



ILMOR

ILMOR ENGINEERING

CAPABILITIES AND SERVICES

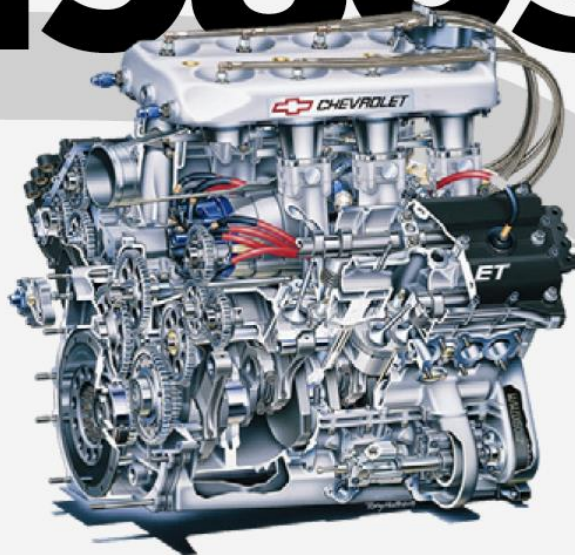




Ilmor Engineering is a global leader in engineering and manufacturing solutions. Always innovating and always at the forefront, we deliver cutting-edge, precision designs and products. We're continuously seeking new and better ways to maximize the performance, reliability, and efficiency of everything we build. Additionally, the Ilmor Customer Experience Team provides superior customer support for each and every one of our products.



1980s



THE START OF A LEGACY

Ilmor got its start in **1983** when two engineers—Mario Illien and Paul Morgan—sent a letter to Roger Penske proposing a new company to design and build turbocharged engines for the IndyCar series. Within three months they gained Penske's backing and Ilmor Engineering was born.

With Illien's design skills and Morgan's manufacturer expertise, alongside access to Penske's Indy Car race team, the team got GM to fund the completion of their eight-cylinder turbocharged Chevrolet engine. In **1986**, four-time Indy winner Al Unser became the first to race with the Ilmor engine and in **1987**, Mario Andretti was the first to win a race for the company at the Long Beach Grand Prix.

The Ilmor Chevrolet engine rapidly became the dominant engine in Indy racing, winning multiple championships and Indy 500s with stunning performance and reliability.

1990s

OFF TO THE RACES

In **1993**, Ilmor partnered with Mercedes to introduce a 'pushrod' engine, built specifically for the Indy 500. The MB-500I engine was perhaps the most powerful and innovative engine in the nearly 100-year history of the race, and Al Unser Jr. drove it to victory in **1994**.

Riding high on the Indy success, Ilmor expanded its partnership with Mercedes-Benz to design and develop a Formula One engine that went on to win the F1 World Championship with McLaren in **1998** and **1999**. Additionally, in **1998**, Ilmor broadened their business with Ilmor Special Projects Group (SPG), and began working on a NASCAR program with Daimler Chrysler. This was followed by two motorcycle projects for Triumph and Harley Davidson and the development of a defense used drone engine.

In **1998**, the Ilmor US headquarters expanded into a custom built 28,000 sq. ft. facility in Plymouth, MI that housed design, engineering, engine build, dyno, and development capabilities.



2000s



MOVING INTO NEW TERRITORY

At the end of the **2000** season, Ilmor entered the Indy Racing League and began development of a GM-designed engine, which won the Indy 500 in both **2001** and **2002**. **2002** also saw the beginning of new relationship with Honda Performance Development (HPD).

After the death of Paul Morgan in **2001**, Ilmor's UK division was sold to Mercedes-Benz, and Penske and Illien re-purchased the Special Projects Group, including the rights to the Ilmor name. In **2011**, Ilmor concluded its eight-year partnership with Honda that yielded 127 wins across eight seasons. Ilmor again partnered with Chevrolet in **2012** to create a new 2.2L, twin turbo IndyCar engine which has won 64 IndyCar races, four IndyCar driver's championships, and six IndyCar Manufacturers Series championships to date through the end of the 2020 season.

In **2015**, Ilmor began racing in the ARCA Racing Series at the ARCA Daytona 200. Ilmor entered the TransAm series, winning over 10 TA2 class races and capturing the **2016** Drivers Championship. In 2018 Ilmor expanded into the NASCAR Truck Series with the Ilmor 396 engine.

MAKING WAVES IN THE MARINE INDUSTRY

In **2002**, Ilmor entered the high performance marine world, building race engines for the "SuperCat" Offshore Racing Series of the American Power Boat Association. The Ilmor marine division has become a well-established supplier to the global marine market. In **2009**, Ilmor created a new generation of MV10 marine products and the new INDY® Sterndrive. In **2010** Ilmor began production of MV8 engines for the MasterCraft Boat Company at its new 50,000 sq. ft. marine manufacturing headquarters in Mooresville, NC. By 2011, Ilmor Marine became the exclusive engine supplier to MasterCraft and launched MV8 7.4L engine. Ilmor High Performance Marine gained attention in **2013** by introducing the MV8-570—the most powerful naturally-aspirated gasoline small-block engine today. Ilmor launched its innovative One-Drive sterndrive propulsion system in **2016** and rolled out the award-winning 483-hp MV8 7.4L engine in **2017**. In **2020**, Ilmor produced its 25,000th marine engine.

