Financial Review 2018

For the year ended December 31, 2018

CONTENTS

CONSOLIDATED ELEVEN-YEAR SUMMARY

AGC Inc. and Consolidated Subsidiaries
For the years ended December 31

(Unit: Millions of yen)

	Note	2018/12 IFRS	2017/12 IFRS	2016/12 IFRS	2015/12 IFRS	2014/12 IFRS
Operating Results						
Net sales		**¥1,522,904**	¥1,463,532	¥1,282,570	¥1,326,293	¥1,348,308
Operating profit		**120,555**	119,646	96,292	71,172	62,131
Profit before tax		**128,404**	114,424	67,563	84,522	41,163
Profit for the year attributable to owners of the parent	3	**89,593**	69,225	47,438	42,906	15,913
Segment Information	4					
Sales to external customers						
Glass Operations		**¥ 756,160**	¥ 733,953	¥ 679,071	¥ 691,411	¥ 684,607
Electronics Operations		**250,285**	260,626	257,069	286,858	317,378
Chemicals Operations		**482,097**	435,145	314,392	315,636	314,694
Ceramics/Other Operations		**34,361**	33,807	32,037	32,388	31,628
Financial Position						
Total assets		**¥2,235,776**	¥2,228,560	¥1,981,451	¥1,991,262	¥2,077,338
Total current assets		**733,196**	722,522	673,436	637,546	627,178
Property, plant and equipment		**1,108,934**	1,060,601	937,869	982,296	1,066,193
Total current liabilities		**463,098**	455,288	377,490	346,157	355,999
Total equity/Total net assets		**1,253,604**	1,289,895	1,168,743	1,163,767	1,180,490
Total shareholders' equity		**—**	—	—	—	—
Non-controlling interests in consolidated subsidiaries		**116,399**	105,860	73,305	69,594	67,364
Per Share Data (Yen)						
Basic — EPS	5	**¥ 399.51**	¥ 302.12	¥ 205.14	¥ 37.12	¥ 13.77
Diluted — EPS	6	**397.58**	300.65	204.26	36.97	13.58
Cash dividends		**115.00**	(Note 7)	18.00	18.00	18.00
Equity/Net assets	8	**5,141.43**	5,239.70	4,736.59	946.48	963.04
Other Data						
Return on equity (ROE)	9	**7.7%**	6.1%	4.3%	3.9%	1.4%
Interest-bearing debt	10	**¥ 541,780**	¥ 489,085	¥ 433,968	¥ 468,733	¥ 499,257
Depreciation and amortization		**121,668**	128,226	121,803	137,381	137,199
Capital expenditures		**230,598**	165,095	126,025	125,103	118,169
Research and development expenses		**45,755**	43,912	39,212	38,927	44,758
Number of shares issued and outstanding (Thousands of shares)	11	**227,441**	235,177	1,186,705	1,186,705	1,186,705
Number of employees		**54,101**	53,224	50,963	50,852	51,114

Notes:
1. The Company maintains its accounting records in Japanese yen. The U.S. dollar amounts included in this consolidated eleven-year summary represent the arithmetical results of translating Japanese yen to U.S. dollars on the basis of ¥111=US$1, the approximate exchange rate as of December 31, 2018. The inclusion of such U.S. dollar amounts is solely for convenience and is not intended to imply that Japanese yen amounts have been or could be converted, realized or settled in U.S. dollars at ¥111=US$1 or at any other rate.
2. The Company has prepared consolidated financial statements in accordance with International Financial Reporting Standards ("IFRS") from the fiscal year ended December 31, 2013 instead of Japanese Generally Accepted Accounting Principles ("JGAAP"). The date of transition to IFRS was January 1, 2012.
3. (IFRS): Under IFRS, profit for the year is presented before deducting non-controlling interests. For comparison, the Company shows profit for the year attributable to owners of the parent.
4. Beginning from fiscal year 2011, the Company adopted the "Accounting Standard for Disclosures about Segments of an Enterprise and Related Information" (ASBJ Statement No. 17, March 27, 2009) and the "Guidance on the Accounting Standard for Disclosures about Segments of an Enterprise and Related Information" (ASBJ Guidance No. 20, March 21, 2008) and restated the amount of the previous year.
5. (IFRS): Based on profit for the year attributable to owners of the parent. Effective July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Basic earnings per share is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the preceding fiscal year.

(Unit: Millions of yen)								(Unit: Thousands of U.S. dollars)
2013/12	2012/12	2013/12	2012/12	2011/12	2010/12	2009/12	2008/12	**2018/12**
IFRS	IFRS	JGAAP	JGAAP	JGAAP	JGAAP	JGAAP	JGAAP	IFRS
¥1,320,006	¥1,189,952	¥1,320,006	¥1,189,956	¥1,214,672	¥1,288,947	¥1,148,198	¥1,444,317	**$13,719,856**
79,894	101,751	70,725	92,945	165,663	229,205	86,682	154,013	**1,086,081**
44,381	74,998	36,653	68,970	143,359	192,158	40,499	70,078	**1,156,793**
16,139	48,433	10,333	43,790	95,290	123,184	19,985	39,178	**807,144**
¥ 664,239	¥ 562,140	¥ —	¥ 562,140	¥ 553,339	¥ 555,999	¥ 522,143	¥ 738,082	**$ 6,812,252**
334,710	341,407	—	341,412	385,041	445,917	368,559	370,576	**2,254,820**
287,960	254,086	—	254,086	245,056	256,654	230,932	299,874	**4,343,216**
33,096	32,316	—	32,316	31,235	30,376	26,562	35,783	**309,559**
¥2,120,629	¥1,916,394	¥2,119,664	¥1,899,373	¥1,691,556	¥1,764,038	¥1,781,875	¥1,832,846	**$20,142,126**
682,179	638,873	695,240	651,248	606,774	626,916	558,509	592,704	**6,605,369**
1,059,946	956,806	1,060,777	957,661	842,563	861,395	928,285	958,588	**9,990,396**
448,018	368,852	457,928	372,816	419,410	402,237	335,583	631,524	**4,172,054**
1,145,145	960,747	1,151,870	996,949	850,460	849,815	808,312	780,864	**11,293,730**
—	—	—	—	—	—	—	—	**—**
57,929	52,443	58,295	53,243	41,444	40,296	52,436	49,815	**1,048,640**
¥ 13.97	¥ 41.90	¥ 8.94	¥ 37.88	¥ 81.90	¥ 105.52	¥ 17.12	¥ 33.53	**$ 3.60**
13.73	39.45	8.58	35.12	75.88	97.84	17.04	33.52	**3.58**
18.00	26.00	18.00	26.00	26.00	26.00	16.00	24.00	**1.04**
940.69	786.01	944.47	815.04	698.51	692.59	646.53	625.51	**46.32**
1.6%	5.8%	1.0%	5.0%	11.8%	15.8%	2.7%	4.7%	**7.7%**
¥ 575,014	¥ 538,600	¥ —	¥ 540,846	¥ 483,297	¥ 508,509	¥ 600,678	¥ 597,612	**$ 4,880,901**
135,751	117,856	—	117,856	110,056	109,966	136,672	135,317	**1,096,108**
138,480	155,329	—	155,334	152,705	117,439	124,937	252,147	**2,077,459**
46,882	47,074	—	48,360	46,442	39,399	44,958	37,700	**412,207**
1,186,705	1,186,705	—	1,186,705	1,186,705	1,186,705	1,186,705	1,186,705	**227,441**
51,448	49,961	—	49,961	50,957	50,399	47,618	47,770	**54,101**

6. (IFRS): Based on profit for the year attributable to owners of the parent. Effective July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Diluted earnings per share is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the preceding fiscal year.
7. Effective July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. For fiscal year 2017, the interim dividends per share were 10 yen which is before taking into account the consolidation of shares, and the scheduled year-end dividends per share are 55 yen which is after taking into account the consolidation of shares.
8. (IFRS): Based on equity attributable to owners of the parent. Effective July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Equity attributable to owners of the parent per share is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the preceding fiscal year.
9. (IFRS): Return on equity attributable to owners of the parent.
10. Interest-bearing debt comprises short-term bank loans, long-term bank loans due within one year, commercial paper, bonds, long-term bank loans, and lease obligations.
11. Effective July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares issued and outstanding is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the current fiscal year.

The discussion and analysis herein of sales and operating profit are based on reportable segment information. Sales for reportable segments include all inter-segment transactions.

Scope of Consolidation

Number of consolidated subsidiaries: 213
Major subsidiaries:
AGC Techno Glass Co., Ltd., Ise Chemicals Corporation, AGC Glass Europe S.A. and AGC Flat Glass North America, Inc.

Currency Fluctuations

The Japanese yen strengthened against the U.S. dollar and the euro during fiscal year 2018. The year-end yen-U.S. dollar rate was ¥111.0=US$1.00, compared with ¥113.0=US$1.00 in fiscal year 2017, and the year-end yen-euro rate was ¥127.0=€1.00, compared with ¥134.9=€1.00 in the previous fiscal year.

