

Technical Bulletin

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Subject: **Bendix® ABS "Chuff" Test Performance**

Chuff Test

Most Bendix® ABS ECUs are capable of automatically performing a check of the ABS modulators when ignition power is applied. This check (commonly referred to as a "chuff" test) is a diagnostic enhancement designed to assist maintenance technicians in verifying proper modulator wiring and installation when servicing the ABS. This bulletin concerns the potential for contamination in ABS modulator valves to limit or prevent the audible "chuff" test sequence at vehicle start up.

How Chuff Test Works

When ignition power is applied, each modulator solenoid is briefly energized. If the air system is fully charged and the service brake pedal is completely depressed during ignition, the modulator creates a single, sharp audible "chuff" of air pressure. The modulators are energized in a certain pattern, as follows: right front, left front, right rear, left rear. This test is performed only when the vehicle is stationary (the ECU will not perform a chuff test if the vehicle is in motion). Refer to the service literature for the specific ECU (available for download at www.bendix.com).

Purpose of the Chuff Test

The chuff test is a diagnostic enhancement designed to assist the maintenance technician in verifying proper modulator wiring and installation when servicing the ABS. This diagnostic check is not required to be conducted by vehicle operators at every ignition cycle. Rather, the ABS indicator lamp on the vehicle dash is designed to give the ABS status to the vehicle operator. Vehicle operators should observe the ABS indicator lamp at start up and during vehicle operation. See "ABS Dash Indicator Operation" below.

ABS Braking Control Operates Differently Compared to the Chuff Test

ABS control is performed in a "closed-loop" manner where the ECU controls the vehicle modulators while closely monitoring the wheel speed. Based on the recovery of the wheel speed, the ECU will deliver shorter or longer modulator control signals as necessary. By contrast, the signals to the modulators during a chuff test are single, small pulses — much shorter than the signals sent during a typical ABS event.

Effect of Contamination on the Chuff Test

The presence of contamination in the modulator valve can, in some cases, prevent the test pulse of air from creating an audible "chuff" during the chuff test, however the modulator valve may still be fully functional and capable of performing ABS functionality. In all cases, there is no effect on the normal service braking of the vehicle.

Bendix ABS ECUs monitor the operation of the modulator valves and when a problem is detected, the ECU will illuminate the ABS indicator lamp on the dash during operation. The status of the ABS indicator lamp, therefore, and not the lack of an audible chuff at start up, should be used as your guide to the ABS system status.

The vehicle will still have normal service braking and it still can be driven, even when the ABS indicator lamp is illuminated, although without the benefits of full ABS. The vehicle should be serviced as soon as possible by a qualified mechanic to restore full ABS functionality.

General Information: ABS Dash Indicator Operation

The ABS dash indicator lamp gives the vehicle operator an indication of ABS status. At each vehicle ignition, the ABS dash indicator lamp

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should illuminate as a bulb check for approximately three seconds and then turn off. If the lamp does not illuminate at ignition or if it comes on during operation or remains on after the initial bulb check after ignition, the vehicle should be serviced as soon as possible by a qualified mechanic to restore full ABS functionality.

Recommendations

Vehicle operators should follow appropriate maintenance procedures to ensure that the air system remains clear of contamination. If a modulator does not create a chuff of air during the chuff test, it is not necessary for the vehicle to

be immediately removed from service. Bendix recommends inspection of the ABS and air system plumbing at the next scheduled maintenance. Such inspection should also check for air system contamination. Disassembly of the modulator for cleaning is not recommended.

Warranty

Bendix warranty does not cover modulator malfunctions due to contamination.

Please contact your Bendix account manager or call 1-800-AIR-BRAKE (1-800-247-2725) for further information.

