

**Securities ID code:6859**

# **ESPEC CORP.**

**Results Briefings for  
Fiscal 2018 Ended March 2019**

**May 23, 2019**

**[www.espec.co.jp](http://www.espec.co.jp)**

# Table of Contents

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**Company Profile**

**Financial Result for the Fiscal 2018 Ended March 31, 2019**

**Analysis per Segment for the Fiscal 2018 Ended March 31, 2019**

**Business Plan for the Fiscal Ending March 31, 2020**

**Action Items for the Fiscal Ending March 31, 2020**

**Reference**

# Company Profile

## Industry-leading manufacturer of environmental test chambers

Name	ESPEC CORP.
Head Office	3-5-6, Tenjinbashi, Kita-ku, Osaka
Represented By	Masaaki Ishida
Established	July 25, 1947
Incorporated	January 13, 1954
Paid-up Capital	¥6,895Million
Shares Issued	23,781,394 Shares
Employees	1,520 (consolidated)

**Main Business**      **Manufacture and Sales of Environmental Test Chambers, Energy Device Equipment, Semiconductor Equipment and Plant Factory.**  
**After-sales Service, Commissioned Tests and others.**



Head office

**Share of Environmental  
Test Chambers:**

**Over 30% worldwide, Over 60% domestic**      (As of March 31, 2019)

# Global Network

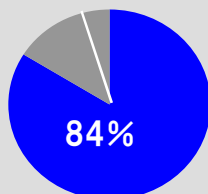
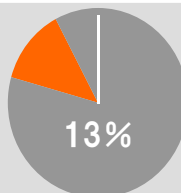
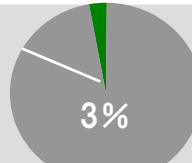
**Consolidated Subsidiaries**  
**10 companies**  
(Global 7 companies,  
Domestic 3 companies)

**Global Network**  
**45 countries**  
**33 companies**

**Business Facilities in Japan : 25**  
**Domestic Agencies in Japan : 46**



# Summary of ESPEC Business (Per Market / Use)

		Main Products	Market	Use	Sales composition (FY2018)
Equipment Business	Environmental Test Chambers	•Temperature & humidity chamber •Thermal shock chamber •Bench-top type temperature & humidity chamber •HAST chamber •Walk-in type temperature & humidity chamber •Combined temperature & humidity chamber •HALT & HASS test chamber •FPD equipment	•Electronic component and equipment market •Automobile market •Semiconductor market •Medicine, Cosmetics, Foods market •LCD and Organic Electro-Luminescence market	•For R & D •For credibility and evaluation •For production and inspection	 84%
	Energy Device Equipment	•Charge-discharge Cycle Evaluation Equipment •LIB safety evaluation system •Fuel cells evaluation system	•Next generation automobile market •Secondary batteries market •Fuel cells market	•For R & D •For credibility and evaluation •Safety evaluation •For production	
	Semiconductor Equipment	•Burn-in system •Semiconductor evaluation system •Instrumentation system	•Semiconductor market •Automobile market	•For production and inspection •For development and evaluation	
Service Business	After-sales Service and Engineering	•After-sales service •Construction around equipment	•Electronic component and equipment market •Automobile market •Semiconductor market	—	 13%
	Commissioned Tests and Facility Rentals	•Commissioned test   •Resale •Equipment rental   •Calibration		•For R & D •For credibility and evaluation	
Other Business	The forest wetland and greening Business	Reforestation (Tree planting) , Waterfront biotope restoration, Urban greening			 3%
	Plant Production Systems	Plant factory, Equipment for growing plants			

# 【Equipment Business】TOPICS

(December 2018)

## ESPEC ENGINEERING VIETNAM CO., LTD. established in Vietnam



**Company name : ESPEC ENGINEERING VIETNAM CO,LTD**  
**Address : Room 8, 9 th Floor, VIT Tower, 519 Kim Ma Street, Ngoc Khanh ward, Ba Dinh District, Hanoi, Vietnam**

**Established: December 2018**  
**Start of operations: January 2019**  
**Business details: Technical support, including product maintenance, preventative maintenance**



**Company name: ESPEC ENGINEERING (THAILAND) CO., LTD.**  
**Address : 700/860, Amata City Chonburi Industrial Estate (Phase8) Moo.5, Tambol Nongkakha, Amphur Panthong, Chonburi 20160, Thailand**

**Established : March 2015**  
**Business details: Technical support, including product maintenance, preventative maintenance, commissioned tests**



# 【Equipment Business】TOPICS

(November 2018)

## Launched sales of evaluation systems for secondary batteries for the Chinese market

- Standard type secondary battery charge-discharge tester for automobiles
- Supports charge-discharge testing for large capacity secondary batteries in automobiles



(February 2019)

## Introduced hypoxic training rooms at fitness clubs

- Recreated conditions simulating oxygen concentration at an elevation of 2,500 meters above sea level
- Enables effective training in a short amount of time



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# **Financial Result for the Fiscal 2018 Ended March 31, 2019**



# Making All Overseas Subsidiaries Share the Same Fiscal Year-End

From fiscal 2018, the fiscal years of overseas consolidated subsidiaries (previously December) will be made the same as the fiscal years for consolidated subsidiaries in Japan (March). To accommodate this change, the overseas consolidated subsidiaries will record a 15-month period of financial results for fiscal 2018.

FY2017	January～March	April～June	July～September	October～December	January～March 2018
		Consolidated subsidiaries in Japan			
	Overseas consolidated subsidiaries				
FY2018	January～March	April～June	July～September	October～December	January～March 2019
		Consolidated subsidiaries in Japan			
		First Half		Second half	
	Overseas consolidated subsidiaries				
	First Half		Second half		
FY2019	January～March	April～June	July～September	October～December	January～March 2020
		Consolidated subsidiaries in Japan			
		Overseas consolidated subsidiaries			

# Financial Result for the Fiscal 2018

(millions of yen)

	FY 2017	FY2018 (Revised Plan)		FY2018 (Result)			
		Revised Plan	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	Result	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries		
					Result	Year on Year	Against the revised plan
Orders-Received	44,775	50,000	47,500	50,698	48,008	7.2%	1.1%
Net sales	44,069	49,000	46,500	50,580	47,060	6.8%	1.2%
Operating income	4,602	5,100	5,000	5,827	5,470	18.8%	9.4%
Ordinary income	4,746	5,200	5,100	5,851	5,493	15.7%	7.7%
Profit attributable to owners of parent	3,308	3,800	3,750	4,289	4,030	21.8%	7.5%

# Financial Highlights

**Sales and profit both increased against revised plan for FY2018**  
**Reference figures\*<sup>1</sup> also increased against the revised plan**

Orders–Received	The Equipment Business significantly increased (especially environment test chambers) and Other Business also increased
Net sales	The Equipment Business significantly increased (environmental test chambers) , while the Service Business and Other Business also increased. Sales of environmental test chambers increased especially in Chinese subsidiaries
Operating income	Increased due to the higher net sales and improvement in the cost of sales ratio
Ordinary income Net income* <sup>2</sup>	Increased due to the increase in operating income

\* 1 Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries

\* 2 Profit attributable to owners of parent

Looking at dividends per share, the interim dividend was set as initially planned at ¥22, while the year-end dividend is forecast at ¥46 per share, up ¥6 from the initially planned forecast; accordingly the annual dividend is forecast at ¥68 per share.

# Review of the Fiscal 2018

## External Environment

Largely as ESPEC expected

- Foreign exchange (U.S. dollar/yen) is at \$1 to ¥108~113
- Acceleration of EV conversion in line with strengthening of environmental regulations
- Accelerated development of autonomous driving technology
- Accelerated Development of cutting-edge technologies such as IoT and AI
- Increased uncertainty due to trade friction between the U.S. and China

