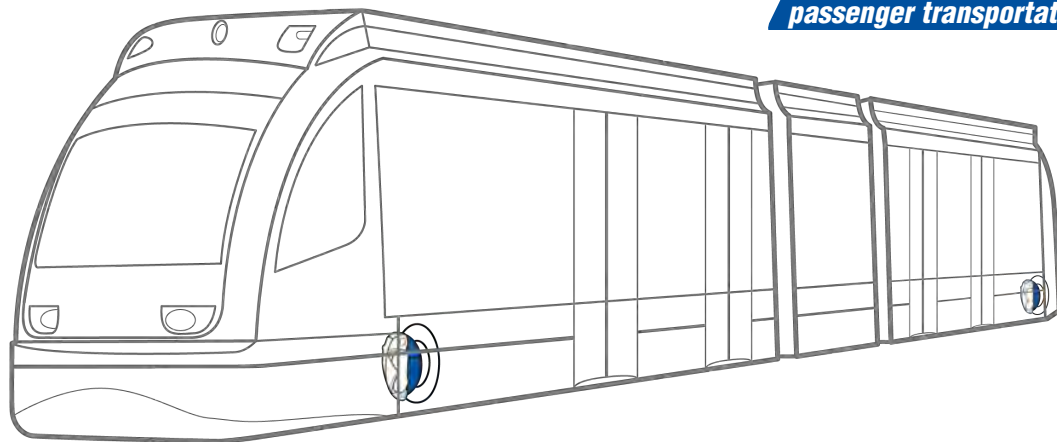


RAIL FRICTION MATERIALS

RAILWAY BRAKE SYSTEMS

Now offering a wider range of brake pad fitments for Light Rail passenger transportation applications...



Overview

With over eighty years experience in developing some of the most advanced friction materials for a wide range of markets, Carlisle Brake & Friction has been able to maintain a successful track record as a leading manufacturer of superior brake system solutions. As a result, many major metropolitan transportation authority's throughout the US turn to Carlisle to fulfill their *Light Rail* friction needs.

Carlisle's premium *light rail* friction formulations have been tested, validated and proven to provide consistent stopping power, stop after stop. Today Carlisle product engineers are preparing to expand on the existing application coverage by launching additional shapes for both the **G180** and **SMD2** *light rail* friction formulations.

Features and Benefits

- » Wear resistance characteristics reduce product lifecycle costs
- » Available in two friction formulas to support a range of conditions
- » High thermal stability
- » Noise free performance

Friction Compounds

Carlisle offers braking materials designed specifically for *light rail* passenger transportation applications. Manufactured in two friction formulations, these products were engineered to perform in both normal and high temperature applications. Each material is composed of a semi-metallic base for lasting performance and a longer overall product lifecycle. Both materials are offered in two pad configurations, both with - or without - grooves, and in a variety of popular thicknesses.

G180 is a high friction, molded lining material suitable for use in a wide range of speeds, contact pressures and temperatures. G180 was designed to provide reliable stopping power in low pressure to high energy *light rail* Transit applications.

SMD2 is a medium friction, molded lining material designed for use in low to medium duty *light rail* Transit applications. Due to its lower nominal friction level, Carlisle's SMD2 exhibits lower wear rates and noise-free braking characteristics.

Popular Light Rail Pad Shapes

CARLISLE RAILWAY BRAKE PADS	SPECIFICATIONS
	U.I.C. 300cm ²
	U.I.C. 325cm ²
	U.I.C. 350cm ²
	U.I.C. 325cm ²

Contact Carlisle for a complete list of all currently available fitments



CARLISLE RAIL - G180



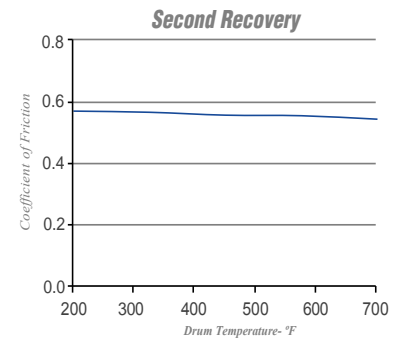
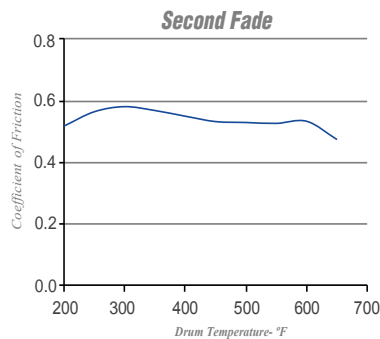
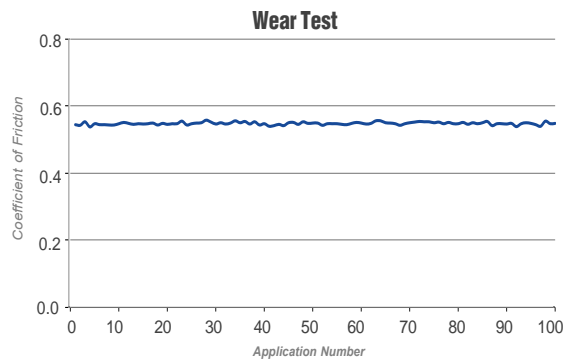
Carlisle G180 is an aramid-reinforced, semi-metallic friction material that offers an excellent wear rate in a 500° to 600° temperature range. G180 exhibits a stable coefficient of friction, with virtually no fade when operating in wet conditions. With a nominal coefficient of friction of 0.50, G180 meets all rail stopping requirements.

