



Cornaglia®

Group



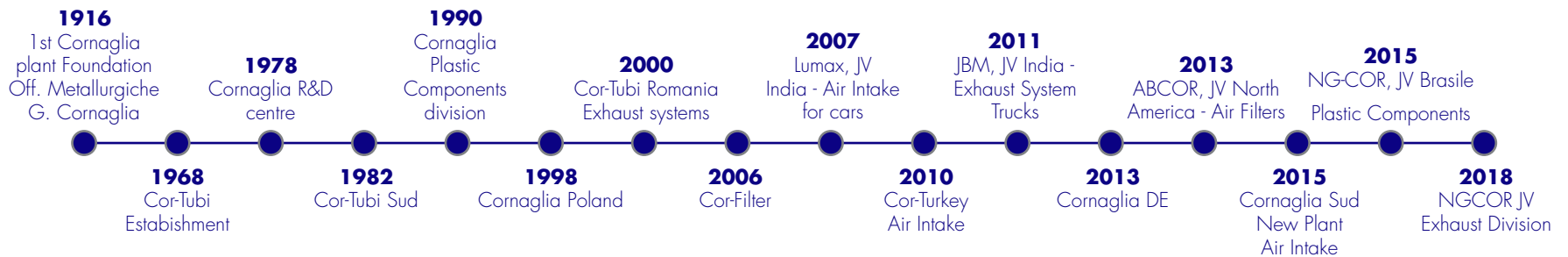
YEARS OF COMMITMENT

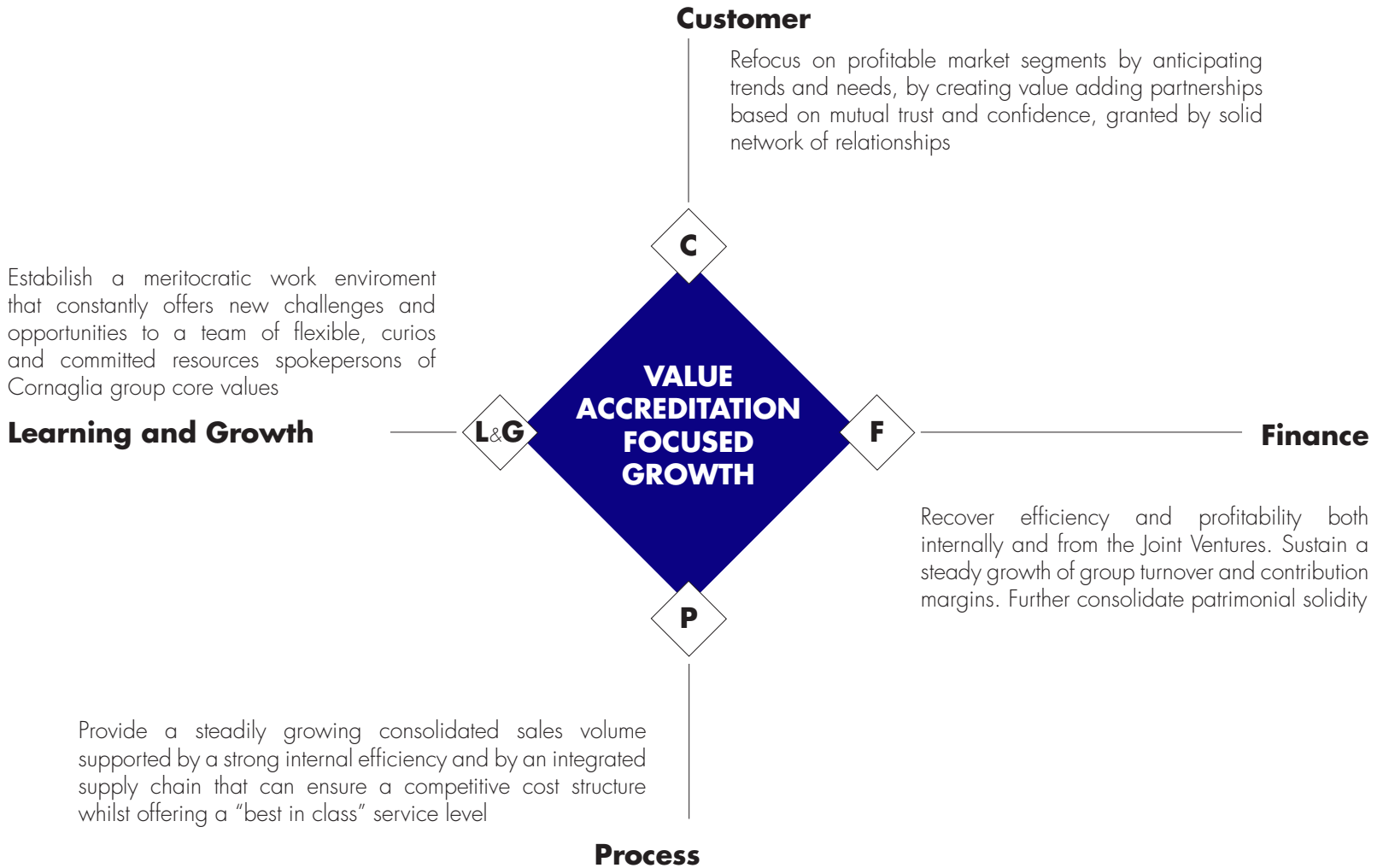
PASSION, DETERMINATION, INNOVATION FROM ITALY TO THE WORLD

Cornaglia is a **Multinational Group** partner for the automotive sector thus **constantly evolving**, capable, by leveraging on **entrepreneurial courage**, to **anticipate** the needs of the markets it competes on.

Able to offer forefront **technical and engineering solutions** highly valuable to our customers, achieved by integrating and coordinating its processes and leveraging on its **continuous improvement approach**.

