

CASE STUDY

**APPLICATION:
CENTRALIZED VACUUM SOLUTION FOR PORT
GRAIN SILOS & UNDERGROUND NETWORKS**

**CUSTOMER:
PORT OF CONSTANTA IN ROMANIA**

OUR CHALLENGE: DUST IN UNDERGROUND, CONFINED GALLERIES AND GRAIN SPILLAGE

Handling millions of tons of dry bulk materials annually presents a major engineering challenge: massive dust accumulation and product spillage within underground transport networks.

The solution integrates several heavy-duty high vacuum CVS ROOTS units with DV AIR cyclone filtering pre-separators, allowing operators to clear spillages in minutes.

Key benefits:

- 90% reduction in cleaning times
- 35% maintenance savings
- 90% of reclaimed material
- Full ATEX safety and compliance



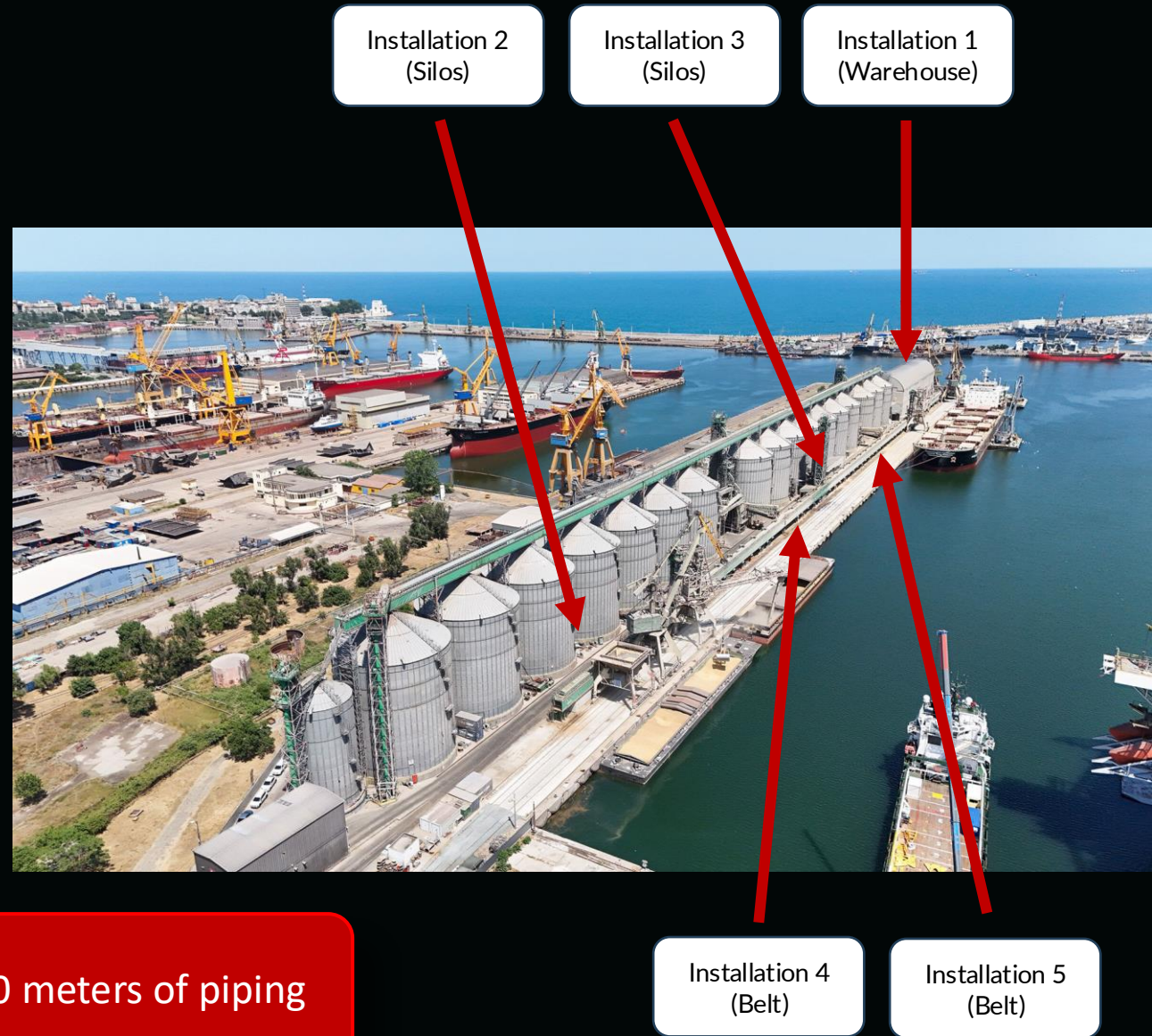
THE CHALLENGE

The customer needed to clear heavy spillage in minutes without raising dust clouds in a confined, potentially explosive environment. A high-vacuum centralized system perfectly integrated into the terminal's underground layout.

