Scientific TESTING LABORATORIES, INC.

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7” X 9” Full Size Cross-tie

Company: Polysum Technologies
Contact: John C. Bayer
Project: 16564
Date: November 30, 1999

Summary

One 7” X 9” Recycled Plastic Cross-tie code # KMC-99-333 was submitted for testing. Testing consisted of camcar screw pull test, spike insertion / extraction test, linear thermal expansion, compressive strength test, and flexural strength test.

Results

Extraction test

A comparison of the force required to extract 5/8” and 7/8” ‘Camcar’ screw fasteners to obtain a full thread engagement of 4”00 and a standard railroad spike from 7” X 9” crosstie. Results are as follows.

Screw size	5/8”	7/8”
Max. Load	7500 pounds	6500 pounds
Pilot hole	0.375”	0.435”

Spike size	5/8” X 5/8” X 6 ½”	
Max. Load	In	Out
Spike A	9,800 pounds	5,000 pounds
Spike B	14,150 pounds	5,650 pounds
Spike C	16,000 pounds	5,100 pounds
Spike D	12,400 pounds	6,800 pounds

Coefficient of Linear Thermal Expansion

Test temperature range -120^0 F < $+150^0$ F

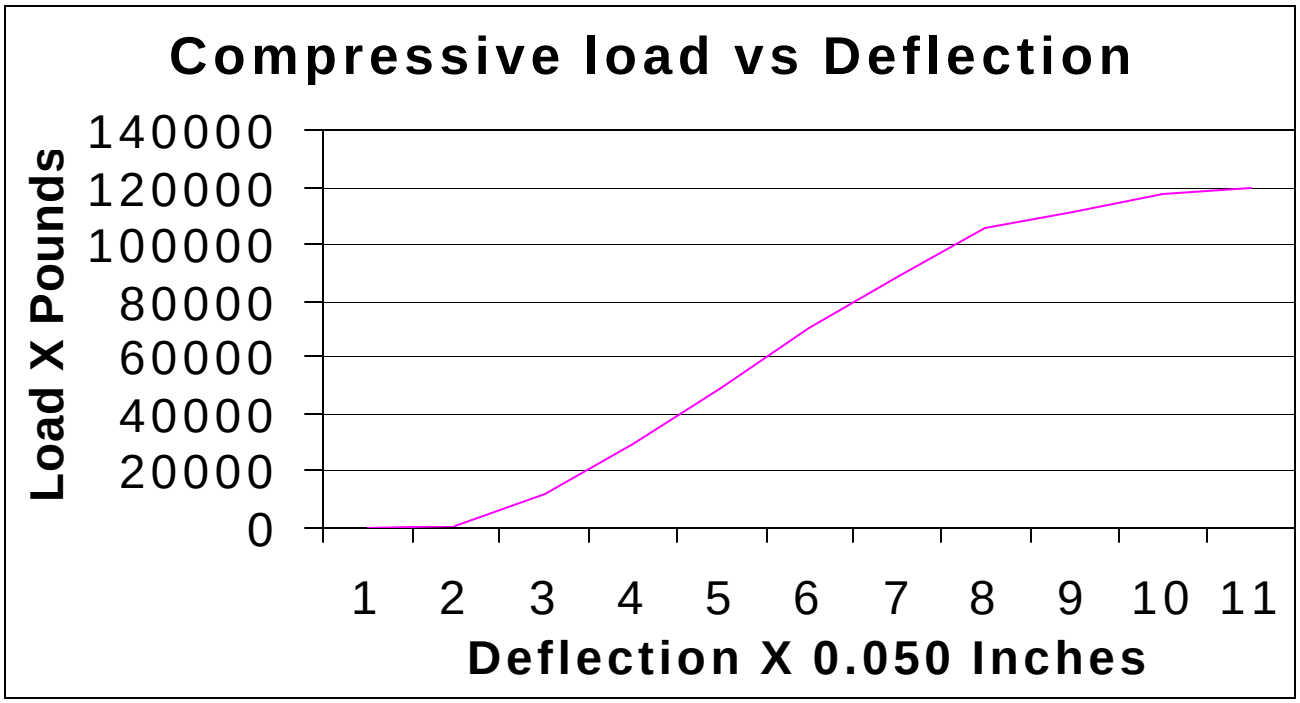
6.81×10^{-5} in. / in. / Deg. F

Compressive Properties

Load applied through an 8.0” X 13.0” track plate and section of rail.

