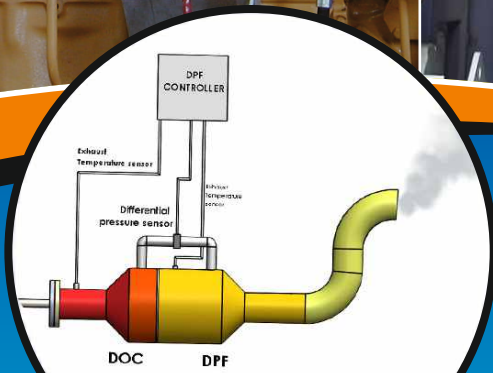
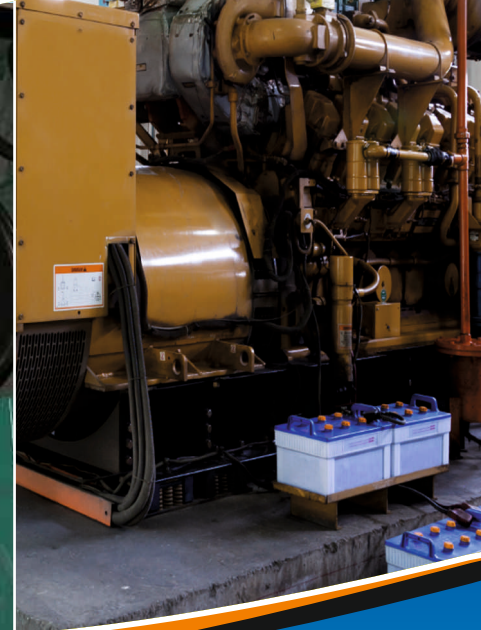
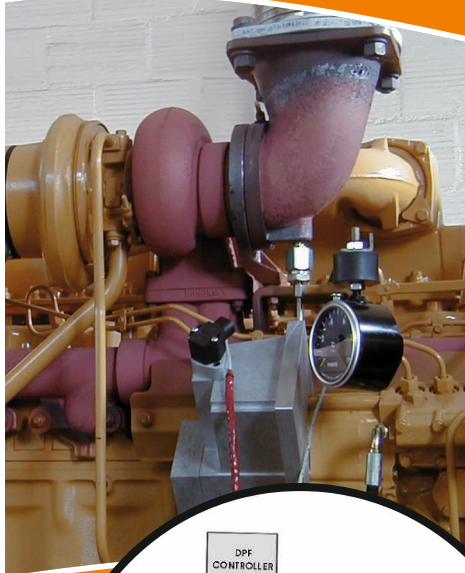
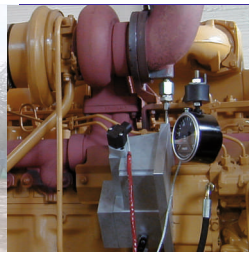


