SJ Industrial Ovens

Precision Furnaces for Metallurgy and Mechanical Component Enhancement

High-Temperature Uniformity & Traceability

Delivering controlled thermal profiles for critical metal properties.

INDUSTRIAL FURNACES FOR HEAT TREATMENT SERVICES AND COMPONENT MANUFACTURING

The mechanical performance of critical metal components—including gears, springs, and structural parts—relies entirely on precise heat treatment. SJ Industrial Ovens designs and manufactures robust, high-temperature furnaces engineered to deliver the tight temperature uniformity and accurate cycling required to control microstructure, maximize hardness, and improve fatigue life for the heat treatment services India relies on.

CORE APPLICATIONS & MANUFACTURER FOCUS

- Heat Treatment Services India
- Stress Relieving Furnace Job Work
- Gear Manufacturer (Carburizing, Hardening)
- Spring Manufacturer (Tempering, Annealing)
- Tool and Die Hardening
- Automotive Components (Axles, Shafts)
- Welding Pre-heating and Post-Weld Heat Treatment (PWHT)

CRITICAL THERMAL PROCESSES FOR METAL COMPONENTS

1. Hardening (Quenching & Tempering)

Focus: Gears, Bearings, Axles, Structural Steels (4140, 8620, EN Series).

Benefit: Heating metal above its critical temperature followed by rapid cooling (quenching) to form martensite. Tempering then reduces brittleness. Our furnaces ensure precise **Austenitizing** temperatures for maximum hardness and strength.

Temp: 800°C to 1100°C | Equipment: Box Furnaces, Pit Furnaces, Tempering Ovens.

2. Normalizing and Annealing

Focus: Forged components, Welded structures, Spring Wire (Annealing).

Benefit: These processes refine grain size, remove internal stresses from prior forming (forging, casting), and soften the metal for subsequent machining, improving overall ductility and uniformity.

FURNACE ARCHITECTURE & PERFORMANCE

High-Efficiency Heating Elements

Our furnaces utilize robust heating solutions to deliver rapid ramp-up and stable soak times for high-mass metal loads:

- Heating Media: Electric (Kanthal/NiCr elements) or Gas Fired (High-Velocity Burners).
- Insulation: Multi-layered ceramic fiber and fire brick lining for maximum thermal efficiency and low surface temperature.

Temperature Uniformity (TUS)

Achieving required mechanical properties depends on uniformity across the load:

- Precision Control: Multi-zone PID controllers maintain TUS within **±5°C** (or better, process dependent) up to 1200°C.
- Forced Convection: Recirculation fans in Tempering Ovens ensure even heating of tightly packed components like springs.

Temp: 750°C to 950°C | Equipment: Car Bottom Furnaces, Large Batch Furnaces.

SPECIALIZED PROCESS FOCUS: SPRINGS AND GEARS

3. Stress Relieving (Job Work Specialists)

Focus: Welded assemblies (PWHT), Machined castings, Stress Relieving Furnace Job Work parts.

Benefit: Heating to a sub-critical temperature followed by slow cooling to reduce residual internal stresses caused by welding, forming, or machining. This prevents dimensional change or cracking during later processing or in service.

Temp: 400°C to 700°C | Equipment: Large Car Bottom Furnaces, Walk-in Ovens | Key Requirement: Slow, precise cooling control.

4. Case Hardening (Carburizing/Nitriding Prep)

Focus: Gear Manufacturer components, Dies, Pins, and shafts.

Benefit: Heating in preparation for atmosphere treatments (Carburizing, Carbonitriding) to achieve a hard surface layer (case) and a tough core. Furnaces maintain a clean, high-temperature inert or semi-inert atmosphere for precise carbon diffusion control.

Temp: 850°C to 1050°C | Equipment: Sealed Quench Furnaces, Gas Carburizing Furnaces.

5. Spring Manufacturing Tempering

Focus: Helical springs, Torsion bars, Leaf springs (Spring Manufacturer).

Benefit: Low-temperature heat treatment of cold-worked or hardened springs to optimize elastic properties, set permanent shape, and maximize fatigue life. Uniformity is critical to prevent variations in spring stiffness.

Temp: 200°C to 500°C | Equipment: High-Uniformity Tempering Ovens (Forced Air).

TRACEABILITY AND CONTROL SYSTEMS

Quality Assurance & Documentation

Our systems provide the necessary data for audit and quality compliance for Heat Treatment Services India:

- Digital Recorder: Tamper-proof recording of temperature profiles (time, temperature, soak).
- Thermocouple Management: Multiple Type K/N thermocouple inputs for precise load temperature tracking.
- Recipe Management: PLC-based controls for storing and recalling certified heat treatment profiles.

Customization for Load Handling

Built to handle the specific dimensions and weight of industrial components:

- Car Bottom Furnaces: Tracks and motorized car for easy loading and unloading of heavy, large assemblies (e.g., large pressure vessels).
- Pit Furnaces: Vertical loading for long, slender items like shafts and gear blanks, ensuring uniform immersion in the quenching medium.

HEAT TREATMENT EQUIPMENT MATRIX

Furnace / Oven Type	Max Operating Temp	Primary Process Use	Target Industry/Component
Electric/Gas Box Furnace	1200°C	Hardening, Normalizing, Annealing	Tool & Die, Small Gear Manufacturer
Car Bottom Furnace	1000°C	Stress Relieving, Large Batch Normalizing, PWHT	Heat Treatment Services India, Fabrication Job Work
Forced-Air Tempering Oven	650°C	Tempering, Pre-Heating, Spring Stress Relief	Spring Manufacturer, Job Work, Automotive
Pit Furnace (Vertical)	1000°C	Quenching, Hardening of Long Shafts/Rods	Gear Manufacturer, Forging Units

THE SJ INDUSTRIAL OVENS ADVANTAGE

Metallurgical Precision

Our furnaces are designed with high-quality refractory and heating systems to minimize decarburization and maintain atmosphere integrity, crucial for high-strength alloy processing.

Low Cost of Ownership

Robust structural design, high-efficiency insulation, and reliable burners/elements ensure maximum uptime and minimal fuel/power consumption, leading to high profitability for job work providers.

Partner with SJ Industrial Ovens for Superior Metal Heat Treatment Results

📞 Sales: 9768072730 | 9820315252 • ✉️ sjindustrialovenssales@gmail.com

📍 Shop No. C-11, A.K. Industrial Estate, Parmar Tecno Centre, Vasai (E), Palghar - 401208, Maharashtra