

*Sulfur and Halogen analysis incl. Fluorine
Fast, Versatile and Robust*

Official testing methods

ASTM: D5987, D7359, D8150, UOP 991, ISO 19242, EN 17813



Automatic Quick Furnace for
Combustion Ion Chromatography

AQF-5000H

Horizontal Furnace Model

Nittoseiko Analytech Co.,Ltd.

AQF-5000H

Advanced, developed to the third generation powerful, fast solution for sulfur and halogen analysis.

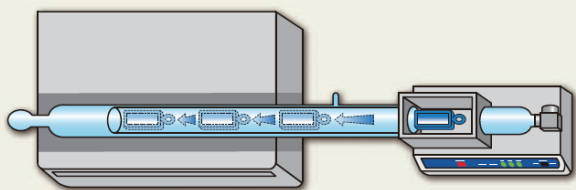
(Halogen: Fluoride, Chloride, Bromide and Iodide)

Effective for “PFAS screening tests”, “Halogen analysis in battery materials”, “environmental samples” and more ...

Features

EASY, SECURE AND REPEATABLE COMBUSTION

Easily customizable combustion programs that provide reliable combustion with full recovery.



HUMIDIFICATION COMBUSTION SYSTEM

Halogens can be measured with high precision because thermal hydrolysis is performed by stable humidification. The liquid volume can be adjusted to three levels, so it can accommodate a wide range of concentrations.

ABSORBENT CORRECTION

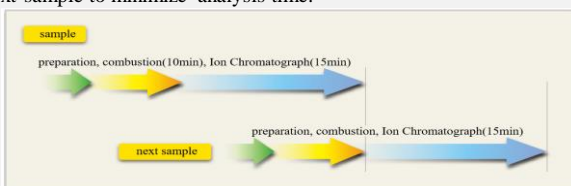
Constant volume function enables highly accurate analysis and easier operation. Since there is no longer a need to use Internal standards, samples with complex matrices can be measured.

VARIOUS SAFETY MEASURES

Equipped with a three-stage electric furnace overheating prevention function. An alert is displayed when the electric furnace was opened, ensuring safety and allowing use it with confidence.

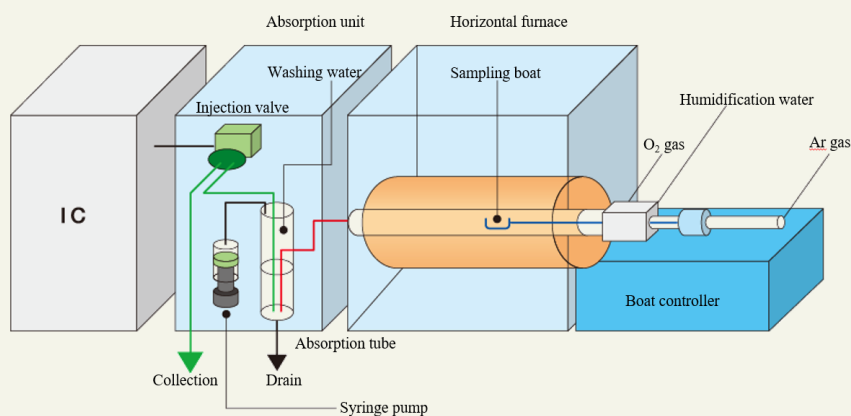
EFFICIENTLY CONTROLLED COMBUSTION

Established program controls total analysis and able to start Combustion of the next sample to minimize analysis time.



Measuring Principle

After samples are thermally digested in the Argon atmosphere they are combusted with oxygen and H_2O . Sulfur in the samples changed to SO_x and Halogens turn to Hydrogen Halide and Halogen gas. These elements will be trapped by the absorbent solution, then injected for IC analysis.



New Function

AUTOMATIC DILUTION of Absorption solution

After injecting the absorbent into the ion chromatograph, it is possible to automatically dilute the absorbent and perform re-measurement. By using the automatic dilution, samples containing both low and high concentration components can be measured in one combustion.