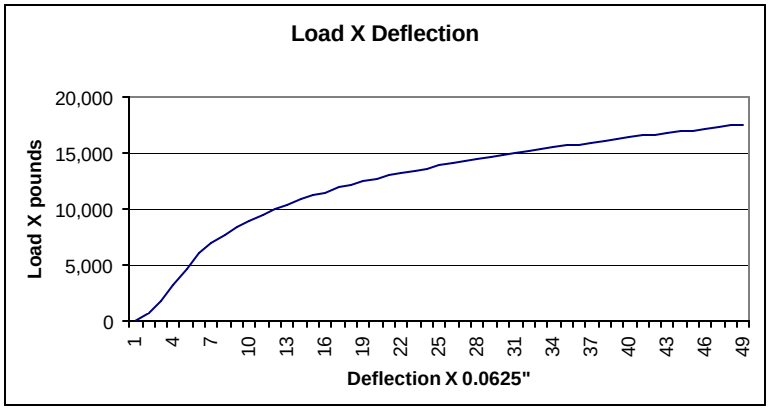
Compressive modulus = 414,000 psi

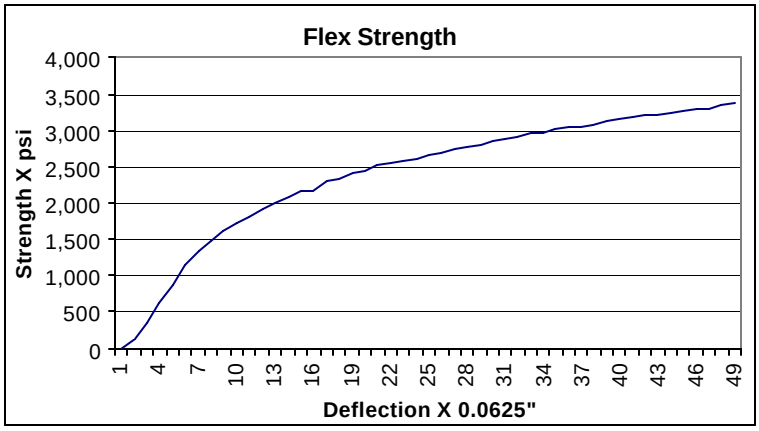
Deflection Inches	Load pounds
0.000	0
0.050	820
0.100	12100
0.150	29200
0.200	49900
0.250	70600
0.300	89300
0.350	105900
0.400	111400
0.450	117900
0.500	119600

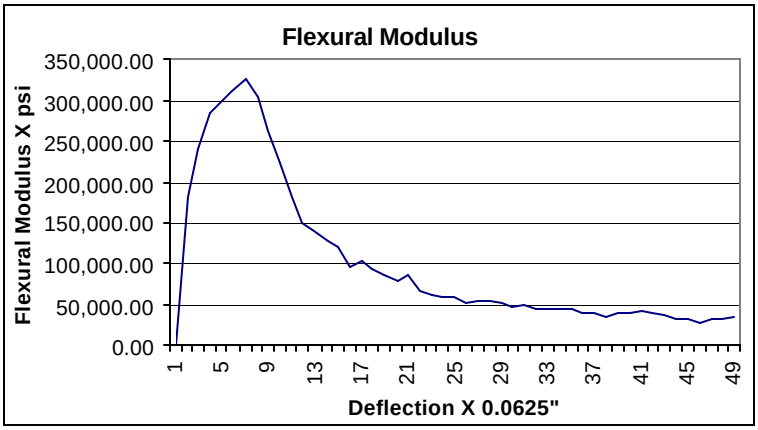


Flexural Properties

Load pounds	Deflection inches	Strength psi	Modulus psi
0	0.000	0	0.00
700	0.063	135	181,310
1,850	0.125	357	240,000
3,300	0.188	636	285,000
4,600	0.250	887	298,000
6,000	0.313	1,157	311,000
7,000	0.375	1,349	326,000
7,700	0.438	1,484	303,000
8,350	0.500	1,610	262,000
8,900	0.563	1,716	223,000
9,500	0.625	1,831	181,000
9,900	0.688	1,908	150,000
10,400	0.750	2,005	140,000
10,800	0.813	2,082	127,000
11,200	0.875	2,159	119,000
11,350	0.938	2,188	96,000
11,900	1.000	2,294	104,000
12,200	1.063	2,352	93,000
12,450	1.125	2,400	85,000
12,700	1.188	2,448	78,000
13,000	1.250	2,506	85,000
13,200	1.313	2,545	67,000
13,400	1.375	2,583	62,000
13,600	1.438	2,622	60,000
13,850	1.500	2,670	60,000
14,000	1.563	2,699	52,000
14,250	1.625	2,747	54,000
14,450	1.688	2,786	54,000
14,600	1.750	2,815	52,000
14,750	1.813	2,843	47,000
14,950	1.875	2,882	49,000
15,100	1.938	2,911	44,000
15,300	2.000	2,949	44,000
15,450	2.063	2,978	44,000
15,600	2.125	3,007	44,000
15,700	2.188	3,027	39,000
15,850	2.250	3,056	39,000
16,000	2.313	3,084	36,000
16,200	2.375	3,123	39,000
16,350	2.438	3,152	39,000
16,500	2.500	3,181	41,000
16,600	2.563	3,200	39,000
16,725	2.625	3,224	38,000
16,825	2.688	3,243	32,000
16,950	2.750	3,268	31,000
17,025	2.813	3,282	27,000
17,200	2.875	3,316	31,000
17,350	2.938	3,345	32,000
17,500	3.000	3,374	35,000
21,350	5.000	4,116	32,000
21,700	6.000	4,183	24,000
21,900	7.000	4,222	18,000







Reported By: Michael D Frederic

Michael D. Frederic

Reviewed By: Ellis R. Sisk

NOTE: Test specimen(s) and material remnants from this project will be discarded after thirty (30) days from the date of this report. Any requests for alternative handling must be submitted in writing and received prior to that deadline

REFERENCES

ASTM D 1042 Standard Test Method for linear Changes of Plastics Under Accelerated Service Conditions.
ASTM D 695 Standard Test Method for Compressive Properties of Rigid Plastics.
ASYM D 790 Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.