



## METAL DRIVE PLATES

### Metal Drive Plates

Since proper clutch operation depends on all components working together efficiently, the metal plates must be the correct thickness and absolutely flat. Most O.E.M.'s produce metal plates that are identical, except for thickness, for use in different models. Always measure the thickness of replacement metals to assure proper fit. Some models may require more than one thickness metal in the same clutch pack. The metal plates may be re-used if they are the correct thickness and meet flatness specifications. If they are discolored from heat, show "hot spots," or are in any way suspect, replace them! Some models utilize a spring or dampener plate. This consists of two metal plates riveted together with a wave-washer between them. Always check the rivets and replace the plate if they are loose. Remember, small pieces of metal floating around in your clutch assembly can lead to costly repairs! Many off-road models come stock with aluminum metal plates. These have a tendency to wear quickly, polish to a high sheen, and "muddy" or contaminate the oil. Replacing them with Barnett steel plates will keep the oil cleaner, increase flywheel effect, and last much longer!

When installing steel drive plates, notice that there is a rounded edge on one side of the plates and a sharp edge on the other. It is important that you install the steel drive plates with the like edges going the same direction. It doesn't matter if the rounded edges or the sharp edges are facing outward, as long as the edges are facing the same direction.

## CLUTCH SPRINGS

### Springs

Another area that is essential to proper clutch operation is adequate clutch spring tension. Weak or fatigued springs are a prime cause of clutch slippage and premature wear. However, poor clutch action can not always be solved by increasing spring tension. Many factors can figure into clutch slippage - such as worn or warped friction or metal plates, pressure plate and/or hub wear, cable stretch or flex, faulty hydraulic systems (where equipped), or improper adjustment of actuator. Excessively heavy springs can also cause problems such as stress or fatigue to clutch activators, case covers, center hub, damage to the pressure plate, broken post, or cable stretch - as well as being very hard on your left hand! One helpful hint for dialing in your clutch is to alternate the stock springs with heavy duty springs. This can be done on applications that have an even number of clutch springs (4, 6, etc.). When doing this, it is important that the springs are alternated so the pressure is distributed evenly. This will also keep the clutch lever pull from being overly stiff.

Barnett clutch springs are made of chrome-silicon. They are heat treated, shot-peened, and preset to remove the initial "sag." Our heavy duty springs provide 10-25% more spring pressure than O.E.M. springs for longer life. Do you need special applications such as extra-light for trials bikes or extra-stiff for drag bikes? We have well over 100 different springs to choose from. Just give us your requirements! Some models are equipped with a diaphragm-type clutch spring. On these models, exact clutch pack thickness is essential. Installed deflection of diaphragm springs must be precise to assure maximum efficiency. This is generally accomplished by having the correct O.A.T. (overall thickness - the combined thickness of friction and metal plates). Barnett diaphragm springs are made of high carbon steel, formed and heat treated to precise tolerances. We also make diaphragm springs for Suzuki and all Harley Davidson models. We also offer coil spring conversion kits for the

Yamaha FJ1100/1200, V-Max, Road Star, Royal Star, 1100 V-Star, 1998-03 YZF1000R1, and 1998 & later Big Twin Harley Davidson.

## OILS

### Oils

As far as what oils to use, we generally suggest following the manufacturer's recommendations. Use good quality motorcycle oils and lubricants. The main purpose of oils in a "wet" clutch application (as far as the clutch pack itself is concerned) is to act as a coolant. Oils flowing through the clutch plates help to keep the plates cooler, resulting in smoother clutch action and longer life. Using too heavy viscosity can cause plates to stick when cold.

Synthetic oil, by its nature, has extra lubricity. This can be a real advantage for the engine, but a disadvantage for a wet clutch. Synthetic oils can cause a worn clutch to fail. All Barnett wet clutches are designed to be run with synthetic or petroleum based oils. \* Remember, the single best insurance you can have for your clutch and bike is to keep clean, good quality oil in it!

