

TurboMatrix Thermal Desorbers

Five different PerkinElmer® TurboMatrix™ Thermal Desorber (TD) models are available:

TurboMatrix 100 TD. Single-tube, manual-pneumatics model, upgradeable to the automated version. Also includes a separate trap-clean-and-test function, which saves time and protects the GC column and detector. Upgradeable to TurboMatrix 150 ATD.

TurboMatrix 150 ATD. Automated sampling of up to 50 tubes with manual pneumatics. Overlaps tube desorption with GC analysis for optimum productivity. Includes a separate trap-clean-and-test function which saves time and protects the GC column and detector.

TurboMatrix 300 TD. Single-tube model, incorporating programmable pneumatic control (PPC), upgradeable to the automated version. Supports pressure and flow control with linear velocity read-out of the carrier gas through the GC column. Also includes a separate trap-clean-and-test function which saves time and protects the GC column and detector. Upgradeable to TurboMatrix 350 ATD.

TurboMatrix 350 ATD. Automated sampling of up to 50 tubes, incorporating PPC. Supports pressure and flow control with linear velocity read-out of the carrier gas through the GC column. Overlaps tube desorption with GC analysis for optimum productivity. Allows the ability to condition tubes during chromatography to minimize downtime and enhance productivity and also includes a separate trap-clean-and-test function which saves time and protects the GC column and detector.

TurboMatrix 650 ATD. Automated sampling of up to 50 tubes, incorporating all of the performance features of the TurboMatrix 350 ATD model plus the ability to re-collect sample (on the source or a new tube) for repeat analysis, the ability to perform dry purge of the tube in sampling direction without the internal standard accessory, and the ability to perform tube and trap impedance measurement as a diagnostic of adsorbent bed condition.

Hardware

Sample tube capacity	TurboMatrix 100 and 300 TD models: single industry-standard sample tube. TurboMatrix 150, 350 and 650 ATD models: 50 industry-standard sample tubes.
Sample tubes	Stainless steel, glass and glass-lined stainless steel sample tubes are available. Each tube is etched with a unique serial number for traceability. Stainless steel tubes may also be fitted with clips that accept adhesive labels for identification. Tubes can be ordered either empty or pre-packed with a variety of adsorbents for active and diffusive (passive) sampling.
Desorptions	Up to 98 or continuous.
PPC	Standard on TurboMatrix 300 TD, 350 and 650 ATD. Provides control of carrier pressure, desorb flow rate, inlet split flow rate, outlet split flow rate with linear velocity read-out.
Tube and trap impedance test	Checks if the packing has settled in the tube or trap or if the tube or trap packing is fragmenting, causing partial blockage. <i>Note: Standard on TurboMatrix 650 ATD.</i>
Tube and trap dry purge	Provides more efficient moisture removal. Trap dry purge supported on all models. Tube dry purge supported on TurboMatrix 650 ATD or with internal standard accessory.

Sample split re-collection	Allows sample re-collection on same or different tubes to enable repeat analysis, without the need for an additional autosampler. <i>Note: Standard on TurboMatrix 650 ATD.</i>
Functional features	Each of the five TurboMatrix Thermal Desorber models incorporates a combination of functional features summarized in the table below.

	TurboMatrix 100 TD	TurboMatrix 150 ATD	TurboMatrix 300 TD	TurboMatrix 350 ATD	TurboMatrix 650 ATD
Automated sampling of up to 50 tubes	No	Yes	No	Yes	Yes
Integral control from data-handling system	Yes	Yes	Yes	Yes	Yes
Improved trap mounting	Yes	Yes	Yes	Yes	Yes
Improved high-temperature tube seal	Yes	Yes	Yes	Yes	Yes
Simplified transfer-line connection	Yes	Yes	Yes	Yes	Yes
Manifold and brazed connections	Yes	Yes	Yes	Yes	Yes
Trap dry purge	Yes	Yes	Yes	Yes	Yes
Separate trap-clean-and-test function	Yes	Yes	Yes	Yes	Yes
MS mode	Yes	Yes	Yes	Yes	Yes
Gas preservation	Yes	Yes	Yes	Yes	Yes
Tube conditioning during run	No	Yes	No	Yes	Yes
Electronic carrier-gas pressure/flow control (PPC)	No	No	Yes	Yes	Yes
Inlet-split, outlet-split, desorb flow rate, electronic control (PPC)	No	No	Yes	Yes	Yes
Pressure-pulsed desorption	No	No	Yes	Yes	Yes
Column leak test	No	No	Yes	Yes	Yes
Sample-split re-collection	No	No	No	No	Yes
Tube and trap impedance test	No	No	No	No	Yes
Dry purge of tube in sampling direction	Optional*	Optional*	Optional*	Optional*	Yes

**with the Internal Standard Option*

Primary desorption oven

Temp range 50 °C to 400 °C; Desorption time 1.0 min to 999.0 min

Quartz cold trap

Low temp range -40 °C to +150 °C (Peltier cooling – standard); -100 °C to +150 °C (LN₂ cooling – optional)

High temp range -40 °C or -100 °C to 400 °C

Time at high temp 0.0 to 999.0 min

Heating rates 5 °C/sec, 20 °C/sec, 40 °C/sec and ballistic

Gas-flow direction Backflush flow for optimal use of traps with multiple adsorbents during trap heating

Transfer line to GC

Length Choice of 1070 mm or 1800 mm

Temp range 50 °C to 300 °C

Material Direct connection of the column or fused silica tubing can be used to interface the unit with any gas chromatograph (GC).