In **2021**, SRX Racing selected Ilmor as their exclusive engine provider for the series. This adds another, top quality race series to the list for the Ilmor 396 Racing Engine.



A GLOBAL FOOTPRINT

 **ILMOR INC.**
Plymouth, Michigan

 **ILMOR MARINE**
 Mooresville, North Carolina

 **ILMOR LTD**
Brixworth, United Kingdom

 **ILMOR AG**
Bäch, Switzerland

LEADERSHIP



Mario Illien



Roger Penske

RECOGNIZED FOR **EXCELLENCE**

FOR 2020



QUALITY

- ISO 9001:2015 accredited



SERVICE AND SUPPORT

- 97% user satisfaction rating
- Six-time Marine Industry CSI Award Winner



INNOVATION

- NMMA Innovation Award Winner



RACING

- 335+ IndyCar race wins
- 21 Indy 500 victories
- Multiple NASCAR Truck Series and ARCA championships

21

INDIANAPOLIS 500 WINS

335+

INDYCAR WINS

97%

**END USER
SATISFACTION RATING**

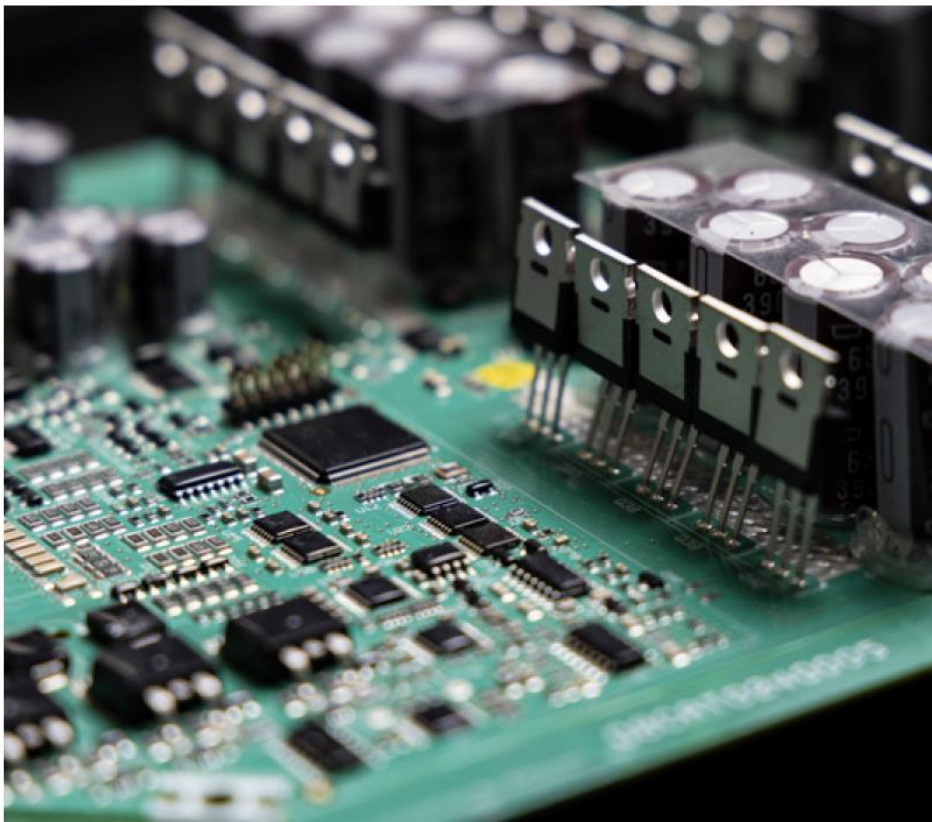
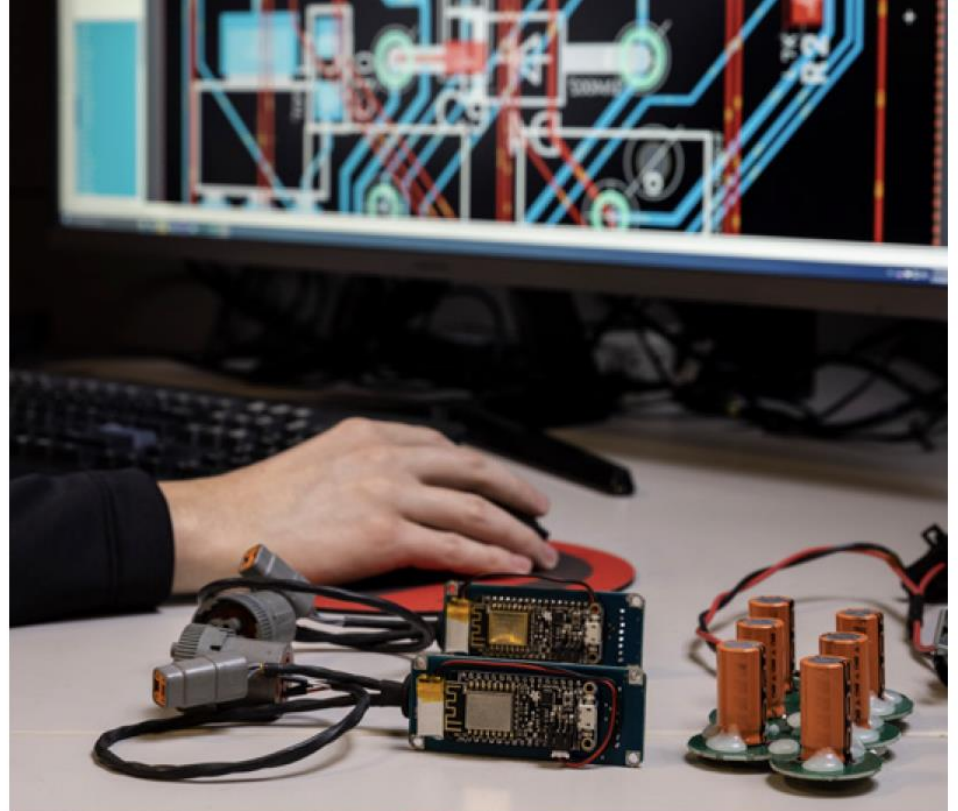
27,000+

