AmericanAirFilter®

Coal Handling and Processing

Advanced Solutions for Coal-Related Environmental Dust Control

Better Air is Our Business® AAF® INTERNATIONAL

AmericanAirFilter®

Coal Handling and Processing

Industry Leader

Our Qualifications

For more than 85 years, AAF International has been providing strategies to improve the quality of air to ensure environmental protection for people, products, and processes worldwide. We understand complex air pollution control problems and continue to develop and implement clean air solutions from concept to final installation.

Experts in Air Pollution Control

Modern industrial processes produce significant quantities of airborne pollutants in all forms -- particulate, gases, vapors, fumes and mists. Coal handling and processing is by far the most polluting in terms of emissions, releasing high levels of dust, carbon dioxide, sulfur dioxide, and nitrogen oxide. Reducing the pollutants to acceptable levels is critical for the safe operation of many coal processes and mandatory to meet stringent emission regulations.

Our complete line of air pollution control equipment allows us to recommend the most efficient and economical environmental solutions ranging from a completely packaged unit to solve small in-plant dust control problems up to large, complex, custom engineered systems for major air pollution control projects. Our extensive experience with numerous applications and industries ensures our customers receive a dependable quality system that meets their exact air quality requirements and complies with existing regulations.

AAF International has an unmatched capability to understand complex air pollution control problems and to develop effective solutions from conception through final installation.

AAF International has pioneered many of the techniques and equipment used in air pollution control applications today. AAF's dust, mist, vapor, and fume control products can be found in thousands of installations in virtually every industry and in most industrialized countries around the world.

Unmatched Product Line and Application Experience

AAF International has over a half-century of experience controlling dust from coal material handling, crushing operations, air tables, drying, and storage. From mine to boiler, our extensive background allows us to recommend the most efficient and economical total air pollution control solutions.

Our experts provide total air pollution control solutions for a broad range of problems specifically associated with coal handling and processing including:

- ***Underground Mining***
- ***Materials Handling***
- ***Crushing - screening***
- ***Air Tables***
- ***Tipples***
- ***Thermal Dryers***
- ***Silo Ventilation***
- ***Unloading***
- ***Bunker Ventilation***

Underground Mining

When coal is extracted, transported, screened or reduced in size, a significant amount of problematic dust is generated. Coal dust is more severe in underground mining because good air is at a premium and space is restricted. Protecting the health and well being of mine workers is a main concern along with limiting potential emissions caused from the mining process.

According to many experts, no industry in the nation is subject to more intensive inspection than underground mining. Code requirements necessitate efficient dust collectors, and as technologies improve, future code requirements indicate even higher efficiency requirements.

The critical areas for dust control in underground mining are those points where one conveyor belt discharges onto another, disturbing the coal and creating light, fine dust particles. Dust loading is typically light but due to the collection efficiency required and the space limitations, most everything but a wet collector is ruled out for this application. Perfect for any mining operation AAF's wet collectors provide several size options while using minimal amounts of space.

A minimum amount of water is recommended since the water is discharged onto moving conveyor belts; large volumes of water would create other problems.

AAF Solution:

Type W RotoClone®, Arrangement A
Type N RotoClone®, Arrangement C

Preparation Plants

Located adjacent to or near the mine, preparation plants have a range of dust control problems due to the diversity of processes involved in coal preparation. As coal is reduced in size, the potential for explosive dust is increased. Potential areas of concern are within thermal dryers, grinding mills, and other process equipment. Threshold limit values dictate the degree of efficiencies to provide adequate in-plant conditions as well as pollution-free discharges to the atmosphere.

Material Handling

At any point in the preparation process where coal is moved or transferred, dust is generated. Dust-loadings can vary from heavy to light depending upon the size and condition of the coal at each application point. Dust particles size can vary from submicron to large.

AAF wet collectors are recommended in heated areas where water can be utilized and easily disposed. Most of these areas will accommodate wet type collectors. Resulting sludge can be forwarded to an appropriate treating point.

