

Thermo Scientific Dionex UltiMate 3000 Thermostatted Column Compartment

Thermo Scientific™ Dionex™ UltiMate™ 3000 products are UHPLC compatible by design, establishing the new standard in conventional LC. Integrating hardware, software, and separation chemistry, we offer UHPLC to everyone—or all needs.



To ensure optimal performance for UHPLC and HPLC separations below, at, or above ambient temperature, a Thermo Scientific Dionex UltiMate 3000 Thermostatted Column Compartment is an essential module for each UltiMate 3000 system.

Versatile and Flexible

The UltiMate 3000 Thermostatted Column Compartments support wide temperature ranges, from 5 °C to 80 °C or 5 °C to 110 °C. They hold up to 12 columns (depending on column length) and columns with a length of up to 30 cm.

The column compartments can be equipped with a large variety of switching valves which are simple to install and easily accessible. The optional 2-position, 6- or 10-port, and 6-position, 7-port valves support advanced column switching techniques, such as the UHPLC+ Solutions for automated application switching, automated method scouting, automated on-Line SPE, parallel setup, and tandem operation.

Short equilibration times enable temperature step gradients and fast changes between methods with different temperatures.

Precise and Reliable

The forced-air design of the UltiMate 3000 Thermostatted Column Compartments provides homogeneous temperature distribution and excellent retention time precisions—even at fluctuating ambient temperature conditions.

Low-dispersion precolumn eluent heaters based on the Thermo™ Scientific™ Dionex™ Viper™ Fingertight fitting system can be applied for better peak shapes and higher resolution at elevated column temperatures. The actively controlled postcolumn cooler allows fast cooling of hot eluents behind the column, e.g. for lower detector noise.

Unique and Elaborate

Features like the opening mechanism of the front door of the column compartment, the Thermo Scientific™ Dionex™ AutoQ™ instrument qualification, column identification system, and system wellness reduce time and costs during operation, qualification and documentation, and improve regulatory compliance.



Figure 1. The UltiMate 3000 Rapid Separation and Standard Thermostatted Column Compartment provide room for up to 12 columns, depending on column length.

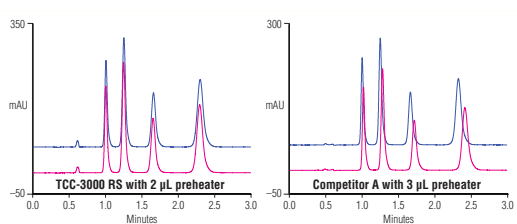


Figure 2. Comparison of two consecutive injections after a temperature change from 90 °C to 100 °C and additional 3.5 min of equilibration after the column oven reached the set-point and reported ready state.

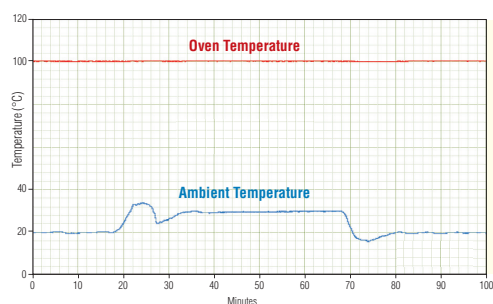


Figure 3. The UltiMate 3000 Thermostatted Column Compartment ensures stable column temperature – even when ambient temperature fluctuates significantly.

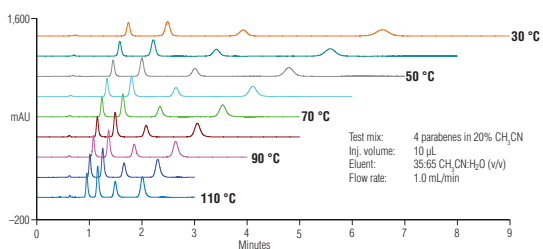


Figure 4. Low-dispersion precolumn eluent heaters provide excellent peak shapes over a wide temperature range.

UltiMate 3000 Thermostatted Column Compartments

The UltiMate 3000 Rapid Separation (RS) and Standard (SD) Thermostatted Column Compartments provide reliable column thermostating at temperatures of 5 °C to 110 °C (RS) and 5 °C to 80 °C (SD) for UHPLC and HPLC analyses of small and biomolecules at elevated, ambient, and sub-ambient temperatures. Both column compartments can incorporate up to 12 columns, depending on column length (Figure 1).

RS/Bio RS

The Rapid Separation (RS) Thermostatted Column Compartment offers highest flexibility in terms of temperature range (5 °C–110 °C), eluent precolumn heating and postcolumn cooling.

Biocompatible switching valves allow the routine use of aggressive mobile phases and buffers (salt and/or pH extremes) for metal-sensitive UHPLC analyses of biomolecules.

SD

The Standard (SD) Thermostatted Column Compartment is a cost-effective choice for conventional HPLC as well as biochromatography separations. It combines state-of-the-art LC with UHPLC compatibility by supporting temperatures up to 80 °C and precolumn heating (optional).

Fast and Efficient Column Heating and Cooling

UltiMate 3000 Thermostatted Column Compartments use large-area Peltier elements and a fan-based forced-air design to provide efficient cooling and heating.

