

Business Briefing about Our Products for Semiconductor Production Equipment (Our high-performance stainless steel business)

 **大同特殊鋼**
Beyond the Special



CMはコチラ

Daido Steel Co., Ltd. (Securities code: 5471)

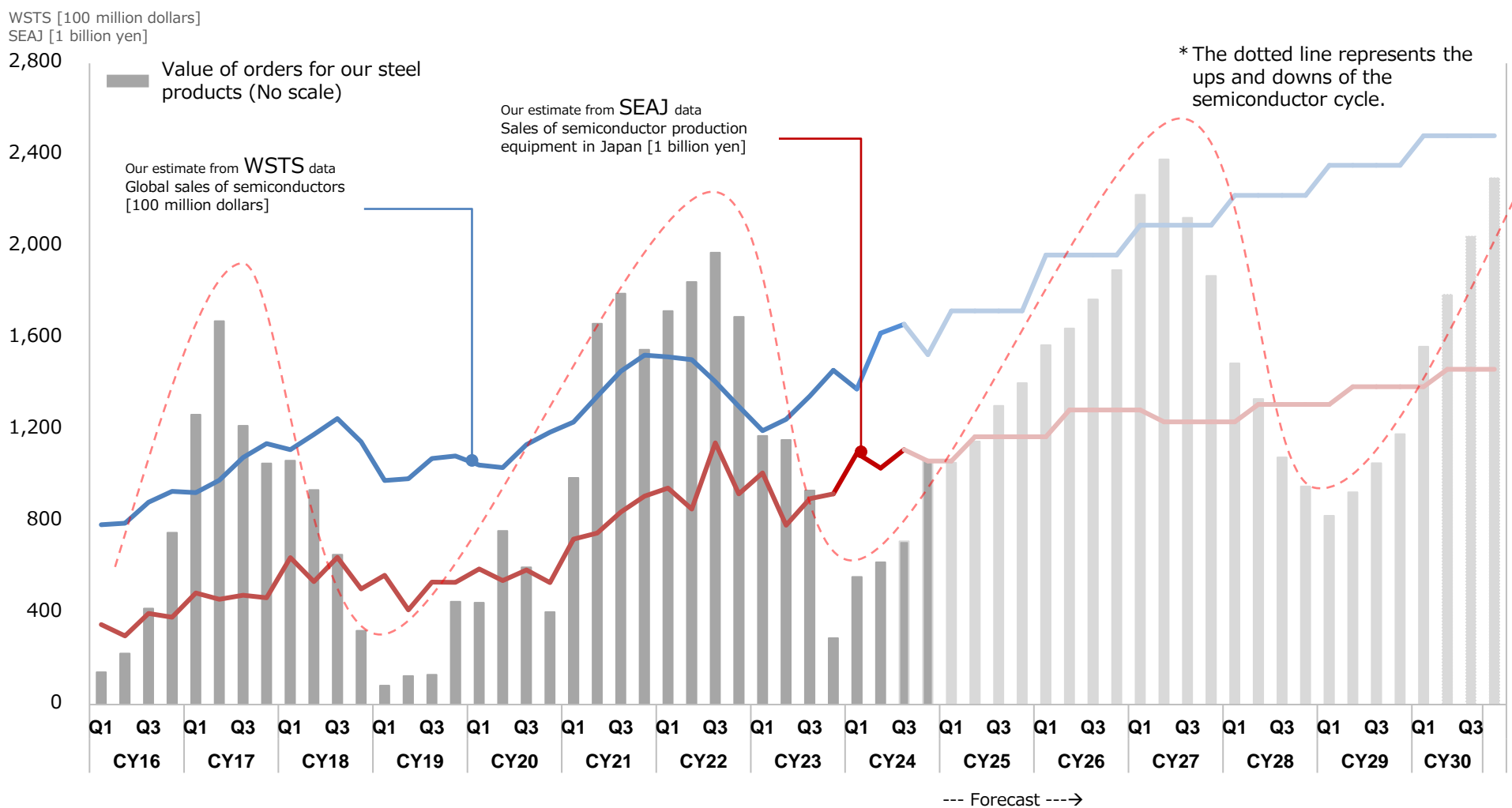
January 15, 2025

 **DAIDO STEEL CO., LTD.**

DAIDO STEEL GROUP
Beyond the Special

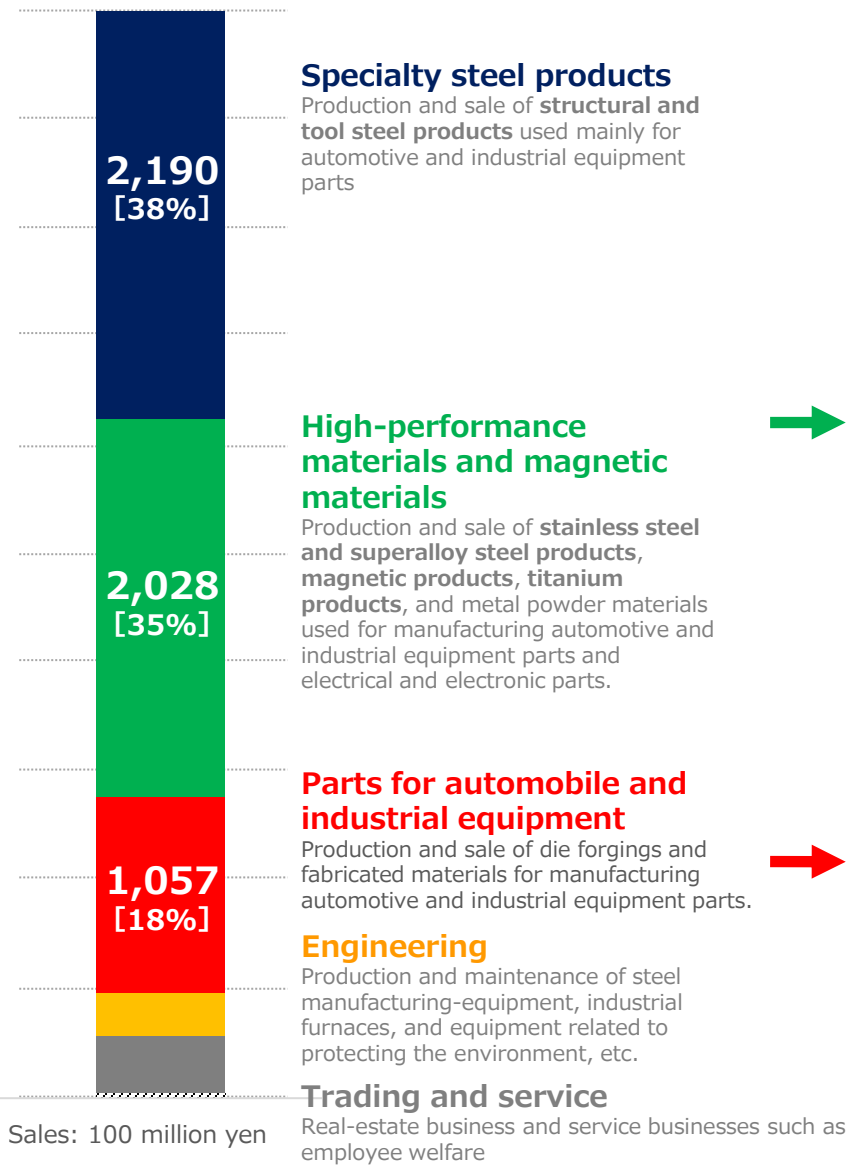
1. Semiconductor Demand and Orders for Our Related Products

➤ The demand for semiconductors and semiconductor production equipment is expected to increase from 2026 to 2030. Orders for our semiconductor-related products are also expected to increase in line with market expansion.



