard Installation:
    1. Cut plank neatly to abut parapets, around openings and penetrations.
    2. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.
E. Roof Deck Composite Plank:
    1. Cut plank neatly to abut parapets, around openings and penetrations.
    2. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.

Specifier Note: Specify the final actions required to clean installed equipment or other completed work to properly function or perform.

Coordinate article below with Division 1 Execution Requirements (Cleaning) Section.

3.04 CLEANING

A. Clean exposed surfaces of all deck surfaces.

B. Remove and replace work that cannot be successfully repaired to permanently eliminate evidence of structural damage.

Specifier Note: Specify provisions for protecting work after installation but prior to acceptance by the owner. Coordinate article below with Division 1 Execution Requirements Section.

3.05 PROTECTION

A. Protect installed work from damage due to weather related moisture.

B. Protect installed work from damage due to subsequent construction activity on the site so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION

Tectum Inc.
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This MANU-SPEC specifies a roof deck and form system. This product is manufactured by Tectum Inc. Revise MANU-SPEC section number and title below to suit project requirements, specification practices and section content. Refer to CSI *MasterFormat* for other section numbers and titles.

SECTION 03510
CEMENTITIOUS ROOF DECK
(CEMENTITIOUS WOOD FIBER PLANK)

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Cementitious wood fiber plank roof deck system.

B. Specifier Note: Revise paragraph below to suit project requirements. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the paragraph below. Add section numbers and titles per CSI *MasterFormat* and specifier's practice. In the absence of related sections, delete paragraph below.

C. Related Sections:

1. Division 5 Sections: Steel Framing.
2. Division 6 Sections: Wood Framing.
3. Division 7 Sections: Roofing.

Specifier Note: Article below may be omitted when specifying manufacturer's proprietary products and recommended installation. Retain References Article when specifying products and installation by an industry reference standard. If retained, list standard(s) referenced in this section. Indicate issuing authority name, acronym, standard designation and title. Establish policy for indicating edition date of standard referenced. Conditions of the Contract or Division 1 References Section may establish the edition date of standards. This article does not require compliance with standard. It is a listing of all references used in this section.

1.02 REFERENCES

A. ASTM International:

1. ASTM C177 Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
2. ASTM C518 Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM C578 Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
4. ASTM D1621 Standard Test Method for Compressive Properties Of Rigid Cellular Plastics.
5. ASTM D2842 Standard Test Method for Water Absorption of Rigid Cellular Plastics.
6. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials.

B. Underwriters Laboratories, Inc. (UL):

1. UL 580 Standard for Safety for Tests for Uplift Resistance of Roof Assemblies.

Specifier Note: Article below should be restricted to statements describing design or performance requirements and functional (not dimensional) tolerances of a complete system. Limit descriptions to composite and operational properties required to link components of a system together and to interface with other systems.

1.03 SYSTEM DESCRIPTION

A. Design Requirements: Provide roof deck assembly designed and tested according to the following:

1. Underwriters Laboratories UL 580 (UL Class 90 Design): [Design No. NM504] [Design No. NM511] [Design No. NM512] [Design No. NM517] [Design No. NM533] [Design No. 474] [Design No. 475] [Design No. 451].

B. Performance Requirements:

1. Provide a roof deck system that has been manufactured, fabricated and installed to provide deflection of [Less than L/240 at design load] [Specify required maximum deflection.].

1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation instructions.

C. Shop Drawings: Provide drawings indicating locations and spacing of planks and purlins.

D. Samples: Submit selection and verification samples as follows:

1. Set of 12-inch (305 mm) square samples for each wood fiber deck unit required, showing full range of exposed texture to be expected in completed work.

2. Labeled set of all accessories required for a complete installation.

E. Quality Assurance/Control Submittals: Submit the following:

1. Test Reports: Upon request, submit certified test reports from recognized test laboratories.

2. Certificates: Submit manufacturer's certificate that products meet or exceed specified requirements.

F. Closeout Submittals: Submit the following:

1. Warranty documents specified herein.

Specifier Note: Article below should include statements of prerequisites, standards, limitations and criteria that establish an overall level of quality for products and workmanship for this section. Coordinate article below with Division 1 Quality Assurance Section.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Utilize an installer having demonstrated experience on projects of similar size and complexity.

Specifier Note: Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

B. Regulatory Requirements and Approvals: [Comply with requirements below.] [Specify applicable requirements of regulatory agencies.].

1. Building Officials and Code Administrators International, Inc. (BOCA):

a. BOCA Research Report No. 86-39.

2. Southern Building Code Congress International (SBCCI):

a. SBCCI Report 9506B.

3. International Conference of Building Officials (ICBO):

a. ICBO Research Report No. 1116.

4. New York City Board of Standards and Appeals:

a. Calendar No. L391-52-SM.

C. Certifications: [Specify requirement for certifications.].

D. Preinstallation Meetings: [Specify requirements for meeting.].

Specifier Note: Article below should include specific protection and environmental conditions required during storage. Coordinate article below with Division 1 Product Requirements Section.

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1. Provide labels indicating brand name, deck style, plank size and plank thickness.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1. Prevent soiling, physical damage or wetting.

Specifier Note: Retain article below when requiring compliance with thermal performance warranty. Coordinate article with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section. Use this article to require special or extended warranty or bond covering the work of this section.

1.07 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under contract documents.

Specifier Note: Coordinate subparagraph below with manufacturer's warranty requirements.

1. Warranty Period (Thermal for Tectum III): 15 years beginning with date of substantial completion.

PART 2 PRODUCTS

Specifier Note: Retain article below for proprietary method specification. Add product attributes, performance characteristics, material standards, and descriptions as applicable. Use of such phrases as "or equal" or "or approved equal" or similar phrases may cause ambiguity in specifications. Such phrases require verification (procedural, legal and regulatory) and assignment of responsibility for determining "or equal" products.

2.01 ROOF DECK AND FORM SYSTEMS

Specifier Note: Paragraph below is an addition to *CSI SectionFormat* and a supplement to MANU-SPEC. Retain or delete paragraph below per project requirements and specifier's practice.

A. Manufacturer: Tectum Inc.

1. Contact: 105 South Sixth Street, Newark, OH 43055; Telephone: (888) 977-9691, (740) 345-9691; Fax: (800) 832-8869; E-mail: info@tectum.com; website: www.tectum.com.

B. Proprietary Systems. Cementitious deck systems, including the following configurations:

1. Tectum III P Roof Deck Plank.

2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: No substitutions permitted.

2.03 ROOF DECK PANEL COMPONENTS

A. Proprietary Products. Cementitious deck products, including the following:

1. Tectum IIIP Roof Deck Panels:

a. Material: Aspen wood fibers bonded with inorganic hydraulic cement, bonded to Styrofoam brand foam insulation, bonded to top surface of 7/16 inch (11.1 mm) oriented strand board (OSB).

b. Nominal Panel Thickness: [3½ inches (89 mm)] [4 inches (102 mm)] [5 inches (127 mm)] [6 inches (152 mm)] [7 inches (178 mm)] [8 inches (203 mm)] [9 inches (229 mm)] [10 inches (254 mm)].

c. Panel sides are detailed with kerfs in Dow Styrofoam to accept Dow Styrofoam spline.

d. Insulation Water Vapor Permeability (ASTM E96): 0.6 perm (34 ng/(Pa × s × m^2)).

e. Insulation Compressive Strength (ASTM D1621): 40 psi (276 kPa).

f. Insulation Water Absorption (ASTM D2842): 1% by volume.

g. Insulation Linear Coefficient of Thermal Expansion: 3.5 × 10E5 in/in/deg F.

h. Insulation Thermal Resistance: R-value R5 per inch.

i. EPS Core Compliance (ASTM C578): Exceeds Type IV.

j. OSB meets Voluntary Product Standard PS2-92 Performance Standard for Wood-Based Structural-Use Panels.

2.04 ACCESSORIES

A. Provide accessories as follows:

1. Tectum Screws:

a. Material: Steel.

b. Type: TruFast SIP screw for appropriate panel thickness.

2. Low VOC Adhesive – For use over swimming pools and similar high humidity environments or as the construction adhesive for any LEED Certified Project.

a. Manufacturer: BASF

b. Type: BASF DegaBond #948

PART 3 EXECUTION

Specifier Note: Article below is an addition to the CSI *SectionFormat* and a supplement to MANU-SPEC. Revise article below to suit project requirements and specifier's practice.

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the roof deck panel manufacturer.

3.02 EXAMINATION

A. Site Verification of Conditions:

1. Verify that site conditions are acceptable for installation of roof deck panel system.
2. Do not proceed with installation of roof deck panel system until unacceptable conditions are corrected.

Specifier Note: Coordinate article below with manufacturer's recommended installation requirements. Retain language applicable to project and to the products specified in Part 2. Consult Tectum Inc. and manufacturer of roofing system for technical information and recommendations.

3.03 INSTALLATION

A. Roof Deck Composite Plank Installation:

1. Place planks on joists with sides and ends butted tightly together. When panel ends are field cut, reinstall kerfs in Dow Styrofoam as per manufacturer spec.
    a. Stagger end joints.
2. Install 3/8" bead of BASF DegaBond #948 Caulk in kerfed portion of Dow Styrofoam on all four sides of every panel.
    a. Insert Dow Styrofoam spline as supplied by Tectum Inc. into all kerf openings.
    b. Tectum panels must be supported by bent plates (steel or other support) at all transitions of the roof. This includes but is not limited to the ridge, valleys, perimeter and panel direction change. Panels must have a minimum of 1 inch bearing and should be glued and screwed at these transitions.
    c. Panel ends must fall over structural supports and have a minimum of 1 inch bearing.
3. Secure planks to joists with screws and adhesive.
4. Do not allow foot traffic on planks until after screws are installed.
5. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.
6. Cut plank neatly to abut parapets, around openings and penetrations.
7. Apply adhesive recommended by manufacturer to ensure diaphragm performance as designed.

Specifier Note: Specify the final actions required to clean installed equipment or other completed work to properly function or perform. Coordinate article below with Division 1 Execution Requirements (Cleaning) Section.

3.04 CLEANING

A. Clean exposed surfaces of all deck surfaces.

B. Remove and replace work that cannot be successfully repaired to permanently eliminate evidence of structural damage.

Specifier Note: Specify provisions for protecting work after installation but prior to acceptance by the owner. Coordinate article below with Division 1 Execution Requirements Section.

3.05 PROTECTION

A. Protect installed work from damage due to weather related moisture.

B. Protect installed work from damage due to subsequent construction activity on the site so that the work will be without damage and deterioration at the time of acceptance by the Owner.

END OF SECTION

TECHNICAL BULLETIN

T 59

Use of ASTM E 1264 "Standard Classification For Acoustic Ceiling Products" in Specifications

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The Federal Specification, Sound Controlling (Acoustical) Tile and Panels SS-S118B is obsolete and has been replaced by ASTM equivalent E1264 Standard Classification for Acoustical Ceiling Products. Class A material meeting E1264 shall be tested in accordance to ASTM method E-84 and the flame spread rating of the product shall not exceed 25, nor shall the material show evidence of continued combustion after the test flame has been extinguished. All surfaces, including those that would be exposed by cutting through the material in anyway, shall meet these requirements. Class A products defined by E1264 shall have a smoke developed rating not to exceed 50. This requirement is equivalent to model code requirements for ceiling materials used as a return air plenum.

The model codes have the same flame spread requirement for Class I or A interior finish materials, but the smoke develop must be less than 450. This value was determined based on the smoke required to obscure exit signs.

Tectum Wall and Ceiling Panels meet the definition of Class A by either of the requirements. Fabri-Tough panels meet the model code requirements for Class I or A but not the ASTM E1264. The smoke developed rating has varied on the tests we have conducted on Fabri-Tough panels from 95 to 155. This is clearly above the 50 requirement. These panels have also been tested in the room-corner test UBC 8-2 or equivalent and meet the code requirements for use of fabric-covered panels.

Specifications must be written in such a manner that the products being specified meet the written requirements. Specifications which show Fabri-Tough should not refer to the ASTM E1264 but refer to the model code requirement for the room-corner test UBC 8-2 or equivalent and the model code definition of Class A or I.

Tectum Interior Panels can be generically specified using ASTM E1264 as Type XIV (excelsior bonded with inorganic binders), Form 1 (No Backing) or Form 2 (Backed with mineral or glass fiber base backing), pattern L (random swirl), Class A.

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TECTUM INC.
The Noise Control Solution

M 69 MARKETING BULLETIN

Checklist for Specifying Tectum™ Roof Decks

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

QUESTIONS	CHECK WHEN COMPLETED
1) Architects Name, Address, Phone & Fax Numbers _____ _____ _____ Phone_____ Fax_____	_____
2) Job Name & Location _____ _____	_____
3) Building Use (IE: Gym, Swimming, Pool, ECT) _____	_____
4) Steel Joist, Wood Joist or Other _____	_____
5) Joist Spacing _____	_____
6) R-value Required _____	_____
7) Diaphragm Required (Lbs./Lin.ft.) _____	_____
8) Design Load Required _____	_____
9) Steep Slope or Low Slope _____ in 12 _____	_____
10) Type Roofing Proposed _____	_____
11) NRC _____	_____

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The Noise Control Solution

QUESTIONS

CHECK WHEN COMPLETED

12) Wind Uplift Requirements (Lbs./Sqft.)

_____ _____

13) Budget for Deck

_____ _____

14) Size of Job

_____ _____

15) Who is the Structural Engineer?

_____ _____

16) What is the Time Frame on Your Job?

_____ _____

17) Special Requirements

_____

_____ _____

TECTUM INC.

The Noise Control Solution

Codes

Codes

ICC-ES Evaluation Report

ESR-1112

Issued May 1, 2009

This report is subject to re-examination in one year.

www.icc-es.org | (800) 423-6587 | (562) 699-0543 *A Subsidiary of the International Code Council®*

DIVISION: 03—CONCRETE
Section: 03510—Cementitious Roof Deck

DIVISION: 09—FINISHES
Section: 09510—Acoustical Ceiling

REPORT HOLDER:

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EVALUATION SUBJECT

TECTUM I, TECTUM III AND TECTUM E ROOF DECK PANELS

1.0 EVALUATION SCOPE

Compliance with the following code:

2006 *International Building Code®* (IBC)

Properties evaluated:

- Structural
- Fire resistance

2.0 USES

Tectum I, Tectum III and Tectum E Roof Deck Panels are used for roof deck construction and as acoustical panels and suspended ceiling tiles.

3.0 DESCRIPTION

3.1 Tectum I:

Tectum I panels are composed of wood fibers impregnated and bound together into slab form with mineral cements. The panels vary in thickness from 1 inch (25 mm) to 3 inches (76 mm) and have widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm). Tectum I panels are available as Tectum I planks, Tectum I long-span planks and Tectum I roof tiles. Tectum I planks have $^1/_2$-inch (13 mm) tongues and grooves on the long edges.

Long-span Tectum I planks have tongue-and-groove edges on long edges and incorporate $^3/_4$-inch-deep-by-$^1/_2$-inch-wide (19 mm by 13 mm) or $1^1/_2$-inch-deep-by-$^1/_2$-inch-wide (38 mm by 13 mm), No. 16 gage [0.0635 inch (1.65 mm) base-metal thickness] galvanized steel channels that are installed in the groove side of the panel.

Tectum I roof tiles have a $^1/_2$-inch-wide (13 mm) rabbet along the long edge for installation between bulb tees or truss tees, which are attached to the top of, and span between, supporting members as described in Section 4.3.

3.2 Tectum III Panels:

Tectum III panels are composite roof planks consisting of $1^1/_2$-inch- to 6-inch-thick (17 mm to 152 mm) Dow Chemical Co. Styrofoam Brand 40 polystyrene foam plastic insulation core factory-bonded to facings of minimum $1^1/_2$-inch-thick (38 mm) Tectum I panels and minimum $^7/_{16}$-inch-thick (11 mm) oriented strand board (OSB) or minimum $^1/_2$-inch-thick (12.7 mm) plywood complying with DOC PS-2 (UBC Standard 23-3). Tectum III panels are available as Tectum III planks and as Tectum III roof tiles in widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm). Tectum III planks have $^1/_2$-inch-deep (13 mm) tongues and grooves along the long edge in the Tectum layer. See Figure 1 for typical edge details and Figure 2 for typical connections. Tectum III panels are mechanically and adhesively fastened to all support members as noted in Sections 4.1 and 4.4.

Tectum III roof tiles have a $^1/_2$-inch-wide (13 mm) rabbet on the long edge for installation between bulb tees or truss tees attached to the top of, and spanning between, supporting members, as noted in Section 4.4.

3.3 Tectum E Panels and Tectum E Roof Tiles:

Tectum E panels and Tectum E roof tiles are composite roof planks consisting of $^3/_4$-inch- to $6^1/_2$-inch-thick (19 mm to 165 mm), nominally 1.0-pound-per-cubic-foot-density (16 kg/m^3), expanded polystyrene foam plastic insulation core recognized in a current ICC-ES evaluation report and complying with ASTM C 578, Type I. The foam plastic core is factory-bonded to facings of minimum $1^1/_2$-inch-thick (38 mm) Tectum I panels on the bottom face and minimum $^7/_{16}$-inch-thick (11 mm) OSB or minimum $^1/_2$-inch-thick (12.7 mm) plywood complying with DOC PS-2 (UBC Standard 23-3) on the top face, with a Type II Class 2 adhesive complying with AC05. Panels are available as Tectum E panels and as Tectum E roof tiles in widths up to 48 inches (1219 mm) and lengths up to 192 inches (4877 mm). Tectum E panels have $^1/_2$-inch-deep (13 mm) tongues and grooves along the long edge in the Tectum layer. Tectum E roof tiles have a $^1/_2$-inch-wide (13 mm) rabbet on the long edge for installation between bulb tees or truss tees attached to the top of and spanning between supporting members as noted in Section 4.4. Tectum E panels and Tectum E roof tiles are mechanically and adhesively fastened to all supporting members, as noted in Section 4.1. See Figure 1 for typical edge details and Figure 2 for typical connections.

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3.4 Acoustical Board and Suspending Ceiling Tile:

Tectum I panels and tiles used as acoustical board and suspended ceiling tiles are fabricated from 1- to 2-inch-thick (25 to 51 mm) material and are available in various sizes with square, beveled or face-rabbeted edges. Panels with face-rabbeted edges are also available in maximum 3-inch (76 mm) thicknesses. The tiles may be installed between suspended ceiling runners, directly to substrate, to steel subpurlins or to furring strips spaced 24 inches (610 mm) on center on walls or ceilings.

3.5 Thermal Barrier:

Tectum I, III and E panels and roof tiles qualify as thermal barriers for use in separating foam plastic insulation from the interior of a building under IBC Section 2603.4 provided the edges are tongue-and-groove, covered with a 1-inch-thick (25 mm) wood strip, or joints are filled with a solid gypsum cement grout.

3.6 Interior Finish:

Tectum I panels have a flame-spread index of not more than 25 and a smoke- developed index of not more than 450, when tested in accordance with ASTM E 84. The panels are therefore classified as Class A interior finish in accordance with IBC Section 803.

4.0 DESIGN AND INSTALLATION

4.1 General:

The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these must be available on the jobsite during installation. The instructions within this report govern if there are any conflicts between the manufacturer's instructions and this report.

All panels must be installed with the plank's long dimension perpendicular to the supports. Fastening to wood framing for all panels must be with screws that penetrate into the framing at least 1 inch (25 mm), unless otherwise noted in this report. Fastening to steel supports for all panels must be with screws long enough to penetrate the steel at least $^1/_2$ inch (13 mm), unless otherwise noted in this report.

Tectum I panels must be attached to supporting members with screws and must be adhesively attached along tongue-and-groove edge joints and to supports in accordance with Section 4.3. See Figure 1 for typical Tectum panel edge details, and Figure 2 for typical connections. See Table 1 for allowable gravity loads, spans, thicknesses and required support member widths.

The Tectum III panels must be placed over steel, wood or concrete framing on flat or sloped roofs with the OSB side facing up. Maximum spacing of supports with allowable gravity loads is noted in Tables 2 and 3.

On concrete supports, a steel or wood insert must be cast in the concrete for installation. Screws for Tectum I panels must be Construction Fasteners, Inc., Dekfast 14 [0.234-inch-diameter (6 mm) shaft, 0.441-inch-diameter (11 mm) head] screws with 2-inch-diameter (51 mm) Construction Fasteners, Inc., washers. Screws for Tectum III and Tectum E panels must be Dekfast 14 screws with $1^1/_2$-inch-diameter (38 mm) Construction Fastener, Inc., washers; or SIP screws [0.194-inch-diameter (5 mm) shaft, 0.610-inch-diameter (16 mm) head]. When adhesion is required, a continuous $^3/_8$-inch-diameter (10 mm) bead of Miracle Construction adhesive, meeting the requirements of APA Specification AFG-01 and of caulking gun consistency, must be used.

4.2 Tectum I, III and E Screwed/Glued Roof Diaphragm:

Product thickness, fastenings, supports and diaphragm length-to-width ratios are set forth for Tectum I panels in Table 6; and in Table 7 for Tectum I long-span panels, 3-inch Tectum I panels, Tectum III panels and Tectum E panels. Tectum I diaphragms noted in Table 7 require No. 22 gage [0.0336 inch (0.85 mm) base-metal thickness], galvanized steel nailing strips, $1^1/_2$ inches (38 mm) wide at the periphery and 4 inches (102 mm) wide over supporting subpurlins.

Tectum panels must be laid with the long edge perpendicular to purlins and square-edge supported ends staggered in adjacent rows. Panels at unsupported tongue-and-groove edges between adjacent rows must be adhered to each other with a $^3/_8$-inch (10 mm) continuous bead of Miracle Construction adhesive placed in the groove of each panel, and the tongue-and-groove joints driven tight. Each supported end must be butted tight against the adjacent plank. Each supported end and crossing where planks are continuous over purlins must be adhered to the purlins or the diaphragm boundary supports with a $^3/_8$-inch (10 mm) continuous bead of adhesive and attached to supports with screws. The minimum length of panel must be sufficient to span three purlins, except for end filler to accommodate staggered joint installation.

4.3 Tectum I Roof Tile Diaphragm:

Tectum I roof tiles, 2 inches (51 mm) or more in thickness and $31^1/_2$ inches (800 mm) wide, must be grouted with gypsum concrete (ASTM C 317 Class A) between truss tees of a minimum size of 000-5-14-2. The truss tees must be welded to steel structural supports using a 1-inch (25 mm) fillet weld on each side of the tee at each support. The supports must be spaced a maximum of 96 inches (2438 mm) on center. Tile ends must be attached with two screws per panel end and glued using a $^3/_8$-inch (10 mm) bead of construction adhesive. The perimeter of the diaphragm must be attached using a $^3/_8$-inch (10 mm) bead of Miracle Construction adhesive and screws with 2-inch (51 mm) diameter washers spaced at $10^1/_2$ inches (267 mm) on center. Screws must be minimum No. 11 gage [0.200 inch (5.08 mm)] and the adhesive must meet the requirements of APA Specification AFG-01. Allowable shear value is 280 pounds per linear foot (4086 N/m).

4.4 Tectum III and Tectum E Roof Tile Diaphragm:

Tectum III and Tectum E roof tiles, $3^1/_2$ inches (89 mm) or more in thickness and $47^1/_2$ inches (1206 mm) wide, must be grouted between truss tees of a minimum size of 000-3-14-$3^1/_2$. The truss tees must be welded to steel structural supports using a 1-inch (25 mm) fillet weld on each side of the tee at each support. The supports must be spaced a maximum of 96 inches (2438 mm) on center. Tile ends must be attached with three screws with $1^1/_2$-inch-diameter (38 mm) washers per tile end, and must be glued using a $^3/_8$-inch-diameter (10 mm) bead of construction adhesive. The boundary of the diaphragm must be attached to supports using a $^3/_8$-inch-diameter (10 mm) bead of Miracle Construction adhesive and screws with $1^1/_2$-inch-diameter (38 mm) washers spaced at 12 inches (305 mm) on center. Screws must be a minimum of No. 14 gage [0.240 inch (6.10 mm)] and the adhesive must meet the requirements of APA Specification AFG-01. Allowable shear value is 310 pounds per linear foot (4553 N/m).

4.5 Wind Uplift:

Uplift resistance for Tectum I, III and E panels fastened with screws is noted in Tables 4 and 5.

4.6 Special Inspection:

Special inspection in accordance with IBC Chapter 17 is required where diaphragm construction incorporates adhesives. The special inspector must verify adhesive type, placement, and curing. Special inspections for seismic resistance must comply with IBC Section 1707.

5.0 CONDITIONS OF USE

The Tectum I, Tectum III and Tectum E Roof Deck Panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The Tectum I, Tectum III and Tectum E Roof Deck Panels are recognized for use in combustible construction or in Type I and II construction where fire-retardant-treated wood is allowed in accordance with IBC Section 603.1(1). When use is as an alternative to fire-retardant-treated wood, the allowable spans for Tectum III and Tectum E must be limited to the spans of Tectum I noted in Table 1.

5.2 Tectum decks with a $1^3/_4$-inch (44 mm) minimum thickness may be used as a roof deck in applications where heavy timber construction is allowed. Decking must be a minimum of 20 feet (6 m) above the floor immediately below

5.3 Structural calculations must be submitted to the code official. Calculations and drawings must be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed

5.4 For use as diaphragms, structural calculations must be submitted to the code official. Calculations and drawings must be prepared, signed and sealed by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed

5.5 The panels must be covered with an approved roof covering immediately after installation and must not be left exposed to the weather.

5.6 For applications in accordance with the IBC, panels with a maximum allowable load of less than 50 psf must be limited to applications that are not subject to the concentrated live loads specified in IBC Table 1607.1 Item 30.

5.7 The products must be manufactured at the Tectum, Inc., plant located in Newark, Ohio, or the Lamit Industries plant located in Columbus, Ohio, with follow-up inspections by PFS Corporation (AA-652).

6.0 EVIDENCE SUBMITTED

6.1 Reports of tests for vertical load, full-scale diaphragm load capacity, flame-spread, roof-covering classification, finish rating, and wind uplift; and reports of room fire tests in accordance with UBC Standard 26-3

6.2 Quality documentation.

7.0 IDENTIFICATION

Labels attached to stacks, skid loads, and crates of the Tectum products bear the Tectum, Inc., name, product name, evaluation report number (ESR-1112) and the name of the inspection agency (Professional Service Industries, Pittsburgh Testing Laboratory Division).

TABLE 1—ALLOWABLE ROOF DECK SPANS FOR TECTUM I PANELS

TECTUM NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS (inches)[2]			
		4-inch-wide Purlins			3-inch-wide Purlins
		35 psf Design Load[1]	40 psf Design Load[1]	45 psf Design Load[1]	50 psf Design Load[1]
1 1/2	2.4	---	----	---	24
2	3.5	42	40	38	36
2 1/2	4.5	48	46	44	42
3	5.3	54	52	50	48
2 long span	3.8	60	---	---	48
2 1/2 long span	4.7	66	---	---	60
3 long span	5.5	----	---	---	72

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]The tabulated design load is the total permitted and does not include the weight of the Tectum plank.
[2]Center to center of supports.

TABLE 2—ALLOWABLE ROOF DECK SPANS FOR TECTUM III PANELS[1]

TECTUM III NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS[3] (inches)		
		30 psf Superimposed Design Load	50 psf Superimposed Design Load	60 psf Superimposed Design Load
3 1/2	4.4	---	72[4]	---
4	4.6	---	72[2]	---
5	5.0	96[2]	---	72[2]
8	5.5	---	96[2]	---

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]Values limited to a maximum deflection of $L/240$ where L is the span in inches.
[2]Support conditions require a minimum 4-inch bearing width.
[3]Center to center of supports.
[4]Support conditions require a minimum 2 1/2-inch bearing width.

TABLE 3—ALLOWABLE ROOF DECK SPANS FOR TECTUM E PANELS[1,2]

TECTUM E NOMINAL THICKNESS (inches)	WEIGHT (psf)	ALLOWABLE SPANS[3] (inches)	
		40 psf Superimposed Design Load	50 psf Superimposed Design Load
2 3/4	4.4	---	48
4	4.6	72	60
5	5.0	---	72
6	5.2	---	84
8 1/2	5.5	---	96

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]Values limited to a maximum deflection of $L/240$ where L is the span in inches.
[2]Support conditions require a minimum 4-inch bearing width.
[3]Center to center of supports.

TABLE 4—UPLIFT RESISTANCE FOR TECTUM I DECKS IN POUNDS PER SQUARE FOOT[1,2,3]

PANEL WIDTH (inches)	SPAN (inches)	SCREWS PER JOIST	UPLIFT RESISTANCE FOR 1-INCH PENETRATION IN WOOD	UPLIFT RESISTANCE FOR ATTACHMENT TO STEEL OR 1.5-INCH PENETRATION IN WOOD
31	24	2	110	130
47	24	2	73	86
31	36	2	74	87
47	36	2	49	57
47	36	3	73	86
31	42	2	63	74
47	42	2	42	49
47	42	3	63	74
31	48	2	55	65
31	48	3	83	98
47	48	2	37	43
47	48	3	55	65
31	60	2	37	44
31	60	3	55	65
31	72	2	30	35
31	72	3	46	54

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]Screws are Dekfast No. 14 screws with a 2-inch-diameter washer described in Section 4.1.
[2]Values are based on screws acting alone and panels installed in a two-span condition.
[3]Wood framing must have a minimum specific gravity of 0.50.

TABLE 5—UPLIFT RESISTANCE OF TECTUM III AND TECTUM E DECK IN POUNDS PER SQUARE FOOT[1]

PANEL WIDTH (inches)	SPAN (inches)	SCREWS PER JOIST	UPLIFT RESISTANCE FOR 1-INCH PENETRATION IN WOOD[2]	UPLIFT RESISTANCE FOR ATTACHMENT TO STEEL[3]
47	48	2	50	69
47	48	3	75	104
47	60	3	60	83
47	60	4	79	110
47	72	3	50	69
47	72	4	66	92
47	84	3	43	59
47	84	4	57	79
47	96	3	37	52
47	96	4	50	69

For **SI:** 1 inch = 25.4 mm, 1 psf = 0.0479 kPa.

[1]Values are based on nails acting alone and panels installed in a two-span condition.
[2]Screws are SIP screws described in Section 4.1. Wood framing must have a minimum specific gravity of 0.50.
[3]Screw are Dekfast No. 14 screws described in Section 4.1.

TABLE 6—TECTUM I ALLOWABLE SHEAR OR SEISMIC LOAD IN POUNDS PER LINEAL FOOT[5,6,7]

TECTUM I THICKNESS (inches)	WOOD PURLINS OR WOOD NAILERS BOLTED TO METAL PURLINS														METAL PURLINS	
	Length-to-Width Ratio[1]							Length-to-Width Ratio Not Over 2:1			Length-to-Width Ratio Not Over 3:1			Length-to-Width Ratio Not Over 3:1		
	Screw Size	Unblocked Diaphragm, Uniform Screw Spacing on Supports[2,3]		Blocked Diaphragm, Uniform Screw Spacing on All Panel Edges[2]		Unblocked Diaphragm, Screws Spaced 4 inches o.c. through Metal Strips[2,3]			Unblocked Diaphragm, Screws Spaced 4 inches o.c. through Metal Strip and Glued[3]			Unblocked Diaphragm, Screws Spaced 8 inches o.c. through Metal Strip and Glued[3]			Unblocked Diaphragm, Self-tapping Screws Spaced 8 inches o.c. through Metal Strip and Glued[3]	
		3-inch Purlin Width[4]		3-inch Purlin Width[4]		Screw Size	3-inch Purlin Width4	4-inch Purlin Width4	Screw Size	3-inch Purlin Width4	4-inch Purlin Width4	Screw Size	3-inch Purlin Width4	4-inch Purlin Width4	Screw Size	4-inch Nominal Top Flange Width
		4" o.c.	2" o.c.	4" o.c.	2" o.c.											
2	$3^1/_2$" 14 ga	140	200	200	350	$3^1/_2$" 14 ga	175	175	$3^1/_2$" 14 ga	230	300	$3^1/_2$" 14 ga	200	250	3/16"	250
$2^1/_2$	4" 14 ga	140	200	200	350	4" 14 ga	---	200	4" 14 ga	250	330	4" 14 ga	210	280	3/16"	280
3"	---	---	---	---	---	$4^1/_2$" 14 ga	---	200	$4^1/_2$" 14 ga	250	360	$4^1/_2$" 14 ga	220	300	3/16"	300

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.5939 N/m.

[1]The diaphragm length-to-width ratio for wood frame construction must not exceed 3:1. The diaphragm deflection limit for masonry or concrete construction must be determined as follows:

$$\Delta p = \frac{h^2 f}{0.01(Ew)(t)}$$

where:

Δp = Allowable diaphragm deflection, inches.
H = Unsupported height of the wall, feet.
F = Allowable flexural compressive strength of the wall, pounds per square inch.
Ew = Modulus of elasticity of the wall, pounds per square inch.

Table 6 notes continued on the next page.

Table 6 notes continued from the previous page.

The diaphragm deflection is determined by the formula:

$$\Delta d = \Delta s + \Delta b = \frac{(F)(Qavg)(L)}{2x10^6} + \frac{5wl^4 x1728}{384EI}$$

where:

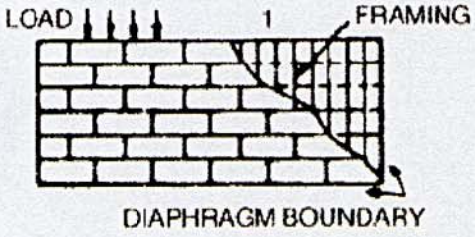
Δd = Total diaphragm deflection, inches.
Δs = Shear deflection, inches.
Δb = Bending deflection, inches.

$$F = \frac{33{,}000Qavg}{(Qd)^2}$$

(For a diaphragm having a uniform shear distribution across its span)

Qavg = Average unit shear on diaphragm in pounds per foot between points for which deflection is to be determined. (For a simply supported diaphragm uniformly loaded, "Qavg" is equal to the actual diaphragm shear per foot divided by two.)
Qd = Allowable diaphragm shear in pounds per foot from table.
W = Uniform load on diaphragm in pounds per foot.
L = Diaphragm span, feet.
E = Modulus of elasticity of diaphragm chord, psi.
I = Moment of inertia of chords, inches[4].

[2]Values may be increased one-fourth if the boundary fastening of the diaphragm has the screw spacing reduced one-half.
[3]Values must be decreased one-fourth when continuous unblocked joints are parallel to the direction of horizontal forces.
[4]Purlin widths are nominal dimensions.
[5]In addition to screw fastening, all boards must be fastened to one another at tongue-and-groove edge joints and to supports with ⅜-inch-diameter bead of adhesive.
[6]Minimum thickness of structural steel support must be 0.20 inch.
[7]The planks are oriented to the load and framing as follows:



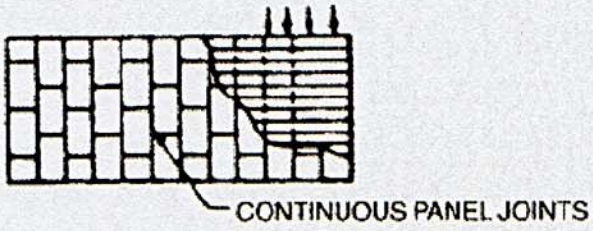


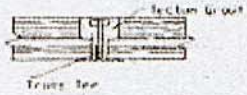
TABLE 7—ALLOWABLE SHEAR FOR WIND OR SEISMIC FORCES IN POUNDS PER FOOT FOR HORIZONTAL ROOF DIAPHRAGMS CONSISTING OF TECTUM III OR E PANELS, TECTUM I LONG-SPAN PANEL AND 3-INCH TECTUM I PANEL[1,2,3]

ITEM	SCREW SIZE	MINIMUM PENETRATION INTO FRAMING (inches)	MINIMUM TECTUM III/E THICKNESS (inches)	MAXIMUM SUPPORT SPACING (inches)	MINIMUM NORMAL WIDTH OF WOOD/STEEL[4] FRAMING MEMBER (inches)	FIELD FASTENER SPACING (inches)	PERIMETER FASTENER SPACING (inches)	UNBLOCKED DIAPHRAGM
Tectum III/E	No. 14 self-tapping with 1 1/2-inch-diameter steel washer	1	3 1/2	60	Steel support only[4]	18	18	265
			5	72		18	18	230
Tectum III/E	No. 14 self-tapping with 1 1/2-inch-diameter steel washer	1[4]	5	48	Steel support only[4]	16	16	310
Tectum III/E	No. 14 with 5/8-inch-diameter head	2	5	72	4	16	12	320
		2 1/2	3 1/2	60	4	16	12	360
		2 1/2	3 1/2	72	4	16	12	340
Tectum III/E[5]	No. 14 self-tapping with 1 1/2-inch-diameter steel washer	1	5	72	4	8	6	785
2-inch-thick long-span plank[6]	No. 14 with 2-inch-diameter washer	1 1/4	2	48	4	16	12	320
2 1/2-inch-thick long-span plank[6]	No. 14 with 2-inch-diameter washer	1 1/4	2 1/2	60	4	16	10	390
3-inch-thick long-span plank[7]	No. 14 with 2-inch-diameter washer	1 1/2	3	72	4	16	12	280
3-inch-thick plank	No. 11 with 2-inch-diameter washer	15/16	3	48	Steel support only[4]	10	10 ends 16 length	450

For **SI:** 1 inch = 25.4 mm, 1 plf = 14.5939 N/m.

