

CASE STUDY

APPLICATION: COLLECTION OF COAL OF VARIOUS GRAIN SIZES IN ATEX ZONE 22

CUSTOMER: DEALER OF CHEMICAL PRODUCTS

BENEFITS:
QUICKLY SEPARATE THE VACUUMED COAL BASED ON PARTICLE SIZE,
POSSIBILITY OF MOVING THE SYSTEM BETWEEN DIFFERENT PLANTS.

DEPURECO
INDUSTRIAL VACUUMS

A **chemical distributor** operating across multiple sites needed to vacuum **large quantities of coal with varying particle sizes**, ensuring safety, efficiency, and operational simplicity between locations.

The material to be processed readily accumulates and can generate hazardous residues if not handled correctly. The entire process occurs in an **ATEX Zone 22 environment**, where preventing dust dispersion and minimizing the risk of combustible-dust buildup are essential.

The customer's primary requirement was a **powerful yet mobile vacuum system** that could be moved between sites without complex fixed installations. At the same time, the collected material had to be **separated by particle size** to optimize product handling and facilitate reuse or disposal.



THE CUSTOMER'S REQUIREMENT DEPURECO CHALLENGE



The customer requested the design and construction of a mobile vacuum system designed to:

- **Enable multi-site operation** with rapid setup/commissioning, combining high capacity with easy mobility.
- **Feature a modular, flexible architecture**, with three modules configurable to the application.
- **Provide efficient big-bag (FIBC) collection** and, when required, particle-size classification..
- **Maximize safety** when extracting potentially explosive dust in ATEX Zone 22.

WHY IS THIS AREA CLASSIFIED AS ATEX?

Workplaces where coal is processed, especially when the material exists in different particle sizes, are classified as **potentially explosive areas** under the ATEX directive.

During crushing, screening, or handling, fine coal dust can become airborne and, in the presence of an ignition source, create an explosive atmosphere. Even small concentrations of combustible dust pose a significant risk.

For this reason, such environments are classified as **ATEX Zone 22**, where explosive atmospheres may occasionally occur.



Coal is a solid material of organic origin, used across several industrial sectors, including chemicals, energy, and filtration.

COAL COLLECTION SYSTEM

FOR VARIABLE PARTICLE SIZES

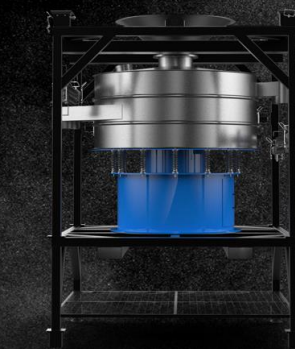
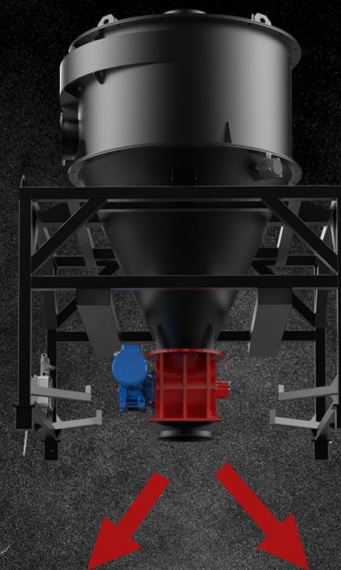
The vacuum system consists of a **PUMA 30 S ATEX 1/3D vacuum unit** with an SP filter-cleaning system and three modules that can be configured according to the customer's operational requirements.



