ART+

Aerosol Research & Technology Plus

The Clean Air Platform Company
www.art-plus.co.kr

Aerosol Research and Technology Plus

ART PLUS

Bio Aerosol
Particle
Gas
Others

COMPANY PROFILE

ART Plus delivers sustainable technological innovations across diverse industrial sectors, including environmental monitoring, data-driven solutions, and smart city platform development. We provide optimized environmental management systems and precision instruments for both public and private sectors.

Clean Air, Smarter Systems, Sustainable Tomorrow

Main Business Area

Product Sales

Measurement of particulate & gaseous substances, Emission reduction efficiency evaluation systems

- Bioaerosol measurement instruments
- Indoor and outdoor environmental monitoring devices
- Equipment for Testing and Evaluating the Performance of Air Filters, Masks, Sensors, and Air-Related Devices

Technical Services

Climate crisis solutions, carbon-neutral platform development, annual equipment performance inspection and calibration

- Standardization of Testing Technologies for Domestic and International Certification
- AI/Big Data-based environmental solutions
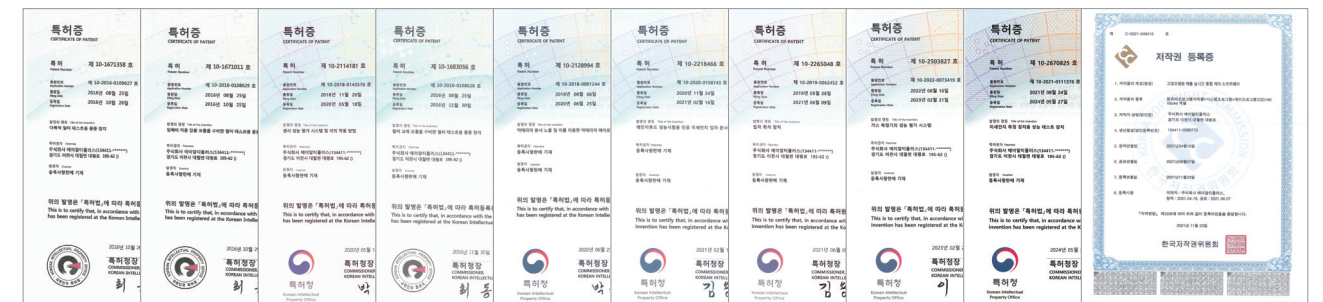
Research & Development

Research on related standard technologies and execution of government R&D projects

- Infrastructure development projects based on performance evaluation
- Development of lightweight sensor modules for unmanned aerial vehicles

Patents & Awards

HISTORY

2016-2017

- 2016.03 Established ART Plus Co., Ltd.
- 2016.11 Recognized as an affiliated research institute
- 2017.11 Awarded the of 'Group achievement award' by NASA

2018

- 2018.03 Acquired ISO 9001, 14001 quality environment management system certification
- 2018.11 Selected as a promising small business in Gyeonggi-do
- 2018.12 Selected as a frontier venture company by the Technology Guarantee Fund

2019-2020

- 2019.05 Awarded the Korea green energy company grand prize
- 2020.12 Awarded the Minister of Small and Medium Venture Business Award for excellent venture business in Gyeonggi-do

2021

- 2021.06 Awarded the Ministry of Foreign Affairs for 'TOP company for K-Corporate SustainableManagement'
- 2021.06 Designated as a Gyeonggi-do Star Company

2021

- 2021.10 Gyeonggi Province Economic and Science Promotion Agency, Selected as a Gyeonggi Good Company
- 2021.11 Selected as Best SME to Work For (3 categories) by the Korea Chamber of Commerce and Industry
- 2021.12 Received Gyeonggi Governor's Commendation for Meritorious Service in SME Growth and Development from Gyeonggi Province

2022

- 2022.05 Received a Presidential Commendation for Exemplary SME at the Korea SME Convention
- 2022.08 Confirmed as a Technology Innovation-Type SME
- 2022.12 Certified as a Family-Friendly Company by the Ministry of Gender Equality & Family
- 2022.12 Gyeonggi Province Economic and Science Promotion Agency, Awarded Proud Gyeonggi Small and Medium Business Person
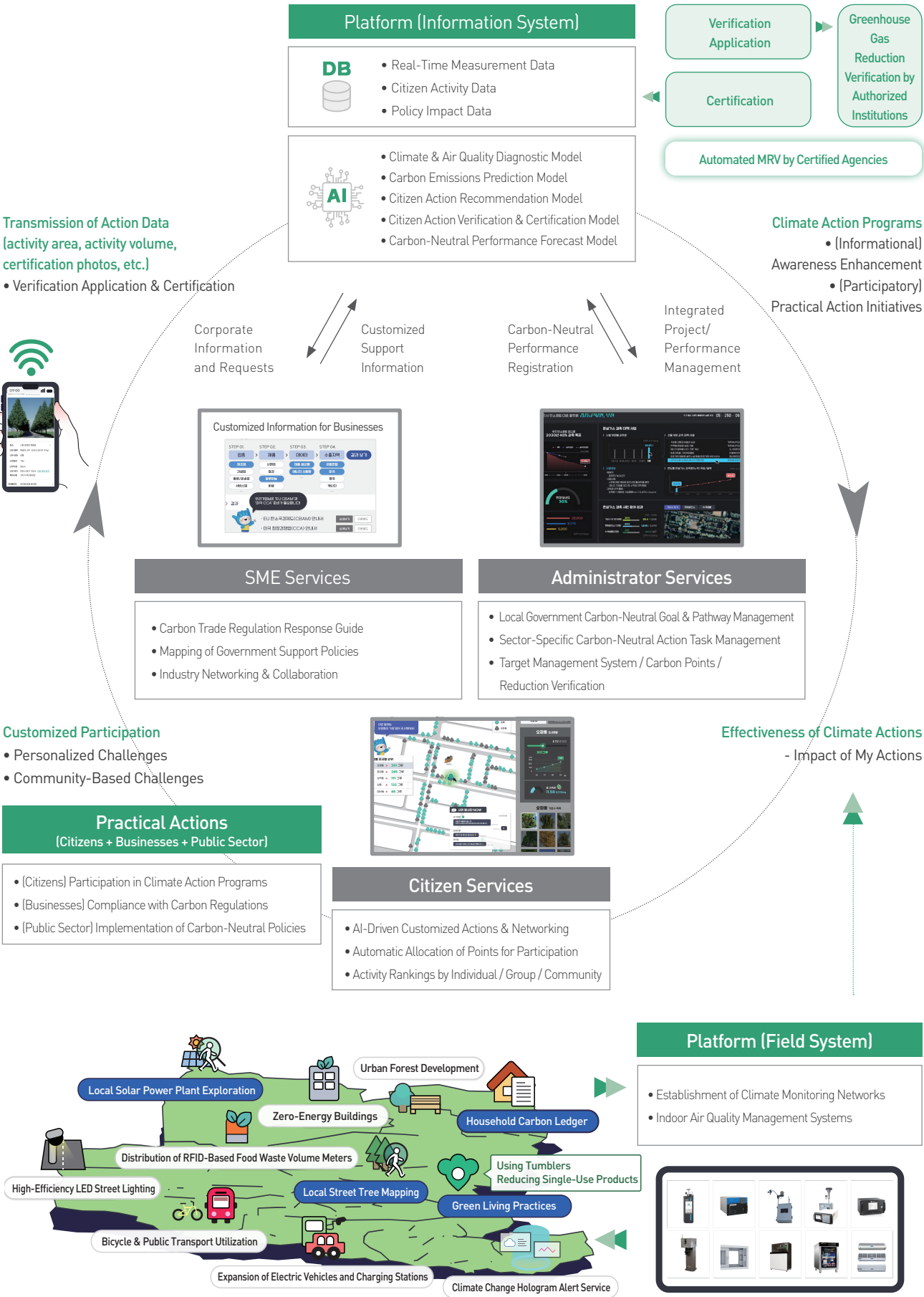
2024~

