

THE WORLD LEADER IN CLEAN AIR SOLUTIONS



## Surface Treatment Clean Air Solutions

**PARTICULATE FILTRATION**



Bringing clean air to life.™

# Controlling Air Quality of Paint Lines

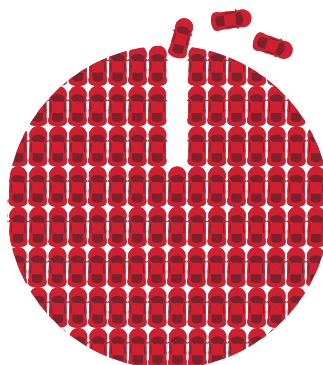
Managing an automotive paint line is challenging. The smallest factors can have serious consequences. Air quality is critical to every step of the process in a paint shop. Contaminated air can lead to expensive rework and even shut-downs of the line. It can significantly impact the “First-time Through Rate” and the overall production schedule of a vehicle.

## Potential Causes of Defects Leading to Rework:

- Ambient dust or process dust
- Human hair
- Textile fibres
- Contaminants, such as silicone or PVC particles
- Human error
- Process error



## Studies Show



The average **reject and rework rate** in a plant is

**1.1% - 3.1%**

Required rework causes productivity to suffer:

- **Longer production schedules**
- **Loss of profits due to add-on-processing**
- **Negative impact on Key Performance Indicators**
- **Increased operating costs for paint line**

Cars and commercial vehicles produced in 2016:

GLOBALLY  
**95** mio

Total costs for reject and rework\*:

GLOBALLY  
**\$665** mio

EU27  
**21.7** mio

EU27  
**\$152** mio

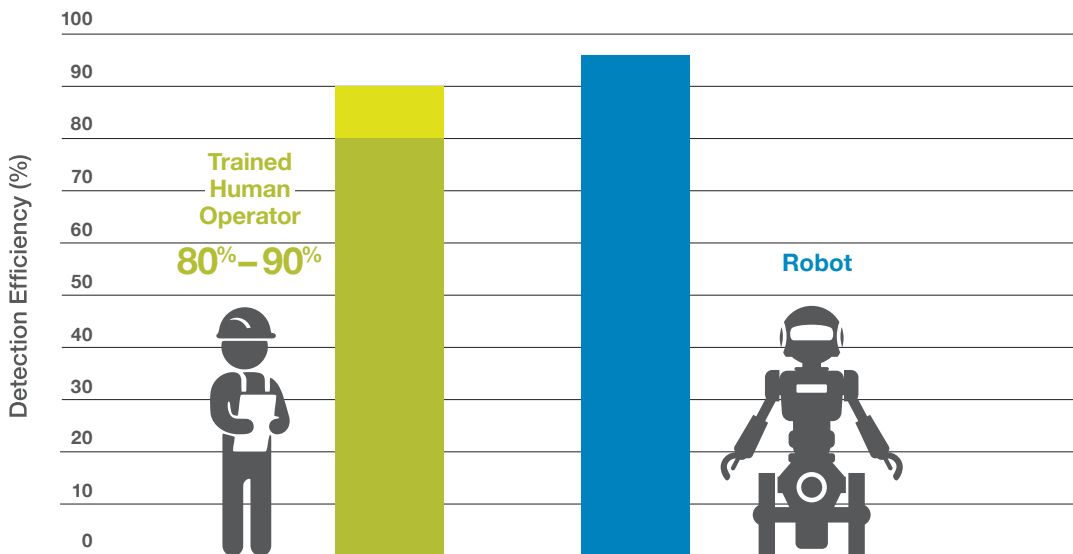


\*Assuming an average reject and rework rate of 2%, and an average off-line cost for rework of \$350.

For every **10,000 cars** produced in **Europe**, costs for rework reach almost **\$70,000**

# Managing Risks and Detecting Defects

Detection Efficiency Rates



There are significant costs associated with managing risks and detecting defects. Even when the most comprehensive precautions are taken, failures occur. Actual detection efficiency rates of trained human operators range from 80% to 90%. When robots are used to fill the role of human operators, detection efficiency rates increase to approximately 96%.

