Test Item：Chemical Filter Performance Test
Manufacturer/Model：Taiwan Nitta Filter Co. Ltd./ NP-XX-R-T FF AA, 600*600*47 mm
Application No：JF55RD5000-157

Test Results and Descriptions

I. Test results

1.1. Initial Removal Efficiency

Challenge Gas	NH_3 (Ammonia)			
Face Velocity	0.3 m/sec (The value is calculated by 6.48 CMM of flow rate passing through a reference filter which has a cross-section of 600mm*600mm)			
Test items	Upstream Concentration	Downstream Concentration	Removal Efficiency	Time
Initial removal efficiency at low concentration	84.7 ppb	1.5 ppb	98.2 %	6 hours

II. Test Descriptions

2.1. Testing Date and Location

The chemical filter test was performed at ITRI GEL Chemical Filter Testing Laboratory during the period from January 21st, 2020.

2.2. Test Conditions

1. Temperature: 23±0.5℃; Relative Humidity: 50±3% RH.
2. Face Velocity: 0.3 m/s (This value is calculated by 6.48 CMM of flow rate passing through the reference filter, which has 600mm*600mm square cross-section)
3. It took one hour to purge and condition the testing chemical filter.

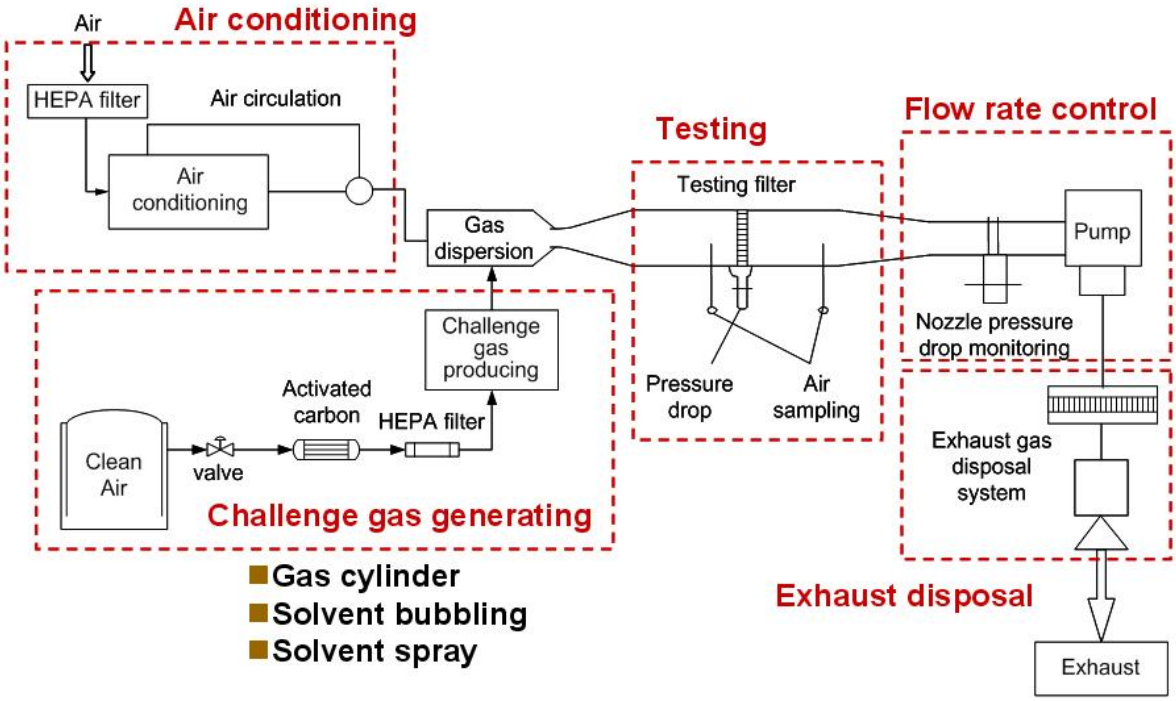
2.3. Test Instruments

Instrument	Brand	Documental no.	Measurement Range	Detection limit/ Accuracy	Sampling Type	Calibration Date
Differential Pressure Gauge #2 (for nozzle)	YOKOGAWA	926853	0 ~ 120 mm Aq	- / 0.2 mm Aq	On-line	2020.01.10
Thermometer	IZUDER	840353-07	10 ~ 35 °C	- / 0.5 °C	On-line	2020.01.10
Dew Point Gauge	GENERAL EASTEN	26467	5 ~ 30 °C	- / 0.5 °C	On-line	2020.01.10
Ion Chromatography	Metrohm MIC-3	069878	0.016 ppb ~ 1 ppm	0.016~0.081 ppb / 5% of Reading	Off-line	2019.10.28

2.4. Evidence of Traceability Standards

Instrument	Documental no.	Serial no.	Traceable source	Traceable documents	Expiration date
Differential Pressure Gauge #2 (for nozzle)	926853	12D421004－317	GEL-D500	K455CD5110-RA-0106	2021.01.09
Thermometer	840353-07	E941284	GEL-D500	K455CD5110-RA-0104	2021.01.09
Dew Point Gauge	26465	1931196	GEL-D500	K455CD5110-RA-0103	2021.01.09
Ion Chromatography	069878	069878	GEL-D500	J455CD5110-RA-1002	2019.10.28

Ⅲ. Appendix



Sketch of Gas-Phase Filter Testing Facility

The Definition of Removal Efficiency:

The removal efficiency (η) is defined as following,

$$\eta = \frac{C_{in} - C_{out}}{C_{in}} \times 100\%$$

Where C_{in} is the upstream concentration (ppm, ppb), C_{out} is the downstream concentration (ppm, ppb).

Filter Removal Capacity Determination:

The removal capacity (Q), which means total mass of challenge gas removed by a filter (g/filter), is calculated by

$$Q = C_{in}' \times V \times \frac{1}{0.082} \times \frac{1}{(273+T)} \times M \int \eta(t)dt \times 10^{-3}$$

Where C_{in}' is the upstream concentration (ppm), V is airflow rate (m^3/min), T is temperature (°C), M is the molecular weight of challenge gas (g/mole) and t is measuring time (min).

Photograph of the sample

Photograph of the testing