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July 20, 2021

Mr. Chris Scoville  
Trex Company, Inc ("Customer")  
160 Exeter Drive  
Winchester, VA 22603-8614

**RE: Snow and Live Load Span Analysis for Enhance Basics, Naturals Composite, Decking Transcend, and Select Composite Decking**

Dear Mr. Scoville:

Pursuant to your request, Architectural Testing, Inc., an Intertek company ("Intertek-ATI"), has analyzed test data for the above referenced deck product for the purpose of determining the allowable span rating based on live loads of 100 psf and 200 psf and for snow loads of 250 psf, 300 psf and 350 psf, and 400 psf. The following Intertek-ATI reports were used to perform the analysis:

Product	Span (in)	Referenced Projects	
		Flexural	End Use Adjustment Factors
<b><i>Enhance Basics and Naturals</i></b>	16	J0314.01-119-19	J0314.01-119-19
<b><i>Transcend 1x6</i></b>	16	I3429.01-119-19	F0855.01-119-19
<b><i>Transcend 2x6</i></b>	16 and 24	I3429.01-119-19	F0855.01-119-19
<b><i>Select 1x6</i></b>	16	E5777.01-119-19	E5777.01-119-19
<b><i>Select 2x6</i></b>	16 and 24	I3429.01-119-19	E5777.01-119-19

The calculation methods of ICC-ES™ AC174 *Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails)* were used with the following exceptions:

- For snow load analysis, The End Use Adjustment Factors for high temperature were not included, since the snow loads would not exist concurrent with high temperature.
- Duration of load and creep effects were not addressed in these analyses.
- Snow and Live load spans greater than the products' span / load rating are not valid for construction purposes and are presented for information purposes only.
- Calculations for span tables is based on the lesser of a factory of safety of 2.5 for the average test results and 2.1 for the minimum test results per ICC-ES AC174.
- Calculations for the span are based on a deflection limit of L/180 per ICC-ES AC174.

Span at Snow and Live Distributed Loads							
Product	Test Span	Live Load		Snow Load			
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Enhance Basics and Naturals	16"	16"	16"	16"	16"	16"	16"
Transcend 1x6	16	20"	16"	16"	16"	16"	16"
Transcend 2x6	16/24	24"	20"	20"	20"	20"	20"
Select 1x6	16	16"	16"	16"	16"	16"	16"
Select 2x6	16/24	24"	20"	24"	20"	20"	20"

This letter of results neither constitutes certification of these products nor expresses an opinion or endorsement by this laboratory; it is the exclusive property of the client so named herein and relates only to the reported specimens. This letter of results is complete only when all attachments listed are included. This letter of results may not be reproduced, except in full, without the written approval of Intertek-ATI.

For INTERTEK-ATI:

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Daniel C. Culbert, P.E.  
Engineer Team Leader

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Adam R. Kunkel

cc: J9170.01-122-34  
i3429.02-122-34  
i3429.05-122-34

Attachments (pages): This letter of results is complete only when all attachments listed are included  
Snow Load Span Calculations (10 pages)

**Trex Decking - Enhance Basics and Naturals Decking****Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads**

The following deck board snow load span calculations are based on calculation methods of ICC-ES AC 174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) and flexural test data from Intertek-ATI Report No. J0314.01-119-19. With the exclusion of high temperature adjustment factors, snow load overall end-use adjustment factors for strength and stiffness were 1.00 and 1.00 respectively and live load overall end-use adjustment factors for strength and stiffness were 0.67 and 0.56 respectively (see Intertek-ATI Report No. J0314.01-119-19) Duration of load and creep effects have not been addressed in this analysis

Flexural test loading was third point, the desired loading is uniform

Equivalent Uniform Load using Equivalent Bending Moment and Allowable Load:

Reference AC174, Section 4.3.3 For Criteria

Average Ultimate Test Load = 730 lb (Fernely)

$$730 / 2.5 = 292 \text{ lb allowable load}$$

5% Nonparametric ultimate test load = 706 lb (Fernely)

$$706 / 2.1 = 336 \text{ lb allowable load} > 292 \text{ lb, allowable load from avg governs}$$

