Sizing for Air Supply Combustion/Ventilation

Remember the Area of a Circle = 3.14519 x Radius Squared
Divide the diameter by 2 to get the radius

The National Fuel Gas Coda has a new alternate method to calculate the minimum size for a Combustion/Ventilation opening, using one opening not two.

The opening is sized in accordance to 5.3.3.2 of the National Fuel Gas Code which states:

One permanent covering commencing within 12 in. (30 cm) of the of the top of the enclosure, shall be permitted where the equipment has clearances of at least 1 in. (2.5 cm) from the sides and back and 6 in. (16 cm) from the front of the appliance. The opening shall directly communicate the outdoors or shall communicate through a vertical or horizontal duct to the outdoors or spaces (crawl or attic) that freely communicate with the outdoors, and shall have a minimum area of:

• I sq. in. per 3,000 BTU per hr (7cm2 per kW) of the total input rating of all equipment located in the enclosure, and
• Not less than the sum of the areas of all the vent connectors in the confined space.

Example:
Calculate the minimum size of a single opening to be used in a mechanical room which has a 40,000 Btuh water heater. The furnace has a 4 in. diameter connector and the water heater has a 3 in. diameter connector. The opening communicates directly to the outdoors through a vertical duct.

Applying the 1 sq. in. per 3,000 Btuh of total input the opening size must be a minimum of:

Minimum Opening Size (Sq. In.) = (Furnace + Water Heater Input) / 3,000
= (100,000 = 40,000) / 3,000
= 140,000 / 3,000
= 46.7 square inches

Also, the opening must be larger than the combined area of the appliance connectors. The combined area of the furnace vent connector and the water heater vent connector is:
Furnace Vent Connector = 4 in. diameter
= 12.6 sq. in.
Water Heater Vent Conductor = 3 in. diameter
= 7.1 sq. in.
Combined Vent Area

= 12.6 (Furnace) + 7.1 sq. in. (Water Heater)
= 19.7 sq. in.

Therefore, to satisfy both conditions the combustion air area is to be a minimum of the largest of the two previous calculations. In this example, the single combustion air area is to be a minimum of 46.7 sq. in.