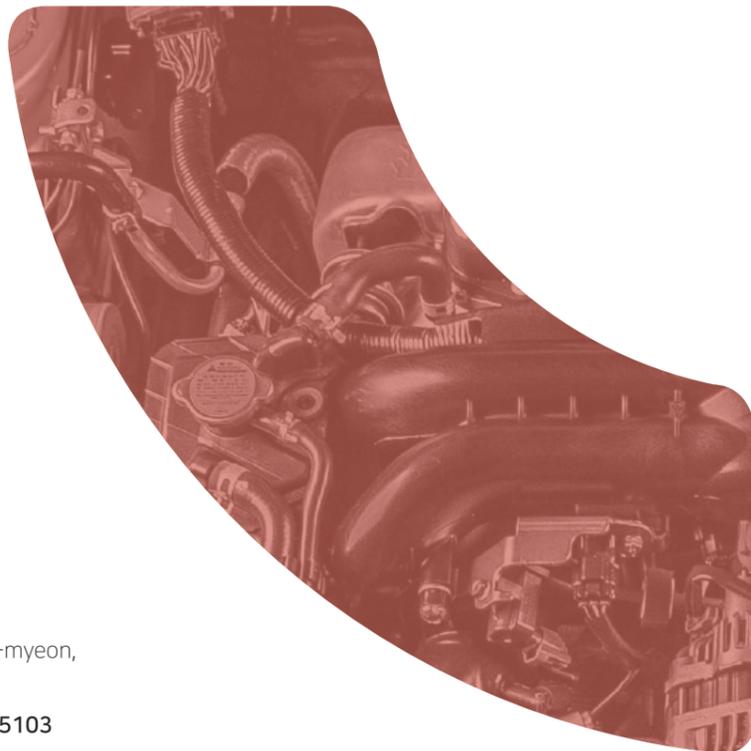


A little makes a lot



**ALL ABOUT
WHEEL
CORPORATION**
Ferrule · Muffler · Tube



Head Office : 627, Jangyoungsil-ro, Yeongin-myeon,
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www.wheelcorp.co.kr





WHEEL CORPORATION

Responding to technology needs
 Implementing our technology throughout the global market
 Outstanding advantages and improvements
 Going further with new future products



