



**SEPTEMBER 1998**

### ***Flow Quik Air Supply***

Flow Quik is being successfully used on engines from 5 HP Briggs to Big Block Chevy. Most Flow Quik owners who work with larger engines want more air than they can get from a large shop vacuum. Until now they have had to use more than one shop vacuum or build their own air supply. Now there's a better way - the Flow Quik Air Supply. The supply is an attractive compact unit with a Formica exterior that can form a nice base for your Flow Quik. It features two high capacity motors, an air direction lever (for switching from intake to exhaust testing), and a pressure control knob (for adjusting the depression). It can provide 240 CFM at 10 inches, and 190 CFM at 28 inches. Power consumption is less than 20 Amps on a 120 VAC line.

We have also added a Test Plenum. The Test Plenum provides a work surface for mounting a head using standard flowbench fixtures. It is an attractive mate for the Air Supply.

### ***Trade Show***

We will be at the Performance Racing Industry (PRI) trade show east, December 3-5 in Indianapolis, Indiana. This is the largest show in the world for hardcore racing. For more information and to pre-register contact PRI: Phone (714) 499-5413 Fax (714) 499-0410. Pre-registering is strongly recommended.

### ***What is Base Circle Runout?***

If a cam lobe had no lift it would be round, like a journal. But if you accurately measured the profile of this round lobe you would still find some spots that were higher than others because of runout. Automotive cam lobes have a portion of the lobe that is supposed to be round, which is called the base circle.

Before we can measure a cam lobe we must address the issue of how to mount the camshaft for measuring. Cams are mounted on centers for grinding, but they run on the bearing journals in the engine. Unless the journals and the centers are perfect (nothing is ever perfect) the mounting method will make a difference in the runout. Cam Pro Plus mounts the camshaft on the bearing journals because that is how the camshaft is used.

Cam lifts are measured from a point called "zero lift." Zero lift is defined as the lift on the base circle. But now we have a problem because the lift on the base circle varies due to runout. What point should be considered zero? Should the lowest point on the base circle be zero lift? Or do we want to figure out where the ramps are and do some sort of averaging to define zero? This is an important issue because the zero lift point affects many commonly used camshaft parameters including total lift, duration, timing angles, and area under the curve.

Cam Pro Plus finds the lowest point on the base circle and calls that zero. It also scans the base circle to find the highest point. The difference between these two points is the base circle runout. Cam Pro Plus subtracts the base circle runout value from the measured lift values and uses the result as lift (except for the base circle runout graph). The Cam Pro Plus base circle runout graph shows the lift curve of the base circle.

Any camshaft can experience a change in measured base circle runout because camshafts seldom stay straight. It is common for runout to change as the stresses in the metal which were introduced by the different manufacturing processes work themselves out over time. Thus while quality cam manufacturers strive to limit

base circle runout to .001 inch (and some even limit it to .0005 inch), you may see runouts up to four times these values when you measure a camshaft.

## ***Depression Control is Shipping Now***

The depression control automatically adjusts the power to your flow bench's vacuum motors to keep the depression steady. It responds quickly to changes in input power or valve opening. Now you can test as quickly as you can open the valve to the next test point. This greatly reduces the time required to run a test. One customer reported that he now accomplishes in three minutes what used to require one hour! To be fair I should mention that the hour included keying the flow data into a spreadsheet and graphing it, but graphing the data is also included in the three minutes.

The reduction in total power used by the motors combined with much faster test times greatly reduces or eliminates the problems associated with overheated rooms and overheated benches. The depression control is compatible with any bench that uses vacuum motors. While it is fully integrated with Flow Pro software and hardware, it can be used stand alone with an optional control panel.

## ***Head Porting Books***

In the March '98 newsletter we asked for your recommendations on literature about head porting and promised to publish the responses. Thanks to all who contributed. Unless otherwise specified look for these at your bookstore.

<u>Design of Racing and High Performance Engines</u> published by SAE, Phone 412-776-4841
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<u>Flathead Fever</u> by Mike Davidson
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<u>Flow Numbers</u> self-published by Trey Musgrove 1526 Willowview Dr. Grove City, OH 43123 Phone (614) 875-1401
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<u>Harley-Davidson Evolution 1340 Performance Tests</u> by Jerry Branch, Branch Flowmetrics Phone 714-827-1463
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<u>How to Build, Modify, &amp; Power Tune Cylinder Heads</u> by Peter Burgess & David Gollan
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<u>How to Build &amp; Modify Chevrolet Small Block V-8 Cylinder Heads</u> by David Vizard
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<u>Porting Notebook</u> self-published by Bill Jones 3294 Meadow Wood Way Salt Lake City, UT 84118 Phone 801-969-3807
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<u>The Chevrolet Power Manual</u> available from Chevy dealers
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<u>The Chevrolet Racing Engine</u> by Bill Jenkins
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The Design and Tuning of Competition Engines  
by Philip H. Smith

The Scientific Design of Exhaust & Intake Systems  
by Philip H. Smith and John C. Morrison

## ***E-mail newsletter***

If you would prefer to receive this newsletter via email send your request to [newsletter@auditech.com](mailto:newsletter@auditech.com). You will receive the email version faster, and it will save on paper (not to mention printing and postage). While you are on-line check out our website ([www.auditech.com](http://www.auditech.com)). On the site you can download the latest demo software, view our full line of products, check out old newsletter articles and other technical articles, get the contact numbers for our dealers, and send us email.

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