



Forming Tomorrow. Today!

# Shaping Parts with Innovative Forming Techniques



Electropneumatics &  
Hydraulics (India) Pvt. Ltd.

Component  
Manufacturing  
Division (CMD)

## Electropneumatics

Electropneumatics has been in the business of designing and manufacturing metal forming machinery for more than 40 years. Hydraulic presses, servo presses, tube/section benders, end formers, powder compacting presses, honing machines, chassis and power transmission tower line equipment, etc. are some of the products manufactured. They cover a gamut of applications in the forming arena for the automotive, rail and ship building, power and boiler, furniture, white goods and general engineering sectors. Our expertise lies in developing forming solutions to meet customer-specific applications.

## Component Manufacturing Division

The Electropneumatics Component Manufacturing Division (CMD) is a division of Electropneumatics that offers customised solutions using advanced technologies for part and assembly manufacturing. Its proficiency lies in the development of complex parts and processes, many for the first time in India, offering world class engineering, development and production technologies, through forming techniques such as stamping, tube hydroforming, hot stamping, tube bending, end forming, and more.

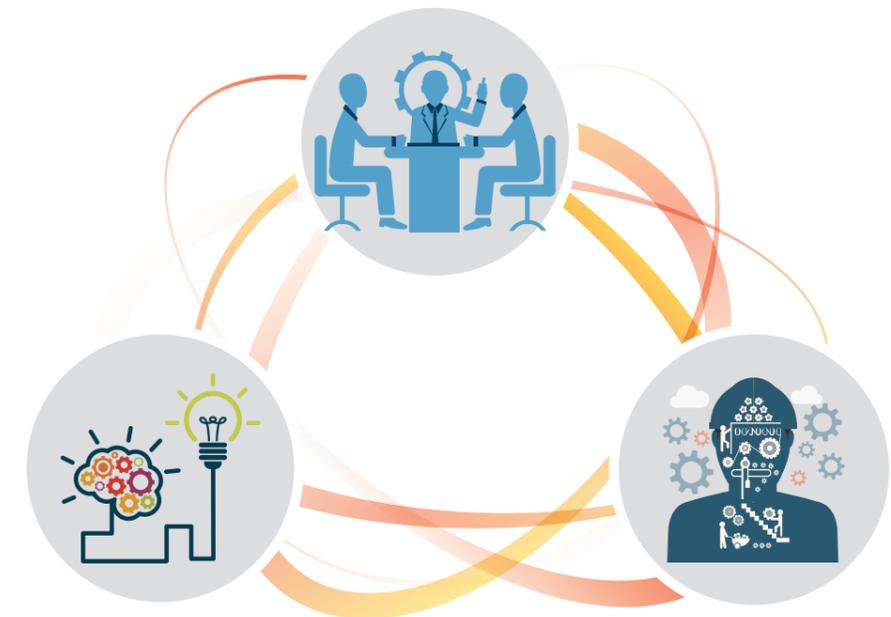
Our experience as forming machine builders perfectly complements our product and process development skills and enables us to offer tailored-solutions to specific customer requirements that are unique, cost-effective and enhance product characteristics.



# Our Strengths. Your Advantage.

## CUSTOMER

Solutions on par with best in the world  
Unique, customised answers for complex applications  
Commitment to customer targets



## PRODUCT

Boost product functionality through enhanced properties  
Lighter, stronger, safer, integral parts  
Economical on price

## PROCESS

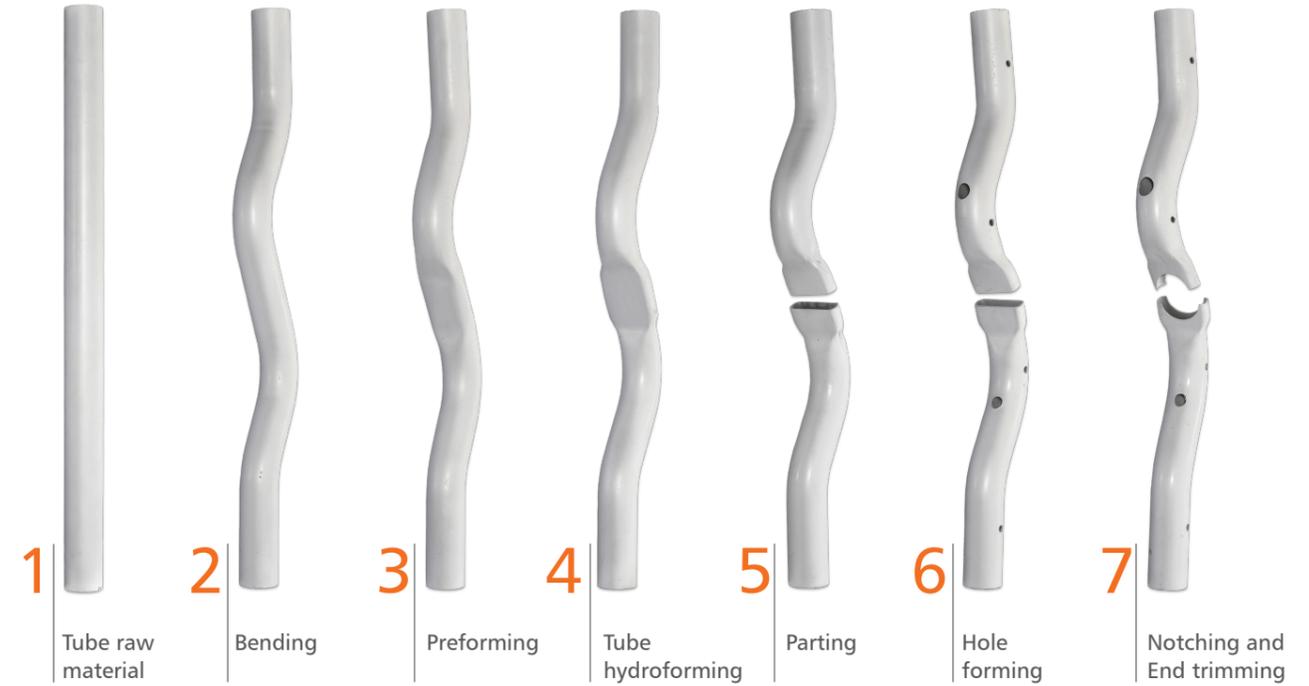
ISO/TS 16949:2009 quality system  
World-class manufacturing set-up  
Modern manufacturing technologies  
100% indigenous

## Some of our valued customers



# Concept To Delivery

Electropneumatics has the expertise in idea generation, feasibility analysis, design and selection of materials, material behaviour, tool and process design, determination and development of the best production technology right through to implementing the first prototype and series production. This opens up a plethora of fascinating possibilities for all kinds of component shapes.



More than 4 decades of **forming technology** expertise

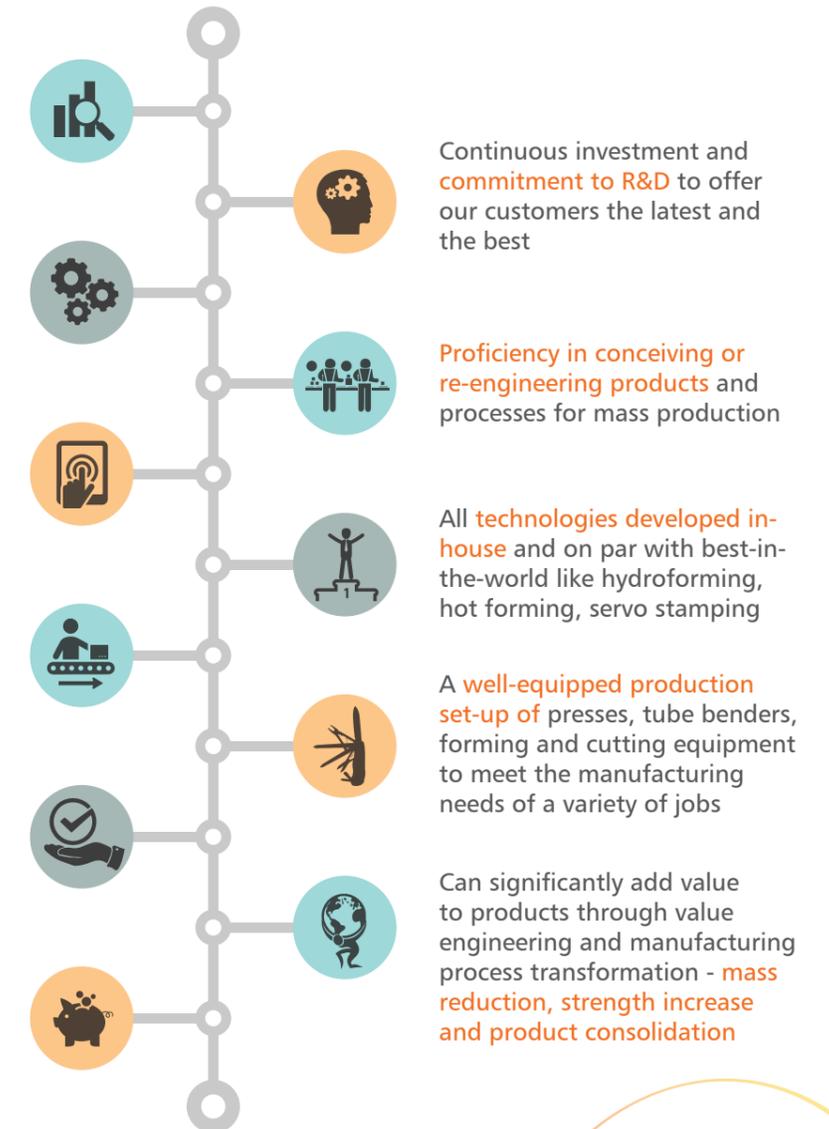
**Completely indigenous.** No dependence on external agencies