* WSTS: World Semiconductor Trade Statistics
* SEAJ: Semiconductor Equipment Association of Japan

2. Sales by Segments and Semiconductor-related Products



Specialty steel products
 Production and sale of **structural and tool steel products** used mainly for automotive and industrial equipment parts

High-performance materials and magnetic materials
 Production and sale of **stainless steel and superalloy steel products, magnetic products, titanium products,** and metal powder materials used for manufacturing automotive and industrial equipment parts and electrical and electronic parts.

Parts for automobile and industrial equipment
 Production and sale of die forgings and fabricated materials for manufacturing automotive and industrial equipment parts.

Engineering
 Production and maintenance of steel manufacturing-equipment, industrial furnaces, and equipment related to protecting the environment, etc.

Trading and service
 Real-estate business and service businesses such as employee welfare

Stainless steel, superalloy steel, steel bars

→

Valves

Joints

MFC

Stainless steel, superalloy steel, wire rods

→

Gas filters

Fasteners

LM guides

Stainless steel, superalloy steel, strip steel

→

Bellows

High-purity target materials

Stainless steel open-die forgings

→

Gas supply line pipes

LED

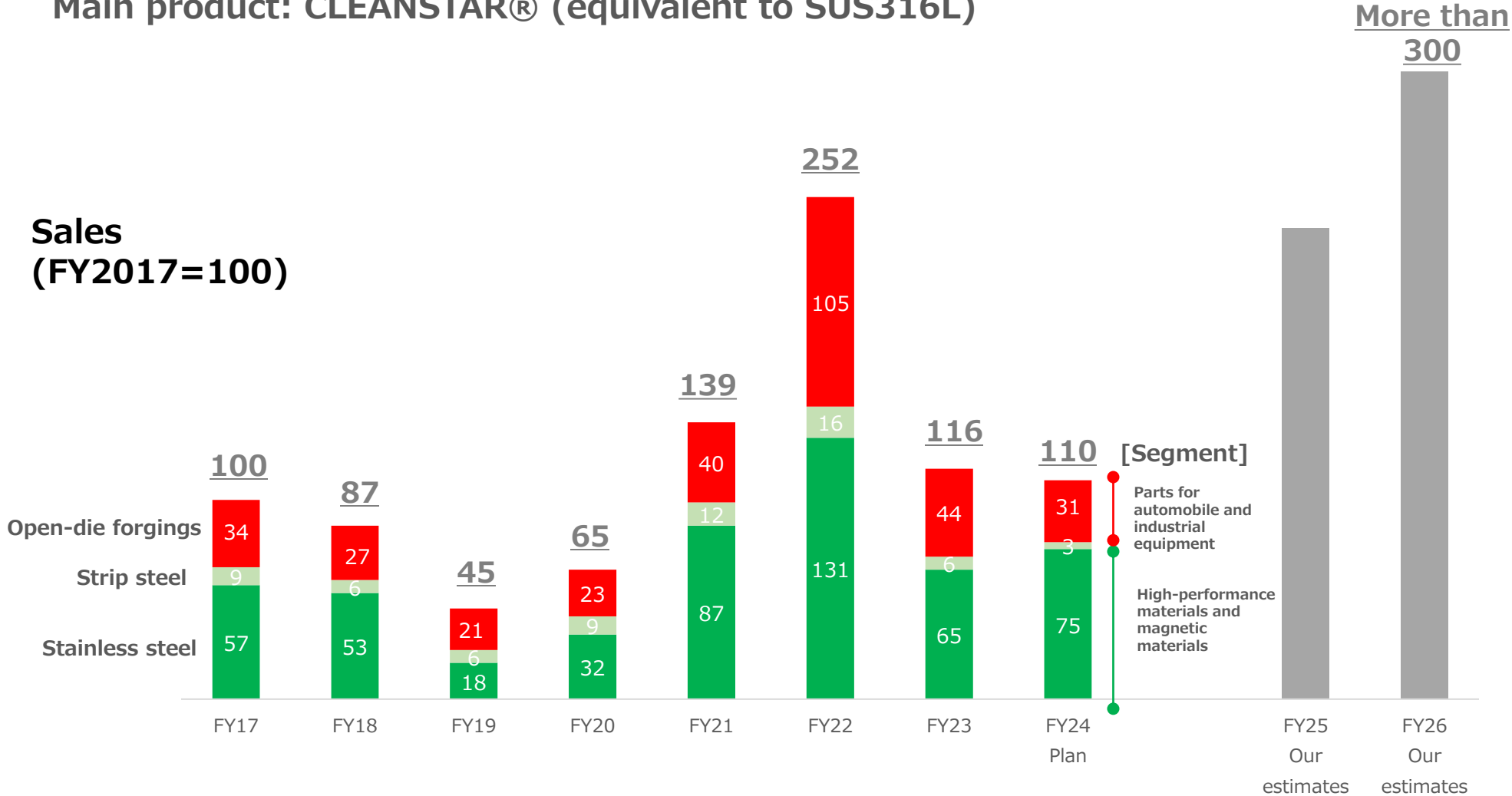
Stainless steel powder

(FY2023 results: Japanese GAAP)

3. Sales Trends for Semiconductor Production Equipment (non-consolidated basis)

➤ The sale of semiconductor production equipment products is expected to more than triple in FY2026 over FY2017 sales.

Main product: CLEANSTAR® (equivalent to SUS316L)



4. Specialty Steel Applications in the Semiconductor Industry

Targets

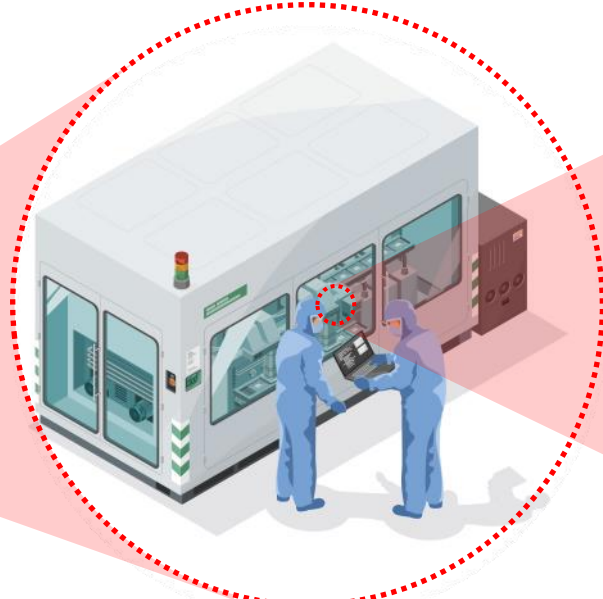


OIL REFINERY

Factory infrastructure

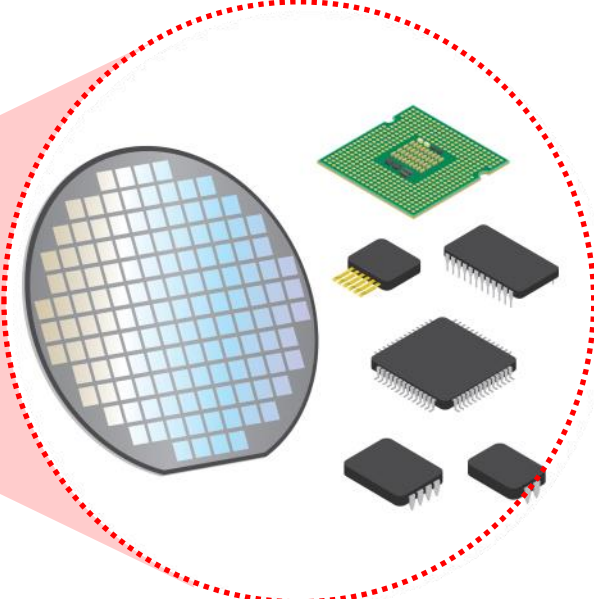
Parts for automobile and industrial equipment

