



PROGRAMMABLE DRUG STABILITY TEST CHAMBER

Programmable Drug Stability Test Chamber - ToronDST™ P Series

ToronDST™ P Series is a pharmaceutical-grade drug stability test chamber and temperature humidity incubator designed for ICH-compliant long-term, intermediate, and accelerated stability studies. Available in six capacity options from 150 L to 1,600 L, it combines precise dual-parameter temperature and humidity control with a 5-year on-board data archive, role-based access control, and a comprehensive seven-layer protection system delivering the environmental control, data integrity, and sample security required in regulated pharmaceutical and research environments.

The ToronDST™ P Series is a drug stability test chamber built for pharmaceutical laboratories, contract research organizations (CROs), and quality-control departments that require ICH-aligned temperature and humidity conditioning for stability programs without the extended data archive depth of the premium ToronDST. As a fully featured temperature humidity test chamber and temperature humidity incubator, it independently controls both temperature (0°C to 70°C without humidification; 10°C to 60°C with humidification) and relative humidity (25–98% RH for smaller models; 30–95% RH for larger models) with a temperature fluctuation of $\pm 0.5^{\circ}\text{C}$ at 25°C across all six variants.

The BRIGHT I control system continuously monitors and automatically compensates its control parameters in response to changes in the ambient laboratory environment, maintaining accurate setpoints without manual recalibration. A 30-segment, 99-cycle programmable engine enables automated execution of complex multi-step temperature and humidity profiles for accelerated aging, intermediate, and long-term stability conditions. On-board non-volatile memory stores equipment data records with exact timestamps for over 5 years (no SD card required) and exports data via USB in a tamper-evident, non-modifiable file format to support audit-trail requirements.

Practical design features include a glass observation inner door for sample inspection without chamber entry, manually adjustable circulating air volume to match varying shelf loads, rapid post-door-opening recovery of both temperature and humidity, an LED-illuminated interior for photostability studies, a water tank with built-in water shortage alarm, a mechanical lock for sample access control, and a built-in printer for immediate hard-copy record output. Single-door models (150 L, 250 L, 400 L) serve dedicated stability conditions; side-by-side door models (800 L, 1,000 L, 1,600 L) support high-throughput programs.

APPLICATIONS

Programmable Drug Stability Test Chamber - ToronDST™ P Series

Applications

The ToronDST™ P Series drug stability test chamber and temperature humidity test chamber is well suited to a wide range of regulated and research applications, including:

- ICH Q1A long-term drug stability studies (25°C / 60% RH)
- ICH accelerated stability testing (40°C / 75% RH)
- Intermediate stability studies (30°C / 65% RH)
- Pharmaceutical packaging & container-closure integrity testing
- Biopharmaceutical & vaccine stability evaluation
- Medical device humidity & temperature conditioning
- Photostability studies (ICH Q1B) with LED illumination module
- Cosmetic & personal care product shelf-life validation
- Nutraceutical & dietary supplement stability testing
- CRO & contract manufacturing organization (CMO) stability programs



FEATURES

Programmable Drug Stability Test Chamber - ToronDST™ P Series Key Features



- BRIGHT I adaptive control system automatically compensates PID control parameters in response to changes in ambient laboratory conditions — maintaining accurate temperature and humidity setpoints without manual recalibration throughout the study duration
- 30-segment, 99-cycle programmable engine enables fully automated execution of complex multi-step temperature and humidity profiles — supporting accelerated aging ramps, intermediate stability cycling, and any custom time-temperature-humidity protocol required by the study design
- On-board data logger stores equipment event and environmental records for more than 5 years without an SD card, timestamps every record with exact date and time, and exports via USB in a tamper-evident, non-modifiable file format — delivering a traceable audit trail for 21 CFR Part 11 and ICH Q1A(R2) compliance
- Multi-level user permission system restricts access to settings, calibration, and data management functions based on assigned roles — supporting GMP-compliant access control and preventing unauthorized changes to active stability studies
- Real-time data and trend curve viewing allows operators to monitor current temperature, humidity, and historical performance graphically on the touchscreen controller without pausing or interrupting the running program