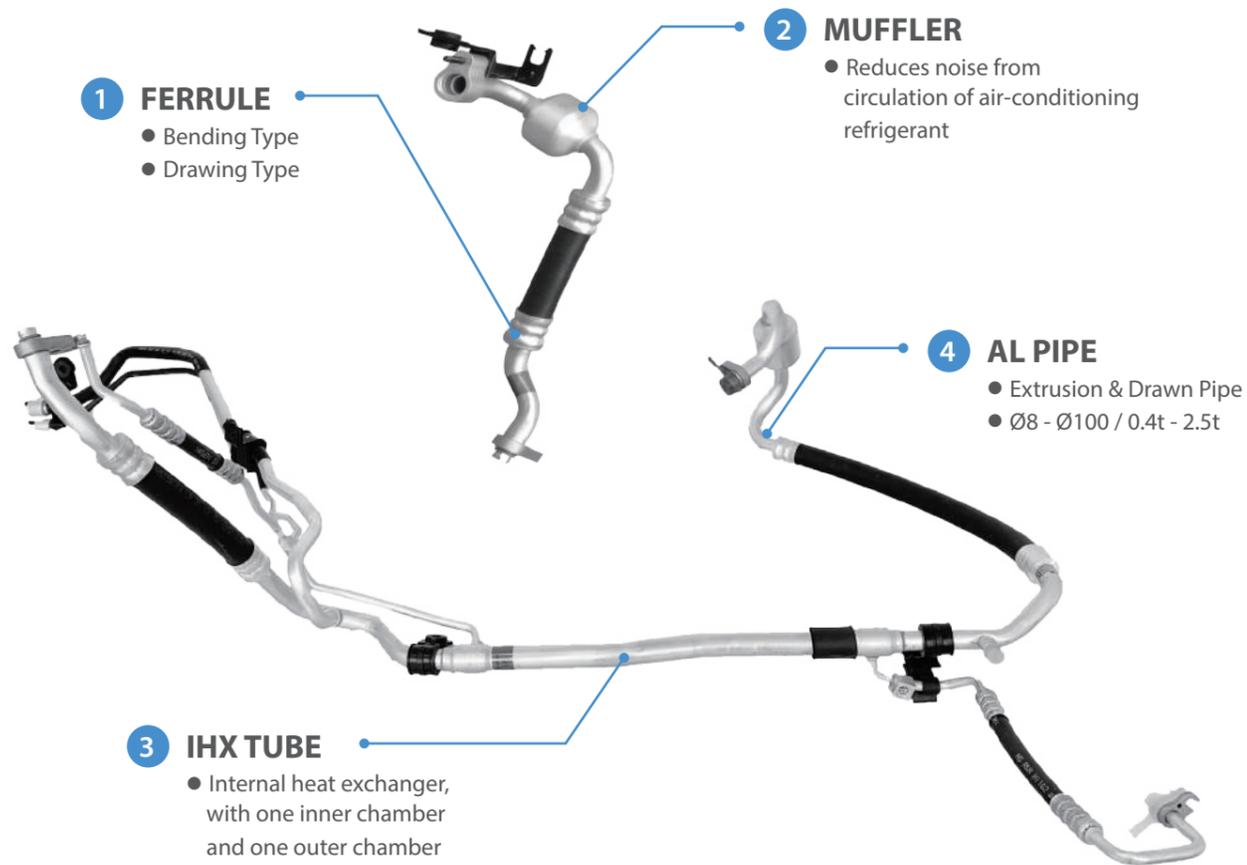
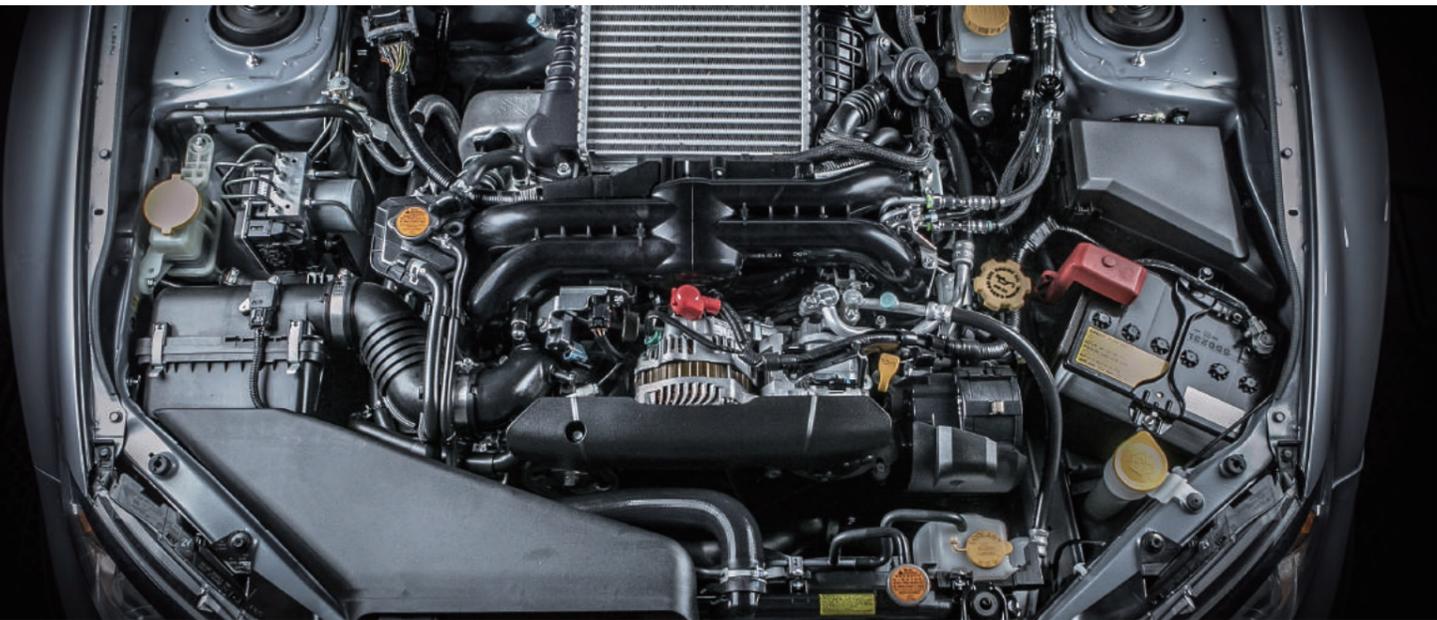
To make products and materials that contribute to a more efficient and sustainable automotive industry is the objective that we pursue as we have been supplying to important worldwide customers. We always look ahead, beyond our current production goods, through innovative thinking and new technologies like Brazeless Mufflers, High Corrosion-Resisting aluminum materials and so on. Join us to be a business partner with the small but strong global manufacturer!



