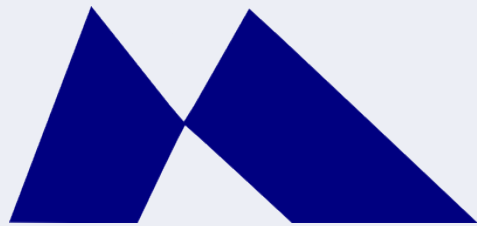




Montupet General Presentation



Updated
January 2016



MONTUPET



Abstract

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





OVERVIEW

- Products
- History
- Customer base
- Footprint

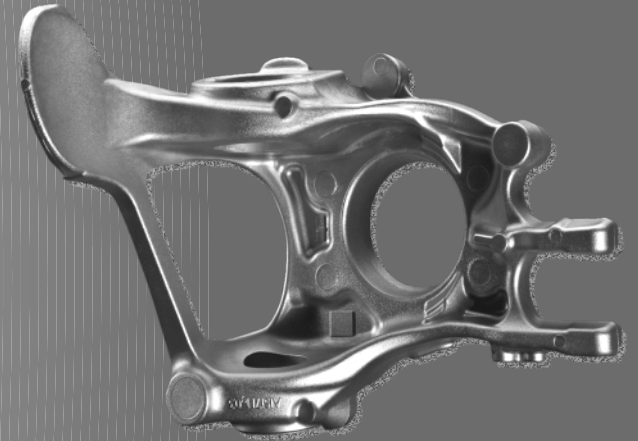
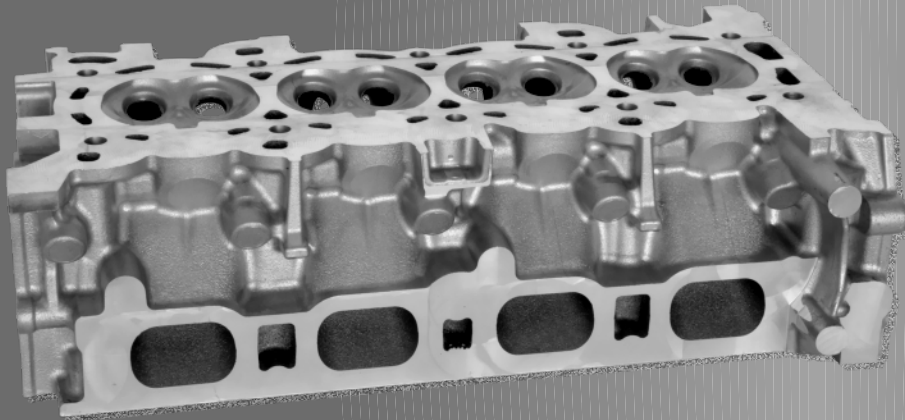


Products

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



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

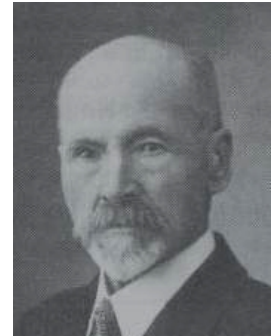


20% Safety parts
Master cylinders, suspension knuckles...