This design ensures fast temperature equilibration upon startup, after opening the front door, and after changing the set temperature (Figure 2). In addition, this design prevents hot spots and provides homogeneous, stable temperatures throughout the entire compartment to guarantee maximum retention time precision.

A calibrated temperature sensor ensures accuracy, which is particularly important when transferring methods from one HPLC system to another.

- Short equilibration times
- Temperature step gradients
- Fast switching between methods with different temperatures
- Stable column oven temperatures even under fluctuating ambient temperatures (Figure 3)

Application Flexibility

UHPLC applications are often run at elevated temperatures where eluent viscosity is lower and analytes elute earlier. In contrast, chiral separations often require sub-ambient temperatures for greater peak resolution. With extended temperature ranges, from 5 °C (maximum 18 °C below ambient) to a maximum of 110 °C, the TCC-3000RS Column Compartment is ideally suited for a wide range of HPLC applications below, at, and above ambient temperatures.

Precolumn eluent heating and postcolumn cooling can further improve performance at higher temperatures. Small internal volumes ensure minimal additional gradient delay as well as low extra column volume to minimize peak dispersion, allowing for UHPLC analyses with highest resolution (Figure 4). The eluent precolumn heaters and postcolumn coolers use the Viper Fitting technology for virtually zero-dead-volume fluidic connections.

Integrated Switching Valves

The column compartment can be equipped with up to two switching valves. The 2-position, 6- or 10-port as well as 6-position, 7-port valves can be used to switch between multiple columns (Figure 6).

Advanced switching techniques, such as the UHPLC+ Solutions, can be easily handled and automated by the Thermo Scientific™ Dionex™ Chromeleon™ Chromatography Data System (CDS).

- Holds up to two 2-position, 6- or 10-port and 6-position 7-port valves for advanced column switching techniques.
- Titanium and PEEK valves are available for different bio-UHPLC and bio-HPLC applications.
- Switching valves with pressure ratings up to 103 MPa (15,000 psi) cover the whole pressure range of the UltiMate 3000 RS and SD platforms.



Figure 6. A large variety of switching valves support advanced switching techniques.

Column Identification System

The Column Identification System is a powerful feature of the UltiMate 3000 Thermostatted Column Compartment that simplifies documentation and regulatory compliance. The Column Identification System is simple; a small memory card is affixed to any UHPLC and HPLC column. When the column is placed in the oven, the card is inserted into the chip card reader (Figure 7).

The card accompanies the column for its lifetime and carries all relevant information: the Chromeleon CDS documents, the column ID and column variables with every analysis, and allows automatic inclusion of this information in your reports.

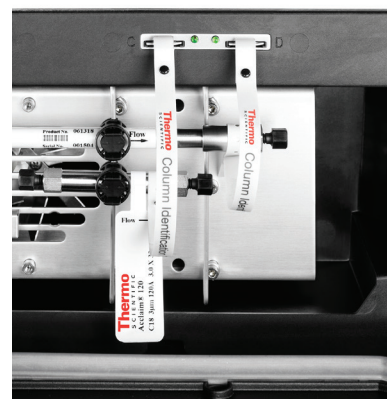


Figure 7. The column identification system enables automatic documentation of important column variables for regulatory compliance and improved laboratory management.

Operational Safety

The UltiMate 3000 Thermostatted Column Compartment is equipped with sensors for humidity and organic vapor. In the event of an error, an audible alarm is activated. Errors are immediately communicated, and with Chromeleon CDS an intelligent response to each error can be preset in the software (e.g., running an automated emergency shutdown routine).

AutoQ Equipment Qualification

The Dionex AutoQ instrument qualification routines automate otherwise time-consuming qualification tasks. With control by Chromeleon CDS, the following tests are performed automatically:

- Installation Qualification
- Operational Qualification
- Performance Qualification

Upon completion, the software creates comprehensive reports including passed/failed checks and charts.

System Wellness for Reliability

By ensuring reliable operation and minimizing downtime for maintenance, the system wellness functionality helps you to detect small problems before they become big ones.

- Limits for temperature and column-specific variables (for example, maximum number of injections, maximum pressure, and expiration date) can be set.
- Proper door closure is monitored.
- Safety sensor monitoring.

All actions are reported to the user and documented in the Chromeleon instrument audit trail. Predictive performance indicators, such as the number of valve switches, make scheduling routine maintenance easy.