PUMA 30 S ATEX 1/3D



1) Cyclonic pre-separator



2) Vibrating screen



3) Steel Frame

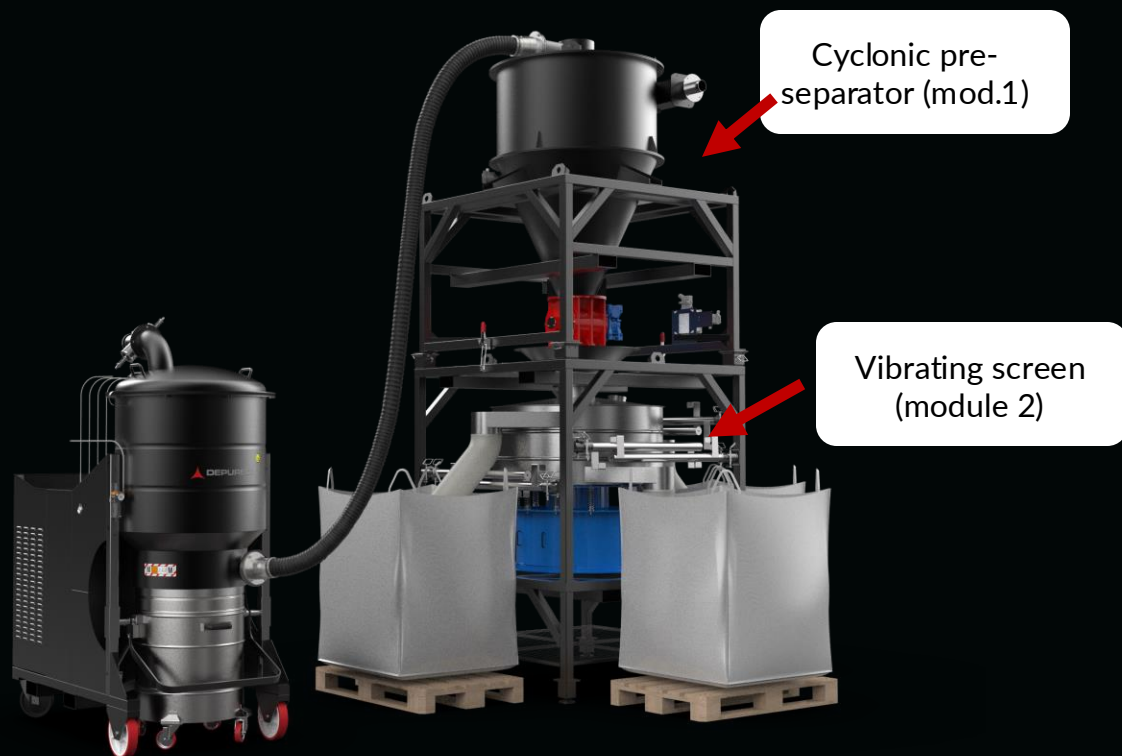
COAL COLLECTION SYSTEM

FOR VARIABLE PARTICLE SIZES



VACUUM UNIT + PRE-SEPARATOR + VIBRATING SCREEN

For particle size separation of coal.



VACUUM UNIT + PRE-SEPARATOR + STEEL FRAME

For simple material collection, with no need for separation.



COAL COLLECTION SYSTEM

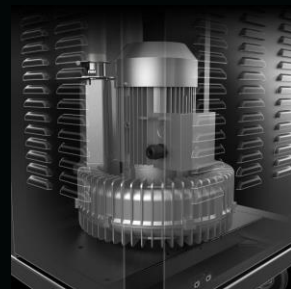
VACUUM UNIT



PUMA 30S ATEX 1/3D CODE: A613

The **PUMA 30 S ATEX 1/3D** is a high-power industrial vacuum designed for heavy-duty work in ATEX Zone 22 environments. It features an ATEX-certified side-channel blower and an automatic filter-cleaning system, making it ideal for continuous operation with minimal maintenance. Third-party certification (RINA) classifies the internal area as **Zone 20 (Z20)**, ensuring safe vacuuming of metal dust and combustible/explosive dust.