- Manually adjustable circulating air volume allows operators to fine-tune airflow intensity to match the actual sample load on the shelves — ensuring uniform temperature and humidity distribution across the working space regardless of shelf occupancy level
- Rapid post-door-opening recovery system quickly restores both temperature and humidity to setpoint after each chamber entry, minimizing out-of-specification exposure time for samples stored throughout the chamber
- Seven-layer protection system provides comprehensive coverage of all critical failure modes: a. Upper & lower limit over-temperature alarm b. Over-temperature automatic shutdown c. Door-open alarm d. Water shortage alarm e. Sensor fault alarm f. Overload & leakage protection g. Compressor over-temperature protection
- Glass observation inner door allows visual inspection of chamber contents and shelf loading status at any time without opening the outer door and disturbing the controlled environment — minimizing recovery cycles during long-duration stability runs
- Mechanical door lock with glass lock group secures chamber contents against unauthorized access between scheduled inspection intervals, supporting GMP sample security requirements for pharmaceutical stability programs
- Built-in printer provides immediate on-demand hard-copy output of operating data, alarm events, and study records — eliminating the need for an external printer and supporting paper-based documentation requirements in regulated laboratory environments

THEORY & METHOD

Theory and Method

ToronDST™ P Series operates as a combined temperature humidity test chamber and temperature humidity incubator, independently controlling both temperature and relative humidity within the working space. Temperature is managed by a compressor-based refrigeration circuit (for cooling below ambient) combined with electric resistance heating elements, modulated by the BRIGHT I PID controller. The BRIGHT I system continuously compares setpoint and actual temperature, adjusts heater and compressor output, and automatically compensates its control parameters when ambient laboratory

conditions shift, maintaining stable internal performance without operator intervention.

Humidity control is achieved through an evaporative humidification system supplied by an internal water tank. The system heats water to generate vapor, which is distributed throughout the chamber by a circulating fan whose speed is manually adjustable to match the actual sample load on the shelves. A precision combined temperature/humidity sensor provides continuous live feedback to the BRIGHT I controller, which modulates humidification and dehumidification output to maintain the RH setpoint within the specified tolerance. A dedicated water shortage alarm alerts operators before the water supply drops low enough to compromise humidity control or allow sensor damage.

After each door opening, the BRIGHT I system immediately initiates recovery of both temperature and humidity to setpoint, minimizing the duration and magnitude of out-of-specification conditions for stored samples. All operating data (temperature, humidity, user events, alarms, and system events) are written to internal non-volatile memory with exact timestamps, building a continuous, traceable record that covers more than 5 years of operation. This archive is exported via USB in a tamper-evident, locked file format suitable for regulatory review under 21 CFR Part 11 and ICH Q1A(R2). Multi-level user permissions restrict access to settings, calibration, and data management functions by role, supporting GMP-compliant access control for pharmaceutical stability programs.

TECHNICAL SPECIFICATIONS

Programmable Drug Stability Test Chamber - ToronDST™ P Series
Technical Specifications

Parameter	ToronDST™ P 15	ToronDST™ P 25	ToronDST™ P 40	ToronDST™ P 80	ToronDST™ P 100	ToronDST™ P 160
Volume (L)	150	250	400	800	1,000	1,600
Voltage	220V ±10V, 50/60 Hz (110V is also available)					
Ambient Temperature (°C)	10 - 30					

Parameter	ToronDST™ P 15	ToronDST™ P 25	ToronDST™ P 40	ToronDST™ P 80	ToronDST™ P 100	ToronDST™ P 160
Temp. Range without Humidification (°C)	0 – 70					
Temp. Range with Humidification (°C)	10 – 60					
Temp. Resolution (°C)	0.1					
Temp. Fluctuation at 25°C (°C)	±0.5					
Temp. Uniformity at 25°C (°C)	±1			±1.5		
Humidity Range (% RH)	25 – 95			30 – 95		
Humidity Fluctuation (% RH)	±3			±5		
Rated Power (W)	1,900	1,950	2,000	3,500	3,600	3,700
Timer Range per Segment (h)	1 – 9,999					
Interior Dimensions W×D×H (mm)	510×390×760	510×450×1,090	600×640×1,050	1,220×585×1,123	1,363×670×1,123	1,363×800×1,500
Exterior Dimensions W×D×H (mm)	650×820×1,400	650×880×1,724	745×1,070×1,695	1,362×1,068×1,789	1,362×1,168×1,789	1,562×1,238×2,039
Shelves — Standard / Max (pcs)	3 / 4	4 / 7	4 / 7	8 / 16	8 / 16	8 / 16
Door Type	Single			Side-by-side		
Shelves per Layer (pcs)	1					
Net Weight / Gross Weight (kg)	115 / 142	133 / 162	158 / 190	310 / 366	340 / 390	440 / 490
Package Size (mm)	790×1,000×1,610	790×1,210×1,930	890×1,250×1,900	1,510×1,250×2,010	1,510×1,400×2,010	1,710×1,490×2,250



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