

A background image showing various mechanical parts and components, including what appears to be a motor or actuator, with the Ferro Tec logo overlaid in a semi-transparent blue color.

# Ferrotec Holdings Corporation

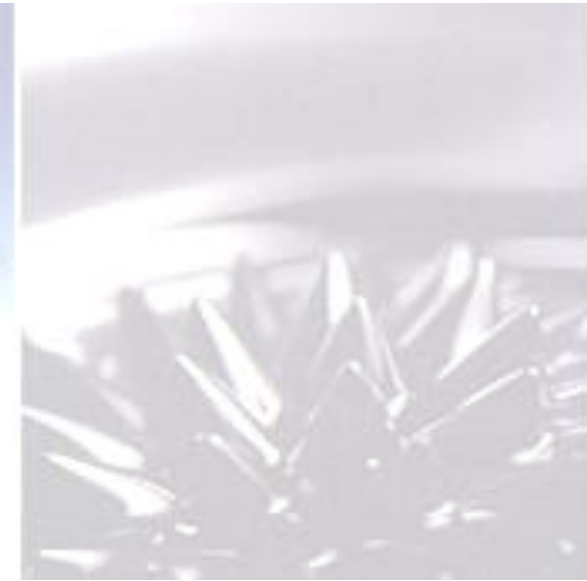
Results for the 1<sup>st</sup> half of the fiscal year ending March 31, 2019

November 27, 2018

( JASDAQ 6890 )

<http://www.ferrotec.co.jp/>

1. This 1st half results cover six months period from April to September of Ferrotec, and six months period from January to June of consolidated subsidiaries and affiliated companies included in investment profit loss in equity method.
2. These materials were prepared for the purpose of providing information regarding the company's results of operations for the 1<sup>st</sup> half of the fiscal year ending March 31, 2019.
3. These materials were prepared based on information available as of November 27, 2018. All opinions, forecasts and other forward-looking statements are based on management's judgments in accordance with materials available at that time and may be changed without prior notice.

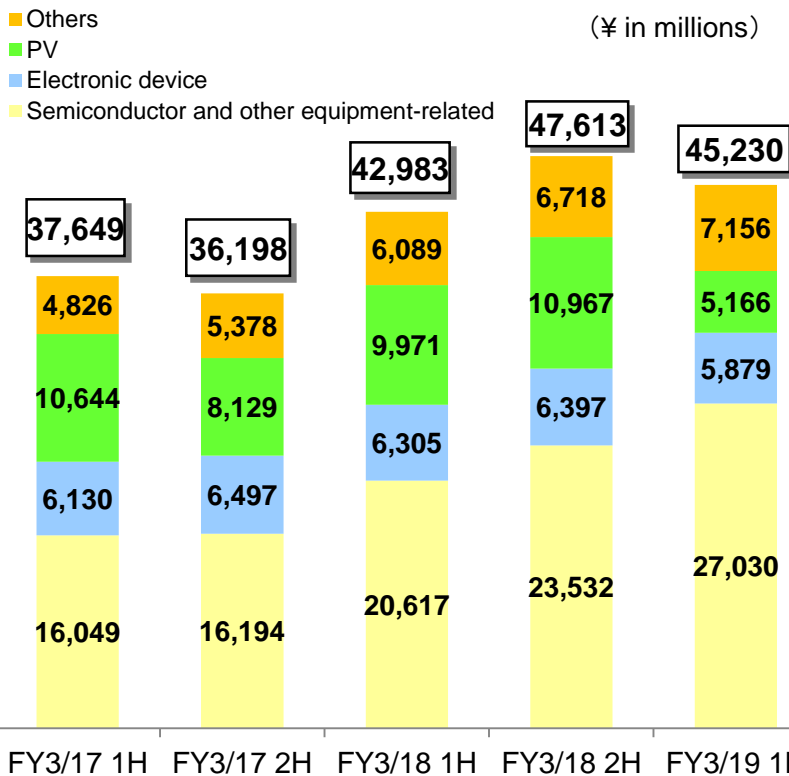


## First Half of FY March 2019 Financial Results

# Sales and Operating income Trend

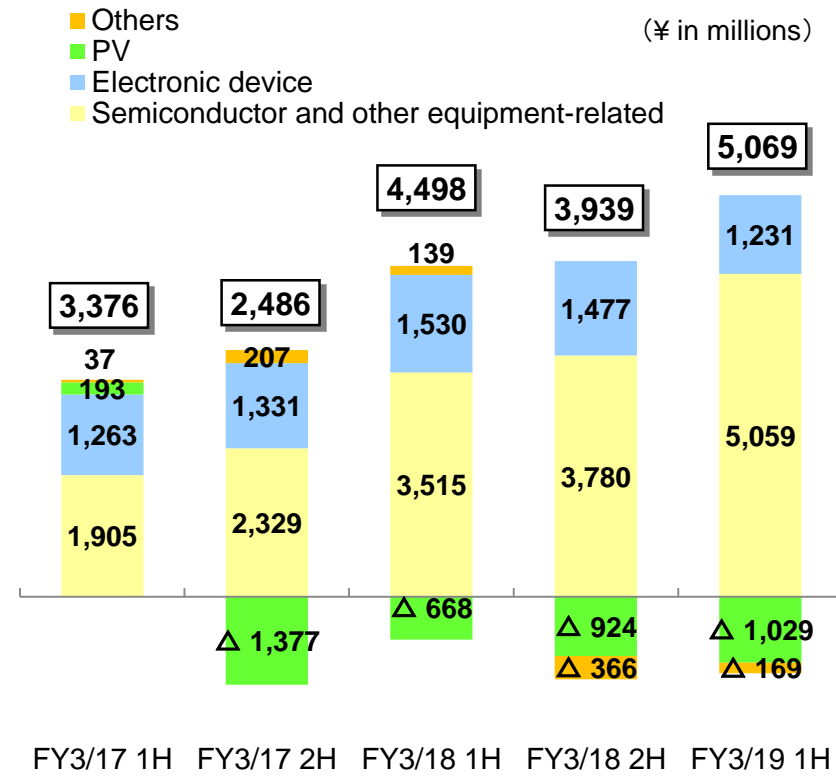
## Sales Trend

(¥ in millions)



## Operating income Trend

(¥ in millions)



# Consolidated Financial Summary



¥ in millions	FY March 2018 1 <sup>st</sup> half		FY March 2019 1 <sup>st</sup> half		YoY	
	Amount	Pct. of sales (%)	Amount	Pct. of sales(%)	Amount	Pct. change (%)
Net sales	42,983	100.0	45,230	100.0	2,247	5.2
Cost of sales	30,689	71.4	31,353	69.3	664	2.2
Gross profit	12,293	28.6	13,877	30.7	1,584	12.9
SG&A expenses	7,795	18.1	8,808	19.5	1,013	13.0
Operating profit	4,498	10.5	5,069	11.2	571	12.7
Non-operating income	255	0.6	610	1.3	355	139.2
Non-operating expense	896	2.1	813	1.8	△ 83	△ 9.3
Ordinary profit	3,857	9.0	4,866	10.8	1,009	26.2
Extraordinary income	0	-	147	0.3	147	-
Extraordinary loss	54	0.1	282	0.6	228	422.2
Net income attributable to owners of parent	2,299	5.4	2,825	6.2	526	22.9
Capital investment	4,702	-	11,114	-	6,412	136.4
Depreciation	1,916	-	2,651	-	735	38.4

# Consolidated Financial Summary

¥ in millions	FY March 2019 1st half	
	Amount	Pct. of sales (%)
<b>Net sales</b>	45,230	100.0
Cost of sales	31,353	69.3
<b>Gross profit</b>	13,877	30.7
SG&A expenses	8,808	19.5
<b>Operating profit</b>	5,069	11.2
Non-operating income	610	1.3
Non-operating expense	813	1.8
<b>Ordinary profit</b>	4,866	10.8
Extraordinary income	147	0.3
Extraordinary loss	282	0.6
<b>Income before income tax</b>	4,731	10.5
<b>Income taxes</b>	1,921	4.2
<b>Net income attributable to owners of parent</b>	2,825	6.2

The gross profit margin improved from 28.6% to 30.7% mainly because the benefit of higher sales in the semiconductor and other equipment-related segment offset the inventory valuation loss (using the lower-of-cost-or-market method) in the photovoltaic-related segment.