Milestones

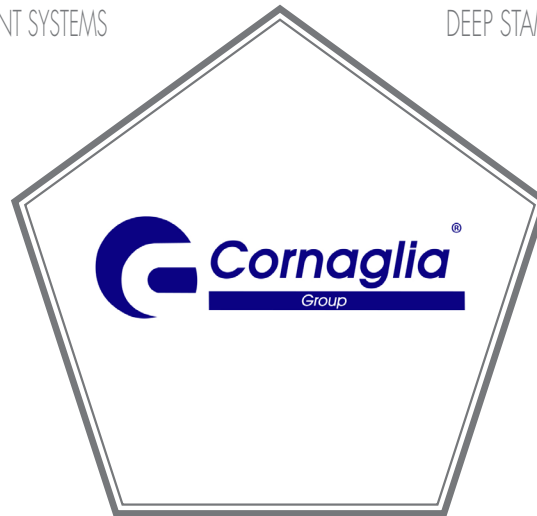






COR-TUBI EXHAUST DIVISION
COMPLETE EXHAUST AND AFTER TREATMENT SYSTEMS

METAL SHEET DIVISION
DEEP STAMPING AND ASSEMBLY

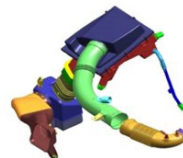


PLASTIC DIVISION
COMPLETE AIR INTAKE SYSTEMS
AND PLASTICS COMPONENTS

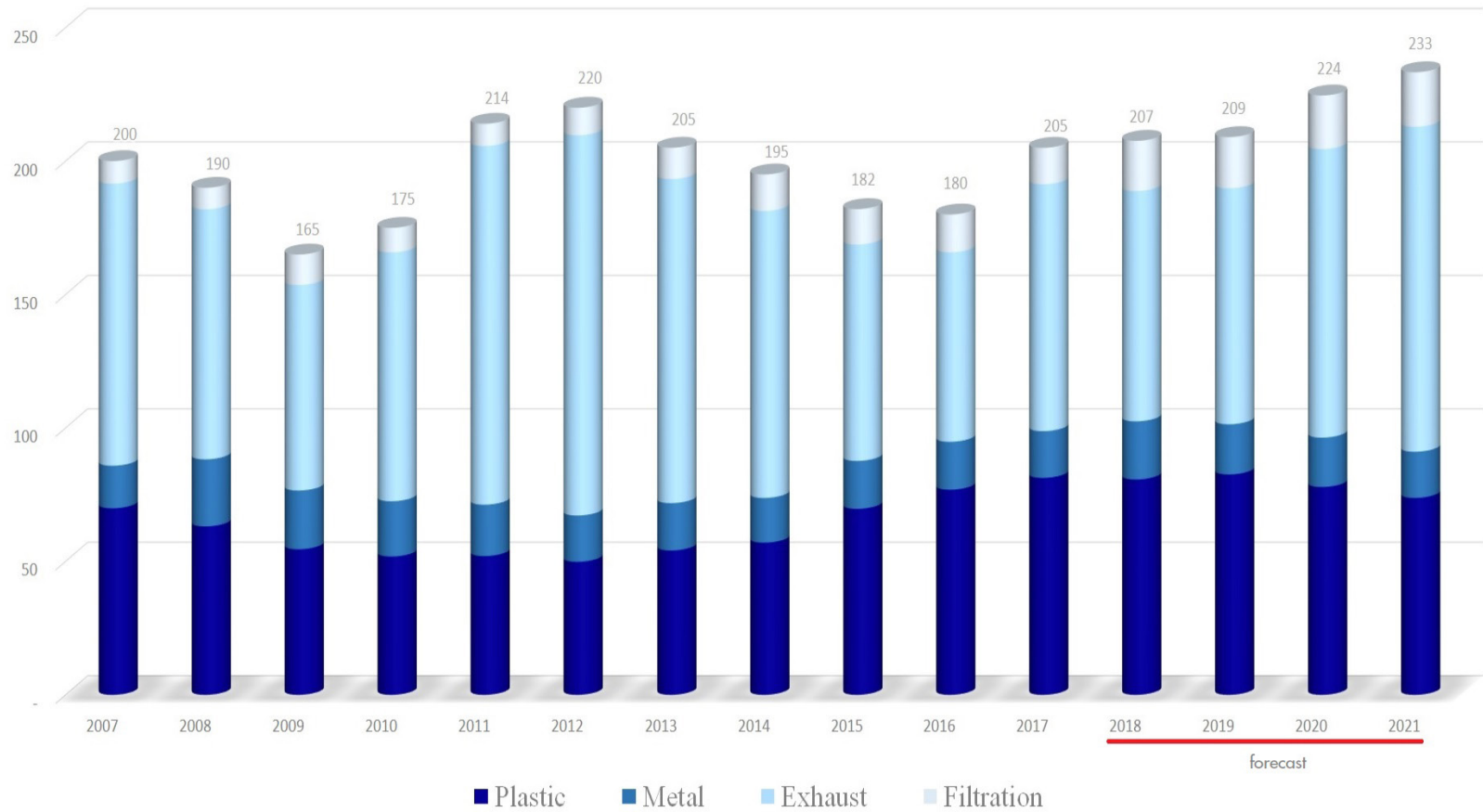
FILTER DIVISION
FILTER ELEMENT

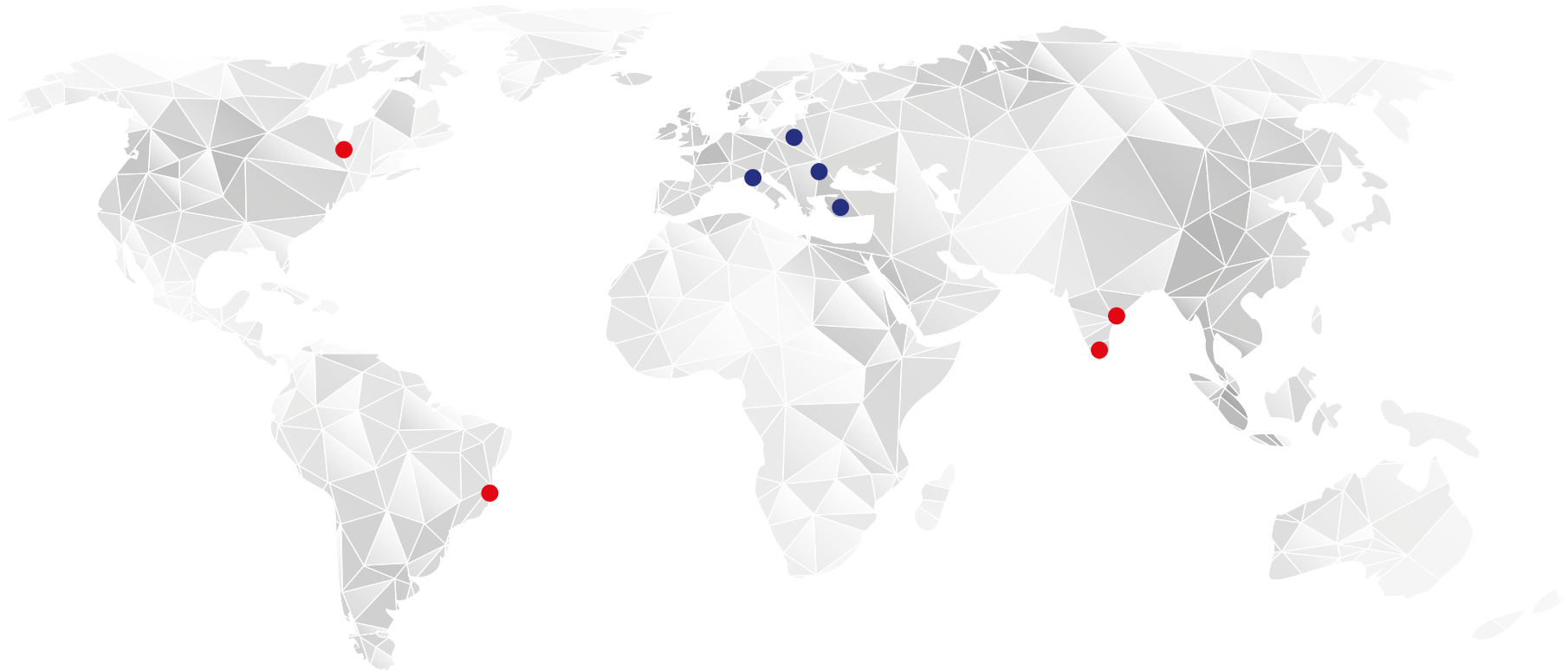


RESEARCH & DEVELOPMENT CENTRE



in milion euros





ITALY - POLAND - ROMANIA - TURKEY - INDIA - CANADA - BRASIL

