



TORONTECH



HYDROGEN REDUCTION TUBE FURNACE 1700°C - TT-HRTF-100-1700

The Hydrogen Reduction Tube Furnace 1700°C – TT-HRTF-100-1700 is designed for advanced hydrogen reduction applications that require maximum safety and durability. It features a high-grade nickel-based superalloy processing tube, engineered to withstand continuous hydrogen gas flow without cracking or breaking. To enhance operational safety, the system includes a 3M hydrogen detector that instantly shuts off both the hydrogen gas generator and the inlet valve if a leak is detected.

This model is equipped with a $\Phi 100 \times 1200$ mm quartz tube and a 440 mm heating zone. It supports continuous operation at 1600°C, with a maximum working temperature of 1700°C. The reactor tube is constructed from durable alumina ceramic, while heating is powered by high-quality Molybdenum Disilicide (MoSi_2) elements for efficiency and longevity. An N-type thermocouple ensures precise temperature monitoring, and the system operates on 380V/12 kW, making it ideal for research laboratories and industrial hydrogen reduction processes.

APPLICATIONS

- **Hydrogen Reduction Processes** – Enables precise reduction of metal oxides into high-purity metals such as tungsten, molybdenum, and titanium. Delivers reliable performance under continuous hydrogen flow, ensuring safe and efficient operation for industrial and laboratory use.
- **Advanced Ceramic Materials** – Supports high-temperature sintering and reduction of ceramics in controlled atmospheres. Provides excellent uniformity and thermal stability, essential for structural ceramics, catalysts, and advanced composites.
- **Metallurgical Research & Powder Metallurgy** – Facilitates hydrogen reduction and sintering of metal powders into dense, uniform components. Widely applied in the development of advanced alloys, hydrogen storage materials, and powder metallurgy research.

- **Nanomaterials & Functional Materials** – Provides uniform high-temperature environments for synthesizing and processing nanostructures, advanced composites, and catalytic materials. Enhances R&D in next-generation materials for electronics, catalysis, and renewable energy.
- **Semiconductor & Electronics Industry** – Supports annealing, surface treatment, and hydrogen-based processing of semiconductor substrates. Ensures precise temperature control critical for microelectronics, optoelectronics, and thin-film device development.
- **Energy & Hydrogen Technology** – Applicable for thermal treatment of hydrogen storage systems, solid-state electrolytes, and energy conversion materials. Ensures stability and reproducibility in high-temperature hydrogen research and energy innovation.
- **Aerospace Materials Engineering** – Enables processing and evaluation of high-performance alloys, ceramics, and composites under hydrogen atmospheres. Ensures mechanical strength, thermal stability, and durability for aerospace-grade applications.
- **Petrochemical & Chemical Laboratories** – Suitable for catalyst activation, hydrogenation studies, and reaction mechanism research at temperatures up to 1700°C. Delivers consistent, reproducible thermal performance for advanced chemical R&D.
- **Universities & Research Institutes** – Ideal for multidisciplinary studies in physics, chemistry, metallurgy, and materials science. Provides versatile programmability, robust safety features, and precise control for academic and institutional research.
- **Industrial Quality Control & Certification** – Delivers ultra-high temperature and hydrogen atmosphere testing for product validation, compliance verification, and certification. Meets ISO, CE, SGS, and TÜV standards required in

regulated industries.

FEATURES

Furnace Shell

- The shell is constructed from Q235 low-carbon steel with an electrostatic-resistant and corrosion-resistant surface.
- A durable double-layer metal frame is integrated with a heat-insulating fan structure to ensure a low external surface temperature.
- The furnace is designed for horizontal operation with a top-opening lid for easy access.

Refractory Material

- The furnace features a multi-layer insulation system made of lightweight alumina ceramic fiber and high-performance insulation board backing.
- It is asbestos-free and engineered for low heat loss and energy efficiency.

Heating System

- The furnace uses high-grade HRE spiral resistance wire, securely embedded along the inner surface. It provides radiant heating within the chamber, promoting energy efficiency, long service life, and stable performance.
- A ring-shaped resistance wire arrangement ensures even temperature distribution across the furnace chamber.

Temperature Control Panel

- Equipped with advanced controllers capable of handling complex thermal processes.
- Supports up to 30 programmable segments for automated temperature curve control.
- Features include over-temperature protection, fault alarms, and automatic safety shutoff.

Rotary System

- The furnace tube rotates 360° using a gear-driven electric motor, with adjustable speeds between 12-20 rpm, allowing uniform heating of materials inside the tube.
- The furnace body can be electrically tilted, with an adjustable tilt angle for smooth loading and unloading of materials.
- A 304 stainless steel sealing flange is included for maintaining vacuum or controlled atmosphere environments.
- Optional tube materials include high-quality quartz, metal, or alumina ceramic to support various processing needs.

TECHNICAL SPECIFICATIONS

Model	TT-HRTF-60-1700Q	TT-HRTF-100-1700Q	TT-HRTF-150-1700Q	TT-HRTF-200-1700Q
Reactor Quartz Tube	Φ60×1200mm	Φ100×1200mm	Φ150×1500mm	Φ200×1500mm
Heating Zone Length	440mm	440mm	600mm	600mm
Max Temp	1700℃			
Continue Temp	1600℃			
Heating Element	High quality Molybdenum Disilicide MoSi2 heater			
Chamber Material	Polycrystalline inorganic alumina ceramic fiber materials			
Temp Precision	±1℃			
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℃/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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