
Securities ID code:6859

ESPEC CORP.

**Results Briefing for The Second Quarter
of Fiscal Ending March 2018**

November 20, 2017

www.espec.co.jp

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Company Profile

World-leading manufacturer of environmental test chambers:
70th year since company was founded

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	¥6,895 Million
Shares Issued	23,781,394 Shares
Employees	1,453 (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 September 30, 2017)

Global Network

Consolidated Subsidiaries
11 companies
(Global 8 companies,
Domestic 3 companies)

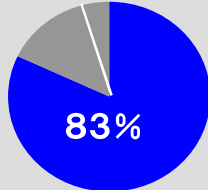
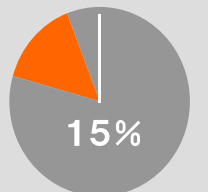
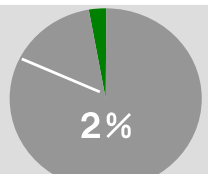
Global Network
43 countries
33 companies

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



●: Consolidated Subsidiaries
△: Non-consolidated Subsidiaries

Summary of ESPEC Business (Per Market / Use)

		Main Products	Market	Use	Sales composition (FY2017 2Q)
Equipment Business	Environmental Test Chambers	<ul style="list-style-type: none">•Temperature & humidity chamber•Thermal shock chamber•Bench-top type temperature & humidity chamber•HAST chamber•Walk-in type temperature & humidity chamber•Combined temperature & humidity chamber•FPD equipment	<ul style="list-style-type: none">•Electronic component and equipment market•Automobile market•Semiconductor market•Medicine, Cosmetics, Foods market•LCD and Organic Electro-Luminescence market	<ul style="list-style-type: none">•For R & D•For credibility and evaluation•For production and inspection	 83%
	Energy Device Equipment	<ul style="list-style-type: none">•Charge-discharge Cycle Evaluation Equipment•LIB safety evaluation system•Fuel cells evaluation system	<ul style="list-style-type: none">•Next generation automobile market•Secondary batteries market•Fuel cells market	<ul style="list-style-type: none">•For R & D•For credibility and evaluation•Safety evaluation•For production	
	Semiconductor Equipment	<ul style="list-style-type: none">•Burn-in system•Semiconductor evaluation system•Instrumentation system	<ul style="list-style-type: none">•Semiconductor market•Automobile market	<ul style="list-style-type: none">•For production and inspection•For development and evaluation	
Service Business	After-sales Service and Engineering	<ul style="list-style-type: none">•After-sales service•Construction around equipment	<ul style="list-style-type: none">•Electronic component and equipment market•Automobile market•Semiconductor market	—	 15%
	Commissioned Tests and Facility Rentals	<ul style="list-style-type: none">•Commissioned test•Equipment rental <ul style="list-style-type: none">•Resale•Calibration		<ul style="list-style-type: none">•For R & D•For credibility and evaluation	
Other Business	Environmental Engineering Business	Reforestation (Tree planting) , Waterfront biotope restoration, Urban greening			 2%
	New Business	Plant factory, developing and creating new businesses as a major source of profit			

TOPICS

(in July 2017)

**ESPEC launches TSA series of thermal shock chambers,
the first chambers in Japan to be compliant with European F-gas Regulation***

- Environmental test chambers will be regulated from 2020
Similar regulations will start in Japan from 2025
- Global Warming Potential, which is far more than the F-gas Regulation, is used as a refrigerant
(Restrict GWP 2500 or more by regulations → Use GWP 1397)
- ESPEC plans to complete 3 core products by fiscal 2018, and all products by fiscal 2020



*** European F-gas Regulation**

In Europe, the greenhouse gas HFC (hydrofluorocarbon), PFC (perfluorocarbon), and SF6 (sulfur hexafluoride) are called F gases. Regulations have been put in place to curb the discharge of these gases into the atmosphere; they were promulgated in June 2006 and enforced on July 4.

It has been decided to reduce in stages the total amount of HFC in products sold in Europe in line with the revised European F-gas Regulation enforced in January 2015.

TOPICS

(in August 2017)

ESPEC Foundation for Global Environment Research and Technology (Charitable Trust) * Holds the 20th awards ceremony

- Held a 20th awards ceremony for commemoration
- Increased the award amount as the number of entries increased
[At initial establishment]
Award of ¥2.5 million per year for 3 to 4 themes
↓
[Fiscal 2017]
Award of ¥9.05 million per year for 19 themes
- Total award of ¥105.22 million for 202 projects over 19 years up until last year



*ESPEC Foundation for Global Environment Research and Technology (Charitable Trust)
Established in 1997, the 50th anniversary of its founding, as a business to fulfill its social responsibilities
Assisted provided from funds for survey research and technology development on global environmental conservation, greening education/enlightenment activities, etc.

TOPICS

(in January 2017)

Achieved 38th place in the Nikkei Environmental Management Survey

FY	Ranking
2016	38
2015	48
2014	113

(in February 2017)

Environmental Communication Award
Won the Excellence Award for
2 consecutive years



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

TOPICS

Promotion of diversity – Initiatives to promote women's success



- February 2016 – From the Ministry of Health, Labor and Welfare:
The Company received the "Kurumin" certification, which is granted to companies that support child-rearing

- March 2016 – From Osaka City:
The Company received the "Leading Company in Women's Advancement in Osaka City" certification

- September 2016 – From the Ministry of Health, Labour and Welfare:
The Company received the highest ranking of the certification mark "Eruboshi" based on the Act on Promotion of Women's Participation and Advancement in the Workplace



Financial Result for the Second Quarter of Fiscal Ending March 31, 2018

Review of the First Half of Fiscal 2017

External Environment

- Foreign exchange (U.S. dollar/yen) is at \$1 to ¥108~114
- Acceleration of EV conversion in line with strengthening of environmental regulations

China: NEV regulations introduce in 2019
U.S.: Strengthen ZEV regulations from 2018 (10 states)
Europe: World's strictest CO₂ emissions regulations
(To be reduced to 95g/km by 2021, and further reduced by 30% by 2030)
- Accelerated development of autonomous driving technology
- Development of cutting-edge technologies such as IoT and AI
- Activated investments in overseas commissioned testing institutions

Developments within ESPEC

- A "ONE ESPEC Structure" in the Chinese market began to get on track
(July 2015 Converted SHANGHAI ESPEC ENVIRONMENTAL EQUIPMENT CORP. into a wholly owned subsidiary)
- Expanded product lineup for Europe
November 2016: Made compliant with IEC standards and automobile-related standards
High-Power Temperature & Humidity AR Series
Rapid temperature change type
July 2017: Made compliant with European F-gas Regulation
Thermal Shock Chamber TSA series
- Created synergies with QUALMARK CORPORATION of North America
- Strengthened profitability improvement activities for customized products

Financial Highlights

Sales and profit both increased year on year in the first half of fiscal 2017

ESPEC announced upward revision of forecast in October
because the results also exceeded initial plan

	Year on Year	Initial plan
■ Orders-Received	○ The Equipment Business increased (especially environment test chambers)	○ Investments continued to increase, against initial plan, exceeding expectations both in Japan and overseas
■ Net sales	○ The Equipment Business increased (especially environment test chambers)	○ Increased against initial plan because orders received exceeded expectations both in Japan and overseas
■ Operating income	○ Increased due to the higher net sales and improvement in the cost of sales ratio	○ Increased against initial plan due to the higher net sales and improvement in the cost of sales ratio
■ Ordinary income, Net income*	○ Increased due to the increase in operating income and the decrease in foreign exchange losses	○ Increased due to the increase in operating income
■ Looking at dividends per share, the interim dividend was set at ¥20, up ¥5 from the initially planned forecast while the year-end dividend is forecast at ¥38 per share, up ¥3 from the initially planned forecast; accordingly, the annual dividend is forecast at ¥58 per share. (Including a commemorative dividend of ¥2 to mark ESPEC's 70th anniversary)		

