

What is a Marine Dynamometer?

A Dynamometer is a device that provides a measurable load (force) on an engine. This International Dyno service of Marine Dynamometers provides a load for marine outboards and I/O's to closely simulate actual on-the-water operation. Dyno load measurements can be used to evaluate an engine's full throttle power and acceleration.

Why is load testing an engine so important?

An engine's operating characteristics are completely different during no-load (static) running than they are during loaded (dynamic) running. It would make sense that you should do your tuning and troubleshooting on an engine that is comparably loaded to actual on-water conditions. Many customer complaints do not show up on an engine operating with no load.

My shop is located on or near water. Why would I want a Dyno?

It takes 5-15 minutes to connect the Dyno and run an engine test. Compare this to the time it takes to water test an engine. Also consider the fact that you can Dyno-test day or night, regardless of weather, and in your shop where your tools and parts are always within reach. Your liability exposure for worker's comp and the customer's property is drastically reduced. To verify your solution to the engine problem, you would need to re-water test. The Dyno would only take 5-10 minutes.

I have a test tank. Why do I need a Dyno?

Test tanks are fine for the lower horsepower engines and a limited amount of applications. Few engines can be run at full throttle in a tank with a test prop without aeration and prop cavitation. This will cause engines surging. A full line dealer would need a wall full of test props. Also test tanks are not portable.

Can Dyno testing harm an engine?

Dyno testing will not harm an engine. All you are doing is duplicating normal operating conditions, in your shop.

How do I cool the engine during a Dyno test?

Since a typical Dyno test generally takes less than a few minutes of full load operation, a flushette which supplies water to both sides is sufficient. For extended running or poor water supply conditions, something as simple as a small cattle watering tank (or even your test tank) can be used to supply engine cooling while operating the Dyno.

How is the engine power measured?

We measure engine output as pressure (P.S.I.) buildup in the Dyno. We provide charts for all the engines listing their output at specific full throttle RPMs. For evaluating changes and engine improvements, at a specific RPM, an increase in pressure corresponds to an increase in engine power.

Why don't you measure engine output in terms of horsepower?

Simply, our method of reading pressure is much less expensive. A pressure reading serves as a reference point, as does a horsepower reading. Our method of measurement makes the Dynamometer affordable to every dealer. It is important to realize that when the manufacturers assign a horsepower rating to an engine, it is done under optimal conditions (i.e., a specific altitude, temperature, barometric pressure and humidity levels). This, coupled with the fact that they are allowed a +/- 10% margin of "error" in production, means that you would rarely see an engine producing the exact horsepower for which it was rated.

What engines can I run on the Dyno?

There are models for most standard production outboards and I/O's ranging from 35 H.P. to 575 H.P.

How much maintenance is required on the Dyno?

The only routine maintenance suggested is a yearly change of the hydraulic fluid.

How does the Dyno produce service revenue?

By enabling you to effectively speed up service work and drastically increase your

troubleshooting accuracy. Costly “comebacks” are virtually eliminated. Potentially bad trade-in’s can be identified on-the-spot. But the most obvious means of increasing revenue is by implementing a “Dyno Tuning” charge. Most shops charge a flat fee to simply connect the Dyno to the customer’s engine and run it. Multiply the number of engines you service by your “Dyno Tuning” charge to see how quickly this benefit alone will pay for the Dyno.

What will a Dyno “tell” me about an engine?

By comparing your initial Dyno reading to the specifications published in our Performance Guidelines booklet for that particular engine, you can determine if it’s producing proper full throttle power. If it isn’t, or if you are making modifications for additional performance, your initial Dyno reading serves as a reference point. For each subsequent Dyno run you can actually measure the increase or decrease in power resulting from your work. Also, the Operator’s Manual contains tuning/diagnostic hints with general pressure loss readings typically resulting from problems such as a dead cylinder, power pack breakdown, high-speed miss, acceleration bog, heat-related problems, etc. The Dyno is a time saving tool.

Will my customers pay a Dyno tuning charge?

