Founded in 1999 by Fred Otto, Midwest Thermal-Vac has become a leader in vacuum carburizing for the Aerospace, Motor sports, and Commercial Industries with multiple quenching capabilities to handle just about any commercial material.

Midwest Thermal-Vac has also successfully demonstrated consistent repeatability of predictable results for new materials such as:

- Aubert & Duvall X12 VDW and XD15NW
- Questek In. Ferrium C61, CS62, S53, C69 & M60S
- Timken Company’s CSS-42L, CSB-50NIL, CBS-600 and BG42VIM
- CarTech AerMet 100
- Teledyne Corp. VascoMax C-250, 300 and 350

By taking advantage of the newest technology available today, Midwest Thermal-Vac is able to effectively provide it’s customers the opportunity to utilize the latest streamlined manufacturing process improvements within the industry. This has been shown to yield increased quality in the heat treatment process and a decrease in overall production costs.
Currently Midwest Thermal-Vac has a 4 cell ICBP furnace with internal oil quench and 22 bar Gas Quench capabilities
Midwest Thermal-Vac has a horizontal single cell low vacuum furnace with high pressure gas quench capabilities.
Midwest Thermal-Vac has a horizontal single cell low vacuum tempering furnace.
Midwest Thermal-Vac has a full on-site Laboratory for complete heat treating analysis.
HORIZONTAL INSTALLATION
TYPE ICBPH TG
<table>
<thead>
<tr>
<th>Cold Wall Vacuum Furnaces Graphite Thermal Chamber</th>
<th>Temperature range</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>800 ~ 1200 °C</td>
<td>ARRAY of GAS INJECTORS around the LOAD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gas Injection 5 to 15 mbars</th>
<th>Gas Phases</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propylene</td>
<td>800 ~ 1200 °C</td>
<td>ALTERNATE INJECTION of the 2 GAS (CARBURIZING / DIFFUSION phases)</td>
</tr>
</tbody>
</table>
BOOST AND DIFFUSE PROCESS OF CARBURIZATION

OBTENTION OF CARBON PROFILE

- Start of carburizing
- Enrichment phases
- Diffusion
- End of carburizing

Time

%C

Enrichment
Diffusion

%C

Time
PURE NITROGEN up to 22 mbars abs.

The performances of these cells under pure N2 permits a more uniform quenching and specified CORE HARDNESS in aerospace and automotive Industry applications:

A. BENEFITS:

- **LOWE R DISTORSION LEVEL** on the PARTS

  **MORE IMPORTANTLY:**
  - **NARROW DISPERSIONS /REDUCED TOLERANCES**
    - Part to part
    - Batch to batch

- **VERY NICE COSMETIC ASPECT** of the PARTS:
  - “Bright SILVER” color after heat treatment

CONSEQUENCES:

- **REDUCED GRINDING** → **COST SAVING**
- **PROCESS SIMPLIFIED** → **NO WASHING AFTER H.T.**
A. BETTER OVERALL QUALITY

- Metallurgical quality.
- Less distortion with gas quenching and better reproducibility
- Nice cosmetic aspect of the parts: SILVER color.
- Perfect reproducibility of the treatment.
- Precise quality control through computer supervision.

B. ENHANCED PRODUCTION FLOW AND LOGISTICS

C. MORE FLEXIBILITY

D. ENHANCED PRODUCTIVITY
METALLURGICAL QUALITIES

- ABSENCE OF INTERGRANULAR OXIDATION
- HARDNESS DROP NOT OBSERVED
- LESS PITTING
- GRINDING OF CEMENTED LAYER USELESS
- NO SCALE, NO SOOT, NO OXIDATION
- PERFECT CONTROL OF CASE DEPTH
  - ± 5/100 mm due to very short transition periods (5 sec.) between C/D phases
- NO GRAIN GROWTH OBSERVED at HIGH TEMPERATURE (till 1000 °C)
  - due to FAST CYCLE
- PROTECTION OF CERTAIN AREAS AGAINST CARBURIZING IS POSSIBLE
  - METALLIC SHUTTERS
- STOP OFF PAINT
  - DEFORMATION
    - In many cases, it has been shown and proved that the "INFRACARB" process plus gas quenching have reduced deformations drastically compared to conventional carburizing and oil quenching.