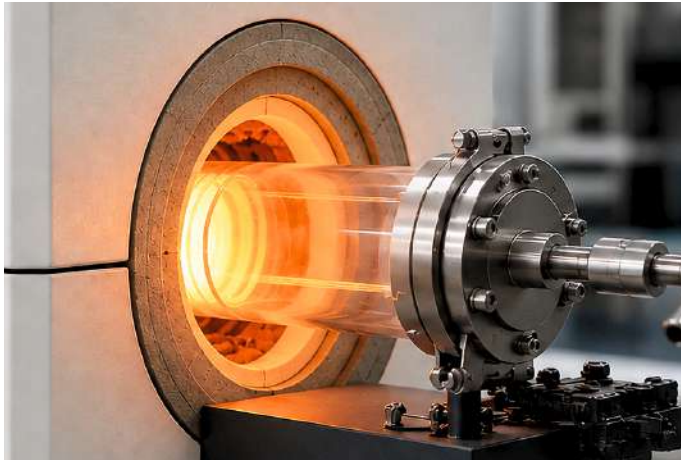




TORONTECH

MAY, 2026

NEWSLETTER



TUBE FURNACES FOR **PRECISE** **HIGH-TEMPERATURE** PROCESSING

High-temperature thermal processing requires precision and proper atmosphere control. Tube furnaces enable work in vacuum, inert, or reactive gas environments at temperatures up to 1800°C, offering superior zone-by-zone temperature control compared to box furnaces.

Torontech's ToronTherm™ Tube Furnace lineup includes various configurations for laboratory and pilot-scale thermal processing, catering to needs from single-zone to multi-zone systems and specialized designs for powders and CVD applications.

PRODUCT HIGHLIGHTS

Single Zone Tube Furnaces



- **Uniform Single-zone Heating:**
Ideal for straightforward thermal processing - annealing, sintering, and heat treatment in one controlled zone.
- **Temperature Range Up to 1700°C:**
Models available at 1200°C, 1400°C, and 1700°C for a wide range of material requirements.
- **Vacuum & Atmosphere Capable:**
304 stainless steel sealing flanges enable operation under vacuum or inert/reactive gas environments.

Two Zone Tube Furnaces



- **Two Independently Controlled Zones:** Maintain different temperatures simultaneously in a single furnace tube for gradient or dual-stage processing.
- **Ideal for CVD Precursor Workflows:** Upstream zone handles precursor vaporization while the downstream zone controls deposition temperature.
- **Consistent Temperature Uniformity:** zone independence environments. eliminates thermal crosstalk, delivering reliable gradient profiles.





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Three Zone Tube Furnaces

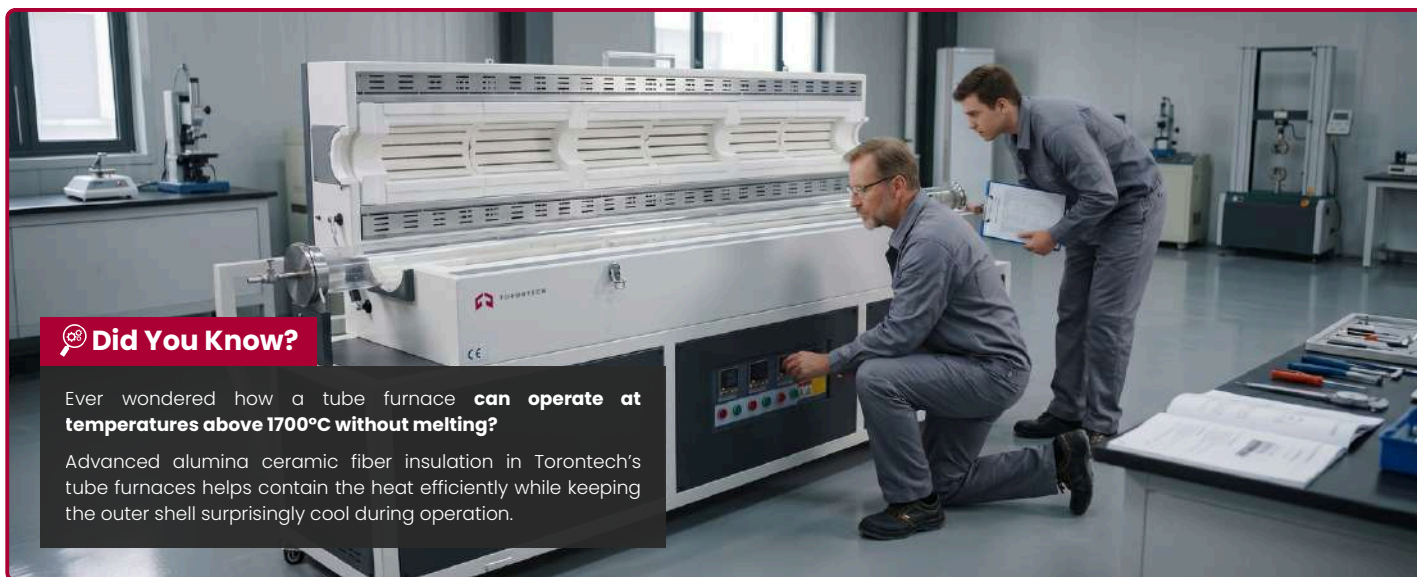


- › **Three Independently Controlled Zones:** Deliver exceptional temperature uniformity across the sample length or precise thermal gradients.
- › **Extended Uniform Zone:** End zones compensate for heat loss at tube ends, expanding the effective flat-zone length.
- › **Advanced Materials Research:** Used in crystal growth, carbothermal reduction, multi-step thermal synthesis, and catalyst studies.
- › **Up to 1700°C Capability:** SiC or alloy resistance wire heating elements suit diverse high-temperature applications.