**Skill and experience** in materials, forming / cutting processes, tools, fixtures and gauges, and their design using modern 3D/FEA tools

Well-equipped **in-house manufacturing CNC shop** for machining of complex dies and tools

**ISO/TS 16494:2008** system-based approach and compliance to international good manufacturing standards

**Superior parts.** Strong but light, at the most economical manufacturing cost



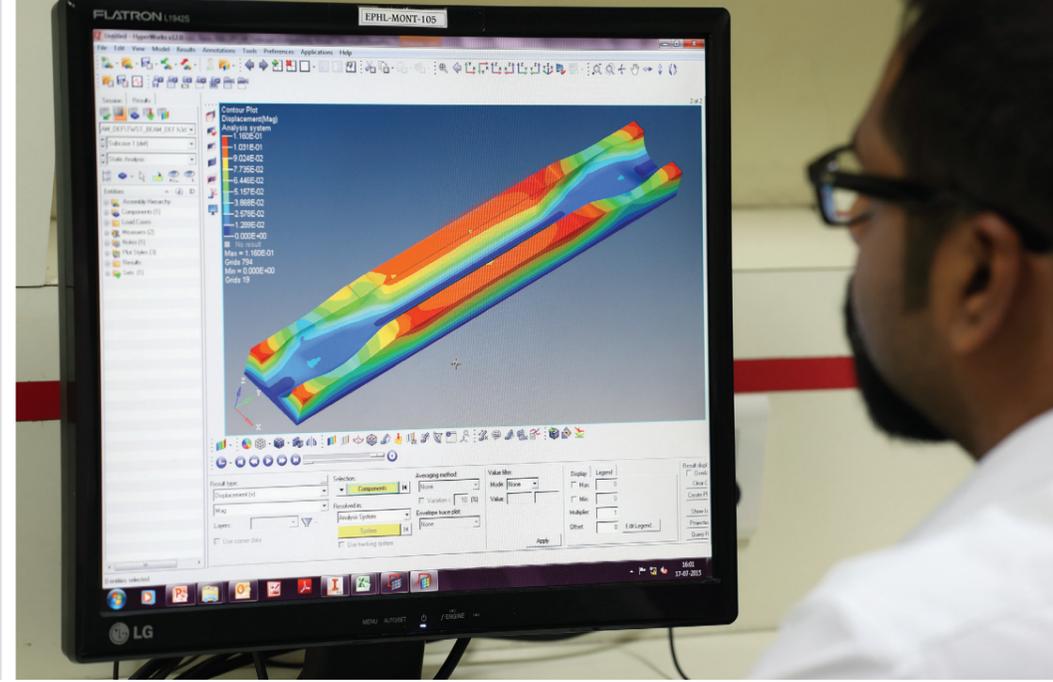
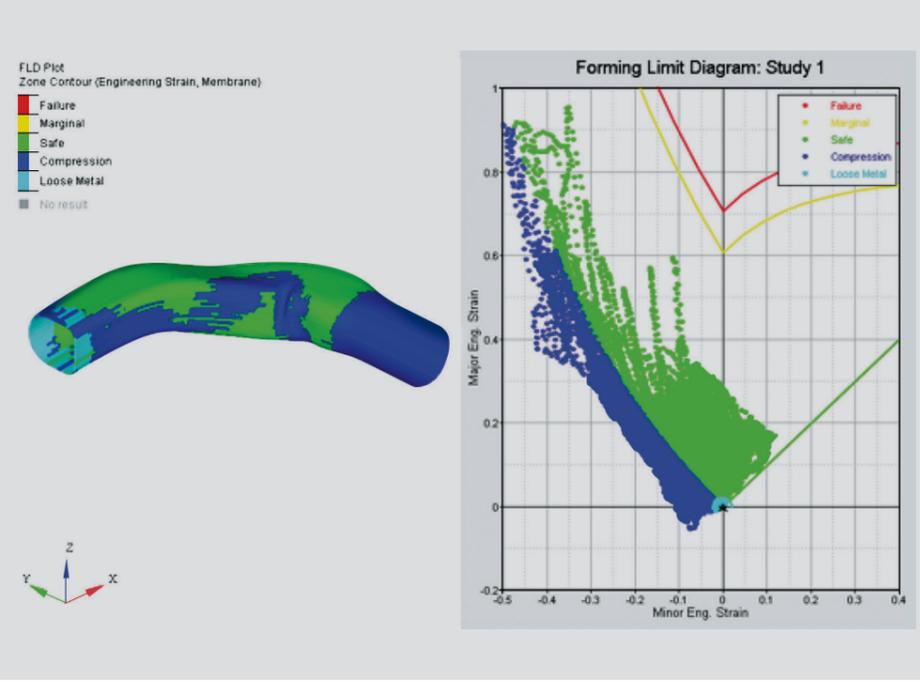
Continuous investment and **commitment to R&D** to offer our customers the latest and the best

