



HYDROGEN REDUCTION 3-ZONE TUBE FURNACE 1200°C - TT-HRTF3Z- 50-1200

The **Hydrogen Reduction 3-Zone Tube Furnace 1200°C - TT-HRTF3Z-50-1200** is designed for high-temperature hydrogen reduction processes with maximum safety and durability. It features a processing tube constructed from a high-performance nickel-based superalloy, engineered to withstand continuous exposure to flowing hydrogen without cracking or degradation. A 3M hydrogen detector is integrated into the system, automatically shutting off both the hydrogen gas generator and the inlet valve in the event of a leak, ensuring safe and reliable operation.

This model includes a $\Phi 150 \times 1500$ mm quartz tube with a 600 mm heating zone. It supports continuous operation at 1100°C, with a maximum temperature capability of 1200°C. The reactor tube is made of durable alumina ceramic, while high-quality HRE alloy resistance wires provide stable and efficient heating. Equipped with a B-type thermocouple for accurate temperature monitoring, the system operates on 220V/4 kW (with 110V available), making it suitable for advanced hydrogen-based thermal processing in research and industrial applications.

APPLICATIONS

- **Hydrogen Reduction Processes** – Specially engineered for high-temperature hydrogen reduction of metals, alloys, and oxides. The nickel-based superalloy processing tube ensures durability under continuous hydrogen flow, delivering reliable and reproducible results for industrial and research applications.
- **Powder Metallurgy & Metal Refining** – Supports hydrogen-based reduction and sintering of metal powders into dense, high-purity components. Enhances metallurgical properties and enables the development of advanced alloys and specialty metals.
- **Nanomaterials & Advanced Materials Research** – Enables the synthesis and hydrogen reduction of nanomaterials, catalysts, and functional composites. Provides uniform heating and controlled atmospheres critical for next-generation materials development.

- **Catalysis & Chemical Engineering** – Ideal for hydrogen-based catalyst activation and chemical reaction studies. Ensures consistent processing conditions for petrochemical, energy, and environmental research.
- **Energy & Battery Materials** – Facilitates hydrogen reduction of electrode and solid-state electrolyte materials. Enhances conductivity, stability, and cycle life of lithium-ion and advanced battery systems.
- **Aerospace & High-Performance Materials** – Supports hydrogen treatment of alloys and coatings used in aerospace and defense industries. Ensures high strength, oxidation resistance, and thermal stability under extreme service conditions.
- **Universities & Research Institutes** – Designed for advanced academic research in materials science, nanotechnology, chemistry, and physics. Offers precise temperature control, programmable multi-zone heating, and robust safety features for laboratory environments.
- **Industrial Quality Control & Certification** – Provides hydrogen-based high-temperature testing for material validation, compliance verification, and product certification. Conforms to ISO9001, CE, SGS, and TÜV standards for regulated industries.

FEATURES

Furnace Shell

- The shell is constructed from Q235 low-carbon steel and features an electrostatic-resistant, corrosion-resistant coating. Its durable double-layer metal frame is combined with a heat-insulating ventilation structure, keeping the external surface temperature low. Designed for horizontal use, it features a top-opening structure for convenient operation.

Refractory Material

- The furnace uses a multi-layer insulation system made from lightweight alumina ceramic fiber backed with premium insulating boards. It is asbestos-free, minimizes heat loss, and supports low energy consumption.

Heating System

- High-grade HRE spiral resistance wires are securely embedded along the inner surface, providing efficient thermal radiation heating within the chamber. This setup ensures energy efficiency, reliability, and an extended lifespan.
- A ring-shaped resistance wire layout ensures consistent temperature distribution throughout the furnace.

Temperature Control Panel

- Features an advanced controller capable of handling complex processing needs.
- Supports programmable temperature control with up to 30 segments for automatic curve-based operation.
- Includes over-temperature and fault alarms with built-in automatic safety shutoff features.

Rotary System

- The furnace tube uses a gear-driven electric motor to rotate 360° at speeds between 12–20 rpm, ensuring even heating of materials.
- The furnace body is electrically tiltable with an adjustable angle, allowing smooth loading and unloading of materials.
- Equipped with a 304 stainless steel sealing flange to enable either vacuum or controlled atmosphere environments.
- Compatible with high-quality quartz tubes, as well as optional metal or alumina ceramic tubes for various applications.

TECHNICAL SPECIFICATIONS

Model	TT-HRTF3Z-60-1200Q	TT-HRTF3Z-100-1200Q	TT-HRTF3Z-150-1200Q	TT-HRTF3Z-200-1200Q
Reactor Quartz Tube	Φ60×1200mm	Φ100×1200mm	Φ150×1500mm	Φ200×1500mm

Heating Zone Length	440mm	440mm	600mm	600mm
Max Temp	1200°C			
Continue Temp	1100°C			
Heating Element	High quality Alloy Resistance Wire□ HRE□			
Chamber Material	Polycrystalline inorganic alumina ceramic fiber materials			
Temp Precision	±1°C			
Thermocouple	N-type national standard platinum rhodium thermocouple			
Temp Controller	Intelligent microcomputer PID temperature control instrument, SSR control, PID parameter self-tuning function; programmable 30 program segments, program temperature rise, program heat preservation, program cooling			
Heating Rate	1-20°C/min free adjustment			
Furnace Structure	Furnace temperature control integrated structure; double-layer shell, air circulation and heat insulation			
Equipment Protection	Modular control, sound and light alarm signal will be sent out for over temperature and broken coupler in the working process, and the protection action will be completed automatically			
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	High-quality cold-rolled steel plate CNC machine tool blanking processing, after welding, grinding, polishing, phosphating, pickling, surface electrostatic spraying plastic powder			
Certification	ISO9001 CE SGS TUV			
The standard configuration	1. furnace body 2. temperature controller 3. Power cord 3 meters 4. 1 thermocouple 5. 1 manual6. One furnace hook 7. One pair of high temperature gloves 8. Two pipe plugs 9. One set of sealing flange			



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