

Updated  
January 2016

# Montupet General Presentation

**MONTUPET**





# Abstract

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- **Overview**
- **Financial results**
- **Technical expertise: cylinder heads**
  - R&D activities
- **Suspension, braking and engine parts**





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# OVERVIEW

- Strategy
- Products
- History
- Customer base
- Footprint



# Strategy

- Maintain and confirm **technological leadership** as a supplier of reference
- Provide **simultaneous engineering** services adapted to each customer
- Ensure a **global footprint**
- Diversify the **customer base**
- Build on a **sound financial base**

*... guided by strong company values*



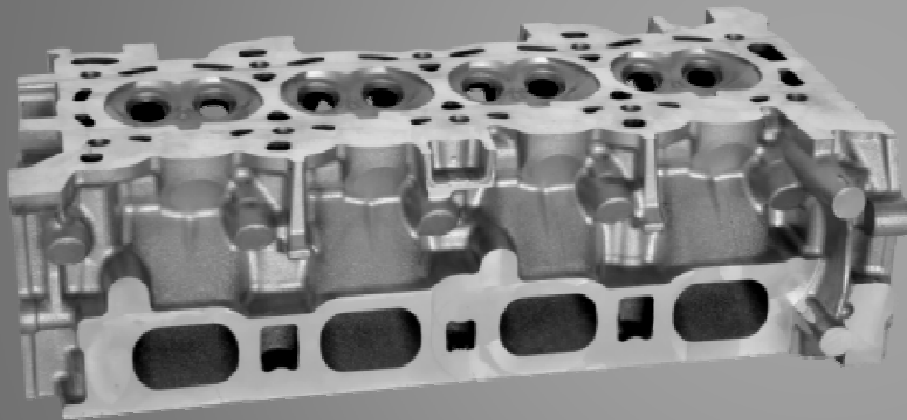


# Products

Design and production of  
**complex cast aluminium components**  
for the automotive industry



**80%** Engine parts  
Cylinder heads, EGR, turbocharger housings...



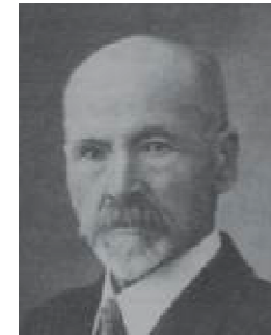
**20%** Safety parts  
Master cylinders, suspension knuckles...





# History

- 1894** Pierre Montupet opens a foundry in Nogent, France
- 1966** Initial public offering (Paris stock exchange)
- 1986** Management buy-out: **focus on automotive industry**
- 1987-89** New foundries in **Spain** and **United Kingdom**
- 2000-06** New foundries in **Mexico** and **Bulgaria**
- 2010** **Focus on core business:** engine and safety parts
- 2013** **Development in Asia:** joint-venture with Jaya Hind (India)
- Today** **450 M€ turnover and a global footprint**





