

**PXI**

PROFILE

# PXI AUTOMOTIVE

[www.pxi-automotive.com](http://www.pxi-automotive.com)



# Group Overview 2023

PXI is a global manufacturer for Thermal Management System Product...



2010

Establish

90,000

Plant area (sqm)

+140

Customer locations

110

2022 Sales (\$M)

## Products

Engine Cooling

Air Condition

Battery Cooling

Chiller Cooler

Electric Compressor

Electric Drive

Safety Brake Suspension



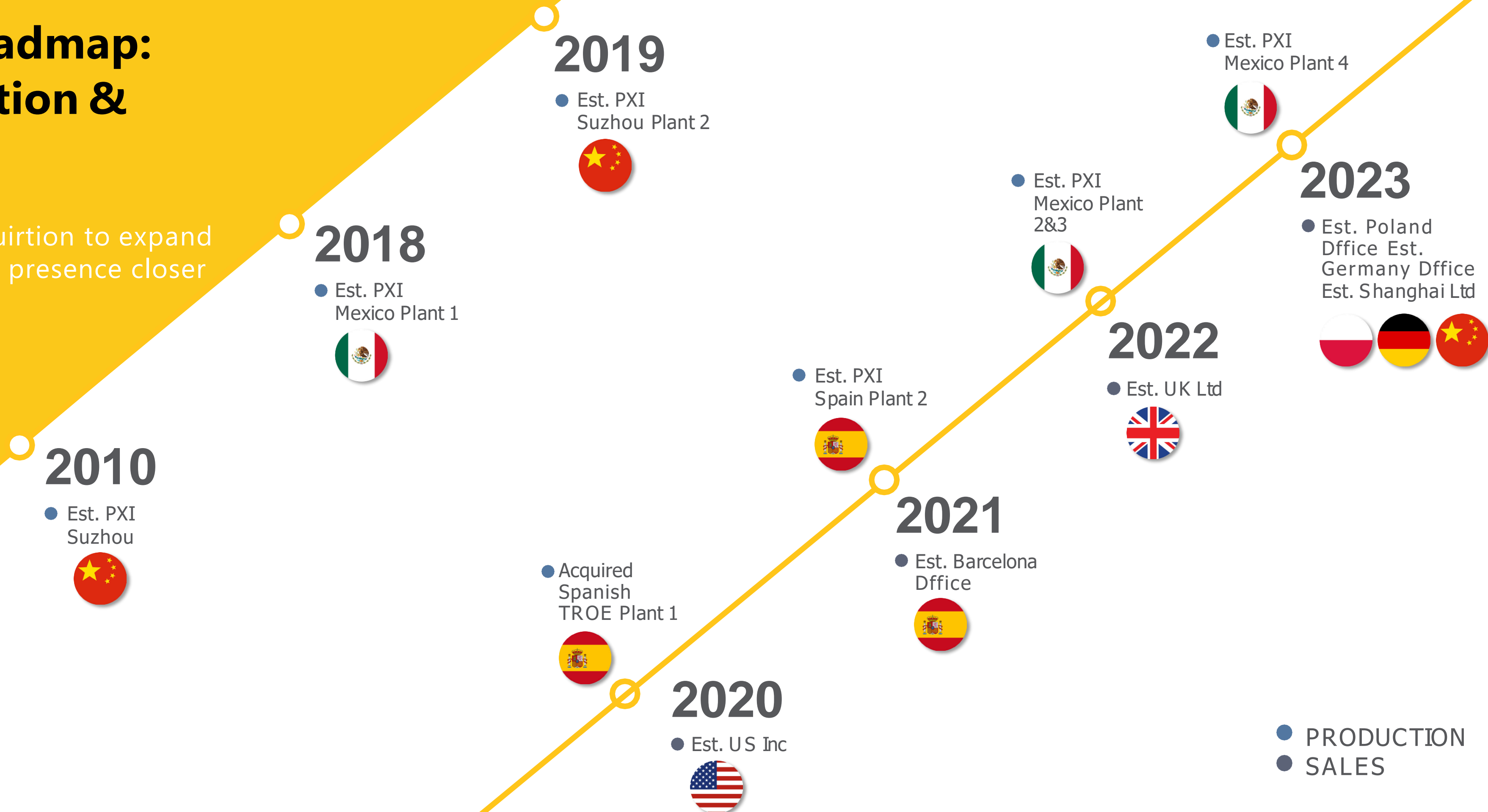
# About PXI

Who are we

- PXI is a global automotive supplier for Thermal Management (TMS) Components
- Shipping over 190 Million parts per year
- Delivered just-in-time with close to 0 ppm made PXI the leading Machining Tier 2 Automotive Supplier
- Reliable partner of choice in the heat exchange & thermal management market segment
- Established plants and sales offices around the world and products mainly ranging from formed complex metal machining parts, pipes, assemblies and castings
- Delivered to all major automotive markets

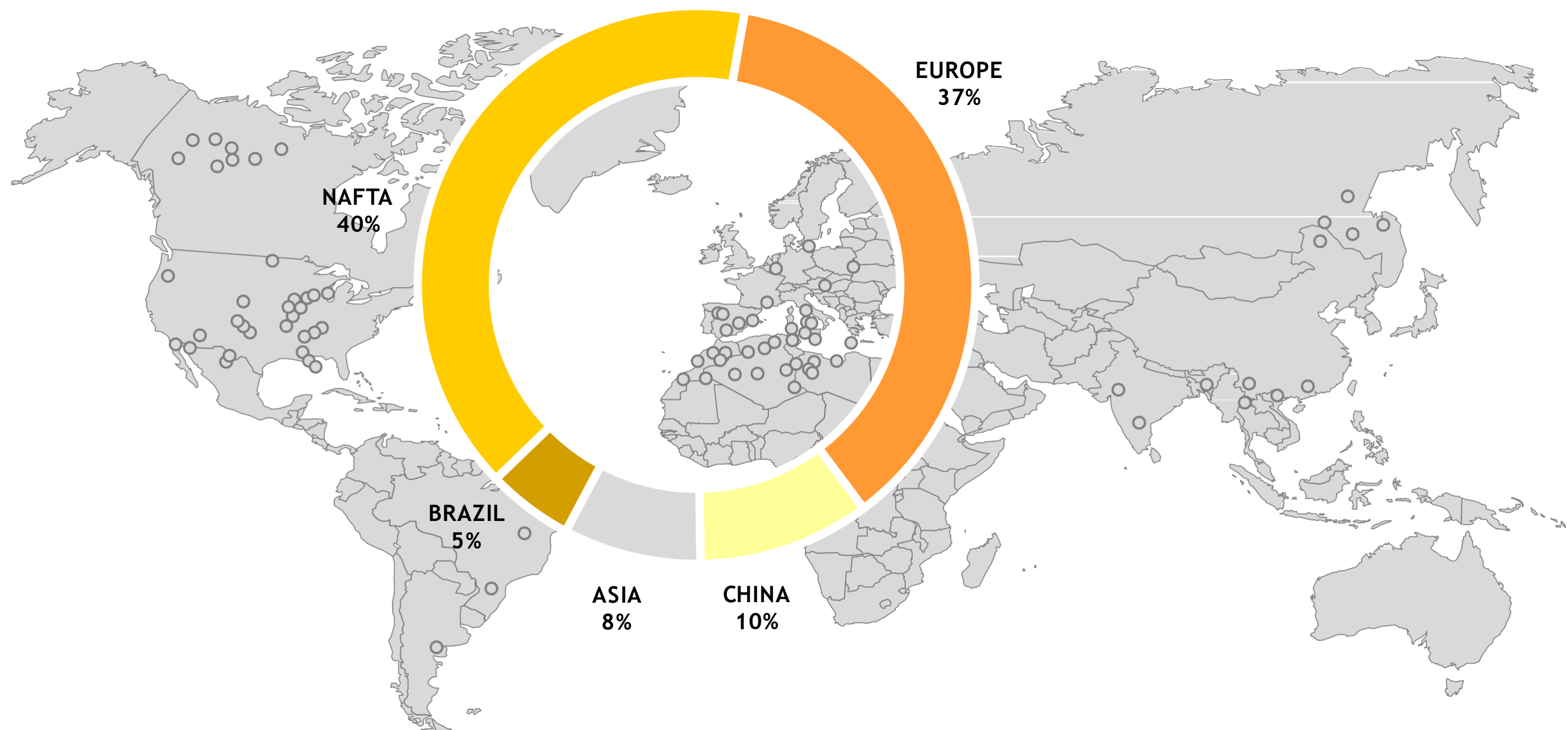
## PXI Roadmap: Production & Sales

Global accquirtion to expand more global presence closer customers





# Global Sales 2023

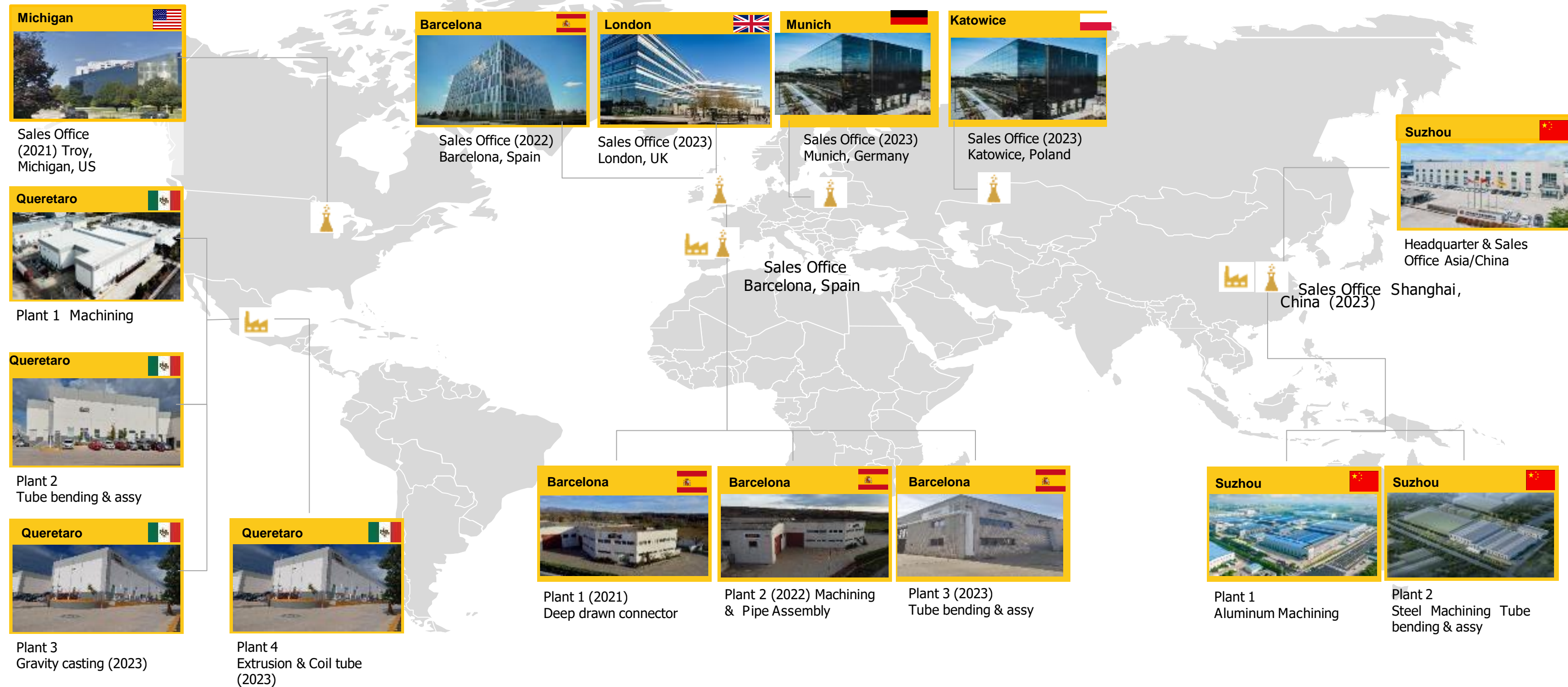


PXI is delivering +140 customer locations...

# Local Footprint 2023

Production Plant

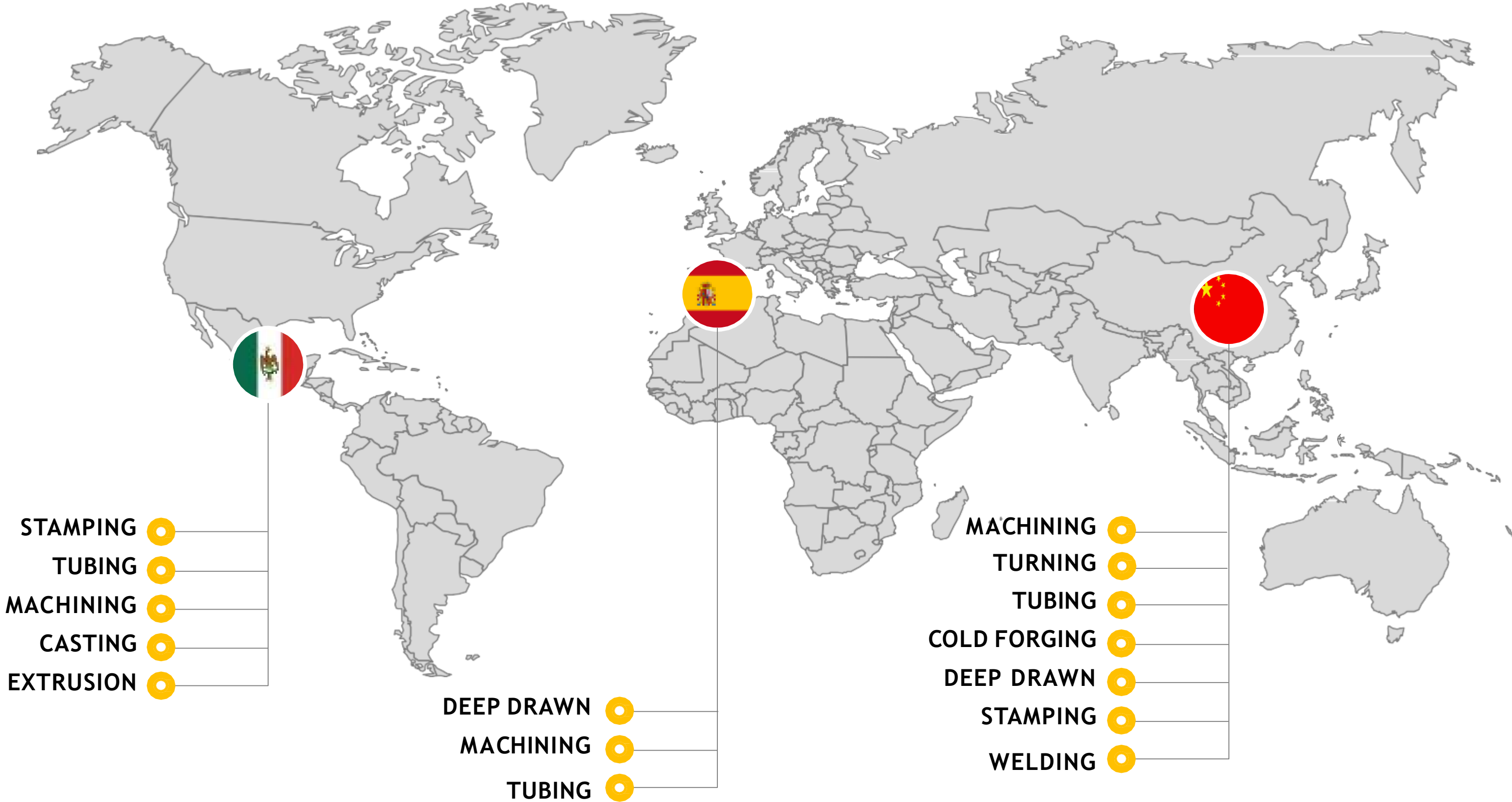
Sales Office



As the leading thermal product provider in the world...we are both global and local