## The Importance of Avoiding a Loss of Control Event

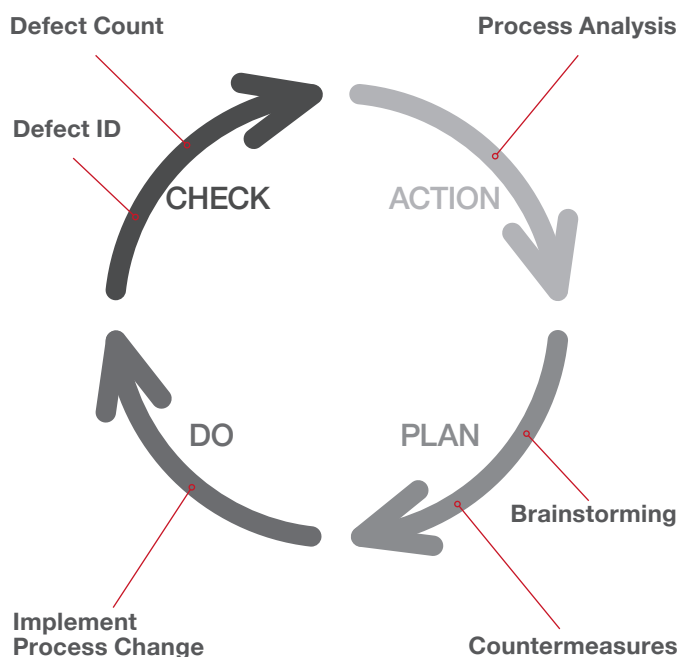
Once contaminated air particles cause a defect on a freshly painted surface, a Loss of Control Event is reached. This is the point at which costly rework is unavoidable.

## Air Quality Management Is Critical to Maintaining a Fluid Supply Chain

Managing air quality for painting processes is critical to maintaining a fluid supply chain. Eliminating airborne dust contamination is essential to preventing failures that halt production, affecting both the upstream and downstream supply chain.

The first step in controlling air quality is installation of appropriate filters for all stages of the paint process. Early detection and effective management of contamination risks are key to minimising production disturbance and reducing costs.

