THE WORLD LEADER IN CLEAN AIR SOLUTIONS

Clean Air Solutions for Surface Treatment

PARTICULATE FILTRATION

AAF® INTERNATIONAL

Bringing clean air to life.™

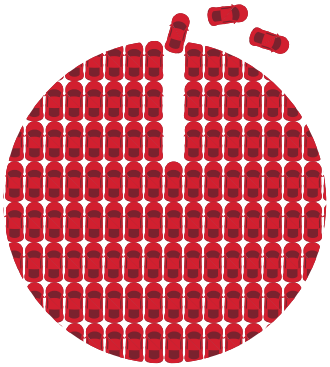
Controlling Air Quality of Paint Lines

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

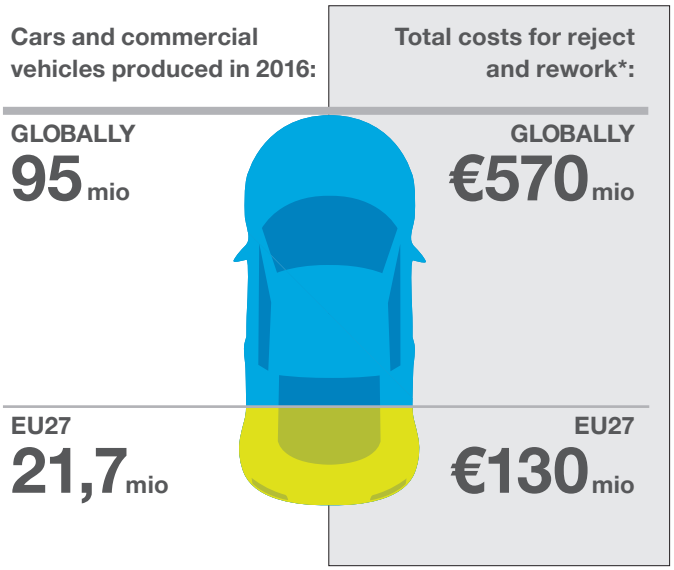


The average **reject and rework rate** in a plant is

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**

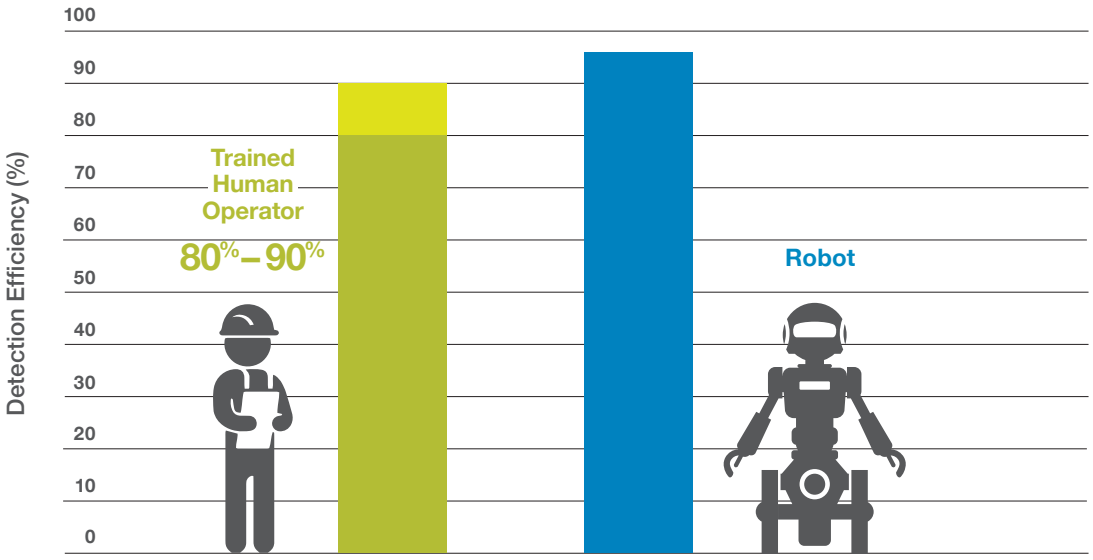


**Assuming an average reject and rework rate of 2%, and an average off-line cost for rework of 300 €.*

For every **10.000 cars** produced in **Europe**, **costs for rework reach almost €60.000**

