FLYWHEEL TECH
IS TOO LIGHT NOT RIGHT?

FLYWHEEL TECH IS TOO LIGHT NOT RIGHT?

Flywheel Tech: Can Too Light be Not Right?

You've seen them advertised and maybe you've already purchased and installed a lightened flywheel for your street, street/strip or full-race car. The clutch company offered a lightened flywheel, so you decided to get one with your new clutch. Did you make the right decision? In most cases, you may have gone in the right direction. In some cases, the stock, a slightly heavier or a slightly lighter flywheel may have been optimum for your application. Understanding exactly how a flywheel works will ensure that you get the best flywheel for your performance combination.

Flywheel: The Friction Surface

One purpose of the flywheel is to serve as a friction surface for the clutch disc. As the clutch is disengaged (when you release the clutch pedal from the floor), the clutch disc begins to be pressed against the flywheel by the pressure ring of the clutch cover (a.k.a. pressure plate). Friction between the clutch disc and the flywheel will cause the clutch disc to be accelerated. Once the clutch is fully disengaged (your foot is off the clutch pedal), the pressure ring will have clamped the clutch disc against the flywheel and the input shaft of the transmission will now be at the same speed as the engine. At this point the clutch disc has also been accelerated from a dead stop to the speed of the engine.

The important aspect of the flywheel as a friction surface is that the flywheel must have a surface that is compatible with the material used on the clutch disc itself. We have seen some aluminum flywheels that use steel inserts that do not fair well with many of the more-popular metallic disc compounds. In most cases, non-metallic, organic clutch discs will be the most compatible to the different materials used on flywheel friction surfaces. The metallic compound clutch discs will be the most difficult to find compatible flywheels friction surfaces. For any application that uses a metallic clutch disc, it is a good idea to purchase

the flywheel from the clutch manufacturer or be sure to ask the flywheel manufacturer if the flywheel will be compatible with the clutch disc material that you will be using.

When you teardown your clutch for inspection, you should not see deep grooves or gouges in the friction surface of the flywheel. If you do, you should seek a different flywheel to work better with your specific clutch disc.

Flywheel: The Energy Storage Device

So if the purpose of the flywheel is to just serve as a friction surface why do people care about the weight of the flywheel? A flywheel actually serves an additional purpose besides acting as a friction surface. The flywheel also serves as an energy storage device for your vehicle.

When your engine is running, potential energy is stored in your flywheel. Two

factors influence the amount of energy stored in the flywheel: 1) the weight of the flywheel and 2) the speed at which the flywheel is being rotated (engine rpm).

Understanding the rpm-to-"stored energy" relationship is pretty easy. If you have ever revved up an engine to a high rpm and dumped the clutch, the results have probably been wheel spin. As you increase the launch rpm (rpm at which you dump the clutch), the amount of wheel spin is increased. This occurs because a higher amount of energy is stored in the flywheel at higher engine speeds. The tires will only hold a certain amount of energy before they break loose. When this energy threshold is exceeded wheel spin will occur. You may have also had the experience of dumping the clutch only to have the engine be lugged down and stalled. This occurs when not enough energy is present to spin the wheels and, as a result, the engine bogs or stalls.

The weight of the flywheel also plays an important roll in the stored energy relationship. Given two flywheels of the same shape and design with different overall weights, the heavier flywheel will store more energy than the lighter. We mention shape and design because where the weight is on the flywheel is also important. When the weight of the flywheel is near the outside, the flywheel

will have more inertia. When the weight of the flywheel is near the center, it will have less inertia. What is inertia? Think of it this way: objects at rest tend to stay at rest while objects in motion tend to stay in motion. What does that mean to you? Let's take a look at the different performance characteristics of a high-inertia/heavy flywheel versus a low-inertia/light flywheel.

