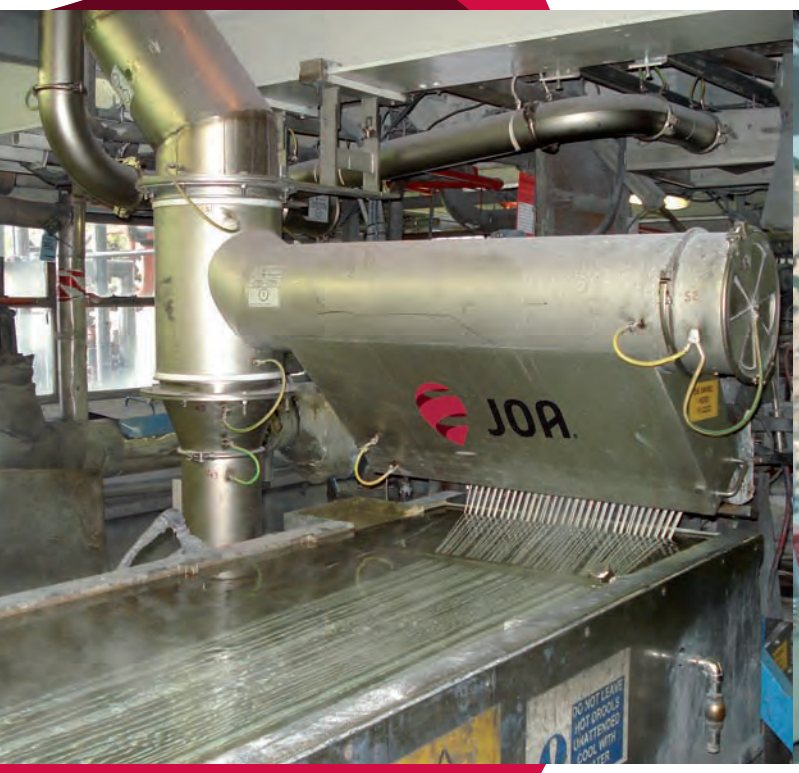
SUSTAINABLE SOLUTIONS



Plastics

JOA®

Introduction

JOA was established in 1998 and has grown into an international organization with its headquarters and R&D facilities in Delft, The Netherlands. Regional offices have been set up in the USA, Latin America and Russia. The background of our company is applied fluid dynamics for high performance Dust and Vapor Extraction Systems and Microclimates.

Our philosophy

With a detailed understanding of the synergy between the production process and the extraction system, a better solution is guaranteed. Computer modeling provides enhanced capabilities for system optimization and expansion, as process changes demand it. Patented JOA products have become a standard for many multi-national companies in the Plastics, Toner and Tobacco markets. Since 1998, JOA has designed and installed over 450 systems which have provided successful operations and value for our customers.

Sustainable Solutions

JOA is focused on delivering value to our customers by providing long-term solutions with focus on productivity and safety, energy reduction and emission control. The range of JOA products and installations cover:

- Dust Extraction
- Vapor Extraction
- Vacuum Systems
- Central Vacuum Cleaning
- Indoor Climate Optimization
- Clean Rooms and Microclimates
- Scrubber technology for dust, chemical and odor scrubbing and heat recovery

We strive to design effective, efficient, high performance systems which maintain their value for the customer and are flexible enough to accommodate future growth and changes.

We look forward to serving your organization, with our team of specialists in this field.

Gerard de Jager,
CEO JOA Group

DUST EXTRACTION SOLUTIONS

JOA provides a range of proven solutions for effective control of dust emissions in plastic compounding plants. Next to benefits in Environmental Health and Safety, productivity by effective additive usage and reducing waste is a key objective. With ever-increasing raw material and energy costs, manufacturing leaders are focused on high quality, flexible and lean manufacturing. We have met these challenges with the development for standardized solutions for high performance extraction hoods, system balancing and filtration equipment.

Explosion safe dust collector for plastic compounding operation.

JOA follows a 6sigma approach for all installations (Green-field and Retrofits). Each system is designed using our proprietary GCM™ modeling software. Application for the innovative patented Deflector-hoods™ and Carrousels™ enable product additive savings from 30-70%.

