

Navigating Through Retrofits And Upgrading For Lower Emissions



AGENDA

01

Filter Selection Criteria

02

Filter Types

03

Filter & Emissions Options

04

SCR Profile

05

Emerging Developments

DPF Selection Considerations

Product Design

Performance

Installation

Reliability

Service life

Independent Certification – CARB-EPA-VERT-Accredited Test Lab

Cost of Ownership

DPM Capture rates

NOX/ NO2 Reduction

Maintenance

Services Offered

Experience

DPF Filter Material Options



Sintered Metal

Silicon Carbide

Cordierite

Cordierite is the most common

DPF Filter Options

Passive Regeneration

CRT - Uncoated and Coated

FBC - Fuel Borne Catalyst System

Active Regeneration

FBC - Fuel Borne Catalyst System

Electric Regen (Active)

Fuel Burning (Active)

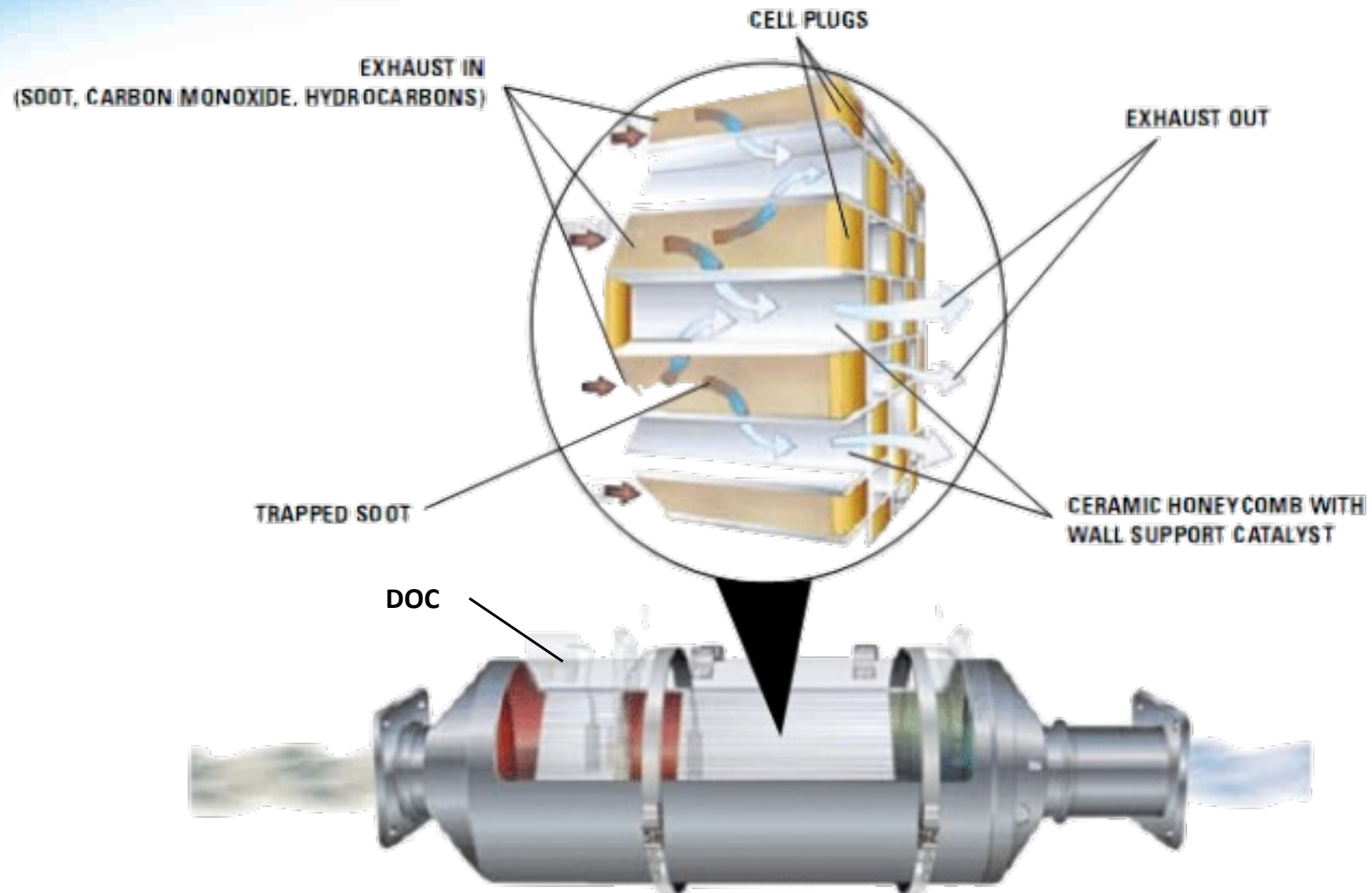
SCR – Selective Catalytic Reduction

DPF/DOC

SCR Module upgrade to existing DPF-NO₂ Reduction

SCRT System – NO₂ Reduction

CRT- Cordierite – Wall Flow Filter



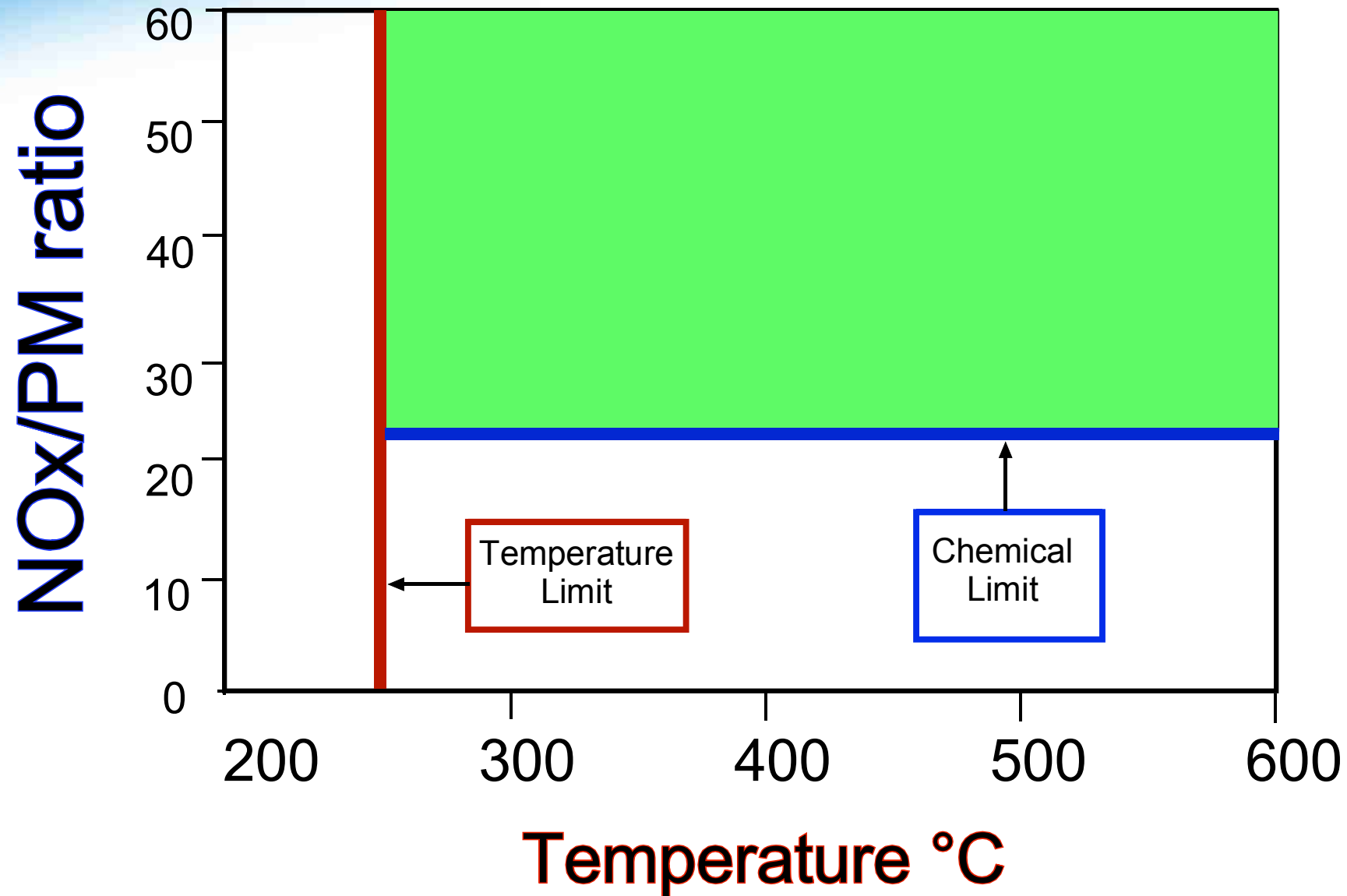
DOC/DPF



Passive regeneration

- Only a portion of the particulates are converted to carbon dioxide during passive regeneration and due to chemical reaction. This process is only effective with the temperature range of 250°C+ to 500°C+
- Idling and low duty cycle dramatically reduces service life
- Coated filters aid Regeneration