# Romania®

Water Let's save **Blue** & **Green**



**INTRODUCTION TO ROMANIA EMISSION  
CONTROL DEVICES FOR DIESEL FUEL BASED**



1

**Company Profile**

2

**Product Principle Introduction**

3

**Exhaust Aftertreatment**

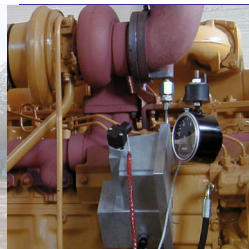
4

**Cases**

**CONTENT**







## Company Profile

**DOC**

Diesel Oxidation Catalyst

**SCR&ASC**

Selective Reduction Catalyst  
& Ammonia Capture Catalyst

**DG Sets**

**POC**

Particulate Oxidation  
Catalyst

**TWC**

Three-way catalytic  
converter

**LNT/NSC**

NOx trap catalyst

**DPF/CDPF/SDPF**

Diesel Particulate  
Filter

**GPF**

Gasoline  
Particulate Filter

**Water-treatment**

**Calibration**

Development Calibration Consulting and Services





# Product Principle Introduction

## Post-processing Technology Route

High Efficiency

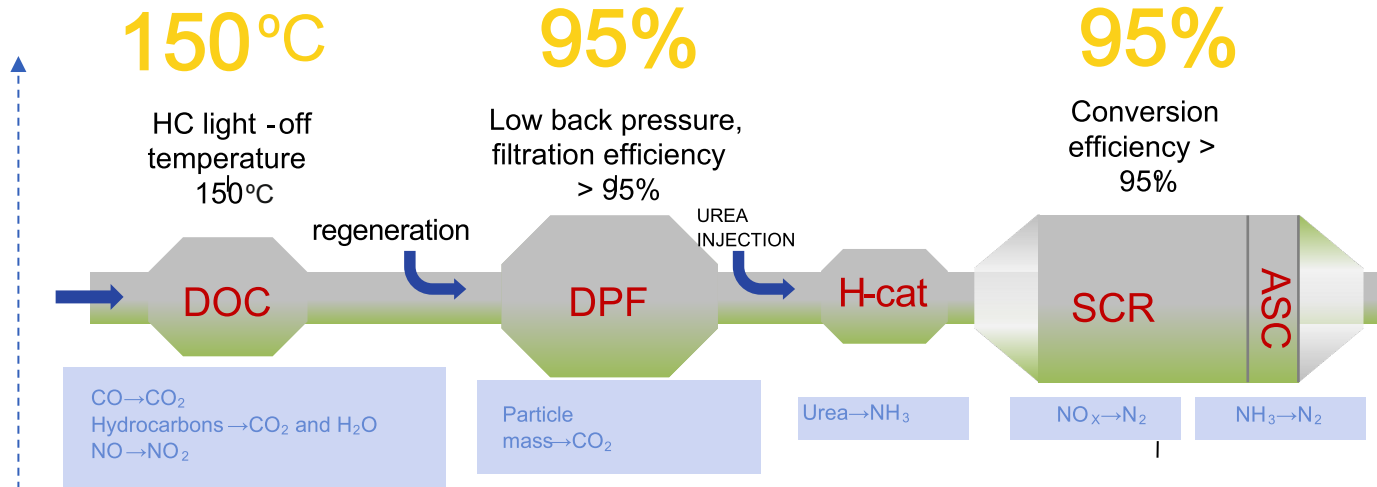
Integrated

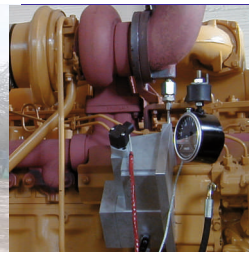
Durability

Economical

Low Cost

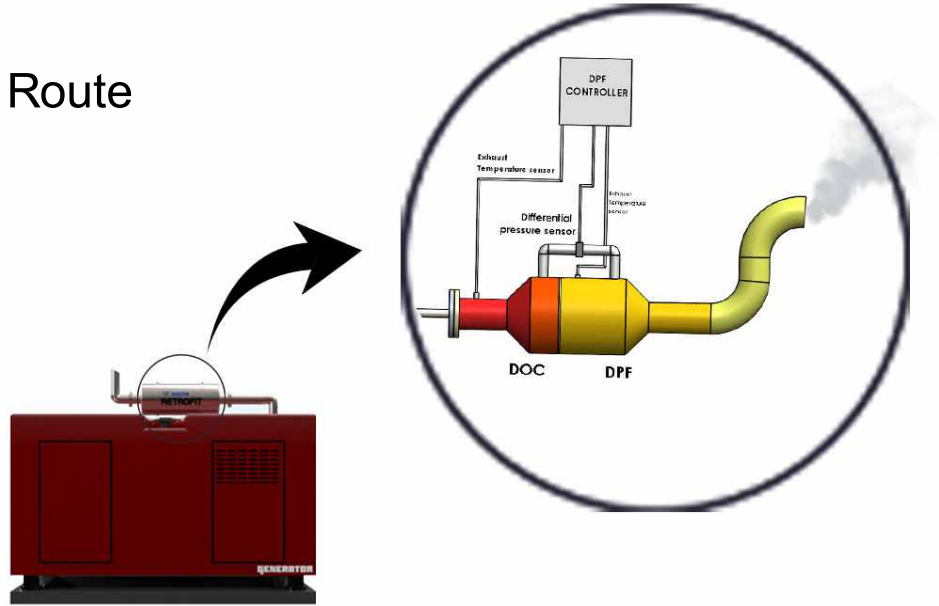
High Stability





# Product Principle Introduction

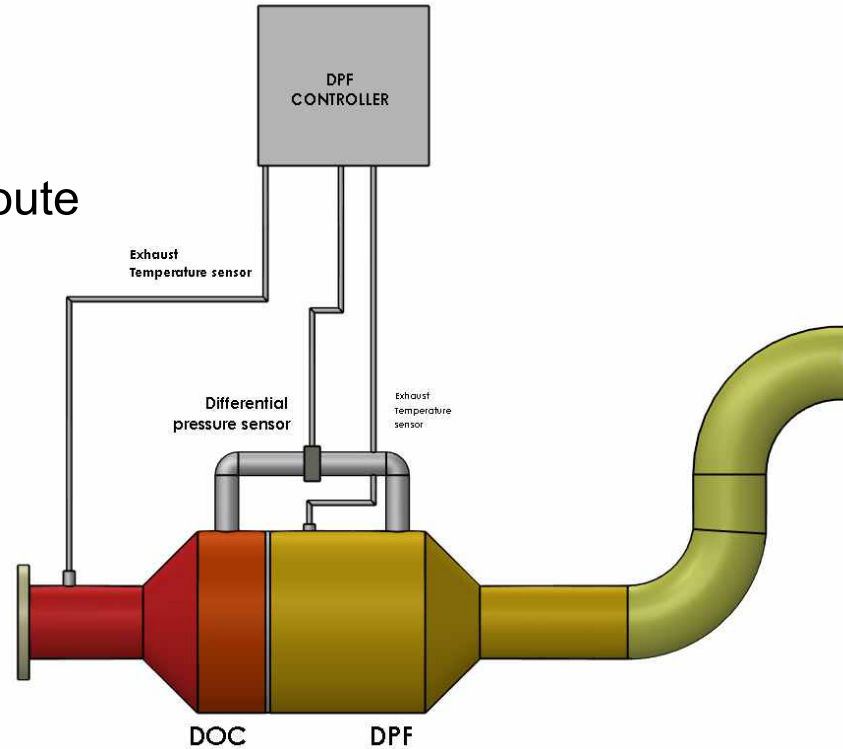
Post-processing Technology Route



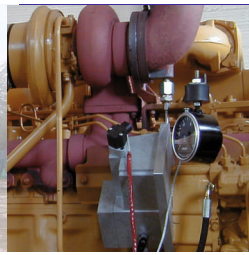


