



Dec's new Powder Transfer System for charging reactors with toxic or explosive powders

Dust caused by the transfer of pharmaceutical powders can be toxic and prone to explode.

**Chris Broadbent**, director of Dec UK Ltd, describes a new, safer system for charging reactors with powder

# Ignition impossible

The hazards of dust explosions encompass all segments of industry. Some of the more common materials presenting a dust explosion hazard are drugs, dyes, fertilisers, foods, grain, insecticides, metals, paper, plastics and rubber. Explosions have occurred in buildings as a result of dust on the floor, on ledges and in equipment such as bins, blenders, collectors, conveyors, dryers, grinders, mixers, pneumatic transport and storage facilities.

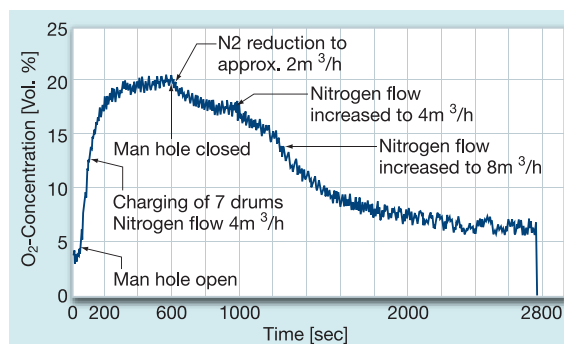
A new solution to the problematic and often hazardous operations of powder transfer and charging in process industries is the Powder Transfer System (PTS), developed and patented by Dietrich Engineering Consultants (Dec). The system is capable of automatically transferring toxic, explosive or other

types of powder into closed vessels containing dangerous vapours and liquids, at any temperature.

## vacuum transfer

The PTS is designed for pressure and is installed directly onto existing process equipment, predominantly reactor vessels. By using a source of absolute vacuum and pressure, the PTS can transfer powders in the same way that liquids can be conveyed, over large distances (horizontal and vertical), in a variety of volumes, and directly into vessels in a safe and contained way. This means that a powder room on the ground floor can be used to charge reactors large distances and several floors up.

The PTS works for all powders regardless of their characteristics, even



Above: Oxygen concentration during charging through an open manway

Below: Schematic showing operation of the PTS

those that are extremely fine, lumpy or even solvent wet, as during the transfer of such materials the PTS will not modify the homogeneity of the powder.

Full vacuum sucks powder from the storage container (drums, bags, FIBCs or hoppers), usually via a simple stainless steel lance held by the operator, and conveys it into the PTS cylindrical chamber. A flat filter membrane separates the chamber from the vacuum line preventing powder reaching the vacuum pump. When the chamber is filled with powder the vacuum valve closes and pressurised nitrogen or other inert gas is supplied to the chamber.

Once an overpressure is created within the chamber the powder is pneumatically discharged into the designated receptacle as soon as the outlet valve is opened. The overpressure also prevents gas and vapour that may already be present within the reactor from rising back up into the PTS chamber. Furthermore, the source of pressure also serves to clean the filter membrane at the top of the chamber (reverse jet) after every cycle of the PTS, thus ensuring each cycle performs under optimum conditions.

The PTS uses pneumatic logic to power the entire process, and forms a physical barrier between the designated receptacle and the PTS chamber, reducing the risk of explosive atmos-

