

Combustion Systems

Many industrial processes consume energy generated by the combustion of fossil fuels such as natural gas, fuel oils derived from crude oil and also coal and other solid fuels. Fossil fuels are expensive and their combustion generates pollutants which are generally emitted to the atmosphere and hence it is vitally important that the combustion processes are as efficient as possible and the production of pollutants is minimised to limit atmospheric pollution.

The attainment of high thermal efficiency in a combustion process requires both accurate control of, in particular, the excess air rate together with the installation of sufficient energy extraction systems to remove the appropriate amount of heat. Rowan **House** Ltd has extensive experience of the design, operation, troubleshooting and maintenance of a range of combustion systems including refinery fired heaters (including ethylene crackers), boilers, incinerators and gas turbines and is well placed to assist clients with combustion systems.

It is often difficult to understand exactly where the heat is going and an overall energy balance carried out across the plant can often identify savings which can be achieved. Rowan **House** Ltd is well placed to offer clients a comprehensive energy balance across the plant to ensure optimum performance.

One method of improving thermal efficiency is by the use of combustion air preheat. Here heat is extracted from the flue gases leaving a combustion process and added to the combustion air entering the process. The air pre-heater normally imposes a significant pressure drop on both the flue gas and combustion air sides and hence it is normally necessary to use a forced draught fan (for the combustion air) and an induced draft fan (for the flue gases). A heater without air preheat can normally be designed to achieve a thermal efficiency in excess of 80% but this is increased to over 90% by the use of air preheat.

The design of air preheat systems must be handled carefully to ensure satisfactory performance and Rowan **House** Ltd has the necessary experience to ensure that the system is correctly designed and we can assist with commissioning if required.

The limit to improvement of thermal efficiency is normally the acid dew-point of the flue gases. Any significant amount of sulphur in the fuel will significantly increase the acid dew-point and hence reduce the potential for the improvement of thermal efficiency. If acid dew-point conditions are reached, then the potential exists for expensive corrosion problems. However there are techniques for avoiding acid dew-point condensation and Rowan **House** Ltd can assist you with this if your fuels contain significant quantities of sulphur.

Hence for all your combustion applications, contact :

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