Rail Engineering Applications

CK Composites, Inc. has been making insulation materials for rail engineering applications for more than 15 years. We have the capability to prototype your design or manufacture small quantities or large orders with excellent delivery times. We can assist in your efforts to replace damaged or worn parts. CK can reverse engineer to replicate an old part for which no drawings are available.

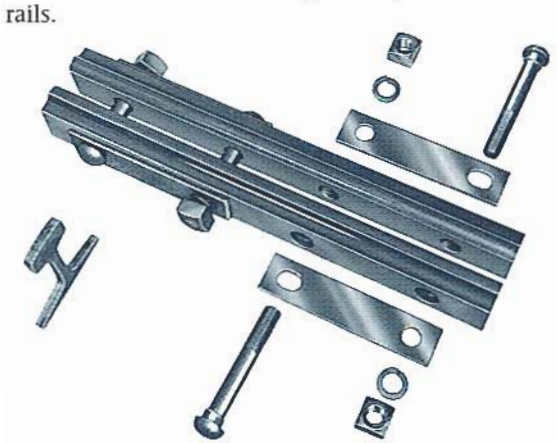
Epoxy Resin Insulators

CK Composites, Inc. manufactures a wide range of cast resin third rail and post insulators. CK's custom formulation capability offers a way to vary properties to meet your specific needs. In addition to design and manufacturing, CK has a complete test facility for electrical and thermal cycling of parts prior to shipping.

Insulating Rail Joint

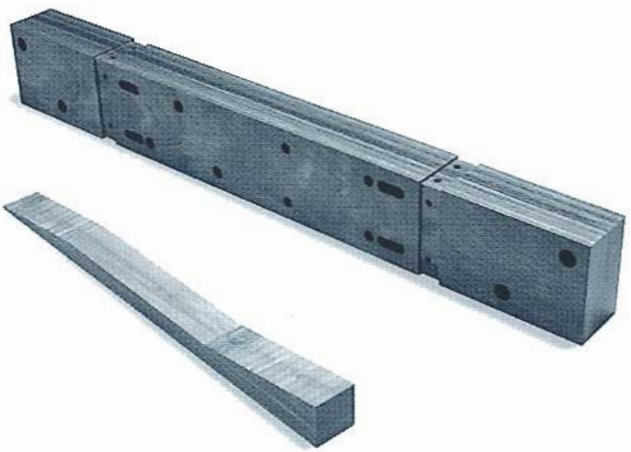
CK Composites, Inc. manufactures shoe beams for all weights and types of rails. Over 6 million laminated wood rail joints for use in jointed track have already been supplied to railways in all parts of the world.

CK's insulating rail joint employs two densified laminated wood fishplates. This material is specially suited to withstand the severe shearing and bending stresses to which these components are subjected. They are supplied ready drilled, complete with high tensile steel bolts for bolting directly to the running rails.



Shoe Beams and Slippers

CK Composites, Inc. supplies shoe beams and slippers for transit authorities needs throughout the U.S. These are machined from our special beech wood laminate which has been impregnated with phenolic resin and densified under 3,900 tons of pressure to form a unique material known as Insulam (or previously as Permali®). In addition to being electrically insulating, Insulam is moisture resistant, termite-proof, and dimensionally stable at a wide range of temperatures.



Rail Engineering Applications

Insulam Technical Data

Mechanical Properties (Type 5)

Tensile Strength, psi, Lengthwise (ASTM D-638)	28,000
Compressive Strength, psi (ASTM D-695):	
Perpendicular to laminations	17,000
Parallel to laminations and grain	17,000
Flexural Strength, psi (flatwise) (ASTM D-790):	
Lengthwise	32,500
Crosswise	—
Shear Strength, psi:	
Parallel to grain and laminations	3,500
Perpendicular to laminations, parallel to grain	4,800
Perpendicular to grain and laminations	9,500
Bonding Strength, lbs., cond. A	1,500
Impact Strength, Izod, ft lb/in of notch (ASTM D-256):	
Perpendicular to face, lengthwise	5.4
Perpendicular to edge, lengthwise	5.0
Modulus of Elasticity, psi (ASTM D-790)	2.5×10^6

Physical Properties

Water Absorption–%–24 hr (ASTM D-570):	
Thickness 1/2"	1.00
Thickness 1"	0.75
Intermittent operating temperature	150°C (302°F)
Continuous operating temperatures:	
In Oil	105°C (221°F)
In Air	105°C (221°F)
Specific Gravity (ASTM D-792)	1.30
Hardness (Rockwell H scale) (ASTM D-735)	90–100
Specific Heat	0.4
Coefficient of thermal expansion–celsius units (ASTM D-696):	
Type 5 Lengthwise	8×10^{-6}
Type 5 Crosswise	69×10^{-6}
Type 5 Perpendicular to laminations	113×10^{-6}
Type 6 Parallel to laminations	15×10^{-6}
Type 6 Perpendicular to laminations	113×10^{-6}
Thermal Conductivity–cal/cm/°C/sec (ASTM C-177):	
In plane of laminations—lengthwise	5.6×10^{-4}
In plane of laminations—crosswise	3.6×10^{-4}
Perpendicular to laminations	3.4×10^{-4}

Electrical Properties

Dielectric Strength (step-by-step @25°C–ASTM D-229):	
Perpendicular to laminations V/M (kV) 1/8"	360 (45)
Perpendicular to laminations V/M (kV) 1/4"	250 (63)
Perpendicular to laminations V/M (kV) 1/2"	175 (88)
Parallel to laminations V/M (kV)	87 (65)
Power Factor (ASTM D-229):	
–%–60 Hz	1.9
–%–103 Hz	3.0
–%–106 Hz	5.0
Dielectric Constant–60 Hz (ASTM D-229)	4.5
Specific Resistance–ohms/cm3 (ASTM D-257)	2 x 1012

Impulse Strength
Typical Values for Flashover in Air,
1.2 x 50 Wave Form

Distance Between Electrodes	Negative Wave	Positive Wave
12"	210 kV	150 kV
24"	435 kV	380 KV
36"	620 kV	560 kV

All data are based on applicable NEMA/ASTM test standards

Epoxy Technical Data

Epoxy Formulation	Typical Range Available
Specific Gravity (ASTM D-792)	1.8–2.2
Heat Deflection Temperature (ASTM D-648)	62°C–165°C
Flexural Strength (ASTM D-790)	6,200 psi–10,500 psi
Compressive Strength (ASTM D-695)	16,000 psi–30,000 psi
Impact Strength* (ASTM D-256)	0.4 ft-lb/in–1.4 ft-lb/in
Dielectric Strength (ASTM D-149)	310 v/mil–400v/mil

**Izod, unnotched*

CK Composites, Inc.

P.O. Box 1087 • Mount Pleasant, PA 15666
Phone: 724.547.4581 • Fax: 724.547.2890
www.ckcomposites.com