

A black and white photograph showing a large stack of carbon steel cold-drawn welded tubes. The tubes are arranged in a grid-like pattern, with their circular ends facing the camera. The background shows a warehouse structure with metal beams and other stacks of materials.

**MARCEGAGLIA  
CARBON STEEL**

**COLD-DRAWN WELDED TUBES**

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- MARCEGAGLIA COLD-DRAWN WELDED TUBE PRODUCTION
- MANUFACTURING PROCESS
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- PRODUCT RANGE AND TYPICAL APPLICATIONS

# MARCEGAGLIA GROUP

# GLOBAL PLAYER IN STEEL

**5.3 BILLION EURO SALES**

MARCEGAGLIA HOLDING

**OF WHICH 5.1 BILLION EURO SALES**

MARCEGAGLIA STEEL

**5.8 MILLION TONS**

PROCESSED YEARLY

**6,500 EMPLOYEES**

**25 STEEL PLANTS**

**60 SALES OFFICES**

**1° INDEPENDENT PLAYER**

IN STEEL PROCESSING SECTOR IN THE WORLD

**1° PRODUCER OF STAINLESS STEEL WELDED TUBES**

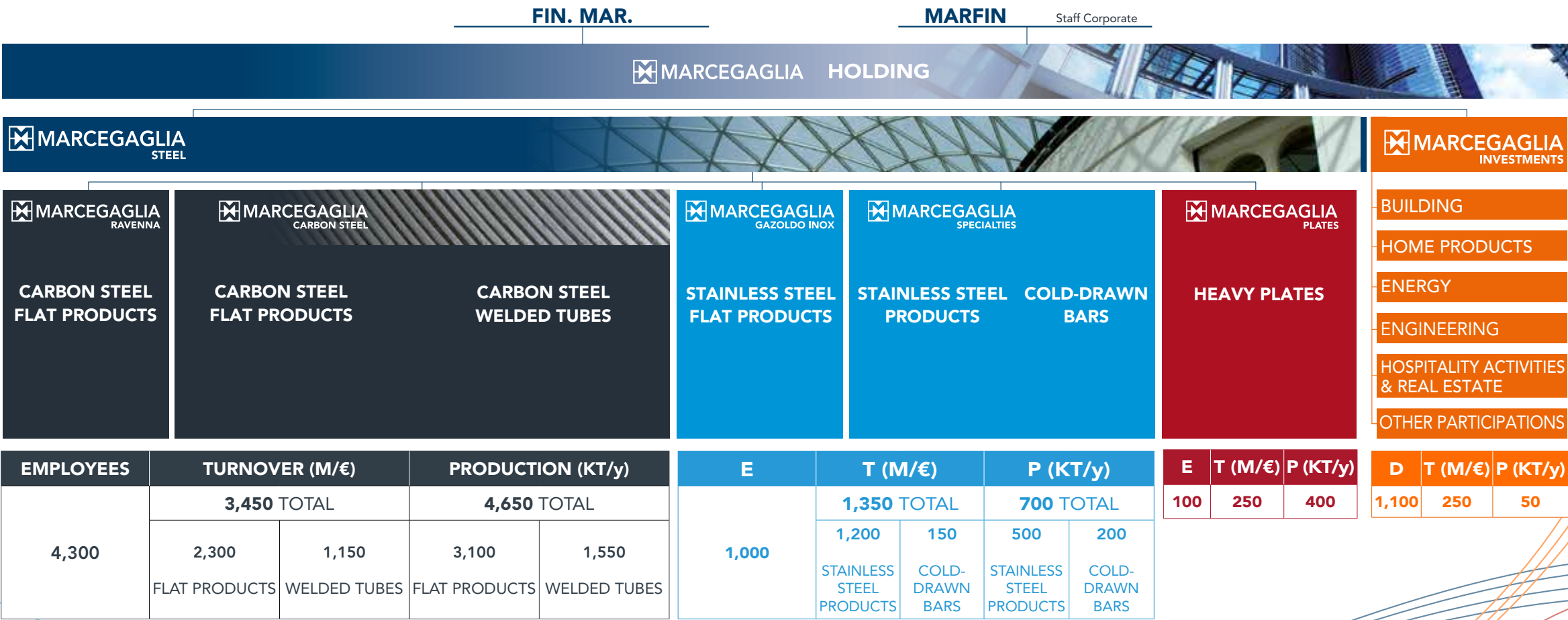
IN THE WORLD

**1° PRODUCER OF CARBON STEEL WELDED TUBES**

IN EUROPE

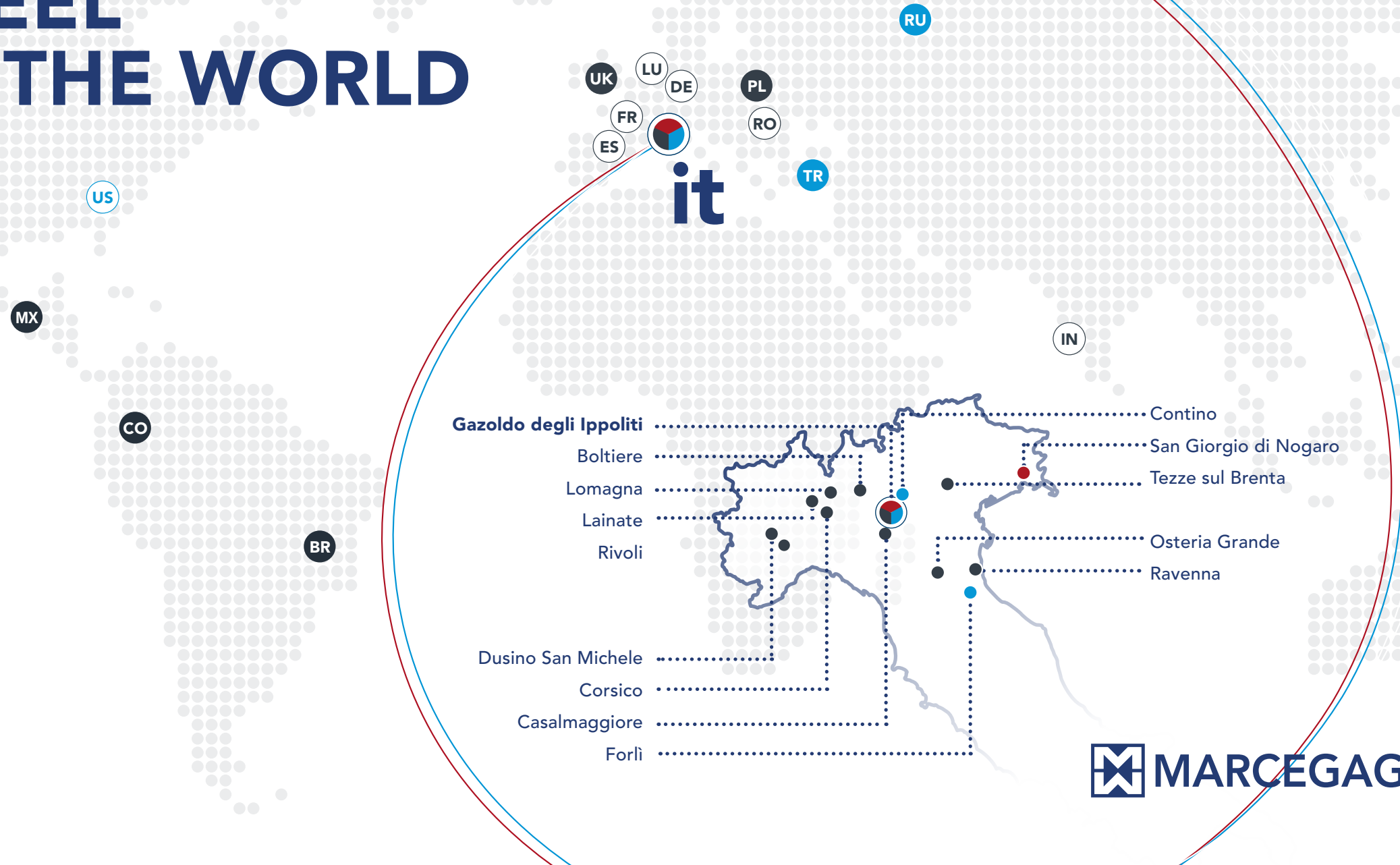
**1° SERVICE CENTER** IN ITALY

# STEEL CORE

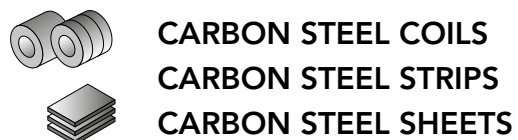




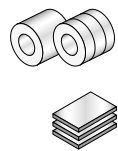
# STEEL IN THE WORLD



# PRODUCT RANGE



CARBON STEEL COILS  
CARBON STEEL STRIPS  
CARBON STEEL SHEETS



HOT DIP GALVANIZED COILS  
HOT DIP GALVANIZED STRIPS  