In unheated areas where freezing might occur, fabric collectors provide the highest level of control and are cost effective. These collectors must have suitable grounding and anti-static media. Explosion venting must be provided.

AAF Solution:

Wet Collectors:
Type W RotoClone®
Type N RotoClone®

Fabric Collectors:
Design M FabriPulse®
Millennium™

Crushing Operation

Run-of-mine coal goes through a crusher for proper sizing. During this process fine particle matter is generated and must be collected to keep in-plant conditions within the threshold limit values. Those plants that have heat and a water supply find that wet collectors are preferred.

For plants having no water clarification, AAF's Millennium or FabriPulse fabric collectors are the recommended solution.

As with other applications, grounding is required, anti-static media is recommended, and explosion vents must be provided on each collector.

AAF Solution:

Wet Collectors:
Type W RotoClone®
Type N RotoClone®

Fabric Collectors:
Design M FabriPulse®
Millennium™

Preparation Plants (continued)

Air Tables

Plants not incorporating a heavy media wet separation use air tables for coal preparation. Forced air is blown through the coal as it passes over a table. Since the coal is lighter in weight than the waste material, the coal is blown up over the table into a cyclone and fabric collector system that removes the coal dust from the airstream.

Dust loads can be as high as 50 to 80 gr/ft^3. The cyclone should exhaust into a fabric collector which reclaims maximum product while providing a non-visible discharge into the atmosphere.

AAF Solution:

Fabric Collector:
Design M FabriPulse®
Millennium™

Thermal Coal Dryers

After screening for size, coal usually about ¼" x 0 is passed through a thermal coal dryer to remove surface moisture. Most coal is dried to about 4-4 ½% surface moisture to avoid additional shipping weight, freezing in the cars and reduced BTU value.

Thermal dryers used today are generally the fluid bed type which forces hot air through a moving bed of wet coal.

Because coal handled by thermal dryers can include large amounts of filter cake or fine dust, the particle size leaving the dryer varies from extreme ultra fine to large particles. Dust loads can be as high as 200 to 250 gr/ft^3. Single and double-stage cyclones are employed to collect as much dry usable coal as possible, which is run back into the dryer discharge product for loading.

Material escaping the cyclones is extremely fine and to meet air pollution codes a high energy venturi-type wet collector or fabric collector is required.

AAF Solution:

Wet Collector:
KinPactor®

Fabric Collector:
Millennium™

Silo Ventilation

At preparation plants, coal is generally stored in circular structures during phases of its processing. As material is dropped into these silos, air is displaced and considerable dust is generated. Entrained air flows into the openings as a result of falling material. The displaced air volume and the entrained air must be exhausted by adequate ventilation.

In those areas where heat is available along with a water supply, wet collectors are the recommended solution. Where freezing can occur, a cloth collector may be used. Safety precautions for fabric collectors noted in "Material Handling" must be employed.

AAF Solution:

Wet Collector:
Type W RotoClone®

Fabric Collector:
Design M FabriPulse®
Millennium™

Central Power Stations

Material Handling

There are many parallel situations between the central power station and the processing plant in that coal is moved and transferred, generating dust conditions. Dust-loading can be light to heavy depending upon the condition of the coal. Dust can be submicron to large particles.

In heated areas where water is available, wet collectors are recommended for cleaning emissions generated by materials handling. In areas where freezing might occur, fabric collectors are suggested. Grounding is required, anti-static media is recommended, and explosion vents must be provided on each collector.

AAF Solution:

Wet Collector:
Type W RotoClone®

Fabric Collector:
Design M FabriPulse®
Millennium™
OptiFlo®

Unloading

When unit trains are unloaded at the power station, through either bottom-dump or side-dump cars, the procedure is rapid and considerable dust is produced. Because these unloading areas are generally always unheated, fabric collectors are recommended. Anti-static media is recommended, and explosion vents must be provided on each collector.

