



ADVANCED DRUG STABILITY TEST CHAMBER

Advanced Drug Stability Test Chamber - ToronDST™ A Series

ToronDST™ A Series is a pharmaceutical-grade drug stability test chamber engineered for ICH-compliant long-term, intermediate, and accelerated stability studies. Combining precision temperature and humidity control with a 10-year on-board data storage architecture, multi-level access permissions, and a comprehensive six-layer protection system, the ToronDST™ A Series meets the rigorous data integrity and audit-trail requirements of regulated pharmaceutical, biotechnology, and clinical research environments. Six capacity options span 150 L to 1,600 L to accommodate small-batch research through large-scale production stability programs.

The ToronDST™ A Series is a drug stability test chamber purpose-built for pharmaceutical and biopharmaceutical organizations that must demonstrate product shelf life and quality under precisely controlled temperature and humidity conditions. As a fully featured temperature humidity test chamber, it delivers the environmental control, data management, and security capabilities required by regulatory bodies in the United States, Canada, Europe, and internationally.

At its core is the BRIGHT II adaptive control system, which continuously monitors and automatically compensates control parameters in response to changing ambient environmental conditions to ensure that the chamber maintains its setpoints even as laboratory temperature and humidity fluctuate. A 30-segment, 99-cycle programmable engine supports complex time-temperature-humidity profiles for accelerated and intermediate stability studies. The on-board data logger stores equipment records for over 10 years without reliance on an SD card, timestamps every event with exact date and time, and exports audit-ready data via USB in a tamper-evident, non-modifiable file format — providing the complete data traceability chain that ICH Q1A and 21 CFR Part 11 frameworks require.

Practical laboratory design features include a glass observation inner door for visual inspection without chamber entry, manually adjustable circulating air volume to accommodate varying sample loads, rapid temperature and humidity recovery after door opening, an LED-illuminated interior for photostability studies, a built-in mechanical lock for sample security, and a built-in printer for immediate on-demand hard-copy records. Smaller single-door models (150 L, 250 L, 400 L) suit dedicated study conditions, while larger side-by-side door models (800 L, 1,000 L, 1,600 L) serve high-throughput stability programs.

APPLICATIONS

Advanced Drug Stability Test Chamber - ToronDST™ A Series Applications

The ToronDST™ A Series drug stability test chamber and temperature humidity test chamber is 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
- Cosmetic & personal care product shelf-life validation
- Nutraceutical & dietary supplement stability testing
- Food science moisture & temperature stress studies
- Electronic component & material humidity conditioning



FEATURES

Advanced Drug Stability Test Chamber - ToronDST™ A Series Key Features



- BRIGHT II adaptive control system automatically compensates PID control parameters in real time in response to changes in ambient laboratory conditions — maintaining precise temperature and humidity setpoints without manual recalibration, even as seasonal or HVAC-driven environmental fluctuations occur
- 30-segment, 99-cycle programmable engine enables fully automated execution of complex multi-step temperature and humidity profiles — supporting accelerated aging ramp sequences, intermediate stability cycling, and any custom time-temperature-humidity protocol required by the study design
- On-board data logger stores equipment event records for more than 10 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 — providing a complete, audit-ready data traceability chain for 21 CFR Part 11 and ICH Q1A 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 running stability studies

- Real-time data and trend curve viewing enables operators to monitor temperature and humidity performance graphically at the controller touchscreen — without interrupting running programs or requiring a separate connected computer
- Manually adjustable circulating air volume allows operators to fine-tune airflow intensity to match actual sample load configurations — ensuring uniform temperature and humidity distribution across the working space regardless of shelf occupancy
- 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 stability samples stored near the door
- Six-layer protection system provides comprehensive safety coverage across all critical failure modes:
 - Upper & lower limit over-temperature alarm
 - Over-temperature automatic shutdown
 - Door-open alarm
 - Sensor fault alarm
 - Overload & leakage protection
 - Compressor over-temperature protection
- Glass observation inner door allows visual inspection of chamber contents and shelf loading status without opening the outer door and disturbing the controlled environment — essential for minimizing recovery cycles during long-duration stability studies
- Mechanical door lock 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 a separate external printer and supporting paper-based record requirements in regulated environments