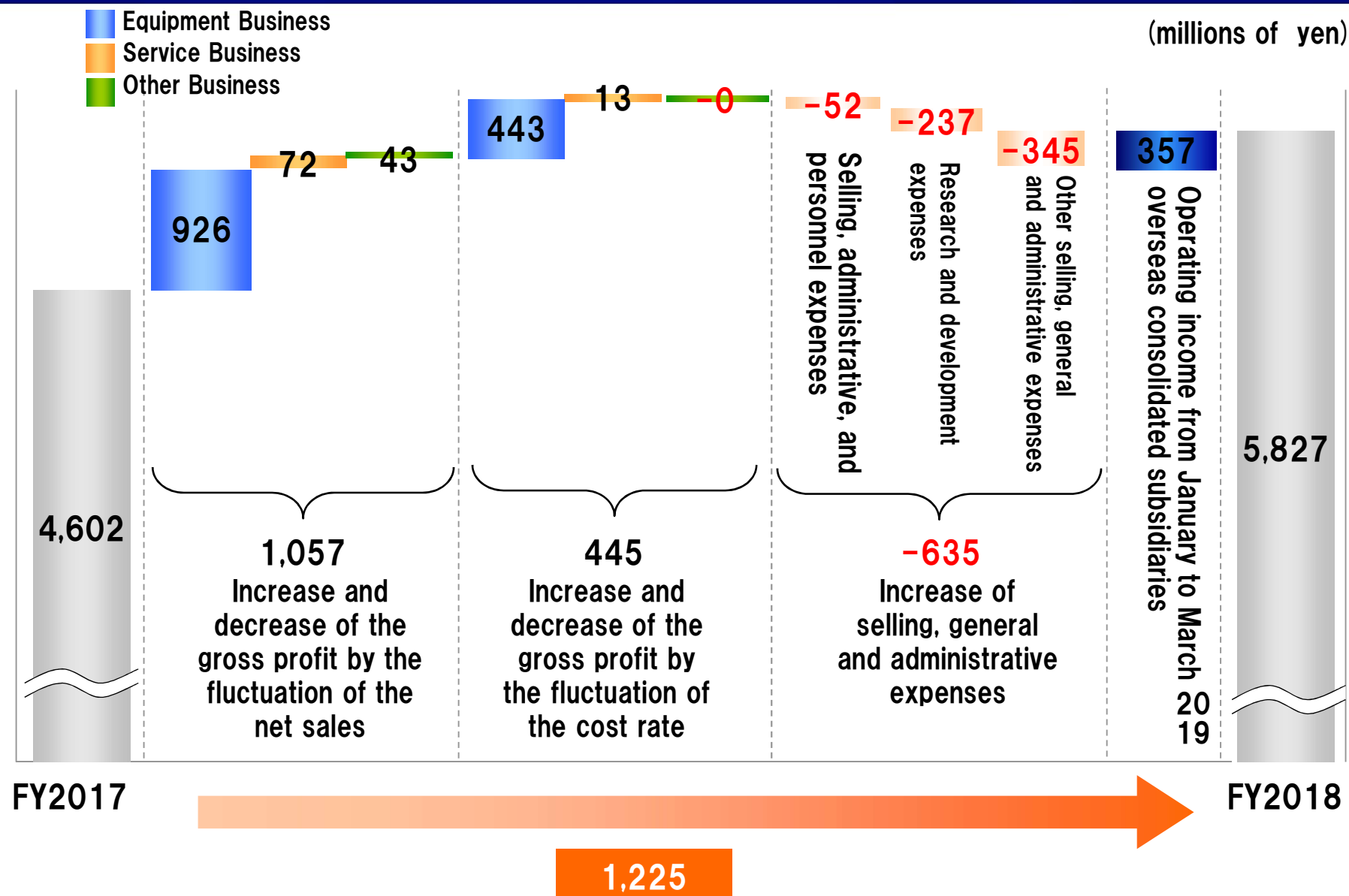
## Developments within ESPEC

Implemented policies as planned

- Built system for increasing domestic production
- Profitability improvement activities for customized products
- Chinese business performed stronger than expected
- Expanded product line for Europe
  1. Made compliant with IEC and automotive standards
  2. Made compliant with European F-gas Regulation
- ESPEC ENGINEERING VIETNAM CO., LTD. established in Vietnam

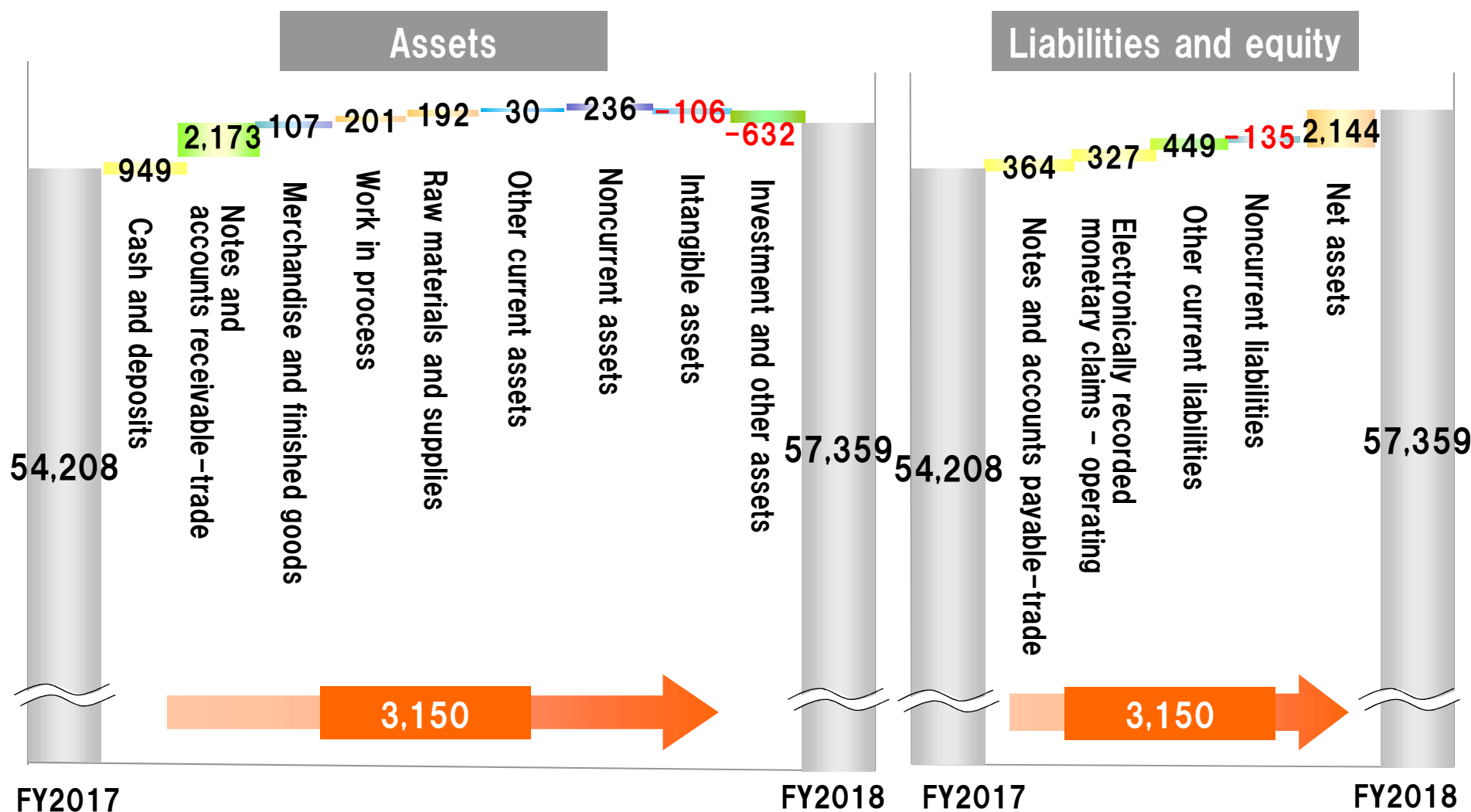
Upwardly revised the full-year results and dividend forecasts in January 2019