Conditions for Passive Regeneration



Cleaning Filter Cordierite Filters

- 8 hours baking in industrial grade kiln at up to 1050°F
- Burning the excess deposits of soot
- Ash Weighing
- Flow, and pressure testing
- Filter blowing to remove all excess ash. Process repeated until DPF is completely clear
- Final inspection and hand blowing so that DPF cells are completely unplugged.
- Filter material is brittle and often damaged
- Filter can be cleaned only 3 times on average



FBC – Fuel Borne Catalyst Systems



A dosing system is used to add an additive to the diesel fuel combusted in the engine. The combusted additive is deposited on the particulate filter together with the particulate matter (PM).

This reduces the ignition temperature of the PM on the filter from normally 600°C – 650°C to 380°C – 400°C and the system is able to regenerate itself periodically or intermittently by means of the exhaust gas temperature of the engine.

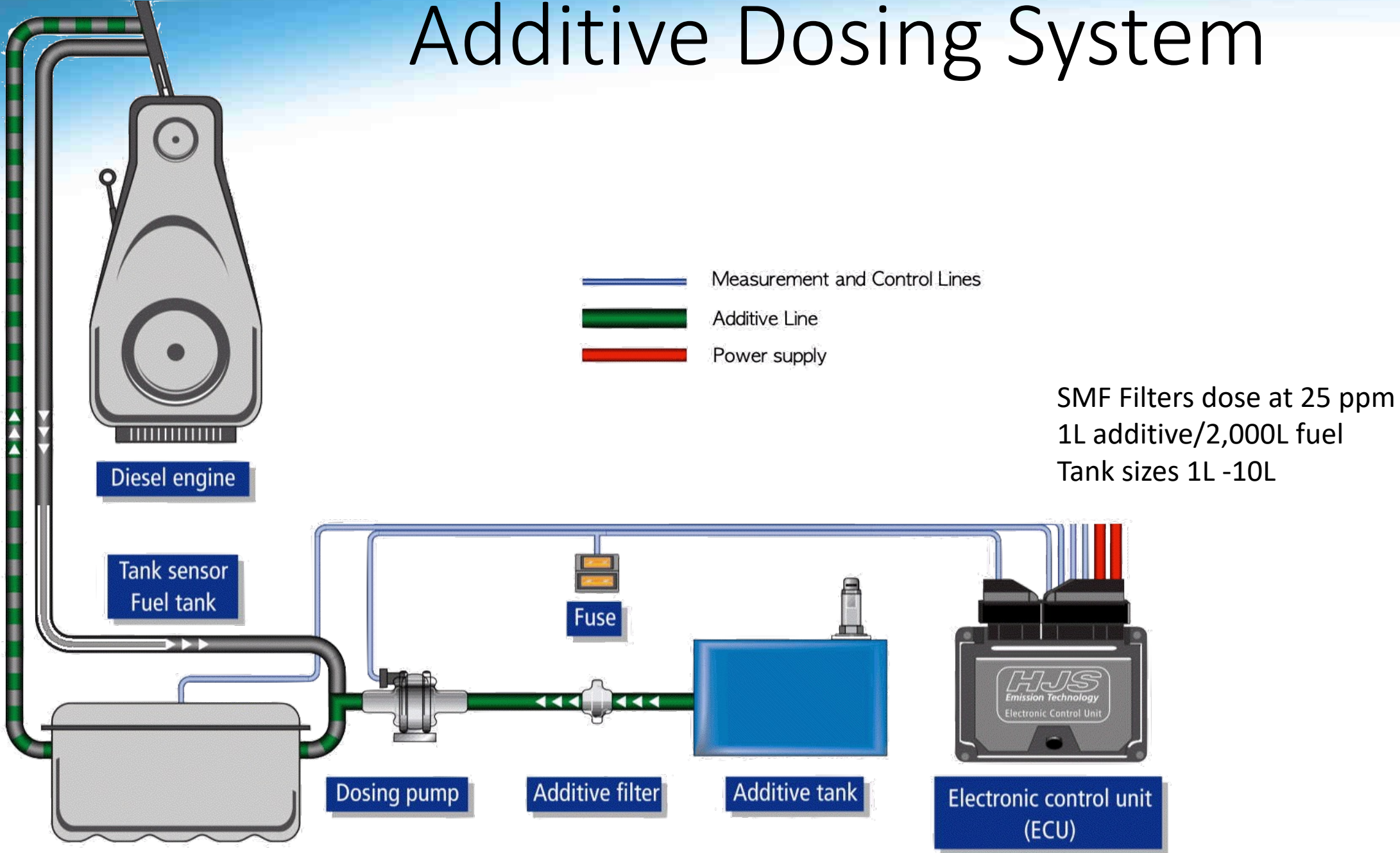
Advantages

Lowers the soot ignition temperature by 200°C

Complete and uniform burn-off of ash

NOX neutral

Additive Dosing System

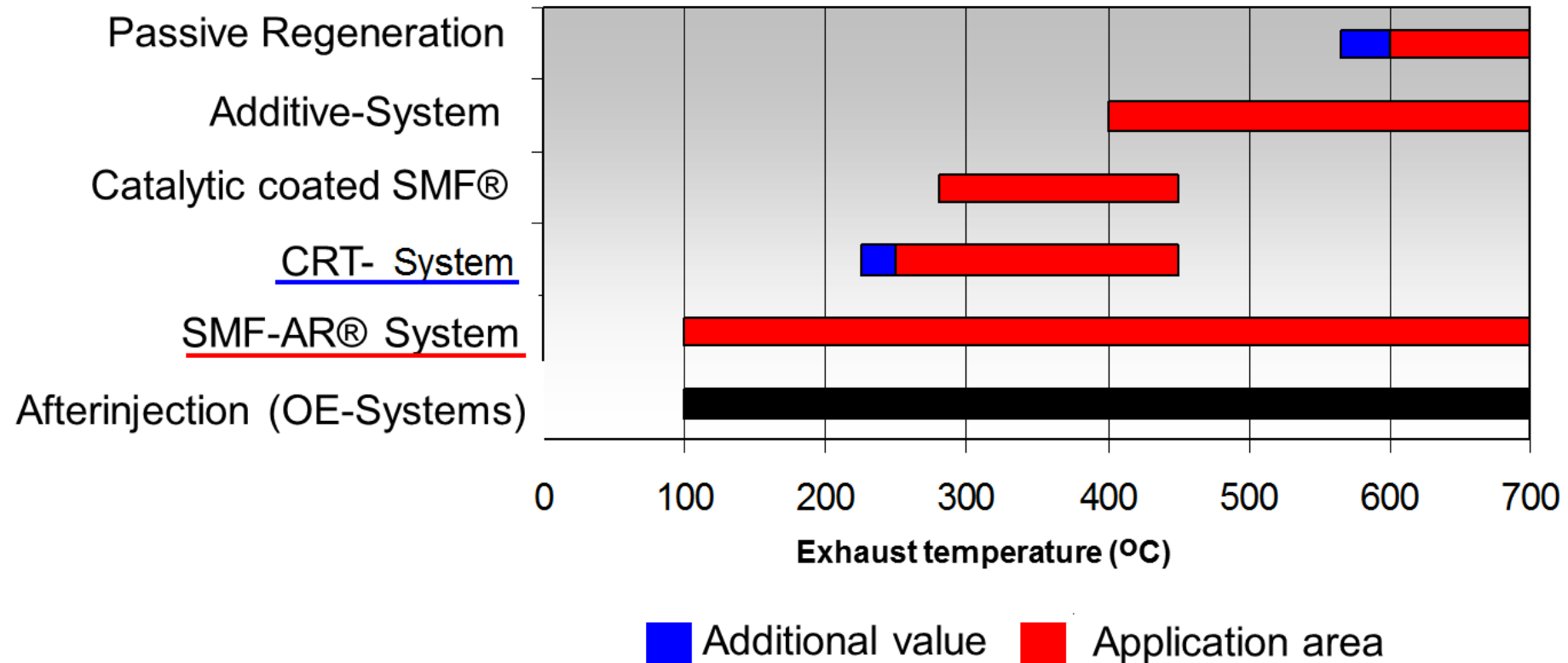


Fuel burn catalyst regeneration –

FBC-regeneration of DPF via catalytic activation of soot

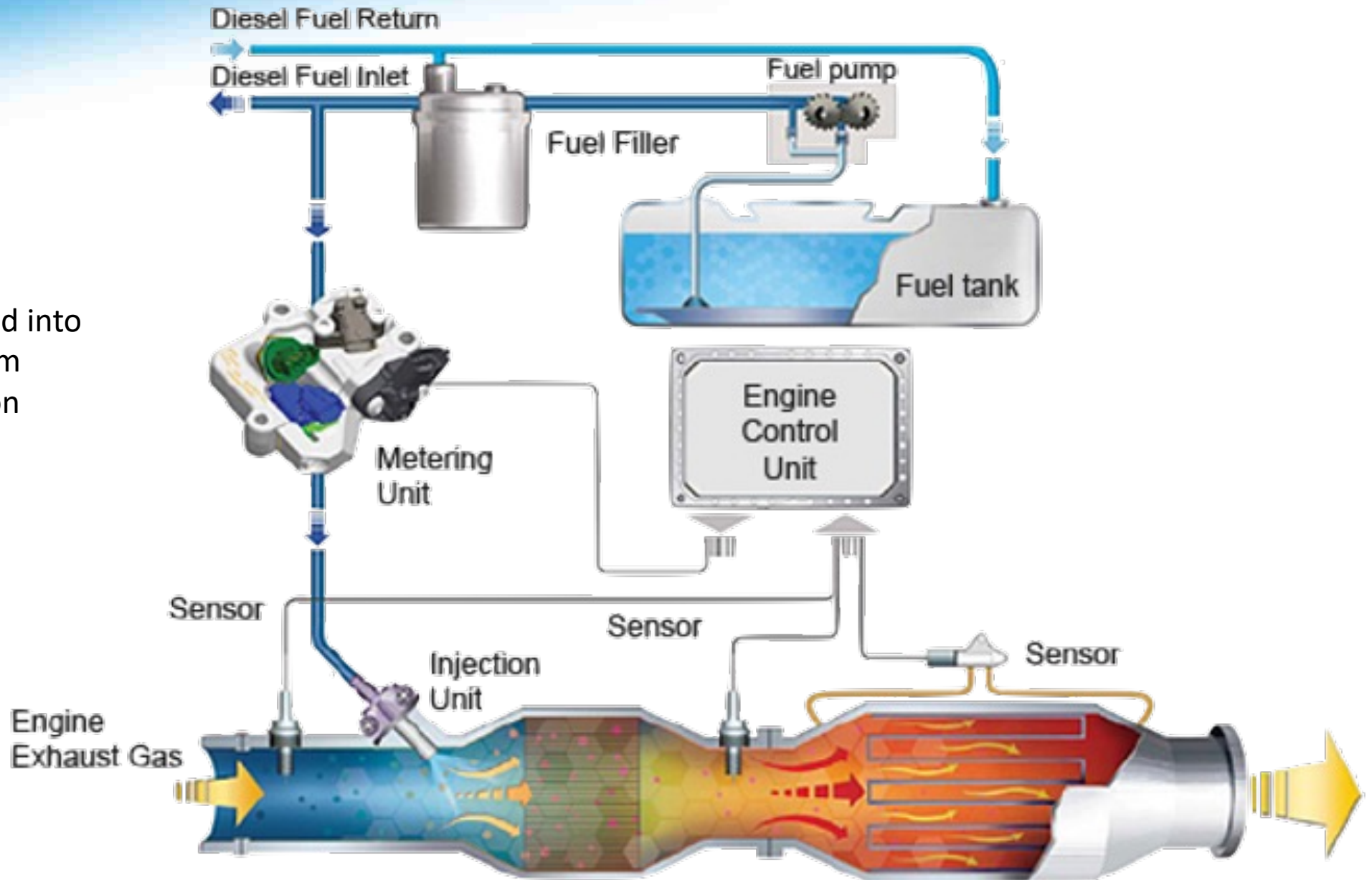
- Reduction of soot ignition temperature from 600°C to 400°C
- Increases the burn off soot reaction

Application areas and Regeneration Technologies



Fuel Burner DPF

Diesel fuel injected into the exhaust stream to aid regeneration



Electric Regeneration

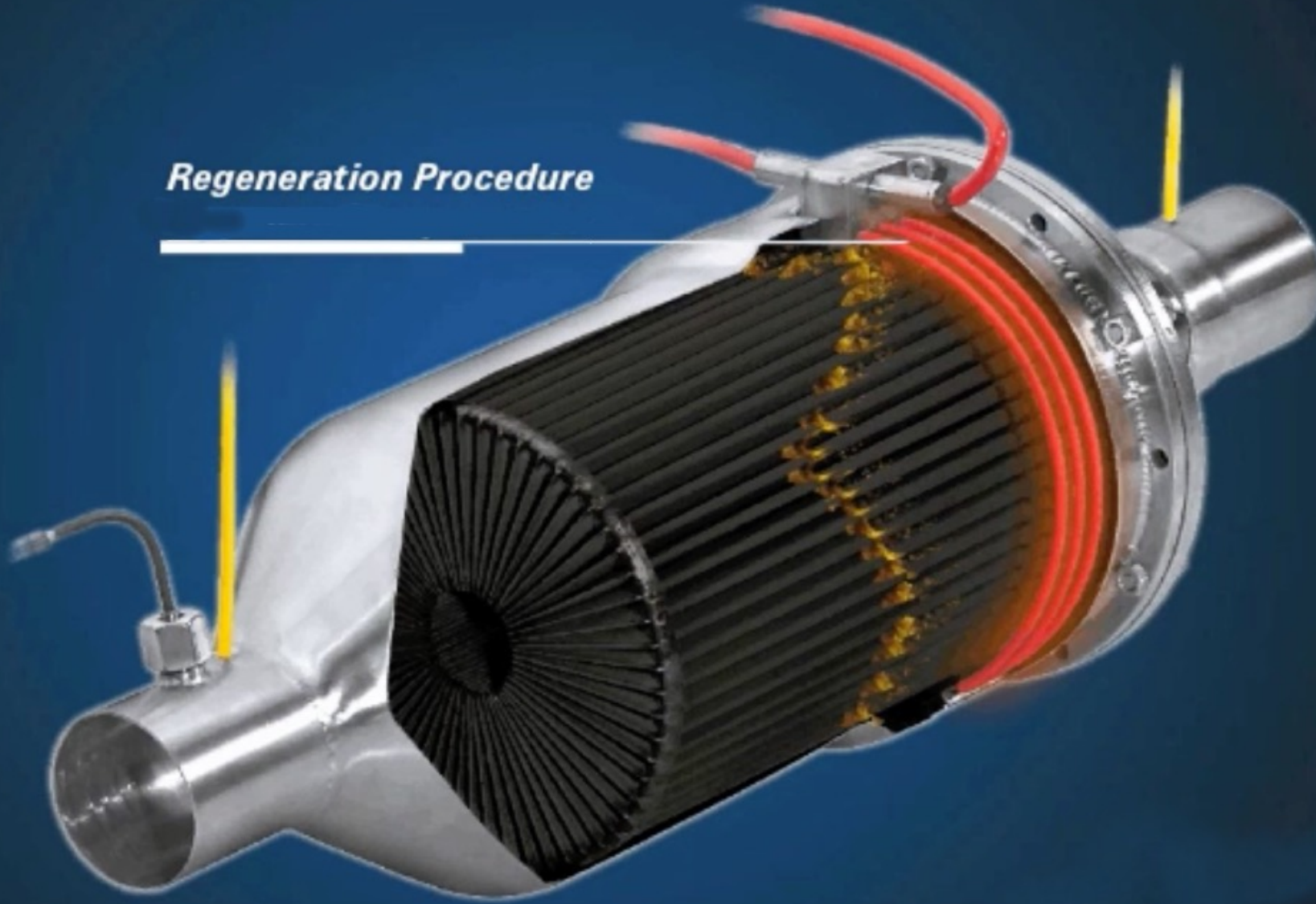
Provides regeneration at low exhaust temperatures