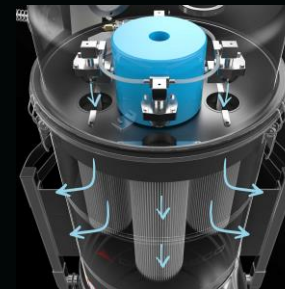
- Power: 18,5 KW
- Vacuum in continuous run: 380 mBar
- Maximum air flow: 1.180 m3/h



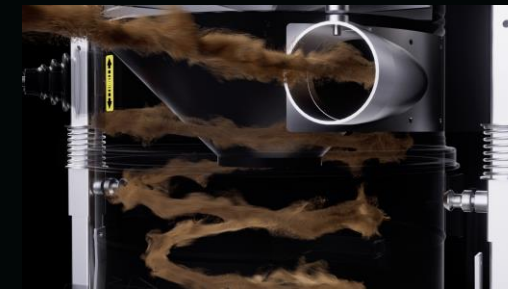
Atex certified side
channel blower



4 polyester cartridges,
M class



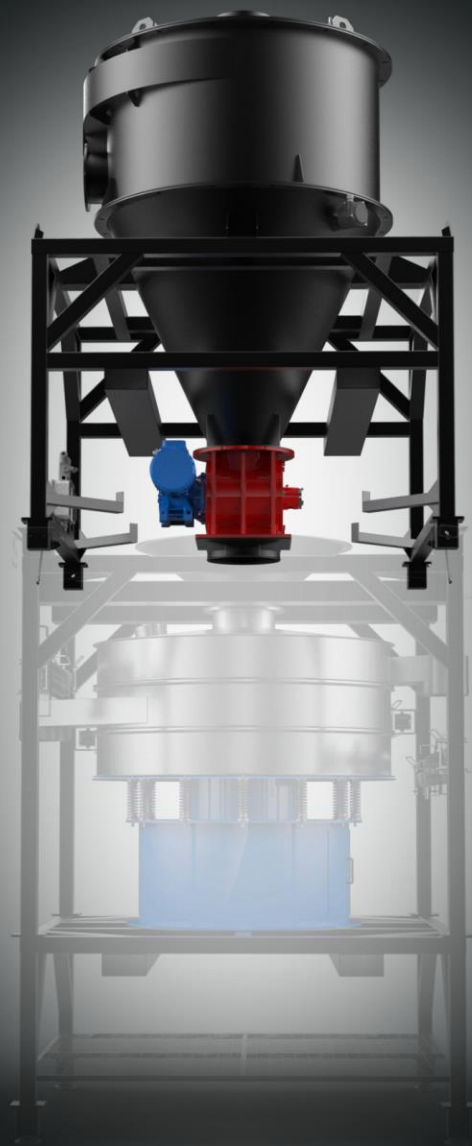
SP filter cleaning
system



Internal protection certified Category 1D,
ensuring maximum safety

COAL COLLECTION SYSTEM

MODULE 1 – PRE-SEPARATOR Ø 1100



Module 1 consists of a **1100 mm diameter cyclonic separator** equipped with:

- Rotary level detector
- Explosion relief vent
- Rotary valve continuous discharge system

The frame incorporates a **tie rod clamping system** that ensures greater stability between the modules. There are also lifting points with eyebolts and special slots for forklift trucks.

Nella configurazione dell'impianto, il **modulo 1** deve sempre essere presente. Sul modulo 1 possono poi montarsi il modulo 2 o il modulo 3, a seconda delle esigenze.

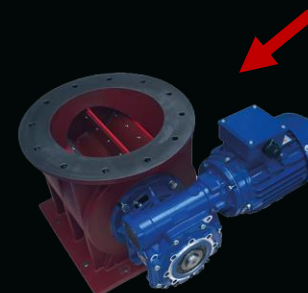
In caso di blocco dello scarico, è possibile comandare dal quadro elettrico l'**inversione della rotocella** per alcuni cicli, così da sbloccare il materiale.