Overview of the Period Ended December 31, 2018

■ Overview

In fiscal year 2018, the global economy surrounding the AGC Group maintained a moderate recovery, but the impact of trade and other problems became apparent around the end of the fiscal year. In Japan, the economy continued a trend of moderate recovery thanks to factors such as the government's economic policies, and the United States also continued its economic recovery along with increased consumer spending and other factors. Countries such as Russia and Brazil maintained a trend of recovery. On the other hand, the growth rate in Europe was slow in the second half of the fiscal year, and consumer spending of China showed a negative sign.

Under such a business environment, due to an increased volume of shipments in each business section as well as consolidation of companies acquired in the first quarter of 2017, the AGC Group posted net sales of ¥1,522.9 billion, up ¥59.4 billion, or a 4.1% increase, from the previous fiscal year. Operating profit increased by ¥0.9 billion, or a 0.8% increase, year-on-year to ¥120.6 billion due to the increase in raw material and fuel prices and other factors. Profit before tax was ¥128.4 billion, up ¥14.0 billion, or a 12.2% increase, year-on-year, mainly due to an improvement in other income and expenses. Profit for the year attributable to owners of the parent was ¥89.6 billion, up ¥20.4 billion, or a 29.4% increase mainly due to the decrease in income tax expenses from the previous fiscal year.

■ Consolidated Net Sales

Consolidated net sales were ¥1,522.9 billion in fiscal year 2018.

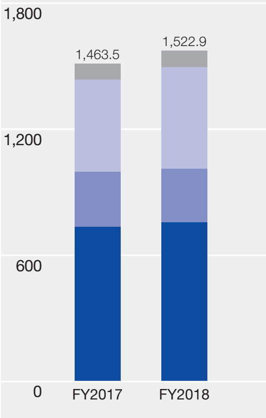
By reportable segment, the Glass Operations recorded sales of ¥757.5 billion in the year under review. In the flat glass business, sales of architectural glass increased year-on-year, mainly because shipments of architectural glass remained favorable in Europe and the impact of appreciation in the value of the euro, even though all shares in AGC Flat Glass Philippines, Inc. were transferred and it was removed from the scope of consolidation and shipments declined in Japan and Asia. In the automotive glass business, the AGC Group's shipments increased in Japan, Asia, and Europe and the euro appreciated in value. Consequently, sales increased from the previous fiscal year.

Sales in the Electronics Operations were ¥252.6 billion. Shipments of LCD glass substrate increased slightly, and the range of decline in selling prices shrunk. Shipments of specialty glass for display applications increased from the previous fiscal year. Shipments of cover glass for car-mounted displays increased from the previous fiscal year. For electronic materials, shipments of optoelectronic materials decreased from the previous fiscal year, but shipments of semiconductor-related products increased.

Sales in the Chemicals Operations were ¥484.4 billion. Sales of chlor-alkali products and urethane products increased from the previous fiscal year mainly because of the increase in selling prices for caustic soda in Japan and Southeast Asia and the consolidation of Vinythai Public Company Limited in March 2017. In the categories of fluorine products and specialty products, sales increased from the previous fiscal year because shipments of fluorine products, including fluorine resin for use in semiconductor-related products, remained firm. In the life science category, sales increased from the previous fiscal year due to consolidation of CMC Biologics (now AGC Biologics) in February 2017 and an increase in shipments.

Sales by Reportable Segment

(Billions of yen)



Sales by Reportable Segment

(Unit: Millions of yen)

	FY2017	FY2018
Glass Operations	¥ 735,119	**¥ 757,457**
Electronics Operations	262,391	**252,646**
Chemicals Operations	437,605	**484,350**
Ceramics/Other Operations	75,415	**79,030**
Corporate or Elimination	(46,998)	**(50,581)**
Net sales	¥1,463,532	**¥1,522,904**

■ Profit and Expenses

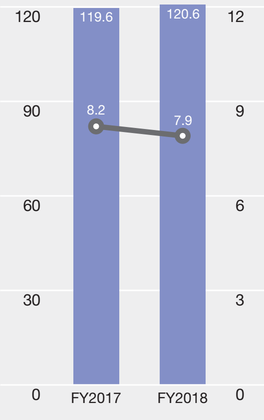
Cost of sales increased by ¥42.5 billion or 4.0% to ¥1,103.1 billion from the previous fiscal year. The cost-to-sales ratio stood at 72.4%.

Cost of Sales and SG&A Expenses

(Unit: Millions of yen)

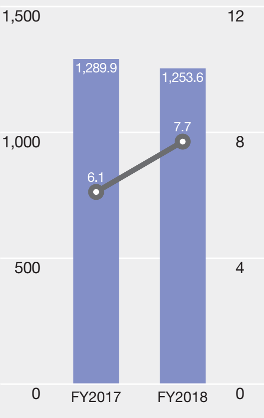
	FY2017	FY2018
Cost of sales	¥1,060,587	**¥1,103,106**
Cost-to-sales ratio	72.5%	**72.4%**
Gross profit	402,945	**419,797**
SG&A expenses	285,051	**300,706**
SG&A expenses as a percentage of net sales	19.5%	**19.7%**

Operating Profit and Operating Margin
(Billions of yen/%)



Operating Profit (left scale)
Operating Margin (right scale)

Total Equity and ROE
(Billions of yen/%)



Total Equity (left scale)
ROE (right scale)

Operating profit, the net result of gross profit minus selling, general and administrative (SG&A) expenses and share of profit (loss) of associates and joint ventures accounted for using equity method, was ¥120.6 billion, up ¥0.9 billion or 0.8% year-on-year. The operating margin decreased from 8.2% to 7.9%.

Other expenses were ¥13.2 billion, compared with ¥12.7 billion in fiscal year 2017.

Losses on disposal of non-current assets of ¥5.3 billion and expenses for restructuring programs of ¥3.6 billion were recorded.

In addition, the AGC Group recorded a foreign exchange gain, net of ¥4.9 billion, compared to a ¥1.0 billion foreign exchange loss in the previous fiscal year.

Profit before tax was ¥128.4 billion, up ¥14.0 billion, or a 12.2% increase, year-on-year, mainly due to an improvement in other income and expenses.

Consequently, profit for the year attributable to owners of the parent was ¥89.6 billion, up ¥20.4 billion or a 29.4% increase from ¥69.2 billion in the previous fiscal year. Basic earnings per share increased by 32.2% year on year from ¥302.12 to ¥399.51. ROE increased by 1.6 percentage points to 7.7%.

Profit

(Unit: Millions of yen)

	FY2017	**FY2018**
Operating profit	¥119,646	**¥120,555**
Operating margin	8.2%	**7.9%**
Profit before tax	114,424	**128,404**
Profit for the year attributable to owners of the parent	69,225	**89,593**
Percentage of net sales	4.7%	**5.9%**
Per share data (Yen)		
—Net income—basic	302.12	**399.51**
—Net income—diluted	300.65	**397.58**
Return on equity (ROE)	6.1%	**7.7%**

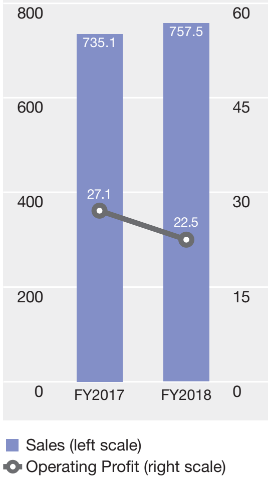
Performance by Reportable Segment

■ Glass Operations

Sales of architectural glass increased year-on-year, mainly because shipments of architectural glass remained favorable in Europe and the impact of appreciation in the value of the euro, even though all shares in AGC Flat Glass Philippines, Inc. were transferred and it was removed from the scope of consolidation and shipments declined in Japan and Asia. In the automotive glass business, the AGC Group's shipments increased in Japan, Asia, and Europe and the euro appreciated in value. Consequently, sales increased from the previous fiscal year.

As a result, net sales from the Glass Operations for the fiscal year were ¥757.5 billion, up ¥22.3 billion, or a 3.0% increase from the previous fiscal year. However, operating profit was ¥22.5 billion, down ¥4.5 billion, or a 16.8% decrease mainly due to the increase in raw material and fuel prices and logistic costs.