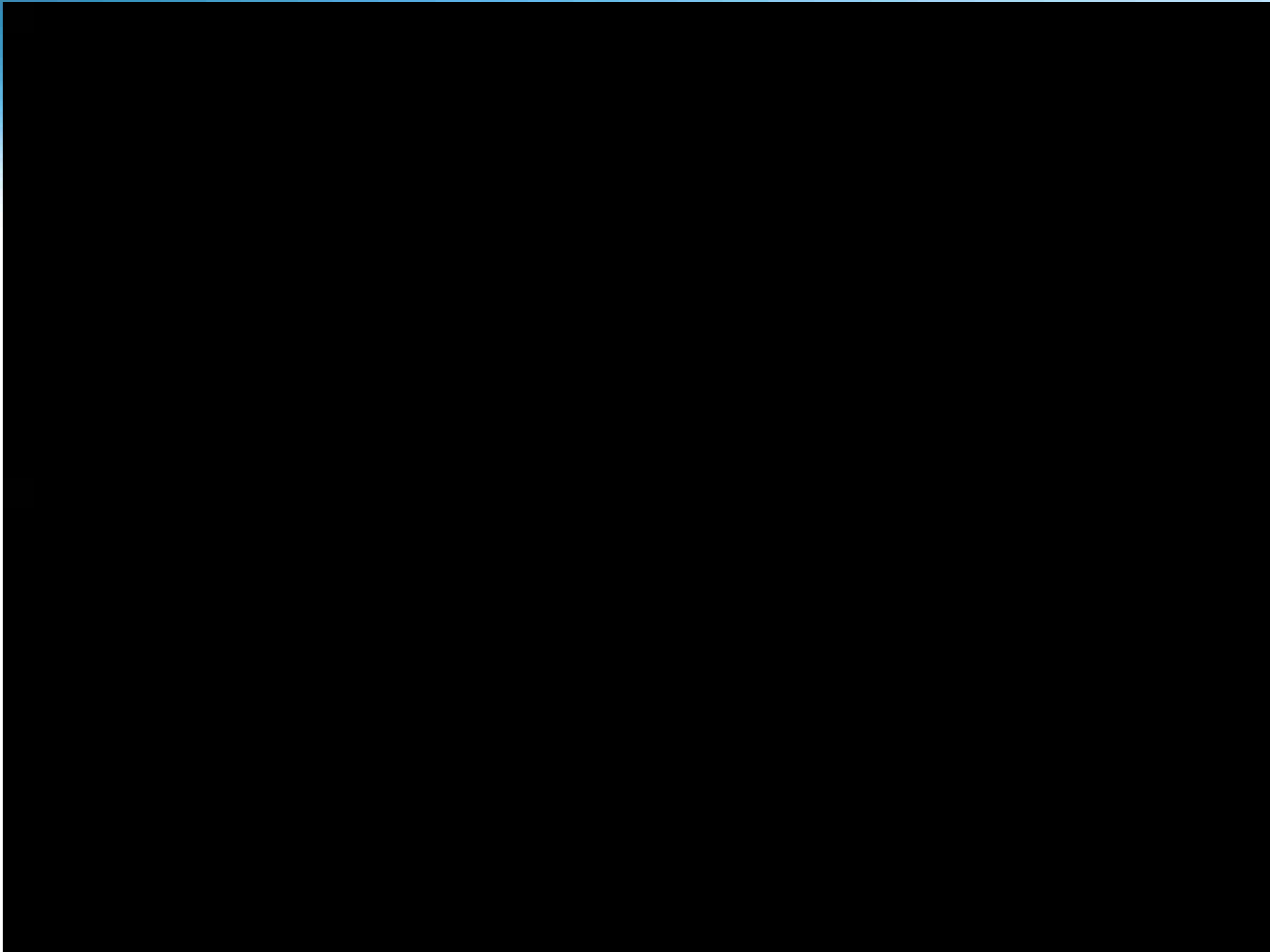


HJS SMF-AR Filter
Automatic Regen
Time to Regen 3-5 minutes

SMF[®] Filter Regeneration

Regeneration Procedure





Cleaning a Sintered Metal Filter

Water clean - Duration 15-20 minutes

- Remove filter from housing.
- Wash the filter from the inlet end.
- Simply rotate the element.
- Air dry the element.
- Re-install the filter element.
- Re-set the DPF display.
- Operate equipment normally