- 2024.01 Selected as a Youth-Friendly Strong Small Giant Company by the Ministry of Employment and Labor for 3 consecutive years
- 2024.11 Gyeonggi Family-Friendly Great Workplace Certification
- 2025.03 Establishment of the 2nd Affiliated Research Institute
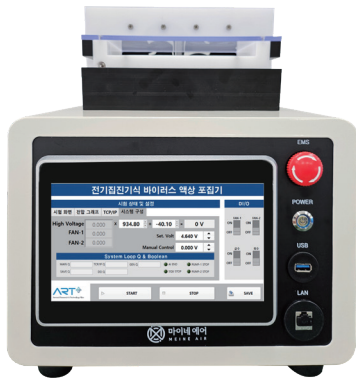
Integrated Solutions for Sustainable Cities
smART Green City Environmental & Energy Platform Services

Next-generation carbon-neutral platform development service, tailored to the scale and characteristics of each city, AI and Big Data-based environmental data analysis delivering effective smart environmental solutions for both public sectors and industrial sites

Technical Consulting

- Formulation of Informatization Strategies and Master Plans

Establishment and Provision of Citizen-Participatory Carbon-Neutral Management Systems

- Provision of Living Lab operational models, PoC, and MVP pilot services
- Delivery of region-specific solutions through spatial optimization modeling
- Implementation of carbon-neutral practices in collaboration with citizens and community groups

Development of City-Level Integrated Carbon-Neutral Platforms (smart Green City)

- Real-time carbon emissions analysis utilizing AIoT technology
- Establishment of MRV systems (Monitoring, Reporting, Verification)
- Integrated management of urban environmental factors based on diverse regional environmental data, including city size and type

Buildings	IoT-based Building Energy Management Systems (BEMS) for security, control, fire safety, lighting, and energy status monitoring
Road Transportation	Carbon emissions tracking based on traffic volume and travel distance, certification of greenhouse gas reduction from eco-friendly vehicles
Waste Management	Resource circulation solutions such as zero food waste initiatives, use of tumblers/multi-use cups, and disposal of high-quality recyclable materials, along with greenhouse gas reduction analysis
Agriculture & Livestock	Real-time monitoring of disease control, odor, and greenhouse gas emissions
Carbon Sinks	Analysis of greenhouse gas reduction in urban forests, community forests, and street trees, with KOC certification
Industry	Simultaneous reduction systems for greenhouse gases and fine dust in manufacturing processes, including energy management systems for industrial complexes and factories (CEMS, FEMS)
Climate Change-Inducing Substances	Real-time data collection and infrastructure development for industrial exhaust gases and other emissions
Community Environment	Provision of information and policy decision-making services on wind paths, urban heat island maps, air pollution concentration, and predicted damage areas

Platform (Information System)

DB
- Real-Time Measurement Data
- Citizen Activity Data
- Policy Impact Data

AI
- Climate & Air Quality Diagnostic Model
- Carbon Emissions Prediction Model
- Citizen Action Recommendation Model
- Citizen Action Verification & Certification Model
- Carbon-Neutral Performance Forecast Model

Verification Application → Greenhouse Gas Reduction Verification by Authorized Institutions

Certification

Automated MRV by Certified Agencies

Transmission of Action Data
(activity area, activity volume, certification photos, etc.)
- Verification Application & Certification

Corporate Information and Requests

Customized Support Information

Carbon-Neutral Performance Registration

Integrated Project/ Performance Management

Climate Action Programs
- (Informational) Awareness Enhancement
- (Participatory) Practical Action Initiatives

Customized Information for Businesses

SME Services

- Carbon Trade Regulation Response Guide
- Mapping of Government Support Policies
- Industry Networking & Collaboration

Administrator Services

- Local Government Carbon-Neutral Goal & Pathway Management
- Sector-Specific Carbon-Neutral Action Task Management
- Target Management System / Carbon Points / Reduction Verification

Customized Participation
- Personalized Challenges
- Community-Based Challenges

Effectiveness of Climate Actions
- Impact of My Actions

Practical Actions
(Citizens + Businesses + Public Sector)

- (Citizens) Participation in Climate Action Programs
- (Businesses) Compliance with Carbon Regulations
- (Public Sector) Implementation of Carbon-Neutral Policies

Citizen Services

- AI-Driven Customized Actions & Networking
- Automatic Allocation of Points for Participation
- Activity Rankings by Individual / Group / Community

Platform (Field System)

- Establishment of Climate Monitoring Networks
- Indoor Air Quality Management Systems

Local Solar Power Plant Exploration
Urban Forest Development
Zero-Energy Buildings
Household Carbon Ledger
Distribution of RFID-Based Food Waste Volume Meters
Using Tumblers Reducing Single-Use Products
High-Efficiency LED Street Lighting
Local Street Tree Mapping
Green Living Practices
Bicycle & Public Transport Utilization
Expansion of Electric Vehicles and Charging Stations
Climate Change Hologram Alert Service

BioAerosol-to-Liquid Sampler

BALS-100

Key Features

- High-Flow Liquid Collection Device Utilizing Electrostatic Precipitation Method
- Real-time high-speed liquid collection and data output
- Capable of drawing in up to 250 L/min, enabling immediate access to representative data
- Excellent collection efficiency from nano-sized (nm) particles without damaging test samples
- Offers approximately 10 times greater coverage and up to 3 times higher sample viability compared to a collision impactor type (28.3 L/min)
- Recovered liquid samples can be used for antigen-antibody testing (rapid kits) or molecular diagnostics (PCR analysis)
- Enhanced user convenience
  - Compact size: Built-in computer and touch panel eliminate the need for additional experimental accessories
  - Flexible setting of test time, liquid supply, and recovery time according to the measurement space size

Applications

BALS-100 can be used in a variety of environments where viruses and micro-organism may pose a potential hazard.

- Biological research in laboratories
- Food poisoning risk management in food processing plants
- Preventing the spread of contaminated diseases on public transport
- Facilities for vulnerable/sensitive populations such as classrooms and nursing homes
- Epidemic surveys in public buildings
- Environment investigations in industrial work environments
- Pathogen surveillance and infection management in medical facilities
- Indoor air quality research
- Worker safety and environmental monitoring at construction sites, sewage treatment plants, agricultural environments, etc.