● 100% owned ● Joint venture



**BU Plastic & Metal
CORNAGLIA POLAND**

ul. Grazynskiego 141
R.I. di Bielsko- BIALA (PL) 7443



**BU Plastic
CORNAGLIA TURKEY**

NOSAB 113 SOK. no: 10-16140
Nilufer Bursa - TURKEY



**BU Plastic
CORNAGLIA SUD**

Via Sorlati, 50
82011 - Airola (BN)



**BU EXHAUST
COR-TUBI ROMANIA**

Titesii, Sat Valea Stanii, nr 277-A
117754, Arges - Romania



**BU EXHAUST
COR-TUBI SUD**

Strada Statale 154 km 6
66041 Atesga (CH)



**BU Filtration
COR-FILTERS SRL**

Via Alcide de Gasperi, 50
16030 - Casarza Ligure (GE)



**BU Plastic
CORNAGLIA SPA**

Via Rivoli, 118
10090 - Villarbasse (TO)



**BU Metal
CORNAGLIA SPA**

Strada Mirafiori, 31
10092 - Beinasco (TO)



**BU Exhaust
CORNAGLIA SPA**

Via San Michele, 33
14017 - Valfenera (AT)



**BU Research & Development Centre
CORNAGLIA SPA**

Borgo Brassicarda, 18
14019 - Brassicarda (AT)



BU Plastic & Exhaust - NGCOR Group

Alcebiades da Cruz, nº 195 – Bloco: 02
São José dos Pinhais - Brazil



BU Filtration - ABCOR Filters Inc.