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

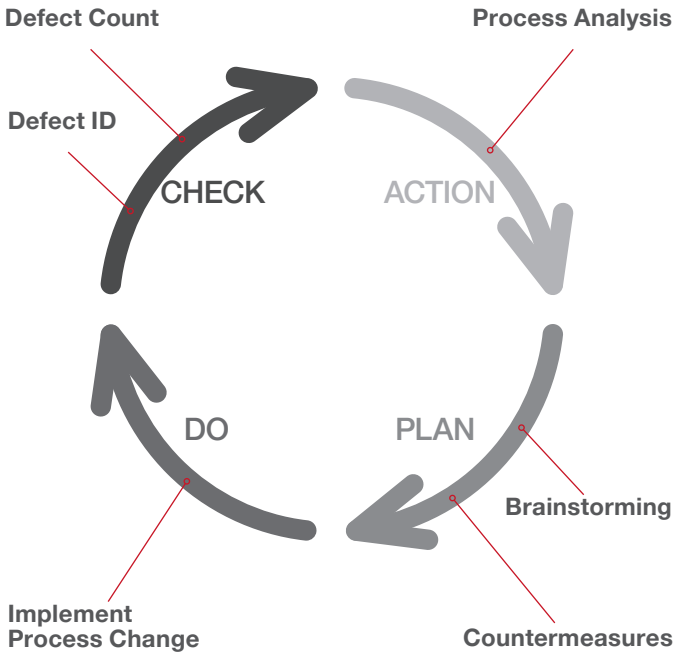
Once contaminated air particles cause a defect on a freshly painted surface, a Loss of Control Event is reached. This is the point at which costly rework is unavoidable.

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 disturbances and reducing costs.

Total Quality Management



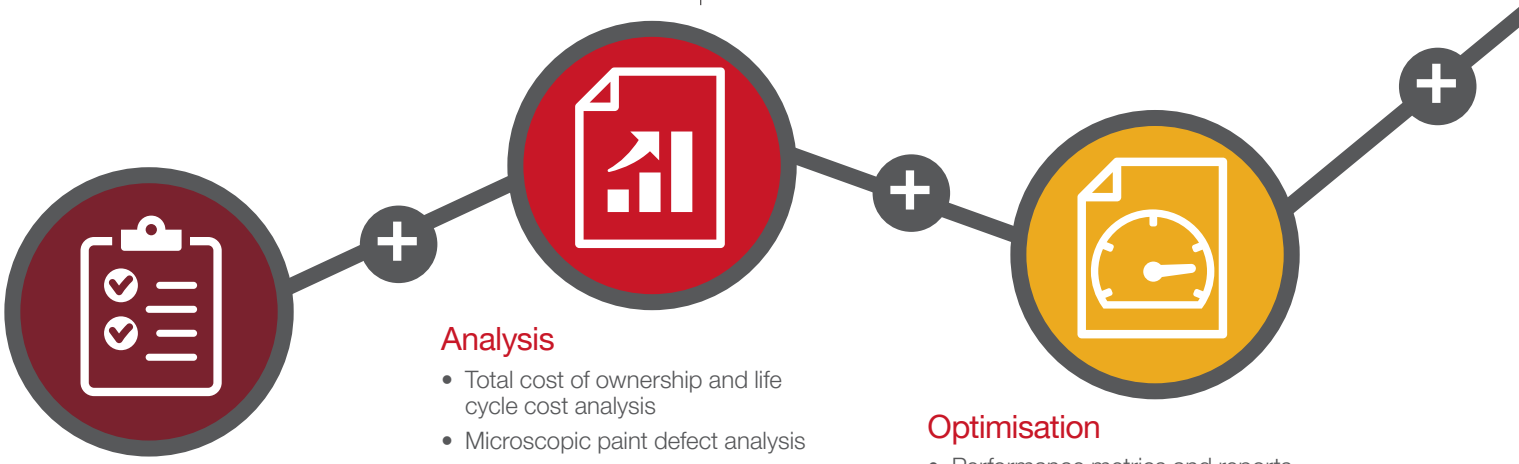
Total TranspAIRency™

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.