# Customer base

## Carmakers



## Tier-1 suppliers





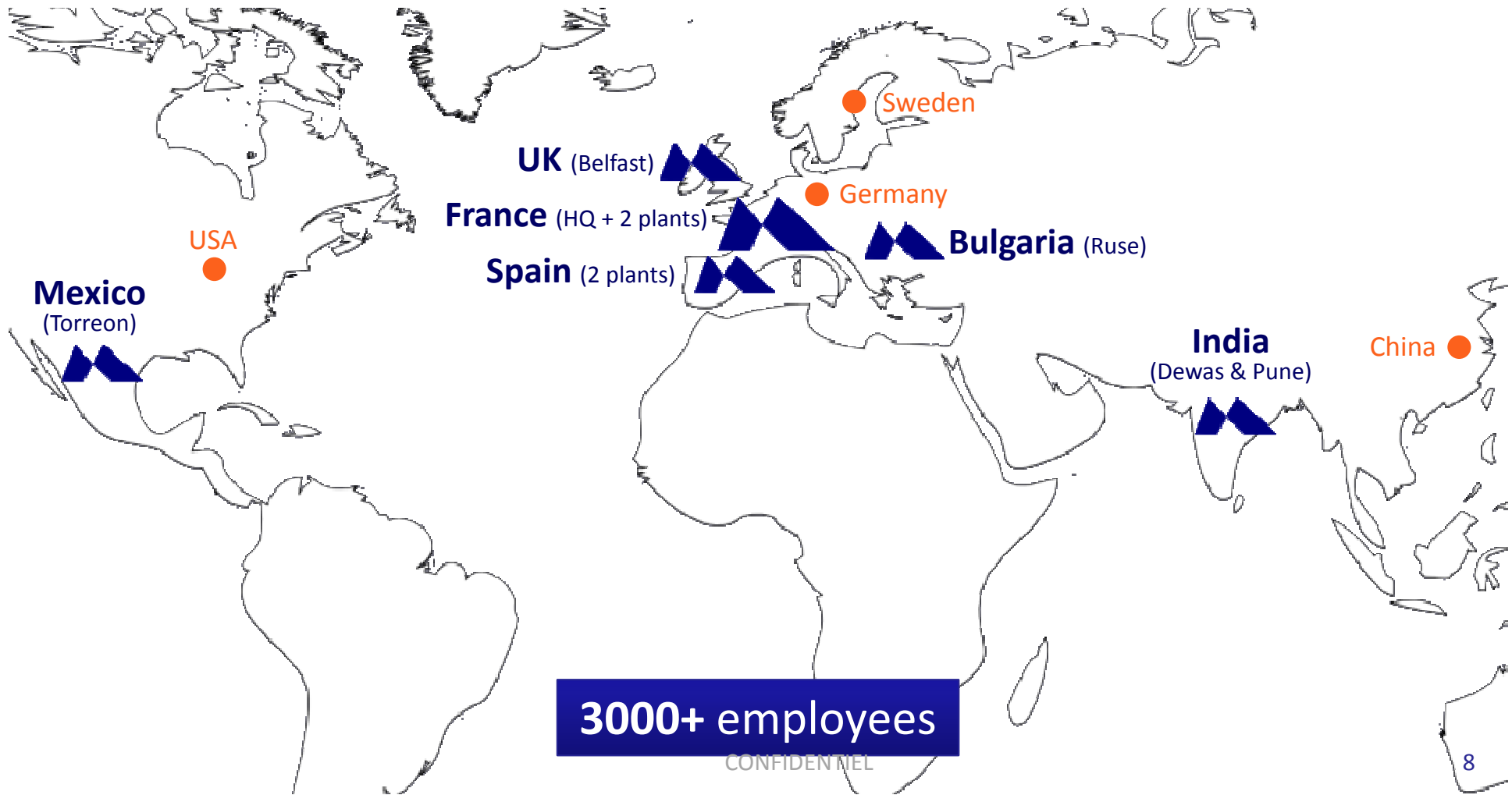
# Footprint



Production site



