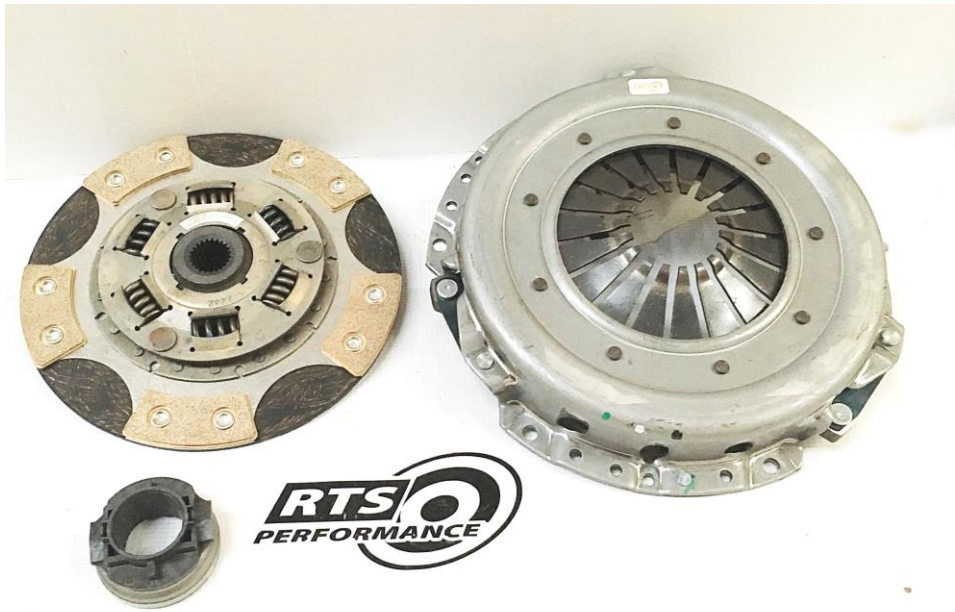


RTS EUROPE Ltd TWIN FRICTION INSTALL GUIDELINES AND CLUTCH SYSTEM TROUBLESHOOTING

Miba Friction. RTS Europe's only Choice of Friction Segments

Innovation in Motion Miba

Friction materials of the Miba Friction Group are a key performance element in clutches and brakes in the international automotive and machine industries. By developing new friction materials and continuously improving existing friction materials, the Miba Friction Group is making a significant contribution to overall efficiency improvements to clutch and brake systems.

Whether construction equipment or mining vehicles, high-speed trains, aircraft, trucks or passenger vehicles – manufacturers and suppliers from a variety of industries trust the friction material solutions of the Miba Friction Group. As a development partner and supplier, we accompany our partners all over the world. Four global production sites allow us to respond quickly and flexibly to our customers' needs and requirements.

RTS Europe and the RTS Group have carried out rigorous testing and identified the best Performance Friction is Miba. From 1st January 2018 we have used only Miba Friction on all our Twin Friction applications including the market leading Ford Focus RS MK2, Audi S3 / TFSI and MK7 Golf