COMPANY HISTORY

| | |
|----------|--|
| 2000. 07 | Establishment of Wheel Corp. |
| 2004. 09 | Granted patent for Ferrule production technology |
| 2005. 05 | Relocated to larger facility (Hwasung) |
| 2006. 09 | Granted patent for Muffler production technology |
| 2009. 02 | Acquired TS16949 Certificate |
| 2009. 06 | Granted patent for Brazeless Muffler production technology |
| 2010. 06 | Relocated to larger facility (Asan) |
| 2010. 07 | Acquired ISO14001 Certificate |
| 2013. 04 | Granted patent for Spiral IHX Tube extrusion |
| 2017. 12 | Establishment of 2nd Plant (Hwasung) |
| 2018. 08 | Acquired IATF16949 Certificate |
| 2019. 12 | Achieved 30 billion KRW(USD 25 million) in annual turnover |

SYSTEM DIAGRAM

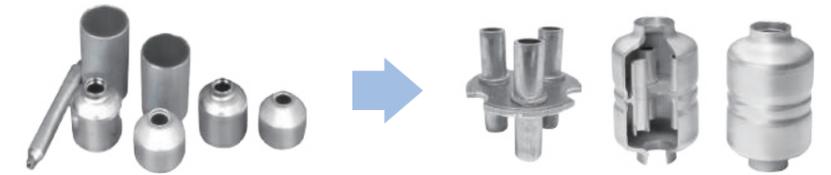


NEW & INNOVATIVE PRODUCTS

WHEEL's technology is more innovative than conventional types.

Universal Muffler

Development in Progress

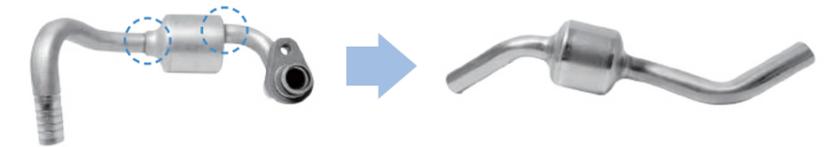


Advantages

- Small but better performance
- Light weight
- Can replace larger or multiple mufflers into one Universal Muffler

Blazeless Muffler

Development in Progress



Advantages

- No need to be brazed
- Reduce cost (Labor, Leek test etc)
- Reduce defective rate

IHX Tube

Conventional Type



Wheel Type



Advantages

- Avoid patent dispute
- Similar performance



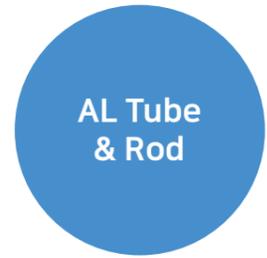
MANUFACTURING PROCESS FOR ALUMINUM EXTRUDED MATERIAL