THEORY & METHOD

Theory and Method

The ToronDST™ A Series operates as a combined temperature humidity test chamber and temperature humidity incubator, independently controlling both temperature and relative humidity within the working chamber. Temperature control uses a refrigeration compressor (cooling) combined with electric resistance heating elements (heating), regulated by the BRIGHT II adaptive PID controller. The controller continuously measures the gap between setpoint and actual temperature and adjusts heater and compressor output accordingly, achieving a temperature fluctuation of $\pm 0.3^{\circ}\text{C}$ at 25°C across all six models.

Humidity control is achieved through an evaporative humidification system fed by an internal water tank. Heated water generates water vapor that is injected into and circulated throughout the chamber by a variable-speed fan. A precision temperature/humidity sensor continuously monitors both parameters and feeds data to the BRIGHT II controller, which modulates humidification output to maintain the setpoint within $\pm 2\%$ RH (smaller models) or $\pm 3\%$ RH (larger models). The circulating air volume is manually adjustable to compensate for varying sample volumes and shelf loading configurations, ensuring uniform distribution across the workspace.

After the door is opened and closed, the BRIGHT II system initiates a rapid recovery cycle that restores both temperature and humidity to setpoint as quickly as possible — minimizing the duration of out-of-specification exposure for stored samples. The BRIGHT II adaptive control system continuously compensates its PID parameters in response to changes in the ambient laboratory environment (temperature swings, seasonal changes), maintaining accurate internal conditions without requiring manual recalibration. All operating data (temperature, humidity, timestamps, alarm events, user login records, and system events) are written to the internal non-volatile memory in real time. This on-board archive stores over 10 years of records independently of any SD card or external storage medium, and exports data via USB in a locked, non-modifiable format that supports data traceability and audit-trail review under 21 CFR Part 11 and ICH Q1A frameworks.

TECHNICAL SPECIFICATIONS

Advanced Drug Stability Test Chamber - ToronDST™ A Series Technical Specifications

Parameter	ToronDST™ A 150	ToronDST™ A 25	ToronDST™ A 40	ToronDST™ A 80	ToronDST™ A 100	ToronDST™ A 160
Volume (L)	150	250	400	800	1,000	1,600
Votlage	220V +10V, 50/60 Hz (110V is also available)					
Ambient Temperature (°C)	10 – 30					
Temp. Range without Humidification (°C)	-10 ~ 85			0 ~ 85		
Temp. Range with Humidification (°C)	10 – 60					
Temp. Resolution (°C)	0.1					
Temp. Fluctuation at 25°C (°C)	±0.3					
Temp. Uniformity at 25°C (°C)	±0.8			±1		
Humidity Range (% RH)	15 – 98			20 – 98		
Humidity Fluctuation (% RH)	±2			±3		
Rated Power (W)	1,900	1,950	2,000	3,100	3,200	3,300
Timer Range per Segment (h)	1 – 9,999					
Interior Dimensions W×D×H (mm)	506×400×750	506×450×1,100	600×610×1,100	1,200×610×1,100	1,200×760×1,100	1,400×850×1,350

Parameter	ToronDST™ A 150	ToronDST™ A 25	ToronDST™ A 40	ToronDST™ A 80	ToronDST™ A 100	ToronDST™ A 160
Exterior Dimensions W×D×H (mm)	670×770×1,455	670×817×1,805	762×978×1,805	1,362×980×1,782	1,362×1,130×1,782	1,562×1,220×2,040
Shelves — Standard / Max (pcs)	3 / 6	4 / 12				
Door Type	Single			Side-by-side		
Shelves per Layer (pcs)	1					
Net Weight / Gross Weight (kg)	115 / 142	172 / 198	200 / 226	310 / 360	370 / 440	520 / 620
Package Size (mm)	830×980×1,660	830×1,030×2,010	930×1,190×2,010	1,510×1,160×2,010	1,510×1,310×2,010	1,710×1,400×2,250



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