THE SOLUTION

Five centralized vacuum installations cover the terminal's warehouse tunnel, silo batteries and conveyor galleries. Each is built around a DV AIR 800 + CVS ROOTS unit installed at ground level.

- Fixed steel pipeline with a suction outlet roughly every 12 m
- Operators plug a hose into the nearest outlet and clear spillage in minutes
- Grain and dust are conveyed to the DV AIR cyclone pre-separator and discharged automatically into Big Bags
- ATEX-compliant: flameless vent and ATEX-certified guillotine valves for branch isolation



5 installations

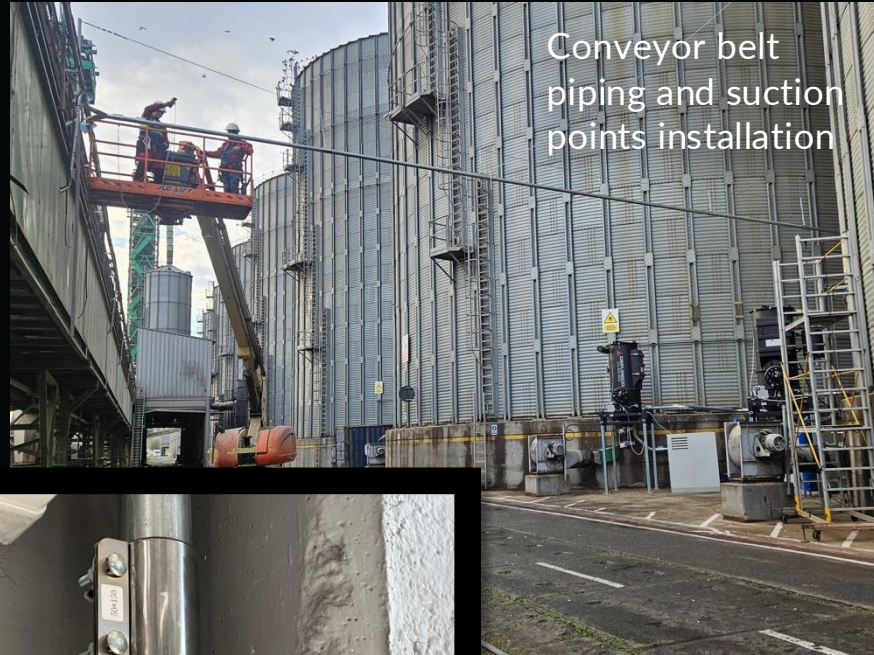
124 suction points

1.460 meters of piping

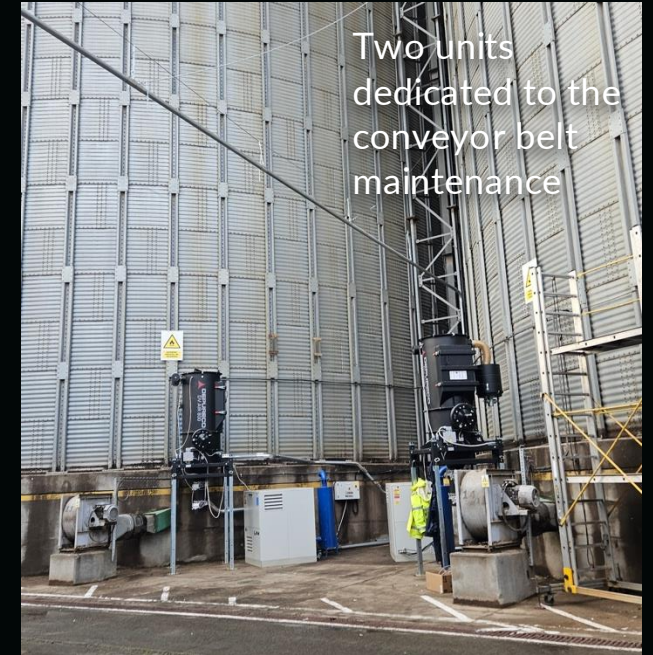
OUR CENTRAL VACUUM **INSTALLATION**



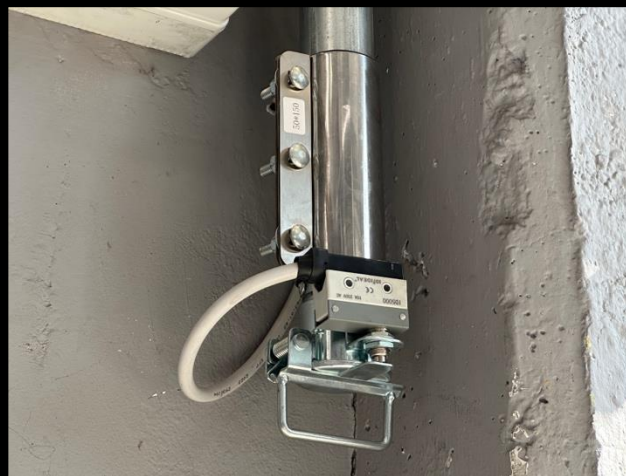
DV-AIR + CVS ROOTS
between the silos



Conveyor belt
piping and suction
points installation



Two units
dedicated to the
conveyor belt
maintenance



Suction point with microswitch for
remote power on and off



Conveyor belt
tunnel detail

INSTALLATION 1 – WAREHOUSE TUNNEL

The DV AIR + CVS ROOTS unit stands outside the warehouse at surface level. A single vacuum line drops into the underground tunnel and runs along its full length. Spilled grain and dust are conveyed to the surface and end directly in a Big Bag, without raising dust in the tunnel.

FEATURES

- 10 suction points along a single 120 m line, one approximately every 12 m
- Up to two operators vacuuming simultaneously
- 2–3 m³ of material per outlet per shift
- DV AIR pre-separation with automatic Big Bag discharge
- ATEX-compliant: flameless vent and ATEX-certified guillotine valve