Operating income increased 1,012 million yen, the result of higher sales and the addition of eight subsidiaries, and the operating margin improved from 10.5% to 11.2%.

Equity in earnings                      ¥ 294 million  
Foreign exchange loss                      ¥ 96 million

Extraordinary losses were caused by overdue interest of 115 million yen associated with photovoltaic business litigation and 167 million yen for the disposal of outdated equipment and other assets.

# Net Sales and Operating Profits by Segment



\*Parts Cleaning: results for FY3/18 are posted in the Other segment, and results for FY3/19 onward are posted in the Semiconductor and other equipment-related segment.

Net sales (¥ in millions)	FY March 2018 1st half		FY March 2019 1st half		YoY	
	Amount	Pct. of sales(%)	Amount	Pct. of sales(%)	Difference	Pct. change(%)
Semiconductor and other equipment-related	20,617	48.0	27,030	59.8	6,413	31.1
Electronic device	6,305	14.7	5,879	13.0	△ 426	△ 6.8
Photovoltaic-related	9,971	23.2	5,166	11.4	△ 4,805	△ 48.2
Others	6,089	14.2	7,155	15.8	1,066	17.5
<b>Total</b>	<b>42,983</b>	<b>100.0</b>	<b>45,230</b>	<b>100.0</b>	<b>2,247</b>	<b>5.2</b>

Operating income (¥ in millions)	FY March 2018 1st half		FY March 2019 1st half		YoY	
	Amount	Pct. Of Sales(%)	Amount	Pct. Of Sales(%)	Difference	Pct. change(%)
Semiconductor and other equipment-related	3,515	17.0	5,059	18.7	1,544	43.9
Electronic device	1,530	24.3	1,231	21.0	△ 299	△ 19.5
Photovoltaic-related	△ 668	-	△ 1,029	-	△ 361	-
Others	139	2.3	△ 169	-	△ 308	-
Corporate & elimination	△ 18	-	△ 22	-	△ 4	-
<b>Total</b>	<b>4,498</b>	<b>10.5</b>	<b>5,069</b>	<b>11.2</b>	<b>571</b>	<b>12.7</b>

# Consolidated Balance Sheet ~Assets~



( ¥ in millions )	FY3/18	FY3/19 1H	Difference
Current assets	66,826	80,292	13,466
Cash & deposits	23,648	36,720	13,072
Note & accounts receivable	20,700	21,076	376
Inventory	16,773	16,507	△ 266
Fixed assets	51,631	60,208	8,577
Tangible fixed assets	43,541	51,273	7,732
Building	10,355	9,733	△ 622
Equipment & machinery	12,564	12,611	47
Tools, furniture, and fixture	7,304	7,684	380
Land	1,589	1,586	△ 3
Construction in progress	11,186	19,188	8,002
Intangible fixed assets	2,922	3,561	639
Goodwill	378	269	△ 109
Investments & other assets	5,166	5,373	207
<b>Total assets</b>	<b>118,457</b>	<b>140,500</b>	<b>22,043</b>

## [ Current assets]

Proceeds from long/short-term loans and bonds increased cash and deposits

## [ Main reason for increase in tangible fixed assets]

Increased mainly due to increase in Construction in progress for 8-inch wafer production and raising output of ceramic and quartz products

## [Intangible fixed assets]

Land-use rights at Chinese subsidiary increased 754 million yen to 2,947 million yen

Goodwill amortization was 137 million yen (inconsistency with difference is caused by yen conversions of foreign currency-denominated goodwill)

# Consolidated Balance Sheet

~Liabilities and net assets~



( ¥ in millions )	FY3/18	FY3/19 1H	Difference
Current liabilities	43,477	48,518	5,041
Notes and accounts payable	18,419	18,043	△ 376
Shot-term debt	5,874	8,978	3,104
Current portion of long-term borrowings + Bonds	5,643	7,499	1,856
Fixed liabilities	23,167	39,662	16,495
Long-term debt+Bonds	13,896	29,831	15,935
Total liabilities	66,645	88,180	21,535
Net Assets	51,812	52,319	507
Shareholder's equity	43,855	46,236	2,381
Total accumulated other comprehensive income	7,449	5,302	△ 2,147
Non-controlling interests	502	776	274
Total liabilities & shareholder's equity	118,457	140,500	22,043

## [Current liabilities]

Increased due to increase in accounts payable due to strong sales of products in the semiconductor and other equipment-related segment and increase in equipment payable

## [Interest-being debt ]

Short-term debt +Current portion of long-term borrowings+Bonds      ¥16,477 million (11,518)

Long-term debt + bond      ¥29,831 million (13,896)

Total      ¥46,308 million (25,414)

Net interest-being debt      ¥9,588 million (1,766)

\*Parentheses represent the figures as of end-FY3/18

## [Net assets]

### Breakdown

Net income      ¥2,826 million

Dividends      △¥444 million

Foreign currency translation adjustments      △¥2,147 million



# Consolidated Cash Flow



¥ in millions	FY3/18 2Q	FY3/19 2Q
<b>Cash flow from operating activities</b>	<b>4,794</b>	<b>5,403</b>
Income before income taxes	3,802	4,731
Depreciation	1,916	2,651
Exchange gain & loss (Δ : gain)	19	279
Changes in notes & accounts receivable (Δ : increase)	Δ 2,665	Δ 1,324
Changes in inventories (Δ : increase)	Δ 1,053	Δ 181
Changes in accounts payable (Δ : decrease)	1,902	Δ 214
Others	873	Δ 539
<b>Cash flow from investing activities</b>	<b>Δ 4,640</b>	<b>Δ 12,251</b>
Payments for purchase of tangible fixed assets	Δ 4,702	Δ 11,114
Proceeds from sales of tangible fixed assets	73	29
Payments for purchase of intangible fixed assets	Δ 27	Δ 915
Others	16	Δ 251
<b>Cash flow from financing activities</b>	<b>12,311</b>	<b>20,679</b>
Changes in short-term borrowing	472	3,282
Proceeds from long-term debt	2,485	14,247
Payments of long-term debt	Δ 2,178	Δ 2,890
Proceeds from the issuance of bonds	3,245	6,638
Payments for dividend	Δ 370	Δ 443
Others	Δ 2	Δ 155
<b>Changes in cash &amp; cash equivalents</b>	<b>12,327</b>	<b>13,071</b>
Cash and cash equivalents, beginning of year	<b>14,778</b>	<b>23,648</b>
Cash and cash equivalents, end of year	<b>27,166</b>	<b>36,720</b>

[ Operating cash flow ]	
Income before income tax + Depreciation	<b>¥ 7,382 million</b>
Decrease in operating CF due to increase in notes & accounts receivable	<b>Δ¥ 1,324 million</b>
Decrease in operating CF due to increase in inventories	<b>Δ¥ 181 million</b>
Decrease in operating CF due to decreased accounts payable :	<b>Δ¥ 214 million</b>

[ Investing cash flow ]	
Main content of payments for tangible fixed assets acquired	
▪ Shanghai subsidiary :	<b>¥ 954 million</b>
▪ Hangzhou subsidiary :	<b>¥ 5,607 million</b>
▪ Yinchuan subsidiary :	<b>¥ 1,453 million</b>
▪ Chinese subsidiary in Dongtai, else :	<b>¥ 1,542 million</b>
The acquisition of land-use rights by a subsidiary in China was the largest component of payments for purchase of intangible fixed assets	

[ Financing cash flow ]	
Proceeds from long-term debt :	<b>¥ 14,247million</b>
Proceeds from the issuance of bonds :	<b>¥ 6,638million</b>