# Analysis of Operating Income Increase and Decrease Factor



# Statement of Assets and Liabilities

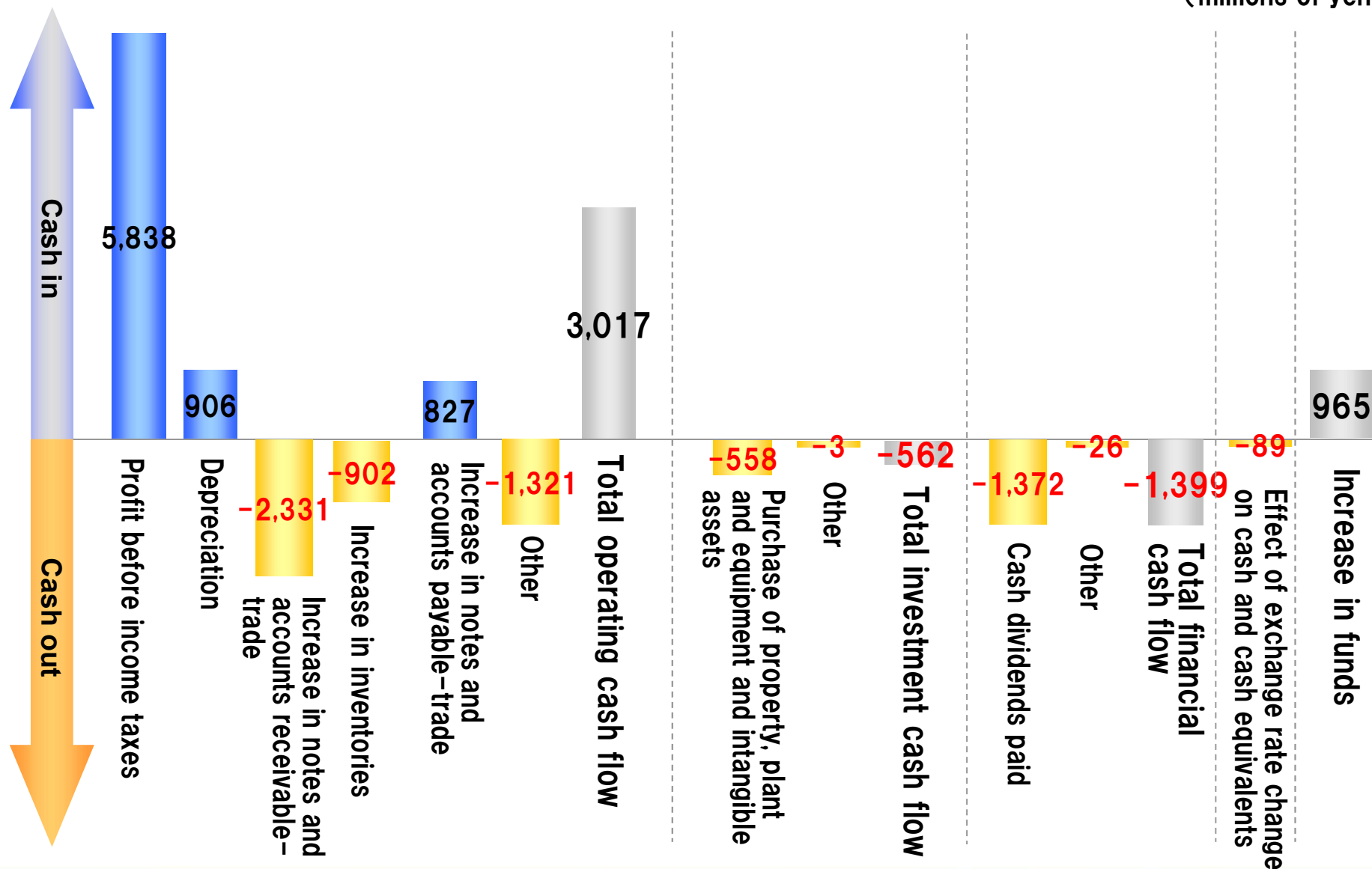
(millions of yen)



\* The Partial Amendments to the Accounting Standard for Tax Effect Accounting (ASBJ Statement No. 28, February 16, 2018) was applied from the beginning of the first quarter of FY2018, and figures as of FY2017 on the consolidated balance sheet have been revised to reflect the changes.

# Statement of Cash Flow

(millions of yen)



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# **Analysis per Segment for the Fiscal 2018 Ended March 31, 2019**



# Equipment Business

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## Environmental Test Chambers

■ Customized products performed strongly in Japan, and performed soundly in all areas overseas, with a particularly strong trend in China

\* Reference: Orders–received and net sales both increased year on year

## Energy Device Equipment

■ Orders–received performed strongly for evaluation systems for secondary batteries and fuel cells

\* Reference: Orders–received increased but net sales decreased year on year

## Semiconductor Equipment

■ Orders–received were sluggish due to a slowdown in the semiconductor market

\* Reference: Orders–received and net sales both decreased year on year

\* Reference: Comparison for regular year financial results period assuming a 12–month period for overseas consolidated subsidiaries

# Equipment Business

(millions of yen)

	FY 2017	FY 2018		
		Result	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	
			Result	Year on Year
Orders-Received	37,076	42,587	39,979	7.8%
Net Sales	36,602	42,638	39,236	7.2%
Operating Income [Profit ratio (%) ]	4,092 [11.2%]	5,193 [12.2%]	4,908 [12.5%]	19.9%

# Service Business

(millions of yen)

	FY 2017	FY 2018		
		Result	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	
			Result	Year on Year
Orders-Received	6,488	6,614	6,524	0.5%
Net Sales	6,292	6,613	6,486	3.1%
Operating Income [Profit ratio (%) ]	524 [8.3%]	620 [9.4%]	548 [8.5%]	4.5%

## After-sales Service and Engineering

Both orders and sales remained steady and increased year on year

## Commissioned Tests and Facility Rentals

Commissioned test is steady

\* Reference: Orders-received decreased but net sales increased year on year

\* Reference: Comparison for regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries

# Other Business

(millions of yen)

	FY 2017	FY 2018	
		Result	Year on Year
Orders-Received	1, 416	1, 706	20. 4%
Net Sales	1, 375	1, 541	12. 0%
Operating Income [Profit ratio (%) ]	Δ15 [Δ1. 1 %]	9 [0. 6%]	—

\* The Other Business segment was not affected by the irregular fiscal period so a reference figure is omitted.

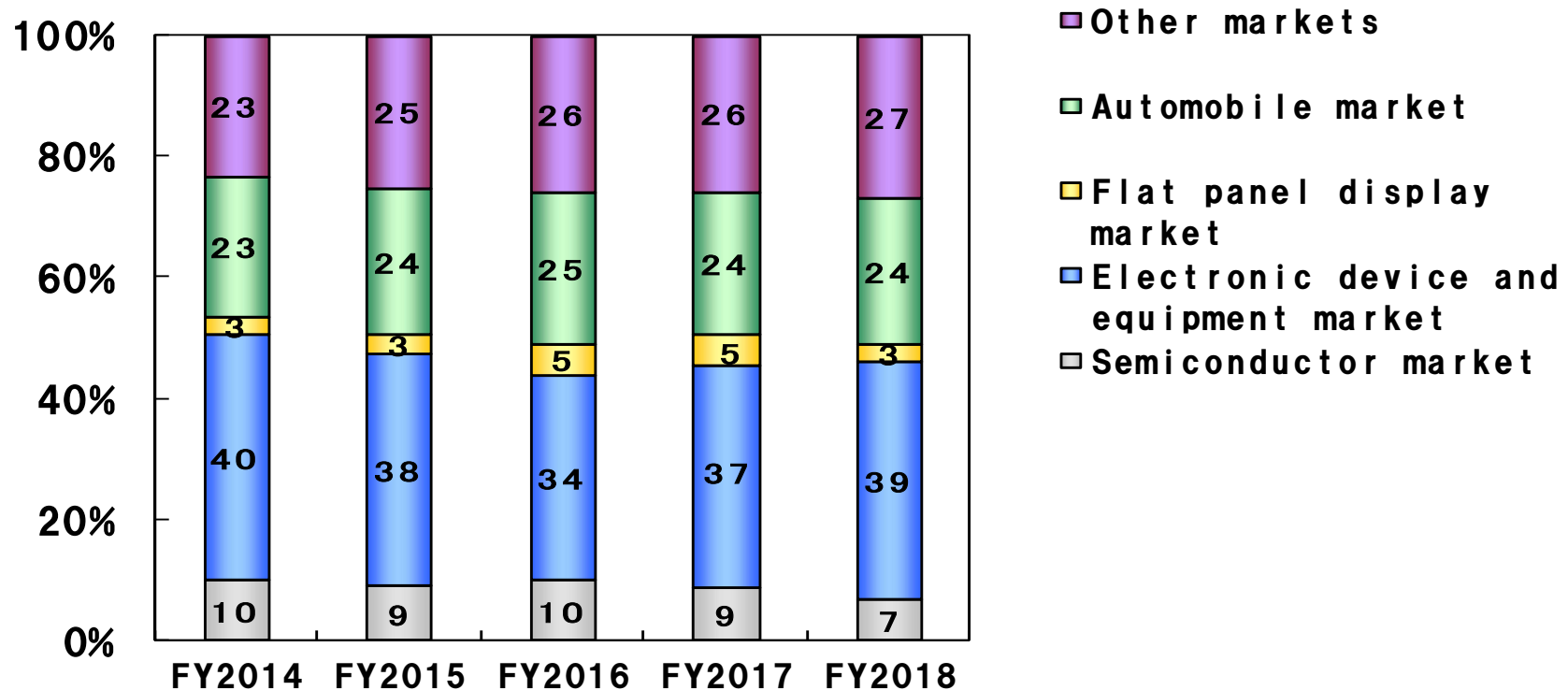
## The Forest Wetland and Greening Business, Plant Production Systems

■ Plant factory business performed strongly at ESPEC MIC Corp.

