

Aerodyne Gas Chromatograph

A field-deployable modular GC with thermal desorption pre-concentration for time-of-flight mass spectrometry

Features

Flexibility – up to three GC columns depending on application, pre-concentration methods (e.g. thermal desorption vs cryo-mechanical), detector type(s)

Field deployable – ruggedized GC with small, light-weight footprint for automated operation

Detector compatibility – true plug-and-play operation with all Aerodyne TOF-MS systems (hardware and software, including Tofwerk Acquity)

Dual detectors – designed to operate automatically with two detectors for a more complete data set

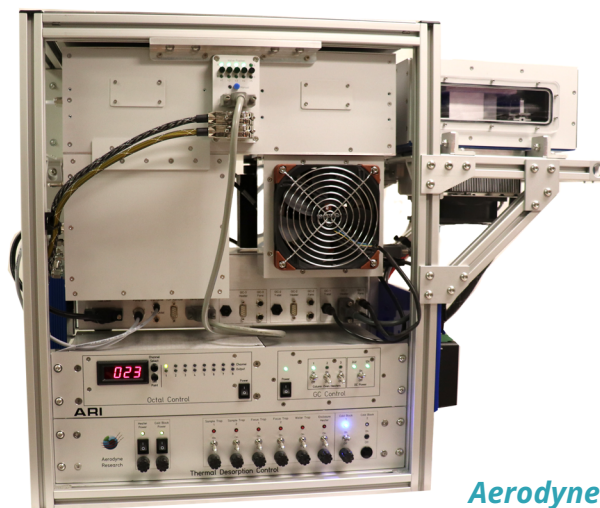
Turn-Key – ready-to-run on delivery due to pre-installed analytical column(s) with custom pre-loaded method(s)

Speed – flow path allows user to perform multiple GC operations at once; the benefit of this parallel operation is a faster GC cycle (10 – 30 min) without loss of performance

GC Technology

Aerodyne Research offers a modular gas chromatograph (GC) with thermal desorption preconcentration (TDPC) that combines recent innovations in fast GC separation with highly selective and sensitive detection in a field-deployable package for the measurement of VOCs and OVOCs.

Aerodyne works with our customers to provide a GC system with a **custom separation method** appropriate for their analytical needs. The instrument delivers with the required capillary column installed and analytical methods pre-loaded into the Windows-based control software, for a true **turn-key** operation.



*Aerodyne GC
equipped with two-stage thermal
desorption preconcentration system*

Data Analysis Software

Wavemetrics Igor Pro analysis software (TERN) allows for retention time correction, automated baseline and peak fitting.

TERN provides de-convoluted peak fitting for overlapping chromatographic peaks. Compatible for analysis of both high resolution (HR) and unit mass resolution (UMR) data.

Compatible Accessories

Sample Pre-concentrators

Thermal Desorption (TDPC)

Cryomechanical (CMPC)

Other commercial systems

(e.g. Markes Unity thermal desorption systems)

Detectors

Vocus PTR-ToF-MS

EI-ToF-MS

CIMS-ToF-MS

Other commercial detectors

(Agilent q-MS, FID, etc.)

Direct Injection Methods

Passivated sample loop

(0.005 – 1 mL)