# Global Capability





# Local Footprint 2023

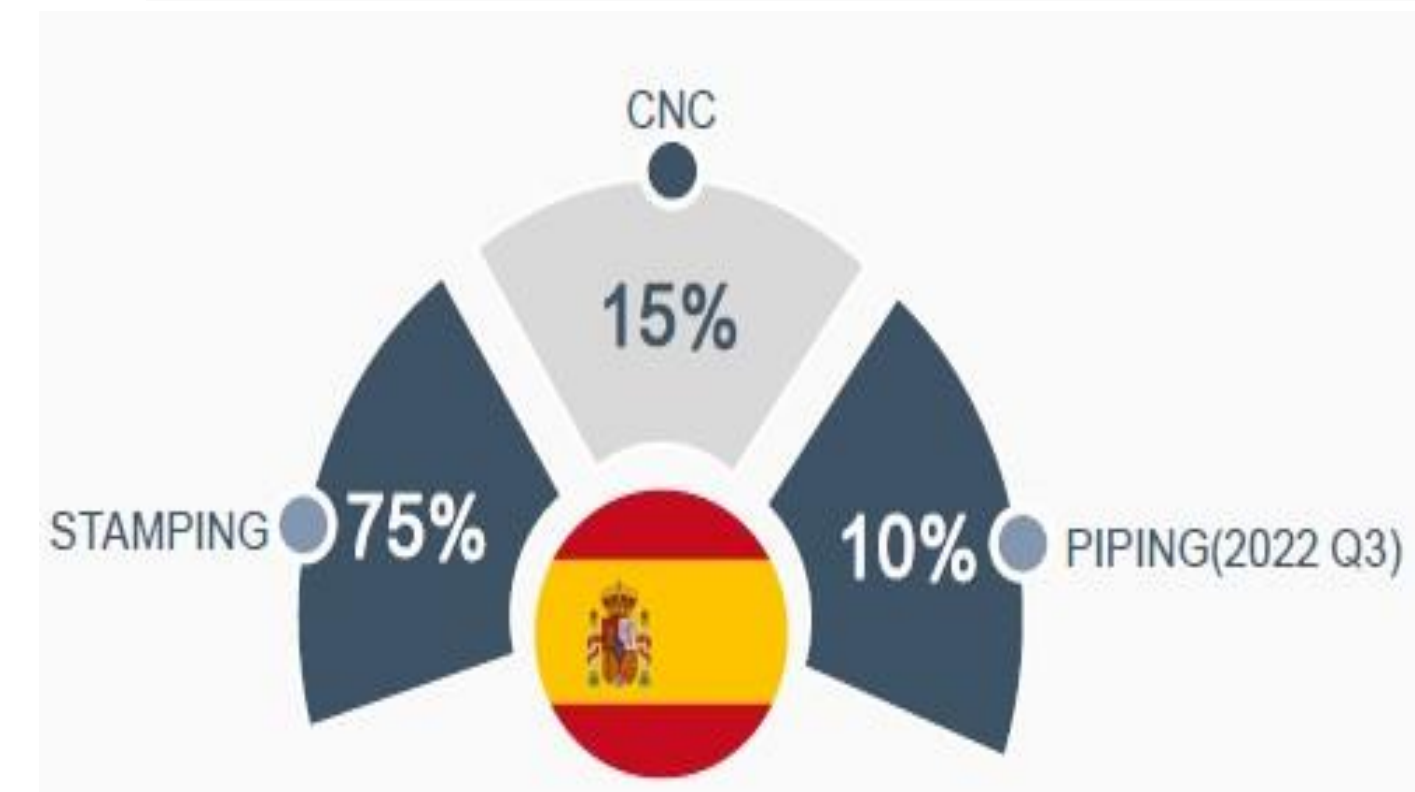
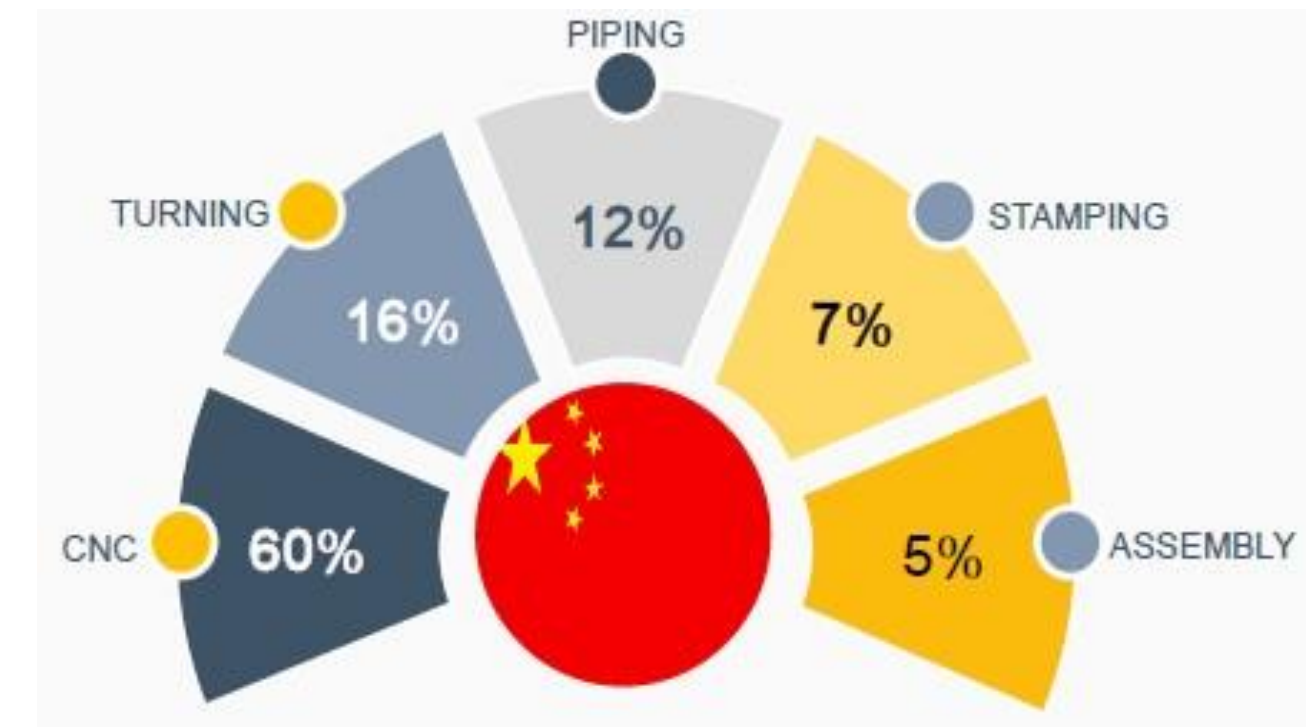
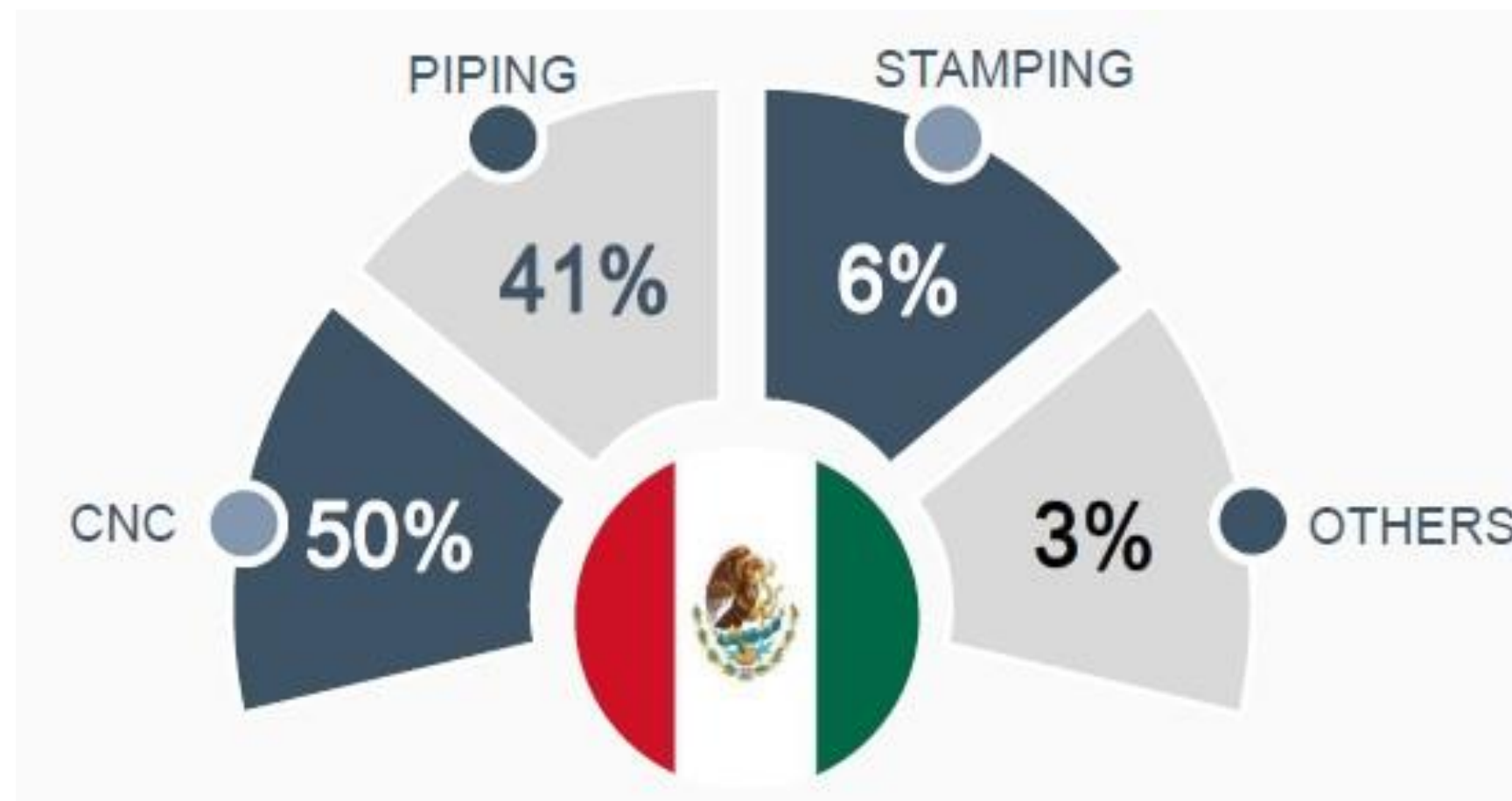




# Capability PXI Globally

Diversified superior capability and competence to enhance customer value-creation