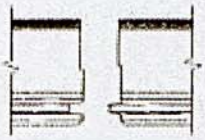
[1]In addition to screw fastening, all boards must be fastened to one another at tongue-and-groove edge joints and to supports with a 3/8-inch-diameter bead of adhesive.
[2]See Footnote 1 to Table 6.
[3]See Footnote 7 to Table 6.
[4]Minimum thickness of structural steel support must be 0.20 inch.
[5]An overlayment of 7/16-inch OSB must be attached to the top of the panels. Two-inch, No. 16 gauge staples at 4 inches o.c. must be at the perimeter of each overlayment and at 8 inches o.c. at 24 inch intervals. A 3/8-inch bead of adhesive must be applied at the perimeter and at 24-inch intervals. All overlayment joints offset panel joints.
[6]Long-span plank utilizes a 1/2-inch-by-3/4-inch, No. 16 gauge steel channel section along the tongue-and-groove edges.
[7]Long-span plank utilizes a 5/8-inch-by-1 1/2-inch, No. 16 gauge steel channel section along the tongue-and-groove edges.

Tectum III/E Roof Tile Edge Detail



Tectum I Roof Tile Edge Detail

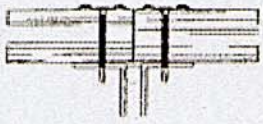
Tectum I Roof Plank Edge Detail



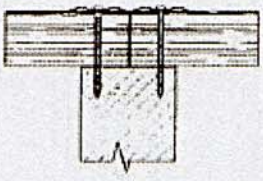
Tectum III/E Roof Plank Edge Detail

Tectum I Long Span Edge Detail

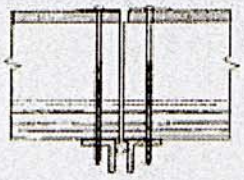
FIGURE 1—TYPICAL EDGE DETAILS



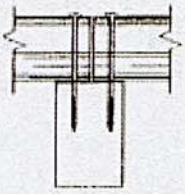
Tectum I Panel Typical End Condition on Steel



Tectum I Panel Typical End Condition on Wood

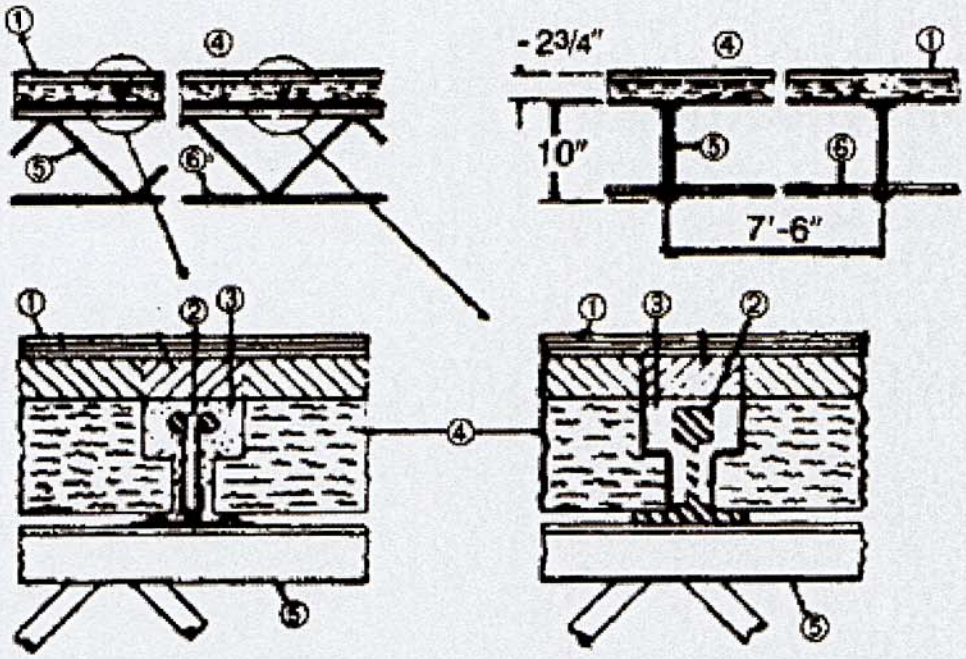


Tectum III/E Typical End Condition on Steel



Tectum III/E Typical End Condition on Wood

FIGURE 2—TYPICAL END CONDITIONS



1. **Built-up roofing**
2. **Bulb Tee**
3. **Grout Mixture**—Tectum grout shall be used as cemetitious mixture between structural cement fiber units and bulb tees.
4. **Structural Cememt-Fiber Units—Tectum Inc.**—Care is to be taken to ensure that units are tightly butted at end joints.
5. **Joists**
6. **Bridging Angle**—Bridging angle shall be welded to joists with spacing of bridging in accordance with recommended practice.

FIGURE 3—TYPICAL ROOF CONSTRUCTION

T4 TECHNICAL BULLETIN

Diaphragm and Tectum™ Roof Decks

Rev. Dec. 2009

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum roof decks are structural building products. As structural products they are used as an element in achieving the diaphragm requirement for a structure.

Building must be able to resist the design horizontal loads imposed on the building from earthquakes (seismic) or winds. The structural roof assembly is an important element in the transfer of these loads to shear walls. This loading is typically expressed in pounds per linear foot.

Diaphragm shear requirements of the roof assembly vary greatly depending on the size and shape of the building and locations of shear walls within the building. Required shear values for roof assemblies range from less than 100 pounds per linear foot to over 1000 pounds per linear foot. Most requirements for buildings where Tectum decks are used are between 200 and 350 pounds per linear foot design load. Requirements of over 500 pounds per linear foot are needed in some roof areas where Tectum decks are used. Each building project needs to be evaluated by a structural engineer to determine the design shear requirement and the transfer paths.

Tectum decks were first evaluated for their adequacy as a roof diaphragm system in 1956. Testing has continued as new systems and products were developed. Many of these tested systems and products are listed in our ICC-ES Evaluation Report ESR-1112. This report is available online at www.tectum.com that has a link to the report on the ICC-ES website.

Attachment of Tectum decks requires screws and construction adhesive. Adhesive is used on the supports and along the tongue and groove joint of planks. Roof plank systems require staggered ends and a two span condition to achieve the design values. Tests where spans are eight foot are based on single span.

Additional diaphragm values are shown in the current roof deck catalog. Copies of specific tests are available upon request.

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

CTL Engineering Inc.
2860 Fisher Road, P.O. Box 44469, Columbus, Ohio 43204
Phone: 614/276-8123 • Fax: 614/276-6377

Consulting Engineers • Testing • Inspection Services • Analytical Laboratories

February 23, 1994

Tectum, Incorporated
105 South Sixth Street
Newark, Ohio 43055

Attention: Mr. Larry Brown
Technical Service Director

Reference: Diaphragm Load Test
3-1/2 Inch Tectum III Roof Deck
Wood Frame 6 ft. on Centers
Fastener No. 14 with 5/8 Inch Heads
CTL Project No. 94-30037A

Dear Mr. Brown:

The following report is according to your request, describing the diaphragm load test witnessed by CTL Engineering, Inc. The testing is now complete.

I. BACKGROUND

CTL Engineering, Inc. was requested to supervise and witness diaphragm load testing of roof deck samples in accordance with ASTM E 455-76. The assembly of the 3-1/2 inch Tectum III Roof Deck panels to the test frame was witnessed on January 18, 1994. The diaphragm load test was witnessed on January 28, 1994.

II. PANEL CONSTRUCTION

A. Specimen Description (see sketch A)

1. Manufacturer - Tectum, Incorporated, Newark, Ohio

2. Panel Identification - 3-1/2 inch Tectum III Roof Deck

3. Dimensions - 144" x 47" x 3-1/2"

B. Specimen Construction (see photo no. 1)

1. The top layer is 7/16" thick 2MW wafer board, ANSI 208.1.

2. The middle layer is 1-1/2" thick Dow styrofoam.

3. The bottom layer is a 1-1/2" thick Tectum substrate. The Tectum substrate is made up of excelsior combined with a binding mixture of magnesium oxysulfate, sodium silicate and limestone solution.

4. The panel's layers are bonded together under pressure with a urethane adhesive, MOR-AD 190-2, manufactured by Morton Industries.

III. ASSEMBLY OF TEST SECTION

A. Dimensions of Test Section

1. The overall test section dimensions are 288" x 96" (see sketch A). The structural frame was made of wood lumber with section measurements of 3-3/8" by 5-1/4". The wood perimeter frame was bolted together using clip angles and bolts at all connections. The frame had cross pieces on 6 foot centers along the length of the frame. The frame was locally reinforced, with a 3-3/8" by 5-1/4" by 120" timber, where the load cylinders applied their load. The reinforcement distributed the load evenly and prevented localized contact failures (see photo no. 2).

2. The test frame was covered with three rows of Tectum III panels running along the length of the test frame (see sketch A). The center of the middle row contained one full width and length panel measuring 47" by 144". The row was completed by a "72 by 47" panel on either end. Both outside rows contained two panels, 24" wide, with their lengths measuring 144".

3. The panel end butt joints were staggered between rows (see sketch A).

B. Test Panel Assembly

1. The panels were first glued (Tectum substrate side down) to the wood structure. Glue was applied between the Tectum III side tongue joints using a 3/8" bead of construction adhesive, meeting American Plywood Association specification AFG-01. The adhesive was applied at all contact areas (see sketch A). The Tectum III end butt joints were not glued.

2. The 3-1/2" Tectum III panels were screwed to the structural wood frame using no. 14 size screws 6" long with a 5/8" head. The screws were installed at 12" spacings around the test frame's perimeter and 16" spacings along the frame's three cross members (see sketch A). The screws were driven in so that their heads were flush or below the surface of the Tectum III top surface.

3. The test frame was allowed to set for ten days prior to the load test.

IV. TEST SETUP

A. The test frame was placed in the load frame constructed from rectangular steel tubing (see photo no. 3).

B. The test assembly was held in the load frame by diagonal straps on the top and bottom (see photo no. 3). The test frame was simply supported on each end per the ASTM E 455-76 simple span frame test.

C. Dial indicators were mounted to measure support and span deflections (see photo no. 4).

D. The load was applied by two calibrated, hydraulic cylinders, a pump, and a pressure gauge (see photo no. 2). Calibration data is attached.

E. The hydraulic cylinders were positioned between the test frame and the load frame (see photo no. 2). The cylinders were positioned 8 feet from each end or one-third of the total span from each end of the test frame.

V. TEST PROCEDURE

A. The test frame was pre-loaded to 400 on the gauge or approximately 400 lbs. per cylinder. The pressure was then returned to zero.

B. The dial indicators were zeroed.

C. The cylinder pressure was raised in 200 pound increments and the pressure was maintained while each set of dial indicator readings were taken. The time at each load was approximately one minute.

D. At the selected loads of 1,400 lbs, 2,800 lbs and 3,800 lbs the load was decreased to zero and deflection readings were taken initially and after 5 minutes at zero load. Then the load was returned to the selected load and the deflection reading taken again. The loading deflection test proceeded in 200 lb increments.

E. The test section did not reach ultimate load or failure during the test. The test was stopped when the loaded test panel deflected enough to contact the steel test frame.

The maximum load before the panel contacted the test point was determined and used to calculate the allowable design load. This is a conservative value because the ultimate failure load is usually used to calculate the design allowable.

VI. TEST RESULTS

A. The maximum shear load during testing was 17,084 lbs.; (not ultimate shear load).

B. Maximum shear reaction (Ru)
Ru = 17,084 lbs ÷ 2 reactions
Ru = 8,542 lbs

C. Maximum shear strength (Su)
Su = 12 in/ft x 8,542 lbs ÷ 96.0 in
Su = 1,068 lbs/ft

D. Design allowable shear (Sda)
Sda = 1,068 lbs/ft x 1.33 (wind/seismic) ÷ 4.0 (F.O.S.)
Sda = 355 lbs/ft

E. Total deflection (TD) (at Sda = 355 lbs/ft)
TD = {D2 + D3 - D1 - D4} ÷ 2
Where D2 and D3 are span deflections and D1 and D4 are support deflections interpolated from the test data corresponding to a load reading of 2840 lbs.
TD = {.138 + .136 - .044 - .098} ÷ 2
TD = .066 in.

F. The complete test results of shear reaction vs. total deflection are shown on the attached graph. The relaxation to zero load is shown on a separate graph.

Under the maximum load the test panel demonstrated transverse slipping (see photo no. 5) and gaps between the panels (see photo no. 6).

After the test, the bond between the Tectum and wood frame was checked by removing the screws and pulling up the Tectum III panels. The majority of the bonds to the wood frame were intact (see photo no. 7).

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation for, or endorsement of, the product or material tested.

The testing services have been performed, findings obtained, and reports prepared in accordance with generally accepted testing laboratory principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

Thank you for using the services of CTL Engineering, Inc. Should you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Respectfully submitted,

CTL ENGINEERING, INC.

Hal I. Dunham, P.E.
Mechanical Engineer

D. Bruce Turner
Engineering Technician

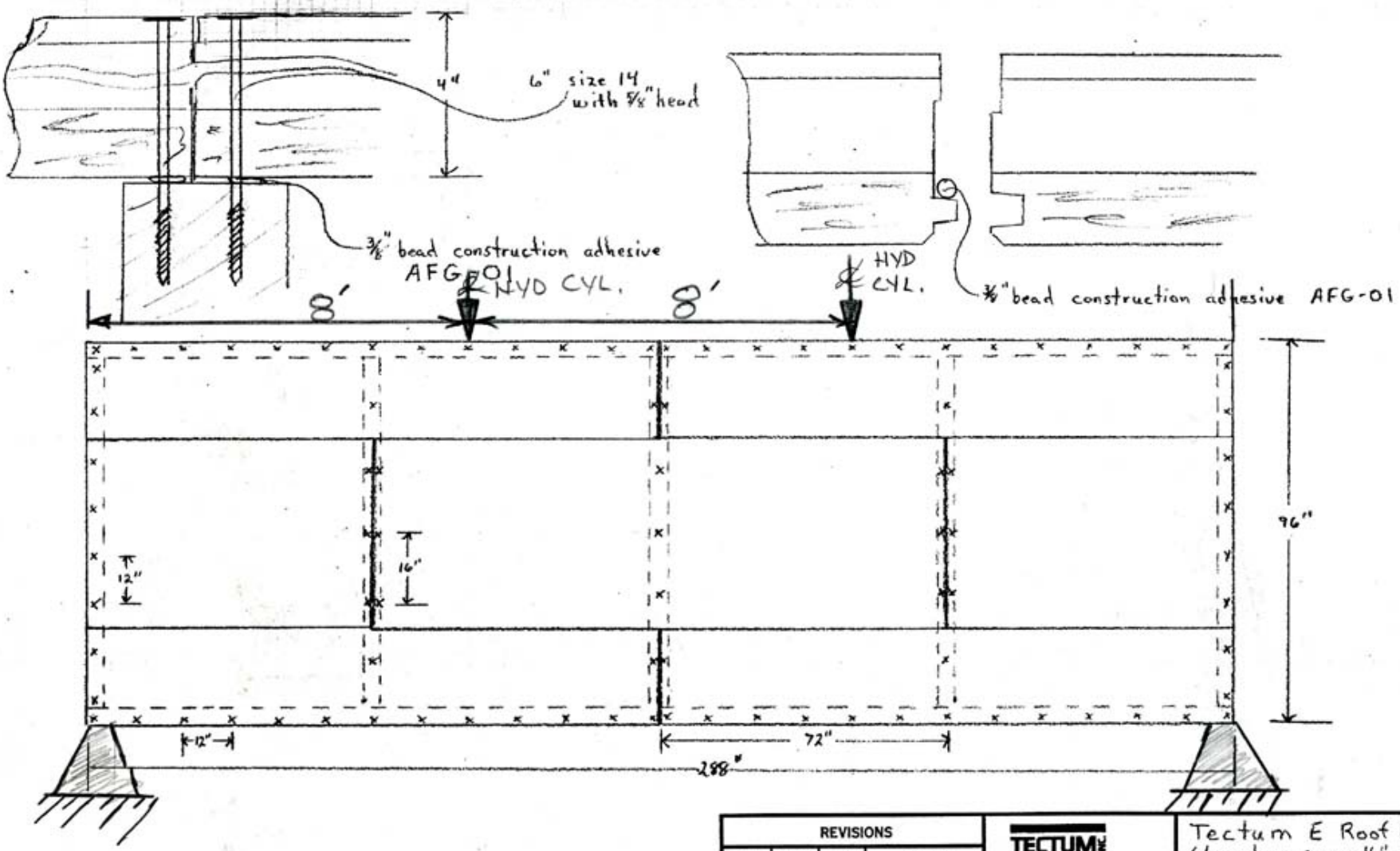
HID/DBT/gm
Attachments

CTL ENGINEERING

GAUGE PRESSURE TO CYLINDER LOAD CALIBRATION		
Gauge Load Reading (lbs)	Left Cylinder (lbs)	Right Cylinder (lbs)
0	0	0
1,000	1,100	1,120
2,000	2,000	2,000
3,000	3,060	3,040
4,000	4,060	4,040
5,000	5,060	5,040
6,000	6,060	6,060
7,000	7,100	7,080
8,000	8,140	8,120
9,000	9,160	9,140
10,000	10,200	10,160
11,000	11,240	11,200
12,000	12,240	12,200
13,000	13,260	13,240
14,000	14,260	14,240
15,000	15,260	15,240
16,000	16,260	16,240
17,000	17,240	17,220
18,000	18,240	18,220
19,000	19,240	19,220
20,000	20,240	20,200

Calibration Date - January 25, 1994

CTL ENGINEERING



REVISIONS			
No.	DATE	BY	REMARKS

TECTUM

Tectum E Roof Panels 4" 6' centers screw 16" o.c field 12" o.c. perimeter

DATE _____ SCALE _____

DRAWN _____ CHECKED _____

APPROVED _____

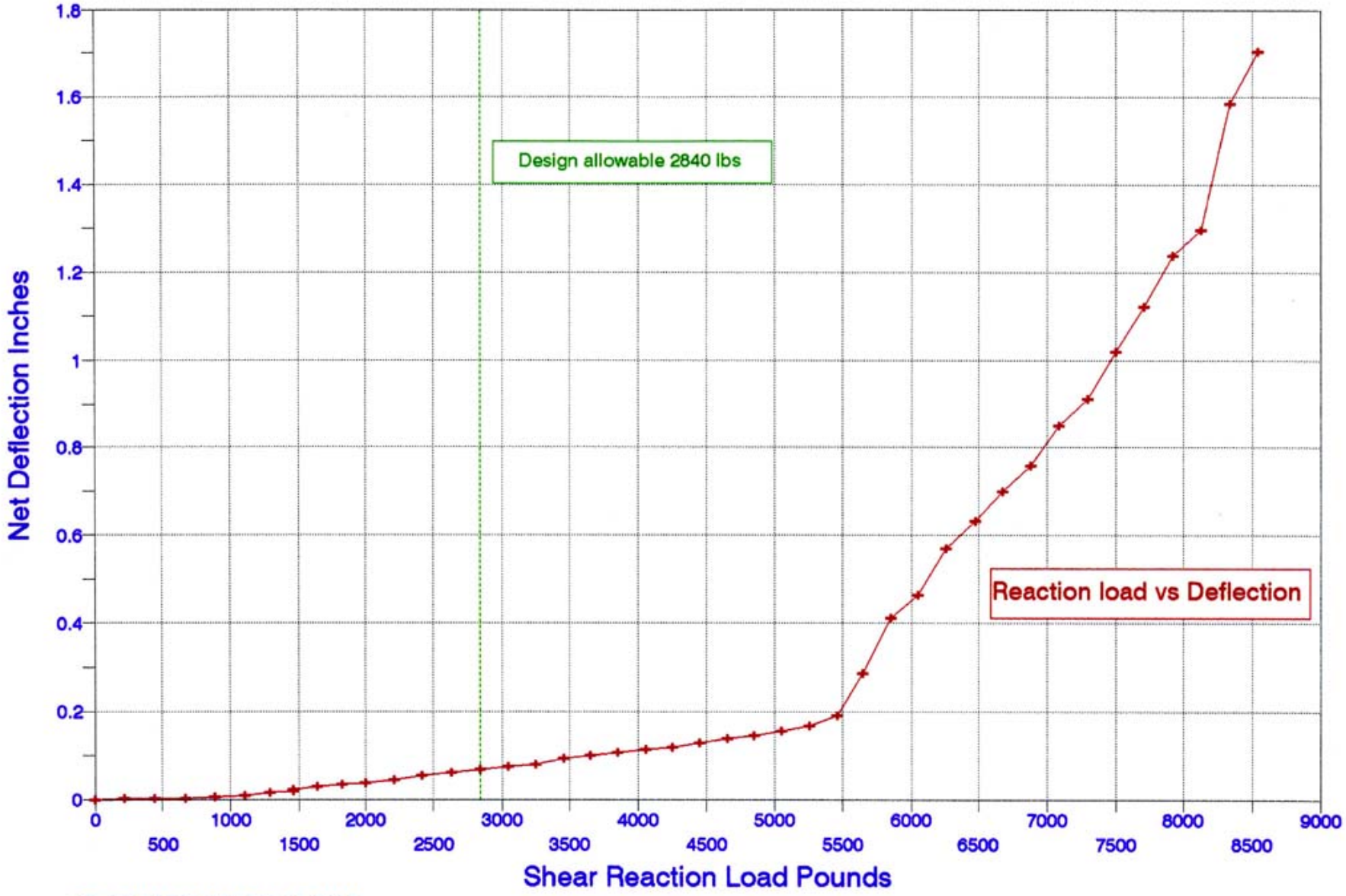
DRAWING NUMBER 3-94

MILLS CO.—299GL—300—5-60

SKETCH A

DIAPHRAM TEST LOAD vs DEFLECTION

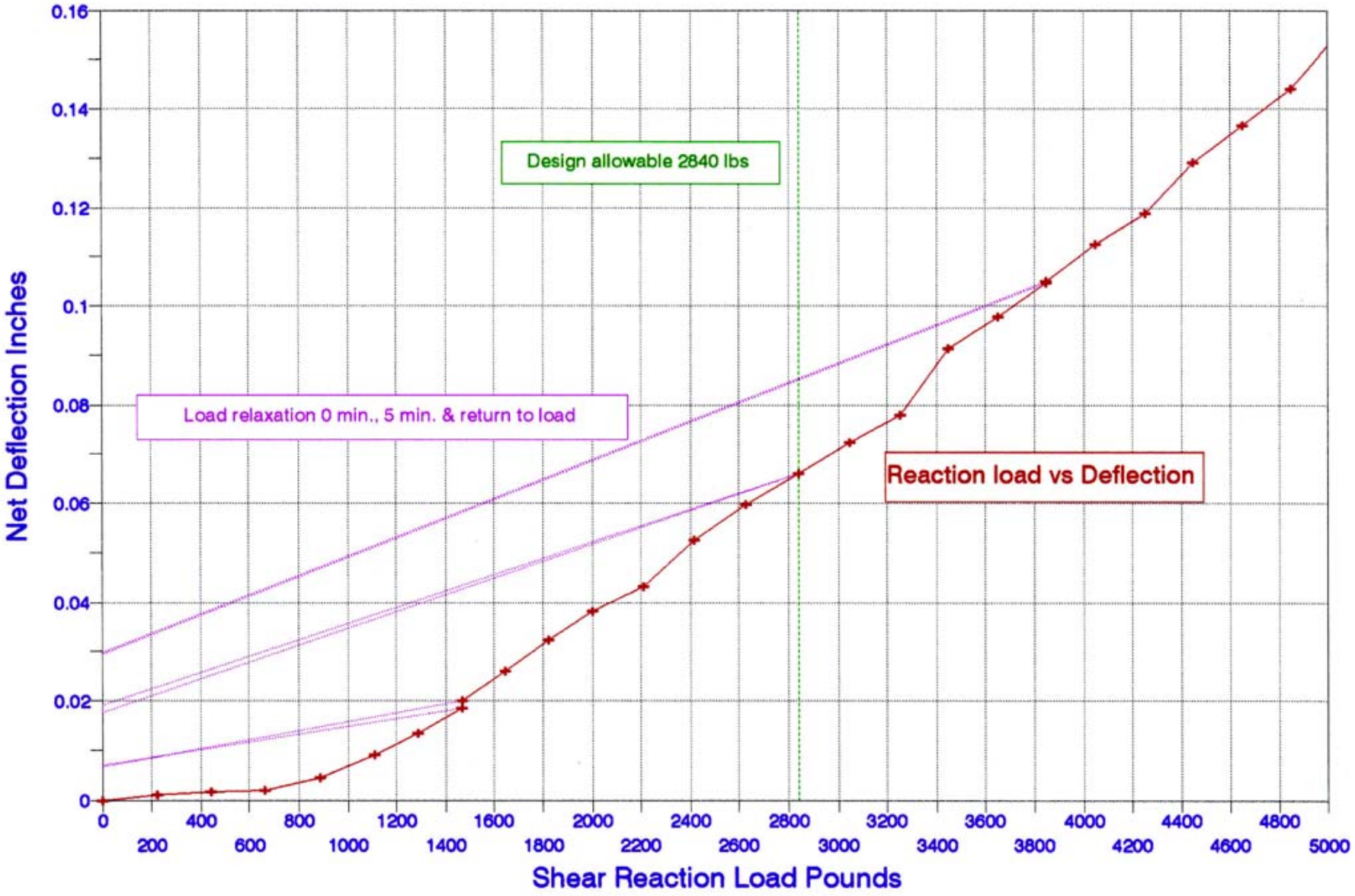
3-1/2" Tectum On Wood Frame 6' O. C.



CTL ENGINEERING PROJECT 94-30037A

PORTION OF LOAD VS DEF. WITH RELAXATION

3-1/2" Tectum On Wood Frame 6' O. C.



CTL ENGINEERING PROJECT 94-30037A

PHOTO NO. 1 - Shows the cross-section of the 3-1/2" thick Tectum III Roof Deck Panels. The top layer is 7/16" 2MW wafer board ANSI 208.1 (see arrow W), middle layer 1-1/2" of Dow styrofoam (see arrow S) and the bottom 1-1/2" layer of Tectum substrate (see arrow T). The panel's layers are bonded together with a urethane adhesive MOR-AD 190-2 from Morton Industries.

PHOTO NO. 2 - Shows a close-up of the load side of the test set-up. The two hydraulic cylinders (see arrows C), pump and gage (see arrow P) which apply the load. The cylinders, pump and pressure gauge were load calibrated prior to the test. Notice the reinforcing timber (see arrow T) at the cylinder loading location.

PHOTO NO. 3 - Shows the test set-up prior to the diaphragm load test. Note load cylinders (arrows C) and dial indicators at supports and along span (arrows I).

PHOTO NO. 4 - Shows a dial indicator used to measure deflections at the supported ends.

PHOTO NO. 5 - Shows the slippage at longitudinal joints between panels at maximum load.

PHOTO NO. 6 - Shows gaps between panels at maximum load.

PHOTO NO. 7 - Shows a view of the frame and panel removed after the test. The majority of the bond was found intact.

CTL Engineering Inc.
2860 Fisher Road, P.O. Box 44469, Columbus, Ohio 43204
Phone: 614/276-8123 • Fax: 614/276-6377

Consulting Engineers • Testing • Inspection Services • Analytical Laboratories

April 26, 1994

Tectum, Incorporated
105 South Sixth Street
Newark, Ohio 43055

Attention: Mr. Larry Brown
Technical Service Director

Reference: Diaphragm Load Test
2-1/2 Inch Tectum LS Roof Deck Plank
Wood Frame 5 ft. on Centers
Fastener No. 14 with 2" Profile Washer
Plank Joints Reinforced with 16 Ga. Channel
CTL Project No. 94-30037D

Dear Mr. Brown:

The following report is according to your request, describing the diaphragm load test witnessed by CTL Engineering, Inc. The testing is now complete.

I. BACKGROUND

CTL Engineering, Inc. was requested to supervise and witness diaphragm load testing of 2-1/2 inch Tectum LS roof deck plank samples in accordance with ASTM E 455-76. The assembly of the 2-1/2 inch Tectum LS roof deck planks to the test frame was witnessed February 25, 1994. The diaphragm load test was witnessed March 14, 1994.

II. PANEL CONSTRUCTION

A. Specimen Description (see sketch A)

1. Manufacturer - Tectum, Incorporated, Newark, Ohio

2. Plank Identification - 2-1/2 inch Tectum LS roof deck plank

3. Dimensions - 120" x 31" x 2-1/2"

B. Specimen Construction (see photo no. 1)

The Tectum LS roof deck plank is made up of excelsior combined with a binding mixture of magnesium oxysulfate, sodium silicate and limestone solution.

III. ASSEMBLY OF TEST SECTION

A. Dimensions of Test Section

1. The overall test section dimensions are 288" x 96" (see sketch A). The structural frame was made of wood lumber with section measurements of 3-3/8" by 5-1/4". The wood perimeter frame was bolted together using clip angles and bolts at all connections. The frame had 4 cross pieces spaced on 5 foot centers along the length of the frame with the remainder of the 24 foot frame completed with a 4 foot space. The frame was locally reinforced, with a 3-3/8" by 5-1/4" by 120" timber, where the load cylinders applied their load. The reinforcement distributed the load evenly and prevented localized contact failures (see photo no. 2).

2. The test frame was covered with four rows of Tectum LS roof deck planks running along the length of the test frame (see sketch A). The middle two rows contained two 120 inch long full width panels measuring 31" wide. The middle two rows were completed with a 48" long by 31" wide plank on one end. Both outside rows contained three planks, 17" wide, with their lengths measuring 120", 120" and 48".

3. The plank end butt joints were staggered between rows (see sketch A).

B. Test Plank Assembly

1. The planks were first glued to the wood structure. Glue was applied between the Tectum side tongue joints using a 3/8" bead of construction adhesive, meeting American Plywood Association specification AFG-01. The adhesive was applied at all contact areas (see sketch B). The Tectum end butt joints were not glued.

2. The Tectum side tongue joints were reinforced with 16 gauge galvanized steel channels 120" long (see sketch B). The channel end joints were staggered away from the plank end joints.

3. The 2-1/2" Tectum LS roof deck planks were screwed to the structural wood frame using no. 14 size screws 3-3/4" long with a 2" profile washer. The screws were installed at 10" spacings around the test frame's perimeter and 16" spacings along the frame's four cross members (see sketch A). The screws were driven in so that the profile washers were not flush but above the surface of the Tectum.

4. The test frame was allowed to condition for seventeen days prior to the load test.

IV. TEST SETUP

A. The test frame was placed in the load frame constructed from rectangular steel tubing (see photo no. 3).

B. The test assembly was held in the load frame by diagonal straps on the top and bottom (see photo no. 3). The test frame was simply supported on each end per the ASTM E 455-76 simple span frame test requirements.

C. Dial indicators were mounted to measure support and span deflections (see photo nos. 3 & 4).

D. The load was applied by two calibrated, hydraulic cylinders, a pump, and a pressure gauge (see photo no. 2). Calibration data is attached.

E. The hydraulic cylinders were positioned between the test frame and the load frame (see photo no. 2). The cylinders were positioned 8 feet from each end or one-third of the total span from each end of the test frame.

V. TEST PROCEDURE

A. The test frame was pre-loaded to 400 on the gauge or approximately 400 lbs. per cylinder. The pressure was then returned to zero.

B. The dial indicators were zeroed.

C. The cylinder pressure was raised in 200 pound increments and the pressure was maintained while each set of dial indicator readings were taken. The time at each load was approximately one minute.

D. At the approximate loads of 1,800 lbs, 3,600 lbs and 4,800 lbs the load was decreased to zero and deflection readings were taken initially and after 5 minutes at zero load. Then the load was returned to the selected load and the deflection readings taken again. The loading deflection test then proceeded in 200 lb increments.

E. The test section reached ultimate or maximum load at 9,364 lbs per cylinder during the test.

VI. TEST RESULTS

A. The maximum shear load during testing was 18,728 lbs; (not ultimate shear load).

B. Maximum shear reaction (Ru)
Ru = 18,728 lbs ÷ 2 reactions
Ru = 9,364 lbs

C. Maximum shear strength (Su)
Su = 12 in/ft x 9,364 lbs ÷ 96.0 in
Su = 1,170 lbs/ft

D. Design allowable shear (Sda)
Sda = 1,170 lbs/ft x 1.33 (wind/seismic) ÷ 4.0 (F.O.S.)
Sda = 389 lbs/ft

E. Total deflection (TD) (at Sda = 389 lbs/ft)
TD = {D2 + D3 - D1 - D4} ÷ 2
Where D2 and D3 are span deflections and D1 and D4 are support deflections interpolated from the test data corresponding to a load reading of 3112 lbs.
TD = 0.078 in.

F. The complete test results of shear reaction vs. total deflection are shown on the attached graph. The relaxation to zero load is shown on a separate graph.

The test planks demonstrated transverse slipping (see photo no. 5) and gaps between the planks (see photo no. 6) under the maximum load.

This test report contains only findings and results arrived at after employing the specific test procedures and standards listed herein. It is not intended to constitute a recommendation for, or endorsement of, the product or material tested.

The testing services have been performed, findings obtained, and reports prepared in accordance with generally accepted testing laboratory principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

Thank you for using the services of CTL Engineering, Inc. Should you have any questions, or if we may be of further assistance, please do not hesitate to contact us.

Respectfully submitted,

CTL ENGINEERING, INC.

