

## Macawber Installation Case Study: Titanium Dioxide – Ace Hardware Corporation

### IN BRIEF

Ace Hardware is a division of Matteson and is a paint manufacturer as well as a supplier of hardware items. In the early 1980's Ace wanted to improve the handling requirements for one of the paint ingredients, Titanium Dioxide (TiO<sub>2</sub>). TiO<sub>2</sub> appears to be a simple dry powder and therefore easy to convey pneumatically. However, from analysis the opposite is true. The material particle shape as seen in the microscope shows an extremely cohesive material and it is therefore a steady challenge for pneumatic conveying. Subsequently conveying tests performed in our full-scale conveying circuits confirmed our observations which caused us to design a special arrangement for the Denseveyors<sup>®</sup>. A complete handling system was designed for the Illinois plant with two Denseveyors<sup>®</sup> serving the needs of six weigh bin reception hoppers. The systems continue to function well providing energy efficient and clean handling of this very special and demanding powder

### MATERIAL CHARACTERISTICS

|              |  |
|--------------|--|
| Material     | Titanium Dioxide   |
| Bulk Density | Aerated 800 kg/m <sup>3</sup> (50lb/ft <sup>3</sup> )  |
| Size         | 100% < 250 microns   |
| Temperature  | Ambient  |
| Moisture     | 1.0%   |
| Condition    | Highly cohesive and adhesive powder containing agglomerated lumps<br>Tends to coat steel surfaces<br>Moderately abrasive |
| Special Note | Systems also handle calcined clay, calcium carbonate, mica, amortized silica and feldspar                                |

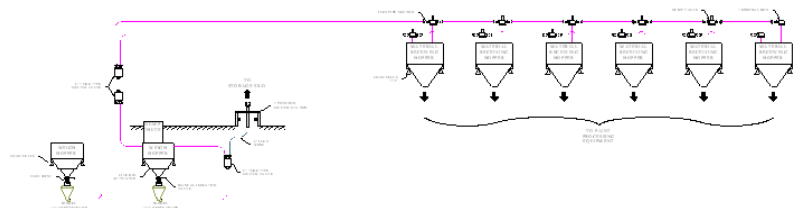


### SYSTEM OBJECTIVES

1. Capable of handling titanium dioxide and five other metals
2. Reliable, low maintenance operation & low pipe wear
3. Ability to prevent material build-up in vessels and pipelines

### SYSTEM PERFORMANCE

|                    |                  |
|--------------------|------------------|
| Transfer Capacity  | 36 Mt/h (40 t/h) |
| Conveying Distance | 122m (400ft)     |
| Reception Points   | Six              |



### IMPROVEMENTS ACHIEVED

1. Low velocity dense phase mode of conveying resulted in low pipe wear – Macawber provides no-wear guarantees for pipe and bends.
2. Unique Denseveyor<sup>®</sup> design provides for smooth, efficient vessel fill and discharge
3. Vessel filled via the unique Macawber Dome Valve<sup>®</sup> – low maintenance and no lubrication required
4. Macawber technology requires no pipeline boosters.