**Proficiency in conceiving or re-engineering** products and processes for mass production

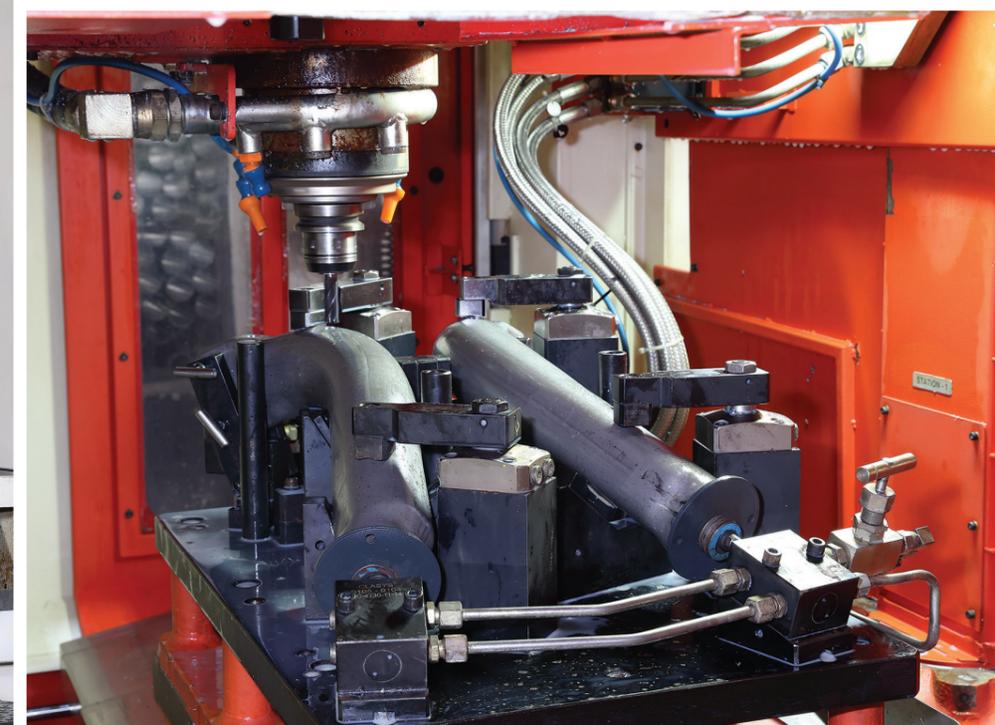
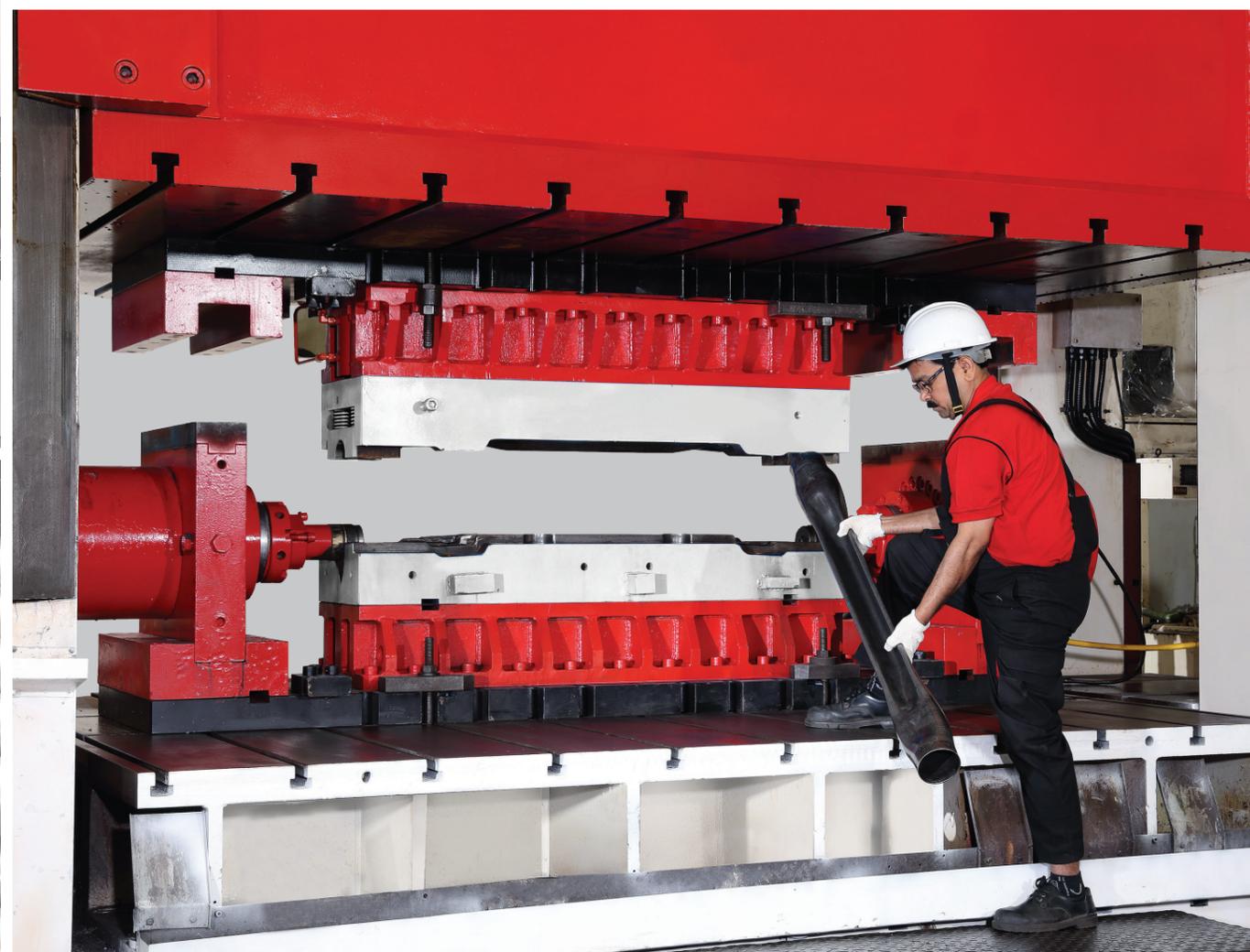
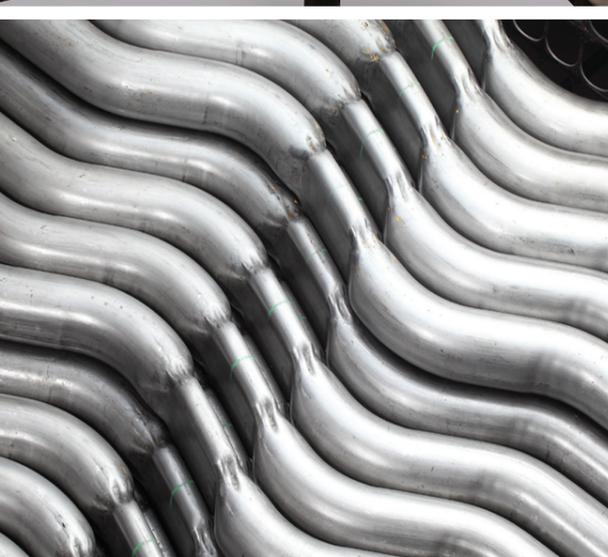
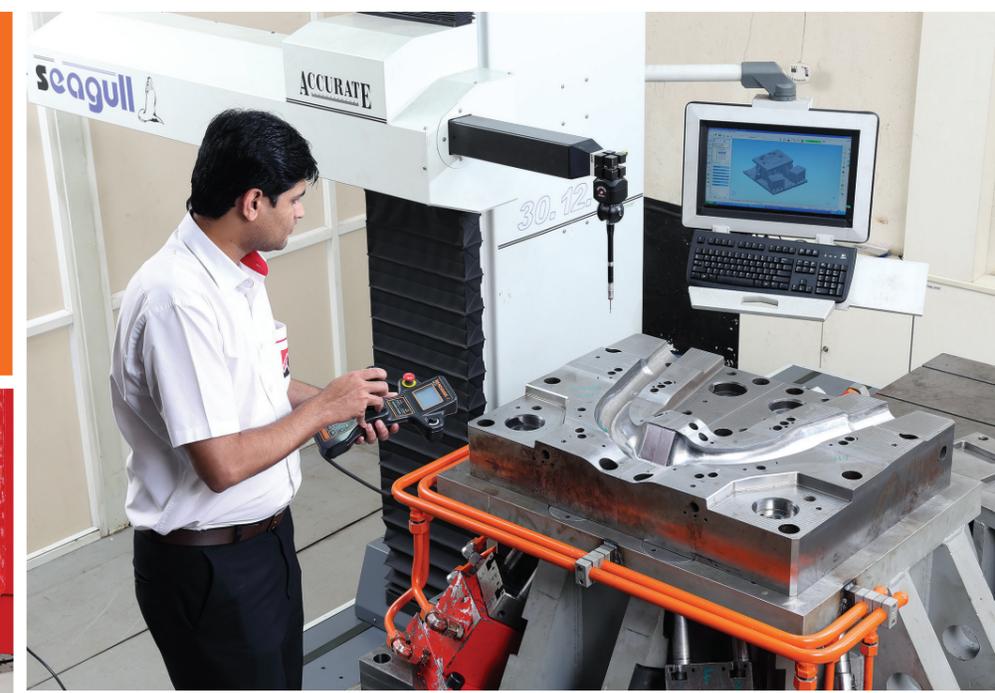
All **technologies developed in-house** and on par with best-in-the-world like hydroforming, hot forming, servo stamping

A **well-equipped production set-up** of presses, tube benders, forming and cutting equipment to meet the manufacturing needs of a variety of jobs

Can significantly add value to products through value engineering and manufacturing process transformation - **mass reduction, strength increase and product consolidation**