Hal I. Dunham, P.E.
Mechanical Engineer

D. Bruce Turner
Engineering Technician

HID/DBT/nh
Attachments

CTL ENGINEERING INC

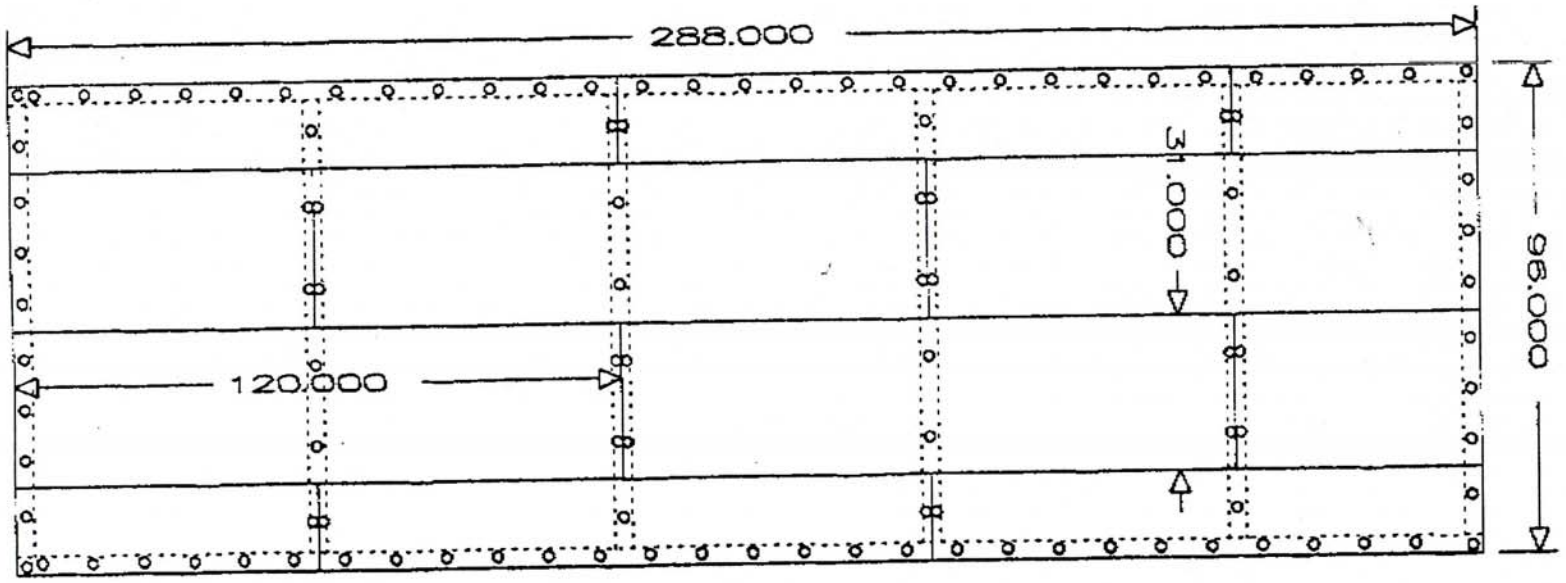
GAUGE PRESSURE TO CYLINDER LOAD CALIBRATION		
Gauge Load Reading (lbs)	Left Cylinder (lbs)	Right Cylinder (lbs)
0	0	0
1,000	1,100	1,120
2,000	2,000	2,000
3,000	3,060	3,040
4,000	4,060	4,040
5,000	5,060	5,040
6,000	6,060	6,060
7,000	7,100	7,080
8,000	8,140	8,120
9,000	9,160	9,140
10,000	10,200	10,160
11,000	11,240	11,200
12,000	12,240	12,200
13,000	13,260	13,240
14,000	14,260	14,240
15,000	15,260	15,240
16,000	16,260	16,240
17,000	17,240	17,220
18,000	18,240	18,220
19,000	19,240	19,220
20,000	20,240	20,200

Calibration Date - January 25, 1994

TECTUM, INC. CTL PROJECT NO. 94-30037D

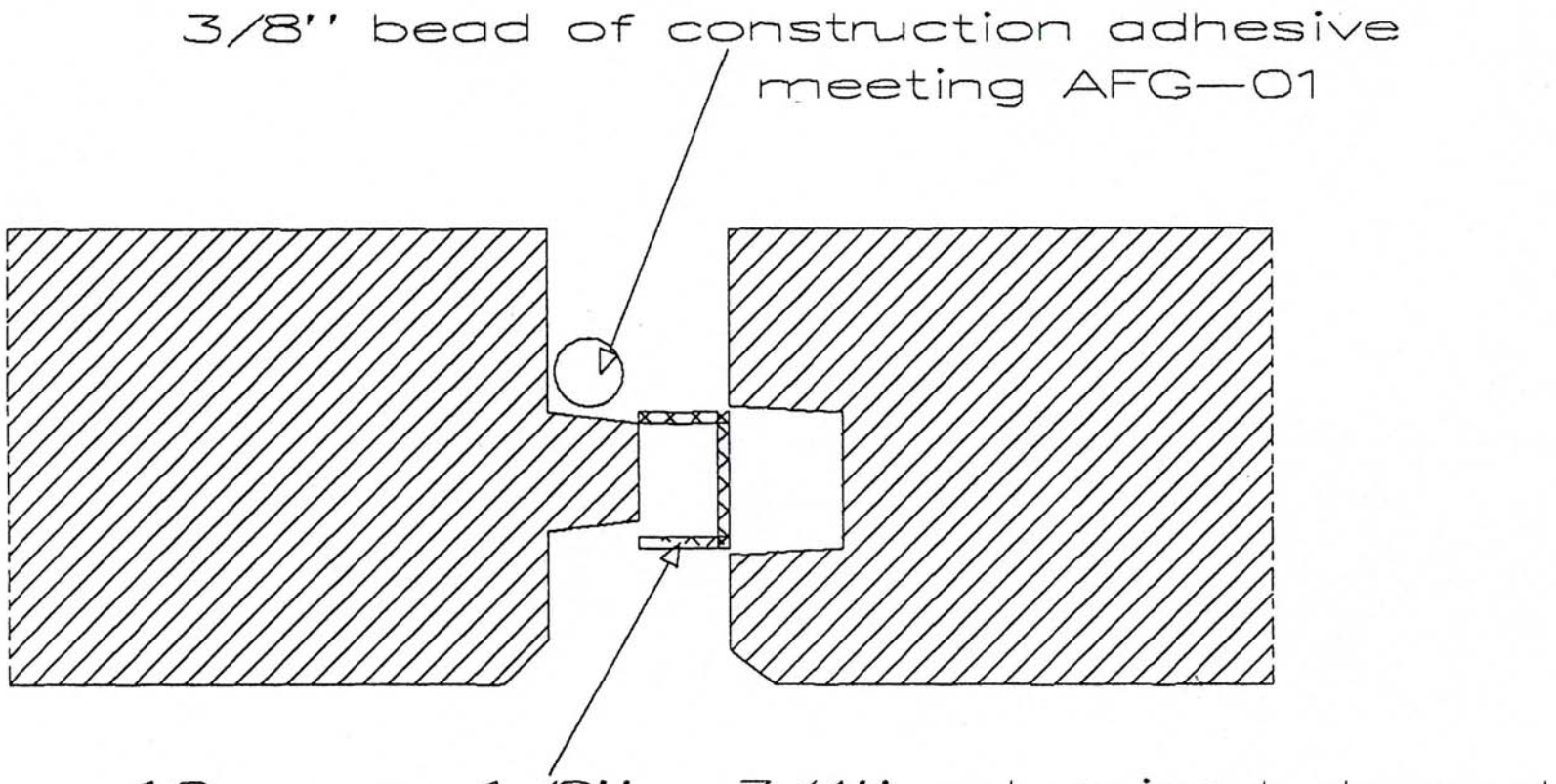
SKETCH A

Tectum 2.5'' Long Span at 60'' Centers
3.75'' Size 14 Screws with 2'' Diameter Washers
10'' o.c. at perimeter; 16'' o.c. field



CTL ENGINEERING

2.5'' Long Span Roof Plank



SKETCH B

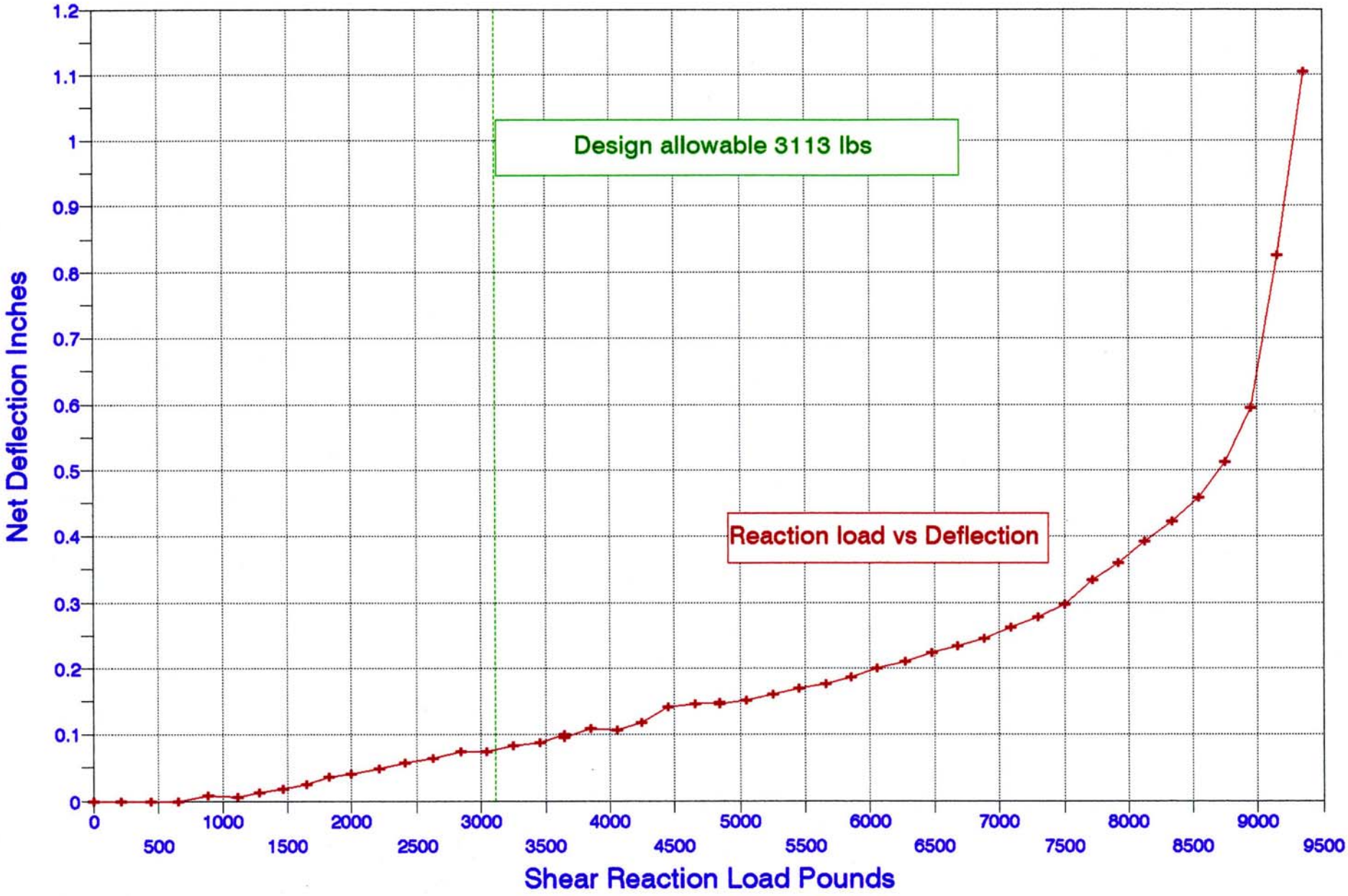
TECTUM, INC.

CTL PROJECT NO. 94-30037D

CTL ENGINEERING

DIAPHRAM TEST LOAD vs DEFLECTION

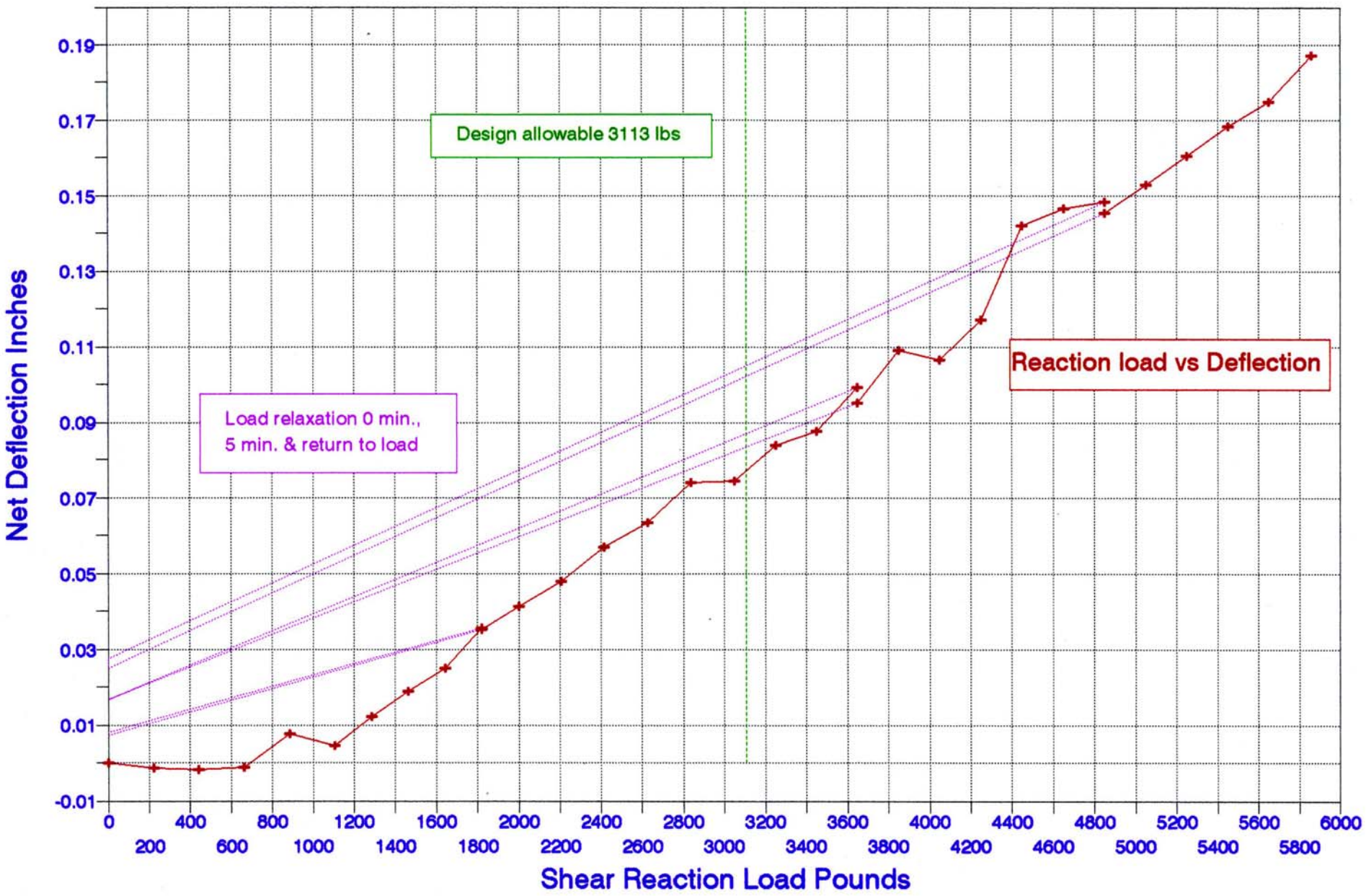
2.5" Tectum L S On Wood Frame 5' O. C.



CTL ENGINEERING PROJECT 94-30037 D

PORTION OF LOAD VS DEF. WITH RELAXATION

2.5" Tectum L S On Wood Frame 5' O. C.



CTL ENGINEERING PROJECT 94-30037 D

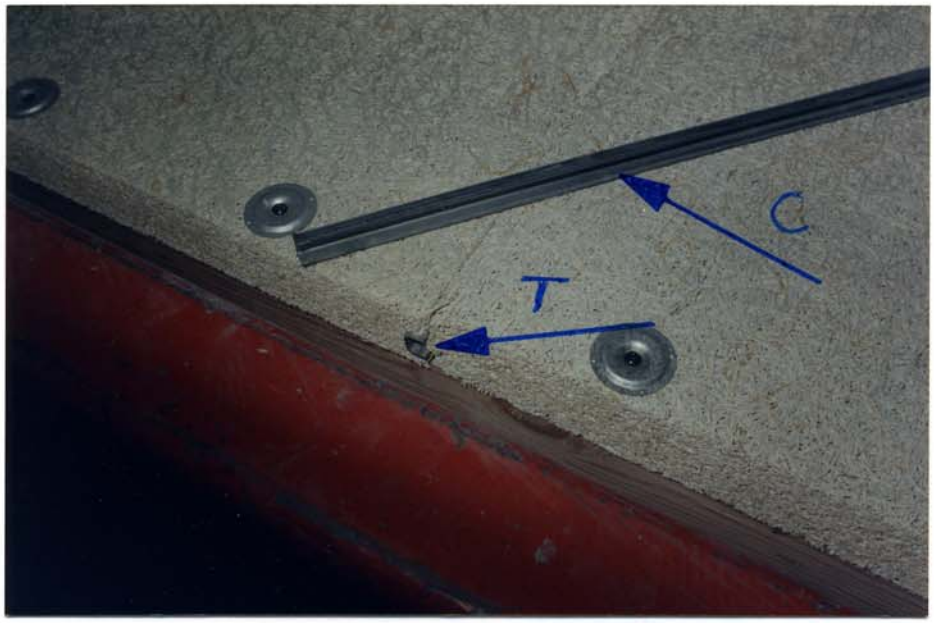


PHOTO NO. 1 - Shows the side view of the 2-1/2" thick Tectum LS roof deck planks. Notice the longitudinal tongue and groove joints are reinforced with 16 gauge channels (see arrow T). A section of unused channel is also shown (see arrow C).

PHOTO NO. 2 - Shows a close-up of the load side of the test set-up. The two hydraulic cylinders (see arrows C), pump and gage (see arrow P) apply the load. The cylinders, pump and pressure gauge were load calibrated prior to the test. Notice the re-inforcing timber (see arrow T) at the cylinder loading location.

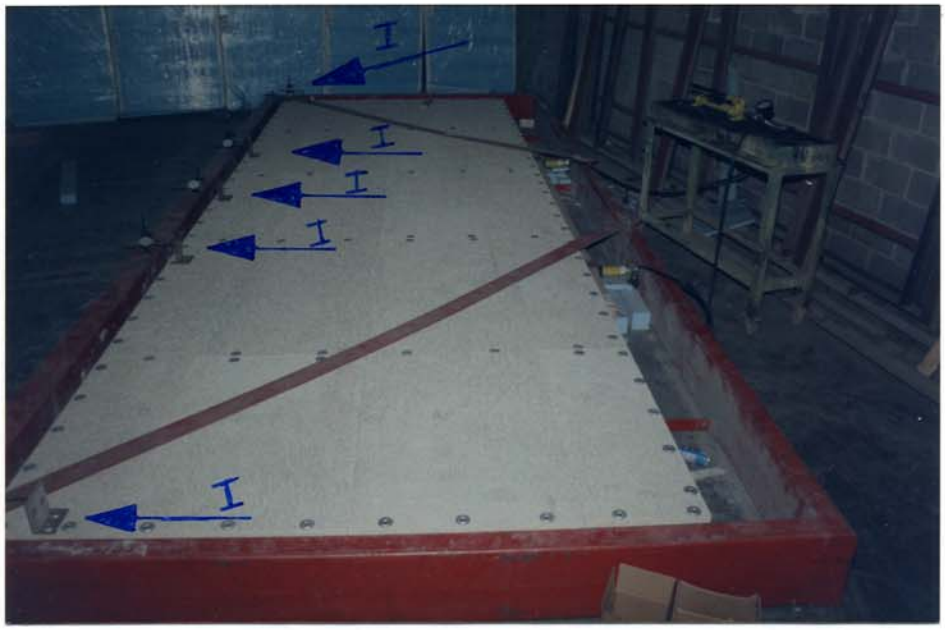


PHOTO NO. 3 - Shows the test set-up prior to the diaphragm load test. Note dial indicators at supports and along span (arrows I).

PHOTO NO. 4 - Shows a dial indicator used to measure deflections at the supported ends.

PHOTO NO. 5 - Shows the slippage at longitudinal joints between planks at maximum load.

PHOTO NO. 6 - Shows gaps between planks at maximum load.

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LABORATORY No.

CLIENT'S No. 722535

ORDER No. BF-8460-3

REPORT

3-79PT

March 27, 1979

DESCRIPTION: Witnessing the Preparation, Aging and Testing of 1-1/2", 2", 2-1/2" and 3" Gold Bond Tectum Structural Roof Deck in accordance with the California Aging Testing as specified by the Office of Architecture and Construction - State of California.

FOR: Gold Bond Building Products
Div. National Gypsum Company
Research Center
1650 Military Road
Buffalo, NY 14217

REPORTED TO: Gold Bond Building Products
Div. National Gypsum Company
2001 Rexford Road
Charlotte, NC 28211

ATTN: R. J. Brindley

During the period of February 19, 1979 thru March 14, 1979 a representative of Pittsburgh Testing Laboratory, Buffalo, New York Office, witnessed the preparation, aging and testing of Gold Bond Tectum Roof Deck specimens 1-1/2", 2", 2-1/2", and 3" thicknesses.

PREPARATION OF SPECIMENS

All of the test specimens used in the subsequent tests were obtained from standard production material from the Newark, Ohio Plant of Gold Bond Building Products Division, National Gypsum Company on January 10, 1979.

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LABORATORY No.

CLIENT'S No. 722535

ORDER No. BF-8460-3

REPORT
3-79PT

March 27, 1979

Structural Roof Deck panels were Underwriters' Laboratories labeled for Structural Cement Fiber Units. U.L. gave a Fire Hazard Classification as follows (based on 100 for untreated red oak):

	Exposed Surface	
	Unfelted	Felted
Flame Spread	15	490-755
Fuel Contributed	0	40-180
Smoke Developed	0	Over 500

The Structural Roof Deck panels were 4 foot by 8 foot (32 inches by 8 foot for 1-1/2" thickness) and asphalt felt backed. The program consisted essentially of cutting test specimens from the previously mentioned slabs and aging and tested as follows:

1. Three specimens from each thickness were used as control specimens. Six specimens from each thickness were put through six (6) 48 hour accelerated aging cycles as follows:

   a. 25 hours in a fog room at 70° - 73°F with a minimum 95% relative humidity.

   b. Conditioned at $10^{\circ} \pm 5^{\circ}$F for twenty hours.

   c. Heated at $210 \pm 3^{\circ}$F in dry air for three (3) hours.

2. On completion of the six (6) 48 hour aging cycles, the specimens were air dried at 70°F for 72 hours to allow to attain practical equilibrium.

3. Density was obtained on all specimens before and after aging, based on weight and dimension measurements.

4. All specimens were then tested for Modulus of Rupture in accordance with the Durability Test for the Office of Architecture & Construction, State of California.

   The Modulus of Elasticity was calculated from MOR results as additional information.

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LABORATORY No.

CLIENT'S No. 722535

ORDER No. BF-8460-3

REPORT
3-79PT

March 27, 1979

CONCLUSIONS

Tectum Structural Roof Deck Panels of either 1-1/2", 2", 2-1/2" or 3" thicknesses, when aged and tested in accordance with the Office of Architecture & Construction, State of California requirements, met their stated requirements:

Unaged (min.) - 260 psi

Aged (min.) - 165 psi

Respectfully submitted,

PITTSBURGH TESTING LABORATORY

J. Gentile, Manager
Buffalo District

Inspector: F. J. Macano

F. J. Macano

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LABORATORY No.

CLIENT'S No. 722535

ORDER No. BF-8460-3

REPORT

3-79PT

March 27, 1979

Specimen	Modulus of Rupture (lbs./in.^{2})	Modulus of Elasticity (lbs./in.^{2})	Avg. Density (lbs./ft.^{3}) Before Aging	After Aging
1-1/2" Aged	370	52013	19.58 (1)	19.41
1-1/2" Aged	328	55809		
1-1/2" Aged	381	58825		
1-1/2" Aged	337	54101		
1-1/2" Aged	384	55809		
1-1/2" Aged	331	55372		
1-1/2" Control	447	87062		
1-1/2" Control	479	91274		
1-1/2" Control	435	97569	19.56	-----
2" Aged	235	32606	19.85 (1)	19.81
2" Aged	295	46739		
2" Aged	372	64990		
2" Aged	307	48321		
2" Aged	370	71579		
2" Aged	361	62917		
2" Control	420	86653		
2" Control	357	66406		
2" Control	395	77627	19.88	-----
2-1/2" Aged	340	74176	20.09 (1)	19.64
2-1/2" Aged	460	89477		
2-1/2" Aged	417	86982		
2-1/2" Aged	378	89477		
2-1/2" Aged	449	95061		
2-1/2" Aged	440	90279		
2-1/2" Control	529	135746		
2-1/2" Control	428	107992		
2-1/2" Control	491	133396	20.21	-----
3" Aged	244	57277	19.33 (1)	18.76
3" Aged	224	54205		
3" Aged	398	79873		
3" Aged	430	87195		
3" Aged	207	50947		
3" Aged	216	52986		
3" Control	347	97569		
3" Control	436	114439		
3" Control	295	93576	19.23	-----

Note (1): Average density of "as received" samples obtained from all nine samples. (Three control plus six samples before aging.)

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LABORATORY No.

CLIENT'S No. 722535

ORDER No. BF-8460-3

REPORT

3-79PT

March 27, 1979

SUMMARY

	Avg. Density (lbs./ft.^{3})		Avg. Breakload (lbs.)	Avg. MOR (psi)	Avg. MOE (psi)
1-1/2" Tectum, as received	19.58	(1)	693	454	91968
1-1/2" Tectum, aged	19.41		545	355	55321
2" Tectum, as received	19.85	(1)	900	391	76895
2" Tectum, aged	19.81		745	323	54525
2-1/2" Tectum, as received	20.09	(1)	1100	483	125711
2-1/2" Tectum, aged	19.64		938	414	87575
3" Tectum, as received	19.33	(1)	1008	359	101861
3" Tectum, aged	18.76		796	287	63747
California Requirements					
As Received (min.)	18.5		----	260	-----
Aged (min.)	18.5		----	165	-----

Note (1): Average density of "as received" samples obtained from all nine samples. (Three control plus six samples before aging.)

T 35 TECHNICAL BULLETIN

Tectum™ Products Use in Non-Combustible Construction Types

Rev. Dec. 2009

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum structural roof deck products usually can be substituted for roof decks required to be non-combustible. Tectum products have been tested in accordance with ASTM E-84, with a flame spread index of 25 or less and showed no evidence of significant progressive combustion, when the test is continued for an additional twenty (20) minute period. In addition, the flame front has not progressed more than 10 feet and thus meets the model code fire test requirements of fire retardant treated wood.

Fire retardant treated woods have been used over eighty (80) years. Tectum products have been used for over fifty (50) years.

Tectum interior products qualify as a Class A/I interior finish because they have a flame-spread index of 25 or less. Class A/I interior finishes can be used in all types of construction.

ICC-ES Evaluation Report ESR-1112 (See full report for conditions of use available on www.tectum.com/roofdeck)

THE INTERNATIONAL CODE ALLOWS FIRE RETARDANT TREATED WOOD TO BE USED AS AN ALTERNATIVE FOR NON-COMBUSTIBLE MATERIALS in certain applications. Tectum I, Tectum III and Tectum E panels can be substituted for non-combustible materials in the roofs of buildings requiring non-combustible construction where the design loads conform to the Tectum substrate. **Exception:** In buildings of Type I construction exceeding two stories in height, fire-retardant-treated wood is not permitted in roof construction when the vertical distance from the upper floor to the roof is less than 20 feet. It also can be used unprotected in assembly, business, education, and residential occupancies when the roof decks can be exposed under these conditions. Tectum decks are permitted in non-combustible type construction where heavy timber building is permitted.

Heavy timber decks are permitted in non-combustible where one (1) hour or less fire resistant rating is required. Tectum decks 1 ¾" or thicker can be used as heavy timber where the roof deck is a minimum of 20 feet above the floor.

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TECTUM INC.
The Noise Control Solution

M 82 MARKETING BULLETIN

Approved Construction for Tectum™ Roof Decks

Rev. Dec. 2009

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Tectum I, Tectum III, Tectum IIIP & Tectum E Roof Decks are approved in Type I (B), Type II (A & B), Type III (A & B), Type IV (HT) and Type V (A & B) construction. Verification is:

Go to ICBO Report #1116:

1. Finding 4.2: Decks 1 3/4" and thicker may be classified as heavy-timber roof deck.
    a. This would include all thicknesses of Tectum I, III, IIIP & "E".

Go to International Building Code to define uses of "Heavy Timber":

1. Section #603.
    a. Note 17: Heavy timber is permitted by Note C, Item 2, to Table 601 and Sections 602.4.7 and 1406.3.
2. Table #601.
    a. See the fire-resistant ratings for roof construction. All of the types (Type I (B), Type II (A & B), Type III (A & B), Type IV (HT) and Type V (A & B) construction) require 1 hour or less.
3. Now go to Note C, #2.
    a. "In all occupancies, heavy timber shall be allowed where a 1-hour or less fire-resistance rating is required."

Therefore, Tectum I, Tectum III, Tectum IIP and Tectum E Roof Deck can be used in non-combustible constructions, Type I (B) and Type II and Type III, which are just about all school buildings throughout the country.

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T 47 TECHNICAL BULLETIN

Tectum™ Roof Deck as Base for Class A Coverings

Rev. April 2006

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UNDERWRITERS LABORATORIES INC.®
333 PFINGSTEN ROAD · NORTHBROOK, ILLINOIS 60062—2096

an independent, not-for-profit organization testing for public safety

November 6, 1989

Watersaver Company, Inc.
Mr. Bernie Barr
Regional Sales Manager
P. O. Box 20939
Billings, MT 59106

Our Reference: Subject 55

Dear Mr. Barr:

Your October 30, 1989 letter to our Ken Rhodes, regarding 3 in. thick flat Tectum roof deck covered with a 4 ply, gravel surfaced built-up roof covering, has been referred to the writer for reply.

To answer your inquiry, this 4 ply covering, if made up of UL Classified materials, would comply with all requirements of our Standard UL 790 and would be Classified as a Class A covering. Due to the wood fiber content, Tectum decks cannot comply with the literal definition of "noncombustible". However, due to their minimal combustibility, we consider them a suitable alternate to conventional noncombustible decks such as steel, concrete and poured gypsum decks.

Tectum and other structural cement-fiber units demonstrate a relatively low incidence of combustibility as evidenced by their Flame Spread rating of 15 to 20 in tests conducted under UL 723 in the Steiner tunnel. We have judged that any Classified roofing system would be considered suitable for installation over a minimum 2 in. thick Classified structural-cement fiber unit. This judgement is based on the demonstrated high degree of fire resistance of such units when exposed to Class A Burning Brand and Intermittent Flame Tests (UL 790) without the benefit of a roof covering. In such tests, the surface of the units darken in the test flame and brand impingement areas, but no flame or glowing occurs on either the exposed or unexposed faces of the units. With this performance in mind, it is felt that these units are acceptable alternates for noncombustible decks intended to be covered by Classified roofing systems.

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It is hoped that the above fully responds to your inquiry. However, should you have any questions, please contact the writer.

Very truly yours,

R. L. DONAHUE
Assistant Managing Engineer
Fire Protection Department

TECHNICAL BULLETIN

T 72

U.L. Roof Deck Construction Listed As Fire Classified

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

In the U.L. Directory on Roofing Materials and Systems under Roof Deck Constructions are two sub categories. One is wind uplift and the other is fire. Fire is either listed as not investigated or classified. The fire-classified assemblies have been tested in accordance to ANSI/UL 1256 and have flame spread less than the test requirement.

The ANSI/UL 1256 test is an extended E-84 test that evaluates an assembly for under deck flame spread. The codes recognize this test as a diversified test where a 15-minute thermal barrier does not exist between the underside of the deck and foam plastic. Several unique systems have been tested which can be used without a thermal barrier.

The ANSI/UL 1256 test is similar to the code-required test for fire retardant treated wood (FRTW). The end point of this test protocol is less stringent than the code requirement for FRTW. Tectum panels have been tested and meet the code requirement for FRTW.

We have not tested at UL for the ANSI/UL 1256, as it is not a requirement of any of the model codes. This test is used for systems that do not have thermal barrier protection for foam plastics. Tectum panels of 1 1/2" or thicker meet the requirements of a thermal barrier.

Tectum panels 1 1/2" or thicker meet the FM Class 1 requirement that includes a 30-minute calorimeter test. This is the highest rating by FM for deck assemblies for resistance to under deck fires and reduced insurance rates. This test is also a code recognized diversified test for protection of foam plastic.

There are a variety of methods of code compliance. Assemblies are not required by the code to comply with UL fire classified rating. Tectum products comply based on the thermal barrier requirement of the code and does not have to meet requirements of diversified tests for use as a roof deck.

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T 29 TECHNICAL BULLETIN

U.L. Wind Uplift Class 90

Rev. April 2006

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What are the U.L. Standard 580 tests for Wind Uplift Resistance of Roof Assemblies?

This test is to evaluate comparative resistance of roof assemblies to simulated load which correspond to wind velocities of 100 - 174 mph. This test evaluates the roof deck, its attachments to supports and roof covering materials only.

The test is conducted by applying various positive pressures to the underside of the deck and various negative pressures (vacuum) to the top of the deck. Three classifications are possible; Class 30, Class 60, and Class 90.

Each test assembly is subjected to each level of the uplift test in the sequence of Class 30, Class 60, and Class 90. To obtain a Class 90 an assembly must be subjected to the Class 30 and Class 60 in that order prior to the Class 90 test.

Each of the class tests consist of 5 phases:

Phase 1 - 5 minutes of negative pressure
Phase 2 - 5 minutes of negative and positive pressures
Phase 3 - 60 minutes of oscillating negative and steady positive pressure
(Oscillations are about every 10 seconds)
Phase 4 - 5 minutes of negative pressure
Phase 5 - 5 minutes of negative and positive pressure

The following are approximate indicated wind velocities for each phase:

Class 30	Class 60	Class 90
Phase 1 - 75 mph	Phase 1 - 102 mph	Phase 1 - 126 mph
Phase 2 - 100 mph	Phase 2 - 142 mph	Phase 2 - 174 mph
Phase 3 - 80 - 117 mph	Phase 3 - 122 - 167 mph	Phase 3 - 149 - 174 mph
Phase 4 - 90 mph	Phase 4 - 116 mph	Phase 4 - 137 mph
Phase 5 - 122 mph	Phase 5 - 159 mph	Phase 5 - 188 mph

U.L. Wind Uplift Class 30, Class 60, or Class 90 does not refer to wind velocity. However, it coincides with the nominal uplift pressure in lbs. per square foot in phase 2 of each class.

To achieve a U.L. Wind Uplift Class 90 requires four hours of subjection to simulated wind loads. The oscillation phase can cause a slow developing weakness and phase 5 will reveal such weaknesses. Only the best of assemblies can achieve a U.L. Wind Uplift Class 90.

Refer to U.L. Building Materials Directory, Roof Deck Constructions (TGKX).

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TECHNICAL BULLETIN

T 73

U.L. Wind Uplift on Metal Roofing with Berridge Roofing

Rev. April 2006

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Tectum E and III roof planks are classified in U.L. wind uplift designs with Construction No. 474 and 475. These constructions include Berridge Cede-Lok metal roof panels for No. 474 and Berridge High Seam metal roof deck panels. The continuous panel clips on No. 474 used #10 x 1" fasteners into the OSB at 10" o.c. and for No. 475 the panel clips were spaced 12" o.c. with one #10 x 1" fasteners per clip. The drawing on page two of this bulletin shows the deck attachment.

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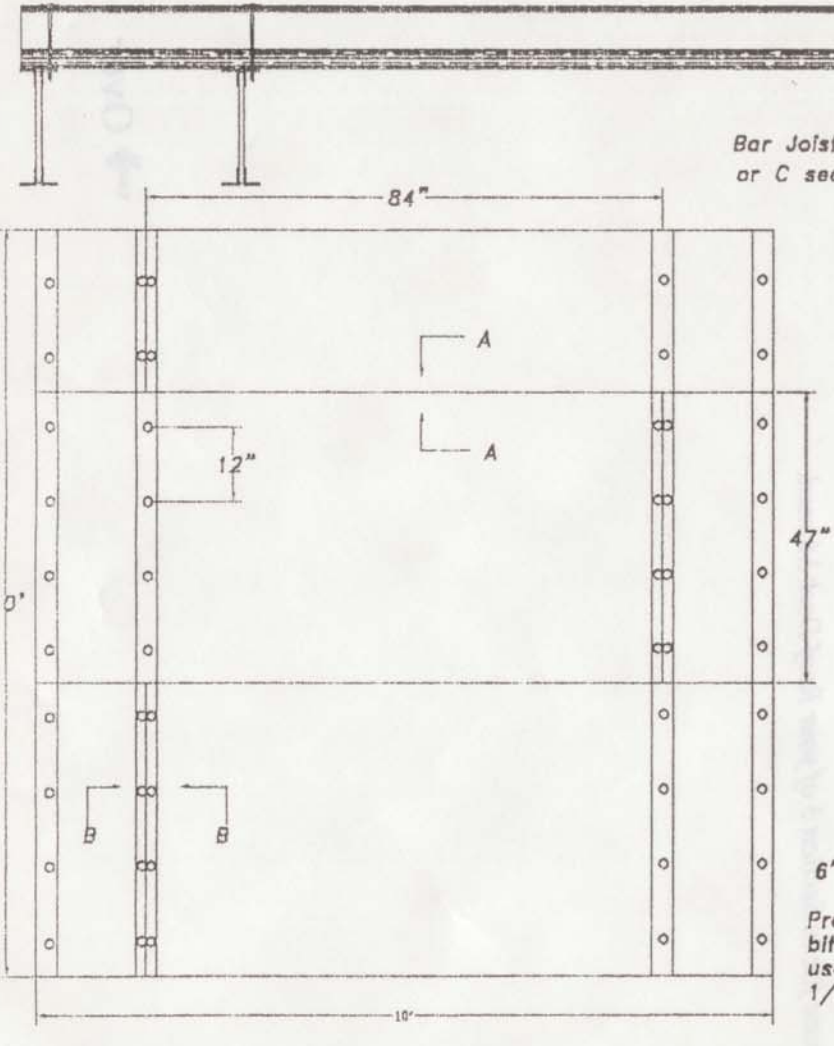
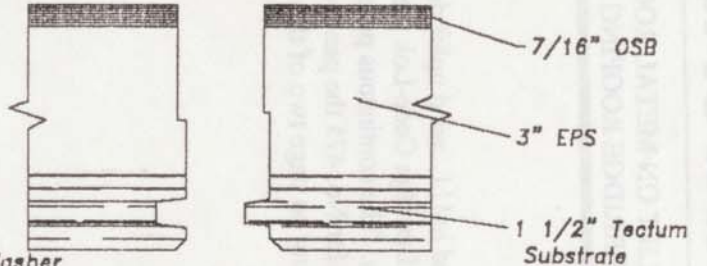
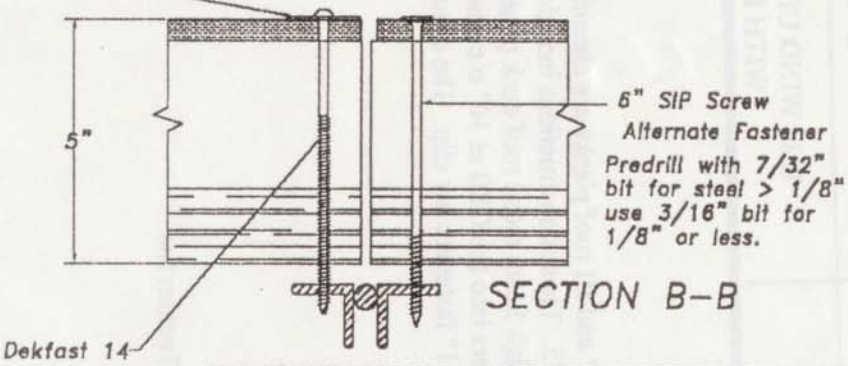
Uplift Tectum E/III Roof Deck @ 84"



SECTION A–A





SECTION B–B

Predrill with 7/32" bit for steel > 1/8" use 3/16" bit for 1/8" or less.

