

Environmental Testing & Thermal Processing Equipment

ADAPTABLE SOLUTIONS

commitment:



TPS[™]
Thermal Product Solutions



TPS[™] commitment
Thermal Product Solutions



MARKETS

**ONE SOURCE FOR THERMAL PROCESSING—
NO OTHER COMPANY OFFERS AS WIDE A RANGE OF PRODUCTS**

Industries

- Aerospace
- Automotive
- Automotive Components
- Ceramics
- Computer Peripherals
- Defense
- Die Casting
- Electronic Applications
- Environmental Processing
- Fabricated Metal
- Fiber Optics
- Industrial Processing
- Machinery
- Medical Components
- Medical Devices
- Oil and Gas Drilling
- Optical Electronics
- Optics
- Petroleum
- Pharmaceutical
- Photovoltaic
- Precious Metals
- Semiconductor
- Solar Cells

Applications


- Afterburning
- Aging
- Alternative Fuels
- Altitude
- Annealing
- ASTM Tests
- Automotive Component Cure
- Burn-In
- Continuous Cure
- Controlled Atmosphere
- Conveyors
- Curing
- CZ Crystal Growth
- Depyrogenation
- Die Attach Cure
- Die Coat Cure
- Drill Bit Curing
- Drying
- Encapsulation Cure
- Heat Sink Attach Cure
- Ink Mark Cure
- Machined Silicon Parts
- Medical Component Cure
- Mold Cure
- Optics
- Optoelectronic Cure
- Photo Resist
- Post Mold Cure
- Pre-Heat
- Print Cartridge Cure
- Research
- Shelf Life
- Solar Cells
- Stability
- Steady State
- Sterilization
- Stress Relief
- Temperature/Humidity
- Thermal Cycling
- Thermal Shock
- Underfill Cure
- Vacuum
- Vivariums



SOLAR PANEL TESTING

The ETCU series chambers were designed specifically for solar panel testing.

GREEN TECHNOLOGY



TPS THERMAL PRODUCT SOLUTIONS IS COMMITTED TO INNOVATIVE PRODUCTS SPECIFICALLY DESIGNED FOR THE NEW ENERGIES MARKETS.

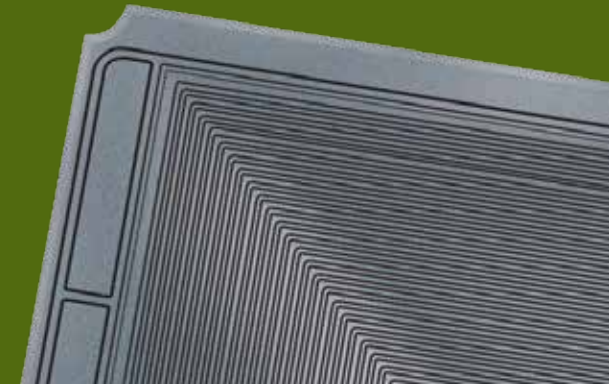
WIND GENERATION COMPONENT TESTING

Tenney provides a full line of environmental rooms and chambers to accommodate humidity and temperature extremes.



FUEL CELL TESTING

The Tenney line of environmental chambers and rooms provides solutions for testing fuel cells.





BATTERY TESTING

No matter what type of battery you need to test, TPS Thermal Product Solutions has the standard or custom thermal processing oven or chamber for you. We use the most up-to-date technology and engineering to build equipment to test a wide variety of batteries, from small battery cells to large lithium ion battery packs.

Got NIMH, lead acid, or lithium ion batteries of any shape or size? We say, bring it on.



ENVIRONMENTAL CHAMBERS

We provide efficient and environmentally friendly chambers to address the widest possible range of temperature and humidity for your laboratory.



ENVIRONMENTAL ROOMS

Tenney's expertise in environmental control allows you to specify a room that can simulate altitude, humidity, and temperature in any configuration to perfectly fit your needs.



