Donaldson
FILTRATION SOLUTIONS

FILTRATION SOLUTIONS FOR MINING & MINERAL INDUSTRY

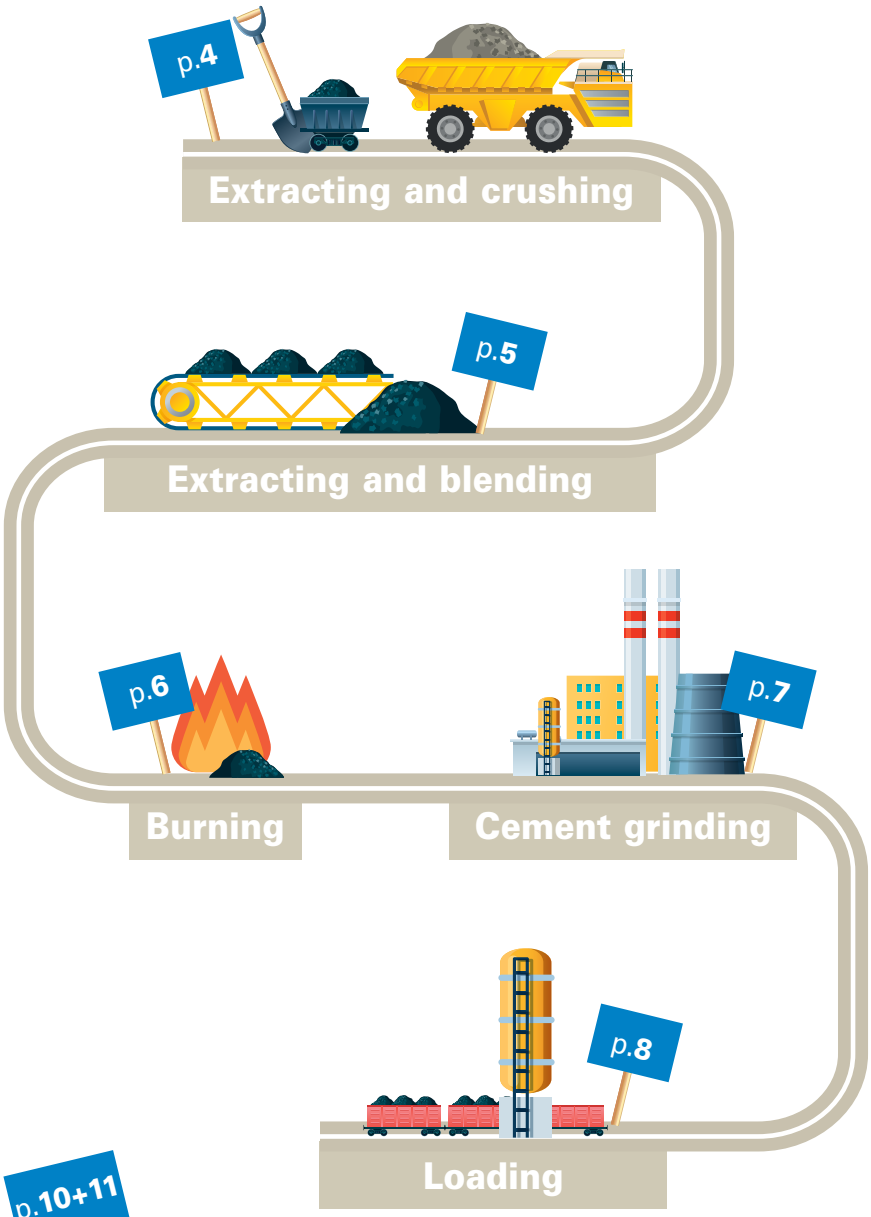
DONALDSON®: YOUR SINGLE FILTRATION SOURCE FOR MINING AND MINERALS

Large flows of abrasive dust are typical in all mining and mineral processing applications. Without effective dust control, equipment and process are put at risk.

With an extensive portfolio of products and decades of expertise, Donaldson is the partner you need.

