Abex
An IC Industries Company

Friction Products Division
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Asbestos-free brake linings turn to fiber glass

Asbestos, a material whose name means "incombustible" in ancient Greek, was *the* material of choice for manufacturing brake linings until recently. The fibrous mineral has excellent heat resistance, tensile strength and flexural strength characteristics, and it is easily processed into brake linings.

Abex EXL *brake linings are manufactured from a friction material whose matrix is centered around chopped strand fiber glass in a thermosetting polymer resin.*

Now, however, brake lining manufacturers have developed asbestos-free materials.

No material was overlooked as a possible replacement for asbestos. The search included fiber glass, the material the Friction Products Division of Abex Corporation, Winchester, Va., settled on as the best asbestos replacement. The company is using fiber glass reinforcement in its *ABEX EXL* (extra long life) brake linings.

ABEX EXL brake linings are available for automobiles, trucks, off-road vehicles and industrial brakes — all of the brake products it traditionally offers in asbestos. *ABEX EXL* friction material is a matrix centered around PPG chopped strand in a thermosetting polymer system.

Abex, a member company of IC Industries, has been manufacturing brake linings since 1902, when it began producing brake shoes for locomotives and railroad cars. Today, it is the world's largest producer of friction materials, with 16 plants throughout the world supplying brake linings for automobiles, trucks, airplanes, off-road vehicles, material-handling equipment and industrial machinery.

Abex began investigating alternate materials for asbestos when higher braking temperatures and higher wear rates became apparent as vehicles were downsized and tractor/trailer trucks were made more streamlined in response to government-mandated fuel-efficiency goals and the public's demand for fuel-efficient cars.

Smaller cars, more aerodynamic design, smooth-rolling radial tires and front-wheel-drive necessitated smaller and lighter brake components and overall brake system redesigns. The typical 1983 disc brake rotor is two inches smaller and 15 pounds lighter than its 1973 counterpart. Brakes on compact and subcompact cars, therefore, absorb more energy than before. Brake and automobile manufacturers began to look for environmentally acceptable materials that performed even better than asbestos.

Truck brakes today also operate at higher temperatures, mainly because of improvements that have reduced drag and improved fuel economy. Aerodynamic flaring, lower axle ratios, radial tires and declutching fans have reduced drag in tractor/trailers by about 100 horsepower over the past six years. Today, a typical tractor/trailer descending a three percent grade must develop 369 percent more brake horsepower to stop than in 1973.

Nonmetallic and metalic linings

Abex's research for a high-performance, asbestos-free brake lining material covered nonmetallic and metallic materials.

As tractor/trailers became more aerodynamic, reduced drag caused brakes to work harder, increasing wear and operating temperatures. Trucks like this Mack Ultra-Liner demand more brake horsepower than less "slippery" trucks of 10 years ago.