Gas supply line pipe



Manufacturing equipment

Piping-related products
(valves, joints, bellows)
MFC (Mass Flow Controllers)
Gas filters
 LM (Linear Motion) guides
 Encoders (LED)
 Fasteners



Semiconductor products

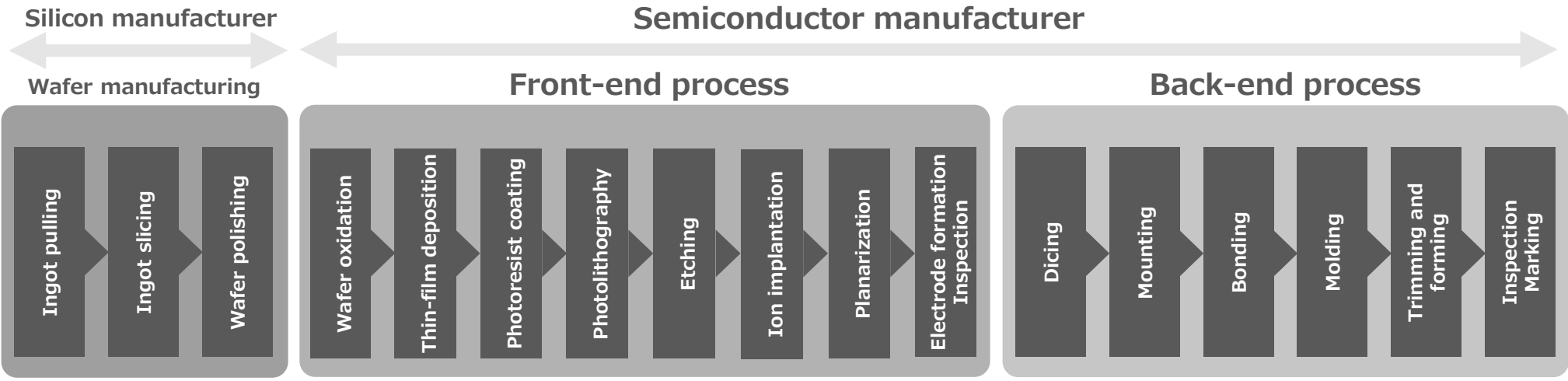
High-performance materials and magnetic materials

Power semiconductors
 - Ni junction layers
 Semiconductor and electronic components
 - Ti barrier layers
 - Ni alloy wiring protective layers

Uses

5-1. Overview of the Semiconductor Production Process

Three major processes contribute to the manufacture of semiconductors:

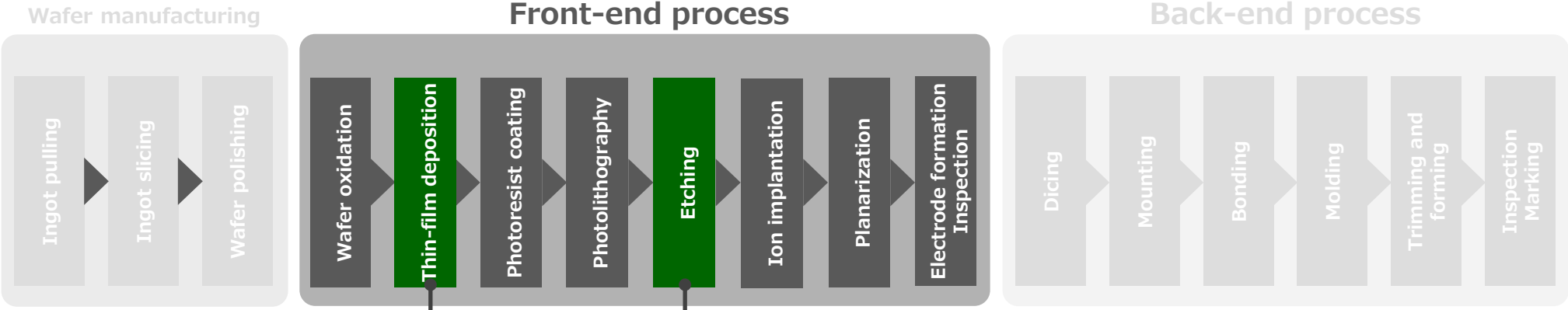


Production processes	Outline of the separate processes	Required steel characteristics		
		Corrosion resistance	Surface cleanliness	Low levels of thermal expansion
Wafer manufacturing	The process of producing silicon wafers, wherein high-purity silicon ingots are created, sliced and then polished	Resistance to corrosion, especially from corrosive gases	Cleanliness of the steel's surface Very low level of impurities	Limited expansion and contraction due to changes in temperature
Front-end process	This is where a silicon wafer is prepared, making it ready to serve as a substrate for the formation of electronic components that will perform functions such as power control, signal amplification, and data storage.			
Back-end process	This is where a wafer with electronic components formed on it is cut (diced) into individual chips, which are then packaged as finished products.			

5-2. Our Business Opportunities in the Front-end Process

Corrosive gases are used by equipment that performs thin film deposition and etching in the front-end process

- Corrosion-resistant stainless steel and superalloy steel are used because they can withstand these corrosive gases -



Thin film deposition system

Valves and joints

MFCs (Mass Flow Controllers)

Gas filters

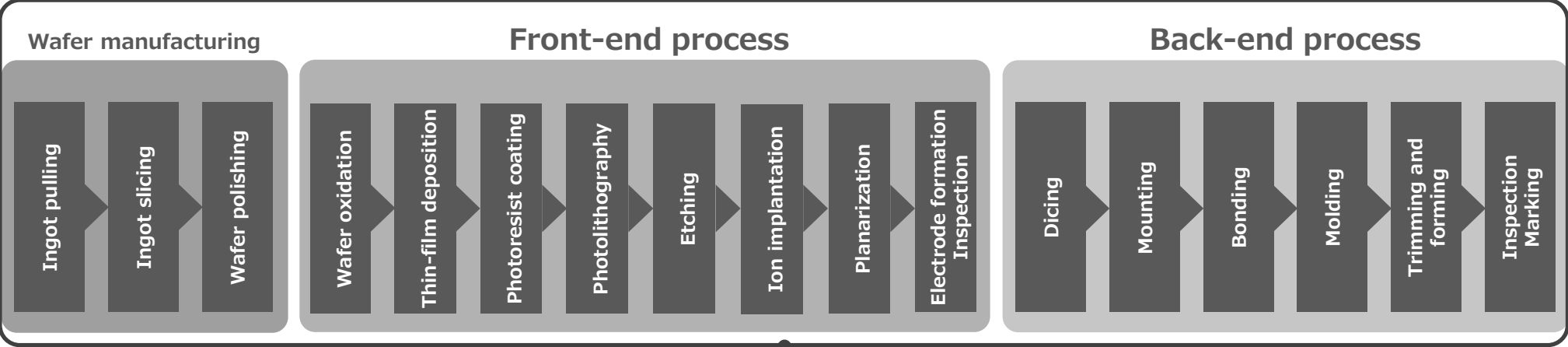
Etching system

* Pie chart shows our estimated market share

5-3. Our Business Opportunities within the Overall Process

➤ Various component parts of the semiconductor factory infrastructure and the manufacturing equipment

- Stainless steel is widely used to make gas supply lines and semiconductor production equipment components -



Daido Steel's products are used extensively throughout the entire semiconductor manufacturing process.

