



SOLVING DUST FALLOUT WHILE MOVING DRY GOODS

DUST SUPPRESSION HOPPER

Ravensdown Fertilizer Co-op had a dust problem while bulk loading fertilizers into their general store. Trucks, front end loaders and staff were all working in a dirty, low visibility situation and the potential for an accident was high. Ravensdown now has 49 DSH hoppers installed in 36 stores. **"The hoppers have been a great success in cutting down the dust problem and make visibility a lot easier and provide a perfect pour when loading."**

Hugh Eaglesome
Ravensdown Fertilizer Co-op

DUST SUPPRESSION HOPPER

REDUCE HAZARDS, HEALTH RISKS, DUST & WASTE



What makes the DSH System unique?

- Easy to install with minor interruption to production.
- Minimal reconfiguration required for installation.
- Exceptional support and customer service.
- Award winning, patented product.
- Standard model has no internal moving parts.
- Variety of sizes available to suit customer's unique requirements.
- Supported by an innovative, progressive distribution network.



**Award Winning
Loading Spouts Which
Ingeniously Contain
Dust Within The
Product Stream When
Discharging Dry
Bulk Materials**

Customers

DSH Systems have installations in North and South America, Asia, Europe, South Africa, Australia and New Zealand. Below are a few examples of clients in the United States.

- *Cargill*
- *Mosaic*
- *ADM*
- *Bunge*
- *C&H*
- *Riceland*
- *US Silica*
- *CHS*
- *Kinder Morgan*
- *Domino Sugar*
- *Ingredion*
- *Carmeuse
Lime and Stone*

Awards

Finalists for the Environmental Transport Award, DSH Systems are proud to have achievements recognized once again as one of the industry's finest performers at this prestigious event.

Finalists in the Dust Control Technology Category among other industry leaders. Nominations for the awards came from every sector of the bulk handling community and from companies of all sizes, from sole traders and family firms right up to globe-spanning mining multi-nationals.

Award Winning Innovation

DRY CARGO INTERNATIONAL PUBLICATION

Engineering & Equipment Featured Article

Clean Loading Of Fertilizers With DSH

Bulk loading of fertilizers is a very dusty job as the airborne dust envelops working environments, neighborhoods, plant and machinery and the emissions cause low visibility and dirty, dangerous and very unpleasant working conditions. The DSH System was invented to provide a much-needed solution and achieves this result **without the need for electricity, dust extraction or internal moving parts**. The DSH System offers positive product transfer control, unlike other handling and loading methods which entrain air, resulting in dust particles becoming airborne and

leading to expensive problems and environmental health and safety issues. The DSH System reduces product waste, thus increasing profit margins and can also eliminate the need for more expensive dust control methods. The DSH (Dust Suppression Hopper) System is installed under a feed point where it is suspended above the target repository and kept at operating level. At the point of loading or transferral, air is extruded from the hopper and the fertilizer is concentrated into a moving solid column, falling through free air into any target repository while containing the dust fines in the center of the column. Extraction is unnecessary, cleaning and disposal costs are

reduced and the client receives a fully specified blend as product loss is minimal. Loading is faster, storage tonnages increase, dust explosion risk is mitigated and operations can be enabled closer to urban areas. **The first hopper to be installed in a fertilizer plant in the USA went to Mosaic Crop Nutrition site in Savage, Minnesota.** Lisa Brickey, Warehouse Manager, needed an improved dust control system at her loading facility. An initial DSH hopper installation was quickly increased to five hoppers at her plant and her recommendations to her colleagues has now resulted in other installations at Mosaic Crop Nutrition plants in the USA and South America.



Tested Product List

FERTILIZERS

- Blue T super
- Bouruca rock
- DAP
- MAP
- Feed phosphate
- Keserite
- Potsulf
- Sulphur
- Urea

SUPERPHOSPHATES

- Dolomite lime
- Lime (granular)
- Potash
- RPR fertiliser
- Serp super
- Togo rock

FOODSTUFFS

- Revel A
- Salt - coarse
- Salt - plain table
- Raw sugar
- Refined sugar

MINERALS & QUARRY PRODUCTS

- Bauxite
- Gravel
- Kaolin
- Magnesite
- Olivine
- Sands
- Salt - deicing
- Soda ash

GRAINS & STOCK FOODS

- Barley
- Barley moultings
- Canola meal
- Corn
- Corn germ
- Corn gluten
- Corn gluten feed
- Corn gluten meal
- Corn gluten pellets
- Cotton seed meal
- DDG's
- Pepsygen
- Rapeseed meal
- Sorghum
- Soybeans
- Soybean meal
- Soybean hulls
- Soybean pellets
- Wheat





PROFESSOR PETER WYPYCH

Dust Explosions Conference

Expert On Dust Control

On latest developments in handling technology to increase plant safety, Professor Wypych discussed two new systems. Both are backed companies, which promise major reductions in fugitive dust emissions.