REVISIONS			
NO.	DATE	BY	REMARKS
1	2/16	LDB	

TECTUM INC.

System Used for Uplift Testing

DATE 6/8/95 SCALE none DRAWING NUMBER

DRWN LDB CHECKED

APPROVED

CAD FILE UPLIFTNOA

T 34 TECHNICAL BULLETIN

Maintaining a "Class A" Roof with Tectum™ Roof Deck Material

Rev. April 2006

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Tectum I Roof Decks used under Class A roof coverings will maintain the rating for coverings over noncombustible decks.

The 1997 UL Roofing Materials and Systems Director on Page 13 states: "Minimum 2 in. thick unfaced structural cement-fiber units, formed into slabs or boards and Classified under CIYT in the Fire Resistance Directory are suitable alternatives as roof decks for all Classified roofing systems intended for use over noncombustible decks." Tectum I Roof Deck panels are Classified under CIYT.

Tectum III Roof Decks utilize APA rated sheathing of 7/16 in. oriented strand board. The same page of the UL Directory states: "The use of 7/16 in. (minimum) thick non-veneer APA rated sheathing (oriented strand board panels, structural particleboard panels, composite panels or waferboard panels) is a suitable alternative to 15/32 in. (minimum) thick plywood specified in the Class A, B, and C classifications for the individual manufacturers.

Tectum Roof Deck panels can be used with a large variety of roofing materials while maintaining the ratings achieved by the roof covering manufacturer.

Class I decks as rated by Factory Mutual does not address fire from the exterior as does Class A, B, and C. Tectum I Roof Decks meet the requirement for Class I as tested by Factory Mutual Research Corporation. This report is in Technical Bulletin T-61.

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T 78 TECHNICAL BULLETIN

U.L. Listing for Tectum™ I Roof Tile with LWIC

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

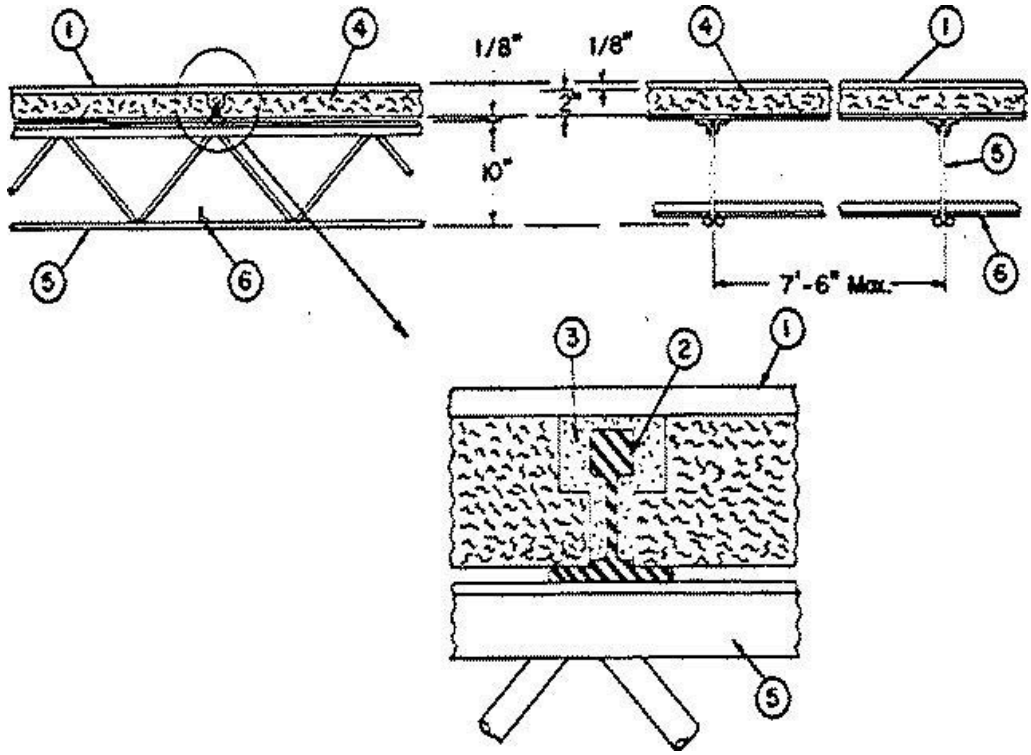
As a result of a joint effort between Tectum Inc., Western Fireproofing of Kansas and Elastizell Corporation, there is a new UL listing for Tectum I Roof Tile (in bulb tees) with LWIC (Light Weight Insulating Concrete) on top of the Tectum tile. The UL number is TGKX.NM511. This provides written proof of the bond between Tectum I Roof Tile and LWIC and that a Class 90 UL uplift can be achieved.

TGKX.NM511
Roof Deck Constructions

Construction No. NM511

February 02, 2006

Uplift — Class 90
Fire — Not Investigated



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The Noise Control Solution

1. Built-Up Roof* — Classified by Und. Lab. Inc. (Roofing Materials and Systems Directory). One layer of plastic-faced glass scrim ("Chem-Ply roofing sheet") cemented to structural wood-fiber units with cold application cement ("Chem-Ply field adhesive") applied at a nominal rate of 1 gal per 100 sq ft. Adjacent sheets to be lapped 2 in. All laps to be cemented with cold application cement ("Chem-Ply lap adhesive") applied at a nominal rate of 1/4 gal per 100 sq ft. As an alternate, minimum three ply, hot mopped, Classes A, B or C, Roofing system. All materials Classified by Und. Lab. Inc.

1A. Roof Topping Mixture — (Optional - Not Shown) - Max 2 in. thick application to Structural Cement Fiber Units (Item 4).

ELASTIZELL CORP OF AMERICA (View Classification) — "Range II Elastizell"

2. Bulb Tee — Type 218 or heavier. Span not to exceed 8 ft, 0 in. Welded to supports with 3/4 in. long fillet welds. Two welds on alternating sides required on continuous spans, four welds required at end joints.

3. Grout Mixture — Grout used between structural cement fiber units and bulb tees. Minimum compressive strength 1100 psi.

4. Structural Cement Fiber Unit* — Care is to be taken to assure that units are tightly butted at end joints.

TECTUM INC (View Classification) — "T200 Tectum Tile" , "T250 Tectum Tile" or "T300 Tectum Tile".

5. Joists — Type 10J3 open web steel joists, spaced not more than 8 ft, 0 in. O.C. and welded to supports.

6. Bridging Angle — Welded to joists.

* Bearing the UL Classification Mark

T 61 TECHNICAL BULLETIN

Tectum™ I Meets Factory Mutual Research Corporation

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Inc. submitted Tectum I plank to Factory Mutual Research Corporation (FMRC) for approval requirements for Class I fire and I-60 and I-90 wind storm classifications. The FMRC examined through testing the interior fire spread and structural pull through and pull out testing and as a result approved Tectum I plank for Class I when installed as specified in the conclusions of the report.

The complete report is a part of this bulletin. Please review it and it may be presented to architects and engineers who wish to use Tectum I plank products in a Class I construction that is insured by Factory Mutual.

Please note that this report is subject to re-examine and manufacturing inspections by FMRC. Tectum I plank will also be listed in the FMRC Approval Guide.

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

Factory Mutual System

Factory Mutual Research

1151 Boston-Providence Turnpike
P.O. Box 9102
Norwood, Massachusetts 02062

0W4A5.AM
(4457)

March 26, 1993

TECTUM PLANK
for
CLASS 1
ROOF DECK CONSTRUCTION

from

TECTUM, INC.
P.O. BOX 920
NEWARK, OHIO 43058-0920

I INTRODUCTION

1.1 Tectum, Inc. submitted their Tectum Plank to determine if it meets the Factory Mutual Research Corporation (FMRC) Approval requirements for Class 1 Fire and 1-60 or 1-90 Windstorm Classifications.

1.2 Examination included testing of the potential interior fire spread, structural pull-through and pull-out testing.

1.3 Tests show that the Tectum Plank as tested meets the FMRC Approval requirements when installed as specified in the CONCLUSIONS of this report.

II MATERIALS TESTED

2.1 Tectum I roof deck is a factory prepared plank which consists of Aspen wood fiber and magnesium oxysulfate hydraulic cement, treated with inorganic binder. It is manufactured with tongue and groove sides in a minimum 1 1/2 in. (38 mm) thickness.

2.2 Construction Fasteners, Inc. Dekfast 14 - The screw is a size No. 14 with No. 14 diameter thread design and truss No. 3 Phillips head. The carbon steel screws are coated with Construction Fasteners, Inc. Sentri finish.

2.3 Construction Fasteners, Inc. 2 in. (51 mm) diameter plates are 0.025 in. (0.6 mm) galvalume sections with a 0.26 in. (6.7 mm) hole in the center.

2.4 The proprietary formulations are on file at FMRC.

III TESTS AND PROCEDURES

3.1 FMRC corrosion resistance testing was waived because of previous satisfactory performance of the fasteners in prior Approval programs sponsored by the fastener manufacturer.

3.2 FMRC Calorimeter Fire Tests

The fire test from below the roof deck was conducted using the FMRC Construction Materials Calorimeter which measures the maximum rate of fuel contribution by the sample roof, also expressed as maximum heat release rate (HRR); e.g, for a Class 1 rating, the assembly must exhibit a HRR no greater than 410 $Btu/ft^2/min$ (77.6 kW/m^2) in any 3 minute time frame during the 30 minute fire exposure.

3.3 Tensile Pull-Through Tests

3.3.1 Tensile pull-through tests were conducted with the fastener and plate/Tectum deck combination to determine the ability of the Tectum deck assembly to remain in place up to the 60 psf (2.9 kPa) or 90 psf (4.3 kPa) uplift pressure.

3.3.2 Tests were conducted using a Tinius Olsen tensile testing machine. The fastener and plate was placed through the center of the Tectum sample with the fastener held in the upper stationary jaws of the tester and the jig holding the Tectum sample attached to the moving head. Force was exerted in a direct line parallel to the shank of the fastener at a crosshead speed of 2 in./min (51 mm/min) until failure occurred.

3.4 Tensile Pull-Out Tests

3.4.1 Tensile pull-out tests were conducted with the fastener/substrate combinations to determine the performance of the fastener in resisting pull-out from the substrate.

3.4.2 Tests were conducted using a Tinius Olsen tensile testing machine. The fastener was installed in each substrate sample with the fastener secured to the upper stationary jaws of the tester and the frame holding the substrate sample attached to the moving head. Force was exerted in a direct line parallel to the shank of the fastener at a crosshead speed of 2 in./min (51 mm/min) until failure occurred.

IV TEST SAMPLES

4.1 FMRC Calorimeter Test Panel

One 4-1/2 by 5 ft. (1.4 by 1.5 m) panel was constructed.

The components and sequence of installation were as follows:

Tectum I plank, 1.5 in. (38 mm) thickness.
Conventional 4 ply asphalt BUR roof cover

4.2 Tensile Pull-Through Test Samples

Three (3) samples were prepared by inserting the fastener and plate through the center of the Tectum sample with the fastener held in the upper stationary jaws of the tester and the jig holding the Tectum sample attached to the moving head. Force was exerted in a direct line parallel to the shank of the fastener at a crosshead speed of 2 in./min (51 mm/min) until failure occurred.

4.3 Tensile Pull-Out Test Samples

Six (6) samples (three for each fastener/substrate combination) were prepared by installing the fastener in each substrate sample with the fastener secured to the upper stationary jaws of the tester and the frame holding the substrate sample attached to the moving head. Force was exerted in a direct line parallel to the shank of the fastener at a crosshead speed of 2 in./min (51 mm/min) until failure occurred.

V RESULTS

5.1 FMRC Calorimeter Fire Test

The calorimeter test showed the test panel to have fuel contribution rates below the maximum permissible rates for Class 1 construction. These rates and the Class 1 limits are noted below:

Maximum Average Rate of Fuel Contribution
for Various Time Intervals
Btu/ft^2/min (kW/m^2)

Time Interval	3 min	5 min	10 min	Average
Class 1 Standard	410(77.6)	390(73.8)	360(68.1)	285(53.0)
Test Sample	226(42.8)	226(42.8)	226(42.8)	180(34.1)

5.2 Tensile Pull-Through Tests

The tensile pull-through tests result (average of three) produced a value of 674 lbf (2998 N).

5.3 Tensile Pull-Out Tests

5.3.1 The results of the tensile pull-out tests (average of three) were as follows:

Substrate	lbf (N)
Lumber	576 (2560)
Minimum 3/16 in. (5 mm) steel	2192 (9748)

5.3.2 The fastener referenced above requires predrilling of the steel support substrate. The pilot hole diameter is 7/32 in. (5.5 mm).

VI CONCLUSIONS

6.1 The above test results, information submitted by Tectum, Inc. and wind uplift test results conducted in an approval program whose sponsor allowed use of data for the purpose of this program indicates that Tectum I Plank meets FMRC Approval requirements when secured to the supporting substrate with the above referenced fastener and plate applied as outlined in Tectum, Inc. publication 03500/TEC.

6.2 Tests show that the tested roof construction in and of themselves would not create a need for automatic sprinklers.

6.3 The tested construction meets the FMRC Approval criteria and when Approval is effective will be listed in the FMRC Approval Guide in Cementitious Wood Fiber Roof Deck section.

6.4 Approval is effective when the Approval Agreement is signed and received by FMRC.

6.5 Continued approval will depend upon satisfactory field experience and periodic Quality Audit Inspections.

6.6 Roof covers must be installed using an FMRC Approved Roof Perimeter Flashing System (see FMRC Approval Guide).

VII MARKING

7.1 The manufacturer shall mark each wrapping or shipping container with the manufacturer's name and product trade name. In addition, the container must be marked with the FMRC Approval Mark and the words "Subject to the conditions of Approval as a Cementitious Wood Fiber Roof Deck when installed as described in the current edition of the FMRC Approval Guide".

7.2 The manufacturer agrees that use of the FMRC name or Approval Mark is subject to the conditions and limitations of the FMRC Approval. Such conditions and limitations must be included in all references to FMRC Approval.

VIII MANUFACTURER'S RESPONSIBILITIES

8.1 To assure compliance with his procedures in the field, the manufacturer shall supply to the roofer such necessary instruction or assistance required to produce the desired performance achieved in the tests.

8.2 The manufacturer shall notify FMRC of any planned change in the Approved product, prior to general sale or distribution, using Form 797, Approved Product Revision Report.

IX QUALITY AUDIT INSPECTION AND RE-EXAMINATION

9.1 Re-examination and manufacturing inspections will be conducted periodically on the Approved products at the Tectum, Inc. manufacturing location in Newark, Ohio to determine that the quality and uniformity of the materials have been maintained and will provide the same level of performance as originally Approved.

TESTS AND REPORT BY:

L. N. D'Angelo
Senior Engineer

REPORT APPROVED BY:

G. A. Smith
Manager
Materials Section - Approvals

M 45 MARKETING BULLETIN

Tectum™ Roof Deck over Swimming Pools

Rev. Dec. 2009

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Inc. recommends the use of 5" or greater Tectum IIIP roof plank over swimming pools. The maximum span being 5' o.c. except in areas where the heating degree days are less than 5000 the maximum span is 6' o.c. The panel consists of 1 1/2" Tectum substrate, 3" or greater of extruded polystyrene insulation (Dow Styrofoam™ brand insulation), and 7/16" OSB. The attachment of the panels requires the use of corrosive-resistant screws spaced to achieve design requirements. The edges and ends of the panels must be sealed with BASF adhesive Degabond 948 in both sides of the slot above the Tectum substrate to minimize moisture migration. The screws and adhesive are available from Tectum Inc. The use of other screws or sealant required specific approval from Tectum Inc. Notify Tectum Inc. when Tectum IIIP deck is being used in pool applications. Panels must be terminated at or on the wall and be insulated from exterior conditions. Typical details are shown at www.tectum.com in the Drawings section (Pool Details).

As an alternate, 2" Tectum I roof plank can be used provided:

1) Maximum span 36".

2) An NRCA-recognized vapor retarder installed over the deck in accordance to NRCA requirements.

3) A minimum R-20 insulation above the vapor retarder.

4) Tectum deck is attached with corrosive-resistant screws available from Tectum Inc.

Another alternate is 2" Tectum I roof tile. The maximum tee spacing is 32" o.c. using bulb tees either galvanized or coated with a rust-prohibitive coating intended for use over pools. The roof tile is grouted in place and attached as required with corrosive-resistant screws. Follow number 2 and 3 above.

When using Tectum I roof decks, the specifications for the deck system, vapor retarder, and insulations are to be reviewed on an individual basis by Tectum Inc.

Ventilation requirements for pool areas must conform to current building code requirements for high humidity areas.

WARNING: Tectum Long Span Plank is not to be used in pool areas. Urethane or isocyanurate insulations should not be used without a vapor retarder as they will absorb moisture.

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T 75 TECHNICAL BULLETIN

Use of Latex Adhesive with Tectum™ Composite Decks

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The use of the solvent free adhesive Degabond 948 in the foam line at the panel edges and ends has been effective in reducing or eliminating condensations from occurring in the deck joints in swimming pool and other high humidity installations. The use of this adhesive also reduces water infiltration from the exterior during the installation process.

High humidity environments during the heating season can result in condensation along the joints of the roof deck. This is caused by the warm moist air reaching the dew point temperature. This can happen at edge and end joints. Condensation only occurs when there is a temperature differential between the inside and outside. In some projects, the humidity is very high during the construction process. When a building is closed and temporary heaters are used, a large amount of moisture in the air results. The moisture may be from the heaters directly or from curing of concrete. This type of high humidity condition during installation can result in condensation and moisture at the panel joints. This moisture from condensation can result in staining of the deck.

When the conditions described are anticipated, the use of Degabond 948 adhesive is recommended.

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T 58 TECHNICAL BULLETIN

Vapor Retarders

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Vapor retarder is defined as: A material having a perm rating of 1.0 or less such as foil, plastic sheathing or insulation facing, installed to retard passage of water moisture through the exterior envelope.

The 1989 ASHRAE Fundamentals Handbook states that, "The accepted perm rating of a vapor barrier for use in domestic construction is 1.0 perm."

The Dow Styrofoam brand insulation used in Tectum III Roof Deck qualifies as a vapor retarder under both definitions. Styrofoam brand insulation thicknesses have the following perm ratings. These perm ratings were determined to the ASTM test procedure E-96.

THICKNESS	PERMEANCE (maximum)
1.5"	1.0
2.0"	0.8
3.0"	0.6

ISO or EPS board roof insulations do not meet the definitions of a vapor retarder. See November 2001 RSI Article on back of this bulletin.

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The Noise Control Solution

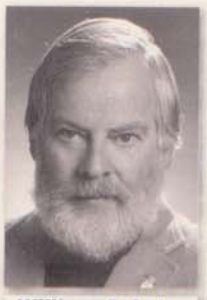
New roofs fail, roofing not at fault

In recent years I have consulted on large roofs in Connecticut, New Hampshire, Michigan, Maine and Iowa that were leaking all over but there were no holes in the roofing. The leaks were caused by condensation due to a faulty insulation/vapor retarder system

In each case the roof insulation was 3" to 5" of single layer iso or EPS board

Connecticut High School pool

The 3 1/2" thick foil-faced iso board rested on steel purlins with a PVC clip and caulk in the joint that was perpendicular to the purlins. The exposed foil facer had a factory-applied white finish.



William A. Lotz, P.E.
Insulation, Vapor Barrier & Moisture Consultant
Acton, ME

The gaps between adjacent iso boards varied from 1/8" to 1/2". The caulk could not bridge the gap. The building was dehumidified to 50% in the pool area. The moisture in the air found every gap between iso boards and condensed on the underside of the steel roof and rained back down into the building. The owner is unhappy. Presently the architect, foam manufacturer and the contractor are pointing fingers at each other. I recommended removing the entire roof and insulation system and installing a system that works.

Maine Elementary School

The sloped roof had 5 1/2" single-layer iso board on the plywood roof deck. On top of the foam were sleepers, an air space, more plywood and shingles. The specifications called for the wall vapor retarder to be taped to the roof vapor retarder. The contractor "forgot to buy" any tape to seal the vapor retarder at the eaves. The warm air inside the building went out through the gap at the eaves, flowed up the ventilation space above the insulation and out the ridge vent. (I do *not* recommend eave or ridge vents.)

Each of these condensation problems could have been prevented by a well designed and installed vapor barrier and double layer roof insulation.

On a 0°F night an infrared camera showed the shingles were above 60°F. Ice dams resulted and leaked into the building. The problem was solved by taping the vapor retarder at the eaves, as was originally specified.

New Hampshire textile factory

The first roof insulation was the typical metal building insulation and facer. That failed quickly and condensation rained into the building. The metal roof and the insulation were scrapped. The building operates at 62% humidity as required by the weaving process.

The second insulation/roof system consisted of 3"-thick foil-faced iso boards with shiplap joints and caulk in the joints. The condensation rained again. The joints were re-caulked. It still rained. The building humidity was finding the joints above the purlins and condensing on the underside of the metal roof. The metal roof and insulation system were removed.

The third roof insulation system was a factory-foam insulated panel system. It worked. Lawsuits are pending.

Michigan Y pool

The roof-ceiling system consisted of 1 1/2" thick wood, V groove boards fastened on 16" centers to 2 x 8's, then an air gap and a metal roof. A poly vapor retarder was installed on top of the wood deck and up and over each 2 x 8. Between the 2 by 8's was fitted 5" thick polystyrene bead board. This resulted in every 16 inches the poly vapor barrier was on the cold side of the insulation.

As you would expect, condensation occurred at the 2 by 8's and rained down all over the wood ceiling and glulam beams. The architect did not specify any vapor retarder in the masonry walls and they were wet, too. This one will be rather expensive to fix.

Iowa High School

The architect specified a perforated (acoustical) steel deck, vapor retarder and 5" thick iso foam roof insulation with a metal roof. At the 11th hour during construction the architect agreed to the contractor deleting of the vapor retarder.

Each winter the moisture from inside the building found the holes in the steel deck, the many 1/2"-2" gaps in the single-layer iso roof insulation, condensed on the steel deck and rained on the students' heads.

I have recommended that the metal roof and the roof insulation be removed; install a Fortifiber vapor retarder and two layers of iso board and a new roof. The lawyers are working on who will pay for the retrofit.

Each of these condensation problems could have been prevented by a well designed and installed vapor retarder and double layer roof insulation. Expensive lessons for several architects, manufacturers and contractors. RSI

MARKETING BULLETIN

M 66

Tectum™ Roof Deck in Ice Arenas

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Roof Deck has been used successfully in ice arenas for over 35 years. Tectum Roof Deck has several features that make it ideal for use in special buildings such as ice arenas. Tectum products have excellent insulation, sound absorption, durability and light reflectance.

Tectum products are recognized by authorities on ice arena construction such as Jack Vivian, Ph.D., Director of Sports Facilities and Research Laboratory at the University of Michigan. He has commented that:

> *"Tectum Inc. can continue their history of proven roof design by promoting the value of known R factors. Low emissivity ceilings were developed for existing arenas as a way to reduce radiant loads without having to install a new roof deck."*

Lee Otte at Cardinal Glass in Northfield, Minnesota, a manufacturer of low E-Glass for various window manufacturers has suggested that:

> "Tectum Inc. should promote the value of R values as related to roof deck design and not get involved in emissivity which very few people understand."

Tectum III Roof Deck with the Dow Styrofoam brand insulation which acts as a vapor retarder or Tectum I Roof Deck with a vapor retarder and additional insulation are the recommended products. An R-Value of 20 to 30 depending upon the geographic location is most effective. Ice arenas have a special problem. A continual problem is the cost of operating a compressor to maintain the ice temperature. Refrigeration capacity, location, and the season of the year all have a bearing on the cost of operating an ice arena. The basic principals on heat transfer will always apply. Wherever two surfaces of different temperatures meet, the warmer will always lose energy to the cooler.

The amount of heat radiated to the ice is controlled by the temperature of the ceiling and of the ice surface and by a proportionality factor called emissivity. Emissivity is a property of the radiating material: it is one for a perfect radiator of heat and zero for a material that radiates no heat. The higher the R-Value of the ceiling, the lower the radiant energy transfer between the ice and the roof deck surface. Low emissivity ceilings were developed for existing arenas as a way to reduce radiant loads without having to install a new roof with additional insulation.

Conclusion

1) Tectum Roof Decks should be used in ice arenas because of their high R factors. This negates the need for low emissivity ceilings.

2) Economy of operation of an emissivity ceiling is based on clean, reflective surfaces that will not be impacted negatively with age.

3) Due to the potential for damage in an ice arena, a Tectum Roof Deck provides the durability that lay-in ceilings or light weight sheeting cannot provide.

4) Tectum Roof Decks have proven to be effective in hockey and ice arenas for sound control, light reflectance, durability and energy savings for over thirty years.

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TECTUM INC.
The Noise Control Solution

TECHNICAL BULLETIN

T 77

Tectum™ Roof Deck and Lightweight Insulating Concrete

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum roof plank and roof tile have been successfully used as a structural substrate for LWIC for several years. The porous nature of Tectum decks allow the LWIC to dry from the underside of the deck without sustaining water damage from the LWIC slurry. The result is a structural, acoustical deck with permanent insulation. The deck can be re roofed without costly replacement and disposal of the existing insulation.

In March of 2002 CTL Engineering, an independent credited testing agency, witnessed diaphragm load tests to determine what effect if any LWIC had on the overall roof deck system. The test method was ASTM E 455-98, "Method for Static Load Testing of Framed Floor or Roof Diaphragm Constructions for Buildings".

Test I

1. 2" x 31" x 96" Tectum roof tile, grouted in place between 218 bulb tees welded to the steel frame.

2. A 3/8" bead of adhesive, APA spec AFG-01, was applied at all contact points between the tile and steel frame.

3. 3 1/4" 14 ga. Screws with 2" washers were spaced 12 inches on center around the perimeter with 2 screws per plank end within the field. The screws were driven into predrilled 7/32" diameter holes.

4. 3" x 24"x 48" sheets of EPS with six 2" holes per sheet were then set into a butter layer of LWIC.

5. 2" hex 19 ga & 16 ga Galvanized wire mesh was laid over the EPS.

6. 2 inches of Elastizell LWIC was poured over the assembly, floated and smoothed. The assembly was allowed to cure for thirty days.

Results

- The test section reached ultimate failure at a load of 12,243 lbs. per cylinder.
- The maximum test load was 24,486 lbs.
- The maximum shear reaction was 12,243 lbs.
- The maximum shear strength was 1,530 lbs./ft
- The design allowable shear was 509 lbs./ft

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Test II

1. 3"x 31"x 144"Tectum I roof plank, T&G sides were screwed and glued in place onto a wood frame made of 2 1/2" x 5 1/2" wood beams bolted together.

2. A 3/8" bead of adhesive, APA spec AFG-01, was applied at all contact points between the plank and the wood frame and the longitudinal tongue and groove joints between planks.

3. A 1 1/2 inch 16 ga. Formed steel channel was inserted in the longitudinal groove.

4. 4 1/2" 14 ga. Dekfast screws with 2" washers were spaced 12 inches on center along the long sides of the perimeter and 10 1/2" on center along the short sides of the perimeter. The planks had 2 screws per plank end within the field.

5. 3" x 24" x 48" sheets of EPS with ten 2" holes per sheet were then set into a butter layer of LWIC.

6. 2 inches of Siplast LWIC was poured over the assembly, floated and smoothed. The assembly was allowed to cure for thirty days.

Results

- The test section reached ultimate failure at a load of 13,052 lbs. Per cylinder.
- The maximum test load was 26,103 lbs.
- The maximum shear reaction was 13, 052 lbs.
- The maximum shear strength was 1,631 lbs/ft
- The design allowable shear was 542 lbs./ft

Random pullout tests were then conducted using 7" and 7 1/2" GypTec** fasteners. A 3/8" pilot hole was drilled through the LWIC only, the fasteners are self drilling into the Tectum deck.

- 7" fasteners yielded an average pull out of 301# per fastener
- 7 1/2" fasteners yielded and average pullout of 405# per fastener

These two roof deck systems are proven long lasting and economical systems for flat and low slope roof decks. It is an ideal solution in areas where higher allowable shear values are required.

**Trademark of ITW Buildex

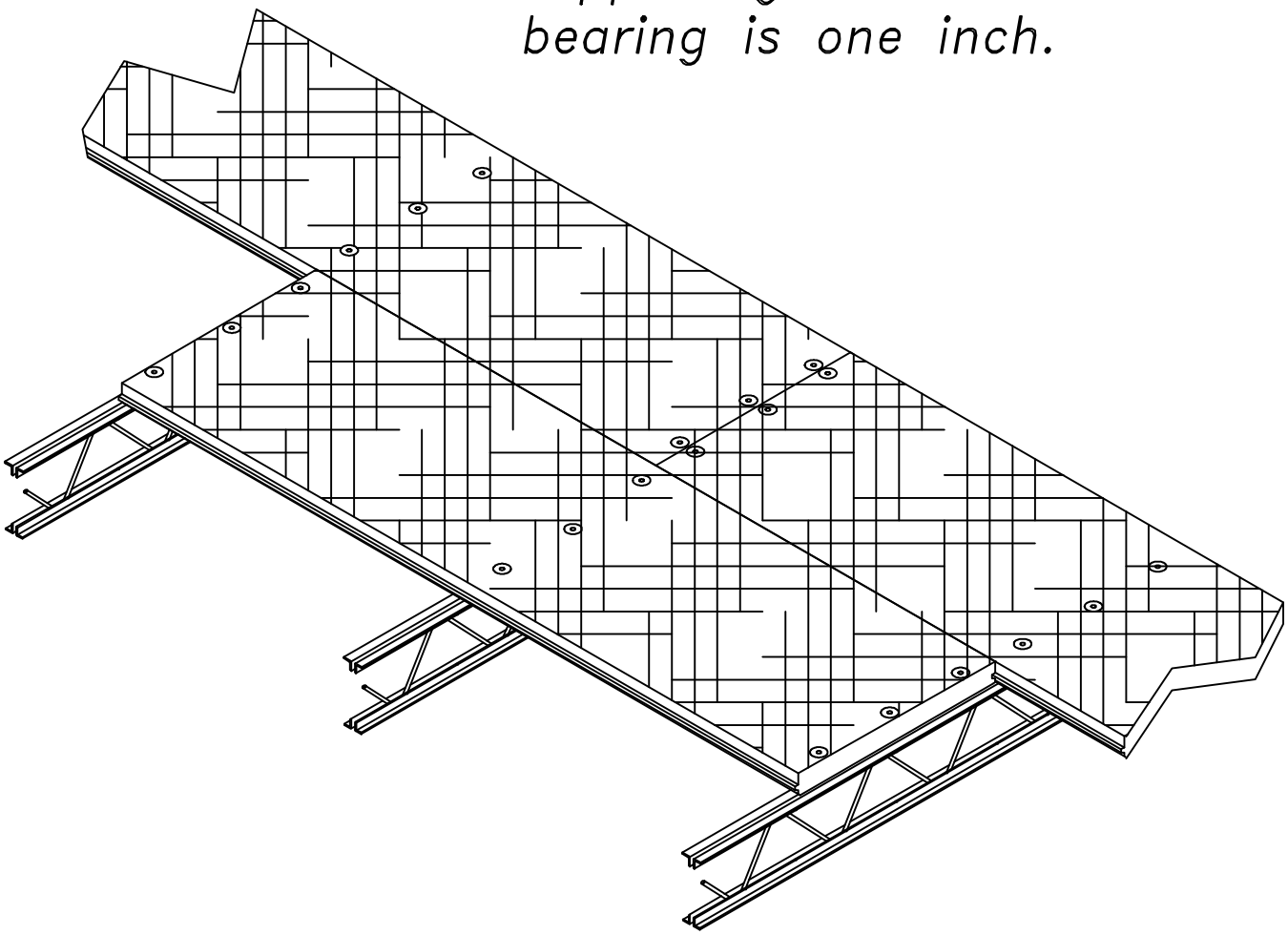
TECTUM INC.

The Noise Control Solution

Details & Drawings

Tectum Plank attached directly to steel

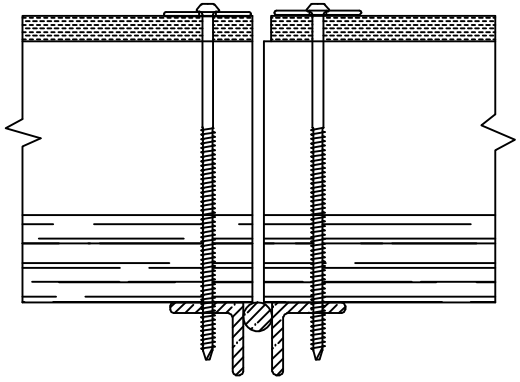
End joints must fall over supporting members. Minimum bearing is one inch.



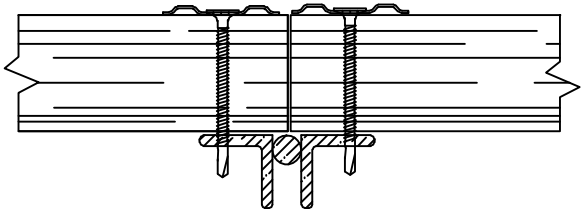
Tectum Plank over bar joist.

Joist spacing not to excede allowable span of deck
Screw spacing is shown in Technical Bulletin T-69
T-69 is available online at www.tectum.com
Screws per panel width vary depending on uplift and diaphragm requirements.

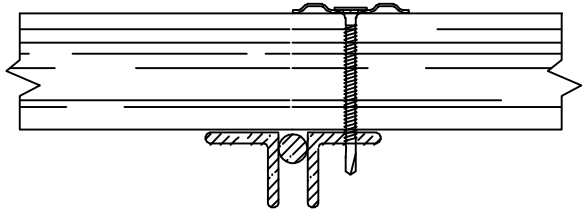
Tectum Deck over steel



Tectum III, E, and NS deck uses Dekfast 14 screws with a 1-1/2" washer. Predrilling is required for 1/8" thick or thicker steel. TruFast HD may be substituted and does not require a washer and will self drill up to 3/8" steel.



Tectum I deck uses either Dekfast 14 screws or S-25 self-drilling screws. A 2" diameter washer is required.

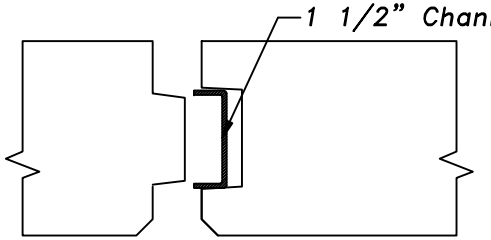


One row of screws is required at intermediate supports.

Note: A 3/8" bead of construction adhesive is required when specified.