Gas supply line pipe



Our VIM-VAR steel pipes have a high market share in the field of corrosive gas supply lines, etc.

LM guides



Our long-life stainless steel (DSR7) has a high market share, for use as a material to make LM guides for various types of equipment.

Fasteners



Daido Steel's 316L wire rods and steel bars are widely used as a material for making fasteners (for example, nuts and bolts).

Bellows



Bellows manufactured using stainless steel and superalloy strip steel are also included as parts for semiconductor production equipment.

* VIM: Vacuum Induction Melting furnace, VAR: Vacuum Arc Remelting furnace

6. Our Stainless Steel Products for Semiconductor Production Equipment ①

➤ Introducing CLEANSTAR®

*SEMI Standards: These international standards are used in the semiconductor industry. They were established by Semiconductor Equipment and Materials International (SEMI).

Product overview

- CLEANSTAR®, a super-clean stainless steel developed by Daido, meets JISG4303 and SEMI F20(*) international standards.
- High-level cleanliness & optimized chemical composition provide superior corrosion resistance, compared to Type 316L.
- Three steel grades, to suit the particular manufacturing process in terms of application and required characteristics.

Steel grades	Main process	Typical major components (mass%)					
	Primary / Secondary	C	Mn	S	Ni	Cr	Mo
CLEANSTAR-A	VIM / VAR	0.006	Extremely low Mn	Extremely low S	14.7	16.7	2.2
CLEANSTAR-B	AF / VAR	0.007	Low Mn	Extremely low S	14.7	16.7	2.2
CLEANSTAR-C	AF / -	0.015	1.8	Low S	12.1	16.7	2.0
Type 316L		0.030 or less	2.00 or less	0.030 or less	12.00 to 15.00	16.00 to 18.00	2.00 to 3.00

Process selection according to required characteristics (Please see page 11)

Reduced elements that adversely affect corrosion resistance

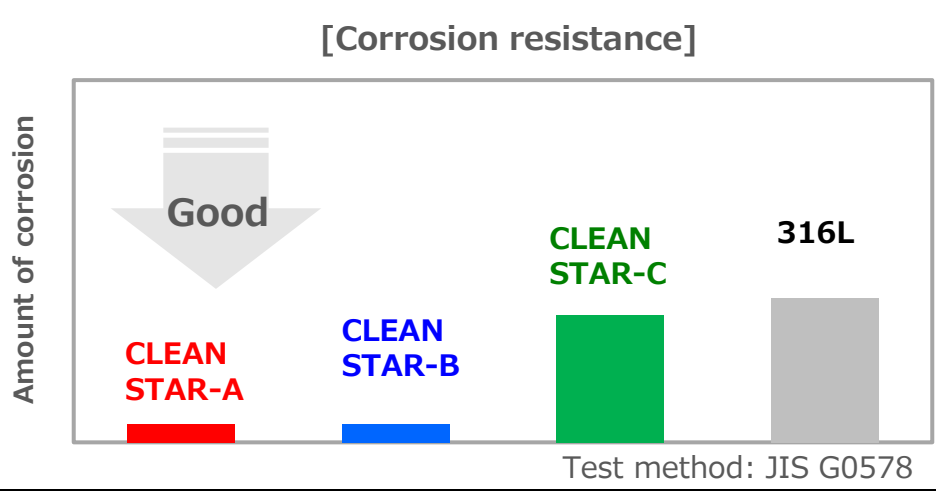
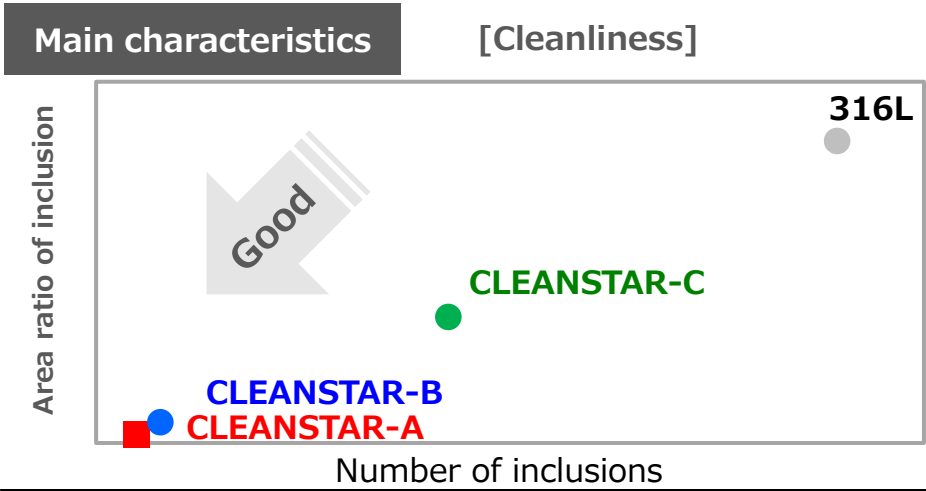
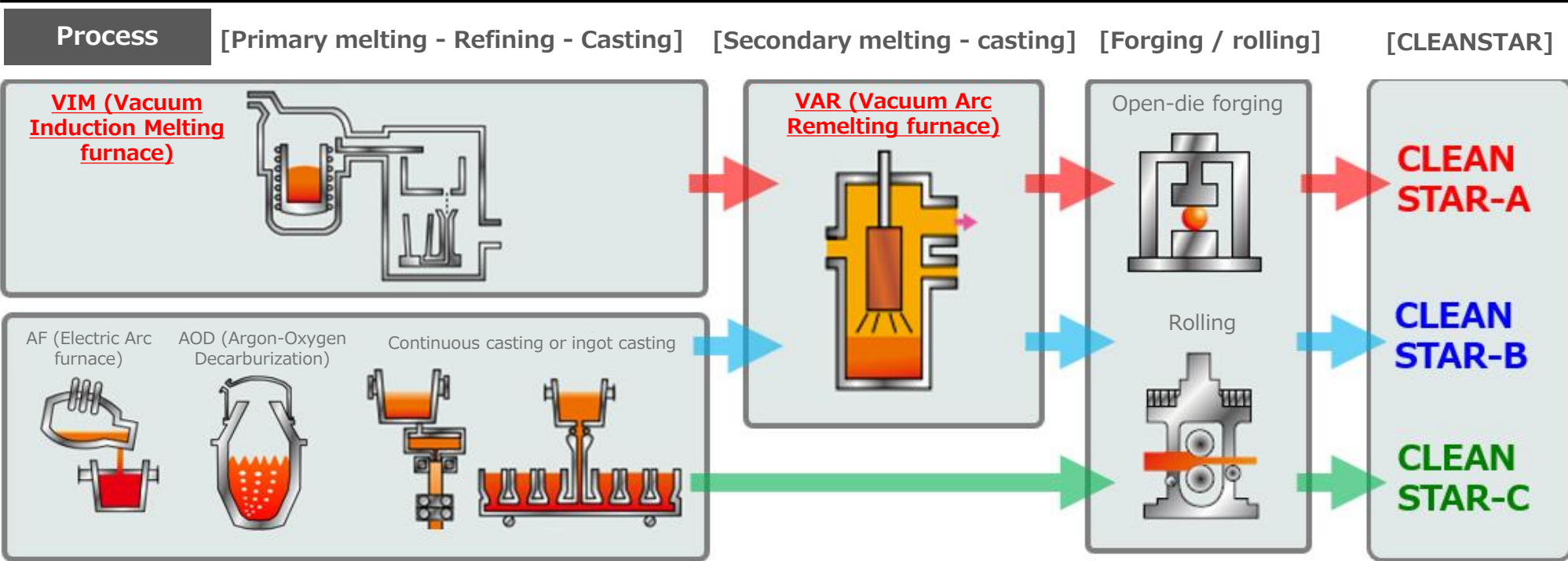
Manufacturing technology