For:  $P_t$  = allowable snow load from test x Strength Adj Factor = 292 lb x 1.00 = 292 lb

$P_t$  = allowable live load from test x Strength Adj Factor = 292 lb x 0.67 = 196 lb

$L_t$  = test span = 16.0 in

$P_u$  = total uniformly distributed load (lb) =  $L_u \times w \times W / 144$

$L_u$  = uniform load span (in) {to be determined}

$w$  = uniform load (psf)

$W$  = tributary board width = 5.50" + 0.13" gap = 5.625 in

For a worse case single span condition,

$$M(\text{uniform}) = \frac{P_u \times L_u}{8} \qquad M(\text{3rd pt}) = \frac{P_t \times L_t}{6}$$

$$\frac{P_u \times L_u}{8} = \frac{P_t \times L_t}{6} \therefore L_u = \frac{8 \times P_t \times L_t}{6 \times L_u} = \text{Sub for } P_u, L_u = \frac{4 \times P_t \times L_t \times 144}{3 \times L_u \times w \times W}$$

$$\text{Combinning } L_u\text{'s: } L_u = \sqrt{\frac{192 \times P_t \times L_t}{w \times W}}$$

L For 100 psf:  $L_u = (192 \times 292 \times 16 / 100 / 5.625)^{(1/2)} = 39.9 \text{ in}$

L For 200 psf:  $L_u = (192 \times 292 \times 16 / 200 / 5.625)^{(1/2)} = 28.2 \text{ in}$

S For 250 psf:  $L_u = (192 \times 292 \times 16 / 250 / 5.625)^{(1/2)} = 25.3 \text{ in}$

S For 300 psf:  $L_u = (192 \times 292 \times 16 / 300 / 5.625)^{(1/2)} = 23.1 \text{ in}$

S For 350 psf:  $L_u = (192 \times 292 \times 16 / 350 / 5.625)^{(1/2)} = 21.3 \text{ in}$

S For 400 psf:  $L_u = (192 \times 292 \times 16 / 400 / 5.625)^{(1/2)} = 20.0 \text{ in}$

**Trex Decking - Enhance Basics and Naturals Decking****Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads**

Equivalent Uniform Load using Equivalent Deflection at L/180

Reference AC174, Section 4.1 and ASTM D 7032 Section 5.3 For Criteria

Test Load at L/180 deflection: 16.0 in / 180 = 0.089 in

Average Ultimate Test Load = 190 lb (Winchester)

Snow Stiffness Adjustment Factor = 1.00

Live Stiffness Adjustment Factor = 0.56

W (adjusted snow) = 190 lb x 1.00 = 190 lb

W (adjusted live) = 190 lb x 0.56 = 106 lb

For a worse case single span condition,

$$\Delta(\text{uniform}) = \frac{5 \times P_u \times L_u^3}{384 \times EI} \quad \Delta(\text{3rd pt}) = \frac{23 \times P_t \times L_t^3}{1296 \times EI}$$

$$\frac{5 \times P_u \times L_u^3}{384 \times EI} = \frac{23 \times P_t \times L_t^3}{1296 \times EI} \therefore L_u^3 = \frac{384 \times 23 \times P_t \times L_t^3}{5 \times 1296 \times P_u}$$

$$\text{Substiute for } P_u, L_u^3 = \frac{8832 \times P_t \times L_t^3 \times 144}{6480 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt[4]{\frac{2944 \times P_t \times L_t^3}{15 \times w \times W}}$$

L	For 100 psf:	$L_u = (2944 \times 106 \times 16^3 / 15 / 100 / 5.625)^{(1/2)} = 19.7$ in
L	For 200 psf:	$L_u = (2944 \times 106 \times 16^3 / 15 / 200 / 5.625)^{(1/2)} = 16.6$ in
S	For 250 psf:	$L_u = (2944 \times 190 \times 16^3 / 15 / 250 / 5.625)^{(1/2)} = 18.2$ in
S	For 300 psf:	$L_u = (2944 \times 190 \times 16^3 / 15 / 300 / 5.625)^{(1/2)} = 17.3$ in
S	For 350 psf:	$L_u = (2944 \times 190 \times 16^3 / 15 / 350 / 5.625)^{(1/2)} = 16.7$ in
S	For 400 psf:	$L_u = (2944 \times 190 \times 16^3 / 15 / 400 / 5.625)^{(1/2)} = 16.1$ in