Friction and Wear (SAE J661)

Normal μ = 0.52
 Hot μ = 0.50
 Wear Rate = 0.006 in.³/hp.-hr.

Thermal Properties

Temp.	Wt. Loss
200°C	0.3%
300°C	0.8%
400°C	3.4%



Typical Material Properties

TEST	TEST PROCEDURES	TYPICAL VALUE
Operating Friction (250°F)	GM C-1	0.51
Max. Recommended Load	GM C-1	200 psi
Max Recommended Temp.	GM C-1	750°F
Shear Strength	ASTM D732	6500 psi
Tensile Strength	ASTM D638	4010 psi
Compressive Strength	ASTM D695	22,410 psi
Flexural Strength	ASTM D790	8020 psi
Izod Impact	ASTM D256	1.3 ft.-lb./in.
Specific Heat	MMCT-121	.26 cal/g°C
Thermal Conductivity	MMCT-120	1.2 W/m ² K

Proudly Made in the USA



CARLISLE RAIL - SMD2



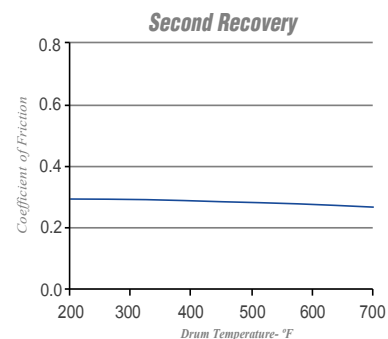
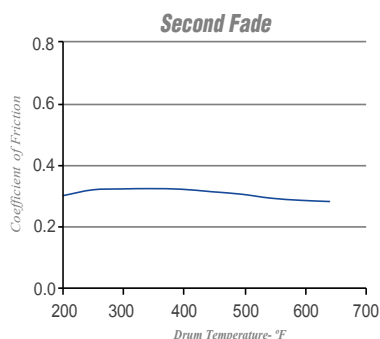
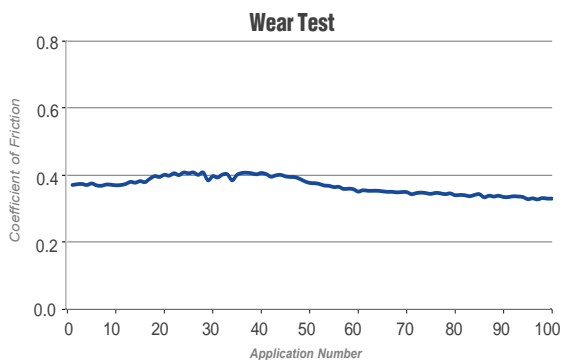
Carlisle SMD2 a steel fibered material formulated for heavy car disc brake use. This material is designed to perform under severe braking applications where brake temperatures reach 800° to 900°. Under these conditions, SMD2 shows a very high resistance to heat and fade, as well as an extremely low rate of thermal expansion. SMD2's nominal coefficient of friction is also 0.35.

Friction and Wear (SAE J661)

Normal $\mu = 0.36$
 Hot $\mu = 0.003 \text{ in.}^3/\text{hp.-hr.}$
 Wear Rate = 0.34

Thermal Properties

Temp.	Wt. Loss
200°C	0.0%
300°C	0.1%
400°C	0.6%



Typical Material Properties

TEST	TEST PROCEDURES	TYPICAL VALUE
Operating Friction (250°F)	GM C-1	0.35
Max. Recommended Load	GM C-1	200 psi
Max Recommended Temp.	GM C-1	850°F
Shear Strength	ASTM D732	4000 psi
Tensile Strength	ASTM D638	1910 psi
Compressive Strength	ASTM D695	11,360 psi
Flexural Strength	ASTM D790	3480 psi
Izod Impact	ASTM D256	0.7 ft.-lb./in.
Specific Heat	MMCT-121	0.18 cal/g°C
Thermal Conductivity	MMCT-120	7.6 W/m ² K

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