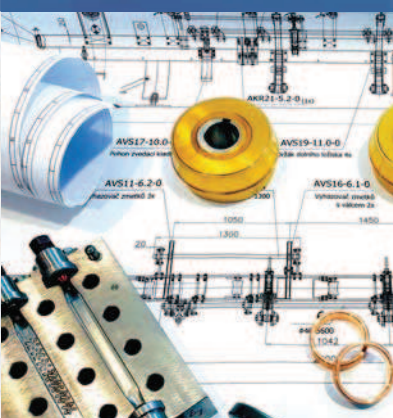


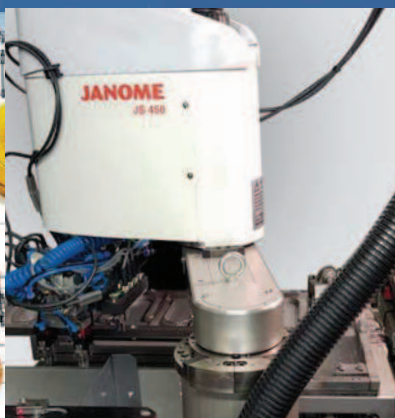
PRODUCTION FOR AUTOMOTIVE INDUSTRY



We provide a complex solution in the field of production of longitudinally welded stainless steel tubes and profiles for the automotive industry. With our own resources, we manage the whole process, ranging from structural technology development and construction of production mills and machines to mass production and shipment of the final products. We supply production support and service of realized projects. Currently we specialize in production of components for EGR heat exchangers.



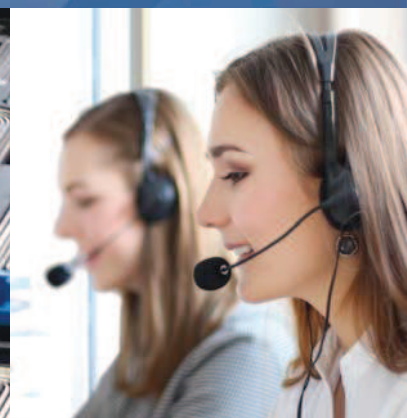
Development of technologies for component production



Production of mills and machines for component manufacturing



Serial production of automotive components



Production support and service



LONGITUDINALLY LASER WELDED STAINLESS STEEL TUBES FOR EGR COOLERS

EGR coolers

The EGR (Exhaust Gas Recirculation) cooler is a heat exchanger located in the engine compartment whose function is to recycle part of the exhaust gas and re-inject it into the intake manifold of the engine. This mixture leads to lower combustion temperature and less oxygen excess, resulting in a reduction of NOx emissions.

Our Products

Attl provides stainless steel EGR Cooler gas tubes produced on our own developed mills and machines. We produce components for both low pressure and high pressure EGR coolers:

- » various grades from ferritic to austenitic materials,
- » various designs such as smooth, corrugated, flat, oval dimpled and bended tubes.

Our Solutions

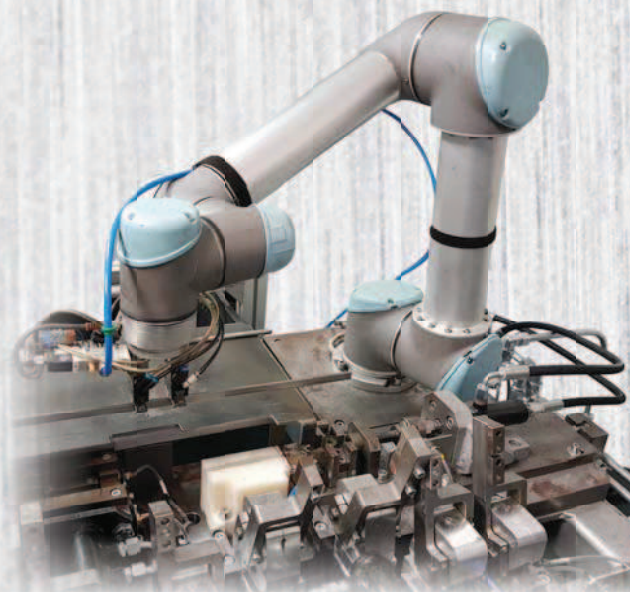
For the automotive segment, we produce custom-made mills and machines, which are proven by their long-standing experience in developing and manufacturing these technologies and their operation in automotive industry by Attl company



Attl S2 Laser Welding Mill for longitudinally laser welded thin-walled stainless steel tubes

We provide finishing operation solutions for EGR heat exchanger tubes such as:

- » Cutting high-cadence tubes for further operations
- » Robotic expansion of ends
- » Bending of tubes using automatic machines for serial production
- » Hydroforming for forming spiral and dimpled tubes (up to 2000 bar)
- » Automatic straightening of tubes to ensure the horizontal and vertical straightness with an accuracy of ± 0.04 mm.