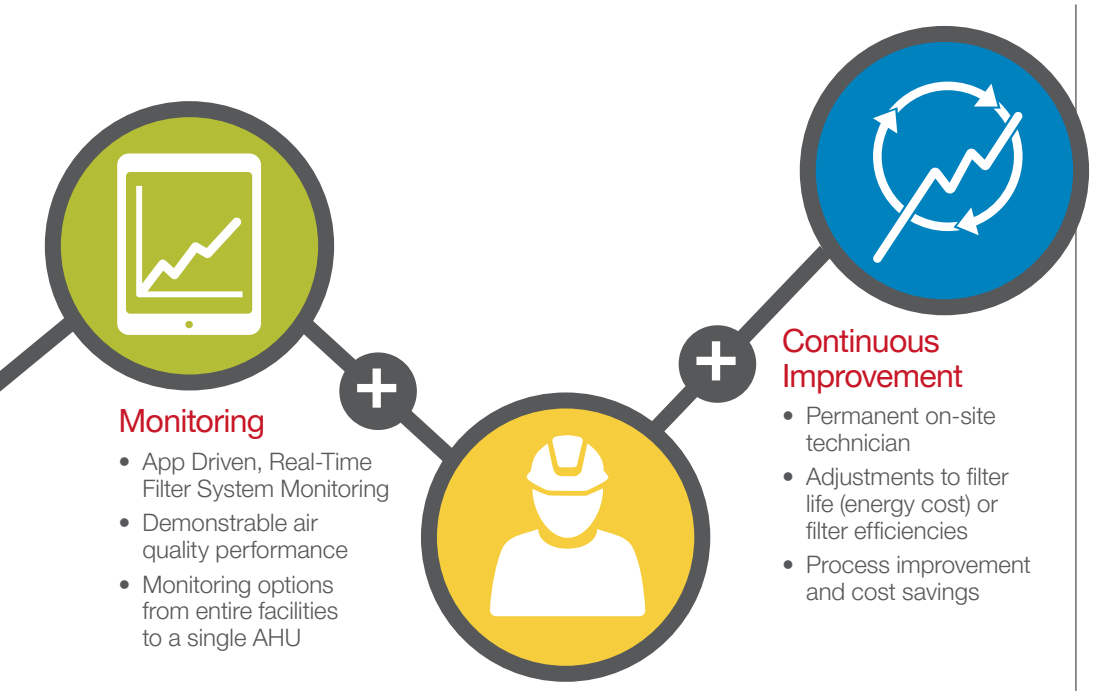
All tiers

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.

Basic

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



Monitoring

- App Driven, Real-Time Filter System Monitoring
- Demonstrable air quality performance
- Monitoring options from entire facilities to a single AHU

Continuous Improvement

- Permanent on-site technician
- Adjustments to filter life (energy cost) or filter efficiencies
- Process improvement and cost savings

On-Site Technician and Service

- Installation and replacement filter changeout with disposal of used products
- Order and stock management
- Cleaning of filter systems

Active

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)

Worry Free

The Platinum tier provides the ultimate level of air quality optimisation. We provide the additional service 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.

