

Controlled Humidification



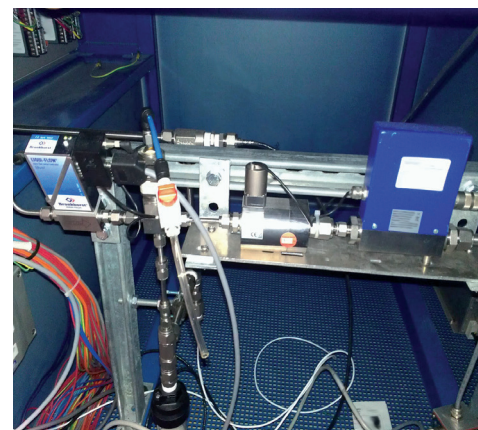
Application note A047-ME01-1216B



A leading UK company specializing in synthetic bone repair materials for orthopaedic and dental applications use Bronkhorst products to perfect their production process. A leader in the research and development of bone graft technologies.

Bronkhorst have supplied Controlled Evaporation Mixing (CEM) systems for humidification of the furnaces that are used for the manufacture of the bone repair product.

- ◆ Orthopaedic bone graft substitute
- ◆ Dental synthetic bone graft material



A LIQUI-FLOW meter and an EL-FLOW or MASS-STREAM gas flow controller are used with a mixing valve to add an air and water mix

Application requirements

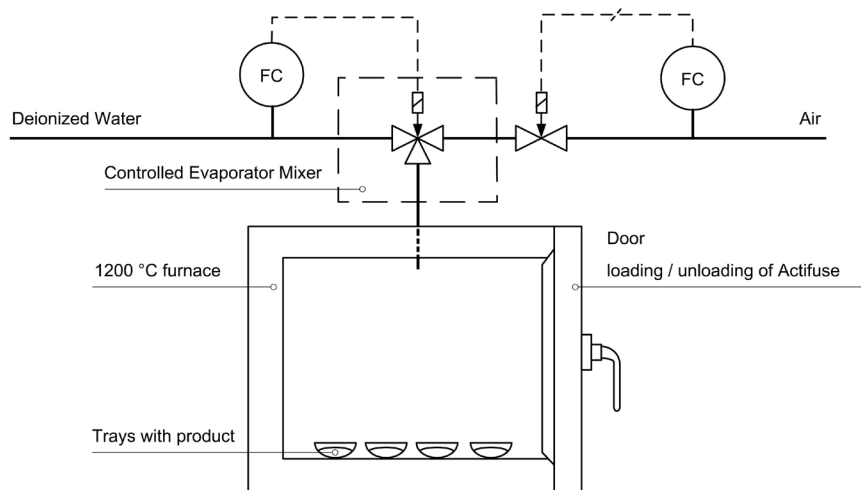
The furnace at over 1200 degrees Celsius will produce yellow powder if the water is not added, hence the use of the CEM. The properties will not change just the colour of the powder.

The colour is crucial as yellow powder is rejected by surgeons as they believe it to be inferior quality. Having a consistent white colour therefore is of utmost importance.

Important topics

- ◆ Accurate dosing of air constituents
- ◆ Documentation of test conditions
- ◆ Repeatability
- ◆ Compact system

Process solution



Flow scheme

Humidification of a furnace

After manufacturing the bone grafting powder it needs to be dried and sintered. The process is carried out in a high temperature furnace with a controlled atmosphere. If the atmosphere is not controlled properly, discolouration of the end product renders it useless for sale and cannot be re-worked. The accurate control of water to the furnace by means of a CEM, with air as the carrier gas, results in a perfect white colour recognised by the doctors using this product. Depending on the furnaces, the flow rate of water is accurately controlled at 42 g/h, 84 g/h or 122 g/h.

A high degree of control is needed for repeatable batch consistency of many years for this high value product. ■

BRIGHT local readout and control

As an option, the systems can be used in combination with BRIGHT local Readout/Control Modules, to give a better visualisation for the user (see picture).



Recommended Products



EL-FLOW F-201AV/F-211AV DMFC
Mass Flow Meters and Controllers for gas applications have a housing designed for laboratory and clean processing conditions. The instruments are truly unique in their capability to measure and control flow ranges between 0...1 mln/min and 0...1670 l/min with pressure rating between vacuum and 400 bar – all in one range of instruments.

- ◆ Accuracy
- ◆ Measurement of gas known and recordable
- ◆ Control of gas always ensures that the gas carries the water to the furnace
- ◆ Small size: it fits on the side of the furnace
- ◆ Instant control: no time waiting for production
- ◆ Clean system and therefore no chance of contaminating the medical product



LIQUI-FLOW L13 and L23
Digital Liquid Flow Meters/Controllers for low flow ranges. The instruments operate on a thermal, thru-flow measuring principle. The flow meter can be connected to a control valve to form a closed control loop. For ranges from 0,25 ... 5 g/h up to 20 ... 1000 g/h for fluids with thermal properties similar to H₂O.

- ◆ Compact assembly ensures space efficiency
- ◆ Economical solution, low cost of ownership
- ◆ Tubeless construction reduces potential leak points
- ◆ Service friendly; easily accessible from the top
- ◆ Great flexibility regarding system extension or modification
- ◆ Analog or digital communication



Controlled Evaporator Mixer
The vapour generation system consists of a liquid flow controller, an MFC for carrier gas and a temperature controlled mixing and evaporation device. The system is suitable for mixing liquid flows of 0,25-1200 g/h resulting in saturated vapour flows of 50 mln/min up to 100 l/min. This vaporizer system can also replace bubblers.

- ◆ Small units, fit on the side of the furnace
- ◆ No moving parts, almost maintenance free
- ◆ No contamination of the mix
- ◆ Easy of use and purge facility for quick start ups
- ◆ Great value for money to ensure the products are of the same high quality everytime



MASS-STREAM Series
The MASS-STREAM™ covers flow ranges from 0.01...0.2 l/min up to 100...5000 l/min (Air), and follows M+W Instruments' strategy of widely standardised product ranges. The instruments have IP65 protection as a standard and are operated with a main-board with all functions for accurate flow measurement and control.

- ◆ Useable for virtually every kind of gases
- ◆ Compact and robust IP65 design
- ◆ Very low pressure drop
- ◆ Measurement without moving parts
- ◆ No inlet pipes needed
- ◆ Optional with integrated TFT display
- ◆ Maintenance-free

Contact information



Controlled Humidification
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ME: Medical
01: Medical equipment

T +31(0)573 45 88 00 F +31(0)573 45 88 08
I www.bronkhorst.com E info@bronkhorst.com