# Full-Year Forecast



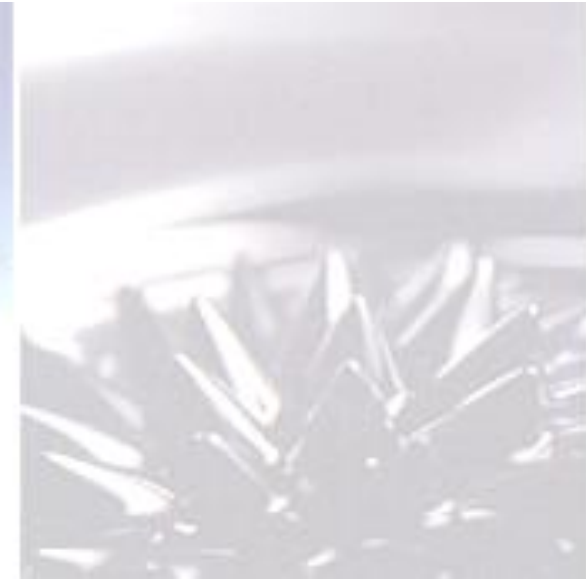
(¥ in million)	FY3/18	FY3/19(E)	YoY(%)
Net sales	90,597	92,000	1.5
Operating income	8,437	9,800	16.2
Ordinary income	7,157	8,500	18.8
Net income attributable to owners of parent	2,678	5,300	97.9
Capital investment	12,300	40,000	225.2
Depreciation	4,188	5,000	19.4

Note: Exchange rate FY3/18⇒FY3/19 : US\$ ¥ 112.04 → ¥ 105.00      RMB ¥ 16.63 → ¥ 16.00 (Avg. during period)  
 Capital investment is based on cash flow considering unprojected large-scale capital investment and accounts payable facilities at the end of previous fiscal year.

# Business forecast (sales by segment)



¥ in millions	FY3/18	FY3/19(Est.)	YoY(%)
Semiconductor and other equipment-related	44,150	57,699	30.7
Vacuum Feedthroughs	11,761	13,869	17.9
Quartz	11,523	14,900	29.3
Ceramics	8,729	11,100	27.2
CVD-SiC	3,039	2,900	△ 4.6
EB-Gun, LED	3,936	4,630	17.6
Semiconductor wafer	5,161	6,600	27.9
Parts cleaning	2,511	3,700	47.4
Electronic device	12,701	12,000	△ 5.5
Thermo-electric module	11,634	11,050	△ 5.0
Ferrofluid, others	1,068	950	△ 11.0
Photovoltaic-related	20,938	9,000	△ 57.0
Quartz crucibles	1,850	1,404	△ 24.1
Solar silicon	13,066	4,371	△ 66.5
PV manufacturing Equip.	157	125	△ 20.3
Solar cell	5,865	3,100	△ 47.1
Others	12,807	13,301	3.9
<b>Total</b>	<b>90,597</b>	<b>92,000</b>	<b>1.5</b>



## Status by Segment and Outlook



**Vacuum feedthroughs**

**Quartz**

**Ceramics**

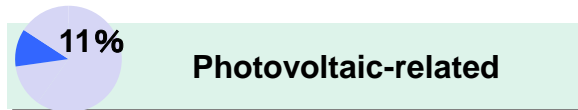
**CVD-SiC**



**Ferrofluid**

**Thermo-electric module**

**Substrates for power semiconductor**



**PV silicon (Ingot) [OEM]**

**Mono-crystal ingot**

**Multi-crystal ingot**

**PV wafer**

**Solar cell**

125 R150

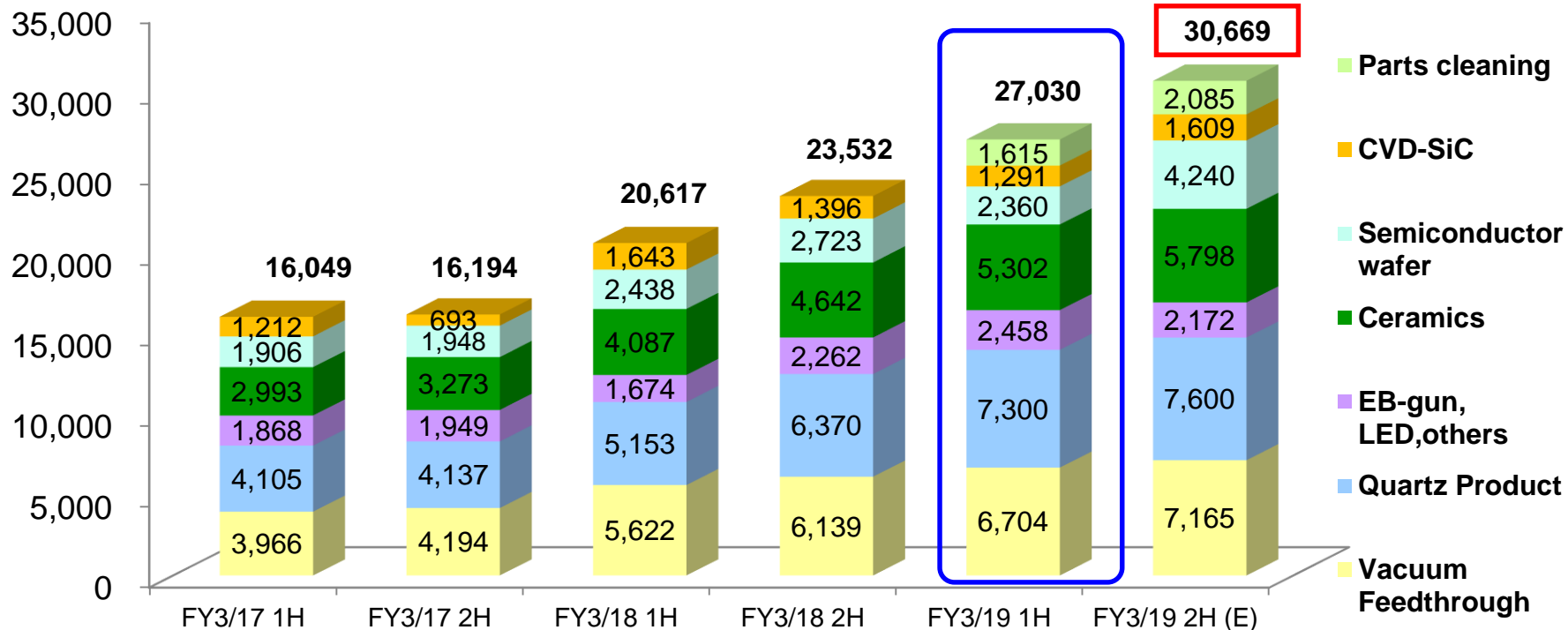
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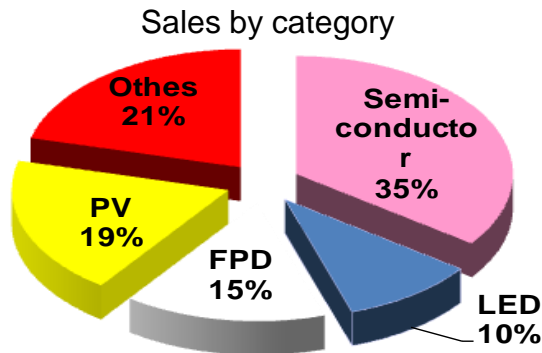
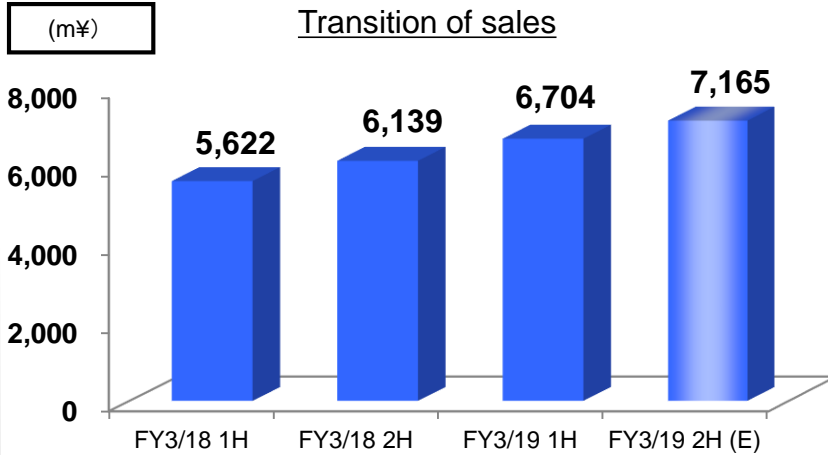
156 R200+

