

Wednesday, 30 September 2010

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BACKGROUND

2011 YAMAHA APEX Dyno Test

American Snowmobiler magazine puts the new Yamaha Apex to the test, please see the editorial of Mark Boncher, senior editor of AMSNOW published September the 17th 2010

The throttle has been pulled, the data has been captured, and now we know the number that many have been waiting to hear this fall, the independent dyno stats for the new 2011 Yamaha Apex.

In our early preseason dealings with the tech boys at Yamaha we were made to believe that this sled would only make 3-5 horsepower more than the 2010 RX-1.

Wow, were we duped!

No reason to be blue

While Yamaha is known worldwide as the Blue Team they don't have any reason to be feeling down after Jim Czekala at Dynotech Research put the new Apex on his dyno.

Yamaha is known for being a conservative company and often under promises, but over delivers, and that's the case here. The particular unit we dynoed was a demo sled used for consumer test rides in the northeast - supplied by Keith Wood of Woody's Performance in Topsham, Maine. The sled had about 1,700 miles on the odometer and we were told by Yamaha's Marketing Manager Wade West that "at about 1,300 miles you can tell these sleds really wake up. The chassis and track finally loosen up well and the driveline is done being broken in at this point."

This Apex was more than ready to show well on the dyno.

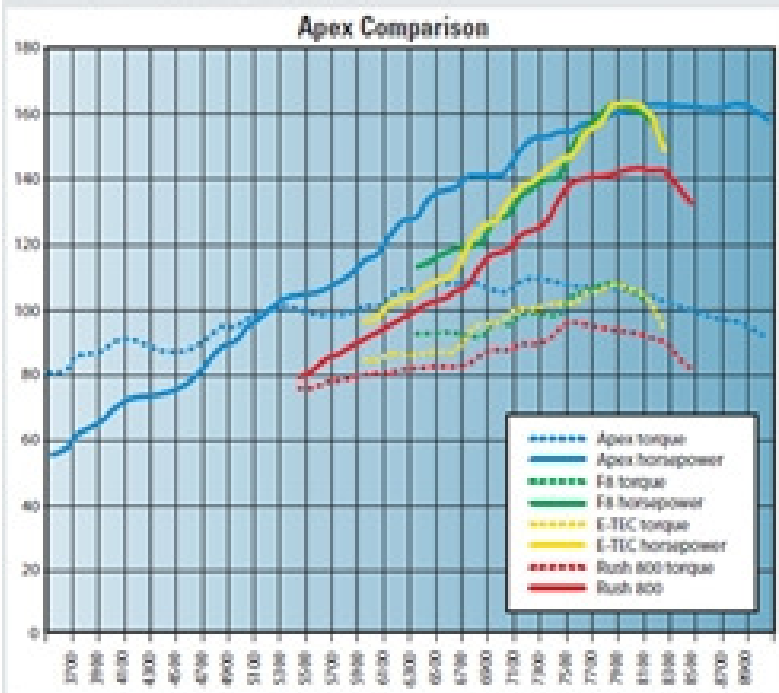
The final numbers showed the new Apex pulling 162.8 hp at 8,300 rpm. The exceptionally uniform and flat torque curve had a peak of 109.8 ft.-lbs. at 7,300 rpm. This sled is steady throughout its power band, even more so than other impressive 4-stroke snowmobile engines we've seen from Yamaha.

Jim chimed in when we were discussing the results and said "It should be easy to clutch for those aftermarket fellows looking to get a little more performance as the 2-strokes only have a pimple of power in the power band and 4-strokes are much better."

For the brass at Yamaha this means that they now have a 4-stroke snowmobile that can compete with the big 2-stroke 800 twins from Cat (800 H.O. EFI), Polaris (800 CFI) and Ski-Doo (800R E-TEC) on power. The Yamaha Apex and Cat and Ski-Doo 800s have now all been independently dynoed to make roughly 163 horses while the Polaris 800 makes 143.2 ponies. (see graph)

This is good news for Yamaha guys and gals debating on buying the expensive Apex as this new, more powerful Apex engine may help them justify digging into their piggybanks to their significant other!