MARINE ENGINES SOLD

A BREADTH OF **EXPERTISE**

ELECTRONICS AND CONTROL SYSTEMS

- In-house circuit board design
- System-wide hardware design and manufacturing
- Project-specific, customized solutions
- Automate and military grade wiring manufacturing





RPM SYNC JOYSTICK ANCHOR PLANING

ePDM Faults

CLEAN POWER
STARTER
RH BANK
LH BANK
FUEL PUMP 1
FUEL PUMP 2
DASH POWER
IGNITION
AUX PUMP
STERN POWER

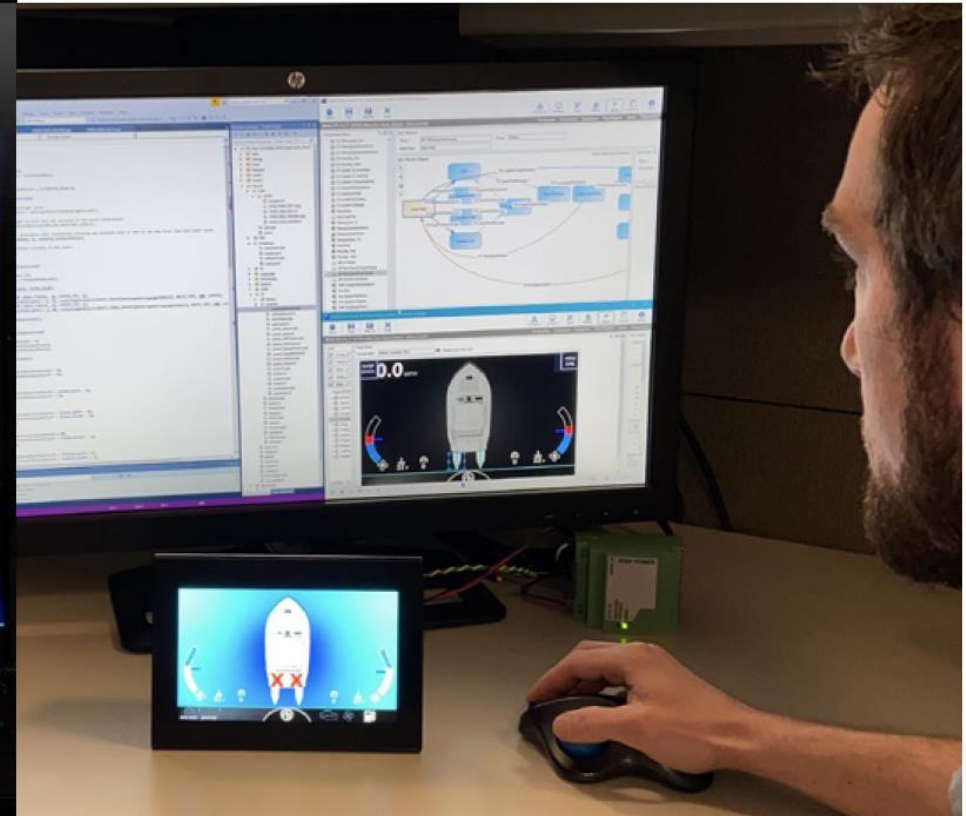


NO FAULT (green dot) CIRCUIT OFF (blue dot) FAULT ACTIVE (red dot) PRESS TO RESET (red dot)

