

THE WINNING COMBINATION

On the dyno & in the dirt with hopped-up pump gas

By the DIRT BIKE Staff

Last month we found that pump gas develops as much power in a stock bike as the most exotic and expensive fuel blends we concocted. Unfortunately, engine-destroying detonation occurred, even with the highest octane pump gas, unlike the smooth, ping-free operation we found with our high-octane mixtures. Detonation was so severe during the dyno test with the lowest octane pump gas we used (88 octane leaded regular), that our test engine blew up! Most riders like the high performance race bikes offer, and want to avoid detonation-related engine death, but they don't have easy access to racing gasoline or aviation fuel. Octane boosters look like a solution to the octane shortage problem. They can be found at most motorcycle dealers and aren't as expensive to use as race gas or aviation fuel. How do they work? Read on.

TESTING ONE, TWO, THREE . . .

We gathered 17 of the most popular octane boosters for our test. They were mixed with unleaded premium gasoline, the fuel recommended by Honda for the CR250R, at half of the maximum strength listed by each booster manufacturer.

Some of the boosters weren't conventional gasoline additives. Bel-Ray's MC1+, Blendzall's Gold Label, PJI's and Silkolene's Pro 2 are two-stroke oils that contain octane-boosting agents. We mixed these products with the test gasoline at the oil manufacturer's suggested ratios.

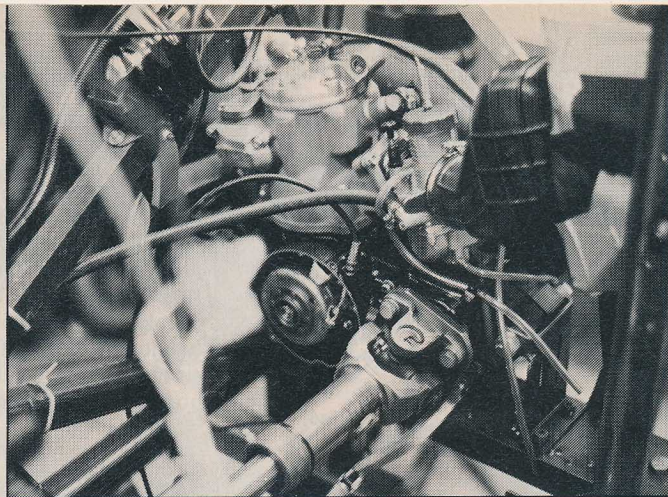
Dyno tests were run at Boyesen Engineering for each product. Each of the octane boosters was then used in a CR250 ridden on a motocross course. The test rider was asked to note the machine's throttle response and tendency to ping.

RESULTS

Track testing showed that every octane booster in our test but one, Blendzall Gold

Tower of power. Octane-boosting products have been developed to capitalize on the lack of high-performance pump gas. At an average cost of \$1.98 per mixed gallon, most are a functional and economical alternative to racing gasoline, which may cost \$5 per gallon. Two-stroke oils that include octane-boosting agents provide extra economy by eliminating the need for a separate gas additive. ▶





Lively, ping-free response (like race gas) is what DIRT BIKE was looking for from the boosters. Octane boosters release the full power available from machines that need more octane than pump gas offers.

Octane ratings (the measure of a fuel's resistance to pinging) are usually calculated by using a slow-revving (900 rpm max) variable-compression engine that would work better mowing a lawn than powering a motorcycle. Boyesen Engineering fed this dyno-mounted CR250 engine samples of each octane booster to give DIRT BIKE readers more real-world data.

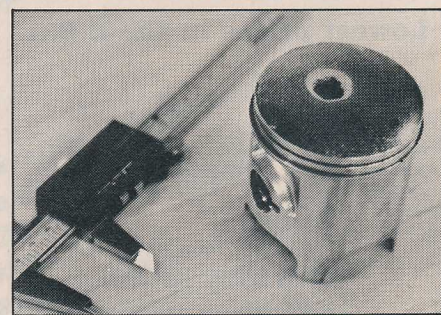
◀ Complex, hideously expensive NASA fuel containers were used to separate the fuel samples. The clear glass jars let us see if the additives caused any mixing problems with the two-stroke oil we used—they didn't. We drained the bike's tank and carb between each test.