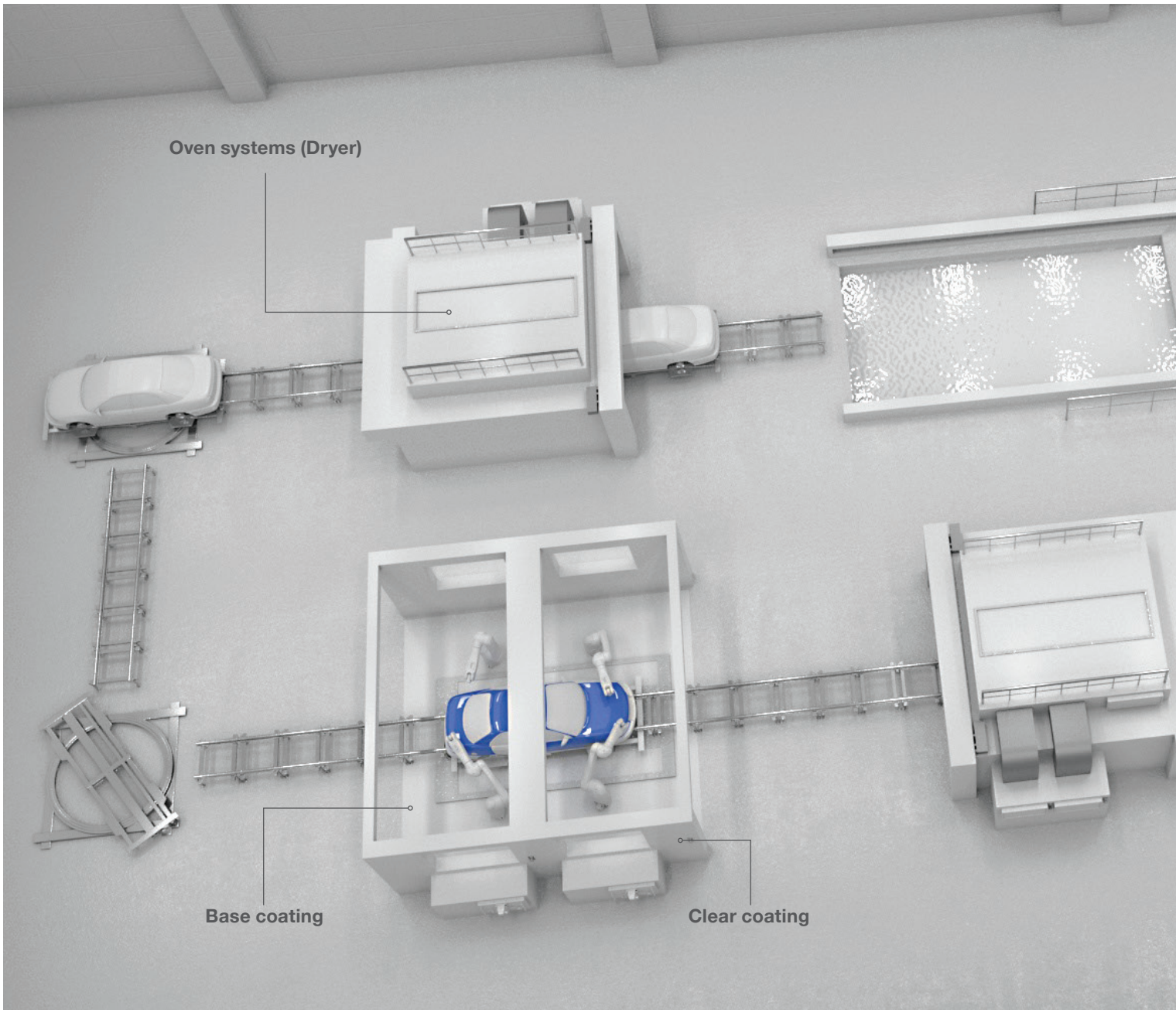
TCO Diagnostic® Provides Significant Results for the Automotive Industry

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.

Sensor^{3}60® - ^{2}4/7 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.