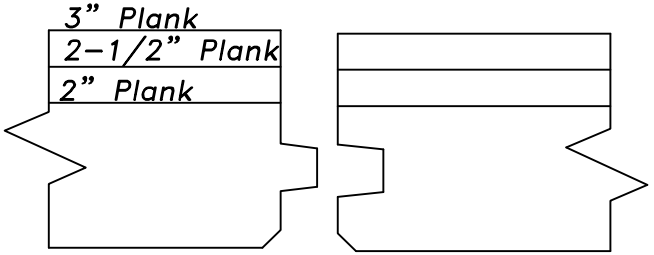
Long Span Plank Detail

Note: Channel ends must be over structural supports

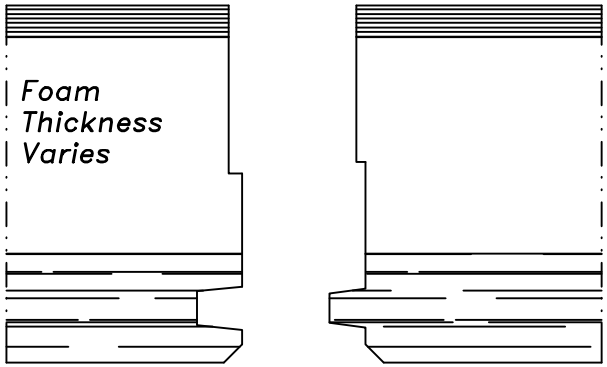


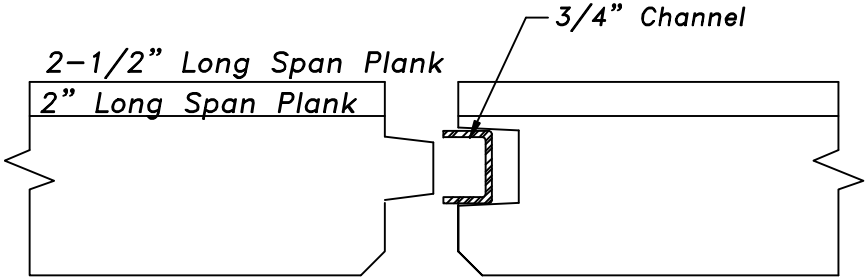
Tongue and groove detail
3" Long Span Plank

Roof Plank Detail



Composite Plank III/E Detail



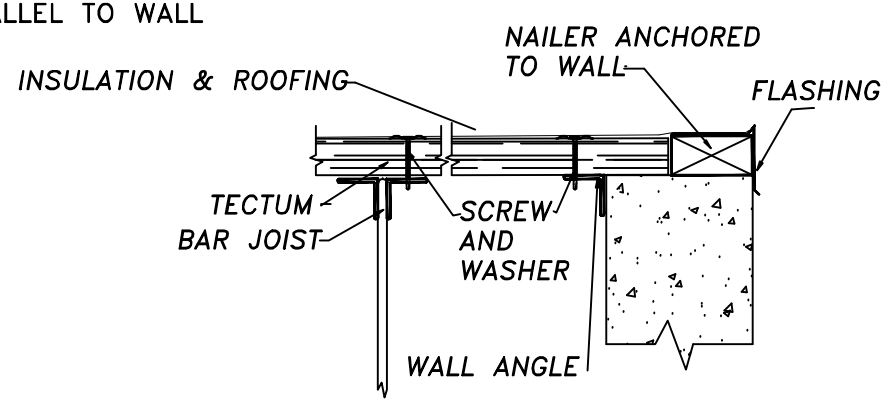


Edge Detail

NOTE: When adhesive is specified, use a 3/8" bead on the tongue

FLUSH EAVE DETAIL–

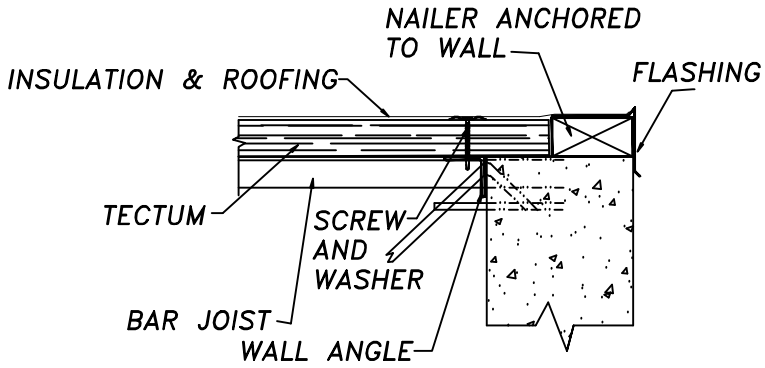
JOIST PARALLEL TO WALL



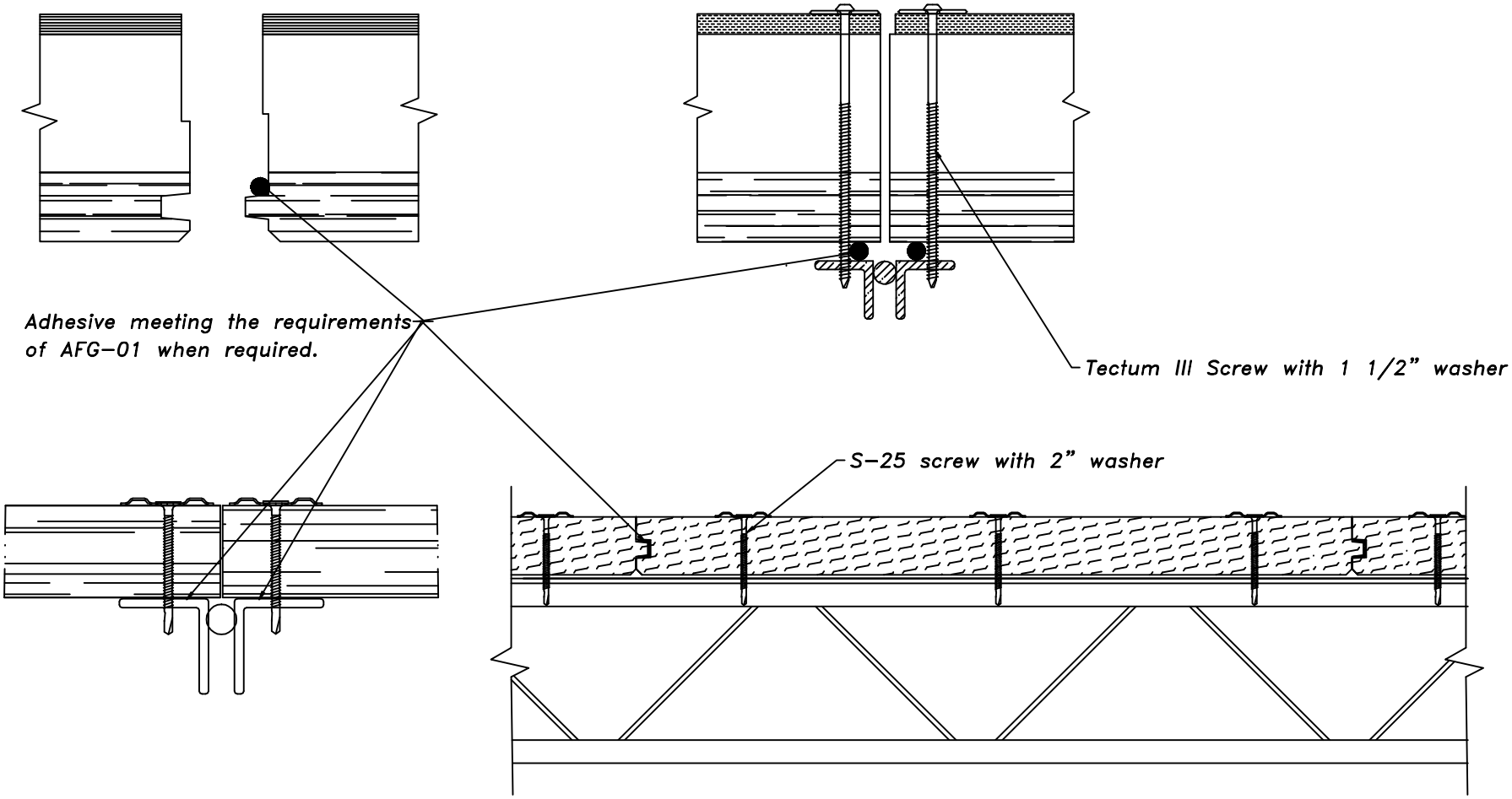
NOTE: Panel can be screwed to masonry wall instead of angle. It is not practical to screw through a plate into masonry.

FLUSH EAVE DETAIL–

JOIST RIGHT ANGLE TO WALL



NOTE: Panel can be screwed to masonry wall instead of angle. It is not practical to screw through a plate into masonry.



Typical end and side detail for Tectum Roof Decks attached to bar joist. Screw spacing and number per panel width is shown on other drawings.

REVISIONS			
NO.	DATE	BY	REMARKS

TECTUM INC.

Screw attachment of Tectum plank to Steel

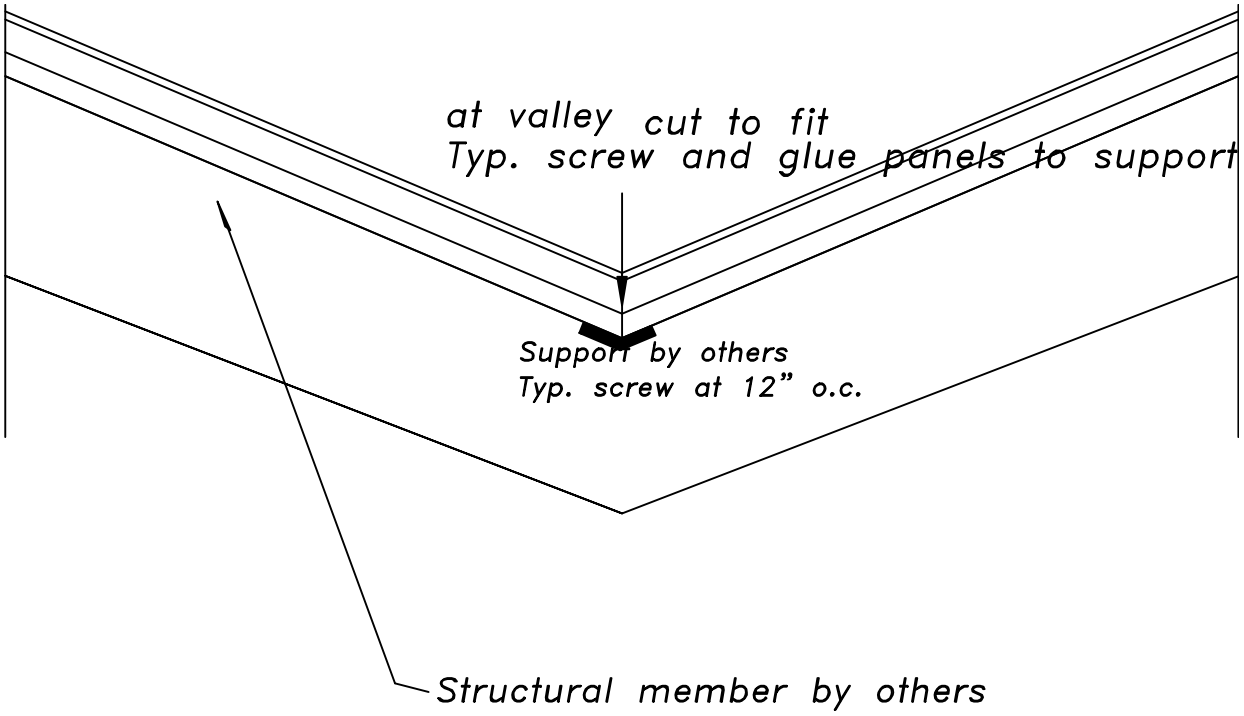
DATE *2/23/95* SCALE *none*

DRWN: *LDB* CHECKED:

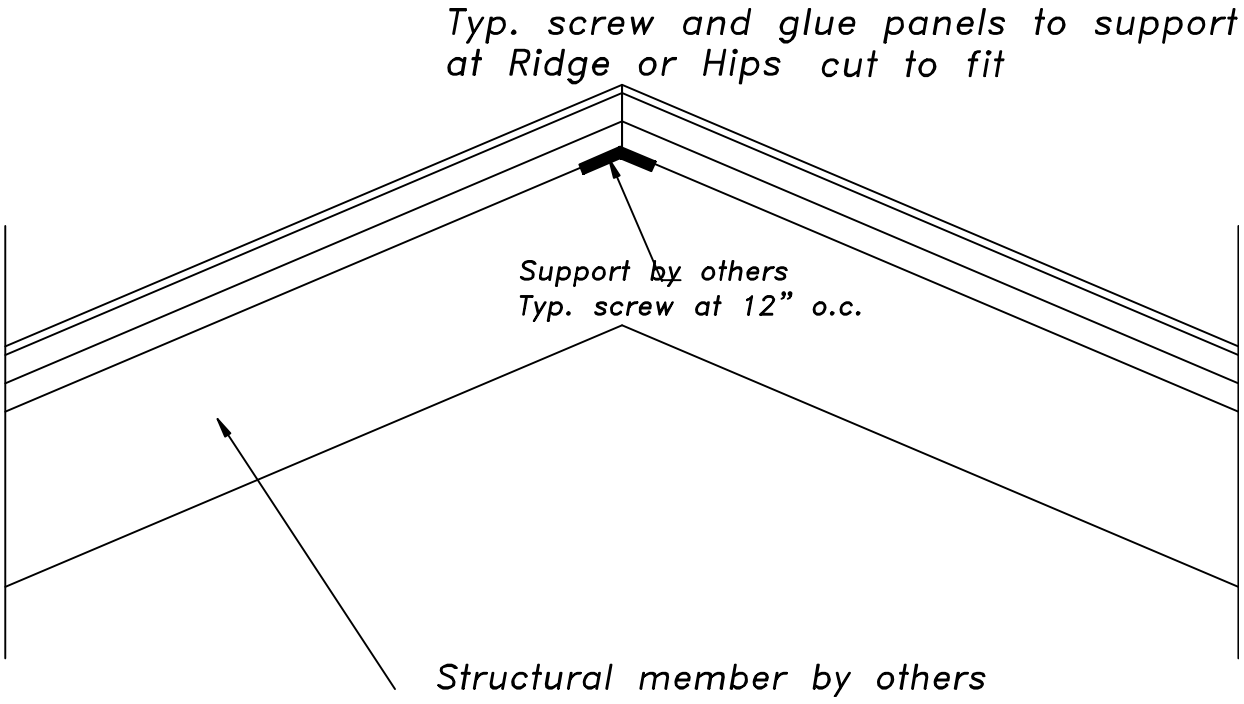
APPROVED:

DRAWING NUMBER *RP11*

CAD FILE: *RP11*

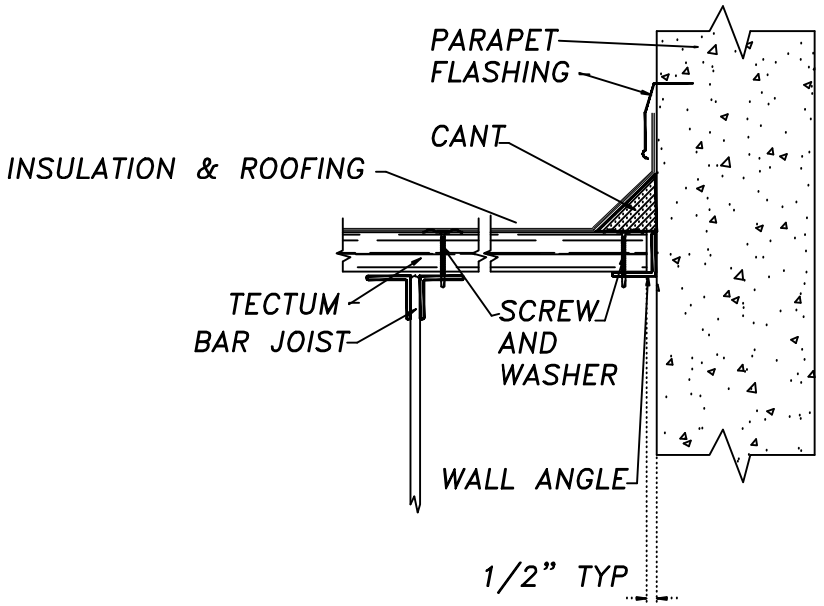


NOTE: Supports can be wood or steel.



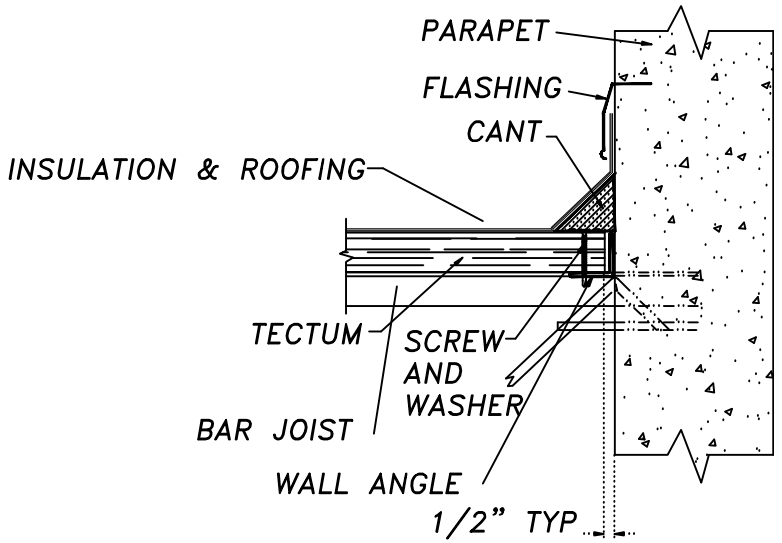
PARAPET DETAIL–

JOIST PARALLEL TO WALL



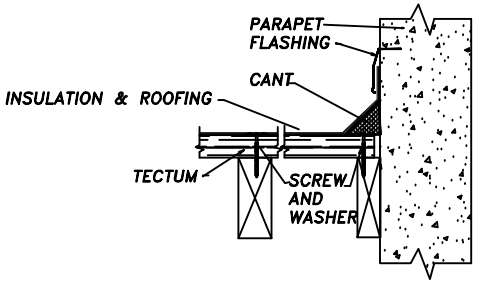
PARAPET DETAIL–

JOIST RIGHT ANGLE TO WALL



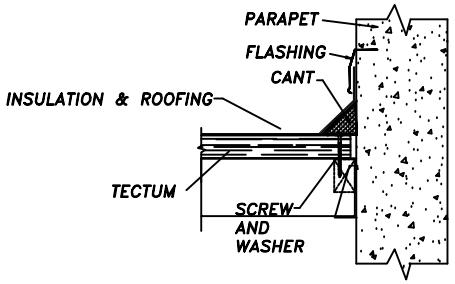
PARAPET DETAIL–

WOOD JOIST PARALLEL TO WALL



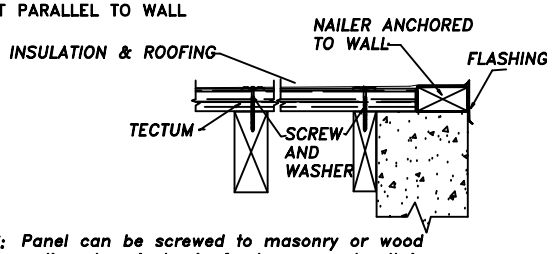
PARAPET DETAIL–

WOOD JOIST RIGHT ANGLE TO WALL



FLUSH EAVE DETAIL–

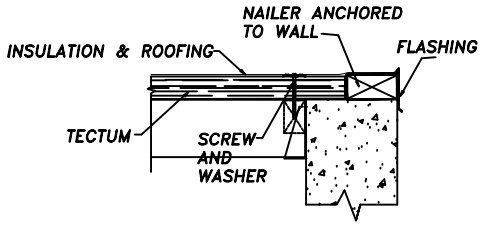
WOOD JOIST PARALLEL TO WALL



NOTE: *Panel can be screwed to masonry or wood wall system instead of edge support. It is not practical to screw through a metal plate into masonry.*

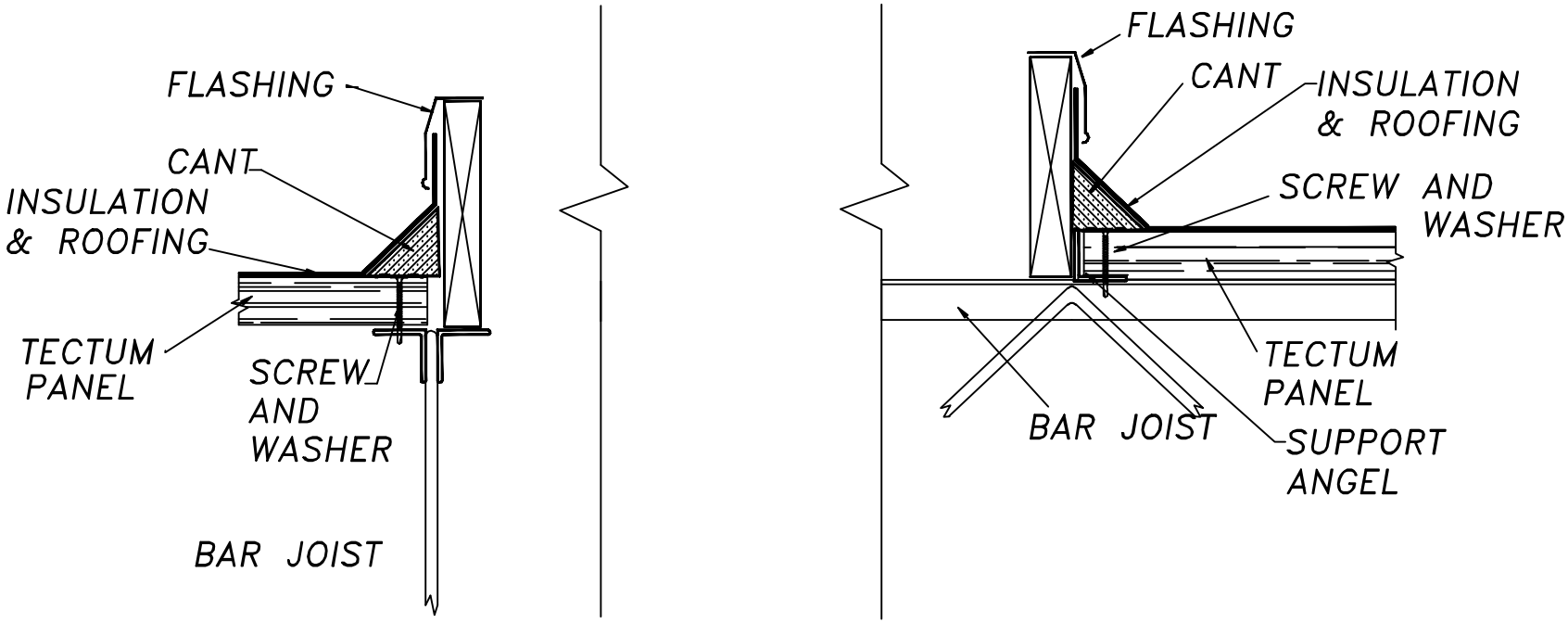
FLUSH EAVE DETAIL–

WOOD JOIST RIGHT ANGLE TO WALL



NOTE: *Panel can be screwed to masonry or wood wall system instead of edge support. It is not practical to screw through a metal plate into masonry.*

OPENING DETAIL–

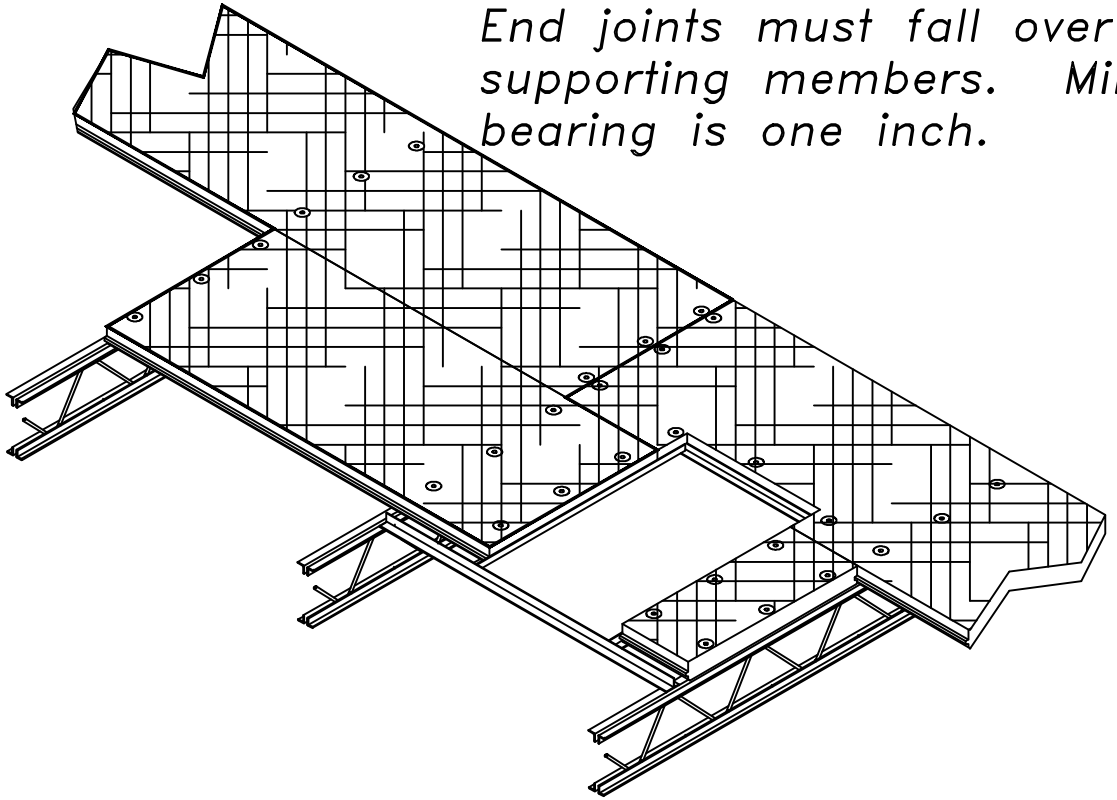


Tectum Plank – Opening Detail

Bar Joist Construction

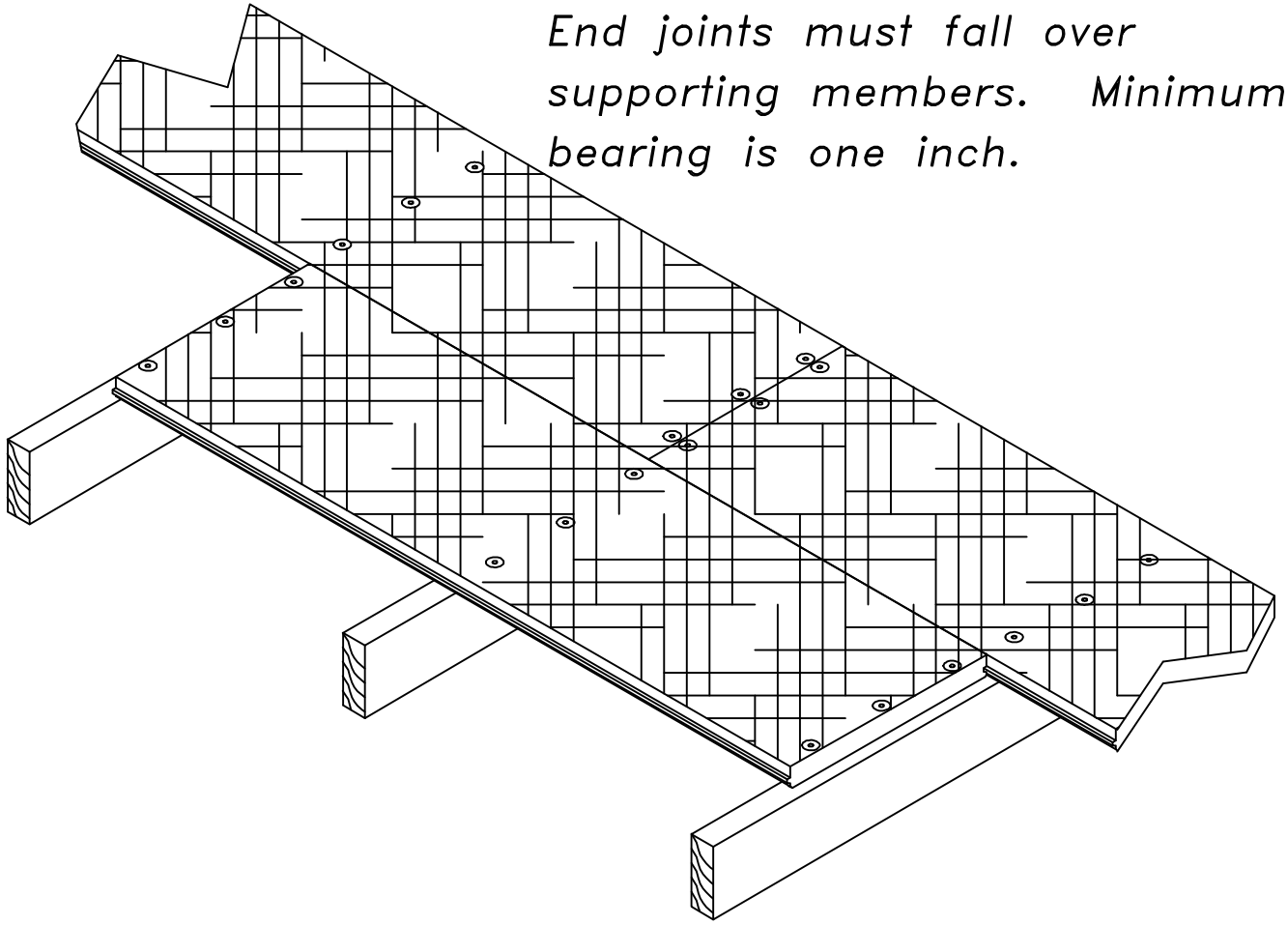
For Long Span Plank, any opening within 4" of the long edge must have supplimentary support.

End joints must fall over supporting members. Minimum bearing is one inch.



Detail of Tectum Plank over bar joist. Supplimentary framing required for openings greater than 8" in any direction. Screw attach panels to the framing for the opening. Spacing dependant on uplift and diaphragm requirements.

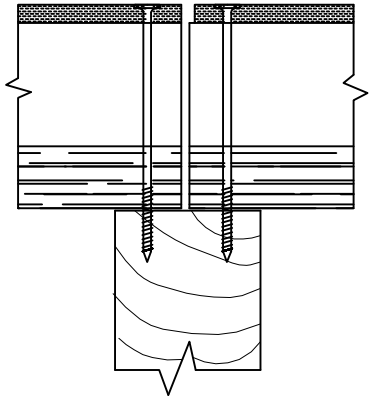
Tectum Plank attached directly to wood



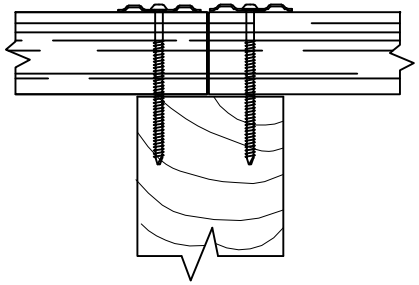
End joints must fall over supporting members. Minimum bearing is one inch.

Detail of Tectum Plank over wood members
Joist spacing not to exced allowable span of deck. Screw spacing is shown in Technical Bulletin T–69. Screws per panel width will vary depending on uplift and diaphragm requirements.

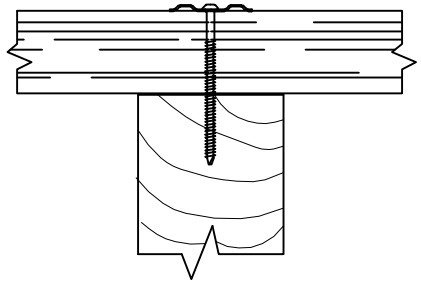
Tectum Deck over Wood



Tectum III, E, and NS decks use SIP screws. Minimum length is one inch longer than panel thickness. 1-1/2" penetration preferred.



Tectum I deck uses Dekfast 14 screws. Minimum length is one and one half inch longer than panel thickness. 1-1/2" penetration preferred.



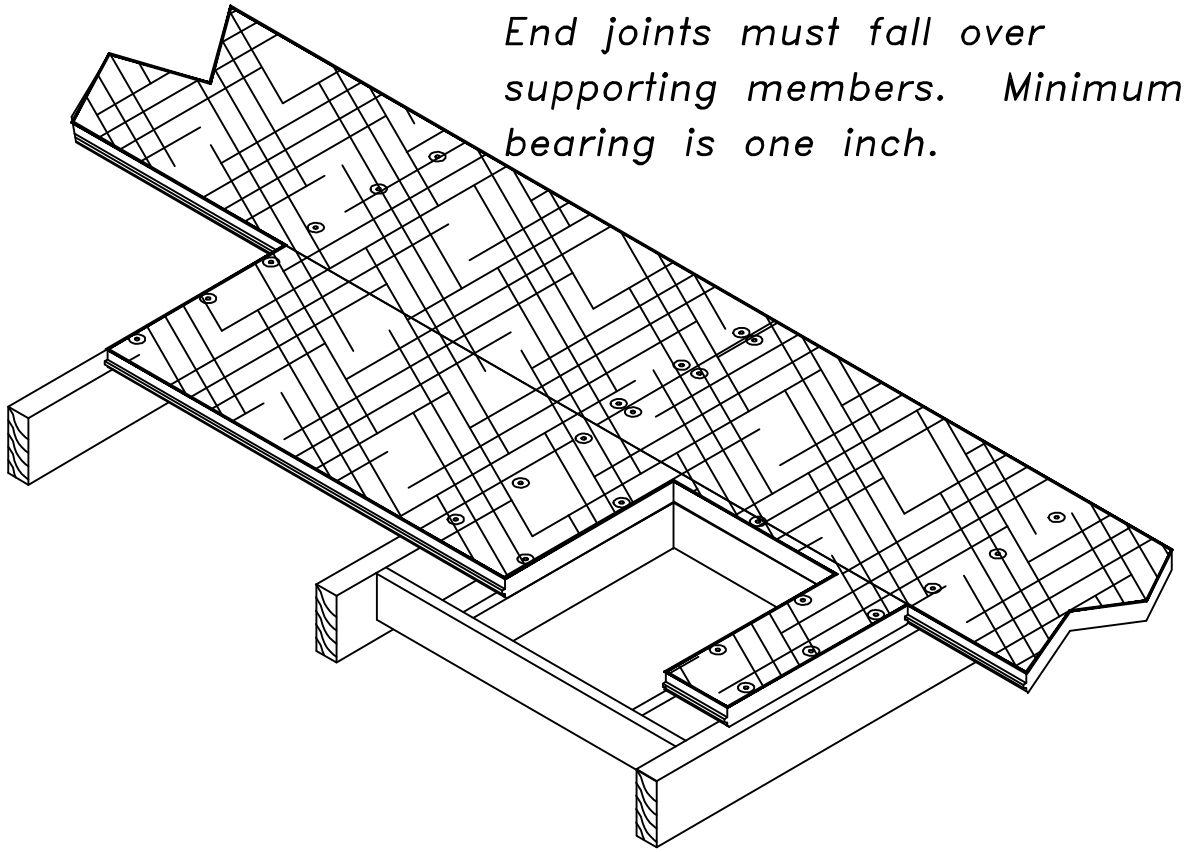
One row of screws is required at intermediate support.

NOTE: A 3/8" bead of construction adhesive is required when specified.

Tectum Plank – Opening Detail

For Long Span Plank, any opening within 4" of the long edge must have supplimentary support.

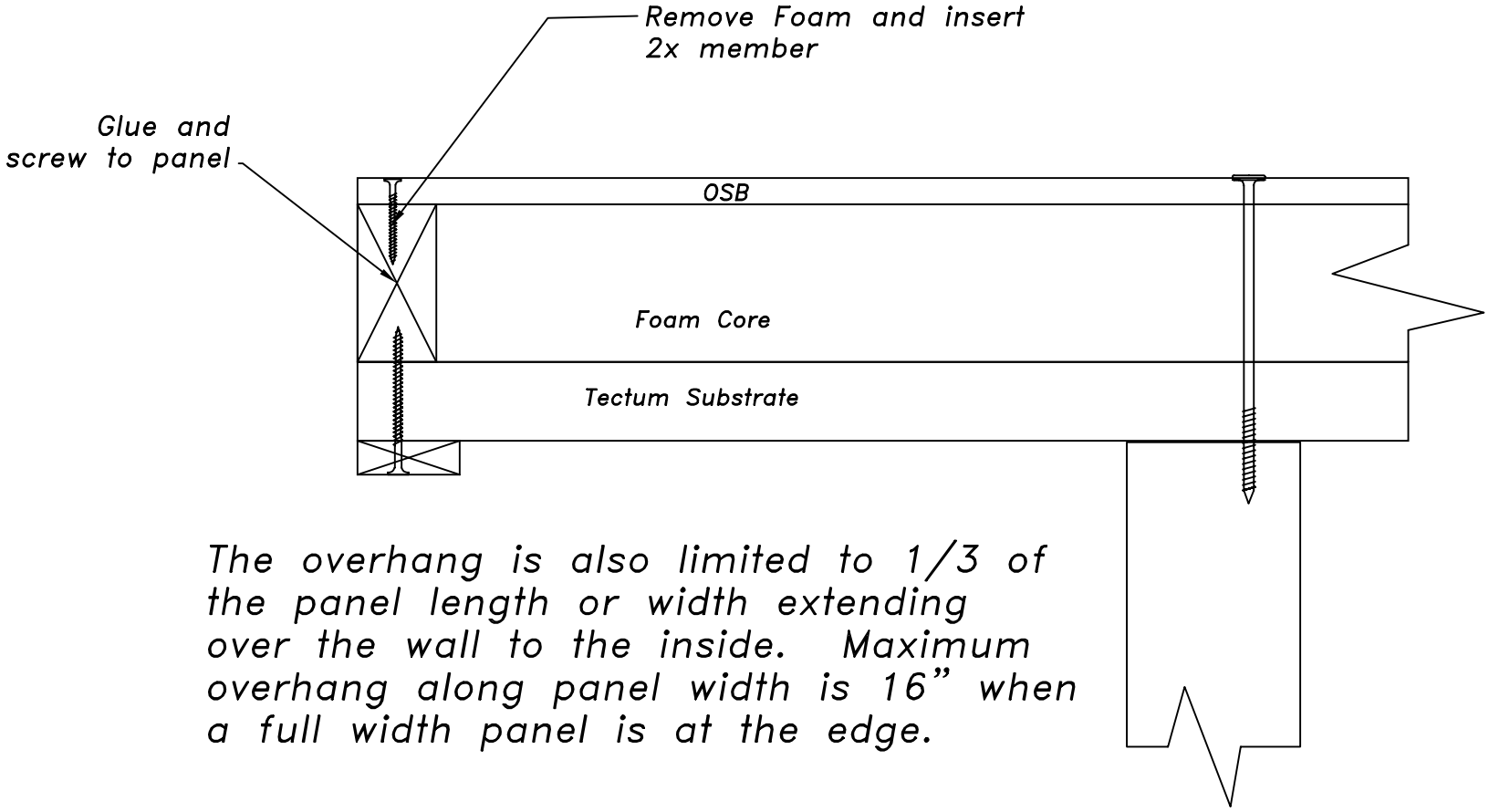
End joints must fall over supporting members. Minimum bearing is one inch.