Sales and Operating Profit of Glass Operations
(Billions of yen)

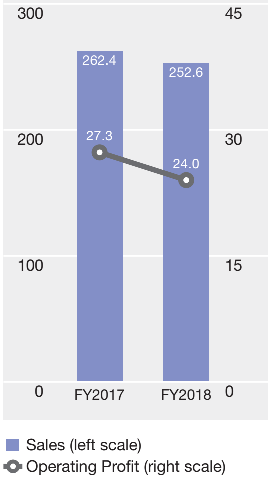


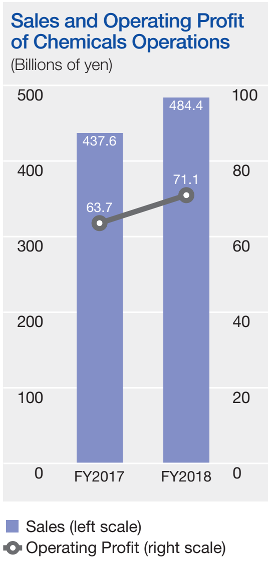
■ Electronics Operations

Shipments of LCD glass substrate increased slightly, and the range of decline in selling prices shrunk. Shipments of specialty glass for display applications increased from the previous fiscal year. Shipments of cover glass for car-mounted displays increased from the previous fiscal year. For electronic materials, shipments of optoelectronic materials decreased from the previous fiscal year, but shipments of semiconductor-related products increased.

As a result, net sales from the Electronics Operations for the fiscal year were ¥252.6 billion, down ¥9.7 billion, or a 3.7% decrease, from the previous fiscal year, and operating profit was ¥24.0 billion, down ¥3.3 billion, or a 12.0% decrease from the previous fiscal year.

Sales and Operating Profit of Electronics Operations
(Billions of yen)





Chemicals Operations

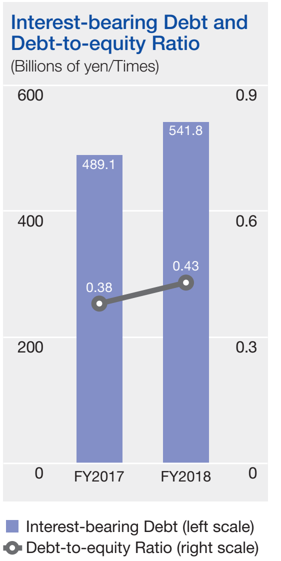
Sales of chlor-alkali products and urethane products increased from the previous fiscal year mainly because of the increase in selling prices for caustic soda in Japan and Southeast Asia and the consolidation of Vinythai Public Company Limited in March 2017. In the categories of fluorine products and specialty products, sales increased from the previous fiscal year because shipments of fluorine products, including fluorine resin for use in semiconductor-related products, remained firm. In the life science category, sales increased from the previous fiscal year due to consolidation of CMC Biologics (now AGC Biologics) in February 2017 and an increase in shipments.

As a result, net sales from the Chemicals Operations for the fiscal year were ¥484.4 billion, up ¥46.7 billion or a 10.7% increase from the previous fiscal year. Operating profit was ¥71.1 billion, up ¥7.5 billion, or a 11.7% increase from the previous fiscal year.

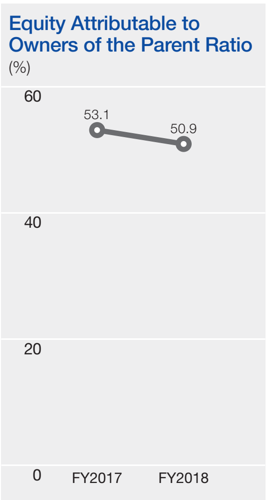
Sales and Operating Profit by Reportable Segment

(Unit: Millions of yen)

	FY2017	**FY2018**
Glass Operations		
Sales	¥735,119	**¥757,457**
Operating profit	27,064	**22,522**
Operating margin	3.7%	**3.0%**
Electronics Operations		
Sales	262,391	**252,646**
Operating profit	27,334	**24,041**
Operating margin	10.4%	**9.5%**
Chemicals Operations		
Sales	437,605	**484,350**
Operating profit	63,671	**71,138**
Operating margin	14.6%	**14.7%**



* Debt-to-equity Ratio = Interest-bearing Debt/Total Equity



Assets, Liabilities and Equity

We continue to adhere to a policy of maintaining appropriate liquidity, securing the funds necessary to conduct our operations and ensuring the soundness of our balance sheet. With the aim of facilitating the stable procurement of long-term funds, we have obtained an A– rating from Standard & Poor's, an A2 rating from Moody's Investors Service and an AA– rating from Rating and Investment Information, Inc.

Total assets as of the end of the fiscal year under review were ¥2,235.8 billion, up ¥7.2 billion and remained at the same level as the end of the previous fiscal year.

Total liabilities as of the end of the fiscal year under review were ¥982.2 billion, up ¥43.5 billion from the end of the previous fiscal year. This increase was mainly due to an increase in interest-bearing debt.

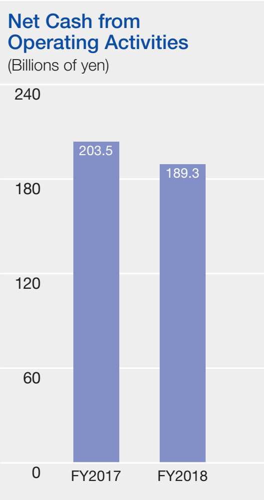
Total equity as of the end of the fiscal year under review was ¥1,253.6 billion, down ¥36.3 billion from the end of the previous fiscal year. This decrease was mainly due to a decrease in exchange differences on translation of foreign operations affected by the appreciation of the yen compared to the end of the previous fiscal year.

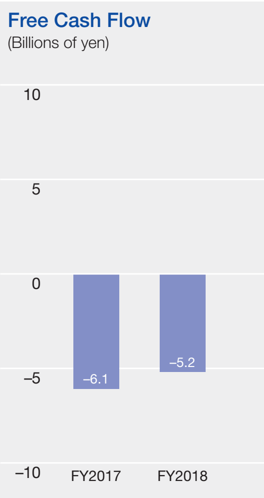
As a consequence of the above, the equity attributable to owners of the parent ratio for fiscal year 2018 decreased by 2.3 percentage points from 53.1% to 50.9%. Equity attributable to owners of the parent per share decreased from the previous fiscal year to ¥5,141.43.

Summary of Assets, Liabilities and Equity

(Unit: Millions of yen)

	FY2017	FY2018
Total assets	¥2,228,560	**¥2,235,776**
Total current assets	722,522	**733,196**
Inventories	261,708	**277,014**
Property, plant and equipment	1,060,601	**1,108,934**
Total current liabilities	455,288	**463,098**
Interest-bearing debt	489,085	**541,780**
Total equity	1,289,895	**1,253,604**
Equity attributable to owners of the parent ratio	53.1%	**50.9%**
Equity attributable to owners of the parent per share (Yen)	5,239.70	**5,141.43**
Debt-to-equity ratio (Times)	0.38	**0.43**





Cash Flows

The free cash flow for the fiscal year under review, which is the sum of cash flows from operating activities and investing activities, was ¥(5.2) billion (¥(6.1) billion in the previous year) mainly due to an increase in capital investment. Cash and cash equivalents as of the end of the period (net cash) decreased ¥2.9 billion or 2.3% from the end of the previous year to ¥123.5 billion mainly due to payment of dividends and acquisition of treasury shares in financing activities.

■ Cash Flows from Operating Activities

Net cash from operating activities for the fiscal year under review was ¥189.3 billion, down ¥14.2 billion or 7.0% from the previous year.

■ Cash Flows from Investing Activities

Net cash from investing activities for the fiscal year under review was ¥194.5 billion, down ¥15.1 billion or 7.2% from the previous year. This decrease was mainly due to purchase of property, plant and equipment and intangible assets and purchase of subsidiaries.

■ Cash Flows from Financing Activities

Net cash from financing activities for the fiscal year under review was ¥8.7 billion (expenditure of ¥18.7 billion in the previous year). This increase was mainly due to proceeds from borrowing or issuing long-term interest-bearing debt, in spite of dividends paid and acquisition of treasury shares.

Summary of Cash Flow Statements

(Unit: Millions of yen)

	FY2017	**FY2018**
Net cash from operating activities	¥ 203,504	**¥ 189,287**
Profit before tax	114,424	**128,404**
Depreciation and amortization	128,226	**121,668**
Net cash from investing activities	(209,560)	**(194,450)**
Purchase of property, plant and equipment and intangible assets	(157,227)	**(211,370)**
Free cash flow	(6,055)	**(5,162)**
Net cash from financing activities	(18,720)	**8,657**
Effect of exchange rate changes on cash and cash equivalents	3,868	**(6,407)**
Net increase (decrease) in cash and cash equivalents	(20,907)	**(2,913)**
Cash and cash equivalents at beginning of year	147,325	**126,417**
Cash and cash equivalents at end of year	126,417	**123,503**

Business Risks

Set out below are risks associated with the AGC Group's operations and other risks that may materially influence the decisions of investors to invest in the AGC Group. However, this section does not include all possible risks relating to the AGC Group; there may exist additional risks not stated below. Any such risks are also likely to influence investors' decisions.

Forward-looking statements in this section are based on information available as of March 28, 2019.