We selected one of the most representative processes to showcase Donaldson's complete solutions for mineral handling: cement production.

The example of cement production



Extracting and crushing

Cement minerals contain four essential elements: calcium, silicon, aluminum and iron. The most important raw materials for making cement are limestone, clay and marl. These are extracted from quarries by blasting or by ripping with the use of heavy machinery. Wheel loaders and dumper trucks transport the raw materials to the crushing installations. Once blasted from the quarry, all materials are transported to crushers and reduced to the size of gravel.

EXPERT TIP

Two basic strategies exist for applying dust control to mines and quarries.

1. Source collection, in which the dust collector is put at the source of the dust emission so collected dust can be deposited directly back into the process stream and
2. centralized collection where the collector is put in a central location and dusty air is ducted and discharged as a separate process stream.

DUST COLLECTION // MEDIA TECHNOLOGY

CHALLENGE

- Wide range of airflows, from small to very high
- Different types of trucks and machinery with diverse filtration needs
- Maintaining stable pressure drop is challenging due to environmental conditions and peak loads

SOLUTION

- Local extraction systems that work on the spot versus centralized systems with fixed ducting
- Flexible product range covering from small to very big airflows
- High-flow filtration media with the lowest possible restriction for optimal efficiency and stable pressure drop

RECOMMENDED

- PowerCore® CPC
- PowerCore® CPV
- Dalamatic® DLMC
- Dalamatic® DLMV

Proportioning and blending

The crushed material is transported into the raw material storage of the cement plant by conveyor-belts, cableways or railways and in exceptional cases with trucks. Once there, it is stored in blending beds and homogenised.

The raw materials are now analysed in the plant laboratory, blended in the proper proportion and then ground even finer. After grinding, the material is now ready for the kiln or preheater, depending on plant type.

DUST COLLECTION // MEDIA TECHNOLOGY

CHALLENGE

- Collection of large amounts of dust without impacting optimal product flow
- Control high level of emissions released into the atmosphere

SOLUTION

- Customised filtration solutions needed to secure optimal airstreams for both centralised systems and locally installed filter modules
- Selection of optimal filter media to handle large amounts of air-born dust

RECOMMENDED

- PowerCore® SVU
- PowerCore® CPV
- Dalamatic® DLMV

Burning

The burning of the raw meal is carried out in preheater kilns that work by varying methods, the main difference being in the preparation and preheating of the kiln feed. By chemical conversion, a process known as sintering, a new product is formed: clinker.

Tetratex®

Tetratex membrane is a proprietary expanded PTFE (Polytetrafluoroethylene) technology manufactured solely by **Donaldson Membranes**.

MEMBRANE TECHNOLOGY

CHALLENGE

- High temperature
- Large gas volumes
- Critical to process, environmental pressures, alternative fuels

SOLUTION

- Near zero emissions
- Lower pressure drop
- Reduced cleaning regime
- Higher airflow
- Extended lifetime

RECOMMENDED

- Tetratex® Ultra High Efficiency ePTFE membrane laminated to woven glass fabric

Cement grinding

After burning, the clinker tumbles onto a grate cooled by forced air and stored in clinker silos.

From there the clinker is conveyed to horizontal steel pipes filled with steel globules called ball mills or roller presses. As the tube rotates, the steel balls smash the clinker into a superfine cement with the addition of gypsum and anhydrite, as well as other additives, depending on the use to which the cement is to be put.

DUST COLLECTION // MEDIA TECHNOLOGY

CHALLENGE

- Extreme abrasive, corrosive and aggressive dust
- Very fine particles
- High dust loads
- Risk of production blockages, equipment abrasion, secondary dust emissions, and higher costs for maintenance and materials handling

SOLUTION

- Knowledge and experience in capturing airflow patterns
- Surface filtration for high efficiency and low pressure drop
- Consideration of incoming air velocity, dust distribution, and air patterns within the collector

RECOMMENDED

- Tailored filter media selection: Tetratex Xcel or Tetratex Extreme ePTFE Membrane laminated to either Polyester or Acrylic needlefelt
- Dalamatic® DLMV
- Dalamatic® DLMC

Loading

From the grinding mills, the cement is conveyed to silos where it awaits shipment, depending on type and strength class. From there it is mainly loaded in bulk form from terminals onto rail or road vehicles as well as onto ships.

