

## Clutch Slippage

### Background

Clutch slippage is often first detected as a minor jump in engine rpm when taking a loaded vehicle up a steep hill. Often, this can be cured or prevented very simply. However, ignoring the problem or delaying action with today's high torque engines will usually result in destroyed clutches, towing bills, lost service time and even progressive damage to other vehicle components. This is historically one of the most frequently reported field problems. Its cause can be better understood if the conditions under which it occurs are examined more closely.

Slippage basically occurs in 3 ways:

**1. New Installation:** A new clutch has been installed and found to be slipping when first put into service.

**2. Low Mileage:** A new clutch installation begins to slip at very low service mileage.

**3. In-Service:** A clutch which has been performing satisfactorily begins to slip while in service.

The primary causes of the slippage can be quite different for each of these categories so we will examine each of them in detail.

### **1. NEW INSTALLATION**

The primary causes of this slippage are related to clutch misinstallation, misadjustment and misapplication as follows:

#### **1.1 Mis-installation**

- Used flywheel not resurfaced (has grooves, steps, heat checking, hard spots or is not flat)
- Clutch bolts not tightened
- Adjustment lock-nut not tightened (allowing the bearing to screw itself in and eliminate linkage freeplay)
- Grease or oil on flywheel (lowering friction level)

## Clutch Slippage (Continued ...)

- Clutch release linkage is blocked from full travel (can be caused by mis-routed fuel, air or electrical lines or mis-installed chassis component)
- Clutch release system binding (damaged or binding pivots and bushings or lack of grease)
- Wrong clutch installed (not enough torque capacity)
- Clutch bolts too long (prevents clutch from being drawn tight against flywheel)
- Clutch break-in required (a diaphragm spring clutch has its lowest torque capacity when new, and when combined with the lower friction level of new facings and grease or oil on the clutch or flywheel, it can sometimes slip when full torque is immediately applied. A few miles of low torque “break-in” usage will usually burn off oil and grease contamination and properly seat the friction facings, increasing their friction level)
- Overly thick clutch disc installed (prevents the clutch from developing its full clamp load)
- Clutch lip not inside flywheel pilot (16” & 17” only)
- Clutch disc installed backwards

### 1.2 Misadjustment

- Lack of linkage freeplay at release bearing for mechanical release systems (prevents full application of clutch clamp load)
- Excessive release bearing gap to transmission (causes front of release bearing sleeve to contact rear of clutch disc hub preventing full application of clutch clamp load)

### 1.3 Misapplication

- Installed clutch has torque capacity lower than engine torque (wrong clutch, mislabeled box or insufficient clutch clamp load)
- Engine torque has been boosted above original specifications
- Field remanufactured clutch disc used with low friction level facings

## **Clutch Slippage** **(Continued ...)**

### **2. LOW MILEAGE**

Diaphragm spring clutches have their lowest torque capacity when new. Initial usage normally causes the clutch to grow stronger. In this case however, clutch conditions which were insufficient to cause slipping when new have deteriorated enough in a few miles to the point where slippage can occur. This includes misadjustment, vehicle release system defects, clutch contamination, driver abuse and clutch dimensional and performance parameters.

#### **2.1 Misadjustment**

- Clutch originally set up with very little linkage freeplay for mechanical release systems (initial break-in wear causes freeplay to disappear preventing full application of clutch clamp load)
- Clutch adjustment lock-nut insufficiently tightened (becomes loose after a few miles allowing the bearing to screw itself in and eliminate linkage freeplay)
- Clutch pedal upper stop adjusted too low preventing full upward travel of pedal for hydraulic release systems (prevents linkage self-adjusting feature from functioning)

**Note: If you suspect that a defective hydraulic clutch release system is the problem cause, contact the vehicle dealer service department for specifications and repair or contact Valeo at (888) 71-VALEO for a free copy of our hydraulic clutch release system diagnostic guide.**

#### **2.2 Vehicle Release System Defects**

- Fully depressing clutch pedal does not result in at least 1/2" movement of clutch release bearing (results in clutch not fully disengaging causing clutch drag, and hard shifting which inputs excessive heat into the clutch facings causing them to disintegrate)
- Clutch release system binding (damaged or binding pivots and bushings or lack of grease)

#### **2.3 Clutch Contamination**

- Friction facings soaked with oil (caused by engine rear seal or transmission front seal leakage)

## **Clutch Slippage** **(Continued ...)**

- Clutch internal surfaces packed with fine dust (caused by poor clutch housing sealing and results in release system gaining freeplay and lowering clutch clamp load)

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### **2.4 Driver Abuse (Premature Clutch Wear and Damage)**

- Riding the clutch pedal (preventing full application of clutch clamp load)
- Hill holding using the clutch (inputs excessive heat into the clutch facings causing them to disintegrate)
- Starting in too high of a gear (inputs excessive heat into the clutch facings causing them to disintegrate)
- Excessive engine speed during clutch engagement (inputs excessive heat into the clutch facings causing them to disintegrate)

### **2.5 Clutch Dimensional and Performance Parameters**

- Clutch has low pressure plate lift (results in clutch not fully disengaging causing clutch drag, and hard shifting which inputs excessive heat into the clutch facings causing them to disintegrate)
- Clutch disc excessively warped (results in clutch not fully disengaging causing clutch drag, and hard shifting which inputs excessive heat into the clutch facings causing them to disintegrate)

## **Clutch Slippage** **(Continued ...)**

### **3. IN SERVICE**

When a clutch has been performing correctly for a number of months and then begins to slip, clutch adjustment and maintenance, clutch contamination, driver abuse or wear-out is usually the cause.

#### **3.1 Adjustment & Maintenance**

- A correctly adjusted clutch has been allowed to remain in service too long without readjustment allowing linkage freeplay to disappear on mechanical release systems (prevents full application of clutch clamp load)
- Clutch pedal upper stop adjusted too low preventing full upward travel of pedal for hydraulic release systems (prevents linkage self-adjusting feature from functioning)
- Clutch release system binding (damaged or binding pivots and bushings or lack of grease)

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#### **3.4 Wear-Out**

- The clutch has reached the normal end of its useful life and is too thin (prevents the clutch from developing its full clamp load)