Yes. Explain to them the benefits of testing and confirming their engines’ performance under loaded conditions in the shop. Explain hourly labor charges they’re saving versus an on-the-water test. Explain how you can actually measure their engine’s performance and provide them with before and after Dyno readings, if you wish. The simple fact that you have a Dyno suggests that you have a capable and professional service department. So advertise it.

I can’t afford a Dyno right now.

Many decision makers want to wait for some undefined level of sales or productivity before investing in a Dyno. The fact of the matter is that a Dyno will help you achieve a particular sales goal. You can’t charge for tank test. You can charge for a Dyno test. Forget, for a moment, about all the troubleshooting and cost-savings benefits and calculate one year’s revenue for Dyno-Tuning charges alone. You’ll see why we say that a Dyno doesn’t cost...it pays. In reality what costs is the lack of a Dyno.

Will my mechanics use a dynamometer?

Sometimes it’s difficult to break old methods for testing engine load such as lake testing or water tank testing. However, an owner stressing the need for faster customer service and increased mechanic productivity can go along way in making the transition for lake testing to dyno testing. Some dealerships pay their mechanics extra if they use the dyno and avoid an lake testing situation.

Is the dynamometer easy to use?

Dynamometers have been around for many years are simple to use. There are simple operating instructions for attaching the dynamometer to the boat engine. Two easy to read gauges provide RPM and torque readings. A performance guide book cross references these readings into measurements can that be used to see if the boat engine is operating within the manufacturer’s published specifications.

How long will it take to complete a dynamometer test?

Most dynamometer tests are actually quite short, usually two minutes or less. Of course there is set-up time to consider. An experienced mechanic can usually do the dyno test from start to finish in thirty minutes or less. Certainly much less time than a lake test, even if your dealership is located on the water.

How much time will mechanics save on a dynamometer test versus a lake test?

Although it depends on how far your dealership is from the lake, our independent survey indicated that most “on water testing” takes two hours or more if the boat has to be trailered to the lake. Compared with a typical dynamometer test, you should expect to save 2½ hours or more.

Are there any other mechanic productivity improvements by using a dyno?

One of the many advantages of the dyno, is that it’s right there in your shop. That’s the same place all your other tools and testing equipment are located. It’s handy to use and greatly increases mechanic productivity. In addition, any replacement

parts needed for repairs are also close at hand or can be promptly ordered.

Isn't a lake test still better than a dynamometer test?

The lake is certainly great for having fun, but it's not very productive. A lake does not provide your mechanics with any readings to help them diagnosis engine problems. The lake conditions are not consistent from day to day and do not provide a controlled environment like your shop.

How about a water tank test versus a dynamometer test?

A small water tank can help with low engine idle speeds only. But to cavation problems, mid-range and full throttle conditions are not possible and still get accurate results. A large water tank can solve some of these problems, but space considerations and environmental issues often make this no feasible. Lastly, like the lake, a water tank test doesn't provide any diagnostics. A dyno test can be submerged in a water tank for additional testing if needed.

Can I use a dynamometer test to diagnose boat & motor trade-ins?

Absolutely. Many marine dealer owners demand that every trade-in must be tested on the dynamometer. The RPM and torque readings indicate whether the engine is operating within the engine manufacturer's specifications. One dealer indicated they paid for their dyno with one trade-in because it diagnosed a lower unit problem that was not detected on first inspection .

Can I use a dynamometer test to keep used boat & motor resale prices higher?

Sure. Many marine dealer owners used the dyno readings on an engine to show a perspective buyer the results. If the motor (1/2 the cost of the boat generally) is within the operating specifications, you can demand a premium for the boat and motor, assuming boat appearance and other conditions are acceptable. Conversely, poor dyno readings may indicate that your resale price should be lower. But if you tested the used boat and motor on trade-in, it should result in a resale price still above your trade-in allowance.

Is a hydraulic dynamometer more reliable than a water-brake dyno?

Dynamometers have been around since the early 1900's and use many methods for inducing a braking force on the device under test. Water, hydraulic, eddy current and others are common forms of braking. Hydraulics have been found to be a more stable fluid for measuring engine characteristics. More stability means less breakdown, lower maintenance costs and better testing results. Hydraulic fluid based dyno's provides more consistent results and longer life than water based dynamometers.