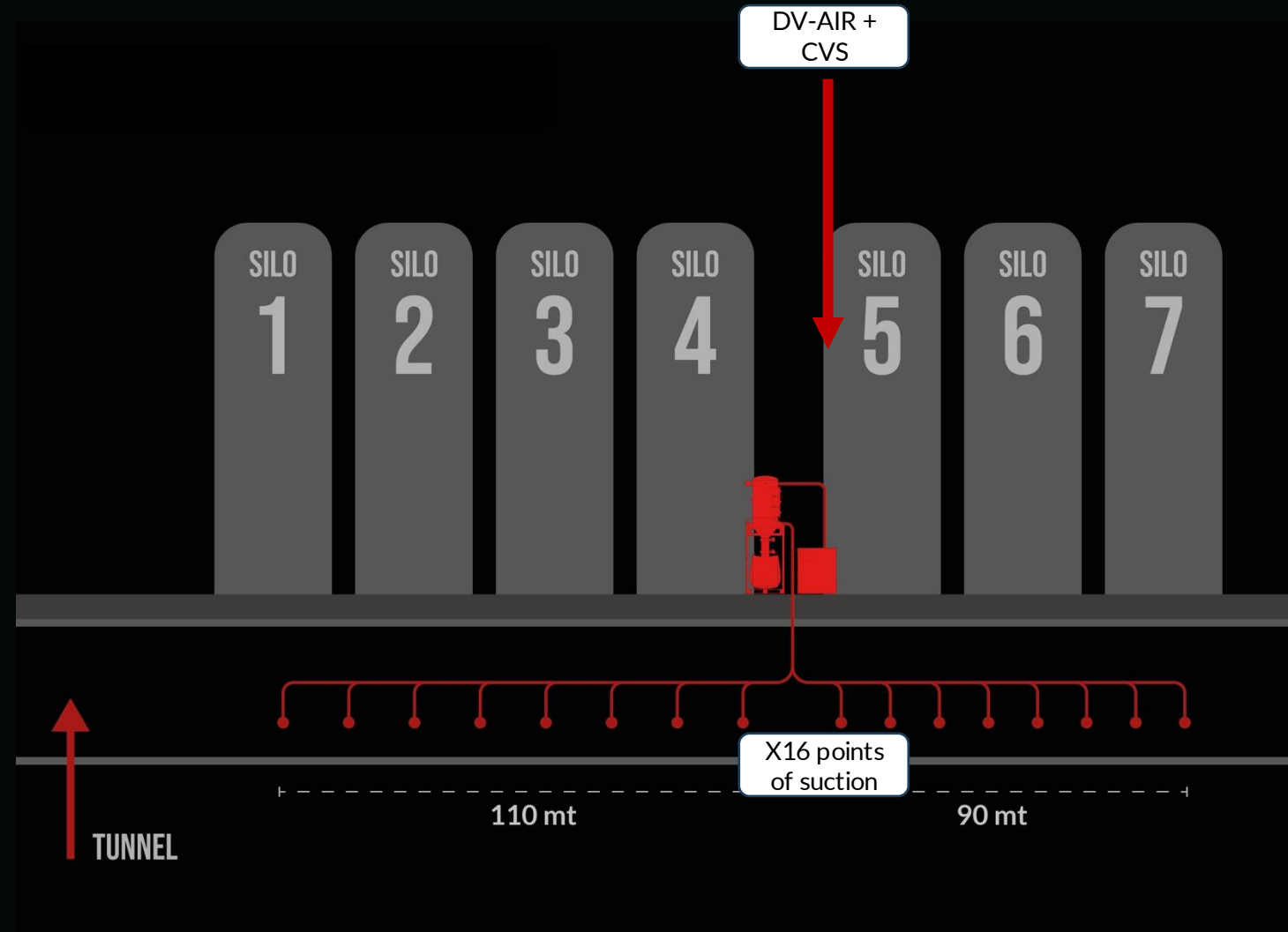


INSTALLATION 2 – SILO BATTERY (7 SILOS)

The unit sits between the fourth and fifth of seven silos, directly above the tunnel beneath them. From this central position the line descends and splits in two, one branch towards each end of the battery. Valves on the split let the crew close the branch they don't need, so the full suction power goes where the spillage is.

FEATURES

- 16 suction points on 200 m of DN76 steel piping (8 + 8; branches of 110 m and 90 m)
- Up to two operators vacuuming simultaneously
- 2–3 m³ of material per outlet
- ATEX-compliant: flameless vent and ATEX-certified guillotine valves for branch isolation
- Automatic Big Bag discharge of the recovered material