Both orders-received and net sales increased year on year

# Breakdown of Sales by Market

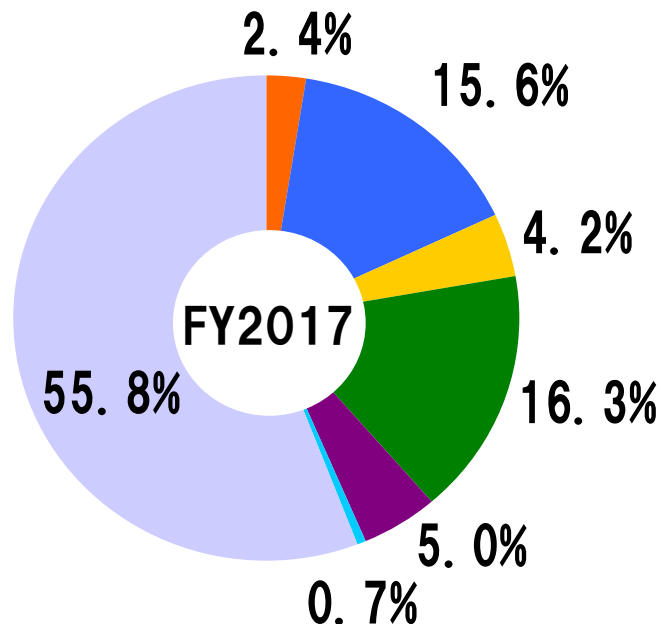
Non-consolidated (Equipment business)



# Sales by Region

FY 2017

Overseas sales ratio: 44. 2%

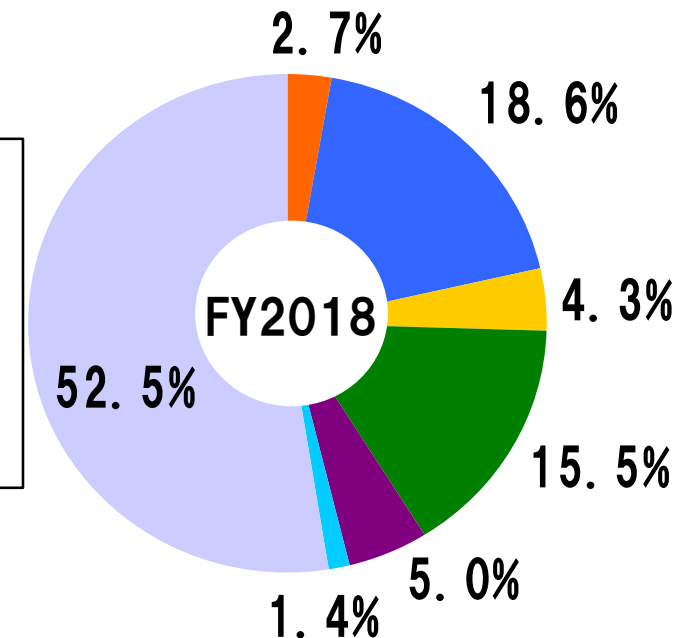


Total: 44,069million yen

(Overseas sales: 19,488million yen)

FY 2018\*

Overseas sales ratio: 47. 5%



Total: 47,060million yen

(Overseas sales: 22,352million yen)

\* Comparison against the financial results of 12-month period for overseas consolidated subsidiaries for FY2018

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# **Management Plan**

## **for the Fiscal Ending March 31, 2020**

# FY 2019 Awareness of the Environment

Equipment Business	Environmental Test Chambers	◎	Strong investment sentiment in the automobile market, both in Japan and overseas based on use of electronic components and development of automated driving
		○	Strong investment sentiment in the electronics market, both in Japan and overseas based on advances in technological innovations related to 5G, the IoT and AI
	Energy Device Equipment	○	Strong investment sentiment in in eco cars such as electric vehicles
	Semiconductor Equipment	○	Recovery expected in the semiconductor-related market
Service Business	Semiconductor Equipment, Commissioned Tests and Facility Rentals	○	Demand in the after-sales service and engineering field should remain about the same as last year. Firm demand for commissioned tests centered on the automobile market.
Other Business	The Forest Wetland and Greening Business, Plant Production Systems	△	No significant changes in the Forest Wetland and Greening Business, Plant Production Systems

The environment encompassing business segments is as stated above, but there is strong anxiety regarding a slowdown in the global economy due to factors such as trade friction between the U.S and China and we believe customers will show a cautious mindset regarding investment



# FY 2019 Assumed exchange rate

## ■ Assumed exchange rate

	FY 2017	FY 2018		FY 2019
	Results	First half Results	Results	Assumed
US\$(yen)	112.17	108.68	110.40	110.00

## Reference. FY 2019 Exchange rate sensitivity

(for every appreciation of ¥1 against the U.S. dollar)

Net Sales	A decrease of ¥131 million
Operating Income	A decrease of ¥22 million

# Business Plan for the Fiscal Ending March 31, 2020

(millions of yen)

	FY 2018		FY 2019			
	Results	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	Plan			
			First half	Second half	Full Year	Year on Year (12 months reference)
Orders-received	50,698	48,008	23,500	24,000	47,500	-1.1%
Net sales	50,580	47,060	21,500	26,000	47,500	0.9%
Gross profit [Profit ratio (%) ]	18,163 [35.9%]	17,084 [36.3%]	7,970 [37.1%]	9,240 [35.5%]	17,210 [36.2%]	0.7%
Operating income (loss) [Profit ratio (%) ]	5,827 [11.5%]	5,470 [11.6%]	2,300 [10.7%]	3,200 [12.3%]	5,500 [11.6%]	0.5%
Ordinary income (loss) [Profit ratio (%) ]	5,851 [11.6%]	5,493 [11.7%]	2,400 [11.2%]	3,200 [12.3%]	5,600 [11.8%]	1.9%
Profit attributable to owners of parent [Profit ratio (%) ]	4,289 [8.5%]	4,030 [8.6%]	1,700 [7.9%]	2,400 [9.2%]	4,100 [8.6%]	1.7%
Capital expenditures	1,197	—	700	1,900	2,600	—
Depreciation expenses	897	—	500	500	1,000	—
R&D expenditures	1,290	—	700	500	1,200	—
Profit Per Share (yen)	187.65	176.32	74.37	105.00	179.37	—

# Equipment Business

(millions of yen)

	FY 2018		FY 2019			
	Results	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	Plan			
			First half	Second half	Full Year	Year on Year (12 months reference)
Orders-received	42, 587	39, 979	19, 800	19, 500	39, 300	-1. 7%
Net sales	42, 638	39, 236	18, 000	21, 300	39, 300	0. 2%
Operating income [Profit ratio (%) ]	5, 193 [12. 2%]	4, 908 [12. 5%]	2, 100 [11. 7%]	2, 750 [12. 9%]	4, 850 [12. 3%]	-1. 2%

# Service Business

(millions of yen)

	FY 2018		FY 2019			
	Results	Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries	Plan			
			First half	Second half	Full Year	Year on Year (12 months reference)
Orders-received	6,614	6,524	3,200	3,700	6,900	5.8%
Net sales	6,613	6,486	3,100	3,800	6,900	6.4%
Operating income [Profit ratio (%) ]	620 [9.4%]	548 [8.5%]	250 [8.1%]	400 [10.5%]	650 [9.4%]	18.6%

# Other Business

(millions of yen)