Specifications

Description		Specification
Dimension		345 X 335 X 357 mm (WDH, O.D.)
Control		7" Touchscreen Panel Computer, Operating Software Program
	High Voltage Output	13 kV (positive)
	Supply/Drain	16 ml/min
	Fan Speed	Max. 2,500RPM (120 mm)
High Voltage Discharge Part	Case	215 x 130 x 80 mm (WDH)
	Case Material	Acetal, PC
	Wire	Tungsten wire 0.04 mm
	Sample Suction Flow	200 L/min(default)

Description		Specification
Specification	Aqueous solution bottle size	30 ml
	Peristaltic Pump tube	I.D. 1mm, Connector: 1/8in
Sample capacity	Bacteria Collection Efficiency	~90 %
	Virus Collection Efficiency	~85 %
Other		TCP/IP Communication Function, Wire/Wireless LAN, USB2.0 2EA
Power Consumption		220 VAC 60 Hz, Max. 1 kW
Consumables		Aqueous solution bottle, Cooling Fan, Pump, High voltage wire, Tube

BioAerosol Detection Device

BADD-10

[Wet Cyclone] [Microfluidic channel] [Bioluminescence based sensors]
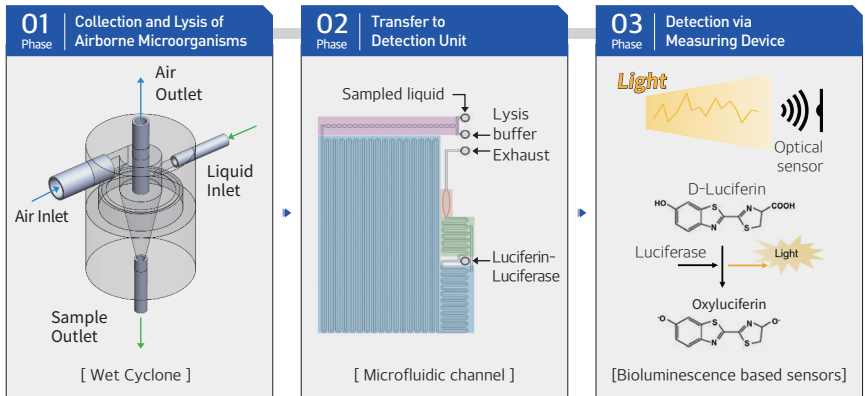
Key Features

- Displays concentration levels of airborne microorganisms
- Measures biological particles distinguishable from fine dust
- Enables intuitive observation of changes in microorganism concentration levels
- Reduces microorganism detection time to 2 hours
- Provides API for platform integration
- Ensures operational convenience and data reliability

Applications

Applicable in various environments where viruses and microorganisms may pose potential risks

- Biological research in laboratories and indoor air quality assessments
- Management of foodborne illness risks in food processing plants
- Prevention of epidemic transmission in public transportation
- Monitoring of vulnerable/sensitive facilities such as classrooms and nursing homes
- Epidemic investigations in public buildings
- Workplace exposure assessments in industrial environments
- Pathogen monitoring and infection control in medical facilities
- Worker safety monitoring in environments such as construction sites, wastewater treatment plants, and agricultural settings
- Facilities for vulnerable/sensitive populations such as classrooms and nursing homes

Specifications

Description	Specification
Dimension	306 X 418 X 340 mm (WDH, O.D.) (Excluding Sample Probe)
System Control	10.5" Touchable Monitor & Mini Computer, Exclusive Software
Reagent Types	Ultra Pure Water / Bacteria Lysis Buffer / Luciferin-Luciferase
Communication	TCP/IP Communication Function, Wire/Wireless LAN, USB2.0 2EA
Power Consumption	220 VAC 60 Hz, Max. 1 kW

Description		Specification
Air Sampling	Air Pump	24 VDC on/off Control
	Sampling Flow	13 L/min
	Cyclone	Wet cyclone method, mixture of sampling air & ultra pure water
	Probe	1/4" Stainless Steel Tube

Scanning Mobility Aerosol Spectrometer

P-SMAS

Key Features

- Uses eco-friendly water as the working fluid — suitable for environments where hydrocarbons cannot be used, and performs exceptionally well even under high-humidity conditions
- Combines CPC, DMA, and DMA Controller into a single, compact 5.4 kg unit
- Eliminates complexity in installation and operation, with convenient portability
- No need for radioactive isotopes; ensures operator safety with soft X-ray technology

Applications

- Monitoring in semiconductor and electronic component manufacturing environments
- Atmospheric and environmental research
- Combustion and engine exhaust gas analysis
- Pharmaceutical and bioaerosol research
- HVAC and building air-conditioning evaluation
- Nanomaterial synthesis and process monitoring

Specifications

Description	Specification	
Flow rate	Total Sampling Flow Rate	1 L/min
	Aerosol Flow Rate	0.12 L/min
Aerosol Measurement Size Range	9.31 nm – 294 nm	
Aerosol Size Resolution	> 64 ch/decade	
Working Fluid	Water (Deionized or Distilled Water)	
Neutralizer	soft X-ray	
Dimensions	230 x 230 x 310 mm (WDH)	
Weight	5.4 kg	
Power	14 – 19 VDC	
기타	• Standalone Operation with Touchscreen Control • WiFi, USB(2.0), USB(3.0), HDMI, LAN, micro-SD • Windows^TM based • GPS (Option)	

Aerosol Monitoring for Stack

AM4S

Key Features

- Capable of real-time, long-term continuous measurements
- Equipped with an isokinetic sampling probe to respond to changes in stack gas velocity
- High-temperature, high-concentration particle dilution system applied
- Pre-treatment heater installed to maintain relatively high temperatures inside the stack, preventing condensation of sampled gas
- Supplies hot, dry air to the exhaust and mixes it with the sampled gas to lower absolute humidity, suppressing condensation
- Suitable for measurements in wet stacks
- Periodic automatic cleaning system

Applications

- Product CustomizationIndustrial Stack Emission Measurement
- Incinerators, Biomass Combustion, and Waste Treatment Furnaces
- Exhaust Air from Industrial Dryers, Kilns, and High-Temperature Processing Equipment
- Exhaust Monitoring after High-Temperature and High-Humidity Processes in Cleanrooms
- Particle Measurement in High-Temperature, High-Humidity Ventilation Systems such as Subways and Tunnel

Specifications

Description	Specification
Measurable Gas Velocity Inside Stack	Up to 10 m/s
Dilution Ratio	Typical 40:1
Operating Temperature Range	~ 200 ℃
Operating System	• Control of Primary and Secondary Dilution Air Flow Rates • Temperature Control (Pre-treatment Heater & Main Heater) • Reception and Logging of Measurement Data from the Measuring Device

Large Particle Generator

AKG-1791 / AKG-1791A

MODEL	AKG-1791	AKG-1791A
Usage	Dust sensor(PM-2.5)	Medium performance air filter performance evaluation
Special note	Use alone	Use alone
Size (WDH,mm)	• Controller : 400 x 600 x 350 • Column : ⌀ 200, 512 H	• Controller : 400 x 600 x 350 • Column : ⌀ 305, 1,462 H

Specifications

Classification	Specification	Classification		Specification
Operating type (mode of operation)	Micro spray nozzle	Control pressure		Supply via Clean Air Intake Unit with Automatic Control System
Particle Source	KCl or NaCl in aqueous solution, other types of particles soluble in water	Particle concentration	PM concentration	~ 8,000 $\mu g/m^3$ (PM-10, KCl criteria)
Particle supply method	Peristaltic pump, Supply flow control possible (~1.2ml/min)		Max. number concentration	Appx. 10^7 #/cc
Generated particle size range	0.1~10 μm	Power		220 VAC , 6A
Generated particles flow rate	~ 50 L/min (Variation According to Compressor Supply Pressure)	Other components		HEPA filter, Heater & Ionizer

