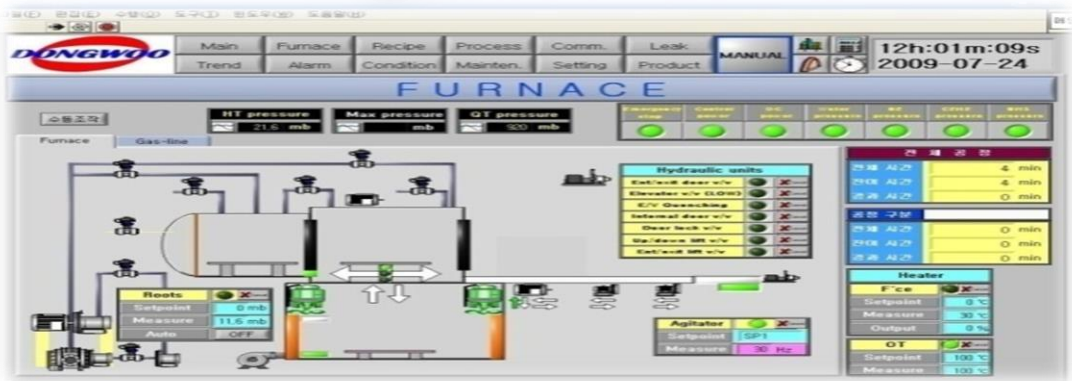
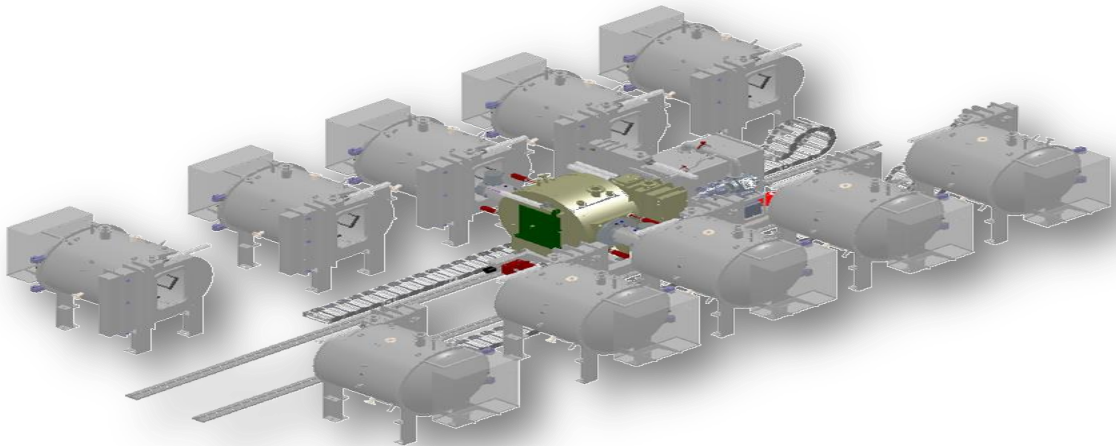




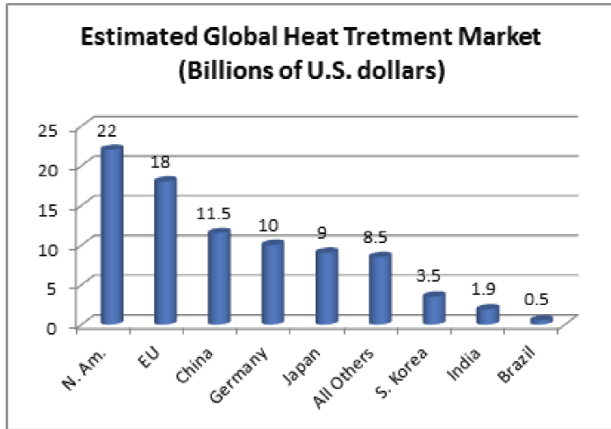
# Double Track Type Vacuum Carburizing Furnaces