HOT DIP GALVANIZED SHEETS



PRE-PAINTED COILS  
PRE-PAINTED STRIPS  
PRE-PAINTED SHEETS



CARBON STEEL  
WELDED TUBES



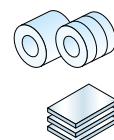
COLD-DRAWN WELDED TUBES



REFRIGERATION TUBES



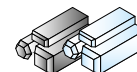
HEAVY PLATES



STAINLESS STEEL COILS  
STAINLESS STEEL STRIPS  
STAINLESS STEEL SHEETS



STAINLESS STEEL WELDED TUBES



CARBON AND STAINLESS STEEL  
COLD-DRAWN BARS



STAINLESS STEEL FLAT BARS



STAINLESS STEEL COLD FORMED SECTIONS



# MARCEGAGLIA COLD-DRAWN WELDED TUBE PRODUCTION



# PRODUCTION

**BOLTIERE**

**RIVOLI**

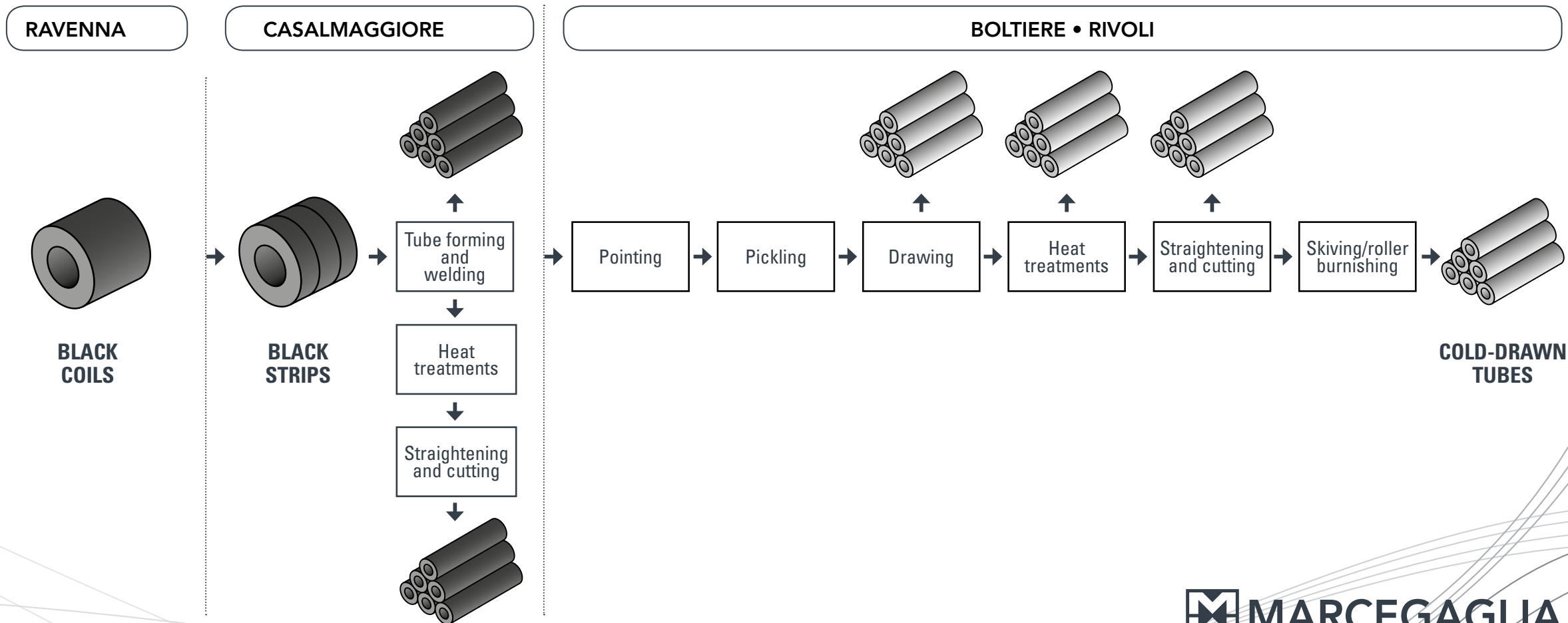
Gazoldo degli Ippoliti

Marcegaglia Carbon Steel cold-drawn welded tubes production takes place in the **Boltiere** and **Rivoli** plants, with a total production capacity of about 100,000 tons.



**MARCEGAGLIA**  
CARBON STEEL

# AN INTEGRATED PRODUCTION CHAIN





# MARCEGAGLIA BOLTIERE

**65,000 MQ**

**TOTAL AREA**

**42,000 MQ**

**COVERED AREA**

**215 EMPLOYEES**

The Marcegaglia plant in Boltiere (Bergamo) is dedicated to the production of welded and seamless cold-drawn tubes for automotive, hydraulic and mechanical applications.

Marcegaglia Boltiere stands out as one of the largest cold-drawn tube production plants in Europe, in terms of production capacity and product range, with a global distribution.