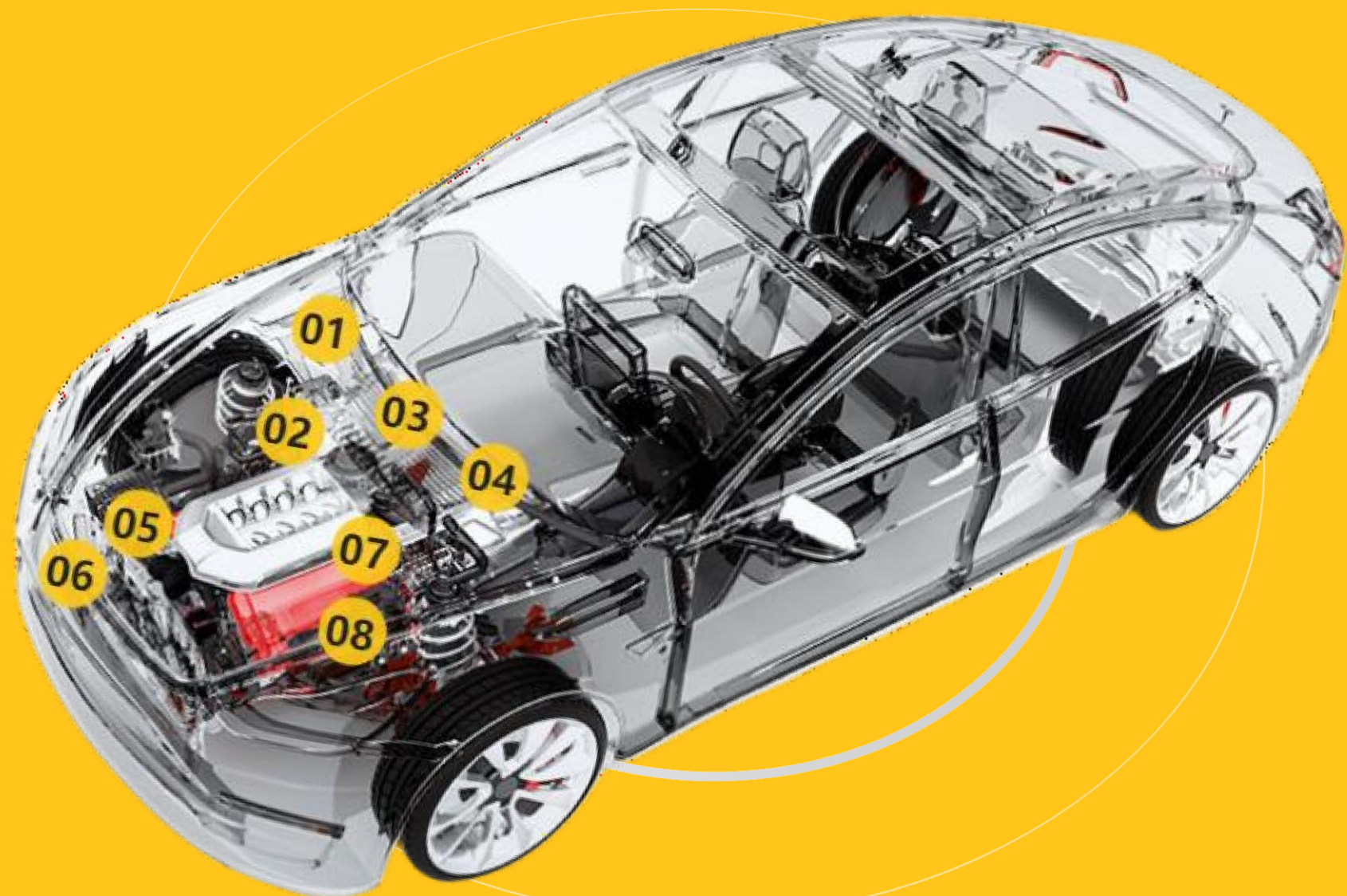
## Sister Plants





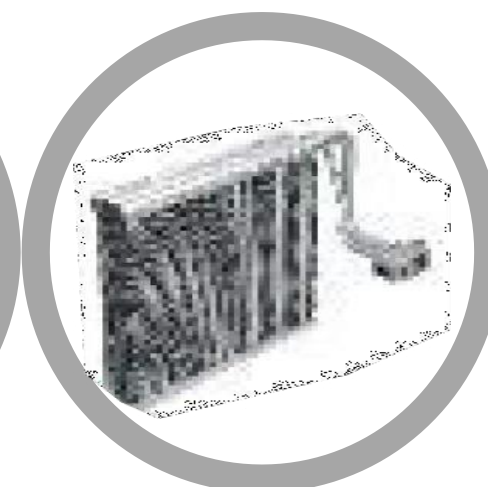
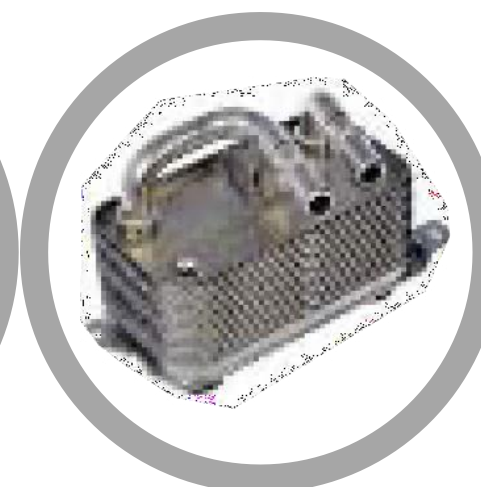
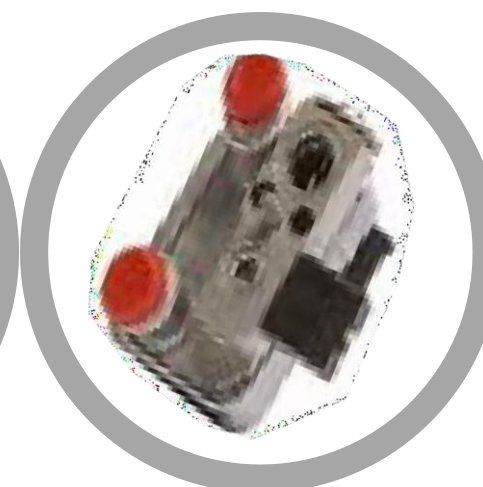
# Product Application

Product in diversified end-application...



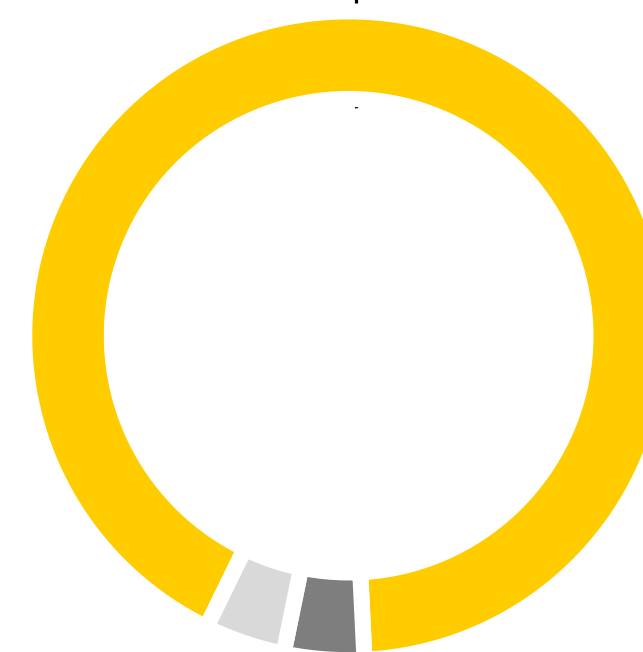
- 01 Chiller
- 02 Electric A/C Compressor
- 03 Thermostatic Valve for A/C
- 04 Battery Cooling

- 05 Heat Pump
- 06 Heat Exchanger
- 07 Electric Drive Module
- 08 Fluid Transportation



Thermal Management System (TMS)

92%

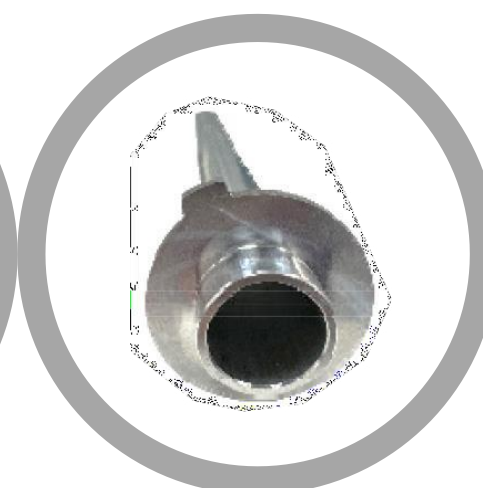
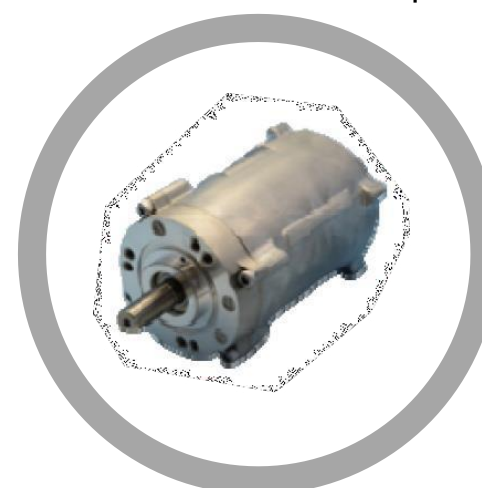


4%

Electric Drives Module

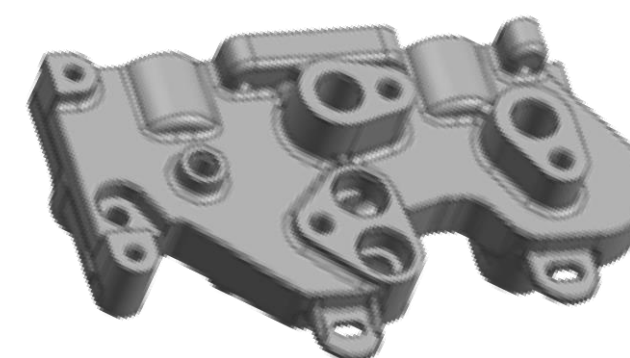
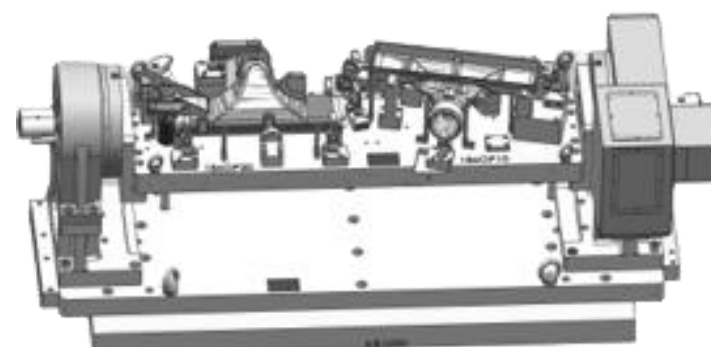
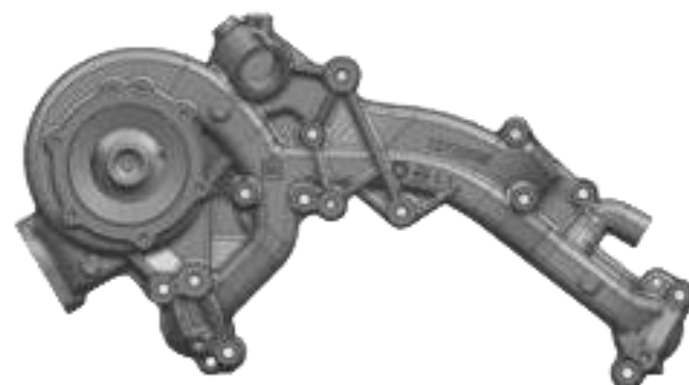
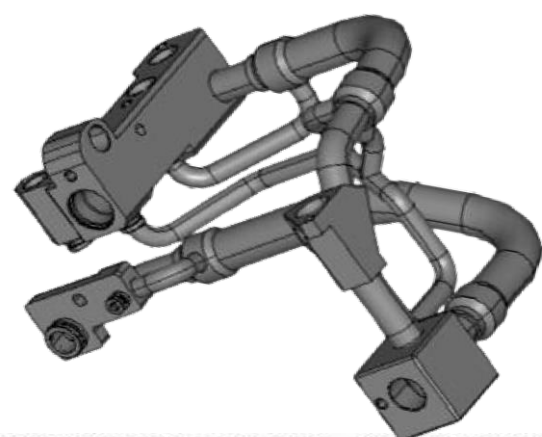
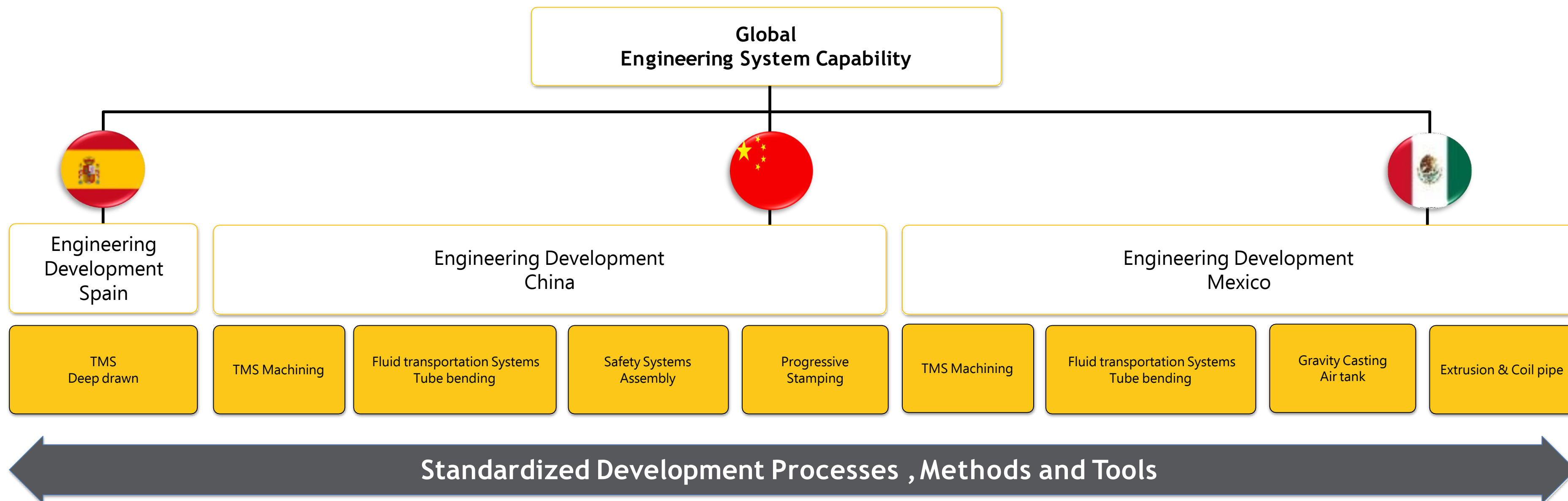
Brake System