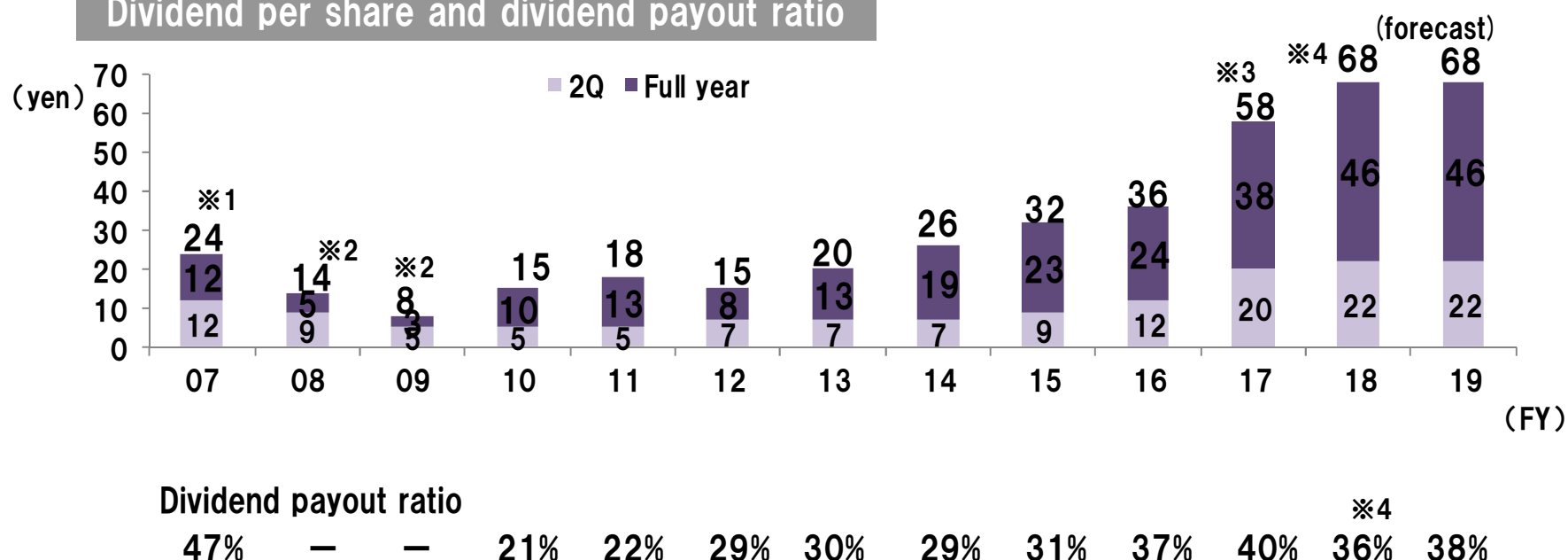
	FY 2018	FY 2019			
	Results	Plan			
		First half	Second half	Full year	Year on year (%)
Orders-received	1, 706	600	900	1, 500	-12. 1%
Net sales	1, 541	500	1, 000	1, 500	-2. 7%
Operating income [Profit ratio (%) ]	9 [0. 6%]	-50 [-10. 0%]	50 [5. 0%]	0 [0. 0%]	—

# Dividends

## Dividend policy

Recognizing that passing on profits to our shareholders is a key priority and that raising corporate value on a lasting basis is fundamental to raising shareholder value, dividends are decided taking into account sustainability and the dividend payout ratio.

## Dividend per share and dividend payout ratio



\*1.The dividend per share for FY2007 included a commemorative dividend of ¥2 per share to mark the Company's 60<sup>th</sup> founding anniversary.

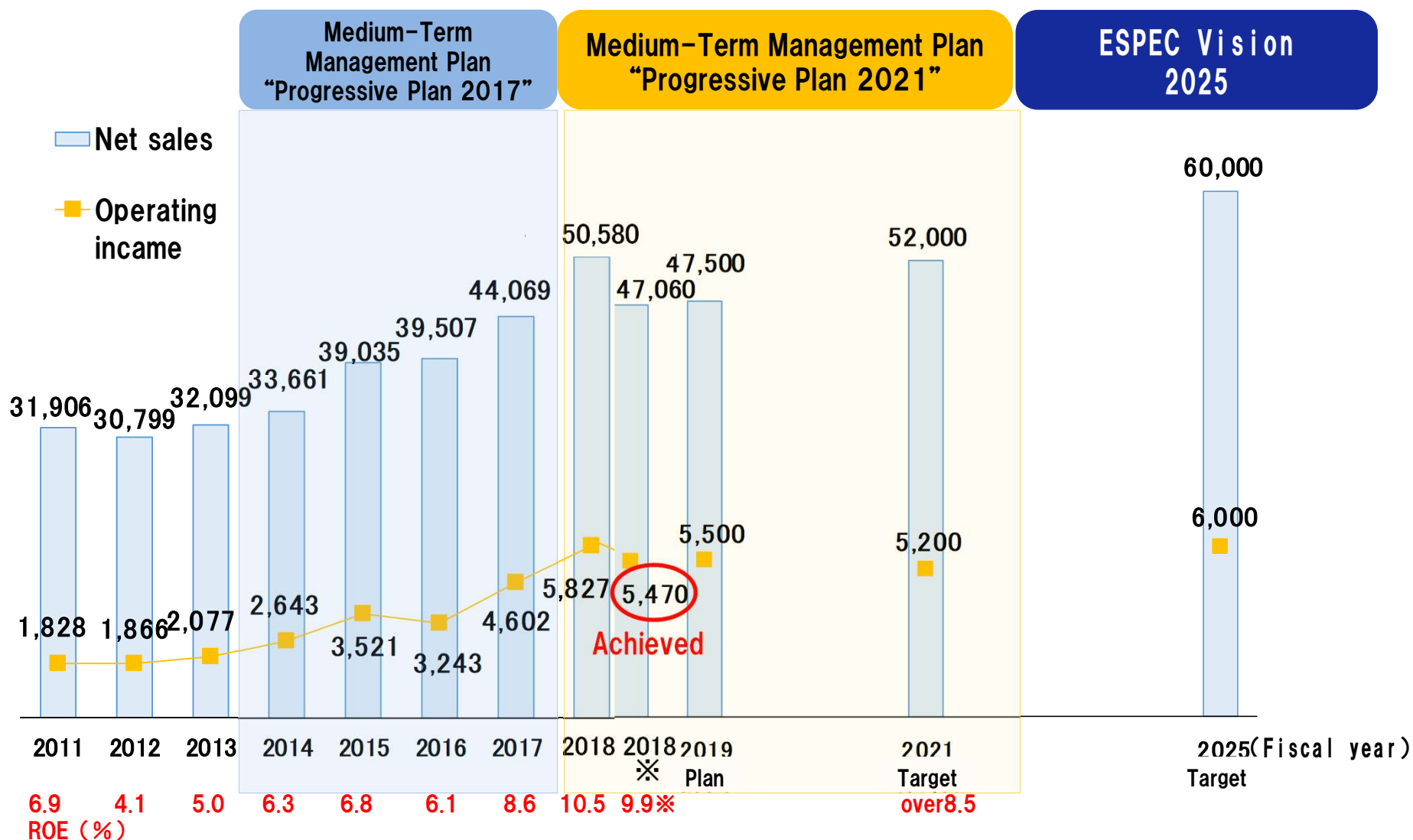
\*2.Dividends were implemented in FY2008 and FY2009, despite posting a net loss.

\*3.The dividend per share for FY2017 includes a commemorative dividend of ¥2 per share to mark the Company's 70<sup>th</sup> founding anniversary (an interim dividend of ¥1 per share and a year-end dividend of ¥1 per share).

\*4.FY2018 was an irregular 15-month fiscal period for overseas consolidated subsidiaries. The dividend payout ratio for a 12-month period is 39% (reference)

# Long-Term Vision and Medium-Term Management Plan

(millions of yen)



※Reference: Regular year financial results period assuming a 12-month period for overseas consolidated subsidiaries

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## **Action Items for the Fiscal Ending March 31, 2020**



# Business strategy in the Equipment Business segment

## Environmental Test Chambers

- Advance customization process innovation
- Expand product lineup for the automobile market

## Energy Device Equipment

- Expand sales in the Chinese secondary battery market

## New field

- Advance new business development  
Medical, materials, food machinery  
Biodiversity businesses



Secondary battery charge-discharge tester for automobiles

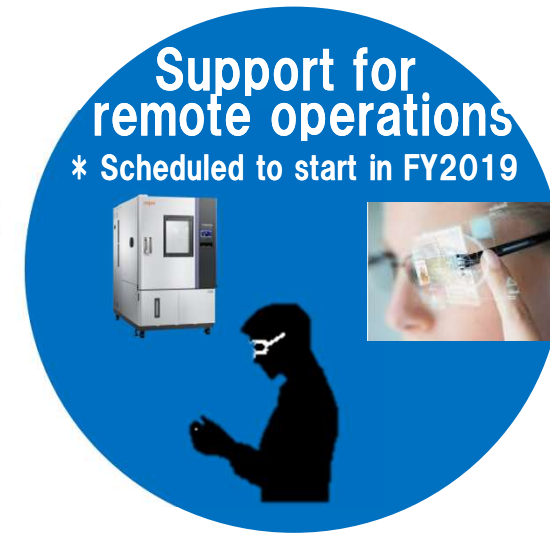


Aging Cabinet

# Business strategy in the Service Business segment

## After-sales Service

- Expand sales by proposing a new service menu  
Maintenance support utilizing smart glasses



## Commissioned Tests

- Secure new customers through a specification testing consultation service  
Comprehensive proposals from planning and implementation to analysis of specification testing
- Expand sales through a global standard specification compliance service  
Certified ISO/IEC 17025 test facility (automobiles, trains, airplanes)



Toyota Test Center

# Global strategy

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## Core expansion areas

### Europe

- Expand business through an expanded lineup
- Strengthen the technical support framework

### ASEAN

- Expand sales by consolidating Thai and Vietnamese subsidiaries

# Strengthen management foundation and promote ESG

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Under the corporate philosophy, THE ESPEC MIND,  
the Company is aiming for sustainable growth

