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DIRECTORATE GENERAL BORDER ROADS

# GENERAL MAINTENANCE INSTRUCTIONS

No.14

**GENERAL HANDLING, MAINTENANCE AND CLEANING PROCEDURE  
FOR TURBOCHARGERS USED ON DIESEL ENGINES OF  
INTERNATIONAL HARVESTER CONSTRUCTION EQUIPMENT  
MACHINES EQUIPPED WITH TURBOCHARGED DIESEL ENGINES**

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communicated to the press or to any person not  
authorised to receive it.

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GENERAL HANDLING, MAINTENANCE AND CLEANING PROCEDURE FOR TURBOCHARGERS USED ON DIESEL ENGINES OF INTERNATIONAL HARVESTER CONSTRUCTION EQUIPMENT MACHINES EQUIPPED WITH TURBOCHARGED DIESEL ENGINES.

1. The purpose of this Instruction is to fully inform you of the care that must be taken in the operation and maintenance of turbochargers to assure maximum service life.

**CAUTION**

2. Air flow requirements for diesel turbocharged engines are considerably greater than for a non-turbocharged engine of the same size running at the same speed. Air inlet accessories, such as precleaners, must be selected to minimize the restriction at this higher air flow and to maintain performance of the turbocharger unit.

**GENERAL HANDLING**

(a) Cover or plug all openings in the turbocharger when handling or shipping to prevent the entrance of foreign material.

(b) Before installation, prime the lubrication system of the turbocharger by adding clean filtered oil into the oil inlet connection. Rotate the shaft and check for interference of the compressor or turbine wheel in the housing.

(c) All connections to the turbocharger (manifolds and piping) must be clean and free of foreign material since serious damage to the turbocharger or engine could result. All connections must be airtight.

(d) Install the turbocharger support brackets, if provided, to relieve excess stress on the turbocharger inlet flange and exhaust manifold. Exhaust stacks of extra long length and other fixtures should not be rigidly attached to the turbocharger. If extended stacks are used, they should be supported by the hood. Exhaust stack must be higher than intake stack.

(e) When hauling or transporting a unit, the exhaust stack should be covered.

**OPERATION AND MAINTENANCE INSTRUCTIONS**

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(a) When starting turbocharged diesel engines, do not fully advance the engine speed control lever immediately. Run the engine at part throttle for a few minutes to allow through distribution of the lubricating oil. The machine should not be placed under load until normal oil pressure is reached.

(b) When a turbocharged diesel engine has been in storage for 30 days or longer, when an engine has been overhauled, or when a new turbocharger has been installed on an engine the following must be done before starting the engine:-

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- (i) Remove the oil inlet tube from the turbocharger.
- (ii) Pour approximately five ounces of engine oil into the turbocharger core assembly.
- (iii) Reinstall the oil inlet tube. The above precaution provides initial lubrication for the turbocharger bearings before engine oil pressure is built up.
- (c) SERIES 3 Oil is to be used in all turbocharged engines. Oil drain and filter change periods are as stated in operator's manuals. Use of oil under other classification will cause sludging.
- (d) New engines are "run-in" at the plant; therefore, all new engines are shipped without a turbocharger oil inlet screen. It is recommended that an oil inlet screen be installed in the turbocharger after an engine overhaul.

IMPORTANT DO NOT LEAVE THE SCREEN IN THE TURBOCHARGER BEYOND THE FIRST 5 TO 25 HOURS OF OPERATION OF A NEWLY OVERHAULED ENGINE, AS THIS SCREEN CAN CLOG WITH CARBON THAT IS NORMALLY SUSPENDED IN THE OIL OF A DIESEL ENGINE.

This clogging will "starve" the turbocharger bearings of oil and thus bring about premature failure. To avoid premature bearing failure, the procedures listed below must be followed.

- (i) All screens are to be removed from the turbochargers on machines in the field, unless it is a newly rebuilt engine in its first 5 to 25 hours of operation. All machines should be checked on the pre-delivery service to be sure that the screen has been removed.
- (ii) The screen is to be installed in the turbocharger of an engine that has been rebuilt and should be left in - for the first 5 to 25 hours of operation. At the end of this time, the screen must be removed and the crankcase oil changed. It is suggested that this be done when the head is retorqued.
- (iii) Any time the Air research turbocharger is removed and reinstalled, the screen is to be used for the first 3 to 10 hours and then removed. The Schwitzer turbocharger does not have a screen.
- (iv) The lubricating oil pump on the 817 series diesel engines should be primed (Refer to Service Bulletin 1-60-11 if available).
- (e) It is imperative that the oil bath air cleaner be serviced every 10 hours or more frequently under severe dust conditions because of the oil carry-over and power losses that result from a restricted cleaner (CAUTION-Before disassembling, thoroughly clean oil connections to prevent the entry of dirt.)
- (f) Clean the engine crankcase breather periodically to assure that there is no restriction.
- (g) During normal operation the turbocharger should be free from any unusual noises.

**IMPORTANT**

(h) It is important to operate the engine at ½ throttle (no load) for three to five minutes before final shut-down after operating under load . This will aid in the cooling of both the engine and turbocharger thus minimizing the possibility of damage.

(j) Check the cap screws, hold-down nuts air connections and oil connections to and from the turbocharger for tightness at periodic intervals. Retorque after initial worm-up following assemblies of these parts. Hoses and oil lines should be inspected and replaced when necessary.

(k) Cover the exhaust stack to prevent water from entering and damaging the turbine during shutdown periods.

(l) When the air cleaner hose is removed at the filter change periods, check the compressor wheel for deposits, damaged blading, interference or excessive end play.

(m) At 500 hour intervals remove the compressor housing, inspect and clean if necessary.

(n) It is advisable to allow exhaust manifolds to cool before removing them. From the engine. This will prevent warping.

(o) When installing the turbocharger on the mounting flange, a liberal application of Never-Seeze or a comparable compound should be applied to bolts or studs to provide easier future removal.

**TURBOCHARGER CLEANING PROCEDURE**

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(a) In the event deposits are discovered, the deposits should be removed and the compressor impeller and housing should be cleaned. The removal of the deposits is to protect the engine and the turbocharger. (CAUTION-ALL deposits must be removed to prevent turbocharger bearing failure.)

(b) Remove the compressor housing to prevent deposits and cleaning solvent from entering the engine intake system and to facilitate cleaning of the wheel.

.....(c) The safest cleaning procedure is to loosen the biggest portion of the deposits by using a non-metallic scraper to avoid damage to turbocharger components. After scrapping, thoroughly brush all deposits from the impeller. A suggested combination cleaning tool would be a tooth brush with the handle field square for scraping purposes.

**Attention**

Cleaning should be done with a petroleum solvent and not with a chemical detergent cleaner, All deposits must be removed from the impeller wheel so that balance of the rotating assembly will not be affected. Because of the high speed of the turbocharger rotating the assembly, this balance is critical and, if disturbed, could result in turbocharger failure.

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(d) Reassemble the housing to the -turbocharger.

(e) Operate the turbocharger for a short period of time at low engine idle speed to remove any deposits which may have fallen into the compressor housing. Do this before connecting the compressor discharge outlet to the engine intake manifold to prevent deposits and solvents from entering the engine.

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