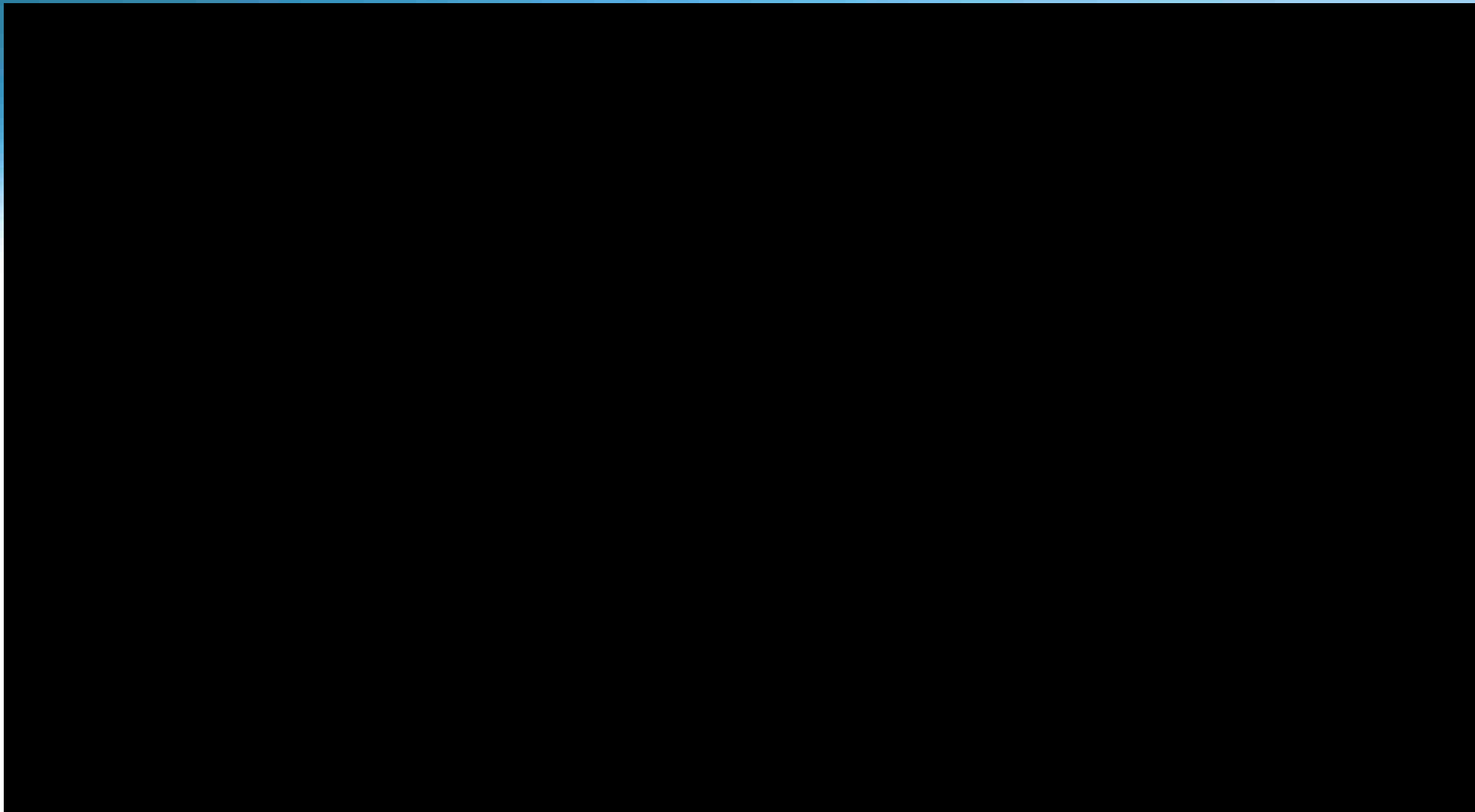
Cleaning Equipment

HJS Sintered Metal filters are cleaned with water
The process take 15-20 minutes

- Cleaning cabinet for mobile and stationary use
- Wasted water will be captured and refurbished
- Separation of soot and water

- Dimensions: 61' X 19" X 19"
- Weight: 81.5 lbs. / 37 kg

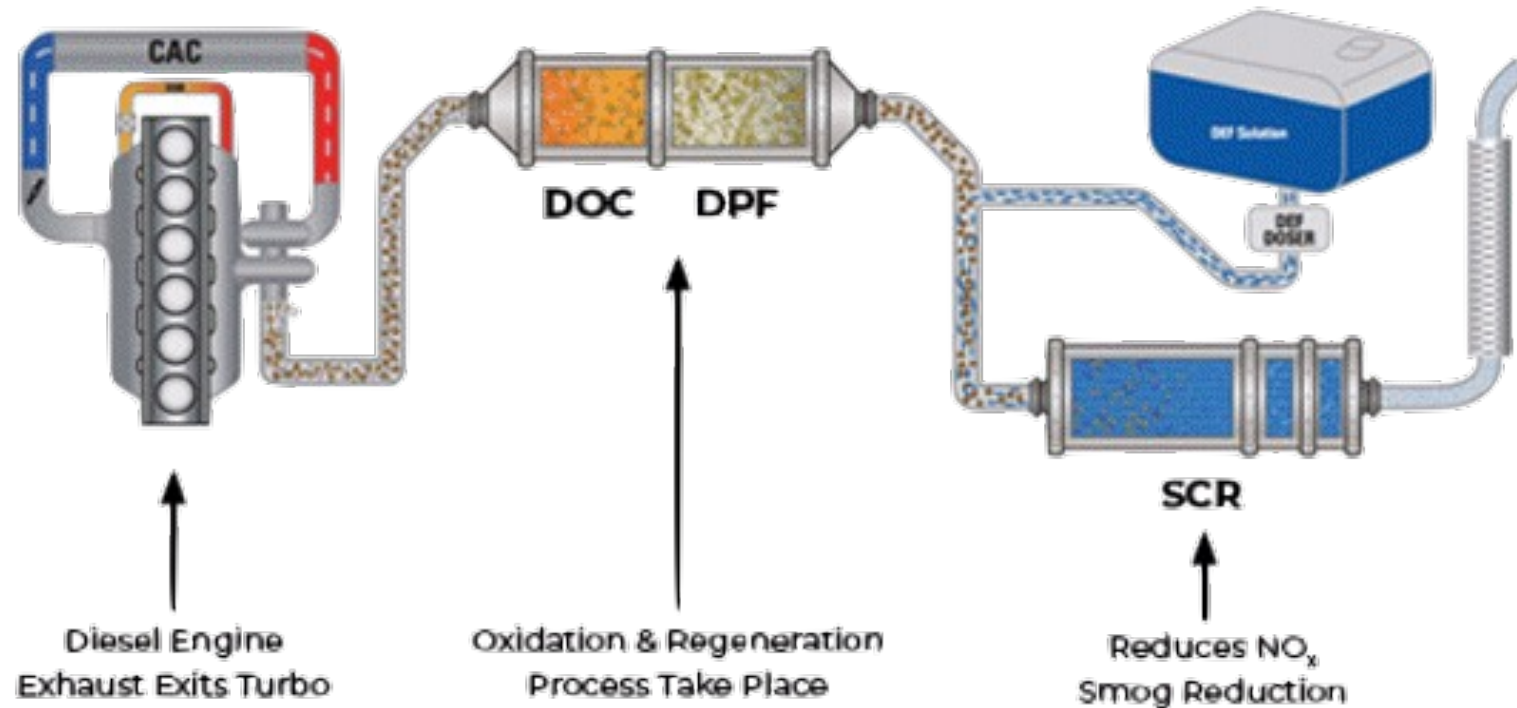




SCR Technology

Basic Aftertreatment System Configuration

System design and component placement may change based on application. The basic aftertreatment technology and functions are constant.



SCRT

1. SCRT[®] - **S**elective **C**atalytic **R**eduction **T**echnology

CRT[®]-System

Stage 1

Continuously Regenerating Trap (CRT)

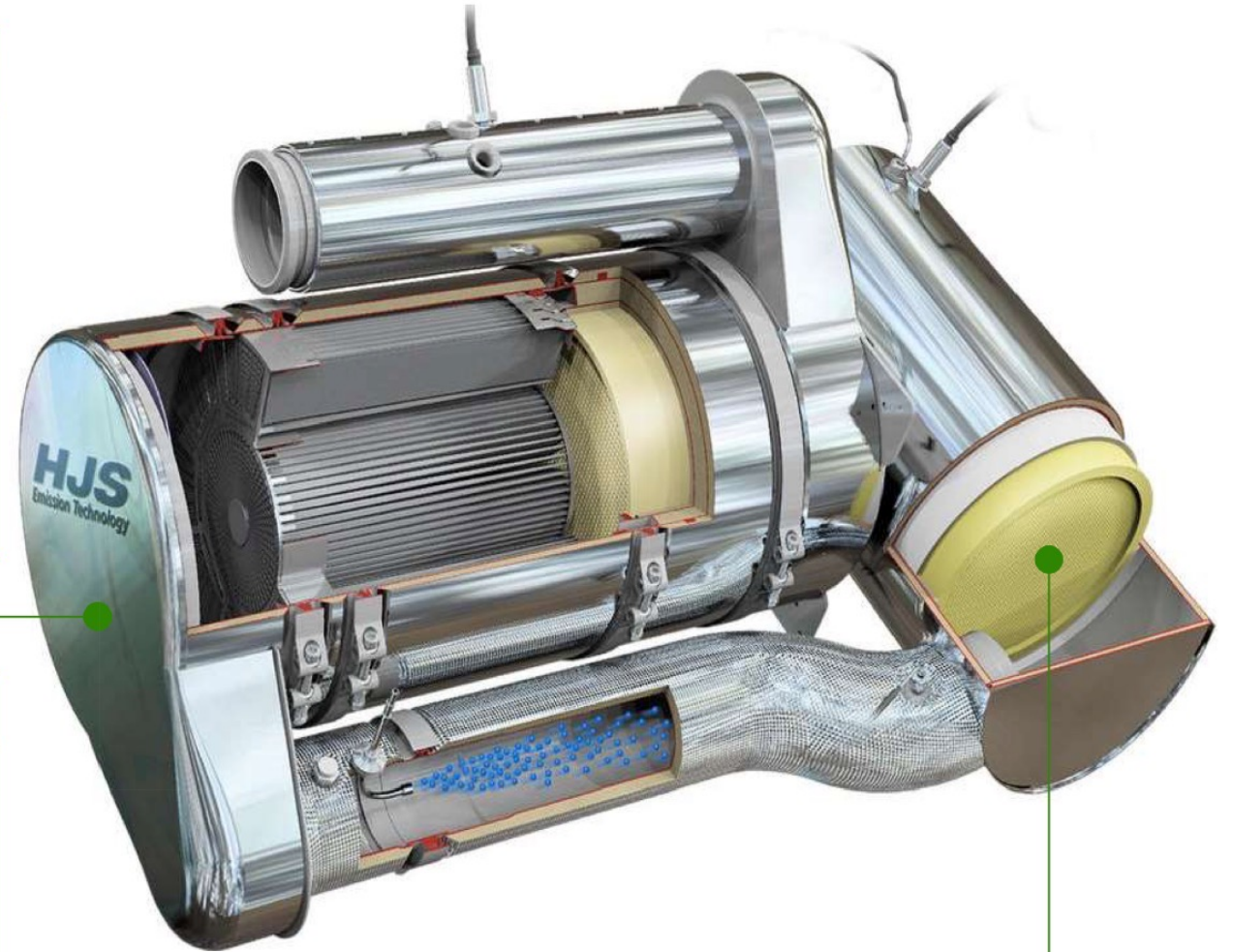
- Reduction of hydrocarbons (HC)
- Reduction of carbon monoxide (CO)
- Trapping and reduction of particulate matter (PM)