Detail of Tectum Plank over wood members

Supplimentary framing required for openings greater than 8" in any direction. Screw attach panels to the framing for the opening. Spacing dependant on uplift and diaphragm requirements.

Overhang detail for Tectum composite panels.
Maximum overhang for 5” or thicker panels is 24”



The overhang is also limited to 1/3 of the panel length or width extending over the wall to the inside. Maximum overhang along panel width is 16” when a full width panel is at the edge.

REVISIONS			
NO.	DATE	BY	REMARKS

TECTUM

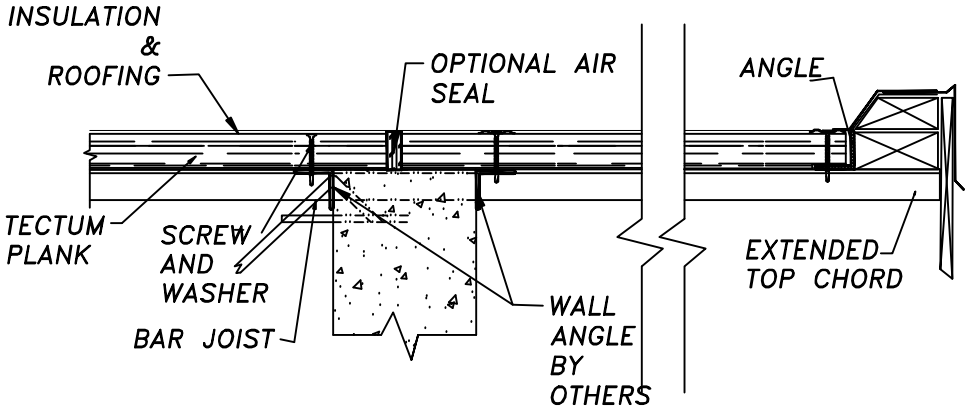
DATE
DRWN:
APPROVED:

SCALE
CHECKED:

DRAWING NUMBER
CAD FILE:

OVERHANG DETAIL–

JOIST RIGHT ANGLE TO WALL

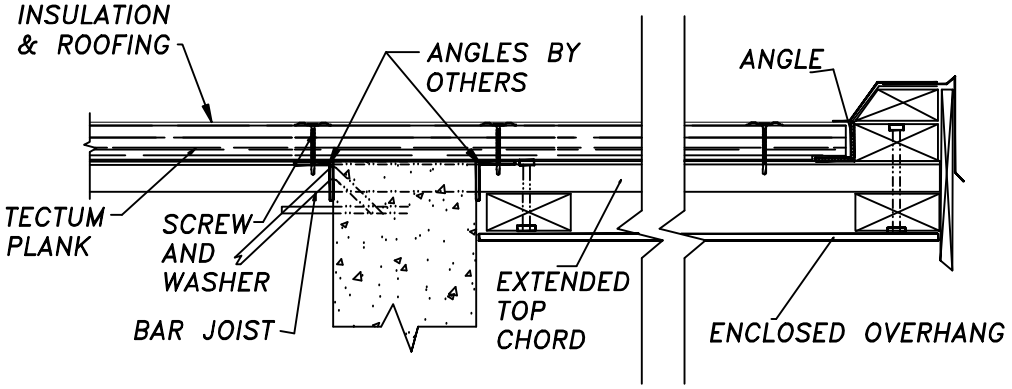


NOTE: Panel can be screwed to masonry wall instead of angle. It is not practical to screw through a plate into masonry.

Seal required for swimming pools, ice rinks, etc.

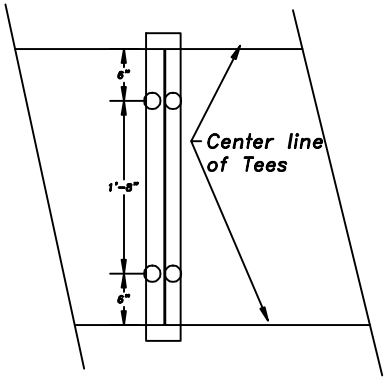
OVERHANG DETAIL–

JOIST RIGHT ANGLE TO WALL



NOTE: Panel can be screwed to masonry wall instead of angle. It is not practical to screw through a plate into masonry.

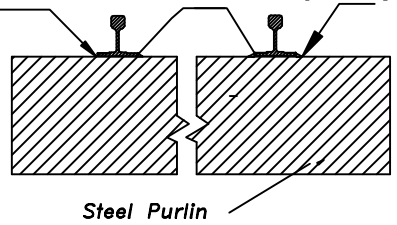
Bulb Tee Details



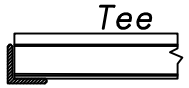
PANEL ENDS

Weld both side
for spans over 84"

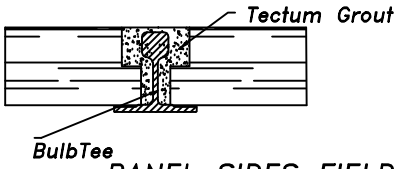
Fillet weld both sides at
tee ends and minimum
alternate sides along length



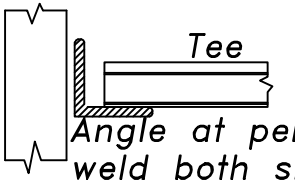
BULB TEES WELDED
TO STEEL PURLINS



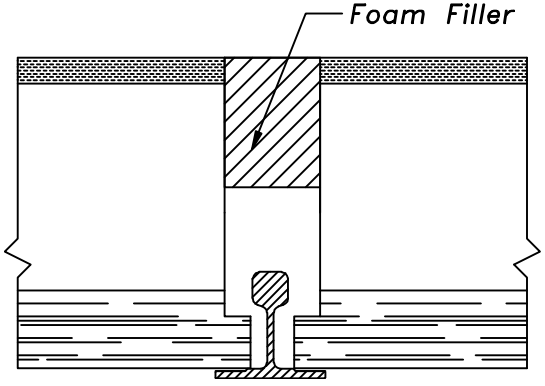
Angle at overhang
welded to tee

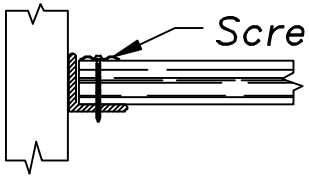


PANEL SIDES FIELD

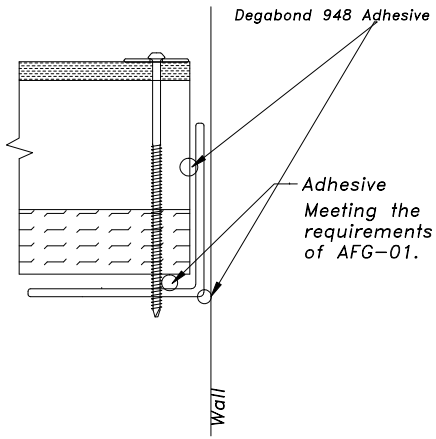


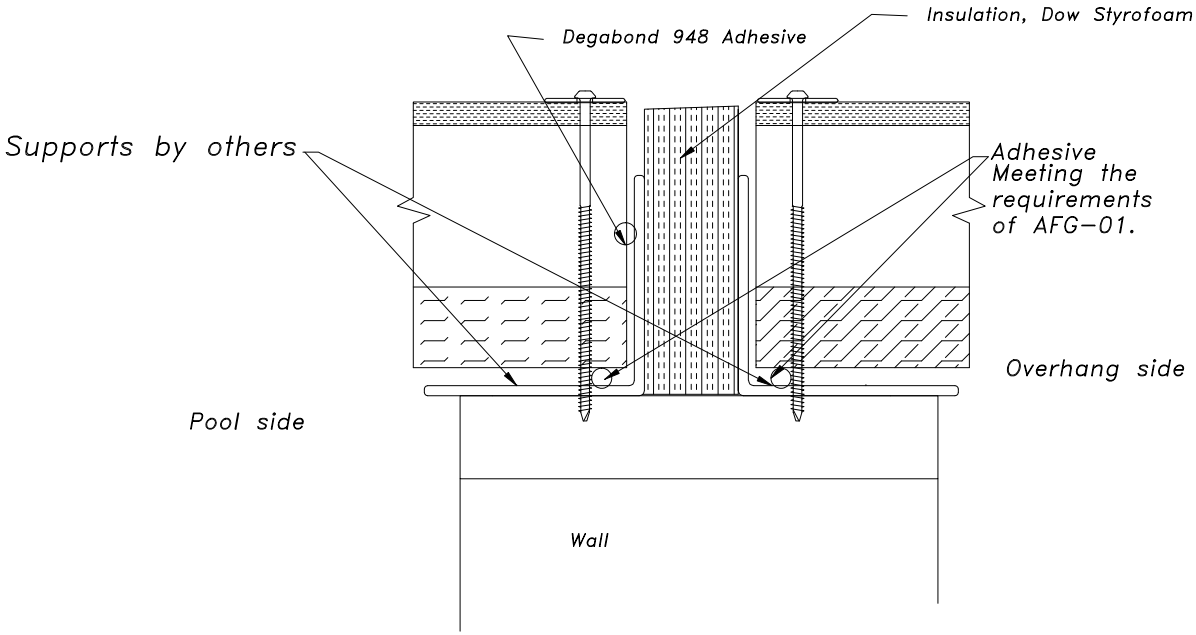
Angle at perimeter
weld both sides of tee



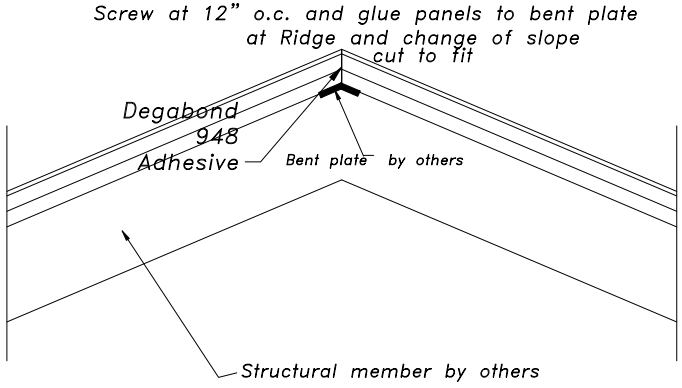


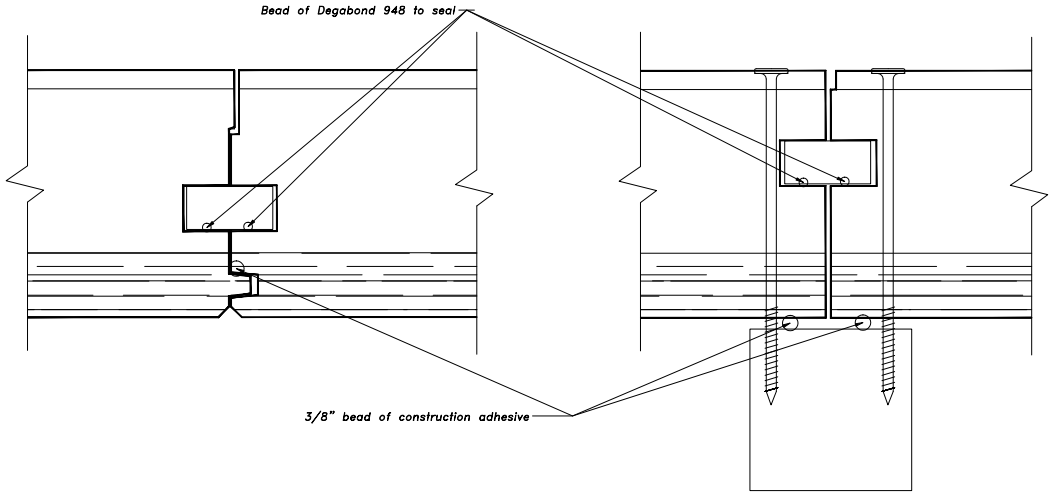
Perimeter where
long edge butts
wall.





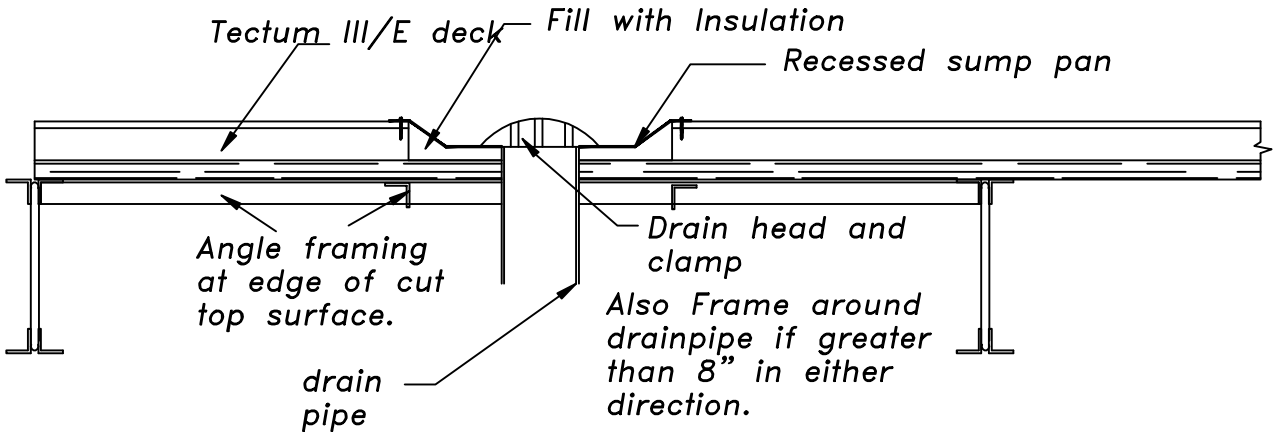
Tectum IIIP detail





TECTUM INC.

Sump pan, drain, and accessories by others.
Framing by others.



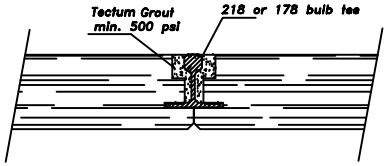
REVISIONS			
NO.	DATE	BY	REMARKS

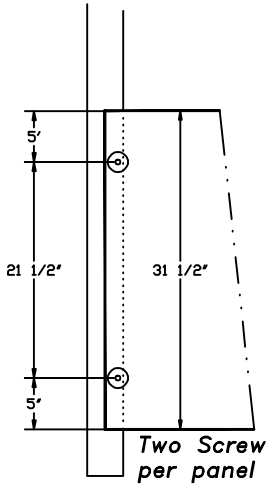
TECTUM

Tectum III/E deck
Sump Detail

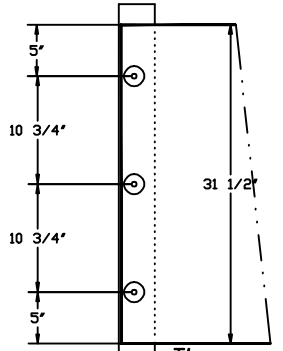
DATE
SCALE
DRAWING NUMBER
DRWN:
CHECKED:
APPROVED:
CAD FILE:

Tectum concealed tee deck has been tested for diaphragm shear. The design shear load for panels spanning 8 foot between structural members is 196 lb./lin.ft. The vertical design load is 50 lb./sq.ft.





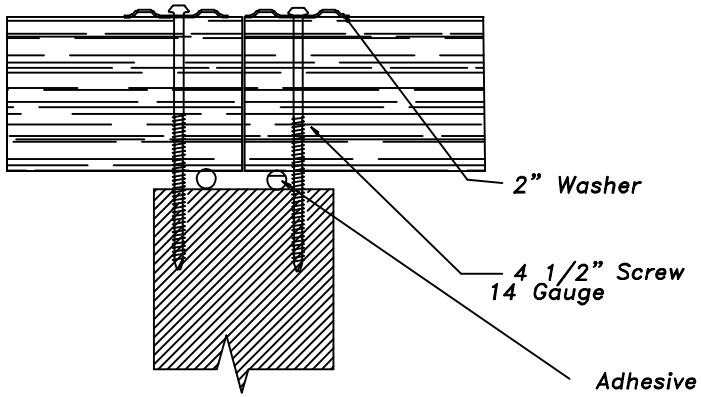
Two Screws per joist per panel width in field



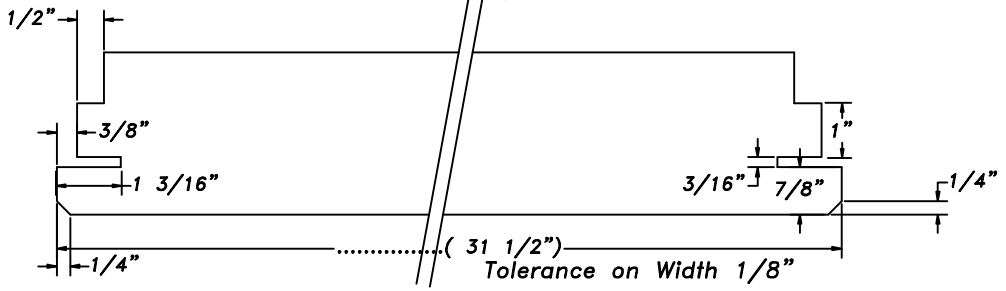
Three screws per panel width on the perimeter

Screw spacing on longitudinal sides are at 12" o.c. on perimeter.

Field joint attachment



Roof Deck for concealed Bulb Tee
Use 3" Deck Only
Tolerances on details 1/32"



REVISIONS			
NO.	DATE	BY	REMARKS
1	2/98	ldb	218
2	5/02	ldb	no truss

TECTUM

CONCEALED TEE ROOF DECK

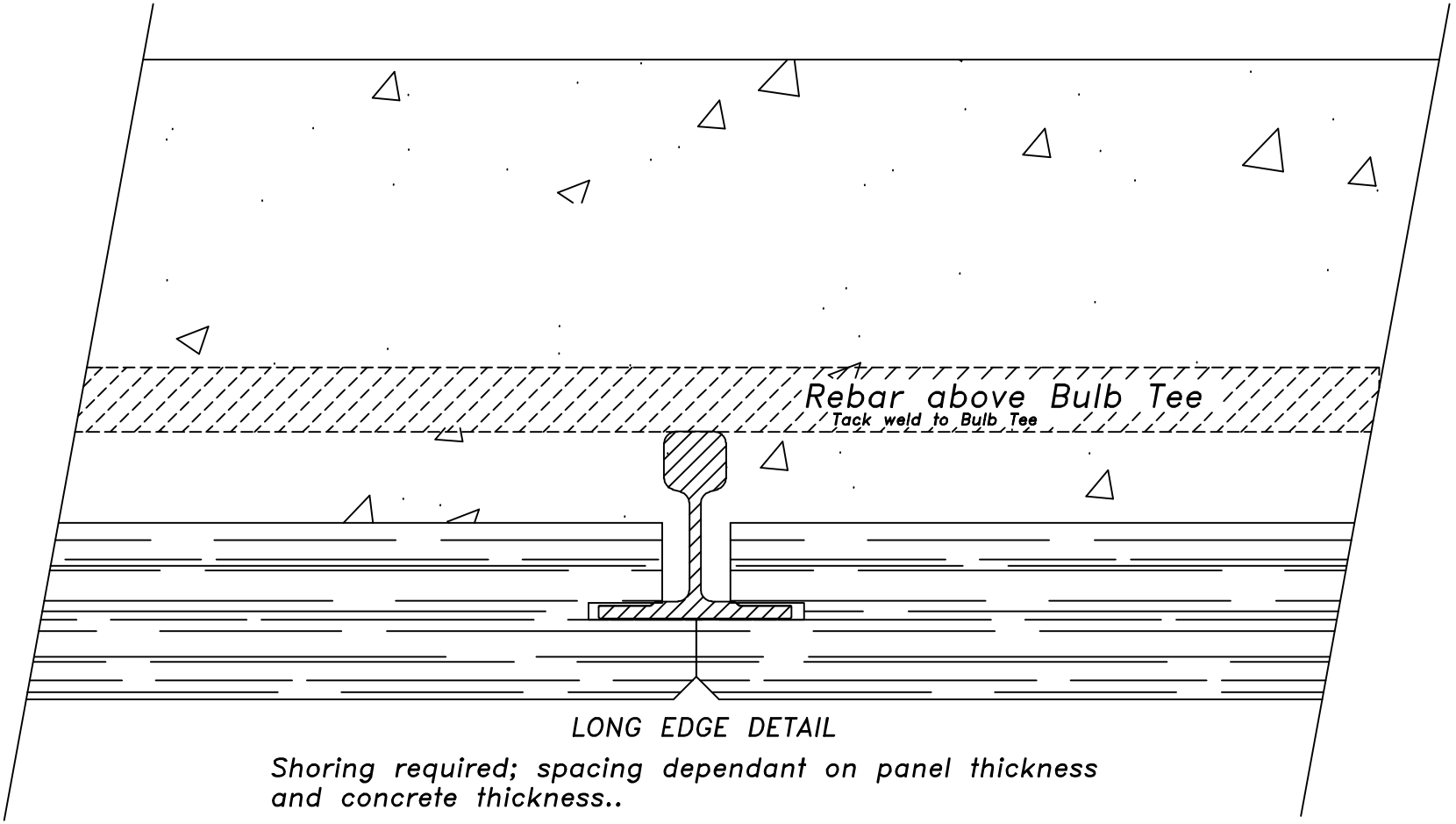
DATE 8/7/96 SCALE NONE

DRWN: LDB CHECKED:

APPROVED:

DRAWING NUMBER DETAILS

CAD FILE: CDTART



LONG EDGE DETAIL

Shoring required; spacing dependant on panel thickness and concrete thickness..

Panel ends to be tongue and groove.

REVISIONS			
NO.	DATE	BY	REMARKS
1	7/2006	LDB	Bulb Tee

TECTUM

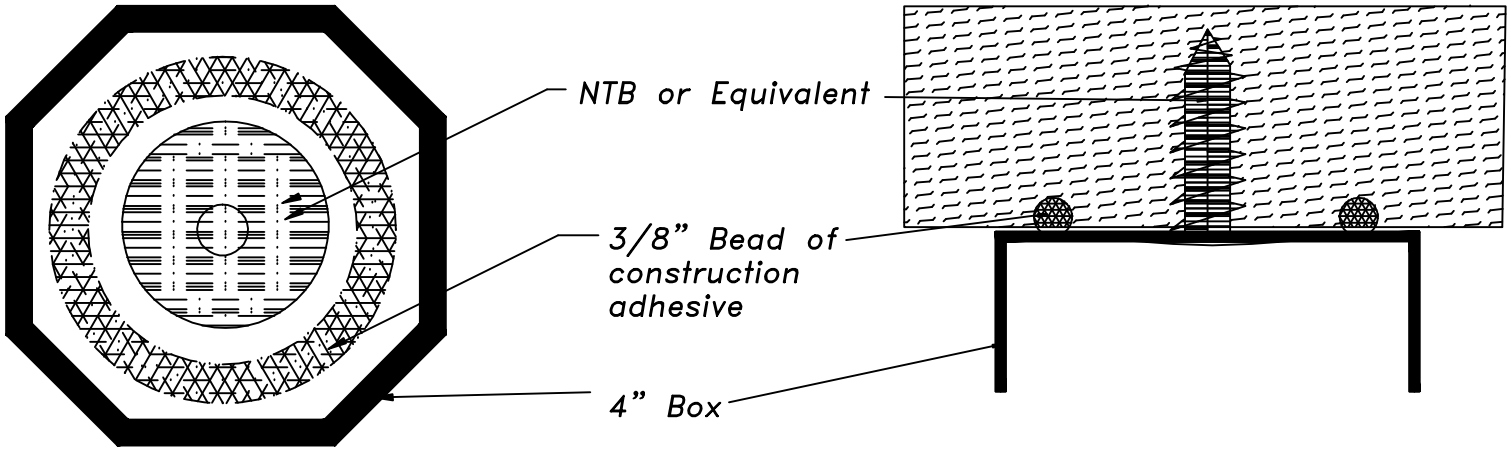
Concealed Tee Form Deck

DATE 7/10/96 SCALE none DRAWING NUMBER

DRWN: LDB CHECKED:

APPROVED:

CAD FILE: FDCNTGRT



REVISIONS			
NO.	DATE	BY	REMARKS

TECTUM

Electrical Box Attachment

DATE *11/15/94* SCALE *None*

DRWN: *LDB* CHECKED:

APPROVED:

DRAWING NUMBER

CAD FILE: *Elecbox*

TECTUM INC.

The Noise Control Solution

Installation Guidelines

T 62 TECHNICAL BULLETIN

Roofing Over Tectum™ I Roof Decks

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The following procedures are recommended for the attachment of roofing felts, vapor retarders and insulation over Tectum I roof decks.

The majority of Tectum I roof decks will have additional insulation applied. If Tectum I deck is used in a high humidity area, special design considerations must be addressed. These include but not limited to the application of a vapor retarder and prevention of the dew point temperature from occurring within the Tectum I substrate.

The three most common methods for attachment of roofing felts and insulation are mechanical attachment, solid mopping and strip mopping. Each has some advantages.

The installation of a vapor retarder over Tectum I roof deck must meet the requirements of the NRCA Design Manual for vapor retarders. Attach the base sheet by one of the methods listed.

Mechanical Attachment: A base sheet can be mechanically fastened to the Tectum I roof deck. When insulation is mopped to this base sheet or BUR is attached to the base sheet, the attachment must meet the required uplift resistance. Manufacturers of fasteners designed to attach base sheets to Tectum I roof decks are Simplex Nails, Inc.*, Americus, GA www.simplexnails.com/main.html 800-622-3354 or E S Products* (esproducts.com), Bristol, RI 401-253-8600.

Solid Mopping: Solid mopping is a continuous mopping of the Tectum I roof deck surface leaving no unmopped areas. Use a steep asphalt conforming to the requirements of ASTM D312, Type III or Type IV. The base sheet or insulation is adhered by the hot asphalt.

Strip Mopping: Strip mopping or sprinkle mopping may be used on Tectum I roof deck. Sprinkle mopping is defined as a random mopping pattern, which the heated beads of asphalt are strewn on the substrate in a random pattern with a brush or mop. Strip mopping is a mopping pattern where the hot asphalt is applied in parallel bands. The base sheet is adhered by the hot asphalt.

Attachment of insulation
See Technical Bulletin T-38 for information on fastener attachment of insulation to Tectum I roof decks. This bulletin also addresses foam adhesive attachment of insulation to Tectum I roof decks.

*The inclusion of another manufacturers products of specifications in our literature does not indicate an endorsement or guarantee. The use, application and installation must conform to the individual manufacturers instruction and literature.

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The Noise Control Solution

T 74 TECHNICAL BULLETIN

Use of Copper Roofs Over Tectum™ E and III Roof Decks

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

When flat copper roofs are used over Tectum E or III Roof Decks, it is necessary to provide a vented layer between the roofing and the panels. The heat transfer from copper roofing to the deck is much greater than with other metal roofing systems. The maximum use temperature of the polystyrene insulation can be exceeded with flat copper roofing systems that are directly applied.

CAUTION: Vented deck construction is required when flat copper roofs are used over Tectum E and III roof decks.

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TECTUM INC.
The Noise Control Solution

TECTUM™ Roof Deck Project

Installation Guidelines

Distribution:

Installation Supervisor

Job Foreman

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TECTUM INC
Since 1949

P.O. Box 3002
Newark, Ohio 43058-3002
740.345-9691 or 888.977-9691
740.349-9305 or 800.832-8869 FAX
http://www.tectum.com

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II. General Instructions

III. Before the Deck Arrives
- A. Job site inspection
- B. Shop drawings review
- C. Delivery date
- D. Job site meeting with general contractor and related trades
- E. Storage on job site

IV. Installation
- A. Safety
- B. Planning
- C. Transfer material to job
- D. Tools
  1. Cutting
  2. Fastening tile
  3. Fastening plank
  4. Slide hammer

- E. Special requirements
  1. Penetrations in roof deck
  2. Skylights
  3. Painting

- F. Cautions
  1. Concentrated loads
  2. Roof traffic
  3. Damaged panels
  4. Prolonged exposure to precipitation
  5. Inside moisture problems
  6. Use of vapor retarders
  7. Sound transmission blocks
  8. Wind seals

- G. Job site clean up

- H. Inspections / Acceptance

I. Introduction

The TECTUM™ roof deck project checklist is provided as a guide for contractors using TECTUM roof deck products.

Congratulations...you are about to install one of the premier roof decks available today. Quality installation procedures will assure a quality building. Proper handling will also assure the contractor of optimum production efficiency.

TECTUM roof deck products provide a combination of physical characteristics usually achieved only in a combination of several separate building materials. The installation of a TECTUM roof deck provides with one product 1) structural roof deck with diaphragm and vertical loading capacity; 2) excellent sound absorption; 3) insulation values up to an R of 45; and 4) a unique decorative textured interior finish.

II. General Instructions

Good planning will lower your risks of omissions and/or costly errors. TECTUM™ roof deck is relatively easy to install and maintain provided a few basic precautions are taken by the jobsite foreman by reviewing and using the guidelines for the job.

III. Before the Deck Arrives

To ensure fast, efficient installations, the following steps should precede the arrival of the TECTUM™ roof deck on the jobsite.

A) The jobsite should be inspected. The area where the material will be stored and staged for
production reserved.

1) The accessibility of the building will determine the hoisting equipment required on the jobsite for unloading the trucks and placing material on the roof.

2) Determine the start point on the deck.

3) Verify the structural spacing of the purlins and structural steel/wood. Will standard length material be acceptable or will special lengths be required? Does it conform to the approved shop drawings?

4) Verify the purlins are all spaced correctly on the same plane.

5) Verify the perimeter supports are installed and properly aligned with the purlins/structural steel/structural wood.

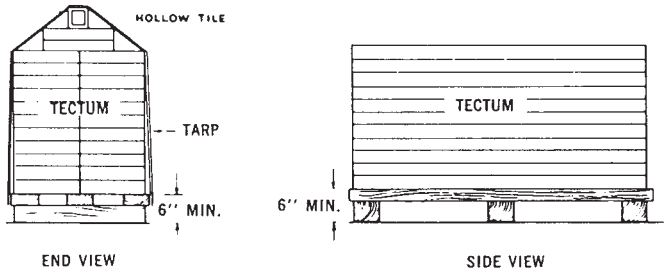
B) Shop drawings should be reviewed. Approved shop drawings are required before the project begins. Clarify questions or omissions with the architect before you proceed. The cutting list should be taken from the shop drawings and the order and delivery dates confirmed with Tectum Inc.

C) Delivery dates should be confirmed a minimum of one week in advance of the requirements. Crews and equipment should be available to unload trucks in a timely matter. Truckers are independent contractors and the majority will be prompt, but delivery is always subject to weather, breakdowns and unforeseen circumstances. Do not schedule production until the material is on the jobsite. Inspect all TECTUM roof deck shipments. Any variation from the bill of lading must be noted as well as damage. Check accessories and provide safe storage.

D) Request the general contractor or owner's representative schedule a meeting to coordinate the installation with other trades. Review the scope and responsibilities of the roof deck sub-contractors as related to other trades. Access to the work area, restrictions to trades working below, spacing of bar joists/purlins to accommodate standard length material and coordination of waterproofing are examples of items that must be discussed.

E) Storage

1) TECTUM™ roof deck should be unloaded and stored on the site or in a building under construction on a stacking platform. The platform is to be raised at least 6" from the ground or floor level. The TECTUM roof deck should be covered with a tarpaulins, waterproof paper or plastic film and secured. Waterproof coverings must be ultraviolet (UV) light resistant for TECTUM III, NS and "E" decks. The deck will be stacked so that the protective cover will shed water. If the TECTUM roof deck is to be stored for a long period, the platform will be covered with a moisture resistant material before the deck is stacked on the platform. Allow for air circulation under the waterproof cover to prevent condensation.



F) Care of the Material

1) Care must be used in handling TECTUM roof deck to prevent damaging edges and exposed surfaces from mechanical devises and staining due to exposure.
2) All TECTUM deck laid in a day should be made water tight at the completion of that days work, preferably by the application of the roofing, or at the option of the contractor, by covering with waterproof film such as polyethylene. When sidewalls and roof deck are not erected at the same time, edges and plank ends should be temporarily weather proofed to safeguard against damage.
3) If uncompleted deck gets wet, planks should be placed over it to support any heavy materials which might be stacked on the deck, or to support the weight of wheel-barrows or buggies transporting concentrated loads. If wetting has been ongoing over a period of time, judgment must be used as to whether wet panels need replacement.
4) Application of roofing over TECTUM roof decks should be in accordance with roofing manufacturer's specifications. Careful job coordination will result in the simultaneous application of the roofing to insure the TECTUM deck is not exposed to precipitation or condensation which may cause water staining. Extended exposure to moisture may result in loss of structural strength. If job conditions do not permit prompt application of the roofing, the TECTUM deck shall be protected from the weather. Sloped roof shall be covered with underlay paper.

IV. Installation

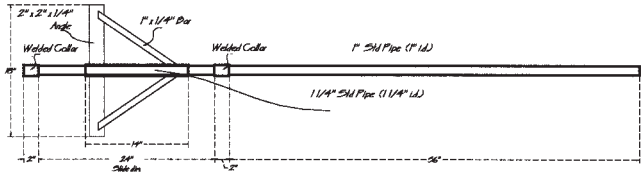
A) Safety. All pertinent health and safety rules and regulations for the project must be followed.

B) Planning. A well thought out plan of action will incorporate all the elements need to complete the project in a timely fashion: work schedule, materials, labor, tools and hoisting equipment. A meeting with the crew before the project begins should provide them with a plan of action, the job conditions they will be working with and the type of material, fasteners and safety precautions.

C) Transfer. For transferring TECTUM™ roof deck from the storage or staging area to the roof, a forklift hoist or a crane may be used. A level platform for temporary storage on the deck is recommended. The platform must spread the load to the underlying structure.

For moving TECTUM roof deck panels across a low slope roof, the use of light roller conveyors (roller skate type) is recommended. Dollies (four wheel, rubber tire) can be used. Planking should be used to prevent concentrated loading from stacks or piles of construction material and wheeled vehicles.

D) Tools. Different TECTUM deck systems will require special tools; however, most jobs will require cutting, fasteners and a slide hammer to drive the TECTUM panels tightly together.

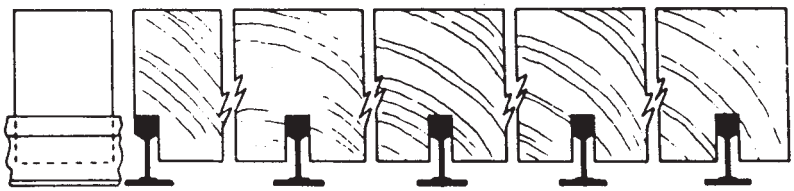


1) Cutting. Circular saws and Linearlink VCS12 for thicker TECTUM III and “E” panels. CAUTION: Cutting should be done on a level surface. Dust on a sloped roof will create a hazard.

2) Fastening - Tile System.

a) Positioning and Attaching Tees

(1) Bulb tees/truss tees should be spaced accurately according to specifications (plus or minus 1/16”) and securely positioned by means of templates. The tees should be welded at every point of crossing over the main framing members by means of a fillet weld on alternate sides of the tee flanges at intermediate supports for spans of less than 8’ (both sides on spans over 8’) and on both sides of the tees at the ends. Fillet welds should be a minimum of 3/4” in length. Allow expansion joints as directed by the structural engineer. Screws can be used instead of fillet welds for truss tees. Holes for the screws can be prepunched or field drilled with the typical pattern the same as the welds. Attachment must meet the uplift requirements of the local building code.