## Total Quality Management





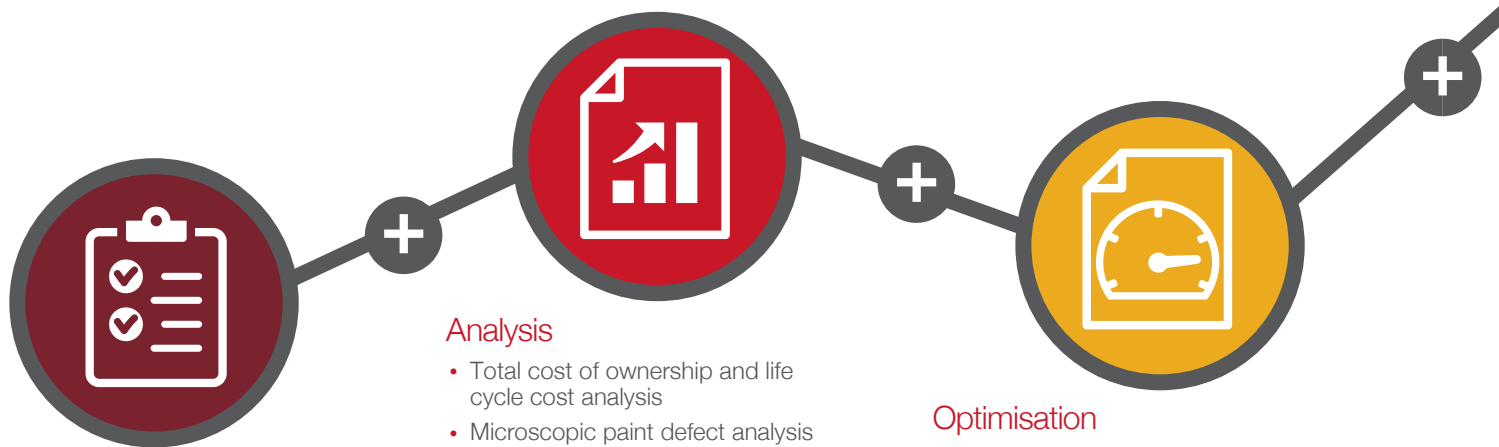
# Total TranspAIRency™

## AAF's Total TranspAIRency™ Program

AAF introduces an air quality and filter systems optimisation program for automotive manufacturing processes. This all-inclusive filter management program is a combination of AAF's global competencies, production capabilities, innovative products, intelligent tools, technical support, and on-site services. AAF provides the insight and expertise to find the optimised filtration solutions, identify improvement opportunities, and tailor to your specific needs for a comprehensive purchase perspective-improving air quality while balancing productivity and profitability.

## A Comprehensive Package Solution

AAF provides this total package approach through a combination of products and services at a fixed price with a built-in cost savings program, as well as the support of a permanent, on-site technician who will ensure the most effective solution for optimal process performance, quality improvement, and cost reduction.



### Audits

- Quantitative air surveys
  - Concentration of dust particles
  - Relative humidity and temperature
  - Booth balancing
- Down draughts in paint lines
- Inspection of dirt in paint
- Electrical energy consumption

### Analysis

- Total cost of ownership and life cycle cost analysis
- Microscopic paint defect analysis
- Computational fluid dynamics (CFD)

### Optimisation

- Performance metrics and reports
- Proactive involvement with dirt teams
- Total Cost of Ownership (TCO) optimisation

## A Customised Program Offering More Service and Less Worries

With customised solutions from AAF, you can tailor your air management program to optimise your processes and meet your air quality needs. We help you achieve the specific operational outcomes you need for your business.

### All tiers

All AAF air management program customers have access to AAF specialists and on-site technicians. They will provide you with expert analysis, reporting, and recommendations.

### Silver tier

In the Silver tier, our experts help ensure the most optimal effective solution for cost savings and risk reduction. They will show you how to optimise your performance and lower your total cost of ownership.

**Audits + Analysis + Optimisation + Monitoring  
+ Continuous Improvement + Site Technician**



## TCO Diagnostic® Provides Significant Results for the Automotive Industry

TCO Diagnostic (TCOD) is an integral part of our TranspAIRency™ total management concept. The innovative tool aids in the selection of the optimal filters for your air handling systems and operating conditions. The insight it provides leads to the identification of opportunities for improvement and the development of a solution customised to meet your specific needs. The end results are improved air quality, energy savings, operational flexibility, and a lower total cost of ownership.



## Sensor360® - 24/7 Monitoring and Early Warning System

AAF uses the advanced technology of Sensor360® to monitor air quality and provide early warning of air contamination and failures in paint processes, reducing downtime and operating costs. The system, which is monitored 24/7 by AAF professionals, also analyses trends to identify opportunities for improvement and optimise process performance.



### Gold tier

The Gold tier includes all the features of Silver. Additional services are designed to reduce planned and unplanned downtime.