# Product Principle Introduction

Post-processing Technology Route







## Exhaust Aftertreatment

Romania developed the emission control devices (retrofit) for diesel fuel based generator sets and marine, we have developed an exhaust after treatment system for engines up to 800KW.

From the processing effect, it can be divided into:

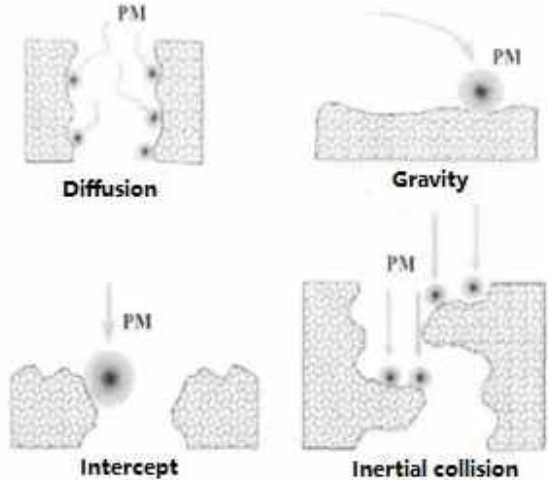
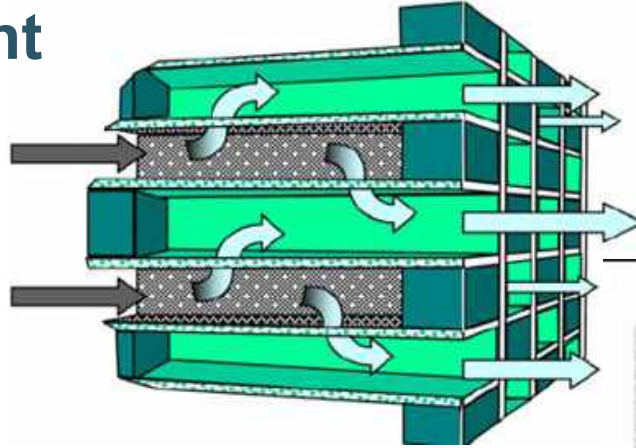
1. DPF:-It mainly deals with PM (smoky particles) components in the exhaust gas.
2. DOC:-It mainly deal with CO, HC (carbon monoxide, hydrocarbon) components in the exhaust gas.
3. SCR- It mainly deals with NOX (nitrogen oxides) components in the exhaust gas.



## Exhaust Aftertreatment

### DPF structure and working principle:

The DPF filter body is a ceramic carrier with the small holes at both ends blocked. The diesel exhaust gas enters the intake port. Because the end of the intake port is blocked, the exhaust must pass through the filter wall of the intake port and enter the adjacent exhaust port. The exhaust channel discharges the exhaust gas into the atmosphere, and the particulate matter in the exhaust gas is filtered and trapped by the filter wall during this process as the picture shows.

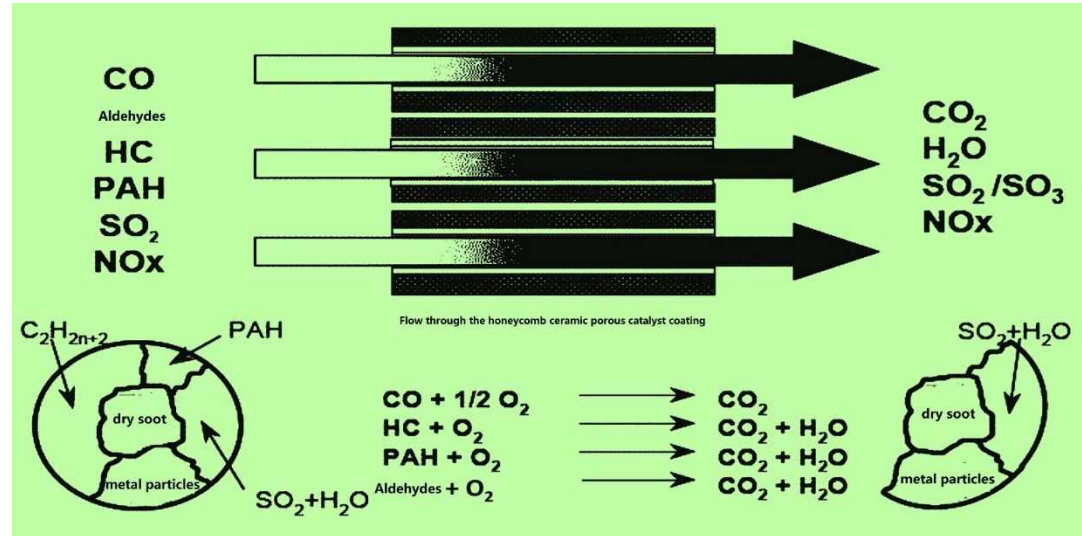




## Exhaust Aftertreatment

### DOC structure and working principle

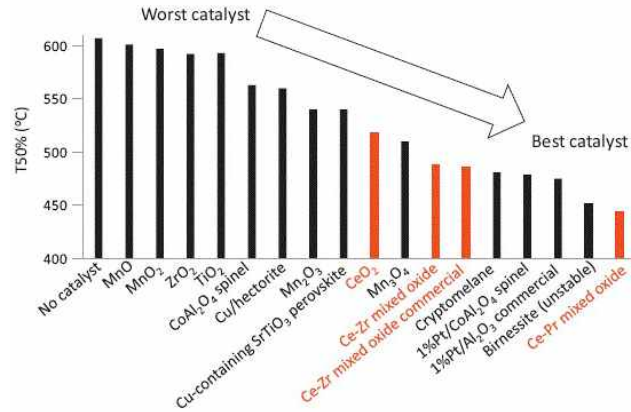
Under the action of precious metals, HC, CO, in the exhaust gas of the engine undergo oxidation reaction to generate  $\text{CO}_2$  and  $\text{H}_2\text{O}$ . At the same time, the exothermic reaction in this reverse process can appropriately increase the exhaust temperature of the engine. The role of the DOC system is to provide a chemical reaction site and a catalyst required in the chemical reaction process. As the picture shows







## Exhaust Aftertreatment



**Regeneration of different types of catalysts 50% regeneration temperature**

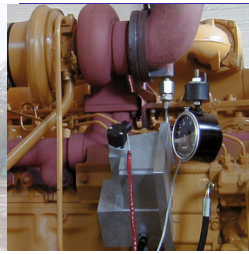


**Coated catalyst**



**Uncoated catalyst**

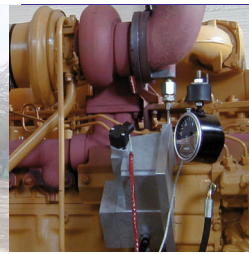
Commonly used catalysts are noble metal catalysts (such as platinum Pt, etc.), low melting point catalysts (including  $V_2O_5$ ,  $MoO_3$ , etc.), alkali metal catalysts (including oxides and salts of K, Cs, etc.), transition metal composite catalysts (including perovskite, etc.) or  $(ABO_3)$  and spinel  $(AB_2O_4)$ , etc.). In contrast, precious metals have better effects and are more expensive; alkali metals have good activity but are prone to sulfur poisoning; perovskite catalysts have good activity, strong stability, low price, and better anti-sulfur poisoning effect. Considering the activity, stability, anti-toxicity and application cost of the catalyst, the perovskite catalyst is better, but the precious metal is more suitable in terms of effect.



## RECD Monitoring system

Main components of RECD system:

- (1) Temperature Sensor;
- (2) Pressure Sensors;
- (3) Display Unit;
- (4) Online Monitoring .

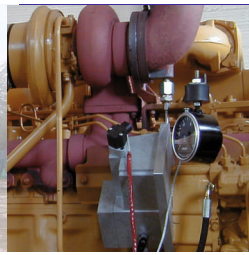


# Temperature & Pressure Sensors

## Pressure Sensors

The main function of the differential pressure monitoring system is to determine the amount of particulate matter captured in the DPF by monitoring the exhaust back pressure at both ends of the DPF filter at different temperatures. At the same time, it can also monitor the changes in the relevant pressure and temperature during the regeneration process.



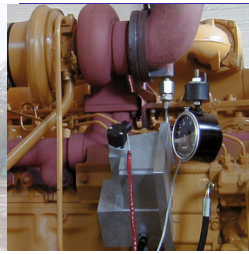


## Temperature & Pressure Sensors

**Temperature Sensors** :- There will be two Temperature sensor in the retrofit device to measure the temperatures at the different locations.

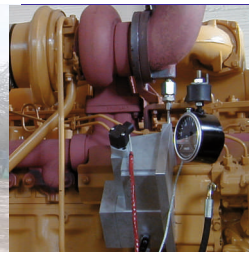
**Temperature Sensor 1** :- Detect whether the temperature before DPF reaches the target regeneration temperature @ 200 Deg. C.

**Temperature Sensor 2** :- temperature after DPF to prevent the regeneration temperature from being too high and cause damage to the DPF carrier

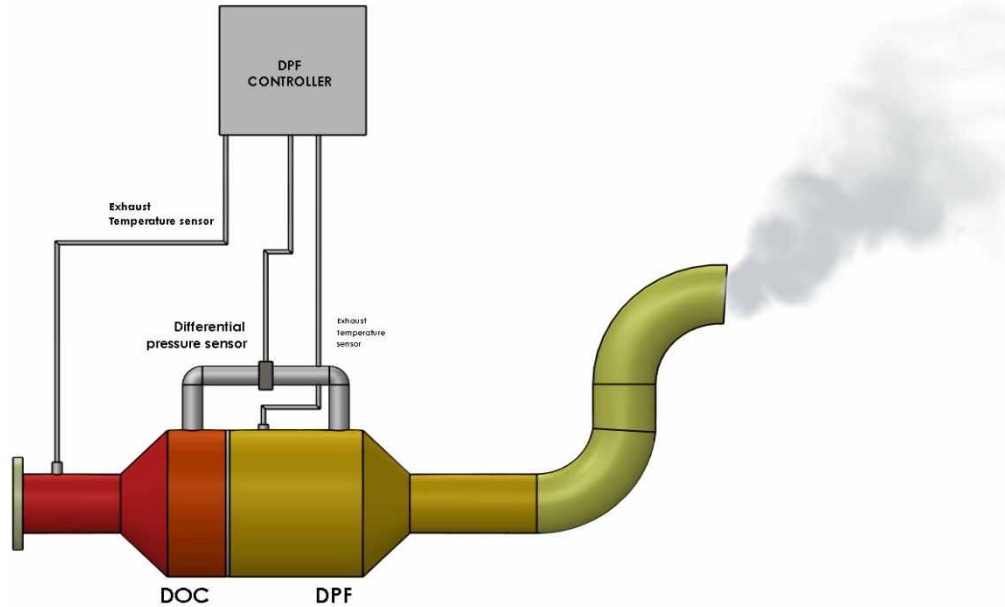


## REF - Control Device

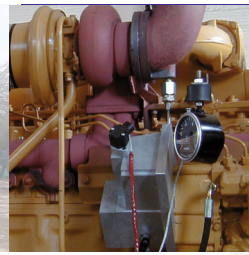
**Romania Retrofit Control Device (REF - 8000 Series)** :- REF - Control device is to monitor the healthiness of the RECD (Retrofit Emission Control device), it monitors the continuously the Pressure level & temperatures of the RECD with visible alarm indication. Online enable REF Control devices with internet and cloud-based options are available with an optional, it enables user to view the pressure and temperature levels, in web-based application and it alerts the user through mails, so that user can act immediately for preventive actions



# Temperature & Pressure Sensors installation locations





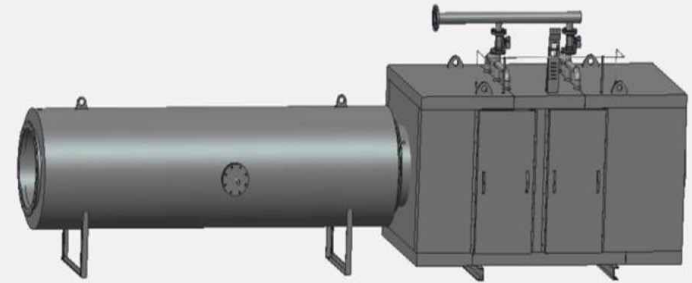


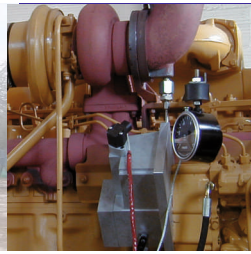
## Exhaust Aftertreatment

(2) Large packaging

Package design advantages:

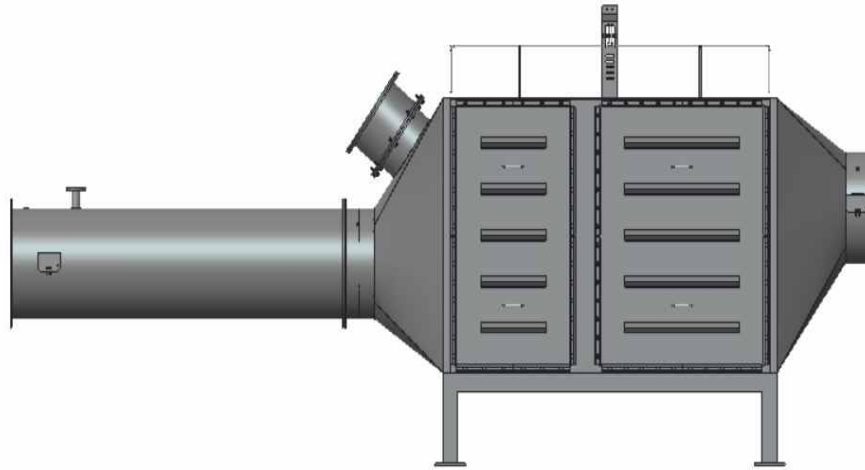
1. Add a third layer of skeleton to reserve upgrade space for later emissions;
2. For gas engines, the design height difference between the intake and exhaust ports can effectively reduce the risk of deflagration caused by the accumulation of natural gas in the purifier due to incomplete combustion of the engine;
3. In order to facilitate later disassembly and maintenance, the disassembly and maintenance port can cancel the original full - flange bolt fastening structure and upgrade it to a detachable movable door.

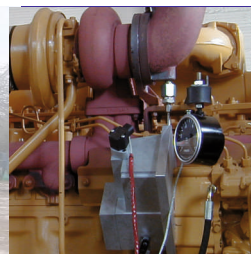




## Exhaust Aftertreatment

Inlet and exhaust port height difference for gas engine design





# Exhaust Aftertreatment

Detachable Movable Door



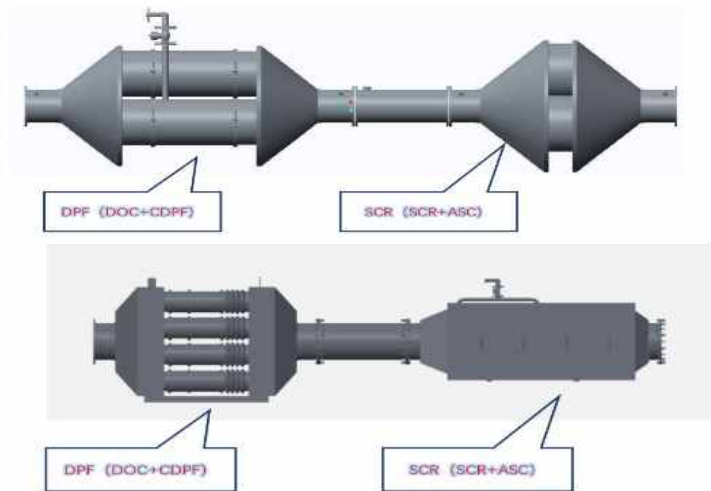




## Exhaust Aftertreatment

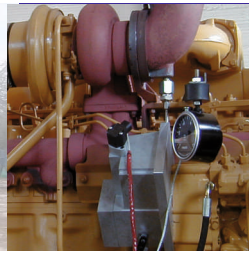
Post-processing combination layout

Cylinder type double drop layout scheme



1. Products below 500kw are planned to have a cylindrical design, and the injection system is planned to be a small pump injection system for vehicles, which can basically cover the needs of the small power bench transformation, generator sets and inland marine markets
2. The products above 500kw are planned with a square design, and the injection system is planned with a large-flow injection system, which can basically cover the market demand for high-power bench transformation, generator sets and marine medium-speed engines
3. Model spectrum is designed in double rows, and a third-row reserved layer can be added according to customer needs
4. For double drop demand, it can match DOC and DPF products
5. The size of the pattern spectrum is the reference basis, and can be adjusted to the special shaped design according to the actual situation

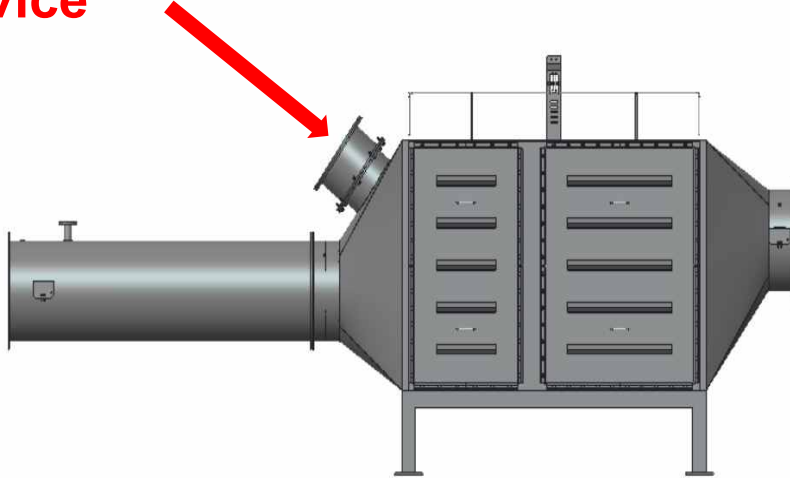




## Cases

2100KW Gas Generating Set SCR Reconstruction Project

**Explosion pressure protection device**





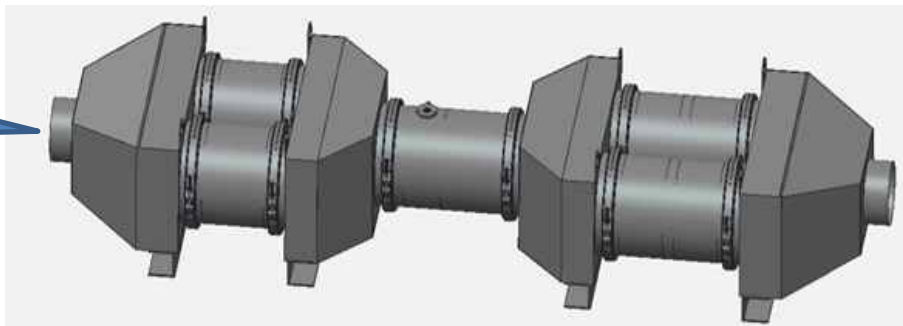
## Cases

### Generator set project



100KW  
DOC+DPF

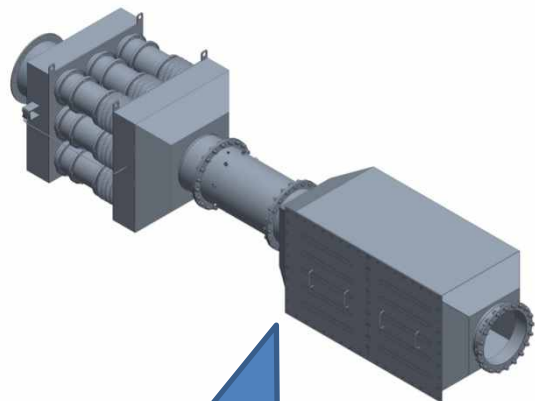
300KW  
DOC+ DPF+SCR





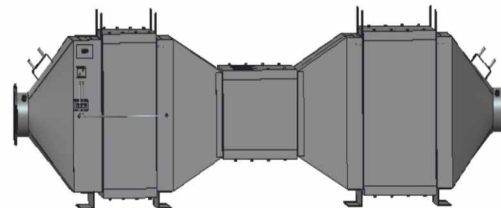
## Cases

### Generator set double drop project

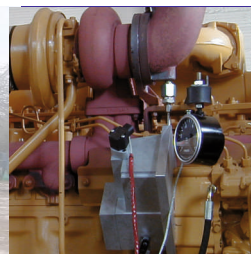


1000KW  
DOC + DPF

440KW  
DOC + DPF

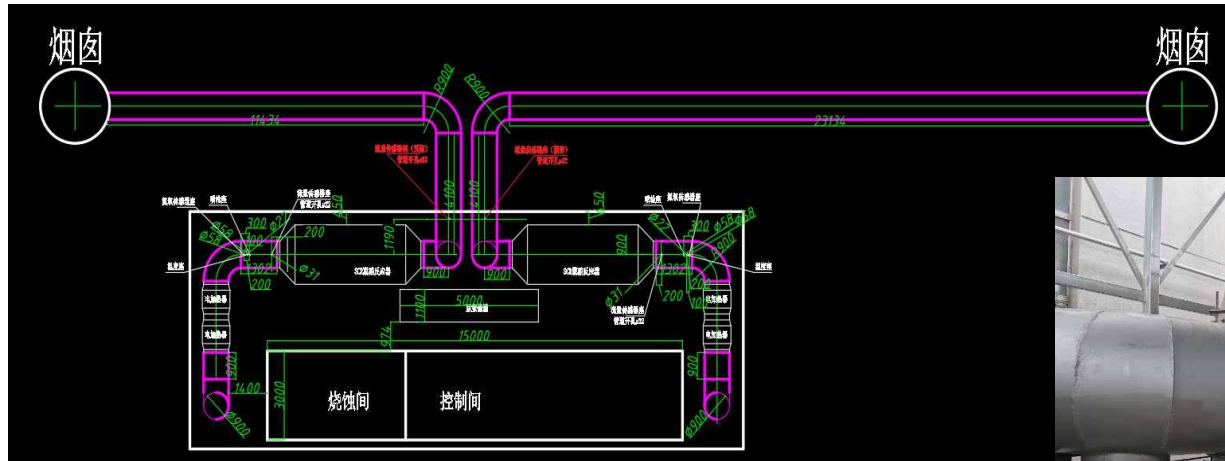




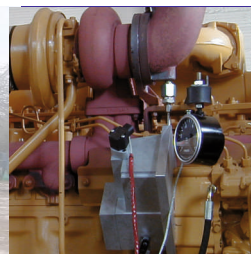


## Cases

SCR reconstruction project of 4000KW marine engine test bench



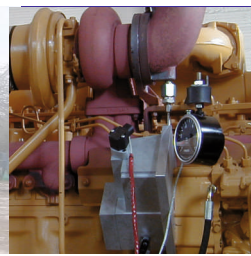




## Cases

500KW engine test bench double down transformation project



