
italtecnica
ENGINEERING YOUR IDEAS

SERVICES

Italtecnica has proven experience in the combustion engines field, prototypes and special vehicles produced in small series.

It guarantees a complete, turnkey offer: from the design, to the production and testing, for the construction of vehicles and high-performance powertrains.

POWERTRAIN

Design, production and testing of high-performance combustion engines and hybrid powertrains.

COMPONENT CONSTRUCTION

In-house design & construction of CNC and lathe machined part

VEHICLE EQUIPMENT

Design, virtual simulation, prototyping and tuning of chassis and suspensions
Engineering and validation of every kind of vehicle, including all the auxiliary systems (cooling, lubrication, fuel supply, HVAC, ecc.), engine/parts swap.

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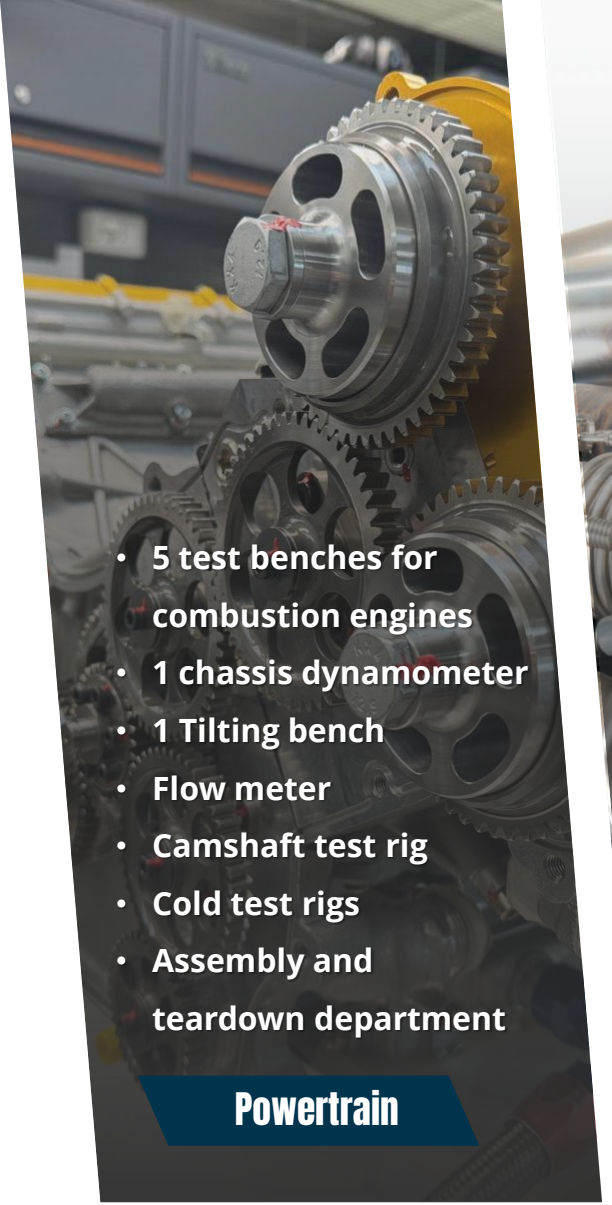
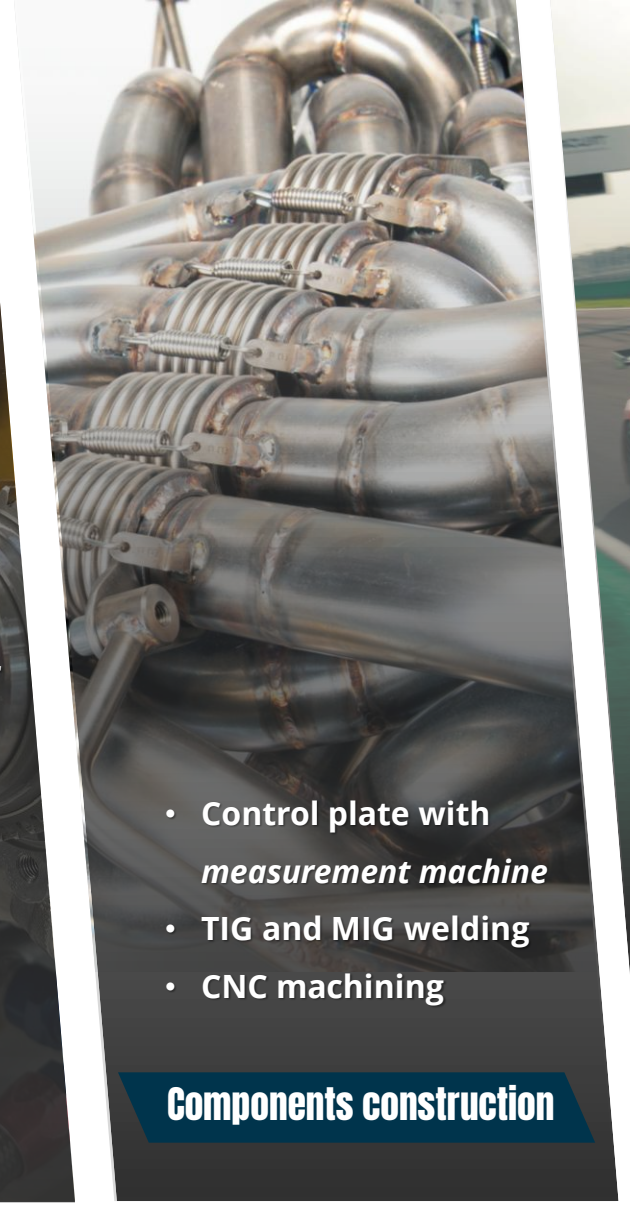


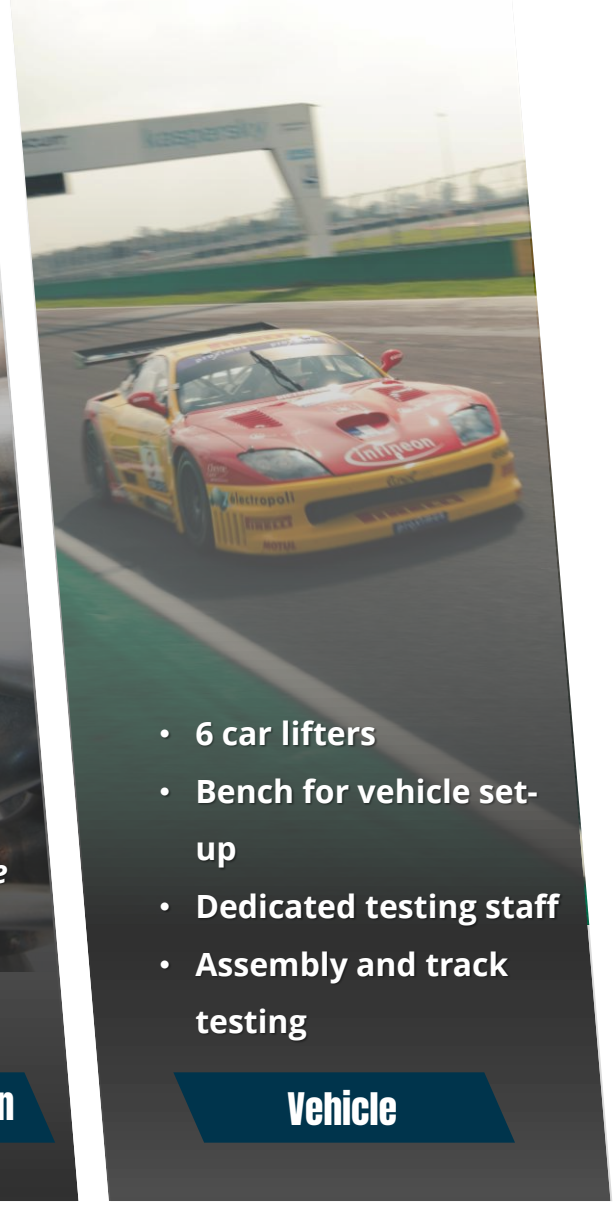
- 5 test benches for combustion engines
- 1 chassis dynamometer
- 1 Tilting bench
- Flow meter
- Camshaft test rig
- Cold test rigs
- Assembly and teardown department

Powertrain



- Control plate with *measurement machine*
- TIG and MIG welding
- CNC machining

Components construction



- 6 car lifters
- Bench for vehicle set-up
- Dedicated testing staff
- Assembly and track testing

Vehicle

KNOW-HOW

Italtecnica relies on a solid technical know-how based on the specific skills of its work teams combined with the vast experience gained in over 35 years of work as lead player in the automotive industry.