**Consumable Quartz crucible**

※ The bar chart represents the pct. of each segment in FY3/19 1H sales

Sales  
(¥ in million)





Note) Each category includes OEM sales

## 1. Status of 1st half of FY3/19

- Demand was strong for vacuum process semiconductor manufacturing equipment
- In the FPD market, lower demand in the organic EL sector as major Korean and Chinese panel makers pushed back investments
- Consistently firm contract processing demand in the semiconductor industry and in China

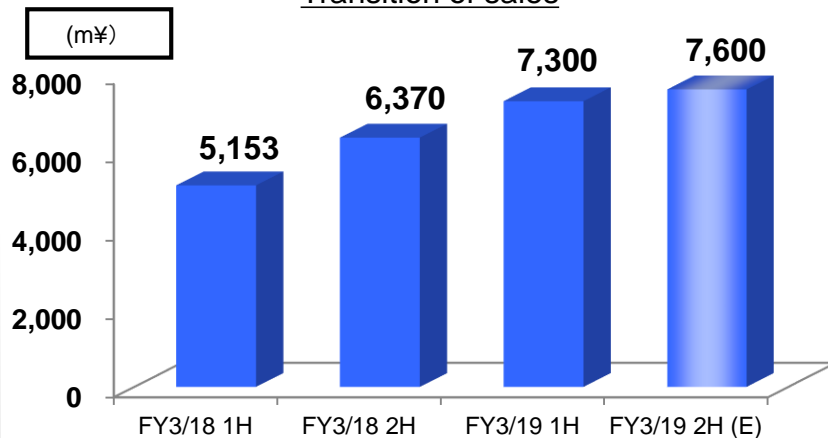
## 2. Outlook for 2nd half of FY3/19

- Sales of products used in semiconductor manufacturing equipment to be slowed because of the postponement of memory device investments
- Anticipate a continuation of weak demand for products used in the organic EL and LCD sectors of the FPD market
- For contract processing, forecast no change in capacity utilization due to solid demand in sectors other than solar cells and semiconductor manufacturing equipment which is on weak demand.

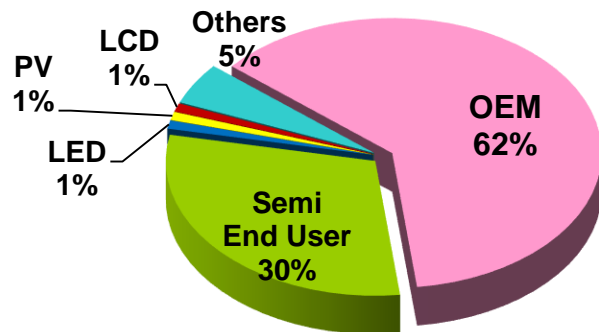
## [Measures]

- Continue joint development projects with semiconductor manufacturing equipment companies
- Continue making capital investment for large processing machinery
- Strengthen ties among Ferrotec Group companies to generate synergies
- Strengthen sales activities in China by using the distribution channels and brands of every Ferrotec Group company

Transition of sales



Sales by category



## 1. Status of 1st half of FY3/19

- Substantial investments in the memory device, IoT and automotive device categories; increase in new orders involving manufacturing equipment
- Demand for quartz consumables also increased at semiconductor end users
- Started full-scale deliveries of Si parts to a major manufacturing equipment company in Japan

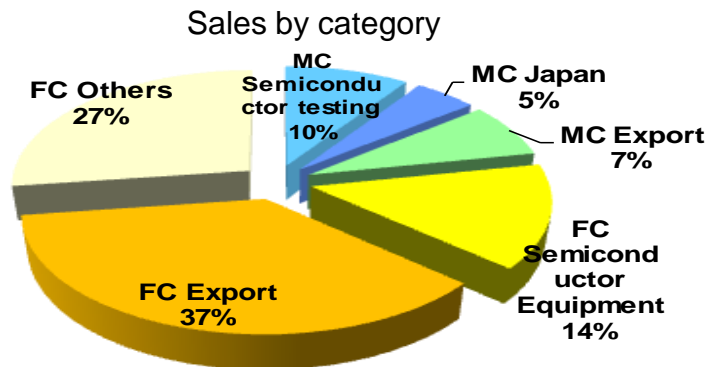
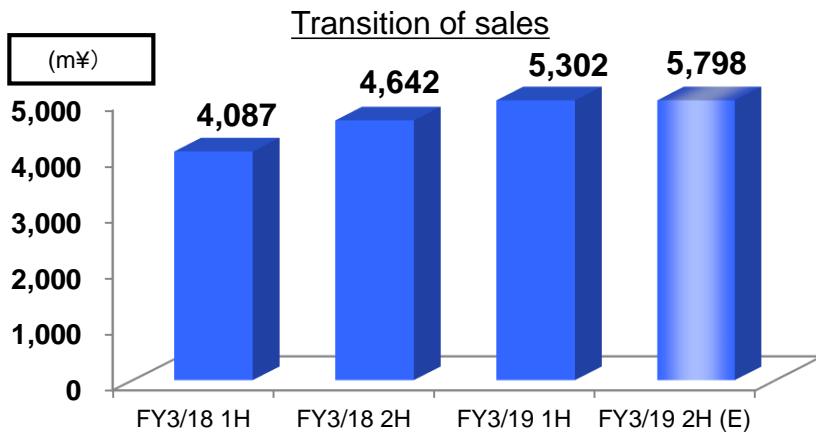
## 2. Outlook for 2nd half of FY3/19

- Companies are postponing purchases of semiconductor manufacturing equipment, mainly for memory (DRAM, 3D-NAND) devices
- Consistent orders; expect high capacity utilization to continue in the second half due to tight supplies of quartz products, where consumables are a high pct. of sales
- As in the first half, semiconductor manufacturers in China are raising output and demand is very strong for products used at newly constructed fabs
- Also expect higher sales of Si boards and Si parts used in fine-pitch high-temperature processes

## [Measures]

- Increase capacity to meet higher demand at major contract manufacturing customers; build factories in China (construction has started at the Changshan and Dongtai factories)
- Step up activities involving the development of next-generation and later generation devices (Establish development base in Yamagata in Japan and plan to start operating a factory in the spring of 2019 for the production of next-generation products)





FC (Fine Ceramics), MC (Machinable Ceramics)

## 1. Status of 1<sup>st</sup> half (Jan-Jun) of FY 3/19

### Machinable ceramics “Photoveel”

- Overseas sales of semiconductor test jig materials increased
- Sales in Japan of general-purpose machinery and medical products increased
- Sales in Japan of semiconductor test jig materials decreased

### Fine ceramics

- Sales in Japan of materials used in semiconductor etching equipment and film forming equipment increased
- Consistently strong demand overseas for parts used in etching equipment

## 2. Outlook for 2<sup>nd</sup> half (Jul-Dec) of FY 3/19

### Machinable ceramics “Photoveel”

- Overseas semiconductor test jig materials are strong
- Slow sales in Japan of semiconductor test jig materials for logic devices

### Fine ceramics

- Overseas sales of parts for etching equipment are strong
- Demand is weak in Japan for parts for semiconductor film forming equipment
- Sales in Japan of parts for FPD manufacturing equipment is on slow trend