AL Ingot

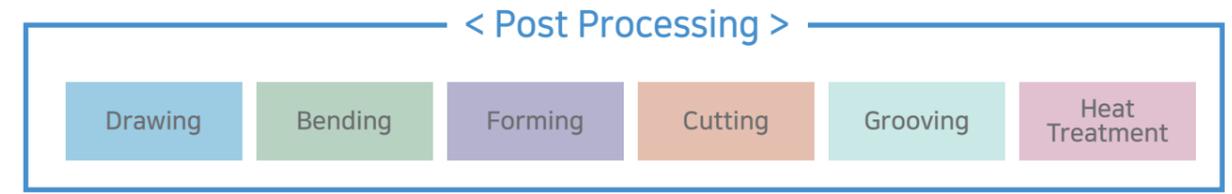


AL Extrusion



AL Tube & Rod

| In-house Facility | | | |
|---------------------------|--------------------------|----------|-------------------------|
| Name | Monthly Capacity | Quantity | Note |
| Extrusion machine | 400ton | 2 | 1600ton, 2000ton |
| Plugged-drawing machine | 200ton | 1 | - |
| Skin-pass drawing machine | 150ton | 1 | - |
| Heat treatment equipment | 100ton | 2 | Tower |
| Press machine | Up to 30 Million units | 25 | For Ferrule |
| Press machine | Up to 10 Million units | 8 | For Muffler |
| Automated Beading machine | Up to 400 Thousand | 2 | *Self designed & making |
| IHX machine | Up to 300 Thousand units | 3 set | *Self designed & making |
| Cutting machine | Up to 800 Thousand units | 2 | For Tubes |
| Special cutting machine | Up to 1 Million units | 10 | For Ferrules |
| Bending machine | Up to 10 Thousand units | 1 | Long size tube |
| End-forming machine | Up to 10 Thousand units | 2 | - |
| Grooving machine | Up to 300 Thousand units | 2 | - |
| Leak test machine | Up to 20 Thousand units | 1 | - |



AL Tube



Cutting



Bending



Heat treatment (if needed)



Beading



AL Coil



Forming



End Cutting



Grooving



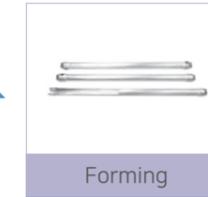
Machining



Deep Drawing



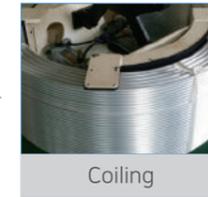
Rib Cutting



Forming



Drawing



Coiling



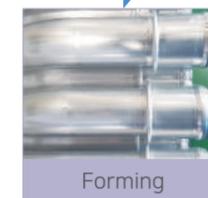
AL Rod & Hollow



Impact



Forming



Forming



Bending



AL Shape



Surface treatment



FERRULE

Deep Drawing Type

Using Aluminum Plate as its raw material
Progressive stamping from material to products at once



FERRULE

Pipe Based Type

Using Aluminum Pipe as its raw material
Fully automatic operation from pipe cutting to bending



Production Process



| | |
|--------------------------|--|
| Pros. | <ul style="list-style-type: none"> - High production speed - High available for material usage (A3000, A5000 and SPCC, STS400 series) - Flexibility for product design range |
| Wheel's Advantage | <ul style="list-style-type: none"> - Minimizing the loss of material (Own Tooling Technic) - Huge capacity with 15 press machine - Free tooling cost if Wheel owned (Wheel holds more than 50 tools itself) |

| Drawing Mandrel Bush Coupling | | | |
|-------------------------------|----------------|-----------|--------|
| Raw Material | Outer Diameter | Thickness | Length |
| A1050,1070 | Ø7~40 | T0.2~2.2 | 5~45mm |
| A3003 | | | |
| A5052,5005 | | | |
| SUS304,430 | | | |
| SPCE | | | |