(1) Economic conditions in markets in which the AGC Group's products are sold

Demand for the AGC Group's products is impacted by trends in industries such as construction and building materials, automobiles, electronics, displays, and chemicals. The AGC Group's products are supplied throughout the world, for example in Asia, the United States and Europe, as well as in Japan, and sales are therefore influenced by local economic conditions. Although the AGC Group is working hard to build an earnings structure that is resilient to changes in the business environment by improving productivity and reducing fixed and variable costs, its performance and financial position are susceptible to declining demand from the industries mentioned as well as economic downturns in the regions where its products are primarily sold.

(2) Expansion of overseas operations

The AGC Group has substantial overseas operations, including exports of products and manufacturing abroad. The risks associated with operating abroad include deteriorating political and economic conditions, the imposition of regulations on imports and foreign investments, unexpected changes in laws, the worsening of public security, economic sanctions between countries, and the occurrence of terrorist attacks and war. These events may hinder the AGC Group's overseas operations and have a serious effect on its performance and financial position.

(3) Competitive edge and development and commercialization of new technologies and products

In every field in which the AGC Group operates, there are competitors supplying products similar to those of the AGC Group. Accordingly, to maintain its competitive edge, the AGC Group is striving to identify the needs of customers, and to develop and commercialize new technologies and products. However, should the AGC Group fail to appropriately respond to technical changes and customer needs or take too long to develop and commercialize new technologies and products, growth could be hampered and profitability could decline. This may significantly impact the AGC Group's performance and financial position.

(4) Procurement of production materials and resources

Because the AGC Group partially uses special materials of which suppliers are limited, if supply tightens or is delayed, the AGC Group's performance and financial position may be greatly affected.

(5) Government regulations

In the countries and regions where it operates, the AGC Group is subject to the local government approval and authorization of investments, regulations on exports and imports, and laws governing commercial transactions, labor, patents, taxation, foreign exchange, and other issues. Consequently, amendments to these regulations and laws may significantly influence the AGC Group's performance and financial position.

(6) Environmental regulations

The AGC Group conducts glass and chemicals operations that use large quantities of resources and energy. Accordingly, we have defined "Environment" as one of Our Shared Values in the AGC Group Vision. While complying with various laws and regulations related to the environment, the AGC Group conducts activities to reduce its environmental impact, such as cutting greenhouse gas emissions and minimizing the amount of industrial waste sent to landfills.

However, in light of the growing seriousness of environmental issues such as mitigation and adaptation to climate change, sustainable use of resources, prevention of pollution, proper management of chemical substances and water risks, the Group faces the possibility of heightened environmental regulation, including the emergence of new laws and regulations and greater corporate social responsibilities. As a result of these factors, the Group may have to bear higher costs needed to comply with laws and achieve environmental regulatory measures, scale down production, and reduce production efficiency. Consequently, the AGC Group's performance and financial position may be significantly impacted.

(7) Product liability

The AGC Group is making every effort to ensure that products are of the highest quality, according to their individual characteristics. Despite these efforts, the possibility remains that quality problems may occur because of unanticipated factors, prompting a major recall, for example. This could substantially influence the AGC Group's performance and financial position.

(8) Intellectual property rights

The AGC Group endeavors to acquire intellectual property rights that are useful for its present business activities and future operations alike, while investigating the rights and business conditions of third parties, in order to prevent intellectual property issues from arising. However, there is the possibility that the AGC Group will have disputes with third parties over intellectual property or that third parties will infringe the AGC Group's intellectual property rights. This has the potential to materially influence the AGC Group's performance and financial position.

(9) Litigation and legal procedures

There is always a risk that other firms, corporate groups, or individuals may take legal actions against the AGC Group with respect to its operations at home and abroad. As of March 28, 2019, there were some lawsuits and legal proceedings pending. If these lawsuits and proceedings result in an unfavorable outcome for the AGC Group, its performance and financial position may be significantly impacted.

(10) Effect of natural disasters and accidents

The AGC Group endeavors to prevent occupational accidents and other accidents involving equipment and facilities, such as production machinery, through the establishment and operation of a systematic management system for occupational safety and health, and for industrial safety and security, along with efforts to promote and ensure machinery safety, and to manage inspections, maintenance and repairs. However, the AGC Group faces the risk of unforeseeable events such as a severe occupational accident, serious fire, explosion or leakage incident.

Regarding preparedness for natural disasters, the AGC Group has assessed risks concerning earthquakes, high winds, flooding and other natural events at its major bases, and has drawn up business continuity plans for bases that are exposed to significant hazards. Despite these efforts, the Group faces the risk of unforeseeable events such as damage to production facilities and the suspension of product shipments due to severed transportation networks, as a result of natural disasters such as major earthquakes, typhoons, and floods.

If production is suspended temporarily or for an extended period at any of the Group's facilities as a result of the occurrence of such unforeseen events, the supply of products to customers may be disrupted given that alternative production is not possible for certain products, and this could have a significant impact on the AGC Group's performance and financial position.

(11) Exchange rate fluctuations

The AGC Group manufactures and sells products worldwide, and converts transaction accounts in local currencies, including sales, costs, and assets, into Japanese yen when preparing its consolidated financial statements. Even if the values of these items remain unchanged in local currency terms, they may change when converted into Japanese yen depending on exchange rates.

The AGC Group also manufactures products at its facilities worldwide, including Japan, and exports the products to a number of countries. The AGC Group generally procures raw materials and sells products in the local currency of each country/region, but there are some product sales and material purchases denominated in foreign currencies. Accordingly, fluctuations in exchange rates influence the prices of materials the AGC Group procures and the pricing for its products, and this impacts the AGC Group's performance and financial position.

(12) Retirement benefit obligations

The AGC Group calculates costs for employee retirement benefits and obligations based on actuarial assumptions of the returns on pension funds and a specific discount rate. If the actuarial assumptions and results diverge substantially because of deterioration in the market environment for pension fund management, future costs for retirement benefits will increase, and this may seriously impact the AGC Group's performance and financial position.

(13) Decline in fixed asset values

If the values of the AGC Group's fixed assets were to decline because of a drop in market values or profitability, the AGC Group's performance and financial position may be substantially impacted.

(14) Information security

Information systems are now playing an extremely important role in the AGC Group's business activities, and the AGC Group strives to protect its information assets, such as systems and data. Nevertheless, if important operations are interrupted or confidential data is leaked and so forth due to a disaster, attack by a hacker or computer virus, unauthorized access, or other unforeseen situation, it may have a significant impact on the AGC Group's performance and financial position.

1 FINANCIAL STATEMENTS (IFRS)

Consolidated Financial Statements (IFRS)

i) Consolidated Statements of Financial Position

(Unit: Millions of yen)

	Note	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
ASSETS			
Current assets			
Cash and cash equivalents	5, 25	¥ 126,417	**¥ 123,503**
Trade receivables	6, 25	260,497	**260,111**
Inventories	7	261,708	**277,014**
Other receivables	6, 25	43,774	**50,836**
Income tax receivables		5,570	**4,531**
Other current assets	25	24,554	**17,199**
Total current assets		722,522	**733,196**
Non-current assets			
Property, plant and equipment	8	1,060,601	**1,108,934**
Goodwill	9	78,757	**89,076**
Intangible assets	9	58,038	**56,645**
Investments accounted for using equity method	10	39,575	**35,245**
Other financial assets	25	234,896	**179,081**
Deferred tax assets	11	23,157	**20,140**
Other non-current assets		11,011	**13,455**
Total non-current assets		1,506,038	**1,502,580**
Total assets		¥2,228,560	**¥2,235,776**

	Note	FY2017 (as of December 31, 2017)	FY2018 (as of December 31, 2018)
		(Unit: Millions of yen)	
LIABILITIES AND EQUITY			
LIABILITIES			
Current liabilities			
Trade payables	12, 25	¥ 159,489	**¥ 156,594**
Short-term interest-bearing debt	13, 25	73,666	**67,281**
Long-term interest-bearing debt due within one year	13, 25	63,629	**71,897**
Other payables	12, 25	127,580	**143,202**
Income tax payables		12,210	**8,775**
Provisions	14	1,893	**929**
Other current liabilities	25	16,819	**14,417**
Total current liabilities		455,288	**463,098**
Non-current liabilities			
Long-term interest-bearing debt	13, 25	351,789	**402,601**
Deferred tax liabilities	11	59,492	**34,989**
Post-employment benefit liabilities	15	50,585	**61,478**
Provisions	14	10,045	**8,049**
Other non-current liabilities	25	11,463	**11,954**
Total non-current liabilities		483,376	**519,074**
Total liabilities		938,665	**982,172**
EQUITY			
Share capital	17	90,873	**90,873**
Capital surplus	17	101,420	**94,368**
Retained earnings	17	735,653	**773,760**
Treasury shares	17	(43,629)	**(28,821)**
Other components of equity	17	299,716	**207,023**
Total equity attributable to owners of the parent		1,184,034	**1,137,204**
Non-controlling interests		105,860	**116,399**
Total equity		1,289,895	**1,253,604**
Total liabilities and equity		¥2,228,560	**¥2,235,776**

ii) Consolidated Statements of Profit or Loss and Consolidated Statements of Comprehensive Income (Consolidated Statements of Profit or Loss)