Satisfactory reclamation of the coal dust is provided through this dry collection technique. The collected material may later be added to the fuel supply for consumption.

AAF Solution:

Fabric Collector:
Design M FabriPulse®
Millennium™

Bunker Ventilation

After coal has been received and processed, it is stored in bunkers for future use. Ventilation must be provided during this storage period to prevent the accumulation of explosive gases. The design criteria is to sweep air across the top of each bunker section. This air is discharged to the atmosphere and the collectors operated continuously. When dust is controlled and maintained, the formation of explosive gas is prevented.

A dry or wet collector may be used depending upon the temperature situation and performance required.

AAF Solution:

Dry Collector:
Design M FabriPulse®
Millennium™
OptiFlo®

Wet Collector:
Type W RotoClone®

Crushing and Screening

Some central power stations provide additional crushing and screening within their plant operations. Good exhaust ventilation is required for crusher, screens, and transfer points. These collectors can be either wet or dry type depending upon operating conditions. A fabric collector may be employed where freezing is a concern.

AAF Solution:

Wet Collectors:
Type N RotoClone®
Type W RotoClone®

Fabric Collectors:
Design M FabriPulse®
Millennium™
OptiFlo®

Wet Collectors

AAF International pioneered the development of wet collector devices designed to remove particulate matter from the air by passing them through a liquid medium. AAF supplies wet collectors for a wide range of applications from small nuisance dust problems to extremely large gas cleaning systems.

Type N RotoClone®

Arrangements B-C-D
The Type N RotoClone is the best solution to many dust collection needs. Combining high efficiency, low maintenance costs, simplicity, low water usage, and flexibility in one rugged, well proven piece of equipment, the Type N RotoClone has solved thousands of dust collection problems. It has no moving parts, pumps, or other auxiliary equipment, requires minimum space and is easy to install.

The collector is furnished in three arrangements – manual sludge removal, continuous sludge ejection, and continuous sludge sluicing. Sizes available for volumes of 900 to 57,600 CFM.

Brochure APC-1-511

Type W RotoClone®

The Type W RotoClone is a combination dust collector and fan that will meet a variety of applications. In addition to being versatile, the Type W is the most cost-effective, high efficiency wet dust collector in its class with a minimum water requirement – only ½ - 1 GPM per 1000 CFM of air cleaned. The distinguishing feature of the Type W is the addition of water sprays to the basic principle of dynamic precipitation.

Brochure APC-1-512

Type W RotoClone®

KinPactor®

Type N RotoClone®

KinPactor®

Designed for air pollution control and recovery of valuable materials from gas streams. The KinPactor scrubber uses a venturi-type orifice for intermixing of dust particles and water. This intermixing is accomplished by rapid contraction and expansion of the airstream and a high degree of turbulence. Dust is collected through the principle of impaction.

The KinPactor is generally designed to use 8 GPM of scrubbing water per 1,000 CFM of saturated gas at the throat volumes of 1,000 to 60,000CFM.

The KinPactor is used wherever high pressure drop venturis are necessary to collect submicron particulate or exceptionally high efficiency is required.

Brochure APC-1-514

Fabric Collectors

One of the universally applied air pollution control devices is the fabric collector which removes particulate matter from the gas stream via filtration through special fabric materials.

Millennium™

Millennium™

A pulse-jet, fabric dust collector with the most efficient compressed air bag cleaning system available. Down-flow air design aids migration of the dust to the collection hoppers and prevents its re-entrainment in the air system.

In its operation, incoming air is baffled downward and is distributed evenly throughout the filter at reduced velocities, permitting high air-to-cloth ratio and thus minimizing wear on the filter media. The Millennium is available in 14 standard sizes from 4,000 to 100,000 CFM.

Brochure APC-1-405

Design M Fabri-Pulse®

The Design M FabriPulse® is AAF's answer for those applications where economy, compactness, and low headroom are factors. It is designed to meet the needs of applications requiring 50 to 1,500 square feet of cloth area.