4%

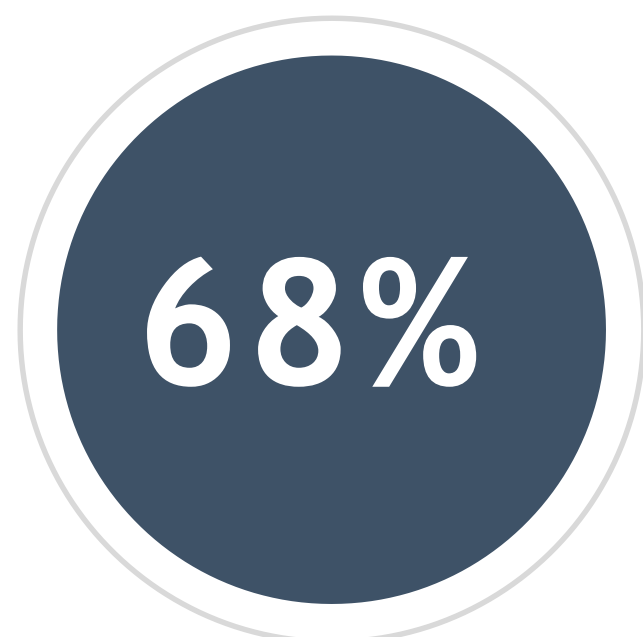




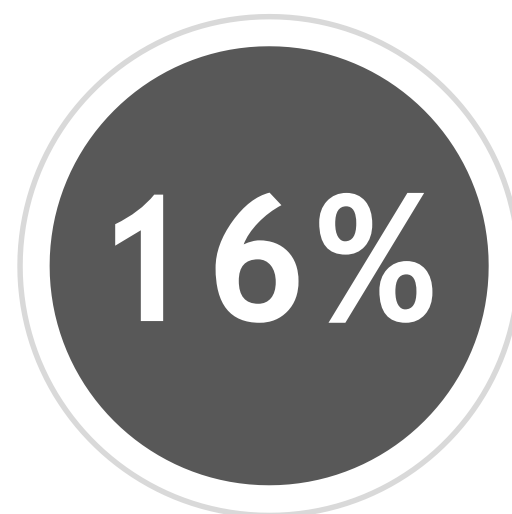
# Engineering Excellence



## Product Material



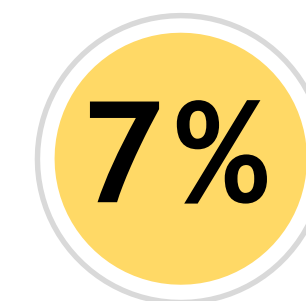
Extruded Aluminum



Cold Forging Aluminum



Rolled Aluminum



Stainless steel

## Alloys

6060•6061•6063•6082•3003•3103•5083F•••••

## Steel

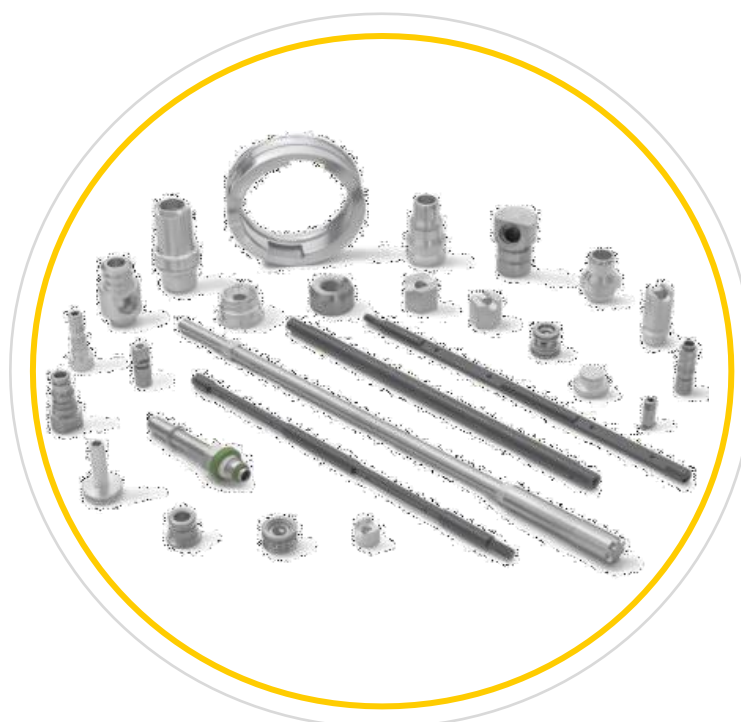
304•316L•430F•••••

# Group Product Segment

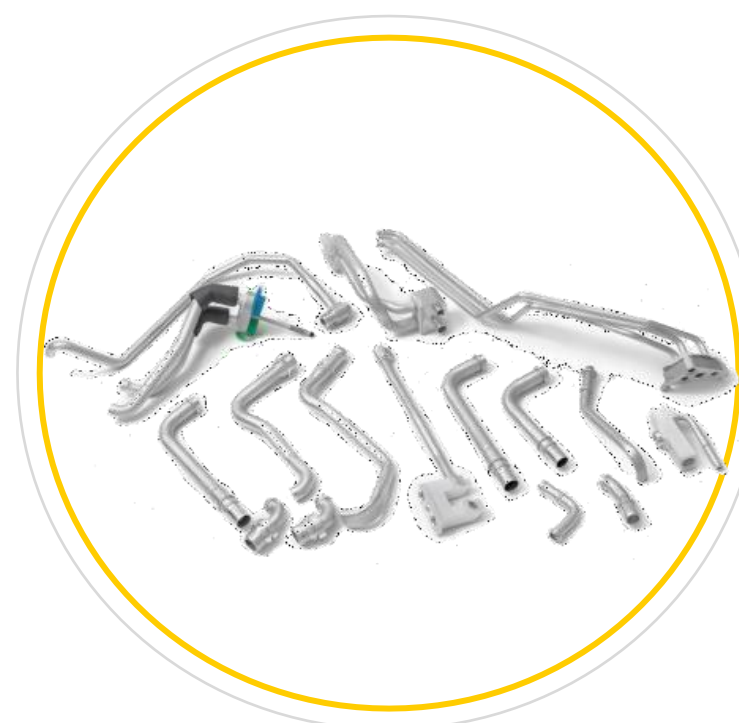
Al machining



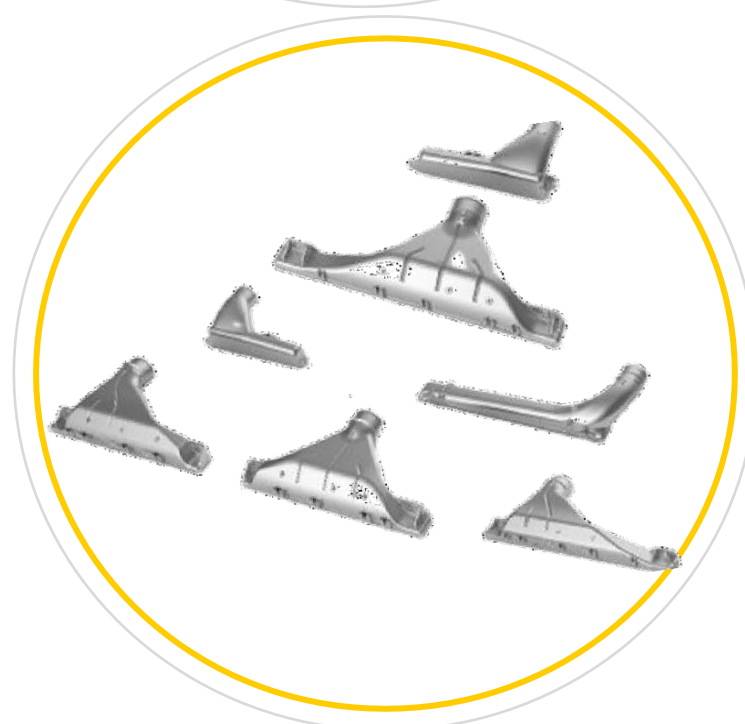
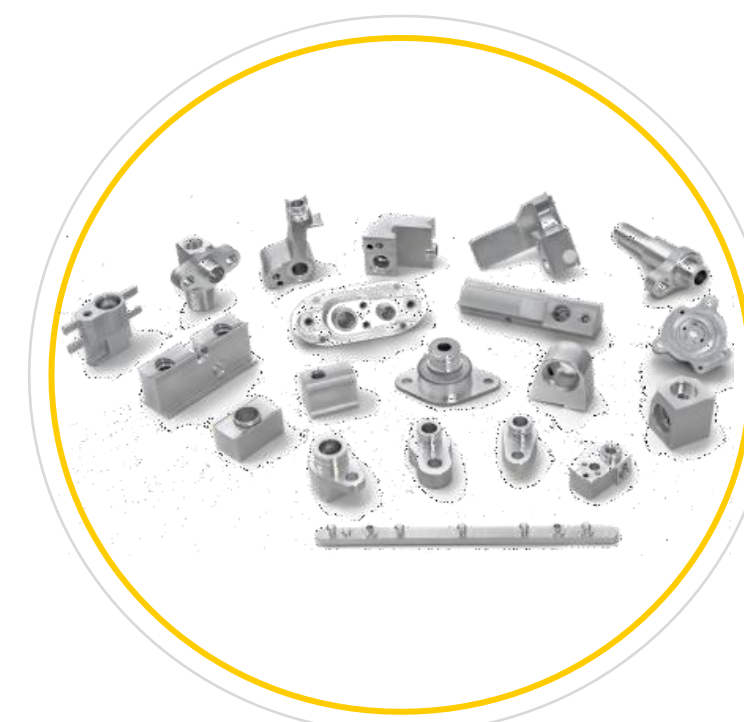
Steel machining



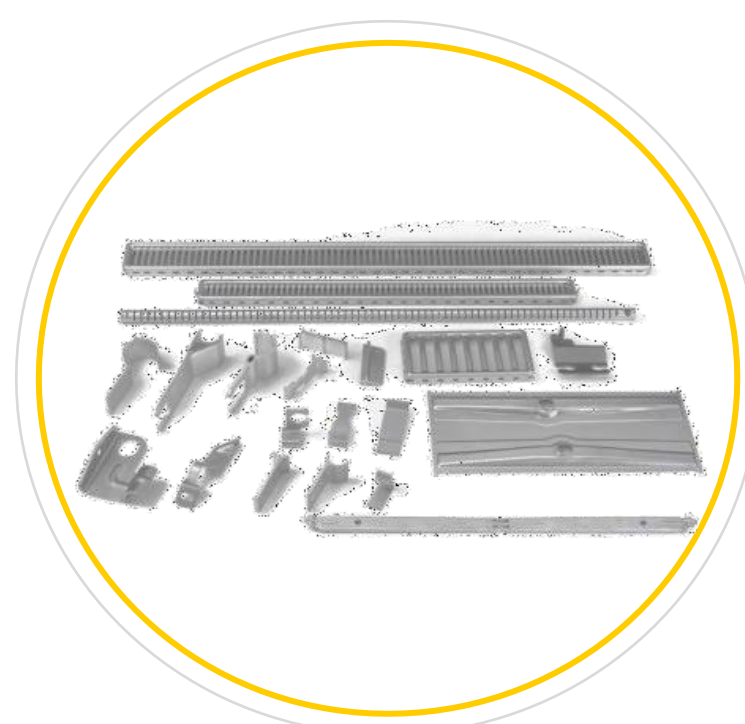
Piping & Assembly



Al forging



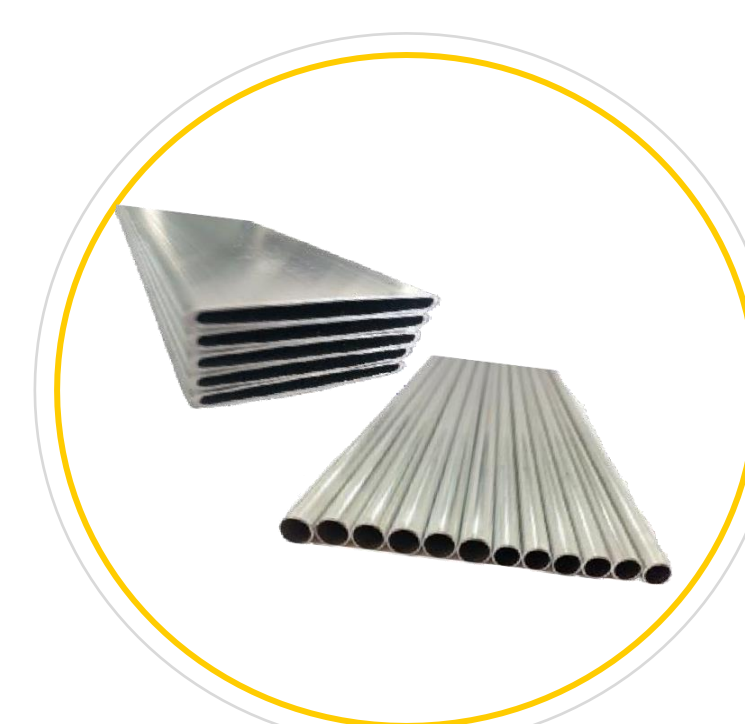
Gravity Casting



Stamping



Assembly



Extrusion & Coil Pipe



# Heat Pump



## Technology Advantage

- ◀ High-pressure performance
- ◀ High class of production line
- ◀ Hydraulic clamping fixture
- ◀ High tolerance and roughness

**EXV/ASV | Valve Housing**

# Heat Exchanger



Connector | Block



## Technology Advantage

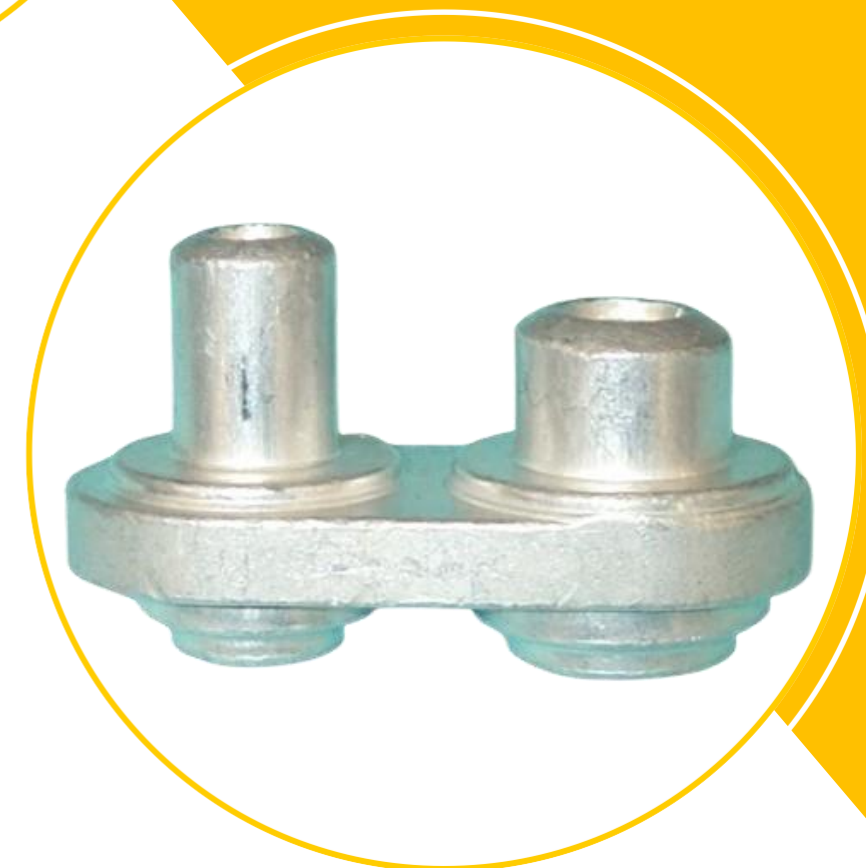
- ◀ Precision machining out of extrusion
- ◀ Automated machining process
- ◀ High efficiency
- ◀ High tolerance and roughness



# Accumulator



Connector | Block



## Technology Advantage

- ◀ Cold forged in house
- ◀ Mold design and fabrication in house
- ◀ Precision machining
- ◀ High tolerance and roughness



# Coolant connector & shaft

## Technology Advantage

- ◀ Cold forged process
- ◀ Precision machining process
- ◀ Hydraulic clamping fixture
- ◀ High tolerance and roughness