*Profit attributable to owners of parent

Summary of Profits and Losses

(millions of yen)

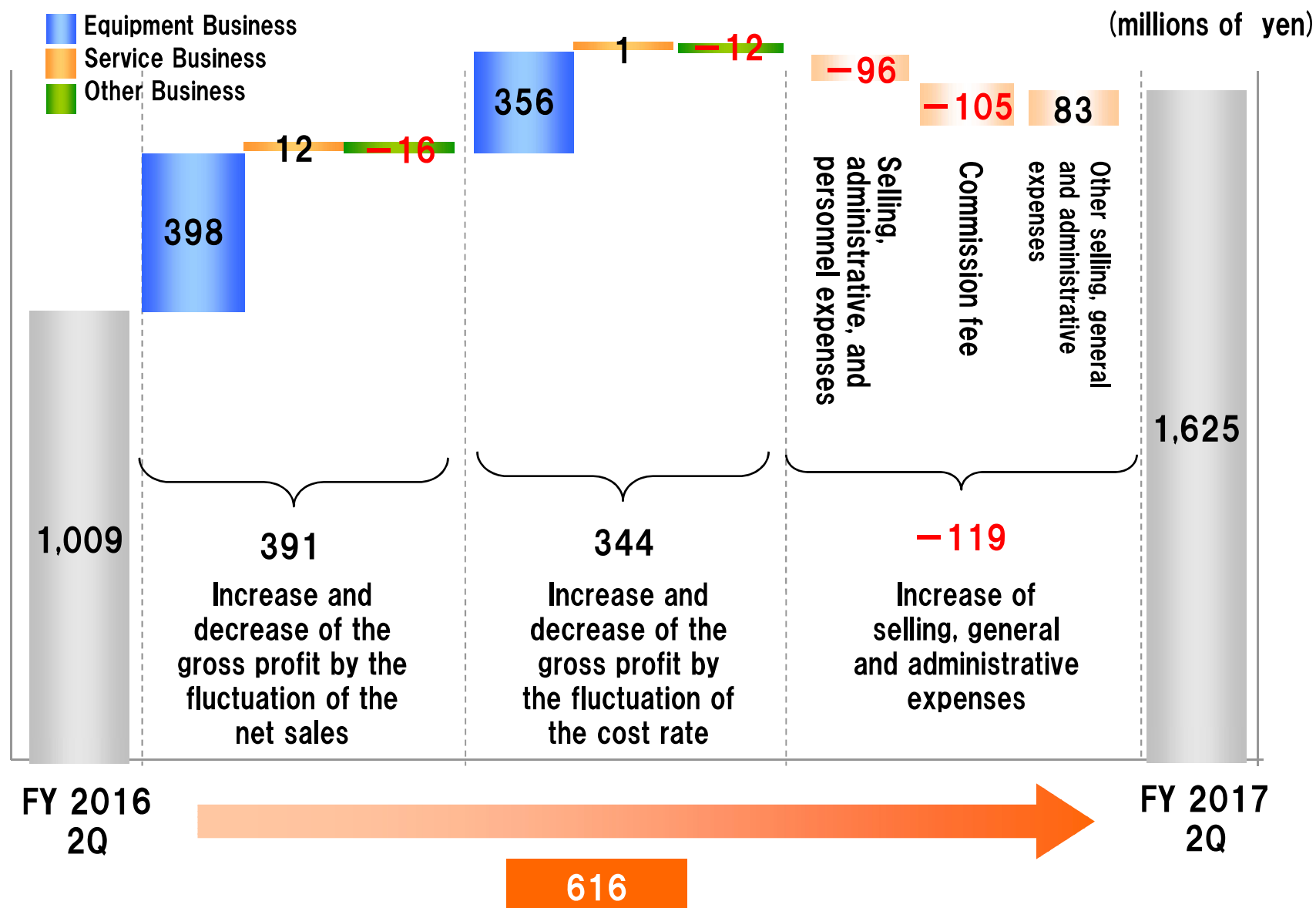
	FY 2016 2Q	FY 2017 2Q (Initial plan)	FY 2017 2Q	Year on Year	Initial plan ratio
Orders–Received	19,914	20,000	22,850	14.7%	14.3%
Net sales	17,250	17,500	18,396	6.6%	5.1%
Cost of Net Sales (Cost of sales ratio)	11,360 (65.9%)	11,300 (64.6%)	11,770 (64.0%)	3.6%	4.2%
Gross profit	5,889	6,200	6,625	12.5%	6.9%
SG & A	4,880	5,000	4,999	2.4%	−0.0%
Operating income	1,009	1,200	1,625	61.1%	35.4%
Ordinary income	833	1,250	1,691	103.0%	35.3%
Profit attributable to owners of parent	512	850	1,165	127.5%	37.1%

Performance by Segment

(millions of yen)

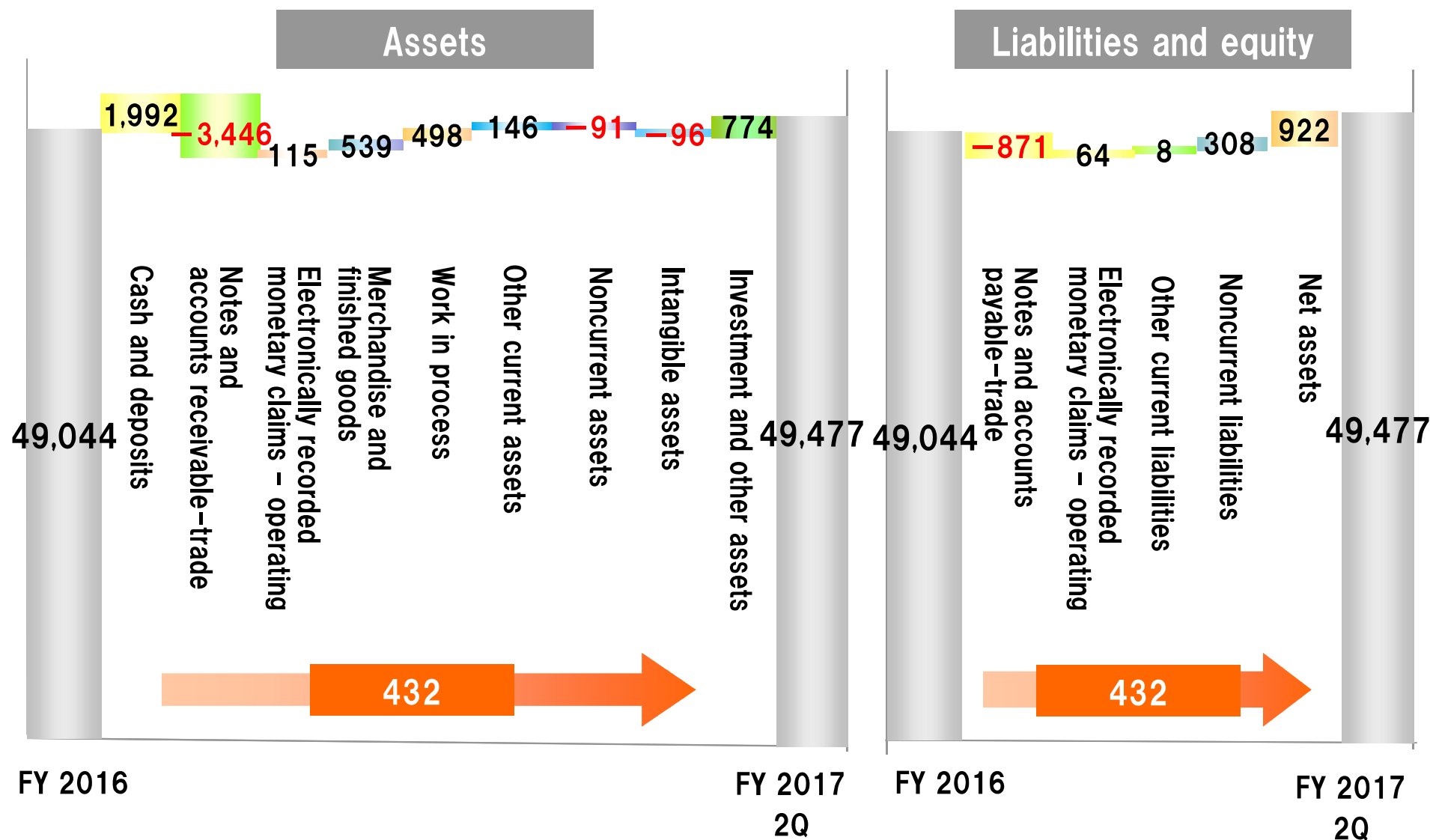
Segment		FY 2016 2Q	FY 2017 2Q (Initial plan)	FY 2017 2Q	Year on Year	Initial plan ratio
Equipment Business	Orders-Received	16,508	16,500	19,230	16.5%	16.5%
	Net Sales	14,188	14,300	15,355	8.2%	7.4%
	Operating Income	901	1,050	1,621	79.9%	54.4%
Service Business	Orders-Received	2,908	3,000	3,061	5.3%	2.0%
	Net Sales	2,666	2,800	2,702	1.3%	-3.5%
	Operating Income	152	200	87	-42.6%	-56.5%
Other Business	Orders-Received	621	600	674	8.6%	12.3%
	Net Sales	502	500	439	-12.6%	-12.2%
	Operating Income	-45	-50	-82	—	—
Elimination	Orders-Received	-124	-100	-115	—	—
	Net Sales	-108	-100	-100	—	—
	Operating Income	1	0	-0	—	—
Total	Orders-Received	19,914	20,000	22,850	14.7%	14.3%
	Net Sales	17,250	17,500	18,396	6.6%	5.1%
	Operating Income	1,009	1,200	1,625	61.1%	35.4%