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# MARCEGAGLIA-NOVERO

**55,000 MQ**  
TOTAL AREA

**27,000 MQ**  
COVERED AREA

**75** EMPLOYEES

In June 2018, the Marcegaglia group completed the acquisition of Novero Spa, a company based in Rivoli (Turin) specialized in the production of welded and seamless precision cold-drawn tubes in all varieties of carbon and low- and medium-alloy steels.



**MARCEGAGLIA**  
CARBON STEEL



# QUALITY AND ENVIRONMENT

The production chain of Marcegaglia Carbon Steel cold-drawn tubes is **ISO 9001:2015** and **IATF 16949:2016** certified.

In 2019 RINA awarded the Boltiere plant **"Best4 ISO 26000:2010"** certification, reserved for companies certified in the Quality, Environment, Safety and Social Responsibility sectors (ISO 9001, ISO 14001, BS OHSAS 18001 and ISO 26000:2010).

The Boltiere plant, like other companies in the Marcegaglia group, is also **ISO 50001:2011** certified for energy.

Member of CISQ Federation



CERTIFIED MANAGEMENT SYSTEM  
**ISO 9001 - ISO 14001**  
**BS OHSAS 18001**  
**ISO 50001**



# MANUFACTURING PROCESS



# PRODUCTION AREAS



The Marcegaglia plants are equipped with a total of:

- **18 drawing banches** (including 4 automated lines)
- **4 heat treatments** lines
- **5 non destructive test** lines
- different **finishing** lines
- **6 skiving and roller burnishing** machines

