

TST Turbine Housings

TST does not recommend turbocharger parts changes for most mild power upgrades. **TST Power Kits** make sufficient power in Dodge Ram TurboDiesels that both automatic transmission and manual clutch limits are reached such that automatic and manual clutches will slip without the need for any additional power increases. **TST** currently offers automatic transmission upgrades and offers a manual clutch which will transmit even higher power levels. When pushing for much higher power ratings a turbine housing or complete turbocharger change may be required. The stock engine turbine housing is usually quite adequate for power ratings up to 270 horsepower with 675 pound feet on the 6BT; and 450 horsepower with 1100 pound feet on the C8.3.

Exception to the rule is 1989 through 1993 Dodge Ram TurboDiesel which had too large a turbine housing. 1989-1993 Dodge Diesels were factory equipped with non-wastegated 18 or 21 square centimeter (cm²) turbine housings. These vehicles benefit greatly from the smaller 16 cm² non-wastegated turbine housing. This smaller housing spools up the turbo quicker for better acceleration and raises maximum boost pressure 5 to 10 psi. This extra boost allows the fuel flow rate to be elevated either by fuel pump or injector changes for extra horsepower.

1994 and later 6BT engines were factory equipped with a 12 cm² wastegated turbine housing. The 12 cm² housing typically spools up very rapidly and the maximum boost was easily adjustable to handle power ratings up to 270 horsepower and 675 pound feet of torque. Some 215 horsepower '96-'98 manual Rams run extremely high exhaust gas temperatures due to their poor breathing at 2500 plus rpm at 280 horsepower and higher. The 12 cm² housing is so small at this power and engine speed that it creates excessive back pressure in the exhaust manifold causing poor airflow. The restriction is in the turbine housing thus changing exhaust pipes and mufflers do very little to help. By changing to the 16 cm² non-wastegated turbine housing on these engines, breathing is improved permitting higher power and lower exhaust temperatures.

TST Turbine Housing Installation Instructions

The exhaust turbine housing installation is most easily performed with the turbo still on the engine. Remove the exhaust to turbine housing vee band clamp, remove the four bolts holding the turbine housing to the bearing housing, remove the four nuts holding the turbine housing to the exhaust manifold. Next remove the air cleaner hose, carefully spin the rotor by hand while removing the turbine housing. Don't let the turbine housing bind tightly against the rotor or the shaft and blades may be bent affecting balance and ruining the turbo. If you are lucky the turbine housing will come off easily.

If the turbo has been extremely hot, you may need to remove the entire turbo from the engine in order to separate the turbine housing from the bearing housing. Remove the air inlet clamp, the big hose that comes from the air cleaner, and the air cleaner assembly. Remove the hose clamp from the turbo drain hose near the block. Alternatively, you can remove the two bolts holding the oil drain line to the turbo, but you will need a new gasket Cummins #3519807. Remove the clamp holding the boost air outlet tube to the turbo compressor housing (this is the tube going to the intercooler). Remove the band clamp and exhaust pipe from the back of the turbo. Remove the wastegate air pressure line at the pressure canister motor that moves the linkage to the wastegate. Remove the pressurized oil feed line at the top of the turbocharger. Both this line and the drain line can leak oil, so position rags and containers to catch the oil. Remove the nut holding the boost line to the exhaust manifold and the hose clamp at the compressor housing or AFC housing where the boost signal is obtained.

Remove the boost line assembly from the engine. Remove the hose fitting at the boost signal port in the compressor housing or at the back of the AFC housing. Plug the boost port with a 1/8" NPT pipe plug, using a bit of thread sealer. If you have the **TST Power Kit** installed; this boost signal port is the place where you put the boost control elbow to increase maximum boost with the stock wastegate-equipped turbocharger. The boost control is not used with the non-wastegated turbine housing.

Next, remove the four nuts (15 mm) holding the turbo to the exhaust manifold, pull the turbo off the studs, and work the turbo oil drain tube off the hose coupling. Remove the turbo from the engine compartment.

Mark the relative position of the exhaust turbine housing to the center housing of the turbo, so you can install the new 16 cm² turbine housing at the same angle. A good reference location is the top bolt holding the exhaust housing to the turbo versus the boss for the pressurized oil inlet. Then remove the four bolts and lock plates holding the exhaust housing

to the turbocharger. The top bolt has to be unthreaded a bit at a time, and the split lock plates can be slid out from it, if your turbo has the two half-circle plates split at top and bottom. This bolt is close to the pressurized oil inlet boss.

While gently spinning the turbo rotor from the compressor housing end with a finger (fresh air end, through the hole where the air cleaner tube attaches), tap the exhaust housing alternately in different places around its perimeter with a hammer. Particularly if the turbo has been hot a few times, the housing will not just slide off. If you hear any sound of the exhaust housing beginning to touch the turbine blades, tap on the other side so that you take the housing off straight. Do not allow the exhaust housing to damage the blades or bend the shaft, which will happen if the housing is not removed straight.

Spread a bit of anti-seize high-temperature lubricating paste on the mounting surface for the new exhaust housing, and on bolt and stud threads. Tap the new 16 cm² turbine housing straight onto the turbo while again checking the rotor blades for free-spinning. Also check that its alignment is the same as the original housing to the rest of the turbo. In many cases, the housing will slip on easily. Install the new exhaust housing at the same angle as the original, so the oil lines and boost tube will line up well. Reinstall the turbo in reverse order from the removal procedure. Use a new gasket (Cummins # 3901356) between the turbo exhaust housing and the engine exhaust manifold, and tighten the four nuts in stages, in a cross pattern. If necessary, rotate the new turbine housing slightly to get proper alignment to the rest of the turbo before final tightening of the four bolts that clamp the turbine housing to the rest of the turbo. It is a good idea to add clean motor oil to the turbo oil reservoir through the pressurized oil inlet if it seems the oil may have drained out during the procedure. After start-up, check for oil leaks at the pressure inlet and drain fittings.

The new housing is over an inch shorter because it doesn't have a wastegate assembly on the back end. Slide the exhaust system forward enough to match it to the new turbo exhaust outlet. You may need to bend the 1/2" diameter rod that is welded to the exhaust pipe near the transmission to allow moving the exhaust pipe forward. This rod serves as a bracket mounting the exhaust pipe to a rubber-cushioned boss on the transmission mount under the truck. The other exhaust system mounts probably will match up well, but their clamps can be shifted or the brackets can be bent a little if necessary to accommodate the new placement of the exhaust system.

Torque specifications in lb.-ft. are as follows:

- Exhaust outlet band clamp: 6
- Turbine housing bolts: 15
- Oil drain tube to turbo bolts: 18
- Oil supply line: 11
- Turbo to exhaust manifold nuts: 24

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