RACE TECH EMULATOR FITTING REQUIREMENTS

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FOR PROPER FIT OF THE GOLD VALVE CARTRIDGE EMULATOR THE FOLLOWING CONSIDERATIONS MUST BE CHECKED:

FITTING THE EMULATOR and MODIFYING THE DAMPING RODS

1 **FIT INTO THE FORK TUBE** - The outer diameter of the Emulator must be smaller than the inner diameter of the fork tube by at least 0.75 mm (0.030"). It can be as much as 4 mm (0.160") smaller. The OD is first dimension listed in the description in the catalog.

2 **FIT IN / ON THE DAMPING ROD** - Typically there are two types of damping rods, **cupped top and flat top**. Please keep in mind that a "perfect" seal is not required for optimum performance. The main fork spring holds the Emulator down on top of the damping rod. The Emulator can move around a bit without losing its seal.

CUPPED TOP - (fig 1) Most Japanese forks are cupped on top. This is the typical installation for the standard Emulator (though some special models are designed specifically for flat top). Before installation, check the fit of the Gold Valve Emulator by placing it on the top of the damping rod. The step on the Emulator must sit into the top of the damping rod (Cup ID - fig 1) and have 0.5 mm (0.020") clearance minimum. It can have quite a bit of clearance but it must completely cover the opening in the end of the rod.

The dimensions of the step diameter are listed second in the description in the catalog. (Some models of Emulator come with a sizing circlip to fit a wider range of diameters. In this case there will be two diameters listed for step diameter.)

FLAT TOP - (fig 2) The instructions for the Flat Top Style also covers damping rods that have parts of the rod extending upward as well. Many older model Ceriani, Betor, Bitubo, etc. forks are this type. A special adapter must be manufactured for proper fit. As there are many different styles here are some general instructions:

A. Most adapters look like a straight sleeve or tube. The adapter can be machined out of aluminum. It must seat flat on the top of the damping rod. It does not have to locate on the rod but it can, depending on the specific application.
B. The Emulator step diameter should fit into the adapter with about 0.5 mm (0.020") clearance. Put a generous chamfer around the top of the adapter. This will allow the Emulator to locate in the adapter more easily.
C. The locking nut on the Emulator should be clear of the damping rod by at least 1/3 the inner diameter of the damping rod.
D. During final assembly check to be sure the adapter and Emulator are sitting properly on the top of the damping rod.

3 **REMOVE STOCK COMPRESSION OR REBOUNDADJUSTERS** - (Older 80's MX Models; KX, YZ, etc with compression) If there is any type of compression/rebound valve or adjuster, it must be removed. Some models have Travel Control Valves (position sensitive valves) that sit on top of the damping rod. These must be removed. Most notably early Kawasaki's

4 **STOCK REBOUND ADJUSTMENT** - (ZX11, FJ1100/1200, etc) Some models have rebound adjustment. Installation of the Emulator requires removal of the adjuster. This means you will no longer have external adjustment. Special installation instructions and brazing is required. The instructions are available separately on request and are included in the ZX11 kit.

5 **ENLARGE THE COMPRESSION FEED HOLES** – To eliminate the harsh spike caused by the high speed compression damping on stock forks you must enlarge and / or add compression feed holes. Each Emulator Kit is supplied with specific instructions. All there needs to be is enough flow area. Too much does not hurt. If the compression holes are too big or too close together the damping rod can be weakened and might break.

6 **ANTI-DIVE MECHANISMS** – (Gold Wings, etc.) Because of the addition of the feed holes at the bottom of the damping rods any anti-dive mechanism will be disabled. This is not only allowed it is encouraged. Because the Emulator increases low speed compression damping (and higher spring rates are typically used) there will be no need to create anti-dive by restricting down the flow area and increasing high speed damping. This is beneficial because increased high speed compression damping causes harshness on square edge bumps.

SPRINGS

7 **SPRING RATE** – Most street motorcycles come with springs that are too soft. This is in an effort to keep the front end from being too harsh with damping rod style forks. By using the Emulator you will eliminate the major cause of harshness. This allows you to use a stiffer spring and creates a much better ride in every situation. Consult www.racetech.com for your application.