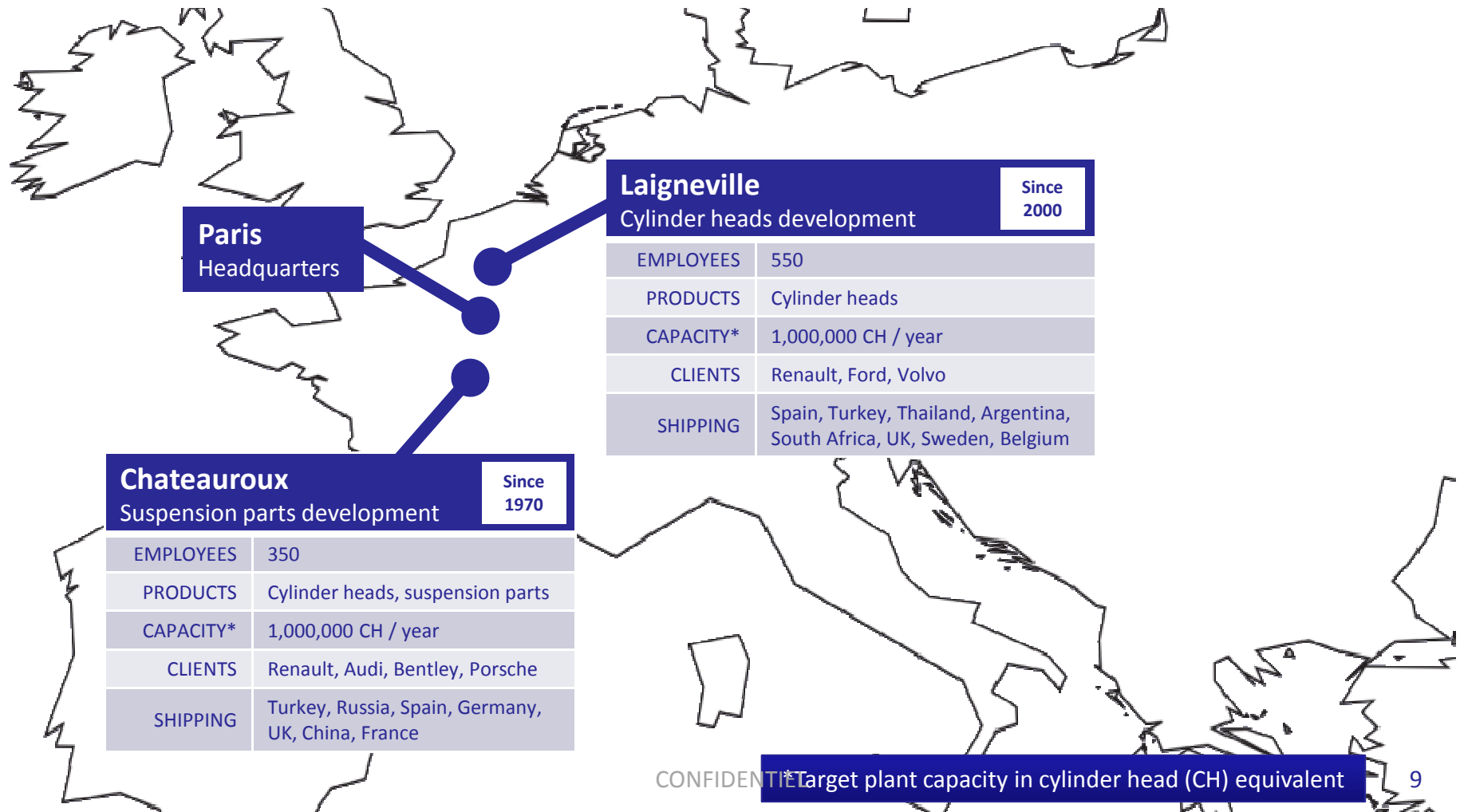
Sales office





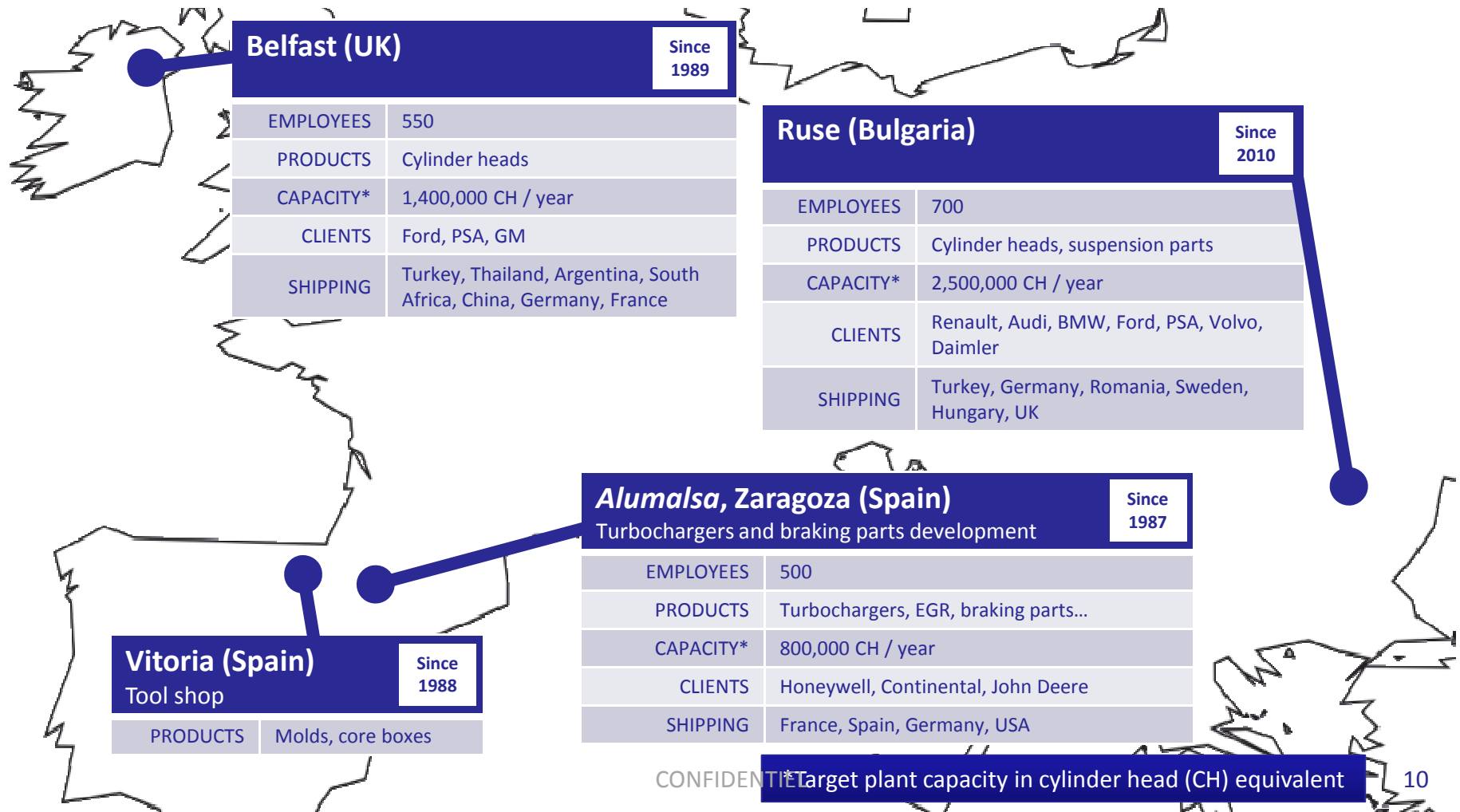


# Footprint / France



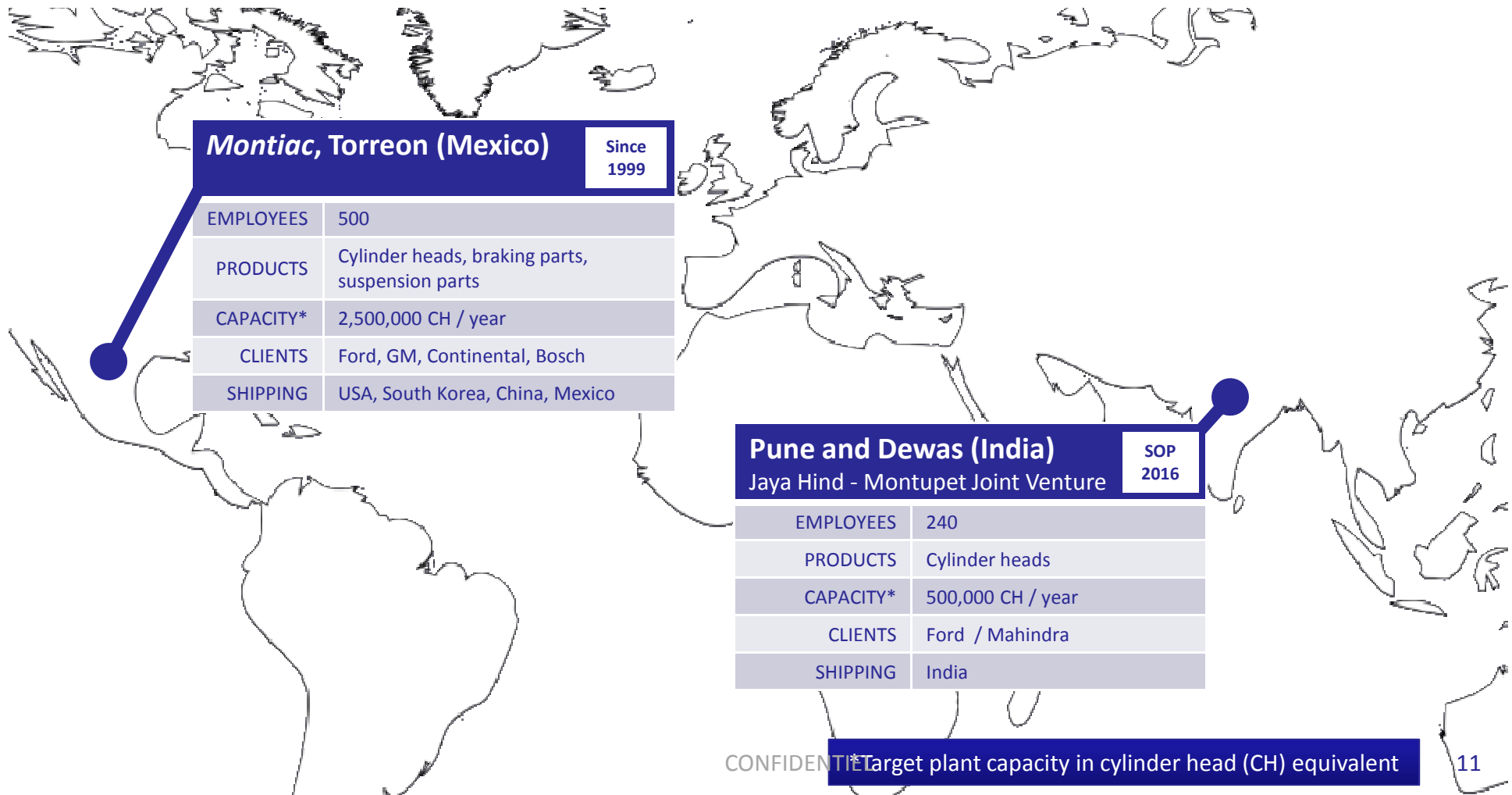