**Summary:**

Deck Product	Criterion	Allowable Span (in) due to Snow					
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Enhance Basics and Naturals	Stress	39.9 in	28.2 in	25.3 in	23.1 in	21.3 in	20.0 in
	Defl.	19.7 in	16.6 in	18.2 in	17.3 in	16.7 in	16.1 in
	<b>Limiting</b>	<b>19.7 in</b>	<b>16.6 in</b>	<b>18.2 in</b>	<b>17.3 in</b>	<b>16.7 in</b>	<b>16.1 in</b>



### Trex Decking - Contour Decking

#### Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads

The following deck board snow load span calculations are based on calculation methods of ICC-ES AC 174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) and flexural test data from Intertek-ATI Report No. i13429.01-119-19. With the exclusion of high temperature adjustment factors, snow load overall end-use adjustment factors for strength and stiffness were 1.00 and 1.00 respectively and live load overall end-use adjustment factors for strength and stiffness were 0.67 and 0.53 respectively (see Intertek-ATI Report No. D1815.01-119-19) Duration of load and creep effects have not been addressed in this analysis

Flexural test loading was third point, the desired loading is uniform

Equivalent Uniform Load using Equivalent Bending Moment and Allowable Load:

Reference AC174, Section 4.3.3 For Criteria

Average Ultimate Test Load = 939 lb (Winchester)

$$939 / 2.5 = 376 \text{ lb allowable load}$$

5% Nonparametric ultimate test load = 857 lb (Winchester)

$$857 / 2.1 = 408 \text{ lb allowable load} > 376 \text{ lb, allowable load from avg governs}$$

For:  $P_t$  = allowable snow load from test x Strength Adj Factor = 376 lb x 1.00 = 376 lb

$P_t$  = allowable live load from test x Strength Adj Factor = 376 lb x 0.67 = 252 lb

$L_t$  = test span = 16.0 in

$P_u$  = total uniformly distributed load (lb) =  $L_u \times w \times W / 144$

$L_u$  = uniform load span (in) {to be determined}

$w$  = uniform load (psf)

$W$  = tributary board width = 5.50" + 0.13" gap = 5.625 in

For a worse case single span condition,

$$M(\text{uniform}) = \frac{P_u \times L_u}{8} \qquad M(\text{3rd pt}) = \frac{P_t \times L_t}{6}$$

$$\frac{P_u \times L_u}{8} = \frac{P_t \times L_t}{6} \therefore L_u = \frac{8 \times P_t \times L_t}{6 \times L_u} = \text{Sub for } P_u, L_u = \frac{4 \times P_t \times L_t \times 144}{3 \times L_u \times w \times W}$$

Combining  $L_u$ 's: 
$$L_u = \sqrt{\frac{192 \times P_t \times L_t}{w \times W}}$$

L For 100 psf:  $L_u = (192 \times 252 \times 16 / 100 / 5.625)^{(1/2)} = 37.1 \text{ in}$

L For 200 psf:  $L_u = (192 \times 252 \times 16 / 200 / 5.625)^{(1/2)} = 26.2 \text{ in}$

S For 250 psf:  $L_u = (192 \times 376 \times 16 / 250 / 5.625)^{(1/2)} = 28.7 \text{ in}$

S For 300 psf:  $L_u = (192 \times 376 \times 16 / 300 / 5.625)^{(1/2)} = 26.2 \text{ in}$

S For 350 psf:  $L_u = (192 \times 376 \times 16 / 350 / 5.625)^{(1/2)} = 24.2 \text{ in}$

S For 400 psf:  $L_u = (192 \times 376 \times 16 / 400 / 5.625)^{(1/2)} = 22.7 \text{ in}$



### Trex Decking - Contour Decking

#### Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads

Equivalent Uniform Load using Equivalent Deflection at L/180

Reference AC174, Section 4.1 and ASTM D 7032 Section 5.3 For Criteria

Test Load at L/180 deflection: 16.0 in / 180 = 0.089 in

Average Ultimate Test Load = 184 lb (Winchester)

