

# Macawber Installation Case Study: High Pressure Fuel/Sorbent Injection System - Canada

## IN BRIEF

The system is designed to continuously convey a mixture of coal dust and limestone into a high-pressure reactor with a process back pressure of up to 270psi. The design convey rate is variable from 60-220Kg/hr with an accuracy of +/-1% using a Hardy loss-in-weight control system and four load cells. The system is rated to 390psi and uses a variable pitch feed screw with inverter drive to give the required turn down speed range. Control is fully automated from the control room and the whole system built to ATEX zone 2, 3D. The conveying distance is 25m through a 10mm bore stainless steel pipe line. The loss-in-weight control system is used to automatically compensate for the changing bulk density as the fuel/sorbent mix changes to maintain a constant injection rate in Kg/hr.

## MATERIAL CHARACTERISTICS

Pulverized coal	1-600 microns, nominally 70 microns
Bulk Density Coal	640 Kg/m <sup>3</sup>
Bulk density Limestone	1,090 Kg/m <sup>3</sup>
Temperature	Ambient to 45°C maximum
Moisture Content	0.5%
Condition	Free flowing when aerated

## SYSTEM OBJECTIVES

1. Extremely accurate feed rate over an extended range
2. Reliable operation in an explosive hazardous environment
3. Easily maintained with good access

## SYSTEM PERFORMANCE

Transfer Capacity	60-220Kg/hr
Conveying Distance	25m
Reception Points	Single point injection

## IMPROVEMENTS ACHIEVED

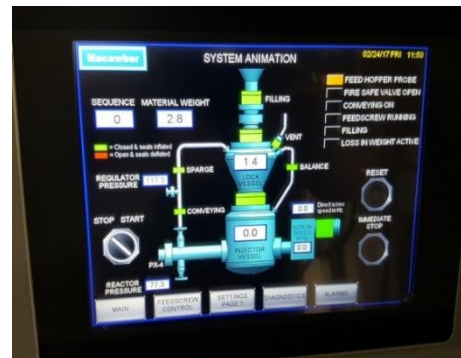
1. Acceptable transfer rates on a reduced convey pipeline size
2. Reduced nitrogen usage compared with other systems
3. Very small footprint for use in a confined space



Final inspection prior to delivery



Actual installation at the research facility



System control page on the HMI touch screen