OCTANE BOOSTER RATINGS

| PRODUCT | MAX HP | MAX TORQUE | ON-TRACK PERFORMANCE |
|------------------------------|--------|------------|---|
| SUPER UNLEADED, NO BOOST | 41.3 | 24.8 | Good performance, light pinging |
| RACE GAS | 42.0 | 27.0 | Strong response, no pinging |
| BEL RAY MC-1+ | * | * | Less response than race gas, same as super unleaded, no pinging |
| BLENDZALL BLK LABEL | 40.7 | 26.1 | Stronger response than race gas, no pinging |
| BLENDZALL GLD LABEL | 41.2 | 26.6 | Strongest response of all products, light pinging |
| BLENDZALL O.B. | 41.2 | 26.4 | Slightly stronger response than race gas, no pinging |
| KLOTZ O.B. | 41.2 | 26.8 | Slightly stronger response than race gas, no pinging |
| KLOTZ GAS LEAD ADDITIVE O.B. | 41.5 | 26.9 | Stronger response than race gas, no pinging |
| LUBRITECH GAS UP | 41.7 | 26.8 | Slightly stronger response than race gas, no pinging |
| MAXIMA HI-TEST | 41.7 | 26.7 | Stronger response than race gas, no pinging |
| NEO GAS ADDITIVE | NA | NA | Same response as race gas, no pinging |
| 104 OCTANE BOOST | 41.5 | 27.0 | Same response as race gas, no pinging |
| O'NEAL POWER PLUS | 41.3 | 26.8 | Same response as race gas, no pinging |
| PJ1 OCTANE PLUS | 41.7 | 26.6 | Stronger response than race gas, no pinging |
| PJ1 GOLDFIRE PRO | * | * | Less response than race gas, same as super unleaded, no pinging |
| SILKOLENEPRO 2 | * | * | Better response than super unleaded, no pinging |
| SILKOLENE PRO BOOST | 41.2 | 26.5 | Slightly stronger response than race gas, no pinging |
| SILOO O.B. | 41.7 | 27.0 | Same response as race gas, no pinging |
| TK7 TWO-STROKE POWER BOOSTER | 42.0 | 26.8 | Same response as race gas, no pinging |

* Output measured at the countershaft on a 1988 Honda CR250. Would not suppress pinging well enough to permit a full dyno test.



The hole story. Straight unleaded premium gasoline didn't have enough octane to suppress detonation during the rigors of dyno testing. Normal riding with the same fuel results in light pinging, which might take weeks, rather than hours, to cripple an engine.

Label, stopped the pinging we heard with straight super unleaded. In spite of the pinging, our test rider said the bike felt stronger with Gold Label than with the other products. Many of the boosters produced better response than race gas! None of the boosters caused any mixing problems with two-stroke oil. We didn't have any reliability problems with our two CRs during track or dyno testing that we could blame on the gasoline additives.

WIDE OPEN, ZERO MPH

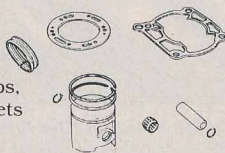
Evind Boyesen warned us that suppressing detonation in an engine running on a dyno requires more octane than almost any real-world riding situation, due to the constant heavy load placed on the engine. He said we'd need about 95 octane for a ping-free dyno run with most stock high-performance engines. All but three octane boosters allowed uninterrupted dyno tests, in contrast to plain super unleaded, which

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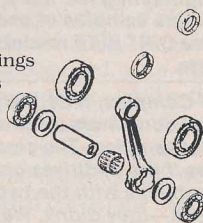
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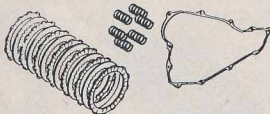
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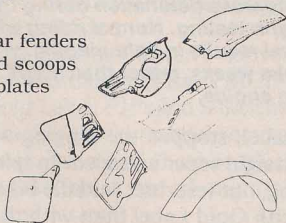
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OCTANE BOOSTERS

caused detonation severe enough to hole a piston. Apparently the boosters mixed at medium strength raised the octane at least four points. Horsepower and torque were greater with most boosters than with straight super unleaded. TK7's power booster equaled the horsepower of race gas! Strangely enough, some of the boosters that felt strong on the track registered a minute horsepower drop on the dyno.

DOES BOOST EQUAL ROOST?