# THE PRODUCTION PROCESS

## TRANSFORMATION

Pointing



Pickling



Drawing



Heat treatments



## FINISHING

Straightening



Cutting



ND Test



Packaging



Skiving/roller burnishing

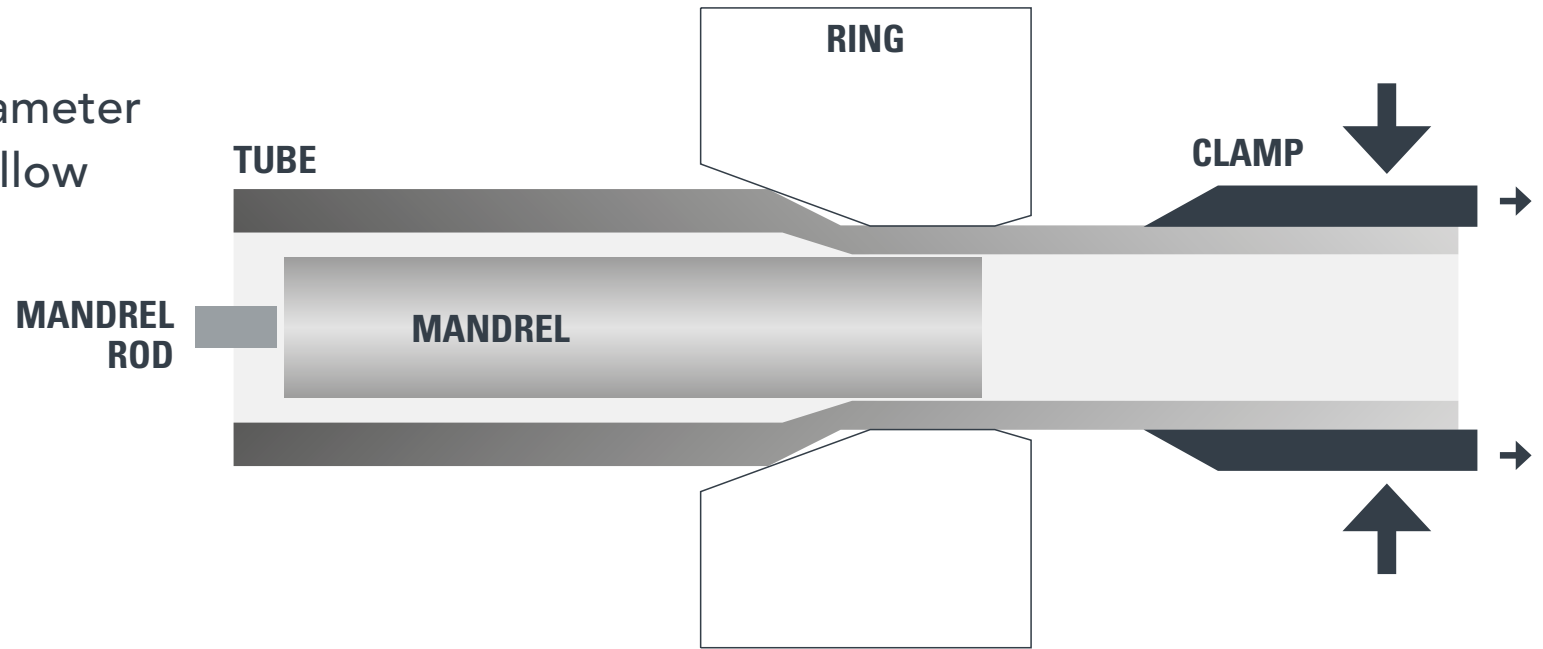


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# COLD-DRAWING PROCESS

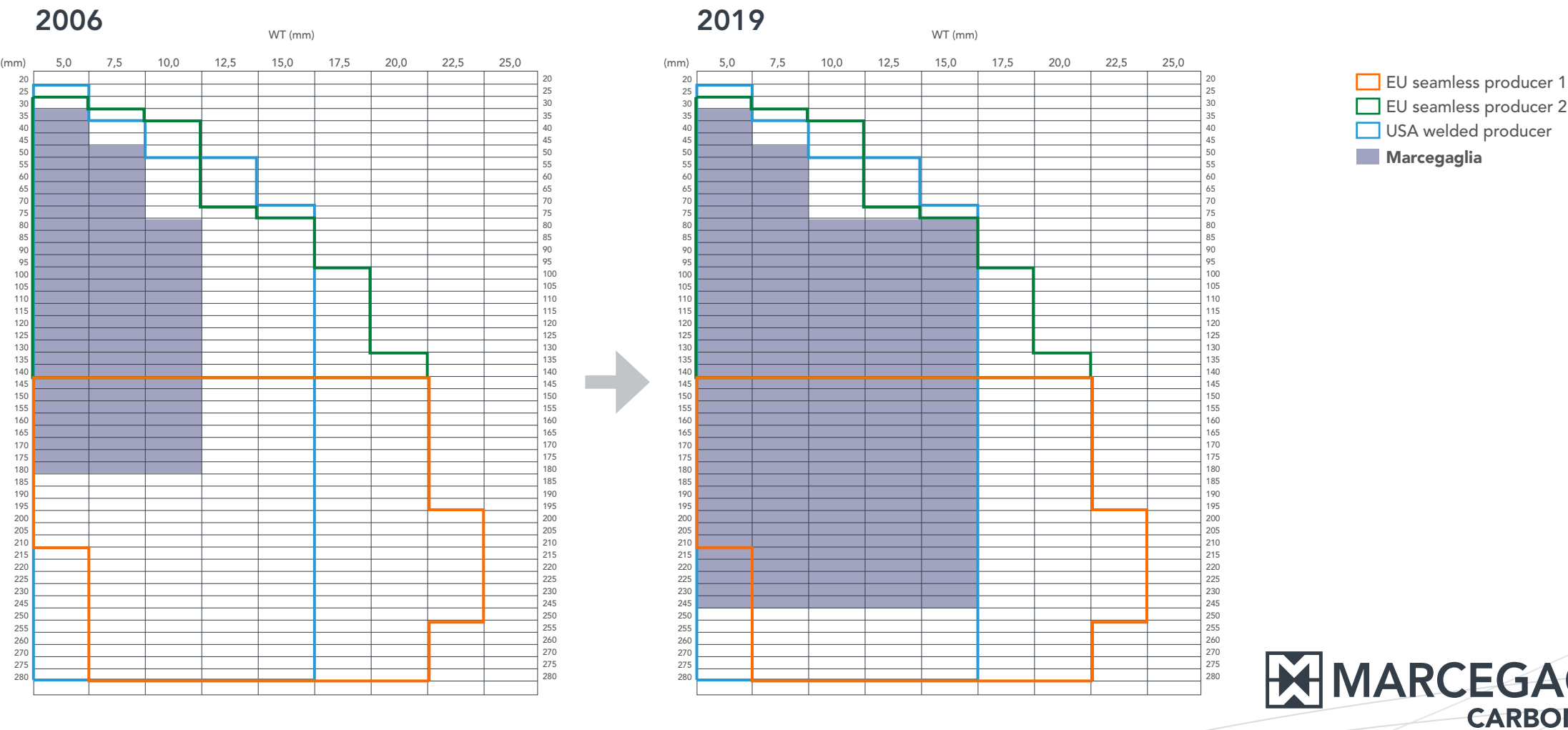
The cold drawing process is a cold reduction of the outside diameter and wall thickness of the starting hollow (Drawn Over the Mandrel).