RPM SYNC JOYSTICK ANCHOR PLANING

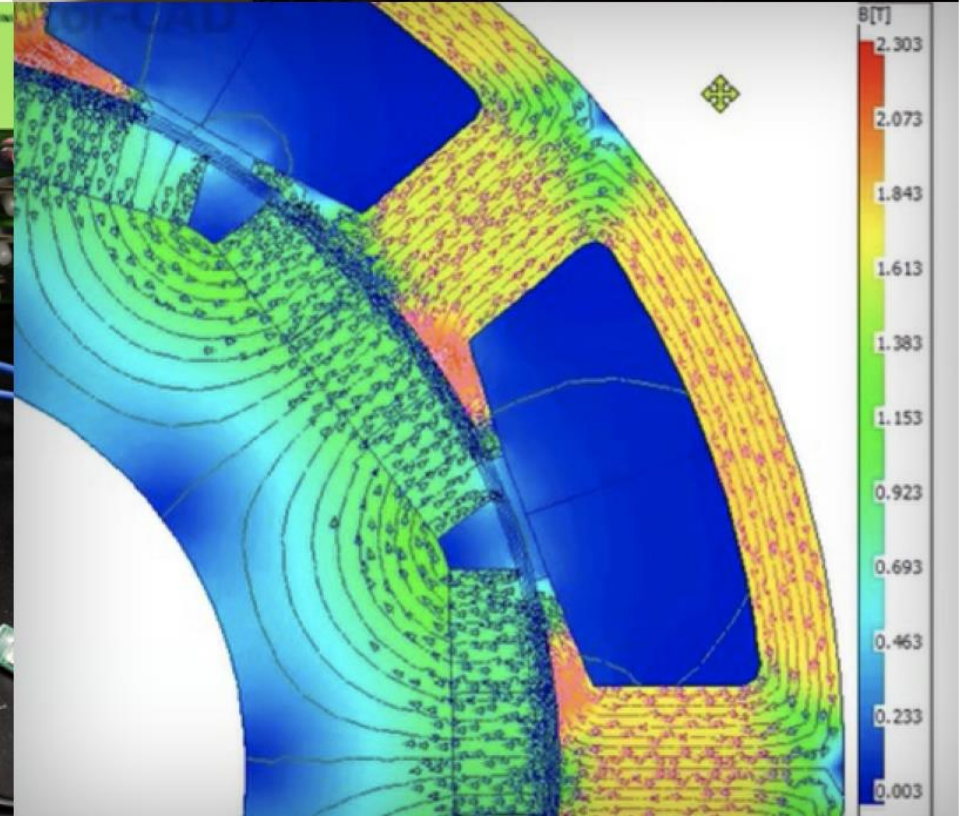
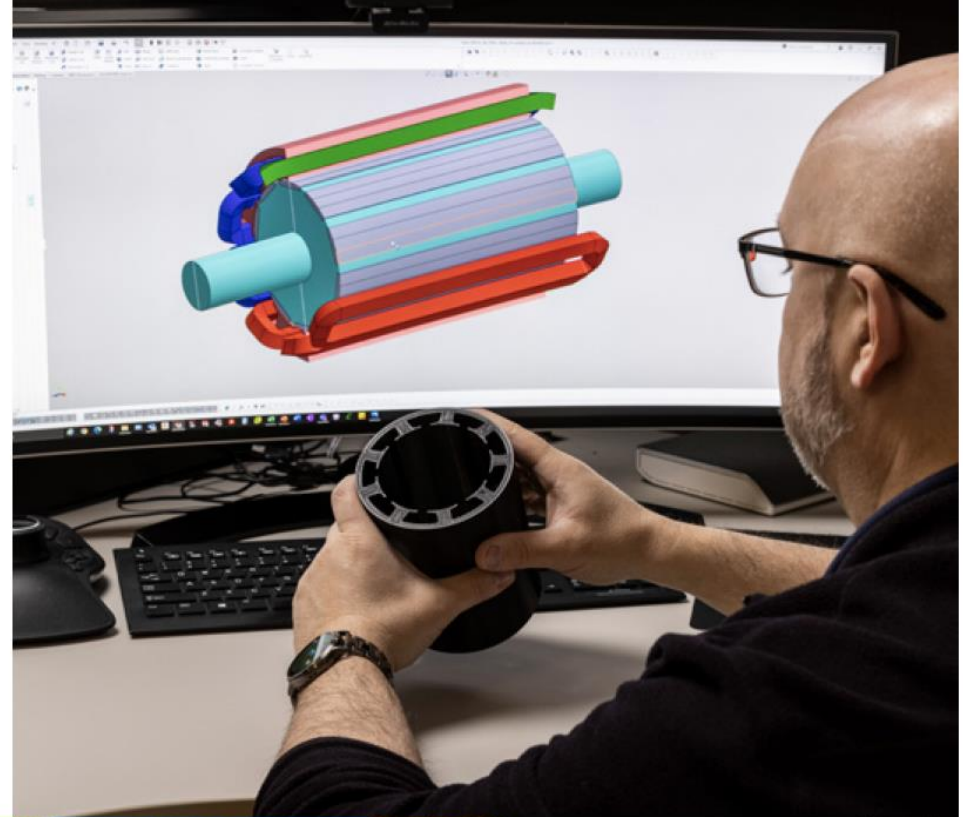
SOFTWARE