RAYBESTOS & ABEX Hybrid Technology Friction Clutch Plates

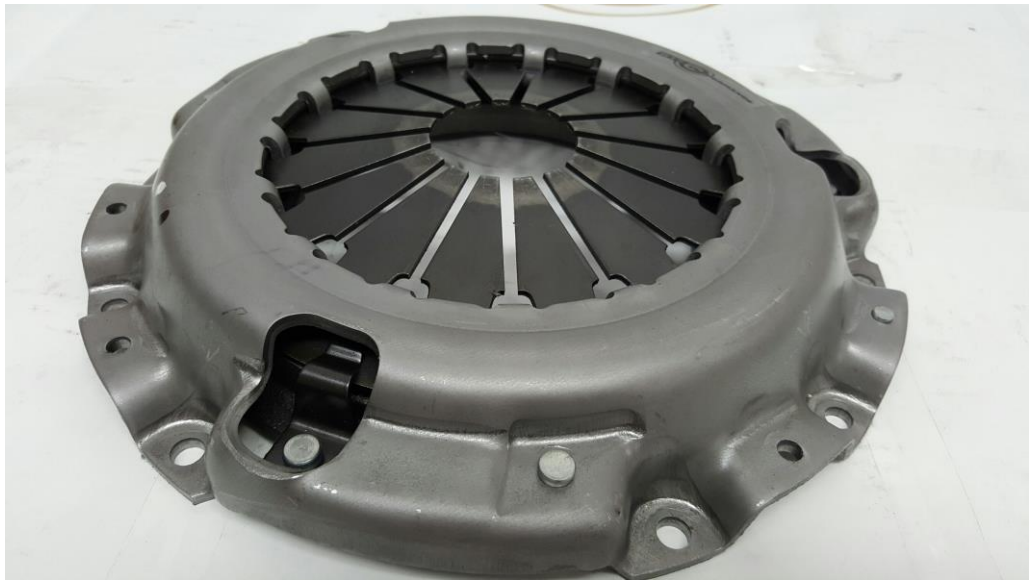
About:

Hybrid Technology (HT) friction clutch plates utilize a Raybestos® or ABEX Powertrain proprietary HD friction material and a unique groove pattern to reduce stresses during shifts to keep the components cooler, improve performance and extend the life of every rebuild. HT frictions seamlessly combine the fluid flow dynamics of a segmented friction lining with the strength and durability of a full friction ring to exceed OE expectations.

Advantages:

* Better-than-OE resistance to extreme heat caused by high-energy loading.
*Smooth shifts and stable performance with no sliding, bumping or chattering.
* Higher torque capacity than conventional high energy materials.
* Low material compression, a critical factor in maintaining piston travel.
* Tight production tolerances for fast, hassle-free installation.
* Excellent distribution of pressure evenly through the clutch.
* Longer clutch and transmission life after rebuild.

RTS EUROPE Ductile Steel Clutch Covers



Ductile Steel can be bent without breaking, whereas **cast iron is brittle** and breaks when bent. ... **Ductile Steal** consists **of Steel**, carbon, silicon, manganese, magnesium, phosphorous and sulphur. Tin and copper are also sometimes found. **Ductile iron** also consists **of** nodular graphite, which gives it flexibility. Cheaper / lower grade brands use Cast Iron covers as it's a cheaper alternative and most often are made in either China or the Far East. Cast Iron covers are mass produced and often are designed to fit multiple applications to save on cost. RTS Ductile Steel Clutch Covers are designed to fit each application only. We never use Rationalised designs unlike many competitive brands.

Using Rationalised designed covers results in clutch failure as we are finding many brands are now using standard Cast Clutch covers on Performance or Fast Road applications. Rationalised covers are not designed to withstand the power uprated or higher power torque levels.
Rationalised covers fit a range of vehicles which all hold initially different standard levels or power. The covers are designed to hold a limited Torque capacity for various applications and cannot absorb or transfer the heat once any performance modifications are made to the vehicle.

Clutch Rivets

The rivets and spacers are plated in chrome free zinc (5 microns zinc and enhanced trivalent passivation.). Alternatively they can be finished to suit customer requirements. Most standard sizes are held in stock.
All clutch applications use OE rivet specifications. All riveting and Friction plate building is carried out in the United Kingdom and not mass produced. Each Clutch Cover and Friction plate whether standard or performance are balanced and a full run off test is carried out at our Cheshire Engineering facility.

Technical Bulletins:

Common Troubleshooting with Performance Clutches.

Dual Mass Flywheels - Bulletin

How it functions:

The Dual Mass Flywheel (DMF) is designed to isolate torsional crankshaft pikes created by diesel engines with high compression ratios. By separating the mass of the flywheel between the diesel engine and the transmission, torsional spikes can be isolated, eliminating potential damage to the transmission gear teeth.

Dual Mass Flywheel Components:

Engine Side Flywheel Damper Springs:

The damper springs that are visible on the engine side of the DMF are designed to dampen heavy torsional spikes that occur when the diesel engine's torsional frequency matches the torsional frequency of the transmission. When the torsional frequencies match (have the same amplitude), severe damage can occur to the transmission if not isolated. These flywheels isolate the torsional frequency match between the engine and transmission to an rpm range below the operating range of the engine (usually 200-400 rpm). These springs only work hard when the engine passes through 200-400 rpm when the vehicle is being either started or shut down.