41 City View Drive
Toronto, ON, M9W 5A5 - Canada



BU Exhaust - JBM Cor-Tubi

Plot No. 268 Sector-24
Faridabad - HR 121005 India



**BU Plastic - LCAT
Lumax Cornaglia Auto Tecnology**

Ambethan Road, Chakan, Tal. khed
Pune 410501, Maharashtra - India

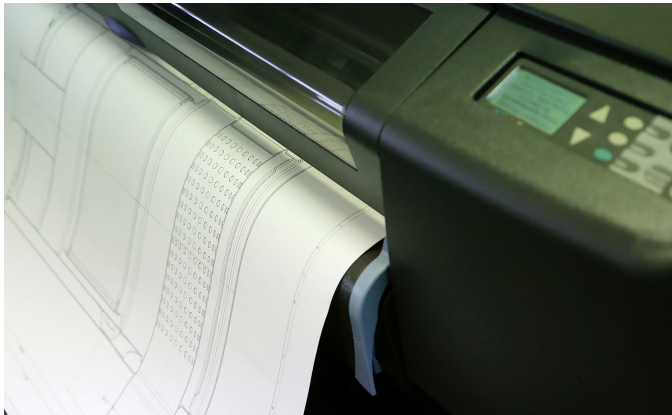


A light blue, low-poly world map serves as the background for the slide. The map is composed of various sized triangles, creating a geometric, wireframe effect. The colors are muted, with shades of blue and grey.

BUSINESS UNIT

R&D CENTRE

The **RESEARCH & DEVELOPMENT CENTRE**, recognized by the Ministry of Education, University and Research is a modern structure that extends over an area of 5,000 square meters in Brassicarda, near Villanova d'Asti. About 50 highly specialized people work there, employed in research and development, prototyping and experimental verification.



Project management

Cornaglia's product development process is ISO-TS certified and includes:

- *analysis of customer needs*
- *system design and preliminary verification with the aid of CAE (Computer-Aided Engineering) tools*
- *in-House prototypes manufacturing*
- *system validation through engine and laboratory testing*

The entire process is managed by APQP tool to assure it meets the requirements of demanding automotive customers.



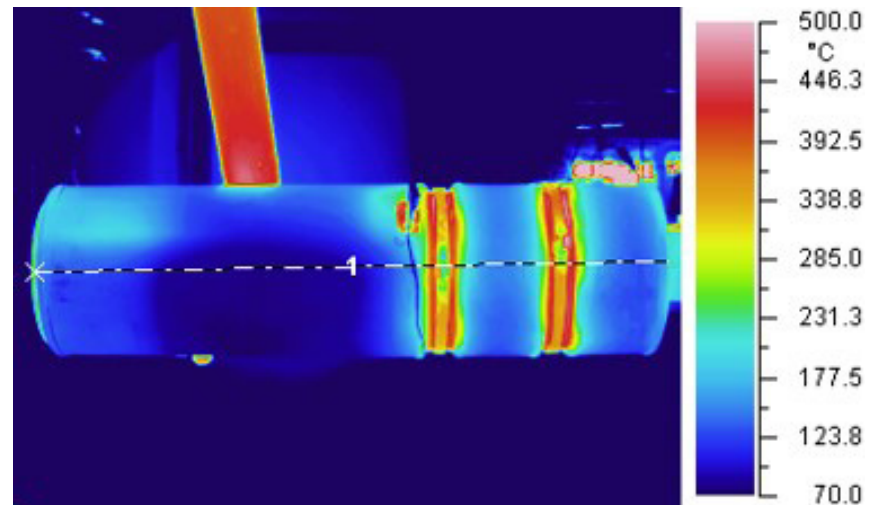
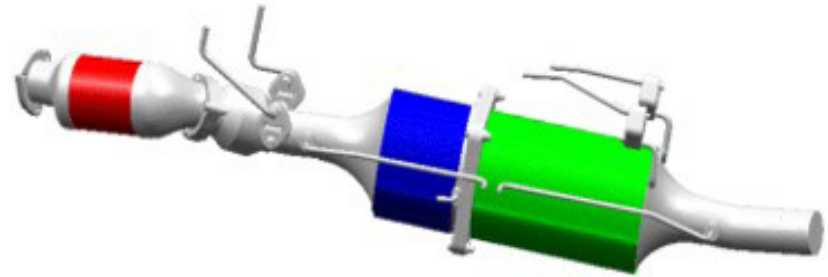
Engineering