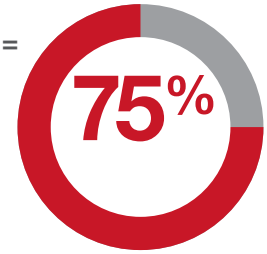
Optimising Process Performance



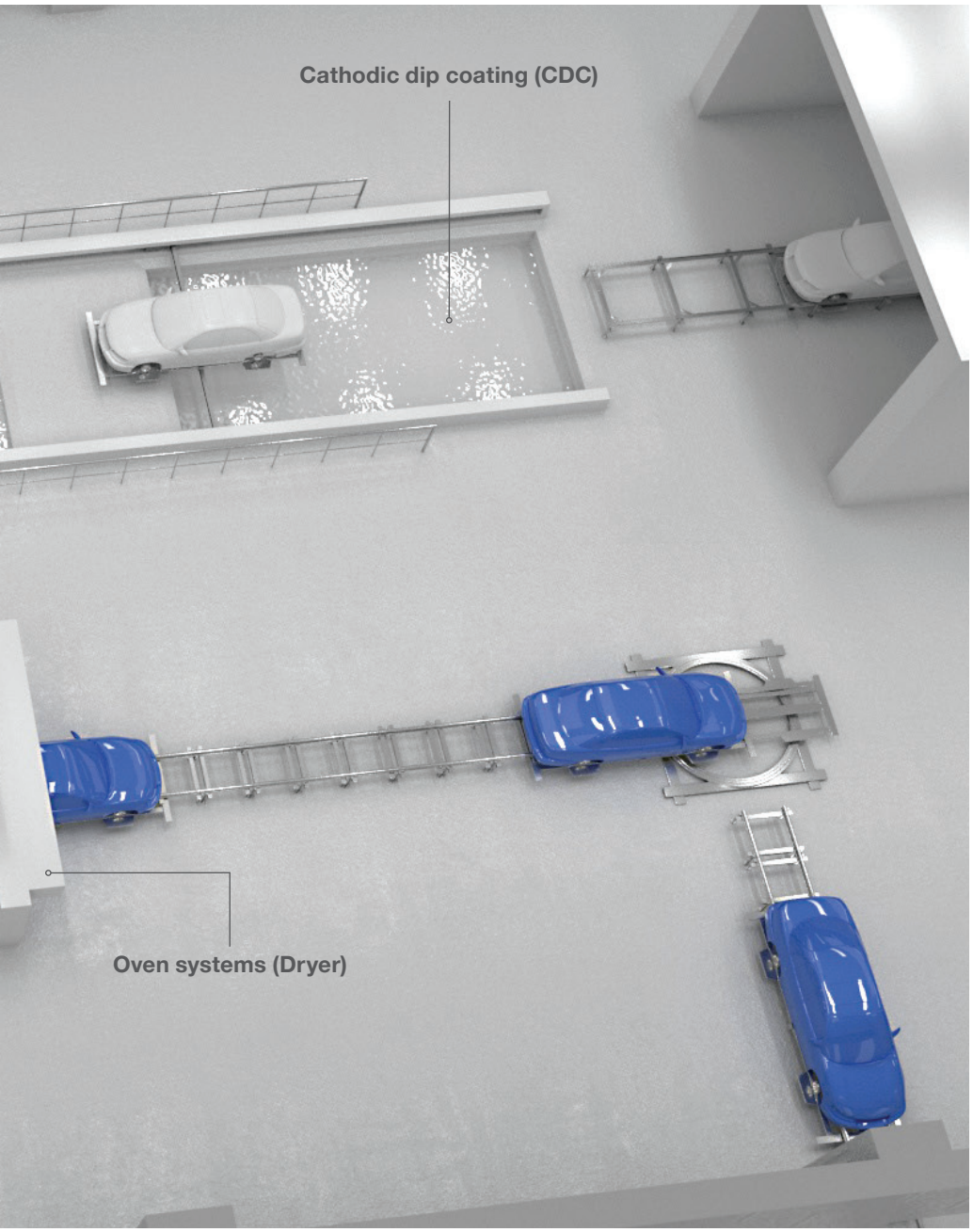
AAF Offers a True Consultative Approach

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



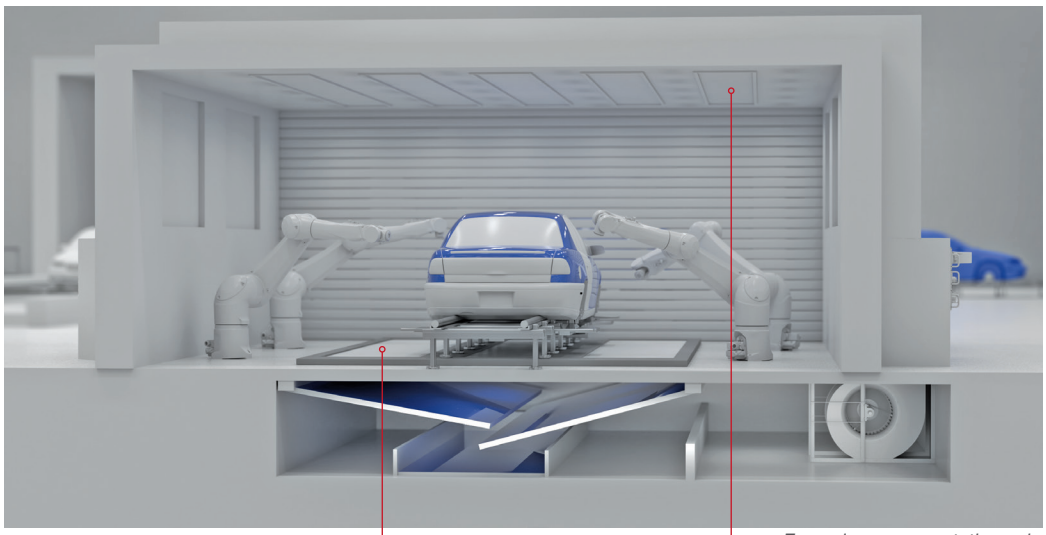
- Audits
- Analysis
- Optimisation
- Monitoring
- On-Site Technician/Service
- Continuous Improvement

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 treatment results, large quantities of air are temperature treated and moved.

Equipment on Site

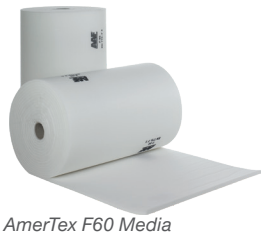
- Handheld laser-particle-counter with specific calibration for surface treatment applications
- Climate control device (including hot wire anemometer, humidity/temperature sensor, and digital pressure drop gage)
- Portable shop microscope with digital camera attachment
- Digital USB-microscope
- Electrical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

Ceiling Mats and Paintstop Media



Exemplary representation only.

AmerGlas® Paintstop Green Media



AmerTex F60 Media

AmerGlas® Paintstop Green Media

AmerGlas PaintStop 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.

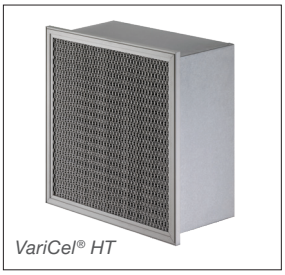
- Economical to use
- Open weave design enhances paint removal from airstream
- Removes overspray of all types of paint lacquer
- Protects exhaust ducts, fans and motors
- Clean exhaust air is discharged to the atmosphere