The professional effectiveness, derived from the combination of engineering knowledge and adaptability developed in the research for technical solutions, presents our work as an added value to solving a simple problem, providing the customer with a completely personalized approach tailored on their needs.

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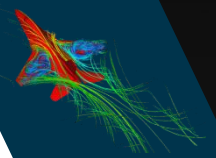
IDEA

Designing of the preliminary virtual model

01-DIMENSIONAL SIMULATION

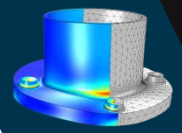
Defining of the main engine characteristics

CFD SIMULATION



Optimizing flows inside the engine

FEM SIMULATION



Optimizing of the most stressed parts

VALIDATION AND TESTING

Production, functional checking and engine test benching

DELIVERY

Assembling and delivery to customer

ICE: from idea to you

Italtecnica with highly expertise engineers and technicians follow every steps; from preliminary idea to production.

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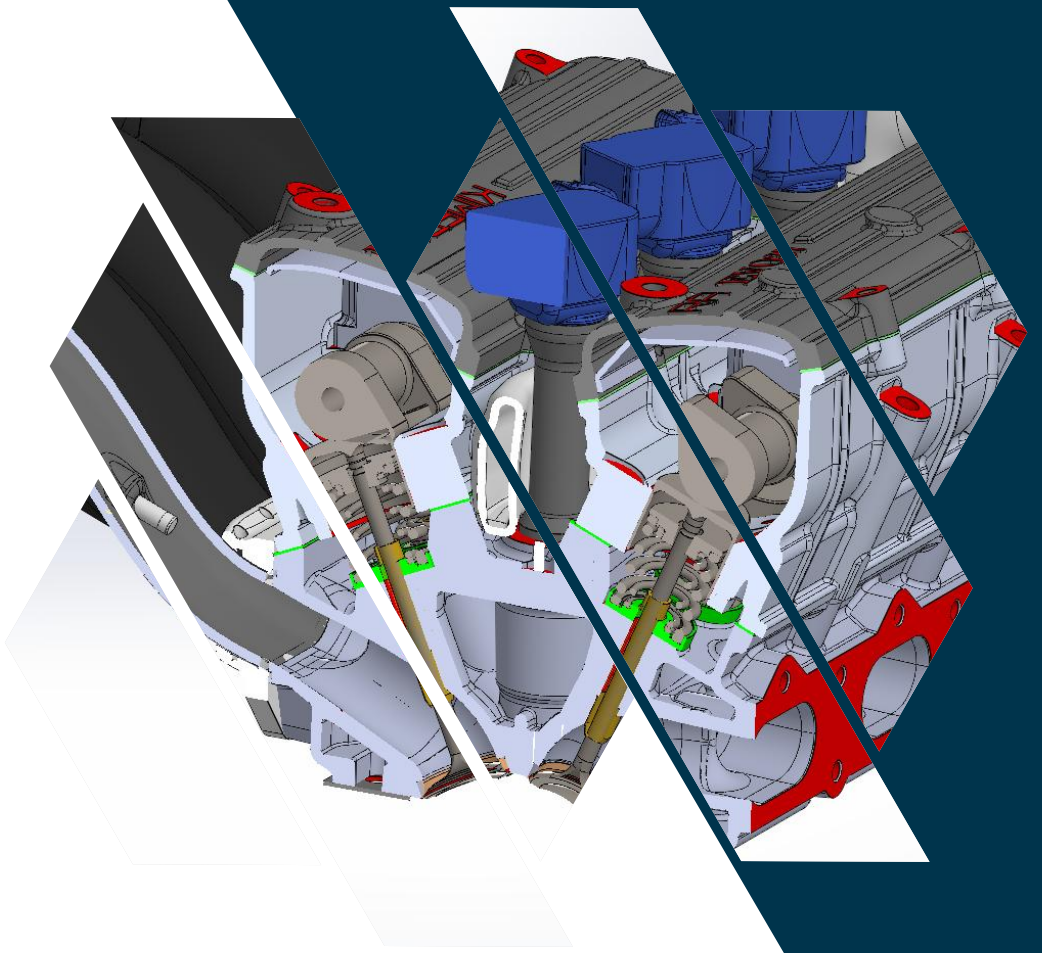
IDEA

Starting from the costumer needs a preliminary 3D CAD model is designed.
All the components are deeply analyzed to satisfy the higher quality standards, and the CAD model is continuously updated during all the process following the simulation results.



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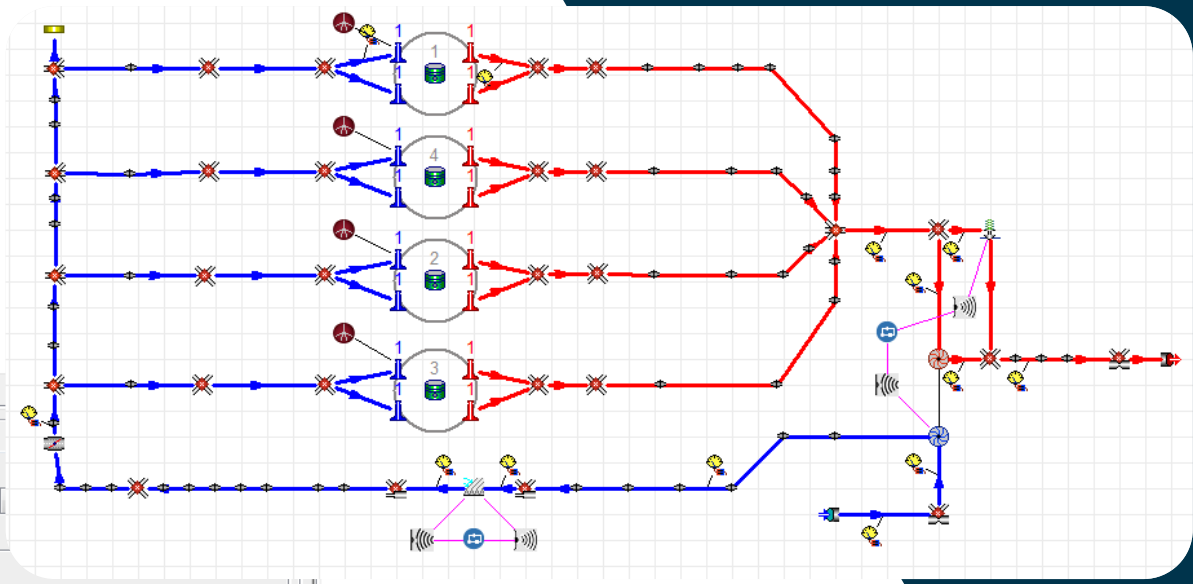
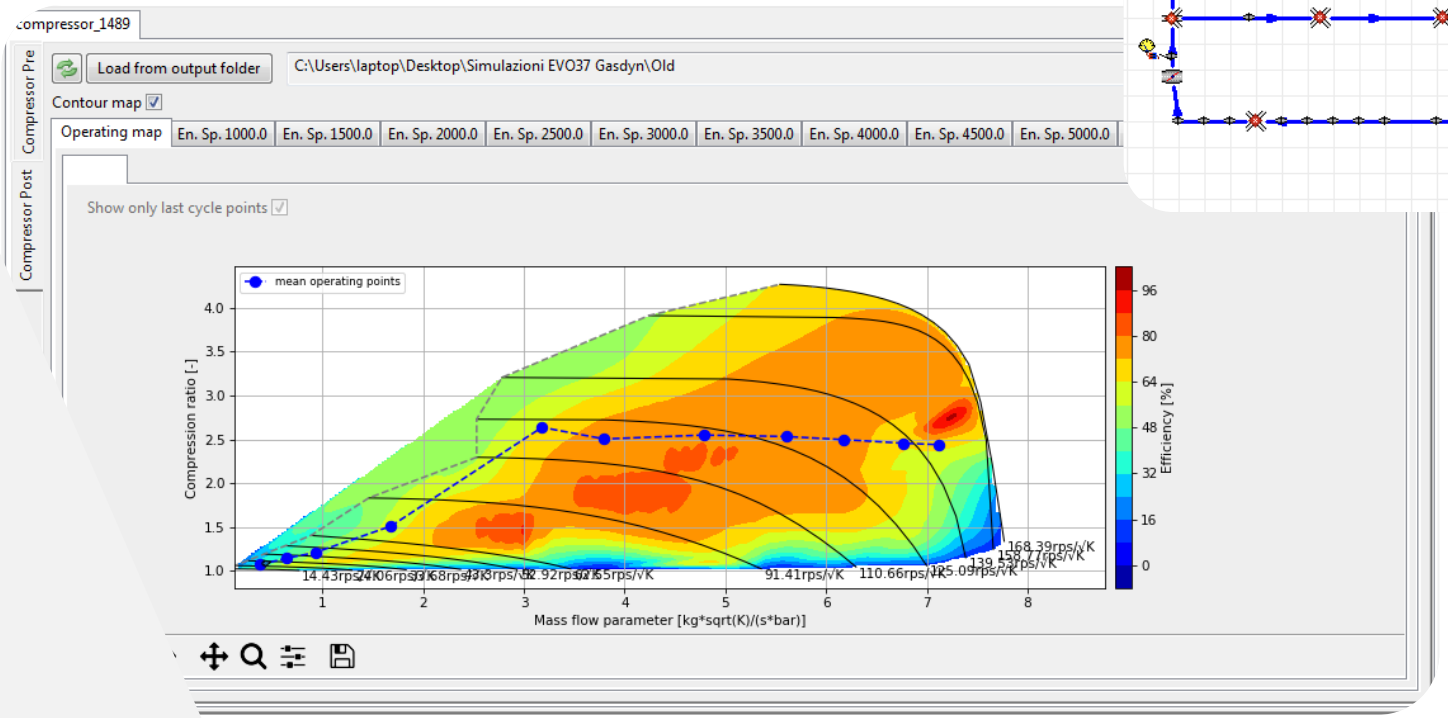
01-DIMENSIONAL SIMULATION