# Multi-Process Capability



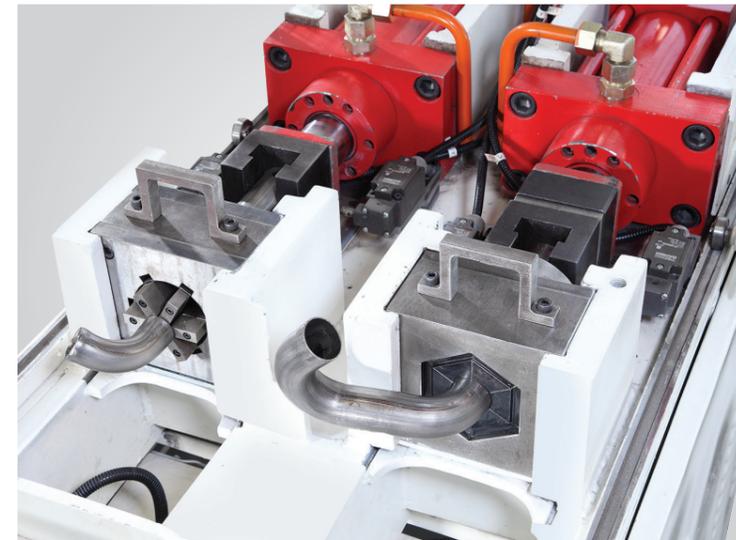
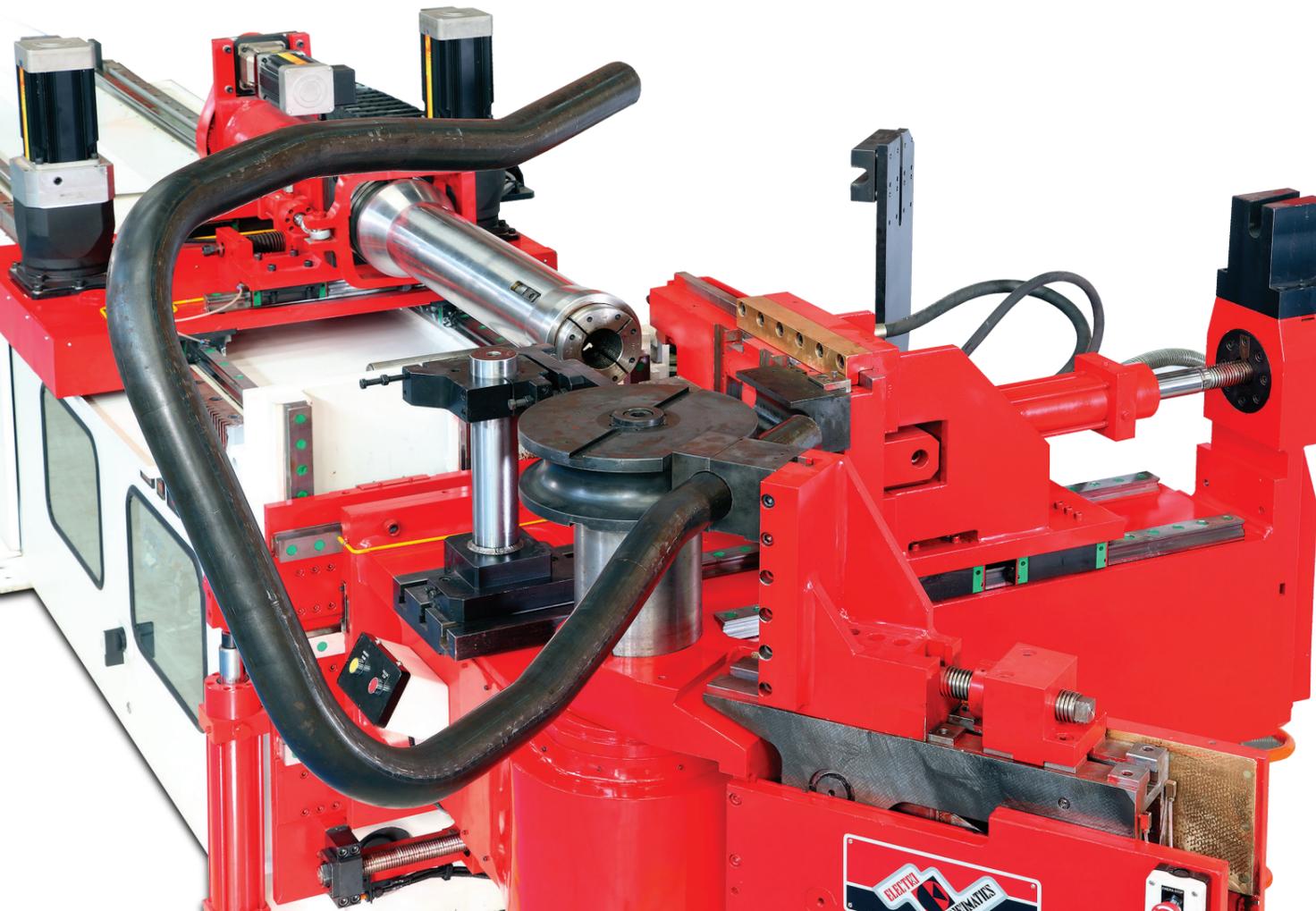
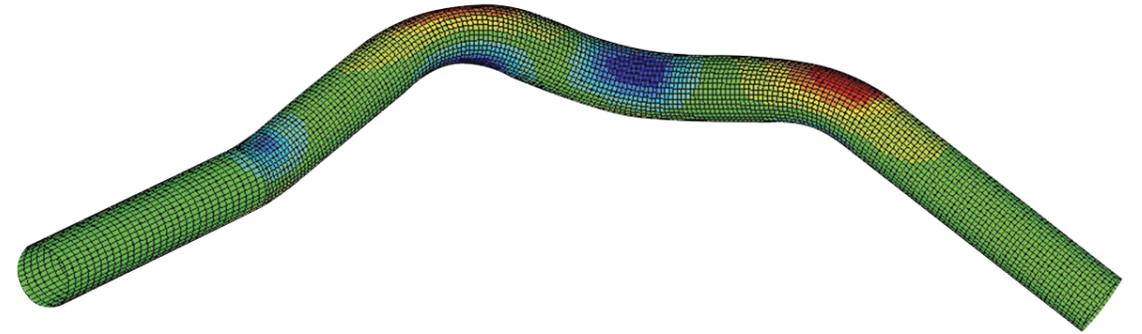
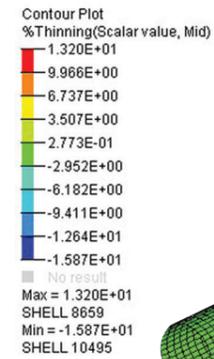
# Production Facility



# Cutting-Edge Forming Technologies

## Tube Bending and End Forming

More than 30 years of being pioneers and leaders in tube bending and forming in India has given us a wealth of experience and knowhow to produce the most critical bends and end forms, often difficult for others. Bending of wires of OD 3 mm up to tubes of OD 120 mm and forming of tubes from OD 16 to 101.6 mm in variety of materials and complex configurations are possible.

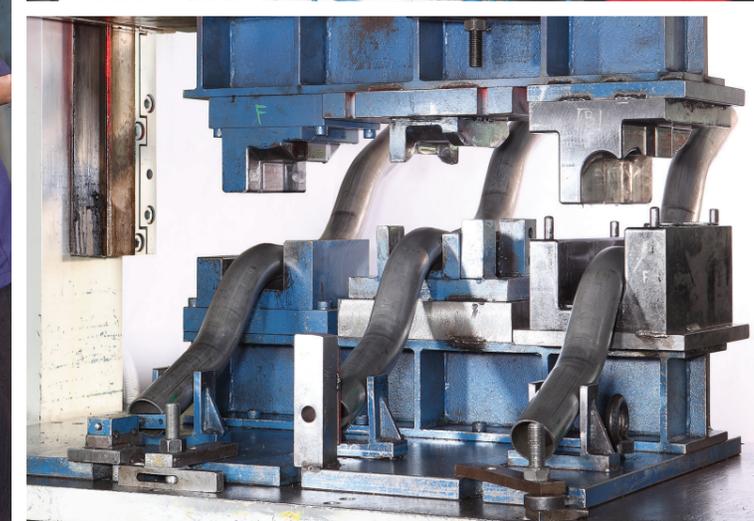
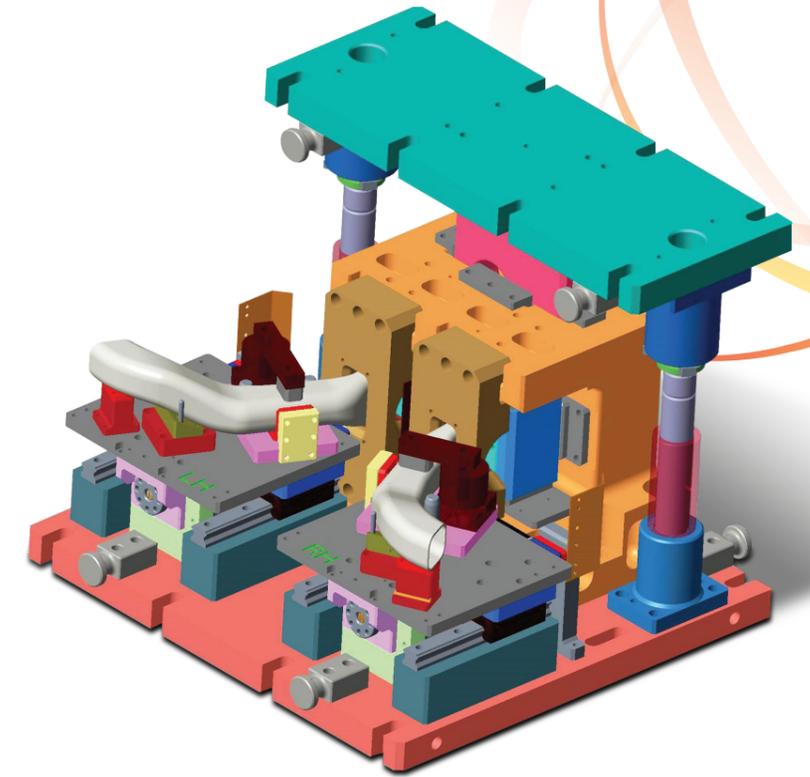


## Cutting-Edge Forming Technologies

### Metal Forming and Cutting

Electropneumatics offers a unique benefit to its customers of metal forming applications- the advantage of the latest advancements like hydraulic and electric servo forming, modern up-to-date equipment and tailored equipment which can be developed for a particular application. The installed presses from 10 T up to 5000 T in bed sizes up to 2500 (LR) mm x 1800 (FB) mm can cover a wide range of parts.