Snow Stiffness Adjustment Factor = 1.00

Live Stiffness Adjustment Factor = 0.53

W (adjusted snow) = 184 lb x 1.00 = 184 lb

W (adjusted live) = 184 lb x 0.53 = 98 lb

For a worse case single span condition,

$$\Delta(\text{uniform}) = \frac{5 \times P_u \times L_u^3}{384 \times EI} \quad \Delta(\text{3rd pt}) = \frac{23 \times P_t \times L_t^3}{1296 \times EI}$$

$$\frac{5 \times P_u \times L_u^3}{384 \times EI} = \frac{23 \times P_t \times L_t^3}{1296 \times EI} \therefore L_u^3 = \frac{384 \times 23 \times P_t \times L_t^3}{5 \times 1296 \times P_u}$$

$$\text{Substiute for } P_u, L_u^3 = \frac{8832 \times P_t \times L_t^3 \times 144}{6480 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt[4]{\frac{2944 \times P_t \times L_t^3}{15 \times w \times W}}$$

- L For 100 psf:  $L_u = (2944 \times 98 \times 16^3 / 15 / 100 / 5.625)^{(1/2)} = 19.3$  in
- L For 200 psf:  $L_u = (2944 \times 98 \times 16^3 / 15 / 200 / 5.625)^{(1/2)} = 16.3$  in
- S For 250 psf:  $L_u = (2944 \times 184 \times 16^3 / 15 / 250 / 5.625)^{(1/2)} = 18.0$  in
- S For 300 psf:  $L_u = (2944 \times 184 \times 16^3 / 15 / 300 / 5.625)^{(1/2)} = 17.2$  in
- S For 350 psf:  $L_u = (2944 \times 184 \times 16^3 / 15 / 350 / 5.625)^{(1/2)} = 16.6$  in
- S For 400 psf:  $L_u = (2944 \times 184 \times 16^3 / 15 / 400 / 5.625)^{(1/2)} = 16.0$  in

#### Summary:

Deck Product	Criterion	Allowable Span (in) due to Snow					
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Contour	Stress	37.1 in	26.2 in	28.7 in	26.2 in	24.2 in	22.7 in
	Defl.	19.3 in	16.3 in	18.0 in	17.2 in	16.6 in	16.0 in
	Limiting	<b>19.3 in</b>	<b>16.3 in</b>	<b>18.0 in</b>	<b>17.2 in</b>	<b>16.6 in</b>	<b>16.0 in</b>



## Trex Decking - Select 2x6 Decking

## Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads

The following deck board snow load span calculations are based on calculation methods of ICC-ES AC 174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) and flexural test data from Intertek-ATI Report No. i13429.01-119-19. With the exclusion of high temperature adjustment factors, snow load overall end-use adjustment factors for strength and stiffness were 1.00 and 1.00 respectively and live load overall end-use adjustment factors for strength and stiffness were 0.67 and 0.56 respectively (see Intertek-ATI Report No. E577.01-119-19) Duration of load and creep effects have not been addressed in this analysis

Flexural test loading was third point, the desired loading is uniform

Equivalent Uniform Load using Equivalent Bending Moment and Allowable Load:

Reference AC174, Section 4.3.3 For Criteria

Average Ultimate Test Load = 2368 lb (Winchester)

$$2368 / 2.5 = 947 \text{ lb allowable load}$$

5% Nonparametric ultimate test load = 2298 lb (Winchester)

$$2298 / 2.1 = 1094 \text{ lb allowable load} > 947 \text{ lb, allowable load from avg governs}$$

For:  $P_t$  = allowable snow load from test x Strength Adj Factor = 947 lb x 1.00 = 947 lb

$P_t$  = allowable live load from test x Strength Adj Factor = 947 lb x 0.67 = 634 lb

$L_t$  = test span = 16.0 in

$P_u$  = total uniformly distributed load (lb) =  $L_u \times w \times W / 144$

$L_u$  = uniform load span (in) {to be determined}

$w$  = uniform load (psf)