The very first engineering phase is the 01-Dimensional simulation of the complete engine, where all the main characteristics of the engine are defined. This analysis is performed using a specific tool “GasDyn” developed in partnership with Milan polytechnic.





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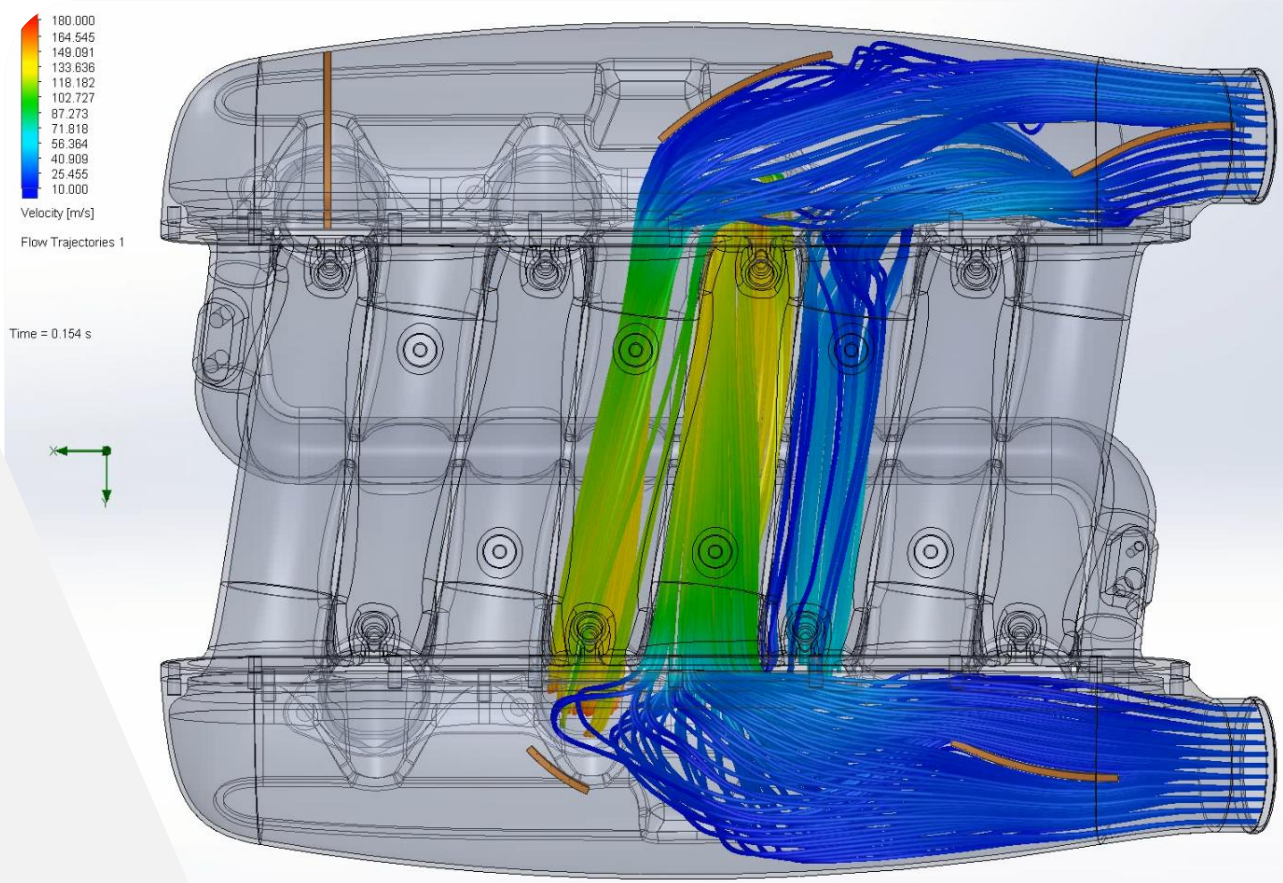
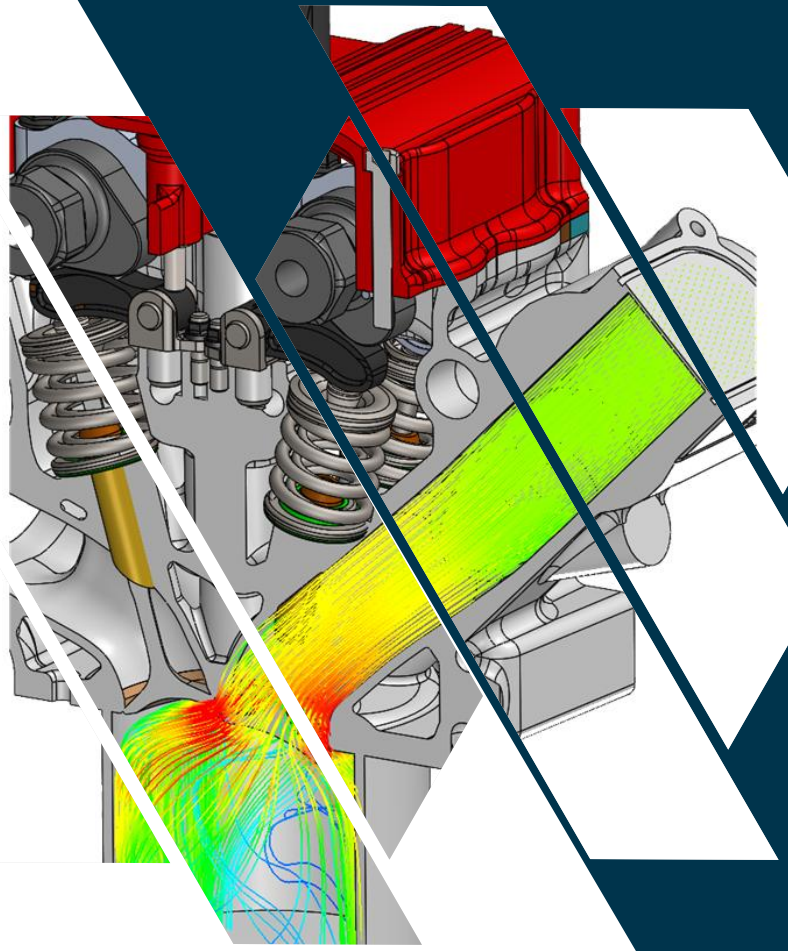
CFD SIMULATION