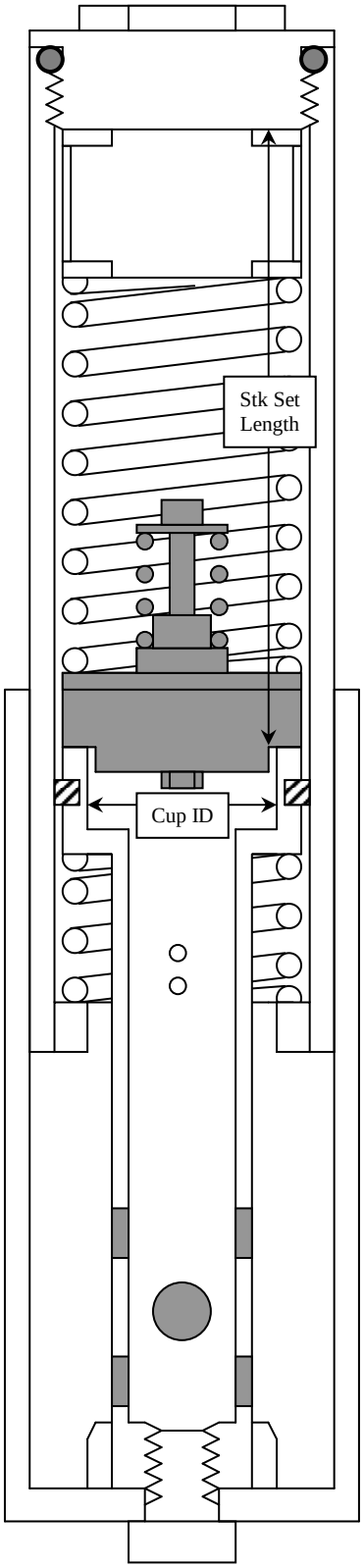

figure 1 Standard Cupped Top

8 **SPRING INNER DIAMETER** - The spring inner diameter must be large enough to allow for proper flow between the inner diameter of the spring and the outer diameter of the Emulator Valve Plate. **The inner diameter of the fork spring must be at least 4mm larger than the Emulator Valve Plate OD (figure 1).** The Emulator Plate outer diameter is the third dimension listed in the catalog.

This is quite often a problem when using aftermarket springs. Also check that the spring does not cover the rebound check valve slots. If it does, most springs can be modified by grinding a 45 degree chamfer on the ID of the spring with a carbide grinding burr.

9 **SPRING LENGTH / PRELOAD** – The Emulator (and adapter) length must be considered when setting up the spring spacer length. Check to see if this is OK by measuring Static (Race) Sag. Typical Static Sag is 25 to 35 mm (1 to 1 3/8") for road bikes and 25% of full travel for dirt bikes.

GENERAL PRELOAD RECOMMENDATIONS

DIRT BIKES
FULL SIZE DIRT BIKES - RANGE - 5 to 10mm (1/4 to 3/8")
85cc MINI DIRT BIKES - 2 to 5mm (1/4")
HEAVY 4 STROKE ENDURO BIKES - 15mm (9/16")

STANDARD STREET AND SPORT BIKES
STREET FORKS - 10 to 30 mm (3/8 to 1 1/4")
STANDARD PRELOAD – 20 mm (0.8") If your model has Preload Adjustment and you are making spacers, cut spacers to set the minimum adjustment to 10 mm (3/8").

More Preload for heavy bikes or when using softer springs.

MEASURING STATIC (RACE) SAG

A Static Sag is the amount the bike settles, from fully extended, with the rider on board in riding position. First, extend the forks completely (bike off the ground). Measure from the wiper to the bottom of the triple clamp on conventional forks or from the wiper to a point on the axle clamp on inverted forks. This is L1.

B Take the bike off the stand and put the rider on board in riding position (Street - sitting or Road race - full tuck). Get an assistant to balance the bike or have the rider hold onto something. Push down on the front end and let it extend **very slowly**. Where it stops, measure the distance between the wiper and the bottom of the triple clamp again. **Do not bounce**. This is L2. (If there were no drag, the bike would come up a little further.)

