

CASE STUDY



Central Vacuum System for Combustible Dust Control

Customer Overview

MARS Petcare, the world's largest pet food producer, operates high-output production facilities requiring strict adherence to safety, cleanliness, and operational efficiency. Their facilities handle large volumes of dry pet food (kibble) and organic dust—materials that pose a combustible dust hazard and require compliant sanitation solutions.

SERVICES PROVIDED:

- Engineering & Design
- Regulatory Compliance & Safety Engineering
- Explosion Protection & Deflagration Analysis
- Automation & Controls Integration
- System Installation & Commissioning
- Documentation & Compliance Support
- Performance Testing & Acceptance Evaluation
- Warranty & Support



Air Dynamics' CV-36 Vacuum System.

Project Overview

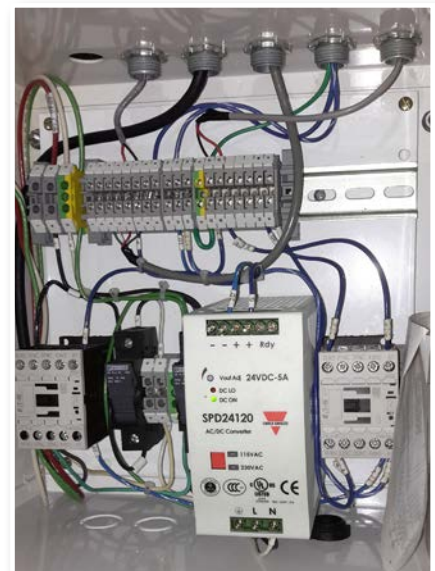
MARS Petcare contracted Air Dynamics Industrial Systems Corporation to design and install a turn-key central vacuum system to support plant sanitation efforts, control combustible dust, and meet corporate safety standards. The vacuum system would need to serve six simultaneous operators - across 50 drop points - within four processing zones, spanning 800 feet.

The Challenge

MARS outlined strict procurement and operational requirements, including:

- Compliance with OSHA and NFPA safety standards (e.g., OSHA CPL 03-00-008, NFPA 652, 654, 68, and CFR 1910 regulations)
- Combustible dust control as a core housekeeping and safety function
- Integration of automation, explosion protection, and dust filtration systems
- Operation under ambient temperatures up to 122°F
- Long-term use: 6 hours/day, 7 days/week, 52 weeks/year with a 10+ year service life
- Fit within a compact equipment footprint (Vacuum system: 4'x4', Producer: 3'x7')

The system also needed to meet MARS' global equipment procurement standards, requiring extensive documentation, drawings, safety protocols, and after-sales support.



Electrical panel.

The Solution

Air Dynamics successfully delivered a custom-engineered CV-36 Industrial Central Vacuum System tailored to the client's facility. Utilizing 3D CADD modeling, the system was precisely integrated into the plant layout, ensuring optimal space and functionality.

Engineered for a minimum airflow of 6,500 FPM through pneumatic conveying, the solution meets stringent safety standards with explosion protection and deflagration isolation in compliance with NFPA and OSHA guidelines. High-efficiency filters capture 99.9% of particles as small as 0.5 microns, with secondary safety filters effective at 1 micron.

Designed for demanding environments, the system features Totally Enclosed Fan-Cooled (TEFC) motors for high-temperature operation and incorporates PLC-based automation and safety monitoring, including bin-level detection, comprehensive fault alarms, HOA switches, and indicator lights.

Operator safety and comfort were also addressed with intrinsically safe vacuum tools, 30-foot metal-reinforced hoses, and noise levels kept below 80 dB(A) at a three-foot distance. The project was completed with full operator training, system balancing, commissioning, and the provision of detailed technical documentation.



CV-36 Vacuum System.

“The system works really, really well”

- Larry Cloar, MARS

The Results

The CV-36 Central Vacuum System exceeded performance expectations and successfully passed a comprehensive Site Acceptance Evaluation. This included detailed inspections for mechanical integrity, electrical safety, and hygiene compliance, as well as thorough sub-system performance testing.

Documentation was meticulously verified, encompassing as-built drawings, operation and maintenance manuals, and cost of ownership reports. The system delivered several key benefits, notably the safe and compliant removal of combustible dust and kibble, which enhanced overall plant sanitation and workplace safety. Its robust automation and simplified maintenance processes contributed to minimized downtime, while its compact design and energy-efficient operation ensured a smaller footprint.

The solution also demonstrated strong long-term return on investment by reducing operational risks, ensuring consistent uptime, and maintaining low noise levels for a safer and more comfortable work environment.

PRODUCTS USED:

- CV-36 Industrial Central Vacuum System
- High-Efficiency Filter/Receiver Units
- Explosion Isolation Components
- Industrial Vacuum Producer
- Intrinsically Safe Vacuum Tools
- Purpose-Built Vacuum Tubing & Fittings
- Electrical and Automation System
- Compact System Housing

Conclusion

Air Dynamics partnered with MARS Petcare to deliver a high-performance, NFPA-compliant central vacuum solution tailored to their unique operational needs. The result is a safer, cleaner, and more efficient environment that supports long-term production success and employee safety.