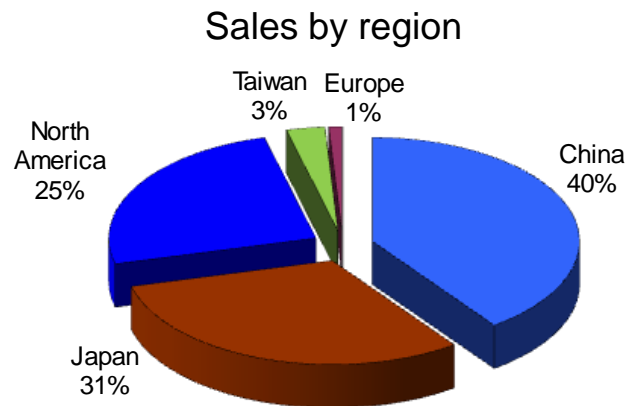
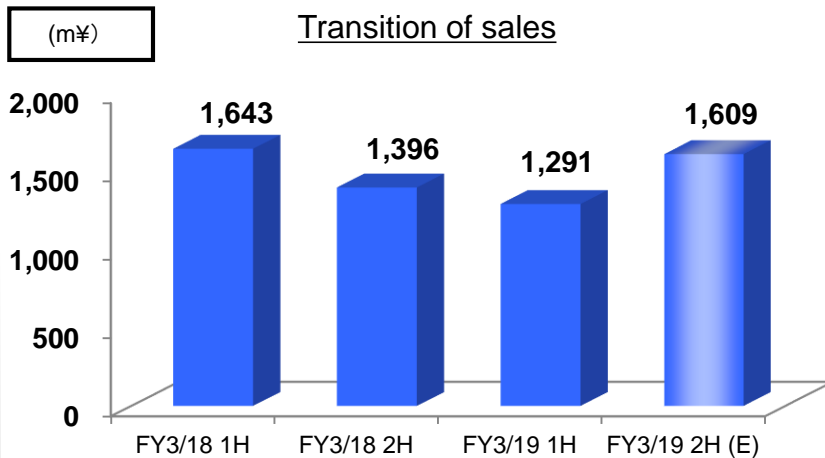
## 3. Sales policy

### Machinable ceramics “Photoveel”

- Take actions aimed at increasing sales of parts used in equipment for extremely precise inspections for automotive devices and other applications by selling large volumes of value-added materials with outstanding heat resistance and electrical properties

### Fine ceramics

- Increase sales of ceramic parts with outstanding electrical properties, surface-treatment products and other products that meet customers' requirements



## 1. Status of 1<sup>st</sup> half (Jan-Jun) of FY 3/19

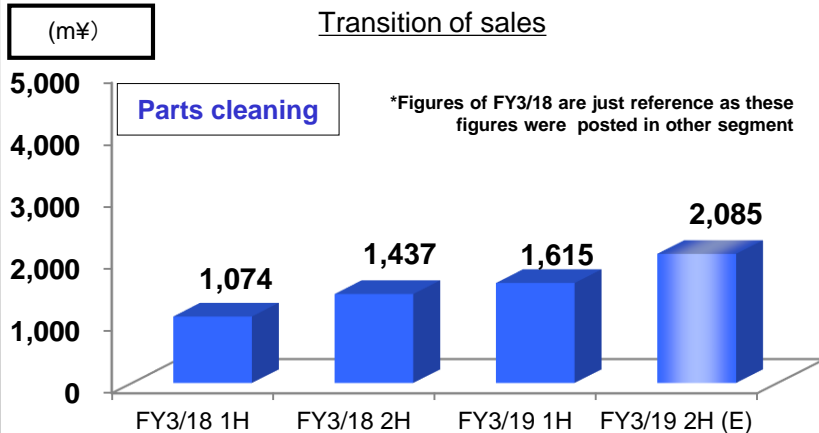
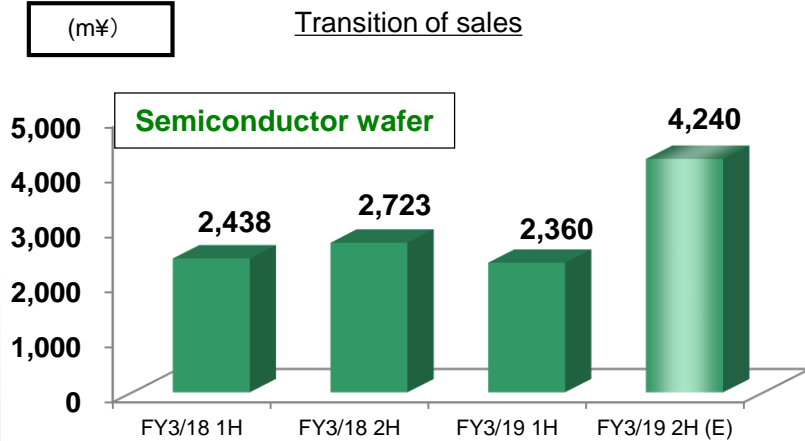
- Sales of semiconductor manufacturing equipment parts in Japan and overseas increased
- Demand decreased for some new equipment parts for which mass production has started due to the use of alternative materials

## 2. Outlook for 2<sup>nd</sup> half (Jul-Dec) of FY 3/19

- Expect strong sales of semiconductor manufacturing parts to continue in Japan and overseas
- Demand for high-purity heat-resistant materials to increase

## [Measures]

- Establish a production system capable of meeting the growth in demand for parts and materials used in semiconductor manufacturing equipment
- Strengthen capabilities for developing products and creating prototypes
- Strengthen interaction and cooperation among Ferrotec Group companies



## Semiconductor wafer:

### 1. Status of 1st half of FY3/19

- Raised monthly output of 6-inch wafers to 400,000
- Stopped production of 8-inch wafers due to environmental measures (restarted production in July)

### 2. Outlook for 2nd half of FY3/19

- Anticipate consistently high capacity utilization for 6-inch wafers due to outlook for favorable market conditions
- Restarted 8-inch wafer production in July and will raise monthly output to 100,000 from 2019 onward

### [Measures]

- 8-inch wafer production at the new Hangzhou Factory, now under construction, is scheduled to begin operation in FY2019
- Increase monthly wafer production capacity to 450,000 (including 100,000 in Shanghai) in FY2020

## Parts cleaning:

### 1. Status of 1st half of FY3/19

- Demand was firm as semiconductor companies in China, build more fabs in China

### 2. Outlook for 2nd half of FY3/19

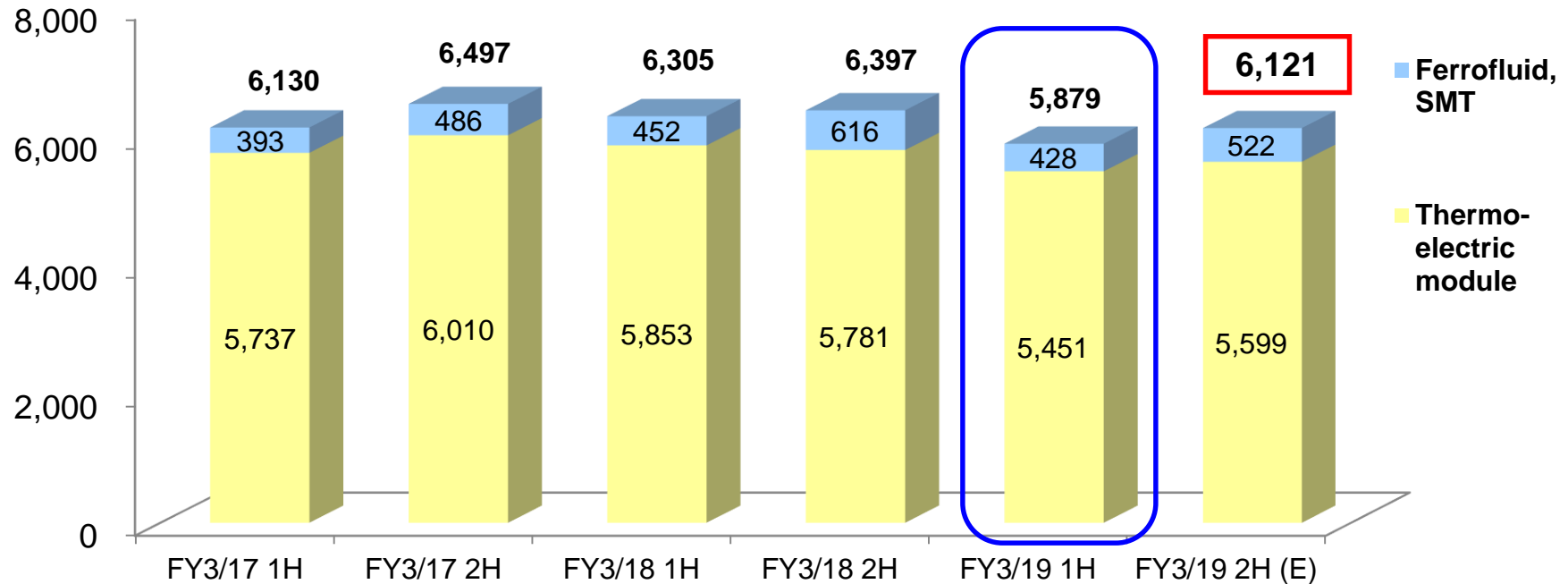
- Expect very strong demand as semiconductor companies that use Ferrotec products increase output
- Prepare for a further increase in production capacity starting in FY2020 by constructing a factory in Tongling in Anhui province and a second factory at Neijiang in Sichuan province