AUTOMATIC ADJUSTMENT of calibration standard

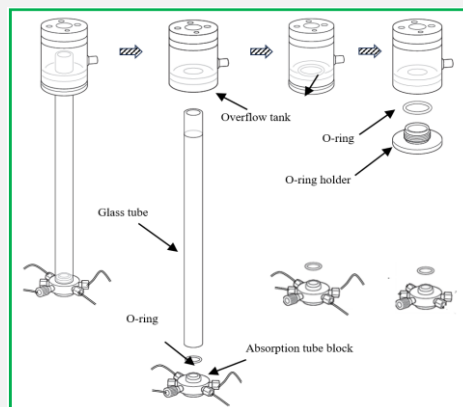
Using the optional syringe pump, it can be prepared calibration standard of different concentrations from one standard by automatic dilution. The function saves time for preparing calibration standards.

AUTOMATIC SWITCHING of Absorbent

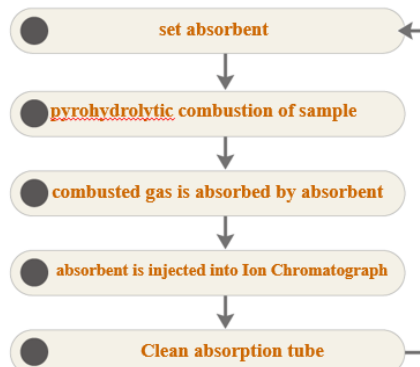
Absorption can be performed by selecting either a solution with redox agent or pure water. Automatic switching is possible according to the measurement item.

ASSEMBLING ABSORPTION TUBE

Easy maintenance since it is an assembled absorption tube consisting of a gas blowing pipe and the absorption unit body.



Process Flowchart



Options

■ Auto Sample Changer Model ASC-570LS for Solid and Liquid samples

ASC570LS can automatically measure each measurement target by switching between liquid measurement mode and solid measurement mode.



Samples tray type	Vial tray for liquid samples
	Boat tray for solid and non-volatile or viscous samples
Sample volume	Liquid: 100μl or less
	Solid: 150mg or less
Liquid	Injection system
	Gastight Microsyringe 25, 50, 100μl
Sample container	Vial with a septum, 2ml or 4ml capacity
	Sample vial quantity
Solid	2ml- 120pcs, 4ml- 84pcs
	Sample boat material
	Ceramic (Standard)
Sample boat quantity	49pcs
	Boat cooling
	Electronic colling (Peltier)
Power supply	AC 100/115/230/240V, 50/60Hz, 192VA
	Mass and weight
	500(W) x 460(D) x 600(H), Approx. 27kg

New

Plug-In Options

Optional units can be integrated directly into the gas absorption unit, combining smart appearance, quick upgrade possibility and easier maintenance

■ Combustion Monitor Model CM-500

CM-500 measures the oxygen concentration in combustion gases. Combustion conditions can be easily optimized by linking boat position and oxygen concentration.

■ Automatic Boat Controller Model ABC-500

Manually inject liquid samples and set up boats. The boat is introduced into the horizontal furnace according to a set program.



Sample type	Solid/Liquid
Sample volume	Liquid: 100μl or less, Solid: 150mg or less
Sample boat	Ceramic, Quartz
Boat cooling	Electronic colling (Peltier)
Power supply	AC 100/115/230/240V, 50/60Hz, 40VA
Mass and weight	450(W) x 250(D) x 180(H) mm, Approx. 9kg

■ Syringe Pump SP-C for calibration

It can be prepared calibration standard of different concentrations from one standard by automatic dilution.

Syringe volume	1ml
Power supply	24VDC
Mass and weight	110(W) x 340(D) x 275(H)mm, Approx. 4kg
Weight	Approx. 4kg



Applications

■ Sample: Polyethylene

Sample	Cl (ppm)	Br (ppm)	S (ppm)
1	72	173	82
2	76	189	89
3	70	167	79
Avg.	73	177	83
RSD(%)	4.5	6.5	6.6

■ Sample: Coal

Sample	F(ppm)	Cl (ppm)	S (%)
1	68	1138	1.43
2	70	1133	1.42
3	67	1086	1.40
Avg.	68	1138	1.42
RSD(%)	2.1	2.6	0.9

*Caution: Variations may occur due to sample composition, uniformity, weighing accuracy, etc.