# MARKET DEVELOPMENT AND KEY FACTORS

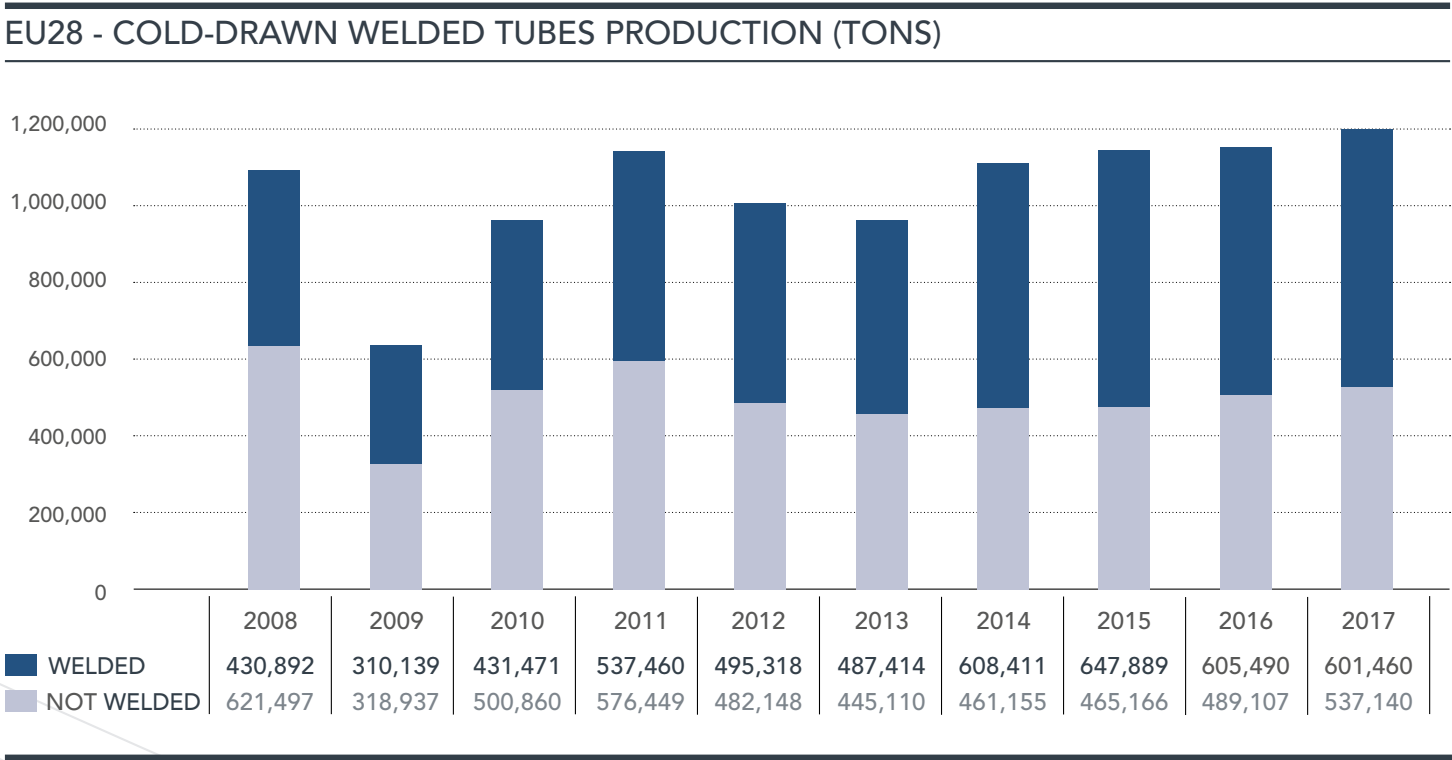
# MARKET DEVELOPMENT

## COLD-DRAWN WELDED TUBE



# MARKET SEGMENTATION

2008-2017



Source: ESTA

Since 2012, the quantity of cold-drawn tubes produced from welded tubes has exceeded that of products from seamless tubes.