»» Tenney »» Blue M

ENVIRONMENTAL



TEMPERATURE/HUMIDITY CYCLING

Every Tenney temperature/humidity chamber draws on a tradition of engineering excellence and features vapor-tight construction, precision controls, and reliable programming and monitoring functions.

ALTITUDE/VACUUM TESTING

Tenney altitude and vacuum chambers simulate a wide range of atmospheric conditions. Simulate altitude to 200,000 feet with an overall temperature range of -70°C to +177°C, humidity capabilities of 20% to 98% RH, and workspace volumes from 5 to 64 cubic feet.

STABILITY/SHELF LIFE

The Tenney chambers can be applied to a wide range of uses. Applications include ICH general stability conditions for room temperature storage; intermediate storage; accelerated shelf-life studies; steady-state, reliability, and stability testing; burn-in; curing; controlled temperature storage; clean room and bio-medical research testing; and production processes.

THERMAL SHOCK

Tenney's thermal shock chambers cycle through a temperature range between 200°C to 70°C in less than ten seconds.

WALK-IN ROOMS

Tenney's expertise in environmental control allows you to specify a room that can simulate altitude, humidity, and temperature in any configuration to perfectly fit your needs.

VIBRATION

Tenney vibration chambers feature a sound-friendly design that exhausts operating air and noise out the top of the unit. Units come with the widest selection of standard compressor packages to meet your testing requirements.



»» Tenney

- Temperature/Humidity Cycling Chambers
- Altitude/Vacuum Chambers
- Walk-In Rooms
- Vibration Chambers
- Steady State Ovens/Chambers
- Stability and Shelf Life



»» Blue M

- High Temperature/High Humidity Chambers
- Ultra-Low Humidity Chambers
- Programmable Humidity Chambers
- Steady-State Humidity Chambers

ELECTRONICS

»»Blue M

MECHANICAL CONVECTION OVENS

Blue M's convection ovens are ideal for constant-temperature work and for applications requiring fast run-up and cool-down rates. The heavy-gauge stainless steel interiors and exteriors combine a fully welded and sealed construction with four inches of fiberglass insulation to minimize heat loss.

BATCH AND INLINE CURING OVENS

Blue M inline curing ovens exhibit cure process control, improved equipment reliability, and reduced maintenance requirements. The batch ovens feature four inches of fiberglass insulation to minimize heat loss, an adjustable exhaust system, and exclusive Blue M heating elements with low-watt density for longer service life.





TENNEY JUNIOR COMPACT TEMPERATURE TEST CHAMBER

The Tenney Junior environmental test chamber is a popular choice for reliable temperature testing. Can be used for testing materials from -75°C to +200°C.



BLUE M 146 SERIES CLEAN ROOM MECHANICAL CONVECTION OVEN

Multiple model options for custom test needs. High quality design and simple operation. Horizontal air flow assures uniform thermal performance under all loading conditions.



146 SERIES CONVECTION OVENS

Ideal for a number of applications, including ASTM testing, epoxy curing, and moisture components and devices.



BLUE M 146 SERIES INERT GAS MECHANICAL CONVECTION OVEN

Prevents oxidation. Impervious barrier between the process chamber and the insulation material.

Blue M

BLUE M FRICTION AIRE SAFETY OVEN

- Controlled heat source eliminates atmospheric explosions and ignitions when working with Class 1, Group D materials
- Ideally suited for testing and processing of hazardous materials, paints, solvents, and lacquers.
- Maximum temperature uniformity
- Natural temperature interlock and built-in overtemperature protection provides added safety to users and product
- Economical design that endures years of use





AUTOMOTIVE

FUELING THE INDUSTRY

The need for speed doesn't go without its safety precautions. The thousands of components that work to get us where we need to be have to be functioning at their absolute best. The mechanics, rubber material, levers, latches, and even cup holders need to be processed through temperature and pressure tests to assure quality performance for miles.