DUST COLLECTION // MEDIA TECHNOLOGY

CHALLENGE

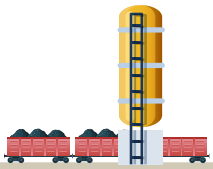
- Specific requirements for different filter housings and pressure relief systems
- Complex maintenance put the silo at risk of leakage and overpressurisation

SOLUTION

- Filter must be sized to accommodate peak dust loads and peak air volumes
- Increased efficiency and performance

RECOMMENDED

- PowerCore® SVU
- PowerCore® CPV
- Dalamatic® DLMV



POWERCORE® TECHNOLOGY: ENGINEERED TO PERFORM IN REAL-LIFE

Anchor Block is a producer company of standard concrete block, decorative stone units, landscape retaining walls and paving stones.

Dust collection had been an extremely challenging task due to very fine and abrasive sand, fly ash, aggregates and cement.

Fine silica dust particles generated during the manufacturing process tended to coat and plug traditional filter bags, causing high pressure drop and shortening filter life. Filters had to be changed frequently, driving up maintenance costs and disrupting production.

The ideal solution?

A CPV dust collector, using Donaldson's compact and light PowerCore® filter packs.

"The PowerCore filter packs have worked really well since the collector was installed

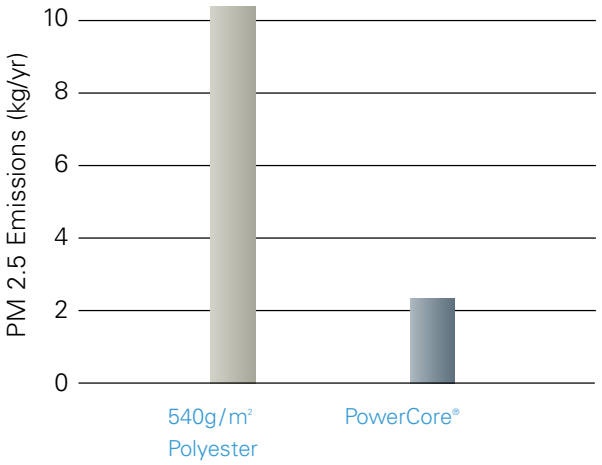
Every time I go by the collector the pressure gauge is hovering at the lowest point.

Our other collectors—baghouse and cartridge—never run that low."

Jay Battenberg
Safety director at Anchor Block

OUTSTANDING PERFORMANCE

78% FEWER EMISSIONS

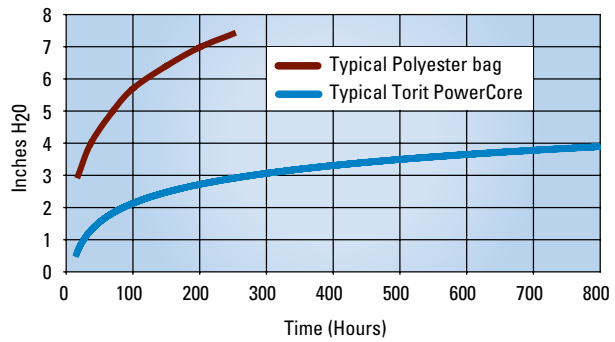


These flat sheet results are based on independent lab tests using ASTM D6830-02 per EPA PM 2.5 performance verification. Annual emissions calculated assuming 24,466 m³/h airflow rate, 265 working days per year, and two shifts per day. Field measurements may vary due to differences in dust contaminant and sensitivity of measurement equipment.