- Development of control system algorithms and software
- Support for various MFDs
- Solutions suitable for motorsport, marine, and automotive applications



ELECTRIC POWERTRAIN

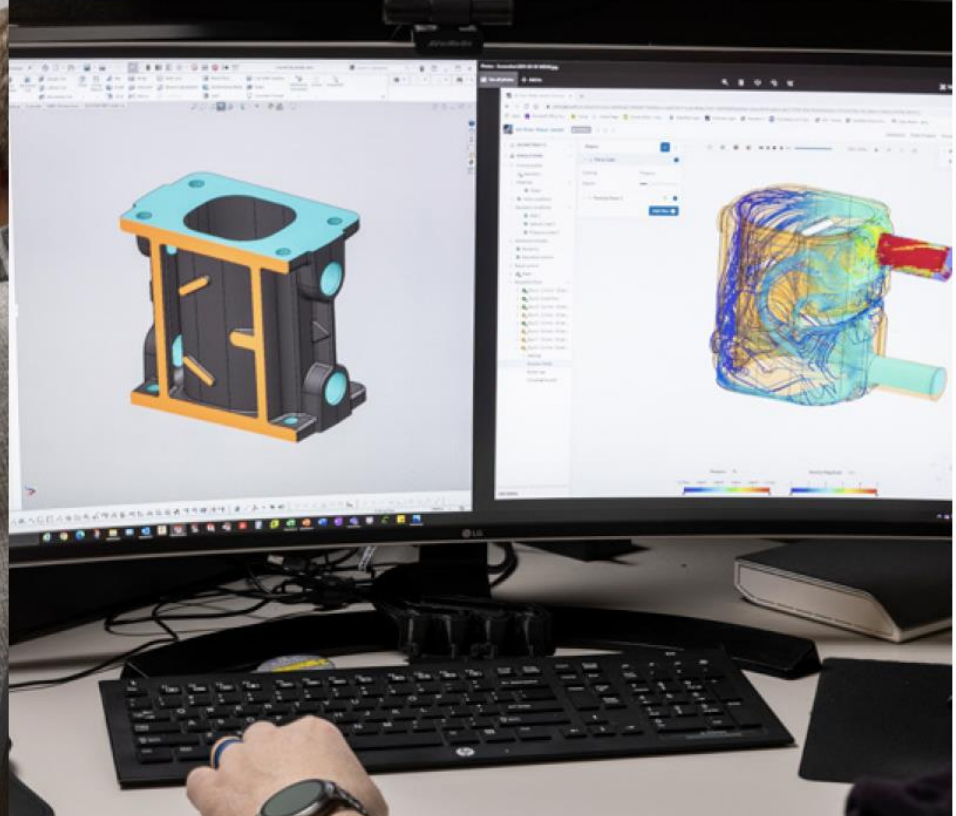
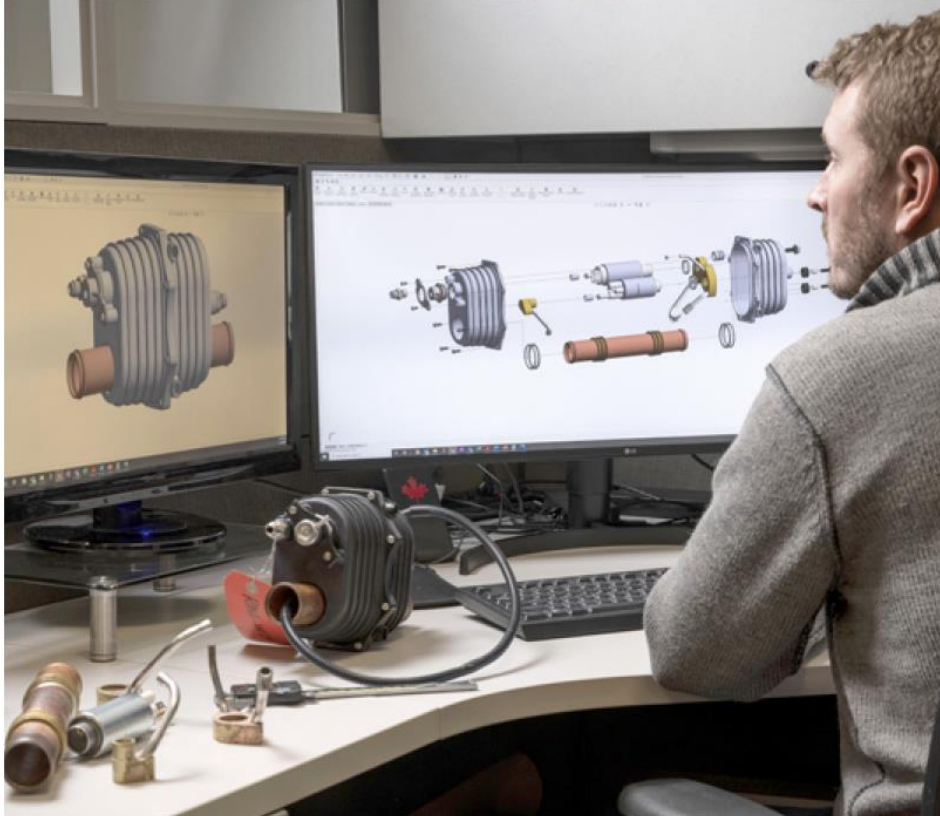
- End-to-end engineering of motor power systems
- Motor controller design
- Battery system development





