EMD MAINTENANCE INSTRUCTION

ENGINE AIR INTAKE FILTERS OIL BATH TYPE

DESCRIPTION

Clean air is very important in engine operation to protect power assembly wearing surfaces from abrasive matter as well as to reduce lubricating oil contamination. A large volume of air is necessary for engine operation, all of which must be properly filtered. Oil bath filters, Fig. 1, offer an efficient means of achieving desired results with comparatively low maintenance expense.

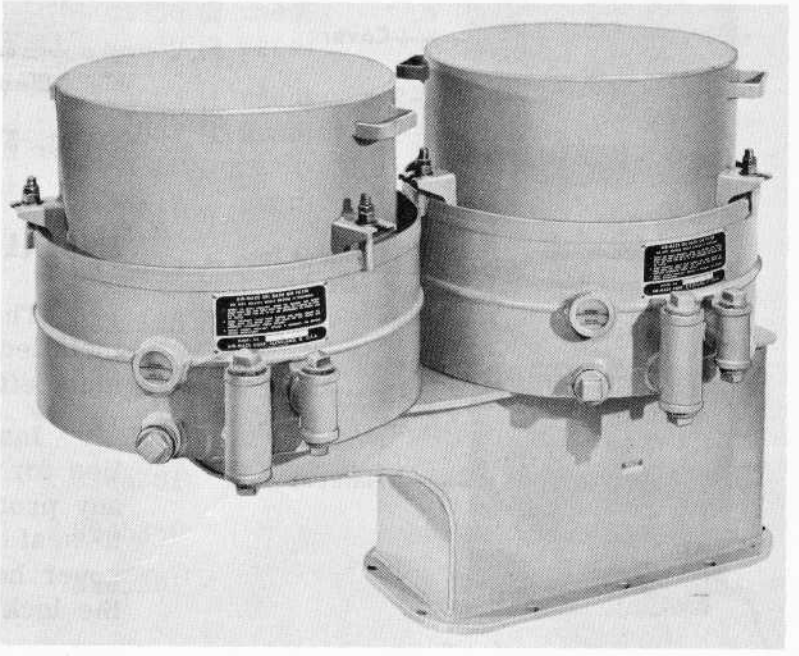

Fig. 1 - Oil Bath Type Engine Air Filter

Each filter consists of three major components: cover, element, and bowl, shown in Fig. 2. The element fits into the bowl with the cover over the element. Gaskets are used at the element support plate and bowl ledge, and between the top of the element and the cover. When the cover bolts are tightened, the gaskets are compressed to provide a seal. Gaskets are also used between the filter and manifold, and at the blower. Oil is maintained in the bowl up to the level of the bead around the bowl. An oil sight glass and/or fill pipes are provided to determine the oil level.

Either one or two filters may be used at each blower to provide the necessary volume of clean air, depending on the installation, size of the engine, and filter used. Filters may be mounted on a manifold as an assembly which is mounted on the blower, or may be secured to an adapter which is mounted on the blower. For specific locomotive applications see Modernization Recommendation 9500.

OPERATION

In operation the dirt laden air enters between the bowl and element cover "A," Fig. 3. As the air reaches the oil it breaks the oil seal at "B." After breaking the oil seal, it changes direction, dropping larger dirt particles from the air stream. Increased air velocity at "B" also causes a turbulent scrubbing action of air by the oil, removing the bulk of dirt particles. Oil is constantly carried onto the diffuser screen "C" and the filter element "D" by the air stream. Returning oil washes down the dirt particles which impinge on the filter screen, keeping the element

clean at all times. The dirt particles removed from the screen accumulate in the bowl sump. The filter element also removes all oil from the air stream so that only clean, oil free air enters the engine blower.