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** **Montupet/Linamar**





Customer base

Carmakers



Tier-1 suppliers





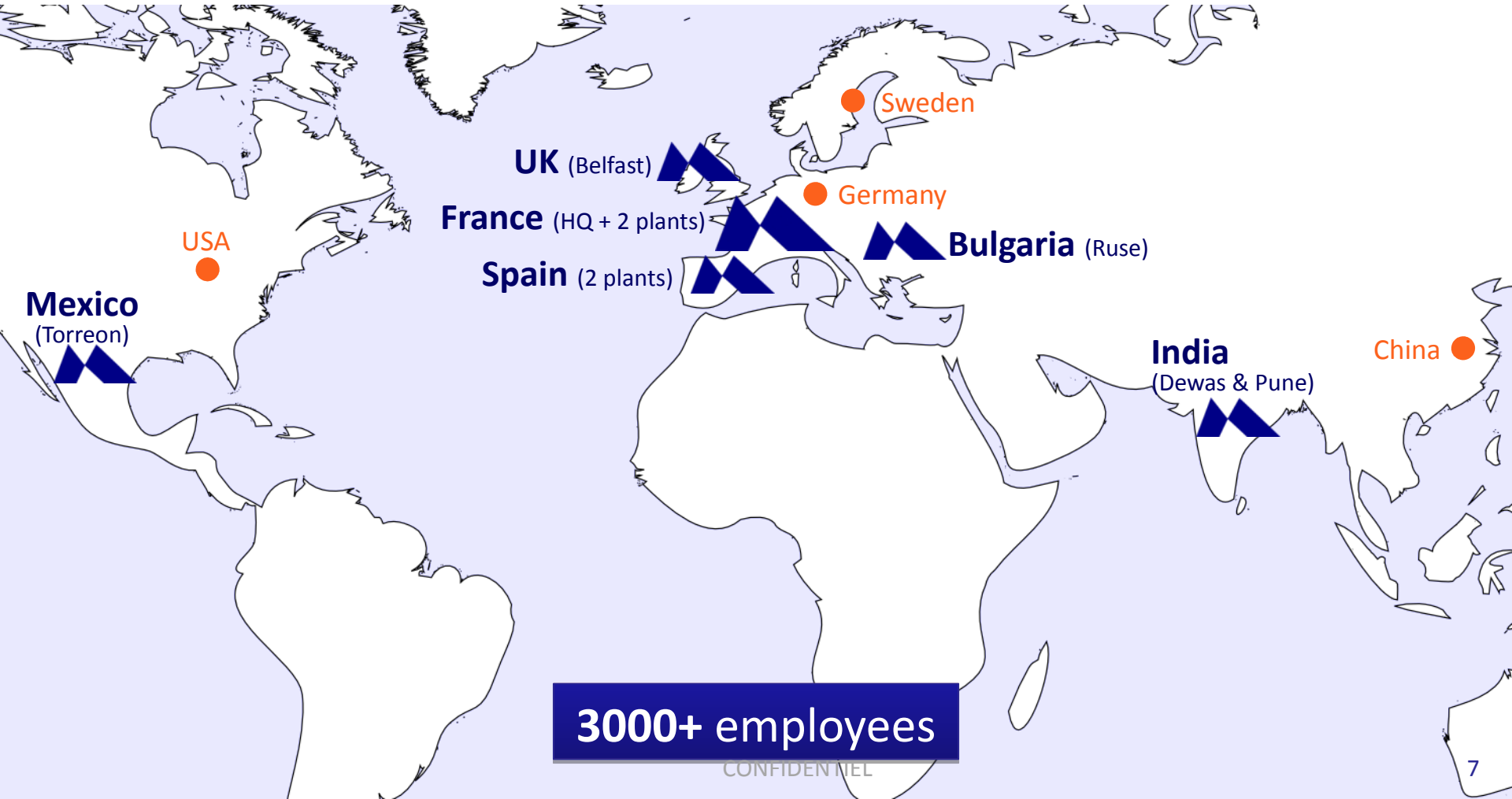
Footprint



Production site



Sales office



3000+ employees

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TECHNICAL EXPERTISE

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



Technical challenges

Montupet Expertise

Cost and weight optimisation
Long term quality performance

Mastery of metallurgy

Best-in-class dimensional accuracy

Advanced coring design

Customer requirements

High mechanical properties

Fuel efficiency and low emission

Complex cooling system and integrated functions

