DUST MANAGEMENT

CONTROL, SUPPRESSION, FILTRATION.

L3423

PROBLEM

CONSEQUENCES OF DUST

The adverse impact of dust is limited only by the distance it can be carried through the air. Issues for the operation and its employees include the risk of explosion, health problems, safety hazards, material loss, increased maintenance requirements, equipment damage, regulatory citations and fines and decreased productivity. Outside the plant, the risks extend to the surrounding community and environment which are exposed to the pollution and health concerns arising from the dust.

These issues can cost an operation a considerable amount of time, money and energy if not dealt with properly. An effective dust management solution is a wise, if not necessary, investment that should be approached as a project, rather than simply a product off the shelf.

FUGITIVE MATERIALS

The escape of airborne dust from bulk material handling systems is a hazardous and costly problem.

TABLE OF CONTENTS

4 Dust Management
6 Passive Control
8 Suppression
10 Filtration

SOLVED

THE MARTIN® SOLUTION

Martin® Dust Management Solutions reduce the escape of airborne dust from material handing systems.

Problem Solved™ GUARANTEED!

UNDERSTANDING DUST MANAGEMENT

The amount of dust generated by a material handling system is governed by the relationship of three characteristics. The amount of dust generated is proportional to the air velocity divided by the factors of particle size and material cohesiveness, as shown in the equation below.

$$\text{DUST GENERATED} \propto \frac{\text{AIR VELOCITY}}{\text{PARTICLE SIZE} \cdot \text{COHESIVENESS}}$$

[A] INCREASE MATERIAL COHESIVENESS

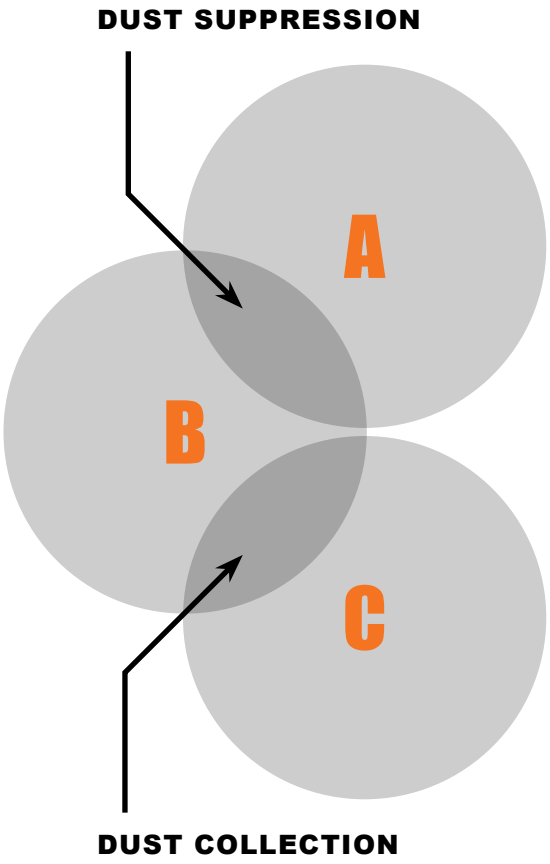
Increasing the cohesiveness of a material makes it harder to separate out individual particles. Particles remain in the body of material and avoid becoming airborne.

[B] INCREASE PARTICLE SIZE

Larger particles are heavier, making them harder for moving air to pick up. If picked up, these particles will fall out of the air more quickly.

[C] MINIMIZE AIR VELOCITY

Dust travels in the air stream, so it stands to reason that if air is controlled, dust can be managed. By reducing air velocity, airborne particles can fall back into the material stream.



3 METHODS OF DUST MANAGEMENT

If you cannot prevent dust from becoming airborne, you must find a way to control it. Control can be accomplished by containing, suppressing or filtering airborne particles. Any of the three characteristics of dust can be altered to minimize the amount of dust generated. Most dust management solutions target one or more of these characteristics.

PASSIVE DUST CONTROL

Minimize Air Velocity

Enclosing airborne dust with an effectively-designed transfer chute reduces air velocity by minimizing air drawn into the transfer point, sealing leaks that allow dust to escape and allowing particles time to settle out of the air.

DUST SUPPRESSION

Increase Material Cohesiveness + Increase Particle Size

Dust-suppression systems increase the weight and cohesiveness of dust by combining the particles with droplets of fluid. This prevents particles from becoming airborne, and encourages the airborne particles to fall back into the material stream.

AIR FILTRATION

Increase Particle Size + Minimize Air Velocity

Air filtration systems minimize air velocity by pulling air and dust out of the material-handing system. They also increase the particle size of airborne dust by forcing particles to agglomerate before being deposited back into the material stream.

PASSIVE DUST CONTROL

MINIMIZE AIR VELOCITY

While it is unlikely dust can be completely eliminated, the first consideration in dust control should always be the minimization of the amount of airborne dust created. Therefore, any change in system design or production technique that will reduce the amount of dust produced should be evaluated.