Analysis of Operating Income Increase and Decrease Factor



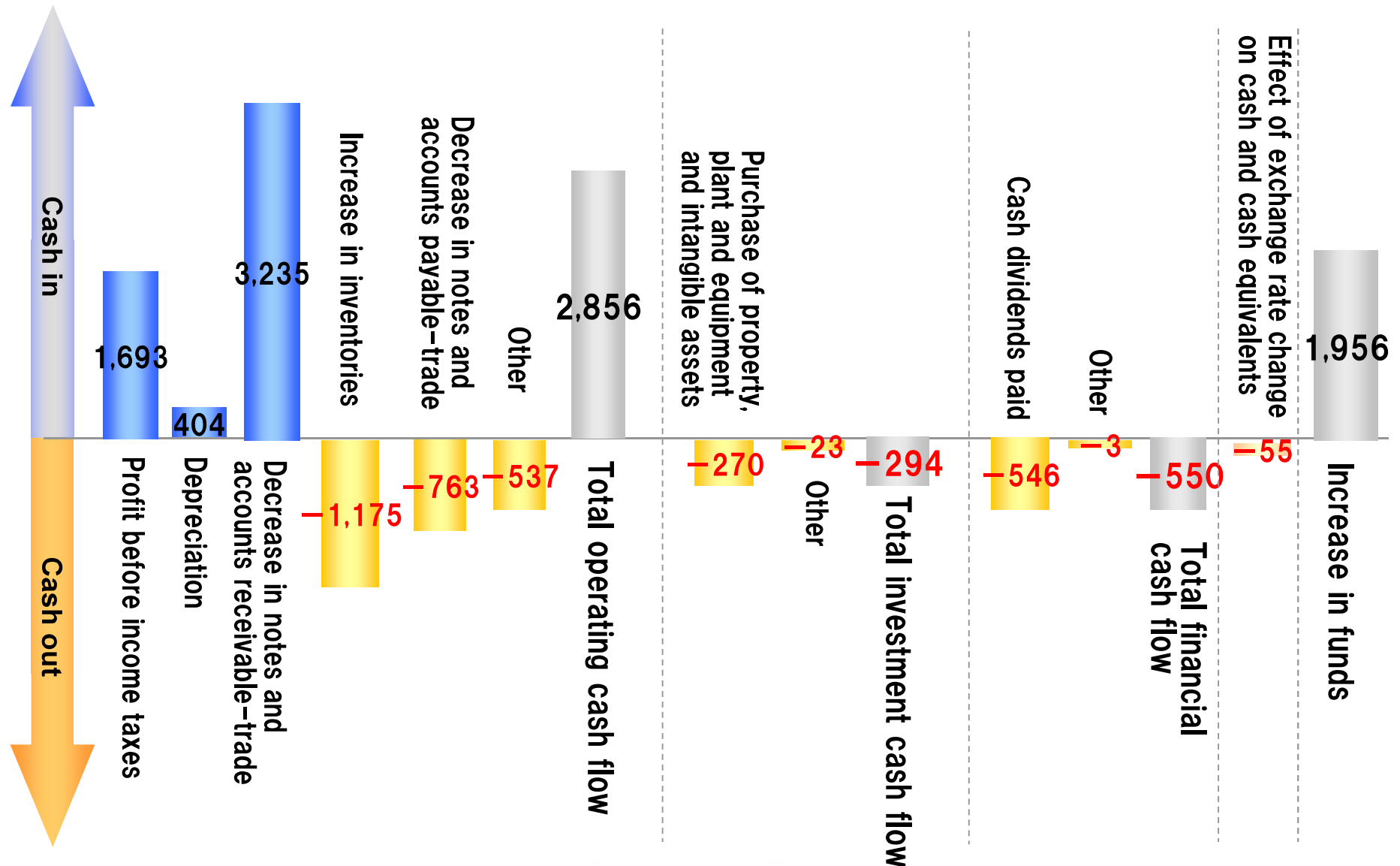
Statement of Assets and Liabilities

(millions of yen)



Statement of Cash Flow

(millions of yen)



Analysis per Segment for the Second Quarter of Fiscal Ending March 31, 2018

Equipment Business

Environmental Test Chambers

- Both orders–received and net sales increased year on year
Orders–received exceeded the previous year, including at overseas subsidiaries, especially because of increases of standardized products both in Japan and for exports
Net sales exceeded the previous year, including at overseas subsidiaries, especially because of increases of standardized products for exports
- Both orders–received and net sales increased against Initial plan
Orders–received exceeded plans, including at overseas subsidiaries, especially because of increases of standardized products and customized products
Net sales exceeded plans, especially because of increases of standardized products
At overseas subsidiaries were about the same as the plans

Energy Device Equipment

- Orders–received decreased year on year, and net sales increased year on year
Orders–received decreased from the previous year because a bulk order was received for fuel cell evaluation systems
Net sales increased because of the recording of sales for certain orders outstanding as of the previous fiscal year–end
- Against the initial plan, orders–received were about the same as the plan, and net sales increased

Semiconductor Equipment

- Orders–received increased year on year, net sales were mostly unchanged year on year, and both orders–received and net sales exceeded initial plans
Orders from smartphone and automotive–related manufacturers were firm

Equipment Business

(millions of yen)

	FY 2016 2Q	FY 2017 2Q (Initial plan)	FY 2017 2Q	Year on Year	Initial plan ratio
Orders-Received	16, 508	16, 500	19, 230	16. 5%	16. 5%
Net Sales	14, 188	14, 300	15, 355	8. 2%	7. 4%
Operating Income [Profit ratio (%)]	901 [6. 4%]	1, 050 [7. 3%]	1, 621 [10. 6%]	79. 9%	54. 4%