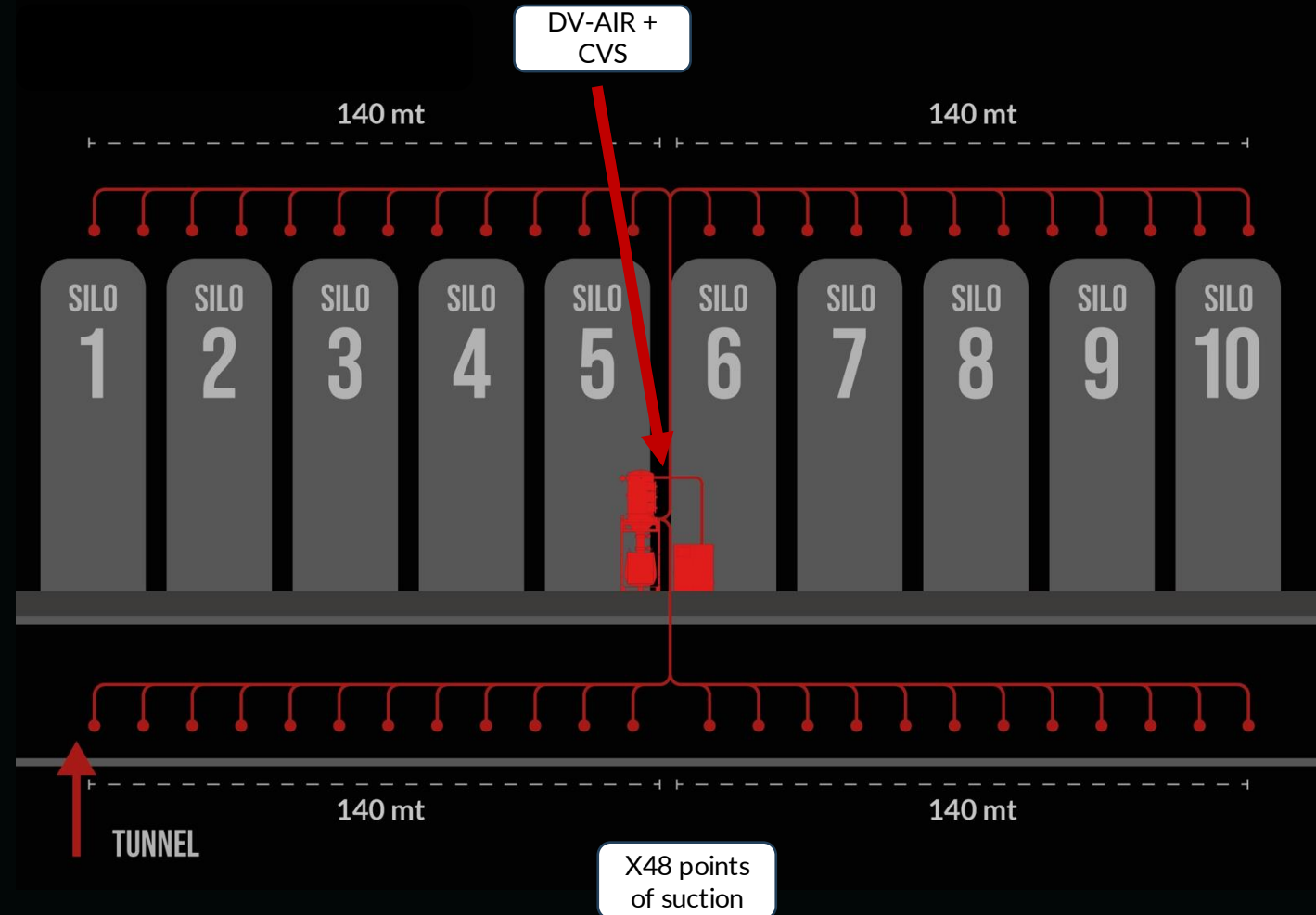


INSTALLATION 3 – SILO BATTERY (10 SILOS, TWO LEVELS)

The most extensive installation: ten silos on two levels served by a single unit. Positioned midway along the battery, the DV AIR + CVS ROOTS system feeds a vertical riser that reaches both the gallery on top of the silos and the tunnel underneath, keeping both levels clear of dust and spillage.

FEATURES

- 48 suction points on 560 m of DN76 piping (4 branches × 140 m, 12 outlets each)
- One unit serving two levels: silo top gallery and underground tunnel
- Up to two operators vacuuming simultaneously
- 2–3 m³ of material per outlet, with automatic Big Bag discharge
- ATEX-compliant: two "Y" bifurcations with ATEX-certified guillotine valves and a flameless vent