- Inclusions that may cause the admixture of foreign matter into a product have been minimized through the use of technology we cultivated as a manufacturer of aircraft materials and ultrafine metal wire.
- Elements that can undermine corrosion resistance have been minimized through our unique chemical composition design and manufacturing processes.

➔ **CLEANSTAR® is widely used as a material for semiconductor production equipment parts that are used where corrosive gases flow.**

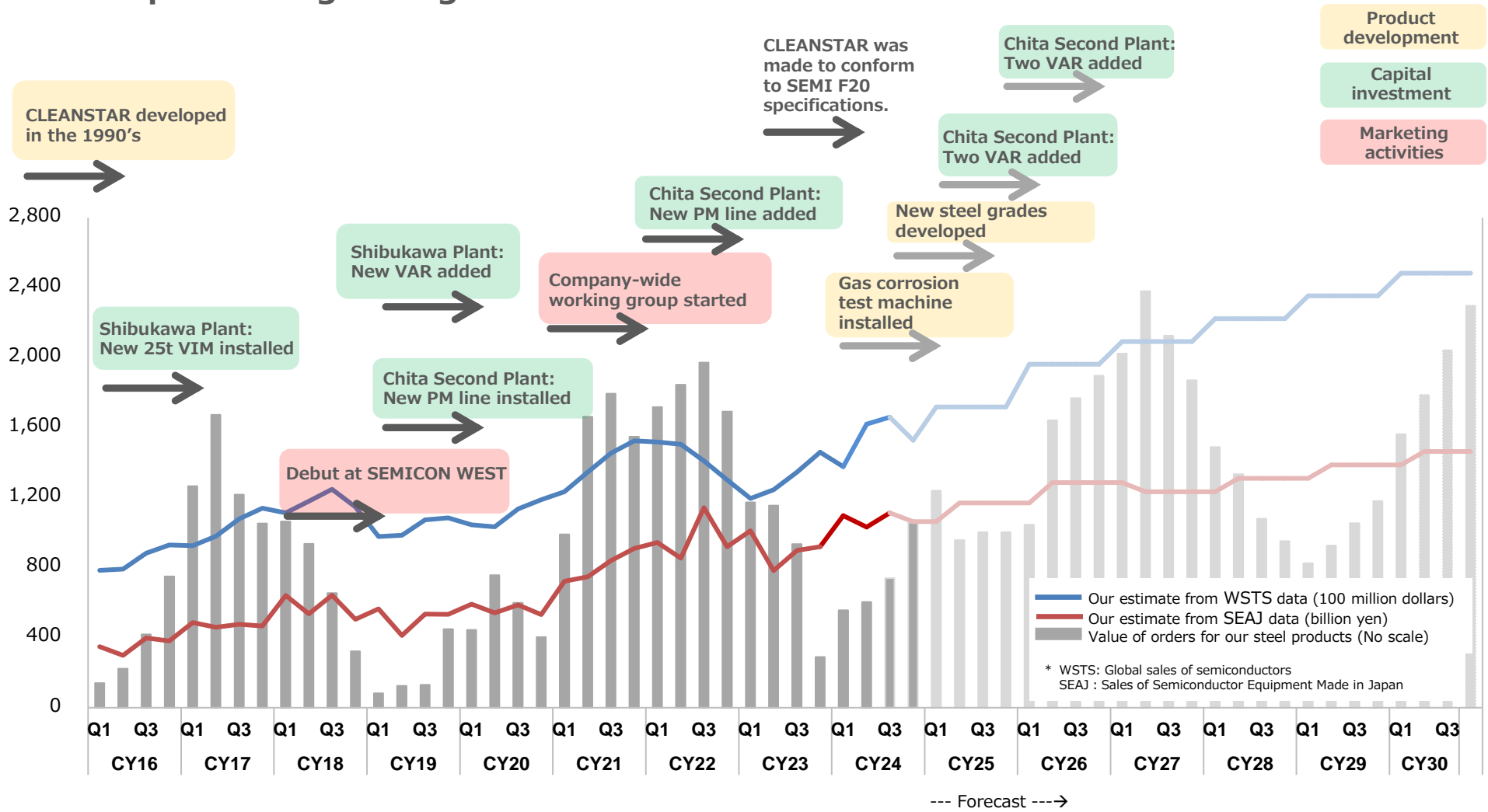
* VIM: Vacuum Induction Melting furnace, VAR: Vacuum Arc Remelting furnace

6. Our Stainless Steel Products for Semiconductor Production Equipment ②



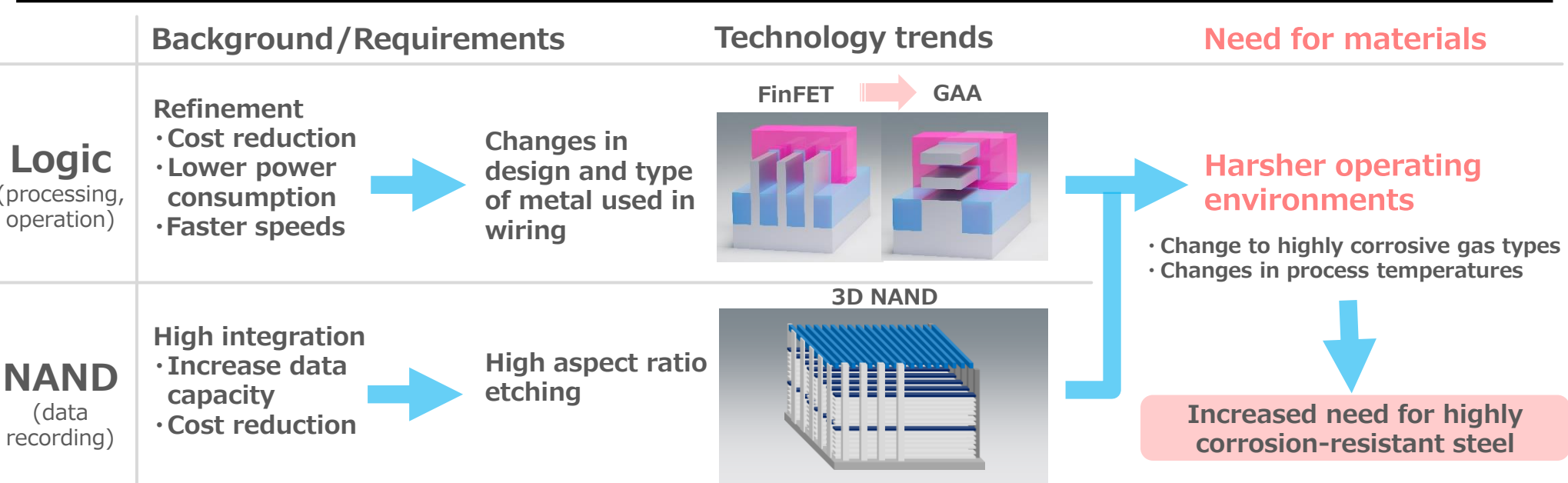
7. Our Measures to Promote Semiconductor Business Growth

