



324MM 3-ZONE LARGE DIAMETER TUBE FURNACE - TT-LDTF- 324-1200

The 324MM 3-Zone Large Diameter Tube Furnace - TT-LDTF-324-1200 is designed with an extended constant-temperature zone and precise temperature control, making it ideal for sintering multiple samples or performing pilot-scale testing. Its reliable performance and accurate thermal management provide consistent results, suitable for both research and industrial applications.

This furnace is commonly used in semiconductor research, nanomaterials, carbon fiber, and graphene processing. It features a $\Phi 324$ mm quartz reactor tube with a 300 mm heating zone, capable of continuous operation at 1100°C and reaching a maximum temperature of 1200°C. Heating is delivered via 1500-type polycrystalline alumina ceramic fiber elements, and temperature is monitored with an N-type thermocouple. The system operates on 380V/10 kW, providing a robust and energy-efficient solution for advanced thermal processing needs.

APPLICATIONS

- **Semiconductor Research** – Provides precise thermal processing for semiconductor wafers, substrates, and devices. Ensures uniform temperature control critical for doping, annealing, and material synthesis.
- **Nanomaterials & Graphene Processing** – Enables high-temperature sintering, crystallization, and thermal treatment of nanomaterials, carbon fibers, and graphene. Supports research and pilot-scale production with stable thermal uniformity.
- **Lithium Battery Materials** – Ideal for thermal processing of cathode, anode, and electrolyte materials. Maintains consistent temperature profiles to ensure reproducible material properties and electrochemical performance.
- **Advanced Materials & New Energy** – Facilitates heat treatment and sintering of ceramics, composites, and other high-performance materials. Supports R&D and industrial applications in next-generation energy and advanced material

sectors.

- **CVD & Vacuum Processing** – Compatible with vacuum or controlled atmosphere conditions. Supports chemical vapor deposition, material growth, and thermal gradient experiments with programmable multi-zone control.
- **Pilot-Scale Thermal Experiments** – Extended constant-temperature zones and multiple heating zones allow for large-sample sintering, batch processing, and gradient studies. Suitable for research labs and industrial pilot operations.
- **Energy-Efficient Heating System** – Utilizes HRE high-temperature alloy resistance wire and 1500-type polycrystalline alumina ceramic fiber for radiant heat transfer. Ring or dual-side heating ensures uniform thermal distribution.
- **Precision Temperature Control** – Equipped with PID microcomputer control, SSR voltage regulation, and N-type thermocouple feedback. Supports up to 30 programmable segments and automatic safety shut-off for over-temperature and system faults.
- **Durable Furnace Shell & Refractory** – Constructed from Q235 low-carbon steel with electrostatic and corrosion-resistant coating. Multi-layer insulation minimizes heat loss and reduces energy consumption, while the horizontal top-opening design ensures user-friendly operation.
- **Customizable & Optional Accessories** – Compatible with quartz, metal, or alumina tubes. Optional vacuum pumps, digital vacuum gauges, flowmeters, and sample holders allow adaptation to specific experimental or production requirements. OEM customization is available based on material output and specifications.

FEATURES

The large-diameter tube furnace integrates a heating system, temperature control unit, working tube, sealing components, and an automated top-opening furnace lid. It operates under vacuum or inert gas environments, supporting a wide range of CVD processes. With multiple programmable temperature zones, it ensures high thermal uniformity and is also suitable for temperature gradient experiments. This furnace is widely used in pilot-scale sintering and batch thermal processing across industries including graphene, lithium battery electrode materials, semiconductors, new energy, and advanced materials.