## **E(Environmental)**

- ① 7th Mid-term Plan on the Environment
- ② Contribute to reducing the environmental load through products
- ③ Promote biodiversity and natural environment preservation activities

## **S(Social)**

- ① Support human resource development and growth
- ② Promote working style reform

## **G(Governance)**

- ① Maintain headquarters functions, strengthen governance
- ② Facilitate good communication with stakeholders

# Investment plan

<b>Strategic investment</b>	<b>1.6 billion yen</b>
<b>Ordinary investment</b>	<b>1 billion yen</b>
<b>Total</b>	<b>2.6 billion yen</b>

**R&D expenditures**

**1.2 billion yen**

## Main Capital Investments

- Construct new building at Kobe R&D Center
- Expand commissioned testing services
- Expand ENA Colorado business site



Image of the new building at the Kobe R&D Center

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Quality is more than a word

ESPEC

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**These materials contain forward-looking statements, including the Company's present plans and forecasts of performance, that reflect the Company's plans and forecasts based on the information presently available. These forward-looking statements are not guarantees of future performance, and plans, forecasts, and performance are subject to change depending on future conditions and various other factors.**

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**E-mail: [ir-div@espec.jp](mailto:ir-div@espec.jp)**

**Jyunko Nishitani (General Manager) ,**

**Yasutoshi Nakagawa and Natsuko Okawa**

**Corporate Communication Department**

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# Reference



# History of Environmental Test

## What is Environmental Test

Test to analyze and evaluate effects of environmental factors such as temperature, humidity, pressure, and light on various industrial products like electronic components in order to ensure product quality.

<1950s>

The environmental test was JIS-standardized in Japan for consumer products.



<1970s-1990s>

"Reliability" and "quality control" became important issues in product development. Demand increased dramatically due to a rapid shift toward computerization and the use of electronic components.



<Today>

Demand is expanding in the energy field, and the development field of automobiles' electrification and automated driving functions.



1961 Japan's First Environmental Test Chamber



【 Low temperature & humidity chamber "Lucifer" 】



Over 60% domestic

Over 30% worldwide

To Worldwide Market Share No.1

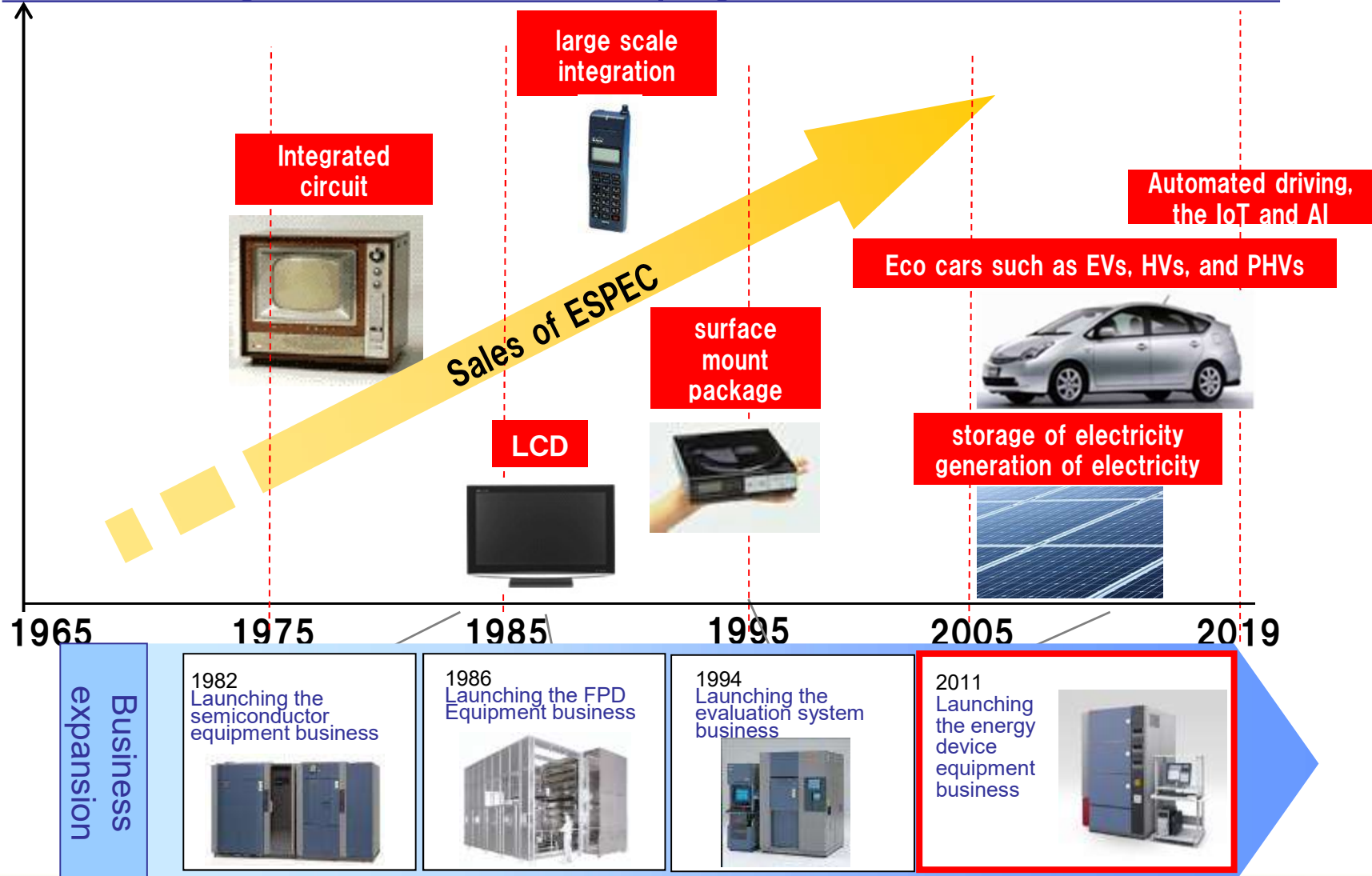


【 Temperature & Humidity Chamber 】

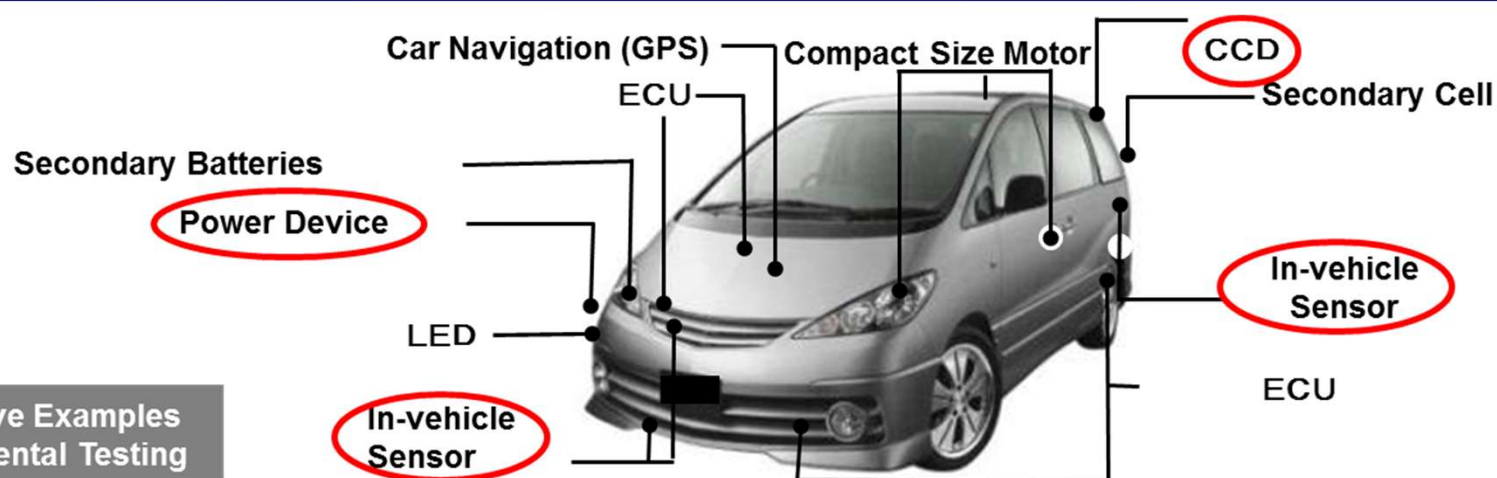
"Platinous J series"

# Transition in Business




Expanding business based on the “environmental creation technology” refined during the course of developing environmental test chambers