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

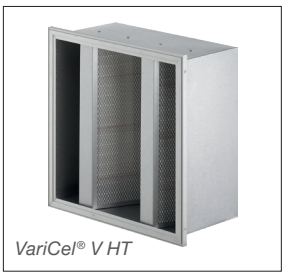
Oven System Filtration Solutions



VariCel® HT

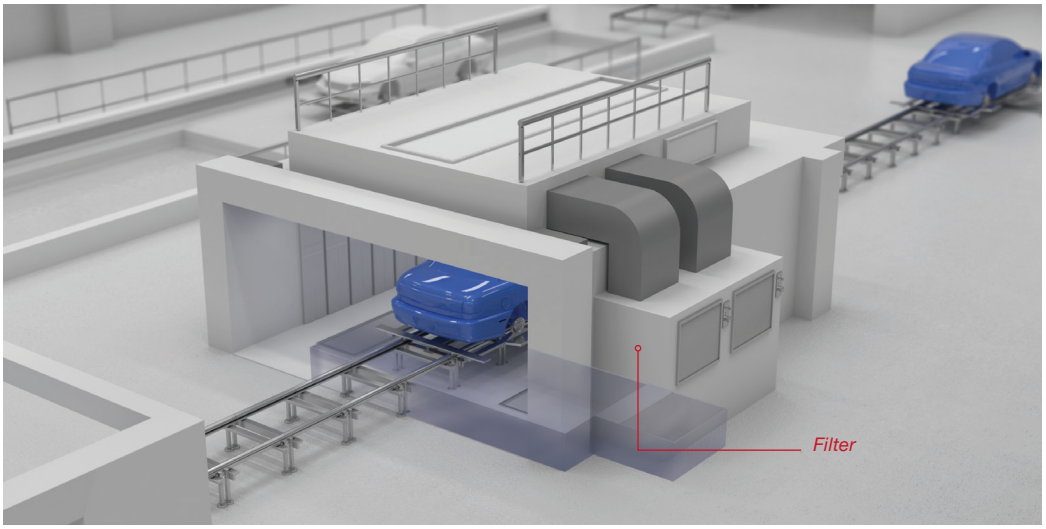
VariCel® II HT

VariCel® XL HT



VariCel® V HT

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 degrade 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 classifications 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 a 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

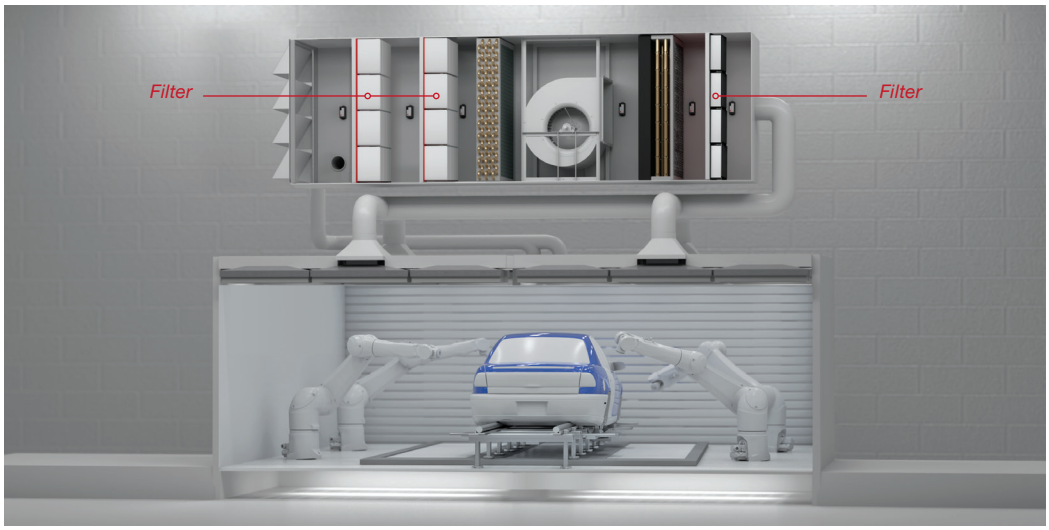
Prefiltration and Recirculation Filters

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® NX

The DriPak NX 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-banks, permit substantially more media to be contained in the VariCel VXL filter—up to 50% more than standard rigid cartridge filters.