Connector | Shaft

# Fluid Transportation

## Technology Advantage

- ◀ Cold drawn pipe welded with block
- ◀ 100% helium or air leakage testing
- ◀ High or low pressure of performance
- ◀ Special end forming shape drive cost reduction



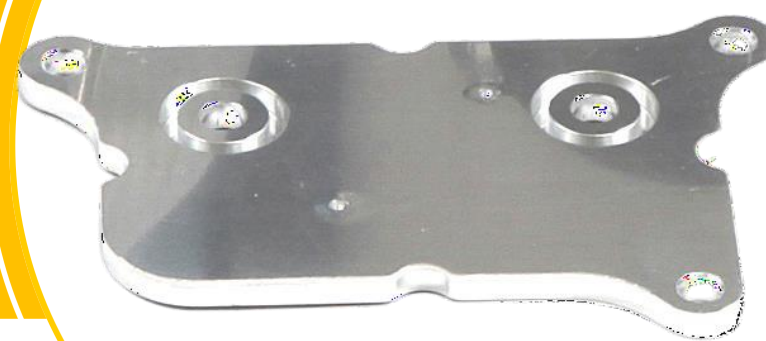
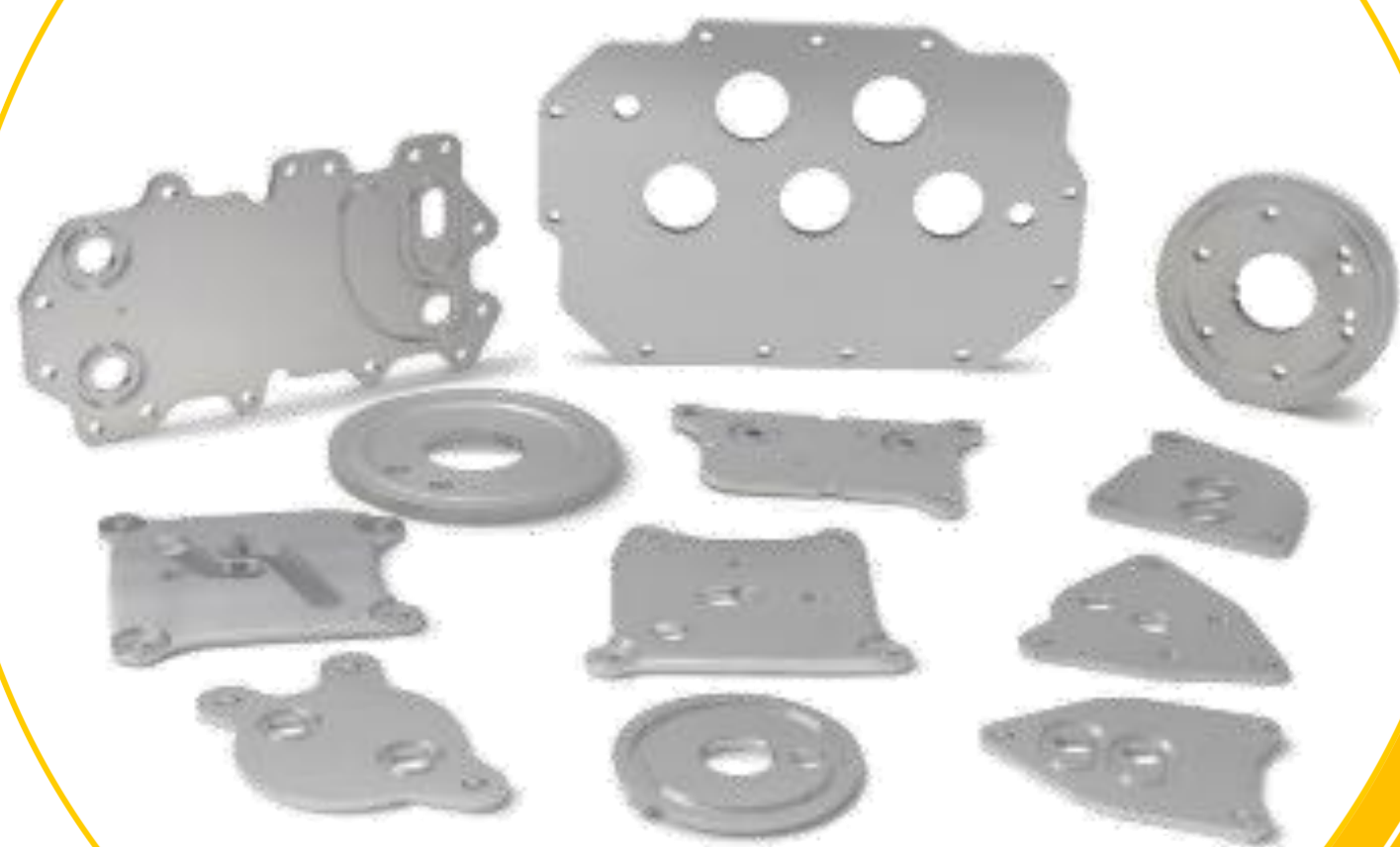
A/C | Pipe Assy



# Battery Cooling

## Technology Advantage

- ◀ Slim design to build
- ◀ Flatness to mount
- ◀ Fine-blanked without burrs
- ◀ High cleanliness request



Chiller | Base Plate



# Electric Drives

## Technology Advantage

- ◀ Electric oil tube with carbon brushes
- ◀ Flatness to mount
- ◀ Rolling or grinding with tight tolerance
- ◀ High cleanliness request



Drives | Disc

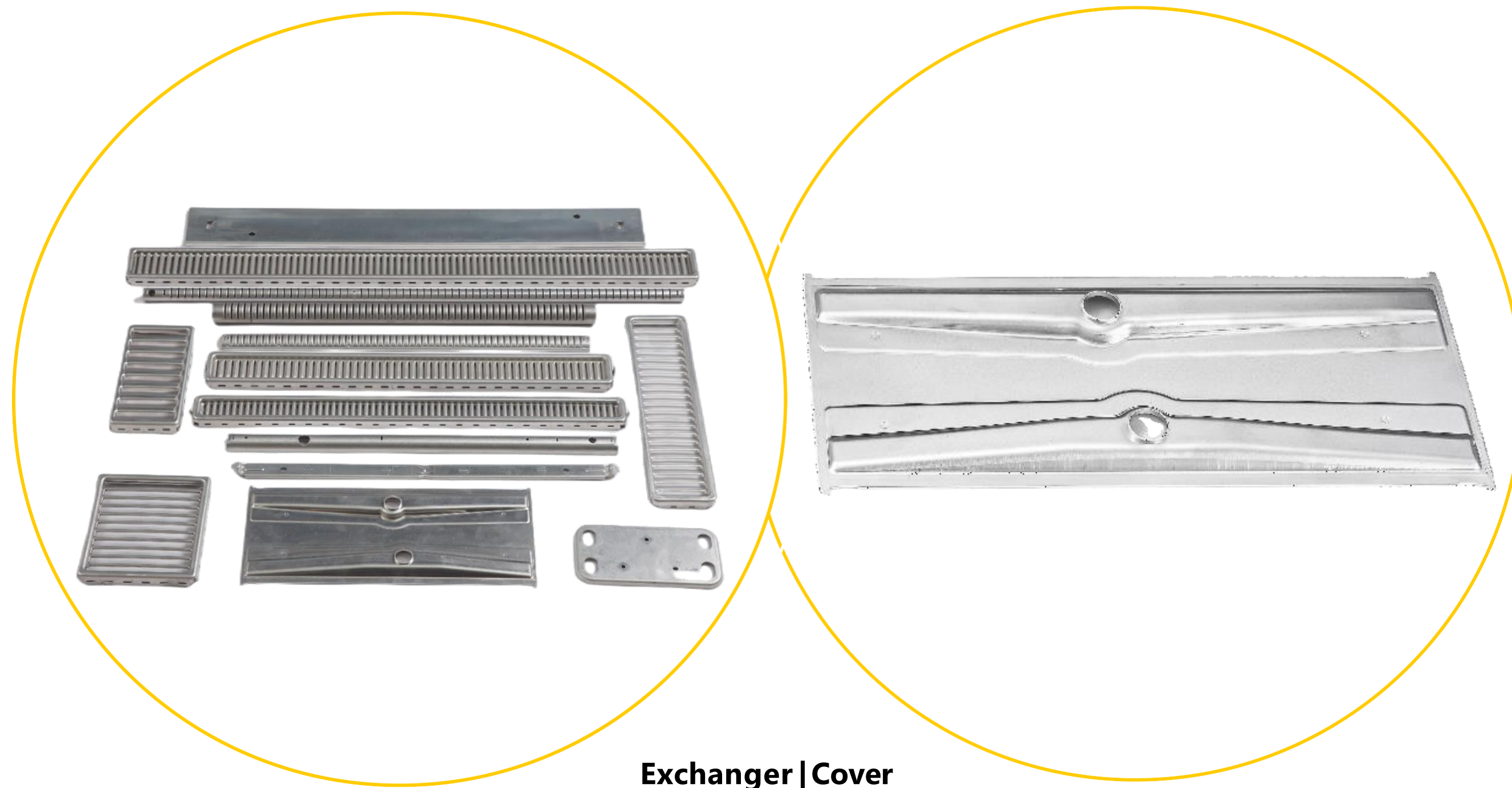


Motor | Shaft



Drives | Welded Assembly

# Thermal exchanger



## Technology Advantage

- ◀ 12 steps progressive stamping
- ◀ Mold design and fabrication in house  
Press 300Ton,400Ton and 500Ton each
- ◀ Cover for Cooler,radiator,controller



# Brake system

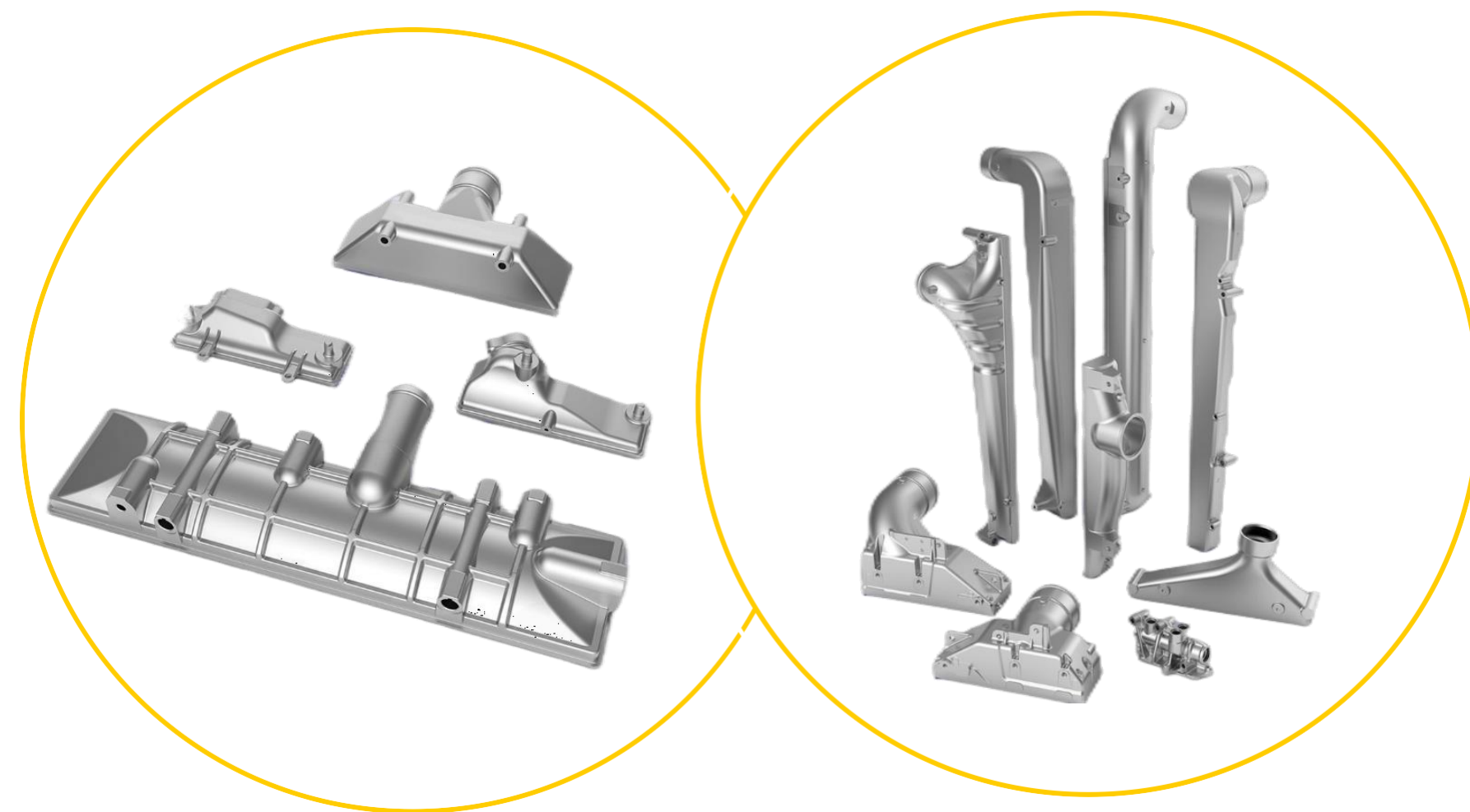


**Assembly |Return Unit**

## Technology Advantage

- ◀ Automated assembly process
- ◀ EOL testing and validation
- ◀ Electronic and mechanical design ability
- ◀ Poke Yoka

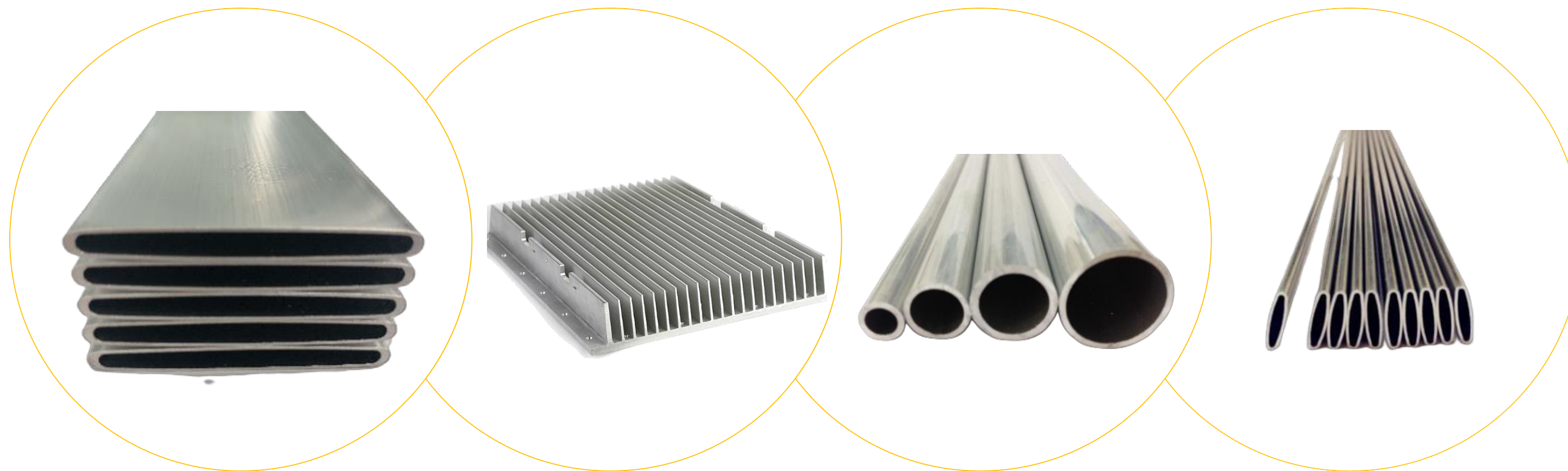
# Thermal Casted Tank



- ◀ Designed for automatic casting production with tilted molding process.
- ◀ Rotary index 0-90 degree
- ◀ Onboard system with multiple circuits for water cooling, gas extraction and temperature control.
- ◀ Side block tilting system
- ◀ Quick mold locking and changeover



# Extruded material



## FABRICATION

- ◀ Extrusion
- ◀ Cold drawing
- ◀ Coiling
- ◀ Cut to length
- ◀ End forming
- ◀ Heat treatment/aging
- ◀ Straightening
- ◀ Shaping

## PRODUCTS

- ◀ Extruded profile
- ◀ Extruded pipe
- ◀ Precision drawn tube
- ◀ Precision shape

PXI Extrusion covers extruded profile, flat tube and coil tube with full-series of Aluminum alloy

## Customers

PXI is the preferred supplier...