SCR-System

Stage 2

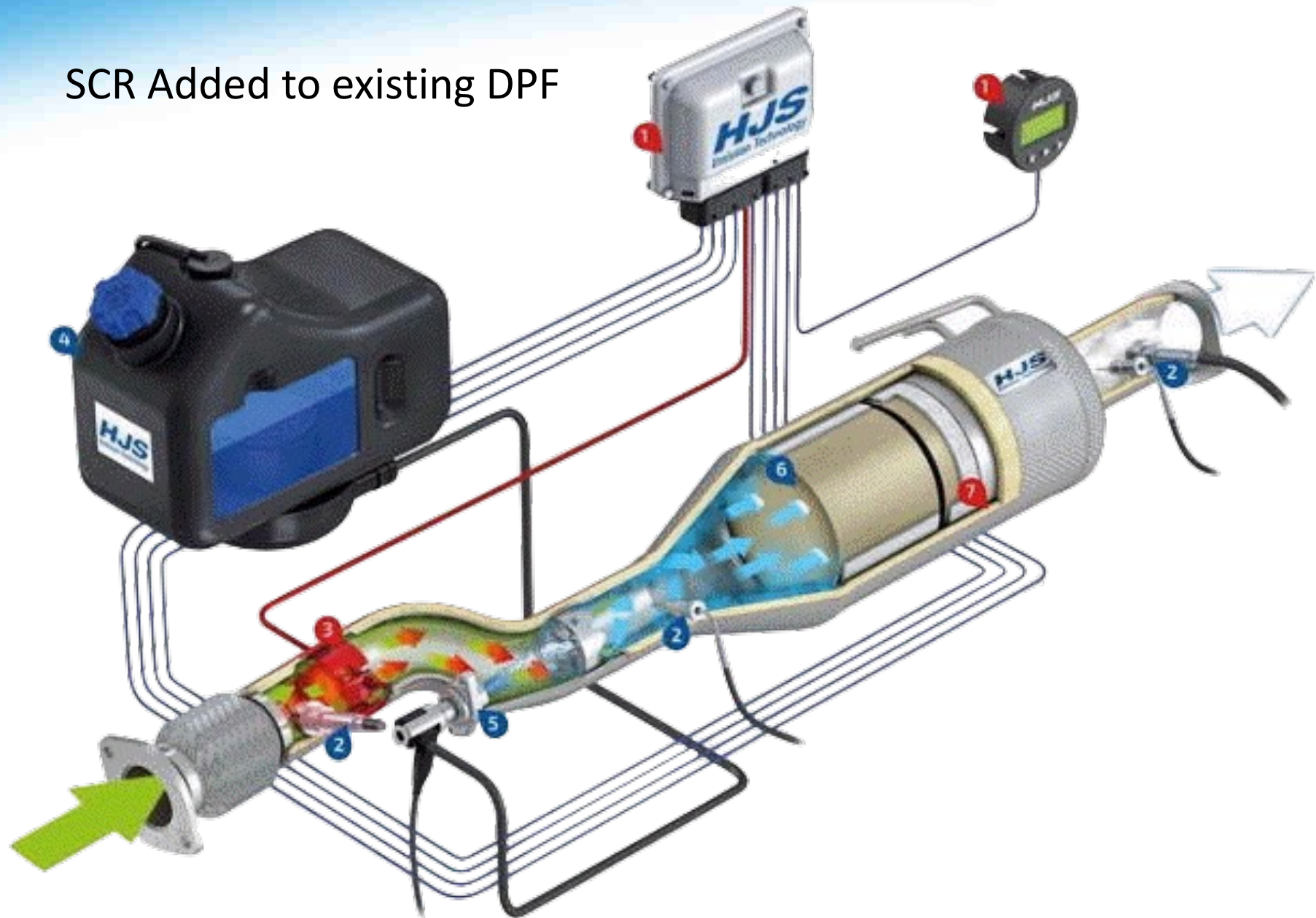
Selective Catalytic Reduction (SCR)

- Reduction of nitrogen oxides (NO_x)
- Reduction of ammonia (NH₃)