# Footprint / Europe





# Footprint / Americas and Asia



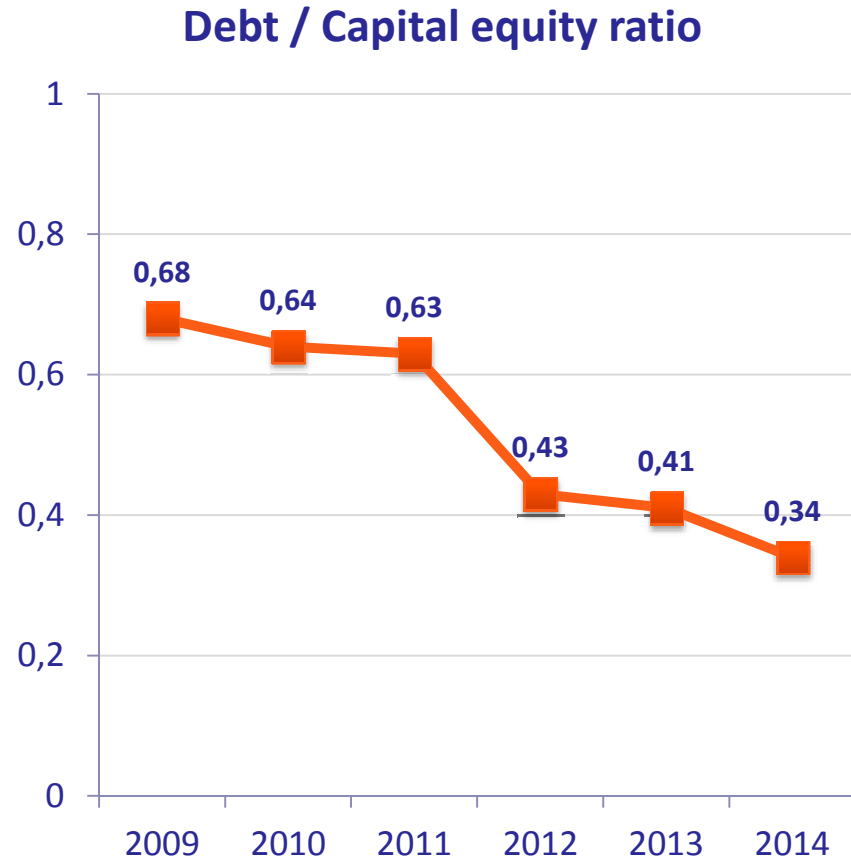
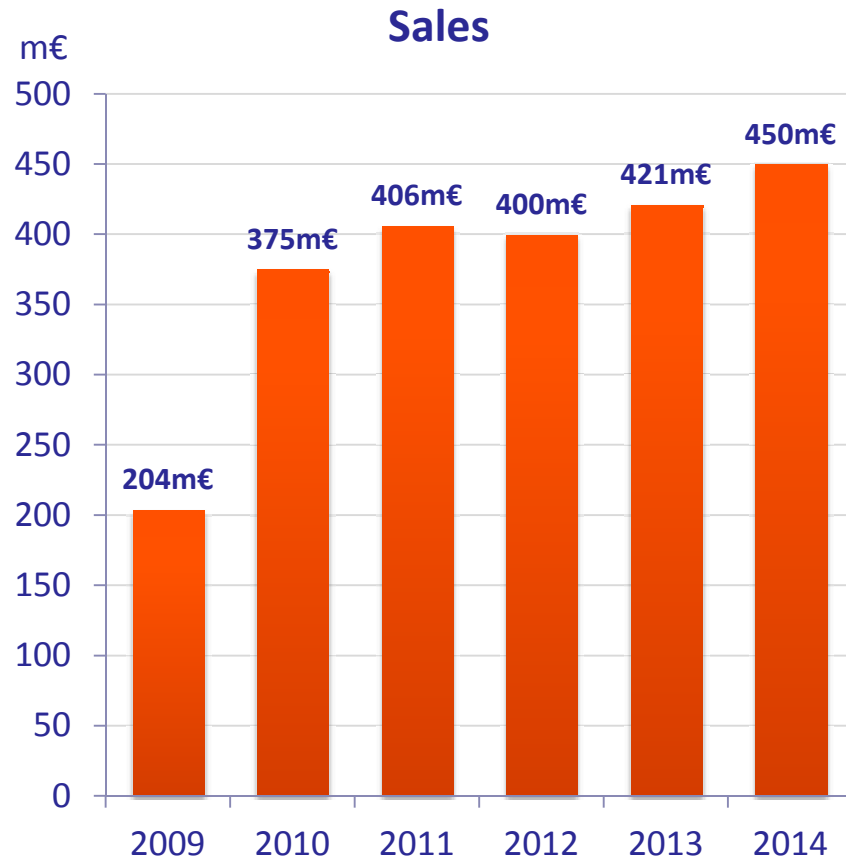