All the engine flows are simulated using specific software and optimized in order to reduce dimension and cost of the parts and improve performances





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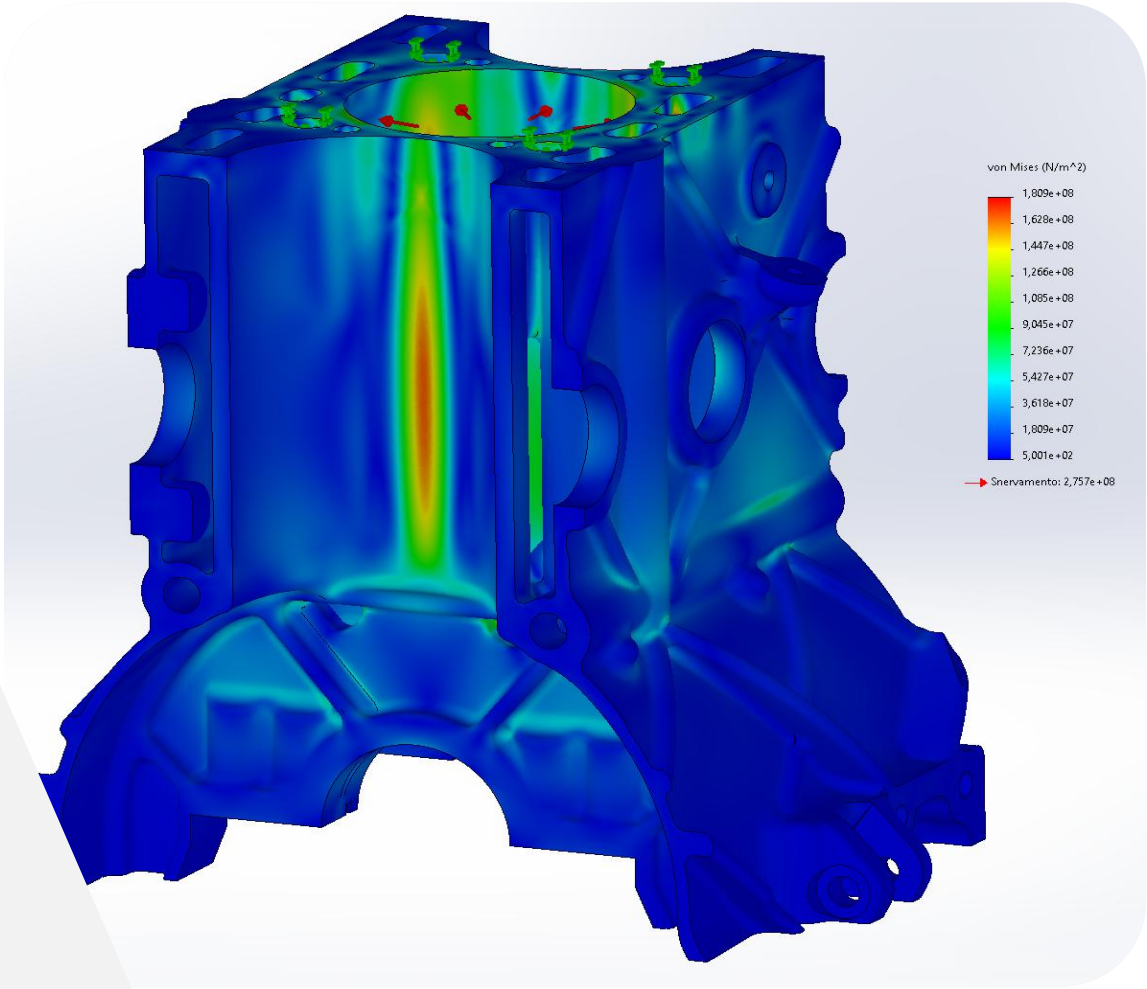
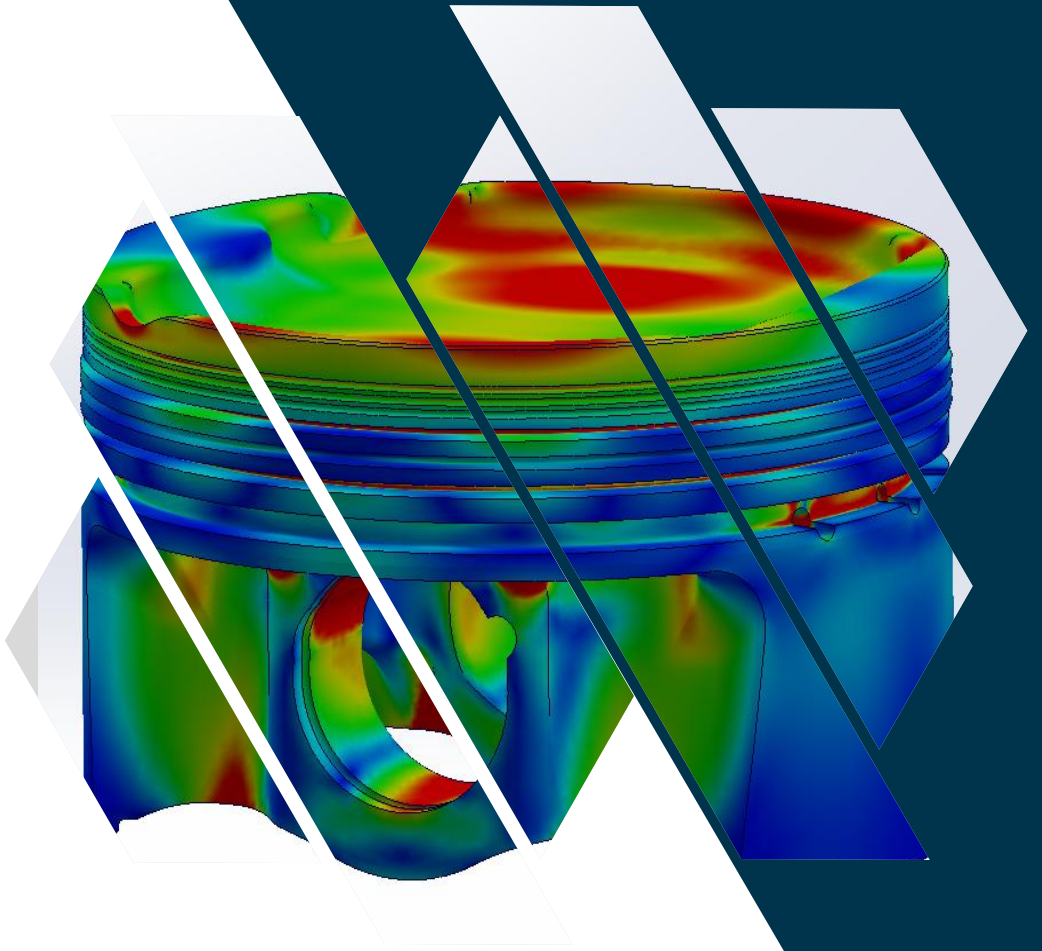
FEM SIMULATION

All the stressed components are simulated using specific software and optimized in order to reduce weight and cost of the parts and improve reliability and performance





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CONSTRUCTION & COLD TEST

A preliminary physical prototype is produced using technologies like 3d metal printing, CNC Machining and sand casting.

All the parts are dimensionally checked, the virtual simulations are cold tested and validated using physical parts, with flow benches and specific instruments.