Global automotive industry objective

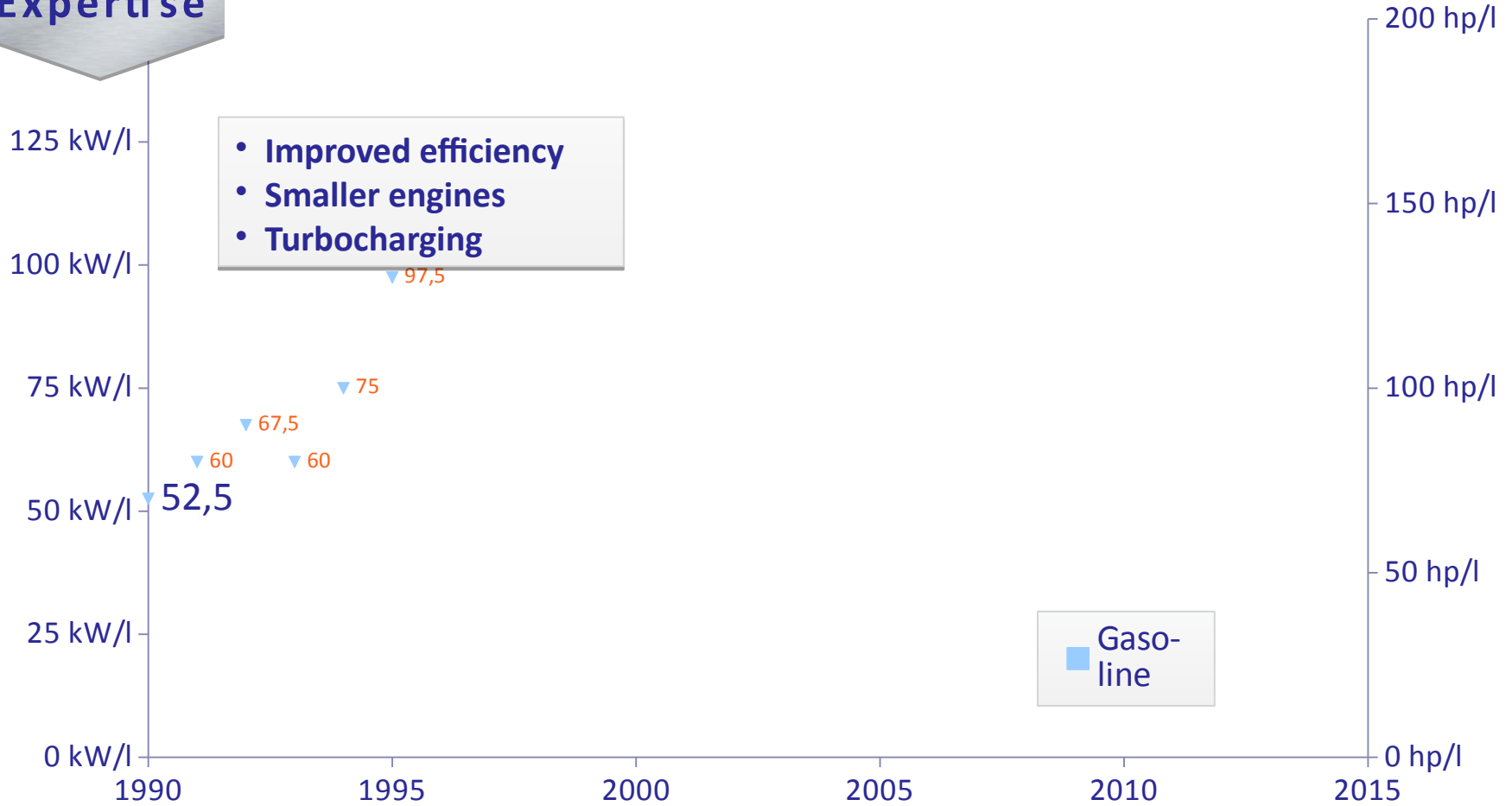
Engine downsizing

(Carbon emission standards & environmental regulations compliance)



Expertise

Engine downsizing



- Improved efficiency
- Smaller engines
- Turbocharging

Gasoline



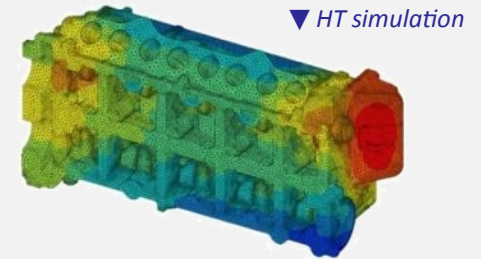
Mastery of metallurgy

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**



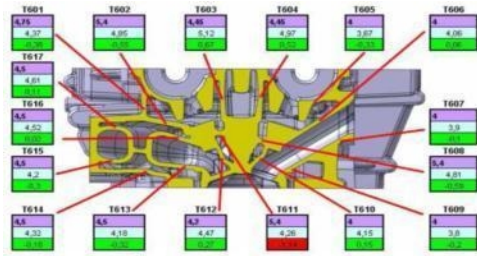
Dimensional accuracy

- Complex geometry design
- Testing and process control

Optimise weight and geometry for improved fuel efficiency



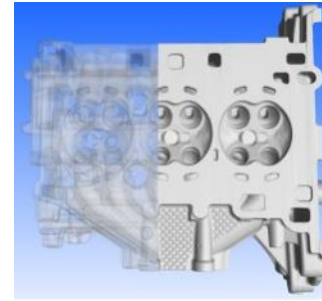
▲ X Ray Tomography (CT Scan)