**MAHLE**



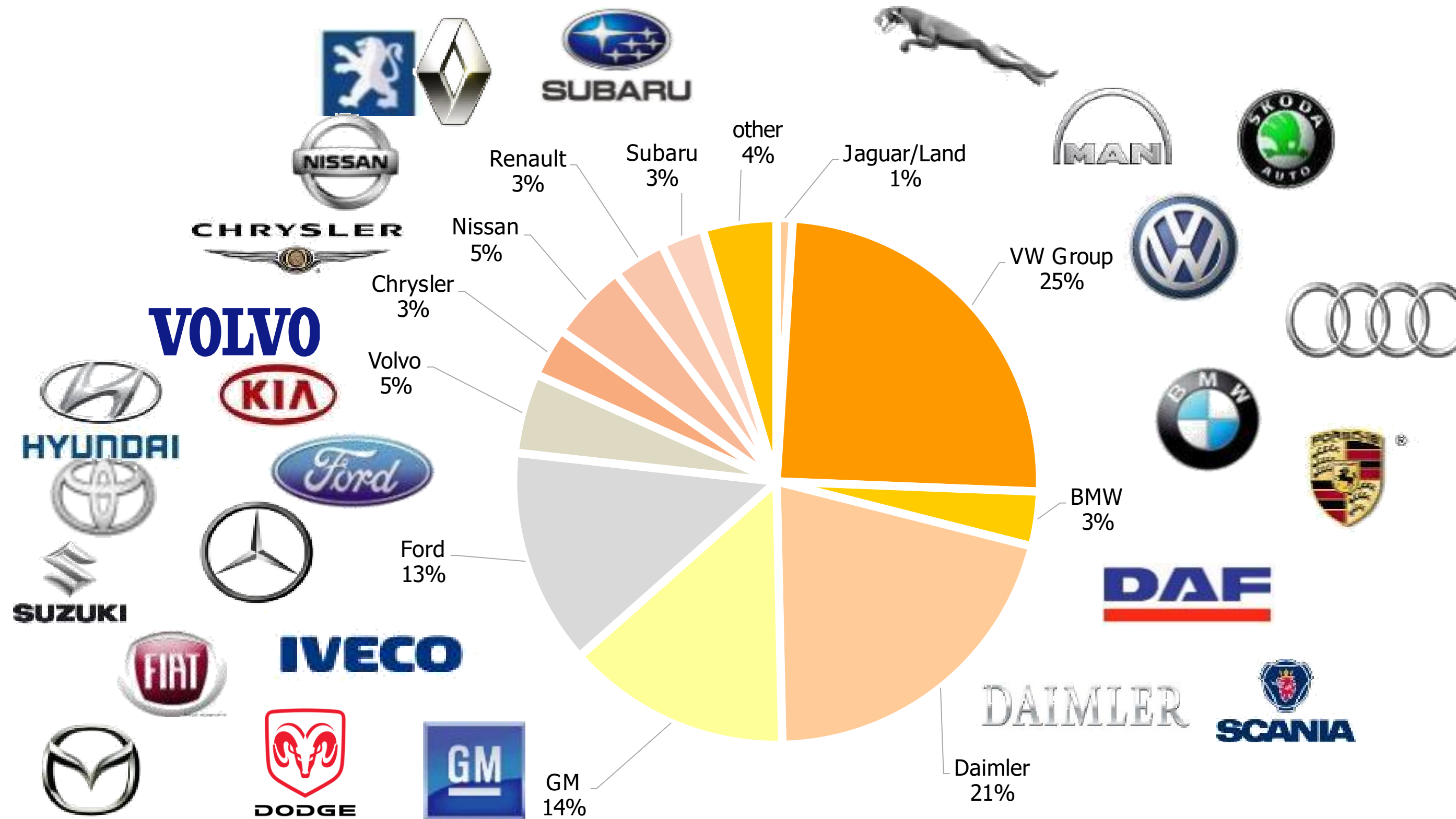
**DENSO**





# OEM

Product in diversified end-customers...





# CNC Production Capability

Superior CNC production capability to meet customer delivery





# Lathing Production Capability

Superior lathing production capability to meet customer delivery





# Green Washing Technology (High Cleanliness Performance)

Superior washing capability to meet customer delivery





# Assembly Capability

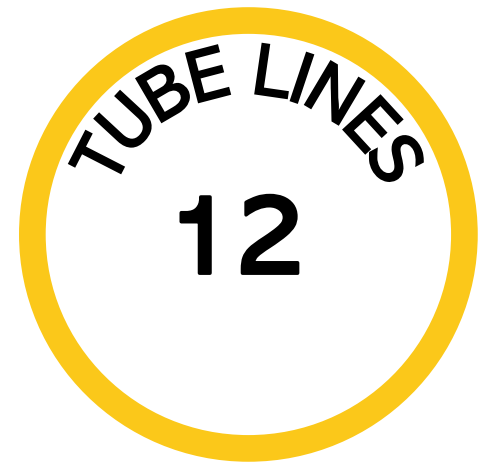
Advanced sensor-detector assembly line





# Production Capability

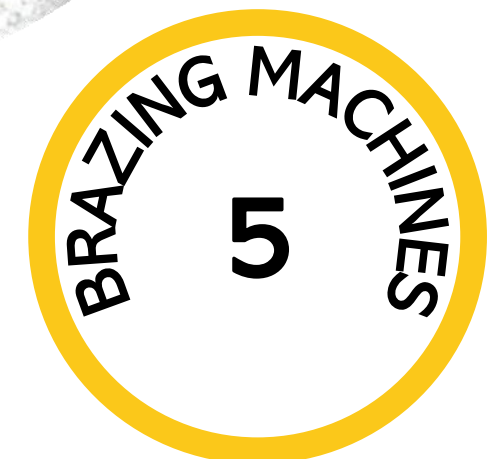
PIPE + BLOCK assembly line....





# Brazing Capability

Multi-station flame brazing line to meet leakage validation





# Progressive Stamping Capability

Various of stamping capability from 60Ton to 400Ton





# Quality Capability

SUPERIOR INSTRUMENTS SECURES OUR PRODUCT QUALITY

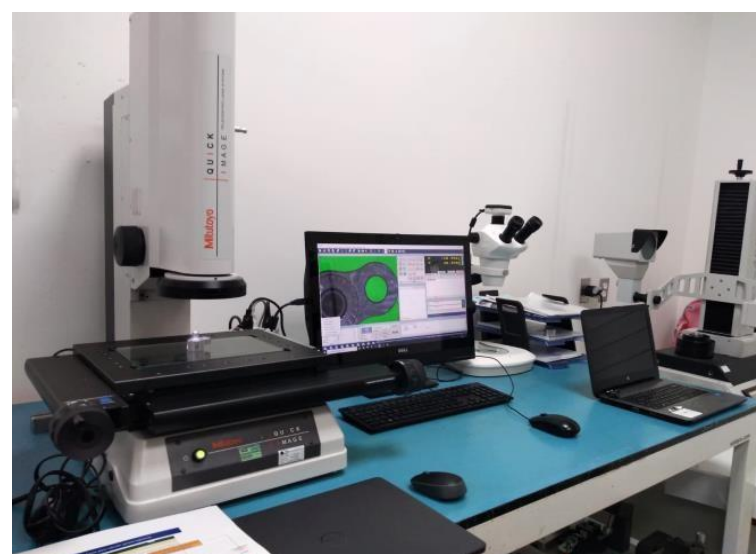
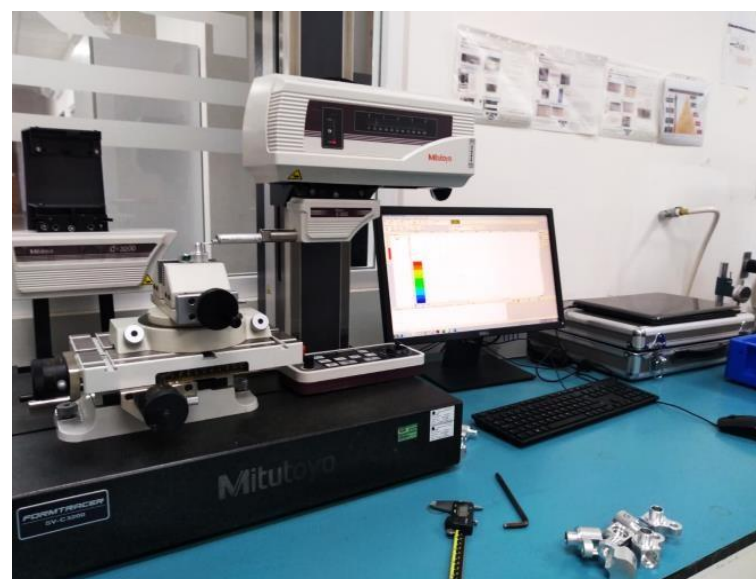
## Methods + Attitudes = Quality

**Q1** Quality First

### Metrology Equipment

- HEXAGON CMM
- MITUTOYO Quick Image 2D measurement system
- Hardness/ Roughness Tester Mitutoyo
- Profilometer Mitutoyo
- Others

- ✓ Full Lay Out
- ✓ First piece record
- ✓ On site SPC monitor station
- ✓ 100% Final Inspection



# Strategic Development

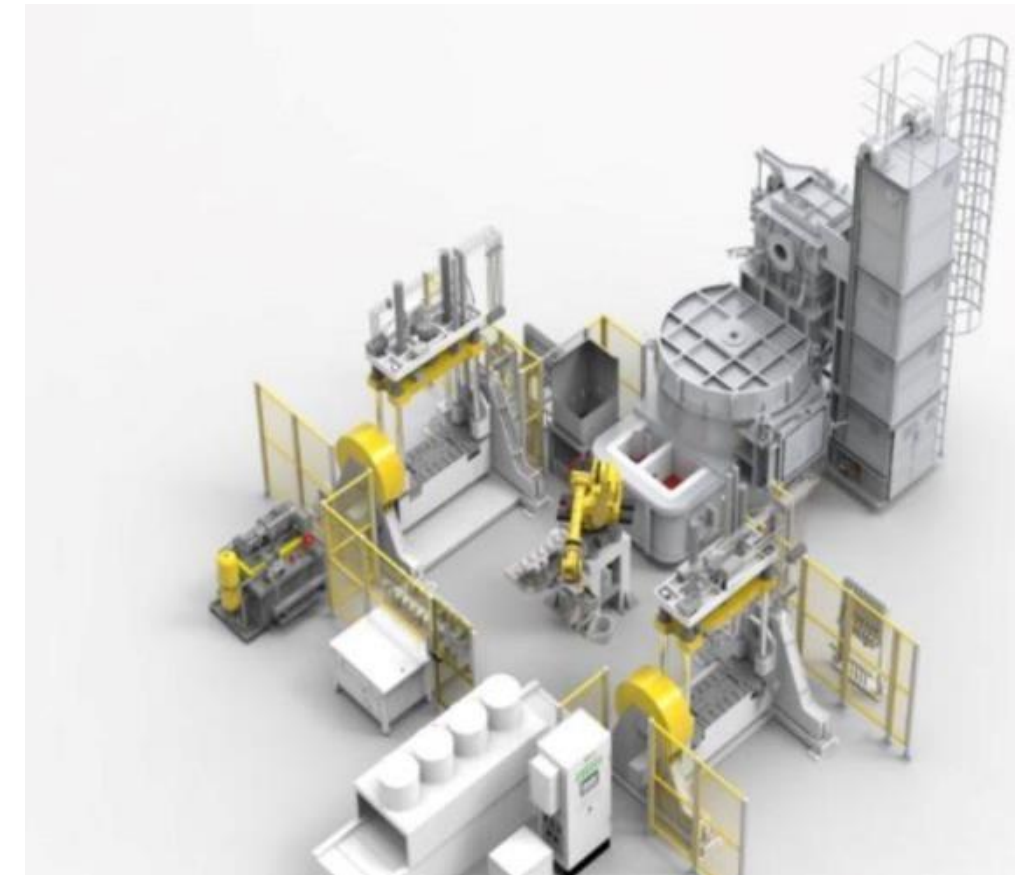
Superior instrument secures our product quality ...