# FINANCIAL RESULTS

- Sound financial basis
- Sales forecast
- Revenue split 2014 - 2016 - 2018



# Sound financial basis



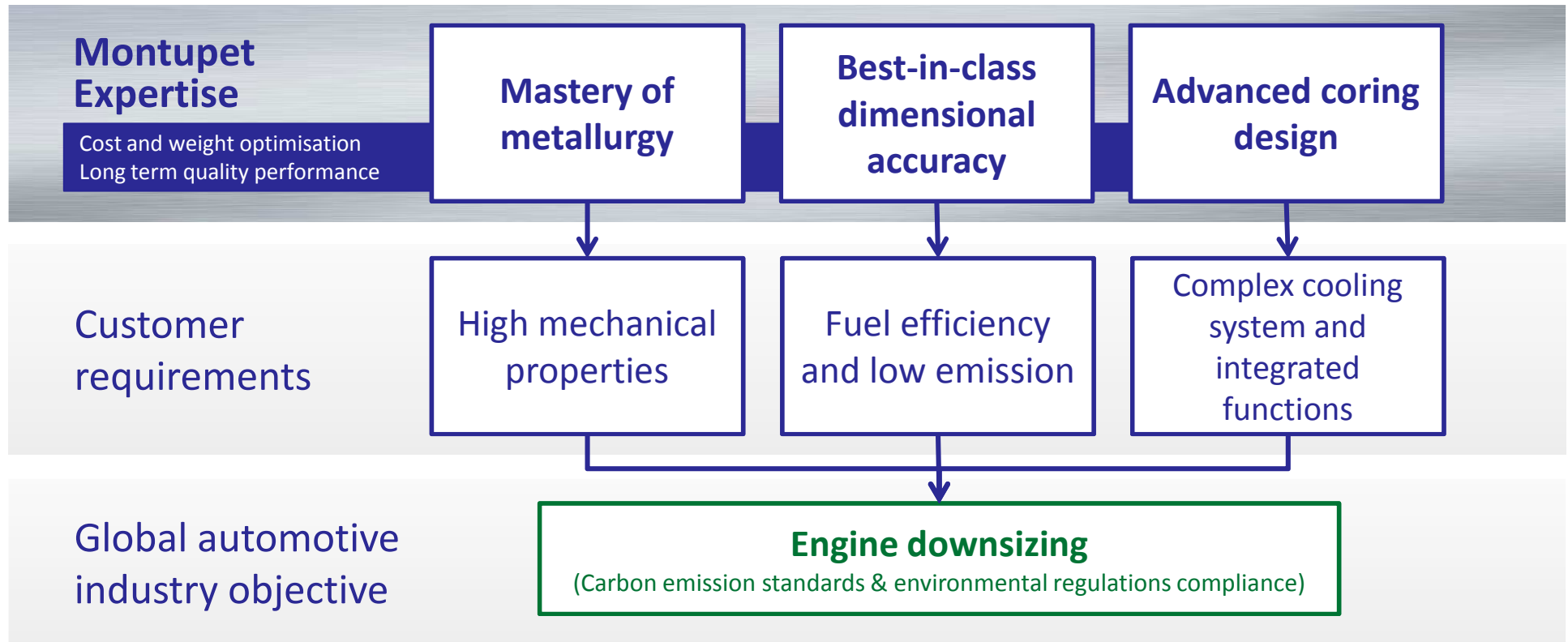


# TECHNICAL EXPERTISE

- Technical challenges
- Engine downsizing
- Metallurgy
- Dimensional accuracy
- Complex coring
- R&D
- Quality performance