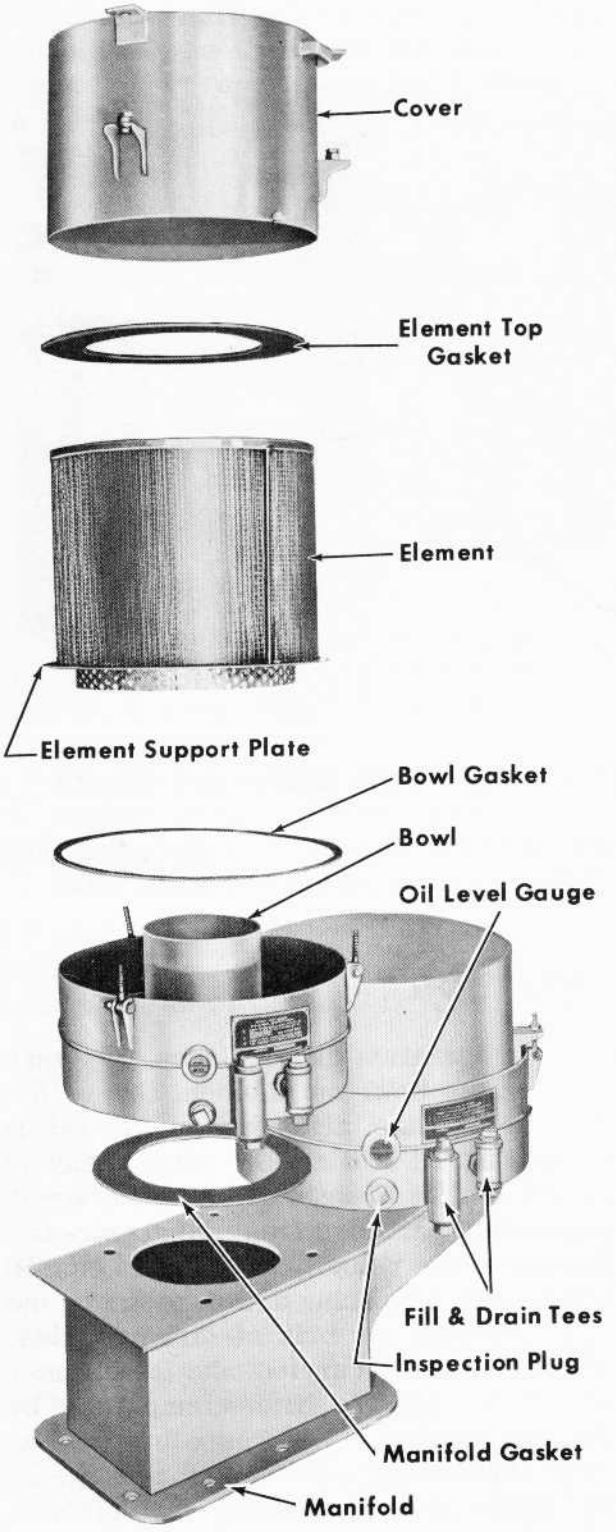

Fig. 2 - Filter Assembly — Exploded View

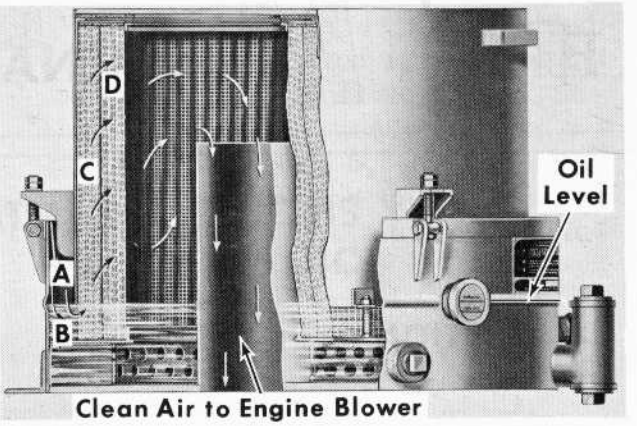

Fig. 3 - Oil Filter — Cutaway View

INSTALLATION

The oil bath filter must be properly installed and maintained to insure maximum efficiency and performance.

Inspect the filter prior to installation for satisfactory condition. Remove any protective paper which may be used to seal off the air openings. Torque the cover hold down nuts to 100 in.-lbs. and the lock nuts to 200 in.-lbs.

NOTE: Overtightening these nuts may cause distortion of the element plate and cover.

Check the gasket surfaces to see that they are clean and will provide a good air seal when the parts are applied.

FILTER OIL SUPPLY

Oil used in the filter can be of the same grade as used in the engine or air compressor. However, where operating temperatures below 20° F. are encountered, an oil having a viscosity of SAE 10 or 20 is recommended.

Oil capacity of the filters varies depending on the filter size. With engine shut down, oil level should be at the center of the bead around the bowl. Fill and drain tees are on each filter and an oil level sight glass is provided to indicate oil level. Approximate capacities of the filters are given in the following table according to use or part number.

