



TORONTECH

VACUUM OVEN WITH INDEPENDENT SHELF TEMPERATURE CONTROL



Vacuum Oven with Independent Shelf Temperature Control — ToronOVEN™ V-IZ Series

ToronOVEN™ V-IZ is a multi-shelf vacuum oven engineered for laboratory and industrial applications that require independent temperature control at each heating shelf level — a capability that sets this series apart from conventional single-zone vacuum ovens where a single setpoint governs the entire chamber uniformly. Each heating shelf in the ToronOVEN™ V-IZ operates with its own dedicated temperature controller and LCD dashboard, allowing researchers to process samples requiring different thermal conditions simultaneously within a single evacuated chamber.

Available in five chamber volumes (30 L, 53 L, 100 L, 250 L, and 500 L) the ToronOVEN™ V-IZ series spans compact benchtop configurations through large-capacity floor-standing units suited to high-throughput laboratory and industrial vacuum drying programs. All models achieve a vacuum degree of 133 Pa and operate across a temperature range of RT+10°C to 250°C, with temperature fluctuation held to $\pm 1^\circ\text{C}$ at 105°C across the full range. A programmable timer supports run durations from 0 to 9999 minutes, covering everything from short degassing cycles to extended multi-hour vacuum drying oven programs.

The stainless steel interior chamber, electrostatically coated cold-rolled steel exterior, silicone rubber door seal, and toughened bulletproof double glass door window are consistent across the series. A power recovery function retains all active setpoints and timer states following any power interruption, protecting ongoing vacuum processes from uncontrolled restart conditions. A vacuum pump is available as an optional accessory. As a true multi-zone vacuum oven, the ToronOVEN™ V-IZ addresses applications where single-setpoint blast drying oven or standard vacuum oven designs cannot simultaneously accommodate the thermal diversity that multi-product or multi-protocol workflows demand.

APPLICATIONS

Vacuum Oven with Independent Shelf Temperature Control — ToronOVEN™ V-IZ Series Applications

The ToronOVEN™ V-IZ serves laboratory and industrial environments where vacuum-assisted thermal processing, independent multi-zone temperature control, and large working volumes are all required within a single instrument:

- Multi-Product Vacuum Drying: the defining application for this series; simultaneous drying of samples with different temperature requirements on separate shelves within a single evacuated vacuum oven chamber, eliminating the need for multiple instruments
- Pharmaceutical Manufacturing and QC: vacuum drying of APIs, granules, excipients, and solid dosage intermediates where shelf-specific temperature profiles support process validation requirements and product-specific thermal limits
- Degassing and Outgassing: removal of dissolved gases, trapped air, and volatile compounds from adhesives, resins, silicones, polymers, and electronic encapsulants under controlled vacuum conditions across multiple product lines simultaneously
- Electronics and Semiconductor Processing: low-temperature vacuum drying, solder curing, and outgassing of PCBs, sensors, and electronic assemblies where shelf-level temperature independence allows component-specific thermal exposure control
- Materials Research and Testing: vacuum annealing, thermal aging, and heat treatment of polymers, composites, ceramics, and nanomaterials requiring different temperature profiles across sample batches loaded on different shelves
- Food Science and Analytical Chemistry: moisture content determination, loss-on-drying analysis, and vacuum thermal processing of food, feed, and agricultural samples per standard analytical methods
- Cannabis and Botanical Extraction: purging of residual solvents from concentrates and botanical extracts under controlled vacuum and temperature conditions, with shelf-level thermal control supporting different extract types processed simultaneously
- Industrial QC and Manufacturing: large-volume vacuum conditioning, product drying, and thermal treatment programs in manufacturing environments where the 250 L and 500 L models provide the capacity that benchtop drying oven configurations cannot match



FEATURES

Vacuum Oven with Independent Shelf Temperature Control — ToronOVEN™ V-IZ Series Key Features

Independent Multi-Zone Shelf Temperature Control

- Each heating shelf operates as an independent temperature control zone with its own dedicated microcomputer controller
- Separate LCD dashboard for each shelf displays setpoint and measured temperature independently in real time
- Multi-layer heating partition design allows simultaneous processing of samples with different temperature requirements in a single evacuated chamber

Vacuum System

- Vacuum degree: 133 Pa across all five models
- Front-panel vacuum valve switch for direct operator control of vacuum application
- Front-panel exhaust valve for controlled chamber venting
- Analog vacuum gauge with real-time chamber pressure display
- Optional vacuum pump available for laboratories without existing house vacuum supply

Control System and Timer

- Microcomputer single-chip temperature control system per shelf zone with over-temperature alarm
- LCD display per shelf zone for clear, independent parameter monitoring

- Programmable timer: 0–9999 minutes for flexible run duration scheduling across short and extended vacuum processing programs
- Power recovery function retains all active setpoints, timer states, and process data after power interruption or system halt