Furnace Shell

- Constructed from Q235 low-carbon steel with a corrosion-resistant, electrostatic finish
- Double-layer metal frame design integrated with thermal insulation fan system to maintain a cool exterior surface
- Horizontal configuration with a top-opening lid for ease of operation

Refractory Material

- Multi-layer insulation system using lightweight alumina ceramic fiber and high-performance insulation board
- Asbestos-free, with low heat loss and reduced energy consumption

Heating System

- Durable metal and ceramic heating elements provide efficient radiant heat distribution within the chamber
- Ring or dual-side heating for optimal temperature uniformity
- Three-zone heating system with independently controlled zones for enhanced accuracy

Temperature Control Panel

- PID controller with SSR/SCR output for stable and precise temperature regulation
- Equipped with a high-grade thermocouple for reliable readings and extended lifespan
- Includes heating status indicator and over-temperature alarm with audible buzzer

Programmable Controller

- User-friendly interface designed to handle complex process requirements
- Supports up to 30 programmable segments
- Integrated alarms for temperature deviations and system faults
- Automatic safety shut-off features

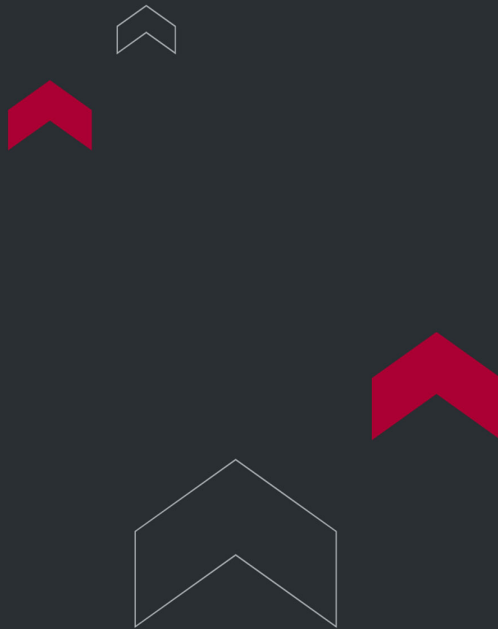
Vacuum & Atmosphere Compatibility

- 304 stainless steel sealing flanges ensure vacuum integrity or controlled gas flow
- Compatible with quartz, metal, or alumina tubes depending on process needs

TECHNICAL SPECIFICATIONS

Model	TT-LDTF-150-1200	TT-LDTF-200-1200	TT-LDTF-280-1200	TT-LDTF-350-1200
Furnace tube size	Φ150×1500mm	Φ200×1500mm	Φ280×1500mm	Φ350×1500mm
Heating zone	900mm	900mm	900mm	900mm
Max temperature	1200℃			
Working temperature	1100℃			
Heating element	HRE high temperature alloy resistance wire			
Chamber material	Polycrystalline inorganic alumina ceramic fiber material prepared by wet vacuum filtration			
Temperature control accuracy	±1℃			
Temperature measuring element	N-type thermocouple			
Temperature control instrument	Intelligent microcomputer PID temperature control instrument, SSR voltage regulation control, PID parameter self-tuning function; programmable 30 program segments, program temperature rise, program heat preservation, program cooling; three-stage partition control			

Heating rate	1-20°C/min free adjustment
Furnace structure	Furnace temperature control integrated structure
Standard configuration	Modular control, it will send out sound and light alarm signal for over temperature and broken coupler in the working process, and automatically complete the protection action
Safety protection	The equipment is equipped with a circuit breaker, which will automatically pop open in case of short circuit leakage, which can protect the safety of equipment and operators
Furnace shell	The shell is processed by high-quality cold-rolled steel sheet CNC machine tools, after welding, grinding, polishing, phosphating, pickling, and electrostatic spraying of plastic powder on the surface
Quality certification	ISO9001 CE SGS TUV
Standard configuration	1 furnace body 2. Power cord 3 meters 3. 1 piece thermocouple 4. 1 piece manual 5. 1 piece furnace hook 6. One pair of high temperature gloves
Optional	1. Optional rotary vane vacuum pump (vacuum degree $\leq 5\text{pa}$) 2. Optional diffusion pump vacuum unit (vacuum degree $\leq 6.67 \times 10^{-2}\text{pa}$) 3. Optional molecular pump vacuum unit (vacuum degree $\leq 6.67 \times 10^{-4}\text{pa}$) 4. Optional digital vacuum gauge (1.0×10^5 - $1.0 \times 10^{-1}\text{pa}$) 5. Optional float flowmeter (range 100-1000ml/min) 6. Optional quartz boat, metal crucible and other material loading containers
OEM	According to the output requirements of the actual material of the user, the customization of special specifications of the product can be realized



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