

White Paper:

Taking the 'sting' out of handling dry bulk pigment materials

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The Problem

Handling pigment materials can be one of the most challenging and frustrating parts of being a paint manufacturer.

It's not enough that emptying the contents of large bulk bags of materials is a cumbersome and somewhat dangerous task. But the dry materials used in paints – pigment, clay and other ingredients – simply don't flow well.

That causes a lot of hardships on manufacturers who often have to waste material they couldn't get out of a bulk bag or have to spend a lot of time unclogging equipment that simply aren't designed to handle these materials.

There are other problems, too. Dumping an entire bulk bag into a disperser can overwhelm the motors, which can damage the equipment or lead to longer mixing times. Operations that require adding several bulk bags into one disperser means a lot of lost time in just getting the next bag ready to be dumped. And with every additional bag, the problems compound themselves.

The kicker is that all these problems have resulted from the industry trying to become more efficient. Bulk bags are still better solutions than their predecessors. The key is investing in solutions that will handle bulk bags in the most efficient way possible.

How it began

Traditionally, dry materials for the paint industry were supplied in 50 - to 100-pound paper sacks that had to be dumped manually into a disperser tank. These sacks were painfully inefficient.

Even if the small paper sack's only problem was its size, a simple calculation reveals its economic downfall (do the math: in a 6,000-pound capacity tank, you need 120, 50-pound bags). But other problems, such as environmental impacts (like dust and bag disposal), labor issues (including repetitive stress injuries from handling the bags) and time factors have long had companies and suppliers seeking alternatives.

Enter the bulk bag, a revolutionary idea with a rather unrevolutionary design. These 2,000- pound mammoths solve issues the smaller paper sacks couldn't touch: they're more efficient to ship, usually cost less to buy, have fewer environmental flaws and can save hours in labor and mixing time.

Unfortunately, they also weigh 1000 to 2,000 pounds. Watching a team of laborers try to empty one of these monsters into a disperser tank can be like watching a vaudeville act, with some companies resorting to tactics involving baseball bats or whatever was necessary to get the material out of the bag (Powder/Bulk Solids magazine, Nov. 2000).

Other issues, such as stacking the bags, having enough room to empty them properly and conquering machine overloads when the material comes out too fast for the equipment have kept some manufacturers from making the switch.

The Solution

Since the mid-1940s, the engineers at Young Industries, Inc. have worked to solve problems in handling and conveying dry bulk materials. They went to work on the bulk-bag handling solution and came up with two designs to fit a variety of needs for different paint companies.

The first is a patented Direct-From-Bag Unloader with a Scale and Stinger® Feeder. The second is the Scorpion™ Unloading System with Stinger® Feeder. Depending on a company's specific operational set up, each of these products shows clear and distinct advantages when addressing the bulk bag handling problem.

Why Choose the Stinger® Solutions from Young Industries?

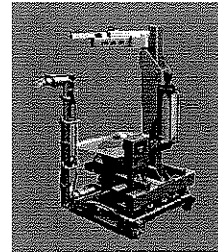
Simply put, the Stinger® is specifically designed to handle hard-to-flow dry materials used in making paint products. The Stinger® is capable of feeding all the following materials at a specified, metered rate without clogging:

- TiO₂
- Aluminum Oxide
- Antimony Oxide
- Clay Powders

- Iron Oxide
- Kaolin Clay
- Calcium Carbonate
- Zinc Oxide
- Other clay or oxide products commonly used in paints

DFB

The Direct-From-Bag Unloader, or DFB for short, is a good first step for companies that do not have any bulk bag handling system in place or need to use their handling system on several disperser tanks. The material moves freely without clogging, there is no waste of product and the material flows at a rate that matches the capability of the disperser.



DFB with STINGER

Here's how the DFB works: The bulk bag is attached to the lifting bracket and then it is placed on the DFB lifting mast. The bag discharge is attached to the TransFlow® conditioning hopper. The material moves from the hopper to the Stinger® that conveys the material to a disperser.