**What does this bring and how it our customers?**

- New capability/product offering
- Competition in the region
- Further Localization/Regionalization



**-A vertically integrated supplier/minimizing supply chain risks**



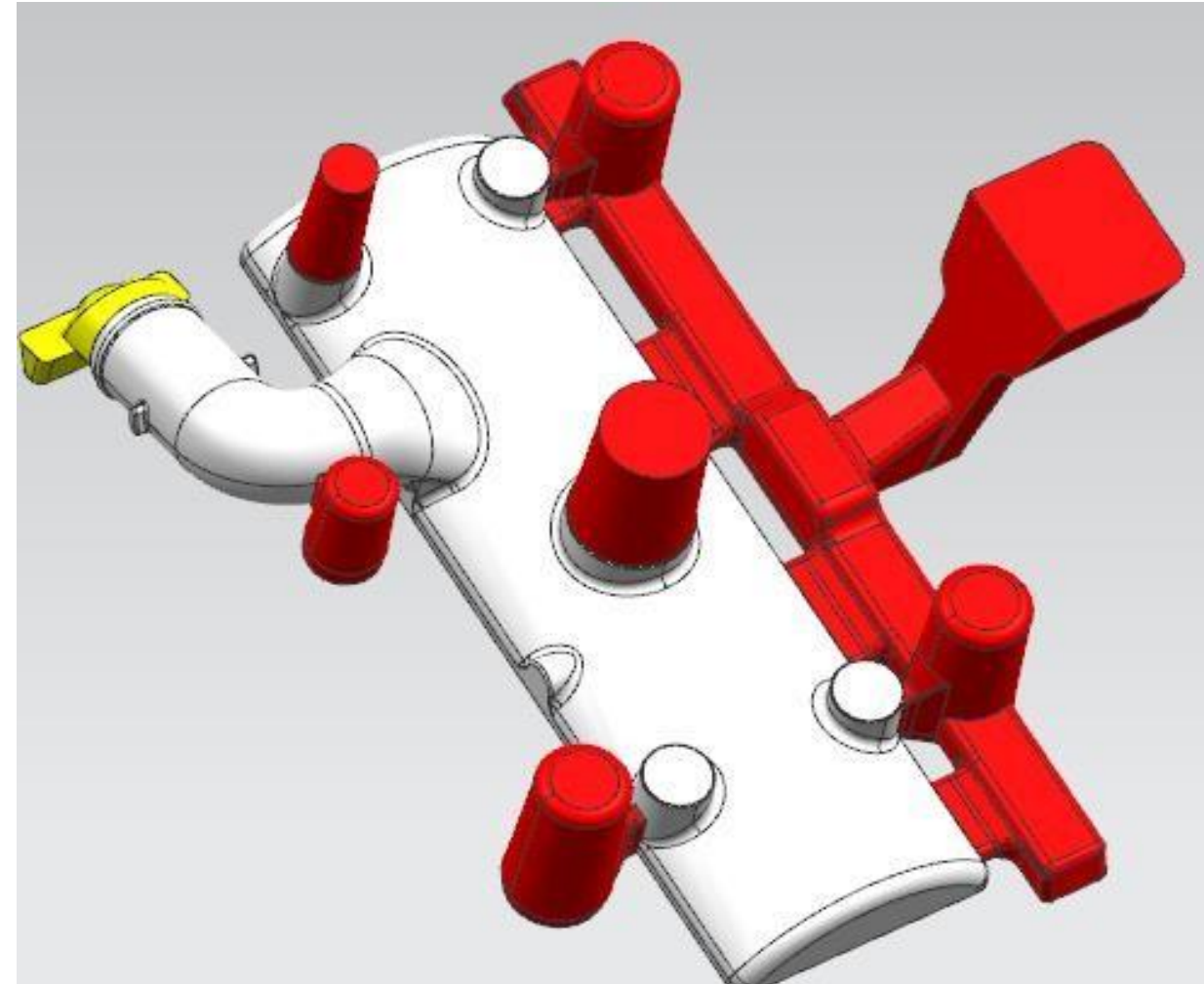
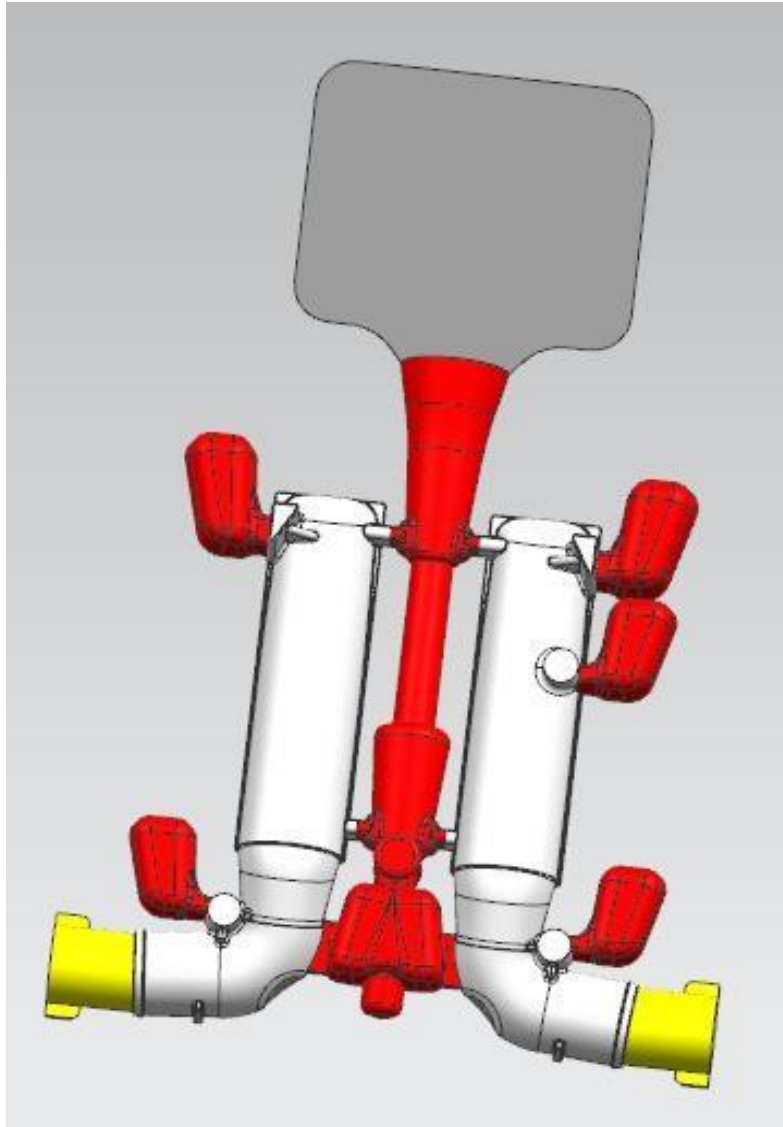
**Gravity Casting cell**



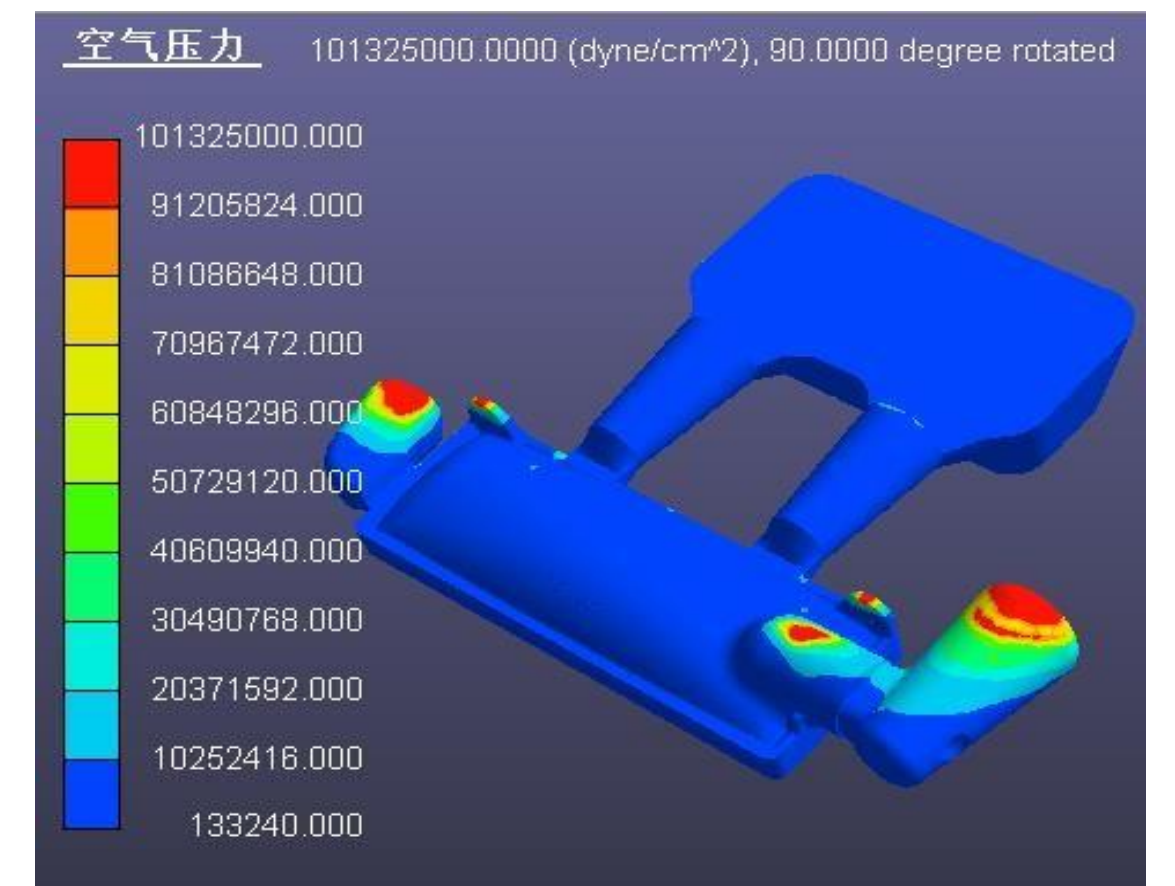
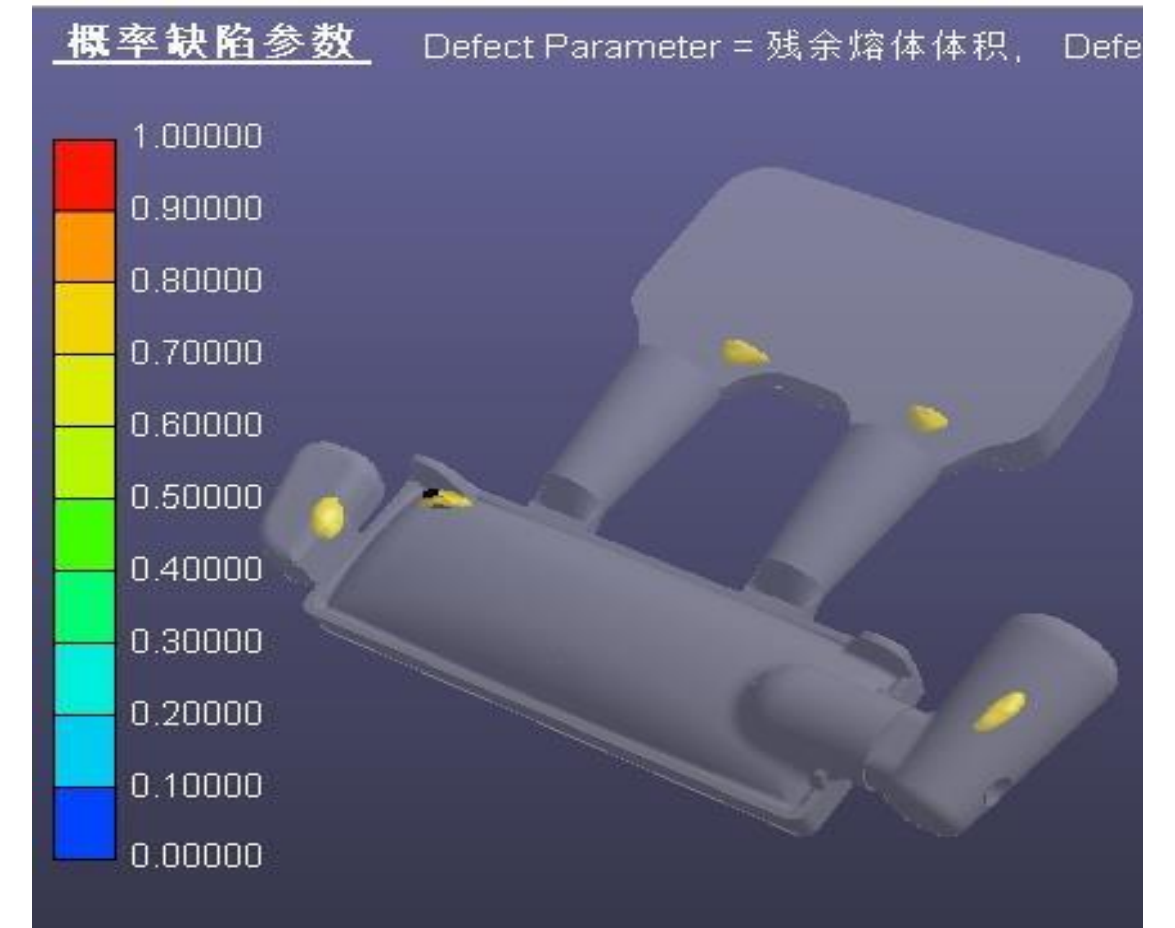
**Extrusion line**



# Casting Engineering Capability

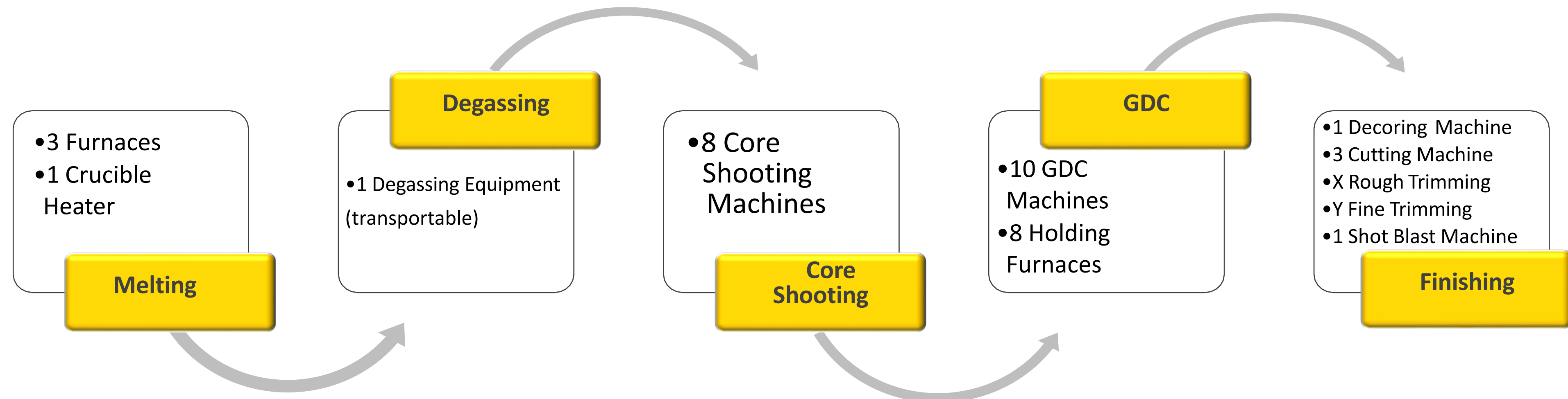


- ◀ Competence in casting mold/fixture design
- ◀ Casting simulation applicable in development
- ◀ Core ability of mold and fixture manufacturing in house