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The DMF damper springs and/or the nylon retainers usually fail because the diesel engine is not running correctly. Bad fuel injectors, worn piston rings, bad valves, etc., will change the resonant frequency of the engine. A change in the resonant frequency of the engine can force the torsional frequency match between the engine and the DMF to fall within the operating range of the engine. This forces the damper springs to work continuously, resulting in failure.

The Friction Ring:

The friction ring located between the inner and outer flywheel is designed to allow the inner and outer flywheel to slip. This feature saves the transmission from damage when torque loads exceed the vehicle rating of the transmission. The friction ring will wear out if excessive torque loads are continuously applied. Loading the vehicle beyond the rated load capacity is often the root cause of friction ring failures in Dual Mass Flywheels.

The Center Bearing:

A sealed double row center ball bearing carries the load between the inner and outer halves of the DMF. The leading cause of center bearing failure is often related to out of balance vibration caused by not aligning the pressure plate with the DMF dowel pins. The center bearing may also fail if a worn transmission input shaft destroys the clutch pilot bearing or if the rated load/towing capacity of the vehicle is exceeded.

The Pilot Bearing:

The pilot bearing supplied is a caged needle roller bearing. If it fails, the transmission input shaft must be repaired or replaced. If the input shaft is not repaired correctly or replaced, the lack of input shaft support will result in DMF Center Bearing failure

Problem: Critical Clutch Disc to Flywheel Match

When replacing a clutch, care should be taken to match the disc to the flywheel prior to installation. A mismatched disc and flywheel can cause contact between the disc damper and the inside diameter of the flywheel. The clutch may function properly initially, but release problems will result. A similar problem will occur if the disc is installed backwards. To avoid the problem, ensure the disc damper fits into the flywheel opening with proper clearance.

Problem: Avoid Release Problems

Check the condition of the pivot, washer, and seal attached to the end of the slave cylinder on Jeep CJ models with external slave cylinders. If any of these parts are missing, cracked, or severely worn, release problems will result. As a clutch wears, the diaphragm spring fingers move closer to the release mechanism. The diaphragm fingers on the new clutch will return to their original, lower height when installed. Excessive wear or misalignment at any of the release mechanism components will cause insufficient slave cylinder travel resulting in little or no release.

Problem: Ford Aluminium Bearing Retainer Wear

The aluminium retainer on these models can wear to a point where it causes the release bearing to bind. This binding and misalignment can result in erratic clutch operation including hard pedal, improper release or clutch chatter. To avoid problems following installation, examine and replace the bearing retainer as needed during installation.

Problems in squeaking:

Insufficient lubrication between the fork and ball stud may be misdiagnosed as a release problem. Light pressure on the clutch pedal will silence the noise temporarily. Transmission removal and lubrication of the pivot ball-to-fork contact will eliminate the problem; however, to ease future lubrication, it is possible to install a grease fitting to permit lubrication without the need for transmission removal.

Locate the raised boss on the outside of the bell housing that is directly in-line with the centre of the pivot ball mounting hole. Drill a hole through the centreline of the boss into the pivot ball mounting hole, and tap the hole for installation of a 8" NPT grease fitting. Lubricate the pivot ball and reinstall the transmission, but install a pipe plug instead of a grease fitting. This will allow installation of a grease fitting in the event that additional lubrication is needed at a later date, but will prevent over-lubrication of the pivot stud during normal maintenance.

Problem: Hard Pedal/Destroyed Clutch

If the clutch removed from a car is destroyed or shows signs of heavy galling or scoring between the release bearing and bearing retainer, the problem is most likely caused by the bearing retainer.

These vehicles were originally equipped with a metal-lined release bearing which can cause heavy galling and scoring at the contact surface of the aluminium bearing retainer. In extreme cases, the bearing retainer breaks off the transmission housing, causing the release bearing to contact the diaphragm fingers at the wrong angle and destroy the clutch.