Dust Generator

APG-2396
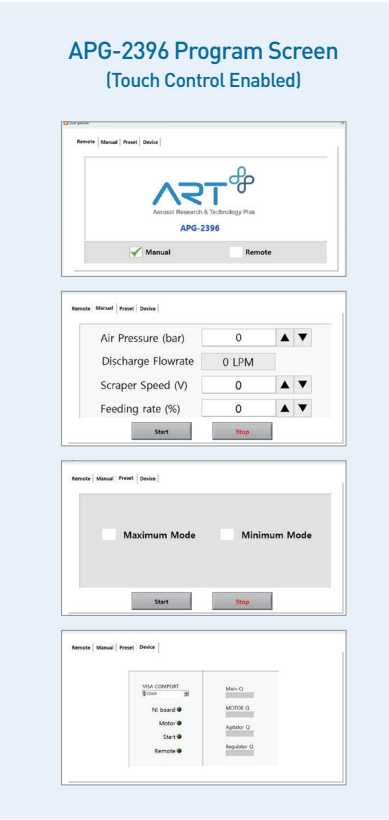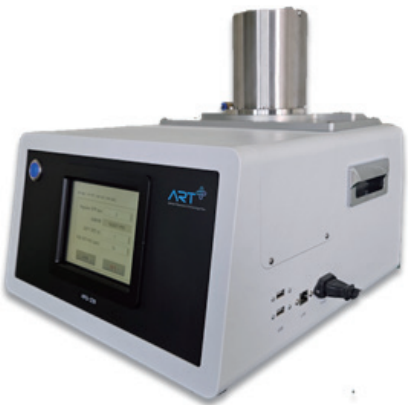
Key Features

• Precise control of dust generation through automatic control systems
• Quantification and digitization of dust generation parameters
• Consistent dust feed rate
• Minimized dust agglomeration
• Control of dust feed motor, agitation speed, and pneumatic system
• Highly useful for performance testing and aerosol research

Applications

• Filter testing: dust loading, filter efficiency, etc.
• Performance evaluation of vacuum cleaners and air purifiers
• Performance testing of electrostatic precipitators
• Particle research and inhalation toxicity studies
• Calibration and verification of measuring instruments

Specifications

Description	Specification	Description	Specification
Maximum Dust Feed Rate	1,200 cm^3	Operating Time	1 ~ 40 h
Aerosol Output Flow Rate	~ 30 L/min	Compressed Air Supply Pressure	Max. 6 bar
Dust Type	Non-stick powder - ISO 12103-A2(Fine), etc	Power Supply	220 VAC, 60 Hz
Dust Generation Concentration	6 ~ 220 g/m^3	Dimensions (WHD)	400 x 420 x 410 mm
		Weight (kg)	19
Dust Generation Capacity	10 ~ 400 g/h	Accessories (Optional)	Clean Air Supply, Compressed Air Supply

Vaporization-type Gas Generator

GGA-2491

Standard Gas Generation Solution for Harmful Gas Removal Performance Testing

Description	Specification
System Configuration	Flow controller, temperature controller, heating plate, gas generation chamber
Test Gases	Formaldehyde, Toluene, Ammonia
Supply Pressure	2 bar (recommended)
Maximum Generation Flow Rate	Max. 5 L/min
Maximum Heating Temperature	Up to 200 ℃
Heating Range	< 150 ℃
Heating Plate	Anodized Aluminum
Injection Method	Micro-syringe (100 μL) with septum injection
Carrier Gas Flow Rate	~ 2 L/min
Case Dimensions	450 × 350 × 270 mm (W × D × H)
Applicable Standard	ANSI/AHAM AC-4

Bubble-type Gas Generator

GGA-1895

Description	Specification
Generator quantity	5EA
Gas type	Acetic acid, Acetaldehyde, Ammonia, Formaldehyde, Toluene
Gas generation method	Bubbling method
Generated concentration	~ 100 ppm @ 30 m^3 test chamber
Generated time	~ 30 min
Generated flow	~ 20 L/min
Constant temperature bath	1 continuous heating water tank 2 (parallel arrangement) • Temperature control : (room temperature +5)~ 60℃
Size[W×D×H]	1,050 × 800 × 1,450 mm
Material	STS, Tempered glass
Chamber ventilation	Carbon filter & Blower
Control system	Control board and operating software (including touch function)

Bacteria Generator

ABG-1771A

- Bacterial aerosol spray in live state
- Generation amount and size control
- Conforms to the Korean Air Cleaning Association SPS-KACA402-1566, China GB 21551.3:2010 standard
- Can be used for chamber test for air cleaner performance evaluation and wind tunnel test device for air filter performance evaluation Bacteria Generator

Classification	Specification
Operating type	Phase 2 spray nozzle
Bacteria supplying method	Peristaltic pump, ~ 2 ml/min
Bacteria outbreak concentration	> 5 x 10^4 CFU/m^3
Control pressure rang	0 ~ 2 atm.
Control flow range (Sheath Air)	0 ~ 50 L/min
Size (WDH, mm)	Controller_400 x 475 x 400. Column_φ 150, 500 H
Weight (kg)	20 (Include Column and Control Box)

NaCl Generator

(ML-1691, for mask leakage performance evaluation)

Classification	Specification	Classification	Specification
Generation type	Impulse spraying using multi-channel orifices	Particle size distribution	0.02 ~ 2.0 μm
Average particle size distribution	0.6 μm (Mass Median Diameter, MMD)	Generation particle concentration	8 ± 4 mg/m^3
Generation flow rate	3 ~ 12 L/min		

Cigarette Smoke Generator

FSQ-003

Classification	Specification	Classification	Specification
Flow range	1 ~ 5 L/min	Duration of each smoke generation	40 ~ 50 s
Power	AC, Single-phase 220V/50Hz	Maximum output	100W (Including smoke ignition generator output)
Weight	7 kg	External size (DWH, mm)	360 × 270 × 400

Air Filter Performance Evaluation System

Features

- Provide reliability of measurement results by optimizing air velocity uniformity, particle concentration, and space uniformity for each systems
- Emergency stop button is available in case emergency situation occurs
- Easily place and remove test filter for user convenience
- Prevent user operated errors in measurement results and test procedures by automating data collection, storage, and statistical processing during system operation

- Provide timely updates to meet changes in related regulations and/or test standards
- Chemically resistant sealants are used to connect in between ducts to prevent damage by the test material specified in the related standards / applied to corrosion resistance material product (Cabin air filter for Gas)

Medium Performance Air Filter Particle Efficiency Performance Evaluation Tester (MF-1712W)

Classification	Specification	Classification	Specification
Surface speed	0.5 ~ 3.8 m/s	Testing filter cross sectional areas	610 × 610 mm
Test particles	KCl, ASHRAE DUST		
Flow rate uniformity	CV 10 %	Particle uniformity	CV 15 %
Transfer system size	2,249 x 12,000 x 2,600 mm		
Related regulations	ANSI/ASHRAE 52.2, ISO 16890		

Cabin Air Filter Gas Efficiency Performance Evaluation Tester (CF-1916W)

Classification	Specification	Classification	Specification
Flow range	150 ~ 680 CMH	Testing filter cross sectional areas	300 x 600 mm
Flow rate uniformity	± 10 %	Gas concentration uniformity	± 5 %
Test gas	N-butane, Toluene, SO₂ (Option: NO₂, Acetaldehyde)		
Transfer system size	3,102 x 1,630 x 3,450 mm		
Related regulations	KS R ISO 11155-2, ISO/TS 11155-2, DIN 71460-2, SPS-KACA014-144		

Cabin Air Filter Particle Efficiency Performance Evaluation Tester (CF-2010W)

Classification	Specification	Classification	Specification
Flow range	150 ~ 680 CMH	Testing filter cross sectional areas	300 x 600 mm
Flow rate uniformity	± 10 %	Particle uniformity	± 10 % (@ 0.3 ~ 5.0 μm), ± 20 % (@ 5.0 ~ 10 μm)
Upstream and downstream correlation ratio	0.7 ~ 1.6	Pressure loss measurement range	~1,000 Pa
Test particles	ISO A2 Fine Dust, KCl	Transfer system size	2,100 x 1,700 x 3,600 mm
Related regulations	KS R ISO 11155-1, ISO/TS 11155-1, DIN 71460-1, SPS KACA014-144		