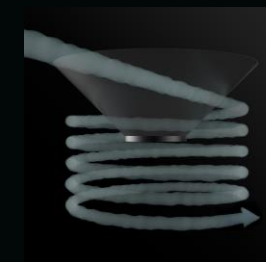
Rotary level detector



Explosion relief vent



Rotary valve
continuous discharge
system



Cyclonic effect

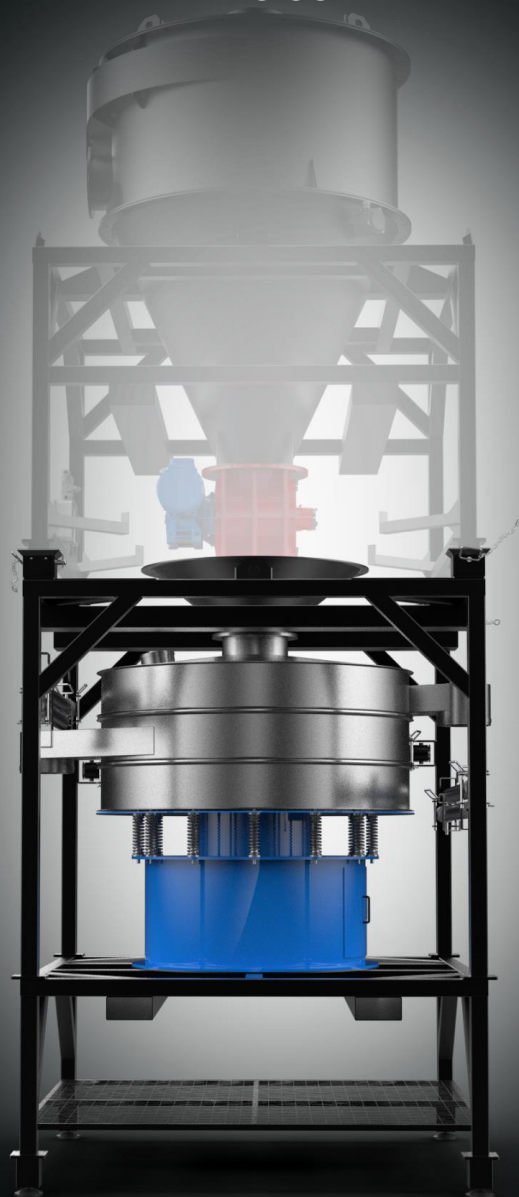
COAL COLLECTION SYSTEM

MODULE 2 – VIBRATING SCREEN



Module 2 is a **vibrating screen** driven by a 2.2 kW, 400 V eccentric-mass vibrator. When combined with Module 1 (cyclonic separator), the system enables high-volume handling and particle-size separation.

- The **vibrating screen** features three discharge outlets to distribute the collected material by particle size. Inside, three wire-mesh discs are installed, customizable to the required particle-size class.
- The **discharge outlets** are equipped with three pairs of foldable arms mounted on the frame, designed to hold the big bags open during filling.
- The vibrating screen frame includes a metal support grid at the base for tool storage and **four adjustable leveling feet**, allowing proper alignment even on uneven floors.



