

## SAFETY TEST FOR GAS COUPLINGS

**A coupling manufacturer employs a test setup for a specific type of gas couplings that are used for the United States market. These gas couplings need to be gas tight during a certain minimum period of time in the occasion of fire.**

The testing is conducted as follows: the gas coupling is mounted at the end of a tube, which is put in a furnace that is heated to a certain constant temperature. Then this coupling-tube setup is subjected to 10 bars (139.5 psi) of air overpressure. A coupling passes the test when the air leakage during a certain amount of time is below a prescribed value. As this is a destructive testing method, not all gas couplings from a batch are tested, but only a few. In the original setup, the pressure sensor malfunctioned often, because of the high flow (it was a flowmeter based on the pressure drop principle). With the Bronkhorst Flow-Pressure Solution the flow cannot be higher than the full scale range of the MFC.



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### Application requirements

The coupling manufacturer needed a compact plug & play system, which is easy to operate with only one input and one output for the air flow and the rest 'out of sight'. Furthermore, a filter is necessary to prevent soot from the furnace entering the measuring device.

### Important topics

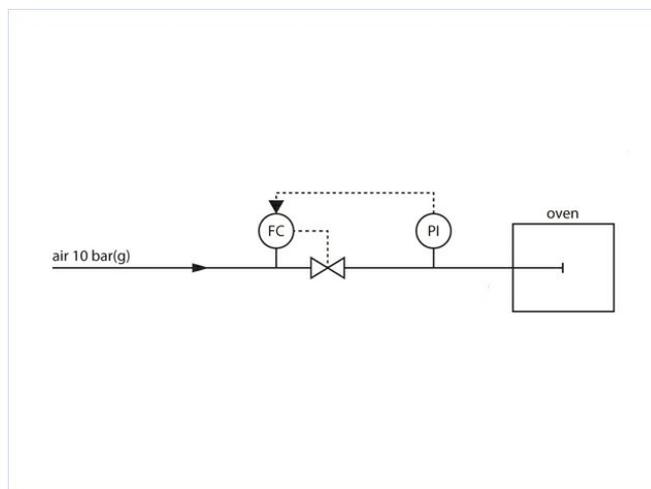
- Pressure management with flow control
  - Plug & Play system
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## Process solution

Bronkhorst's Flow-Pressure Solution comprises a pressure meter (Bronkhorst [EL-PRESS](#) PM51 pressure module), which is a sensor that controls a flow controller upstream. When the gas coupling fails during testing, the pressure meter detects a pressure that is lower than the initial 10 bars, after which it forces the flow controller to generate an air flow to the system. At that point, when this flow has a non-zero value, indeed a leakage is detected. According to the coupling manufacturer, the system is robust with reliable pressure sensing.

For this leakage testing application, a combination of a pressure meter (e.g. [EL-PRESS](#) series) with a flow controller (e.g. [EL-FLOW](#) series) is better than a traditional combination of a pressure controller with a flow meter. In the latter case, there may be a risk of losing signal in the initial period when a pressure controller wants to reach its setpoint very fast. The advantage of Bronkhorst's setup is that the generated flow can never be too high.

The setup comprises a 15 µm filter to prevent soot particles from the furnace to enter the flow controller, which is detrimental for this device. In case of blockage, this filter can be cleaned by back-flushing of air, so there is no need for disassembling the setup to clean the filter. By default, the setup is delivered with a digital control pane to control and display the settings. Via an RS-232 serial port the control panel can be connected to a computer system using Bronkhorst's own software. If desired a modification can be made where a potentiometer is incorporated to adjust the settings manually. This modification includes analog-to-digital switch.



Flow scheme

## Recommended Products



**EL-FLOW METAL SEALED F-201CM**

Min. Bereich 0,12...6 mln/min  
Max. Bereich 1... 50 ln/min  
Druckstufe 64 bar  
Metallische Außendichtung  
im Reinraum montiert



**EL-FLOW SELECT F-201CV**

Min. Bereich 0,16...8 mln/min  
Max. Bereich 0,5...25 ln/min  
Druckstufe 64 bar  
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& Wiederholgenauigkeit



**EL-PRESS P-502C**

Min. Druck 2...100 mbar  
Max. Druck 1,28...64 bar  
Absolut- oder Überdruck  
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Benutzerfreundliche Bedienung,  
menügesteuert mit 4 Drucktasten

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