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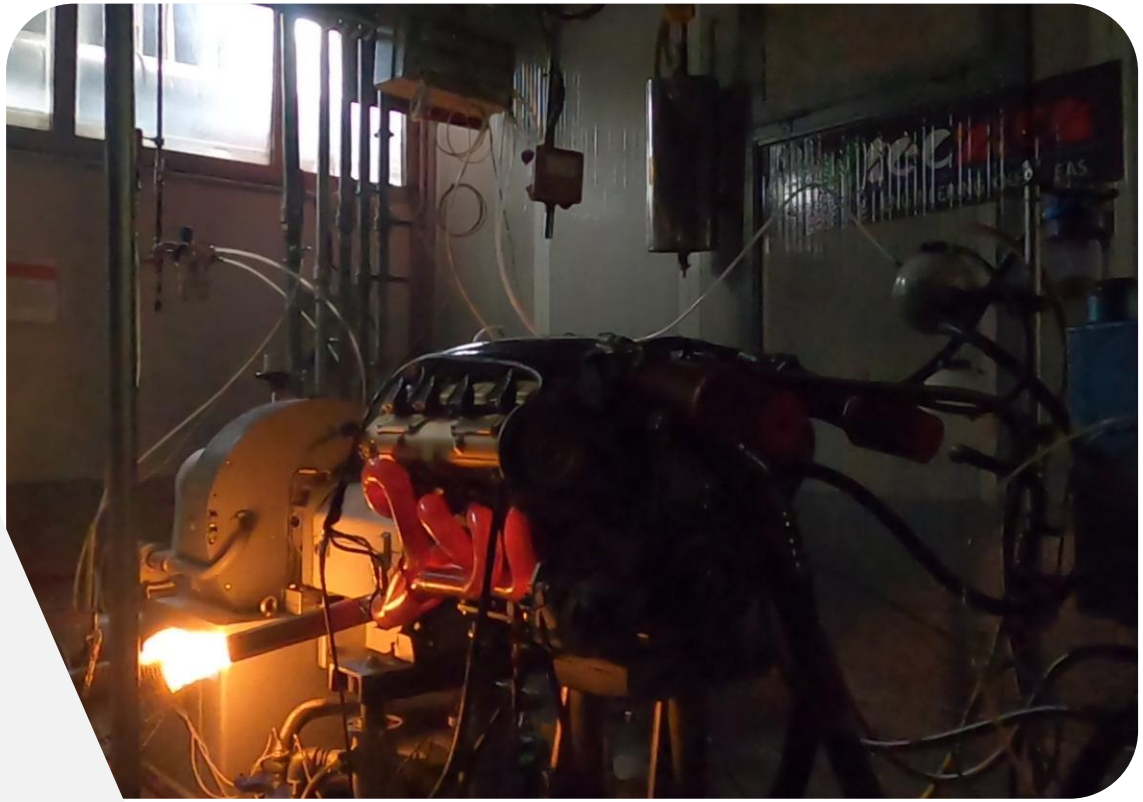
VALIDATION AND TESTING

The engine is assembled, and all the main characteristics are checked.

The complete engine is installed in one of our seven test benches where the functions and the performances are checked. ONLY when the validation process is completed, the production can start with engine #1



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EURO 6 + US Homologation

1. ***Motorsport ECU***: mainly used in motorsport and proto engines application
2. ***Homologated ECU***: hardware and calibration focused to reach EURO 6 IVA and US homologation internally developed for hypercar engines.
   We are also partners in homologation of small series for OEMs and heavy-duty engines.

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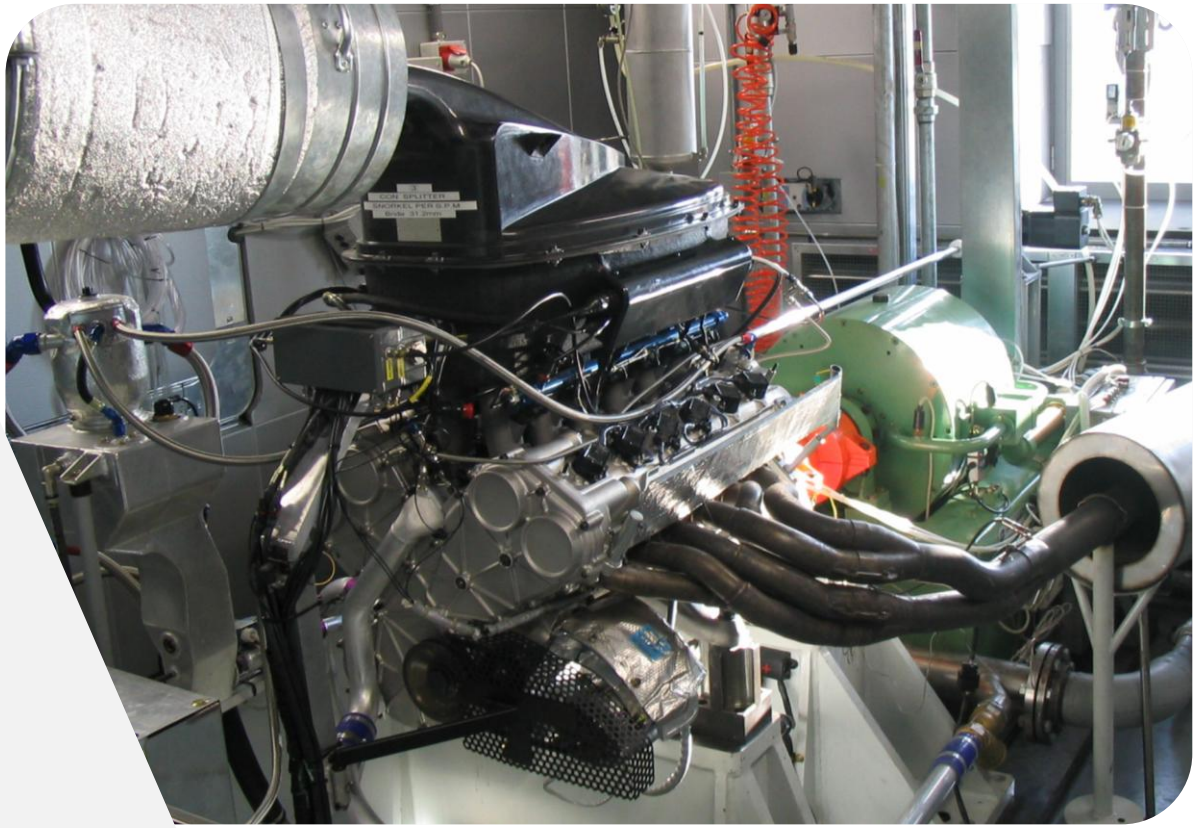
DELIVERY

The most critical parts are dimensional checked before installation.

All the engines are assembled by highly specialized technicians and, if required, are tested on a test bench before shipping to the costumer.



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Our projects - ITV6

Euro 6 IVA ready	
Chassis interface	Road: supported on silent blocks Competition: structural integration with chassis
Cylinder layout	V6 - 90°
Total displacement	3,0 liters
Lubrication system	Dry sump with 4 stages (3 scavenging + 1 delivery) oil pump. Oil heat exchanger integrated on engine
Distribution and timing	DOHC 4 valves per cylinder with rocker arms actuation
Turbocharging system	Sequential turbomatching elettronically managed. Layout with 2 turbochargers and electronic bypass valve and waste-gate
Throttle bodies	6 throttle barrels elettronically managed
Intercooler	Air/liquid with integrated intercooler and electronic circulation pump
Ignition system	Electronic with 6 coils on top
Fuel system	Electronic port fuel + Direct injection. Fuel pressure regulator integrated on engine.
Max Power	STEP1 (road): 610CV @ 7200rpm 670Nm from 3000-6000rpm, full boost@2000rpm STEP2 (endurance): 700CV @ 8000rpm STEP3 (hillclimb): 750CV @ 8000rpm
Weight	<180kg