**Silver + Identification Dirt in Paint, Air Booth Balancing, Computational Fluid Dynamics (CFD)**



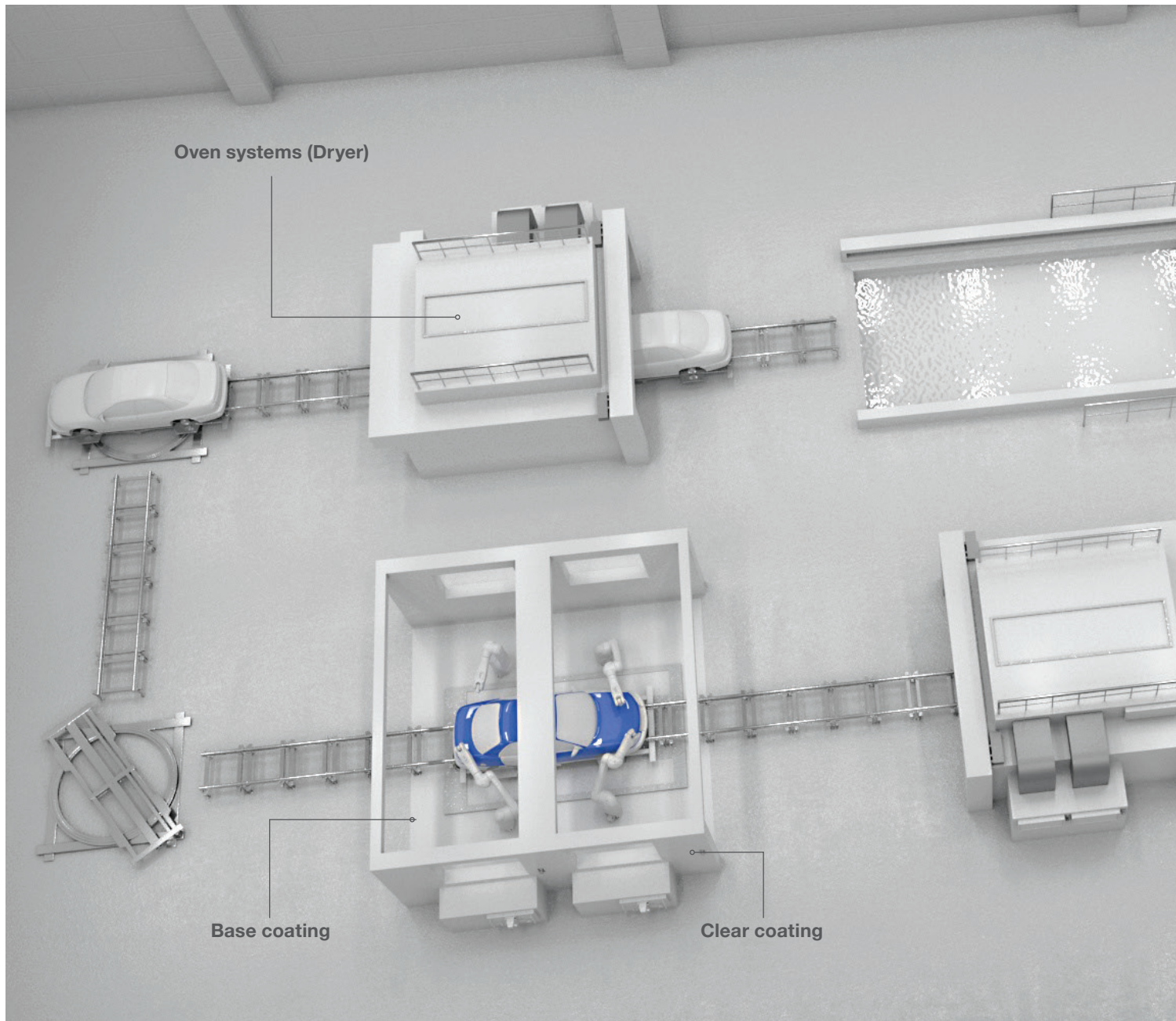
### Platinum tier

The Platinum tier provides the ultimate level of air quality optimisation. We provide the additional services of replacement filter changeout with disposal of used products to increase operational efficiency and reduce business disruption.

**Gold + Change of Filters, Filter Disposal**

Contact your AAF representative to learn how you can improve air quality, increase operational efficiency, and reduce business disruption.

