

Process-Gas Fired Burners

The term process gas seems to imply that this is a fixed and defined quantity. It is not! This is the gas left over, generally in the petrochemical industry, that has a residual burning value and is present in a high enough concentration to be used. The flue gas analyzer needs to know the fuel parameters to calculate the level of CO₂, but these are not available here. Typically, this gas is left over after the catalytic cracking of petroleum products in the refining process. This will consist of a mixture of short-chain hydrocarbons, carbon monoxide, water vapour, carbon dioxide and various other impurities. In industrial processes, this gas is used as it comes, and the flue gas analyzer must try to find its own solution. If the heat produced from process gas is not enough to run the reheaters, then either natural gas or fuel oil is added to make up the deficit. The flue gas analyzer will have to be fitted with a carbon dioxide sensor to make any sense of these results. The oxygen sensor will not be able to find any way of converting the results received to a sensible level. The excess air number should give an almost correct reading, since this is based solely on the level of oxygen and the oxygen remainder will be about 3% for this type of fuel. In practice, this type of burner generally requires slightly more oxygen, especially if the gas is completely uncleaned. 5% is probably nearer to a true figure.

Since the main part of the fuel is basically a waste product and thus free, people will generally pay less attention to the efficiency values, unless the addition of processed fuel becomes high. Checking with a flue gas analyzer is still essential, since an inefficient combustion process will lead to smoke and hence sooting of the internals. This will further reduce efficiency and possibly result in expensive down-time. In reality, the efficiency should be treated as important, since any addition of processed fuels increases costs and wastes valuable resources as well. A flue gas analyzer will hardly be purchased solely for this purpose, but an available unit can easily be used to occasionally check the combustion processes here. The infrared carbon dioxide sensor is an expensive investment, but will ensure constant and correct results from a combustion process that most flue gas analyzers can not easily measure.