Robotic expansion of tube ends



APPLICATIONS FOR THE EGR COOLER GAS TUBES



Attll supplies both LP and HP EGR cooler technologies and is able to produce tubes according to the technology designed and selected by automotive equipment manufacturers.

Straight round tubes (bypass)

Custom production of tubes of various shapes and sizes, responding to the individual requirements of our customers. All products meet standardized automotive parameters and are validated according to international PPAP processes. We are able to supply these products in a wide range of shapes, sizes and lengths.

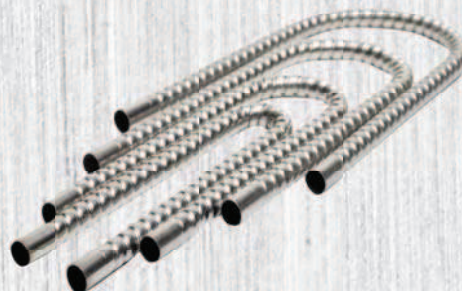


Straight spiral (corrugated) tubes

A great advantage of our products is high variability in shape of spirals or dimples, which we are able to flexibly adapt to the needs of customers. Our Production Development is able to independently develop our products, including the delivery of 3D models. We are able to supply these products in a wide range of sizes and lengths.

Spiral tubes in U-shape

Model series of products which combines excellent price and operational efficiency. This type of product is used in engines with moderate environmental loads. We are one of the few companies in the EU and in the world who offers tubes in a spiral U-tube design.



Oval dimpled tubes in I-shape

Extremely cost effective product type used in engines with lower environmental loads. A great advantage of our products is the high variability of dimples, which we are able to adapt according to customer requirements. We are able to deliver products of this model series in a wide range of dimensions and lengths, reflecting the latest trends in the automotive section.

Oval dimpled tubes in U-shape or S-shape

Model series of products with exceptional operational efficiency. This type of product is used in engines with high ecological loads. We are one of the few companies in the EU and in the world who produces tubes in a oval dimpled S-tube design.



All types of these tubes can be sampled and supplied in small series including a feasibility analysis of the final serial product according to customer request.



SPECIALIST IN LONGITUDINAL LASER WELDING OF THIN-WALLED STAINLESS STEEL TUBES



Attl is a specialist in longitudinal laser welding of thin-walled stainless steel pipes, particularly suitable for the automotive industry. New-generation production lines developed by the company are able to produce stainless steel tubes and profiles of austenitic and ferritic steels, longitudinally welded with fiber laser in the range of $\varnothing 2$ to 16mm; $6 \div 28$ mm; $16 \div 32$ mm in wall thicknesses from $0.12 \div 1.4$ mm in diameter. Completely new know-how is applied to the welding node in particular by measuring edge pressure before welding, welding temperature and edge position registration prior to welding, including geometry of the nominal cross-section of the pipe after welding.

Characteristics of entry material:

Material according to EN/AISI: 1.4301/304; 1.4306/304L; 1.4436/316

Strip width	$10 \div 100$	mm
Strip thickness	$0.15 \div 1.0$	mm
Breaking limit R_m max.	670	MPa
Yield point R_e max.	320	MPa
Ductility A_{80} min.	50	%

Sample range of products:

All profiles and tubes according to DIN 17 457, DIN 11 850.

Tube diameter (mm)	Square profile (mm)	Wall thickness (mm)	Rectangle (mm)	Wall thickness (mm)
$3 \div 10$		$0.2 \div 0.6$		
12	10×10	$0.2 \div 0.8$	15×5	$0.2 \div 0.8$
16	12×12	$0.3 \div 1.0$	15×10	$0.3 \div 1.0$
20	15×15		20×10	
$24; 25; 28$	22×22		20×15	



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Attl a spol. Ltd. is a steadfast, prosperous company in the field of product development and construction of rolling and profiling mills for the production of open and welded thin-walled profiles. A separate, yet significant, division of our company is the production of parts for the automotive industry. Our company motto is to go our own way of constructing products with an emphasis on the quality of the final result.

EGR cooler tubes are produced in our plant located in Sibřina, near Prague, where we have established a dedicated logistics organization with local warehouses to ensure "time" delivery for demanding customers.