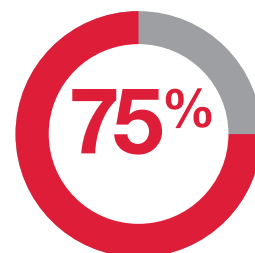
## Optimising Process Performance



### AAF Offers a True Consultative Approach

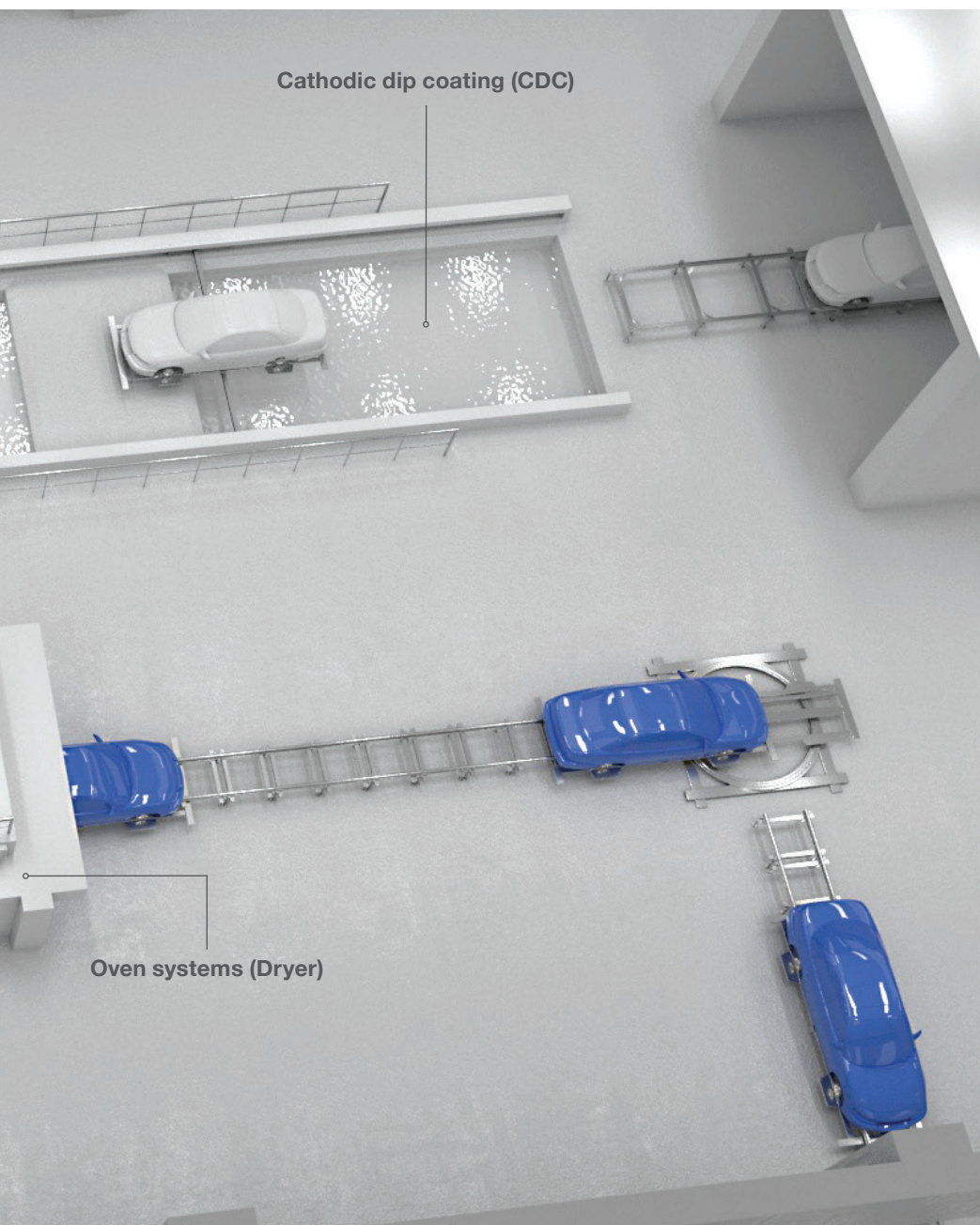
Paint shop operation teams need the support of a trusted on-site advisor who can perform air filtration audits, diagnostics, and continuous improvement to ensure the most optimal effective solution for cost savings and risk reduction. We do this by providing a consultative and technical approach to understanding your complete air filtration needs, application, and business goals, to optimise your performance and lower your total cost of ownership.