Service Business

(millions of yen)

	FY 2016 2Q	FY 2017 2Q (Initial plan)	FY 2017 2Q	Year on Year	Initial plan ratio
Orders-Received	2, 908	3, 000	3, 061	5. 3%	2. 0%
Net Sales	2, 666	2, 800	2, 702	1. 3%	−3. 5%
Operating Income [Profit ratio (%)]	152 [5. 7%]	200 [7. 1%]	87 [3. 2%]	−42. 6%	−56. 5%

After-sales Service and Engineering

- No significant increase or decrease year on year or against the revised plans

Commissioned Tests and Facility Rentals

- Orders-received increased year on year as test consulting and facility rentals were firm, and net sales were mostly unchanged year on year
- Against the initial plan, orders-received increased and net sales decreased

Other Business

(millions of yen)

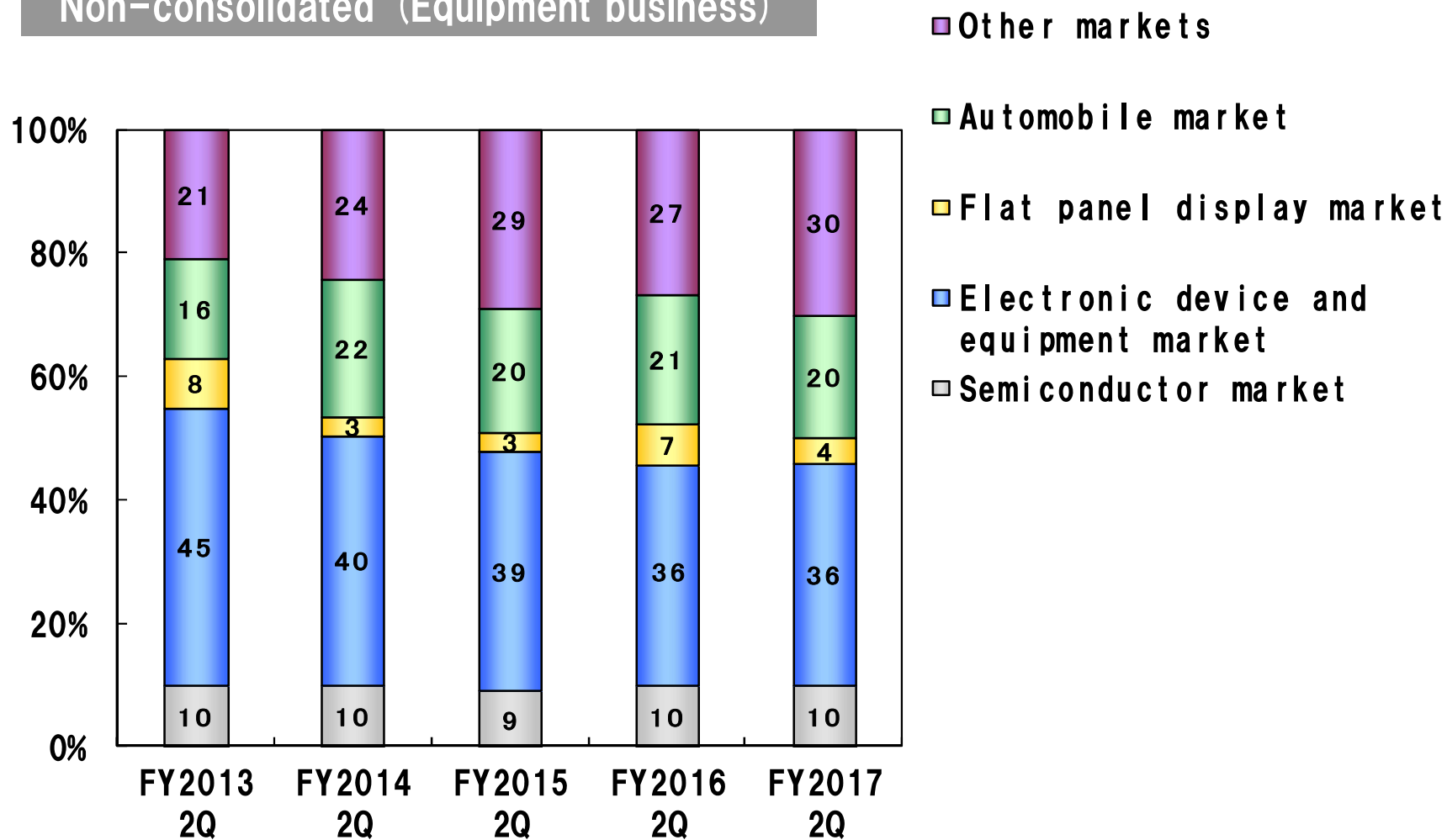
	FY 2016 2Q	FY 2017 2Q (Initial plan)	FY 2017 2Q	Year on Year	Initial plan ratio
Orders-Received	621	600	674	8.6%	12.3%
Net Sales	502	500	439	-12.6	-12.2%
Operating Income [Profit ratio (%)]	-45 [-9.1%]	-50 [-10.0%]	-82 [-18.7%]	-	-

Environmental Engineering and Plant Factory

- Firm demand for the plant factory business and the reforestation (tree planting) business: orders-received increased year on year and against initial plans, but net sales decreased

Breakdown of Sales by Market

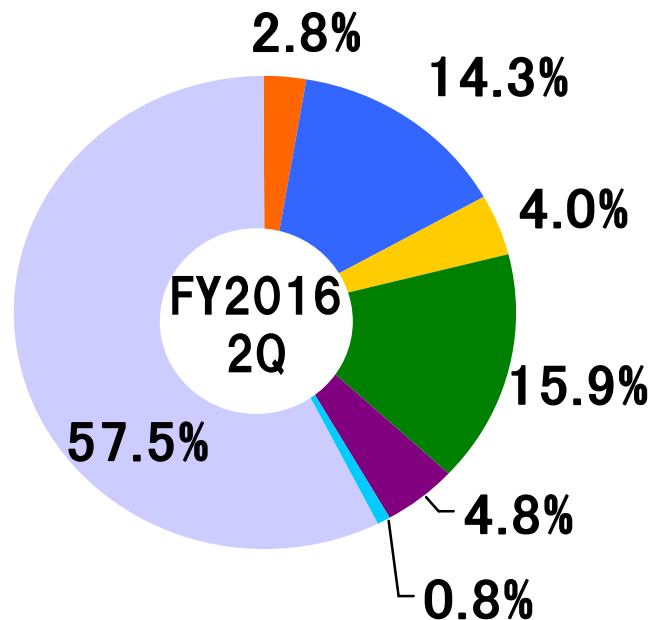
Non-consolidated (Equipment business)



Sales by Region

FY 2016 2Q

Overseas sales ratio: 42. 5%

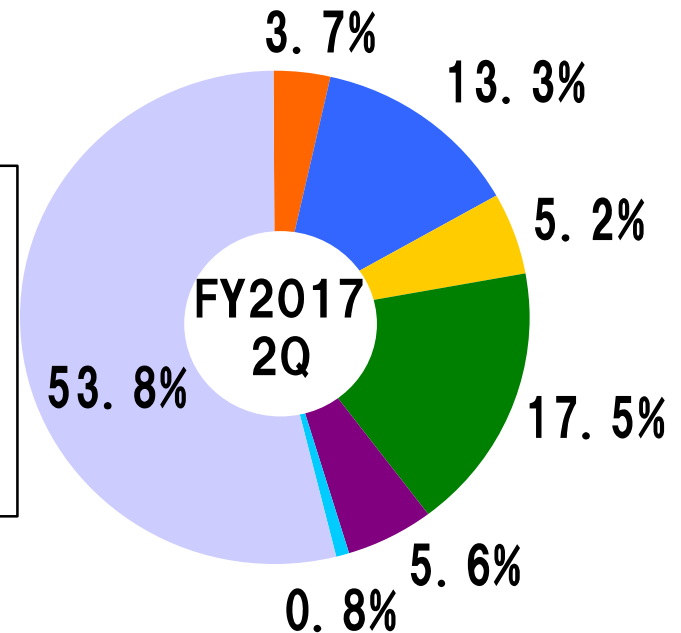


Total: 17, 250million yen

(Overseas sales: 7, 339million yen)