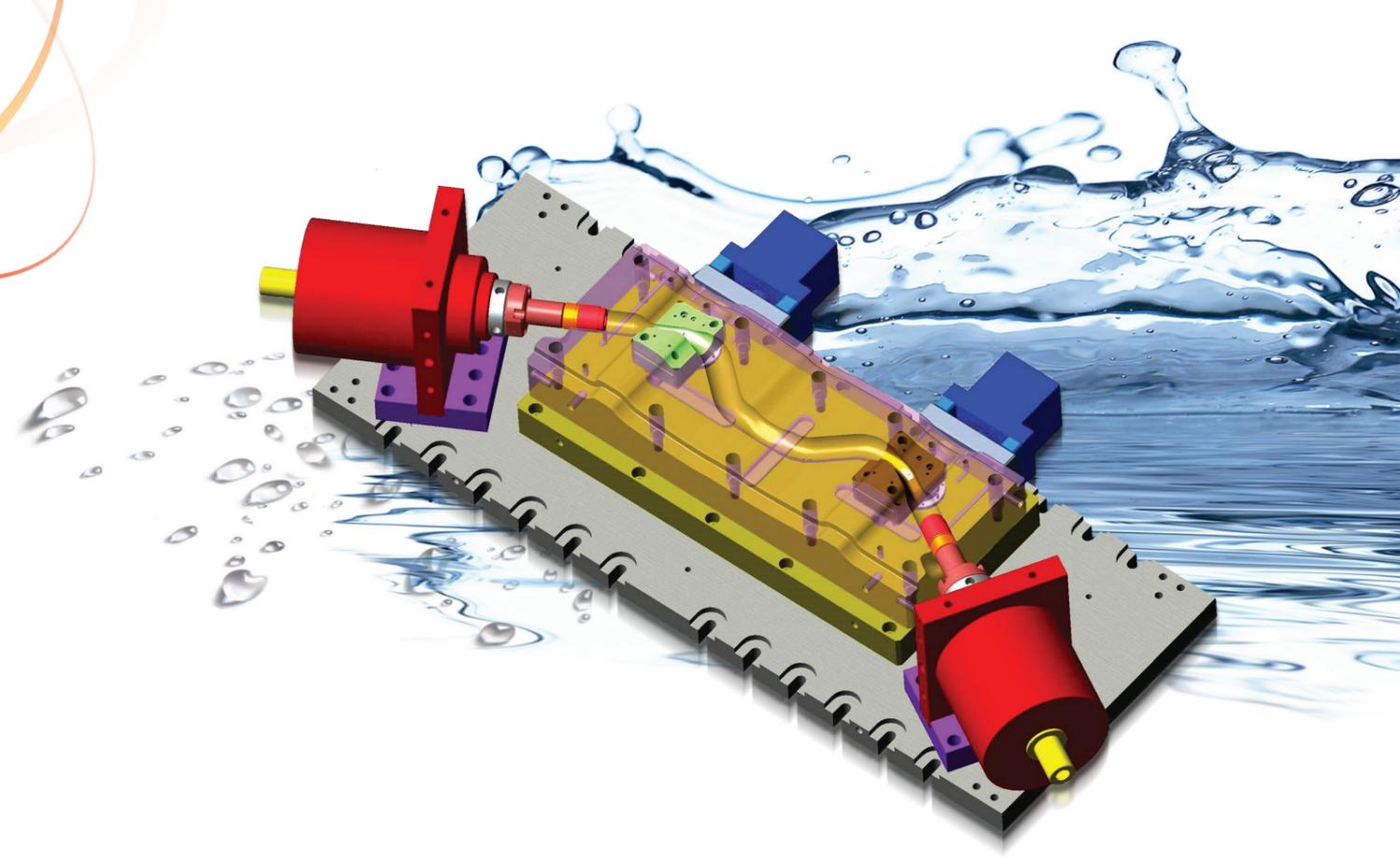
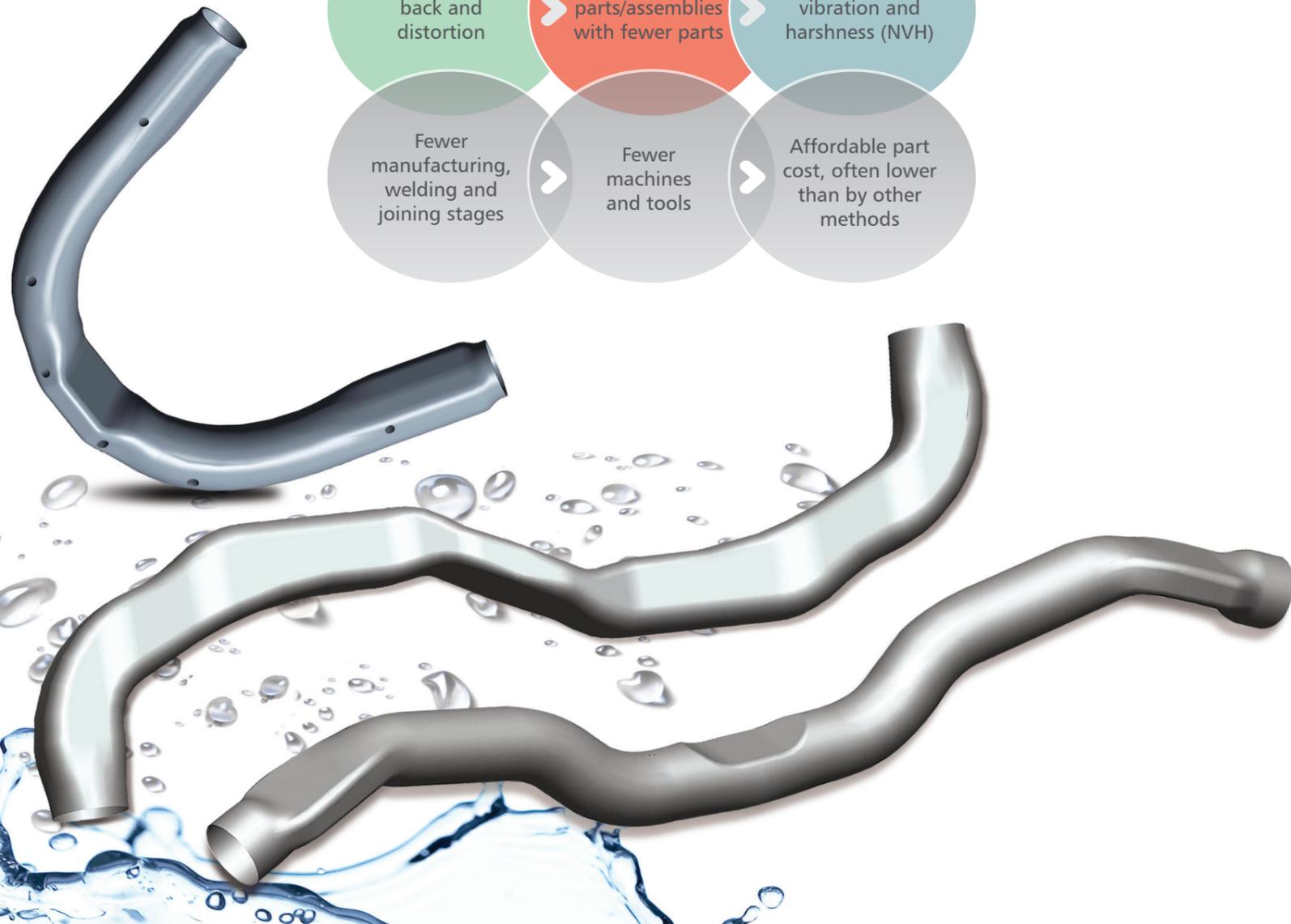
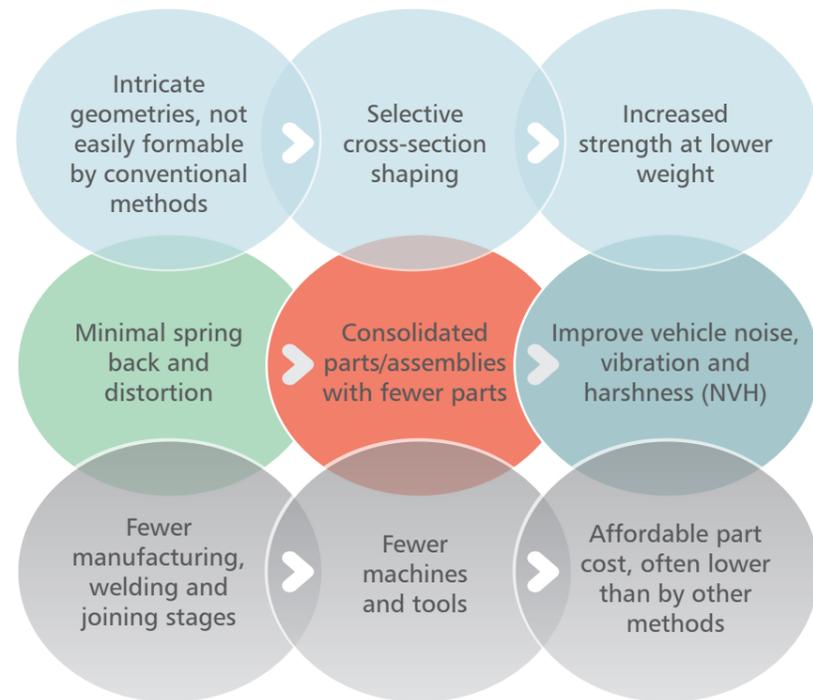
In addition, we have notching, parting, end trimming and drilling SPMs, CNC lathes and vertical machining centers, marking, deburring and ultrasonic cleaning equipment.