Paint shop  
operations =



of energy used  
in automobile  
manufacturing





**Audits**



**Analysis**



**Optimisation**



**Monitoring**



**On-Site  
Technician/Service**



**Continuous  
Improvement**

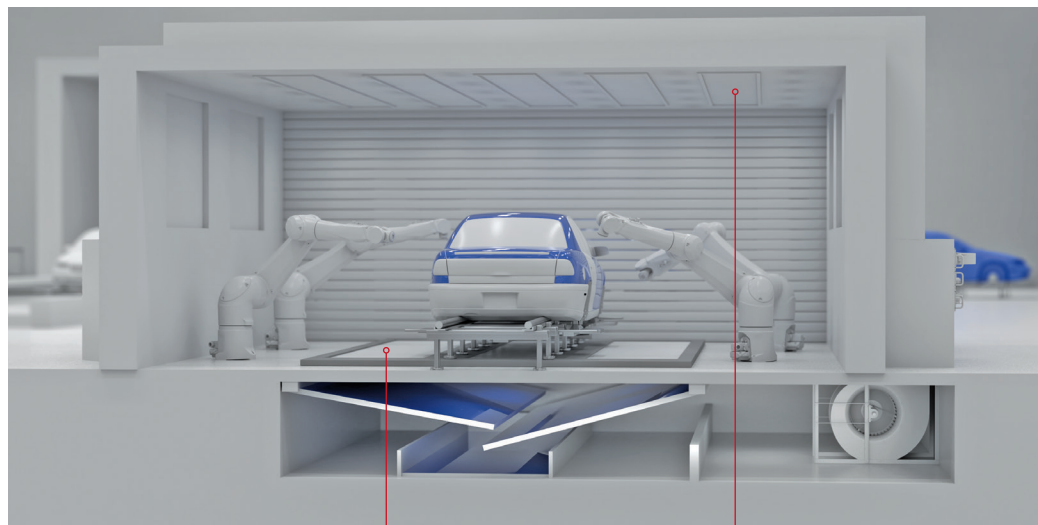
The paint shop is the most energy intensive step of car manufacturing. A full 75% of the total energy required for the process is used in the operation of the paint shop's ovens and spray booths. To achieve the air quality required for optimal surface treatments results, large quantities of air are temperature treated and moved.

### Equipment on Site

- Handheld laser-particle-counter with specific calibration for surface treatment applications
- Climate control device (including hot wire anemometer, humidity/temperature sensor, and digital pressure drop gage)
- Portable shop microscope with digital camera attachment
- Digital USB-microscope
- Electrical energy consumption device
- Accessories such smoke tubes and dirt sampling tools

# Base and Clear Coating Filtration Solutions

## Ceiling Mats and Paintstop Media



*Exemplary representation only.*

### AmerGlas® Paintstop Green Media

AmerGlas Paintshop Green media is a commercial grade media designed to remove paint overspray in paintspray cabins. Paint is collected throughout the full depth, extending pad life and reducing costs. This exclusive media design eliminates faceloading, increases arrestance, and ensures cleaner air.

- Economical to use
- Open weave design enhances paint removal from airstream
- Removes overspray of all types of paint lacquer
- Protects exhaust ducts, fans and motors
- Clean exhaust air is discharged to the atmosphere

### AmerTex F60 Media

The AmerTex F60 air filter media consists of a scientific blend of superfine synthetic fibres in a multi-layered structure. A special woven scrim on the air leaving side prevents particle migration. This gives the media a sturdiness that makes it suitable for larger filter surface areas.

- For paintspray and drying booth applications
- Fine synthetic fibres
- Multi-layered structure



