PolyScape™ BY BEDFORD

Ultra	15%	**Standard**	5%	**Utility**	Baseline			
Adjusted Modulus of Elasticity	163,784 PSI	Adjusted Modulus of Elasticity	32,066 PSI	Adjusted Modulus of Elasticit	46,713 PSI			
Service Factor Adjustment	2.58	Service Factor Adjustment	2.58	Service Factor Adjustment	2.58			

Floor Joists

40# LIVE LOAD 10# DEAD LOAD L/360
Modulus of Elasticity 422,563 PSI

Design Criteria: *Strength* - 40 lbs. per sq. ft. live load, plus 10 lbs. per sq. ft. dead load.
Deflection - Limited in span in inches divided by 360 for live load only.

			Span (feet and inches)														
			2 X 6				2 X 8				2 X 10				2 X 12			
Type	Grade		**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**	**12"**	**16"**	**19.2"**	**24"**
PolyScape	**Ultra**		5'9"	5'2"	4'11"	4'6"	7'9"	7'0"	6'7"	6'2"	9'9"	8'10"	8'4"	7'9"	11'4"	10'6"	9'11"	9'3"
	Standard		4'9"	4'3"	4'0"	3'9"	6'5"	5'10"	5'5"	5'1"	8'0"	7'4"	6'11"	6'5"	9'7"	8'9"	8'3"	7'8"
	Utility		3'9"	3'5"	3'3"	3'0"	5'1"	4'8"	4'4"	4'0"	6'5"	5'10"	5'6"	5'1"	7'8"	7'0"	6'7"	6'1"
		lbs/ft	2.3	2.3	2.3	2.3	4.0	4.0	4.0	4.0	4.3	4.3	4.3	4.3	7.1	7.1	7.1	7.1

Ultra	15%	**Standard**	10%	**Utility**	Baseline			
Modulus of Elasticity	147,315 PSI	Modulus of Elasticity	87,443 PSI	Modulus of Elasticity	53,228 PSI			
Service Factor Adjustment	2.58	Service Factor Adjustment	2.58	Service Factor Adjustment	2.58			

Plank Span

Design Criteria: *Strength* - As indicated, includes weight of board
Deflection - Limited in span in inches divided by 360 for live load only.

		Span (feet and inches)															
		2 X 6				2 X 8				2 X 10				2 X 12			
		Load (PSF)				Load (PSF)				Load (PSF)				Load (PSF)			
Type	Grade	**50**	**60**	**70**	**80**	**50**	**60**	**70**	**80**	**50**	**60**	**70**	**80**	**50**	**60**	**70**	**80**
PolyScape	**Ultra**	4'3"	4'0"	3'10"	3'8"	4'8"	4'5"	4'3"	4'0"	5'0"	4'9"	4'6"	4'4"	5'4"	5'0"	4'9"	4'7"
PolyScape	**Standard**	3'7"	3'4"	3'2"	3'1"	3'11"	3'9"	3'6"	3'5"	4'3"	4'0"	3'10"	3'8"	4'5"	4'3"	4'0"	3'10"
PolyScape	**Utility**	3'0"	2'10"	2'9"	2'7"	3'4"	3'2"	3'0"	2'11"	3'7"	3'5"	3'3"	3'1"	3'9"	3'7"	3'5"	3'3"

Service Factor Adjustments

Temperature Exposure (over 90F)	0.85
Long Term Creep Loading	0.6
UV Exposure	0.8
Chemical	0.95
Total Service Factor	**2.58**

"Joist Mode" Design Values

Type	Grade	Maximum Force @ 3% Load (lbf)	Flexural Strength @ 3% Strain (PSI)	Secant Modulus @ 1% Strain (PSI)	Modulus of Elasticity (PSI)
PolyScape	**Ultra**	1,685	5,254	333,006	422,536
PolyScape	**Standard**	1,063	3,325	192,481	237,931
PolyScape	**Utility**	577	1,802	100,660	120,520

"Plank" Mode Design Values

Type	Grade	Maximum Force @ 3% Load (lbf)	Flexural Strength @ 3% Strain (PSI)	Secant Modulus @ 1% Strain (PSI)	Modulus of Elasticity (PSI)
PolyScape	**Ultra**	1,883	5,850	326,426	380,073
PolyScape	**Standard**	1,146	3,565	134,036	225,602
PolyScape	**Utility**	676	2,108	118,785	137,329

- IRC Building Code dictates that designs reflect 40 lbs./ft Live Load and 10 lbs./ft Dead Load
- Values include the weight of the beam.
- Values are calculated using beam formula: $y = \frac{5WL^4}{384EI}$ with maximum deflection of L/360.
- Modulus of Elasticity compensation done for appropriate creep and temperature factors.
- Modulus of Elasticity for PolyScape™ was tested using ASTM D6109.

Coefficient of Thermal Expansion Data

COMTEC
Composite Materials Technology Center

Test Data

PolyScape Ultra CLTE Measurements						
Specimen	Temp (°F)	Length (in)	Temp (°F)	Length (in)	Temp (°F)	Length (in)
1	73.4	12.005	-30	11.977	140	12.016
2	73.4	12.004	-30	11.975	140	12.015
3	73.4	12.006	-30	11.978	140	12.017
4	73.4	12.004	-30	11.976	140	12.015
5	73.4	12.004	-30	11.976	140	12.015

PolyScape Standard CLTE Measurements						
Specimen	Temp (°F)	Length (in)	Temp (°F)	Length (in)	Temp (°F)	Length (in)
1	73.4	11.995	-30	11.935	140	12.047
2	73.4	11.990	-30	11.928	140	12.042
3	73.4	12.004	-30	11.941	140	12.054
4	73.4	12.004	-30	11.943	140	12.056
5	73.4	12.004	-30	11.941	140	12.053

Testing Results

- PolyScape Ultra Average CTE **(α) = 1.904E-05 (in/in)/°F**
- PolyScape Ultra Average **(α) = 5.529E-05 (in/in)/°F**