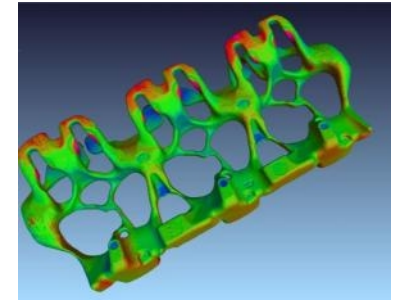
▲ Non destructive thickness analysis



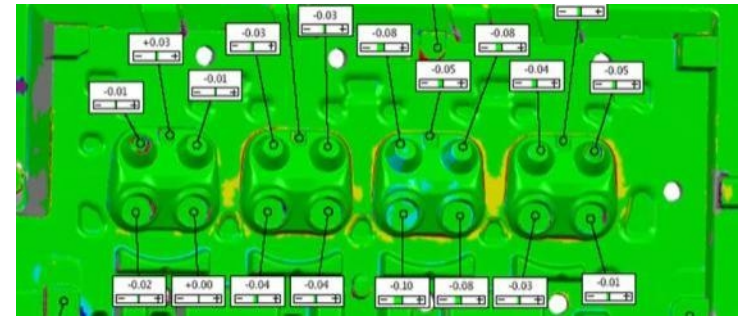
▲ Sections for soundness investigation



▲ CAD model VS real part



▲ 3D model



▲ GOM: geometrical dimensioning

Advanced coring design

Customer design requirements

Complex cores manufacturing

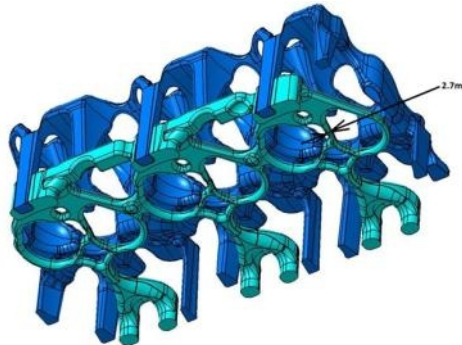
Integrated functions

Double water jacket

Ultra thin cores



▲ *Integrated exhaust manifold*



▲ *Audi W36/37*



▲ *Audi V6 3I 250hp*
Ø < 3 mm



Research & development

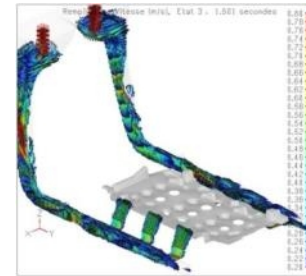
150+

Scientists
& engineers

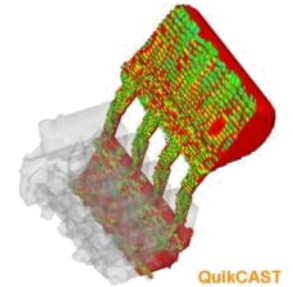
Product and process development

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

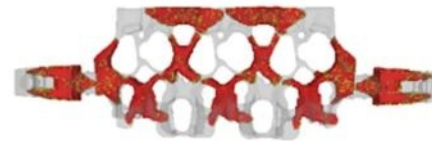
Simulation competences



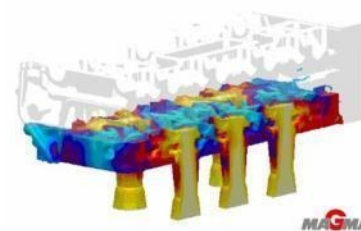
▲ Static gravity filling
(Magma)



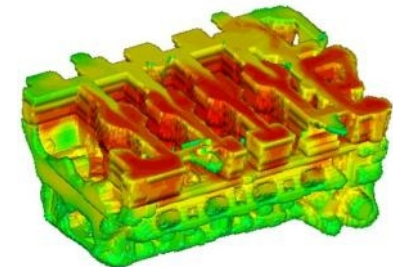
▲ Tilted gravity filling
(QuikCast)



◀ Core shooting (QuikCast)



▲ Low pressure filling
(Magma)



▲ Solidification
(QuikCast)

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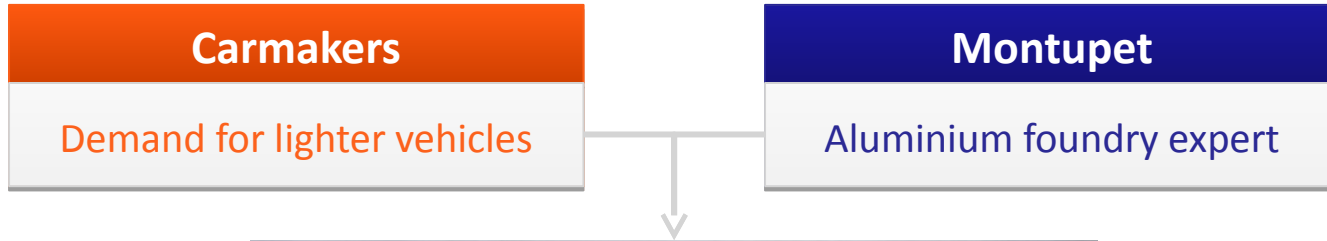


CHASSIS, BRAKING AND ENGINE PARTS

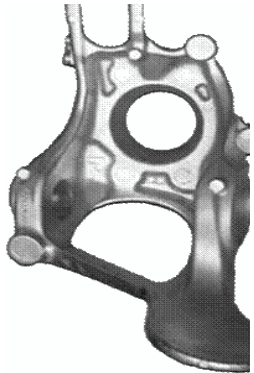
- Aluminium chassis parts
 - Global footprint
 - Technical development
- Engine components
- Braking parts



Aluminium chassis parts



**Mass production of
aluminium chassis parts**



Rear knuckle



Cross member



Machined rear knuckle



*BENTLEY
Front upright*



Expertise

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...



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

Montiac, Torreon
(Mexico)

Alumalsa, Zaragoza
(Spain)



Montupet

Thank you for your attention