ITV6 Engine

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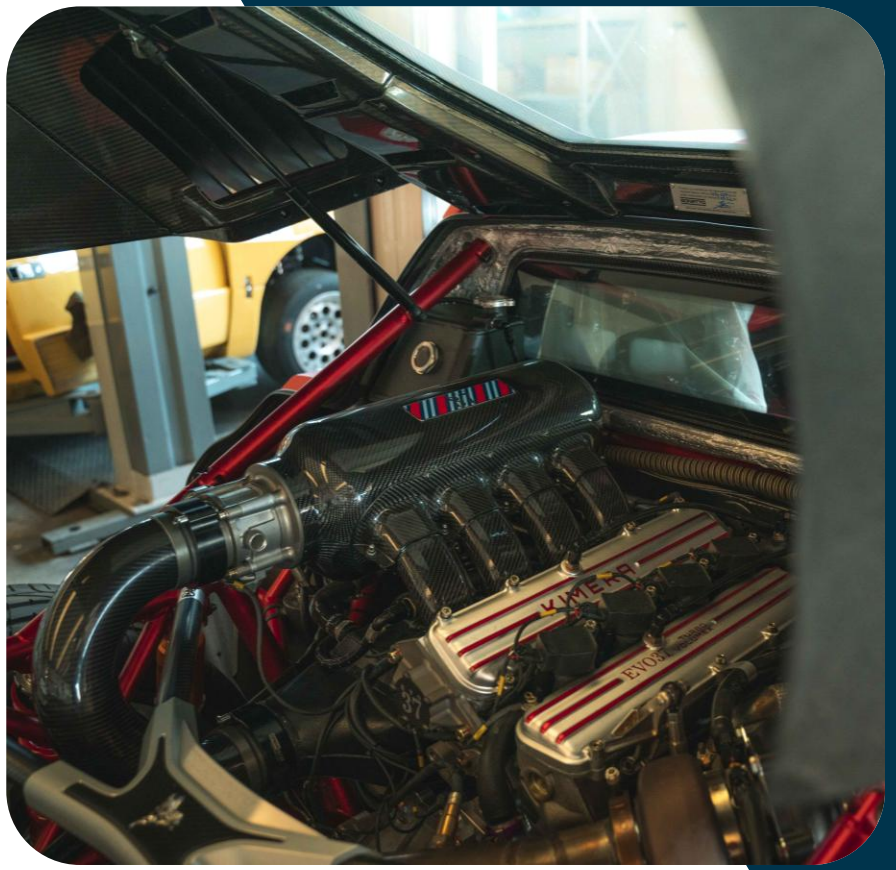
Our projects - 500CV L4

Cylinder layout	4 Cylinder in line
Total displacement	2,15 liters
Lubrication system	• Dry sump system with structural oil pan • 2 scavenge stage + 1 pressure stage • Gear driven oil pump
Distribution and timing	DOHC 4 valves per cylinder with special cooled Inconel valves
Supercharging system	• Centrifugal turbocharger • Roots supercharger with electro-clutch • Electronic bypass valve
Intake manifold	• Carbon Fiber composite • Designed to optimize both RAM and Helmholtz effects
Intercooler	Air/liquid with integrated intercooler and electronic circulation pump
Ignition system	Electronic with 4 coils on top
Fuel system	Electronic Port Fuel Injection
Max Power	• Power: 505CV @ 7000-7250rpm • Torque: 550Nm @4.500rpm 400Nm @2000rpm • Specific power: 235 CV/liter



500CV L4 Engine

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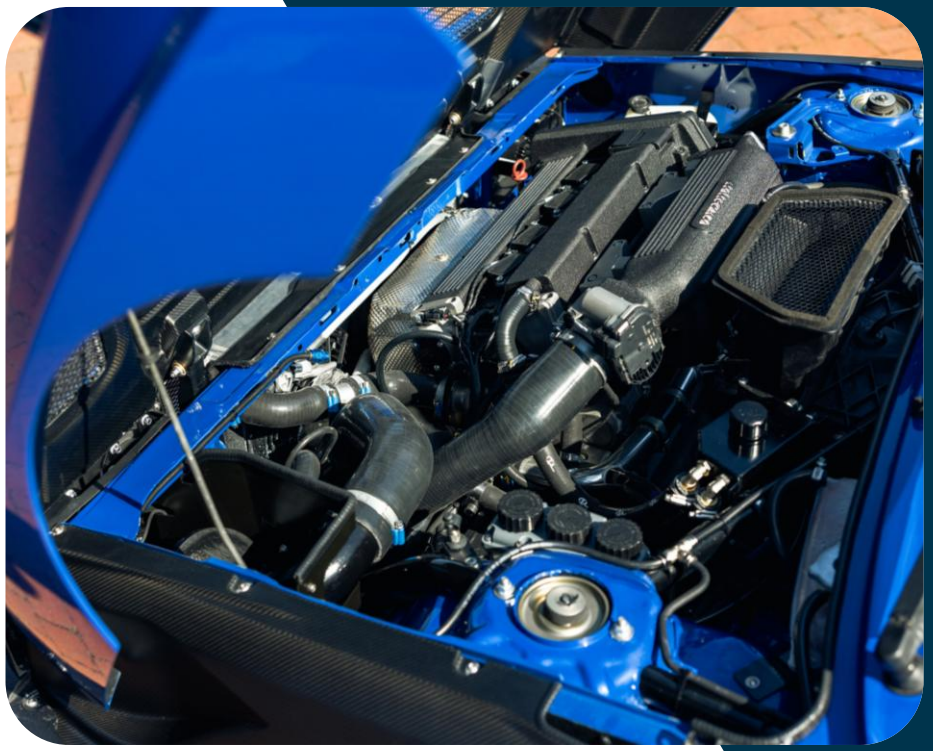
Our projects - 400CV L4

Cylinder layout	4 Cylinder in line
Total displacement	2,02 liters
Lubrication system	Wet sump with new pump gears and baffle plates
Distribution and timing	DOHC 4 valves/cylinder with special Inconel valves
Supercharging system	Turbocharger and electronic waste gate valve
Intake manifold	Original redesigned and machined to optimize both RAM and Helmholtz effects
Intercooler	Air/air intercooler increased
Ignition system	Electronic with 4 coils on top
Fuel system	Electronic Port Fuel Injection
Max Power	• Power: >350CV @ 5500-7500rpm • Torque: >420Nm @ 4000-6000rpm



400CV L4 Engine

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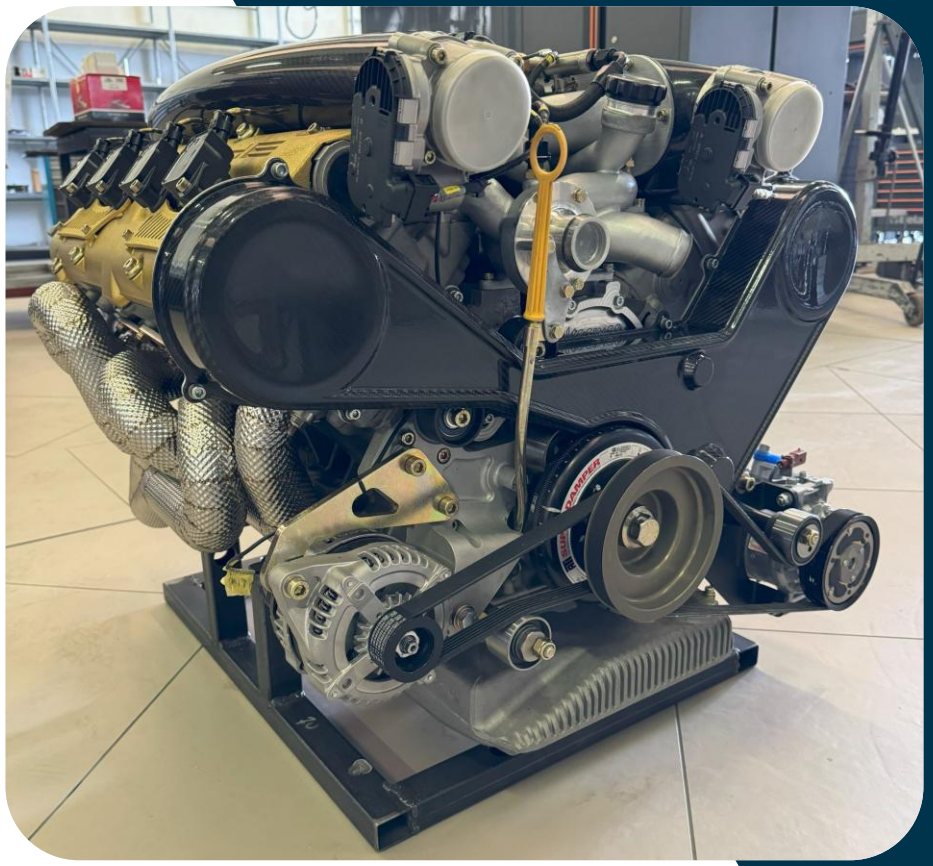
Our projects - V8 NA