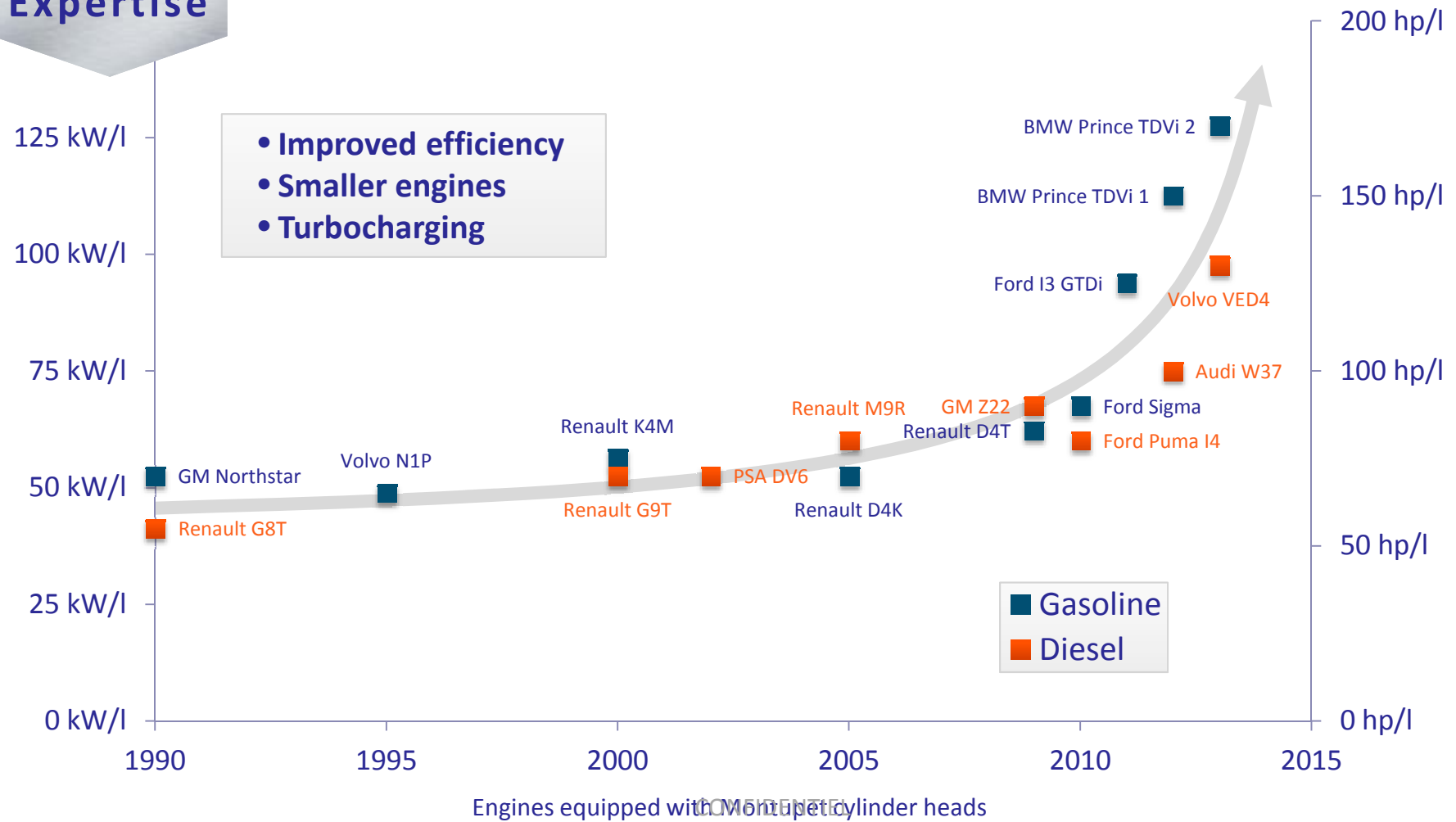


# Technical challenges





# Engine downsizing







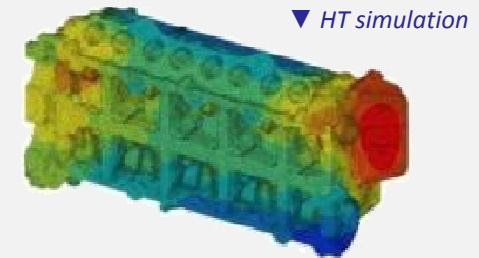
# Mastery of metallurgy

## Large range of alloys and heat treatments

ALLOY	HT	Parts
AlSi7Mg (A356) <i>(Primary)</i>	T7 Water quench	Ford (DV6)...
	T7 Air Quench	GM (Z-22)...
AlSi7MgCu0,5 <i>(Primary)</i>	T7 Water quench	M&M (2.2L CRDI 4 cyl.)...
	T7 Air Quench	Ford (FOX I3 GTDI)...
AlSi10Mg <i>(Primary)</i>	T7 Water quench	Ford (Puma I4)...
AlSi10MgCu0,5 <i>(Primary)</i>	T7 Water quench	Audi (W19,W36,W37)...
AlSi7Cu3 (319) <i>(Secondary)</i>	KF (No HT)	Renault (D4, K4, K7)...
	T5	Ford (FOX GDI), Renault (K9, M9)...
	T7 Water quench	Ford (I4 PFI, I4 GDI)...
	T7 Air quench	Cylinder head in development



## Heat treatment validation



▲ Strain gauges for testing after HT



**Control of the mechanical properties  
during the whole product lifecycle**

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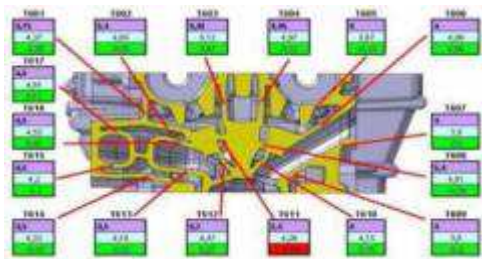
# Dimensional accuracy

- Complex geometry design
- Testing and process control

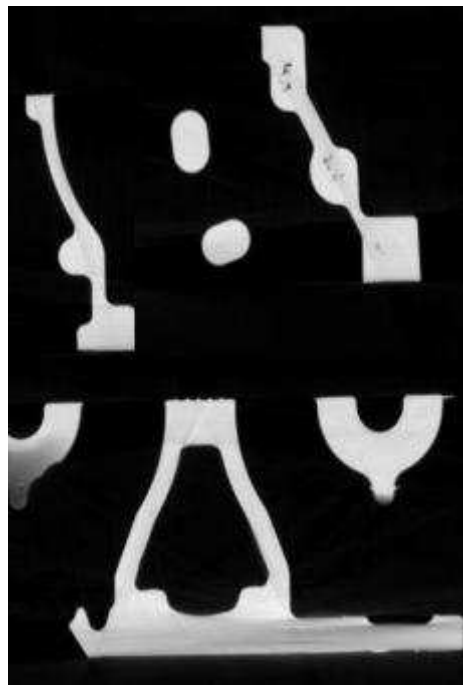
Optimise weight and geometry for improved fuel efficiency



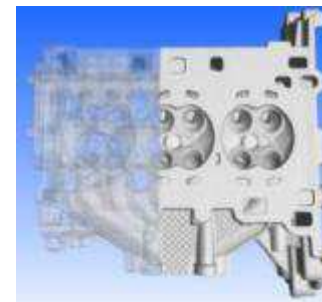
▲ X Ray Tomography (CT Scan)



