sensitive and can cause severe galvanic corrosion in wet environments, when used against the typical grey cast iron countersurface materials. Aircraft disc brakes and heavy duty truck/tractor clutches are present uses for the sintered bronze friction materials.

No known new application of these relatively old and well developed friction materials has resulted from the search for asbestos substitutes, largely due to their cost and sensitivity to light-duty environmental conditions[9].

4.4.4 Carbon-Carbon Friction Materials

These materials are space-age composites of carbon (graphite) fiber, held in a matrix of amorphous carbon using a costly and time-consuming manufacturing process.

Military aircraft, race cars, and some commercial aircraft now sometimes use the carbon-carbon friction materials for both the stationary and rotating elements of disc brakes. High cost and environmental sensitivity have limited additional applications[9]. Recent developments of lower cost carbon fibers may increase their use in vehicle applications.

4.5 Aftermarket Vehicle Considerations

4.5.1 Drum Brakes

Brake design also affects the suitability of using some friction materials. The duo-servo drum brake used in older U.S. vehicles usually employs two different types of linings, with different friction properties, on a single brake to maximize overall brake performance. Aftermarket friction materials must be capable of replicating original design friction levels and friction stability to achieve acceptable vehicle braking performance.

The leading-trailing drum brake used on the rear axle of the new, smaller front wheel drive vehicles does not require friction materials with such stringent friction stability properties. In both applications,