DESIGN AND ANALYSIS CAPABILITIES

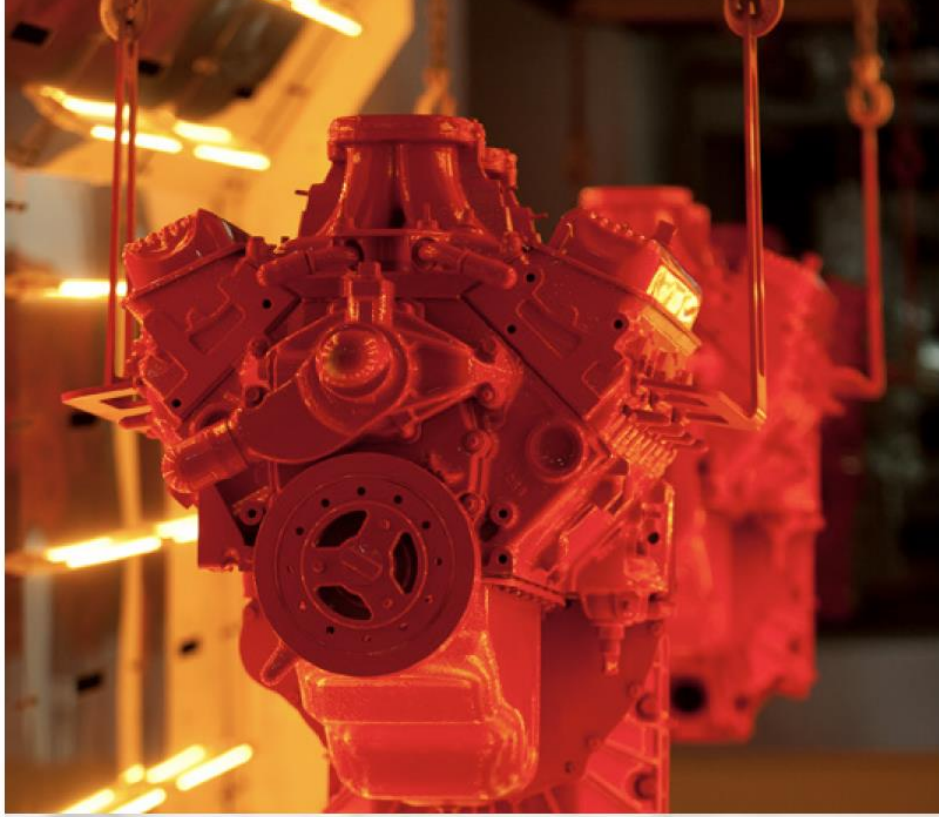
- Computer-aided design
- FEA/CFD predictive analysis
- DFMEA/DVP&R drafting