The JOA turnkey solution includes a process guarantee covering:

- Indoor climate emissions guarantee (MAC)
- Productivity / waste reduction
- System balancing guarantee
- Maintenance cost and interval reduction
- Filter life and emission guarantee

CENTRAL VACUUM CLEANING SOLUTIONS (CVC)

To provide industrial environments, such as plastic, toner, chemical, mineral processing and food industry with robust housekeeping tools, JOA has developed a high performance range of (explosion safe) CVC skids.

Integrated CVC systems, consisting of pre-separation and filtration stages have proven to be the optimal solution for heavy demand cleaning and explosion safe maintenance spills handling.

Our pre-separators, pulse-separators and degritters remove coarse waste materials. The second stage filter unit recovers fine powders and dust. Depending on the process, both stages may contribute to possible product recycling.

GCM™ computer modeling, combined with V0crit optimal conveying-velocity calculations, guarantee adequate product / waste 'pick-up' and conveying to the separator / filter combination.

JOA provides a process guarantee for all installations, including:

- Per pick-up point guaranteed velocity and pressure
- Non plugging design for multi user cleaning operations
- Pre separation efficiency guarantee
- Filter life and emission guarantee

Centralized explosion safe CVC units handling housekeeping of toner production lines.

VAPOR EXTRACTION AND EXTRUDER VACUUM SYSTEMS

The extrusion process for plastics and toner creates its own unique challenges with heavy concentrations of hot vapors, aerosols and odors emitting from the dies, vent ports, and drools.

Similar emissions are generated in the extruder vacuum system. These emissions condense rapidly to form sticky, greasy solids and liquids and VOC's that can pose major obstacles for system performance, and Environmental Health and Safety.

JOA provides a range of proven solutions for effective control of vapor emissions of extrusion processes.
By combining reliable vapor capture, with reduced fouling risk (V0crit) in the pipes, vapors are conveyed adequately to the robust low pressure drop JOA HEAF and Coalescer filtration units. Our solutions guarantee compliance with local emission and odor abatement standards.

Low ΔP-HEAF and Coalescer units combined with modular carbon bed odor abatement.

Next to our standardized filtration technologies, unique, innovative equipment such as the Fiberglass Ballmaker™, Automated Fire Extinguishing systems and Vacuum System Pre-Separators, optimize the extruder up-time and reduces operational risks.

The JOA engineered solutions include:

- Indoor climate emissions guarantee (MAC)
- Non fouling piping design
- Filter / separator life and emission guarantee
- Odor contour guarantee (1 ou_E/hr -98-)

SCRUBBER TECHNOLOGY

As a specialist in process exhaust air / gas cleaning, JOA has developed expertise and experience in advanced scrubbing applications. Next to Plastics and Chemical applications, JOA scrubbers have been applied in Ammonium Sulfate plants, Pharmaceutical, Mineral, Textile, Food and Tobacco processing.

Another important field for JOA exhaust air treatment is our standardized range of structured packing odor abatement towers and cross current scrubbers. Our industrial scrubbing installation are designed for low energy and water consumption. – Bio-fouling control –

Integrated odor solutions based on JOA Structural Packing Scrubbing technology.

The third range of scrubber applications is the JOA integrated ERD (energy recovery) skid, cleaning high temp. exhaust / tail gas, providing heat recovery.

JOA range of standardized, modular scrubbers:

- In-line Venturi;
  High efficiency dust removal (99.9%), applied to critical dust and suitable for high temperature processes
- Packed-bed Column / Spray towers;
  High efficiency removal (98%) of gaseous pollutants / cooling and vapor condensation.
- Cross Current Structural Packing and towers;
  High efficiency (85-90%) odor abatement
- ERD integrated Skid solutions
  Energy recovery ranging from 0.7-2.8 MW.