*AmerGlas® Paintstop Green Media*

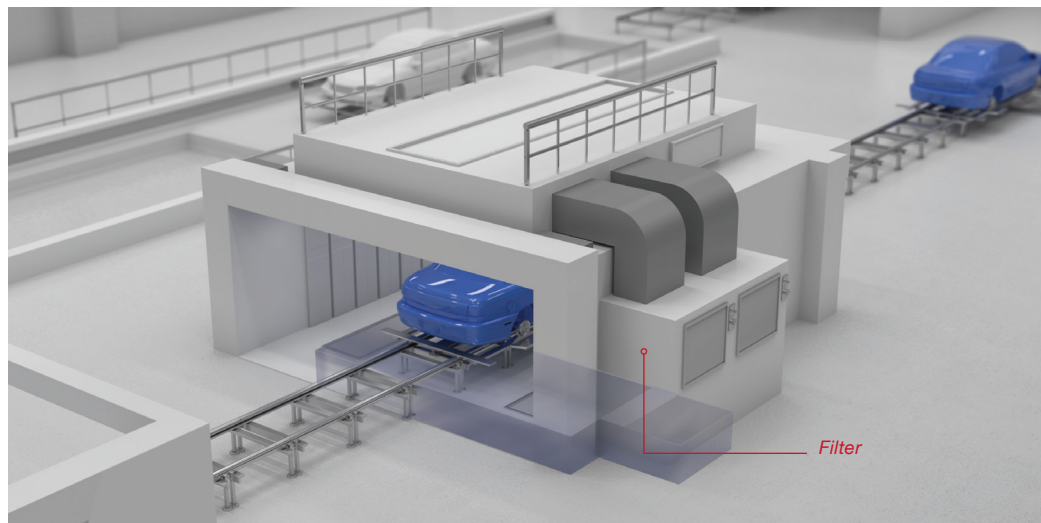


*AmerTex F60 Media*



# Oven System Filtration Solutions

## High Temperature Filters



Exemplary representation only.

### VariCel® HT Filter

The VariCel HT filter is designed for use in drying ovens. The filter is silicon free, no adhesives, sealants or glues are used that could degraded at high temperatures, causing structural damage to the filter or affecting the quality of the drying process.

- Improves air quality in drying lines
- Maximum continuous operating temperature up to 385 °C
- Robust, heat resistant aluminised materials
- Classification ranges of M6, F7 and F8
- Silicon free construction

### VariCel® II HT Filter

The VariCel II HT filter is a high temperature compact air filter that is designed for use in automotive drying tunnel installations. No silicon based adhesives, sealants or glues are used that could degrade at high temperatures and affect the curing process.

- Operating temperature of 385 °C
- Filter classification M6 and F8 according to EN779:2012
- Final resistance: 450 Pa
- Silicon free construction
- Extruded aluminium cell sides with glass fibre media
- Recycle/disposal friendly

### VariCel® XL HT Filter

The VariCel XL HT filter is designed for use in drying ovens with maximum energy savings level and attractive lifecycle cost. In continuous operation at a car manufacturer's paint drying line, the VariCel XL HT filter provides up to 40% savings on energy costs compared to traditional designs, which equals a return on investment of less than 18 months.

- High continuous operating temperature up to 385 °C for improved throughput
- Heat resistant aluminised materials ensure a spall-and flake-free finished product
- Mechanically interlocked filter construction providing increased stiffness under tough conditions
- Fully silicone free product to avoid costly process contaminations
- High dust holding capacity facilitates a longer service life and fewer filter changeouts

### VariCel® V HT Filter

The VariCel V HT filter is designed for use in the recirculation systems of drying ovens. Made of sturdy materials, this filter has a maximum continuous operating temperature of 385 °C. Aluminised steel is used because it does not spall or flake at elevated temperatures.

- Designed for recirculation systems in drying lines
- High temperature, high turbulence operation
- Robust, heat resistant materials
- Classification ranges M6, and F7 according to EN779:2012