*\*There are several petroleum/synthetic blended oils that give excellent service in many motorcycle models*

## CLUTCH SERVICING TIPS

### Clutch Servicing Tips

First of all, you should have a service manual for factory specifications and information. Take off the clutch cover. Be careful to lay out the parts you remove in an orderly fashion, not in a pile. This makes the job go back together quickly and easily. Remember to visually inspect all components and clean them thoroughly. Check the bottom of the clutch case for chips, chunks, shavings, parts, etc. You might have other problems. Take the friction and metal plates and stack them like "pancakes." This is a good way to see if they are flat or not. Hold the stack up to the light. If you find any air gaps or light gaps, they need replacing. Also, if they are burned, scored, warped, bent, chipped, glazed, or if the thickness is not to factory specs, you need to replace it. All the plates stacked together should make a nice flat package. If the components are inspected and/or replaced in this manner, you shouldn't have problems like dragging, hard to find neutral, or hard to shift.

## INSTALLING A NEW CLUTCH

### Installing a New Clutch

1. Check all plates for flatness. Make sure the stack height is correct. Make sure the springs are the correct height and tension. Check service manual for these specifications.
2. Pre-oil or soak the clutch plates (if wet type) in clean oil for about 5-10 minutes. Soak in the same oil going into the bike.
3. Make sure the plates slide into the basket and over the hub freely with no binding. If the basket is notched or fatigued where the clutch tabs go, it is best to repair or replace the basket or hub so further problems don't occur. Make sure the clutch basket and/or hub dampening

unit (if bike is equipped with one) is working properly so it doesn't create a chattering problem. Have your local dealer check it for you if you're not sure.

4. Install the plates as per your owner's manual and check specifications. Replacement plates should go in the same way the old plates came out. Determine the O.A.T. (Overall Thickness). This is the combined thickness of all steels and frictions. Basically, this must not vary to any great extent from stock. You can use more or fewer components, but stack height must remain the same. Too thin a stack may result in slippage, while too thick a stack may cause drag. Some bikes have a judder spring, clutch boss rings, rubber O-rings, or a wave washer. When using Barnett products, you may or may not have to disregard these items. Check your clutch kit for instructions pertaining to this.
5. Install the pressure plate, making sure that if your bike has a dot, arrow, or notch marked by the factory, they must line up for proper function of the pressure plate. These marks are on some models but not all of them. The marks are on the clutch hub and pressure plate. Also, be sure to check the pressure plate along with the backing plate (the two surfaces the friction plates touch) for wear and flatness. An uneven or worn surface can ruin your clutch.
6. When installing the clutch springs (coil or diaphragm), visually inspect your springs for uniformity and tension. Check your service manual for spring length. Weak springs can cause slipping - especially at high R.P.M. Check to make sure your release mechanisms, whether they are lever, cam, push-rod, or hydraulic types, are properly working and do not show excessive wear. This can cause improper clutch adjustment, dragging, hard to find neutral, or hard shifting problems.
7. Lube cable, lever pivot and actuator, as needed. Make sure the cable is routed correctly and has no sharp bends or binding when turning the front forks from side to side. Remember, smooth operation will allow you to properly adjust the clutch.
8. Be sure to torque all bolts to factory service manual specs. Use a new gasket when putting the clutch cover on, making sure to clean the gasket surface first.
9. We recommend following the manufacturer's specifications on oil viscosities and quantity. Remember, the heavier the oil viscosity, the more the clutch plates tend to stick or drag when cold.

## CLUTCH FRICTION PLATES

### Friction Clutch Plates

The "heart" of motorcycle clutches are the friction plates. They are what take the most abuse, wear and tear. Friction plates are designed as consumable items. They are meant to wear and, consequently, need to be replaced from time to time. Certain things can be done to increase their life in your motorcycle. First of all, choose only the best available replacement components. Be sure all related parts, such as the steel drive plates, springs, clutch hub, pressure plate, outer basket, clutch cable or hydraulic system, etc., are in top shape. Always use good quality, clean, fresh oil at the proper level and viscosity. Also, keep your clutch adjusted properly. Riding style can greatly affect clutch efficiency and life. Excessive slipping or "fanning" of the clutch can create excessive heat resulting in premature wear.