Discharge outlet



Big Bag support arms



Levelling feet

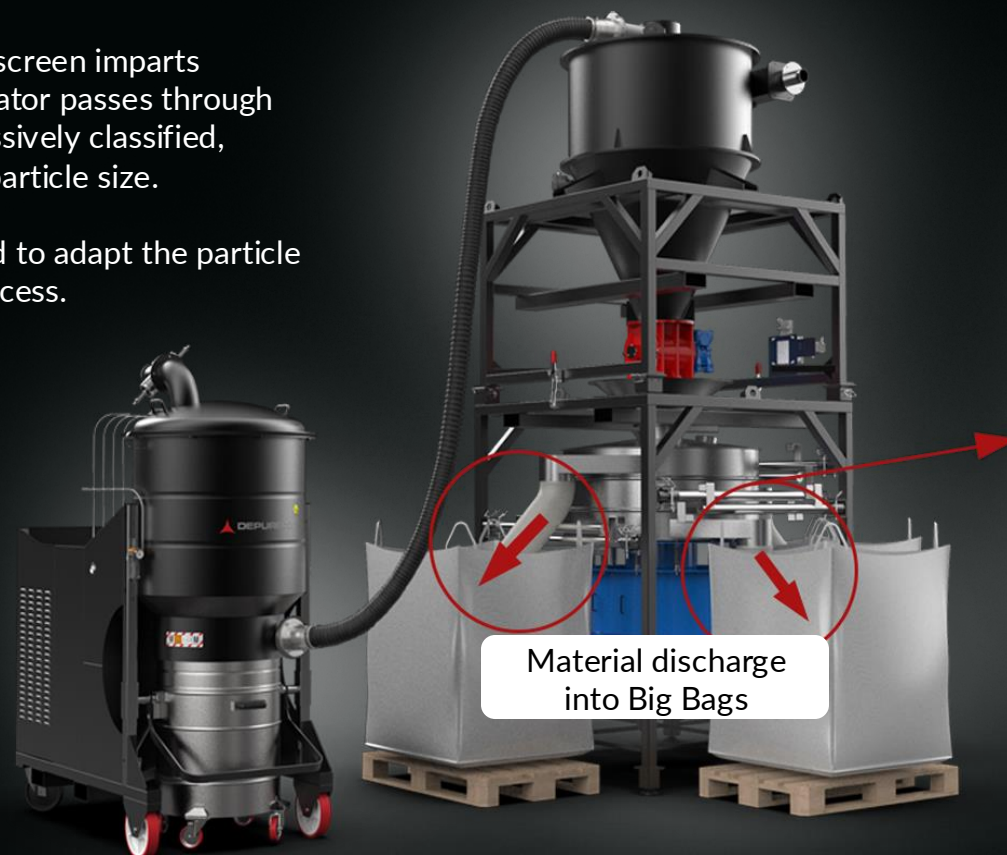
COAL COLLECTION SYSTEM

MODULE 2 – VIBRATING SCREEN



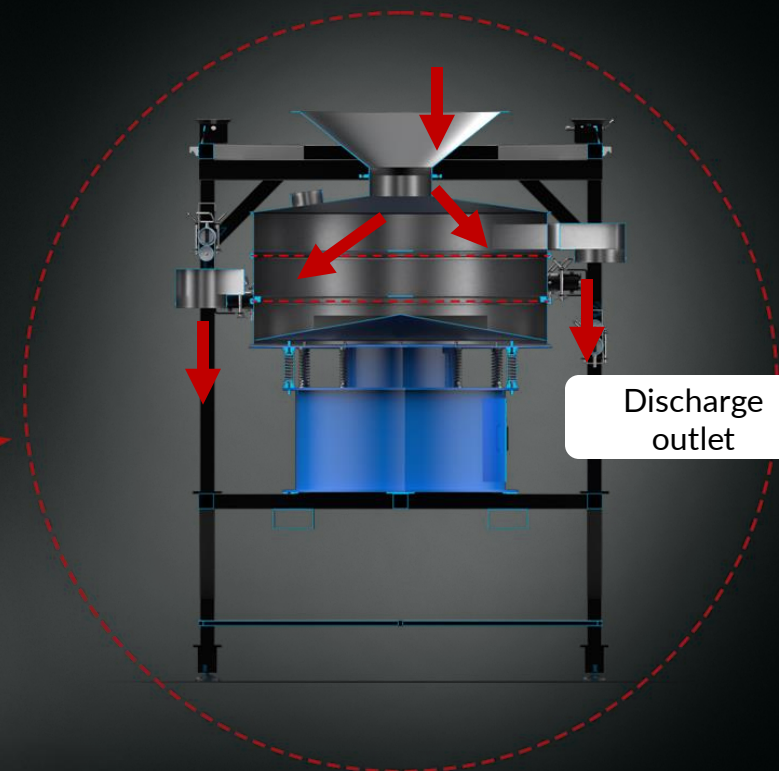
How does the vibrating screen work?