Reliable and low cost solutions to vehicle testing are provided by TPS. Whether hardening metal parts or testing them against environmental factors, we have the materials you need to create industry-leading products.

HOW WE GO THE EXTRA MILE

- Temperature, altitude, humidity, and vacuum tests determine how vehicles will perform under the most relentless conditions.
- Solvent-venting and explosion resistant chambers assure safe product testing.
- Curing and convection ovens harden metal components and paints in the vehicle production process.
- Battery-testing solutions assure high-performance quality in a safe atmosphere.

COMPONENT TESTING

Whether it's the automotive paint, rubber tires, metal chassis, battery, fuel cells, or windshield glass, these test chambers are designed for performance.



ENVIRONMENTAL CHAMBERS

We provide efficient and environmentally friendly chambers to address the widest possible range of temperature and humidity for your laboratory.



ENVIRONMENTAL ROOMS

Tenney's expertise in environmental control allows you to specify a room that can simulate altitude, humidity, and temperature in any configuration to perfectly fit your needs.



BATTERY AND FUEL CELL TESTING

Tenney battery solutions test products against environmental factors and heavy use.

Safety ovens allow testing of possible hazardous material, assuring product and user protection.

Standard and convection ovens harden and analyze metals used in battery production.

Thermal shock and stress solutions check performance limitations.

PHARMACEUTICAL

»» Tenney »» Blue M »» Gruenberg

STERILIZERS AND DEPYROGENATION OVENS

Gruenberg Oven Company designs and manufactures a complete line of standard and custom pharmaceutical sterilizers and depyrogenation ovens. Configurations include laboratory, cabinet, truck-in, pass-through, and continuous arrangements.

VIVARIUMS—DRY-HEAT STERILIZERS

The Gruenberg Vivarium Sterilizer provides the animal care market equipment to sterilize animal habitat cages with dry-heat sterilization. These sterilizers are designed and built for lab animal science applications.

CLASS 100 STERILIZATION DRYING

To maintain class 100 quality throughout the process chamber, HEPA filters are installed in the air intake, exhaust, and recirculation wall. The HEPA filters are a minimum 99.97% efficient at 0.3 microns.

GRANULATION DRYERS

Gruenberg Oven Company designs and manufactures a complete line of standard and custom pharmaceutical granulation dryers with capacities from 15 to 800 cubic feet.





PRECISIONFLO™

100% focused forced-air convection technology.

**Patent Pending*

INTUATOUCH CONTROL SYSTEM

- Multifunction programmable controller
- Color touchscreen
- Real-time data with recipe setup and storage
- SCADA compliant



STERIDRY™ DRY HEAT STERILIZER

This line of sterilizers use forced-air convection technology for reduced energy consumption.



S-SERIES CLASS 100 STERILIZERS

The S-Series is designed to comply with cGMP requirements. Rated for 260°C depyrogenation.



CUSTOM OVENS

We can design and manufacture a custom pharmaceutical oven for you.



TPS[™] commitment
Thermal Product Solutions



»»Blue M »»Gruenberg

INDUSTRIAL



BATCH

BENCH

BURN-IN

CABINET

CONVEYOR

EXPLOSION RESISTANT

INERT GAS CONVECTION

MECHANICAL CONVECTION

POWDER COATING

SAFETY

SOLVENT VENTING

TOP-LOADING

TRUCK-IN

CUSTOM INDUSTRIAL OVEN SOLUTIONS

Since 1932, Gruenberg has supplied innovative, high-quality industrial ovens for heat processing. By delivering uncompromised performance, we have emerged as a leading manufacturer of thermal processing equipment.

Gruenberg's custom engineering group has designed and manufactured thousands of ovens for integration into customer-unique processes. Our experience includes specialty atmospheres, exclusive material handling and chamber arrangements; special heating

and cooling rates; unique air-flow configurations; special venting and recirculation accommodations; and proprietary controls. Ovens can be integrated into the customer's process or stand alone, have various air flows, be continuous or batch-type configurations, and are available with maximum temperatures to 1500°F.