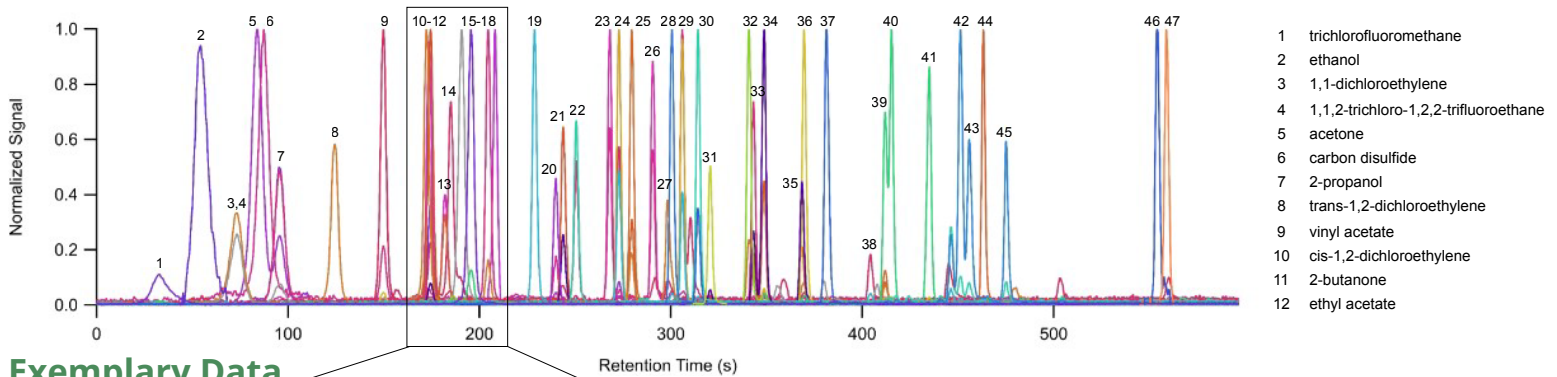
Split/Splitless Injection Port

Commercial autosamplers

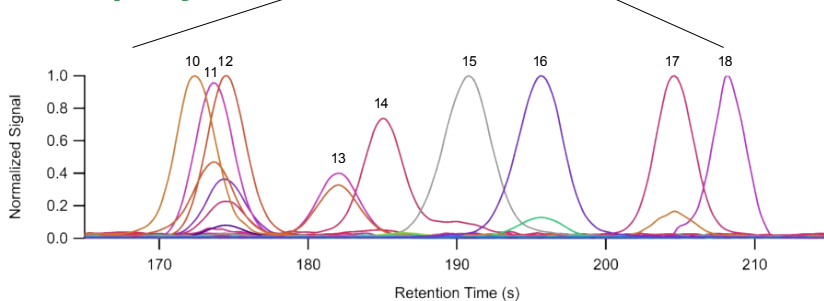
Aerodyne specializes in collaboration and custom design. Please contact us if you would like to discuss additional measurement options and applications.

Gas Chromatograph

TDPC-GC chromatographic separation of a selection of atmospherically relevant VOCs, detected with Vocus PTR-TOF-MS (proton transfer reaction time-of-flight mass spectrometry). Figure shows a 10 minute chromatographic separation typically performed by the GC system.



Exemplary Data



13	tetrahydrofuran	25	toluene	37	bromoform
14	chloroform	26	trans-1,3-dichloropropene	38	1,1,2,2-tetrachloroethane
15	1,1,1-trichloroethane	27	1,1,2-trichloroethane	39	4-ethyltoluene
16	carbon tetrachloride	28	tetrachloroethylene	40	1,3,5-trimethylbenzene
17	benzene	29	2-hexanone	41	1,2,4-trimethylbenzene
18	1,2-dichloroethane	30	dibromochloromethane	42	1,3-dichlorobenzene
19	trichloroethylene	31	1,2-dibromoethane	43	1,4-dichlorobenzene
20	1,2-dichloropropane	32	chlorobenzene	44	benzyl chloride
21	1,4-dioxane	33	ethylbenzene	45	1,2-dichlorobenzene
22	bromodichloromethane	34	m&p-xylenes	46	1,2,4-trichlorobenzene
23	cis-1,3-dichloropropene	35	o-xylene	47	hexachloro-1,3-butadiene
24	4-methyl-2-pentanone	36	styrene		

Specifications

Weight, Size, Power (TDPC-GC)

Weight: 45 kg
Dimensions: 65 cm x 110 cm x 30 cm
Max power: 600 W, 120/240 V, 50/60 Hz (start-up)
 300 W (typical operation)

Sampling / Reagent Gas Specifications

3-inlet system for analysis of sample (ambient), zero, and calibration gases
Sample gas: -40 to 50 °C; 0-90% RH; 50-125 kPa
Carrier gas compatibility: helium, nitrogen
Sample flow rate: up to 200 sccm, ± 1% accuracy
Carrier gas flow rate: up to 10 sccm
 Complete inert/passivated sample flow path (e.g. PFA, SilcoTek Siltek/Sulfinert passivated stainless steel)

REFERENCES

(1) Claffin, M. S., et al. (2021) Atmos. Meas. Tech. 14: 133-152. (2) Lerner, B. M., et al. (2017) Atmos. Meas. Tech. 10(1): 291-313. (3) Isaacman-Van Wertz et al. (2017) J Chromatogr A; 1529:81-92. doi: 10.1016/j.chroma.2017.11.005

Data Outputs

USB

Column Oven Specifications

Max heating rate: 120 °C/min
Max cooling rate: 250 °C/min
Max temperature: 260 °C
Temperature accuracy: ± 0.5 °C (ramped);
 ± 0.25 °C (isothermal)

Column compatibility: all fused silica and metal columns (60m @ ≤0.32mm ID, 30m @ ≥0.53mm ID)

Capillary columns are swappable without venting detector

Adsorbent Trap Compatibility

System compatible with all Markes International and equivalent sorbent tubes and focusing (cold) traps