# Fresh Air & Recirculation System Filtration Solutions

## Prefiltration and Recirculation Filters



DriPak® KX



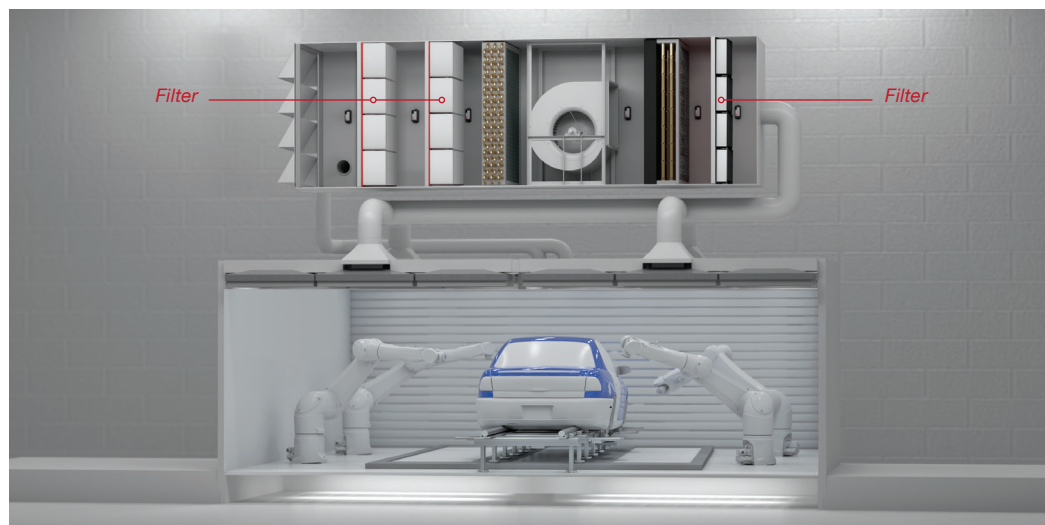
DriPak® NX



VariCel® VXL



VariCel® VXLE



Exemplary representation only.

### DriPak® KX

The DriPak KX filters have the highest dust holding capacity, with optimised pressure drop behaviour for high performance, which is crucial for automotive paint booths.

- Stiff welded pockets
- Pocket spacers for optimised airflow
- Fully incinerable
- High dust holding capacity
- Low pressure drop behaviour
- Non-breaking, synthetic-organic fibres
- Glass and silicon free
- Foam-sealed into injection moulded polyurethane frame
- Low weight and leak-proof design

### DriPak® NXM

The DriPak NXM pocket filter offers best-in-class performance for energy efficiency and ease of installation, based on a unique combination of high-tech filter material, pocket design and ergonomic header construction.

- Proprietary AAF design with stable tapered pockets for optimum airflow
- Exceptionally low pressure drop for extremely low energy use
- Polyurethane header with gastight seal between filter media and header prevents bypass and increases indoor climate
- Sturdy and lightweight injection moulded polyurethane header for easy handling and maintenance
- Fully incinerable with polyurethane or plastic header for minimised environmental impact

### VariCel® VXL

Multiple mini-pleat media packs, assembled into a series of V-blanks, permit substantially more media to be contained in the VariCel VXL filter-up to 50% more than standard rigid cartridge filters.

- Available in efficiencies ePM11 and ePM10 (ISO 16890); M6-F9 (EN779:2012)
- Excellent performance in difficult operating conditions
- Lightweight and easy to install
- Fully incinerable
- Single and double header models

### VariCel® VXLE

The VariCel VXLE compact filter is designed to provide excellent performance combined with high energy savings. Higher dust holding capacity results in less filter changes and an extended service life, thus reducing replacement costs.

- Fibreglass media pack with uniform pleat spacing for reduced operating resistance and energy consumption
- Sturdy construction for handling airflow rates up to 3400 m³/h
- High dust holding capacity for facilitating a long service life and fewer changeouts





## Proven Expertise of AAF

AAF offers the most comprehensive air filtration portfolio in the industry, including particulate and gas-phase filters, to provide a customized clean air solution. Each product is carefully designed, manufactured, and tested in full compliance with all applicable standards to meet the most challenging demands with the lowest Total Cost of Ownership.

### Asia Sales Office Air Filter

American Air Filter Manufacturing Sdn. Bhd. (Malaysia)  
AAF Australia Pty. Ltd. (NSW Sales Office)  
AAF Australia Pty. Ltd. (VIC Sales Office)  
AAF Australia Pty. Ltd. (QLD Sales Office)  
AAF India Private Limited (Noida)  
AAF India Private Limited (Bangalore)  
AAF International (Thailand) Co., Ltd.  
AAF International Air Filtration Systems L.L.C  
AAF Singapore Pte. Ltd.  
PT. AAF International Indonesia  
AAF Saudi Arabia Ltd.

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AAF has a policy of continuous product research and improvement and reserves the right to change design and specifications without notice.

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