High Performance Air Filter Leak Rate Performance Evaluation Tester (HF-1710W)
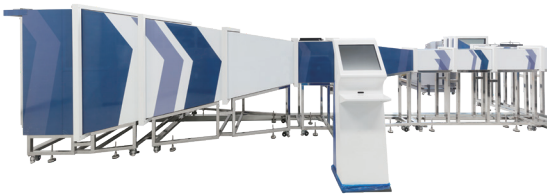
Classification	Specification	Classification	Specification
Surface speed	0.485 m/s	Test particles	NaCl, KCl, PSL, DOP, DEHS
Particle uniformity	CV 15 %	Flow rate uniformity	CV 10 %
Scanning probe	• Area : 9 ± 1 cm² (30 x 30 mm) • Accuracy : 1 mm • Position : 10 ~ 50 mm • Movement speed(X,Y,Z) : 10 cm/s or less		
Transfer system size	4,000 x 8,000 x 2,000 mm		
Related regulations	EN 1822-4, KS B6740 : 2015		

High Performance Air Filter Particle Efficiency Performance Evaluation Tester (HF-1711W)

Classification	Specification	Classification	Specification
Surface speed	0.5 ~ 3.0 m/s	Testing filter cross sectional areas	610 × 610 mm
Test particles	KCl or DOP		
Particle uniformity	CV 15 %	Flow rate uniformity	CV 10 %
Transfer system size	1,584 x 11,500 x 1,780 mm		
Related regulations	KS B 6740 : 2015, KS B 6141 : 2020, KS B 9325 : 2011(Type 1)		

Air Filter Bacterial Filtration Efficiency Performance Evaluation Tester (BF-1713W)

Classification	Specification	Classification	Specification
Surface speed	0.5 ~ 3.0 m/s	Testing filter cross sectional areas	610 × 610 mm
Flow rate uniformity	CV 10 %	Particle uniformity	CV 15%
Test particles	Staphylococcus aureus		
Transfer system size	1,854 x 11,500 x 1,780 mm		
Related regulations	ASTM F2101-14		

IPA Conditioner (Elimination of electrostatic effect of air filter, AIC-1998)

Classification	Specification
Internal volume	Approx. 0.98 m³
IPA generation type	Evaporative in chamber Dualization of IPA generation chamber and filter mount chamber (Space separation using dampers)
Airtightness	< 15 Pa within 1 min
Size(WDH)	1,668 X 805 X 1,724 mm
Related regulations	ISO 16890-4, SPS-KACA002-132:2021

Dust Sensor(PM-2.5) Performance Evaluation System

Features

- Secure particle concentration uniformity in chamber by optimized mixing column and generating system
- Minimize test measurement uncertainty
- Maintain chamber door in lock until test is completed or user decides to end the test to prevent accidents
- Capable of identifying test progress status via warning lights installed outside of test chamber

- Improve user convenience and efficiency by minimizing concentration adjustment time in test concentration sections
- Besides test procedures of initially implemented requirement, provide access to set test concentration and test time to provide expandability as device for fine dust concentration environment research and creating environment
- Automatic test operation and test report storage
- System stand alone control and remote control via external PC

Dust Sensor for Equivalent Verification for Outdoor

- Outdoor test room and equivalency evaluation system is based on 'Air pollution monitoring network installations and operation guidelines' and National Institute of Environmental Research (NIER) affiliated organization of Ministry of Environment 'Installation and operation guidelines for air pollution monitoring stations'
- Measuring equipment for equivalence evaluation is 'type approved' by the Ministry of Environment(Class I, Class II)
- The outdoor test building is constructed in the same way as the installation method of the NIER's "Atmospheric monitoring network" (National Institute of Environmental Research)

- Automatic weighing system minimizes 'Measurement uncertainty by precisely controlling temp./humid. and removing static electricity and particles inside', 'Data processing of more than 100 no. of filters', 'Accommodates more than 100 no. of filters simultaneously', and 'Possible to process large amounts of data'
- Components : Automatic weighing system, ultra fine dust sample collector (sampler type and beta-ray type), precision scale, flow calibration device, outdoor test room and equivalency test facility, spare equipment and accessories

Dust Sensor (PM-2.5) for Repeatability Verification for Indoor

- Chamber large enough to evaluate all 'simplified fine-dust analyzers' sold in South Korea.
  (simple measuring device) sampling flow rate: less than 16.7 L/min)
- Related standard : Ministry of Environment 'Notification 2019-24'

Classification	Specification
External size(WDH)	2,300 x 1,700 x 2,400 mm
Internal size (WDH)	4.1 m³ (1,600 x 1,600 x 1,600mm) The length of each side can be adjusted within 30%
Particle distribution uniformity	± 10 % (Difference in particle concentration at the center point of each quadrant divided by four of the test surface and 5 measuring points at the center point of the test surface)
Background concentration in chamber	2 µg/m³ (up to 30 min)
Maximum sampling flow rate of the test object	~16.7 L/min

General-type Dust Sensor (PM-2.5) Performance Evaluation Tester (ADT-1782)

Classification	Specification	Classification	Specification
External size (WDH)	1,600 x 1,400 x 2,400 mm	Internal size (WDH)	1,000 x 1,000 x 1,000 mm
Test particles	KCl, smoke, dust (User selected)	Control concentration range	10~500 µg/m³
Test particle concentration uniformity	± 15 % (@ 50~500 µg/m³), ± 5 µg/m³ (@ < 50 µg/m³)		
Test particle concentration maintained accuracy	± 10 % (@ 50~500 µg/m³), ± 5 µg/m³ (@ < 50 µg/m³)		

Automotive Part-type(Reliability evaluation) Dust Sensor (PM-2.5) Performance Evaluation Tester for Automobile Parts (ADT-1785)

Classification	Specification	Classification	Specification
Chamber size (WDH)	Test section : 600 x 600 x 600 mm External : 1,600 x 2,800 x 2,300 mm		
Test particles	KCl, Cigarette smoke, dust(User optional)	Control concentration range	10~500 µg/m³
Test particle concentration uniformity	± 15 % (@ 50~500 µg/m³), ± 5 µg/m³ (@ < 50 µg/m³)		
Temp.	-40 ~ 85 ℃ (±2 ℃)	Humid.	30 ~ 85 % (±5 %) @ 25 ℃, Non-Condensing

Mass Production-type Dust Sensor Performance Evaluation Tester (ADT-1786)

Classification	Specification
External size (WDH)	1,900 x 1,650 x 2,200 mm
Internal size (WDH)	1,300 x 1,300 x 1,000 mm
Test particles	KCl, Smoke, Dust (User selected)
Control concentration range	10~500 µg/m³
Test particle concentration uniformity	± 15 % (@ 50~500 µg/m³), ± 5 µg/m³ (@ < 50 µg/m³)
Test particle concentration maintained accuracy	± 10 % (@ 50~500 µg/m³), ± 5 µg/m³ (@ < 50 µg/m³)

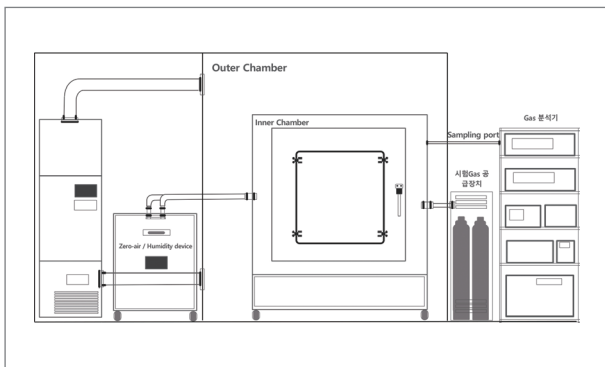# Simplified Gas Sensor Performance Evaluation System