INDOOR CLIMATE SOLUTIONS

Temperature, humidity and air quality control are common Environmental, Health and Safety issues in toner and plastics extrusion plants. JOA provides a range of smart solutions for improving the indoor climate quality of production areas in a strategic, cost-effective manner. Temperature reduction from 4-10°C and humidity reduction from 8-20% are common targets realized with our systems. Additionally our design addresses a significant reduction in WBGT (Wet Bulb Glow Temperature), representing the 'operator' heat load experience.

Effective JOA evaporative cooling combined with Cooljet™ distribution in the target areas.

JOA has developed two specialized air handling devices, the Cooljet™ and Pushjet™, using secondary-air induction cooling which has proven very effective in distributing cool air (from Ventilation, HVAC, or Evaporative Cooling) into the targeted areas.

JOA provides a process guarantee for indoor climate optimization, including:

- Indoor climate performance guarantee
- WBGT optimization
- Air quality improvement guarantee
- Energy optimization

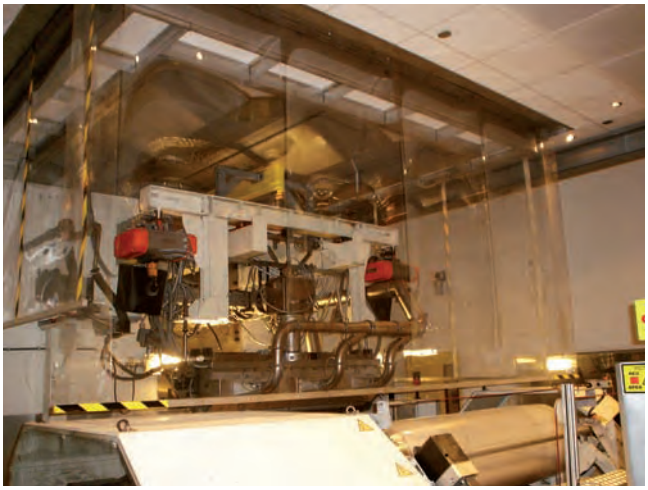
CLEAN ROOM SOLUTIONS

Sustainable Cleanrooms for optical grade and medical plastics (producing sheet, film and compounds) have been realized based on our Pushjet™ and Microclimate™ technology. Also upgrading existing lines to a higher production quality level is handled by this Clean Room technology.

The Microclimate terminates the 'thermal engine' from the die, the root cause of air quality reduction in the critical clean room cooling zone. Additionally effective condensation control, by primary and secondary extraction hoods, protects the important melt area, minimizing surface defects. Finally; clean room pushjets guarantee equal temperature distribution in the production zone, for optimal sheet geometry control.

Major Benefits compared to traditional cleanrooms:

- Improved product quality; reduced surface defects and guaranteed product cleanness.
- ISO class 6/7 performance during operation with 30% air capacity reduction
- CAPEX and Operational Costs reduction



Clean room ISO class 6, with Microclimate™ technology for eliminating the 'thermal engine'.

JOA custom designed clean rooms and extruder line upgrades are provided with a process guarantee on:

- ISO class certification
- Thermal engine termination
- Product quality (temperature balancing)
- Energy reduction

PROJECT EXECUTION

Our lean 6Sigma based project execution method, guarantees: (1) An effective project definition phase. (2) Execution of a shop survey and measurement program provides important data to define the before (and after) situation. (3) & (4) Based upon this input a preliminary engineering design, including a GCM™ system model, will be provided. In close interaction with the customer's engineering team, system requirements and budgets will be reviewed early on in the project (project feasibility). Important information enabling the customer to make the 'Go / No Go' decision is now well defined and documented. (5) Upon customer approval, JOA shall execute detailed engineering and (6) project realization.

All our projects are executed by dedicated JOA project managers with multi-disciplinary project experience. Depending on the location of the plant, the project may include local content manufacturing and installation.

Example measurement program on an extruder line.

