



ECOTRAX[®]

COMPOSITE RAILROAD TIES

PHYSICAL and MECHANICAL PROPERTIES

Test / Standard	Property	Value
Specific Gravity ASTM D6111	Specific Gravity	0.85 – 0.90
	Density	53 – 56 lb/ft ³ (849-897 kg/m ³)
Compression ASTM D6108	Compressive Strength (parallel to grain)	3,000 psi (20.6 MPa) average
	Compressive Strength (perpendicular to grain)	1,200 psi (8.3 MPa) average
	Permanent Deformation Under Load (30,000 lbs. / 13,608 kg)	0.013 in (0.33cm)
Flexural AREMA Chapter 30, Part 2 ASTM D6109	Modulus of Elasticity (flexural)	250,000 psi (1,724 MPa) average
	Modulus of Rupture (bending)	3,000 psi (20.6 MPa) average

Rail/Plate Area Compression AREMA Chapter 30, Part 2	Railhead loaded to 100,000 lb. (45,359 kg) load 20,000 lb. (9,072 kg) increments 30-60 seconds between increments	Elastic deformation at 100,000 lbs. (45,359 kg)	0.153 in (3.89 mm)
		Permanent deformation at recovery after release of 100,000 lb. (45,359 kg) load within 1 minute	0.043 in (1.09 mm)

Cut Spike Pullout and Cut Spike Lateral Restraint AREMA Chapter 30, Part 2	Cut Spike Insertion and Extraction inserted/extracted at 2 inches/ minute (5 cm/min)	Insertion Force *4.5 inches (11.4 cm) depth (average of 8 spikes)	5,906 lbs. (26.3 kN)
		Extraction Force *4.5 inches (11.4 cm) depth (average of 8 spikes)	2,541 lbs. (11.3 kN)
	Lateral Restraint	Force to deflect spike 0.2 in (5 mm) laterally *cut spike inserted to depth of 4.5 in (11.4 cm)	1,849 lbs. (8.2 kN)

Screw Spike Pullout ASTM D6117	Mechanical Fastener Screw Spike Pullout 11/16" (17.5 mm) screw, 9/16" (14 mm) diameter pilot hole	7,103 lbs. (31.6 kN)
--	--	----------------------

Single Tie Lateral Push AREMA Chapter 30, Part 2 Sample size: 7" x 9" x 8'6" tie	Lateral Stability Perpendicular to Rail Average of 20 ties	Newly Installed (0 MGT)		After Accumulated Tonnage (13 MGT)	
		Force	Displacement	Force	Displacement
		2,582 lbs. (11.5 kN)	0.429 in (1.089 cm)	2,670 lbs. (11.8 kN)	0.386 in (0.980 cm)

Thermal Expansion ASTM D6341 Sample size: 6"x9"x12"	Average of six samples	Increase in Length at 140° F (60° C)	Decrease in Length at -30° F (-34.4° C)	Increase in Length at 73° F (23° C)	Linear Coefficient of Thermal Expansion
		0.056 in (1.422 mm)	-0.022 in (-0.559 mm)	0.026 in (0.660 mm)	

Slip Resistance ASTM F609	Average Coefficient of Friction (Dry Condition)	Average Coefficient of Friction (Wet Condition)
	0.60	0.62

ELECTRICAL PROPERTIES

Electrical Impedance AREMA Chapter 30, Part 2	10 volts AC 60-Hertz applied between two running rails for 15 minutes before and after 6-hour soak in water	BEFORE 6-hour soak	current	0.002 milliampere (mA)
			impedance	5 megohms
		AFTER 6-hour soak	current	0.004 milliampere (mA)
			impedance	2.38 megohms

NOTE: All testing was conducted at accredited, third-party test facilities. The information provided herein contains typical or average values intended for reference and comparison purposes only. They should NOT be used as a basis for part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes.