CORNAGLIA®

MOVING FROM TOMORROW

Engineering and Innovation Center

ENGINEERING & INNOVATION CENTER

50 highly specialized engineers.

They are committed to the creation of **innovative solutions** according to the Cornaglia product development process, managed with the **APQP methodology** and **ISO-TS certified**:

- Analysis of the **customer needs**
- System design and **preliminary verification** with the aid of CAE (Computer-Aided Engineering) tools
- **In-house prototype** production
- Validation of the system through **engine tests** and **laboratory tests**

OVERVIEW

- Established in 1978
- Italy headquarter in Grugliasco-Villarbasse (TO), Italy
- 2.500 m²
- 40 people in 2022

Product Development Management

ENGINEERING

VIRTUAL ANALYSIS (CAE)

PROTOTYPES

TESTING

PROJECT QUALITY

INNOVATION

GLOBAL PRESENCE STRATEGY

INDIA

- New R&D Center JV Mangla Cor-Tubi (2024)
- R&D Center JV LCAT

TURKEY

- R&D office

BRAZIL

- R&D office

CHINA

- R&D office (2024)

Engineering and Innovation Center
Highlights

- 3,5% **turnover** spent in Research & Development
- 50 **Patents** filed in the last 10 years
- Dedicated team to Research and Market survey
- Research and Innovation Projects
- Link with main Italian and European **Universities & Research Centers**
- Agreement with **Politecnico of Turin** (since 2013) on:
  - Thesis support, internships and doctorates also targeted to recruitment
  - Partnership contracts for research projects
  - Participation of Cornaglia as Industrial Partner of Politecnico to calls for funded research projects
  - Cornaglia presence with its own Office within the Politecnico Campus

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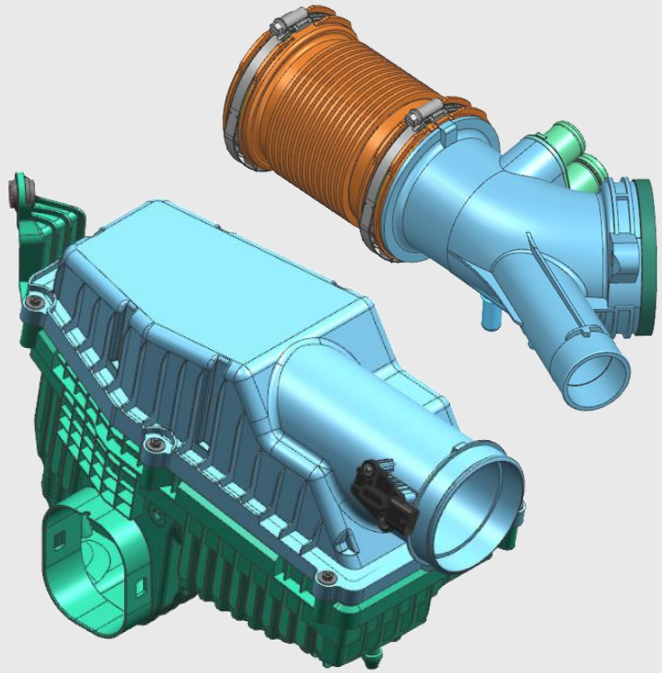
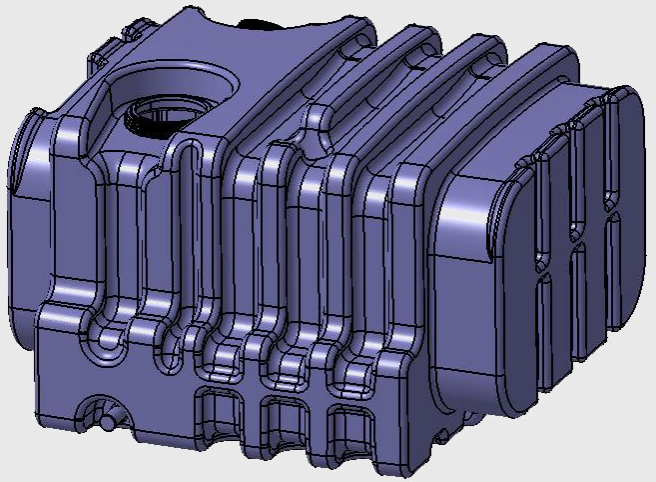
Cornaglia design capabilities and tools

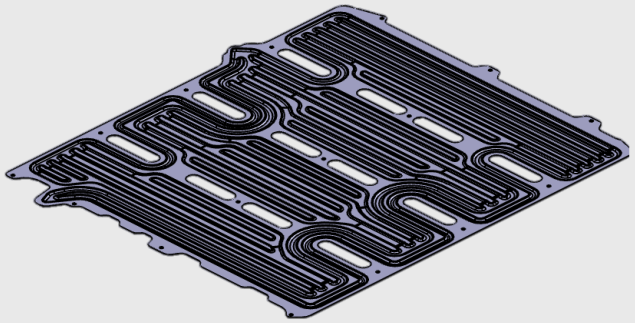
Starting form customer input, Cornaglia design own full capabilities to taylor the products according to Customer expectation and targets.

CAD Tools:

- CATIA Release 5.27
- NX (Unigraphics) Release 19.19



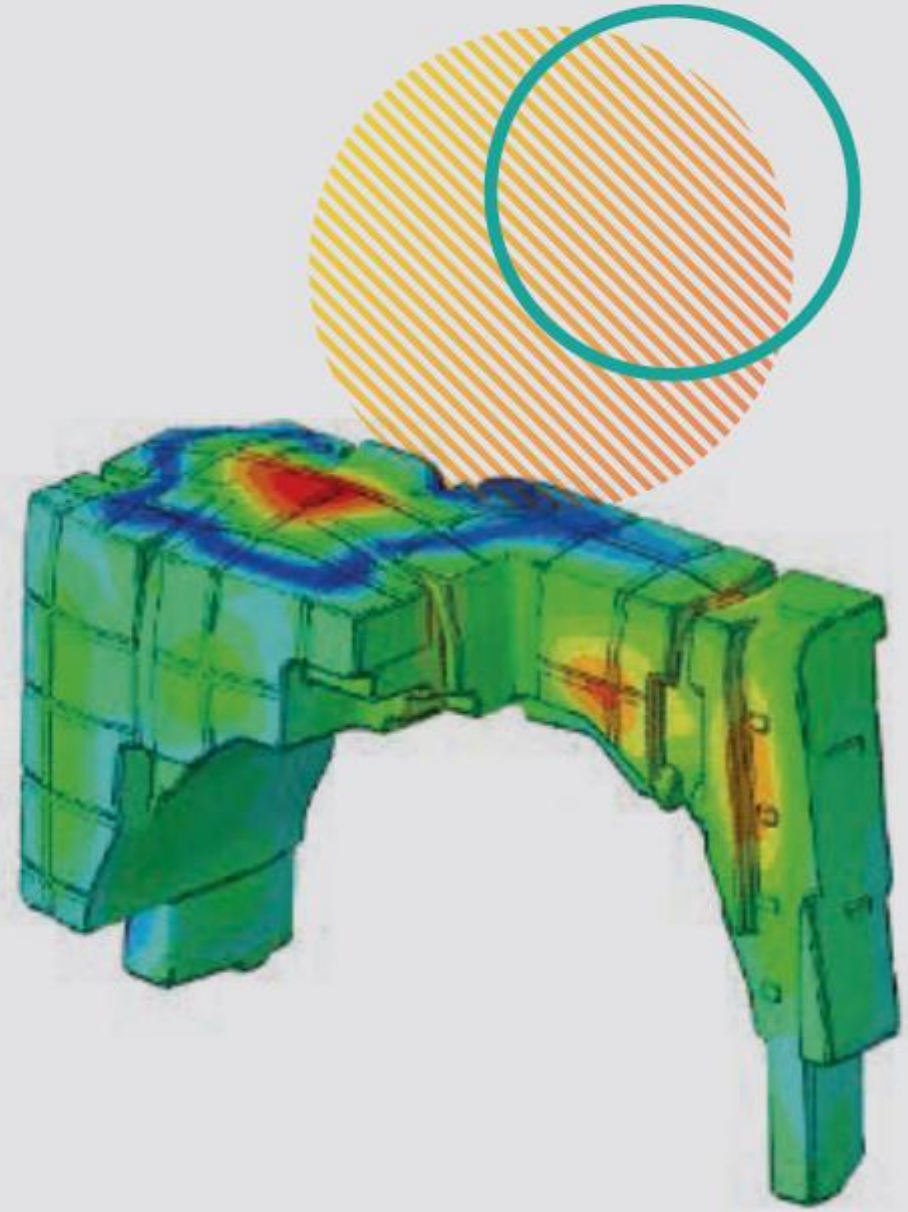




CAE CAPABILITIES

Full coverage of virtual simulation tasks for all product lines

- Pre/Post-processing
- CFD Single-phase/Thermal
- CFD Multi-phase/Urea injection
- FEM Linear/Dynamic
- FEM Non-linear
- NVH 1-D Acoustic
- NVH Vibro-acoustic/Aero-acoustic



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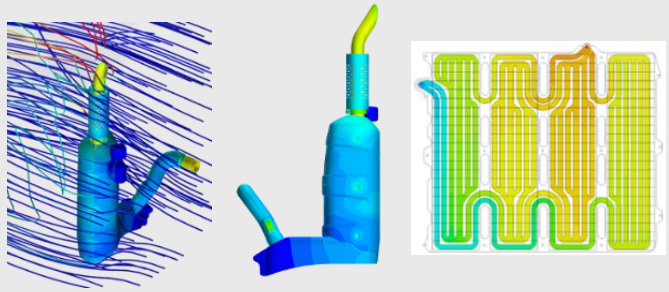
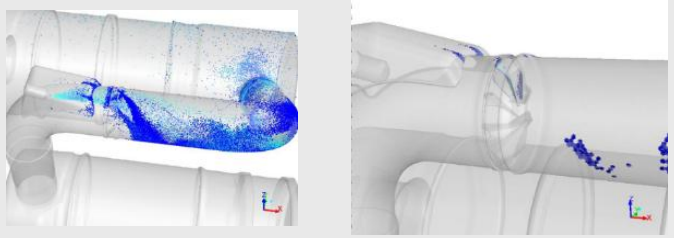
Cornaglia CAE capabilities and tools - CFD

Analysis	Solver	Output	Application
CFD Single phase Thermal	SIEMENS STAR-CCM+® Ansys		ATS Off-Road Tractor Battery Cooler
CFD Multi phase Urea injection	CONVERGE CFD SOFTWARE		ATS Off-Road Tractor

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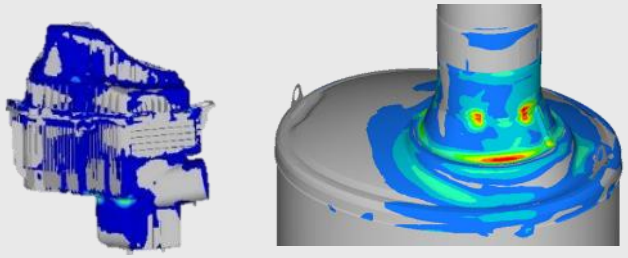
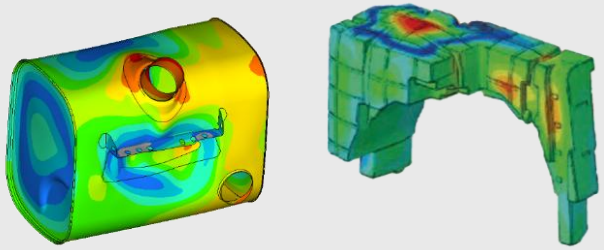
Cornaglia CAE capabilities and tools - FEM

Analysis	Solver	Output	Application
FEM Linear Dynamic	Nastran MSC Software		ATS/AIS On and Off-Road
FEM Non linear	SIMULIA ABAQUS		ATS/Tank On-Off Road

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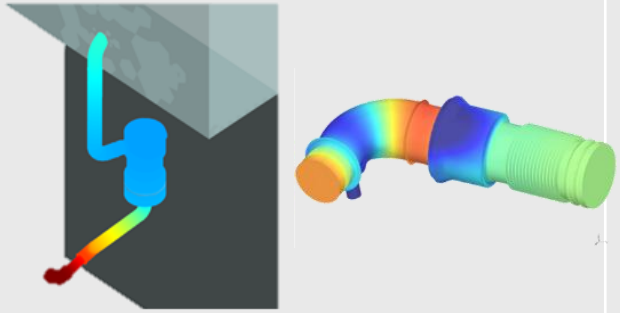
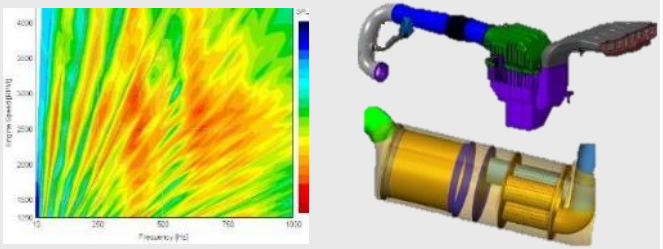
Cornaglia CAE capabilities and tools - NVH

Analysis	Solver	Output	Application
NVH Vibro acoustic Aero acoustic	Actran™ MSC Software		ATS/AIS On and Off-Road
NVH 1D	GT Gamma Technologies		ATS/Tank On-Off Road

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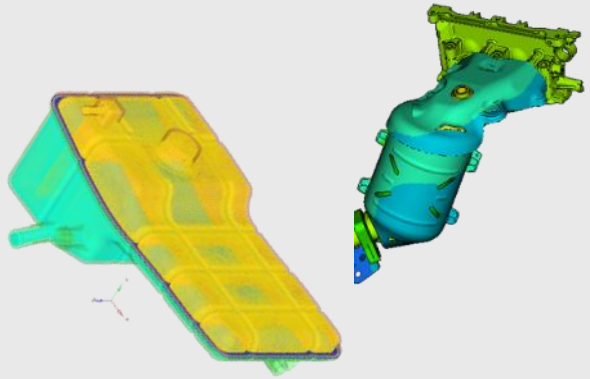
Cornaglia CAE - pre/post processing and collaborations

Analysis	Solver	Output	Application	Main Cooperation
Pre/Post Processing	Altair HyperWorks		ALL Application	Capgemini, GT, Gamma Technologies, PWT, BeOnD, Politecnico di Torino, Ansys

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Cornaglia Testing – Application fields

Cornaglia testing Lab own the expertise and own the facilities to perform following type of test:

- Fluidodynamic
- Filtration
- Skin temperature
- Acoustic
- Strain analysis
- Vibration
- Fatigue
- Environmental
- Leakage
- Compression and Tensile

Location: Villarbasse, Piedmont, ITALY

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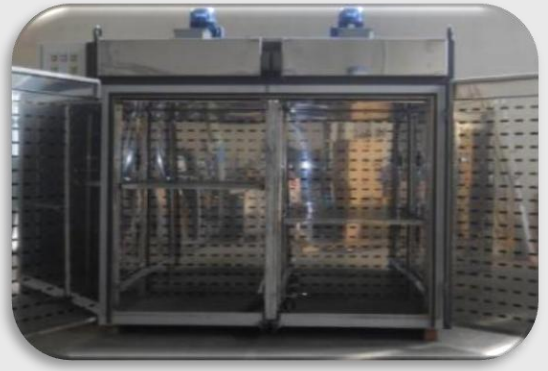
Fluid Dynamics and Materials Laboratory

COLD FLOW BENCH

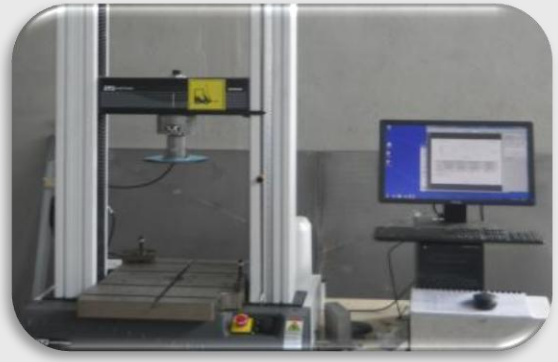
CLIMATIC TEST CHAMBER

AGEING OVEN

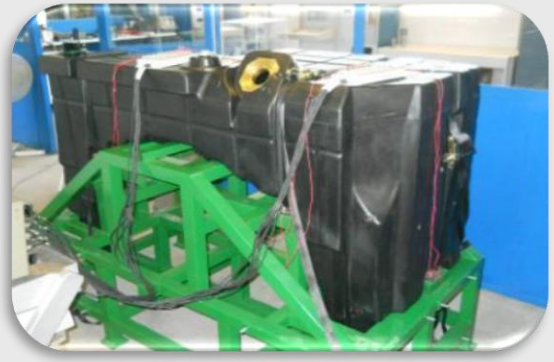


SALT SPRAY CELL

UTM



TANKS VALIDATION



LEAKAGE TEST

RAPID PROTOTYPING

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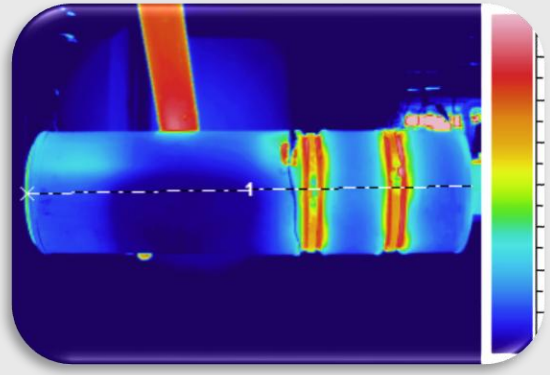
NVH Laboratory

HOT FLOW BENCH

SKIN TEMPERATURE



HOT SHAKER

FATIGUE BENCH

TRANSMISSION LOSS

COLD SHAKER

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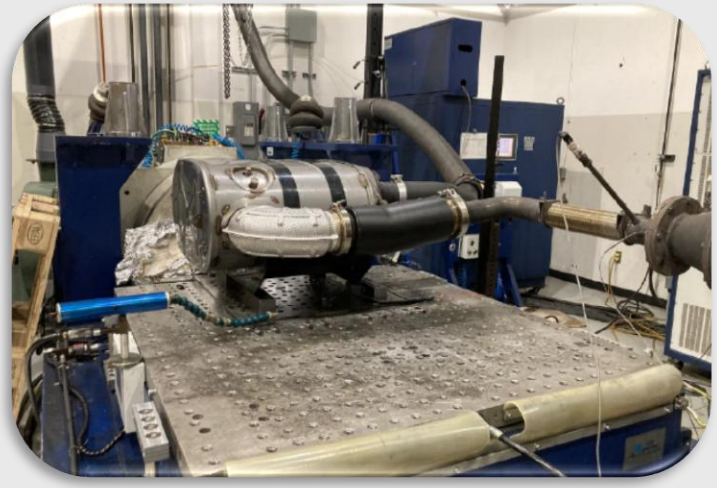
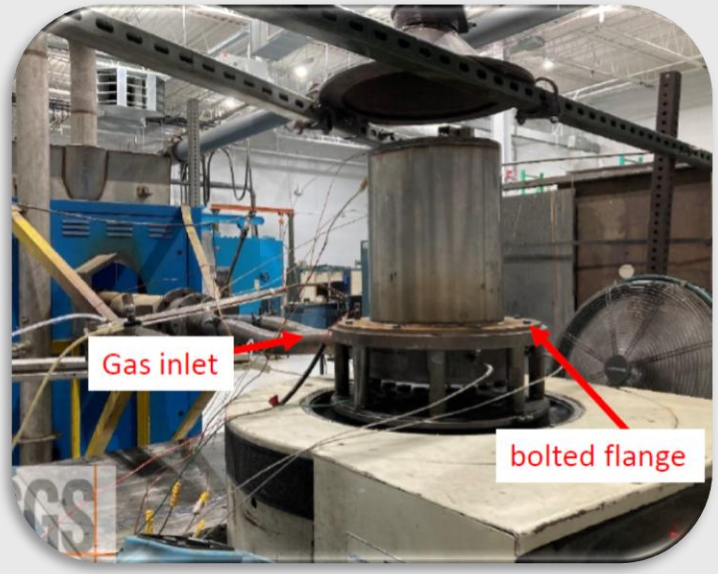
Cornaglia Testing – External partnership for shaker/vibration testing

Collaboration with SGS to perform:

- **PSD HOT and Cold fatigue test**
- **Canning vibration test in hot and cold condition**

TRP LABORATORIES





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Cornaglia Testing – External partnership for Urea testing

STSE Hot Flow Test Bench main features

The HotFlow Test Bench design focal points are:

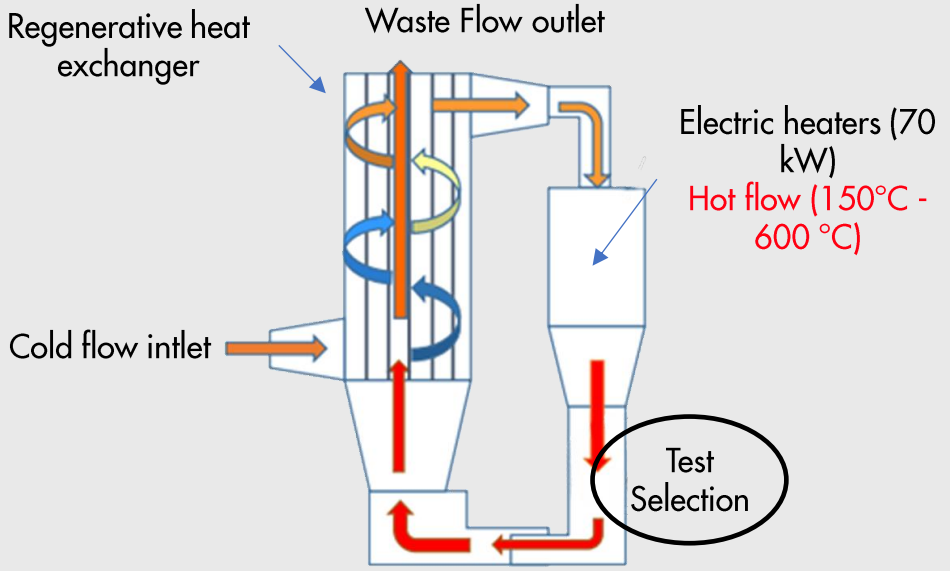
- 800 kg/h max mass flow rate @ 600 °C(*) max temperature.
- Electric heaters (70 kW) to obtain the required test reproducibility avoiding any residual combustion gas.
- Pure NO, gas insertion system using separate NO and NO, pure bombs in order to guarantee a fully accurate and flexible NO, composition.
- Test section designed in order to allow the installation of the complete exhaust line layout.

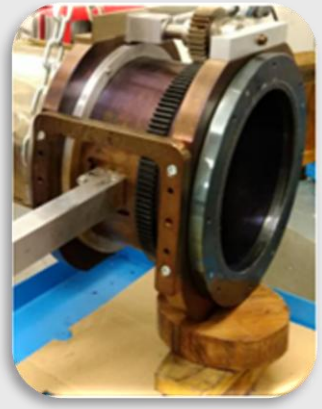
Regenerative configuration to reduce the input power.

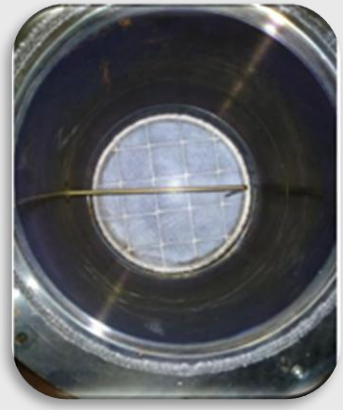
Basic diagnostics applied:

- SCR converters characterization by gas analysis (conversion efficiency, ammonia slip, ammonia storage) using AVL Sesam i60 FTIR.
- Internal ammonia deposits evaluation by complete SCRF converter weighting
- Internal UWS spray imaging in realistic hot flow current (both fast shutter and high-speed)
- NH, and NO, distribution and velocity local maps at the SCRF catalyst outlet sectioni using STSe Local GasSampler device.

(*) at the heating section exit; the actual temperature at the test section is design dependent







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