SOLUTIONS



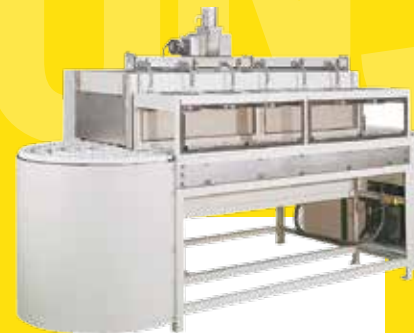
TOP-LOADING OVENS

Designed to reach 1000°F, top-loading ovens are ideally suited for core hardening, preheating, component testing, heat treating, and tempering.



POWDER-COATING OVENS

Modular powder-coating ovens that grow with you. Reliable and durable, production-tested designs. Custom models for specialized applications.



CONVEYOR OVENS

Gruenberg designs, manufactures, and supports conveyor ovens for a wide range of applications.

INDUSTRIAL OVENS TO MEET YOUR NEEDS

- Explosion Resistant
- Truck-In
- Solvent Venting
- Custom Designs

CONTINUOUS PROCESS



»» Blue M »» Gruenberg

INLINE CURING

Blue M blends innovative technology, global vision, customer awareness, and advanced manufacturing capabilities to provide the ultimate in thermal inline curing solutions. If floor space is an issue, Blue M offers several vertical inline curing ovens.

CONTINUOUS PROCESS

Gruenberg manufactures custom continuous process curing ovens that incorporate various temperature ranges for a multitude of applications.





GRUENBERG

The continuous process curing ovens include state-of-the-art digital controllers, uniform air flow, safety features, and rugged construction.

BLUE M

Our inline curing solutions feature improved reliability and reduced maintenance requirements. When integrated into manufacturing, Blue M ovens decrease total throughput time and decrease the total cost of ownership.



INNOVATIVE DESIGN

EDS

ENGINEERING DESIGN SERVICES

Before you make a capital investment in new equipment, let TPS design an oven, furnace, or environmental chamber to your exact specifications.

Our dedicated engineers and designers have improved hundreds of chamber and oven designs for environmental, pharmaceutical, photovoltaic, and continuous process applications.



DESIGNING THE PERFECT PRODUCT

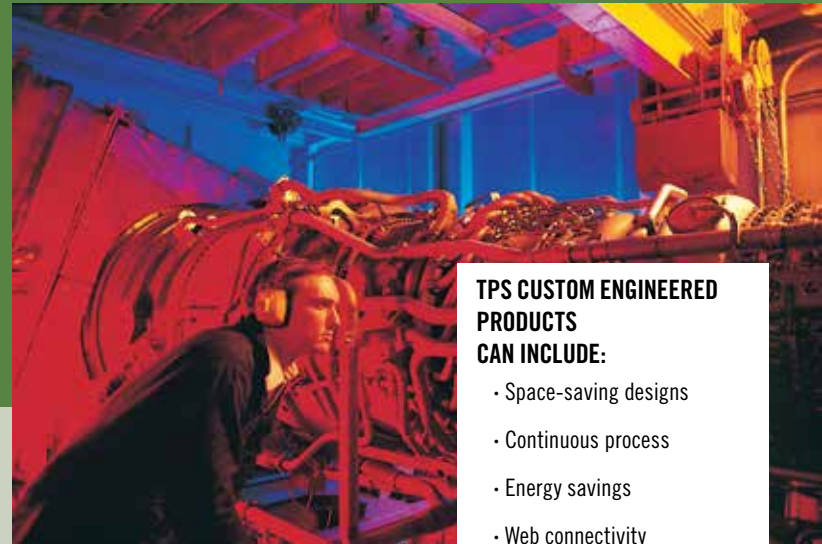
Our EDS department can help you get exactly what you need for your application.