# [Equipment Business] Usage Case with Environmental Test Chambers



Representative Examples  
for Environmental Testing

Device	Process/Test Condition		Our Products
<b>【Power Device】</b> 	Inspection	■ Thermal shock test: $-40^{\circ}\text{C} \rightleftharpoons +125^{\circ}\text{C}$	Thermal shock chamber
		■ High temperature exposure: $+175^{\circ}\text{C}$ , $+85^{\circ}\text{C}$	(Compact size) Oven
		■ Burn-in test	Burn-in chamber
<b>【In-vehicle Sensor】</b> 	Inspection	■ Temperature cycle test of printed circuit board: $-40^{\circ}\text{C} \rightleftharpoons +110^{\circ}\text{C}$	Temperature & humidity chamber (Platinous) / Oven
		■ Temperature characteristic test after soldering: Linear change between $-30^{\circ}\text{C}$ and $+85^{\circ}\text{C}$	Burn-in chamber, Rapid-rate thermal cycle chamber
	Evaluation	■ Thermal shock test : $-30^{\circ}\text{C} \rightleftharpoons \text{RT} \rightleftharpoons +80^{\circ}\text{C}$ , $-55^{\circ}\text{C} \rightleftharpoons +155^{\circ}\text{C}$	Thermal shock chamber
<b>【CCD/CMOS】</b> 	Production	■ Diffusion Test: $+150^{\circ}\text{C}$	Compact size Oven
		■ Drying after cleaning: $+85^{\circ}\text{C}$	Clean Oven
	Evaluation	■ Screening: $+85^{\circ}\text{C}$	Temperature chamber (Platinous) / Burn-in chamber
	Inspection	■ Temperature and humidity test: $+85^{\circ}\text{C} / +85\%\text{rh}$ , $+60^{\circ}\text{C} / 90\%\text{rh}$	Temperature & humidity chamber (Platinous)
		■ Acceleration test: $+120^{\circ}\text{C} / 100\%\text{rh}$	HAST chamber
		■ Thermal shock test : $-40^{\circ}\text{C} \rightleftharpoons +125^{\circ}\text{C}$ , $-20^{\circ}\text{C} \rightleftharpoons +85^{\circ}\text{C}$	Thermal shock chamber

# [Equipment Business] Main New Products

Release Date	Name of product	Features
Dec. 2018	Aging Cabinet	<ul style="list-style-type: none"> <li>• There is no temperature rise due to defrosting, and long-term continuous operation of high humidity environment is possible while maintaining below 5°C</li> <li>• Equipped with sterilization mode</li> </ul>
Nov. 2018	Standard type secondary battery charge-discharge tester for automobiles	<ul style="list-style-type: none"> <li>• Supports charge-discharge testing for large capacity secondary batteries in automobiles</li> </ul>
Oct. 2018	Environmental Stress Chamber AR series Rapid-Rate Temperature Cycle Type (5K/min)	<ul style="list-style-type: none"> <li>• Conforms to IEC standards and a German automobile industry standard</li> <li>• Uses European F-gas Regulation-compliant low-GWP refrigerant R-449A</li> </ul>
Mar. 2018	Environmental Stress Chamber AR Series Rapid-Rate Temperature Cycle Type	<ul style="list-style-type: none"> <li>• Second F-gas Regulation-compliant low-GWP refrigerant (R449) environmental testing chamber</li> </ul>
Feb. 2018	Environmental Stress Chamber AR Series Standard Type	<ul style="list-style-type: none"> <li>• Added four models with new 220 L and 390 L chambers (with and without humidity control), bringing the total lineup to 12 models</li> </ul>
Dec. 2017	Faster Temperature (& Humidity) Chamber SM Series	<ul style="list-style-type: none"> <li>• Achieved temperature change of 5°C/min with 1,800 L capacity</li> <li>• Made networking functions a standard feature</li> </ul>
Nov. 2017	Highly Accelerated Stress Test System (HAST) 	<ul style="list-style-type: none"> <li>• Added a new controller for improved operability and visibility</li> <li>• Added new functions using networks</li> </ul>
Jul. 2017	Thermal Shock Chamber TSA series	<ul style="list-style-type: none"> <li>• the first chambers in Japan to be compliant with European F-gas Regulation</li> </ul>
Nov. 2016	High-Power Temperature & Humidity Chamber AR Series Rapid temperature change type	<ul style="list-style-type: none"> <li>• Compatible with IEC standards and automobile-related standards</li> <li>• Achieves rapid temperature change rate of up to 18°C/min</li> </ul>



# [Equipment Business] Examples of Products Delivered

(Delivered in July 2018)

- Delivery examples of temperature (& humidity) chambers, test chambers for use for building materials

## Uses

Reproduce the environment inside apartments (temperature and humidity) and outdoors (weather such as rain, snow, and solar radiation), conduct performance evaluations and durability tests of building materials for sash, balcony, etc.



temperature (& humidity) chambers, test chambers for use for building materials



Temperature (& humidity) chambers are movable so that building materials for testing can be easily changed



Furnished with irradiation equipment and watering (rain) equipment, to reproduce an outdoor weather environment

# [Equipment Business] Examples of Products Delivered

(Delivered in March 2016)

## ■ Smart System Research Facility, Fukushima Renewable Energy Institute, AIST (Koriyama city, Fukushima)

Product delivered:

Large walk-in type temperature & humidity chamber

Uses:

Performance and safety evaluation for large power conditioners for solar power generation  
Supports heat generation loads of 100 kw and large weights (21 tons)



Large walk-in type temperature & humidity chamber

## ■ National Laboratory for advanced energy storage technologies (NLAB), National Institute of Technology and Evaluation (Nanko, Osaka City)

Product delivered:

1. Walk-in type temperature & humidity chamber for charge-discharge testing
2. External short-circuit testing equipment (energy devices equipment)

Uses:

1. Evaluate the performance of storage batteries by repeatedly charging and discharging them
2. Evaluate safety by confirming that storage batteries will not catch fire or rupture if they short circuit



Walk-in type temperature & humidity chamber for charge-discharge testing

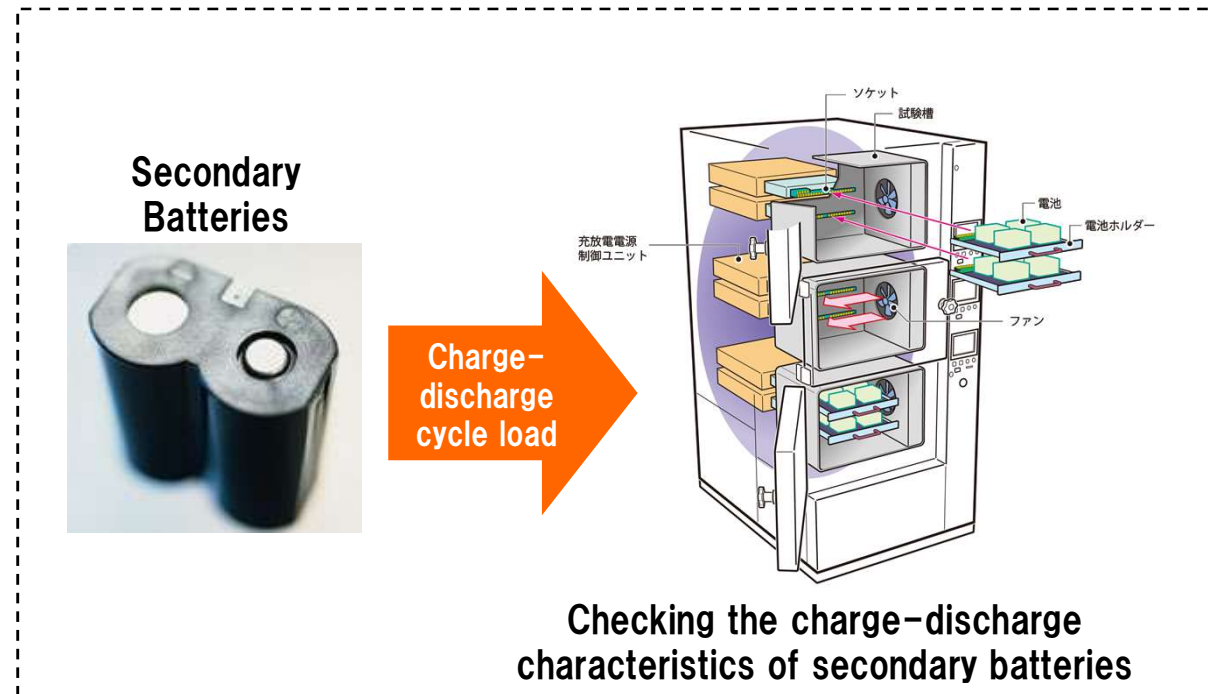
# [Equipment Business] Usage Case with Energy Device Equipment

