A good-looking, classic combo: a Stromberg 97 and a chrome-bonnet air cleaner. To make it work as "nifty" as it looks, toss the paper element and substitute a K&N.

IN WITH THE GOOD AIR

THE CLEAN-AIR ACT FOR VINTAGE FILTERS

BY RON CERIDONO

There's a lot to be said for modern technology. Certainly the best thing that's happened on the contemporary performance scene is computer-controlled fuel injection. And while all that zoomy, polished-aluminum, TPI stuff looks trick and works great, there are those among us who still live in the past and prefer a few old-fashioned carburetors to electronic squirters. With the increasing popularity of nostalgia cars, more and more rodders are joining the ranks of the "injectorless" by topping off their engines with anywhere from two to a half-dozen carburetors. And of course, that usually means those neat, old-timey, chrome-bonnet air cleaners are part of the package. But I'm sorry to say, in many cases, those filters are the weak link in the system—some of them look better than they work.

During a recent bench racing session with Jere Jobe of Vintage Carburetion Technologies, the subject of air cleaners came up. Jere pointed out that he frequently traces fuel-mixture problems with multiple Stromberg 97 carburetors (as well as other types of mixers) to the elements used in these small chrome filters. Complaints about everything from poor performance to lousy mileage have often been traced to the elements in these filters.

To pinpoint the problem, Jere spent some time on his flow bench evaluating the most common elements found in vintage-style air cleaners. What he found was interesting, and somewhat disappointing. Typically, these air cleaners come with one of three types of elements, which can often be distinguished by color or pleat pattern. Without a doubt, the worst of the breed are the off-white variety with extremely tightly packed folds. Perhaps a well-intentioned attempt to put more filtering media in the element, the result is paper packed so tightly that airflow suffers. It suffers a lot—flow bench testing has shown these elements pass as little as 50 cfm!

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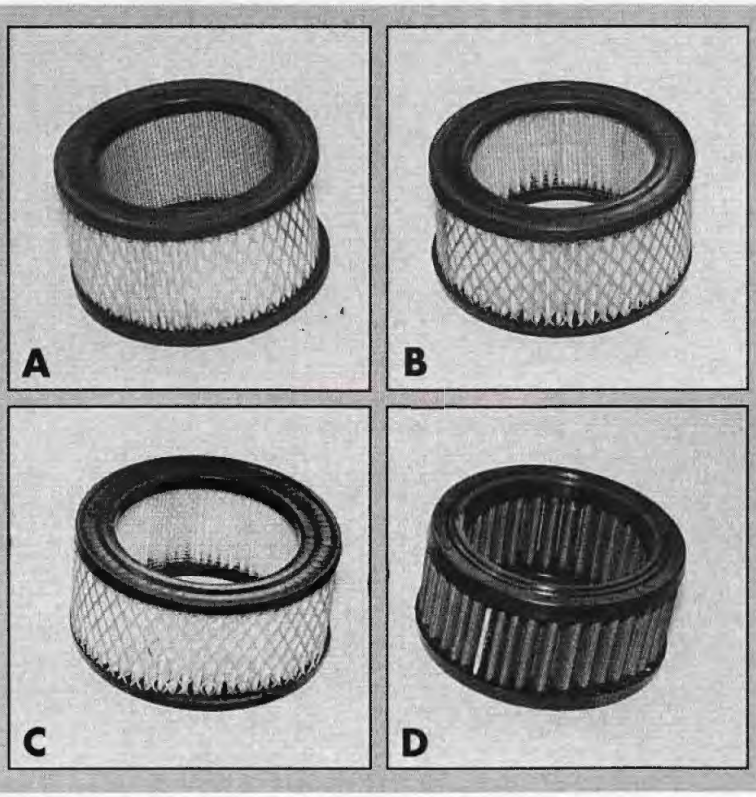

Common chrome-bonnet filter elements. Left to right: A) tightly packed paper; note the number of pleats; very low flow; B) tan oil filter paper; also flows poorly; C) bright white paper; flows the best, but still not enough; D) K&N E-3120.

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Another common element uses tan paper, which was actually intended for oil filters. As you might guess, these filters don't flow very well, either—something around 65-70 cfm is all they're capable of handling.

Last, we have filters that use an extremely white paper. Flow is a little better at around 100 cfm, but these elements are notorious for plugging up. And keep in mind that, a Stromberg 97 flows around 150 cfm (and other two-barrels flow more), so even the best of the paper filters isn't good enough.

It's hard to know for sure which element a filter has so, if you have any doubts about what's in your air cleaners, check with whoever supplied them. Or, do what Jobe recommends: Throw the paper filter away and install a K&N element. His testing has shown that a K&N E-3120 element (a 4-inch-round, 2-inch-high filter that fits most chrome-bonnet air cleaners) flows around 180 cfm, a vast improvement over the best paper filter.

What makes the K&N element different is the filtering material used. K&N's use pleated, oil-impregnated, cotton gauze as the filtering media. This crisscrossed, cotton-fiber design is inherently much less restrictive to airflow than paper, while the oiled surface of the fabric traps and collects dirt and dust more effectively, as well.

Despite the fact a K&N will collect a large amount of debris without starving the engine for life-supporting oxygen, even they need to be cleaned from time to time, and therein is another advantage to their design: K&N filters are simply washed, then reoiled. It is recommended that the filter be inspected every 30,000 miles or 12 months and, if cleaning isn't necessary, a reoiling is recommended. K&N filters can be washed up to 25 times, so the average rodder will never have to worry about replacing them.

Obviously, there are a number of variables and special circumstances that influence air-cleaner selection. But for a general rule of thumb, use the following formula to determine the minimum-size K&N filter your engine requires:

$$A = \frac{\text{cid} \times \text{rpm}}{20,839}$$

A = effective filtering area
cid = cubic-inch displacement
rpm = revolutions per minute at maximum power

As an example, let's take a look at what a 327 Chevy with a redline of 5,500 rpm would require:

$$A = \frac{327 \times 5,500}{20,839} = 86.30 \text{ square inches}$$

Determining the effective size of a filter can be done by a number of methods. For round filters, multiply the diameter by pi (3.1416) times the height, then subtract .75. K&N suggests doing so to compensate for the rubber seal on the top and bottom of the element, and the fact that little air flows immediately adjacent to them. The following example is for a typical 4-inch-round, 2-inch-tall air-cleaner element:
4 x 3.1416 = 12.5664 x 2 = 25.1326 - .75 = 24.3828

So, our small-block Chevy would need a minimum of 86.3 square inches of filter area. If the engine had three-twos topped with air cleaners using K&N elements, we'd be fairly close to the optimum filter capacity. With the paper filters, our little Chevy could be gasping for air.

Interestingly, it appears K&N is slightly conservative on claims for its filters; Jobe's testing shows they flow even better than published figures indicate. But flow bench or not, it doesn't take a rocket scientist to figure out what a restrictive paper filter will do to performance, and what has to be done to cure the problem. All you've got to do is pick the right element, and those nifty little chrome filters will work as good as they look. SRM

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