The Launch

Do you have problems in not being able to spin the tires when you dump the clutch? If the answer is yes, then a heavier flywheel may be the solution. If the opposite is true, then a lighter flywheel may be exactly what you need. If you are experimenting with different weight flywheels, refer to your vehicle's 60-foot times to determine which flywheel is working best for your combination. Remember, if you switch to stickier or bigger tires you may need a heavier flywheel if the engine cannot spin the tires.

Through the gears

One advantage of a lighter flywheel is that less energy (horsepower) is used in accelerating the flywheel as the engine pulls to redline. You can see this when you run the same engine on an inertia-style (DynoJet) chassis dynamometer. With the same engine in the car, a lighter flywheel will show more horsepower at the wheels than a heavier flywheel. In this sense, a lighter flywheel has its advantage.

Another advantage of a lighter flywheel is that the engine will decelerate quicker when the clutch is engaged at high rpm between gear shifts. The result is that the engine speed will drop faster to match to the speed of the transmissions input shaft. The end result is that the shift will usually be quicker and smoother than when a heavy flywheel is in the mix.

The Balance

So what is going to be the best flywheel for your application? It all depends on your combination. As your ability to make traction is increased, the amount of energy you need to have your flywheel store for an optimum launch will also increase. In the end, the lightest (or more specifically lowest-inertia) flywheel that will deliver the optimum launch for your vehicle is going to provide the best overall performance for your application.

THE HOOK UPS

Advanced Clutch Technology
206 East Avenue K-4, Dept. DS02
Lancaster, CA 93535
www.advancedclutch.com

Exedy
Daikin Clutch Corporation
8601 Haggerty Rd
Belleville, MI 48111
(800) 346-6091
www.Daikin-Clutch.com

Clutch Masters Inc. (CMI)
267 E. Valley Blvd. Dept DS02
Rialto, CA 92376
(909) 877-6800
www.clutchmasters.com

Comp Cams (ZEX)
3406 Democrat Rd.
Memphis, TN 38118
(901) 366-1807
www.compcams.com

RPS
9820 Owensmouth Ave. Ste. 14
Chatsworth, CA 91311
(818) 993-9174
www.turboclutch.com

ET Drag®

ET Street®

ET Front™

SPORT COMPACT RACERS

Introducing 6 New Sizes From M/T®

Mickey Thompson has been hard at work testing and developing tires for the sport compact market and the results are six new tires that are sure to make you a winner! Find out why 33 World Championships were won on M/T's last year, try a set today!

New! Sizes

22.0/8.0-13	#3010
24.5/8.0-14	#3013
24.5/8.0-15	#3015
26.0/10.0-15	#3053C
28.0/10.5-15	#3055C
28.0/11.5-15	#3057C

ET DRAG DRIVE TIRES	
24.5/7.0-13	#3012
24.5/8.0-13	#3014
24.5/9.0-13	#3016
20.0/6.0-14	#3017
20.0/8.0-14	#3018
26.0/8.5-14	#3020
28.0/9.0-14	#3024
22.0/8.0-15	#3019

NON DRIVE TIRES	
22.5/4.5-15	#3005
24.0/4.5-15	#3006
25.0/4.5-15	#3003
26.0/4.5-15	#3007
27.5/4.5-15	#3009

Marty Ladwig-NHRA Hot Rod Class. Front-28.0/10.5-15 Rear-24.0/4.5-15

- State of the art construction
- Requires little or no burnout
- Compounded for long life
- Consistent performance
- A proven dragstrip winner

M/T is a Major Sponsor of the NHRA Sport Compact Series and will have a service rig with technical staff to service your needs and answer your questions at all NHRA Sport Compact National Events.

MICKEY THOMPSON PERFORMANCE M/T. TIRES & WHEELS

Nelson Hoyos-NHRA Modified Class
Rear-24.0/4.5-15 Front-28.0/10.5-15

For The Dealer Nearest You Call 800-700-0394 ext. 2404
Tech Hotline 330-928-9092 • www.mickeythompsontires.com