FY 2017 2Q

Overseas sales ratio: 46. 2%



Total: 18, 396million yen

(Overseas sales: 8, 491million yen)

Business Plan for the Fiscal Ending March 31, 2018

FY 2017 Second half Awareness of the Environment

Equipment Business	Environmental Test Chambers	◎	Strong investment sentiment in the automobile market, both in Japan and overseas based on ongoing computerization, use of electronic components and development of automated driving.
		◎	Investments continued to be made in the smartphone market in Japan and overseas, supported by continued technological innovation
		○	Investment continued to be made in automakers and electronics manufacturers in general in Japan
		○	Overseas, investments were solid in all areas, including China, Europe, the U.S., Southeast Asia and other areas
	Energy Device Equipment	△	In secondary batteries, the market is growing but strategies are being reviewed
		○	Demand for fuel cells is firm, based on ongoing development of fuel cell vehicles.
	Semiconductor Equipment	○	Firm demand for semiconductors centered on the automotive sector.
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	Environmental Engineering Business, Plant factory	△	Orders received for the plant factory business and the reforestation (tree planting) business were not bad, but the waterside project businesses were weak

FY 2017 Assumed exchange rate

■ Assumed exchange rate

	FY 2015	FY 2016		FY 2017	
	Results	First half Results	Results	First half Results	Assumed
US\$(yen)	121.11	111.74	108.81	112.34	110.00

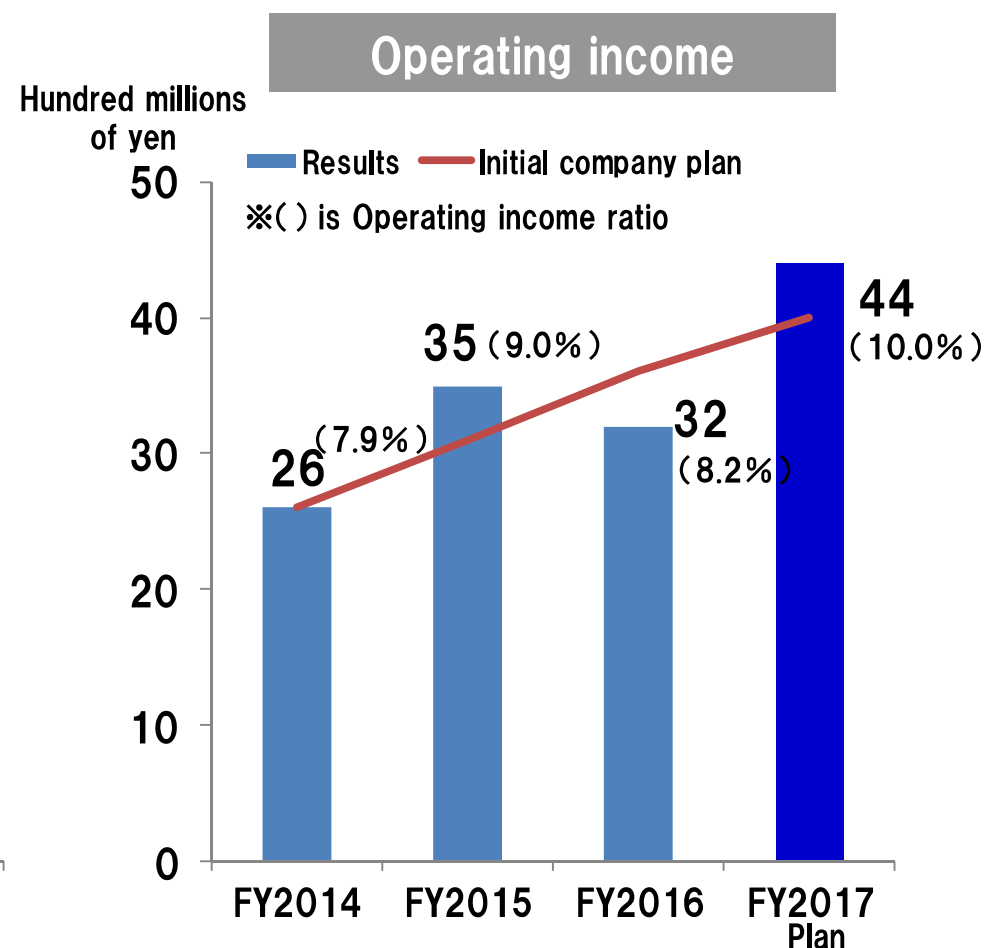
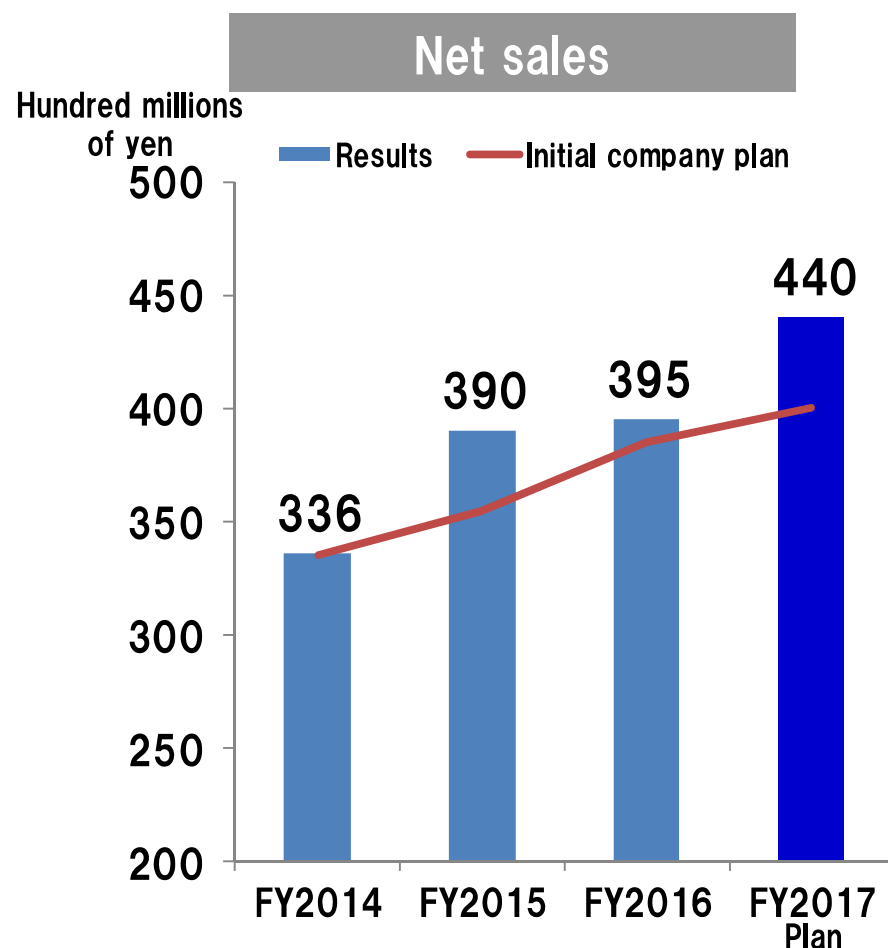
Reference. FY 2017 Exchange rate sensitivity