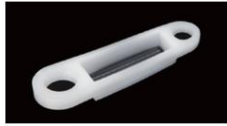


System Configuration



Official Testing Methods

No.	Description	Target Halogen
ASTM D5987	Standard Test Method for Total Fluorine in Coal and Coke by Pyrohydrolytic Extraction and Ion Selective Electrode or Ion Chromatograph Methods	F
ASTM D7359	ASTM D7359 is the standard Test Method for Total Fluorine, Chlorine and Sulfur in Aromatic Hydrocarbons and Their Mixtures by Oxidative Pyrohydrolytic Combustion followed by Ion Chromatography Detection (Combustion Ion Chromatography-CIC)	F, Cl, S
ASTM D8150	Standard Test Method for Determination of Organic Chloride Content in Crude Oil by Distillation Followed by Detection Using Combustion Ion Chromatography	Cl
ASTM D8247	Standard Test Method for Determination of Total Fluorine and Total Chlorine in Coal by Oxidative Pyrohydrolytic Combustion Followed by Ion Chromatography Detection	F, Cl
UOP 991	Trace Chloride, Fluoride, and Bromide in Liquid Organics by Combustion Ion Chromatography (CIC)	F, Cl, Br
ISO 19242	Determination of total sulfur content by ion chromatography	S
IEC 62321-3-2	Determination of certain substances in electrotechnical products - Part 3-2: Screening - Fluorine, bromine and chlorine in polymer and electronics by combustion-ion chromatography (C-IC)	Br
DIN 38409-59	Determination of adsorbable organically bound fluorine, chlorine, bromine and iodine (AOF, AOCl, AOBr, AOI) using combustion and subsequent ion chromatographic measurement	F
ASTM WK68866	New Test Method for Determination of Adsorbable Organic Fluorine in Waters and Waste Waters by Adsorption on Activated Carbon followed by Combustion Ion Chromatography	F
EPA 1621 Draft Method	Screening Method for the Determination of Adsorbable Organic Fluorine (AOF) in Aqueous Matrices by Combustion Ion Chromatography (CIC)	F

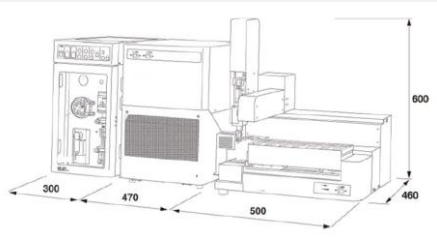
Sample Boats

Material	Ceramics	Porcelain	Sintered quartz	Quartz	Nickel (inner boat)
Appearance					

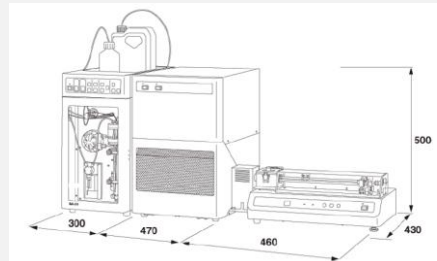
Standard Specifications

Sample introduction	Automated boat control
Sample	Solid, Liquid
Amount	1 – 150 mg (solid), 5 – 100 µL (liquid)
Sample Pyrolysis	High purity quartz tube (ceramic option)
Electric furnace	Max. 1,100 °C, Openable electric furnace, 2 heating zones (Temperature individually controlled)
Injection to IC	Loop 100µl (5, 20, 50, 200, 500, 1000 µL option)
Tubing material	Fluoro-resin (low blank), PEEK
Signal output	Contact signal to start Ion Chromatograph
Gas	Argon (purity 99.98 % or higher, 0.3 ± 0.1 MPa)
	Oxygen (purity 99.7 % or higher, 0.3 ± 0.1 MPa)
Power supply	AC100-240VAC, 50/60 Hz

Outline view and footprint



In combination with ASC-570LS



In combination with ABC-500

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