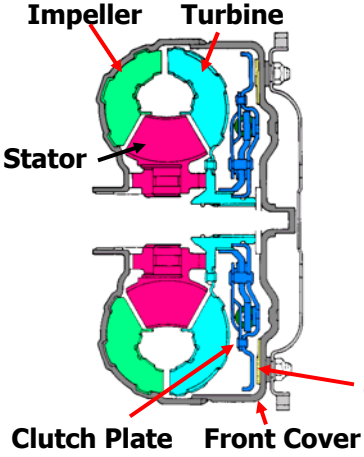


Torque Converter Clutches

1

4-Element Converter



The diagram shows a cross-section of a 4-element torque converter. It features an impeller (green) at the top left, a turbine (cyan) at the top right, and a stator (pink) in the center. Below these is a clutch plate (pink) connected to the turbine by splines. The clutch plate is lined with a clutch lining (red) that contacts the front cover (grey). The entire assembly is housed within a front cover.

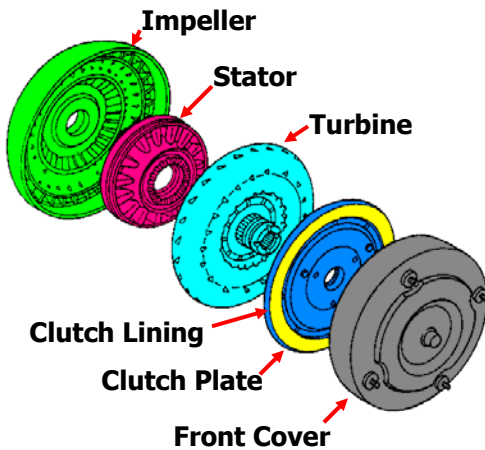
The major parts of a torque converter with clutch are the impeller, turbine, stator and clutch plate. The clutch plate is connected to the turbine by a set of splines, and it has the clutch lining that can contact the front cover.

Clutch Lining

Clutch Plate Front Cover

2

Exploded View

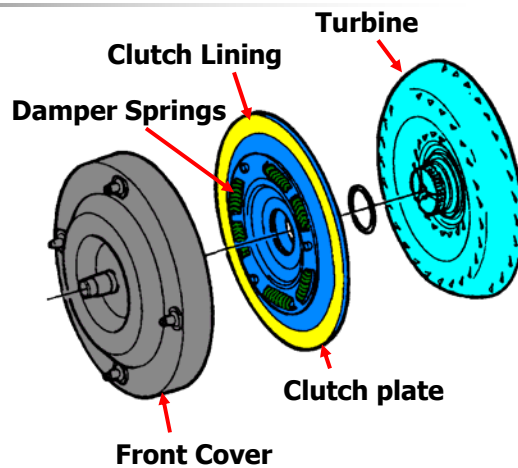


A 4-element torque converter is commonly called a torque converter clutch, TCC. This view shows the relationship of the major parts.

3

Damper

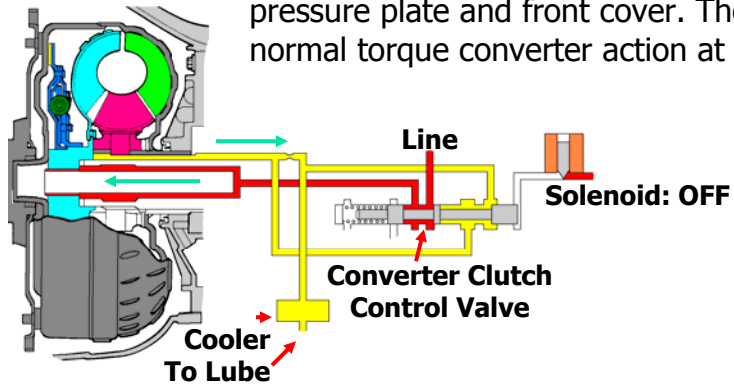
Power flow from the clutch plate to the turbine passes through a set of damper springs. These springs absorb the torsional vibrations from the engine.



