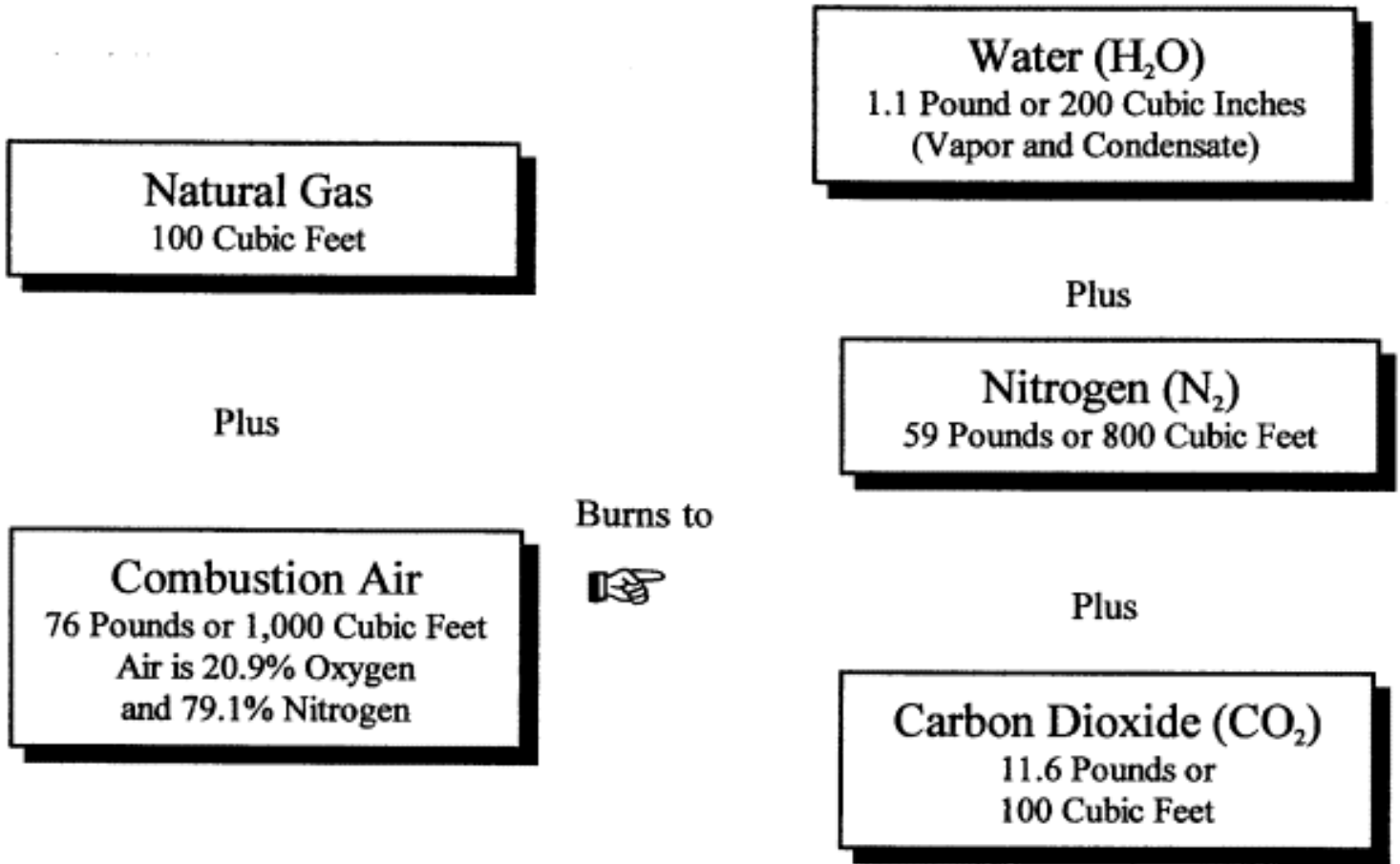
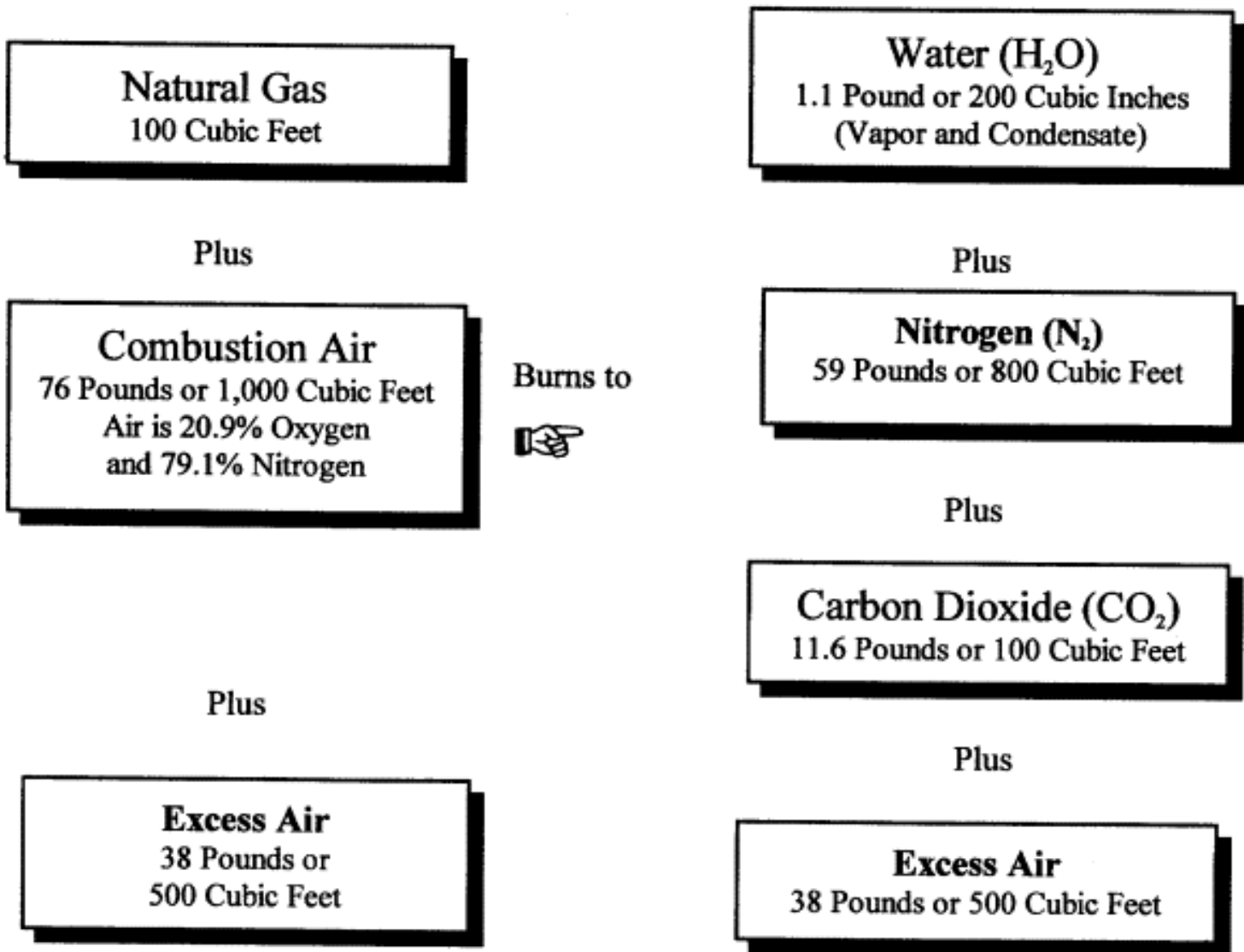


Perfect Combustion

If it were possible to design a heating system capable of 'perfect' combustion, the products of combustion (for natural gas) would be as follows:



The following flow chart defines a more realistic result of good combustion.



Burning with 50% excess air (equivalent to a 7.5% O₂ combustion analysis reading) is typical for many gas-fired appliances and would result in the above products of combustion. Note that excess air does not react with the fuel.

Nitrogen (N) similarly does not react during the combustion process. Nitrogen does not burn. Consequently, for every per cent increase in the amount of O₂ introduced into the flame, 3.76 times as much nitrogen and volume of flue gases also enters the process. In most situations nitrogen reacts with oxygen and forms what is generally called NO_x, a mixture of NO (nitric oxide) and/or NO₂ (nitrogen dioxide), both toxic emissions controlled in many areas.

While some level of excess air is necessary to ensure complete combustion, it also acts to reduce the safe efficient operation of the heating system.

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