W804

CLYMER™

KAWASAKI JET SKI®

PERFORMANCE MANUAL

1976-1994

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W804

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sidered in areas with noise restrictions for watercraft.

PERFORMANCE STAGES

It is rarely practical to go all out on performance modifications in one large step. Not all of us want or can afford this level of performance. The best approach is to perform one or two simple changes, evaluate them fully, then go on to a few more changes. This section includes descriptions of several stages of modification which let you go as far as you want and still have a balanced machine.

One of the first performance tricks that you should consider is available for all Jet Skis and costs only a few dollars and some of your time. It involves setting up the stock watercraft the way Kawasaki intended, including replacing broken or worn parts, and performing a simple tune-up. You will be amazed at the performance your stock Jet Ski can deliver if you set it up right. Think of it as Performance Stage Zero if it will encourage you to do it. Once the watercraft is working properly in its stock form, you will be better able to evaluate other changes which claim to improve performance.

A tune-up is not as exciting to talk about as other subjects in this book, but it is very important in achieving the best engine performance. The following is important in getting the most out of any 2-stroke, stock or modified:

a. Fresh spark plugs.
b. Carburetor adjustment.
c. Decarbonize exhaust system.
d. Decarbonize piston crown.
e. Fresh rings and cylinder hone.

The Clymer Shop Manual is the best source of information on these items.

Several performance stages are described below to add several horsepower or increase reliability. The stages detail a logical progression from Stage I, which adds up to 5 horsepower and noticeable improvement in stable handling, to Stage III, which gives you a machine that would be competitive in club racing. Be careful, though. If you plan on organized competition, make sure that you build to the current rule book of the organization sanctioning the race.

Stage I

a. Ride plate.
b. Intake grate.
c. Air cleaner/flame arrestor.
d. Extractor exhaust.
e. Stainless steel impeller (mild pitch).

Stage II

a. All Stage I improvements.
b. Raise compression pressure to 180 psi.
c. Larger single carburetor or dual carburetors.
d. Blueprinted pump.
e. Impeller with more aggressive pitch.

Stage III

a. All Stage II improvements.
b. Raise compression pressure to 195 psi.
c. Run racing gas.
d. Larger carburetors or fuel injection.
e. Impeller with even more aggressive pitch.

Complete all modifications in one stage before moving on to the next. However, it is not necessary to complete all modifications in the next stage to realize improvement. For example, don't add Stage II modifications until you have completed all Stage I modifications. Once Stage I is complete you can pick and choose items from Stage II if you can't afford all of them at once.

Not every modification or improvement included in the book is listed here. Some modifications in this book are specialized and intended only for a particularly type of riding or for a specific model. Other modifications are just a

The header pipe can be used to move the power peak. A longer header will move the power peak downward in rpm, and a shorter header will move the power peak upward in rpm. However, if the header pipe gets too short it will cause the engine to run much hotter.

Figure 3 shows how the exhaust system works to improve engine performance. As the piston moves downward on the power stroke it opens the exhaust port. Gases begin to escape and generate a pressure wave in the relative low pressure of the expansion chamber. As the piston continues to descend, the pressure wave moves down the expansion chamber pulling a fresh charge of gasoline behind it into the cylinder. Eventually, the wave bounces back when it hits the baffle cone at the end and seals off the exhaust port to prevent the fresh charge of fuel from escaping the cylinder. The piston reverses to compress the charge for the next firing and the exhaust pressure in the expansion chamber bleeds off through the outlet pipe.

Though the design of 2-stroke exhaust systems is well-known from years of motorcycle and snowmobile applications, watercraft applications involve several important compromises. Unlike a motorcycle, watercraft don't have transmissions that can keep the engine working in a narrow power band regardless of conditions. A watercraft engine must develop power over a wider power band. It must develop sufficient low-end power to get the watercraft up on plane quickly and sufficient top-end power to make it interesting to ride. These two goals work against each other. Usually, you can design a pipe to get good low-end grunt or a strong top-end, but not both. Some aftermarket pipes let you change the rear cone section to get the power where you need it for your kind of riding, but you still can't get power at both ends of the rpm spectrum simultaneously.

Another problem with watercraft is that the ideal exhaust system must be stuffed inside a tight, enclosed engine compartment. Of course, designers could simply hang the whole thing outside the watercraft like a motorcycle exhaust, but that is not likely to be attractive to most riders. Instead, the exhaust must be bent around in ways that reduce its ability to make horsepower. Furthermore, the tight quarters make water-cooling the exhaust mandatory to prevent cremating components in the engine compartment or torching the entire hull.

Water-cooling adds its own set of problems. The water flowing in the pipe changes the internal dimensions of the pipe that the designer worked so hard to develop. More importantly, the cooling effect of the water changes the timing of the wave that propagates through the pipe. A sound wave travels slower as the temperature drops. This problem is made even more difficult by the fact that the volume of water flow changes with engine rpm.

It is a wonder that 2-stroke pipes can be made to work at all and is a tribute to the designers who really can extract comparatively large amounts of horsepower from watercraft engines.

AFTERMARKET EXHAUST SYSTEMS

Aftermarket exhaust systems offer improvements in weight, more efficient removal of exhaust gases and the ability to tune engine power for specific kinds of riding. Furthermore, you cannot gain the benefits of other engine modifications such as larger carburetors and increased compression pressure until you can get rid of the larger volume of gas efficiently through an improved exhaust system. Nothing is free, of course. Many aftermarket exhaust systems are noisier than the stock pipe.

The variation in aftermarket exhaust systems is even more bewildering than the variations Kawasaki has from model to model and year to year. This chapter will discuss some of the available systems, but ultimately, you should base your decision on your own research. Write to all the manufacturers and get their brochures and