Chamber and Door Design

- Cold-rolled steel exterior with electrostatic spray finish; stainless steel interior working chamber for corrosion resistance and chemical compatibility
- Toughened, bulletproof double glass door window for visual sample monitoring across all shelf levels without venting the chamber
- Adjustable door mechanism with silicone rubber perimeter seal for consistent vacuum integrity over the service life of the unit
- 1 shelf standard (30 L); 2 shelves standard (53 L and 100 L); 3 shelves standard (250 L); 4 shelves standard (500 L)

Optional Accessories

- Vacuum pump for laboratories without existing house vacuum supply

THEORY & METHOD

Theory and Method

Multi-Zone Independent Shelf Temperature Control

The defining technical feature of the ToronOVEN™ V-IZ is its per-shelf temperature control architecture. Each heating shelf operates as an independent heating zone, governed by its own dedicated microcomputer single-chip temperature control system with a separate LCD dashboard displaying the setpoint and measured temperature for that shelf. The upper and

lower heating dashboards visible on the instrument front panel correspond directly to the independently controlled heating partitions inside the chamber.

This multi-zone design has a direct practical consequence for laboratory workflows: samples with different optimal drying temperatures — for example, a heat-sensitive biological extract requiring 40°C and a polymer component requiring 120°C — can be processed simultaneously on different shelves within the same evacuated vacuum oven chamber. Standard single-zone vacuum ovens and conventional drying ovens require separate runs at separate setpoints to achieve this, consuming instrument time, energy, and operator attention that the ToronOVEN™ V-IZ eliminates.

Vacuum-Assisted Thermal Processing

The ToronOVEN™ V-IZ achieves a vacuum degree of 133 Pa across all five models. At this pressure, the boiling point of water is reduced to approximately 51°C — enabling thorough moisture removal from heat-sensitive samples at temperatures significantly below what atmospheric drying oven processing would require. The elimination of atmospheric oxygen within the evacuated chamber prevents oxidative degradation of reactive samples during heating, making the ToronOVEN™ V-IZ suitable for materials, pharmaceuticals, and electronic components where surface oxidation or chemical reactivity at elevated temperatures would compromise product quality or analytical results.

The vacuum valve switch and exhaust valve are accessible on the instrument front panel, giving operators direct manual control over vacuum application and venting. A front-mounted vacuum gauge displays chamber pressure in real time, allowing operators to confirm vacuum integrity before and during thermal processing without connecting external measurement equipment.

Temperature Control and Process Management

Each shelf's microcomputer control system continuously monitors its dedicated shelf temperature sensor and adjusts heating output to maintain the programmed setpoint within $\pm 1^\circ\text{C}$ at 105°C. An over-temperature alarm activates when a shelf temperature exceeds its programmed threshold — providing a safety layer for unattended vacuum drying runs across multi-hour programs. A programmable timer supports run durations from 0 to 9999 minutes, sufficient for both short degassing cycles and extended overnight or multi-day vacuum drying oven programs. A power recovery function retains all active setpoints, timer states, and process data following any power interruption, protecting long-cycle vacuum processes

from uncontrolled restart or data loss.

Chamber Construction and Vacuum Integrity

The working chamber interior uses stainless steel construction for corrosion resistance and compatibility with the broad range of chemical compounds typically processed in a laboratory vacuum oven. The exterior shell is fabricated from cold-rolled steel plate with an electrostatically sprayed finish. The door incorporates a silicone rubber perimeter seal with an adjustable door mechanism that ensures consistent seal compression across the service life of the unit — a direct determinant of sustained vacuum performance. The toughened, bulletproof double glass door window allows visual monitoring of samples on all shelf levels during vacuum operation without venting the chamber.

TECHNICAL SPECIFICATIONS

Vacuum Oven with Independent Shelf Temperature Control —
ToronOVEN™ V-IZ Series Technical Specifications

Parameter	ToronOVEN™ V-IZ 30	ToronOVEN™ V-IZ 53	ToronOVEN™ V-IZ 100	ToronOVEN™ V-IZ 250	ToronOVEN™ V-IZ 500
Chamber Volume (L)	30	53	100	250	500
Temp. Range (°C)	RT+10 to 250				
Temp. Fluctuation at 105°C (°C)	±1				
Vacuum Degree (Pa)	133				
Rated Power (W)	450	1200	1400	2800	4000
Voltage	220V ±10V, 50/60 Hz (110V is also available)				380V ±10V, 50 Hz
Timer Range (min)	0-9999				

Parameter	ToronOVEN™ V-IZ 30	ToronOVEN™ V-IZ 53	ToronOVEN™ V-IZ 100	ToronOVEN™ V-IZ 250	ToronOVEN™ V-IZ 500
Internal Dimensions W×D×H (mm)	320×320×300	415×370×345	450×500×450	600×600×700	630×810×845
External Dimensions W×D×H (mm)	480×530×615	575×550×675	620×640×780	770×780×1030	800×990×1175
Number of Shelves	1	2	2	3	4
Net Weight (kg)	45	72	88	175	302
Gross Weight (kg)	55	84	103	194	335
Package Size (mm)	610×580×800	645×690×835	740×770×935	880×865×1243	1090×970×1405



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