4

TCC Release

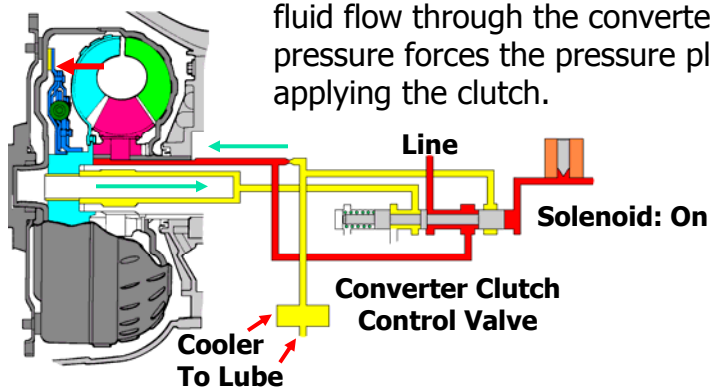
Fluid flow enters the front of the converter and exits at the rear. It flows between the pressure plate and front cover. There is normal torque converter action at this time.



5

TCC Apply

Energizing the solenoid moves the Converter Clutch Control Valve, and this reverses the fluid flow through the converter. Fluid pressure forces the pressure plate forward, applying the clutch.



Animation: [TCC Operation](#)

6

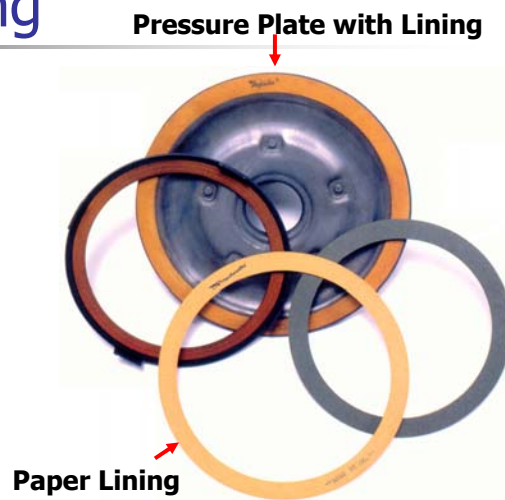
Clutch Apply

With the simple TCC application just described, the clutch can come on too fast. It can be felt as a definite bump, sometimes reducing engine speed down to a point where engine misfire occurs.

7

Clutch Lining

Many torque converter clutches use a paper lining material that is similar to the lining used in other clutches. Some use graphite-paper lining that has a gray color.



8

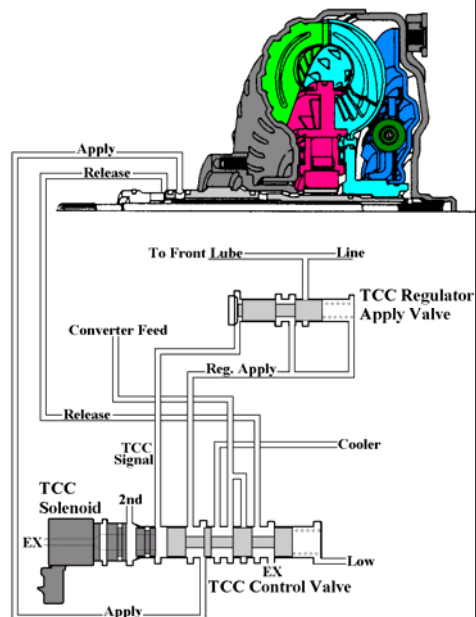
Smooth TCC Apply

TCC apply can be made smoother and less objectionable by allowing the clutch to slip during the application. But, softer clutch apply produces heat and lining wear. The converter clutch lining material must be changed.

9

PWM Apply

TCC apply and release is determined by the TCC Control Valve. TCC apply pressure is determined by the TCC Solenoid and the TCC Reg. Apply Valve. The TCC Solenoid is a pulse width modulated, PWM, solenoid that operates at 32 Hz (32,000 cycles per second).



10