- Available in efficiencies ePM1 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 m^3/h
- High dust holding capacity for facilitating a long service life and fewer changeouts

AAF International has an in-depth understanding of the challenges and opportunities for automotive manufacturing processes. This understanding and technical ability makes us the preferred partner for optimising process performance to protect the quality of your products.

AAF Sales Offices

Austria
AAF Luftreinigungssysteme
Gesellschaft m.b.H.
Campus 21, Europaring F12/401
2345 Brunn am Gebirge
Phone: +43 2236 677 628
Fax: +43 2236 677 628-1
E-mail: sales.austria@aafeurope.com

België/Belgique
AAF N.V./S.A.
Louizalaan/Avenue Louise, 149/24
1050 Brussel/Bruxelles
+32 (0) 2 426 54 51
Aaf.verkoop@aafeurope.com

Dinair Finland
Dinair Clean Air, Oy
Koivuvaarankuja 2,
01640 Vantaa
Phone: +358 10 3222610
E-mail: cleanair@dinair.fi

France
AAF S.A.
9, Avenue de Paris
94300 Vincennes
Phone: +33 143 984 223
Fax: +33 158 641 142
E-mail: sales.france@aafeurope.com

Germany
AAF-Lufttechnik GmbH
Odenwaldstrasse 4
64646 Heppenheim
Phone: +49 (0)6252 69977-0
E-mail: sales.germany@aafeurope.com

Dinair Baltic and Russia
Dinair Filton SIA
Rupnicu Street 4
Olaine, Latvia, LV-2114
Phone: +371 67069823

Denmark
AAF/Dinair APS
Vallensbækvej 63.1
2625 Vallensbæk
Phone: +45 70260166
E-mail: sales.denmark@aafeurope.com

Great Britain and Ireland
Air Filters Ltd (AAF International)
Bassington Lane, Cramlington
Northumberland NE23 8AF
Phone: +44 1670 591 790
Fax: +44 1670 590 262
E-mail: airfilter@aafeurope.com

Greece
AAF-Environmental Control Epe
1 Ifaistou & Kikladon
15354 Glika Nera
Phone: +30 210 663 20 15
Fax: +30 210 663 51 09
E-mail: greece@aafeurope.com

Italy
AAF S.r.l.
Via Friuli, 28/30
21047, Saronno (VA)
Phone: +39 02.9624096
Fax: +39 02.9606409
E-mail: sales.italy@aafeurope.com

Dinair Norway
Dinair AS
Prof Birkelands vei 36
1081 Oslo
Phone: +47 22 90 59 00
Fax: +47 22 90 59 09

Slovakia & Eastern Europe
AAF International s.r.o.
Bratislavska 517
91105, Trencin, Slovakia
Phone: +421 32/746 17 14
www.aafintl.com

Spain & Portugal
AAF S.A.
Vidrieros, 10
28830 San Fernando de Henares
Madrid, Spain
Phone: +34 916 624 866
Fax: +34 916 624 275
E-mail: info@aaf.es

Dinair Sweden
Dinair AB
Hamngatan 5
SE-592 30 Vadstena
Phone: +46 (0)143-125 80
Fax: +46 (0)143-125 81

The Netherlands
AAF Verkoop Nederland
Boerdijk 29A
7844 TB Veenoord
Phone: +31 (0)591 66 44 66
E-mail: aaf.verkoop@aafeurope.com

Turkey
AAF Hava Filtreleri ve Ticaret A.S.
Zumrutevler Mahallesi
Nil Caddesi No : 4 A Blok / DAIKIN
Binasi Kat 3
34852 Maltepe - Istanbul
Phone: +90 216 449 51 64
Fax: +90 216 449 5150
E-mail: bilgi@aaf.com.tr

Bringing clean air to life.

AAF International
European Headquarters
Odenwaldstrasse 4, 64646 Heppenheim
Tel: +49 (0)6252 69977-0
aafintl.com