HIGH-LEVEL MANUFACTURING

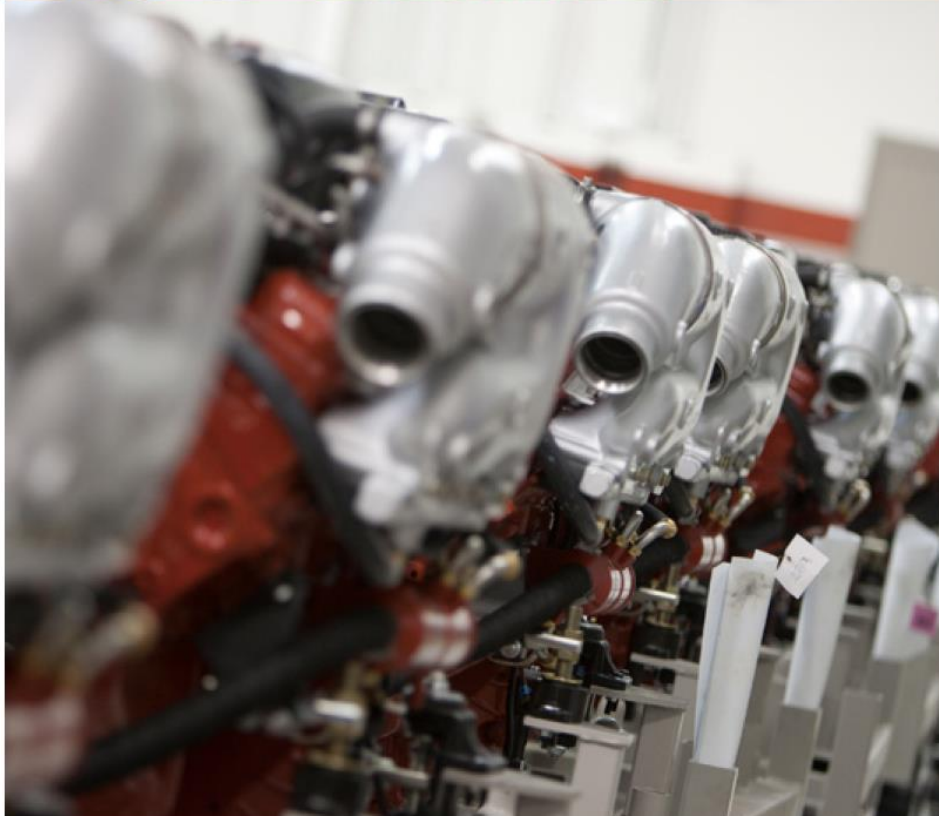
- Production via 5-Axis machining
- Capacity for scalability
- Advanced precision capabilities





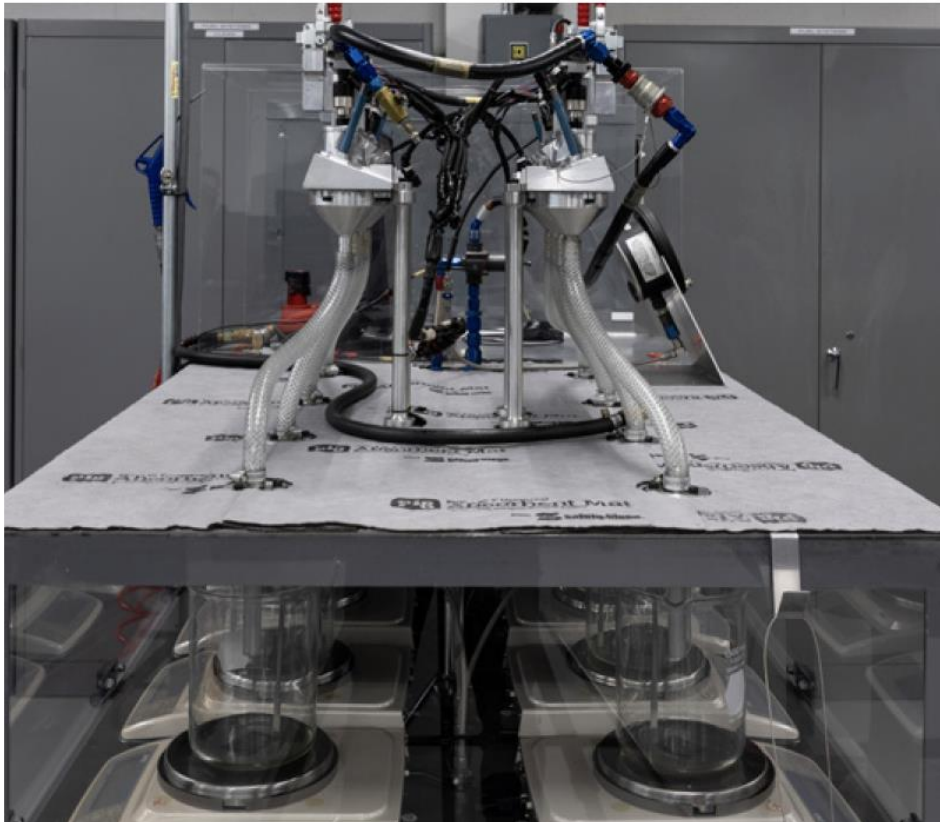
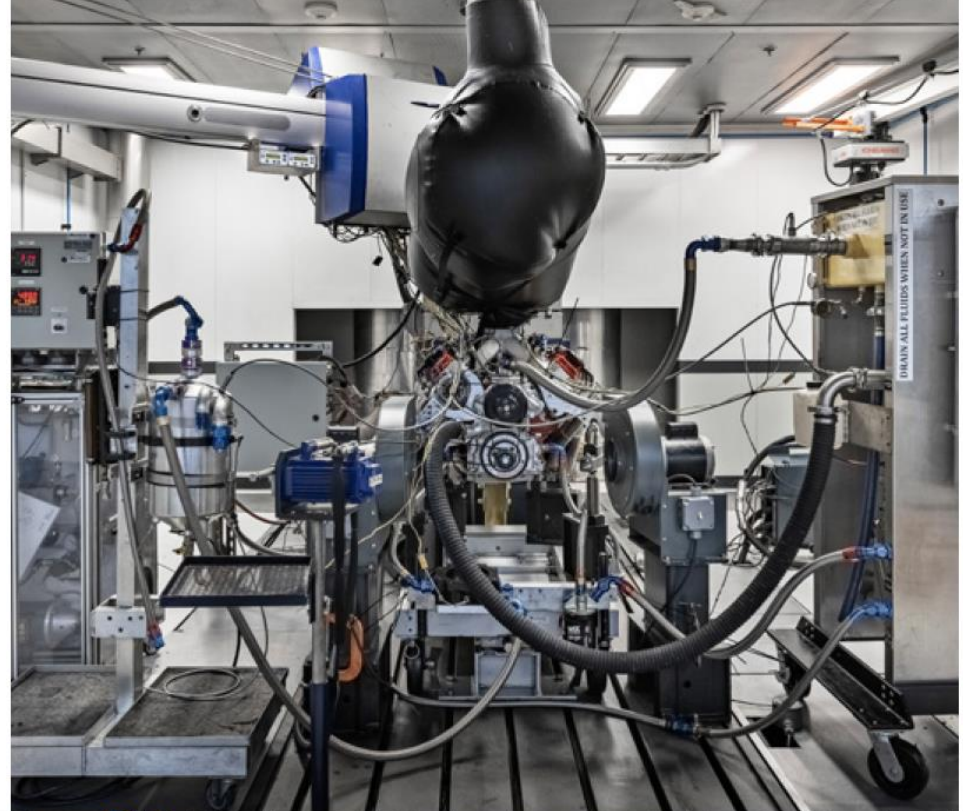
ASSEMBLY

