



**GTRI Report: A5428/1**

## **EVALUATION OF THE AURA VENTS FOR HORTON HOMES, INC.**

Final Report for Horton Homes, Inc.  
12 August 1997

### *Preface*

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The GTRI Principal Investigator was Dr. K. K. Ahuja. Horton Homes technical monitor was Mr. Carl Brorup.

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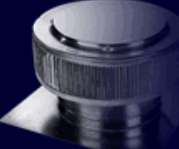
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### **Section 1**

#### **VENTILATION CAPACITY OF AURA VENTS**

##### **1.1 OBJECTIVE**

The objective of the study described here was to evaluate the ventilation capacity in cubic feet per minute (cfm) of the aura vents manufactured by Active Ventilation Products, Inc. for Horton Homes, Inc. Six Aura vents were tested: 6 in. Aura, 8 in. Aura, 12 in. Aura, 14 in. Aura, 14 in. Aura Commercial, and 18 in. Commercial. Volume flow measurements were made for each vent at five different wind speeds.



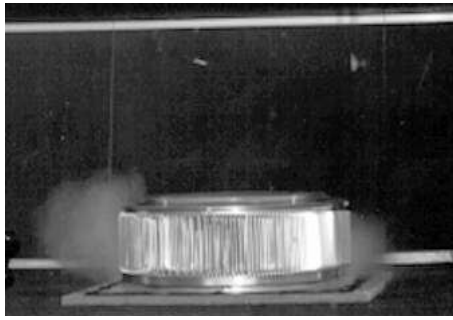
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The following is a table of the volume flow exhausted from the house by the 14 in. Aura vent shown in the test configuration in Figure 5.



Wind Speed	Volume Flow
<i>mph</i>	<i>cfm</i>
4.0	177.79
5.2	202.46
7.5	281.11
9.8	314.44
11.4	357.44

A smoke flow visualization was performed to ensure that air was being drawn into the house and blown out of the house through the vent at all wind speeds. Air was being withdrawn from the house interior at all wind speeds tested. A smoke flow visualization showing that smoke was indeed being ventilated out of the enclosure onto which the vent was mounted is shown in Figure 6.

Volume flow rates as a function of wind speed for the 8 inch and the 14 inch Aura vent are shown in [figure 7](#). Almost a linear relationship appears to exist between the flow rates and the wind speed in the region of wind speeds tested.

#### 1.4.3 The Results of other Aura Vents

Other four vents (6 in Aura, 12 in Aura, 14 in Aura Commercial, and 18 in Aura commercial) were tested using the methodology described above for the 8 inch and the 14 inch diameter vents. The following four tables provide the data for these four vents:

6 in. Aura Vent		12 in. Aura Vent		14 in. Aura Vent commercial		18 in. Aura Vent	
Wind Speed	Volume Flow	Wind Speed	Volume Flow	Wind Speed	Volume Flow	Wind Speed	Volume Flow
<i>mph</i>	<i>cfm</i>	<i>mph</i>	<i>cfm</i>	<i>mph</i>	<i>cfm</i>	<i>mph</i>	<i>cfm</i>
n/a	n/a	3.5	116.82	4.0	177.79	3.7	148.93
n/a	n/a	5.1	165.22	5.2	202.46	5.2	205.25
7.5	86.57	7.4	228.52	7.5	281.11	7.5	296.94
10.0	115.42	9.9	269.01	9.8	314.44	10.0	475.66
11.1	128.81	10.8	307.88	11.4	357.44	11.6	419.34

A plot of volume flow rates versus the wind speed for these four vents appears in [Figure 8](#). Once again, a linear relationship is found.

#### 1.5 CONCLUSIONS

All Aura vents were found to provide ventilation. As expected, the larger vents provided larger volume flow rates. For example, the 8 in. Aura vent exhausted about half as much air as the 14 in Aura vent, at all wind speeds. For the two lowest wind speeds of 4.0 and 5.2 miles per hour, volume flow rates for the 6 inch commercial Aura were too small to be measurable. A ranking of the ventilation capacity at each of the nominal test speed is provided in Figures 9-13, respectively.

It should be noted that the curves of volume flow rates (X) versus the wind speed (Y) should pass through the zero or the origin of the X-Y axis as there should be no flow for zero wind speed. As seen in [Figure 8](#) they approximately pass through the origin. The same is true for the 8 inch vent in [Figure 7](#). However, the curve fit for the 14 inch vent in [Figure 7](#), when extrapolated to zero wind speed shows somewhat positive ventilation for the zero wind speed. We believe it is a manifestation of the curve fit which has been made using a small number of data points. Additional test points should improve the curve fit. the data as measured (rather than extrapolated) should be considered reasonably accurate. To estimate volume flow rates at wind speeds other than those tested, one should be able to use linear extrapolation of the curves provided in figures 7 and 8. Some care should be exercised in using linear extrapolation of the data for the 14 inch vent to estimate the volume flow rates at wind speed below 4 miles per hour.

[Continued \(Section 2\)](#)