It features bag lengths of 4 and 6 feet, a housing and hopper constructed of 12-gauge steel, a specially designed bag in a cartridge assembly that can be easily changed, and flanged outlets for ease of installation and layout in the field.

Brochure APC-1-411

Design M FabriPulse®

Dry Collectors

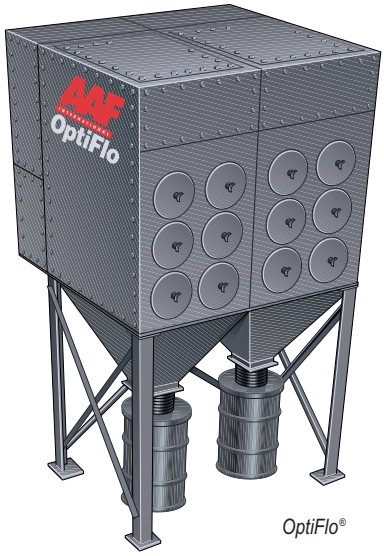
OptiFlo®

The OptiFlo cartridge collector system is a completely modular design that allows an unlimited range of sizes. Modules can be interconnected to accommodate the largest air cleaning task. The compact modules conserve valuable space.

OptiFlo units have the lowest flange-to flange pressure drop, allowing up to 10% greater airflow with lower fan horsepower than competitive models. The OptiFlo design permits free-fall of dislodged particulate into the hopper without direct impingement of contaminant on the cartridges, minimizing abrasion and dust build-up.

A wide selection of cartridge types, options, and accessories enable the collector to be tailored to specific application requirements. Choose from top or front inlet and side or bottom outlet arrangements.

Brochure APC-1-102



OptiFlo®

AmericanAirFilter®

Coal Handling and Processing

Dust Collection Guide for Coal Processing

(Use this table for quick reference in evaluating solutions for your air pollution control applications.)

Wet Collection

Operation	Concentration	Particle Size	Type W Arr. A	Type W Arr. D	Type N	KinPactor Scrubber	Notes
Materials Handling	Moderate	Medium	Yes	No	Yes	Norm. not req.	1, 5
Bunker Ventilation	Light	Fine	Yes	No	No	Norm. not req.	2
Dedusting and Air Tables	Heavy	Med. to Coarse	No	No	No	Norm. not req.	3
Drying	Heavy	Fine to Coarse	No	No	No	Yes	4
Silo Ventilation	Light	Fine	Yes	No	No	Not req.	2
Crushing	Heavy	Coarse	No	Yes	Yes	Norm. not req.	1, 5
Unloading	Moderate	Medium	Yes	Yes	Yes	Norm. not req.	1, 5

Fabric and Dry Collection

Operation	Concentration	Particle Size	FabriPulse	OptiFlo	Notes
Materials Handling	Moderate	Medium	Yes	Yes	1
Bunker Ventilation	Light	Fine	Yes	Yes	2
Dedusting and Air Tables	Heavy	Med. to Coarse	Yes	No	3
Drying	Heavy	Fine to Coarse	No	No	4
Silo Ventilation	Light	Fine	Yes	No	2
Crushing	Heavy	Coarse	Yes	No	1
Unloading	Moderate	Medium	Yes	No	1

Notes:

1. Conveying, screening, crushing, and unloading. Fire hazard – use subject to restrictions (i.e. explosion vents and fire extinguishers). Skimmer precleaners followed by Type W RotoClones have been used on materials handling.
2. Remote from other dust producing points. Separate collector usual.
3. Heavy loading suggests final high-efficiency collector for all except very remote locations.
4. Stainless steel required because of extremely corrosive conditions. Newer emission codes will require KinPactor.
5. Skimmer precleaner should be used with Type W, Arrangement A RotoClones.

AAF INTERNATIONAL®
10300 Ormsby Park Place Suite 600
Louisville, Kentucky 40223-6169

www.aafintl.com
Customer Service 800.477.1214
Fax 800.254.3019

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