ULTIMATE 3000 THERMOSTATTED COLUMN COMPARTMENT SPECIFICATIONS

Column Compartment Class	 	
	TCC-300RS	TCC-3000SD
Temperature Range	5 °C–110 °C Max. 18 °C below ambient	5 °C–80 °C Max. 18 °C below ambient
Temperature Accuracy	±0.5 °C	
Temperature Stability	±0.1 °C	
Temperature Precision	±0.1 °C	
Heatup/Cooldown Time	Typically 12 min from 20 °C to 50 °C/Typically 15 min from 50 °C to 20 °C at ambient temperature of 25 °C	
Column Capacity	Up to 12 columns, depending on column length Max. column length: 30 cm	
Postcolumn Cooler Capacity	TCC-3000RS only: $\Delta T > 40$ °C at 3 mL/min water and 100 °C compartment temperature	
GLP Features	Full support of Automatic Equipment Qualification (Dionex AutoQ), Qualification Status and System Wellness Monitoring All system parameters are logged in the Chromeleon Audit Trail Column Identification System for four columns	
Communications	All functions controllable via USB	
I/O Interface	2 digital inputs, 2 programmable relay outputs	
Emission Sound Pressure Level	< 65 dB(A) in 1 m distance	
Dimensions (h × w × d)	19 × 42 × 51 cm (7.5 × 16.5 × 20 in.)	
Power Requirements	100–120 V, 60 Hz; 200–240 V, 50 Hz	
Weight	13.0 kg (28.7 lb)	12.8 kg (28.2 lb)

Fully Controlled by Various Software Packages

All thermostatted column compartments are controlled by a variety of software programs.

Chromeleon Software

No other data system comes close to providing the capabilities and the usability of the Chromeleon Chromatography Data System (CDS) software—it's Simply Intelligent™. The software is designed to take users from samples to results in the shortest possible time.

Sequence set-up, processing, and result calculations can all be performed quickly, easily, and without training. It controls IC, LC and GC instruments from a wide range of manufacturers.

Other Software Integration

Chromeleon software has the capability to integrate full instrument control for the complete range of UltiMate 3000 LC modules with other software. Thermo Scientific™ Dionex™ DCMS^{LINK}™ provides the integration with Xcalibur, Analyst®, and HyStar™ mass spectrometry software. Additionally, UltiMate 3000 instrument interfaces are available for Thermo Scientific Atlas and Empower™ 2 and 3 chromatography data acquisition software. These solutions provide Chromeleon's advanced instrument control capabilities in the user's familiar software environment.

Enjoy Industry-Leading Support

Thermo Fisher Scientific Customer Support Centers are located in the United States, Europe, and Asia. These state-of-the-art laboratories are equipped with the full line of Thermo Scientific instrumentation and software capabilities. Support Centers provide accessible locations for advanced training and enhanced application development capabilities. Users can visit these laboratories or sign up to learn new skills in addressing challenging applications, receive training and support, and discover new, innovative HPLC, GC, and IC solutions.

Ordering Information

Thermostatted Column Compartment	Part Number
Rapid Separation Thermostatted Column Compartment TCC-3000RS	5730.0000
Thermostatted Column Compartment TCC-3000SD	5730.0010
Valve Actuators	
Valve Actuation HT Right Side, < 125 MPa (18,130 psi)	6730.0001
Valve Actuation HT Left Side, < 125 MPa (18,130 psi)	6730.0002
Valve Actuation HP Right Side, < 41 MPa (6000 psi)	6730.0003
Valve Actuation HP Left Side, < 41 MPa (6000 psi)	6730.0004
Valve Pods < 103 MPa (15,000 psi)	
Pod 2-position, 6-port HT Valve, SST, pH 0-14, < 103 MPa (15,000 psi)	6730.0006
Pod 6-position, 7-port HT Valve, SST, pH 0-14, < 103 MPa (15,000 psi)	6730.0016
Pod 2-position, 10-port HT Valve, SST, pH 0-14, < 103 MPa (15,000 psi)	6730.0026
Pod 2-position, 6-port HT Valve, Ti, pH 0-14, < 103 MPa (15,000 psi)	6730.0031
Pod 2-position, 10-port HT Valve, Ti, pH 0-14, < 103 MPa (15,000 psi)	6730.0032
Valve Pods < 41 MPa (6000 psi)	
Pod 2-position, 6-port HP Valve, SST, pH 0-10, < 41 MPa (6000 psi)	6722.9013
Pod 2-position, 10-port HP Valve, SST, pH 0-10, < 41 MPa (6000 psi)	6722.9023
Pod 6-position 7-port HP Valve, Ti, pH 0-10, < 41 MPa (6000 psi)	6722.9035
Valve Pods < 34 MPa (5000 psi)	
Pod 2-position, 6-port HP Valve, PEEK®, pH 0-14, < 34 MPa (5000 psi)	6723.9013
Pod 2-position, 10-port HP Valve, PEEK, pH 0-14, < 34 MPa (5000 psi)	6723.9023
Precolumn Eluent Heaters and Postcolumn Eluent Cooler Inserts	
1 µL Precolumn Heater, Viper, ID 0.10 mm, SST, < 125 MPa (18,130 psi)	6722.0510
2 µL Precolumn Heater, Viper, ID 0.13 mm, SST, < 125 MPa (18,130 psi)	6722.0530
7 µL Precolumn Heater, Viper, ID 0.18 mm, SST, < 125 MPa (18,130 psi)	6722.0540
11 µL Precolumn Heater, Viper, ID 0.25 mm, SST, < 125 MPa (18,130 psi)	6722.0550
2 µL Postcolumn Cooler Insert, ID 0.13 mm, SST	6730.0008

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Thermo Scientific Dionex products are designed, developed, and manufactured under an ISO 9001 Quality System.

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