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

Net Sales	A decrease of ¥123 million
Operating Income	A decrease of ¥1,500 thousand

Targets for the Fiscal Ending March 31, 2018 and Progress of Medium-Term Management Plan

Outlook for achieving the medium-term management plan
(Net sales of over ¥40,000 million, operating income of ¥4,000 million or more, and an operating income ratio of at least 10%)



Business Plan for the Fiscal Ending March 31, 2018

(millions of yen)

	FY 2016	FY 2017				
	Results	First half (Results)	Revised Plan			Full Year (Initial plan)
			Second half	Full Year	Year on Year (%)	
Orders-received	40,289	22,850	21,150	44,000	9.2%	40,500
Net sales	39,507	18,396	25,604	44,000	11.4%	40,000
Gross profit [Profit ratio (%)]	13,447 [34.0%]	6,625 [36.0%]	8,878 [34.7%]	15,503 [35.2%]	15.3%	14,150 [35.4%]
Operating income [Profit ratio (%)]	3,243 [8.2%]	1,625 [8.8%]	2,775 [10.8%]	4,400 [10.0%]	35.7%	3,700 [9.2%]
Ordinary income [Profit ratio (%)]	3,171 [8.0%]	1,691 [9.2%]	2,809 [11.0%]	4,500 [10.2%]	41.9%	3,800 [9.5%]
Profit attributable to owners of parent [Profit ratio (%)]	2,233 [5.7%]	1,165 [6.3%]	2,035 [7.9%]	3,200 [7.3%]	43.3%	2,700 [6.8%]
Capital expenditures	655	347	452	799	22.0%	720
Depreciation expenses	789	402	416	818	3.7%	825
R&D expenditures	1,025	437	683	1,120	9.3%	1,125
Profit Per Share (yen)	97.85	51.01	88.98	139.99	43.1%	118.13

Equipment Business

(millions of yen)

	FY 2016	FY 2017				
	Results	First half (Results)	Revised Plan			Full Year (Initial plan)
			Second half	Full Year	Year on Year (%)	
Orders-received	33, 124	19, 230	17, 570	36, 800	11. 1%	33, 300
Net sales	32, 334	15, 355	21, 445	36, 800	13. 8%	32, 800
Operating income [Profit ratio (%)]	2, 630 [8. 1%]	1, 621 [10. 6%]	2, 179 [10. 2%]	3, 800 [10. 3%]	44. 5%	3, 050 [9. 3%]

Service Business

(millions of yen)

	FY 2016	FY 2017				
	Results	First half (Results)	Revised Plan			Full Year (Initial plan)
			Second half	Full Year	Year on Year (%)	
Orders-received	6,096	3,061	3,139	6,200	1.7%	6,200
Net sales	6,065	2,702	3,498	6,200	2.2%	6,200
Operating income [Profit ratio (%)]	594 [9.8%]	87 [3.2%]	513 [14.7%]	600 [9.7%]	1.0%	650 [10.5%]

Other Business

(millions of yen)

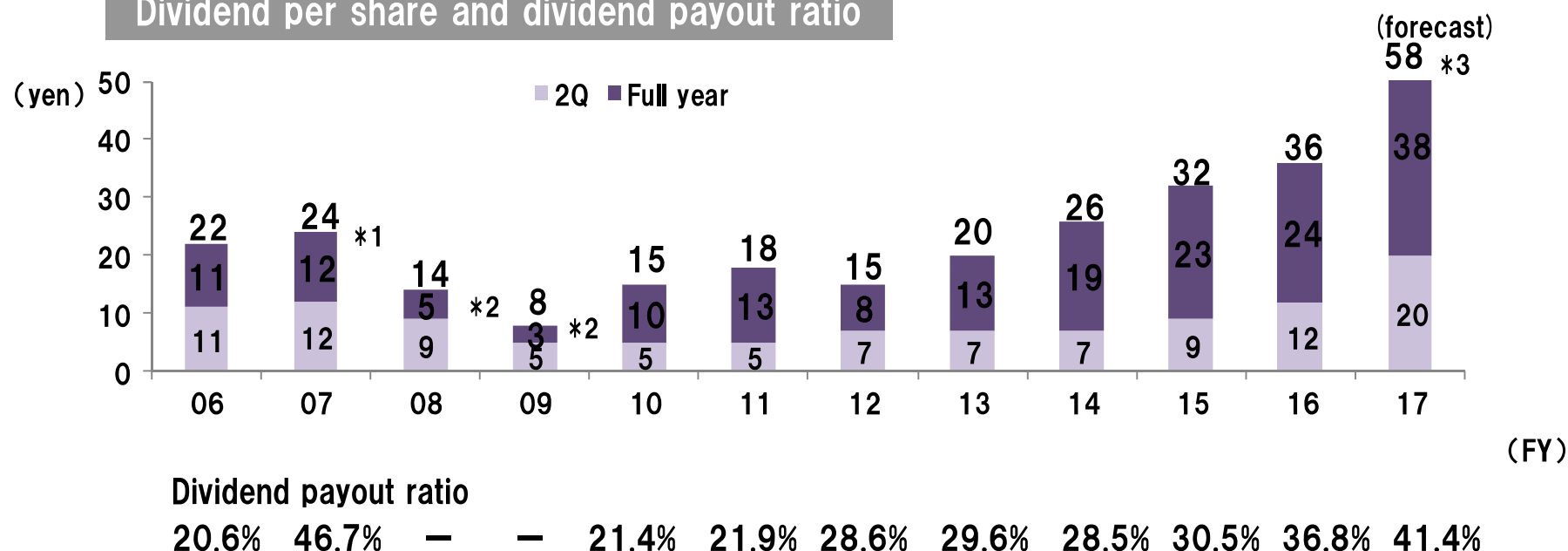
	FY 2016	FY 2017			
	Results	First half (Results)	Plan		
			Second half	Full Year	Year on Year (%)
Orders-received	1,331	674	626	1,300	-2.4%
Net sales	1,378	439	861	1,300	-5.7%
Operating income [Profit ratio (%)]	18 [1.3%]	-82 [-18.7%]	82 [9.5%]	0 [-]	-

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 60th 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 70th founding anniversary (an interim dividend of ¥1 per share and a year-end dividend of ¥1 per share).

Quality is more than a word

ESPEC

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.

INQUIRIES:

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E-mail: ir-div@espec.jp

Jyunko Nishitani (General Manager) ,

Natsuko Ookawa and Ryosuke watanabe

Corporate Communication Department

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

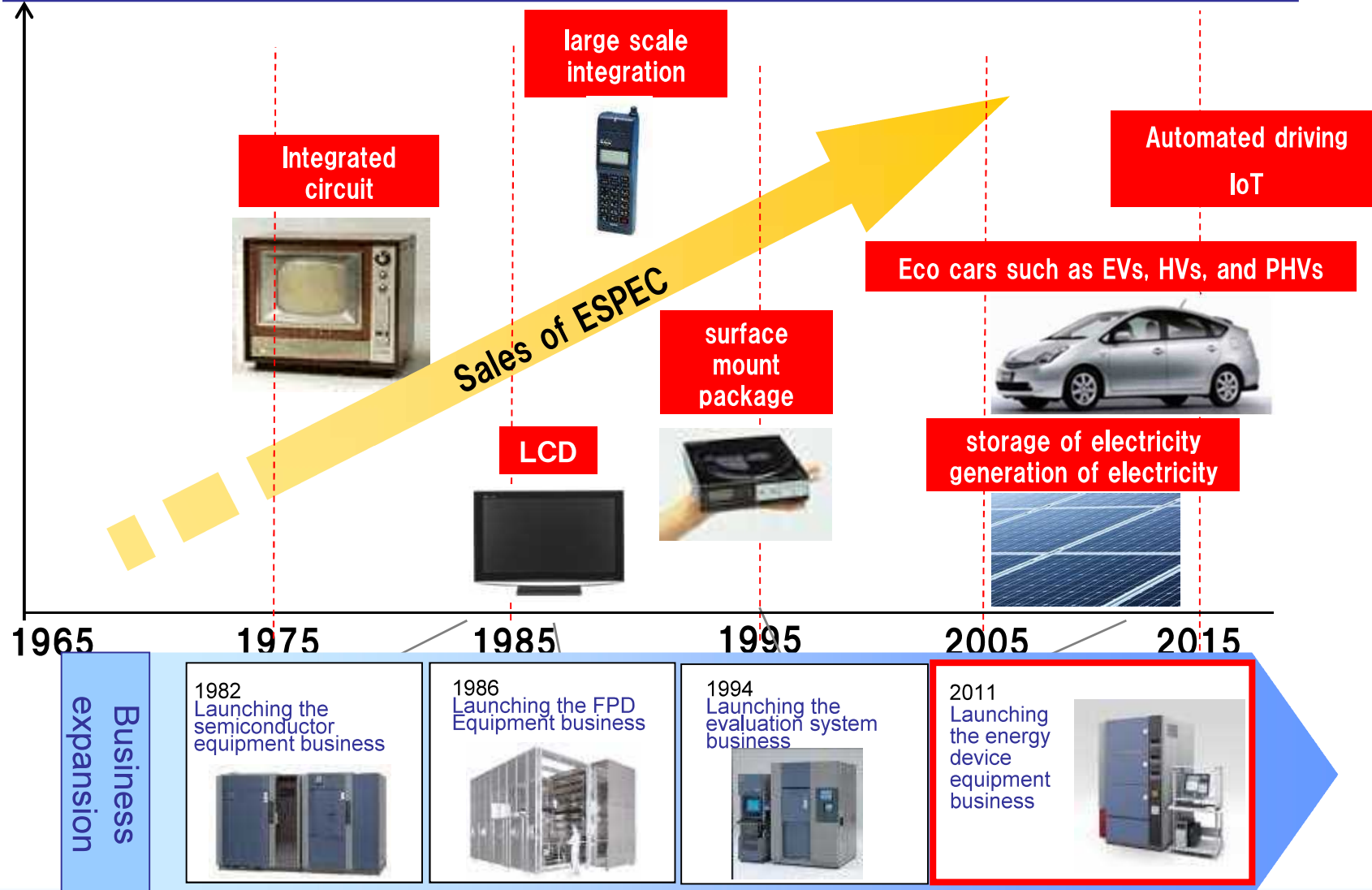


【 Temperature & Humidity Chamber 】

"Platinous J series"

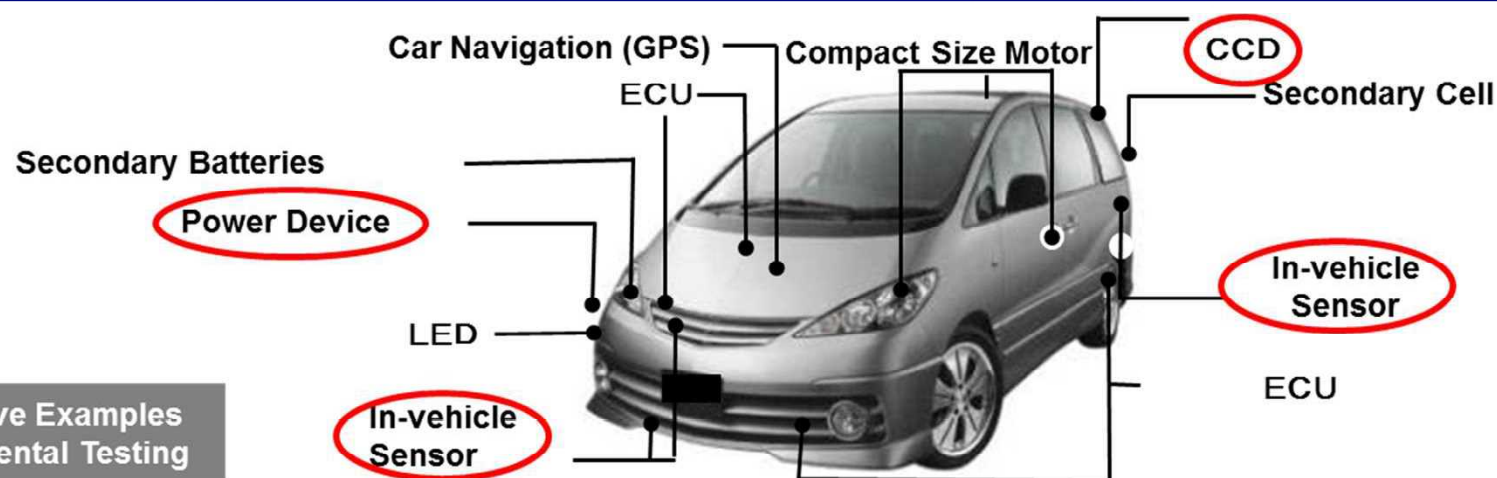
Transition in Business

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
【Power Device】 	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
【In-vehicle Sensor】 	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°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
【CCD/CMOS】 	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
Jul.2017	Thermal Shock Chamber TSA series	<ul style="list-style-type: none"> •the first chambers in Japan to be compliant with European F-gas Regulation
Nov.2016	High-Power Temperature & Humidity Chamber AR Series Rapid temperature change type	<ul style="list-style-type: none"> •Compatible with IEC standards and automobile-related standards •Achieves rapid temperature change rate of up to 18° C/min
Jun.2016	IPX9K-compatible testing equipment (High-pressure steam cleaning injection)	<ul style="list-style-type: none"> •Evaluates the impact of high-pressure steam on electronic devices during cleaning of automobiles; meets ISO standards
Jun.2016	Siloxane endurance testing equipment	<ul style="list-style-type: none"> •Evaluates the impact on electronic devices of siloxane contained in resins and other materials, mainly in automobiles
Apr.2016	Added new functions to Online Core, a communications network product	<ul style="list-style-type: none"> •Central management system for equipment and peripheral devices (monitoring of operating condition, schedule management, etc.)
Sep.2015	Constant-Temperature Bath for Combined Testing Equipment	<ul style="list-style-type: none"> •Material evaluation testing of mainly plastics, rubbers, and fibers
Feb.2015	Low Temperature (&Humidity) Chamber	<ul style="list-style-type: none"> •Preservation testing of foods Long-term refrigerated storage testing of pharmaceuticals and cosmetics
Nov.2014	Thermal Shock Chamber TSA series	<ul style="list-style-type: none"> •Build in state-of-the-art controllers to improve operability

[Equipment Business] TOPICS

Expansion of product lineup for European automobile market

(in November 2016)

■ High-Power Temperature & Humidity AR Series Rapid temperature change type

- Can be tested for compliance with automobile-related standards and international IEC standards
- Achieves rapid temperature change rate of up to 18°C/min
- Achieves a “frost-free” state of no frost throughout the entire temperature and humidity control range



(in July 2017)

■ Thermal Shock Chamber TSA series

- ESPEC first company in Japan to be compliant with European F-gas Regulation
- Environmental test chambers will be regulated from 2020
Similar regulations will start in Japan from 2025
- Global Warming Potential, which is far more than the F-gas Regulation, is used as a refrigerant
(Restrict GWP 2500 or more by regulations → Use GWP 1397)



[Equipment Business] TOPICS: 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] TOPICS: Examples of Products Delivered