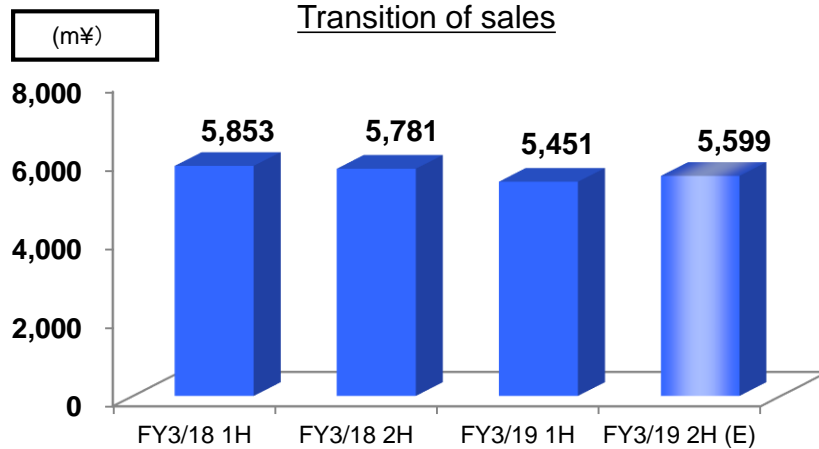
### [Measures]

- Consider more growth in production capacity as needed based on the outlook for demand at customers in China's semiconductor and FPD industries

# Electronic Device Segment

Sales  
(¥ in million)





## 1. Status of 1st half of FY3/19

### Automobile Seat Application

- Sales slowed down somewhat in the United States
- Started an automotive project for increasing sales of products used in automobiles
- Started mass production of products for automobile cup holders

### Other Applications

- Sales of cooling products for wafer and semiconductor manufacturing equipment were firm
- Increased number of applications involving consumer products and biomedical products
- Strong sales in the communications sector because of 5G investments

## 2. Outlook for 2nd half of FY3/19

### Automobile Seat Application

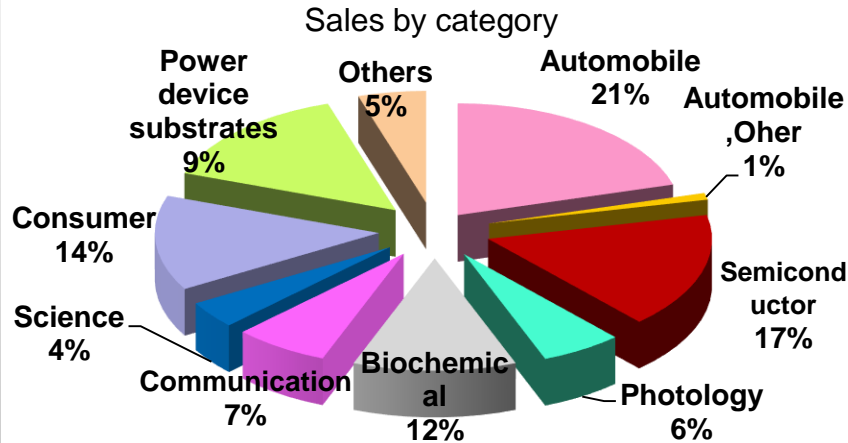
- Expect sales to be about the same as in the first half
- Create products for applications in next-generation automobiles

### Other Applications

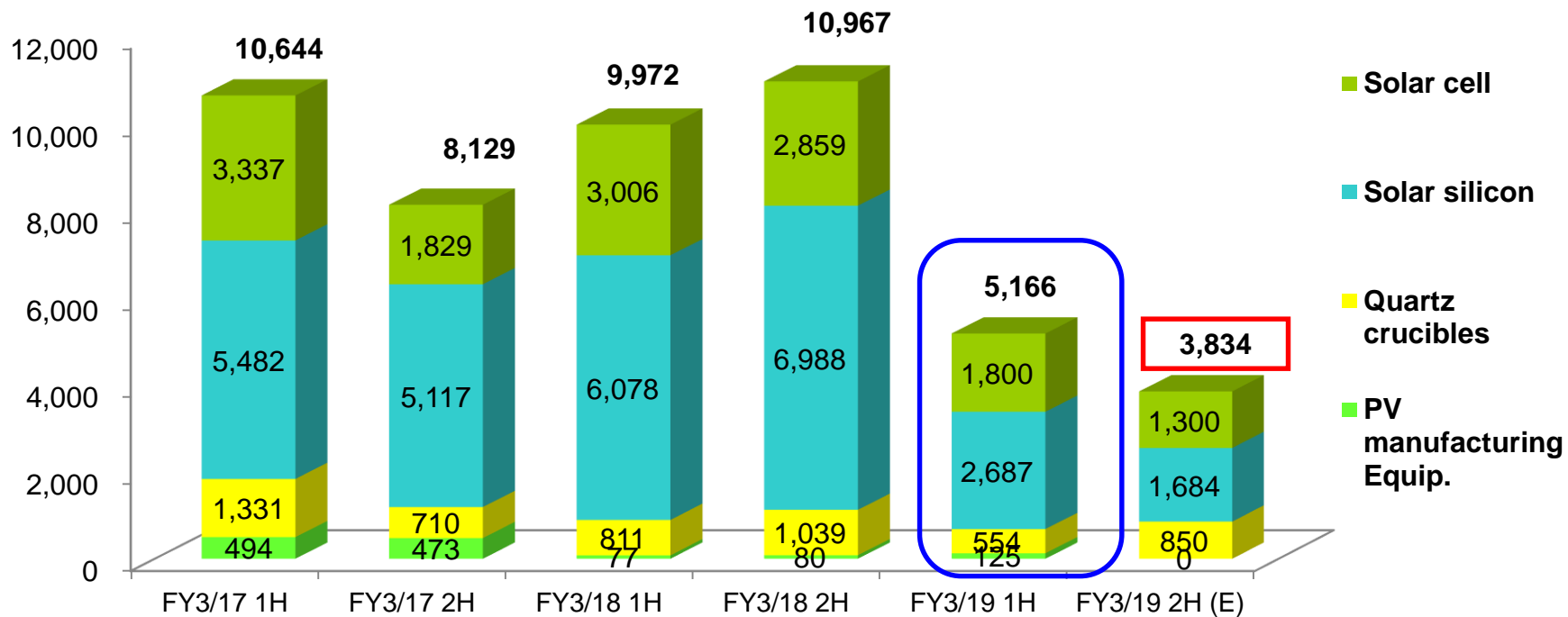
- Strong performance by consumer product assembly (showcases, etc.)
- Expect sales involving fiber-optic communications to remain strong

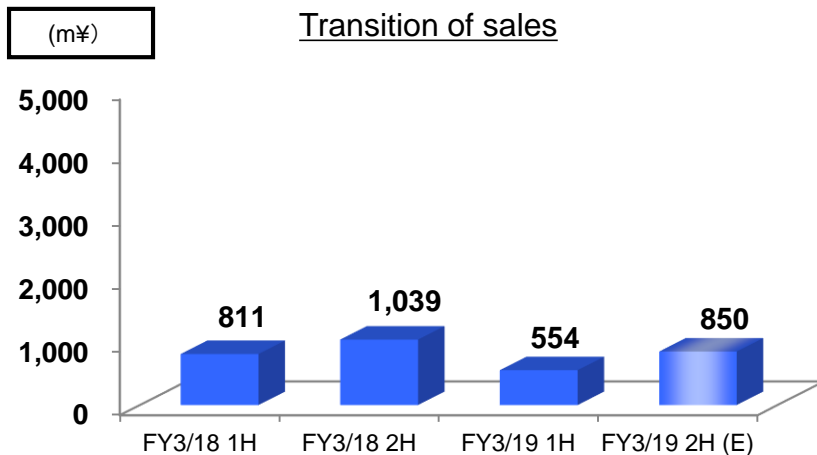
### [Measures]