# FEATURES AND BENEFITS

- Full body normalizing of the shell stock after welding ensures that both the welding and the surrounding areas are **metallographically and mechanically homogeneous with the rest of the tube**
- **Improved quality surface** (less defect after painting and consequently improved fatigue life)
- **Reduce eccentricity** → The eccentricity is 3% max (better roundness OD / ID)
- Tubes are **100 % controlled** by ultrasonic test (full body)
- **Good toughness** at low temperatures



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# FEATURES AND BENEFITS

- Today the WE production range is covering 80% of the HYCY market
- The main end user has already shifted from SS to Welded 100% (Caterpillar, J.C.B., etc.)
- Benefits are mainly technical, but also the production costs (not price) are lower
- Total cost of the finished product (cylinder) is lower due to less machining

# PRODUCT RANGE AND TYPICAL APPLICATIONS

# PRODUCT RANGE

**18-245 MM**

OUTSIDE DIAMETER MIN-MAX

**1.5-15 MM**

THICKNESS

**SUPERIOR THICKNESSES  
ON REQUEST  
(IN EXECUTION SEAMLESS)**

Marcegaglia Carbon Steel offers a **wide range** of precision cold-drawn tubes, welded and seamless, in all carbon steel and low-alloy steel varieties.

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# TYPICAL APPLICATIONS



**70%**  
Hydraulic

**30%**  
Automotive



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# PRODUCTS



## HYDRAULIC CYLINDERS

- Tubes for cylinder ready to use H9
- Tubes for cylinder suitable for honing or skiving & roller burnishing
- Tubes for cylinder finished H8
- Tubes for telescopic cylinders
- Tubes for piston rods

## AUTOMOTIVE AND MECHANICAL APPLICATIONS

- Tubes for mechanical applications
- Tubes for automotive applications
- Tubes for cardan shafts



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# HYDRAULIC CYLINDERS

## READY-TO-USE CYLINDERS TUBES H9

USED MAINLY  
FOR AGRICULTURAL APPLICATIONS

Low pressure cylinders: <200 bar

### TECHNICAL CHARACTERISTICS

GRADE E355

TREATMENT +C Hard

#### SURFACE FINISHING

- **Outside diameter:** smooth as drawn (EN 10305-2)
- **Inside diameter:** roughness  $R_a < 0.80 \mu$  (average  $0.50 \div 0.60 \mu$ )

#### DIMENSIONAL TOLERANCES

- **Outside diameter:** 50% EN 10305-2
- **Inside diameter:** ISO H9 (ISO H10 for thickness < 4 mm)
- **Eccentricity:** < 3%
- **Straightness:** 1:1000 mm

**Outside diameter (mm):** min 30 - max 145

**Thickness (mm):** min 2.5 - max 7.5



# HYDRAULIC CYLINDERS

TUBES FOR CYLINDER SUITABLE FOR HONING OR SKIVING & ROLLER BURNISHING

## TECHNICAL CHARACTERISTICS

GRADE	E355
TREATMENT	+SR Stress Relieved
SURFACE FINISHING	<ul style="list-style-type: none"><li>• <b>Outside diameter:</b> smooth as drawn (EN 10305-2)</li><li>• <b>Inside diameter:</b> with stock allowance (skiving/roller burnishing)</li></ul>
DIMENSIONAL TOLERANCES	<ul style="list-style-type: none"><li>• <b>Outside diameter:</b> 50% EN 10305-2</li><li>• <b>Eccentricity:</b> &lt; 3%</li><li>• <b>Straightness:</b> 1:1000 mm</li></ul>