Production Process



| | |
|--------------------------|---|
| Pros. | <ul style="list-style-type: none"> - Unique production method in the world - High production speed - No loss of material, relatively low cost (World best level, 20% of Global Market share) |
| Wheel's Advantage | <ul style="list-style-type: none"> - Using in-house pipe, controllable for law material quality (with In-house AL extrusion process) - Huge enough capacity with 20 press machine - Free tooling cost if Wheel owned |

| Ferrule Shell Double O-ring Ferrule | | | | |
|-------------------------------------|----------------|-------------------------------------|-----------|---------|
| Raw Material | Outer Diameter | Thickness of AL pipe inserting area | Thickness | Length |
| A1070 A3003 A6063 | Ø13~36 | 1.0~3.0t | 1.2~2.0t | 20~45mm |

MUFFLER

Pipe Based Type



Production Process



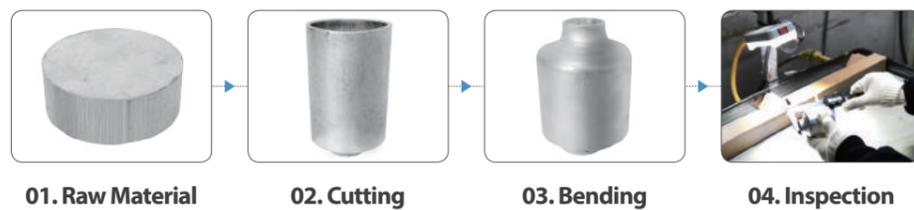
| Muffler (Pipe Type) | | | | |
|---------------------|----------------|------------------------------|-----------|----------|
| Raw Material | Outer Diameter | ID of AL pipe inserting area | Thickness | Length |
| A3003 | Ø20~70 | Ø9.0~34 | 1.6~4.0t | 30~110mm |
| A6061, 6063 | | | | |



MUFFLER

Forging Type

Production Process



| Muffler (Forging Type) | | | | |
|------------------------|----------------|------------------------------|-----------|----------|
| Raw Material | Outer Diameter | ID of AL pipe inserting area | Thickness | Length |
| A3003 | Ø20~70 | Ø9.0~34.0 | 1.6~4.0t | 30~110mm |
| A6061, 6063 | | | | |
| A6082 | | | | |

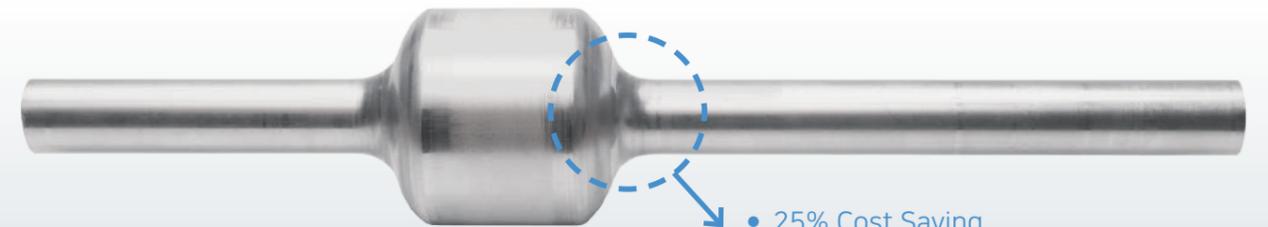
MUFFLER

Brazeless Muffler



Shrinking, Drawing

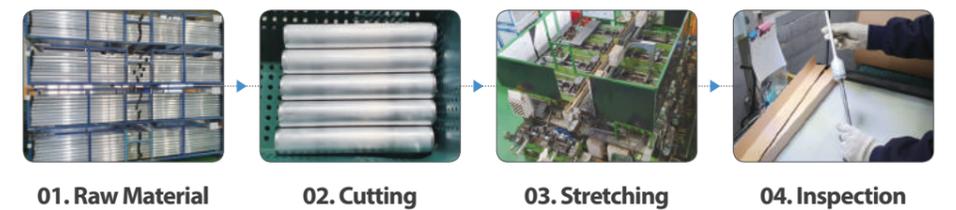
The brazeless muffler is produced mainly by shrinking and drawing process