$W$  = tributary board width = 5.50" + 0.13" gap = 5.625 in

For a worse case single span condition,

$$M(\text{uniform}) = \frac{P_u \times L_u}{8} \qquad M(\text{3rd pt}) = \frac{P_t \times L_t}{6}$$

$$\frac{P_u \times L_u}{8} = \frac{P_t \times L_t}{6} \therefore L_u = \frac{8 \times P_t \times L_t}{6 \times L_u} = \text{Sub for } P_u, L_u = \frac{4 \times P_t \times L_t \times 144}{3 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt{\frac{192 \times P_t \times L_t}{w \times W}}$$

L For 100 psf:  $L_u = (192 \times 634 \times 16 / 100 / 5.625)^{(1/2)} = 58.8 \text{ in}$

L For 200 psf:  $L_u = (192 \times 634 \times 16 / 200 / 5.625)^{(1/2)} = 41.6 \text{ in}$

S For 250 psf:  $L_u = (192 \times 947 \times 16 / 250 / 5.625)^{(1/2)} = 45.5 \text{ in}$

S For 300 psf:  $L_u = (192 \times 947 \times 16 / 300 / 5.625)^{(1/2)} = 41.5 \text{ in}$

S For 350 psf:  $L_u = (192 \times 947 \times 16 / 350 / 5.625)^{(1/2)} = 38.4 \text{ in}$

S For 400 psf:  $L_u = (192 \times 947 \times 16 / 400 / 5.625)^{(1/2)} = 36.0 \text{ in}$

**Trex Decking - Select 2x6 Decking****Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads**

Equivalent Uniform Load using Equivalent Deflection at L/180

Reference AC174, Section 4.1 and ASTM D 7032 Section 5.3 For Criteria

Test Load at L/180 deflection: 16.0 in / 180 = 0.089 in

Average Ultimate Test Load = 612 lb (Winchester)

Snow Stiffness Adjustment Factor = 1.00

Live Stiffness Adjustment Factor = 0.56

W (adjusted snow) = 612 lb x 1.00 = 612 lb

W (adjusted live) = 612 lb x 0.56 = 343 lb

For a worse case single span condition,

$$\Delta(\text{uniform}) = \frac{5 \times P_u \times L_u^3}{384 \times EI} \quad \Delta(\text{3rd pt}) = \frac{23 \times P_t \times L_t^3}{1296 \times EI}$$

$$\frac{5 \times P_u \times L_u^3}{384 \times EI} = \frac{23 \times P_t \times L_t^3}{1296 \times EI} \therefore L_u^3 = \frac{384 \times 23 \times P_t \times L_t^3}{5 \times 1296 \times P_u}$$

$$\text{Substiute for } P_u, L_u^3 = \frac{8832 \times P_t \times L_t^3 \times 144}{6480 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt[4]{\frac{2944 \times P_t \times L_t^3}{15 \times w \times W}}$$

L	For 100 psf:	$L_u = (2944 \times 343 \times 16^3 / 15 / 100 / 5.625)^{(1/2)} = 26.5$ in
L	For 200 psf:	$L_u = (2944 \times 343 \times 16^3 / 15 / 200 / 5.625)^{(1/2)} = 22.3$ in
S	For 250 psf:	$L_u = (2944 \times 612 \times 16^3 / 15 / 250 / 5.625)^{(1/2)} = 24.3$ in
S	For 300 psf:	$L_u = (2944 \times 612 \times 16^3 / 15 / 300 / 5.625)^{(1/2)} = 23.2$ in
S	For 350 psf:	$L_u = (2944 \times 612 \times 16^3 / 15 / 350 / 5.625)^{(1/2)} = 22.4$ in
S	For 400 psf:	$L_u = (2944 \times 612 \times 16^3 / 15 / 400 / 5.625)^{(1/2)} = 21.6$ in

**Summary:**

Deck Product	Criterion	Allowable Span (in) due to Snow					
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Select 2x6	Stress	58.8 in	41.6 in	45.5 in	41.5 in	38.4 in	36.0 in
	Defl.	26.5 in	22.3 in	24.3 in	23.2 in	22.4 in	21.6 in
	<b>Limiting</b>	<b>26.5 in</b>	<b>22.3 in</b>	<b>24.3 in</b>	<b>23.2 in</b>	<b>22.4 in</b>	<b>21.6 in</b>