Cylinder layout	V8 - 90°
Total displacement	4,957 liters
Lubrication system	Wet sump with new pump gears and baffle plates
Distribution and timing	DOHC 4 valves/cylinder with special Inconel valves
Engine block & cranktrain	• Original cylinder block with reinforced closed deck system • Engine conrods realized in high strength forged steel with lower mass • Pistons with special ceramic layer deposit to avoid knock
Engine cooling system	Liquid cooled with electric water pump electronically managed
Intake System	• Naturally aspirated • Aluminum casting and carbon fiber. • Designed to optimize both RAM and Helmholtz effects
Ignition system	Electronic with 8 coils on top
Fuel system	Electronic Port Fuel Injection
Max Power	• Power: >450CV @ 6000-7500rpm • Torque: >500Nm @5000-6000rpm 415Nm @2500rpm



V8 NA Engine

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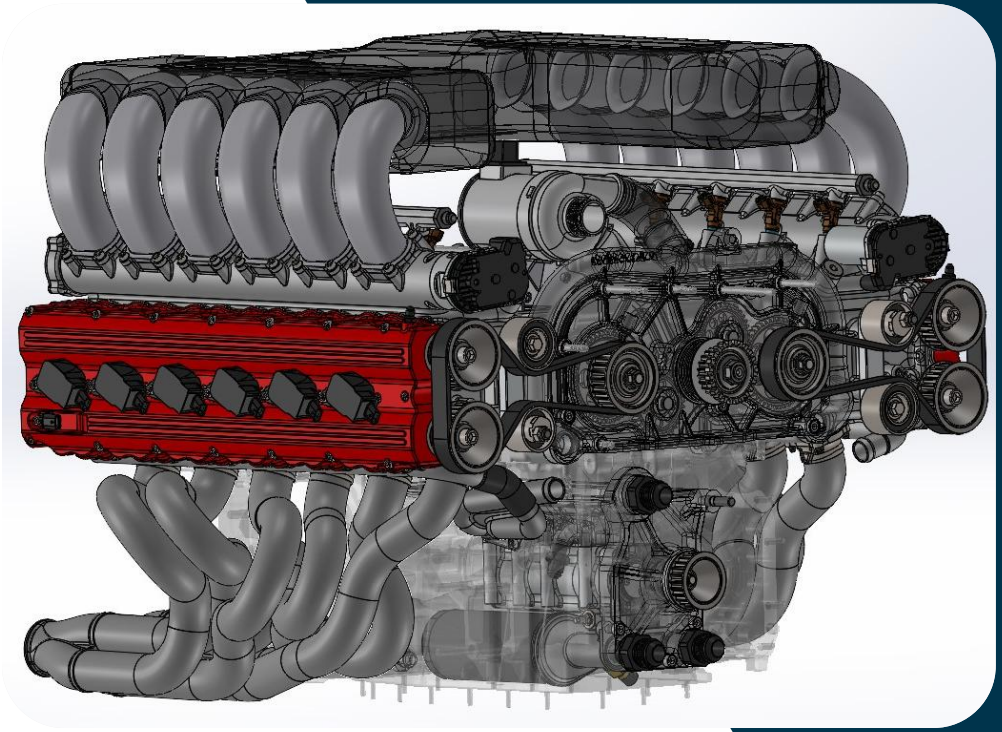
Our projects - V12 180°

Cylinder layout	V12 - 180°
Total displacement	5,58 liters
Lubrication system	Dry sump with 4 stages (3 scavenging + 1 delivery) oil pump.
Distribution and timing	DOHC 4 valves per cylinder with rocker arms actuation
Throttle bodies	12 throttle barrels elettronically managed
Engine cooling system	Liquid cooled with electric water pump electronically managed
Intake System	• Naturally aspirated • Aluminum 3D printed and carbon fiber. • Designed to optimize both RAM and Helmholtz effects
Ignition system	Electronic with 12 coils on top
Fuel system	Electronic Port Fuel Injection
Max Power	• Power: >600CV @ 9000rpm • Torque: >600Nm @6000rpm



V12 180° Engine - Render

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Our projects - V12 120°

Euro 6 IVA ready	
Cylinder layout	V12 - 120°
Total displacement	7,0 liters
Lubrication system	Dry sump with 7 stages (6 scavenging + 1 delivery) oil pump.
Distribution and timing	• Gear driven timing system • DOHC 4 valves per cylinder with special cooled Inconel valves • Intake and exhaust variable timing system
Turbocharging system	Layout with 4 parallel turbochargers and 2 electronic waste-gates
Intake manifold	• Designed to optimize both RAM and Helmholtz effects • Air/liquid integrated intercooler with electronic circulation pump
Ignition system	Electronic with 12 coils on top
Fuel system	Electronic port fuel + Direct injection. Fuel pressure regulator integrated on engine.
Max Power	• Power: >1500CV @ 8000rpm • Torque: >1500Nm @5000rpm

V12 120° Engine

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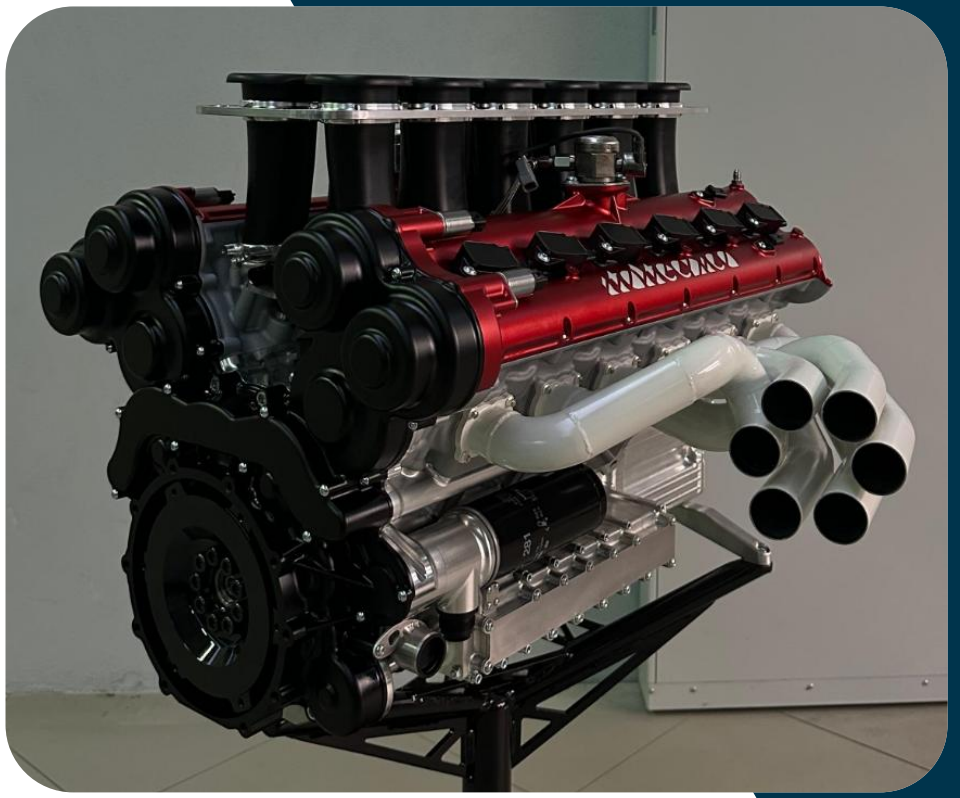
Upcoming projects - ITV12 Orion NA

Euro 6 IVA ready	
Chassis interface	Supported on silent blocks
Cylinder layout	V12 - 65°
Total displacement	6,7 liters
Lubrication system	Dry sump with 8 stages oil pump.
Distribution and timing	• Gear driven timing system • DOHC 4 valves per cylinder with special cooled Inconel valves • Intake and exhaust variable timing system
Intake System	• Naturally aspirated • Aluminum CNC and carbon fiber. • Designed to optimize both RAM and Helmholtz effects
Engine block & cranktrain	• Engine conrods realized in high strength forged steel with lower mass • Pistons with special ceramic layer deposit to avoid knock
Ignition system	Electronic with 12 coils on top
Weight	<200kg