HJS has more than 50,000 retrofits in the field

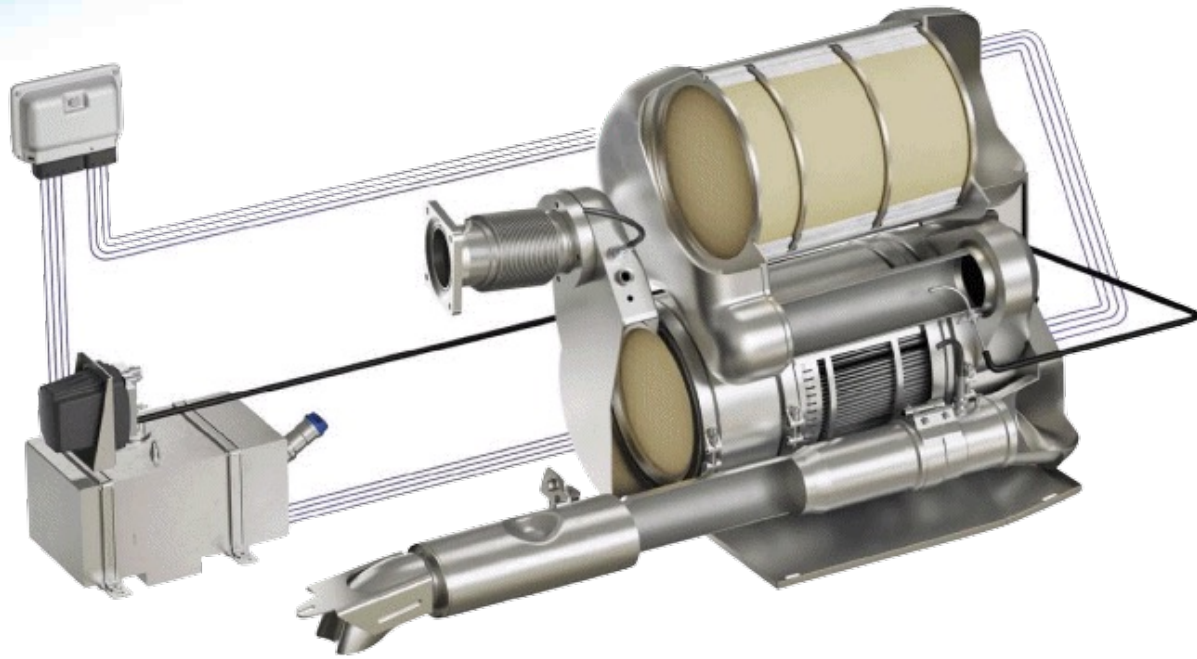
SCR Added to existing DPF



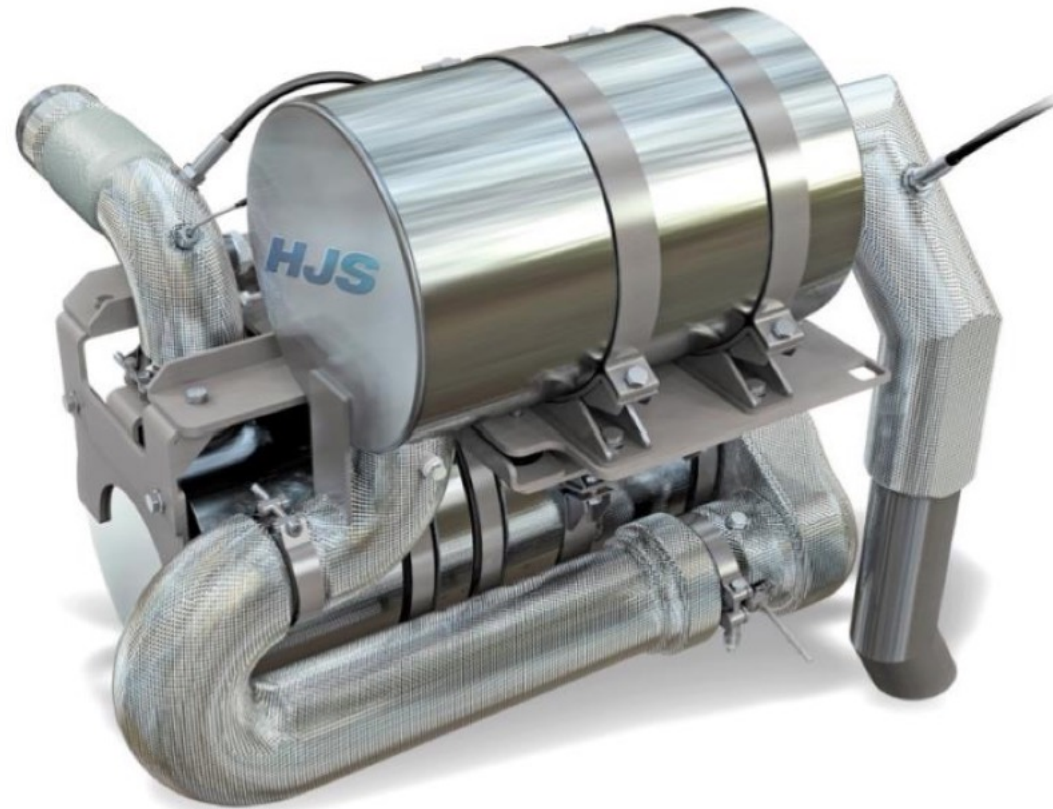
Add-on SCR Module upgrade to existing DPF NO₂ Reduction



SCR



SCRT System



SCR - Loader





Emerging Development Early 2024

Continuous On-Board Real-Time Emission Measurement

Independent NOX/NO2 Sensor

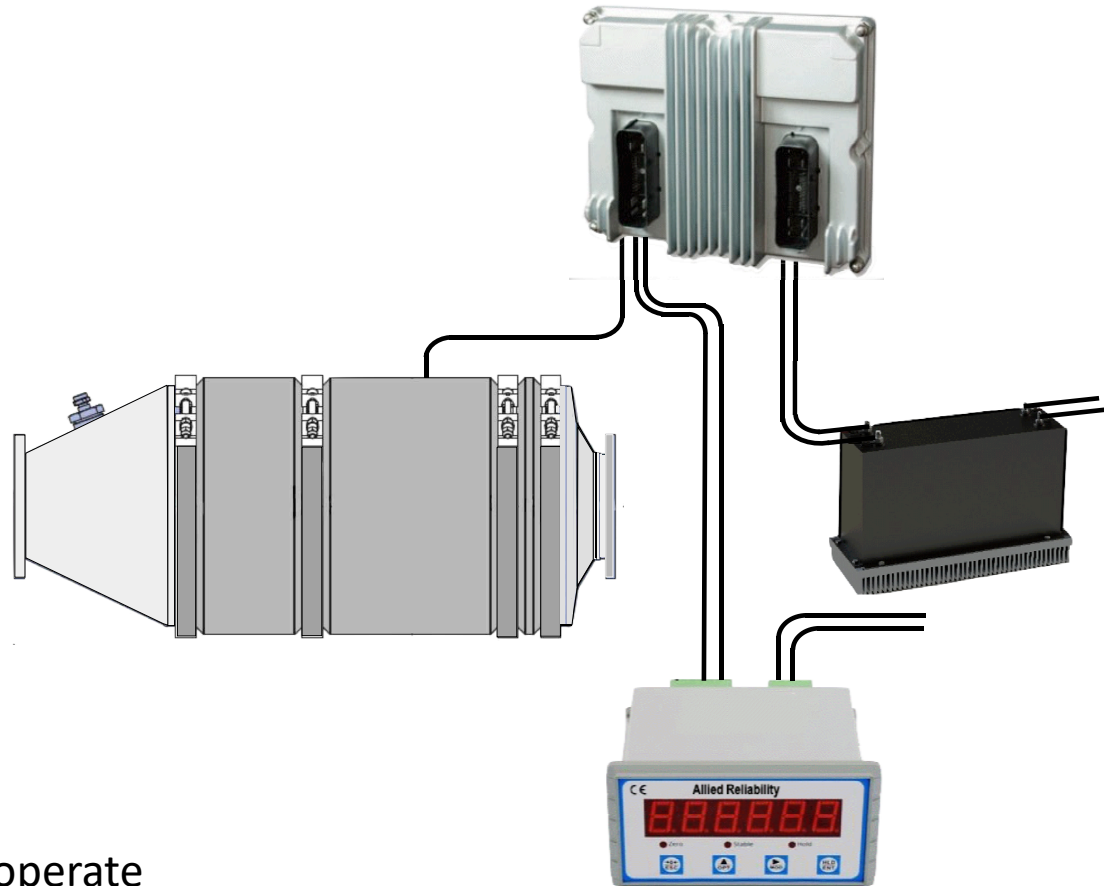
Induction Regeneration for ceramic Filters