1) The Olds Elevator was developed by engineer, Peter Olds, when he needed to elevate sand for metal casting five meters above his foundry floor. The Olds Elevator minimizes particle damage and dust and hence, according to Professor Wypych, has "much less chance of explosion propagation."

He added, "I see the Olds Elevator replacing lots of bucket elevators."

2) The Dust Suppression

Hopper was developed by DSH Systems' Trevor Schwass when he was asked by a fertilizer company for a solution to a plant plagued by dust. The facility was suffering to such an extent that men and machinery disappeared into the murk. In response, and after several years of design, tinkering and fine-tuning, Trevor developed the Dust Suppression Hopper which continuously discharges product through free air as a solid column. The system consists of a hopper with a central plug and uses mechanical means to control the

clearance between the hopper and the plug. Material is conveyed into the top of the hopper and is contained until the weight forces the hopper to move away from the plug, releasing the material through the cavity between the plug and the hopper at the bottom of the device. The "head" of material maintained in the hopper squeezes the trapped air and allows it to disperse; the product then flows in parallel entry and exit.

In the battle to reduce the incidence of dust explosions, the Old Elevator and Dust Suppression Hopper will be two very useful tools in the armory of bulk handling engineers and technicians.



Understanding The Science



Dust generation by direct feed from conveyor belt. Particle break-away at the edge of the feed causes high volumes of dust.



With DSH systems, there is no dust generation on impact. Radial flow occurs away from the impact point.



Converging powder stream rapidly thins. No dust emission from falling jet occurs.

DSH System Sizes

Your size selection is dependent upon your product, its bulk density and flow rate. Your decision on size requirement should be made in conjunction with your supplier. We continue to research new sizes and construction materials.

- DSH Mini**
- DSH 4**
- DSH 8**
- DSH 1**
- DSH 5**
- DSH 9**
- DSH 2**
- DSH 6**
- Tardis**
- DSH 3**
- DSH 7**

GUIDELINES ONLY

Load-Out Rates

DSH MODEL	Bushels Per Hour	Tons Per Hour (48 PCF)	Tons Per Hour (100 PCF)
DSH MINI	800 - 3,200	25 - 95	50-200
DSH 1	3,200 -5,000	95 - 150	200 - 310
DSH 2	5,000 - 8,200	150 - 245	310 - 510
DSH 3	7,300 - 12,800	220 - 380	450 - 790
DSH 4	12,800 - 20,000	380 - 600	790 - 1,200
DSH 5	20,000 - 29,000	600 - 860	1,200 - 1,800
DSH 6	29,000 - 39,000	860 - 1,175	1,800 - 2,400
DSH 7	39,000 - 52,000	1,175- 1,530	2,400 - 3,200
DSH 8	52,000 - 65,000	1,530 - 1,940	3,200 - 4,100
DSH 9	65,000 - 80,000	1,940 - 2,400	4,100 - 5,000

Tardis System - Compass Minerals in Utah - Loading Salt

Compass' prime requirements were for 316 stainless steel construction and inspection hatches for dust filtering and sampling needs. The units had to be fully enclosed with a flange fitting directly onto their existing loading spout. The end result was an integrated unit with hatches for the air to escape, but with all the dust contained. (Unit pictured below)

Construction Materials

You can specify the construction material of each system to suit your requirements, which could be any of the following, but not limited to this list:

- Polyethylene rotational molded hoppers to cover most applications.
- Corten, Hardox, and 304 Stainless Steel hoppers for warm or abrasive products.
- 316 Stainless steel hoppers for food grade and corrosive situations.

Engineered Solutions

We will analyze your requirements, your existing loading facilities and will provide the best dust reduction solution for your environment. Site specific engineering may be required to suit your requirements.

To date, customization has included features such as steel or fabric filter covers, dust socks (with or without covers), custom-made springs and frames.

If your site does not fit our standard products, we will endeavor to engineer a solution that works for your application.



Tardis system loading salt at
Compass Minerals in Utah.

