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Coding Information

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Title: Diagnosing Turbocharger Oil Discharge

Applies To: VT 275, VT365, DT 466, DT 570, HT 570, MAXXFORCE 5, 7, DT, 9, 10 Engines

DESCRIPTION

The presence of oil at the discharge of either the turbine or compressor housings and or in the CAC (charge air cooler), plumbing and hoses does not necessarily indicate a defective turbocharger. Certain engine configurations, operating and performance conditions may exist where oil may be present at the discharge of either the turbine or compressor housings and or in the CAC (charge air cooler), plumbing and hoses. Once again, the visual presence of oil **does not** necessarily indicate a defective turbocharger.

Some of the engine models listed above were originally built with a closed breather system. With this configuration oil will be present in the compressor outlet, CAC, plumbing and hoses as oil vapors from the breather are directly returned to the compressor inlet side of the turbocharger.

Other engine models listed above were originally built with an open breather system that are less likely to exhibit oil passing through the air induction system. However, oil still may be present in the air induction system due to other abnormalities that need to be investigated. Some of the probable causes are listed below. Misdiagnosis of this concern leads to unnecessary warranty expense and may result in dealer charge back, given that most turbochargers returned to Navistar for oil discharge are found to trouble free as a result of a warranty review.

SYMPTOMS

- Oil discharge at compressor and turbine outlet

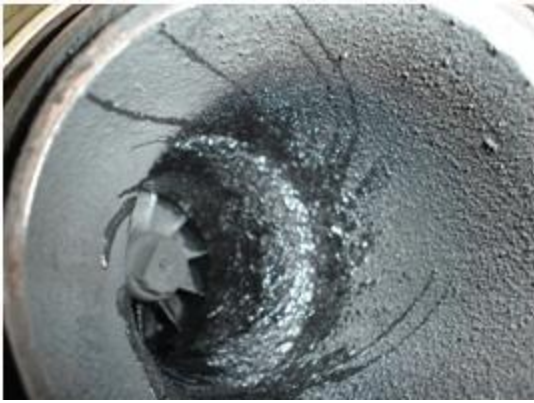
- Oil in CAC, plumbing and hoses
- Oil coking at the compressor discharge or in the air induction system

TROUBLESHOOTING AND POSSIBLE CAUSES

1. Exhaust engine brake (Inline 6 cylinders)
 - a. Use of the exhaust engine brake affects the pressure balance between the bearing and compressor housings. The consequence of using the engine brake is considered normal operation and oil may be observed in the compressor housing, and or in the CAC, plumbing and hoses.
2. A plugged air filter creates high inlet restriction to the turbocharger compressor affecting the pressure balance between the bearing and compressor housings.
3. Excessive engine idling creates unfavorable conditions in the turbine and compressor housings where pressures are low promoting oil migration from the bearing housing.
4. Excessive crankcase pressure affects the pressure balance between the bearing, turbine and compressor housings.
 - a. A plugged crankcase breather, a worn or defective air brake compressor, worn valve guides or damaged power cylinders contribute to excessive crankcase pressure.
5. A worn or defective air brake compressor can introduce oil to the turbocharger compressor inlet. This will result in oil discharge at the compressor outlet and oil being observed in the CAC, plumbing and hoses.
6. A plugged turbo oil drain will cause excessive oil pressure in the bearing housing causing oil to migrate to the turbine and compressor housings.
 - a. Extended oil drain intervals, hot shut downs and excessive oil temperature are the mostly likely causes.
7. Excessive exhaust back pressure affects the pressure balance between the bearing and compressor housings creating an unfavorable negative pressure in the compressor housing.
8. The presence of oil at charge air cooler connections does not automatically indicate a concern exists with the turbocharger as most of these connections are susceptible to seepage.
9. Excessive turbine shaft radial and axial bearing clearance that permits contact between the wheels and housings may allow oil to migrate to the turbine and compressor housings past the seal rings. This failure mode can only be corrected by a turbocharger replacement.

Example of Oil Discharge at Turbine Outlet

The oil visible in the turbine outlet in this example is due to a restricted turbocharger oil drain.



Examples of Probable Cause for Oil Discharge at Turbine Outlet

Note the restricted oil drain from the bearing housing.



Note the highly restricted oil drain tube from bearing housing.



Examples of Oil Discharge at Compressor Outlet

Note the oil discharged at the compressor outlet.



Probable Causes for Oil Discharge at Compressor Outlet

1. Exhaust engine brake (Inline 6 cylinders)
2. A plugged air filter
3. Excessive engine idling
4. A worn or defective air brake compressor
5. Excessive crankcase pressure
6. A plugged turbo oil drain
7. Excessive exhaust backpressure
8. Excessive turbine shaft radial and axial bearing clearance (wheel contacting the housing)

Turbocharge Oil Discharge Diagnostic Tree *Click on link:*

[Diagnosing Turbocharger Oil Discharge From the Compressor Outlet](#)

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