C Next, lift up on the front end and let it drop **very slowly**. Where it stops, measure again. **Do not bounce**. This is L3. The reason L2 and L3 are different is due to stiction or drag in the seals and bushings. (If there were no drag, the bike would drop a little further.)

D Half way between L2 and L3 is where the Sag would be with no drag or stiction. L2 and L3 must be averaged to find the midpoint and subtracted from L1 to calculate true Static Sag.

Static Sag = L1 - (L3 + L2)/2

E To adjust Static Sag use the preload adjusters, if available, or make longer or shorter preload spacers.

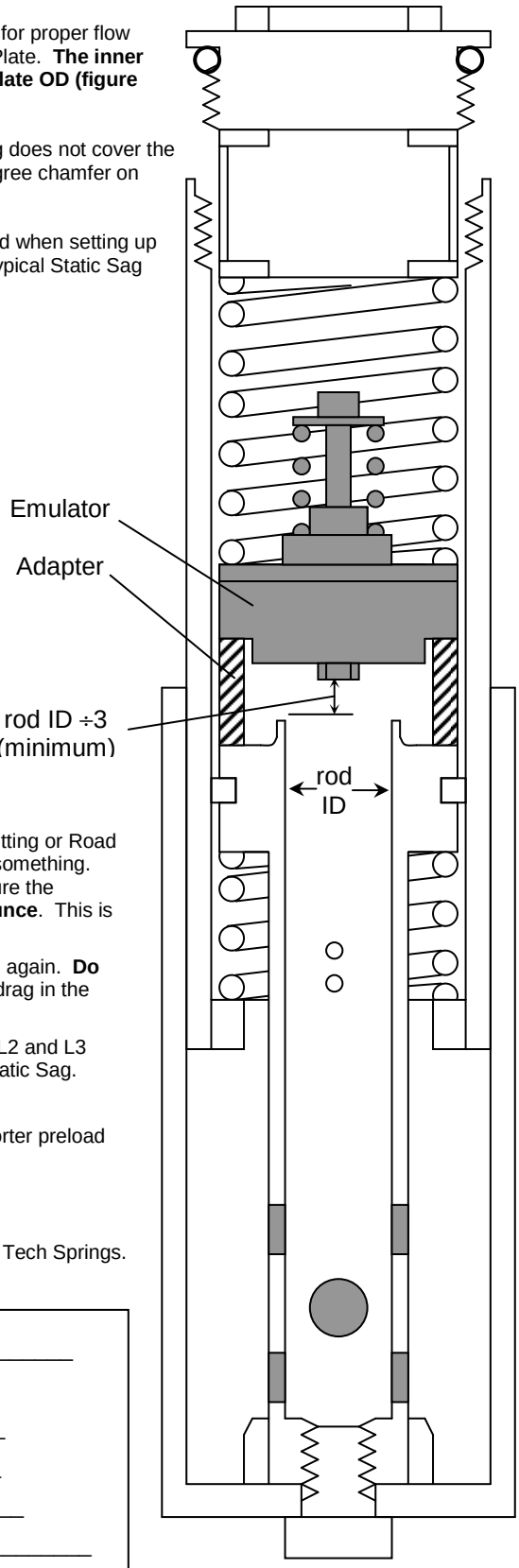

figure 2
Flat Top

OIL LEVEL

10 **OIL LEVEL** – Please call Race Tech. NOTE: All oil levels recommended are with Race Tech Springs.

Name _____ Phone _____

Email _____

Address _____

City _____ State _____ Zip _____

Make _____ Yr_____ Model_____

Rider Weight _____ lbs or kg ::: Bike Weight_____ ::: Spring Rate Req'd _____

Fk Tube OD/ID (mm) _____ /_____ Spring OD/Length _____ /_____

Spr Spacer Length _____ Stk Set Length _____ Fork Travel _____

Cupped or Flat Top ::: Damping Rod Top OD _____ Damping Rod Cup ID _____

Damping Rod OD/ID (if flat top style) _____ / _____

Dimensions in mm (if possible). Measure diameters to 0.1mm Send Competed Form to:

Vintage Tech Support Contact Matt Wiley: mwiley@racetech.com 951-279-6655 ext# 108