

assembly⁷ for the pneumatic antilock brake system on large trailers. Information provided by Bendix indicates that the M-12 was manufactured between November 1997 and March 2001 with a total production of approximately 78,509 units. Additional information indicates that the M-12 underwent four modifications during the years of production. Those modifications are summarized in the table below.

Date	Modification
March 1998	Change in solenoid supplier.
August 1998	Dura Drain Feature Added.
September 1999	Housing Casting Improved.
October 2000	Dura Drain Feature Discontinued.

With regard to the defect petition, the most applicable modification would appear to be the introduction of the Dura Drain feature, which was added as a product improvement. Bendix reported an approximate production of 50,778 units (approximately 64% of the total units) with this feature. The Dura Drain feature was subsequently discontinued, reportedly as a means to reduce cost. Production of the M-12/MC-12 was discontinued approximately 5 months later (March 2001), as it was replaced by the MC-30 modulator/ECU assembly.

M-12—Bendix Response

Bendix advised ODI that with regard to the defect alleged by the Petitioner, the company conducted an investigation that consisted of multiple tests and studies. This investigation began in November 2000 after a Bendix representative, while on a routine customer contact visit, was informed of an issue that was described as “inconsistent trailer braking.” The customer, a vehicle fleet owner with facilities near the Bendix headquarters, regularly participated in the evaluation

of Bendix products. According to Bendix, the complaint concerned reports of three fleet drivers who described an occurrence of “trailer push,” in which the vehicle driver senses that the trailer brakes appear to operate more slowly or less effectively than the tractor brakes. The ensuing investigation determined that the likely cause was a diminished build up of air pressure in the trailer brake system.

During the early stages of the investigation, the Petitioner’s allegation and analysis that diaphragm rigidity due to cold ambient temperatures was considered as a possible cause. Bendix reported that further evaluation and testing “cast doubt” on the Petitioner’s contentions. The company reported that there had been no similar complaints during the winter months of 1998, 1999 and early 2000. Furthermore, the compound used in the M-12 diaphragm was specified for adequate performance to –40 degrees Fahrenheit. Bendix reported that testing at cold ambient temperatures could not “consistently replicate the predicted (poor) performance” due to a rigid diaphragm.⁸

Nonetheless, Bendix continued to receive trailer-braking complaints, many outside of winter months. As Bendix conducted detailed inspections of the M-12 modulators, the company observed “a strong correlation (of braking complaints) to the presence of solid or fibrous contamination in the air intake valve area.” The company also observed that the complaints “were regionally clustered” and “specific to certain vehicle (trailer) makes.” The conclusion of their investigation was that contamination in the intake port of the valve and not the rigidity of the diaphragm was the most likely cause for a majority of the “trailer push” or extended braking distance complaints. Bendix also noted that an evaluation of some complaints revealed other causes such as kinked air lines or external

valve damage. Regarding the source of the contamination, Bendix cited the observation of material consistent with insect infiltration or hibernation as well as possible maintenance practices.

Bendix reported no known occurrences of crashes or injuries associated with the lack of performance or failure of the M-12 modulator.

Bendix Complaint and Warranty History

ODI queried Bendix with regard to complaints and warranty claims that referenced the M-12. Bendix provided ODI with data indicating that between April 1999 and early August 2003, the company received complaints on 139 M-12 units⁹ that were in use on trailers owned by seven (7) fleets. Nearly 70% of the complaints were received from one large fleet described by Bendix as one that regularly participates in product evaluations. A second large fleet accounted for approximately 18% of the complaints, revealing that nearly 88% of the complaints originated with two fleet operations.

Bendix reported that in those cases in which it was able to investigate the basis for the complaint, contamination of the air system was identified in approximately 94% of the complaints. With regard to the contamination, Bendix reported that the majority consisted of evidence of insect nesting and fibrous/cloth material likely to have been introduced during vehicle assembly or maintenance.

For all but 27 complaints, Bendix provided information on the month and year of the complaint (identified as the date of occurrence). Review of the data revealed that more than half of the complaints were received during 2001. The data also revealed that less than one half of the complaints occurred during the winter months of November through February. These trends are illustrated in the tables below.

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⁷ The M-12 also carries the designation of MC-12 when an ECU is combined with the modulator/relay valve assembly.

⁸ Data provided by Bendix does indicate that some early testing revealed occasional leakage of Dura Drain at colder temperatures when the antilock system is active. Additionally, Bendix concedes that a rigid diaphragm could lead to degradation in antilock brake performance.

⁹ Complaints appear to reflect all M-12 units. There was no differentiation between units produced with and without the Dura Drain feature, resulting in an overall complaint rate of 17.7 per 10,000 units.