- Worldwide sales activities for sub-assembly products
- Develop products for more automotive applications

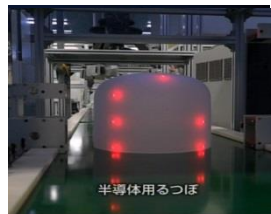


Sales  
(¥ in million)





Mono-crystal quartz crucible



Semiconductor crucible

## 1. Status of 1st half of FY3/19

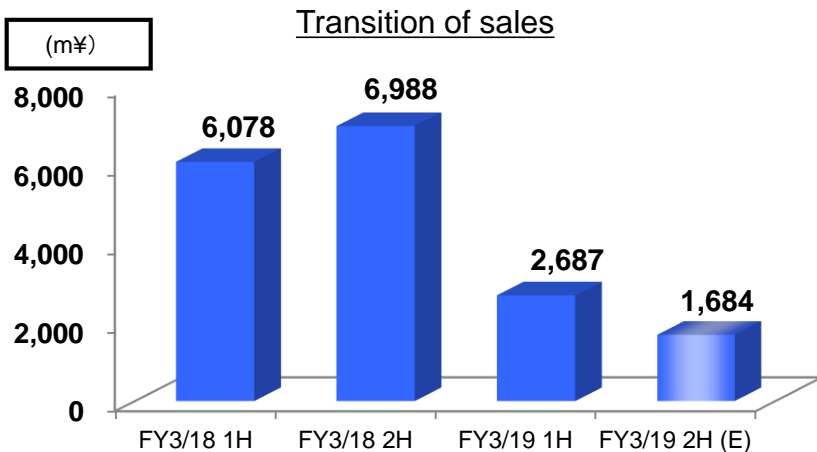
- Large decrease in crucible sales in the solar cell sector; China's subsidy cut impacted demand starting in the latter half of 1H
- In the semiconductor industry, sales of mono-crystal crucibles increased
- Total first half sales decreased due to the termination of production and sales of multi-crystal vessels

## 2. Outlook for 2nd half of FY3/19

- Sales and earnings to increase as sales of value-added crucibles for semiconductor applications becomes the primary product in this business
- Sales for semiconductor applications to be strong, including increasing sales of large crucibles for 8-inch ingots
- For solar cell applications, selling only some large-diameter crucibles

## [Measures]

- Increase sales of semiconductor crucibles by focusing on semiconductor applications
- Plan to start operations by the end of 2018 at a factory devoted solely to semiconductor crucibles (clean-up, automation of post processing)
- May start mass production of a 32-inch large-scale melting furnace in the first half of 2019 by speeding up the development of this product



**Mono-crystal ingot**



**Multi-crystal ingot**



**PV wafer**

## 1. Status of 1st half of FY3/19

- China's May 31 announcement about a new solar power policy (reduction in subsidies) has dramatically altered this market. Prices have plunged as demand fell and competition increased. Sluggish in the latter half of 1H.
- Due to a quality problem at a major OEM supplier, production of unprofitable products, which were also affected by temporarily suspending shipments, was reduced and inventories were liquidated.

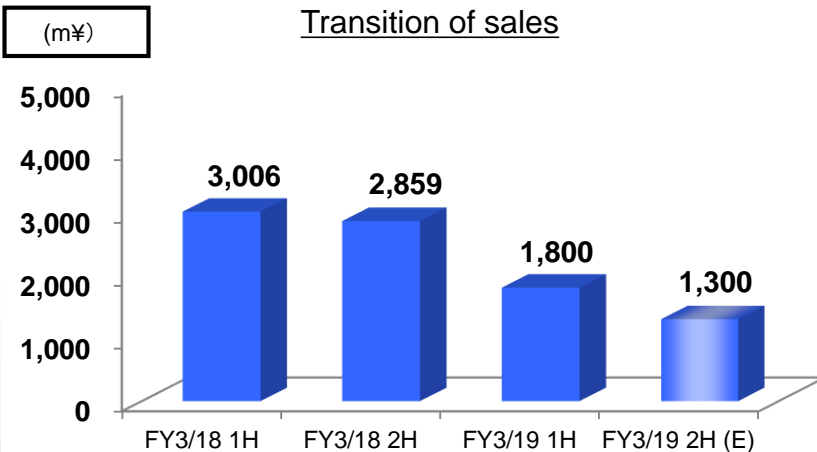
## 2. Outlook for 2nd half of FY3/19

- Prices are expected to remain low
- Specialize only in OEM production to improve profitability
- The OEM quality problem has been resolved and shipments have resumed

### [Measures]

- Take actions to maintain high quality of OEM products; low oxygen, thinner wire technology
- Continue reducing output of unprofitable products
- Continue reducing inventories





Solar cell

## 1. Status of 1st half of FY3/19

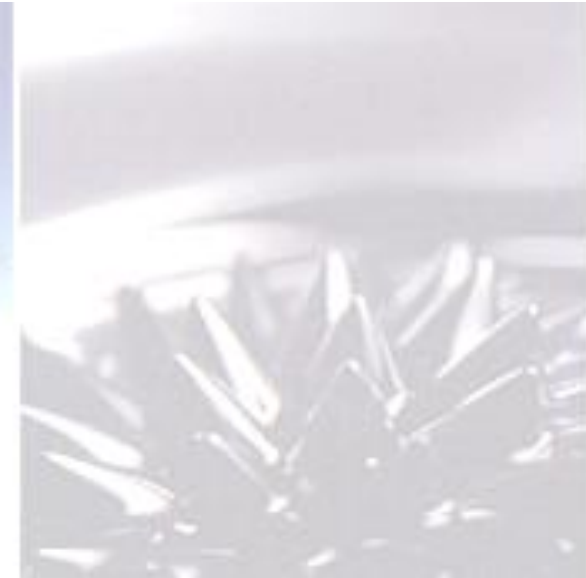
- The market downturn following China's May 31 subsidy cut announcement caused prices to plummet; losses increased in the latter half of 1H.
- Shifted to OEM production to improve profitability

## 2. Outlook for 2nd half of FY3/19

- Expect prices to remain low
- Increase use of OEM suppliers to improve profitability







### **[Measures]**

- Increase OEM production
- Continue to cut costs
- Continue activities to increase conversion efficiency



## Reference Materials

Corporate Name	Ferrotec Holdings Corporation
Date of Foundation	September 27, 1980
Address	Nihonbashi Plaza Building, 2-3-4, Nihonbashi, Chuo-ku, Tokyo Japan
Listed	JASDAQ (Listed Code: 6890)
President	Akira Yamamura
Business Segment	Business management of group companies, R&D operations
Capital	17,607,000,000 JPY
Issued Stock	37,002,202 shares
Related Company	[42 Consolidated Subsidiary] [6 Companies Accounted for by the Equity Method]
Employees	[Consolidated] 7,379 [Non-consolidated] 81

1980~	1990~	2000~
<p>Started manufacturing and selling products using ferrofluids (computer seals, vacuum feedthroughs)</p> <p><b>Vacuum Feedthroughs</b></p> 	<p>92 – Started manufacturing and selling thermo-modules and modules in China 98 – Started manufacturing and selling quartz products for the semiconductor industry</p> <p><b>Thermo-electric module</b></p>  <p><b>Quartz</b></p> 	<p>02 – Started contract manufacturing service business for silicon wafer processing, machine tool production and other activities (Shanghai factory) 05 – Started photovoltaic products business; started manufacturing and selling machinery and crucibles for manufacturing silicon ingots and crystals 08 – Started manufacturing and selling ceramic products</p> <p><b>Ingot</b></p>  <p><b>Single crystal silicon growing furnaces</b></p>  <p><b>Machinable Ceramics</b></p> 

