

# Charging a Powder with a Low Minimum Ignition Energy

## Overview

De Dietrich Process Systems (DDPS) was given the task of transferring a product with a low Minimum Ignition Energy (MIE) ~3 mJ. Due to the low MIE the customer wanted additional capabilities to monitor the O<sub>2</sub> entering the system with the product. In addition, the system needed to be installed outdoors. DDPS designed a system that included some of the following key features:

- O<sub>2</sub> sensor on the vacuum pump exhaust
- Static monitoring system for conductive bulk bags
- Protective shrouds/bellows to encase the load cells and protect equipment from outdoor elements

## About

This customer is a leading developer of specialty materials including toughening agents and resins for high-performance thermoset systems and specialty nitrile latex for niche applications.

## Challenges

The biggest challenges for this project were monitoring the O<sub>2</sub> as desired and designing a control system suitable for an outdoor area that often experiences very cold temperatures. Additionally, all hardware and instrumentation needed to be capable of handling water exposure or protected from such exposure.

Another added challenge was adding product into an 8" nozzle when the desired rate required our 12" Powder Pump system. A reduction in an area like this always creates potential for bridging or trouble discharging the powder easily.

## Solution

DDPS developed a system that would monitor the O<sub>2</sub> levels and set off an alarm if levels exceeded the desired value for a set time. The system included all stainless hardware



*Left: 12" Powder Pump unit featuring reducer  
Right: Bulk bag unloading station*



and protective features like bellows for the load cells and a cap for the bag sealing nozzle to cover when not in use.

The control panel utilized heaters on the inside of the panel designed to turn on when temperatures dropped below freezing.

Heat tracing and insulation was used to wrap the oxygen monitor and surrounding piping to ensure the fluid inside the instrument would not freeze.

A 12" x 8" reducer was added to the bottom of the Powder Pump outlet. This reducer has a mesh, sintered metal screen that allows the entire wall of the reducer to be fluidized with nitrogen to prevent any bridging while discharging powder.

## Results

The customer was able to achieve 6% oxygen content, meeting the requirements of their process. By minimizing product bridging during transfer, the material was able to be moved efficiently, eliminating the downtime that is potentially needed to unclog the discharge port. The ability to install the system outdoors reserved space inside the facility for other important process use.

**VISIT** [www.ddpsinc.com](http://www.ddpsinc.com)

**CALL** 908.317.2585

**EMAIL** [sales@ddpsinc.com](mailto:sales@ddpsinc.com)