Modular In-line DPF/SCR

Emission Sentry

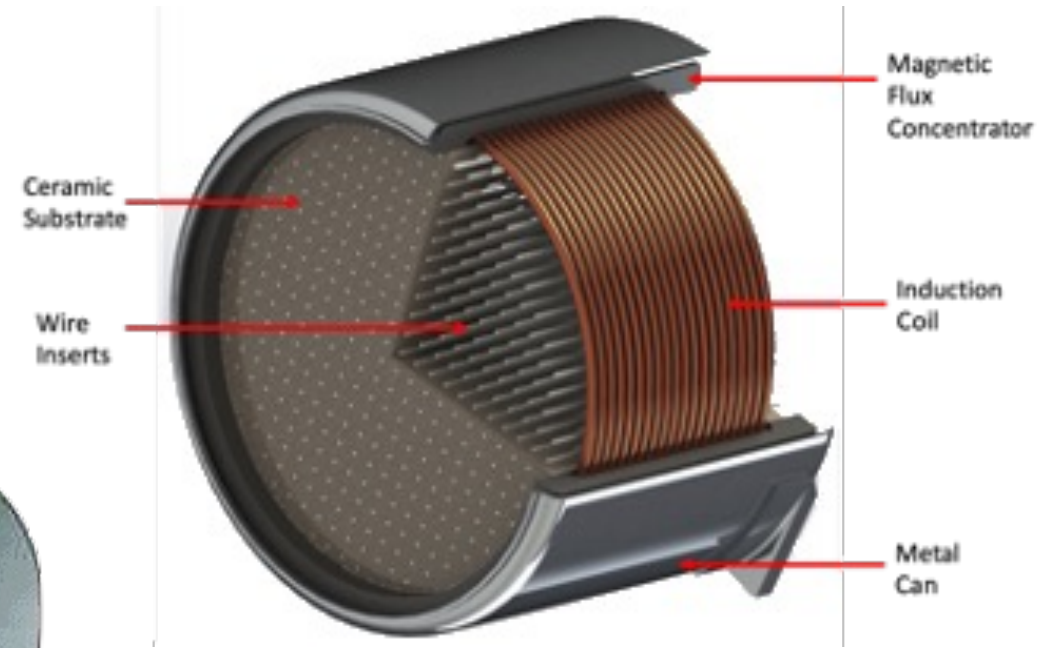
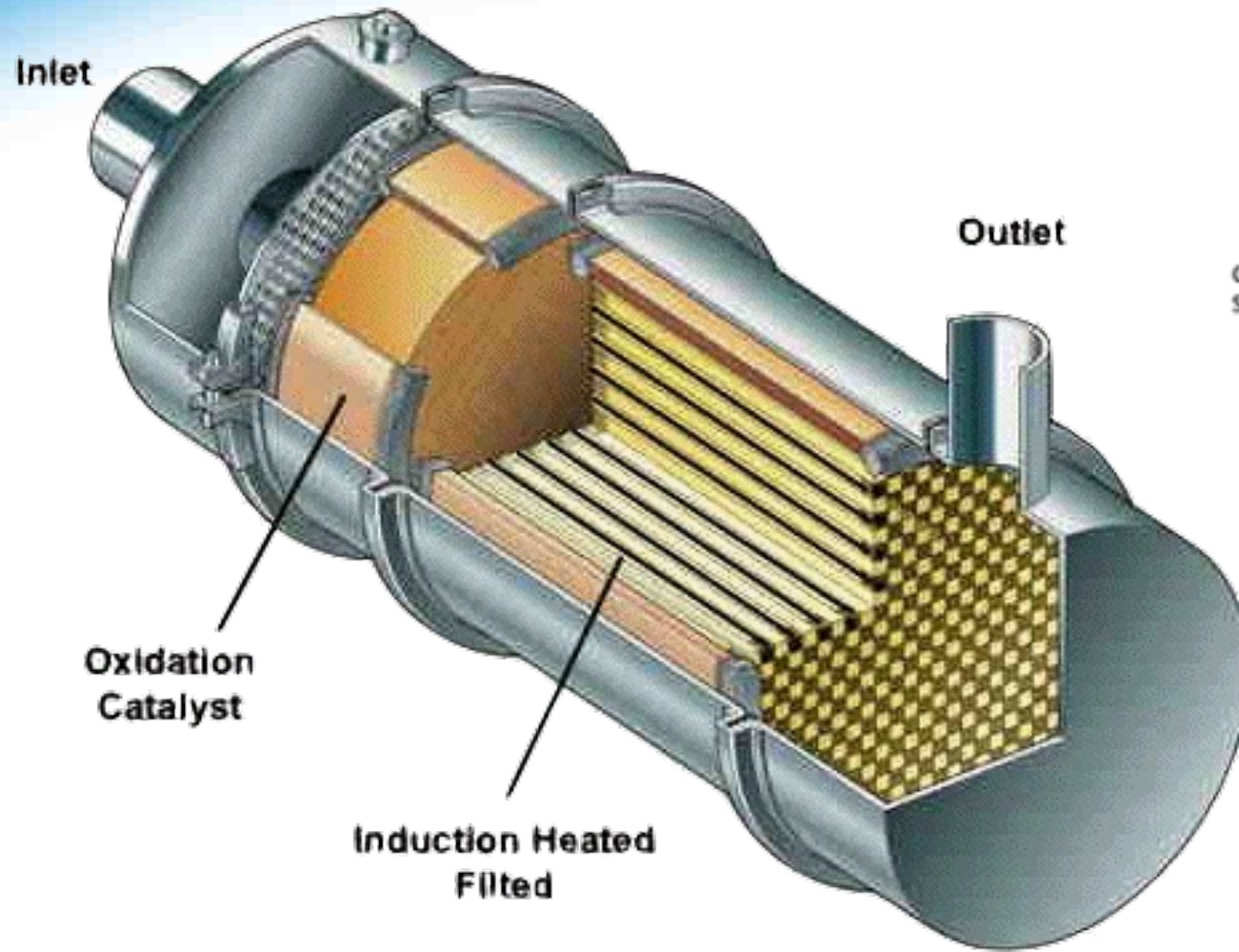
Active regenerated ceramic filters using Induction Heating

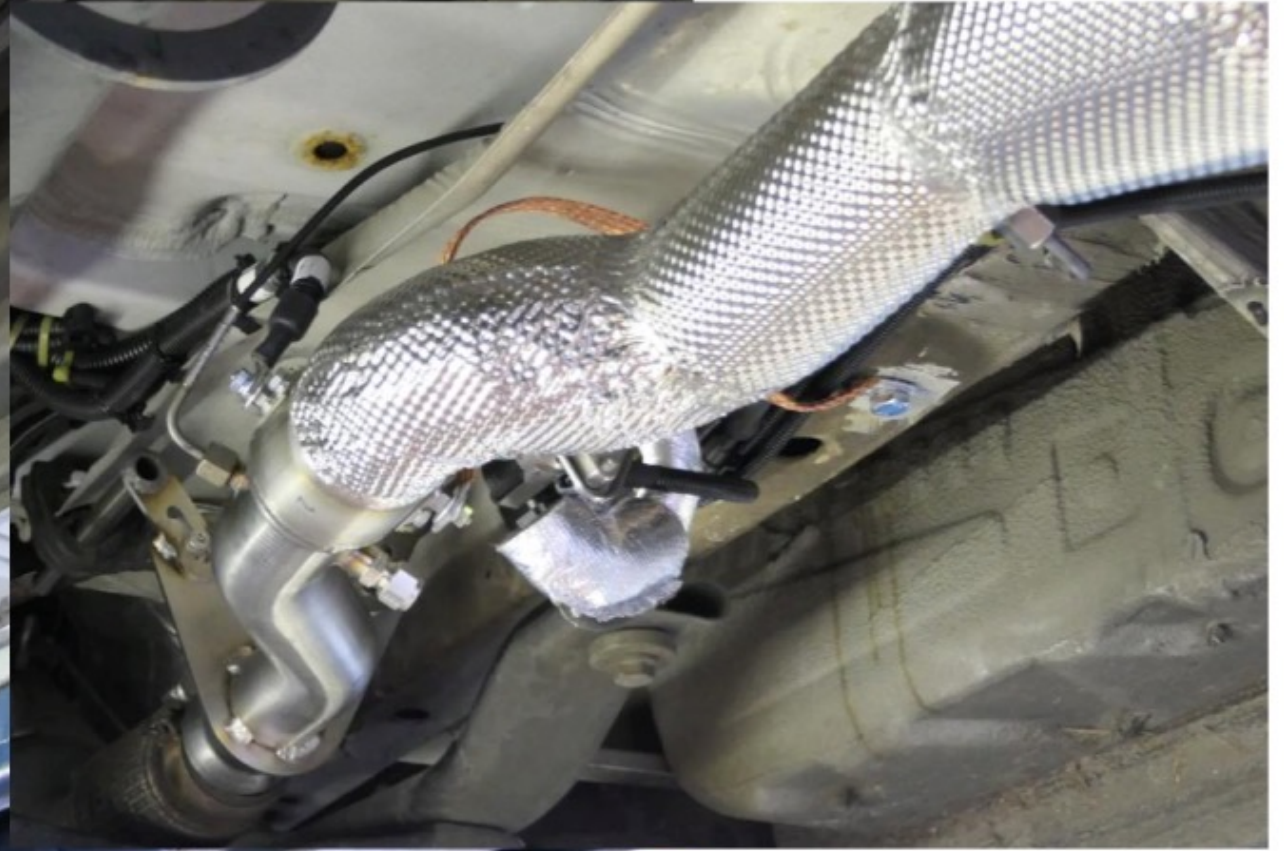
Uniform Regeneration
Regenerates while in use
Rapid Regen
Extends filter life
Extends service intervals



Emission Sentry filters can operate
in the 50 HP – 1,250 HP range.

Increases the efficiency of Ceramic Filters Improvement in regeneration uniformity





Allied Reliability/TF Hudgins

- We offer DPF installation
- Start-up
- Commissioning
- DPF Maintenance
- Training
- Monitoring and Reporting