The Stinger distributes the right amount of material straight from the bag into the hopper, while the Trans-Flow media, a Young Industries patented design, keeps the material from clogging.

There are several major advantages to the DFB design:

1. **It's totally portable.** For a company that needs to unload its dry materials into several dispersers, this is the way to go.
2. **Not as much room is needed to empty the bag.** Because the unloader is attached to a forklift rather than on a hoist, less headroom and overall factory floor area is required.
3. **Material can convey vertically, not just horizontally.** This is a big advantage for companies where the disperser tanks are above the floor. The Stinger® can convey the material upward to the top of the disperser tanks without compromising flow rate.

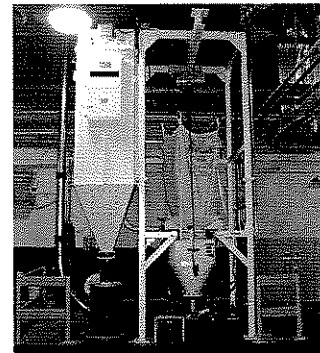
4. **The flow can be stopped at any time.** Need to make accurate batch weighing? Not a problem. The material conveying stops just as fast as it starts: Instantly. And by using the integral scale, you get accurate batches.

While the DFB has a lot of practical uses for emptying bulk bags, it becomes much more impractical when many bags must be emptied – especially when they all need to be emptied into the same disperser. For that, Scorpion™ Unloading System is a better choice.

Scorpion™ Unloading System

The Scorpion™ Unloading System uses the same patented Trans-Flow® media for bulk bag emptying and material conveying as the DFB, with one major exception: it is completely stationary.

Designed for use for large dispersers, the Scorpion™ Unloading System uses a stationary bulk unloading frame that uses a hoist to lift bulk bags into place. This process enables more efficient bag changing for disperser tanks that require many-thousands of pounds of material.



Scorpion Unloading System to holding hopper with STINGER

Material is conveyed from the unloading frame to a holding bin by the product pump conveyor. This conveyor is connected to a holding bin that can store 4,000 to 16,000 pounds of materials and the Stinger® that is attached to the bin discharge feeds the material to the disperser at a metered rate.

Looking at the initial example of the advantages of using bulk bags over smaller paper sacks, the same theory can be applied for showing the advantages of Scorpion™ Unloading System over the DFB Unloader. In a disperser where unloading 10,000 pounds of dry materials are required, an unloader must empty five of the 2,000-pound bulk bags. For the DFB, that means unhooking the bulk bags and going through the bag discharge connection each time. While this is being performed, the disperser is waiting and not making paint.

Using the Scorpion™ Unloading System, the material is pre-staged in the holding bin and when need by the disperser, the material is feed at the optimum feed rate. Just like the DFB, the Stinger® with the Trans-Flow media keeps the material moving smoothly and at a metered rate.

The major advantages to Scorpion™ Unloading System are:

1. **The unit is permanent.** That makes it ideal for larger-capacity dispersers.
2. **The system is automated.** Each bag can be set up with little labor required. Less man time and an automatic pace means greater savings and faster production.
3. **Reduce disperser mixing time.** The holding bin can be filled while the other processes are being performed by the disperser.
4. **Higher quality batches.** A metered rate solids feed helps the disperser mix better

Summary

Handling dry solid materials in bulk bags remains a challenge to paint manufacturers, but solutions are available. Young Industries provides two types of bulk bag handlers specifically designed for hard-to-flow materials like those used in making paints: the Direct-From-Bag Unloader with Scale System and Stinger® Metering Feeder and Scorpion™ Unloading System. Each has its distinct advantages for different manufacturing environments and different requirements for operation. But both have the unique ability to make the bulk bag challenge a manageable part of paint manufacturing. For more information call William Mahoney at 570-546-1826 or visit www.younginds.com/pigment.

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