Retort Tempering
Vacuum Purged Furnaces
VTR series

- Bright tempering
- Stress Relieving
- Protective Atmosphere Annealing
- Available Option – Gas nitriding type ZeroFlow® including nitrocarburizing
- Pre- and Post-oxidation

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Advantages of VTR furnaces:

- Shorter cycles, increased production output and precise process control.
- Horizontal loading (vertical loading available optionally).
- Electric (E) or gas (G) heating.
- Compact design, simple installation, fast start up and easy maintenance.
- Smart-sized low mass retort for fast heating, cooling and optimized energy consumption.
- Temperature uniformity better than ±5°C (or ±3°C) according to AMS 2750D; meet SAT and TUS requirements.
- Door closing system with a clamping ring and lip seal prolongs the service life of the door lip seal.

- Short evacuation time to purging vacuum level $10^{-1}$ or $10^{-2}$ mbar.
- Standard external forced cooling system with cooling air flow over the retort surface.
- Optional internal forced cooling system to improve and reduce cooling cycle.
- Optional configuration – furnace with two cooling systems for higher cooling efficiency with a minimum requirements of installation area.
- Furnaces meet both European and North American standards.
Option – gas nitriding ZeroFlow®
invented by prof. L. Małdziński

- New gas nitriding technology provides alternative to the current industry standard.
- High precision of the nitrided layer formation attained with precise control of atmosphere.
- Process control by ammonia proportioning and flow stopping (ZeroFlow®).
- Option – nitrocarburizing and post-oxidation.
- Low consumption of process gases and low emission of exhaust gases (significantly lower than in traditional processes).
- Quick and accurate on-line reporting of atmosphere composition in a closed system; no complex sampling system.
- Simplified gas system.
- Low capital costs.
- ZeroFlow® simulation software.

Control system advantages

- Fully automated furnace operation controlled by PLC (Programmable Logic Controller) and IPC (Industrial PC-class computer).
- LCD touch screen visually displays all technological parameters of heat treatment processes.
- Large capacity of a hard disc (HDD) recording of unlimited number of recipes. It eliminates errors resulting from creating new recipes by a furnace operator.
- All process data are recorded, and can be displayed as a diagrams on a separate screen or saved on HDD or a CD.
- Export of historical data and alarm messages to external system for further analysis (e.g. to *.csv files).
- Easy integration with any database.
- The furnace is equipped with the internal Ethernet network; remote furnace service is available through Internet or modem connection using dedicated software.
- Optionally the control system can be equipped with advanced batch reporting and history analyzing software which can present data using templates for standard MS Office applications, such as Word and Excel.
- A separate diagnostic screen reminds about maintenance requirements of individual components of the furnace.
## Technical data

- **Electric (E) or gas (G) heating.**

<table>
<thead>
<tr>
<th></th>
<th>VTR 4035/36</th>
<th>VTR 4050/48</th>
<th>VTR 4056/60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform zone (WxHxL)</td>
<td>mm</td>
<td>600x600x900</td>
<td>900x800x1200</td>
</tr>
<tr>
<td>Max. load</td>
<td>kg</td>
<td>600</td>
<td>1500</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>ºC</td>
<td></td>
<td>150-750</td>
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<tr>
<td>Temperature uniformity</td>
<td>ºC</td>
<td></td>
<td>± 5</td>
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<tr>
<td>Heating power</td>
<td>kW</td>
<td>90</td>
<td>150/240</td>
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<tr>
<td>Cooling gas pressure</td>
<td>bar abs.</td>
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</tbody>
</table>

*Other sizes and parameters available on request*