AGT-2080G

Key Features

- Dual-chamber system
- Equipped with safety devices to prevent test gas leakage
- Maintains test concentration within an average of ±10% during a 10-minute test period
- Automatic and remote control system
- Meets performance certification standards for simplified measuring instruments (Atmospheric and indoor air fields) under the Ministry of Environment's "Act on Environmental Testing and Inspection"

System Schematic

Classification		Specification
Test chamber configuration	Dimensions / Temperature / Humidity	< 15 ~ 20 m³ (External) / < 4.1 m³ or < 1.0 m³ (Internal) 0 ~ 40 ℃ ± 1 ℃ (External) / 50 % ± 5 % (@ 20 ℃) (Internal)
ZERO AIR	Generation Flow Rate Generated Gas Concentration	400 L or within 250 L CO_2 < 0.5 ppm, HCnm < 0.01 ppm, CO and CH_4 < 0.03 ppm, NO_x < 2 ppb, SO_2, NH_3, O_3 < 0.5 ppb
Ultra-Pure Water	Applicable Standards for Gas Generation	2 L/min Production of Ultra-Pure Water (Type III Water), Integrated System for Simultaneous Production of Pure and Ultra-Pure Water Compliant with ASTM, NCCLS, CAP Type I, and EP & USP Purified Water Standards
Analytical Gas		NO_2, CO_2, CO, O_2
Pneumatics	Processing Capacity / Power Supply	< ~ 830 L/min / ~ 10 HP
Automatic Control & Program		• External chamber temperature control, communication, and status monitoring • Internal chamber humidity setting and control • Remote control of Internal chamber exhaust/Ventilation • Test gas concentration setting and control • Operating software program

Air Cleaner Performance Evaluation System

Model	AK6001	AK6008	AK6030	AK6050	AK6180
Chamber size (WDH)	1 m³±0.1m³ (1.0×1.0×1.0)	8 m³±0.5 m³ (2.0×2.0×2.0)	30 m³±1.5 m³ (3.5×3.5×2.5)	50 m³±1.5 m³ (4.5×4.5×2.5)	180 m³±1 m³
		Rectangular, or cube shape, Depth(D) is within 85~100% of Width (W)			Rectangular, D<W*2
Test items (Test sample)	-	Purifying ability, Fine-dust removal efficiency (Polydisperse solid potassium chloride) Fine-dust reduction durability (ISO 12103-1 A2 particle)			Fine-dust removal ability (Potassium Chloride)
	Toxic gas purification ability (Ammonia, toluene, and formaldehyde) Toxic gas reduction durability (Formaldehyde) Toxic gas removal efficiency (Ammonia, toluene, formaldehyde, acetic acid, acetaldehyde)			-	-
	-	-	Ozone generation concentration	-	Ozone generation concentration
	Rated flow volume, fine-dust sensor for air purifier, and noise				Noise
Air tightness	Particle concentration after 20 min is 90% or more of initial concentration for particle size of 0.3 ㎛				
Temp./ Humid.	23 ± 3 ℃ (± 1 ℃), 50 ± 10 % R.H ± 5% R.H (average during 20 min)				Temp. 20±5℃, atmospheric pressure 760±20 mmHg
Chamber material	Well, ceiling, and floor: uninterruptible panel, STS304, 310, 316 or glass Surface in chamber: Anti-static				
Applicable regulations	SPS-KACA002-132;2021, KS C 9304; 10.2, KS A ISO 1996-2; 8, SPS-C KACA 0027-7269 (According to Client's requirements, can supply chambers which meet related standard such as GB, AHAM, JEM)				KS C 9326

Mask Performance Evaluation System

Mask Inhalation Resistance Evaluation Tester (ARE-1651)

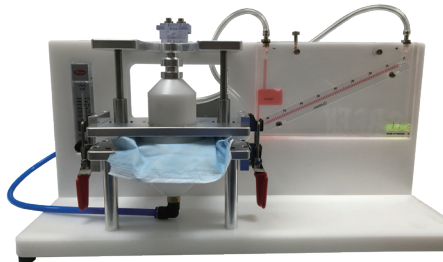| Classification	Specification
Head	Guideline test head for reference criteria for health masks
Inhalation air resistance measurement range	~120 Pa
Flow condition	30 L/min
Operating software	Windows 10
Size(mm)	340 x 540 x 700 (Including Head)
Weight	Approx. 35kg

Leak Rate Performance Evaluation Tester (AML-1652)

Classification	Specification
Aerosol measurement device	Laser Photometer
Aerosol generator	• Aerosol concentration : 8 ± 4 mg/m^3 • Particle size range : 0.02~2 ㎛ • Mass median diameter : 0.6 ㎛(measured by SMPS)
Test room	(Option) Temp. & RH range : 25 ± 2.5 ℃, 50 ± 5 % Air supply & Exhaust : HEPA filter unit
Test chamber environment	• Cleanliness : ISO class 7(10,000 class) • Test chamber environment : Up to 30 times per hour or continuous cycle
Particle Concentration Measurement Interval	0.1 sec

smART Particle Filtration Efficiency(PFE) Measurement Tester (PFE-2037)

Classification	Specification	Classification	Specification
Test flow rate	28.3 L/min	Test sample	Mask, Filter media
Filter efficiency	~ 99.999999 %	Test particle	PSL
Particle efficiency	50 % @ 0.1 ㎛, 100 % @ 0.15 ㎛		
Particle measurement range	0.1~10 ㎛		
Test particle concentration	10^3#/cm^3 or less		
Related regulations	MFDS's Guideline for Permission Review of 'Medical Respiratory Protective Equipment', and ASTM F2299		

smART Mask Differential Pressure Tester (MDP-2030)

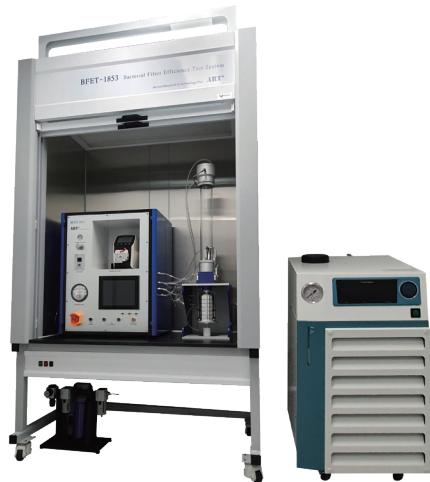| Classification	Specification
Flow	8 L/min
Test area	2.5 cm dia.
Differential pressure measurement	Manometer
Weight	< 7 kg
Related regulations	MFDS's Guideline for Permission Review of 'Medical Respiratory Protective Equipment', and MIL-M-3695 4C 4.4.1.2

smART Flammability Tester (MDF-2034)

Classification	Specification	Classification	Specification
Contact time resolution	1 second	Combustion time measurement resolution	0.1 second
Specimen target size	50 x 150 mm	Specimen fixed angle	45 degrees
Size(WDH)	400 x 380 x 640 mm		
Related regulations	US 16 CFR 1610		

smART Synthetic Blood Penetration Resistance Tester (MBP-2038)
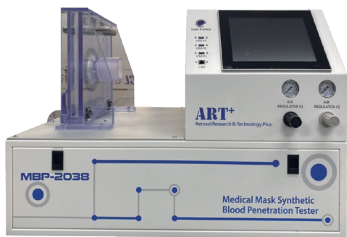
Classification	Specification	Classification	Specification
Blood spraying distance	300 ± 10 mm	Blood spraying speed	450, 550, 635 cm/s
Blood spraying time	0.80, 0.66, 0.57 sec	Blood spraying pressure	10.6, 16, 21.3 kPa
Nozzle	ID 0.84 mm x L 12.7 mm	2-axis motor electric control	2-axis motor electric control
Size(WDH)	860 x 620 x 600 mm		
Related regulations	MFDS's Guideline for permission review of 'Medical respiratory protective equipment', and ASTM F1862		