➤ Promote product development, capital investment, and marketing activities in anticipation of growing future demand



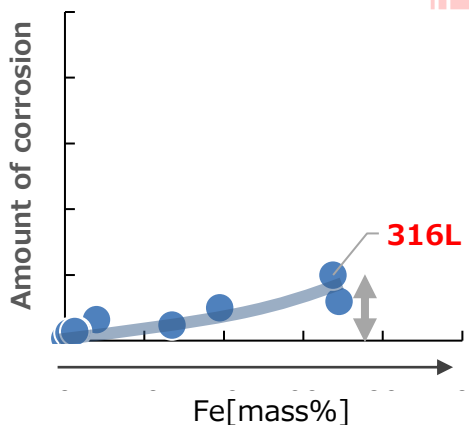
* WSTS: World Semiconductor Trade Statistics
* SEAJ: Semiconductor Equipment Association of Japan

8-1. Technology Trends and Need for Corrosion-Resistant Materials



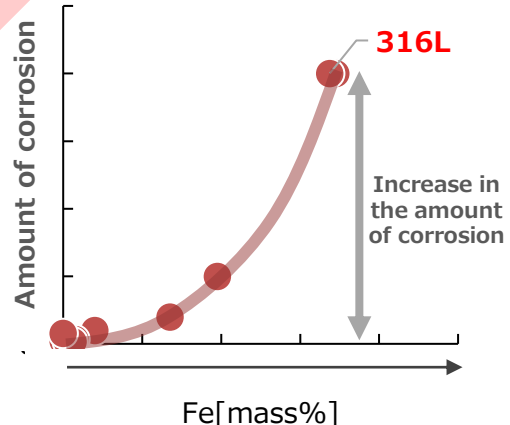
Results of corrosion-resistance evaluation by gas type and material (our own test)

HBr (hydrogen bromide) gas



Change in gas type

HF (hydrogen fluoride) gas

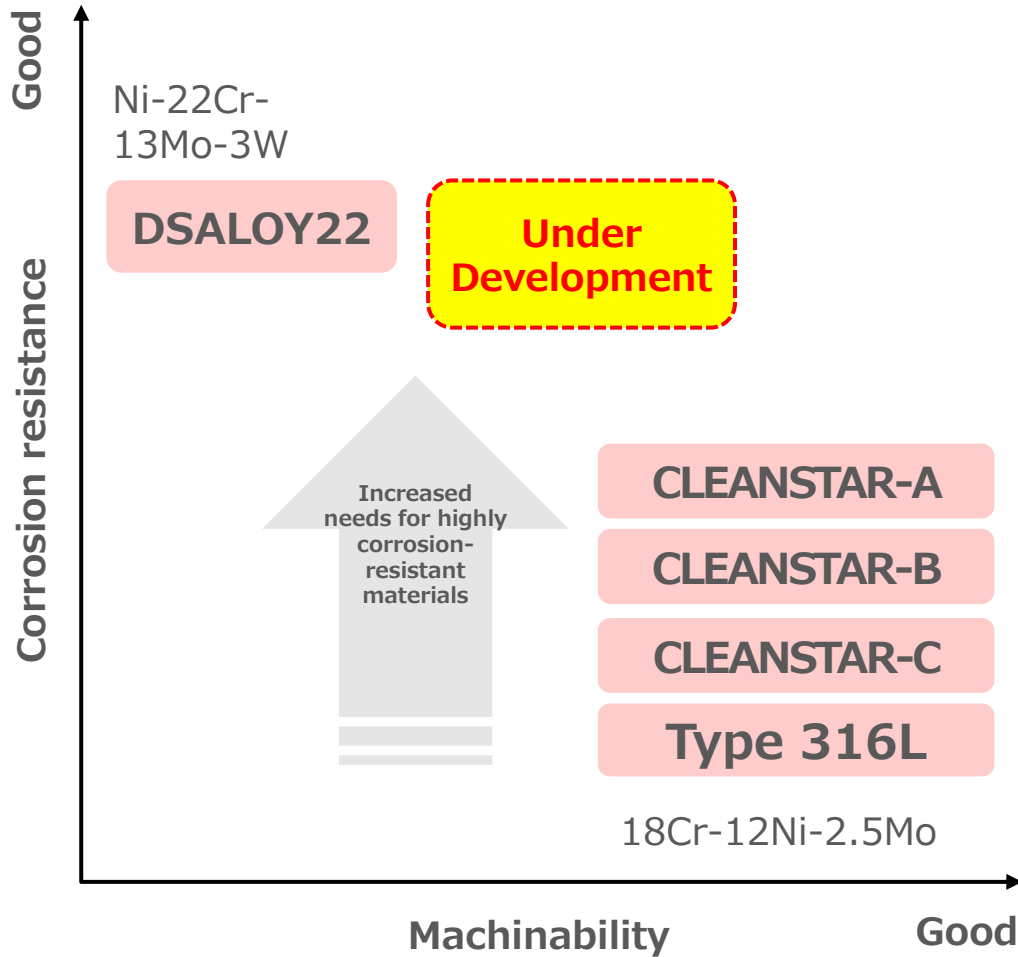


With the frequent use of highly corrosive gases, demand for higher corrosion resistance material would increase to replace Type 316L.
 ⇒ Installed the gas corrosion testing machine
 ⇒ Consider developing a new material with high corrosion resistance & low cost

* FinFET: Fin Field-Effect Transistor, GAA: Gate-All-Around Transistor
 3D NAND: 3D NAND flash memory

8-2. Our Development & Evaluation Technology

➤ Development of new steel grades for corrosive gas environments



Where corrosion resistance is needed

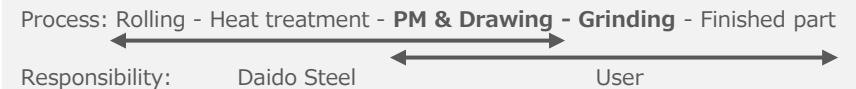
Product group	Present situation
DSALOY22 (equivalent to Hastelloy® C22®)	<ul style="list-style-type: none"> For applications that require even higher corrosion resistance than CLEANSTAR provides, with highly corrosive gases and high temp environments. Currently developing a new material to meet the demand for highly corrosion-resistant materials with improved machinability
CLEANSTAR Type 316L	<ul style="list-style-type: none"> CLEANSTAR-A, -B, and -C, according to the type of gas involved and the environment in which it is used.