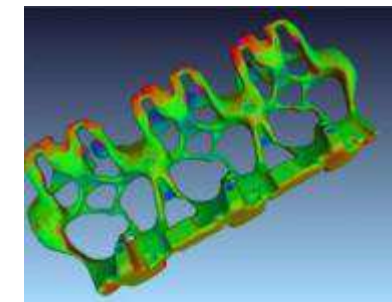
▲ Non destructive thickness analysis



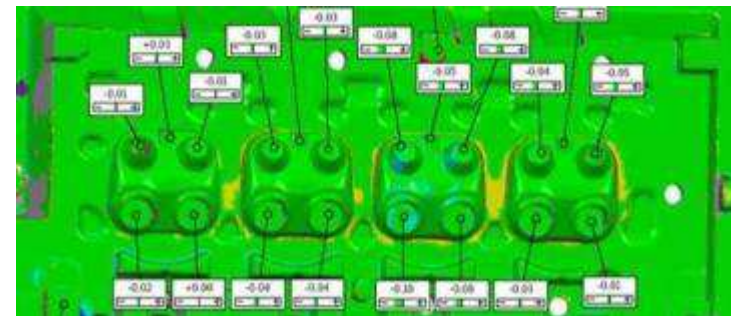
▲ Sections for soundness investigation



▲ CAD model VS real part



▲ 3D model



▲ GOM: geometrical dimensioning



# Advanced coring design

Customer design requirements

Complex cores manufacturing

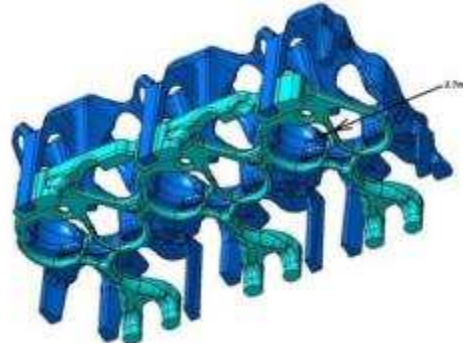
Integrated functions

Double water jacket

Ultra thin cores



▲ *Integrated exhaust manifold*



▲ *Audi W36/37*



▲ *Audi V6 3l 250hp*  
**Ø < 3 mm**

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# Research & development

150+

Scientists  
& engineers

## Product and process development

- New industrial solutions
- Alloy and heat treatment
- Technology intelligence
- Patents

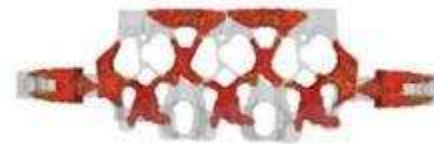
## Simulation competences



▲ Static gravity filling  
(Magma)



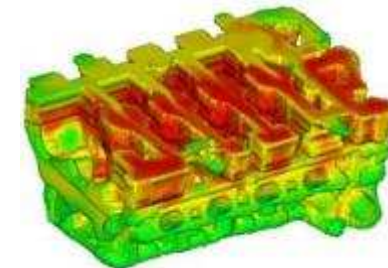
▲ Tilted gravity filling  
(QuikCast)



◀ Core shooting (QuikCast)



▲ Low pressure filling  
(Magma)



▲ Solidification  
(QuikCast)

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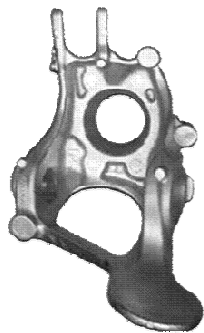


# CHASSIS, BRAKING AND ENGINE PARTS

- Aluminium chassis parts
  - Global footprint
  - Technical development
- Engine components
- Braking parts



