

General Motors Corporation
Statement on
EPA Proposed Asbestos Mining and Import Restrictions and
Manufacturing, Importation and Processing Prohibitions
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Statement for Public Hearing on Asbestos Ban by
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General Motors currently has in production approximately 80 unique brake systems. It sells replacement parts for many additional systems including more than 100 for vehicles produced since just 1982. In addition to federal laws governing brake systems, each system must provide vehicle owners with satisfactory performance for a wide array of conditions. A partial listing of customer requirements includes cold performance, hot performance, park brake effectiveness, noise, wear out life, friction stability, corrosion resistance, heat transfer rate, and fade resistance. These brake systems must satisfy customers ranging among the "old man of the mountain" who spends his retirement driving up and down pikes peak every day, rural mail carriers in Minnesota, New York city taxi cabs, and Mojave Desert park rangers. Though colorful to describe, these conditions represent actual brake tests for our vehicles. A more complete list is included in Attachment I.

Each brake system is thoroughly tested to assure that these stringent requirements are met. This testing process involves hundreds of thousands of test miles on hundreds of vehicles. It involves years of fleet testing on public roads as well as scores of tests by Proving Ground testers. This testing is required to satisfy the safety and performance requirements of our customers. As a manufacturer, we provide this level of performance for both OEM and service brake parts for each of these approximately 200 brake systems. Because this process can require up to five years, an abrupt change of the linings on these brake systems can not be made.

As part of its normal product improvement process, GM completes this validation process on about ten new brake systems each year. This process requires about 100 engineers, technicians, and designers dedicated solely to brake system work. In addition, several hundred drivers and testers are required for the road testing of these vehicles. Fortunately, much of the test driving is done on vehicles which have many other parts being tested. However, redesign of vehicle brake systems already in production would require this testing to occur on many vehicles dedicated solely to brake system testing. Thus, if it takes 400 people to validate 10 brake systems per year, it would require an additional 1600 people for five years to redesign and validate 200 existing brake systems. Certainly some economy of scale would reduce this army, but you can see that the effort is formidable. Even neglecting the cost of such an effort, there are not enough trained people to handle an engineering and testing effort of this size.

We have attempted to produce an orderly phaseout of asbestos in the past. In 1979 the GM brake community made it a goal to eliminate asbestos by 1985. This commitment has largely been met on front disk brakes but has not been met on rear drum brakes. The difficulties in changing the rears have been varied and subtle. They include squeal, wear, and friction stability.

In order to completely eliminate asbestos in brake linings, manufacturers, customers and the NHTSA may have to accept some changes in brake performance. For example, if we convince our customers to accept frequent lining changes and periodic replacement of drums, we could probably use some of the non-asbestos European linings. There is a high probability, however, that the customer will tire of the squealing noise and replace his linings with some untested but quiet lining material.

The key point that needs to be made is that even though there are replacements for asbestos, there are no direct substitutes for asbestos. The distinction is that replacement of asbestos linings with non-asbestos linings requires redesign and revalidation of the complete brake system. There are simply no known materials which can be substituted for asbestos with no change in performance. For example, in Attachment II, I have included a list of system changes which might result from a lining change.

In short, the elimination of asbestos friction materials in passenger cars and trucks represents a formidable engineering challenge requiring not only innovation but also invention. As an engineer I can accept that challenge, but only if the timeframe to implement it is realistic, and the process allows a realistic allocation of resources.

ATTACHMENT I

BRAKE TESTING CONDUCTED AT GENERAL MOTORS

Brake System Testing Required by Federal Law

- "green" brakes
- driver only stopping distances
- fully laden stopping distances
- fade
- water recovery
- parking brake
- abuse
- failures

Brake System Testing Required by Customer Performace Expectations
All of the above testing plus:

- durability
- corrosion
- mountains
- noise
- hills
- fade
- vibration
- pulsation
- cold
- snow
- car wash
- hot
- mud intrusion
- brake balance
- stability
- modulation
- pedal feel
- pull
- braking in a turn
- wear
- service

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ATTACHMENT II

EXAMPLE OF SYSTEM CHANGES THAT MIGHT OCCUR WITH A LINING CHANGE

Assume that a replacement lining has 20 percent less friction than the original:

A larger wheel cylinder would be specified to achieve the required torque output.

A larger wheel cylinder results in more fluid displacement and may require a master cylinder change to obtain the proper pedal travel.

Larger master cylinder may make pedal effort too high necessitating a booster change.

Testing of the vehicle may indicate insufficient park brake capability due to the reduced friction necessitating a park brake cable change.

Increased cable forces may result in park brake strut buckling during abuse tests, necessitating a foundation brake redesign.