Symptoms of this problem include high pedal and gear shift effort, and sometimes no release. Inspect the bearing retainer, and ensure the release bearing moves smoothly on it. When installing a new bearing retainer (GM Part # 8672128), make sure it is installed at a right angle to the transmission. Any misalignment will cause the same problems.

Problem: Cover Orientation on Flywheel with Dowel Pins

For these applications the cover assembly is bolted to the crankshaft and then the flywheel is bolted to the cover assembly. The flywheel is "timed" to the cover by two roll pins. If the cover and flywheel are not oriented to each other during bolt up, one of the roll pins will not line up with the hole or notch in the cover stamping. This results in a deformed cover stamping and the clutch will not release. Prior to installing the flywheel, check the orientation of the pins and mark the flywheel to line up correctly.

Problem: Avoid Engine Sensor Damage

Installation of incorrect mounting bolts and excessive flywheel machining can damage the crankshaft position sensor. The sensor is mounted on the block directly behind the bolt circle of the clutch mounting bolts. To avoid damage, ensure that the correct mounting bolts are installed and a minimum amount of material is machined off the flywheel.

Chatter in First or Reverse Gear

Units diagnosed as having clutch chatter may be corrected by repositioning the frame mounted cordon shaft bracket (cross-shaft bracket) from the left hand frame rail to the cab toe panel. See GM Bulletin No. 83-93-7C for parts list and instructions.

Problem: No Release

The roll pins securing the release fork to the cross shaft can fatigue and break.
This enables the fork to turn on the shaft. Replace the pins
Ensure the pins fit snugly in the holes and replace the fork if necessary.

Problem: Growling Noise from Clutch

For Ford Mustang GT vehicles with a 5.0L and a T5OD transmission built through 4/25/94.

A “growling” noise may be heard when the clutch is either released or engaged at 3500 rpm's or more. The noise results from vibration at the connection between the release fork and cable. It can be eliminated by installing an isolator damper, Ford part # F4ZZ-7C530-A, at the fork-to-cable junction.

Problem: Low Clutch Engagement or Difficulty Starting Engine

Low clutch engagement or excessive pedal effort for engine start may be conditions experienced in these vehicles. This may be the result of the clutch pedal or driver’s foot contacting the carpet while disengaging the clutch. To repair, trim the material underneath the carpet at the contact point to conform with the contour of the floor plan.

Problem: Premature Clutch Wear

These applications may experience clutch slippage once the clutch is 2/3 worn. This is due to insufficient clearance between the bell-housing and the slave cylinder. The slave mounting surface is located too far forward, restricting movement. This prevents proper fork movement, causing partial release and slippage. To avoid premature wear, install a shim between the slave cylinder and the bell-housing.

Problem: Clutch Slippage

To avoid clutch slippage, replace the master cylinder and clutch pedal return spring. Install the new master cylinder and the return and adjust pedal free play to 2-3 mm.

Problem: Clutch Squeals When Cold

In vehicles with hydraulic release systems, the release bearing is in constant contact with the clutch diaphragm fingers. A squealing noise on engagement can result when the release bearing and clutch rotate at different speeds. If the noise stops after approximately five minutes, replace the slave cylinder. If the noise continues after the vehicle is warm, the cause is probably the release bearing and/or pilot bearing. To determine which bearing is the source of the problem, set the parking brake, put the vehicle in neutral and start the engine. If it's the release bearing, you'll hear chirping which gets louder when you slowly depress the clutch pedal. If it's the pilot bearing, you'll hear squealing when you depress and hold the pedal.