(Unit: Millions of yen)

	Note	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Net sales	19	¥ 1,463,532	**¥ 1,522,904**
Cost of sales	20	(1,060,587)	**(1,103,106)**
Gross profit		402,945	**419,797**
Selling, general and administrative expenses	20	(285,051)	**(300,706)**
Share of profit (loss) of associates and joint ventures accounted for using equity method	10	1,753	**1,463**
Operating profit		119,646	**120,555**
Other income	20	6,979	**15,174**
Other expenses	20	(12,711)	**(13,230)**
Business profit		113,915	**122,499**
Finance income	22	8,262	**16,050**
Finance costs	22	(7,752)	**(10,145)**
Net finance costs		509	**5,905**
Profit before tax		114,424	**128,404**
Income tax expenses	23	(35,127)	**(26,412)**
Profit for the year		¥ 79,297	**¥ 101,991**
Attributable to owners of the parent		¥ 69,225	**¥ 89,593**
Attributable to non-controlling interests		10,071	**12,398**
Earnings per share			
Basic earnings per share (Yen)	24	¥ 302.12	**¥ 399.51**
Diluted earnings per share (Yen)	24	300.65	**397.58**

(Consolidated Statements of Comprehensive Income)

(Unit: Millions of yen)

	Note	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Profit for the year		¥ 79,297	**¥101,991**
Other comprehensive income			
Components of other comprehensive income that will not be reclassified to profit or loss, net of tax			
Remeasurement of the net defined benefit liability (asset)	18	12,388	**(5,050)**
Net gain (loss) on revaluation of financial assets measured at FVTOCI(Note)	18	17,207	**(25,256)**
Share of other comprehensive income of associates and joint ventures accounted for using equity method	10, 18	(70)	**76**
Total		29,525	**(30,230)**
Components of other comprehensive income that may be reclassified to profit or loss, net of tax			
Net gain (loss) in fair value of cash flow hedges	18	367	**(535)**
Exchange differences on translation of foreign operations	18	36,301	**(55,361)**
Share of other comprehensive income of associates and joint ventures accounted for using equity method	10, 18	(23)	**58**
Total		36,645	**(55,838)**
Other comprehensive income, net of tax		66,170	**(86,068)**
Total comprehensive income for the year		¥145,468	**¥ 15,923**
Attributable to owners of the parent		¥135,090	**¥ 6,629**
Attributable to non-controlling interests		10,377	**9,293**

Note: FVTOCI: Fair Value Through Other Comprehensive Income

iii) Consolidated Statements of Changes in Equity

(Unit: Millions of yen)

FY2017 (Jan. 1 through Dec. 31, 2017)	Note	Equity attributable to owners of the parent					
						Other components of equity	
		Share capital	Capital surplus	Retained earnings	Treasury shares	Remeasurement of net defined benefit liability (asset)	Net gain (loss) on revaluation of financial assets measured at FVTOCI(Note)
Balance as of January 1, 2017		¥90,873	¥101,237	¥690,890	¥(29,259)	¥(45,106)	¥ 95,891
Changes in equity							
Comprehensive income							
Profit for the year		—	—	69,225	—	—	—
Other comprehensive income	18	—	—	—	—	12,626	17,223
Total comprehensive income for the year		—	—	69,225	—	12,626	17,223
Transactions with owners							
Dividends	17	—	—	(21,864)	—	—	—
Acquisition of treasury shares	17	—	—	—	(25,069)	—	—
Disposal of treasury shares	17	—	—	(126)	383	—	—
Cancellation of treasury shares	17	—	—	(10,315)	10,315	—	—
Transfer from other components of equity to retained earnings		—	—	7,843	—	—	(7,843)
Share-based payment transactions	16	—	182	—	—	—	—
Others (business combinations and others)	26	—	—	—	—	—	—
Total transactions with owners		—	182	(24,463)	(14,369)	—	(7,843)
Balance as of December 31, 2017		¥90,873	¥101,420	¥735,653	¥(43,629)	¥(32,480)	¥105,270

Note: FVTOCI: Fair Value Through Other Comprehensive Income

(Unit: Millions of yen)

FY2017 (Jan. 1 through Dec. 31, 2017)	Note	Equity attributable to owners of the parent					
		Other components of equity					
		Net gain (loss) in fair value of cash flow hedges	Exchange differences on translation of foreign operations	Total	Total	Non-controlling interests	Total equity
Balance as of January 1, 2017		¥225	¥190,686	¥241,696	¥1,095,438	¥ 73,305	¥1,168,743
Changes in equity							
Comprehensive income							
Profit for the year		—	—	—	69,225	10,071	79,297
Other comprehensive income	18	323	35,691	65,864	65,864	306	66,170
Total comprehensive income for the year		323	35,691	65,864	135,090	10,377	145,468
Transactions with owners							
Dividends	17	—	—	—	(21,864)	(2,802)	(24,667)
Acquisition of treasury shares	17	—	—	—	(25,069)	—	(25,069)
Disposal of treasury shares	17	—	—	—	256	—	256
Cancellation of treasury shares	17	—	—	—	—	—	—
Transfer from other components of equity to retained earnings		—	—	(7,843)	—	—	—
Share-based payment transactions	16	—	—	—	182	—	182
Others (business combinations and others)	26	—	—	—	—	24,980	24,980
Total transactions with owners		—	—	(7,843)	(46,494)	22,177	(24,316)
Balance as of December 31, 2017		¥548	¥226,377	¥299,716	¥1,184,034	¥105,860	¥1,289,895

(Unit: Millions of yen)

FY2018 (Jan. 1 through Dec. 31, 2018)	Note	Equity attributable to owners of the parent					
						Other components of equity	
		Share capital	Capital surplus	Retained earnings	Treasury shares	Remeasurement of net defined benefit liability (asset)	Net gain (loss) on revaluation of financial assets measured at FVTOCI(Note)
Balance as of January 1, 2018		¥90,873	¥101,420	¥735,653	¥(43,629)	¥(32,480)	¥105,270
Cumulative effect of change in accounting policy	2	—	—	(244)	—	—	—
Restated balance as of January 1, 2018		¥90,873	¥101,420	¥735,408	¥(43,629)	¥(32,480)	¥105,270
Changes in equity							
Comprehensive income							
Profit for the year		—	—	89,593	—	—	—
Other comprehensive income	18	—	—	—	—	(5,287)	(25,252)
Total comprehensive income for the year		—	—	89,593	—	(5,287)	(25,252)
Transactions with owners							
Dividends	17	—	—	(24,858)	—	—	—
Acquisition of treasury shares	17	—	—	—	(21,521)	—	—
Disposal of treasury shares	17	—	—	(91)	308	—	—
Cancellation of treasury shares	17	—	—	(36,021)	36,021	—	—
Changes in ownership interests in subsidiaries that do not result in loss of control		—	159	—	—	—	—
Transfer from other components of equity to retained earnings		—	—	9,729	—	—	(9,729)
Share-based payment transactions	16	—	129	—	—	—	—
Others (business combinations and others)		—	(7,340)	—	—	—	—
Total transactions with owners		—	(7,051)	(51,242)	14,808	—	(9,729)
Balance as of December 31, 2018		¥90,873	¥ 94,368	¥773,760	¥(28,821)	¥(37,767)	¥ 70,288

Note: FVTOCI: Fair Value Through Other Comprehensive Income

(Unit: Millions of yen)

FY2018 (Jan. 1 through Dec. 31, 2018)	Note	Equity attributable to owners of the parent					
		Other components of equity					
		Net gain (loss) in fair value of cash flow hedges	Exchange differences on translation of foreign operations	Total	Total	Non-controlling interests	Total equity
Balance as of January 1, 2018		¥ 548	¥226,377	¥299,716	¥1,184,034	¥105,860	¥1,289,895
Cumulative effect of change in accounting policy	2	—	—	—	(244)	—	(244)
Restated balance as of January 1, 2018		¥ 548	¥226,377	¥299,716	¥1,183,790	¥105,860	¥1,289,650
Changes in equity							
Comprehensive income							
Profit for the year		—	—	—	89,593	12,398	101,991
Other comprehensive income	18	(444)	(51,978)	(82,964)	(82,964)	(3,104)	(86,068)
Total comprehensive income for the year		(444)	(51,978)	(82,964)	6,629	9,293	15,923
Transactions with owners							
Dividends	17	—	—	—	(24,858)	(2,423)	(27,282)
Acquisition of treasury shares	17	—	—	—	(21,521)	—	(21,521)
Disposal of treasury shares	17	—	—	—	216	—	216
Cancellation of treasury shares	17	—	—	—	—	—	—
Changes in ownership interests in subsidiaries that do not result in loss of control		—	—	—	159	(230)	(71)
Transfer from other components of equity to retained earnings		—	—	(9,729)	—	—	—
Share-based payment transactions	16	—	—	—	129	—	129
Others (business combinations and others)		—	—	—	(7,340)	3,900	(3,440)
Total transactions with owners		—	—	(9,729)	(53,215)	1,245	(51,969)
Balance as of December 31, 2018		¥ 103	¥174,399	¥207,023	¥1,137,204	¥116,399	¥1,253,604

iv) Consolidated Statements of Cash Flows

(Unit: Millions of yen)