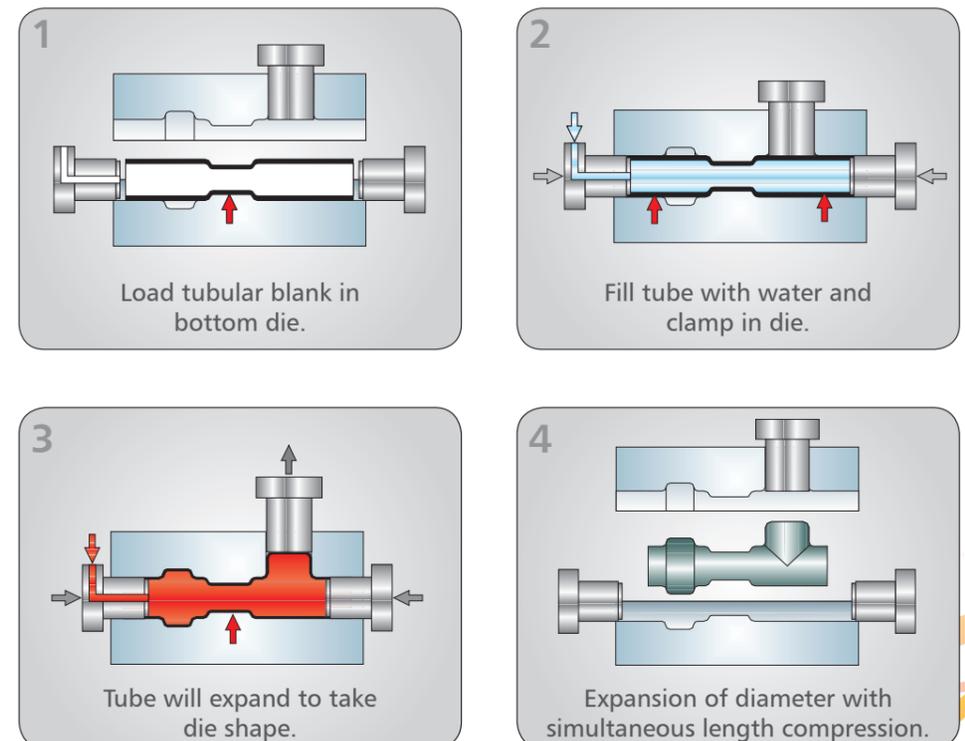
## Cutting-Edge Forming Technologies

### Tube Hydroforming and Hydropiercing

Tube hydroforming is a cold forming process that uses water pressure (up to 3000 bar) to form tubes into complex parts. A combination of internal water pressure inside the tube and external axial compressive force along the length result in parts that are far superior than those made by other techniques. Hydropiercing produces accurate, repeatable holes in different planes during the hydroforming process itself, thereby eliminating subsequent operations.



Electropneumatics developed tube hydroforming in India for the first time in the year 2000. Since then, with continuous R&D efforts, we have developed and produced many types of parts of varying complexities and for varying applications. Five hydroforming presses of 500 T, 800 T, 1000 T, 1600 T, 2000 T and 5000 T run round the clock churning out hydroformed tubular parts. Our competent team can do feasibility study through FEA simulation and analysis and tool and process design engineering. Pre- and post-hydroforming operation capability and facility is also available.

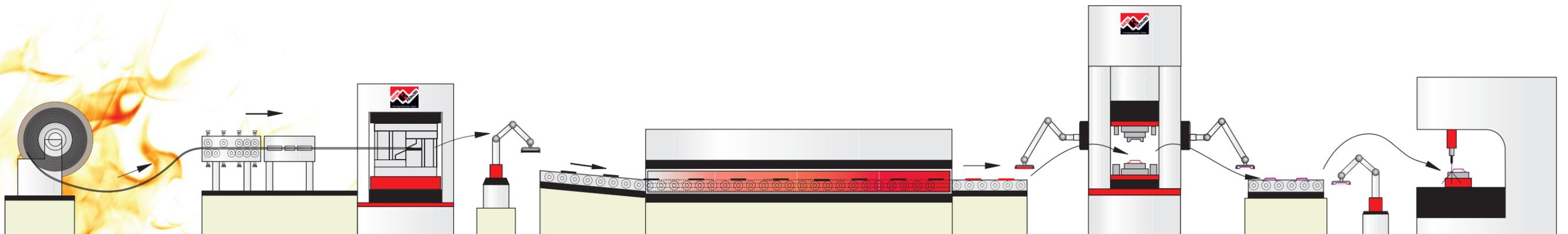
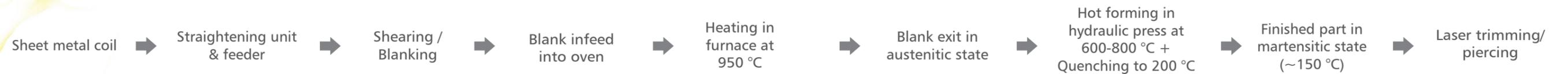
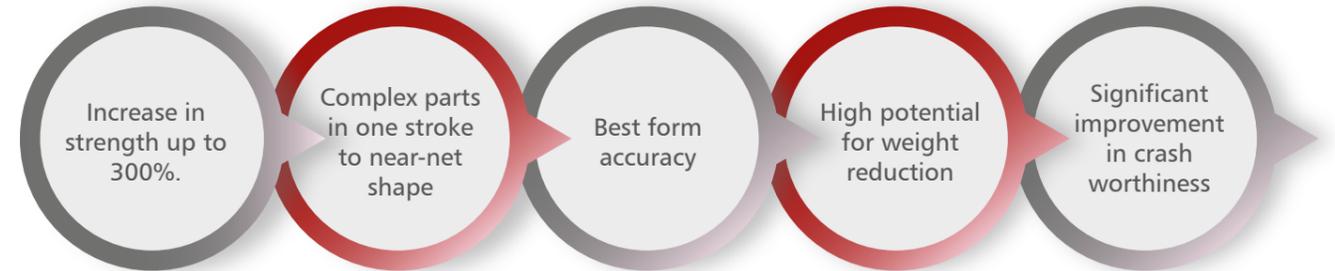
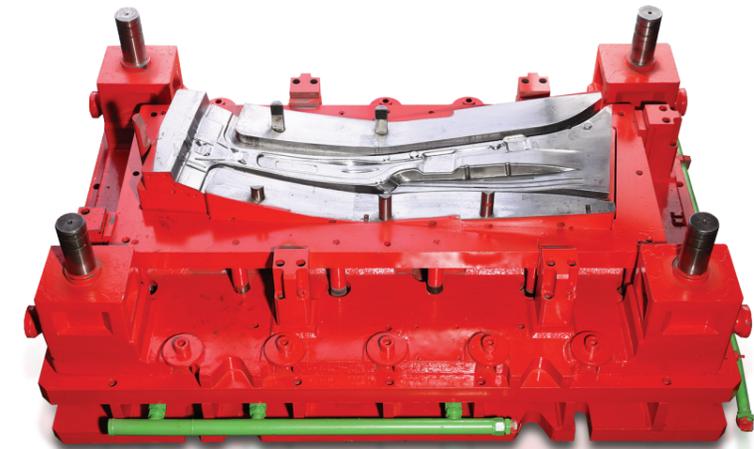
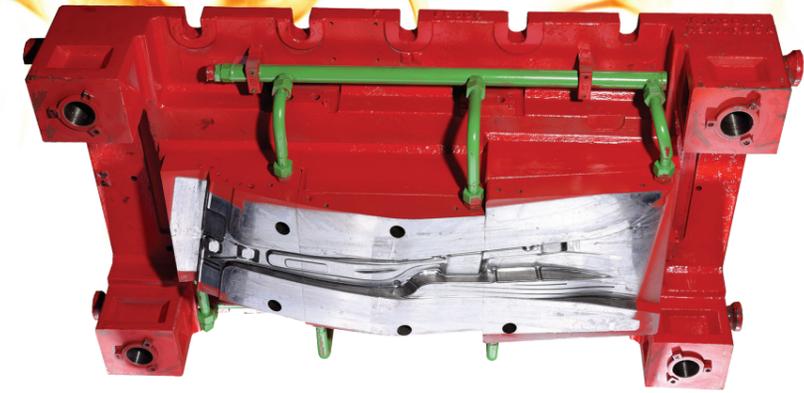


