



400-F Commerce Circle  
 Yorktown, VA 23693  
 Phone: 757-898-5645  
 Fax: 757-597-7737  
[www.ezbore.net](http://www.ezbore.net)

***SMALL ENGINE PERFORMANCE & NEWAY VALVE SEAT CUTTERS***

With a single cylinder race engine, it is critical that both valves seal 100 percent. Any leakage, and overall performance will suffer. Neway products are an excellent solution to accomplish high performance valve seal in small engines.

Most of our original testing came from the production 5hp Raptor style Briggs and Stratton engine. The production engine block created a big challenge for getting the valves to seal, due to inconsistencies of mass production parts. In an effort to achieve the best valve seal possible, we developed a couple techniques from current Neway products for race applications to enhance getting the best seal possible.



What we like about Neway is that the cutter is at a fixed angle and will consistently cut at that angle each time it is put on a pilot shaft. One of the problems experienced with a stone type grinder is that the stones wear, and the angle can change during stone dressing. The power drive for a stone cutter is bulky and tends to easily deflect during operation on small lightweight blocks and/or heads. Many engine builders will use stone cutters to remove the bulk of material and finish by hand using a fixed angle Neway cutter.

The E-Z Bore-packaged Neway kit for Briggs Raptor Engines uses a cutter with matching angles to the valve. In maintenance/repair and production applications, it is standard practice to use a 1 degree interference angle. The theory is that the interference angle allows the two valve contact surfaces to have initial seal. After the engine has run for a period of time, those two surfaces work themselves together for a better seal (lapping while it is running). With matching angles we will see total seal before the engine is started, and no change in the valve lash. Early race engines had .006 to .008 valve lash; current technology has moved towards tighter valve lash, as low as .002 which doesn't allow for any change in the valve lash after initial set-up.



Our kit has the more expensive expandable pilot. This pilot fits a newly installed valve guide with tighter clearances and also covers a worn guide with additional clearance. One pilot will cover a range of 3 to 4 different size tapered pilots.



The expanding collets on these pilots lock, making contact with the full length of the guide. Solid pilots are tapered pins and tend to only lock at the top inside edge of guide. The lower portion of a tapered pilot is smaller in diameter, so the pilot has a tendency to rock and follow the original location of seat contact area. For performance applications, the rigidity of the expandable pilots forces the cutter to give an accurate seat cut based on guide location in relationship with the seat.

These are very simple hand operated tools. Maintaining alignment of the pilot in the valve guide is much easier with lighter weight equipment.

Get the seat cut true with the guide and you will have better valve seal!



After truing the seat with a cutter, check to ensure that there is no light seen through the port between the valve and seat. Then apply machinist dye to the seat and lightly lap surfaces with a 400 to 600 grit extra fine lapping compound. Extra fine compounds will show runout in the seat or valve. The coarser compounds will give the appearance of a sealing surface, but many times the coarser abrasives simply hides the minor run out that is found in the valve or seat. Wipe surfaces clean with a shop towel and any misalignment will easily stand out. Continue lightly cutting until the lapping compound cleans the dye off both surfaces.

This sounds easy and sometime it is, other times it's a job. Always a job that pays big dividends in the end when you're motor is making professional power. Many engine builders apply air pressure or a vacuum to the ports to check for leaks in a number of different fashions – keep in mind that some leakage will occur between the valve and valve guide while testing.

### A Couple Last Opinions



We strongly recommend using the Neway speed handle – This is a spring loaded turning device that allows you to make continuous rotation with the cutter head. The standard turning device that comes with the kit is a “T” handle. The problem with the “T” handle is that to make 1 one full rotation with the cutter you will need to stop and restart approximately 3 times per rotation. Each pause will cause a slight mark in the finish where the cutter stopped and also increases your chance of deflecting or pulling the pilot shaft a different direction each time.



The cutter that we offer for the Animal/ World Formula is packaged differently than the standard off-the-shelf cutters. These cutters are set-up with a different carbide package that is designed for harder seats. The standard carbide will dull easier and has more trouble penetrating the hard composite material used on the exhaust seat.

We offer a little-known cutter for Stock 5hp Raptor blocks. It cuts the eyebrow area immediately outside of the seats. This aluminum area is considered a tech area that cannot be touched, but many of the later production blocks had this area machined, and this cutter will give you a machined finish blended into the outer diameter of the seat. Please note this is an area that is up to a technical inspector's discretion. ***It is imperative that you use great care, and this area must appear stock when completed.***



As always THANKS for your time and business – Remember ***“The Real Speed is in the Details”***