### Trex Decking - Select 2x6 Decking

#### Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads

The following deck board snow load span calculations are based on calculation methods of ICC-ES AC 174 Acceptabnce Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) and flexural test data from Intertek-ATI Report No. i13429.01-119-19. With the exculsion of high temperature adjustment factors, snow load overall end-use adjustment factors for strength and stiffness were 1.00 and 1.00 respectively and live load overall end-use adjustment factors for strength and stiffness were 0.67 and 0.56 respectively (see Intertek-ATI Report No. E577.01-119-19) Duration of load and creep effects have not been addressed in this analysis

Flexural test loading was third point, the desired loading is uniform

Equivalent Uniform Load using Equivalent Bending Moment and Allowable Load:

Reference AC174, Section 4.3.3 For Criteria

Average Ultimate Test Load = 1570 lb (Winchester)

$$1570 / 2.5 = 628 \text{ lb allowable load}$$

5% Nonparametric ultimate test load = 1530 lb (Winchester)

$$1530 / 2.1 = 729 \text{ lb allowable load} > 628 \text{ lb, allowable load from avg governs}$$

For:  $P_t$  = allowable snow load from test x Strength Adj Factor = 628 lb x 1.00 = 628 lb

$P_t$  = allowable live load from test x Strength Adj Factor = 628 lb x 0.67 = 421 lb

$L_t$  = test span = 24.0 in

$P_u$  = total uniformly distributed load (lb) =  $L_u \times w \times W / 144$

$L_u$  = uniform load span (in) {to be determined}

$w$  = uniform load (psf)

$W$  = tributary board width = 5.50" + 0.13" gap = 5.625 in

For a worse case single span condition,

$$M(\text{uniform}) = \frac{P_u \times L_u}{8} \qquad M(\text{3rd pt}) = \frac{P_t \times L_t}{6}$$

$$\frac{P_u \times L_u}{8} = \frac{P_t \times L_t}{6} \therefore L_u = \frac{8 \times P_t \times L_t}{6 \times L_u} = \text{Sub for } P_u, L_u = \frac{4 \times P_t \times L_t \times 144}{3 \times L_u \times w \times W}$$

Combining  $L_u$ 's: 
$$L_u = \sqrt{\frac{192 \times P_t \times L_t}{w \times W}}$$

L For 100 psf:  $L_u = (192 \times 421 \times 24 / 100 / 5.625)^{(1/2)} = 58.7 \text{ in}$

L For 200 psf:  $L_u = (192 \times 421 \times 24 / 200 / 5.625)^{(1/2)} = 41.5 \text{ in}$

S For 250 psf:  $L_u = (192 \times 628 \times 24 / 250 / 5.625)^{(1/2)} = 45.4 \text{ in}$

S For 300 psf:  $L_u = (192 \times 628 \times 24 / 300 / 5.625)^{(1/2)} = 41.4 \text{ in}$

S For 350 psf:  $L_u = (192 \times 628 \times 24 / 350 / 5.625)^{(1/2)} = 38.3 \text{ in}$

S For 400 psf:  $L_u = (192 \times 628 \times 24 / 400 / 5.625)^{(1/2)} = 35.9 \text{ in}$

**Trex Decking - Select 2x6 Decking****Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads**

Equivalent Uniform Load using Equivalent Deflection at L/180

Reference AC174, Section 4.1 and ASTM D 7032 Section 5.3 For Criteria

Test Load at L/180 deflection: 24.0 in / 180 = 0.133 in

Average Ultimate Test Load = 285 lb (Winchester)