THE PERFECT FIT

We create innovative new designs or customize our ovens and chambers to fit your needs, in any environment:

- Military and aerospace
- Consumer product testing
- Clean room applications
- Explosive and inert gas atmospheres
- High temperatures and vacuums
- Small footprint designs
- Robotic load/unload
- Web-based management

Test chambers from benchtop to walk-in rooms.



TPS CUSTOM ENGINEERED PRODUCTS CAN INCLUDE:

- Space-saving designs
- Continuous process
- Energy savings
- Web connectivity
- Validation of results
- Special atmospheres
- Integration with existing production and testing
- Advanced PLC technologies

EDS BENEFITS:

- Direct access to our engineering staff
- Create innovative designs to help you accomplish your testing and manufacturing needs
- Evaluate current process with a goal of saving time and costs
- Collaborate with your staff to develop solutions that match your exact processes
- Create a competitive edge for you by improving time to market

EDS POSSIBILITIES:

- **Proof of concept** and proof of process
- Development of test platforms and prototype units
- Finite analysis and simulation design
- **Optimizing** production processes
- Photovoltaic materials research and testing
- Alternative fuel process research and testing
- Environmental control and **clean processes**
- Processes requiring inert gas and vacuum applications
- Pharmaceutical process research and testing
- Custom **process controls** to solve manufacturing challenges



Ovens and chambers to **fit your workflow.**



ENERGY

FUELING INDEPENDENCE

In Pennsylvania and much of the country, the natural gas and petroleum industry has found renewed hope in the possibility of being independently sustainable. With specific requirements necessary to their success, they need custom testing and processing technologies that understand their operation.

TPS has a variety of testing ovens that are specifically calibrated to the gas industry. Accurate simulations of drilling conditions are a useful advantage to engineers and electronic or component testing prevents costly malfunctioning. No matter what the need, TPS understands and supports the industry.

WELL THOUGHT OUT SOLUTIONS

- Custom ovens calibrate electronic logging instruments and drilling equipment.
- Designed for burn-in, calibration, and downhole simulation specific to the industry.
- Quality construction provides worry-free use and modular opportunity for convenience.
- Safety and solvent-venting ovens protect workers from volatile materials and dangerous reactions.



PETROLEUM PRODUCTION

Drilling component curing ovens and environmental simulation chambers.

COMPONENT TESTING

- Pipe racks
- Mud tanks
- Drill lines
- Casing heads
- Crown blocks
- Kelly hose
- Traveling blocks
- Rotary tables
- Derricks
- Pumpjacks
- Drill floors
- Blowout preventers
- Hooks
- Drill bits
- Shale shakers



HARSH ENVIRONMENT TESTING

Whether you need to test a pumpjack for a rig in the bitter Alaskan cold or a drill line that will be submerged a mile deep into the Bearing Sea, our custom environmental test ovens are designed to prove the integrity of a product in a safe, controlled environment.

