

TECH TALK

TT-19

October 2005



Alternate Sizing of the 821/831/92/HV Series Registers

by Dave Fetters

We publish a significant amount of performance data for the series of products listed above. We also duplicate the data for the sizes shown in the tables for four different deflections, since the blades in the register face are individually adjustable. The sizes listed in the tables cover a range of popular rectangular products, but by no means the full extent of the sizes we can build. In addition, we do not show data for square sizes or for those with a width less than the height. For instance, the extruded aluminum HD series can be built in any 2-inch dimension from 4 x 4 to 48 x 48—more than 500 combinations! Obviously, we cannot publish performance data for all these sizes. How can you determine performance for a size not listed (without calling us, of course)?

The last page of the Engineering Data at the back of our *Registers, grilles & diffusers* catalog shows an “Alternate Sizing Graph” for these products. This graph provides a method of using “equal areas” to find a listed size that has the same approximate performance as the desired size that is not listed. Testing indicates that by varying the dimensions of a grille while maintaining the same area, there is little effect on the airflow. The relationship of the width to the height of a grille is called the *aspect ratio*. A 16 x 12, which is not shown in our data, is approximately equivalent to a 24 x 8 in performance, which is shown even though the aspect ratio has changed. We have just determined the performance of our desired size by looking at a listed size with equivalent performance.

When performing these comparisons, remember to stay with the same blade deflection represented by our designations A, C, E, or G. These deflections are described at the very back of our catalog near the alternate sizing graph.

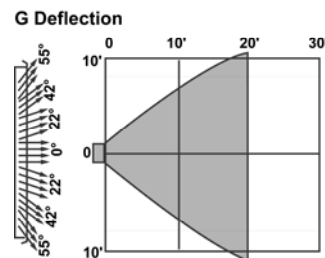
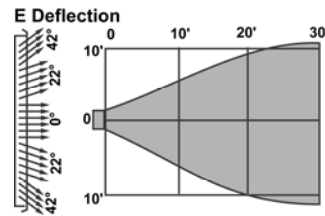
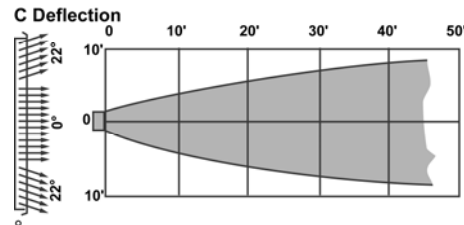
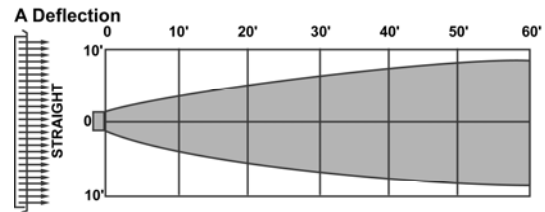
The same alternate sizing can be accomplished by using a calculator through trial and error. The numbers don't always come out perfectly. For example, let's say we are locked into a retrofit size register of 14 inches wide by 22 inches high, and we want to find out how it will perform at various face velocities.

$$14 \times 22 = 308 \text{ square inches}$$

We now need to divide 308 by various widths appearing in our performance data to find a depth that is close to a size that is listed. I started by dividing 308 by 20 and got 15.4, which doesn't match anything. I tried 24, 30, and 36 as well and found that at 30 inches wide, I got 10.26 inches high. It's not a perfect match, but it is close enough to the 30 x 10 listed in our tables, which gives us a reasonably accurate series of performance numbers based on changing face velocity.

This same analysis cannot be applied with any degree of accuracy for other face designs like adjustable curved-blade registers or stamped louver supplies and returns. There are other tricks to generate performance data that use a method called

Blade Deflection



extrapolation, using data from listed sizes to project what the performance will be for unlisted sizes. I'll save this topic for later so that I don't overwhelm you all at once.



Hart & Cooley, Inc. 800.433.6341 toll-free
500 East Eighth Street 616.392.7855 phone
Holland, MI 49423 800.223.8461 toll-free, fax
info@hartcool.com 616.392.7971 fax
www.hartandcooley.com