Bacterial Filtration Efficiency Evaluation Tester (BFET-1853) (for Health & Medical)

Classification	Specification
Bacteria generating device part	• Generation method : Nebulizing • Average particle diameter : 3.0 ± 0.3 ㎛ (ASTM F2101-14) • Concentration level(Challenge level) : 2,200 ± 500 CFU (ASTM F2101-14) • Pressure control range : 0 ~ 2.0 bar • Mixing flow control range : 0 ~ 30 L/min • Feeding speed range : 0 ~ 23.4 ml/min
Bacteria collected device part	6-stage type (Andersen type cascade impactor) Sample measuring range : 0.85 ~ 10 ㎛ Flow rate : 28.3 L/min (1 CFM)
Cooling water supply(8L)	• Temperature range : -20 ~ 40 ℃ • External size : 400 x 700 x 720 mm(WDH)
Hood system : Built-in HEPA filter	• External size : 1,800 x 820 x 2,400 mm(WDH) • Internal size : 1,500 x 640 x 1,200 mm(WDH)
Related regulations	MFDS's Guideline for Permission Review of 'Medical Respiratory Protective Equipment', and ASTM F2101-14

smART Cough Droplet Simulating Environment Virus Filter Tester (VF-2021TS)

- By Patent 'no. 10-2128994', bacterial spray nozzle and bacterial aerosol supply device using the same
- Design considering safety of user from viruses and particles
- Design a system to apply with the standards of <Standards and Test Methods for Quasi-Drugs> announced by the Ministry of Food and Drug Safety and <ASTM F2101-14>

Classification		Specification
Virus generation controller	Pressure control range	0~2 bar
	Supply flow	0~23.4 ml/min
Sneezing droplet generation simulation system	Simulation method	Cylinder and piston
	Cylinder volume	≥ 3 L
	Administration time	min 0.5 s
	Piston driving device	Thrust ≥ 550N, loss rate ≤ 0.1mm
	Discharge air cleaner	HEPA filter (efficiency of 99.97%)

Classification		Specification
Virus collected part	Type	6-stage Andersen type Inertial Cascade Impactor
	Collected particle size range	0.85~10 μm
	Working flow	28.3 L/min (1 CFM)
	Longitudinal detachment method	Linear Motion Guide & Pneumatic cylinder
Virus transfer test chamber	Chamber size and material	Ø 80mm, Length 600mm, Quartz
	Clean air supply part	HEPA filter(efficiency of 99.97%)

Mask Inhalation and Exhalation Resistance Evaluation Tester (MBR-2031)

Classification	Specification
Test head	Sheffield head
Test flow	• Inhalation: 30 and 95 L/min　(2 test modes) • Exhalation : 160 L/min
Flow control	Flow control By mode (inhalation and exhalation), + 5% of set flow rate
Related regulations	Ministry of Employment and Labor 'Safety certification notice' annex 4 dust mask performance criteria, MFDS's Guideline for permission review of 'medical respiratory protective equipment', and EN 149

## CO₂ Concentration Evaluation Tester Inside the Face (MCD-2032)

Classification	Specification
Auxiliary lung device	• Auxiliary lung device : piston &cylinder • Auxiliary lung volume : within 5% of the volume of the breathing simulator • The volume of the CO_2 analyzer duct from the synthetic lung should be within 2,000 ml
Related regulations	Ministry of Employment and Labor 'Safety certification notice' annex 4 dust mask performance criteria, EN 149

Mask Artificial Lung Preconditioning Tester (MLP-2035)

Classification	Specification
Test head	Sheffield head
Simulated breathing device	•Simulated breathing device : Piston & Cylinder •Simulated breathing device volume : 2.0±0.1 liters •Simulated breathing device operation cycle : 25 times per minute •Simulated breathing device drive : linear motor or stepping motor
Humidity control device	Humidity control unit temperature : 37±2ºC Humidity control range : Relative humidity more than 95%
condensate	Equipped with trap device
Related regulations	EN 149

Mask Durability Preconditioning Tester (MDT-2037)

Classification	Specification
Excitation method	Up and down reciprocating motion and drop collision using CAM and piston
CAM	Designed so that the maximum travel distance of the piston is 20mm
CAM rotation speed	100 revolutions per minute or more
Test duration	More than 20 minutes
Related regulations	EN 149

Clogging Tester (MCT-2033)

Classification	Specification	Classification	Specification
Test chamber cross-sectional area	650 x 650 mm	Test chamber length	5,100 mm or more
Test air flow	More than 60 CMH	Test head	Sheffield head
Simulated breathing device	•Simulated breathing device : Piston &Cylinder •Volume : 2.0±0.1 liters •Operating cycle : 25 times per minute •Device drive : linear motor or stepping motor		
Temperature and humidity control device	37±2 ℃, Relative humidity more than 95%		
Related regulations	EN 149		

# Automotive Perception Sensor Performance Evaluation System
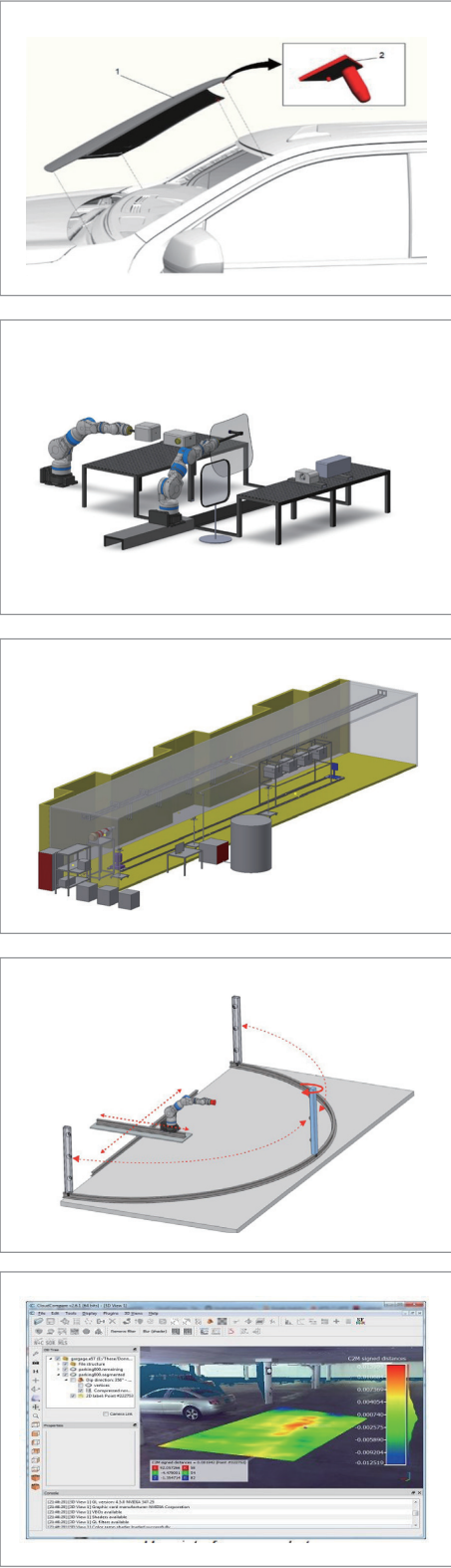
Features

• Collaborative Robot-Based Automated Measurement
• Automatic Sequencing and Repetition Functions
• Automated Data Integration and Real-Time Analysis