Airflow through the system can be managed by controlling the amount of air entering the transfer point, building the enclosure large enough to slow or minimize air speed and utilizing additional control measures to slow air movement. As air velocity is reduced, airborne particles that are too heavy to be supported by the reduced air speed begin dropping from the air stream.

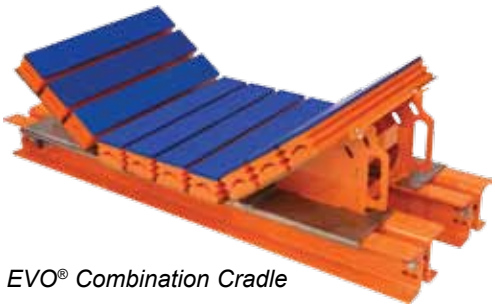
MARTIN® TRANSFER POINT SYSTEMS

Stabilize belt path and seal at skirtboard to prevent escape of dust and spillage at sides and end of loading zone.

- Use when traditional transfer point technology is desired
- Use when support and containment need to be focused on
- Use to upgrade an existing transfer point with minimal disruption

MARTIN® CRADLES

Installed in the loading zone impact area, Martin® and EVO® Impact Cradles absorb the force of falling material to prevent damage to the belt and structure while eliminating belt sag. Track-mounted design allows quicker and easier installation and maintenance. Steel-reinforced bars provide long wear life.



EVO® Combination Cradle

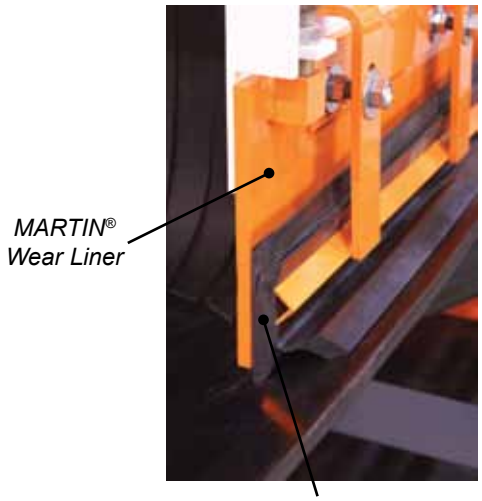
Installed under the skirtboard of a transfer point, Martin® and EVO® Slider Cradles support the edges of the belt to stabilize the belt line and allow effective sealing. Outer support bars and center support roller slide into position on a track, for quicker and easier installation and maintenance. Double-sided UHMW bars provide extended wear life and reduced friction.

EVO® Slider Cradle

MARTIN® SEALING SYSTEMS

Martin® ApronSeal™ and Self-Adjusting sealing systems, clamped on the chute wall, maintain an effective seal and prevent escape of fines and dust. ApronSeal™ dual-seal system stops material and fines with one-piece design for easy maintenance. Self-Adjusting Skirting system floats on the belt and is appropriate for belts with minimal free belt edge.

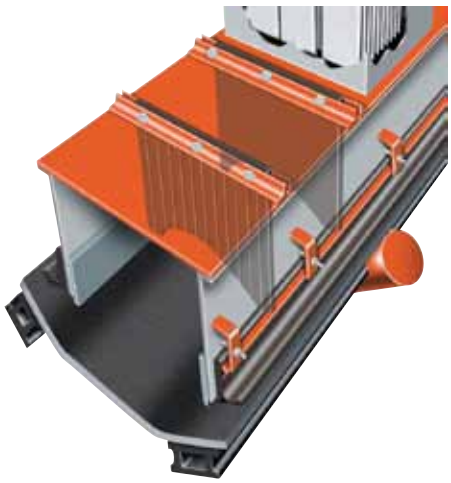
Martin® Wear Liner creates a dam to shield the sealing system from the weight of the material load, prolonging the life of the seal. EVO® External Wear Liner is attached to the outside of the chute, allowing easy adjustment and maintenance without entering the chute.



*MARTIN®
ApronSeal™ Skirting*

MARTIN® DUST CURTAINS

Installed near the end of the transfer point chute enclosure, Martin® Dust Curtains slow loading zone airflow so airborne dust settles back into the belt cargo. Rugged solid or slit ¼-inch rubber construction provides extended service in tough conditions. Curtains bolt into steel frame for simple replacement.



DUST SUPPRESSION

INCREASE MATERIAL COHESIVENESS + INCREASE PARTICLE SIZE

Dust suppression is the application of water, or water enhanced with chemicals, to agglomerate with dust particles to increase their mass, in order to prevent the escape of airborne dust. The water, or water/chemical mix, can be applied to either a body of material—to prevent fine particles from being carried off into the air—or the air above a body of material—to create a curtain, or barrier, that returns the wetted airborne fines to the material.