# Cutting-Edge Forming Technologies

## Hot Forming

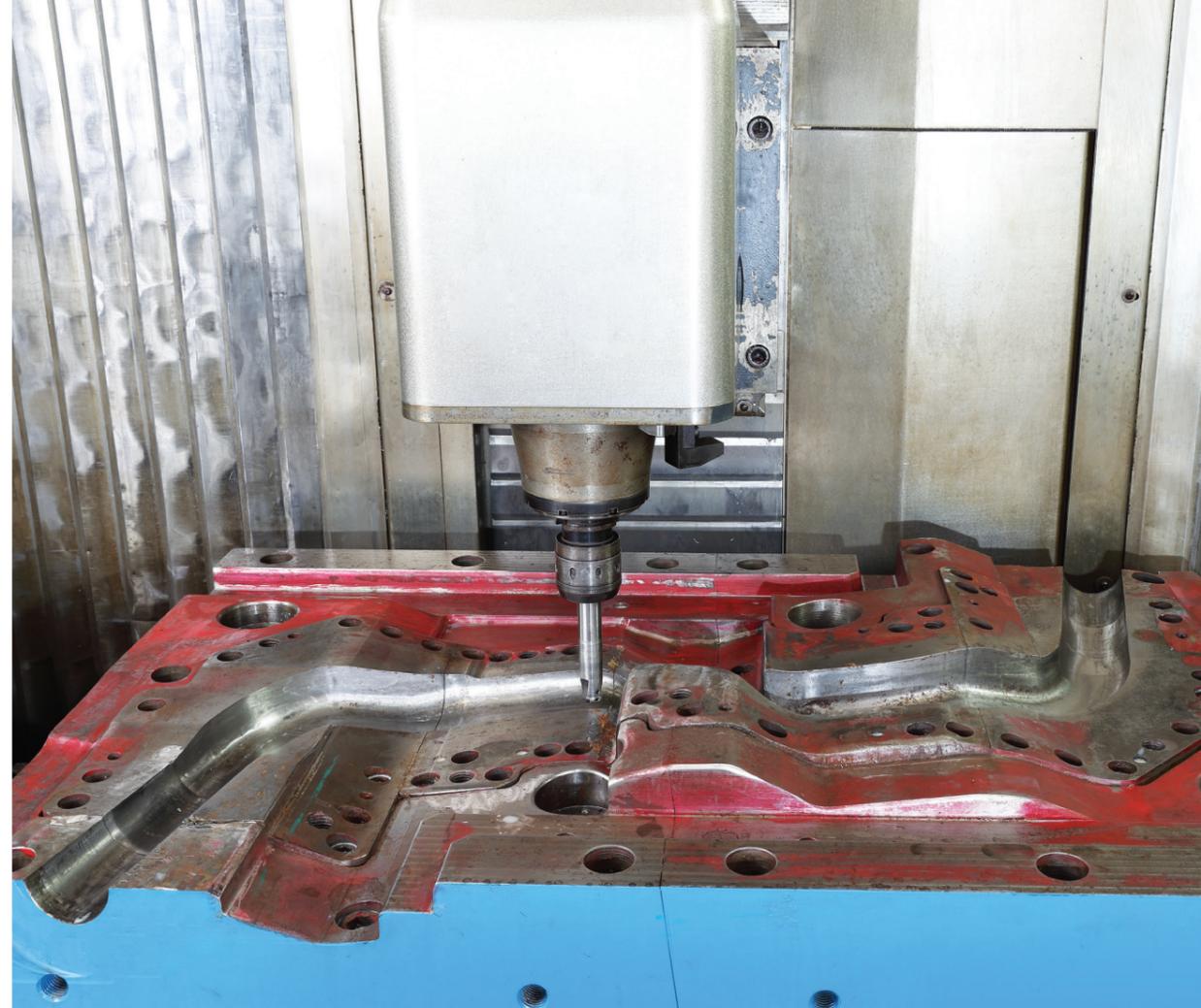
The demand for hot forming over the last few years is driven by stringent crash and safety norms. Passenger and vehicle safety parts such as A-pillar, B-pillar, sill and roof reinforcements, transmission tunnels, carrier understructure, bumpers and side impact bars are now routinely hot stamped to achieve the desired high strengths without an increase in weight. Heated boron steel sheets are formed and quenched in specially designed dies to produce these high tensile strength (up to 1500 MPa) parts.

Electropneumatics has designed and built an 800 T and 5000 T hot forming press for manufacturing such parts in a cost-effective manner. Computational fluid dynamics and FEA analysis is used for developing dies and the die cooling system.

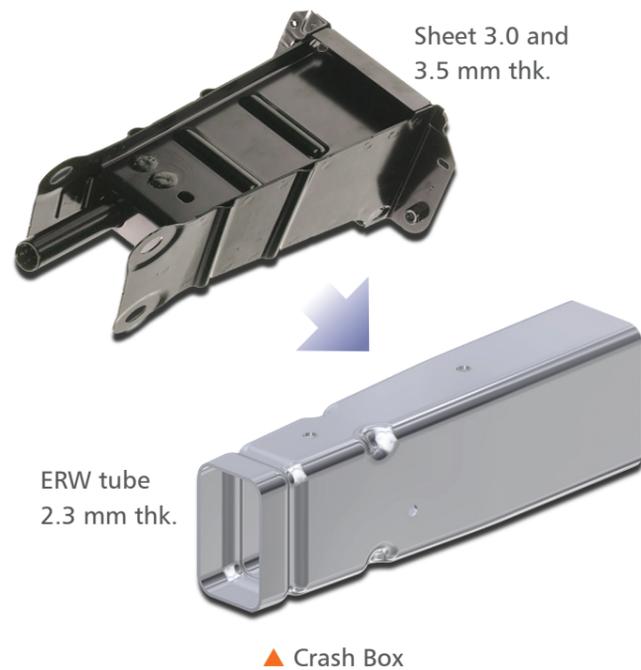


# Multi-Faceted Tool and Die Manufacturing

In-house CNC machine shop with CNC heavy-duty boring machines, CNC lathes and VMCs for manufacturing the most complex dies, tools, punches and fixtures.



# Transforming the Ordinary into Extraordinary

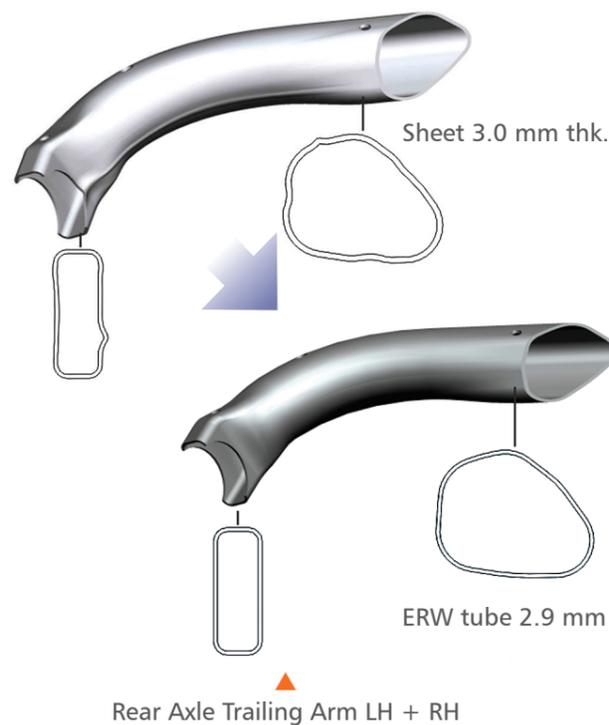


## Hydroforming for Crash Safety

- Conversion to hydroforming augmented impact energy absorption and passenger safety
- Manufacturing stages reduced by 50%
- Reduction in weight of raw material (20%) and finished part (11.8%)
- Eliminated 16 weld spots
- 5 variants hydroformed
- Part cost saving of 22%