**Outside diameter (mm):** min 30 - max 245

**Thickness (mm):** min 5 - max 15

# HYDRAULIC CYLINDERS

MAINLY USED  
FOR EARTH-MOVING MACHINES AND LIFTS

TUBES FOR CYLINDER SUITABLE FOR HONING OR SKIVING & ROLLER BURNISHING



Telehandler



Fork Lift



Drill Rig



Skip Loader



Turf Care



Hauler



Truck Mounted Crane



Harvesting Head



Snow Plow



Truck Mounted Log Loader



Forest Machine



Wheel Loader



Backhoe Loader



Roll-Off



Refuse Collecting

- High pressure hydraulic cylinders: >200 bar

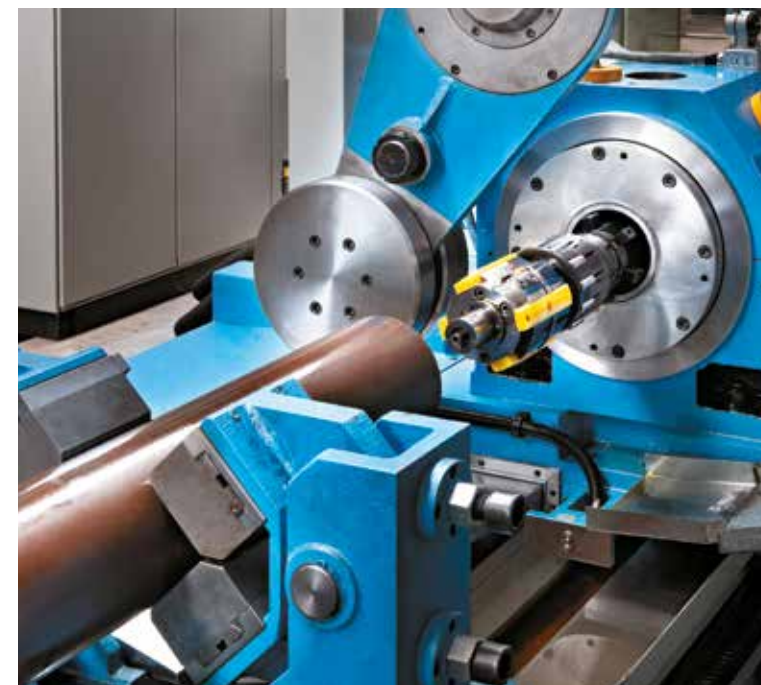
# HYDRAULIC CYLINDERS

## TUBES FOR CYLINDERS FINISHED H8

### TECHNICAL CHARACTERISTICS

GRADE	E355
TREATMENT	+SR (BKS) <b>Stress Relieved</b>
SURFACE FINISHING	<ul style="list-style-type: none"><li>• <b>Outside diameter:</b> smooth ad drawn (EN 10305-2)</li><li>• <b>Inside diameter:</b> skived and roller-burnished H8 Ra max 0.3 <math>\mu</math></li></ul>
DIMENSIONAL TOLERANCES	<ul style="list-style-type: none"><li>• <b>Inside diameter:</b> ISO H8, min. 40 mm - max. 220 mm</li></ul>

**Inside diameter (mm):** min 40 - max 220





# HYDRAULIC CYLINDERS

## TUBES FOR TELESCOPIC CYLINDERS

### TECHNICAL CHARACTERISTICS

GRADE	E355
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TREATMENT	+SR Stress Relieved
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SURFACE FINISHING	<ul style="list-style-type: none"><li>• <b>Diametro esterno:</b> smooth as drawn (EN 10305-2)</li><li>• <b>Inside diameter:</b> roughness <math>Ra &lt; 1.6 \mu</math></li></ul>
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DIMENSIONAL TOLERANCES	<ul style="list-style-type: none"><li>• <b>Straightness:</b> 0.50 mm/m max</li></ul>
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**Outside diameter (mm):** min 40 - max 245

**Thickness (mm):** min 5 - max 15



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# HYDRAULIC CYLINDERS

COLD-DRAWN TUBES SUITABLE FOR CHROME PLATING

## TECHNICAL CHARACTERISTICS

GRADE	E355
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TREATMENT	+N Normalized, +SR Stress Relieved
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SURFACE FINISHING	<ul style="list-style-type: none"><li>• <b>Outside diameter:</b> with stock allowance (for subsequent reworking)</li><li>• <b>Inside diameter:</b> smooth as drawn (EN 10305-2)</li></ul>
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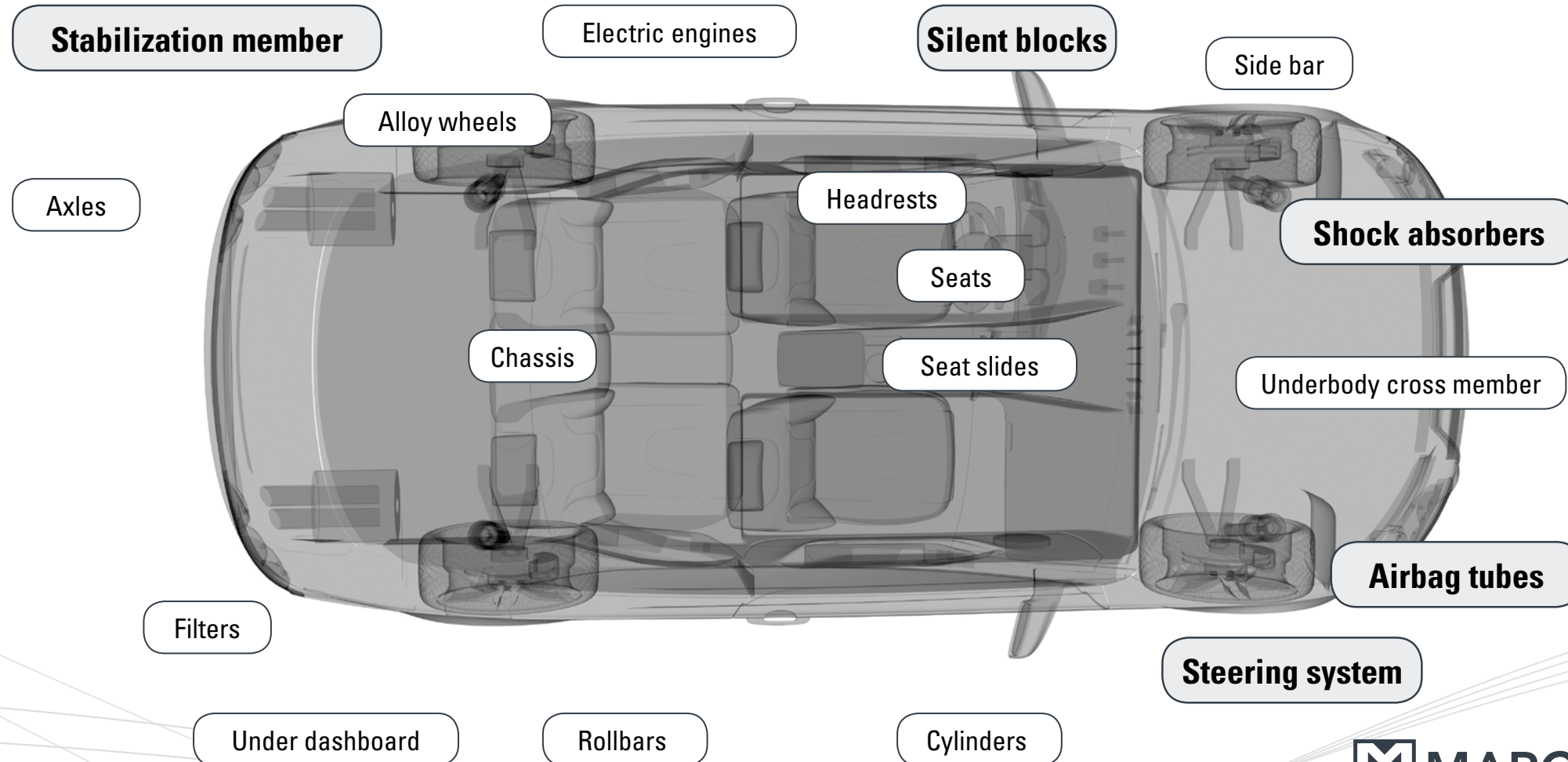
**Outside diameter (mm):** min 30 - max 200