Snow Stiffness Adjustment Factor = 1.00

Live Stiffness Adjustment Factor = 0.56

W (adjusted snow) = 285 lb x 1.00 = 285 lb

W (adjusted live) = 285 lb x 0.56 = 160 lb

For a worse case single span condition,

$$\Delta(\text{uniform}) = \frac{5 \times P_u \times L_u^3}{384 \times EI} \quad \Delta(\text{3rd pt}) = \frac{23 \times P_t \times L_t^3}{1296 \times EI}$$

$$\frac{5 \times P_u \times L_u^3}{384 \times EI} = \frac{23 \times P_t \times L_t^3}{1296 \times EI} \therefore L_u^3 = \frac{384 \times 23 \times P_t \times L_t^3}{5 \times 1296 \times P_u}$$

$$\text{Substiute for } P_u, L_u^3 = \frac{8832 \times P_t \times L_t^3 \times 144}{6480 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt[4]{\frac{2944 \times P_t \times L_t^3}{15 \times w \times W}}$$

L	For 100 psf:	$L_u = (2944 \times 160 \times 24^3 / 15 / 100 / 5.625)^{(1/2)} = 29.6$ in
L	For 200 psf:	$L_u = (2944 \times 160 \times 24^3 / 15 / 200 / 5.625)^{(1/2)} = 24.9$ in
S	For 250 psf:	$L_u = (2944 \times 285 \times 24^3 / 15 / 250 / 5.625)^{(1/2)} = 27.2$ in
S	For 300 psf:	$L_u = (2944 \times 285 \times 24^3 / 15 / 300 / 5.625)^{(1/2)} = 26.0$ in
S	For 350 psf:	$L_u = (2944 \times 285 \times 24^3 / 15 / 350 / 5.625)^{(1/2)} = 25.0$ in
S	For 400 psf:	$L_u = (2944 \times 285 \times 24^3 / 15 / 400 / 5.625)^{(1/2)} = 24.2$ in

**Summary:**

Deck Product	Criterion	Allowable Span (in) due to Snow					
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Select 2x6	Stress	58.7 in	41.5 in	45.4 in	41.4 in	38.3 in	35.9 in
	Defl.	29.6 in	24.9 in	27.2 in	26.0 in	25.0 in	24.2 in
	<b>Limiting</b>	<b>29.6 in</b>	<b>24.9 in</b>	<b>27.2 in</b>	<b>26.0 in</b>	<b>25.0 in</b>	<b>24.2 in</b>



### Trex Decking - Select 1x6 Decking

#### Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads

The following deck board snow load span calculations are based on calculation methods of ICC-ES AC 174 Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) and flexural test data from Intertek-ATI Report No. E5777.01-119-19. With the exclusion of high temperature adjustment factors, snow load overall end-use adjustment factors for strength and stiffness were 1.00 and 1.00 respectively and live load overall end-use adjustment factors for strength and stiffness were 0.67 and 0.56 respectively (see Intertek-ATI Report No. E5777.01-119-19) Duration of load and creep effects have not been addressed in this analysis

Flexural test loading was third point, the desired loading is uniform

Equivalent Uniform Load using Equivalent Bending Moment and Allowable Load:

Reference AC174, Section 4.3.3 For Criteria

Average Ultimate Test Load = 1105 lb (Winchester)

$$1105 / 2.5 = 442 \text{ lb allowable load}$$

5% Nonparametric ultimate test load = 1043 lb (Winchester)

$$1043 / 2.1 = 497 \text{ lb allowable load} > 442 \text{ lb, allowable load from avg governs}$$

For:  $P_t$  = allowable snow load from test x Strength Adj Factor = 442 lb x 1.00 = 442 lb

$P_t$  = allowable live load from test x Strength Adj Factor = 442 lb x 0.67 = 296 lb

$L_t$  = test span = 16.0 in

$P_u$  = total uniformly distributed load (lb) =  $L_u \times w \times W / 144$

$L_u$  = uniform load span (in) {to be determined}

$w$  = uniform load (psf)

$W$  = tributary board width = 5.50" + 0.13" gap = 5.625 in

For a worse case single span condition,

$$M(\text{uniform}) = \frac{P_u \times L_u}{8} \qquad M(\text{3rd pt}) = \frac{P_t \times L_t}{6}$$

$$\frac{P_u \times L_u}{8} = \frac{P_t \times L_t}{6} \therefore L_u = \frac{8 \times P_t \times L_t}{6 \times L_u} = \text{Sub for } P_u, L_u = \frac{4 \times P_t \times L_t \times 144}{3 \times L_u \times w \times W}$$