- **Structure:** consisting of three sections with wire mesh sieves, it allows for precise classification of the material.
- **Operation:** during operation, the vibrating screen imparts vigorous vibration; material from the separator passes through successive wire-mesh sieves and is progressively classified, discharging into three big bags (FIBCs) by particle size.
- **Flexibility:** the sieves can be easily replaced to adapt the particle size to the specific requirements of the process.



Material discharge
into Big Bags

The coal collected in the separator is conveyed to the vibrating screen, where it is separated according to particle size.



Discharge
outlet

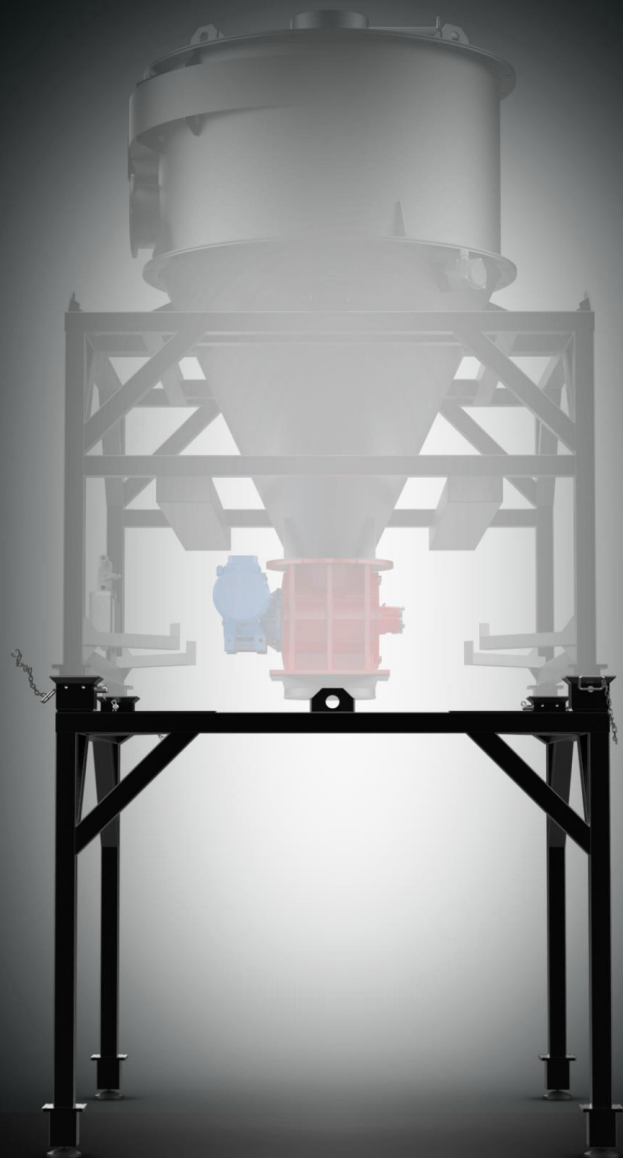
COAL COLLECTION SYSTEM

MODULE 3 STEEL FRAME

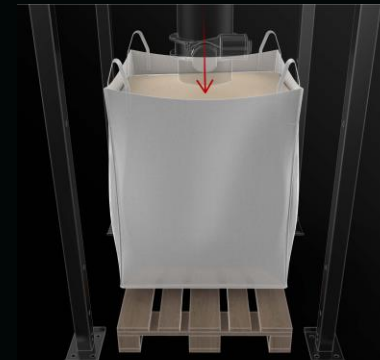


Module 3 consists of a frame with leveling feet and is used when material discharge is required without particle-size separation (i.e., without the vibrating screen).

- The frames are equipped with **alignment guides** that facilitate the positioning and securing of Module 1, which is then locked in place using pins.
- Lifting points with eyebolts have been provided **to allow forklift handling.**



Alignment guides and pin-locking system



Discharge in Big Bag



Forklift-compatible

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ON OUR WEBSITE**

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