**Thickness (mm):** min 5 - max 15





# AUTOMOTIVE AND MECHANICAL



# AUTOMOTIVE AND MECHANICAL

## COLD-DRAWN TUBES FOR AUTOMOTIVE AND MECHANICAL APPLICATIONS

### TECHNICAL CHARACTERISTICS

GRADE	E155 - E195 - E235 - E275 - E355
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	+C Hard
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	+LC Soft
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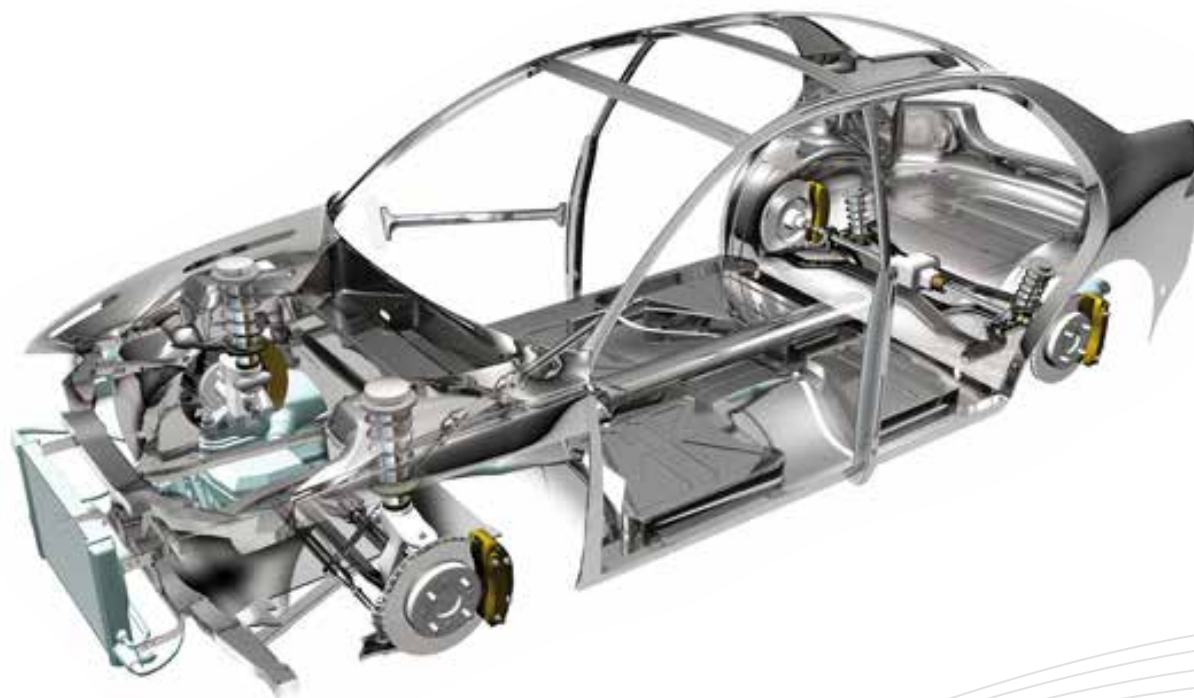
TREATMENT	+SR Stress Relieved
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	+A Annealed
--	-------------

	+N Normalized
--	---------------

**Outside diameter (mm):** min 18 - max 245

**Thickness (mm):** min 1.5 - max 15



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# AUTOMOTIVE AND MECHANICAL

COLD-DRAWN TUBES FOR CARDANS SHAFTS (TRILOBULAR, SPACIAL SHAPES, ETC.)

## TECHNICAL CHARACTERISTICS

GRADE	E235 - E355
TREATMENT	+C Hard
	+LC Soft
	+N Normalized
DIMENSIONAL TOLERANCES	According to customer request
DIMENSIONS AND PROFILES	According to customer request



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CARBON STEEL

# SOME OF OUR CUSTOMERS

**CATERPILLAR®**



**CASE**  
CONSTRUCTION



**FASSI**  
LEADER IN INNOVATION

**OCIMA**  
OLEODINAMICA

**HYVA®**

 **MARCEGAGLIA**  
CARBON STEEL



Ottobre 2019

# OUR STEEL BRINGS YOUR WORLD TO LIFE

 **MARCEGAGLIA**  
CARBON STEEL

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**60<sup>th</sup>**  
1959-2019  
**MARCEGAGLIA**