

HEAVY FACTS

Genuine Volvo Parts

Clutch

The clutch of a truck operates in a very dusty and hot environment. It has to withstand a working temperature of up to 300°C. To achieve optimal function and performance, the components of a clutch must be designed, dimensioned and tested together as an integrated part of the driveline.

The Volvo Genuine Clutch is designed for optimum performance to provide smooth start, easy gear shifting and a long service life.

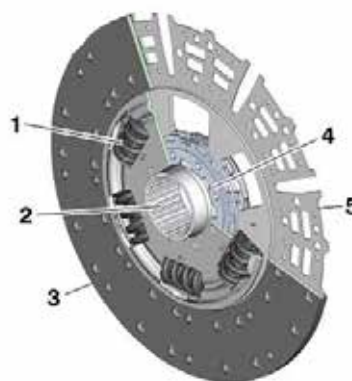
The main components in the clutch are:

- Pressure plate
- Disc
- Release bearing for manual transmission or Concentric Clutch Actuator (CCA) for I-Shift
- Clutch Value Unit (CVU) for I-Shift

Components

The pressure plate is the key component of a clutch that modulates the torque. Then, the actuation system pushes the diaphragm spring, moving the pressure plate. The disc should be able to manage up to 4.4 tons of press power without sliding. The disc allows the driver to start the vehicle smoothly, safely and comfortably in all situations, both with and without load. It contains five main components

- Shock absorbing spring
- Hub
- Lining
- Friction device
- Steel segments



FEATURES

- Complete ready to fit clutch
- Tested to handle torque into gearbox and protect driveline
- Gearbox and engine configured and balanced jointly

BENEFITS

- Minimum downtime for installation
- Minimum risk of damage to other parts of the driveline
- No unexpected costs – increased security
- Smooth operation
- No noise
- Excellent drivability
- Excellent driver comfort

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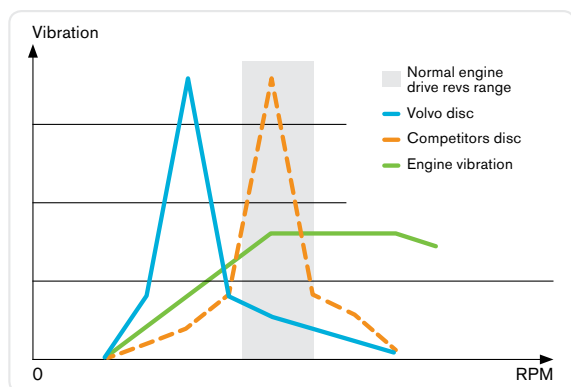
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Technical description

The task of the clutch is to translate the torque from the engine to the transmission with minimum loss of efficiency. Moreover, it has to be able to disconnect the engine from the transmission and the rest of the transmission system, when required. Disengagement of the clutch disc, when gears are shifted is an important part of its functionality. If the clutch is not fully disengaged, when the gear is shifted, there will be high forces into the gearbox, giving high stress levels and increasing wear on the gears, shafts and synchronisers in it; reducing the life of the transmission components.

The difference

- The steel in the shock absorbing spring is of extremely high quality. The stiffness of the spring is reduced while the material strength is high; both of which are beneficial material properties in this instance. Lower spring stiffness means that the vibration peak can be moved out of driving RPMs. This is visualised in the figure below. Volvo's spring stiffness is about 200-300 Nm / degree depending on the engine type. This can be compared to 450 Nm / degree compared to competition. If the vibration peaks into the transmission are too high, the result will be the breakdown of gear wheels in transmission and a rattling noise. Furthermore, due to the quality of the steel, strength can be maintained. This is necessary in order to dampen ignition peaks from the engine. These peaks result in about 30% more torque than normal. If the spring cannot handle these peaks, there will be severe wear on the ingoing gear wheels.



Comparison of vibration peak between a Volvo disc and other discs.

- The hub is splined and can therefore move back and forth on the shaft. This is to minimise drag torque during gear shifting
- The lining is developed to match the Volvo vehicle

specifications: its main components are glass fibre, phenol binders, organic fibres, rubber, charcoal and copper thread. The facing material has a variety of different properties that meets the requirements such as environmental impact, density for gear, shift quality, rotational speed for capacity to burst speed, friction coefficient at different temperatures, damping capacity at different temperatures, driving distance and additional wear resistance at different temperatures. It is made from asbestos-free material, riveted to the disc

- Friction devices in the clutch disc adds friction in the hub unit and dampens the vibration peaks when it runs through the driveline vibration area, thus prolonging the lifetime of the transmission
- Steel segments are placed in between the disc and the material facing it. This is to ensure that the torque ramps up smoothly as dissipates heat

The Volvo genuine clutch is balanced and tested to handle torque transmission to the gearbox. Testing is carried out both at a component level, by the supplier and in our own test laboratory. This is followed by field testing of the truck, in extreme weather and road conditions, for atleast two years.

Service

To guarantee high quality of repair and longer lifetime of the component, it is recommended to have the following skills, competence, tools and equipment.

- Access and ability to use recommended special tools to ensure high quality repair
 - Ability to use Volvo Trucks service information in order to apply the correct and safe repair procedures
 - Use of Volvo Trucks service information on all required parts needed for repair to plan and perform the repair efficiently
- To secure the best possible service, uptime and efficiency, fit the genuine Volvo parts at a Volvo workshop by certified technicians.

Recommended additional parts

Replacing clutch parts is time-consuming. Consider replacement of the complete clutch package instead of individual components; a clutch kit for manual transmission or a clutch kit plus CCA for I-Shift.

VOLVO

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