An advantage of dust-suppression systems is that the treated material does not have to be handled again in order to be reprocessed, as it would with a central dust-collection system. The suppressed dust is returned to the main body of conveyed material and then proceeds on in the process, without requiring additional materials-handling equipment to reclaim the material.

A dust-suppression system cannot be recommended in any case where the material would react adversely to the addition of moisture or to the return of the dust to the process.

MARTIN® DUST FIGHTER™ FOAM

Foaming additive enhances wetting for effective control, while minimizing addition of moisture to conveyed material.

Application Guidelines:

- Minimal moisture addition is required
- Chemical addition is allowed
- Residual effect is desired
- Applicable in hazardous (explosive) environments

MARTIN® DUST FIGHTER™ FOG

Fog-like mist provides effective, single-site, low-moisture dust suppression without any chemicals.

Application Guidelines:

- Use to treat material and/or the air around the material
- Chemical addition is not allowed

Heat tracing may be necessary in extreme cold. Electricity as required by application, Water (50-80 psi)

MARTIN® DUST FIGHTER™ SPRAY

Spray bars apply water directly to material to provide simple, effective, economical dust control.

Application Guidelines:

- Use to treat material
- Applicable in hazardous (explosive) environments

Heat tracing may be necessary in extreme cold.
Electricity (110 V, closed-circuit signal), Water (50-80 psi)

AIR FILTRATION

INCREASE PARTICLE SIZE + MINIMIZE AIR VELOCITY

Air filtration—the passing of dust-carrying air through some form of filtration or separation system—is the final piece in the dust-management system.

There are both active and passive air filtration systems. A passive system merely allows air to move through the filtration system, whereas active systems work like a vacuum cleaner to pull or push air through a filtration method to remove the particles.

Mechanical air filtration systems are installed to pull dust-bearing air away from a dust source, such as a conveyor loading zone; separate the dust from the air; and exhaust the cleaned air. A typical air filtration system consists of three major components:

A. An integrated pickup to capture airborne dust at the source(s).

B. A filter or separation device to remove dust from the air.

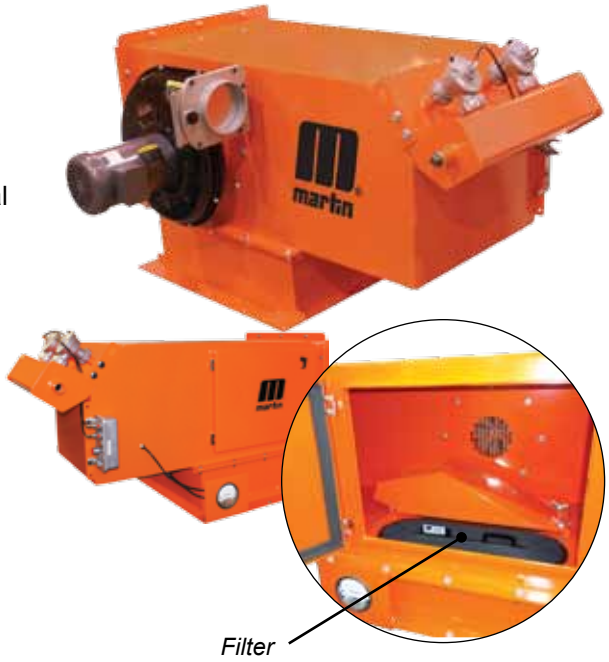
C. A method to clean the filter and place the filtered dust back into the material stream.

MARTIN® AIR CLEANER

Filters dust-bearing air at transfer point without the ductwork or large fans of central “baghouse” systems; returns material to stream. Replacement of compact filter is a one-hand, no-tool procedure that only takes minutes to complete.

Application Guidelines:
- Use to replace “bag house” or central collectors
- Material is returned to material flow
- Moisture addition is not allowed
- Containment is available
- Applicable in hazardous (explosive) environments

Electricity (230/460 V, 3 Phase, 60 Hz),
Compressed Air (10.2 cfm @ 90-100 psi)



MARTIN® DUST BAG

Allows positive pressure to escape while removing particles from air. Controls dust without power; self cleans by collapsing when air flow stops.

Application Guidelines:
- No power consumption or water addition is desired
- Use when creating a passive path for air to flow
- Applicable in hazardous (explosive) environments

Dust bag must be the easiest path for air to escape the transfer point; effective containment including curtains is a must

GLOBAL LOCATIONS

UNITED STATES
AUSTRALIA
BRAZIL
CHINA
FRANCE
GERMANY
INDIA
INDONESIA
ITALY
MEXICO
PERU
SPAIN
SOUTH AFRICA
TURKEY
UNITED KINGDOM

Authorized representatives in over 32 additional countries

MARTIN ENGINEERING USA

One Martin Place
Neponset, IL 61345-9766 USA
800-544-2947 or 309-852-2384
info@martin-eng.com
www.martin-eng.com

Part No. L3423-07/13