	Note	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Cash flows from operating activities			
Profit before tax		¥ 114,424	**¥ 128,404**
Depreciation and amortization		128,226	**121,668**
Interest and dividend income		(8,159)	**(11,550)**
Interest expenses		7,228	**9,351**
Share of profit (loss) of associates and joint ventures accounted for using equity method		(1,753)	**(1,463)**
Loss (gain) on sale or disposal of non-current assets		2,890	**1,183**
Decrease (increase) in trade receivables		(3,566)	**(4,972)**
Decrease (increase) in inventories		(22,929)	**(24,731)**
Increase (decrease) in trade payables		11,528	**2,752**
Others		(15,740)	**1,370**
Subtotal		212,149	**222,012**
Interest and dividends received		9,030	**12,218**
Interest paid		(7,836)	**(9,073)**
Income taxes paid and refund	23	(9,839)	**(35,870)**
Net cash from operating activities		203,504	**189,287**
Cash flows from investing activities			
Purchase of property, plant and equipment and intangible assets		(157,227)	**(211,370)**
Proceeds from sale of property, plant and equipment		7,149	**17,843**
Purchase of other financial assets		(4,984)	**(7,316)**
Proceeds from sale and redemption of other financial assets		27,720	**26,394**
Purchase of subsidiaries	26	(79,173)	**(19,456)**
Proceeds from sale of shares of subsidiary	27	—	**3,860**
Others		(3,044)	**(4,405)**
Net cash from investing activities		(209,560)	**(194,450)**
Cash flows from financing activities			
Changes in short-term interest-bearing debt	13	29,657	**(3,524)**
Proceeds from borrowing or issuing long-term interest-bearing debt	13	83,944	**138,156**
Repayment or redemption of long-term interest-bearing debt	13	(82,189)	**(80,237)**
Proceeds from non-controlling interests		—	**3,790**
Acquisition of treasury shares	17	(25,069)	**(21,521)**
Dividends paid	17	(21,864)	**(24,858)**
Dividends paid to non-controlling interests		(2,802)	**(2,423)**
Others	13	(395)	**(723)**
Net cash from financing activities		(18,720)	**8,657**
Effect of exchange rate changes on cash and cash equivalents		3,868	**(6,407)**
Net increase (decrease) in cash and cash equivalents		(20,907)	**(2,913)**
Cash and cash equivalents at beginning of year	5	147,325	**126,417**
Cash and cash equivalents at end of year	5	¥ 126,417	**¥ 123,503**

Note 1: Reporting entity

AGC Inc. (the "Company") is a company domiciled in Japan. The consolidated financial statements of the Company as of and for the year ended December 31, 2018 comprise the Company and its subsidiaries (the "Group"), and interests in associates and jointly controlled entities, etc. (the "Group entities").

The Group is engaged in business activities primarily in the areas of Glass Operations, Electronics Operations, and Chemicals Operations. Please see Note 4 "Segment information" for details on the Group's businesses.

On July 1, 2018, Asahi Glass Co., Ltd. changed its corporate name to AGC Inc.

Note 2: Basis of preparations

(1) Statement of compliance with IFRS

The Group's consolidated financial statements have been prepared in accordance with International Financial Reporting Standards ("IFRS"), based on the stipulations of Article 93 of the Ordinance on Consolidated Financial Statements. The Group's consolidated financial statements satisfy all of the requirements for a "Specified Company" prescribed by Article 1-2 of the Ordinance on Consolidated Financial Statements.

On March 28, 2019, the consolidated financial statements were approved by President & CEO Takuya Shimamura and Representative Director & CFO Shinji Miyaji.

(2) Basis of measurement

The consolidated financial statements have been prepared on a historical cost basis, except for the following significant items on the consolidated statements of financial position:

— Derivative financial instruments are measured at fair value.
— Equity instruments are measured at fair value.
— Contingent consideration liabilities are measured at fair value.
— Defined benefit pension plan assets and liabilities are measured at the present value of defined benefit obligations less the fair value of the plan assets.

(3) Presentation currency

The consolidated financial statements are presented in Japanese yen. The currency unit is millions of yen, with figures less than one million yen rounded down.

(4) Use of estimates and judgments

The preparation of consolidated financial statements in accordance with IFRS requires management to make judgments, estimates and assumptions that affect the adoption of accounting policies and the reported amounts of assets, liabilities, income and expenses. Actual results could differ from these estimates.

The estimates and their underlying assumptions are reviewed continuously. Changes in accounting estimates are recognized prospectively.

The following notes include information about the judgements made in applying accounting policies that have the most significant effect on the amounts in the financial statements, and uncertainty of assumptions and estimates as of December 31, 2018 that have a significant risk of resulting in a material adjustment to the carrying amounts of assets and liabilities in the year ending December 31, 2019.

— Estimates of useful lives and residual values of property, plant and equipment and intangible assets (See Note 3 "Significant accounting policies" (6) (7), Note 8 "Property, plant and equipment" and Note 9 "Goodwill and intangible assets")
— Calculation of the value in use in cash-generating units, the smallest unit of measurement for impairment of property, plant and equipment, goodwill and intangible assets (See Note 3 "Significant accounting policies" (9), Note 8 "Property, plant and equipment" and Note 9 "Goodwill and intangible assets")
— The recoverability of deferred tax assets (See Note 3 "Significant accounting policies" (16) and Note 11 "Deferred tax assets and liabilities")
— Actuarial assumptions for defined benefit pension plans (See Note 15 "Employee benefits")
— Fair value measurement of assets and liabilities acquired through business combinations (See Note 3 "Significant accounting policies" (1) and Note 26 "Business combinations")

(5) Changes in accounting policies

The significant accounting policies adopted for the Group's consolidated financial statements are the same as those for the consolidated financial statements for the year ended December 31, 2017, with the exception of the items described below.

During the year ended December 31, 2018, the Group adopted IFRS 15 *Revenue from Contracts with Customers* ("IFRS 15") by using the cumulative effect method, with the effect of initially applying this standard recognized at the date of initial application, with no restatement of comparative period amounts.

In accordance with IFRS 15, revenue is recognized based on the following five-step model.

Step 1: Identify the contract with a customer
Step 2: Identify the performance obligations in the contract
Step 3: Determine the transaction price
Step 4: Allocate the transaction price to the performance obligations in the contract
Step 5: Recognize revenue when the entity satisfies a performance obligation

The Group sells a range of products including architectural glass, automotive glass, glass substrates for displays, electronic materials, chlor-alkali & urethane, fluorochemicals & specialty chemicals, and life science products. For the sales of these products, revenue is recognized upon delivery of these products as its performance obligation is satisfied when customers obtain control over these products at the time of delivery. For revenue associated with construction works such as the installation of architectural glass, the revenue is recognized over time. Progress toward completion is measured by the input method based on the costs incurred.

Also, revenue is measured based on the consideration specified in contracts with customers, less discounts, rebates, returned products, and other items.

When consideration is received from a customer prior to fulfillment of the performance obligation, the amount is recognized as a contract liability.

As a result of identifying the contracts with customers and its performance obligations in the contracts and calculating the value of the transactions based on the five-step model indicated above, differences in the consideration received from customers have arisen for certain transactions, compared with the revenue that would have been measured in accordance with the superseded accounting standards.

As a result, compared with the previous accounting standard, in the Consolidated Statements of Financial Position at the beginning of the year ended December 31, 2018, trade receivables decreased by ¥524 million, deferred tax assets increased by ¥280 million, and retained earnings decreased by ¥244 million. At the end of the year ended December 31, 2018, trade receivables decreased by ¥289 million, deferred tax assets increased by ¥208 million, and retained earnings and other components of equity decreased by ¥55 million and ¥25 million, respectively.

In the Consolidated Statements of Profit or Loss for the year ended December 31, 2018, net sales increased by ¥259 million, and income tax expenses increased by ¥70 million.

In addition to the standard described above, the following are the amended accounting standards adopted by the Group from the year ended December 31, 2018. The impact of the adoption of these standards on the Group's consolidated financial statements is immaterial. When applying IFRS 9 *Financial Instruments* ("IFRS 9") (amended in July 2014), the Group has not restated the financial statements of prior fiscal years in accordance with the transition requirements.