- 25% Cost Saving
- Muffler, AL pipe in one piece



Brazeless Type Process



| Brazeless Muffler | | | | | |
|-------------------|-----------|---------|----------------|-----------|--------------------------------|
| Muffler Section | | | Pipe Section | | |
| Outer Diameter | Thickness | Length | Outer Diameter | Thickness | Length |
| Ø35~54 | 1.8~2.5t | 20~50mm | Ø1.8~2.5 | 1.5~2.5t | Max 230mm (per each pipe side) |

IHX TUBE

Straight type



Spiral type



Flat & Flare type



Production Process



| IHX Tube | | | | |
|----------------|--------------|--------------|----------------|---|
| Material | Out-Diameter | Spiral Pitch | Number of Ribs | Option |
| A3003 A3031 | Ø21~25 | 400~800 | ~12 | Flared End Flat Weldy Section Crushing Fins |

ALUMINUM PIPE

Wheel's Advantages



- (1) Unique technology 'spiral-extrusion'
- (2) High-levelled Quality through rigorous material processing experience
- (3) Real-time data collection & analysis
- (4) Automated machining
- (5) In-house heat-treatment function

| Extrusion (Pipe) | Mass Production | | | Feasible | |
|------------------|-------------------------|----------------|-----------|--------------------------|---------------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) |
| | A3003 A3103 A6061 | Ø8.5~54 | 0.5~3t | Ø8~120 | 0.5 ~ 8t |

| Extrusion (Rod) | Mass Production | | | Feasible | |
|-----------------|-------------------------|----------------|-----------|--------------------------|---------------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) |
| | A6061 A6063 A6020 | Ø30~54 | - | Ø10~60 | - |

| Extrusion (Shape) | Mass Production | | | Feasible | |
|-------------------|-----------------|----------------|-----------|--------------------------|---------------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) |
| | A6063 | - | - | A6061 | - |

| AL pipe (Sink-pass Drawing) | Mass Production | | | Feasible | | |
|-----------------------------|-----------------|----------------|-----------|--------------------------|---------------------|-------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) | Note |
| | A3003 A3103 | Ø7~19.05 | 0.7~1.6t | Ø6.35~19.05 | 0.6~1.6t | Coiled tube |

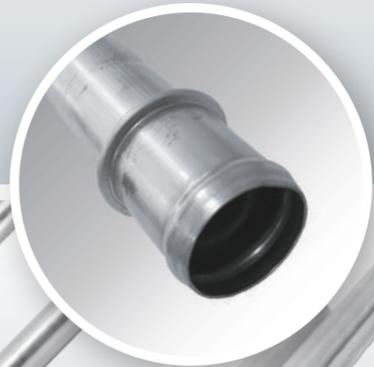
| AL pipe (Plug Drawing) | Mass Production | | | Feasible | |
|------------------------|-----------------|----------------|-----------|--------------------------|---------------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) |
| | A3003 A3103 | Ø15~35 | 0.4~2t | Ø15~40 | 0.4~2.5t |

| AL pipe (End-forming) | Mass Production | | | Feasible | |
|-----------------------|-----------------|----------------|-----------|--------------------------|---------------------|
| | Material | Outer Diameter | Thickness | Outer Diameter (Min~Max) | Thickness (Min~Max) |
| | A3003 A3103 | Ø9~19.05 | 1.2~1.6t | Ø8~19.05 | 1~1.6t |

ALUMINUM PIPE PRODUCTS / COOLANT TUBE



These tubes are used to carry automotive engine coolant between the engine and radiator



References of AL pipe extrusion (~2020)

| Material | A10XX series | A30XX series | A60XX series |
|------------------------|----------------------|---------------------|-------------------------------|
| Min. Out Diameter | 10mm | 6mm | 7mm |
| Max. Out Diameter | 54mm | 70mm | 80mm |
| Length | ~1900mm | ~1900mm | ~1900mm |
| Thickness | 0.8~2.0mm | 0.4~2.0mm | 0.8~6.5mm |
| Major Applied | HVAC Steering system | HVAC Cooling module | HVAC Steering, Thermal system |
| Commonly used material | A1070 | A3103 A3003 | A6061 A6063 A6020 |

CUSTOMERS LIST / CERTIFICATES

Customers List



Certificates

