

Revisions to this document are noted by a stripe in the left-hand margin.

#1098C
Page 1 of 6

SUBJECT: Transmission Fluid and Filter Service Recommendations

EQUIPMENT AFFECTED: 5/6/8/9000 Series Off-Highway Transmissions

Introduction:

Off-highway transmissions require proper transmission fluid and regular fluid system maintenance for optimum performance, durability, and reliability. Fluid selection is influenced by operating environment and duty cycle. The severity of transmission service and the type of fluid, filter assembly, and filter elements determine the fluid and filter change intervals. This document summarizes the current Allison Off-Highway Transmission fluid and filter service recommendations.

Transmission Fluid Recommendations:

Allison Transmission recommends only fluids meeting Allison Type C-4 specification for use in 5/6/8/9000 Series Off-Highway transmissions. The current C-4 fluids approved by Allison are listed in bulletin GN3465EN available via the Allison website www.allisontransmission.com. This list is also available from Allison Transmission Distributors or Dealers. Before using any fluid, check that it is listed in the C-4 Approved Fluids List.

Higher viscosity fluids, such as SAE 30W or SAE 15W-40 oils are recommended for optimum transmission life in 5/6/8/9000 Off-Highway transmissions. When choosing the optimum viscosity grade of fluid to use, consider geographic location and preheat requirements. Proper viscosity grade selection is important for transmissions when operating the transmission in conditions below a fluid's minimum operating temperature. Preheat or fluid warm-up is required when operating Allison transmissions below the fluid's minimum critical temperature, which is viscosity grade dependent. Chart 1 lists a number of lower viscosity fluids for consideration when operating in low ambient conditions and lists the minimum fluid temperatures below which preheat or warm-up are required. If preheating is necessary, use either auxiliary heating equipment, or warm-up the transmission by starting the engine with the transmission in N (Neutral), and operating at the engine low idle speed for a minimum of twenty minutes before attempting range operation. If cold weather starting is not a factor and/or the transmissions are operating in a warm/hot environment, the higher viscosity fluids are recommended.

CAUTION: Disregarding minimum fluid temperature limits can result in transmission malfunction or reduced transmission life.

NOTE: DEXRON®-VI is not approved for 5/6/8/9000 Off-Highway transmissions.

FS / SL5533EN

Allison Transmission, Inc.
Indianapolis, Indiana 46206-0894

Copyright 2007 Allison Transmission, Inc. All Rights Reserved.

Chart 1. Minimum Operating Temperature (without preheat)

SAE Viscosity Grade	Degrees (C)	Degree (F)
SAE 0W-30 or TranSynd™ RD	-30	-22
SAE 0W-20 (Arctic Oil)	-30	-22
DEXRON®-III	-28	-18
SAE 10W	-20	-4
SAE 15W-40	-15	5
SAE 30	0	32
SAE 40	10	50

Transmission Fluid Change Interval:

Fluid analysis is the preferred method for determining the transmission fluid change interval. Monitor the oxidation level according to the measurement limits shown in Table 1. The fluid is still **usable** if it meets both limits in Table 1. If fluid analysis **cannot** be utilized, change the fluid every 1200 hours of operation when using C-4 Fluids, or every 4000 hours when using TranSynd™ RD fluid (see Table 2). If the transmission is utilized in an application where low annual usage applies (less than 500 hours per year), the change interval is 48 months when using TranSynd™ RD **when supported by oil analysis** (see Table 2).

NOTE: A Fluid Analysis Kit PN 29537805 is available from Allison Transmission.

NOTE: If converting from a C-4 approved fluid to TranSynd™ RD fluid, the initial concentration of TranSynd™ RD is not sufficient to allow the 4000 hour change interval. Initial fill of TranSynd™ RD fluid is mixed with former C-4 approved fluid and as such, retains the C-4 approved fluid drain interval of 1200 hours. When the second TranSynd™ RD fluid change occurs, the concentration is sufficient to allow the 4000 hour fluid drain interval.

Table 1. Fluid Oxidation Measurement Limits

Measurement	Limit
Viscosity	+/- 25% change from new fluid
Total acid number	+3.0 change from new fluid
Consult your local industrial yellow pages for fluid analysis firms. Use one fluid analysis firm as results from various firms cannot be accurately compared.	