# Aluminium chassis parts



  
**Audi**  
*Rear knuckle*



  
**Audi**  
*Cross member*

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*Machined rear knuckle*

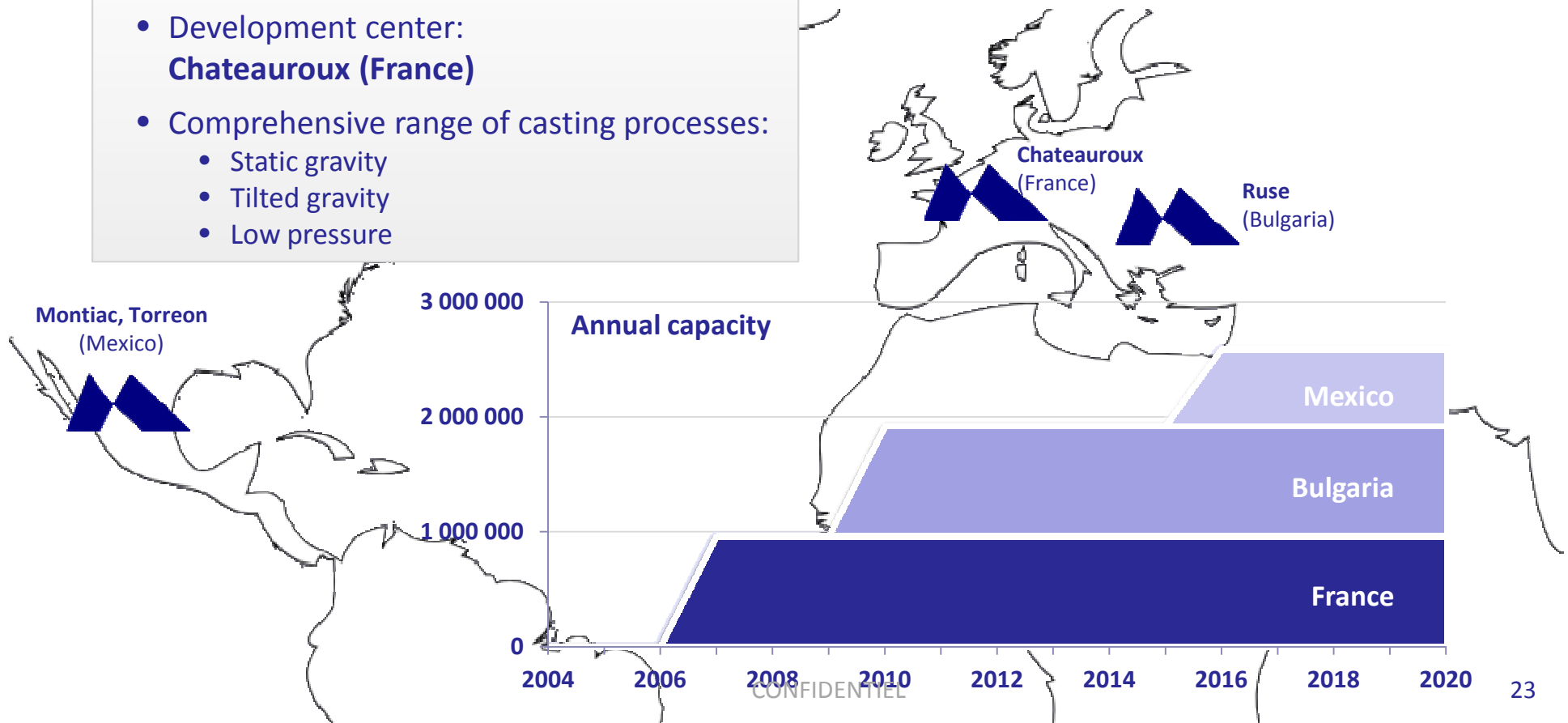


  
**BENTLEY**  
*Front upright*



# Chassis parts footprint

- Development center:  
**Chateauroux (France)**
- Comprehensive range of casting processes:
  - Static gravity
  - Tilted gravity
  - Low pressure





# Chassis parts development

- **Specific controls for safety parts**

- X-ray with automatic sanction
- Fluorescent liquid penetrant inspection
- Chemical and metallurgical analyses
- Dimensional control



- **Expertise in finite element and casting simulation**

- Foundry simulation: Magmasoft, Simulor
- FE calculation: Nastran, Ideas



- **Simultaneous engineering and best-in-class metallurgists**

- Component geometry
- Mechanical properties
- Tooling







# Engine components

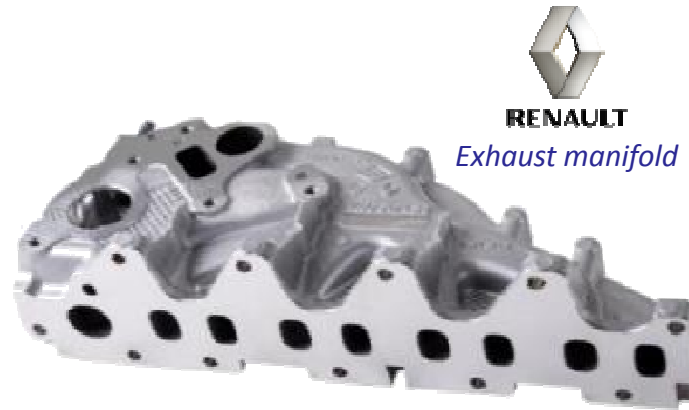
Wide range of aluminium castings

Engine performance and low emissions systems

Complex coring and in-house machining

Customers include OEM and tier-1

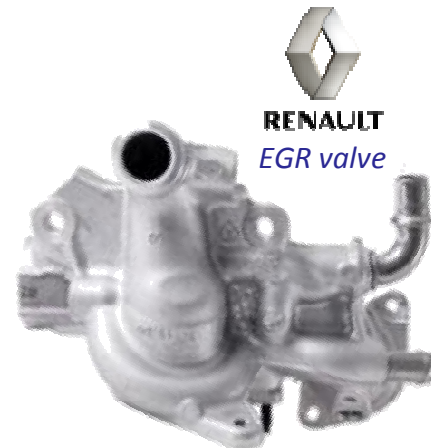
Development center:  
Alumalsa, Spain



**RENAULT**  
*Exhaust manifold*



**IHI**  
*Turbocharger housing*



**RENAULT**  
*EGR valve*



**BorgWarner**  
*Intercooler*

*And more...*

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# Braking parts

**Master cylinders**

**Continental** 

**BOSCH** 

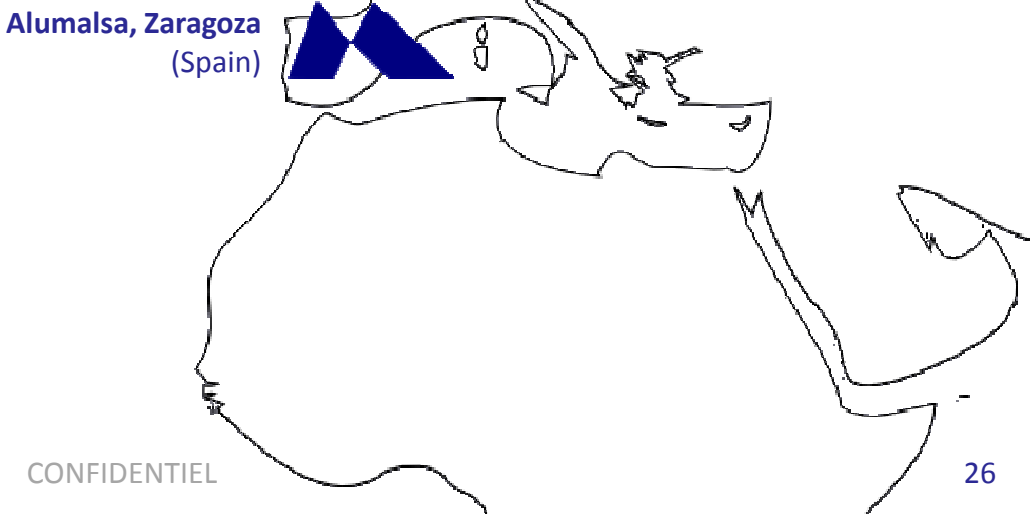
- GM
- Ford
- Chrysler
- Fiat
- Nissan
- Mazda
- Toyota



**50 million parts produced**  
in the past 10 years

**5.5 M parts/year** installed  
capacity

**Fully automated**  
production systems



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Montupet

*Thank you for your attention*



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