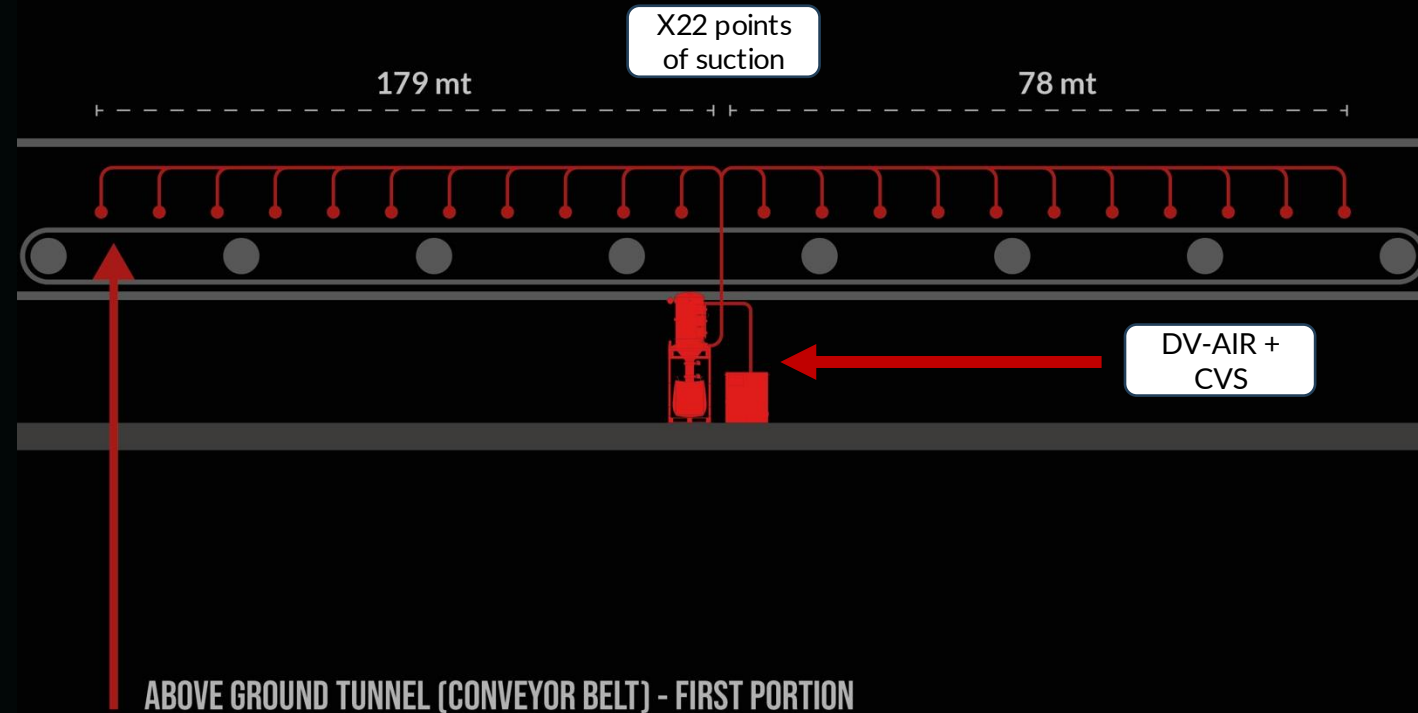


INSTALLATION 4 – CONVEYOR BELT, FIRST SECTION

The conveyor belt in the elevated gallery is too long for a single unit, so the work is split between two systems. For this first section, the unit is installed at ground level and the line rises to the gallery, where it branches out along the belt. Dust and spilled grain are removed before they can wear rollers and bearings or build up on surfaces as a potential hazard.

FEATURES

- 22 suction points on 257 m of DN76 piping (15 + 7; branches of 179 m and 78 m), approximately one every 12 m
- Ground-level unit with a vertical riser to the elevated gallery
- Up to two operators vacuuming simultaneously
- 2–3 m³ of material per outlet
- ATEX-compliant: ATEX-certified guillotine valves on the "Y" and a flameless vent

