

HEAT TREATING PROCESSES AND EQUIPMENT

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Learning made Simple, Visual, and Interactive

Heat Treating Processes and Equipment provides application-based knowledge for some of the most common heat treating procedures and equipment used in modern manufacturing. This course begins with introductory concepts and terminology associated with heat treating, and then delves further to highlight practical, application-based tips and approaches that are designed to improve the performance and efficiency of heat treating operators and specialists. The content provided in this course is presented in the typical THORS format: searchable, highly visual, and interactive-based learning. This course includes all of the material covered in the THORS Heat Treating Basics course.

Credit Hours **2.5**

Learning Objectives

- Understand the basic purposes of heat treating.
- Recall the basic purpose and configuration of heat treating graphs.
- Recognize the difference between the broad processes of conditioning and hardening.
- Understand the various methods of thermo-chemical surface hardening.
- Be able to differentiate between common furnaces and heat treating equipment.
- Demonstrate an understanding of the best practices for heat treating.

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I. Graphical Tools

- Phase Diagrams
- Transformation Diagrams
 - o Time-Temperature Transformation (TTT) Diagrams
 - o Continuous Cooling Transformation (CCT) Diagrams
 - o Transformation Diagrams Example Scenario
- Process Graph Interpretation

II. Heat Treating Processes

- Conditioning Processes
 - o Annealing
 - o Normalizing
 - o Stress Relieving
- Hardening Processes
 - o Through Hardening
 - Neutral Quench Hardening
 - Precipitation Hardening
 - o Surface Hardening
 - Thermal Hardening
 - Thermo-Chemical Hardening

III. Methods and Equipment

- Heat Transfer Methods
- Types of Equipment
 - o Direct-Fired Furnace
 - o Controlled-Atmosphere Furnace
 - o Vacuum Furnace
 - o Salt Bath Furnace
 - o Flame Hardening Equipment
 - o Induction Hardening Equipment
- Best Practices