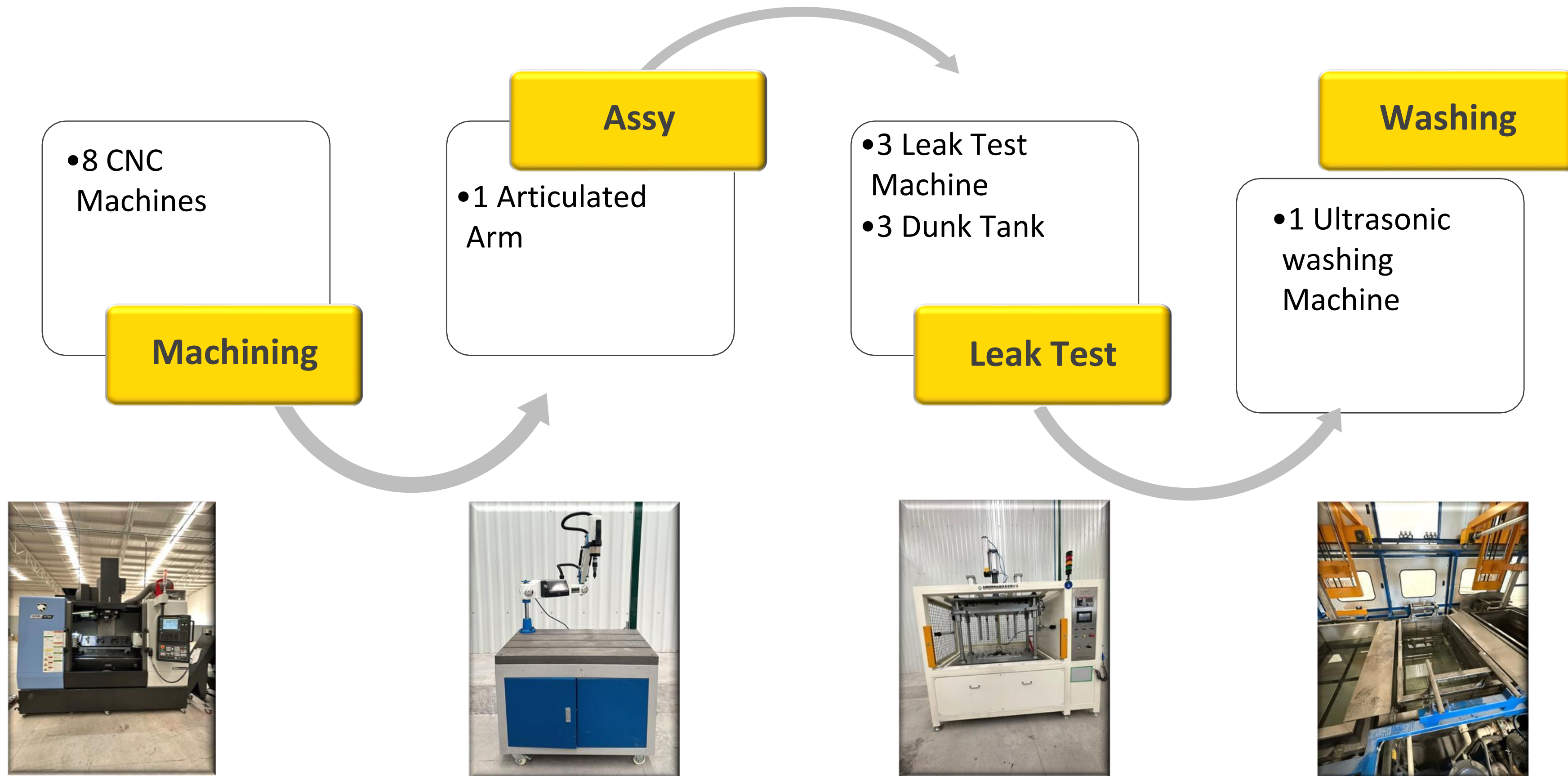


# Hot Area Process Flow





## Cold Area Process Flow





## Laboratory Scope @ PXI Casting



### Incoming

- Aluminum → Chemical Composition
- Sand → Grain Size



### MetLab

- Chemical Composition
- Material Performance
- Defect Characterization



### Process Control

- Casting Internal Sanity
- Cores Internal Sanity
- Cores Cohesion



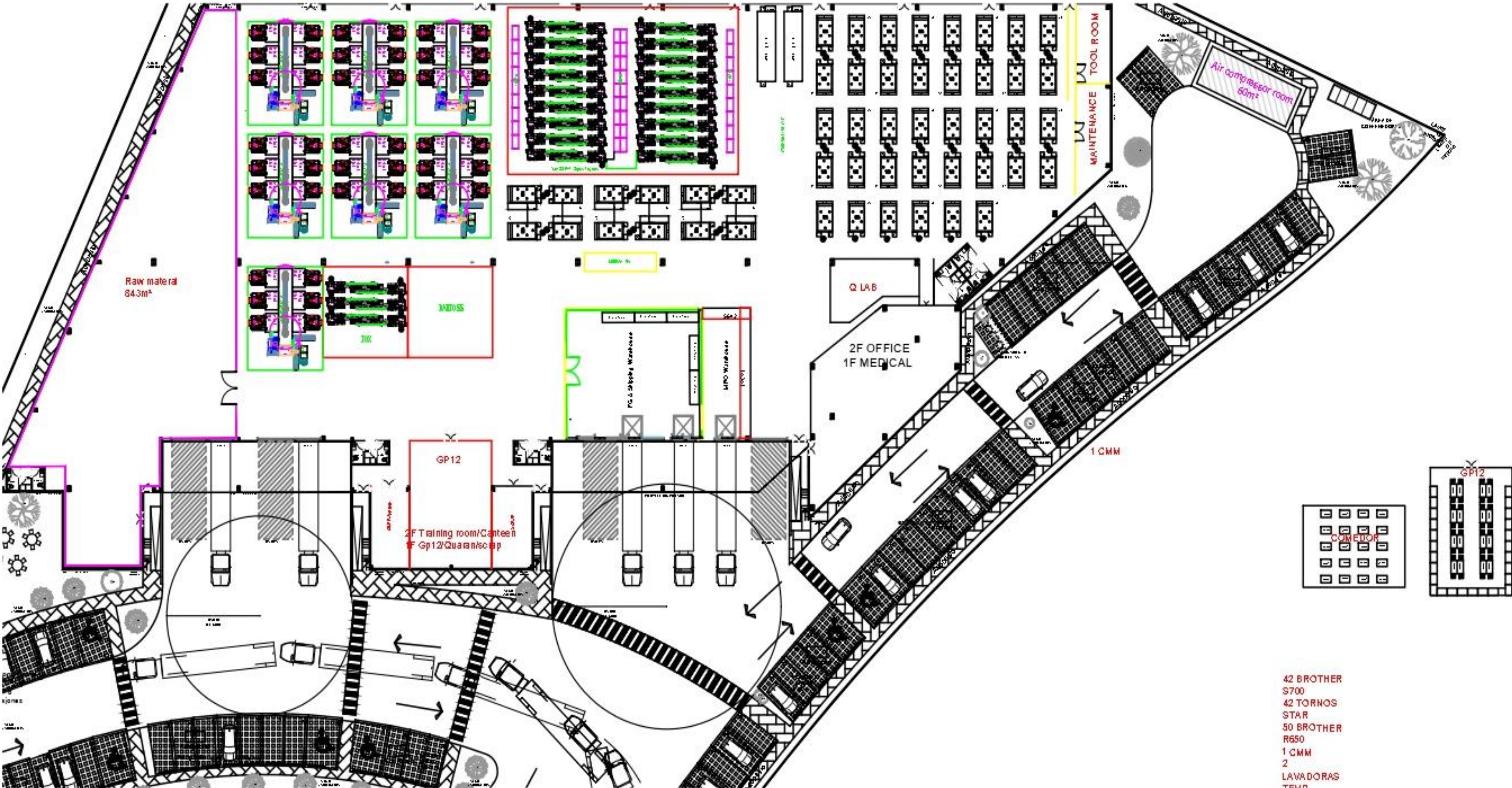
### Metrology

- CMM Measurement
- Optical Comparator
- Hand Equipment



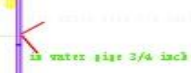




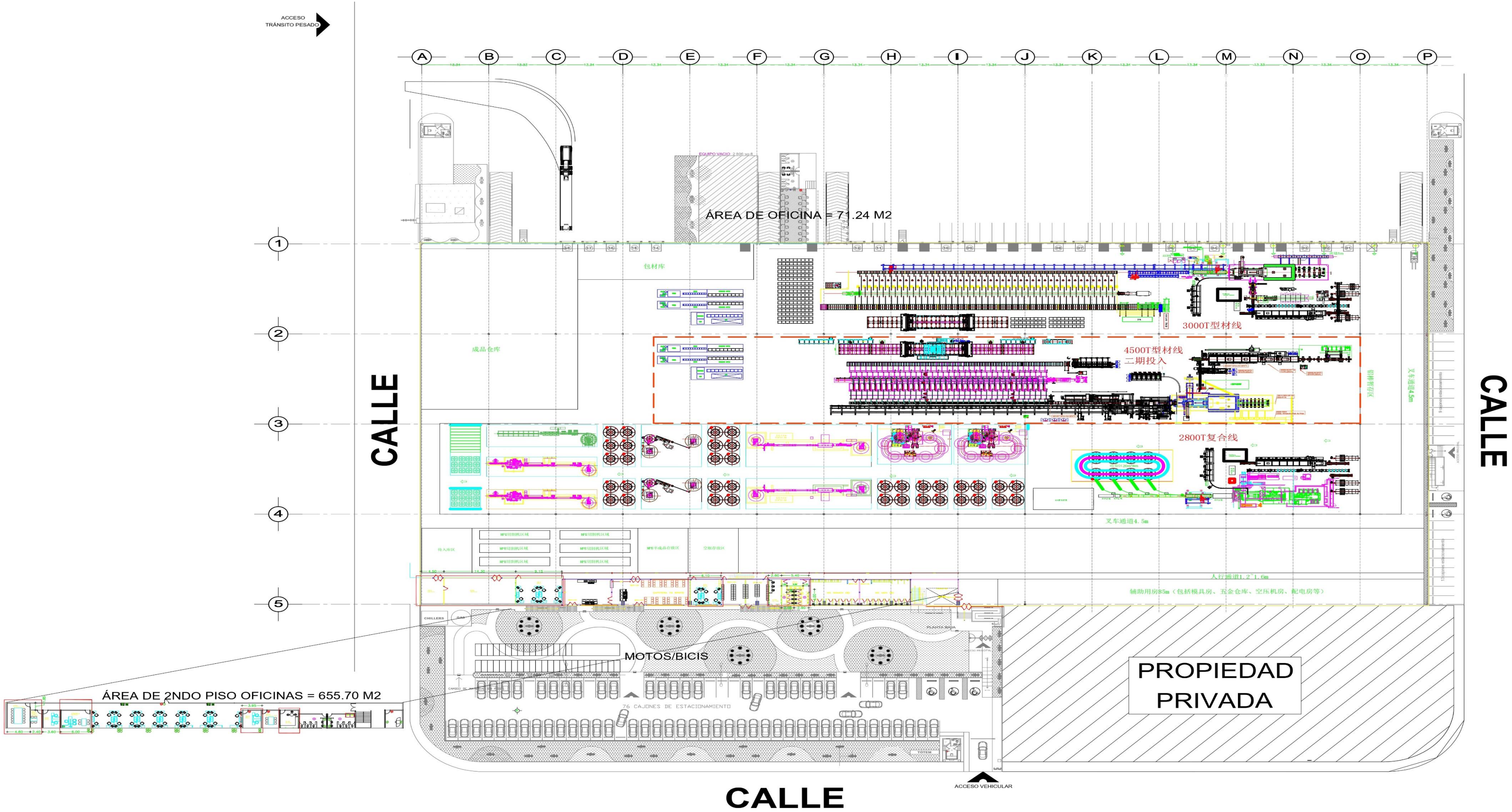


- 42 BROTHER
- S700
- 42 TORNOS
- STAR
- 50 BROTHER
- R650
- 1 CMM
- 2
- LAVADORAS
- TELO











# Profile Parts Introduction

## 1. 1100T Extrusion Line

The billet diameter: 127mm, length: 200-600mm; It can produce profiles of weight less than 1.3kg per meter

## 2. 2800T Extrusion Line

The billet diameter: 203mm, length: 400-1200mm; It can produce profiles of weight range: 2kg-6kg per meter

The billet diameter: 229mm, length: 400-1200mm; It can produce profiles of weight range: 4kg-8kg per meter

## 3. 5500T Extrusion Line

The billet diameter: 381mm, length: 700-1500mm; It can produce profiles of weight range: 8kg-16kg per meter

## 4. 4000T Extrusion Line

The billet diameter: 330mm, length: 600-1300mm; It can produce profiles of weight range: 5kg-12kg per meter



# Precision Drawn Tube Introduction

## **1. Round Tube Spec:**

Outside diameter: Ø6-38mm; Wall thickness: 0.30-3.00 mm; Straight pipe length: 60-4000mm; Coil: 50-300KG / disc

## **2. Elliptical tube spec:**

Width: 10-50mm; Height: 2.0-5.0mm; Wall thickness : 0.25-1.2mm; Length: 60-4000mm.

## **3. Coaxial tube spec:**

Outside diameter: Ø20-38 mm; Wall thickness: 1.20-2.50 mm; Straight pipe length: 60-4000mm.

## **4. Intercooler tube spec:**

Width: 32-120mm; Height: 3-15mm; Wall thickness: 0.4-1.5mm; Length: 60-4000mm



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