Application Locomotive Or Power Unit	Filter And Manifold Assembly No.	Filter Assembly Only No.	Oil Capacity Per Filter Bowl	Oil Capacity Per Engine
SD7, SD9	8232224 RB*	8244061 (2 used)	4 gal.	16 gal.
	8232225 LB*	8244061 (2 used)	4 gal.	
GP7, GP9	8232224 LB*	8244061 (2 used)	4 gal.	16 gal.
	8232225 RB*	8244061 (2 used)	4 gal.	
F3, F7, F9	8233568 LB*	8244060 (2 used)	4 gal.	16 gal.
	8233569 RB*	8244060 (2 used)	4 gal.	
NW2, SW7, SW9, SW1200	8232356 RB*	8244063 (1 used)	2-1/2 gal.	10 gal.
	8232357 LB*	8244063 (1 used)	2-1/2 gal.	
SW900	8242847 Appl. Drawing	8233812 (2 used)	4 gal.	8 gal.
M12, S12G, S16G		8233349 (2 used)	5 gal.	10 gal.
S16G, GC, P, M16		8233350 (2 used)	8 gal.	16 gal.
S16G		**8224786 (2 used)	8 gal.	16 gal.
SR8		8240767 (1 used)	8 gal.	8 gal.
► G8		8245361	4-1/2 gal.	9 gal.
► G12		8245360	3 gal.	12 gal.
► G16		8245361	4-1/2 gal.	18 gal.

*RB stands for engine right bank application and LB for left bank.

**Orifice plate 8227253 having a 13/16" orifice must be used on 16 cylinder engines operating at 720 RPM or over which have greater than 13/16" diameter opening in the manifold adapter when using filter 8224786.

► The oil supply in each filter is in two chambers, connected so that oil in the lower bowl replenishes oil in the upper bowl. The top fill and drain pipe fills the top working chamber and the lower fill and drain pipe fills the bottom or reserve chamber. When filling the filter with oil, about one-quarter of the total amount required is added through the top filler, while the balance is added through the bottom fill pipe. In any event, it is essential that the engine be shut down when adding oil to prevent oil from being drawn out of the filter bowl when either of these pipe plugs are removed.

► CHECKING OIL LEVEL

Operating experience will dictate the frequency of filter oil level inspections; however, until such a schedule can be established, a weekly or more frequent check should be made.

To accurately check filter oil level, the engine must be shut down for at least 15 minutes before the level is determined. This will allow sufficient time for the oil to drain from the filter element to the bowl. When checked, the oil level must not be more than 1/2" below the bead around the bowl. Additional oil may be added if necessary to bring the level up to that required for proper operation.

► CHANGING OIL

Intervals at which it will be necessary to change oil will depend upon conditions of filter operation. These periods

will vary from three to six months. When the oil is drained, check the depth of sludge in the bowl, through the inspection plug. The sludge depth should not exceed 3/4" in depth. If the sludge depth does not exceed 3/4" in depth, refill the filter with the recommended oil to its proper level. See "Filter Oil Supply" for oil capacity of the filter. If the sludge exceeds 3/4" in depth, clean the filter bowl as given in the following.

►CLEANING FILTER BOWL

When sludge accumulation in the bowl exceeds 3/4" in depth, the filter should be removed, disassembled and the bowl cleaned.

1. Loosening the cover holding nuts allows the cover and element to be taken from the bowl.
2. The bowl may now be cleaned of accumulated sludge.
3. If the element requires cleaning, it may be washed using kerosene, fuel oil or mineral spirits. (A dirty element indicates improper maintenance of the oil level in the bowl and/or gasket leakage.) Do not immerse the element in hot caustic cleaners, as damage can result.
4. Whenever the filter is disassembled, the old gaskets must be removed and new gaskets applied before reassembly. Particular attention should be given to the gasket bonded to the "L" ring in the bowl and the top element gasket located at the top of the element. Replace gaskets in the following manner:
   a. Remove old gaskets.
   b. Clean gasket surface of any remaining adhesive using any commercial solvent.
   c. New replacement gaskets are available under the part numbers shown in the chart below.
   d. Apply thin coat of an oilproof adhesive (such as Minnesota Mining EC847 or equivalent) to the metal surface.
   e. Allow adhesive to set until no longer "tacky."
   f. Fix gasket in place using moderate pressure.
   g. If possible, allow one hour time before exposing gasket to oil.
   h. Reassemble the filter, tightening the cover hold down nuts to 100 in.-lbs. and lock nuts to 200 in.-lbs.

Filter Assembly	Bowl Gasket - Qty.		►Element Top Gasket - Qty.		Filter To Adapter Or Manifold Gasket - Qty.	
8244061	8240660	1	8259974	1	8240658	1
8244063	8240659	2	8259973	2	8240664	1
8244060	8240660	1	8259974	1	8240658 8172101*	1
8240767	8241728	1	8259976	1	8233283	1
8224786	8241728	1	8259976 8233250	1 1	8224490	2
8233349	8241727	1	8259975	1	8233283	1
8233350	8241728	1	8259976	1	8233283	1
8233812	8240660	1	8259974	1	8233705	1

*Manifold to adapter gasket.