THE 160+ HORSEPOWER CLUB



THIS GRAPH shows the 2011 Apex (Blue) along with dyno runs Dynotech has done independently for AmSnow. Peak horsepower for the new Apex is comparable to, or better than, current 2-stroke liquid twin 800s. It's important to note the peak torque numbers are better, AND the powerband is consistently strong while being nice and flat. The real test of the new Apex will be overcoming its bulk, or how it's power-to-weight ratio shakes out. We were not given dry weights again this year, but will have wet-weights from our Original Real World Shootout in the March issue... stay tuned!

Questions? Please contact Allen Hidding – YME NV at allen.hidding@yamaha-motor.nl

More thoughts from Dynotech Jim

The new EXUP variable exhaust is certainly different than the exhaust on the 2010 RX-1 sleds, but the small changes on the exhaust and engine certainly had a big effect on performance. Changes included the exhaust header diameter being increased from 35mm to 38mm, and the pipe from the EXUP collector to the muffler being increased in diameter.

The exhaust is made of lightweight titanium and the EXUP housing itself is made of cast titanium. The muffler flow capacity was increased as well. On the new engine the cams are unchanged, but timing WAS changed to increase overlap by 5 degrees. Finally, the intake air box horns increased in length from 115mm to 126mm.

We did a couple extra tests on this sled including having Keith Wood help us out by locking the EXUP open while running several pulls. Interestingly, we saw a significant decline in performance when the EXUP was essentially turned off. "The EXUP surely helps in the mid-range, with no penalty on low-end and still being able to keep your top end as well," Czekala said after the tests.

"Compared to the 150-horse earlier Apex we have an 8% increase in peak power with very minimal changes in tuning/components. Also adding 10% to "velocity stack" length, inside the stock air box, may help peak rev tuning. A larger exhaust pipe diameter must be having a positive effect on power at peak revs and maybe the cam timing is helping here. The 5 degree added overlap is helpful for top end power too.

"One example of this was seen 15 years ago when a friend of mine Kevin Cameron (See story in Cool News) dynoed a bike to do a cam timing evaluation for Cycle magazine. We added 3-4% hp to a stock GS1150 Suzuki just by Kevin methodically "rolling" stock cams (using slotted intake and exhaust cam sprockets) around to optimize horsepower. But that added top horsepower may have cost low-end power, and that is where Yamaha's EXUP helps!

"Finally, big exhaust pipe diameters are said to make more high rpm horsepower, but lose it on the midrange, but in this scenario EXUP makes up that difference."

End of publication.

Footnote

In fact this test reveals the weakness of two strokes. Although the conservative snowmobilers still praise the 2stroke 800 power houses, figures tell another story. Apex delivers 160 + horsepower measured over a wide power band from 7900 rpm till 9000 rpm while the 2 strokes just touch the 160 hp mark and then rapidly drop down (or not even that, in case of the Polaris 800 Rush test machine)

But a snowmobilers dream is the Apex torque curve, flat and strong- much stronger than any of the competition, from bottom to top rpm and already there at an rpm level where the 2 strokes still have to wake up.

2011 YAMAHA APEX		
RPM	HP	Torque
6000	115.3	101
6100	117.5	101.2
6200	123.4	104.6
6300	127.5	106.3
6400	128.7	105.6
6500	134.5	108.7
6600	136.6	108.7
6700	137.7	107.9
6800	141.1	109
6900	141.3	107.5
7000	141.2	106
7100	142.8	105.7
7200	149.2	108.9
7300	152.6	109.8
7400	153.4	108.9
7500	154.6	108.3
7600	155	107.1
7700	157.2	107.2
7800	157.7	106.2
7900	160	106.4
8000	161.4	106
8100	162	105
8200	162.7	104.2
8300	162.8	103
8400	162.4	101.5
8500	162.3	100.3
8600	161.8	98.8
8700	161.8	97.7
8800	162.6	97
8900	162.8	96.1
9000	161.2	94.1