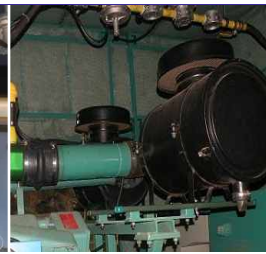
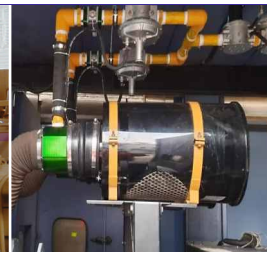
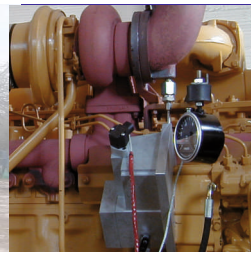


## Cases

1200KW Biogas Generating Set SCR Reconstruction 6T biogas boiler SCR renovation project







## Cases

### Transformation Project of 1200 KVA Biogas Generator Set





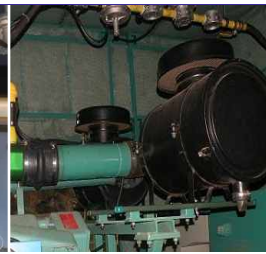
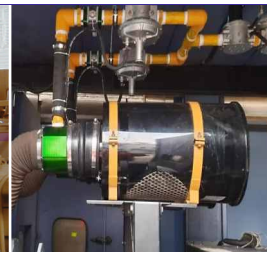
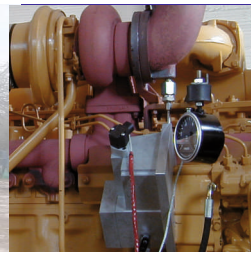
## Cases

2100KW engine test bench DOC&CDPF  
reconstruction project

3000KW engine test bench DOC&CDPF  
reconstruction project

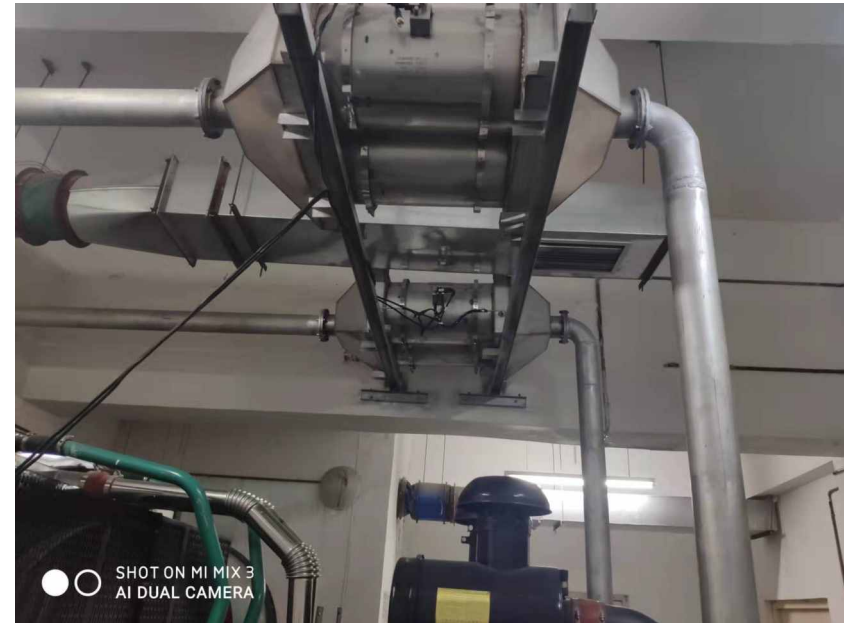






## Cases

600KW standby generator set DPF reconstruction project



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