Performace	• STEP1 :
	  • Power: 850CV @ 8500rpm
	  • Torque: >750Nm (70% available from 3000rpm)
	  • Rev limiter: 9200rpm
	• STEP2 :
	  • Power: >900CV @ 9500rpm
	  • Torque: >800Nm (70% available from 3500rpm)
	  • Rev limiter: 10200rpm



ITV12 Orion - engine

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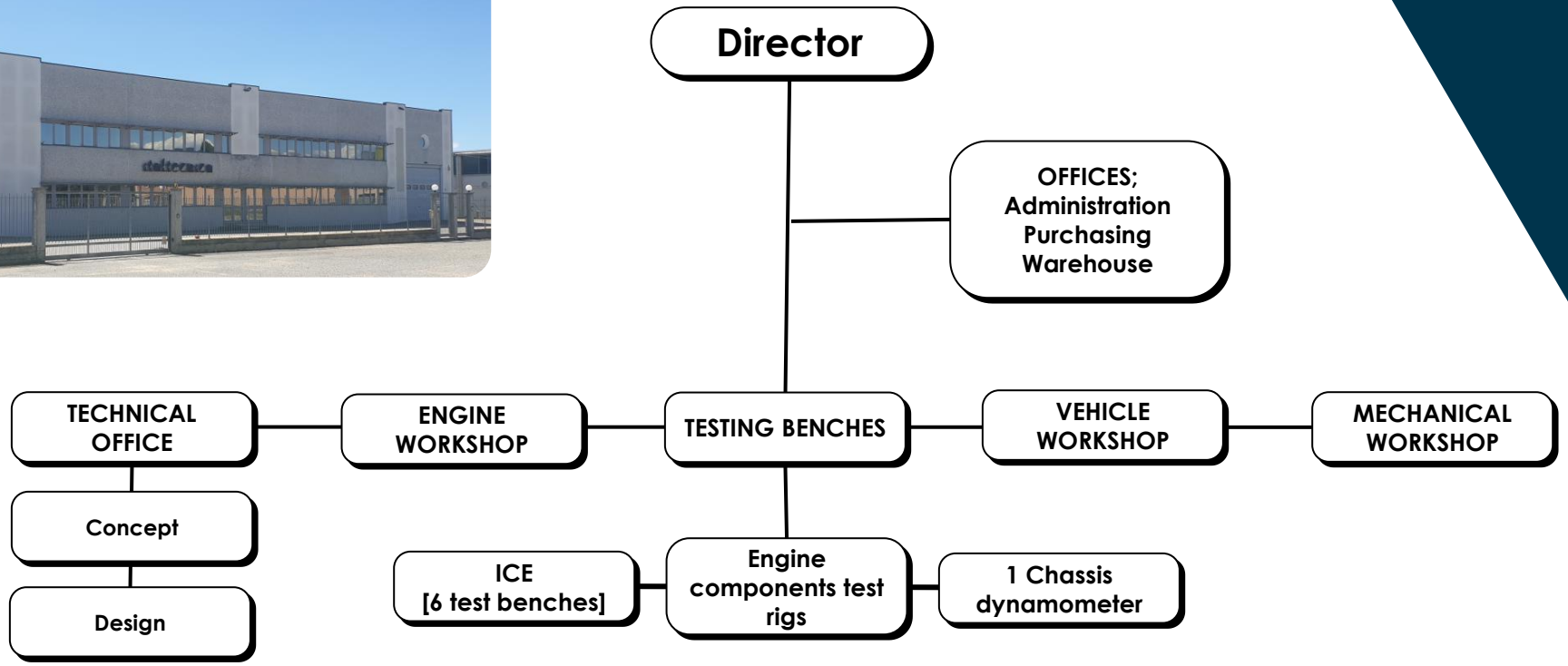
FACILITY & TEAM



Consultant: Ing. Claudio Lombardi

Direct staff: 25 people

Plant dimension: 3000m^2

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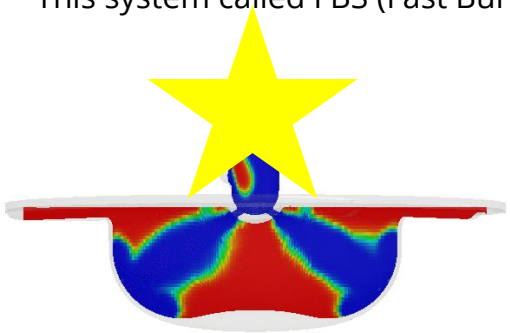
ITALTECNICA & INNOVATION

FBS project: base idea and design

The idea at the base of the FBS project is to have a combustion system that allows a **stable functioning of spark ignition engines with very lean air/fuel mixtures**, with a considerable reduction in the specific fuel consumption, CO_2 and pollutant emissions.

This system called FBS (Fast Burning Cycle), is patented.



Combustion system in operative condition

The system is made of a main combustion chamber and of a small pre-chamber from where partially oxidized highly reactive mixtures are ejected. Their purpose is to increase the activation energy of the combustion inside the main combustion chamber.

The combustion inside the main chamber doesn't develop as a flame front but it is of a diffusive type. In fact, a fast **increase in the flame speed** occurs, which determines a significant increase in the thermal efficiency, allowing the engine to operate with A/F ratios much greater than stoichiometric.

The originality of this pre-chamber system, **applicable both to the active pre-chamber solution and to the passive one**, is based on the mutual positioning of injector and spark plug inside the pre-chamber and allows the chamber to **operate also at low engine loads**.

Loredana Guglielmetti Firmato da: uibm-brevetti
Roma, 28 gennaio

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Ministero dello Sviluppo Economico
Direzione generale per la tutela della proprietà industriale
Ufficio Italiano Brevetti e Marchi

ATTESTATO DI BREVETTO PER INVENZIONE INDUSTRIALE

Il presente brevetto viene concesso per l'invenzione oggetto della domanda:

N. 102019000002983

TITOLARE/I:	• Italtecnica S.r.l. 100.0%
	Saglietti Luigi
DOMICILIO:	Saglietti e Associati corso Vittorio Emanuele II, 82 10128 Torino
INVENTORE/I:	• LOMBARDI Claudio
TITOLO:	SISTEMA E PROCEDIMENTO DI COMBUSTIONE PER MOTORI A COMBUSTIONE INTERNA AD ACCENSIONE COMANDATA
CLASSIFICA:	F02B
DATA DEPOSITO:	01/03/2019

Roma, 28/01/2021

Il Dirigente della Divisione VII
Loredana Guglielmetti

Certification of patent

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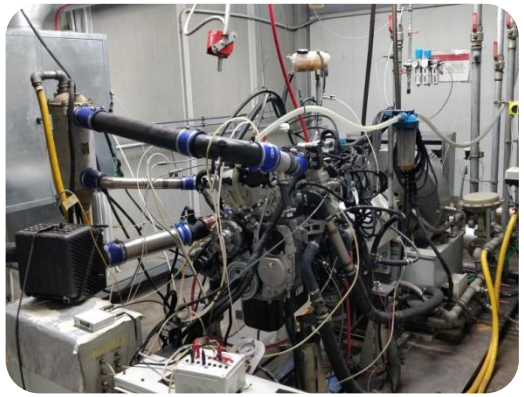
Hydrogen ICEs

Italtecnica always look to the future.

Our highly expert engineers successfully tested different projects of hydrogen ICEs, with some relevant benefits:

- **ZERO** greenhouse gases and particulates (Full Hydrogen mode);
- Relative **short design period**
- **Large application perspective** with small investment by the customers
- In comparison with the fuel cell, it could be faster to apply in a large scale in order to have a **swift reduction of pollution** in urban environment

V8 Engine during assembling phase in Italtecnica



4Cyl Engine during testing phase in Italtecnica

V8 Engine during expo presentation

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MAIN CUSTOMERS AND PARTNERS

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