(Delivered in February 2016)

■ Sangenjaya Campus, College of Sports Sciences, Nihon University (Newly established in April 2016)

Products delivered:

Hypoxic training room, Hypoxic swimming pool chamber

Uses:

Improve cardiovascular and respiratory performance, as well as athletic ability,
through training under hypoxic conditions

Research into athlete development and effective training methods



Hypoxic training room



Hypoxic swimming pool chamber

[Equipment Business]

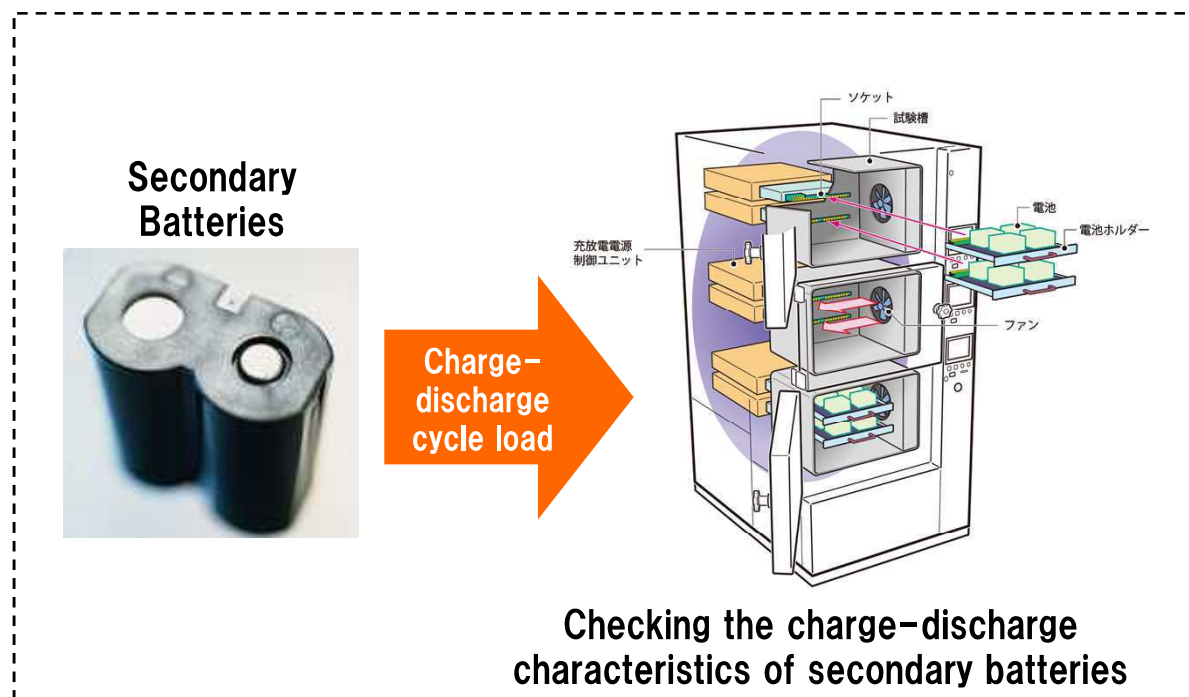
Usage Case with Energy Device Equipment

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]

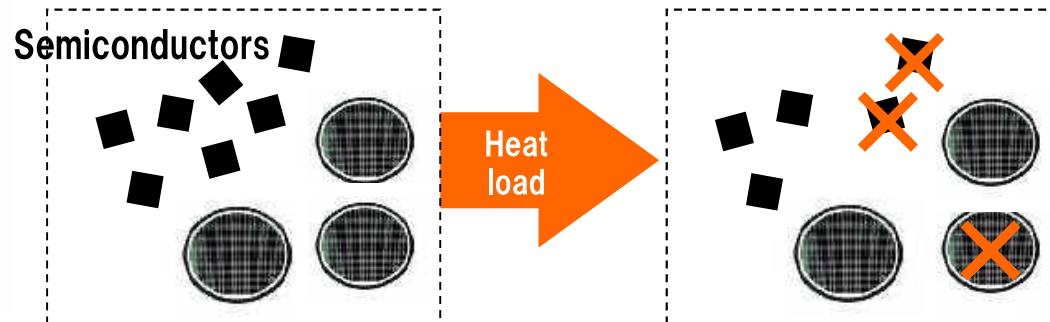
Usage Case with Semiconductor Equipment

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

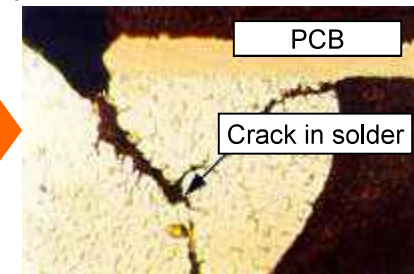


Conductor resistance evaluation system



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 five commissioned test centers in Japan, two commissioned test centers in China.
(In Japan, 2 point of Utsunomiya, Toyota, Kariya and Kobe. In China, Shanghai, Suzhou)

- These centers are IECQ-approved independent testing laboratories that meet ISO/IEC17025 standards.
- The centers are also recognized as official calibration facilities under the Japan Calibration Service System (JCSS).
- Opened the world's first 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)



Battery Safety Certification Center
(in Utsunomiya Technocomplex)

[Service Business] TOPICS

ESPEC provides commissioned tests and certification application services compliant with United Nations regulations at the world's first 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.)

*Entered into force in July 2016



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



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



No. 2 Safety Test Room

[Other Business]

Environmental Engineering Business

Environmental Engineering 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 factory

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



Container plant factory



Phyto-toron

[Other Business] TOPICS: 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

[Other Business] TOPICS

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] TOPICS

ESPEC MIC CORP. received the Award of the Chairman of the Organization for Landscape and Urban Green Infrastructure at the 36th Urban Green Awards* and the 13th Eco Product Special Jury Award

■Urban Green Awards (in October 2016)

- Shared award with Rinno-ji Temple in Sendai City, Miyagi prefecture
 - Restored a row of cedar trees at Sotoshu Kongohozan Rinno-ji Temple that had been cut down for the construction of a tunnel
 - Over five years, more than 30,000 trees of around 60 different species were planted
- *Sponsored by the Organization for Landscape and Urban Green Infrastructure



The trees have grown into a tall broadleaf forest (the approach to Rinno-ji Temple in Sendai City)

■Eco-Products Awards (in November 2016)

- Shared award with Turtle Trap Studio KITOU
- Equipment for capturing foreign turtles that cause problems for the ecosystem
- They can be easily captured by using their custom of basking



"Kamepocha": Floating-type turtle capturing equipment

Initiatives tackling environmental problems

ESPEC positions environmental activities as one of its highest corporate management priorities, and is sincerely making efforts to protect, preserve and enhance the environment

- **ESPEC Foundation for Global Environment Research and Technology (Charitable Trust)**

Provides funding support every year for research, technology development, and greening activities 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



- Achieved 38th place in the Nikkei Environmental Management Survey

- Environmental Communication Award Won the Excellence Award for 2 consecutive years

- * Sponsored by the Ministry of the Environment, and the Global Environmental Forum



Promotion of diversity – Initiatives to promote women's success

ESPEC is promoting the creation of organizations in which women with motivation and ability can succeed, including by fostering female employees and enhancing systems for enabling women to continue work



- February 2016 – From the Ministry of Health, Labor and Welfare:
The Company received the "Kurumin" certification, which is granted to companies that support child-rearing

- March 2016 – From Osaka City:
The Company received the "Leading Company in Women's Advancement in Osaka City" certification



- September 2016 – From the Ministry of Health, Labour and Welfare:
The Company received the highest ranking of the certification mark "Eruboshi" based on the Act on Promotion of Women's Participation and Advancement in the Workplace