Test Field	Evaluation Items	Details
Vehicle LiDAR Cover & Windshield Reflectance	Spectral Characteristics Analysis	- Measurement of broadband (800–1700 nm) transmittance and reflectance - Evaluation of wavelength response characteristics by coating material (AR, filter, etc.)
	Laser Beam Characteristics Analysis	- Measurement of beam divergence changes (widening, focusing) - Quantification of beam shape deformation - M² beam quality evaluation (assessment of focusing ability degradation)
	Point Cloud Analysis	- Analysis of point cloud changes depending on windshield presence, shape, and material - Quantification of accuracy degradation and recognition rate changes
	Performance by Incidence Angle of Cover Glass & Windshield	Adjustment of LiDAR or windshield to various angles using a collaborative robot to measure performance variations
Vehicle LiDAR Distance Performance	Range	Measurement of minimum/maximum detectable distance of the LiDAR
	Accuracy	Verification of error between measured and actual distances
	Precision	Analysis of deviation in repeatedly measured distances
	Resolution	Determination of the smallest distinguishable distance unit
Vehicle LiDAR Angular Performance	Range	Maximum/minimum horizontal and vertical angle difference
	Accuracy	Measurement of error between LiDAR-collected angle values and actual target angles
	Precision	Analysis of angular deviation in repeated measurements from the same position
	Resolution	Quantification of the smallest distinguishable angular unit
Environmental Detection Performance	Climatic Environment Testing	Demonstration testing of detection performance under temperature/humidity, rainfall, snowfall, fog, and sunlight conditions

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System for Calibrating Exhaust Gas Flow Rate

SWT-2411
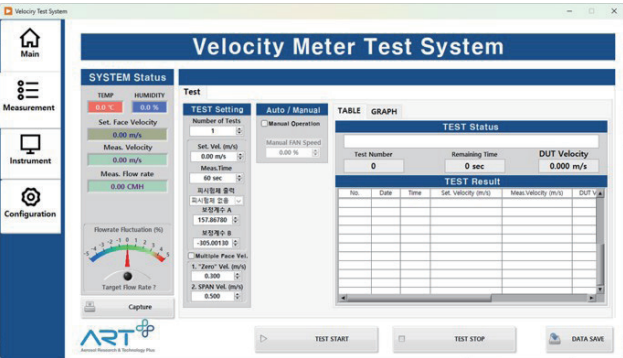
Test Field	Evaluation Items	Details
Wind tunnel System	Overall Length	≥ 7,000 mm
	Test Section Size (W × H × L)	≤ 500 × 500 × 1,000 mm
	Configuration	Settling chamber, contraction nozzle, test section, diffuser nozzle, fan
	Test Airflow Velocity	3–30 m/s (@ 500 × 500 mm)
	Type	Suction-type wind tunnel
	Design Criteria	5th Polynomial
	Contraction Ratio	6~9 : 1
	Temperature & Humidity Sensor Range	0 ~ 50 ℃, 10 ~ 90 %RH
	Performance Verification	ISO3966 Log-Linear Method
Pressure Gauge	Precision	± 0.008 % of reading or 0.0024 % of Q-RPT span, whichever is greater
	Measurement Uncertainty	ISO3966 Log-Line± 0.010 % of reading or 0.0030 % of Q-RPT span, whichever is greaterar Method

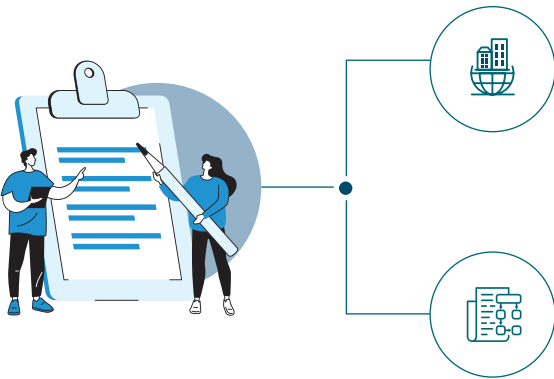| Test Field	Evaluation Items	Details
Pressure Gauge	Range	0 ~ 200 kPa absolute
	Range	-100 ~ 100 kPa gauge
High-Precision Differential Pressure Gauge	Compatible Sensor & Range	0.1 ~ 25,000 mmHg Full Scale
	Range	x1, x0.1, x0.01 of sensor Full Scale, manual or auto-ranging
	Response Time	1, 40, 400 msec, user-selectable
	Differential Pressure Sensor	1.33 mbar, 13.3 mbar (accuracy ±0.05 % of reading)
System Control and Data Acquisition Program		• Acquisition of test environment data (temperature, humidity, pressure) via serial communication • Measurement of test environment and test specimen output data using 16-bit analog input via serial communication • Management of raw data for test validity verification • Optimized storage function for measurement data in a simplified format • Detailed error reporting function for post-test support • Capability to accommodate test procedures according to user requirements

AI Home Appliance Performance Demonstration & Evaluation System

Features

- Collection of feedback on ease of configuration, intuitiveness of control, AI system responsiveness, and overall satisfaction with the functions of lifestyle appliances
- Verification of user data protection, including encryption methods, access control, and compliance with personal data protection regulations
- Evaluation of integration and compatibility between AI lifestyle appliances and other devices/platforms
- Provision of insights on user safety, usability, and convenience beyond direct hardware performance, supporting product improvement
- Implementation of artificial obstacle and interference environments to support performance testing and training of AI appliances and modules in obstacle avoidance and mitigation
- Use of standard housing models with walls separating rooms, living rooms, and bathrooms, creating temperature/humidity conditions similar to real environments

- Evaluation of integration and compatibility between AI lifestyle appliances and other devices/platforms
- Provision of insights on user safety, usability, and convenience beyond direct hardware performance, supporting product improvement
- Implementation of artificial obstacle and interference environments to support performance testing and training of AI appliances and modules in obstacle avoidance and mitigation
- Use of standard housing models with walls separating rooms, living rooms, and bathrooms, creating temperature/humidity conditions similar to real environments
- Assessment of device durability, resistance to environmental factors, and robustness against wear

Evaluation Items

Impact assessment of obstacles and interference in indoor and outdoor residential environments

- External environmental factors (temperature, humidity, fine dust, sunlight)
- Indoor residential factors (human body heat, illuminance, odor, noise)

Accuracy and efficiency evaluation of AI algorithms in predictive maintenance tasks for smart home appliances

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AI Home Appliance Performance Demonstration & Evaluation System

Control System

Control & Monitoring System

- Control & Monitoring Program
  - Real-time monitoring
  - Real-time transmission of location data to the server
  - AI appliance route analysis and route data management
  - Detection of unauthorized departures through designated restricted zones
  - Prevention of log data leakage via Time Bomb and DRM modules
- Location Tracking System
  (UWB Tag, UWB Anchor, operating server)

Integrated Operation / Remote Automation System (optional)

- Remote control platform for indoor/outdoor residential environment simulation system
- API module for indoor/outdoor residential environment simulation system
- Monitoring of biometric recognition factors (temperature/ humidity, illuminance, fine dust)
- Real-time transmission of location data to the server
- Remote control of solar irradiance, angle, and control schedule
- Voice and noise evaluation
- Measurement and remote control of sick-house-syndrome–inducing substances and greenhouse gas concentrations

Data Measurement & Collection Platform

- Data server, firewall, network switch module, and data measurement /collection software

Remote Position Control System for AI Home Appliances

- Mobile robot (travel speed 0.3–1.2 m/s, on/offline mapping capability of at least 1 × 1 km)