

Precise air control during the fluidized bed drying process using continuous electrical control actuators from the Contrac range



Low operating costs thanks to maintenance-free, high-accuracy regulation of drying air during the powder production process

Contrac

Introduction

The process of fluidized bed drying is used to manufacture powder in a variety of sectors. Applications include the production of powdered milk, instant coffee or even detergents.

The process described here is for manufacturing detergent. In this process, the powder generated from spray drying is further compressed by means of fluidized bed drying. A glue made from a mixture of water and soda is admixed for this purpose. This glue enables the powder to be compressed into a heavier mass in a fluidized bed dryer using hot air.

In the drying chamber, hot air is added to the powdered material. Consequently, the powder is held in suspension in a manner resembling a swirling layer, and is simultaneously intermixed. The water evaporates from the glue and is removed from the fluidized bed dryer via a filter along with the hot air.

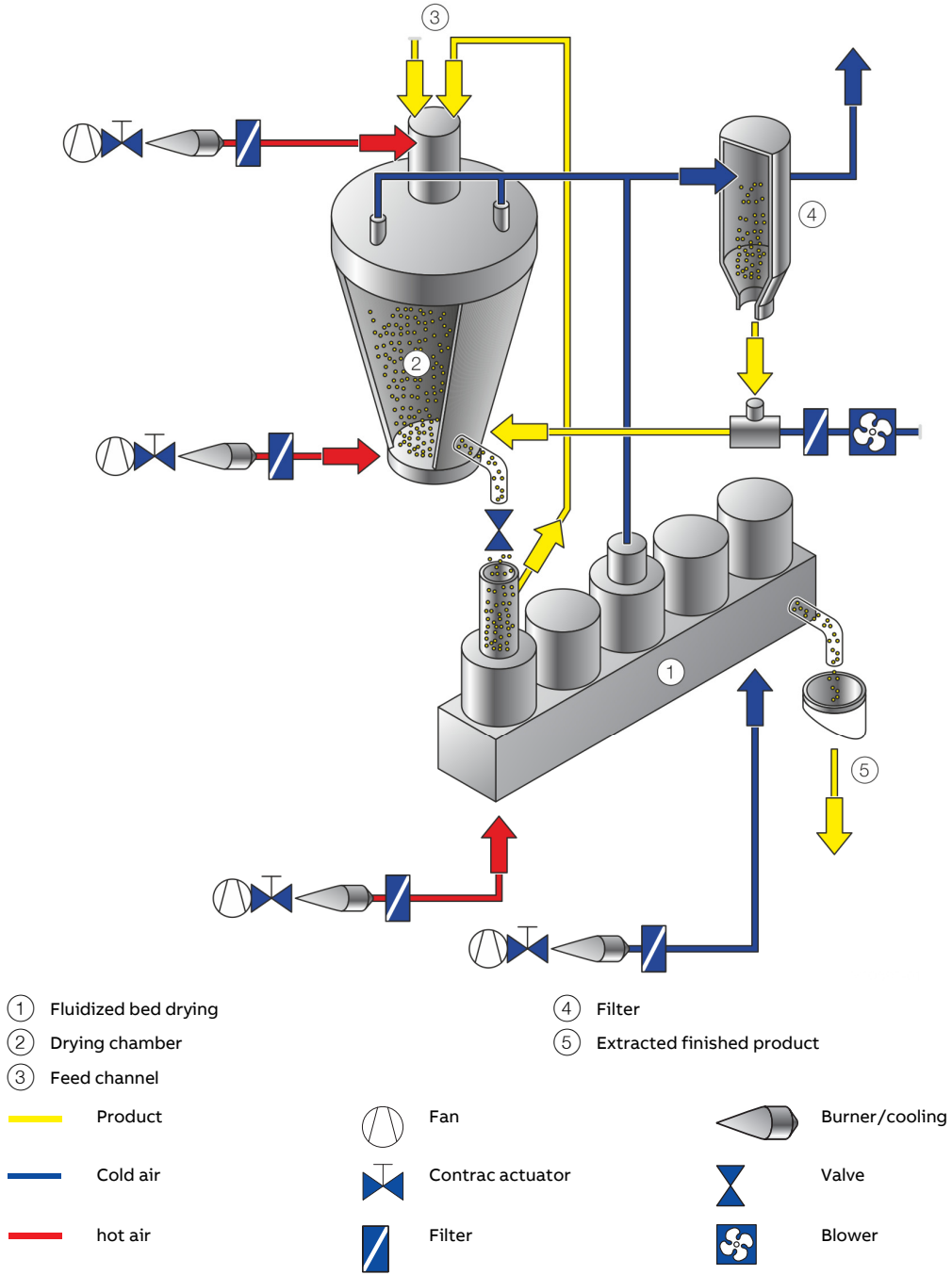
The temperature of the hot air added during this process must be regulated according to the water content and quantity of the glue, and taking cooling caused by the evaporating water into consideration. Regulating the pressure in the fluidized bed dryer is even more important than this temperature regulation process.

During this step, the pressure to be regulated is influenced by the following parameters:

- Quantity of powder added
- Cooling of hot air due to water evaporating from the glue during the drying process and due to the associated volume variations and pressure variations
- Volume of finished powder extracted from the fluidized bed dryer

Diagram of fluidized bed drying

01 Diagram of fluidized bed drying



The problem

If the pressure in a fluidized bed dryer is imprecisely regulated, an excessive negative pressure can make it impossible to extract the powder, meaning that too much of the finished product enters into the filter.

In contrast, if the negative pressure is insufficient, the finished product will be blown out of the fluidized bed dryer as dust, which can contaminate the entire system and ultimately lead to the complete loss of the finished product.

This solution for enhancing the process and minimizing the likelihood of failure comprises an efficient drying process in which the drying air is regulated continually and with a high level of precision.

The solution

Continuous electrical control actuators from the Contrac range are the ideal solution for providing the required level of high-precision regulation for the drying air.

Contrac actuators can provide stepless, continuous movement of final control elements, regardless of whether pressure is regulated using throttle valves or swirl valves. They therefore allow for outstanding control precision of $\pm 0.05\%$ with a stroke time of up to 10 s / 90 °.

The actuators enable S9 – 100 % duty cycle operation in accordance with IEC 60034-1 at ambient temperatures of up to 85°C.

The actuators also feature an oil-lubricated spur gear with drive shafts supported by ball bearings. In linear actuators, highly efficient ball screw spindles convert rotary motion into linear motion. Their robust design and IP rating of IP66 make them ideal for operation in harsh conditions. In addition to the advantages previously mentioned, 10-year maintenance cycles also contribute to reduced operating costs.

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