## Charge-discharge Cycle Evaluation Equipment

Equipment for ensuring the reliability and safety of lithium-ion secondary batteries for next-generation vehicles (e.g., hybrid and electric vehicles)



Charge-discharge Cycle Evaluation Equipment



Evaluating the performance and life of secondary batteries

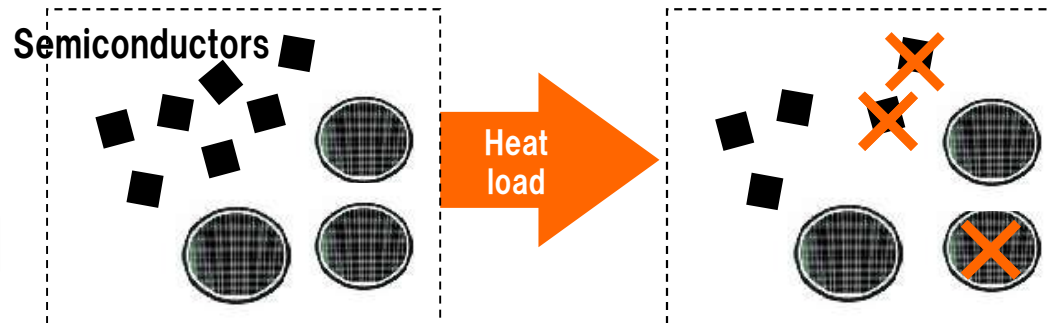
# [Equipment Business] Usage Case with Semiconductor Equipment

## Screening

Eliminate defective products to maintain initial-period quality at the final inspection stage of semiconductor device manufacturing



Burn-in chamber



Elimination of latent early failures

## Reliability Evaluation

Used to evaluate basic failure patterns to ensure reliability in the development of new technologies

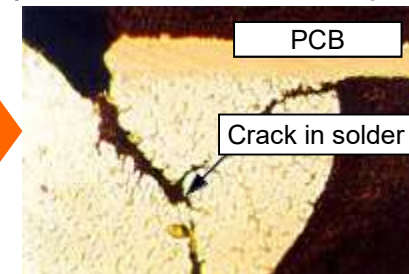


Conductor resistance evaluation system



Heat  
cycle  
load

Example of defect in soldered joint



Electrical evaluation of reliability of joints in electronic parts



# [Service Business]

## After-sales Service and Engineering

Preventive maintenance of products, maintenance service, and the upgrading/improvement and installation/relocation of products

- Speedy response via one of the most extensive networks in Japan
- Launching new services by utilizing the network function mounted in the equipment

## Commissioned Tests and Facility Rentals

Commissioning of testing, analysis, and evaluation; consulting; equipment rental; sales of used products; calibration of test equipment, etc.

- The company has four commissioned test centers in Japan, one in Thailand, two in China.

(Japan: Utsunomiya, Toyota, Kariya and Kobe, Thailand, China: Shanghai, Suzhou)

- The centers are also recognized as official calibration facilities under the Japan Calibration Service System (JCSS).
- [First in world] Opened Battery Safety Certification Center. (in September 2015)
  - Providing a one-stop service for testing and certification application services compliant with United Nations regulations on the safety of automotive rechargeable batteries.
  - Entered into business alliance with TÜV SÜD Japan Ltd., a third-party certification agency (in October 2014)
- [First in Japan] Acquire ISO/IEC 17025 test facility certification simultaneously in the three fields of automobiles, trains and airplanes
  - The Nakanihon test facility provides one-stop services for testing LV 124, the German Automotive Manufacturer Testing Standards



Battery Safety Certification Center

\* ISO/IEC 17025: An international standard in which an authoritative third-party organization certifies whether a test facility or calibration organization is capable of producing accurate measurements or calibration results

# [Service Business]

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## [First in Industry] New services using networks ESPEC ONLINE SERIES

\* Services started in November 2013

### ■ ESPEC online support

Trouble notification and recovery service enabling peace of mind when using the Company's products

### ■ ESPEC OnlineCore

A centralized management system enabling operators to monitor the operation status of multiple networked environmental testing chambers at a glance

### ■ ESPEC OnlineConverter

A network adapter for LAN connection of non-network ready environmental testing chambers  
Enables remote monitoring and operation of networked environmental testing chambers

# [Service Business]

**[First in world] ESPEC provides commissioned tests and certification application services compliant with United Nations regulations at Battery Safety Certification Center**

Providing a one-stop service to support the implementation of 9 safety tests and applications for certification by certification agencies, as stipulated by UN ECE R100-2, Part II\*, a United Nations regulation.

(The facility was opened within the Utsunomiya Technocomplex in September 2015. )



**Battery Safety Certification Center  
(in Utsunomiya Technocomplex )**



**Crush Testing Equipment  
(No. 1 Safety Test Room)**



**No.2 Safety  
Test Room**

# [Other Business]

## The Forest Wetland and Greening Business

### ■ Reforestation (Tree planting)

Recovery of local forest by selecting species and planting out seedlings using potential natural vegetation data.



### ■ Waterfront biotope restoration

Reconstruction of natural environment, development of vegetative revetments, and water quality improvement using aquatic plants.

### ■ Urban greening

Provision of roof and wall greening systems that use moss to effectively alleviate heat island effect.



## Plant Production Systems

Provision of various cultivation environments employing advanced environmental control technologies to control light, temperature, humidity, carbon dioxide, etc.



Plant factory



Phyto-toron

# [Other Business]

**Produced a high value-added vegetables using deep-seawater**

**Established in March 2016 near Haneda Airport at a plant factory\*,  
Production and sales of vegetables high in minerals  
with the use of deep sea water.**

**\* Joint research with DHC Corporation and Kyoto University**



Interior of the plant factory and Factory-produced vegetables "mineraleaf"



## [Other Business] Examples of Products Delivered

### ■ Arid Land Research Center, Tottori University

(Delivered in March 2016)

#### Products delivered:

Experimental System for Analyzing Responses of Dryland plants to Climate Changes (2 units)

(Simulates the climates of arid lands, including high temperature, low humidity, strong sunlight, and high winds)

#### Uses:

Plant cultivation experiments and experiments to develop efficient water-usage technologies in arid lands, research to solve issues facing arid lands



Experimental System for Analyzing Responses of Dryland plants to Climate Changes



Experiment in progress

# Initiatives Tackling Environmental Problems

Achieved 71th place in the Nikkei Environmental Management Survey (FY2017)

## ● Forest preservation activity – Kehara Forest Creation Program

In March 2018, designated as an affiliated business of the Japan Committee for United Nations Decade on Biodiversity  
Since 2007, the Company's employee volunteers have increased to over 1,000 participants

## ● ESPEC Foundation for Global Environment Research and Technology (Charitable Trust)

Provides funding support every year for research, technology development on global environmental conservation.  
Established in 1997 on the 50th anniversary of ESPEC

## ● ESPEC Midori-no-gakko schools

Human resources certification, etc. based on Act on the Promotion of Environmental Conservation Activities through Environmental Education  
Seminars and events are held throughout Japan to train leaders who will think about the global environment



### • Sustainability Report 2018

Won the 22<sup>nd</sup> Environmental Communication Award

※ 「Excellence Award」

※ Sponsored by the Ministry of the Environment,  
and the Global Environmental Forum



# Initiatives Tackling Biodiversity

(March 2018)

**Designated as affiliated businesses of the Kebara Forest Creation Program:  
Creating a Mountain Full of Treasures—The Kyoto Model Forest Project, and The  
Japan Committee for the United Nations Decade on Biodiversity**

- The Kebara Forest Creation Program is a project in which ESPEC and ESPEC MIC CORP. are working with the Fukuchiyama City Oecho Kebara Residents Association regarding forest conservation activities
- ESPEC formulated Creating a Mountain Full of Treasures Project which freshly reveals the attractive treasures in the forest: The variety of living creatures which live in the Kebara Forest. ESPEC conducts conservation activities such as cutting down and thinning, produces maps showing where the living creatures are, and maintains walking courses



Participants in the Kebara Forest Creation Program



This project is designated as a project recommended by the Japan Committee for the United Nations Decade on Biodiversity (UNDB-J)



# To a Company Where Employees Can be More Active

## Initiatives to promote women's success



From the Ministry of Health, Labor and Welfare:  
The Company received the "Kurumin" certification, which is granted to companies that support child-rearing. And the highest ranking of the certification mark "Eruboshi" based on the Act on Promotion of Women's Participation and Advancement in the Workplace.



The female leadership development program

## Employee Education System Enhancement

- Implementation of training aimed at sharing corporate philosophy
- Implement a Global Trainee Program aimed at developing human resources who are capable of working in international settings
- Enhance the education program to support management executive education and self-development



On-site training in the Global Trainee Program (U.S.)