CUSTOMERS

MEETING OUR CUSTOMERS' NEEDS IS MISSION CENTRAL AT TPS

EXPERTISE

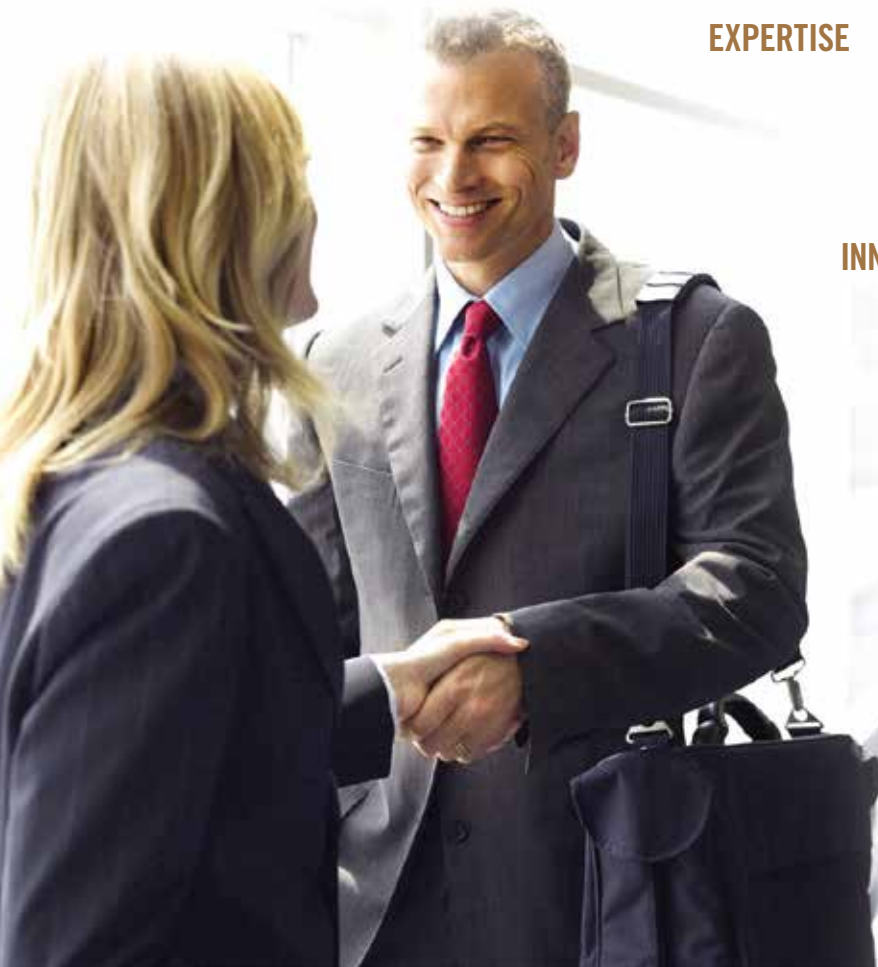
QUALITY

DEPENDABILITY

FAST DELIVERY OF PRODUCTS

INNOVATION

DEDICATED SUPPORT: USA, EUROPE, AND ASIA



- Excellent support and service
- Single source for thermal processing
- Access to engineering expertise
- Proven track record

PREVENTIVE MAINTENANCE

Programs are available to assure your equipment will be ready when you need it.

TLC PROGRAM

The TPS TLC program keeps your equipment tuned, calibrated, and running efficiently.

RETROFITS AND UPGRADES

TPS can retrofit and upgrade all its equipment with modern controls and systems, saving you time and money.

QUALITY

TPS serves its customers through a responsive quality system by designing, selling, and delivering products that meet or exceed performance and expectations. Open, active communication and training throughout all levels of the company provide the forum for ensuring understanding, implementation, and maintenance of the quality policy.

TRAINING

Our equipment comes with one-on-one training with our expert engineers.

REPLACEMENT PARTS

TPS supplies replacement parts for all the equipment manufactured at its facilities.



SUPPORT

**RESPONSIVE, WORLDWIDE
SERVICE AND SUPPORT IS
THE STANDARD AT TPS.**



TPS[™]
Thermal Product Solutions

www.thermalproductsolutions.com



»»Blue M »»Gruenberg »»Tenney

2821 Old Route 15 • New Columbia, PA 17856 USA
Phone: (570) 538-7200 • Fax: (570) 538-7380
www.thermalproductsolutions.com

»»Lindberg/MPH

PO Box 131 • 3827 Riverside Road • Riverside, MI 49084 USA
Phone: (269) 849-2700 • Fax: (269) 849-3021
www.lindbergmph.com

»»Wisconsin Oven

PO Box 873 • 2675 Main Street • East Troy, WI 53120 USA
Phone: (262) 642-3938 • Fax: (262) 363-4018
www.wisoven.com

»»Baker Furnace

3780 Prospect Ave • Yorba Linda, CA 92886-1742 USA
Phone: (800) 237-5675 or (714) 223-7262 • Fax: (714) 223-7283
www.bakerfurnace.com

Specifications and Product Information
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