

Case Study 10

Specialized Equipment Furnace Gas Sampler



OBJECTIVES

- To design and build a gas sampler head for a client's process furnace.
- Small enough to be inserted through a 25mm ball valve into the furnace.
- To handle temperatures over 280°C
- Utilising nitrogen as a propellant gas.
- Ensure gas sample accuracy .
- Include adjustment for both propellant gas and sample gas volumes.

INTRODUCTION

Control and Thermal Engineering were asked to design a furnace gas sampling head with the idea of inserting the whole sampler into the furnace through an existing ball-valve.

The device measured 25 x 75 mm long and was accurately machined from 316 stainless steel

It works by injected nitrogen into the sampler and through a venturi within, creating a vacuum which withdraws furnace gases back through the head and into a sample bag.

Adjustment of both the venturi and propellant gas ensures the sample accuracy.

The accuracy of the device ensures the correct proportions of the combined gases in the sample bag. Knowing these proportions means the composition of the furnace gas can be analysed.

The ability for the whole device to be inserted through a ball valve:

- ensures the integrity of the furnace
- means the gases are of equal temperature, thus maintaining their proportions.
- reduces the temperature drop across the venturi and thus minimising condensation.

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