IFRS	Title	Summaries of new IFRS and amendments
IAS 2 (amended in June 2016)	Share-based Payment	Clarification of classification and measurement of share-based payment transactions
IFRS 9 (amended in July 2014)	Financial Instruments	Changes in classification and measurement of financial instruments, and introduction of impairment requirements based on an expected credit loss model
IFRIC 22	Foreign Currency Transactions and Advance Consideration	Clarification of exchange rate to use on initial recognition of the related assets, expenses or income, when an entity has received or paid advance consideration in a foreign currency

Note 3: Significant accounting policies

(1) Basis of consolidation

i) Business combinations

Business combinations are accounted for using the acquisition method when control is obtained. The Group recognizes goodwill as any excess of the aggregate of the consideration transferred, the amount of any non-controlling interest and, in the case of a business combination achieved in stages, the acquisition-date fair value of the equity interest of the acquiree previously held by the acquirer, over the net of the acquisition-date amounts of the identifiable assets acquired from the acquiree and the liabilities assumed.

If the consideration transferred is lower than the latter net amount, the Group immediately recognizes the difference as profit or loss.

Impairment test of goodwill is conducted annually, regardless of any indication of impairment. (See (9) "Impairment of non-financial assets").

Business combinations of entities under common control are accounted for based on carrying amounts. These business combinations are those in which all the combining entities or businesses are ultimately controlled by the same party or parties both before and after the business combination, and that control is not transitory.

ii) Subsidiaries

Subsidiaries are entities controlled by the Group. A subsidiary is controlled when the Group is exposured or has rights to variable returns from its involvement with the investee, and has the ability to use power over the investee to affect those returns. The accounting policies of subsidiaries have been adjusted in order to ensure conformity with the accounting policies adopted by the Group, as necessary.

iii) Non-controlling interests

The components of profit or loss and other comprehensive income are attributed to owners of the parent and non-controlling interests. Of transactions giving rise to a change in the interest between the Company and the non-controlling interests of a subsidiary, for transactions that do not result in a loss of control, changes in the non-controlling interests in the subsidiary and the net amount of consideration paid (or received) are recognized directly in equity, and are not recognized as goodwill or as profit or loss.

iv) Investments in associates and joint ventures

An associate is an entity over which the Group has significant influence over its financial and operating policies, but does not exercise control of it. Significant influence is presumed to exist when the Group holds 20% or more of the voting rights in another entity. Considering not only the ratio of the voting rights, but also other elements, such as participation in management, an associate is included if the Group can exercise significant influence.

A joint venture is a joint arrangement whereby the parties that have joint control of the arrangement have rights to the net assets of the arrangement.

Investments in associates and joint ventures are recognized at cost initially on acquisition and are subsequently accounted for using the equity method (hereinafter "Investments accounted for using equity method"). Any differences between the investment on the investment date and the corresponding equity of the investee are included in the carrying amount of the investment as goodwill. The consolidated financial statements reflect the investments in associates and joint ventures' share of profit or loss and other comprehensive income of the investee from the date on which the Group obtains significant influence until the end of the reporting period. In the event that the Group's burden of loss exceeds the investment in the investee, the carrying amount of the Group's share is reduced to zero. Except for when the Group incurs obligations or makes payments on behalf of the equity-accounted investee, the Group shall recognize no further loss.

Goodwill that forms part of the carrying amount of investments in associates and joint ventures is not separately recognized, and therefore is not tested for impairment separately. Instead, whenever there is any objective evidence that an investment in an associate or joint venture may be impaired, the entire carrying amount of the investment is tested for impairment as a single asset.

v) Transactions eliminated on consolidation

All intergroup balances, transactions and unrealized gains and losses arising from intragroup transactions are eliminated in preparing the consolidated financial statements.

Unrealized losses are eliminated only to the extent that there is no evidence of impairment.

(2) Foreign currency

i) Foreign currency transactions

Foreign currency transactions are translated into functional currencies of the individual Group entities by applying the rates of exchange prevailing at the dates of transactions. Monetary assets and liabilities denominated in foreign currencies are translated into the respective functional currencies at the prevailing exchange rates at the reporting date. Foreign exchange differences on translation are recognized as profit or loss. Exchange differences for any gains or losses on the assets and liabilities recognized in other comprehensive income are recognized in other comprehensive income.

Non-monetary assets and liabilities measured in terms of historical cost in foreign currencies are translated at the exchange rate at the date of the transaction.

ii) Foreign operations

Assets and liabilities of foreign operations, including goodwill and fair value adjustments arising on the acquisition of foreign operations, are translated into Japanese yen at the exchange rates prevailing at the reporting date. Income and expenses of foreign operations are translated into Japanese yen at the average exchange rate for the period.

(3) Financial instruments

The Group recognizes financial instruments on the contract date when the Group becomes a party to the contractual provisions of the instrument.

The Group derecognizes a financial asset in the following circumstances:

— When the contractual rights to receive the cash flows from the financial asset expire; or

— When the contractual rights to receive the cash flows from the financial asset in transactions in which substantially all the risks and rewards of ownership of the financial asset are transferred to another entity.

In regard to transferred financial assets, the Group recognizes any retained interest of the transferred financial asset as a separate asset or liability.

Financial assets and financial liabilities are offset and presented as a net amount on the consolidated statements of financial position only when the Group has a legally enforceable right to set off the recognized amounts and intends either to settle on a net basis or to realize the asset and settle the liability simultaneously.

i) Non-derivative financial assets

The Group holds non-derivative financial assets that are classified into financial assets measured at amortized cost, financial assets measured at fair value through other comprehensive income and financial assets measured at fair value through profit or loss.

Financial assets measured at amortized cost

Financial assets are classified as financial assets measured at amortized cost if the following two conditions are met:

— The foregoing financial assets are held within a Group business model whose objective is to hold the assets in order to collect contractual cash flows from the assets; and

— The contractual terms of the foregoing financial assets give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

The foregoing financial assets are initially recognized at fair value plus directly attributable transaction costs except for trade receivables, etc., that do not contain a significant financing component. The trade receivables, etc., that do not contain a significant financial component are initially recognized plus transaction cost. After initial recognition, the financial assets are measured at amortized cost using the effective interest method.

Financial assets measured at fair value through other comprehensive income

The Group designates equity instruments as financial assets measured at fair value through other comprehensive income when an irrevocable election has been made on initial recognition to measure the gains and losses arising from changes in the fair value of such instruments in other comprehensive income.

When the foregoing financial assets measured at fair value through other comprehensive income are derecognized through sale, etc., the cumulative gains or losses are reclassified from other components of equity to retained earnings.

Financial assets measured at fair value through profit or loss

The Group measures financial assets at fair value and recognizes any changes in the fair value of such assets as profit or loss, unless the foregoing financial assets are classified as financial assets measured at amortized cost or financial assets measured at fair value through other comprehensive income.

Impairment of financial assets

During the year ended December 31, 2017, financial assets that are measured at amortized cost are assessed for any objective evidence of impairment at each reporting date.

Objective evidence of impairment of financial assets includes: a default or delinquency by the borrower, a concession granted to the borrower that the Group would not have otherwise considered, significant financial difficulty of the issuer or obligor, and the disappearance of an active market.

An individually significant financial assets is individually assessed for impairment. Financial assets that are not individually significant are collectively assessed for impairment in a group of financial assets with similar credit risk characteristics. In assessing collective impairment, the Group evaluates historical loss experiences and other factors.

Impairment loss is measured as the difference between the financial asset's carrying amount and the present value of estimated future cash flows discounted at the financial asset's original effective interest rate. Cash flows relating to short-term receivables are not discounted due to the immaterial effect of discounting.

Impairment loss is recognized in profit or loss.

During the year ended December 31, 2018, the Group recognizes a loss allowance for expected credit losses on financial assets measured at amortized cost and contract assets.

At the end of each reporting period, the Group evaluates whether the credit risk on financial assets has increased significantly since the initial recognition. If the credit risk of a financial asset has increased significantly, the allowance for such financial assets is measured at an amount equal to the lifetime expected credit losses. If the credit risk has not increased significantly, the allowance for such financial assets is measured at an amount equal to the 12-month expected credit losses.

However, with regards to trade receivables and contract asset that do not contain a significant financing component, the allowance is always measured at an amount equal to the lifetime expected credit losses. In estimating the allowance, expected credit losses of certain financial assets are measured on a collective basis such as every past due date.

The Group determines if credit risk has increased significantly by evaluating changes in default risk after initial recognition with reference to factors including significant downgrading of ratings, stopping transaction due to delayed receivable, and other indications of insolvency. If it is more than 90 days past due, the Group determines that default is occurred.

In measuring credit losses, the Group uses reasonable and supportable information on the past events, current conditions and forecasts on future economic conditions, which is available without undue cost or effort at the reporting date.