Octane boosters are designed to stop power-robbing, engine-damaging detonation, and most of the products we tested did that. Two products did quite a bit more, and we'd recommend them over the others due to their outstanding overall performance. Maxima's Hi Test and PJ1 Octane Plus stopped pinging, gave better throttle response than race gas *and* pulled better numbers on the dyno than straight super unleaded pump gas. Are octane boosters worth it? Yes! □

OCTANE BOOST PRICE COMPARISON

| BRAND | COST (per oz.) | DOSE SIZE (oz. per gal.) | COST (per dose) | COST (w/\$1.20 per gal. unleaded premium) |
|------------------------------|-------------------|-----------------------------|--------------------|--|
| BEL-RAY MC-1+ | \$0.30 | 2.50 | \$0.75 | \$1.95 |
| BLENDZALL BLK LABEL | 0.24 | 3.00 | 0.72 | 1.95 |
| BLENDZALL GLD LABEL | 0.15 | 16.00 | 2.40 | 3.60 |
| BLENDZALL O.B. | 0.16 | 3.00 | 0.48 | 1.68 |
| KLOTZ O.B. | 0.39 | 2.00 | 0.78 | 1.98 |
| KLOTZ GAS LEAD ADDITIVE O.B. | 0.43 | 2.00 | 0.86 | 2.06 |
| LUBRITECH GAS UP | 0.33 | 1.50 | 0.50 | 1.70 |
| MAXIMA HI-TEST | 0.30 | 2.00 | 0.60 | 1.80 |
| NEO GAS ADDITIVE | 0.69 | 0.50 | 0.35 | 1.55 |
| 104 OCTANE BOOST | 0.75 | 0.75 | 0.56 | 1.76 |
| O'NEAL POWER PLUS | 0.32 | 2.50 | 0.80 | 2.00 |
| PJ1 OCTANE PLUS | 0.30 | 1.50 | 0.45 | 1.65 |
| PJ1 GOLDFIRE PRO | 0.30 | 3.00 | 0.90 | 2.10 |
| SILKOLENE PRO 2 | 0.46 | 2.50 | 1.15 | 2.35 |
| SILKOLENE PRO BOOST | 0.26 | 2.60 | 0.68 | 1.88 |
| SILOO O.B. | 0.33 | 2.00 | 0.66 | 1.86 |
| TK7 TWO-STROKE POWER BOOSTER | 0.99 | 0.25 | 0.25 | 1.45 |

RECOMMENDED READING: WHERE MOTORCYCLE MAKERS, DOCTORS & THE AMA STAND ON OCTANE BOOSTERS

• Cagiva, Honda, Husqvarna, Kawasaki, KTM, Suzuki and Yamaha all design their motorcycles to run on 90 octane or better pump gas. Who needs these boosters? Are they safe to use? Are they legal for racing? *Dirt Bike* has the answers.

Unfortunately, pump gas doesn't supply the octane needed for peak performance from some stock engines, and frequently falls short of modified engines' octane demands. Motorcycle manufacturers don't recommend using octane boosts, but they don't advise against using them, either. Why no opinion? Consider the difficulty and expense for each manufacturer in testing all their models with the many octane boosters on the market in combination with the many brands of gasolines and oils available.

Each of the products in our test is designed for motorcycle use and should not harm your machine. If you plan to use an octane booster on a regular basis, you should mix a sample of the gas/oil/octane boost mixture you'll be using and bathe a few vulnerable engine parts, such as a crank

seal and a reed petal, in it for 24 hours. If you notice any deterioration, try another octane booster.

SAFETY FIRST

Octane boosters rarely harm engine parts, but they're extremely harmful to humans. Avoid breathing the fumes of octane boosters and keep them and the gasoline mixed with them away from your skin.

RULES FOR FUELS

Before you use the extra performance octane boosters offer in competition, consult the rules of the racing organization whose event you plan to enter. Of the boosters in this test, only the makers of Klotz, Maxima and PJ1 indicated that their products are legal in AMA competition. Three of the four two-stroke oils, Bel Ray MC-1+, PJ1 Goldfire Pro and Silkolene Pro2 are also AMA legal. This is not to say that the others are definitely illegal. The boost concentration, oil (for two-strokes) and gasoline brand you choose may affect the legality of your fuel blend in the AMA's eyes. If you're just racing your buddies, anything goes! •