



TORONTECH

BOTANICAL EXTRACTION VACUUM OVEN



Botanical Extraction Vacuum Oven — ToronOVEN™ BE Series

ToronOVEN™ BE is a compact benchtop vacuum oven designed for laboratory applications that require low-pressure thermal processing — drying, degassing, curing, and heat treatment of moisture-sensitive, oxidation-prone, or thermally delicate samples that cannot be reliably processed in a standard drying oven or blast drying oven at atmospheric pressure. Operating across a temperature range of RT+5°C to 250°C and achieving a vacuum degree of 133 Pa, this vacuum oven removes the atmospheric oxygen and moisture that conventional forced-convection ovens cannot eliminate, enabling lower-temperature drying of heat-sensitive materials without oxidative degradation.

Available in two chamber volumes — 25 L and 53 L — the ToronOVEN™ BE series addresses compact laboratory needs where benchtop footprint, sample protection, and precise vacuum-thermal control are the primary procurement criteria. The microcomputer single-chip temperature control system governs all thermal operations, with temperature fluctuation held to $\pm 1^\circ\text{C}$ at 105°C across both models. A dual-screen high-brightness Nixie tube display with touch buttons provides a clear, accessible interface for setpoint entry and process monitoring. A programmable timer supports run durations from 0 to 999 minutes, and a power recovery function retains all active settings and data following unexpected power interruptions.

The toughened, bulletproof double glass door with an adjustable silicone rubber seal maintains chamber integrity under vacuum conditions while allowing visual monitoring of samples during operation — an important practical feature for processes where sample behavior during drying or degassing needs to be observed without breaking the vacuum. A vacuum pump is available as an optional accessory for laboratories that do not have an existing house vacuum supply.

APPLICATIONS

Botanical Extraction Vacuum Oven — ToronOVEN™ BE Series Applications

The ToronOVEN™ BE is suited to laboratory and research environments where vacuum-assisted thermal processing is required to protect samples from oxidation, enable low-temperature drying, or achieve moisture removal that atmospheric drying oven conditions cannot support:

- Vacuum Drying of Moisture-Sensitive Materials: the primary application for this vacuum oven; removing moisture from hygroscopic pharmaceutical excipients, powders, and granules at lower temperatures than atmospheric drying permits, reducing thermal degradation risk
- Degassing and Outgassing: removal of dissolved gases, trapped air, and volatile compounds from adhesives, resins, epoxies, silicones, and polymer materials prior to casting, bonding, or testing
- Pharmaceutical Manufacturing and QC: drying of active pharmaceutical ingredients (APIs), granules, and solid dosage intermediates under controlled vacuum conditions that meet process validation requirements
- Electronics and Semiconductor Processing: low-temperature drying and outgassing of PCBs, sensors, encapsulants, and electronic assemblies where atmospheric oxygen exposure during heating would cause oxidation or component damage
- Food Science and Analytical Chemistry: moisture content determination and loss-on-drying analysis for food, feed, and agricultural samples requiring vacuum conditions per standard methods
- Materials Research: thermal treatment, annealing, and curing of advanced materials — polymers, composites, ceramics, and nanomaterials — under controlled vacuum atmosphere
- Cannabis and Botanical Extraction: purging of residual solvents from concentrates and botanical extracts under controlled vacuum and temperature conditions in compliance with applicable laboratory processing standards
- Research and Academic Laboratories: general-purpose vacuum oven applications for chemistry, materials science, pharmaceutical science, and engineering research programs requiring oxygen-free or low-pressure thermal processing



FEATURES

Botanical Extraction Vacuum Oven — ToronOVEN™ BE Series Key Features

Control System and Display

- Dual-screen high-brightness Nixie tube display showing setpoint and measured temperature simultaneously on separate readouts
- Touch button interface for direct, wear-resistant parameter entry
- Microcomputer single-chip temperature control system with over-temperature alarm for process safety monitoring
- Integrated timer function: 0-999 minutes for flexible run duration scheduling
- Power recovery function retains all active setpoints, timer state, and process data after power interruption or system halt