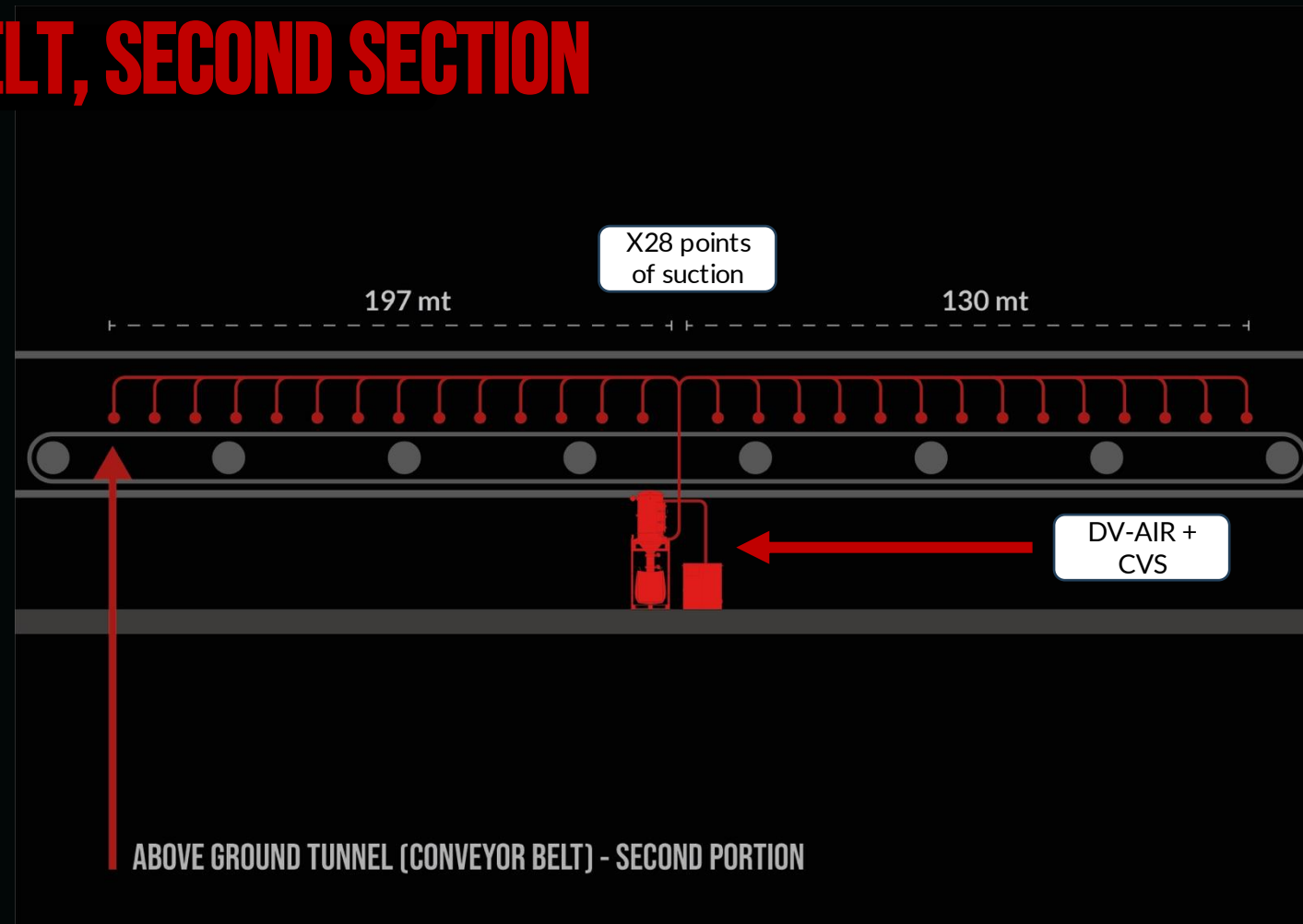


INSTALLATION 5 – CONVEYOR BELT, SECOND SECTION

The second unit completes the coverage of the same conveyor, taking over where Installation 4 ends. The layout mirrors the first section: a ground-level unit, a riser up to the gallery and two branches along the belt. With both systems in place, operators can work on different stretches of the belt at the same time.

FEATURES

- 28 suction points on 327 m of DN76 piping (17 + 11; branches of 197 m and 130 m)
- 197 m branch: the longest single run of the project
- Up to two operators per system; with Installation 4, up to four operators on a single conveyor
- Installations 4 + 5 combined: 584 m of piping, 50 suction points
- ATEX-compliant: flameless vent and automatic Big Bag discharge of the recovered material



SYSTEM WITH DV AIR 800 + CVS ROOTS



FILTERING AND VACUUM UNIT

The chosen filtering unit for maintenance in this working area is the **Depureco DV-AIR 800 + CVS ROOTS**.