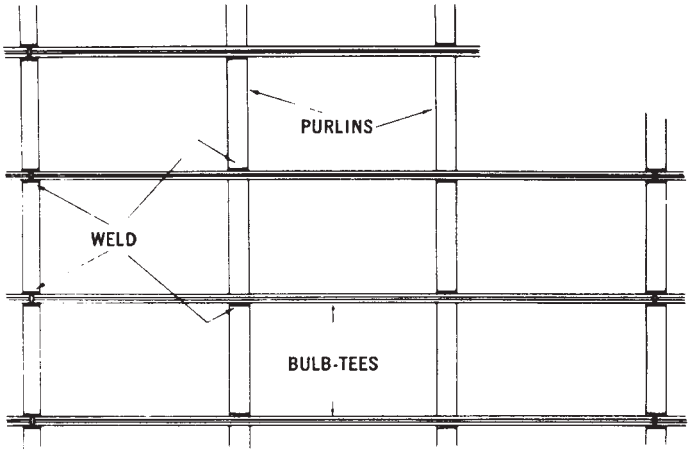
Template for Positioning Bulb Tees

(2) Ends of bulb tees/truss tees should fall on the main framing members and have a minimum bearing of 1". At this point, a fillet weld should be made on both sides of the tee flange. Where tee ends bear on masonry, they should be secured by suitable means. Typically a welding plate is attached to the masonry.

(3) When laying tees on wood purlins, welding plates spaced at 24" or 32" o.c. are nailed or screwed to the purlins and the tees welded to the plates. When concrete purlins are used, steel inserts should be provided.

(4) On sloped decks, when tees are placed parallel with the ridge, the tile spacing must be carefully checked since the TECTUM™ deck will naturally bear more on the lower bulb tee. This will require temporary shimming of the tile to insure equal grouting on both sides of the tiles.

(5) Truss tees may be used when the framing members are wood. The truss tees are screwed to the wood members with a 14 gauge screw at least 1-1/2" in length through the bottom angles.



Recommended Welding Layout

b) Laying TECTUM™ Tile on Bulb Tees

(1) TECTUM roof tile is laid with the long dimension parallel to bulb tee sub purlins. Each tile should be spaced evenly between the bulb tees to provide a minimum edge bearing of 1/2".

(2) When laying 48" long ends T & G tile, all joints running perpendicular to the bulb tees are broken by starting with a full tile, then a half tile, in alternate rows. When square end special length tile is applied, the ends should fall over the bulb tee supports. Tile lengths should be staggered where practical.

(3) The unsupported tongue and groove ends should be butted tightly.

(4) Tile is then cut to fit at ridges, hips, valleys, parapets, curbs, walls, around vents, pipes, etc. Where it is necessary to cut and fit standard pieces, use a power saw with carbide tipped blades.

c) Bulb Tee Spacing and Anchoring TECTUM Tile

(1) The open joints between tile and bulb tees are filled with grout prior to the application of roofing or insulation. Check with your Tectum Inc. distributor for premixed TECTUM grout. See Technical Bulletin T-32.

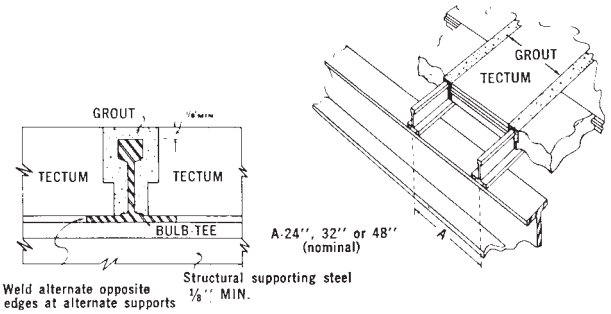
(2) After grout has been poured, it should be leveled.

(3) Filler strips may be required for thicker TECTUM tile. A special hoe or trowel should be used to level the grout and provide the proper depth slot for the fillerstrips.

(4) Tile used on a slope may require wedges to maintain the proper spacing of the panel in the tee. The wedges are placed between the tee and the panel on the lower side.

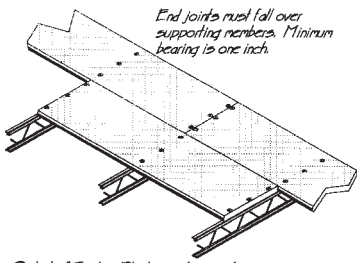
(5) Tile installed with tees running up the slope will require an additional mechanical fastener or thrust angles to prevent the tile from moving down the slope.

(6) Grout should fill the entire space between tile and bulb tee. After the grout has taken its initial set, the excess above the top surface of the deck should be scraped off to form a joint flush with the top surface of the deck. The roofing or insulation may then be applied.



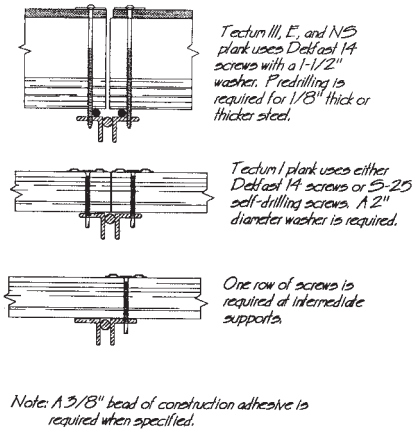
3) TECTUM™ Plank Systems
   a) Verify that the span does not exceed the plank capacity.
   b) All TECTUM plank should be started approximately _" from the parapet wall and/or wood blocking as dictated by building design.
   c) In laying TECTUM plank, the unsupported tongue and groove are butted tightly. This is best accomplished using a Tectum Inc. slide hammer. This tool reduces the risk of damage to the panels that can occur when using a driving block and sledge. Safety is also increased as the user does not need to be atthe edge of the panel swinging a sledge.
   d) The end joints on adjacent rows of plank are staggered.
   e) All TECTUM plank, with the exception of long span when clip attached, should be installed with the tongue leading. This facilitates the application of construction adhesive when required.

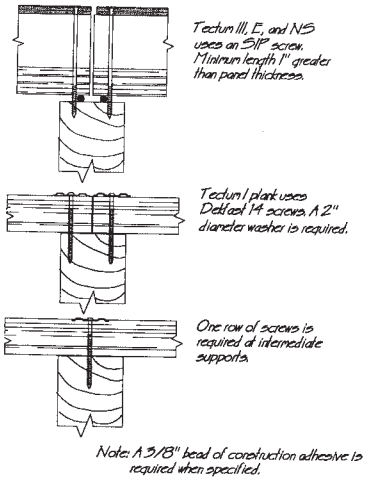
4) Anchorage of TECTUM Roof Plank
   a) Install TECTUM plank in accordance with the approved shop drawings.
   b) Typical methods of installation include attachment with screws and washers, clips, special nails or special screws. Installations may require construction adhesive. The adhesive is placed on structural members and along the tongue. A 3/8" bead is used.
   c) Anchorage must be at intervals which provide uplift meeting the requirement of the local building codes or 30 lbs. p.s.f., whichever is greater.
   d) A minimum of two (2) screws or nails per bearing is required unless clips are used.



Detail of Tectum Plank over bar joist. Joist spacing not to exceed allowable span of deck. Screw spacing is shown in Technical Bulletin T-69. Screws per panel width will vary depending on uplift and diaphragm requirements.

e) Clips, when used, should be placed at each crossing of the plank over supporting members. Typical attachment of the clip is by welding. Screwattachment is also acceptable.
f) Screws are required to be of sufficient length to penetrate the steel with full threads. Screws into wood need to be at least 1” longer than the deck thickness. Nails should be of sufficient length to penetrate the nailable members by 1-1/2”.
g) Special attachment methods may be required for diaphragm construction. Contact Tectum Inc. for additional information.
h) Special installation methods are required in high humidity areas such as over swimming pools. Contact Tectum Inc. for proper design and special installation requirements.





E) Special Requirements.

1) Penetrations in roof deck — Openings greater than 8” in diameter or 8” in any dimension shall be framed and tied into the structural framing. Skylights require special care. Adequate drainage for condensation on metal component of openings must be provided.

2) Painting. The exposed underside of TECTUM™ decks may be painted after installation with a sprayer using quality paint. A latex non-bridging paint should be used to maintain acoustical properties.

F) Cautions.

1) Avoid concentrated loading during construction. Pallets should be distributed over several bar joists when being placed on roof staging area.

2) Secure all individual panels before allowing traffic or other trades on roof.

3) Do not install damaged or marred panels.

4) Do not expose roof deck to prolonged precipitation. If job conditions do not permit prompt application of the roofing, the TECTUM deck should be protected from the weather. Sloped roofs should be covered with underlay paper.

TECTUM deck must not be subjected to excessive water during the erection process.

5) TECTUM roof deck should not be installed over freshly poured, uncured concrete floors without providing adequate ventilation. See the recommendations of the ASHRAE Handbook of Fundamentals.

6) Limitations. TECTUM III or TECTUM I decks with a vapor retarder and additional insulation must be used in high humidity areas. TECTUM “E” and NS should not be specified for rooms subject to continuous high humidity such as swimming pools or commercial laundries. When suspended ceilings are used under TECTUM decks, the enclosed space should always be vented following the ventilation recommendations of the current ASHRAE Handbook of Fundamentals.

7) Sound Transmission Blocks. To minimize room to room sound transmission, place sound transmission blocks over partitions. Blocking should be 2” thick wood, grout or equally dense material and should be caulked for best results when wood or other rigid materials are used.

8) Wind Seal. To prevent heat loss laterally through the TECTUM deck, a wind seal should be installed when TECTUM deck spans an exterior wall. Wind seals can be roofing felt, wood, grouting material, etc.

G) Daily Cleanup at Jobsite. All endouts, dunnage and waste materials shall be disposed of at the end of each working day. Protect cutoffs that are required for use in other areas.

H) Inspection/Acceptance. The job foreman for the erection area should inspect the job in progress at various intervals to ensure the following:

1) Is the deck surface suitable to receiving roofing?

2) Is roof deck protected against rain after the day's work?

3) During erection, are overly heavy concentrated loads being applied to deck surface?

4) Any pieces found unsuitable due to abrasion marks, abused plank or tile should be removed and replaced.

5) Check the following:

a) Are all clips properly spaced and installed correctly?

b) Are all joints properly grouted?

c) Are all pieces properly secured by nails or screws?

d) Are all joints, both side and end, driven tight?

e) Is good ventilation provided for closed in building during construction?

6) Upon final inspection by erection crew foreman, another final inspection should be made with the job superintendent to verify that the deck is acceptable in all respects. The final inspection should be confirmed in writing, if possible signed by both inspectors and filed with the other permanent job records.

TECHNICAL BULLETIN

T 69

Tectum™ Composite - Placement of Attached Screws

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

The location of attached screws for Tectum Roof Deck products is often varied. This drawing gives Tectum Inc. recommended locations. It should be noted that the screws are not placed at the edge of the panels but are spaced in from the edge depending on the width of the panels and the number of screws per joist. Special applications may require some modification of the spacing shown.

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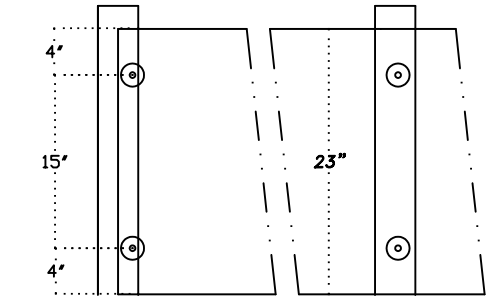
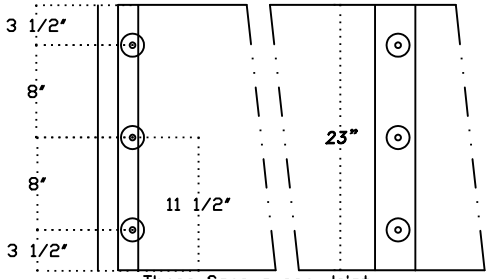
TECTUM INC.
The Noise Control Solution

The location of attachment screws for Tectum roof deck products is often varied. This drawing gives Tectum Inc. recommended locations. It should be noted that the screws are not placed at the edge of the panels but are spaced in from the edge depending on the width of the panels and the number of screws per joist. Special applications may require some modification of the spacing shown.

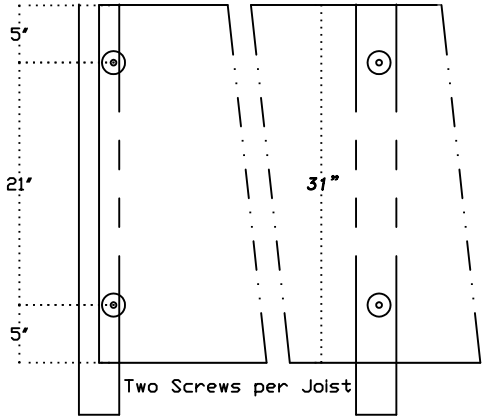
Standard Screw Spacing for Tectum Plank Systems



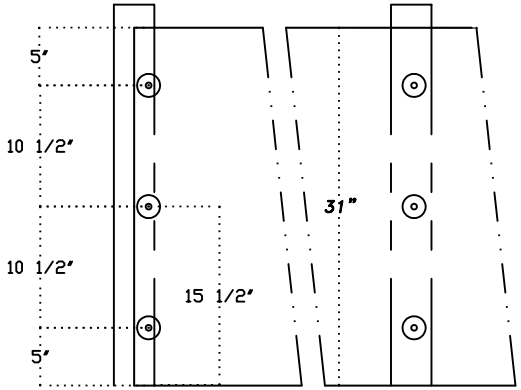
Two Screws per Joist



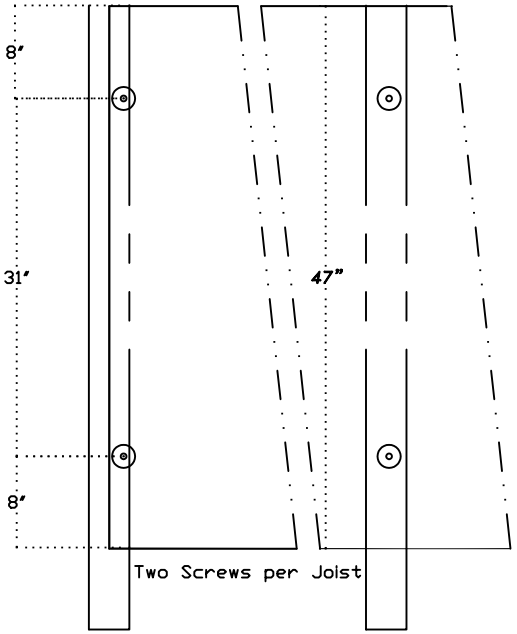
Three Screws per Joist



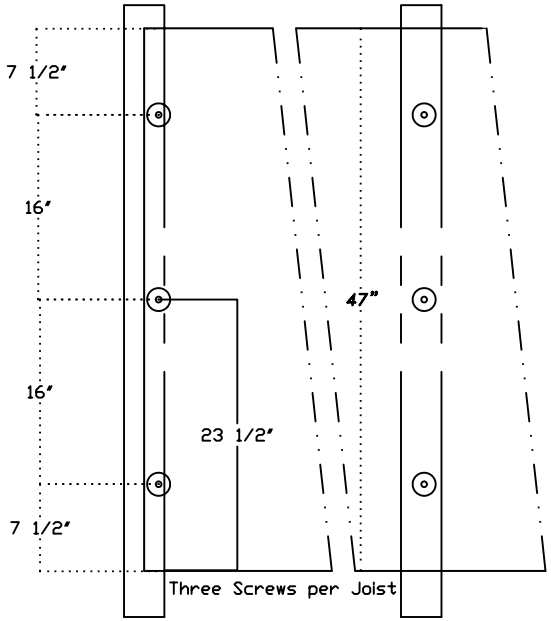
Two Screws per Joist



Three Screws per Joist



Two Screws per Joist



Three Screws per Joist

For use with all Tectum screw and washer assemblies for Tectum I, III, E, and NS plank and waferhead screws for Tectum III, E, and NS plank.

REVISIONS			
NO.	DATE	BY	REMARKS

TECTUM

Roof Plank Screw Spacing

DATE *2/22/95* SCALE *none*

DRWN: *ldb* CHECKED:

APPROVED:

DRAWING NUMBER *RP10*

CAD FILE: *RP10*

T 32 TECHNICAL BULLETIN

Grouting Instructions for Tectum™ Roof Deck

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

MIXING INSTRUCTIONS

Use only clean (drinking quality) water for mixing. Mixing equipment must be kept clean. Dirty equipment will shorten the working time of the grout and accelerate the setting time.

Premixed grout may be mixed in a typical plaster or cement mixer (mechanical type) or may be mixed in a thirty (30) gallon plastic drum with a mixing paddle powered by a grounded, heavy-duty electric drill. Add five (5) gallons of water to the mixer. Add one eighty (80) pound bag of Premixed Grout. Mix three to five (3-5) minutes. Adjust the fluidity of the grout by adding a minimum of water. More water is required if the grout cannot easily be poured into the void completely filling it. Too much water can cause the grout to shrink around the bulb tee and form a depression. Container must be cleaned after each batch is mixed. Mixing should always be done on the deck (if possible) in close proximity to the joints that are to be grouted.

COVERAGE

When mixed as recommended, one eighty (80) pound bag of grout will cover from eighty to one hundred (80-100) lineal feet of void area. Grout coverage varies with the thickness of the deck as well as the size of the subpurlin.

Bulb tees use less grout than truss tees. A rule of thumb is use one-half (1/2) bag more of grout when using truss tees.

Tectum I Thickness	Bulb Tee at 32" nom. Bags of Grout per m.s.f.	Truss Tee at 32" nom. Bags of Grout per m.s.f.
2"	3 1/2	4
2-1/2"	4 1/2	5
3"	5 1/2	6

When using Tectum III Roof tile, filler strips will be required.

SETTING TIME

Average setting time of grout is thirty (30) minutes.

CAUTION

Mixed grout must be used within thirty (30) minutes. Do not retemper material that has started to set. Once the batch is mixed, additional water may be added if necessary. Do not add any additional dry mix material to original recommended mix proportions. Mix each batch separately. Protect mixed material from freezing during installation.

Since mixing and application methods are beyond our direct control, Tectum Inc. can assume responsibility for the performance of this product only when it is used according to instructions and/or our published specifications.

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TECTUM INC.
The Noise Control Solution

Tectum Roof Deck
Approved Contractor Program

Tectum Inc. has established an "Approved Contractor Program" to assure that Tectum products are correctly installed by qualified contractors. For a complete outline of the program, please visit our Web site at www.tectum.com/bulletins.

Qualifications

An approved Tectum Roof Deck Contractor will have experience in the construction industry including the following:

1. A minimum of five years industry experience
2. Qualified personnel on-staff or on-call for installation of the product.
3. All equipment necessary for proper installation of a Tectum Roof Deck.
4. Manufacturers close support and supervision for at least the first three roof deck projects completed.
5. All field supervisors have manufacturer instruction in the proper use and installation of Tectum Roof Deck products.

What to Expect

1. Pre-job meeting with general contractor (a general contractor who fails to schedule a pre-job meeting will be notified in writing that the warranty for the Tectum Roof Deck may be forfeited.) Attendees at this meeting include:
    a. The architect or engineer as the owner's representative
    b. The general contractor
    c. The joist supplier
    d. The roofing contractor
    e. Any others directly or indirectly in contact with the Tectum roof deck assembly
    f. For large projects (over 18,000 sq. ft.) or special projects, such as swimming pools, ice rinks or high humidity buildings, this meeting will include a representative of Tectum Inc. This requirement may be waived by Tectum Inc.
    g. For projects over 50,000 a representative of Tectum Inc. must be included.
2. Agenda for the pre-job meeting should include, but are not limited to:
    a. Critical details.
    b. Structural placement and fastening systems.
    c. Coordination of installation, including joist system, deck and roofing.
    d. Jobsite storage and temporary protection of installed components.
    e. Safety considerations
    f. Power sources, if required.
3. Shop drawings - The contractor is responsible for the submitting all relevant shop drawings to the architect.
4. Code compliance – Any special inspectors must demonstrate their qualifications to the satisfaction of the contractor and building inspector.

Manufacturer's Inspection
A field representative of Tectum Inc. will inspect jobs over 18,000 square feet. Installations of over 50,000 square feet will be inspected by a Tectum Inc. factory representative.

Approved Contractor Evaluation
Approved Contractors are evaluated by Tectum Inc at the completion of each job. This evaluation includes, but is not limited to:

1. Installation in accordance with specifications and shop drawings
2. Appearance of the finished project
3. Housekeeping on the project
4. Storage and care of the product
5. Ability to coordinate all details of the project

Any contractor who fails to perform up to acceptable normal standards may lose approved contractor status.

TECTUM INC.

The Noise Control Solution

Maintenance

Tectum Inc.
P.O. Box 3002
Newark, OH 43058-3002
888-977-9691 Phone
800-832-8869 Fax

Material Safety Data Sheet

Effective Date : January 2, 2008

I. Identification
- a. Product Name : Tectum Panels
- b. Technical Name : Wood-Cement Board
- c. Formula : Proprietary

II. Ingredients
- a. Aspen Wood Excelsior : 44%
- b. Magnesium Oxide : 25%
- c. Sodium Silicate Glass : 16%
- d. Magnesium Sulfate : 9%
- e. Calcium Carbonate : 6%

III. Physical Data
- a. Appearance : Roof Deck or Interior Panels
- b. Color : Light Tan to White
- c. Odor : None
- d. Density : 16-30 lb. per cubic foot
- e. Solubility in Water : Minimal

IV. Fire & Explosion Data
- a. Auto-Ignition Temperature : 560 - 800 F
- b. Extinguishing Media : Water, Carbon Dioxide Foam or Dry Chemical
- c. Special Firefighting Procedures : Full Emergency Equipment with self-contained breathing apparatus should be worn by Firefighters.

V. Physical Hazards
- a. Stability : Stable
- b. Incompatibility : None known
- c. Hazardous Decomposition Products : Carbon Dioxide and Carbon Monoxide
- d. Hazardous Polymerization : None

VI. Health Hazards

At present there are no existing limit values set on exposure to wood cement boards. Machining or cutting can cause dust. Primary route or entry is inhalation of dust. As with any nuisance dust, Tectum dust can cause irritation to the eyes, nose, and throat. Current indications are that these irritations do not result in permanent damage. None of the ingredients are known to cause cancer.

VII. First Aid Procedures

a. Eye Contact : Flush with clean lukewarm (low pressure) for at least 15 minutes occasionally lifting eyelids.

b. Inhalation : Move to area free from risk of exposure.

c. Ingestion : Move to area free from risk of exposure.

VIII. Employee Protection Recommendations

a. Eye Protection : Eye goggles or safety glasses with shields recommended when handling, sawing, routing, etc.

b. Skin Protection : Protect from mechanical abrasion. Long-sleeve shirts and gloves recommended.

c. Respiratory Protection : Mechanically filtering dust masks (NIOSH Approved half face respirator) recommended when handling, sawing, routing, etc.

IX. Additional Information

a. Precautions to be taken in handling and storage

1. Store panels with adequate aisle ways to permit access to all areas.
2. Provide adequate blocking to maintain straight and plumb stacks.
3. Avoid direct contact with open flames or torches

b. Disposal of wood-cement boards

1. Do not allow dust or scrap to accumulate. Keep work areas clean and orderly.
2. Scrap disposal should be done according to good industrial practice and environmental protection regulations. A sanitary landfill should be used when possible.

c. For more detailed information of precautions for the proper handling and storage of Tectum products, contact the sales department, Tectum Inc., Newark, Ohio.

M 68 MARKETING BULLETIN

Cementitious Wood Fiber Roof Deck Panel Replacement

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

There have been several manufacturers of cementitious wood fiber roof decks over the years and several sizes and thicknesses have been made by the different manufacturers. Tectum Inc. can make most sizes and thicknesses required for replacement panels to those that have deteriorated or become damaged. In order to properly price and service this market, we need the following questions answered:

1. **Thickness**: Generally this is 1 1/2", 2", 2 1/2" or 3" in Tectum I. Be sure the measurement is taken on a sound piece of deck, not where deterioration has occurred or some fibers may have swollen and a true reading cannot be made.

2. **Plank or Tile**: Plank has T & G sides and tile is in Bulb Tees or Truss Tees. Some of the plank or tile may have a tongue and groove end as well. Plank may also be long span which has a channel in the joint. Two inch (2") and 2 1/2" have a 3/4" channel and 3" has a 1 1/2" channel. You would need to probe for this between the bevels.

3. **Width**: Many widths are out there and even a 1/2" difference in width makes a lot of difference in pricing and fitting into the system. On plank, measure from center of bevel to center of bevel. On tile, measure from center of bulb or truss tee to center of parallel tee, then measure face width of the tee as well.

4. **Length**: We are not limited to length up to 14'. For ease of handling and less cost, measure the joist spacing and you may need only replace a 4', 5' or 6' length panel. The end MUST fall over a joist.

5. **Color & Texture**: Color and texture of existing panels vary from project to project. Replacement panels may not be an exact match.

Tectum Inc. stands ready to furnish material as required. The more information we have the better we can serve the customer and the above information is imperative before we can even process the inquiry. To get all the necessary information up front and at once will save much time and money for all concerned.

Thickness_____ **Width**_____ **Length**_____

Edge Detail: Plank Tile (Circle One) **Number of Pieces:**_____

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TECTUM INC.
The Noise Control Solution

T 64 TECHNICAL BULLETIN

Specifications for Removing and Replacing Damaged Cementitious Roof Deck Panels

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Procedures

Step 1:

Determine the system:

a) Plank with T&G sides and self support between purlins.

b) Tile with support on sides with Bulb or Truss Tees. Check center to center of Bulb Tees and edge to edge. Tectum tiles must have 1/2" minimum bearing.

Step 2:

Accurately field measure panels to be replaced to nearest 1/16" in width and length to 1/4".

Step 3:

Determine thickness of substrate and insulation, if factory installed.

Step 4:

Determine the number of panels that do not meet the acceptance criteria of the designer or structural engineer.

Step 5:

Follow standard guidelines for protection of building contents and operations.

Step 6:

Remove damaged panels:

a) Plank - Cut multiple span panels over each purlin. Remove attachment mechanism. Panels must be removed in pairs to maintain integrity of tongue and grove.

b) Tile - Cut panels lengthwise in center, parallel to tees and remove. Clean grout from tees.

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Step 7:

Replace panels:

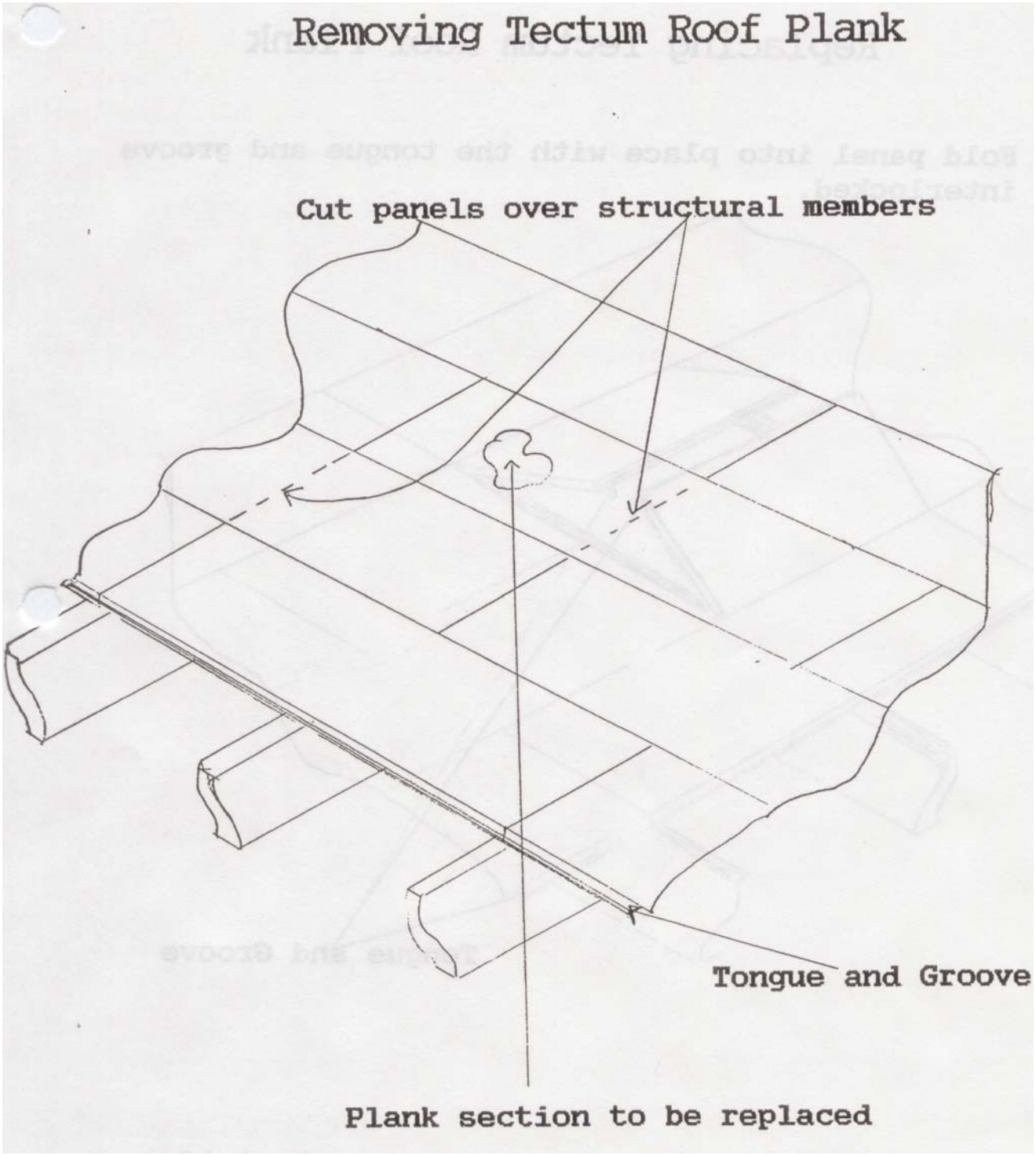
a) Plank - Replace panels in pairs. Place right panel in tongue and groove and left panel in tongue and groove and fold down to purlin. If channel is required, it must be included in the installation. Screw down replacement and adjacent panels with factory recommended screws and 2" washers.

b) Tile - insert panel and grout in place. Center tile on tees. Tile must have 1/2" bearing on each tee.

Step 8:

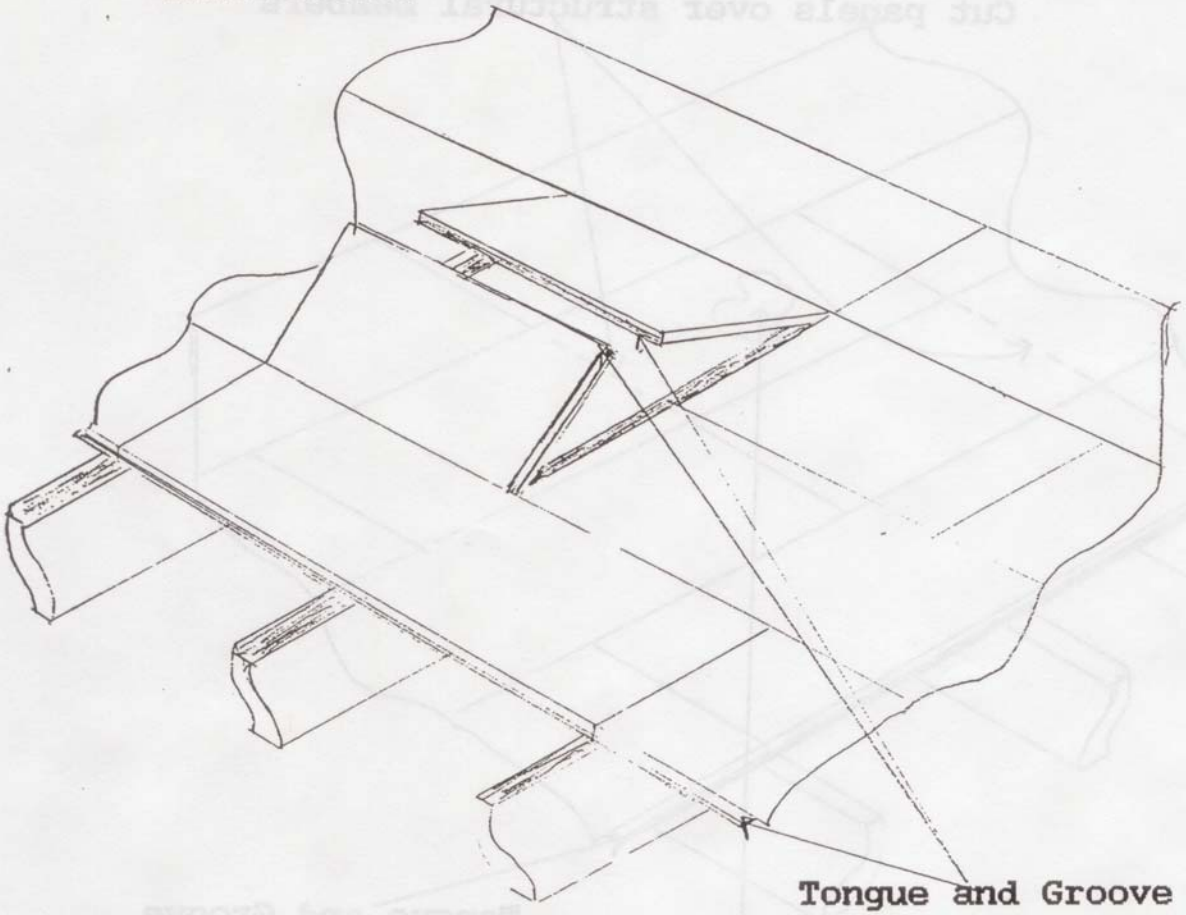
Install insulation as required and water proof repaired deck section by end of each work day.

Removing Tectum Roof Plank

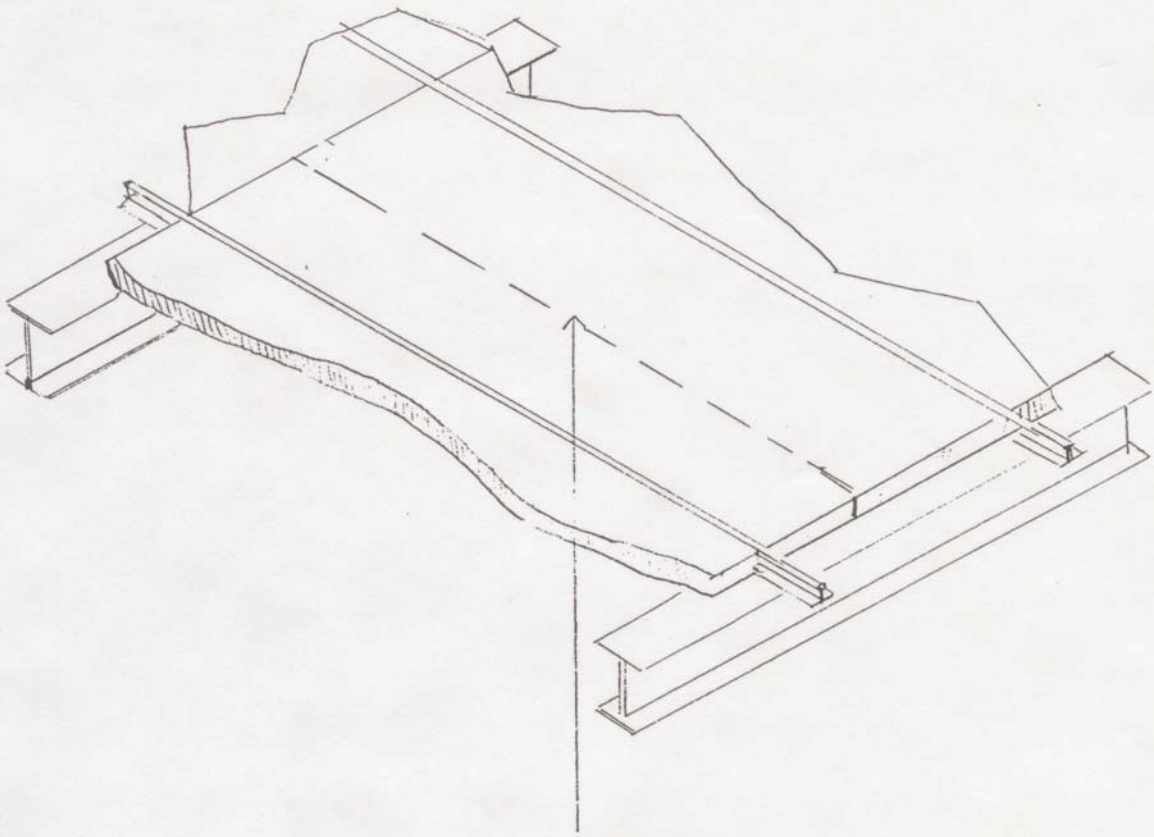


Replacing Tectum Roof Plank

Fold panel into place with the tongue and groove interlocked.