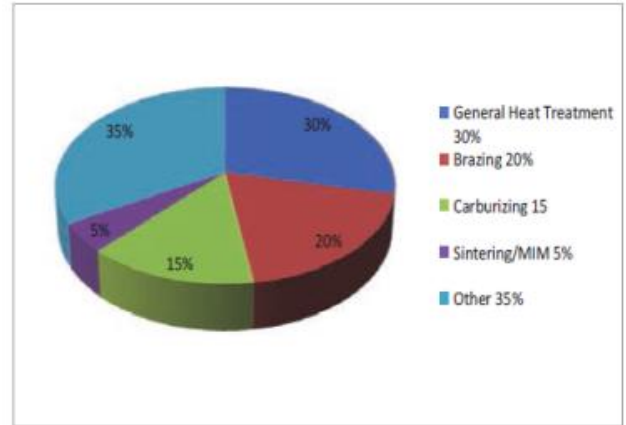
VC-2017 V 3.0

# Vacuum Carburizing Technologies

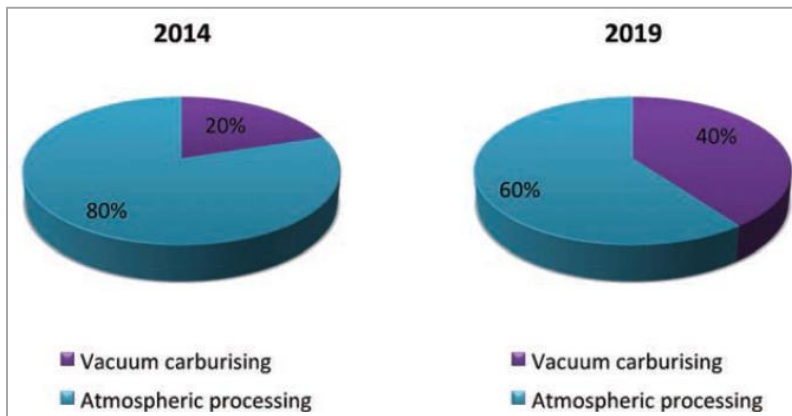
## ● Global Heat Treatment Market



## ● Vacuum Sales (2015, ASM USA)



## ● Automotive Transmission – Carburizing



- Vacuum carburizing continues to gain market share due to its reduced process time and more environmentally-friendly technology.
- Vacuum carburizing has gained a significant market share for the new generation of transmissions such as dual clutch (DCT) and six- and eight-speed automated transmissions

### ■ Advantages of Vacuum Carburizing

- Uniform case depth
- Surface free from intergranular oxidation and surface oxidations
- Environmentally friendly process .
- No fire /flame hazards.
- Shorter process cycle time thus lower production costs.
- Better control on distortion
- Faster start-ups and shutdowns with no furnace idling over the weekends
- No endothermic gas generators required
- Gas quench furnaces require less floor space and no post-washing to remove quench oils
- Enhancing Energy efficiency.

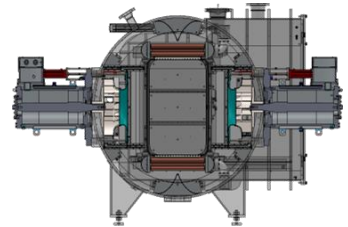
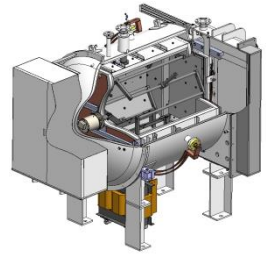
### ■ Disadvantages of Vacuum Carburizing

- Higher initial equipment cost.
- Formation of soot & tar due to pressure and Hydrogen gas introduced.

# Double Track Type Vacuum Carburizing Hardware

## ● Specification

- Composition. Heating chamber 6~10 + Transfer Cell 1 + Quenching cell 1
- Capacity. 600kg. Gloss charge. (W600\*H750\*L1000)
- Temperature. Max. 1100 °C, ± 5 °C / Graphite
- Vacuum Pressure. Max.  $\leq 5 \times 10^{-2}$  mbar, control 5~20mbar
- Gas. Max. 10 m<sup>3</sup>/hr C<sub>2</sub>H<sub>2</sub>, N<sub>2</sub>, NH<sub>3</sub>(optional)
- Heating chamber. Convection heating system, Graphite insulation
- Transfer device. In-Out type Telescopic Fork , Turn Table
- Quenching type. Max. 20 bar high pressure gas (N<sub>2</sub> or He)
- Optional utility. He Recycling system (optional) : 200 m<sup>3</sup>/hr



### ● QUENCHING CELL

- ASME SEC. VIII Div. 1, 2010 Edition
- Vacuum :  $< 5 \times 10^{-2}$  mbar
- Vacuum pump : 280 m<sup>3</sup>/hr (rotary vane)  
2,000 m<sup>3</sup>/hr (Roots)
- Max. 20 bar<sub>abs</sub>
- Cooling Fan
- Heat exchanger
- Fan Motor

### ● TRANSFER CHAMBER

- Water-cooled housing
- Vacuum :  $< 5 \times 10^{-2}$  mbar
- Vacuum pump : 280 m<sup>3</sup> (rotary vane)  
2,000 m<sup>3</sup> (Roots)
- Telescopic fork : Max. 800 Kg
- Turn Table (Slewing bearing)

- External Dimension (W x L x H mm) :  
13,000 x 18,000 x 4,500

### ● TREATMENT CHAMBER

- Water-cooled housing
- Vacuum :  $< 5 \times 10^{-2}$  mbar
- Vacuum pump : 250 m<sup>3</sup> (rotary piston)  
2,000 m<sup>3</sup> (Roots)
- Working Temperature : Max. 1,100 °C
- Temperature uniformity : ± 5 °C 이내
- Graphite felt + ceramic felt Insulation
- Graphite Heater : 180 Kwh
- Convection Fan