We Care About Your Air

System Applications

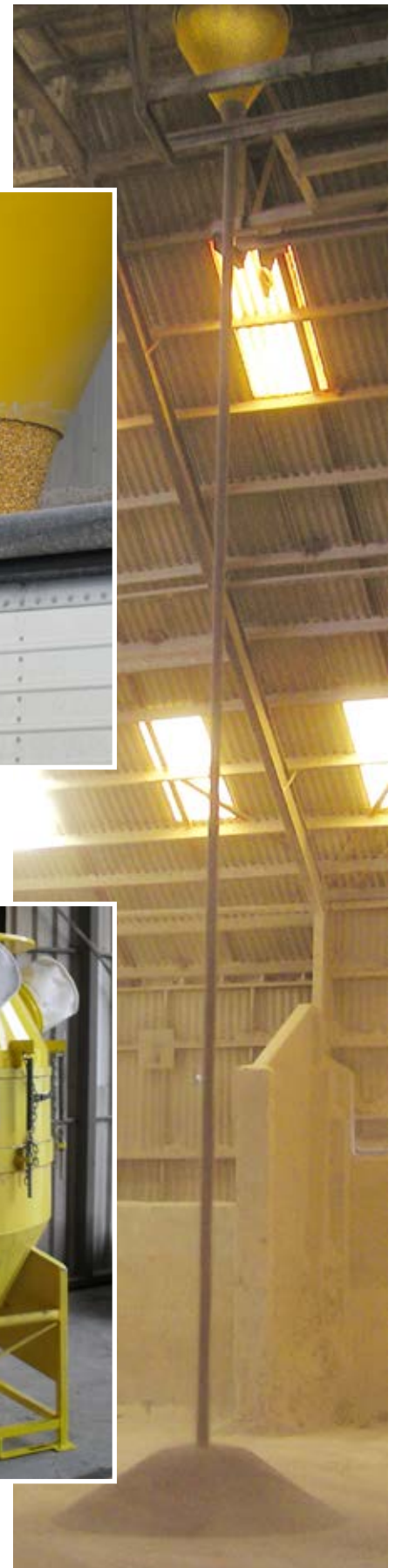
The DSH System hoppers are used to reduce dust while transferring dry, granular, free flowing products. The hoppers are used for bulk loading fertilizers, stock foods, meals and pellets, wheat, barley, sugars, some limes, salt, sand and gravel. If your product is not on this list, please contact us and we can arrange to trial it for you.

Used under a central feed point while bulk loading into any target repository including trucks, rail cars, storage containers, bags, stock piles, ships or barges.



System Models

- The standard model requires no utilities and has no internal moving parts.
- The Tardis system consists of a steel cover which fits over the standard DSH hopper. This unit basically works as an interface between the standard DSH hopper and the customer's existing feed system. (pictured to the right)



Impact Fertilizers loads 120,000 tons of single superphosphate for bulk shipment, generating localized dust, resulting in environmental complaints from the wider community. Installation and use of these hoppers has resulted in a significant reduction of fugitive dust emissions.

"This project exemplifies sustainability by delivering sound environmental and economic outcomes through the introduction of innovative ideas."

Grant W Allen
Impact Fertilizers

DUST SUPPRESSION HOPPER

WHAT ARE PEOPLE SAYING ABOUT THE DSH?



Savings and Benefits:

- Standard model uses no utilities.
- No internal moving parts.
- Reduce maintenance and cleaning costs.
- Relocate or turn off dust extraction.
- Reduce loss of fugitive fines.
- Reduce storage expenses.
- Faster, cleaner truck and rail car loading.
- Reduce product shrinkage.
- Load stockpiles cleanly.
- Improve your employee health and safety.
- Care for your environmental community.
- Enables operation closer to urban areas.
- Improve air quality.
- Improve visibility while loading.



TESTIMONIALS

BEFORE/AFTER PICTURES

“In my 30 years in the grain industry, my observation was that the hopper worked well to reduce the dust levels to well below what would normally be expected.”

Andrew Kotzur
Managing Director - Kotzur



“The DSH, located outside, vulnerable to a degree of weather conditions, coarse and abrasive product has proved hard wearing, durable and efficient for our business.”

Kate Parahi
Store Operations Manager - Ravensdown Fertilizer



“We have one of your hoppers operating on straight urea and I am very impressed with it. Didn't think anything would do that after thirty years in the business.”

Robin Douglas
Projects Manager - Incitec Pivot Ltd.



“We now have basically no maintenance. We no longer have to reline the old system every 3-4 months and no more electrical concerns that used to raise and lower the old chute.”

Karl Van Wanrooy
Logistics Site Supervisor - Incitec Pivot Ltd



“The Hopper has made a big difference in the short time it has been operating, mainly in the time it takes to load. Hopefully every fertilizer company will be using them soon.”

Steve Johnson
Transport Operator - Elders WGF



TESTIMONIALS

BEFORE/AFTER PICTURES



Check Out A Video on Sioux Steel's YouTube Page!

"We bought our first DSH hopper in 2007 and now have four more installed. The DSH System allowed us better control over our dust.

The system requires no air, hydraulics or electricity. There is no waste dust stream to handle and our load out rate was not impacted at all.

We had our first spout up and running in 30 minutes! I had my doubts when I first saw the before and after photos, but the system really does work that well!

We love it!"

Lisa Brickey of Mosaic Crop Nutrition,
Savage, Minnesota

We Care About Your Air



To learn more about which DSH model would work best in your environment, please contact Sioux Steel Company at:



www.dustsuppressionhopper.com

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