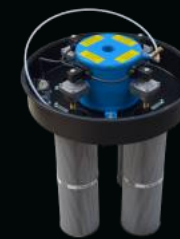


This unit offers exceptional features:

- ATEX compliance to work in a classified environment.
- 4 large surface (340.000 cm²) **cylindrical cartridges**, classified as M Class.
- SP **automatic** filter cleaning system.
- **Tangential inlet**, to ease the process of pushing the vacuumed material down the bin.
- HEPA 14 second stage filtration.
- Double flap valve for automatic and continuous discharge.
- Flameless vent to prevent potential explosions.
- High-vacuum unit driven by a rotary lobe pump.
- Soundproof cabin and inlet silencer.



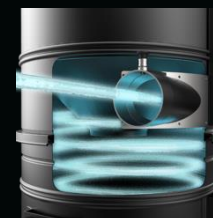
Rotary tri-lobe roots
37 kw - 5000 mmH₂O - 1700 m³/h



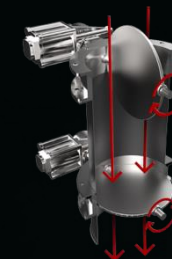
SP automatic filter cleaning system



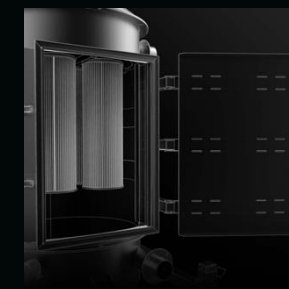
Safety relief valve



Tangential Inlet with cyclone



Pneumatic double flap discharge valve



Filter inspection door



Flameless vent



HEPA 14 secondary filter



Full ATEX compliance