EASY ON THE BUDGET

The surface-loading technology of Ultra-Web® is proven to provide lower operating pressure drop over a longer period of time, and energy costs can be dramatically reduced

Surface Loading Allows Downsizing

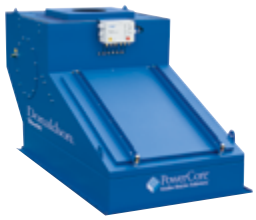


The results from accelerated lab and field tests show that Torit PowerCore can provide lower pressure drop in baghouse applications.

Most popular products for mining

PowerCore®
Silo Venting Unit (SVU) series

- Up to 54% smaller than conventional units
- Faster and safer maintenance
- Extended filter life and service intervals
- Two PowerCore filter packs replace up to six filter bags



PowerCore® CP series (CPC & CPV)

- The most flexible dust collectors for point of use and central installation
- Up to 70% smaller than conventional units
- Wide range of applications
- Reduced installation and maintenance costs

PowerCore® is a compact filter that does the work of multiple cartridge and bag filters.

- Proprietary air filtration technology
- Top performance and efficiency
- Backed by extensive lab and field testing, trusted by OEMs and end-users across the world.

THANKS TO SURFACE-LOADING TECHNOLOGY, ENERGY COSTS CAN DRAMATICALLY REDUCED.

Donaldson's cartridge filters bring an unmatched combination of performance and value.

Downflo® Evolution (DFE)

- Intelligent proprietary design boosts filtration performance while saving energy
- MaxPulse™ Cleaning System for 27% more cleaning energy to filtration media
- Up to 40% less filters required in comparison to other cartridge collectors
- Smaller size, frees up valuable manufacturing floor space

EXCELLENT ENERGY EFFICIENCY

Donaldson delivers increased engine and equipment protection, extended service intervals, reduced downtime and increased operating efficiency maximizing uptime across the entire operation.

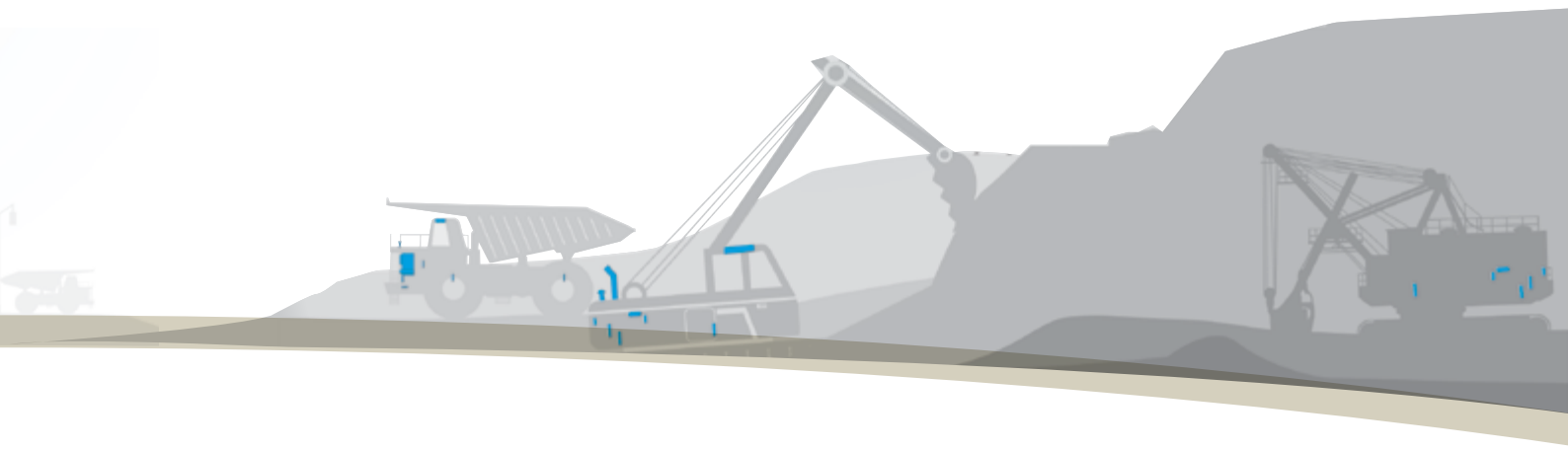
ENGINE AND EQUIPMENT

CHALLENGE

- Contaminations in diesel, risk of damaging injection systems.
- Downtime means lost revenue. Hard – working equipment in challenging mining environments may suffer unplanned shutdowns.
- Tough emission requirements.