Cornaglia designs and develops complete systems and components for passenger cars, light commercial vehicle, medium and heavy duty trucks, buses as well as agriculture and construction machinery.

The following CAD systems are used:

- CATIA V5 R24
- NX 9,03

Design for manufacturing is assured by simultaneous engineering of production processes.



Hybrid cars: study of refrigeration of battery pack containers

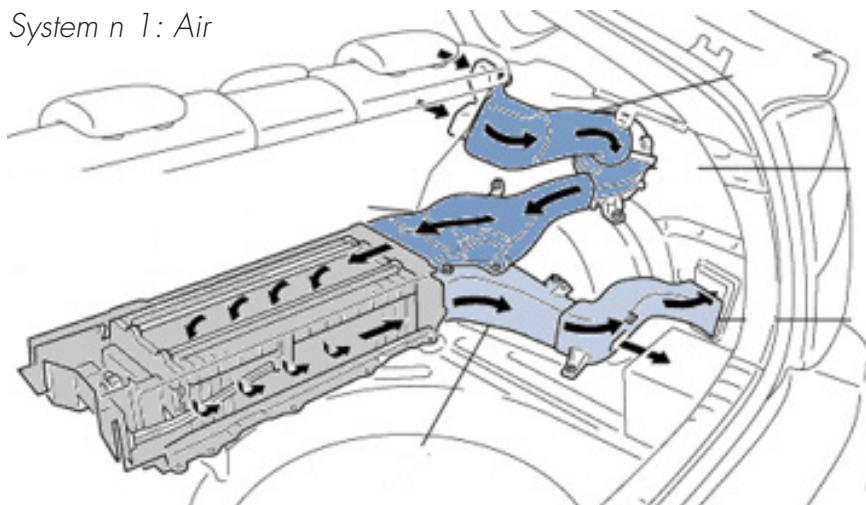
On Hybrid cars the batteries must be used in a certain temperature range.

The innovation center is developing new alternatives to the currently used cooling systems

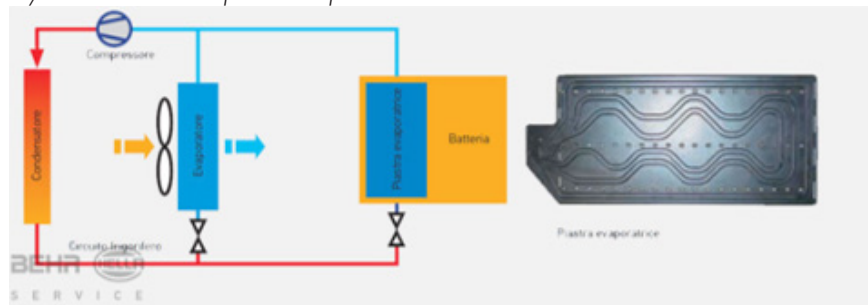
Current systems

- System n 1: Air is drawn in from the vehicle's airconditioned cabin and used to cool the battery.
- System n 2: A special evaporator plate, included in the battery cell, is connected to the vehicle's air conditioning system.
- System n 3: A cooling plate mounted in the battery pack is traversed by the cooling liquid consisting of water and glycol (green circuit).