* Hastelloy and C22 are registered trademarks of Haynes International Inc.

Where improved **machinability** is needed

Process	Explanation
PM	<ul style="list-style-type: none"> To peel steel bar's surface to adjust its dimensions and smooth its surface.
Drawing	<ul style="list-style-type: none"> To stretch steel coil at room temperature to adjust diameter dimensions
Machining	<ul style="list-style-type: none"> To grind off material outside the boundaries of the shape to create the shapes of parts

<Reference> Typical manufacturing processes for making parts



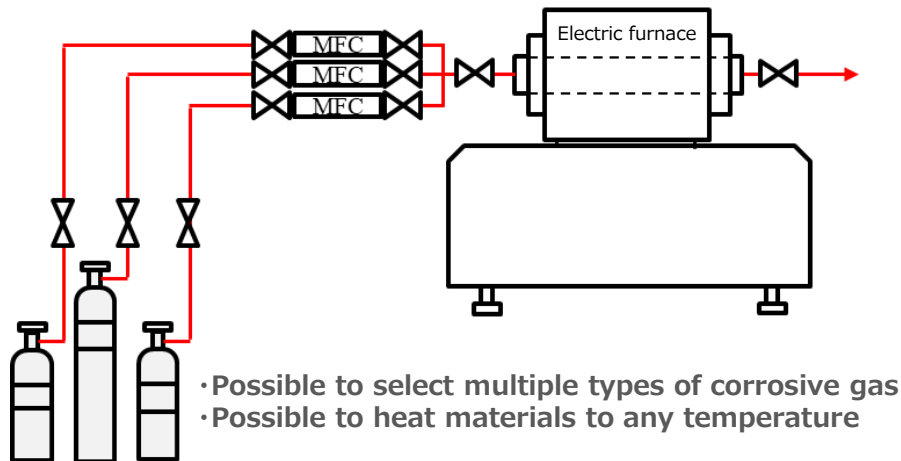
8-2. Our Development & Evaluation Technology

➤ High-temperature gas corrosion testing equipment is currently being evaluated.

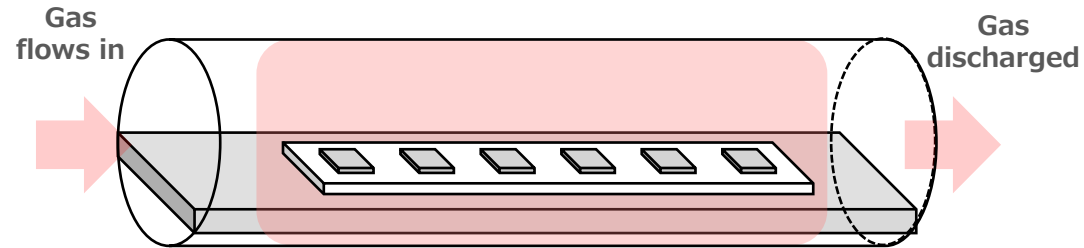
This equipment is used to replicate the operating environment in which steel materials are used during etching and thin film deposition. It makes it possible to evaluate corrosion resistance in situations that closely resemble those of actual manufacturing practice.

Equipment overview

High-temperature gas corrosion test laboratory



Inside electric furnace



<Reference> Differences in corrosion resistance by material (test specimen appearance) Corrosive gas: HF

Material A Material B Material C Material D Material E

Before testing



After testing



9. Our Capital Investments for Expanding Manufacturing Capacity

Shibukawa Plant

4 VIM and 11 VAR furnaces



Port of Nagoya area map

Hoshizaki Plant
Rolling plant for stainless steel, superalloy steel and difficult-to-process bar and wire products



Chita Plant

4 EAFs



Chita Second Plant
During FY2025
4 VAR furnaces being installed
(2 VAR furnaces for titanium are under construction)

Chita Second Plant (“Smart” factory)

- **Reallocation of production resources**
Stainless steel production equipment for SPE application being installed at the Chita Second Plant. Secondary melting and subsequent processes integrated in the Nagoya area.
- **Capacity expansion for high-performance materials**
stainless steel for semiconductor production equipment and superalloy steel
A total of four VARs will be installed at the Chita Second Plant, adjacent to the Chita Plant. The 1st VAR furnace started in December 2024 and the 2nd will start in March 2025. The remaining two furnaces are scheduled to start operating by the end of FY2025.

Chita Second Plant and Chita Plant



High-temperature gas corrosion test laboratory (under test operation)



VAR (started operating in Dec. 2024.)



Heat treatment and machining equipment (fully operating)

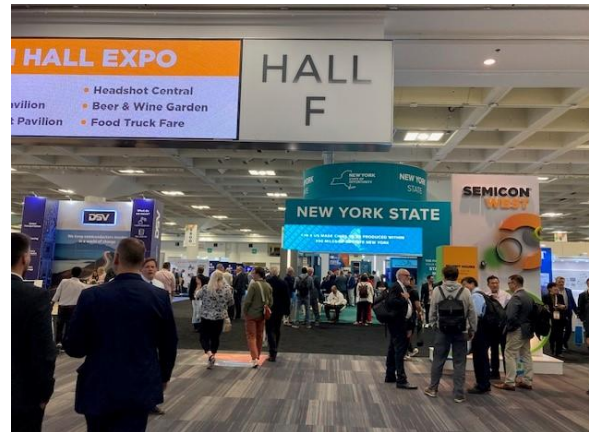


10. Overseas Marketing Activities

➤ Main activities for overseas markets

1. Our exhibition at SEMICON WEST (from 2018 to 2024)

- Exhibition booth at SEMICON WEST in North America



SEMICON WEST exhibition:

- 2018: 1st Exhibition
- 2019: 2nd Exhibition
- 2020: Virtual exhibition due to COVID-19
- 2021: HYBRID exhibition (virtual)
- 2022: HYBRID exhibition (on-site)
- 2023: 6th Exhibition
- 2024: 7th Exhibition