Vacuum Performance

- Vacuum degree: 133 Pa — sufficient for effective low-temperature moisture removal and oxygen-free thermal processing
- Silicone rubber door seal maintains chamber vacuum integrity under continuous low-pressure operation
- Adjustable door positioning for consistent seal compression and long-term vacuum performance

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 without venting the chamber during operation
- Two shelves standard across both models for flexible sample loading configurations

Optional Accessories

- Vacuum pump available as an optional accessory for laboratories without existing house vacuum supply

THEORY & METHOD

Theory and Method

Vacuum-Assisted Thermal Processing

The ToronOVEN™ BE operates on the principle that reducing chamber pressure below atmospheric lowers the boiling point of moisture and volatile compounds present in samples. At 133 Pa — the vacuum degree achieved by this series — water boils at approximately 51°C rather than 100°C at sea level. This means moisture-sensitive samples that would be damaged by conventional drying oven temperatures can be thoroughly dried at significantly lower setpoints, preserving chemical integrity, structural properties, and biological activity that heat exposure would otherwise compromise.

The absence of atmospheric oxygen within the evacuated chamber also eliminates oxidative degradation during heating — a requirement for processing metals, polymers, pharmaceuticals, and electronic materials where surface oxidation, color change, or chemical reactivity at elevated temperatures would affect product quality or analytical results. This combination of low-pressure and controlled-temperature processing is the defining capability of a vacuum oven and the primary reason it serves applications that neither a standard drying oven nor a blast drying oven can address.

Temperature Control System

The ToronOVEN™ BE uses a microcomputer single-chip temperature control system that continuously monitors the internal chamber sensor and adjusts heating element output to maintain the programmed setpoint. Temperature resolution supports precise setpoint management, and fluctuation at 105°C is rated at $\pm 1^{\circ}\text{C}$ across both models. An over-temperature alarm activates when the internal temperature exceeds the programmed threshold, providing a safety layer for unattended vacuum drying runs where operator presence between access intervals may be limited. A power recovery function retains all active program data, setpoints, and timer state following any power interruption, protecting ongoing vacuum thermal processes from data loss and uncontrolled restart conditions.

Chamber Construction and Vacuum Integrity

The chamber shell is fabricated from cold-rolled steel plate with an electrostatically sprayed exterior finish. The inner working chamber uses stainless steel construction for corrosion resistance and compatibility with the broad range of chemical compounds typically processed in a laboratory vacuum oven. The door incorporates a silicone rubber perimeter seal that compresses under vacuum load to maintain chamber integrity at the specified 133 Pa vacuum degree. The toughened, bulletproof double glass door window allows visual monitoring of sample behavior during vacuum drying, degassing, or curing cycles without requiring the chamber to be vented. The door position is adjustable to ensure consistent seal compression across the service life of the unit.

Timer and Process Control

The integrated timer supports run durations from 0 to 999 minutes, covering both short-cycle degassing operations and extended multi-hour vacuum drying programs. The dual-screen high-brightness Nixie tube display presents setpoint and measured temperature simultaneously on separate readouts, allowing operators to confirm process status at a glance. Touch buttons provide clean, direct interface access without the mechanical wear of rotary controls — a practical consideration for laboratory equipment used frequently in shared environments.

TECHNICAL SPECIFICATIONS

Botanical Extraction Vacuum Oven — ToronOVEN™ BE Series Technical Specifications

Parameter	ToronOVEN™ BE 25	ToronOVEN™ BE 53
Chamber Volume (L)	25	53
Temp. Range (°C)	RT+5 to 250	RT+5 to 250
Temp. Fluctuation at 105°C (°C)	±1	±1
Vacuum Degree (Pa)	133	133
Rated Power (W)	900	1400
Voltage	220V ±10V, 50/60 Hz (110V is also available)	
Timer Range (min)	0-999	0-999
Internal Dimensions W×D×H (mm)	300×296×275	415×370×344
External Dimensions W×D×H (mm)	590×430×475	710×505×550
Number of Shelves	2	2
Net Weight (kg)	40	64
Gross Weight (kg)	49	74
Package Size (mm)	690×570×630	810×650×700



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