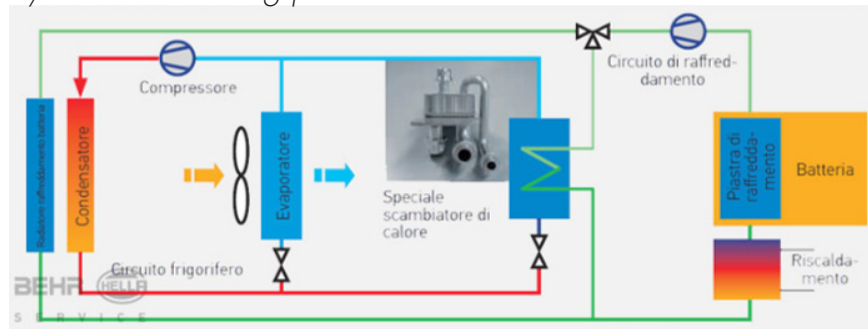
System n 1: Air



System n 2: Evaporator plate



System n 3: Cooling plate



Prototypes

Cornaglia's prototype shop is located inside our R&D Centre and is equipped with all the basic tooling and machines that are needed to support first protos manufacturing.

A metrological room is used to check parts are dimensionally conform to the drawing before shipping.

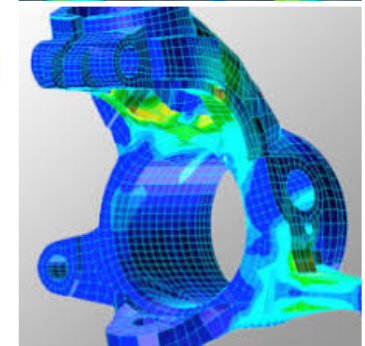
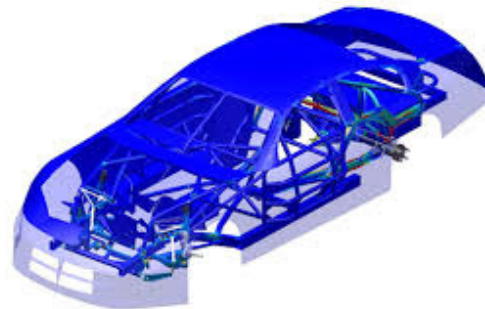
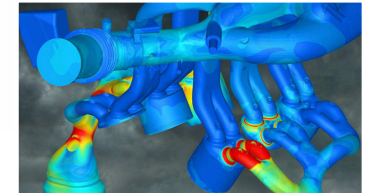
Virtual simulation

Cornaglia's product development process is highly accelerated by using Computer-Aided Engineering tools in the early development phase.

Many different layouts and designs can be evaluated in the concept phase and checked by means of simulation, even before the first prototype is built.

The following state-of-the art simulation codes are used:

- Gamma Technologies gt-potenza
- ANSYS Fluent
- CD-adapco StarCD
- MSC Nastran
- Abaqus



3D Printer

Stratasys Fortus 900M

Technology

FDM (overlapping layers from bottom to top by heating and extruding the thermoplastic filament)