SOLUTION

- Prevent maintenance with high performance filtration.
- Remove – and retain – as much contaminant as possible in all types of operating conditions.
- Comply to emission standards with higher-performing air-intake systems.
- Engine Air intake and Liquid Filtration: Mufflers and Exhaust accessories, bulkfuel filtration for onsite offline storage of fuel.



Dalamatic® series of dust collectors (DLMV & DLMC)

- Versatile models, cased and insertable, to fit your filtration needs
- Ideal for high dust load and heavy, robust applications
- Installation in space-restricted areas thanks to envelope-shaped filter bags

Modular Baghouse

- Robust design
- Reliable service
- Fitting for variable environmental conditions
- Cost advantages over the life of the collector

Dura-Life™ filter bags deliver **cleaner air** and up to **3 times longer filter life** than conventional polyester.

Pleated bags increase production efficiency and drastically cut downtime costs and unplanned shutdowns on abrasive applications. When combined with **Donaldson's Ultra-Web technology, emission reduction reaches up to 75% in comparison to standard bags.**

REVOLUTIONARY TECHNOLOGY ULTRA-WEB®

- Invented by Donaldson
- Engineered to perform in extreme temperature and humidity conditions, unlike ordinary nanofibers
- High efficiency for longer filter life
- Proved action; Used in mineral markets for decades

DONALDSON OFFERS THE WIDEST RANGE OF MEDIA FOR ALMOST EVERY APPLICATION!

Donaldson has a full range of products for compressed air applications within minerals
Blast air for surface cleaning, control air for valves, and drying.

COMPRESSED AIR AND PROCESS

CHALLENGE

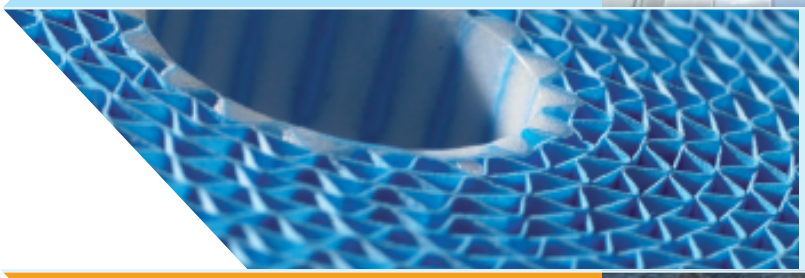
- Compressed air systems are used in different parts of the cement plant.
- Efficiency and purity are significant for compressed air system operation.
- Inadequate compressed air could lead to excess operating and capital costs.

SOLUTION

- Using minimum amount or air, for the shortest time. The air must be dry and clean to protect the equipment from water, corrosion and contaminants.
- Refrigeration air dryers Buran, Borea or Brisa.
- Heatless adsorption dryers HED/ALD/MSD.
- Heat-regenerated adsorption dryers HRS, HRE, HRG+, HRS-L.

YOUR SINGLE FILTRATION SOURCE

DUST COLLECTION



MEDIA TECHNOLOGY

ENGINE & EQUIPMENT

COMPRESSED AIR APPLICATIONS

Discover our range of filtration solutions for the Construction and Mining industries.

Donaldson
FILTRATION SOLUTIONS

Donaldson, your single filtration source

Donaldson offers a complete range of solutions and services designed to improve your productivity, guarantee production quality and help protect the environment while reducing energy consumption and total cost of ownership.

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Discover our range on **www.donaldson.com**

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