

NAVISTAR, INC.		
Material, Parts, and Process Specifications (MPAPS)		NUMBER: MPAPS P-9567
		Former Designation: N/A
TITLE: Evacuation and Fill Process for Clutch Fluid		CURRENT REV No.: 1410
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<i>This specification may involve hazardous materials, equipment, and procedures. This specification does not purport to address all of the safety issues associated with its use. The user is responsible to consult appropriate safety and health practices and to determine the applicability of regulatory limits prior to use.</i>		
Change Notice: Removed Section 4.3.3 and renumbered following sections; revised Section 4.3.4 (now Section 4.3.3); editorial changes.		

1.0 APPLICATION

This specification covers the requirements within vehicle assembly plants for the process to remove air from the clutch system (reservoir, master and slave cylinders, tubing) known as EVAC, and the subsequent process to fill the system with appropriate Hydraulic Fluid (typically DOT 3 or 4).

2.0 SCOPE

This specification includes requirements on vehicle manufacturing processes, to protect various vehicle components from damage during the EVAC and FILL of the Clutch system.

2.1 Restricted Chemical Substances

Effective January 1, 2007, all product supplied to the requirements of this specification must comply with the requirements of the MPAPS B-50 specification.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified, the latest issue of all referenced standards shall apply. The following Specifications, Standards, and Regulations are referenced in this specification.

Quality System Standard ISO 9001 or TS-16949
CFR Title 29, Part 1910
NAVISTAR MPAPS B-50
Manufacturing Standard MS-D-13

4.0 REQUIREMENTS

4.1 General

The clutch system is made up of metal parts (cylinders, tubing) and some plastic or rubber parts (reservoir, seals, gaskets). It has been found that excessive vacuum or fill pressure can damage some of these components. This can be apparent at the plant (such as the bursting or leak in the reservoir) or may not show up until the vehicle is in the hands of the customer (e.g., slow leaks). Hydraulic fluid is generally detrimental to paint and many plastics. Avoiding the mess associated with a burst reservoir is important. Therefore it is required to control these vacuum and fill pressure settings.

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OCTOBER 2014



Documents

Page 1 of 4
Document Sharing Hub

NUMBER: MPAPS P-9567	TITLE: Evacuation and Fill Process for Clutch Fluid	REVISION: 1410
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4.2 EVAC and Fill Process Overview

A “top fill” procedure in the vehicle plant station is to avoid the inconvenience of bleeding of lines. The process uses an evacuation pump to remove air from the system, and follows by filling with fluid. The station has a dedicated hose for the process, that screws onto the reservoir cap location, which is mounted high in the engine compartment near the meeting of the hood and the bulkhead, just forward of the driver. This hose is partially supported by a cable, and the operator must also insert a temporary brace under the reservoir, so the considerable weight of the hose/fill cap do not unduly stress the plastic part. This is critical to maintaining the mechanical integrity of the system.

4.3 EVAC Step

4.3.1 The system, all components collectively, has a volume on the order of one liter. Removal of all air is not practical, but sufficient quantity must be removed to reduce any bubbles once the remaining space is filled with fluid.

4.3.2 The station hose is attached to the system at the cap, and evacuation begins.

4.3.3 Note that full evacuation is not a requirement. The plant should perform some tests with their equipment, and aim to fill the system within station cycle time, with as little evacuation as possible. The clutch hydraulic system is self-bleeding. The only requirement is that the pedal can develop pressure (may require a few pumps) such that the pedal does not hit the floor. This step is performed at the end of the fill cycle. Failure to develop this pressure (caused by the slave cylinder reaching the clutch brake stop) is considered indicative of a leak somewhere, requiring the vehicle to be “off lined” and repaired.

4.4 Fill Step

4.4.1 The same hose used for EVAC shall deliver fluid at a pressure not to exceed 20 psi. It is suggested that a setting of 18 psi will be satisfactory regarding cycle time.

4.4.2 It is desirable that the filling system be able to monitor the volume of fluid delivered, and cease pumping if the volume exceeds some set value, on the assumption there is some leak in the system. This condition would be recorded as a failure.

4.4.3 It is desirable that the filling system halt the process if it fails to deliver at least some minimum amount of fluid within a set time limit the system shall stop pumping, on the assumption there is some blockage in the system. This condition would be recorded as a failure.

4.5 Hose Removal

The hose shall have the vacuum port such that it extends into the reservoir to the depth between the MIN and MAX fill lines. This is so the vacuum will suck up any liquid above the desired level as the cap is being removed, and also catch any drips. Vacuum will be maintained until the operator has hung the hose on a hook or otherwise signaled the control system the step is complete. This vacuum need not be strong to be effective. It is suggested (as a starting point) that 360 mm Hg (1/2 Atmosphere) is sufficient to accomplish the goal (leave just the right amount of fluid in the reservoir, and capture drips). It is not suggested to use the same setting for the EVAC step--- in fact, such a strong vacuum is not recommended. Use a setting reliably sufficient for the goal, not stronger. In this context the goal is completing the process within station cycle time.