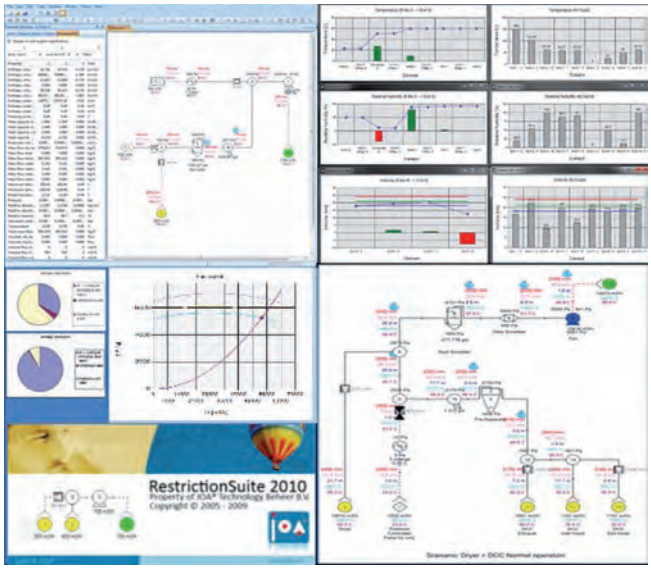
CORE MODELING TECHNOLOGY

Combining 3D engineering with integrated modeling JOA guarantees:

- Efficient project execution for both greenfield projects and upgrades in running plants
- System performance; directly from the moment of start-up, instead of having to learn and optimize during production.

JOA Software modeling tools applied:

1. GCM™ and VOcrit™ Modeling Software
   - Scenario modeling for design optimization and de-bottlenecking of existing systems
   - System balancing and energy optimization
   - Critical conveying velocity calculation; minimizing the risk for duct / pipe fouling



GCM™ optimization dashboard, handling system design and energy optimization.

2. CallPuff™ contour Modeling Software:
   A multi-layer, multi-species, non-steady-state puff dispersion model, which simulates the effects of time and space-varying meteorological conditions on pollutant transport, transformation, and removal.

PLASTICS PRODUCT GROUPS

DUST EXTRACTION

Target Areas:

- Feed hoppers / Side feeders / Loss-in-Weight Feeders / Hand add feeders
- Belt conveyors / Screw augers
- Mixers / Blenders
- Supersack / Drum / Unloading stations

Realized with JOA Turnkey Balanced system solutions and high efficiency Dust filters

CENTRAL VACCUM CLEANING SYSTEMS

Target Areas:

- Extruder floor / feeder mezzanine
- Housekeeping / Maintenance / Explosion safety

References in: Plastic, Toner, Ammonium Sulfate, Mineral, Food processing and Tobacco plants

VAPOR EXTRACTION SOLUTIONS

Target Areas:

- Dies / Vent ports / Side Feeders
- Water bath / Strand conveyor / Under water pelletizer / Cool-down area (drools)

Realized with JOA proprietary Low ΔP-HEAF and Coalescer units

EXTRUDER VACUUM SYSTEMS

Target Areas:

- Extruder low and deep vacuum

Realized with JOA proprietary Pre-Separators and Low ΔP-HEAF units

INDOOR CLIMATE SOLUTIONS

Target Areas:

- Extruder floor / Feeder mezzanine / Closed in areas
- Operator 'high heat load' areas (WBGT)

Realized with JOA proprietary Cooljets™, PushJets™ and Evaporative Cooling units

CLEAN ROOM SOLUTIONS

Target Areas:

- Sheet / Film production line for Optical and Medical grades

Realized with JOA proprietary Microclimates™, and ISO6/7 clean room concepts

SCRUBBER TECHNOLOGY

Target Areas:

- Particulate Scrubbing – Inline Venturi
- Odor Abatement – Structured Packing
- Energy recovery – ERD

References in: Plastic, Toner, Chemical, Pharmaceutical, Ammonium Sulfate and Mineral, Textile, Food and Tobacco processing plants

SUSTAINABLE SOLUTIONS

JOA Main Office
Delftechpark 25
2628 XJ Delft
The Netherlands
T +31(0)15 25 72 796

JOA North America
8349-M Arrowridge Blvd
Charlotte NC 28273
United States of America
T +1 704 523 0777

JOA Complex Russia
Donskoy Business Center
5th Donskoy Proezd 15
Building 2 Office 215
117334 Moscow, Russia
T +7 495 955 5107

More information:
www.joa.nl