When servicing any transmission, visually inspect the fluid at the sample and drain locations for dirt, metal, or coolant contamination. More frequent fluid changes may be required if the fluid is visually contaminated, if the environment produces high levels of contamination, if the duty cycle subjects the unit to frequent overheating, or if fluid analysis indicates that the fluid is oxidized beyond the limits in Table 1.

Table 2. Standard Fluid Change Intervals (by Fluid Type)

Transmission Model	Fluid Recommendation	Drain Interval (hrs)
5000, 6000, 8000, 9000 Series	TranSynd™ RD	4000 hours or 48 months
	C-4 Fluids	1200 hours

Filter Element Change Intervals and Service:

Filter element change intervals are determined by the model filter assembly and filter elements used. The current *High Efficiency Filter Assembly*, released to production built 5/6/8/9000 series Off-Highway transmissions in late 1984 (reference SIL 22-TR-84) uses a fiberglass media rated nominally at 6 micron. The former AC filter used a cellulose media nominally rated at 25–40 micron. For the purposes of this letter, only the current High Efficiency Filter Assembly will be discussed.

NOTE: The charging pump screen located in the transmission sump is an oil strainer and need only be serviced at overhaul.

If the filter change interval cannot be monitored with the delta-P switch as described below, change the filter elements whenever the fluid is changed and at 600 hour intervals between fluid changes.

Allison High-Efficiency filter assemblies are equipped with a differential pressure (Δp) switch to indicate when the filter element requires service. This serves two important functions—it allows the actual change interval to be determined for each customer's application, and is a good service requirement indicator. The Δp switch senses the pressure difference between the unfiltered fluid entering the filtration media and the filtered fluid exiting the filtration media, and acts as a 'cumulative particle counter' indicating when the filter elements are plugged with filtration debris and must be changed. "Cumulative Particle Counter" refers to the debris suspended in the fluid that is captured by the filtration media. This debris varies in size down to the filter element rating. For the case of Allison High-Efficiency Filters, that value is nominally considered to be 6 micron. When enough particles have been captured by the element, the cumulative amount creates enough restriction in the filtration element to generate a pressure differential sufficient to activate the differential pressure (Δp) switch, which is set to a 35 psi differential rating. Sustained operation after the indication point will cause the filter bypass valve to open, allowing unfiltered fluid to circulate into the transmission.

CAUTION: For Allison High-Efficiency direct- and remote-mount transmission main circuit filters, the integral bypass valves are located in the filter base (Figures 1 and 2). Inspect the bypass valves whenever the filter elements are changed. A visual check must show the bypass valve squarely seated in the filter housing (Figure 3). If the valve is cocked, loose, or missing, replace the filter base assembly.

This following procedure applies to Allison High-Efficiency filters and filter elements supplied with transmissions built 1984 and later and those transmissions that have had the High-Efficiency Filter system retrofitted onto earlier built units.

Filter elements capture debris suspended in the fluid generally from two sources. These two sources are contaminants from the transmission / cooler circuit and from the fluid itself. The debris amounts are highest when a new or newly rebuilt transmission is installed or an oil change has just occurred. **Shorter than normal filter service life may be experienced in these conditions** due to the fluid being filtered to the level of the Allison High-Efficiency filter. However, each successive element should provide longer service life. When replacing the filter element, do not change the transmission fluid unless the fluid is visibly contaminated. New transmission fluid is generally contaminated above the 6-micron level and changing the fluid unnecessarily may actually *add contaminants* resulting in reduced filter element life. One way to maximize filter service life would be to **pre-filter** the replacement fluid before or while adding it to the transmission. If problems persist, check with the fluid supplier or perform a fluid analysis of the new fluid. By changing the element(s) before indication by the Δp switch, significant usage of the filter can be wasted and is not cost effective. Additionally, by changing the element prematurely, a vital source of wear contamination information is lost, or at least distorted.

NOTE: Monitoring the actual filter element service life to the indicated change point as determined by the Δp switch indication allows the general condition of the transmission internal wearing components to be determined.

