



**AMERICAN SOCIETY OF PLUMBING ENGINEERS**  
**CHAPITRE DE LA RÉGION D'OTTAWA REGION CHAPTER**  
**CORPORATION À BUT NON-LUCRATIF – NON-PROFIT CORPORATION**  
**318-1411A CARLING AVENUE, OTTAWA, ONTARIO, K1Z 1A7**

### **Getting Back to Basics – Using Venting Tables Effectively**

The Natural Gas Utilization Code, CSA B149, went through some significant changes in 1995, and the changes have added both more information and more complexity to the document. The Vent Sizing Tables, in particular, have changed considerably. Less than 20 years ago the furnace industry introduced to the residential marketplace something called Fan-Assisted Combustion. The boiler and water heater industry soon followed with its first commercial fan-assisted product, introduced in 1986. The process of combusting fossil fuel (natural gas or propane) with air, utilizing a fan blower to control the process was a result of years of research and development into creating a process to improve energy efficiency.

The gas code responded to these changes in the industry by compiling new vent tables to use with the different kinds of negative draft venting systems available. The venting tables initially developed by the manufacturing sector were revised by the code to include other combinations and typical installation parameters that might be encountered. The new vent tables are a result of the evolution of new equipment and venting methods.

The most common questions with respect to reading the vent tables relates to the deciphering of what exactly the information is, and how to extract it.

Basic Rules required to read the Vent Tables :

- I. The intent, obviously, is to always ensure that the products of combustion are vented to the outdoors. It helps to understand that there are three main types of combustion techniques used in today's boiler and water heaters: atmospheric, fan-assisted and forced draft.
- II. Know and understand the category ratings for venting systems.  
Category I = Negative Draft / Non-Condensing  
Category II = Negative Draft / Condensing  
Category III = Positive Pressure / Non-Condensing  
Category IV = Positive Pressure / Condensing
- III. Realize that the vent tables in Appendix B of the B149 code are for Category I rated appliances only. As a result, these tables will only apply to Negative Draft / Non-Condensing appliances which include natural draft (atmospheric) and fan-assisted combustion appliances with a Category I rating (negative draft having a combustion efficiency below 83.6%). If the application is anything other than Category I (negative draft / non-condensing), do not use these tables.

Gas-fired appliances are tested to standards that dictate a vent category rating. The category designations were initiated in the furnace industry but only in 1995 were they passed along to the boiler and water heater industry. The cut off point between non-condensing and condensing is 83.6% combustion efficiency (regardless of the type of appliance) according to CGA standard testing methods.

- IV. The general venting requirements at the beginning of the tables outline some very specific and important information. It describes the differences between Fan-Assisted, Natural, and Depressurization designs and also how to size systems where more than one type of appliance is utilized. Since you might have a fan-assisted and a natural atmospheric appliance on the same vent system the tables have been segregated into different columns to determine the required sizing when the systems are: all fan-assisted appliances, all natural draft atmospheric appliances, or fan-assisted appliances combined with natural draft appliances. There is also a column for buildings with depressurization systems (for negative



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pressure structures) which requires special consideration when appliances that are spillage-susceptible are used.

The general venting requirements also outline some detailed information required to determine how to interpret the tables. For example, a single category I appliance venting configuration with zero lateral lengths is assumed to have no elbows, and that all other configurations are assumed to have two 90 degree elbows. The important part, is that for each additional 90 degree elbow (or equivalent) the maximum capacity listed in the tables should be reduced by 10% for natural draft appliances and 15% for fan-assisted appliances.

The general requirements also describe how to size common venting systems (with more than one appliance on a common stack). If vent connectors are combined prior to entering the common vent then the table capacity must be reduced by 10% and its length cannot be more than 1.5 feet per inch diameter of the stack. It also stipulates how to determine the required size of a chimney if a metal corrugated liner is used. The critical part of reading the tables is to know that there may be a component that has to be de-rated from the listed value, and this information will only be available from reading the general requirements.

- V. Know what type of venting system will be required and use the appropriate table.

The tables are broken down into 8 separate sizing categories. The type of application will dictate which table to use. Determine, for example, if it is a single appliance venting application or a multiple appliance venting application and how it can be vented to the outdoors (double wall chimney, a lined masonry flue, or a tile lined chimney). Then the only remaining issue is to determine whether to use single wall connectors or double wall connectors. At this point, we can then calculate the necessary chimney height (as per the example figures at the back of the sizing tables) and our vent connector lengths and size these components appropriately.

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