REMOVING TECTUM ROOF TILE



CUT PANEL PARALLEL TO TEES AND REMOVE

M 60 MARKETING BULLETIN

Tectum™ Roof Deck Restorer, Natural Touch-Up Paint

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Designed to cover Tectum roof deck that is stained or discolored. When used as directed, Tectum Roof Deck Restorer will extend the practical life of the roof deck by keeping it looking like new.

DIRECTIONS FOR USE

Read Cautions and Directions for use Carefully before using.

When spraying suspended or anchored Tectum Roof Deck, cover everything beneath/under area with cloth or newspaper. Tectum Roof Deck Restorer contains high amounts of solid materials and must be shaken well for proper blending of contents.

1. Surface area must be dry.
2. Shake can extremely well for 2 minutes after marble rattles. Shake occasionally while using.
3. Wear dust mask if available.
4. Hold can about 12 inches from surface and spray one light coat over discolored area. Allow dry time, then follow with another light coat, if necessary. Repeat until desired effect is achieved.
5. After spraying, turn can upsides down and spray until no product comes out of nozzle. Remove nozzle and hold under running warm water if clogged.

WARNING: FLAMMABLE VAPOR HARMFUL. Contains petroleum distillates and trichloroethylene. Do not inhale vapor. Use with adequate ventilation to keep vapors below 50ppm in air. Do not spray on or near heat source or toward any light fixture. CONTENTS UNDER PRESSURE. Store below 120 F. Exposure to temperature above 120 F may cause bursting. Do not puncture or incinerate container. Misuse by deliberately or inadvertently concentrating and inhaling vapors can be fatal. Use only as directed on label.

FIRST AID TREATMENT

IF SWALLOWED: DO NOT induce vomiting. Call a physician or medical facility at once. IF IN EYES: Flush with large amounts of water for 15 minutes. Call a physician. IF INHALED: Remove victim to fresh air if breathing is difficult, give oxygen. Call a physician immediately. IF ON SKIN: Wash skin with soap and warm water. Remove contaminated clothing and launder before re-use. Call a physician if irritation persists.

WARNING: This product contains a chemical known to the State of California to cause cancer.
DISPOSAL: Wrap empty container in paper and place in trash.

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TECTUM INC.

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Warranties

Warranties

MARKETING BULLETIN

M 48

Tectum™ III 15 Year Thermal Warranty

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum Inc. has received a fifteen year limited warranty from Dow Chemical U.S.A., an operating unit of The Dow Chemical Company (Dow) for STYROFOAM* Brand Insulation when used as the insulation in the Tectum III composite panels manufactured by Tectum Inc.

Therefore, Tectum Inc. hereby warrants that for a period of fifteen (15) years, commencing with the date on which the Tectum III subject to this warranty was manufactured (or purchased, if within 180 days of its manufacture), the insulation's actual thermal resistance will not vary by more than ten percent from an R-Value of 5.0 per inch. If the insulation is determined by sampling and tests (conducted as provided below) to not meet warranty value, Tectum Inc. will either deliver to the Owner ("Owner") of the building in which the Insulation and the Tectum III was initially installed a quantity of equivalent product to replace the non-performing Insulation. Total expense to the manufacturers of this warranty will be limited to the original purchase price of the insulation.

THE WARRANTY IS IN LIEU OF ALL OTHER GUARANTEES AND WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS, AND SHALL NOT BE EXTENDED OR ALTERED EXCEPT BY WRITTEN INSTRUMENT SIGNED BY TECTUM INC. THE OWNER. THERE ARE NOT WARRANTIES OR GUARANTEES WHICH EXTEND BETOND THE DESCRIPTION SET FORTH IN THE WARRANTY.

CONDITIONS: Tectum Inc.'s obligation under this warranty is applicable to Insulation manufactured after July 1, 1987 and will only take effect if:

1. The Owner notifies Tectum Inc. of any failure of the Insulation to perform as warranted herein in writing and within thirty days of the Owner's earliest notice, actual or constructive, of such failure; and:

2. The Tectum III was installed in strict accordance with all applicable specifications, recommendations and guidelines which were in effect at the time of such installation. This Warranty shall be void if, in Tectum Inc.'s judgment, the Insulation's performance has been impaired by either damage or alterations (lacking prior written approval) to the product.

EXCLUSIONS: Tectum Inc. does not warrant the compatibility of any other product (including but not limited to any roofing membrane or coating) with the Insulation, and does not assume any liability for any incidental or consequential damages, including (but not limited to) incremental heating, cooling or similar costs and any other harm to persons or property.

INSULATION TESTING: All sampling shall be conducted in accordance with sampling procedures prescribed by Tectum Inc., and samples of the Insulation shall only be taken in the presence of an authorized representative of Tectum Inc. Testing of Insulation samples shall be in accordance with ASTM Test Method C518-85, or the then closest Dow-approved effective equivalent thereof. Insulation samples shall be conditioned to equilibrium prior to testing. All samples and testing costs (including but not limited to costs of insulation covering removal and replacement) shall be at the Owner's sole expense.

* Trademark of The Dow Chemical Company

™ Trademark of Tectum Inc.

TECTUM INC.
The Noise Control Solution

Dow Building & Construction

15 YEAR LIMITED Thermal Warranty

Dow Building Materials. The Dow Chemical Company ("Dow") hereby warrants that for a period of fifteen years, commencing with the date of manufacture printed on the product, that the Insulation's actual thermal resistance for all the products listed below will not vary by more than ten percent from its published R value. If the insulation is determined by sampling and tests (conducted as provided below) to not meet warranty value, Dow will either deliver to the owner ("Owner") of the building on which the Insulation was initially installed a quantity of equivalent Dow product to replace the non-performing insulation or, at The Dow Chemical Company's sole discretion, refund to the Owner the original purchase price of the non-performing insulation. Total Dow expense for the life of this Warranty will be limited to the original purchase price of the Insulation.

THE WARRANTY IS IN LIEU OF ALL OTHER GUARANTEES AND WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND SHALL NOT BE EXTENDED OR ALTERED EXCEPT BY WRITTEN INSTRUMENT SIGNED BY DOW AND THE OWNER. THERE ARE NO WARRANTIES OR GUARANTEES WHICH EXTEND BEYOND THE DESCRIPTION SET FORTH IN THIS WARRANTY.

SAMPLE

Conditions. The Dow Chemical Company's obligations under this Warranty are applicable to product manufactured by Dow after August 28, 2003 and will only take effect if installed in strict accordance with all applicable Dow specifications, recommendations and guidelines which were in effect at the time of such installation. This Warranty shall be void if, in The Dow Chemical Company's judgment, the Insulation's performance has been impaired by either damage or alterations (lacking prior Dow written approval) to the Insulation.

Exclusions. Dow does not warrant the compatibility of any other product, including (but not limited to) any roofing membrane or coatings, with the Insulation, and does not assume any liability for any incidental, consequential, exemplary, special or punitive damages, including (but not limited to) incremental heating, cooling or similar costs and any other harm to persons or property.

Insulation Testing. All sampling shall be conducted in accordance with sampling procedures prescribed by Dow, and samples of the Insulation shall only be taken in the presence of an authorized Dow representative. Testing of Insulation samples shall be in accordance with ASTM Test Method C518-98 or C236-89, or the then closest Dow approved effective equivalent thereof. Insulation samples shall be conditioned to equilibrium prior to testing. All sampling and testing costs (including but not limited to costs of insulation covering removal and replacement) shall be at the Owner's sole expense.

Warranty Includes:

- **STYROFOAM* DURAMATE* Plus Insulation (R-4 and R-5)**
- **STYROFOAM* Residential Sheathing Insulation (R-3.2, R-4 and R-5)**
- **STYROFOAM* STUCCOMATE* Insulation**
- **STYROFOAM* Tongue & Groove Insulation**
- **STYROFOAM* Square Edge Insulation**
- **STYROFOAM* Scoreboard Insulation**
- **STYROFOAM* Residing Board Insulation**
- **STYROFOAM* DECKMATE* Insulation**
- **STYROFOAM* DECKMATE* Plus Insulation**
- **STYROFOAM* Tapered DECKMATE* Plus Insulation**
- **STYROFOAM* FREEZERMATE* Insulation**
- **STYROFOAM* Highload 40 Insulation**
- **STYROFOAM* Highload 60 Insulation**
- **STYROFOAM* Highload 100 Insulation**
- **STYROFOAM* CAVITYMATE* Insulation**
- **STYROFOAM* CAVITYMATE* Plus Insulation**
- **STYROFOAM* CAVITYMATE* SC Insulation**
- **STYROFOAM* PERIMATE* Insulation**
- **STYROFOAM* ROOFMATE* Insulation**
- **STYROFOAM* WALLMATE* Insulation**
- **STYROFOAM* Z MATE* Insulation**

Dow

*Trademark of The Dow Chemical Company

Form No. 179-00331-0404 XPRM/McKAY

MARKETING BULLETIN

M 63

Tectum™ E Roof Deck 20 Year Warranty for R-Values

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum E Roof Decks will carry a twenty year R-Value warranty for 100 percent of the EPS insulation core. The EPS insulation is warranted to maintain 100 percent of the minimum R-Value identified in ASTM C-578, Type I.

The warranty is in effect for a twenty year period following the date of the final inspection and acceptance of the roofing system. See the attached warranty certificate for the specific procedures and limitations.

The warranty for Tectum E Roof Decks reflect the stable R-Value of the EPS insulation which contains no CFC's and therefore show no reduction of R-Value over time.

This warranty will not be automatically issued for Tectum E Roof Deck projects. A warranty form must be completed and signed by both the company and the building owner before it becomes effective.

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TECTUM INC.
The Noise Control Solution

TECTUM INC.

TECTUM* "E" 20 YEAR
THERMAL WARRANTY FOR R-VALUES

WARRANTY NUMBER_____

WARRANTY QUARTER FROM_____**TO**_____

SECTION I

Tectum Inc., 105 South 6th Street, Newark, Ohio 43055 ("Tectum"), subject to the terms, conditions and limitations stated herein, warrants to:

_____

_____

SAMPLE

This Warranty applies only to EPS insulation produced entirely from ACC Dylite M77 and 33M resins and certified by MOLDER to meet the minimum standards identified in ASTM C578. MOLDER certifies that warranted insulation as described herein will be applied by only competent contractors using good construction practices on acceptable systems.

Tectum will repair, replace or refund money, at Tectum's option, up to but not exceeding the original purchase price of the defective material. The Warranty applies only to types I, VIII, II and IX of ASTM C578-85.

Tectum warrants the minimum R-values as stated in Section II of the Warranty. This Warranty shall commence upon date of the final inspection and acceptance of the System by the supplier and shall terminate after twenty (20) years from that date.

SECTION II

MINIMUM R-VALUE STANDARD

Tectum warrants that the EPS insulation will maintain 100 percent of the minimum R-values identified in ASTM C578. R-values shall be tested according to ASTM C518 procedures and shall meet the minimum stated R-values within reasonable limits of experimental error. Such tests will be conducted on a minimum of three 12” x 12" x 1" samples at 75° mean temperature with the results being averaged. The tests will be performed by an independent laboratory selected by Tectum.

Type I Expanded Polystyrene
minimum R-Value per inch at
75°F and at 40°F
3.6 and 4.0.

SECTION III

EXCEPTIONS AND LIMITATIONS

In addition to all other exceptions set forth herein, this Warranty shall not cover any failure of the EPS Insulation to meet the minimum R-value standard due to:

(i) Excessive heat beyond design considerations or fire;
(ii) The effect of any solvent on the EPS Insulation;
(iii) The effect of coal tar pitch on the EPS Insulation;
(iv) The effect of moisture resulting from improper installation, application or design of the Insulation System;
(v) The effect of moisture resulting from a malfunction or failure of any other components or construction;
(vi) The effect of building movement on the EPS Insulation;
(vii) The effect of plasticizer migration either into or out of the EPS Insulation;
(viii) The effect of ultraviolet attack on the EPS Insulation;
(ix) The dfect of pedestrian or equipment traffic or other compressive load on the EPS Insulation;
(x) The effect of all other external forces not under the control of Tectum

SECTION IV

ADDITIONAL TERMS, CONDITIONS AND LIMITATIONS

OWNER shall notify Tectum Inc. in writing at the address set forth in Section I of this Warranty within sixty (60) days after the Owner of a Warranted EPS System becomes or should have become aware of any EPS Insulation which does not meet the minimum R-value standard.

This Warranty shall not be enforceable against Tectum Inc., if in the judgement of Tectum Inc., any of the following shall occur:

(1) The EPS Insulation is damaged by any natural cause, including but not limited to: lightning, strong wind, hunicane, hail, tornado or earthquake.
(2) The EPS insulation is damaged by any act of negligence, any accident or any intentional or unintentional misuse.
(3) The EPS Insulation is damaged because metal work or other material not approved by CONTRACTOR and MOLDER is used in the Roofing System and causes loss of physical properties in the EPS Insulation.
(4) The EPS Insulation is damaged because, if after installation of the System by the Manufacturer's Authorized Applicator, there are any alterations or repairs made on or through the System, or if anything is placed upon or attached to the System without first obtaining written authorization from Contractor, Manufacturer and MOLDER.
(5) The EPS Insulation is damaged by any failure to use reasonable care in maintaining the Insulation System.
(6) The EPS Insulation is damaged because MOLDER or the Owner of the Warranted EPS System fails to comply with any of their obligations stated in this Warranty.

During the term of this Warranty, Tectum or its designated representative shall have free access to inspect the System during regular business hours.

Tectum will not be obligated under the terms of this Warranty until:

(i) The party contracting for services with the Manufacturer's Authorized EPS Contractor has paid in full all invoices and charges for Insulation System installation supplies and services due and owing; and
(ii) The Manufacturer's Authorized Insulation Applicator has paid in full all invoices and charges for EPS materials due and owing to the Insulation System material suppliers.

Originals or copies of such invoices and bills showing the cost of the System shall be given to Tectum along with any claims under this Warranty.

Tectum's failure at any time to enforce any terms or conditions stated herein shall not be construed to be a waiver of its right to enforce that term or condition.

THERE ARE NO WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PURPOSE, WHICH EXTEND BEYOND THE WARRANTY SET FORTH IN THIS WARRANTY AND TECTUM SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL LOSSES OR DAMAGES.

No representative of Tectum has authority to make any representations or promises except as stated in this Warranty.

SAMPLE

Please acknowledge your acceptance of the terms of this Warranty by signing the enclosed copy in the space indicated below and returning the copy of this Warranty to Tectum Inc.'s authorized representatives.

TECTUM INC.
P.O. Box 3002
NEWARK, OH 43058-3002

BY: _____
(Authorized Signature)

TITLE: _____

DATED: _____

OWNER OF BUILDING:

COMPANY: _____

BY: _____

TITLE: _____

DATED: _____

END USE APPLICATION: EPS used in composite panel construction identified as Tectum E by Tectum Inc.

T 66 TECHNICAL BULLETIN

Fully Adhered Single Ply Roofing Over Tectum™ Composite Roof Decks

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

A variety of waterproofing systems have been used over Tectum III, E, and NS roof decks. These composite decks are often used in low slope as well as steep slope applications. Single ply membrane roofing has been successfully installed both as mechanically fastened and fully adhered. The use of solvent-based adhesive systems is not recommended over Tectum composite decks. Single ply manufacturers have available non-solvent based systems for attachment of their roofing.

Studies have shown that the solvent in these adhesives can penetrate the OSB, which is the attachment surface of Tectum composite decks. If this happens, the solvent will attack the foam and the structural integrity of the panels will be compromised. An alternate method of attachment other than solvent-based adhesives must be used.

CAUTION: Do not use solvent-based adhesive over Tectum III, Tectum E, or Tectum NS roof decks for the attachment of roofing materials.

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TECTUM INC.
The Noise Control Solution

Steep Slope Technical Point

No: I0I-09

TO: Steep Slope Sales Team, GAF-Elk Contractors, GAF-Elk Distributors.

FROM: Contractor Services

DATE: 03/02/09

SUBJECT: *Acceptable Substrates For GAF-Elk Shingle Applications*

Why Is The Substrate So Important?	**A shingle roof substrate is like the "foundation" for your roofing system.** The substrate provides the smooth structural base on which asphalt shingles are installed. If the substrate is inferior, the integrity of the roofing system may be compromised.
What's Considered A "Standard Deck" For Shingles?	**Standard decks include:** ○ 3/8" Minimum APA labeled exterior grade plywood or OSB decking ○ Nominal 1" thick (min.) x 6" wide (max.) wood planking, with a maximum 1/8" spacing at the ends and sides for new installations, or ○ Nominal 1" thick (min.) x 6" wide (max.) wood planking, with a maximum ¼" spacing at the ends and sides for existing older installations using a double layer of underlayment for light weight shingles such as Sentinel®. ○ Wood planking, nominal 1" thick (min.) x 6" wide (max.) with spacing greater than ¼" at the ends and sides for existing older installations will require an additional layer of 3/8" minimum APA labeled exterior grade plywood or OSB decking.
Can Other Substrates Be Used Without Prior Approval?	**When properly installed and using the fasteners recommended by the deck manufacturer, the following substrates may be used:** • Loadmaster Shingle Deck (except Sentinel® and Timberline® 30 Shingles) • Tech Shield or equivalent Radiant Barrier Decking systems with vapor permeable, perforated foil backing • 2" Minimum Homasote (Homasote Co.) • 2" Minimum Thermasote (Homasote Co.) • 2" Minimum Span Rock Gypsum Plank (USG) – fasteners must have a minimum 40 lbs. of pullout • Vent-Top Thermacal (Cornell) • Vented-R (Atlas) • Vented Nail-Line (Apache) • Hunter Vented Nail Base • R-Control SIP Panel and Foam-Control Nail Base (AFM Corp. Licensed Mfr.) • Tectum III, Tectum E and Tectum NS (Tectum, Inc.) • Huber Zip Deck System – A waterproof underlayment such as Stormguard® must be used at eaves as required by code or for certain warranty considerations and additional underlayment may be needed on slopes less than 4:12 or on re-roofing projects. **Note:** GAF-Elk shingles are not approved for applications directly over any insulation or fiberboard.
What About Codes?	**Roof decks must meet local codes…** and approval from the local building department should be obtained to confirm the deck construction meets local code requirements.
Is The Substrate Or Workmanship Covered Under GAF-Elk's Warranty?	**No. The substrate must be installed in accordance with the deck manufacturer's specifications.** Roof deck installation instructions for specific deck types must be obtained from the respective manufacturer. GAF-Elk does not warrant the installation method, the performance of the decking or problems with the shingles caused by the deck or substrate.
Where Can I Get More Information?	**GAF-Elk Technical Services can assist you…** with these and other questions you may have regarding your new roof installation. GAF-Elk Technical Services can be contacted **at 800-ROOF-411** (800-766-3411). Also, ***the GAF-Elk website is a great resource*** for just about any question you may have or for additional information you may require. That site is at: www.gaf.com

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CertainTeed Corporation

Roofing Products Group
Technical Service Department
1400 Union Meeting Road
P. O. Box 1100
Blue Bell, PA 19422
1-800-345-1145
610-341-6212 FAX

March 11, 2009

Steven Udolph
Tectum Inc.
105 S. 6th St.
Newark, OH 43055

Dear Mr. Udolph,

We have reviewed the specifications for Tectum NS, Tectum E and Tectum III, and have concluded that these three Tectum decks are acceptable for CertainTeed shingle products.

Our standard warranty will be in force against manufacturing defects.

CertainTeed shall not have any liability or responsibility under the warranty for a) Defects or damage caused by materials used as a roofing base over which the shingles are applied, b) Damage to the shingles caused by settlement, distortion, deterioration, failure or cracking of the roof deck, or c) Defects or failure caused by application of the shingles not in adherence with the written instructions of CertainTeed. Furthermore, fastening and installation requirements for the roof deck, acceptability of insulation and determination of need for vapor retarders are the responsibility of the deck manufacturer and the deck system designer.

If you have any further questions or if we can be of any further assistance, please contact us.

Sincerely,

Chuck Eppley
Supervisor, Technical Services
Roofing Products Group

T 30 TECHNICAL BULLETIN

Attaching Shingles to Tectum™ Roof Deck

Rev. April 2006

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

Tectum I Roof Deck

Tectum Inc. does not recommend the attachment of shingles directly to Tectum I Roof Deck.

Overlay on Tectum I Roof Deck

Nailable sheathing can be attached over Tectum I roof deck. Attachment method must meet uplift requirements and prevent movement of the sheathing down the slope. Attachment through the deck to the structural supports is required. Shingles can be attached with nails appropriate for the applied sheathing.

Tectum III/E/NS Roof Deck

Tectum composite panels (Tectum III, E, and NS) use a code-recognized sheathing (7/16" OSB) as the top surface. Standard roofing nails are used for attachment of shingles to these panels. No additional sheathing is required.

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TECTUM INC.
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TECTUM INC.

The Noise Control Solution

Glossary of Terms

M 86 MARKETING BULLETIN

Glossary of Acoustical Terms

February 2009

TECTUM Inc. • P.O. Box 3002 • Newark, OH 43058 • www.tectum.com • 1-888-977-9691

• **ASTM International:** ASTM International is one of the largest voluntary standards development organizations in the world-a trusted source for technical standards for materials, products, systems, and services. Known for their high technical quality and market relevancy, ASTM International standards have an important role in the information infrastructure that guides design, manufacturing and trade in the global economy.

• **Acoustical Treatment:** The use of acoustical absorbents, acoustical isolation or any changes or additions to the structure to correct acoustical faults or improve the acoustical environment.

• **Acoustics:** The science of sound, including its production, transmission and effects.

• **Air-Borne Sound:** Sound transmitted through air as a medium rather than through solids or the structure of a building.

• **Ambient or Background Noise:** Total of all noise in a system or situation, independent of the presence of the desired signal. Ambient noise may come from the building's mechanical equipment, outside traffic, activities in adjacent room or other sources not directly related to the desired signal.

• **Articulation Class (AC):** A single number rating system used for comparing building system: and sub-systems for speech privacy purposes. The rating is designed to correlate with transmitted speech intelligence between office spaces.

• **Attenuation:** Reducing the intensity of a sound signal, the lowering of sound level. The efficiency of a material to resist the transmission of airborne sound measured in decibels.

• **Background Level:** The normal sound level present in the space above which speech, music or similar specific wanted sound must be presented.

• **Bevel:** A sloped or canted surface contiguous with a. vertical or horizontal surface.

• **Bow:** The maximum component of deviation in the vertical plane or a main runner, cross runner or wall molding where the centroidal axis of these structural components has been permanently deformed from end to end into the shape of a simple regular curve during the manufacturing process.

• **Camber:** The amount of upward bow rolled into a suspension member to offset deflection under the load of lights, acoustical panels, air diffuser, etc.

• **CAC (Ceiling Attenuation Class):** A measure of reduction in sound transmission via plenum path between two rooms determined in accordance with ASTM EI414 and plotted decibel reduction (transmission loss) obtained at 16 frequencies against a stand reflectance curve, in accordance with ASTM E413.

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• **Diffuser:** A circular, square, rectangular or slot outlet located in the ceiling of a room through which supply air is normally discharged on a plane approximately parallel to the ceiling.

• **Ceiling Suspension System:** Entire network or grid of structural components that provides support for acoustical ceiling tile, acoustical ceiling panels, lighting fixtures and air diffusers.

• **CISCA:** Ceilings and Interior Construction Association

• **Coffer:** A recessed panel or dome in the ceiling.

• **Cycle:** The entire sequence of movement of a particle (during periodic motion) from rest to one extreme of displacement, back through rest position to the opposite extreme of displacement and back to rest position.

• **Decibel:** Unit for measuring sound intensity. A division of a uniform scale based upon ten (10) times the common logarithm of the ratio of two like quantities proportioned to power or energy. Zero on the decibel scale corresponds to a standardized reference sound power of 10 - 12 watts.

• The chart below demonstrates how sound pressure levels compare with intensity expressed in units:

100,000,000,000,000	140
10,000,000,000,000	130
1,000,000,000,000	120
100,000,000,000	110
10,000,000,000	100
1,000,000,000	90
100,000,000	80
10,000,000	70
1,000,000	60
100,000	50
10,000	40
1,000	30
100	20
10	10
0	0

• **Deflection:** The sag or bowing down of a member simply supported caused by superimposed loads (i.e., lights, acoustical tile). Deflection is limited to L/360 of the span, per ASTM C-635.

• **Design Loads:** Engineering criteria used to establish or meet safety factors as set forth by building codes.

• **Diffraction:** Roughly, the ability of a sound wave to "flow" around an obstruction or through openings with little loss of energy.

• **Diffusion:** Dispersion of sound within a space so that there is uniform energy density throughout the space.

• **Dispersion:** The scattering of distribution of sound in a space.

• **Distortion:** Any change in the transmitted sound which alters the character of the energy-frequency distribution within the signal so that the sound being received is not a faithful replica of the source sound.

• **Distribution:** The pattern of sound intensity levels within a space; also, the patterns of sound dispersion as the sound travels within the space.

• **Echo:** Any reflected sound which is loud enough and received late enough to be heard as distinct from the source.

• **Exposed Grid:** A suspension system which, after installation of all elements of the ceiling, leaves the main and cross runners exposed when viewed from below.

• **Fire Rating:** Those ratings of a tested assembly which are exposed in hours and applied to floors, roofs, beams, columns and walls.

• **Flutter:** A multiple echo set-up between parallel, reflecting surfaces.

• **Frequency:** The number of times per second that the sound pressure alternates above and below the ambient atmospheric pressure. Each complete alternation is called a cycle and frequency is expressed in Hertz (Hz) or cycles per second (CPS).

• **Grid Members:** Main and cross runners which interlock to support the acoustical, lighting, air diffusers, etc., of the ceiling system, with the secondary function of having aesthetic acceptance when viewed from below. These members may be made from steel or aluminum in various configurations.

• **Heating Degree Days:** Heating degree days are an index of "cold" useful in energy consumption calculations. The number of heating degree days is calculated for each day by subtracting the day's mean temperature from a base temperature (usually, 65F). The daily totals are accumulated for each month and the monthly totals are accumulated for the "heating year" from July through June. The amount of energy consumed for heating is closely correlated to these heating degree days.

• **Horizontal Plane:** The plane through the centroidal axis of the member parallel to the plane of the ceiling.

• **Hz (Hertz):** The unit designation for frequency of a sound wave, formerly cycles per second (CPS) - one cycle per second.

• **Intensity:** The rate of sound energy transmitted in a specific direction through a unit area.

• **L/360:** A standard used to determine the maximum vertical deflection allowed the horizontal member (supported) for acceptance. "L" is the distance between hanger (support) points in inches. The "360" is a pure number without quantity. Therefore, the distances in inches divided by 360 gives a result in inches of maximum allowable vertical deflection.

• **Leaks, Sound:** Any opening which permits airborne sound transmission.

• **LR (Light Reflectance):** The number designation indicating the percentage of light reflected from a ceiling's surface, in accordance with ASTM E1477.

• **Linear Air Diffusers:** They are in integral part of the ceiling system incorporating the air diffuser element with the orifice face at the ceiling line, mechanically locked into the grid system.

• **Loudness:** The effect on the hearing apparatus of varying sound pressures and intensities.

• **Background Noise Criteria:** NC- levels usually refer to steady, continual background levels within a space or neighborhood, as opposed to specific noises or intermittent activities occurring there. The level of a performing orchestra or hand, for example, normally is not expressed in this way, hut in a dBa or Sound Pressure Levels in various frequency hands. All numbers listed may vary as much as +5 points in specific areas.

• **Loudness Level:** The sound pressure level in decibels (relative to 0.0002 microbar) of a simple tone of 1,000 c.p.s. frequency.

• **Masking:** The increase in threshold of audibility of a sound necessary to permit its being heard in the presence of another sound.

• **Mass:** The quality of matter which permits it to resist acceleration; the quality of matter which produces the effect of inertia.

• **Maximum Allowable Load:** The weight placed on the suspension system which if exceeded will cause a greater deflection, in the main or cross runner, than is allowable for safety and to meet ASTM specifications. This is frequently defined as L/360.

• **Moment of Inertia:** Stated in inches, an engineering computation of effectiveness of a grid member to resist deflection of that member.

• **Mounting, Resilient:** Any mounting, attachment system or apparatus which permits room surfaces or machinery to vibrate normally without transmitting all of the energy of vibration to the structure.

• **Noise:** Unwanted sound.

• **Noise Criterion Curves (NC Curves):** Series of criterion curves that portray sound pressure levels for background noises which generally should not be exceeded, or should be maintained, in various human environments.

• **Noise Reduction:** The reduction level of unwanted sounds by any of several means.

• **NRC (Noise Reduction Coefficient):** A measure of sound absorbed by a material. The single number designation representing the average of the sound absorption coefficients of a material at 250 Hz, 1000 Hz and 2000 Hz rounded to the nearest 0.05 when tested in accordance with ASTM C-423.

• **Octave Bands:** An octave is the interval between two sounds having basic frequency ratio of two.

• **Pitch:** The physical response to frequency. The subjective response of the hearing mechanism to changing frequency.

• **Resonance:** The natural, sympathetic vibration of a material at a particular frequency resulting for excitation by a vibration of that frequency.

• **Reverberation:** The prolongation of sound within a space after the source has stopped.

• **Sabin:** One square foot of a surface having perfect absorption, an absorption coefficient of 1.00.

• **Sabin Formula:** Relates room volume and total acoustical absorption to reverberation time:

T = .05V/A T = Reverberation Time in Seconds
V = Room Volume in Cubic Feet
A = Total Absorption in Sabin

• **Self-Drilling Fastener:** A fastener which combines the functions of drilling and tapping.

• **Self-Tapping Fastener:** A fastener which taps its own threads in a pre-drilled hole.

• **Sound:** A vibration in a medium; usually in the frequency range capable of producing the sensation of hearing.

• **Sound Absorption Coefficient:** Fraction of incident sound energy absorbed or otherwise not reflected by a surface.

• **Sound Pressure:** The average deviation in atmospheric pressure above or below the static value due to a sound wave (analogous to alternating voltage).

• **Sound Transmission Classification (STC):** A single number value describing the ability of a system of materials to isolate one enclosed space from another acoustically. A rating method (per ASTM designation E413) based on the requirement that the value of transmission loss at any of the 16 measuring frequencies does not fall below the specified limits of the TL frequency contour.

• **Span:** The distance between two supporting members.

• **Spectrum:** Description of the resolution of a sound wave into components, each of different frequency and (usually) different amplitude and phase.

• **Specular Reflection Loss:** The attenuation of sound in db, as it is reflected from a ceiling, wall, etc. at a specific angle.

• **Speed of Sound:** 344 meters per second or 1,128 feet per second at 25 degrees C or 77 degrees F. The speed of sound is an important consideration in large room acoustics where the relative timing of sound fronts (direct and reflected) has a strong bearing on sound quality.

• **Structure-Borne Sound:** Sound energy transmitted through the solid media of the building structure.

• **Transmission:** The propagation of a vibration through various media.

• **Transmission Loss:** A measure of the decrease is sound level as it passes through a structure. Variable with the frequency of the sound.

• **Unwanted Sound:** Noise: interfering sound, whatever its source or nature.

• **Vertical Plane:** The plane through the centroidal axis of the member perpendicular to the plane of the ceiling.

• **Wanted Sound:** The audible signals which communicate necessary and desirable information or stimuli to the listener.

• **Wave Length:** The distance a sound wave travels during each complete vibration or cycle.

• **Wave, Sound:** A disturbance which is propagated in a medium in such a manner that at any point in the medium the displacement is a function of the time.

MARKETING BULLETIN

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GREEN GLOSSARY

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The following is a green glossary of industry used terms and phrases:

• **CARB Compliant:** Meets the standards of the California Air Resources Board. CARB found that one of the major sources of formaldehyde exposure is through the inhalation of resin emissions from composite wood products.

• **Carbon Footprint:** A measure of the resources used for each person or organization based on the land required for food, clothes and sustenance. Although not precise, this is a common metric in environmental and sustainability reports. Also called Ecological Footprint.

• **CFPA:** Chlorine Free Products Association — an independent not-for-profit accreditation and standard setting organization that promotes sustainable manufacturing practices, advanced technologies free of chlorine chemistry and consumer education on alternatives, and helps develop world markets for sustainably produced third-party certified products and services. See Totally Chlorine Free (TCF) and Processed Chlorine Free (PCF) below and www.chlorinefreeproducts.org.

• **Chlorine:** A chemical element commonly used to bleach fibers, although this practice has been mostly eliminated. Virgin fibers generally contain no elemental chlorine (See ECF below) or are bleached using only non-chlorine compounds such as hydrogen peroxide, oxygen or ozone (TCF). Recycled fibers are generally PCF, meaning they were put back into the paper without the use of any chlorine or its compounds.

• **Conservation:** The preservation and responsible use of our natural resources to ensure they endure.

• **Crop Residue:** An alternative source of fiber for paper making. Bamboo, kenaf and hemp are often used fibers in crop residue. A clean and renewable source of cellulose.

• **CRS:** The Center for Resource Solutions—a national nonprofit working to build a robust renewable energy market by increasing the demand and supply of renewable resources. CRS administers the Green-e Renewable Electricity Certification program, which certifies renewable power products sold by marketers, utilities and energy service providers in wholesale and retail markets. See www.resource-solutions.org.

•**ECF:** Elemental Chlorine Free pulp is bleached without the use of elemental chlorine. Generally this is virgin fiber bleached with chlorine dioxide.

• **Environmental Impact:** A measure of the total impact of an activity on the environment. This includes production, transportation and energy.

• **OFEE:** The Office of the Federal Environmental Executive — created in 2003 to assist the federal government with the application of sustainable environmental practices.

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• **EPA:** The U.S. Environmental Protection Agency, which publishes purchasing guidelines for minimum recycled product content. Many state and local governments and businesses have voluntarily adopted these guidelines. EPA handles most of the responsibility for environmental guidance, direction, monitoring and enforcement in the United States. See www.epa.gov.

• **Formaldehyde:** A cross-linking agent that can have detrimental effects on health. Many environmental organizations and governments are in the process of eliminating formaldehyde from the home and workplace.

• **FSC:** The Forest Stewardship Council—an independent, international, environmentally and socially oriented forest certification organization. It trains, accredits and monitors third-party certifiers around the world and works to establish international forest management standards. Visit www.fsc.org and rainforest-alliance.org.

• **GREENGUARD Certification Standards for Low Emitting Products:** Performance based standards set by the GREENGUARD Environmental Institute (GEI) to define goods with low chemical and particle emissions for use indoors. These goods include primarily building materials, interior furnishings, furniture, cleaning and maintenance products, electronic equipment and personal care products. The standard establishes certification procedures including test methods, allowable emissions levels, product sample collection and handling, testing type and frequency, and program application processes and acceptance.

• **Green-e Renewable Electricity Certification Program:** The nation's leading independent certification and verification program for renewable energy products. CRS established the Green-e Program in 1997 to help individuals and businesses make responsible choices about the power they purchase. Visit www.green-e.org for more information.

• **Green Power:** Electricity produced by renewable resources that have little to no impact on the environment and produce no net greenhouse gas emissions in generating the electricity. These renewable sources include but are not limited to wind power, solar power, low impact hydropower and biomass.

• **Green Seal Certification:** Signifies recycled papers are made with a minimum of 30 percent post-consumer recycled fiber and that mill processes, including packaging, are environmentally preferable. Green Seal is an independent non-profit organization dedicated to safeguarding the environment and transforming the marketplace by promoting the manufacture, purchase and use of environmentally responsible products and services. See www.greenseal.org.

• **LEED:** The Leadership in Energy and Environmental Design Green Building Rating System. Developed by the U.S. Green Building Council (USGBC), it is a nationally accepted benchmark for the design, construction, and operation of high-performance green buildings. LEED recognizes performance in sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality.

• **No Added Formaldehyde:** Products made without formaldehyde. As formaldehyde exists in detectable quantities in almost all of nature, few goods are formaldehyde free. Instead, wood, paper and other natural products are described as being made without the use of formaldehyde.

• **PCF:** Manufactured free of chlorine chemistry and from sustainable raw materials.

• **Recycled:** Made at least in part from recovered fibers. There is no universally acceptable definition so requirements vary by specific circumstances. For example, EPA requires that recycled papers purchased by federal agencies contain post-consumer content. However, the Federal Trade Commission (FTC) does not require post-consumer content in papers labeled recycled. Most U.S. governments and companies uphold the EPA standards, but there is no requirement.

It is very important to note that Tectum products are listed in the GreenSpec Directory** published by Building Green from the editors of Environmental Building News. Tectum Roof Deck is noted on page 69, section 3511 and Tectum Interior products are listed on page 230, section 9512.

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