After system cleanup, the filter elements provide long-service life in a normally functioning transmission. A normally functioning transmission does not generate debris that needs to be removed by the filter element. As the internal wearing components inside the transmission begin to deteriorate, the service life of the filter element is measurably shorter due to the filtering out of the debris from the deteriorating component. When this occurs, the transmission does start to generate debris.

NOTE: Measurable premature filter element Δp indications may be utilized as an early warning signal that a preventive maintenance repair is advisable to prevent excessive consequential damage.

Due to the significant cost-of-operation advantage that can be achieved by monitoring the Δp switch system, it is recommended that the proper function of this system be monitored on a periodic preventive maintenance schedule. A test block to activate the switch is shown in Figure 4.

Technical Information:

For detailed information on transmission fluid characteristics, analysis, and selection, refer to GN2055EN, Automatic Transmission Fluid Technician's Guide, available from any Allison Transmission Distributor or Dealer.

Service Information:

For complete fluid and filter change procedures, refer to the appropriate service manual:

SM1228EN	8000 Series Transmissions Service Manual
SM1833EN	9000 Series Transmissions Service Manual
SM1866EN	5000/6000 Series Transmissions Service Manual

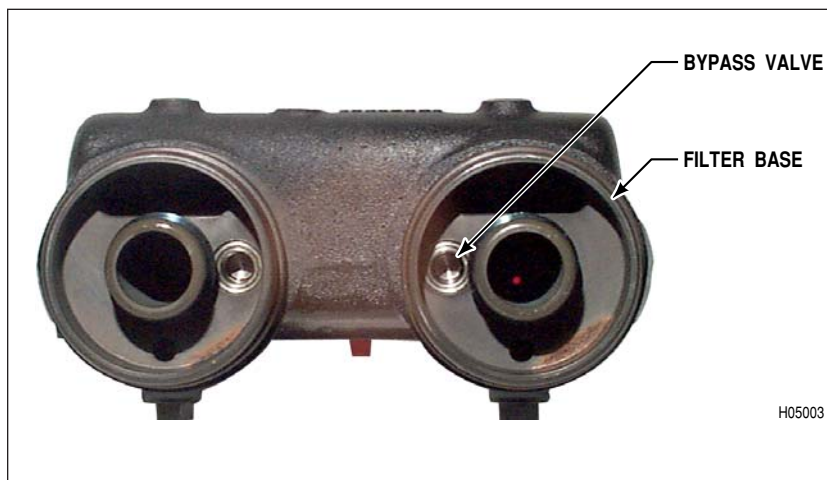


Figure 1. Direct-Mount Filter Base

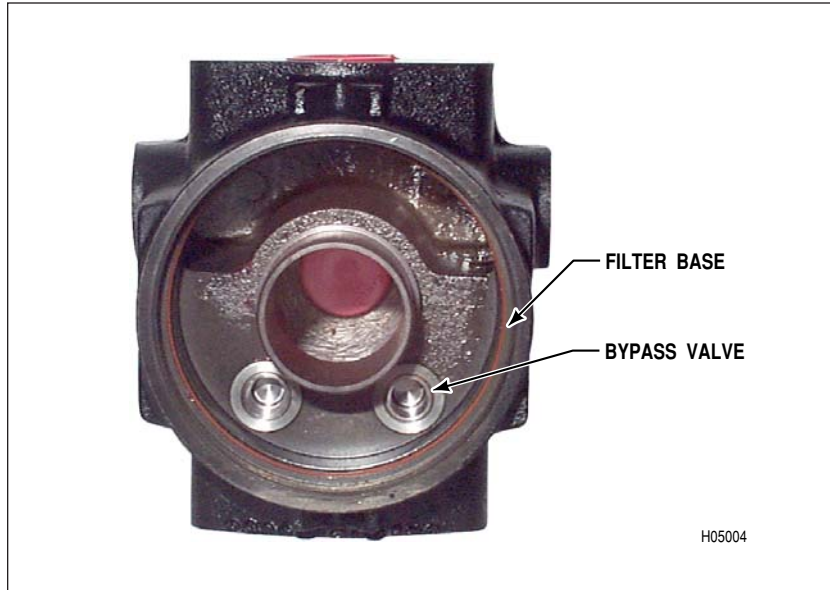
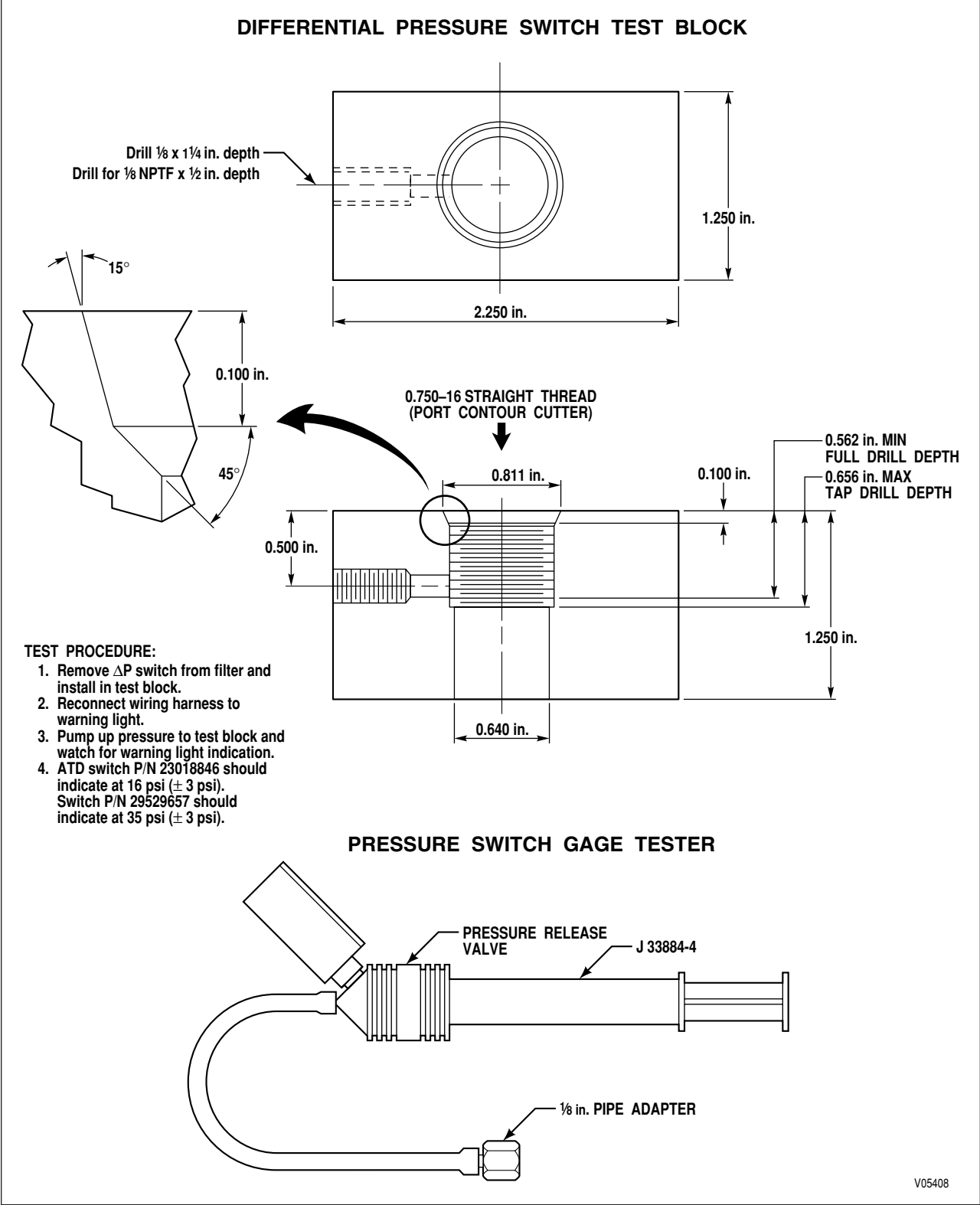


Figure 2. Remote-Mount Filter Base



Figure 3. Bypass Valve Seated in Filter Base



V05408

Figure 4.