Problem: Diagnosing Slipping and Chatter

Slipping or chattering conditions may result from oil contamination of the disc friction material. The clutch push oil seal is often the source of the oil leak. Inspect the push rod seal, the rear main engine seal and the transmission input shaft seals, and replace if damaged or worn. Replace the push rod bushing with a push rod seal

TV Channel

Main Examples of Install Error or Driver Mis-Use

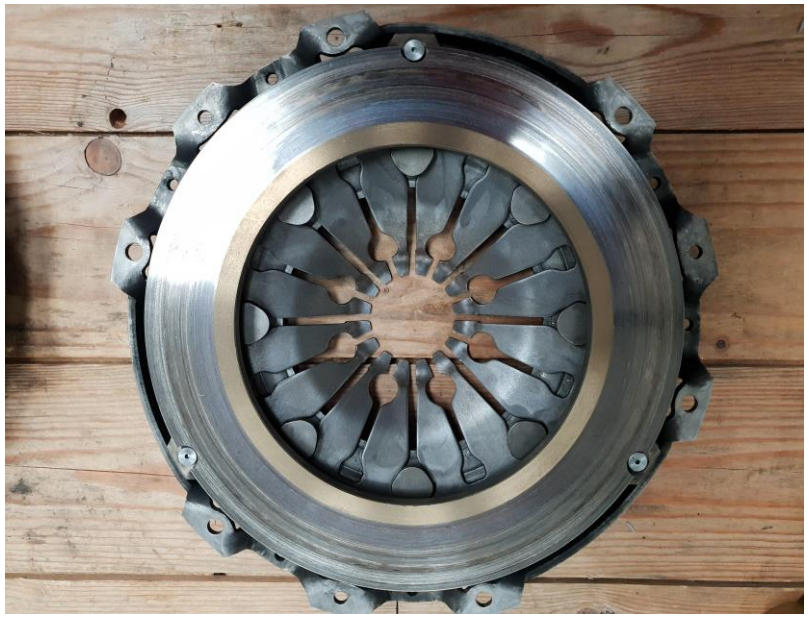
Miss-Aligned Friction plate showing inconsistent wear on the edge of the friction plate. No consistent wear visible.

Left:

Flywheel with inconsistent heat marks. This is a classic case of miss-alignment as the clutch has not been installed with the correct alignment (part no. 400 0237 10) for assembling the clutch

Right:

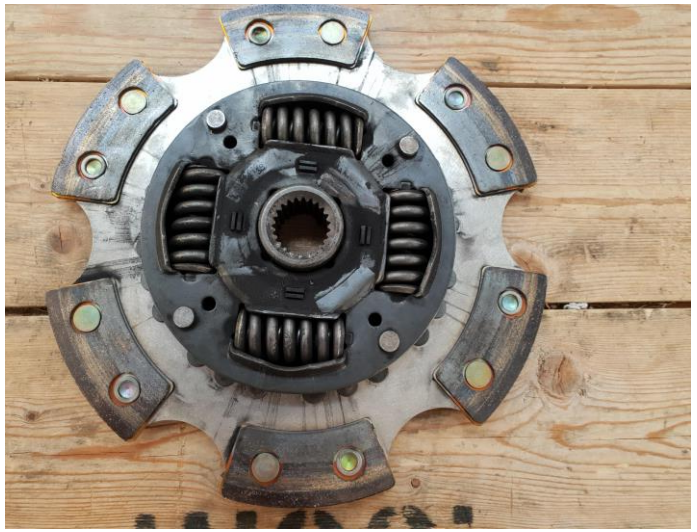
Flywheel with consistent wear correctly lined up too clutch kit.



Gold ring on face or Clutch Pressure Plate caused by severe heat. This is examples of the clutch not been bedded in correctly and the clutch being exposed to mis-use before exceeding our advised bedding in mileage of 750 miles (min)

Contamination of Friction plate:

Oil and grease have contaminated the friction paddle segments resulting in slippage. You can see oil and grease marks on each pad with grease contamination on the Hub core. This can be caused by install error, damaged CSC or other transmission parts failing around the clutch.



Comparison of a new clutch cover and a contaminated clutch cover. This contamination has been moved from the friction plate to the cover and has now effected the clutches performance.

From 01/12/2019 RTS Europe Ltd will not be accepting any returns of Twin friction Self Adjusting Clutch applications unless proof of the correct SAC alignment tool has been used. (Part no. 400 0237 10)

USING AN OLD FLYWHEEL:

RTS Europe do not recommend any RTS Twin Friction Clutch kits be installed to a used or old DMF or SMF. Any Twin Friction SAC not installed to a new Flywheel voids any return warranty.