Multi Zone Tube Furnaces



- › **Independently Controlled Multi-zone Heating:** Create complex temperature profiles or maintain large uniform zones for pilot-scale processing.
- › **Scalable Zone Configurations:** Choose zone count and heated length to match sample dimensions requirements.
- › **Suitable for Advanced CVD & Co-deposition:** Multi-zone control enables sequential chemical reactions within a single tube run.
- › **High Throughput and Research Flexibility:** Accommodates multiple sample positions with zone-specific conditions.



Did You Know?

Ever wondered how a tube furnace **can operate at temperatures above 1700°C without melting?**

Advanced alumina ceramic fiber insulation in Torontech's tube furnaces helps contain the heat efficiently while keeping the outer shell surprisingly cool during operation.

Torontech Inc.
251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada
Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC
601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA
Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE
Meydan Grandstand, 6th Floor, Meydan
Road, Nad Al Sheba, Dubai-261440, UAE
Phone: +971 488 19252
Email: me@torontech.com



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Vertical Tube Furnaces

► Vertical Orientation for Gravity-Assisted Processes:

Samples hang or sit in the hot zone, enabling powder filling, fiber drawing, and quench experiments.

► Improved Gas Flow Dynamics:

Vertical design allows natural convection of process gases from bottom to top through the sample.

► Fluid Bed Quench Option:

Select models integrate a fluid bed below the furnace for rapid quenching of heat-treated samples.

► Vacuum & Atmosphere Rated:

Suitable for crystal growth, material synthesis, and thermal treatments under controlled atmospheres.

► Multiple Temperature Ratings:

1200°C, 1400°C and 1700°C models for laboratory and advanced R&D use.



Hydrogen Reduction Tube Furnaces



► Purpose-built for Hydrogen Atmospheres:

Nickel-based superalloy processing tube withstands continuous H exposure without cracking or embrittlement.

► Integrated 3M Hydrogen Leak Detector:

Automatically shuts off the H generator and inlet valve upon detection of any gas leak.

► Temperature Range 1200°C-1700°C:

Available in multiple configurations including 3-zone models for enhanced uniformity.

Torontech Inc.
251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada
Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC
601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA
Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE
Meydan Grandstand, 6th Floor, Meydan
Road, Nad Al Sheba, Dubai-261440, UAE
Phone: +971 488 19252
Email: me@torontech.com



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Rotary Tube Furnaces



- ▶ **360° Rotation for Uniform Powder Processing:** Continuous tube rotation prevents particle settling and hot spots during thermal treatment.
- ▶ **Continuous or Batch Operation:** Feeding and discharging systems enable semi-continuous production for powder and granular materials.
- ▶ **Adjustable Tilt Angle (Up to 15°):** Tilting body assists material flow through the tube and improves discharge efficiency.

CVD Tube Furnaces

- ▶ **Engineered for Chemical Vapor Deposition:** Precise temperature and gas flow control enables deposition of thin films, coatings, and nanomaterials.
- ▶ **Integrated Vacuum System:** Dual-stage rotary vane pump reaches ≤ 5 Pa; optional molecular pump system achieves 1×10^{-10} Pa.
- ▶ **Multi-channel Gas Delivery:** 3-channel manual float controller or automatic mass flow controller for precise reactant gas management.
- ▶ **PECVD Option Available:** 13.56 MHz RF power supply (200W-500W) ionizes gas for plasma-enhanced deposition at lower temperatures.



Why Choose Torontech

for Your Tube Furnace Program

- ▶ **Complete Configuration Coverage:** Single zone to multi-zone, vertical, rotary, CVD, hydrogen reduction, and large-diameter one supplier for every tube furnace requirement.
- ▶ **Temperature Range Up to 1800°C:** Resistance wire, SiC, and MoSi heating elements span from routine laboratory temperatures to the highest-demand sintering and synthesis processes.
- ▶ **Atmosphere and Vacuum Flexibility:** Every model supports vacuum, inert gas, reactive gas, or air operation with sealing systems rated for the process requirements.
- ▶ **Safety-engineered for Reactive Atmospheres:** Hydrogen reduction models include integrated leak detectors, automatic shutoffs, and superalloy tubes designed for safe lab and production use.
- ▶ **Productive and Programmable Controls:** PID+SSR control, multi-segment programming, and optional PC connectivity enable automated, repeatable thermal profiles with minimal operator intervention.

Ready to Advance Your

High-Temperature Research?

Torontech's **ToronTherm™ Tube Furnaces** help researchers, engineers, and manufacturers achieve precise, repeatable thermal processing under any atmosphere — from routine laboratory annealing to advanced CVD and hydrogen reduction.

Explore the full lineup:

<https://www.torontech.com/tube-furnaces/>

For expert guidance on selecting the right furnace configuration: sales@torontech.com