



Technical Report #40

Turbocharger lubrication

Technical Report

The use of turbochargers is increasingly widespread within the main engine manufacturers worldwide. Such is its current popularity that it is expected that more than the 80% of the engines of our vehicles in the next years will include this device.

Although its use in diesel engines is widespread, it is not that common in petrol engines. However, in the last years the presence of turbocharged petrol engines has become more and more habitual, due to new environment regulations and the improvements in its implementation technologies for this kind of engines.

Basically, the turbocharger is the mechanism that permits the use of the kinetic energy of the exhaust gases by spinning a turbine wheel, which in turn moves a compressor wheel in the other side, both of them connected by a shaft. With this process we compress the intake air, so the density of it is increased, and therefore the mass flow is higher during the intake stroke.

By introducing this air in the manifold we supercharge the engine, and as a consequence the combustion is more effective and more energetic, so we can reduce engines displacement while the power is kept or even increased (we call this downsizing). The use of smaller and lighter engines entails less fuel consumption and thus, less harmful gas emissions to the environment.

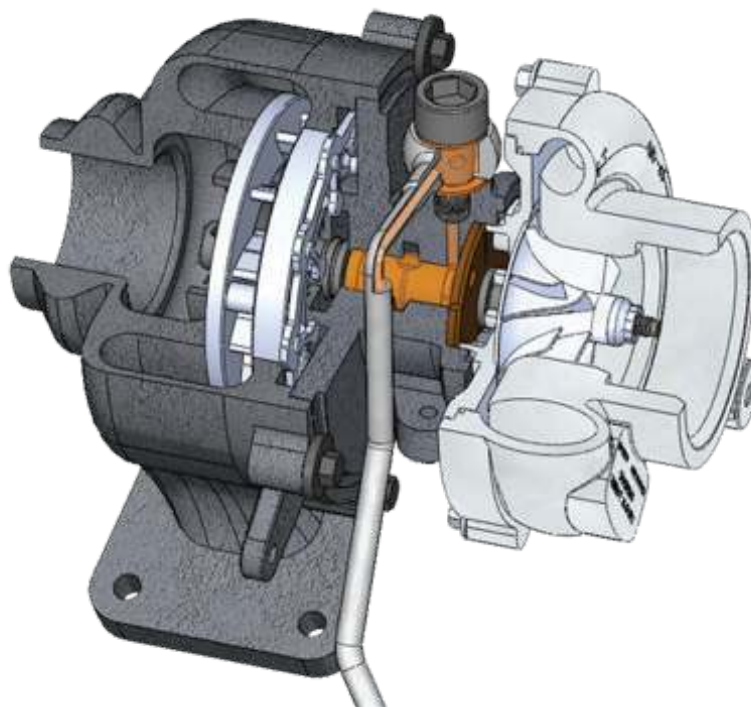
However, the turbocharger is a device that works under very demanding conditions, such very high revolutions per minute of its shaft, over 200.000 rpm, and very high temperatures on the components of the turbine, sometimes reaching 1000°C. Because of this, the turbocharger requires a perfect and continuous lubrication, being the lack of it or the disrepair of the oil the main causes of failure in this device.



To preserve the turbocharger and specially assure the useful life of a new unit after substitution, AJUSA recommends considering the following points, including the substitution of the turbocharger's oil feeding line:

- The use of the proper oil and its substitution within the right range is important to assure the proper lubrication at all times. Follow manufacturer's recommendations for the type of oil, and also for the filters replacement and oil change times.
- Keep the right level of oil. There are risks for the lubrication of the turbocharger in case of low level of oil as for high level of oil. Check periodically.
- The good condition of the oil pump and the ducts, especially the oil feed pipe.

The oil feed pipe is a critical part in the turbocharger lubrication, because it is the component responsible for introducing the oil in the turbine shaft.



"The oil feed pipe must be in perfect condition"

In this sense, AJUSA offers to its customers a new product range, whose main goal is to prevent recurrence of the failure after repairing the turbocharger because of one of the following reasons:

- The oil feed pipe is impaired or any of its connections is leaking.*
- Solid deposits have been created in the inner walls of the pipe and they are choking the oil flow, due to inadequate oils.*
- The closeness to high temperature components has generated deposits of carbonized oil in the inner walls of the pipe that limits the oil flow.*
- Re-use of a pipe whose connections were deformed during its tightening, causing a risk of leaking.*

Furthermore, the following points must be taken into account when changing the pipe:

- Make sure the reference is the right one. For this purpose AJUSA provides its turbocharger components Catalog, its web site and its Technical Assistance department to its customers.*
- Do not extract the oil feed pipe out of the protective bag until the moment of installation.*
- Use new washers and screws when applicable.*
- Do not bend or force excessively the pipe during the installation, it may obstruct the oil flow.*
- Lubricate the housing of the shaft.*
- It is essential to take into account the torque of its terminals to avoid leaks.*