**With a core of ferrofluid expertise**

*~ Ferrotec's core Technology ~*

**Establishing operations in other countries**

91: Established subsidiary in Massachusetts, **USA**  
92: Established subsidiary in Hangzhou, **China**  
95: Established subsidiary in Shanghai, **China**  
97: Established subsidiary in **Singapore**  
99: Started operations in **North America** and **Europe** by acquiring Ferrofluidics

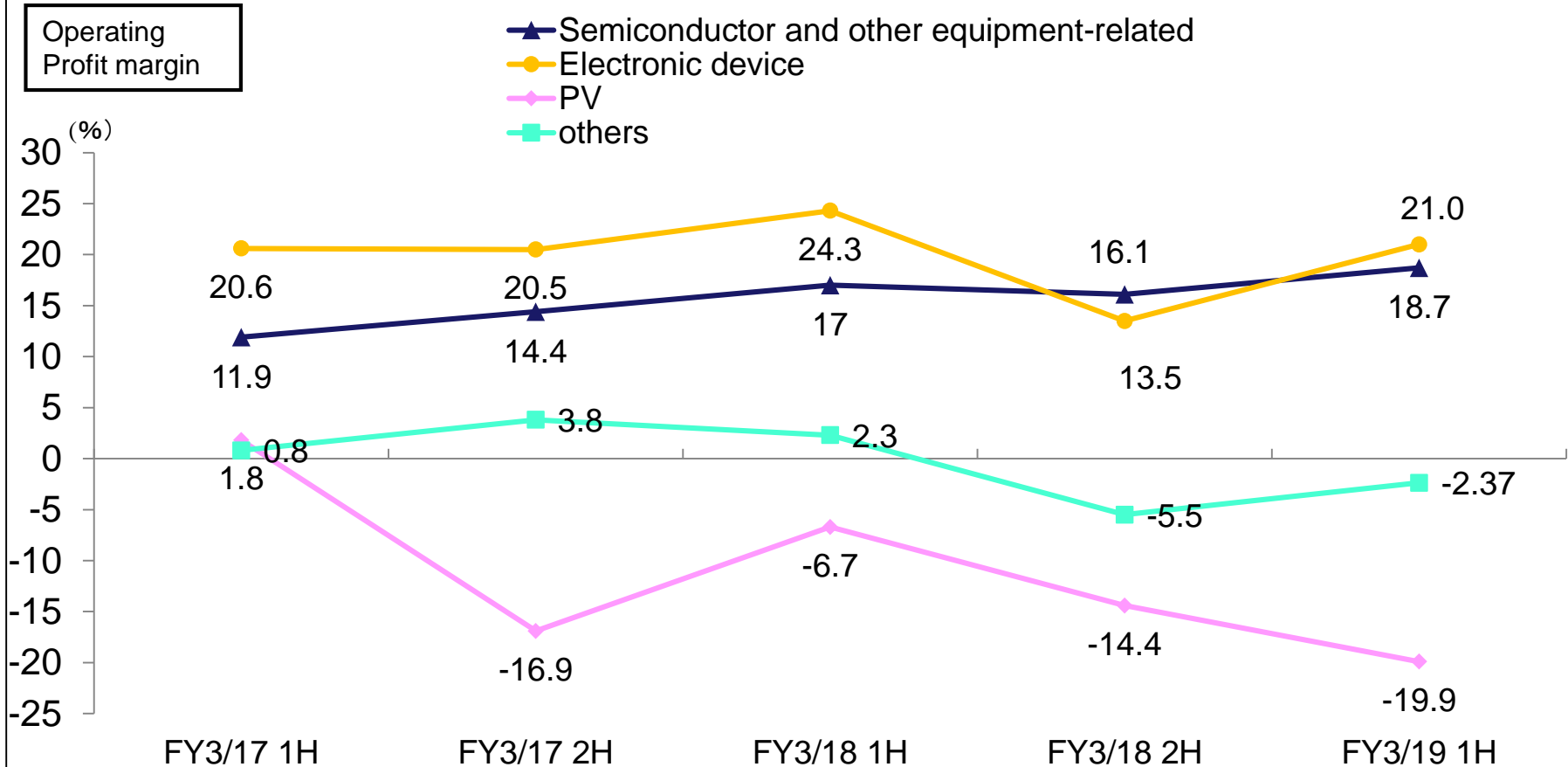
**Building a new profit structure**

**02: Started contract manufacturing service (CMS) business at the Shanghai factory, including silicon wafer processing, machine tool production and other activities**

Expertise in production technologies extending from component processing to final assembly allowed Ferrotec to start the CMS business

**05 : Increased manufacturing and sales activities for photovoltaic products in Hangzhou, China**

# Operating Margin by Business Segment



# Strategies for M&A and Alliances



Time	Company acquired/Alliance partner	Description
April. 2017	Transition to a holding company structure, change of company name	Changed company name to <b>Ferrotec Holdings Co., Ltd.</b>
July 2016	Acquired Asahi Seisakusho Co., Ltd.	Acquired <b>a major business-use laundry equipment manufacturer</b>
July 2015	Acquired ADMAP Inc.	Acquired ADMAP which manufactures and sells <b>CVD-SiC products</b>
Oct. 2011	Merged with a subsidiary	Merged with Ferrotec silicon which manufactures and sells <b>single crystal silicon products</b>
Sep. 2010	Established a joint venture manufacturing and sales company	Ferrotec, a local subsidiary and Covalent Materials agreed to establish a joint venture "Hangzhou Solartech Co., Ltd." to manufacture and sell <b>vessels and related products.</b>
Jul. 2010	Acquired shares of IMI in the US	Began sales of <b>pure silicon products</b>
April.2010	Merged with a subsidiary	Merged with <b>Ferrotec Quartz</b> which manufactures and sells quartz products
Jan. 2010	Acquired the Temescal Division of Edwards Vacuum	Acquired the Temescal Division of Edwards Vacuum which is the leading manufacturer and distributor of <b>electron beam-based evaporative coating systems.</b>
July. 2008	Acquired of Sumikin Ceramics. Changed the name of the company.	Acquired 90% of the surviving company <b>Sumikin Ceramics &amp; Quartz Co., Ltd.</b> after spinning of its business except the ceramics business, converted it into a subsidiary, became "Ferrotec Ceramics" and made it a wholly owned subsidiary in 2013
Dec. 2007	Jointly established an assembly sales company in Korea.	Established "CMC Ferrotec" with the local company for the manufacture of <b>solar cell manufacturing equipment.</b>
April. 2007	Established a joint venture Manufacturing Corporation in Korea	Established joint venture corporation Ferrotec Korea Co.Ltd with Korean Company(KSMC Corp) for manufacturing <b>Vacuum Feedthrough.</b>
Nov. 2006	Merger and liquidation	Merged with Ferrotec Precision, which produces <b>Vacuum feedthrough.</b> Liquidated two subsidiaries(Dec.).
Sep. 2006	Established a joint venture in Taiwan	Established Ferrotec Taiwan jointly with a local partner to sell <b>vacuum feedthroughs</b> and offer maintenance services
Dec. 2005	Established a joint venture with LTD Ceramics Inc. (USA)	Established joint venture in China to manufacture <b>ceramics</b>
July 2005	Acquired NORD Co., Ltd.(Russia)	Acquired company that manufactures and sells <b>Peltier (thermoelectric) devices</b> in order to increase share of global market
May 2005	Business alliance with KSM Inc.(Korea)	Alliance for mutual sales of <b>vacuum feedthroughs</b> and products associated with semiconductor manufacturing equipment
July 2004	Exclusive contract with Applied Films(Germany)	Gave this company exclusive rights to purchase Ferrotec <b>vacuum feedthroughs</b>
Oct. 2003	Business and financial alliance with Aliontek	Technology alliance with ALIONTEK CORPORATION, which has technology for the grinding of quartz products, strengthened manufacturing technology for <b>quartz products</b> in China
Feb. 2002	Business alliance with Toshiba Ceramics and Mitsui Co. for wafer production by commissioning	Ferrotec <b>silicon wafer</b> production equipment moved to China factory to conduct a CMS business, and manufacturing is outsourced to this factory