SOFRASER

Inline control
Combustion

Application
Heavy fuel oils (HFO)

Targets: Power plants, large engine manufacturers, energy companies, furnaces, boilers, fire heaters

Application

Fuel oil is used in industrial conditions for powering a wide range of industries or for building heating. These facilities are provided with variable grades of fuel oil that come from numerous sources. Due to these multiple origins, refining methods, additives, and suppliers, fuel oil quality continually changes.
In order to reach optimal performance, equipment is designed to operate most efficiently when the fuel oil spraying is at a specified viscosity. The correct viscosity is obtained prior to combustion by steam or electric heating.
The oil is atomized (dispersed into the combustion chamber as a spray, fine mist, or droplets) so that it can burn at a high volume flow rate.

Proper spraying ensures combustion efficiency with minimal particles emission and **requires continuous and accurate viscosity measurement and control**.

Challenges

HFO burning presents problems such as:
- Extreme smoke temperatures
- Unburned fuel in the smoke
- Carbon and soot build-up in the furnace
- Residue build-up and clogging
- Dirty fuel burning

Causing:
- Unburned fuel oil waste
- HFO over-consumption
- Increased stack emissions
- Frequent maintenance operations
- Manufacturing downtime

These problems happen frequently because the droplet size is not optimized. The size of the droplet is linked to the fuels' viscosity and takes into account parameters linked to pressure, temperature, and injection, which are often provided by burners' manufacturers. Variations in fuel composition affect the relationship between viscosity and temperature.

In the past, temperature control has been the preferred method for viscosity control. Due to the fuels' origins and characteristics, however, viscosity is different even at the same temperature.

The need to realize viscosity control is crucial.

Solution

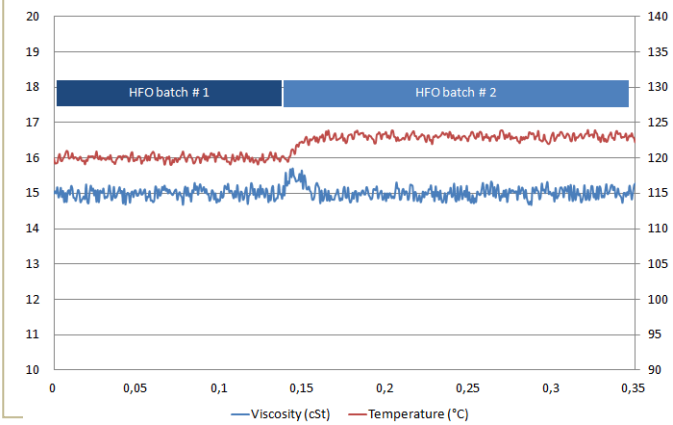
The installation of a vibrating inline process viscometer - **Sofraser MIVI sensor** - and associated electronic controller allow the correct viscosity to be reached after the fuel is heated, stability is maintained during combustion, and consistent atomization is achieved.

Installation

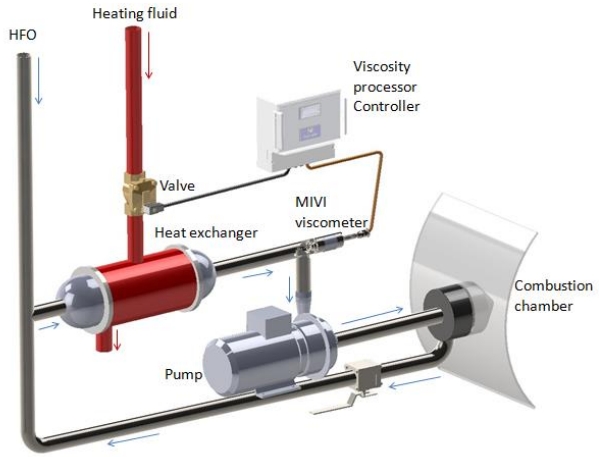
The MIVI inline process viscometer:

- is easily fitted at the heater outlet
- continuously delivers viscosity and temperature information to the electronic cabinet
- the controller instantly assures the correct, constant in-line viscosity at the outlet by activating the heater component (steam or hot water valve, for example), which stabilizes viscosity changes

Viscosity records - Central boiler of a district heating network



Operation diagram



Onsite installation

Key product characteristics

- Robust over time, no moving parts, no maintenance
- No drift in time
- Easy to clean and uncomplicated access to wetted parts
- Large working temperature range
- Options for varying oil flow rates
- Ex-proof certifications (ATEX, FM) if required
- Electronic controller can include high and low viscosity alarms and / or temperature alarms, improving the fail-safe operation