2. PR activities by Daido Steel's overseas group networks

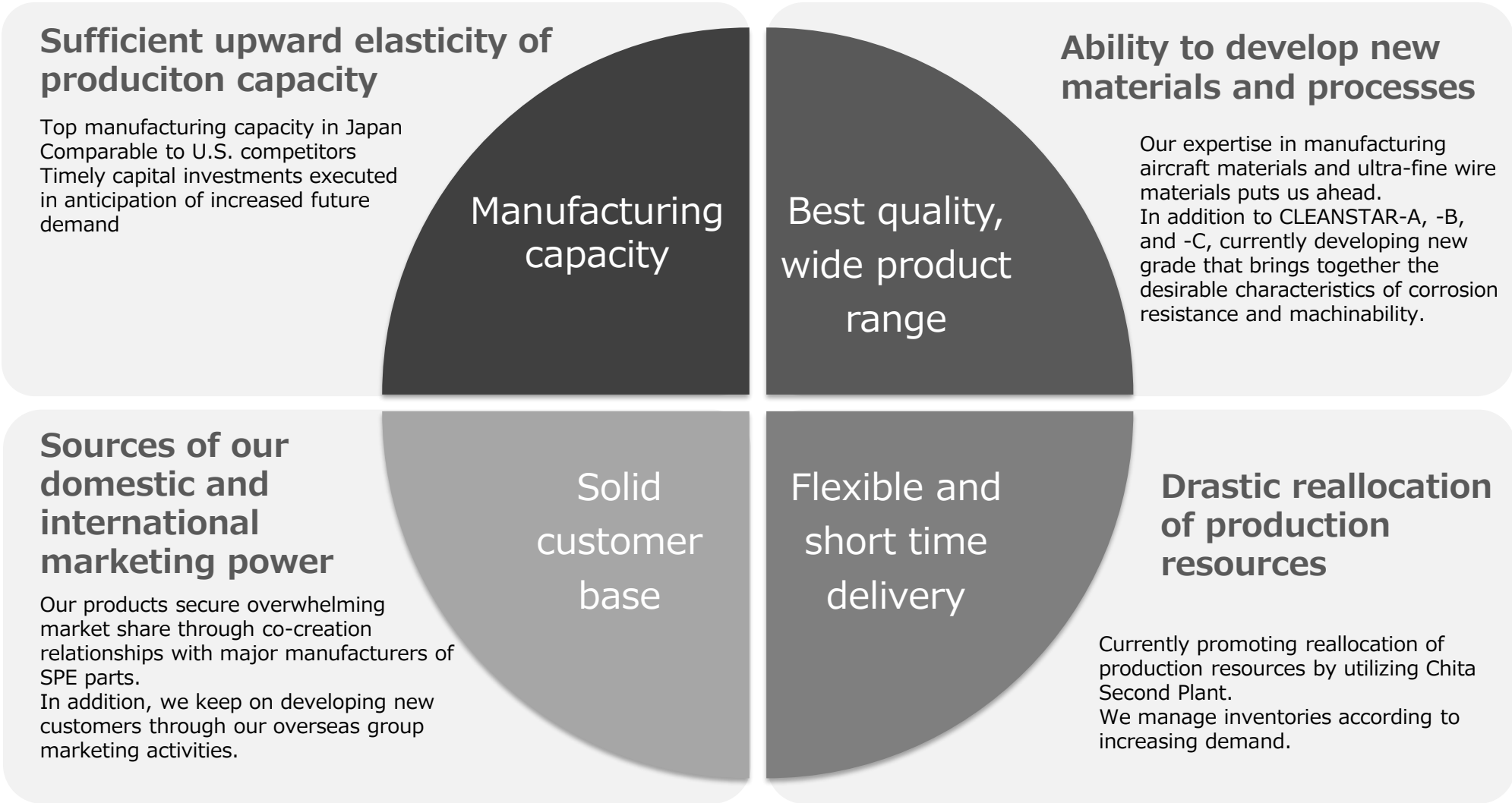
North America: Activities to meet the needs of the North American market, such as exhibiting products at SEMICON and bringing CLEANSTAR products into compliance with SEMI standards

Aggressive development of new customers through Daido Steel (America) Inc.

China: PR promotion to the world's largest semiconductor market, by utilizing sales networks such as Daido Steel (Shanghai) Co., Ltd.

Europe: Daido Steel Group Europe (Germany) conducted a survey of the European semiconductor market

11. Daido Steel's Strength for Semiconductor Production Equipment

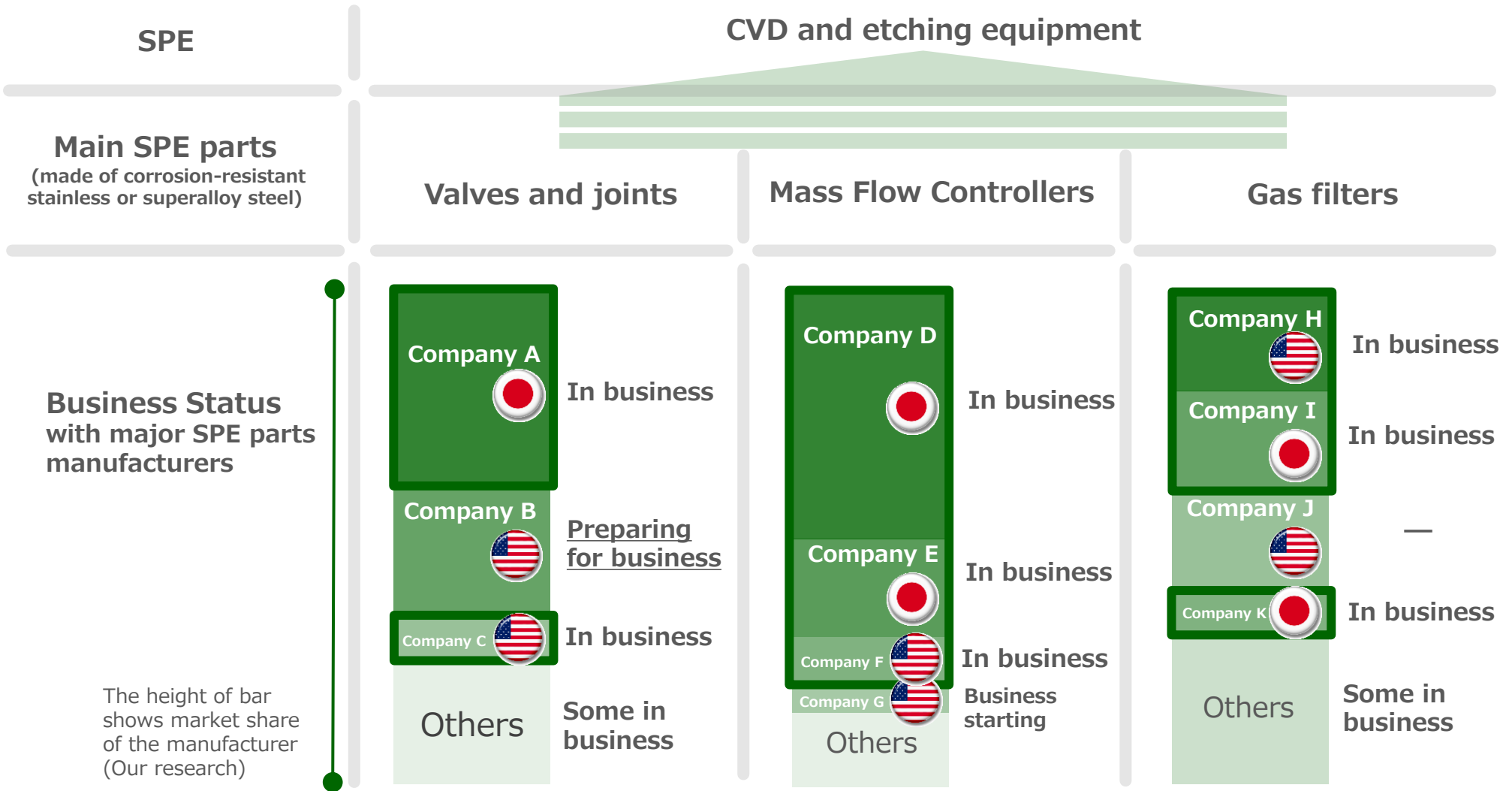


* SPE: semiconductor production equipment

12. Our Business Status with Major SPE Parts Manufacturers

Global market shares of our high-performance stainless steel bars and wire rods

Current: **40%** ➔ FY2026: **50%**



END