Heated valve

Material	316 stainless steel valve body and inert Valcon T-type rotor for valve temperatures from 150 °C to 300 °C (standard). Sulfinert deactivation of valves and fittings optional.
Sample flow path	The tube desorption area, the cold trap and the transfer line are attached directly to the heated valve, minimizing the sample flow path. The heated valve is placed inside a single heated block, conveniently located at the front of the instrument and easily accessible.

Pneumatics

Carrier gas	Manual pneumatics models	Manual pneumatic control via a precision pressure regulator, settable from 0 to 60 psig (0 to 400 kPa); Pressure control split flow rates and primary desorption flow rates are controlled using high-precision needle valves.
	PPC models	Pressure: 0 to 60 psig (0 to 400 kPa); Split flow: 0 to 200 mL/min; A composite measure of fraction of original sample transferred to GC column is displayed; Desorb flow setting range from 0 to 200 mL/min; Carrier gas flow: 0-20 mL/min; Pressure and flow control supported on any GC.
Pneumatic valve actuation	All models require an external supply of dry (dew point -50 °C or below) compressed air in the pressure range of 70 to 90 psig (480 to 620 kPa). Consumption rate: 0.5 L/min (TD), 0.7 L/min (ATD).	
Sample protection	Initial check for adequate carrier gas pressure prior to tube loading. Sequence leak and pressure test completed on sample tube and cold trap before every tube desorption. Ambient temperature carrier gas purge of sample tube to remove air prior to desorption. Purge effluent is routed through the cold trap to avoid loss of volatile compounds. The TurboMatrix 650 ATD or standard addition accessory can also dry purge sample tube at ambient or elevated temperature in sampling direction to remove water prior to tube desorption.	

Control

Standalone operation	Each thermal desorber is a self-contained, standalone unit that can be connected to any GC. The thermal desorbers are controlled through a color graphical touch-screen user interface. Set and actual values of all parameters may be displayed at any time. <ul style="list-style-type: none">• Simple, one-touch operation• Single-method operation• Sequence-based, multi-method operation of up to eight methods• Password protection• Ten operating methods can be stored in the instrument• Parameters remain stored with last-used method directly available after power-up
Languages	English, French, German, Italian, Chinese, Japanese, Spanish and Russian.
Software control	Optional control software package available to operate TurboMatrix instruments from a Microsoft® Windows environment. The control software offers graphical representation of instruments and parameters with intuitive interaction. Sequence building follows the easy drag-and-drop principle. A run log tracks and saves information on samples and performed analyses for GLP compliance. Context-sensitive on-line help is available for all functions. Moreover, when configured into a PerkinElmer TotalChrom® CDS environment, all of the instrument's settings as well as the tube information and sequence build become part of the GC method.
GC/data system interfacing	Output signal lines for READY and RUN to start gas chromatograph and data-handling devices. Input lines for START, STOP and READY to control the thermal desorber externally.

Maintenance alarms	Settable injection counter alerts user when it is necessary to perform routine maintenance.
BCD/relay outputs	Used to provide output of BCD information regarding tube position numbers and relay output for timed control of external devices. <i>Note: Standard on all models.</i>

Optional accessories

Internal standard addition	Used to introduce a known quantity of a gaseous standard into the sample tube for internal-standard calibration and quality assurance. Internal standard is added to sample tube immediately before desorption and analysis in sampling direction to maintain sample integrity and allows standards with several compounds to be used on tubes with multiple adsorbents. Also enables dry purging of sample tubes, in sampling direction, for removal of water prior to desorption.
On-line sampling	System for on-line sampling of ambient air, gas streams or canisters. Includes mass flow controller for sample control, Nafion drier and dry air purge control. Stream selector to switch automatically between sample and calibrant. Thermal desorber can still be used for tube desorption.
Liquid nitrogen cooling	For operation of the cold trap to -100 °C. Requires pressurized liquid nitrogen dewar with pressure release valve set to 25 psi (180 kPa).

Physical details

Ambient operating conditions	Temperature range: 15 °C to 32 °C Humidity: 75% maximum RH without condensation
Power requirements	100/120/240 V ±10%, 50/60 Hz, 1.2 kVA
Dimensions	See table below

	TurboMatrix 100 and 300 TD	TurboMatrix 150, 350 and 650 ATD
Height	48 cm (19 in)	48 cm (19 in)
Width	43 cm (17 in)	43 cm (17 in)
Depth	34 cm (14 in)	56 cm (22 in)
Weight	25 kg (55 lb)	34 kg (75 lb)

PerkinElmer, Inc.
940 Winter Street
Waltham, MA 02451 USA
Phone: (800) 762-4000 or
(+1) 203-925-4602
www.perkinelmer.com



For a complete listing of our global offices, visit www.perkinelmer.com/lasoffices

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