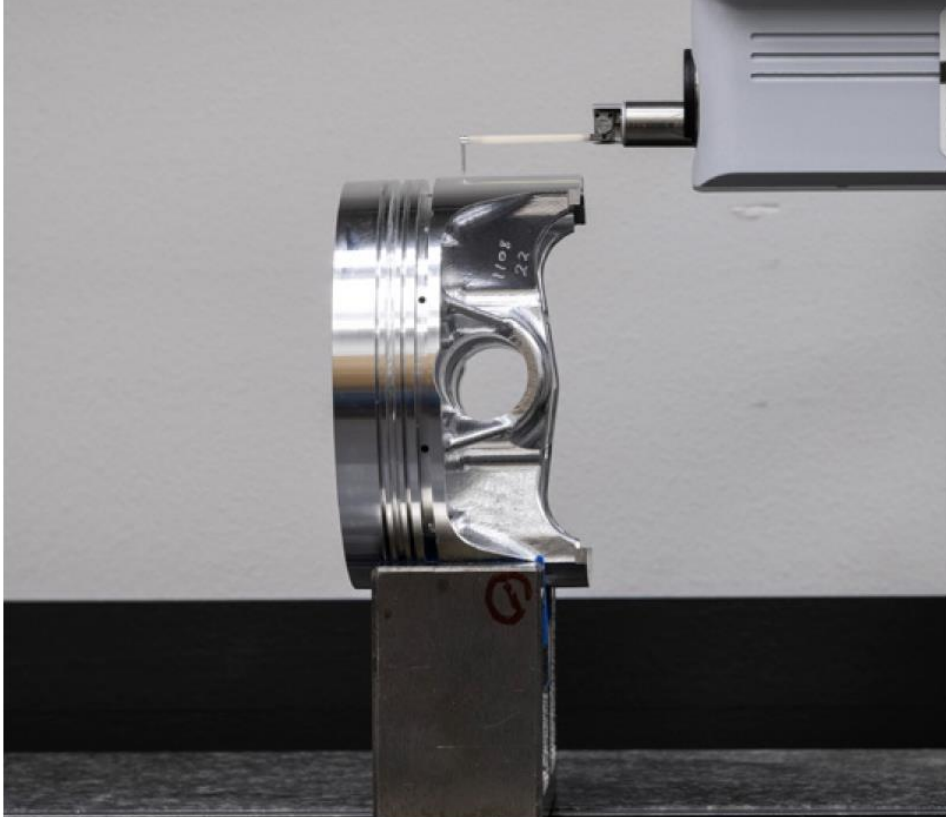
- Precision motorsport assembly standards
- Subsystem component assembly
- Production-level assembly and paint systems
- Industry-standard cleanroom environment



TESTING AND ENGINE EMISSIONS

- AVL engine dynamometer testing
- Motoring test rigs
- EPA, CARB, and EU emissions standard testing
- Flow bench analysis





INSPECTION SERVICES

- Metrology lab
- Non-destructive materials testing
- 3-D remote scanning