Combining  $L_u$ 's: 
$$L_u = \sqrt{\frac{192 \times P_t \times L_t}{w \times W}}$$

L For 100 psf:  $L_u = (192 \times 296 \times 16 / 100 / 5.625)^{(1/2)} = 40.2 \text{ in}$

L For 200 psf:  $L_u = (192 \times 296 \times 16 / 200 / 5.625)^{(1/2)} = 28.4 \text{ in}$

S For 250 psf:  $L_u = (192 \times 442 \times 16 / 250 / 5.625)^{(1/2)} = 31.1 \text{ in}$

S For 300 psf:  $L_u = (192 \times 442 \times 16 / 300 / 5.625)^{(1/2)} = 28.4 \text{ in}$

S For 350 psf:  $L_u = (192 \times 442 \times 16 / 350 / 5.625)^{(1/2)} = 26.3 \text{ in}$

S For 400 psf:  $L_u = (192 \times 442 \times 16 / 400 / 5.625)^{(1/2)} = 24.6 \text{ in}$

**Trex Decking - Select 1x6 Decking****Span Rating for 100 psf, 200 psf, 250psf, 300 psf, 350 psf, 400 psf Live/Snow Loads**

Equivalent Uniform Load using Equivalent Deflection at L/180

Reference AC174, Section 4.1 and ASTM D 7032 Section 5.3 For Criteria

Test Load at L/180 deflection: 16.0 in / 180 = 0.089 in

Average Ultimate Test Load = 197 lb (Winchester)

Snow Stiffness Adjustment Factor = 1.00

Live Stiffness Adjustment Factor = 0.56

W (adjusted snow) = 197 lb x 1.00 = 197 lb

W (adjusted live) = 197 lb x 0.56 = 110 lb

For a worse case single span condition,

$$\Delta(\text{uniform}) = \frac{5 \times P_u \times L_u^3}{384 \times EI} \quad \Delta(\text{3rd pt}) = \frac{23 \times P_t \times L_t^3}{1296 \times EI}$$

$$\frac{5 \times P_u \times L_u^3}{384 \times EI} = \frac{23 \times P_t \times L_t^3}{1296 \times EI} \therefore L_u^3 = \frac{384 \times 23 \times P_t \times L_t^3}{5 \times 1296 \times P_u}$$

$$\text{Substiute for } P_u, L_u^3 = \frac{8832 \times P_t \times L_t^3 \times 144}{6480 \times L_u \times w \times W}$$

$$\text{Combining } L_u\text{'s: } L_u = \sqrt[4]{\frac{2944 \times P_t \times L_t^3}{15 \times w \times W}}$$

L	For 100 psf:	$L_u = (2944 \times 110 \times 16^3 / 15 / 100 / 5.625)^{(1/2)} = 19.9$ in
L	For 200 psf:	$L_u = (2944 \times 110 \times 16^3 / 15 / 200 / 5.625)^{(1/2)} = 16.7$ in
S	For 250 psf:	$L_u = (2944 \times 197 \times 16^3 / 15 / 250 / 5.625)^{(1/2)} = 18.3$ in
S	For 300 psf:	$L_u = (2944 \times 197 \times 16^3 / 15 / 300 / 5.625)^{(1/2)} = 17.5$ in
S	For 350 psf:	$L_u = (2944 \times 197 \times 16^3 / 15 / 350 / 5.625)^{(1/2)} = 16.8$ in
S	For 400 psf:	$L_u = (2944 \times 197 \times 16^3 / 15 / 400 / 5.625)^{(1/2)} = 16.3$ in

**Summary:**

Deck Product	Criterion	Allowable Span (in) due to Snow					
		100 psf	200 psf	250 psf	300 psf	350 psf	400 psf
Select 1x6	Stress	40.2 in	28.4 in	31.1 in	28.4 in	26.3 in	24.6 in
	Defl.	19.9 in	16.7 in	18.3 in	17.5 in	16.8 in	16.3 in
	<b>Limiting</b>	<b>19.9 in</b>	<b>16.7 in</b>	<b>18.3 in</b>	<b>17.5 in</b>	<b>16.8 in</b>	<b>16.3 in</b>