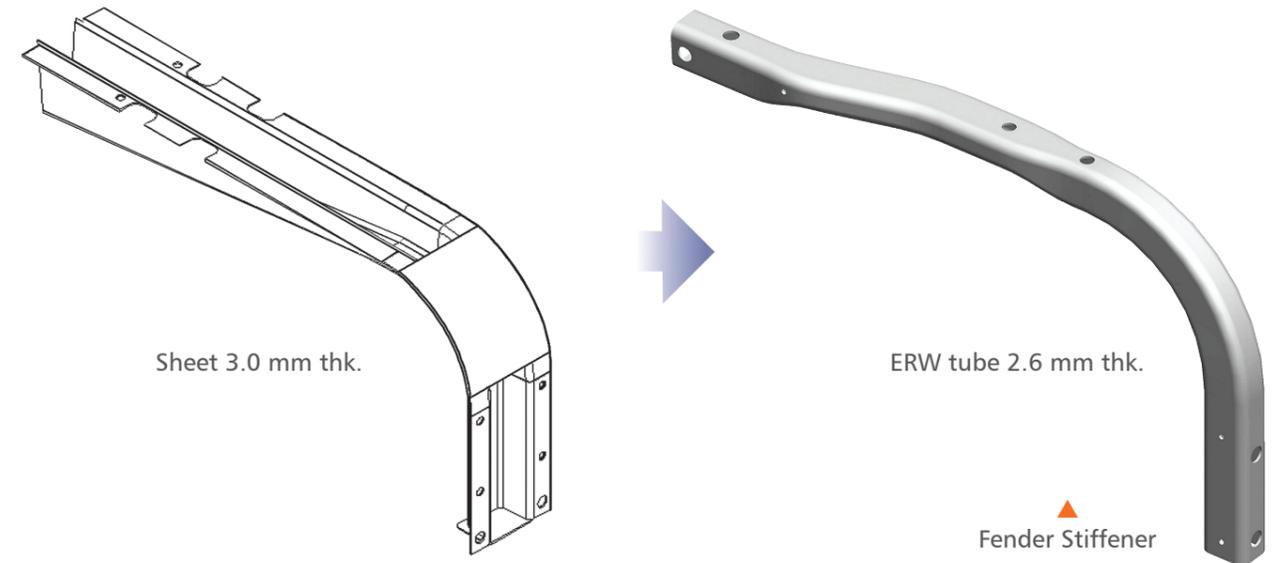
## Hydroforming for Lightweighting

- Part in fewer pieces with reduced joints improves strength-to-weight properties
- Consistent profiles of varying cross-sections along part length
- Value engineering enabled section thickness reduction, thus lower mass
- Enhanced end vehicle fuel efficiency
- Produced in 9 stages instead of 16 (44% reduction)
- Both input and final material weight reduced by around 8%, with further potential up to 20%
- No welding
- Part produced in 17% less time
- Per piece cost down by 20%, with potential up to 36%



## Hydroforming for Product Integrity

- Re-engineered multiple stamped welded box-sections into single consolidated part
- Boost in dimensional stability and part rigidity
- Reduction in manufacturing operations, handling and tools (from 10 to 6 stages)
- Savings in material of 56% (raw material) and 36% (final product)
- 50% cycle time improvement with 20% part cost reduction



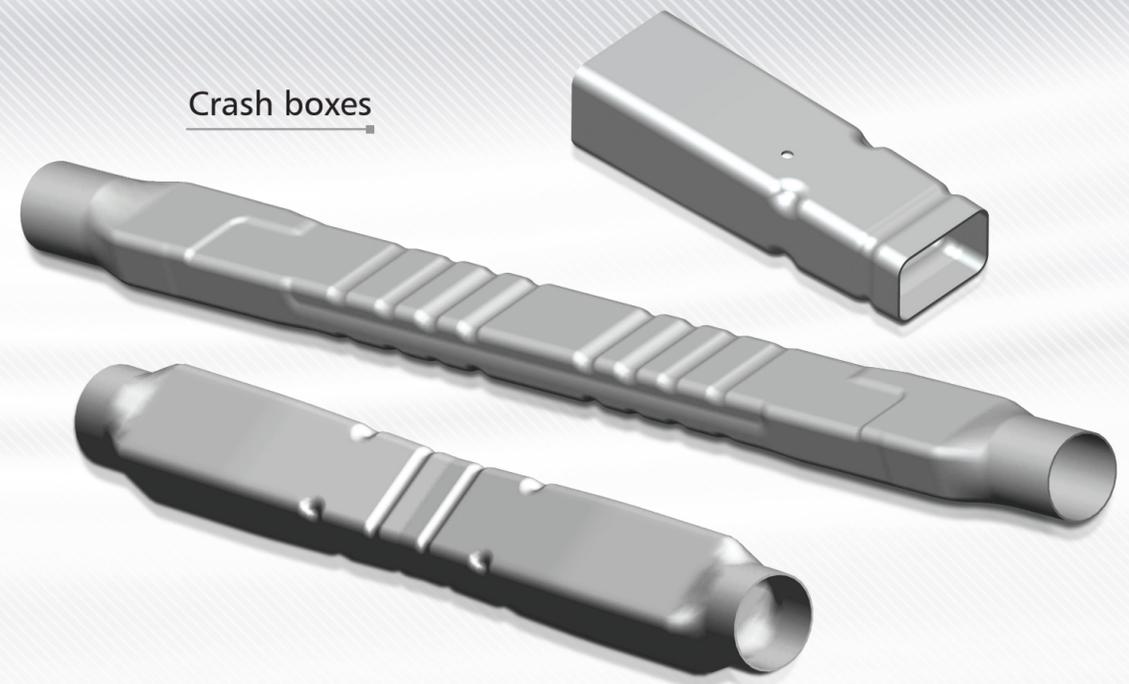
## Hot Forming for a Synergy of Strong and Light

- Complex geometry, high strength and low weight- all achieved in one part in one operation
- Around 50% weight reduction from conventional part
- Side impact strength significantly improved
- 1<sup>st</sup> time indigenously in India





Fender stiffeners



Crash boxes



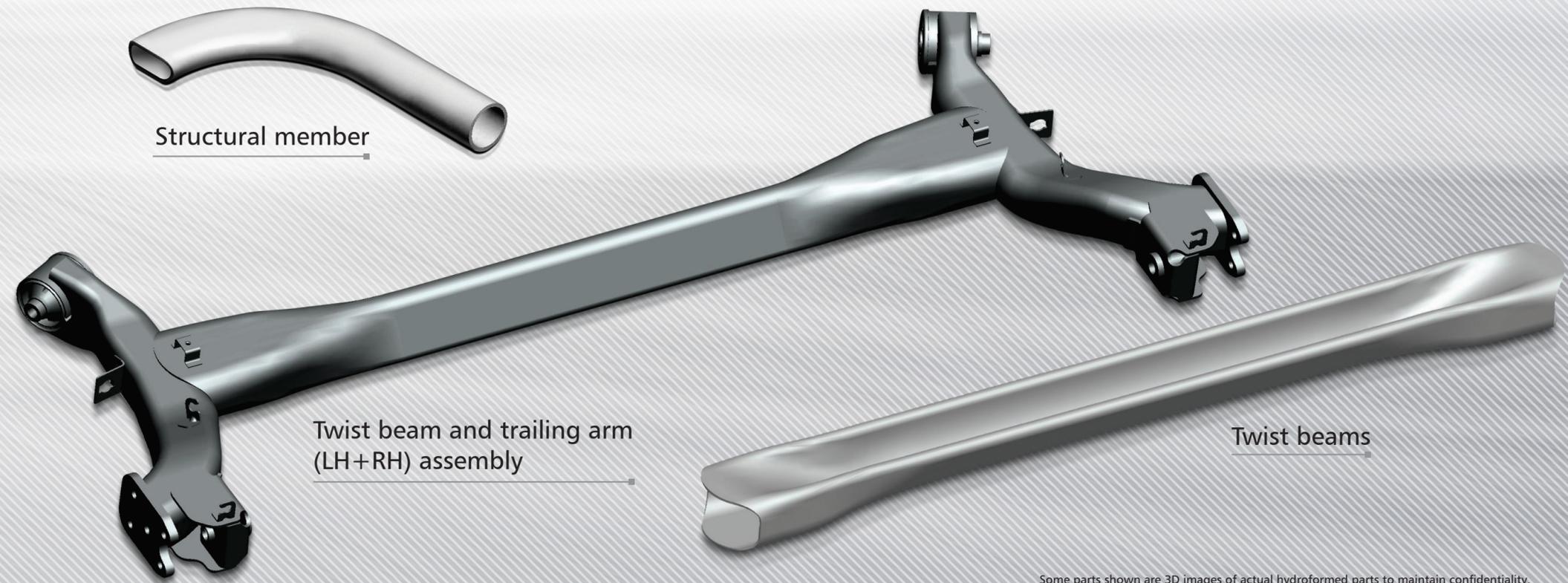
Rear axle trailing arms



Chassis cross members



Structural member



Twist beam and trailing arm (LH+RH) assembly

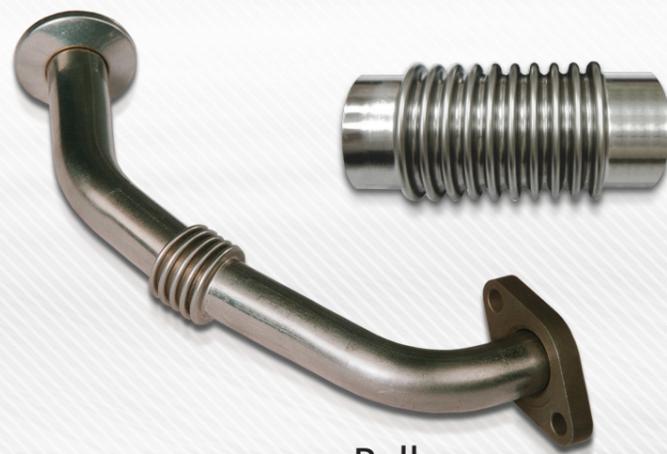
Twist beams



Sanitary fittings



Steering columns



Bellows



Diffusors



Handle bars

Some parts shown are 3D images of actual hydroformed parts to maintain confidentiality.

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