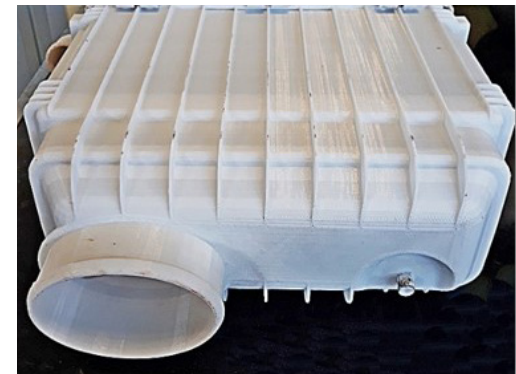
Tank dimensions

914.4 x 609.6 x 914.4 mm

Materials employable

- ASA (simile ABS)
- Nylon 12
- Policarbonato
- ULTEM1010
- ULTEM9085

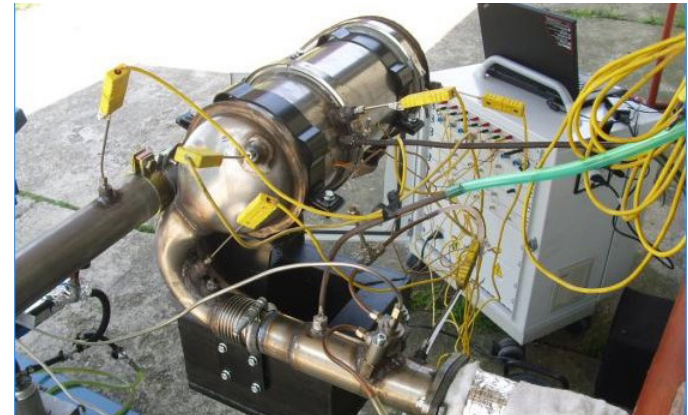
Example of prototype made of Polycarbonate (Air filter body for off-road application)



Cornaglia R&D Centre is equipped with a complete set of testing rooms, benches and instruments to fully support prototypes physical validation:

Testing

- flow test benches
- engine test benches
- emissions analyzers
- semi-anechoic chamber with roller bench
- acoustic chamber
- electrodynamic shaker
- fatigue bench
- climatic chambers
- salt spray cell
- pressure test bench
- tanks test bench
- oven chamber
- leakage test unit
- high temperature oven
- dynamometer



Innovation

Cornaglia heavily invests on innovation as a vital part of the advanced process development, to assure our solutions meet and anticipate customers needs. Examples of Cornaglia's innovations are:

- static urea mixer for exhaust aftertreatment SCR system
- urea sender unit with integrated quality sensor

Partnership

Cornaglia cooperates with the main Italian and European technical universities and research institutes. Consolidated partnerships with selected suppliers allows us to access the latest product innovation and solutions even before they reach the market.



POLITECNICO
DI TORINO

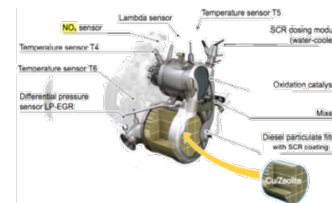


UNIVERSITÀ
DEGLI STUDI
DI PERUGIA

Partnership with the Politecnico of Turin

The current framework agreement, signed on 27 February 2013, is divided into:

- Thesis support, internships / internships and doctorates also targeted for recruitment: since 2013 8 engineers have been hired at the R&D staff
- Partnership contracts for research projects
- Participation of Cornaglia as Industrial Partner of the Politecnico to calls for funded research projects
- Cornaglia is present with its own Office within the Politecnico Campus





HEADQUARTER - CORNAGLIA of BRASSICARDA

Borgo Brassicarda, 18
14019 Brassicarda (AT)

The CORNAGLIA company, with over 100 years of history, has always been committed to reducing the environmental impacts associated with its activities and the risks to the health and safety of its workers.

Environmental and safety performance

- Installation of a photovoltaic system on the roofs of the plants
- Replacement in all Group plants of old burners with “LOW NOX” heat generators with high efficiency and low emissions of Nitrogen Oxides
- Treatment of industrial waste water with water purification plant
- Replacing the old lighting system with LED lighting to reduce consumption and improve visibility in the departments



since 1916
passion, determination, innovation from Italy to the world



BENASCO (TO) - Italy



VALFENERA (AT) - Italy



VILLARBASSE (TO) - Italy



BRASSICARDA (AT) - Italy



AIRCCLA (BN) - Italy



TORONTO - Canada



CASARZA (GE) - Italy



ATESSA (CH) - Italy



BIELSKO BIALA - Poland



PITESTI - Romania



BURSA - Turkey



PUNE - India



CURITIBA - Brasil

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