The Group assesses a credit-impairment based on objective evidence such as a borrower's significant financial difficulty, etc. When it is reasonably determined that all or part of the financial assets are not collectable, the carrying amount of financial assets is directly written off.

ii) Non-derivative financial liabilities

The Group recognizes non-derivative financial liabilities that are classified into financial liabilities measured at amortized cost and contingent consideration liabilities.

Financial liabilities measured at amortized cost

The Group recognizes the following as financial liabilities measured at amortized cost: trade payables, other payables, and interest-bearing debts (borrowings, commercial paper, corporate bonds, and bonds with subscription rights to shares (excluding share subscription rights)), among other items.

The foregoing financial liabilities are initially recognized at fair value less directly attributable transaction costs. After initial recognition, non-derivative financial liabilities are measured at amortized cost using the effective interest method.

The Group derecognizes financial liabilities when the obligation specified in the contract is exempted, cancelled or expired.

Contingent consideration liabilities

The Group recognizes contingent consideration liabilities in business combinations as financial liabilities measured at fair value through profit or loss. The foregoing financial liabilities are measured at fair value, with changes recognized in profit or loss.

iii) Bonds with subscription rights to shares

The Group classifies proceeds from the issue of bonds with subscription rights to shares into a liability component and an equity component based on the issuing conditions.

Upon initial recognition, the liability component of bonds with subscription rights to shares is initially recognized at the fair value of similar liabilities without equity conversion options. The equity component is initially recognized as the total fair value of the bonds with subscription rights to shares less the fair value of the liability component. The transaction cost related to the issue of the bonds with subscription rights to shares is prorated according to the ratio of the initial carrying amounts of the liability and equity components on initial recognition, and deducted from the amounts of the liability and equity components.

After initial recognition, the liability component of the bonds with subscription rights to shares is measured at amortized cost using the effective interest method. The equity component of the bonds with subscription rights to shares is not remeasured.

iv) Derivative financial instruments (including hedge accounting)

The Group holds derivative financial instruments to hedge foreign currency exchange risk, interest rate risk, and commodity price risk.

The Group initially recognizes derivative financial instruments at fair value, with the related transaction costs recognized in profit or loss when incurred. After initial recognition, derivative financial instruments are measured at fair value, with changes in fair value accounted for as follows, depending on whether or not derivatives qualify for hedge accounting:

(Derivatives not qualifying for hedge accounting)

Changes in the fair value of derivative financial instruments which do not qualify for hedge accounting are recognized in profit or loss.

(Derivatives qualifying for hedge accounting)

When applying hedge accounting, at the inception of hedges, the Group formally designates and documents hedging relationships to which hedge accounting is applied and the objectives and strategies of risk management for undertaking hedges.

At the inception of hedges, the Group evaluates whether or not the hedging instrument can be predicted to be effective. Thereafter, the Group continuously evaluates whether the derivative is highly effective in offsetting changes in future cash flows from the hedged items.

The Group applies cash flow hedges by designating qualified derivative financial instruments as hedging instruments. Cash flow hedges are designed to hedge exposure to variations in cash flows that are attributable to a particular risk associated with recognized assets or liabilities or highly probable forecast transactions which will affect profit or loss.

The effective portion of gains or losses on hedging instruments is recognized in other comprehensive income. The amounts recognized in other comprehensive income are reclassified to profit or loss in the consolidated reporting periods when the cash flows of the hedged items affect profit or loss. The ineffective portion of changes in the fair value of hedging instruments is recognized in profit or loss.

Hedge accounting is discontinued prospectively when: the hedging instrument expires or is sold, terminated, or exercised; the hedge no longer meets the criteria for hedge accounting; a forecast transaction is no longer expected to occur; or the hedging designation is revoked. A hedge designation may not be voluntarily revoked unless there is a change in the risk management objective. Therefore, if a hedging relationship ceases to meet the hedge effectiveness requirement relating to the hedge ratio, but the risk management objective for that designated hedging relationship remains the same, the Group adjusts the hedge ratio of the hedging relationship so that it meets the hedge effectiveness requirement again.

v) Equity

Ordinary shares

Ordinary shares are classified as equity. Incremental costs (net of tax) directly attributable to the issue of ordinary shares or stock options are deducted from equity.

Treasury shares

If the Company purchases treasury shares, the consideration paid, including net of directly attributable transaction costs and tax, is recognized as a deduction from equity. If the Company disposes of treasury shares, any gains or losses arising from the disposal of treasury shares are recognized in equity.

(4) Cash and cash equivalents

Cash and cash equivalents comprises cash on hand, bank deposits available for withdrawal on demand, and short-term investments due within three months or less, which are readily convertible into cash and subject to insignificant risk of changes in value.

(5) Inventories

Inventories are measured at the lower of cost and net realizable value. The cost of inventories is measured based on the moving average method, and includes costs of purchase and costs of conversion (including fixed and variable manufacturing overheads). Net realizable value is the estimated selling price in the ordinary course of business less the estimated costs of completion and the estimated costs necessary to make the sale.

(6) Property, plant and equipment

i) Recognition and measurement

Property, plant and equipment is presented at cost less accumulated depreciation and accumulated impairment losses.

Cost of property, plant and equipment includes any costs directly attributable to the acquisition of the asset. The cost of self-constructed assets includes material costs, direct labor costs, direct costs attributable to bringing the asset to the location and conditions necessary for its intended use, and the cost of dismantling, removing, and restoring the asset, as well as borrowing costs that satisfy the requirements for being capitalized.

After acquisition of property, plant and equipment, the Group recognizes costs as the carrying amount of an asset only if it is probable that future economic benefits associated with the item will flow to the Group and the cost can be measured reliably.

Differences between the carrying amount and the consideration received for the disposal of property, plant and equipment are recognized in profit or loss.

ii) Depreciation

Depreciation of property, plant and equipment excluding non-depreciable property, plant and equipment, such as land, is computed under the straight-line method over the estimated useful lives of each item and the depreciable amount which is the cost of the asset less its residual value.

The estimated useful lives of major property, plant and equipment are as follows:

— Buildings and structures: 10 to 50 years
— Machinery, equipment and vehicles: 4 to 15 years
— Tools, fixtures and fittings: 2 to 15 years

The depreciation methods, estimated useful lives and residual values are reviewed at the end of each reporting period, and changed when necessary.

(7) Goodwill and intangible assets

i) Goodwill

Goodwill may be recognized on the acquisition of a subsidiary. The measurement of goodwill on initial recognition is shown in (1) i) "Business combinations."

After initial recognition, goodwill is measured at cost less any accumulated impairment losses. Measurement of goodwill impairment is shown in (9) "Impairment of non-financial assets."

ii) Research and development expenses

Expenditure related to research activities to obtain new scientific or technical knowledge and understanding are recognized as an expense when incurred.

Expenditure on development activities is capitalized as an intangible asset if it is reliably measurable, products or processes are technically and commercially feasible, it is probable to generate future economic benefits, and the Group has an intention and adequate resources to complete those assets and use or sell them. Other expenditure is recognized as an expense when incurred.

Capitalized development expenditure is presented at cost less any accumulated amortization and accumulated impairment losses.

iii) Intangible assets other than goodwill acquired through business combinations

Intangible assets acquired through business combinations and recognized separately from goodwill are initially measured at fair value as of the acquisition date. After initial recognition, the foregoing intangible assets are presented at cost less any accumulated amortization and accumulated impairment losses.

iv) Other intangible assets

Other intangible assets are initially recognized at cost. After initial recognition, intangible assets with finite useful lives are presented at cost less any accumulated amortization and accumulated impairment losses. Intangible assets with indefinite useful lives are presented at cost less any accumulated impairment losses.

v) Amortization

Amortization of intangible assets with finite useful lives is recognized as an expense under the straight-line method over their estimated useful lives from the date when the assets are available for use. The estimated useful lives of major intangible assets with finite useful lives are as follows:

— Patents and trademarks: 5 to 10 years
— Software: 5 years
— Customer relationships: 7 to 30 years

The amortization methods and useful lives are reviewed at the end of each reporting period and changed when necessary.

(8) Leased assets

The Group classifies lease arrangements as finance leases when the lessor transfers substantially all the risks and rewards incidental to ownership of an asset to the Group. Leased assets are initially recognized at the lower of the fair value of the asset and the present value of the minimum lease payments.

Leased assets are depreciated or amortized over their useful lives when it is reasonably certain that the Group will acquire ownership of a leased asset by the end of the lease agreement, or leased assets are depreciated over the shorter of the lease term and their useful lives when it is not reasonably certain that the Group will obtain ownership of the leased asset by the end of the lease agreement.

All other lease arrangements are classified as operating leases and are not reported in the Group's consolidated statements of financial position. Lease payments under an operating lease are recognized in profit or loss on a straight-line basis over the lease term.

Whether an arrangement contains a lease or not is based on the substance of the arrangement, even if the arrangement does not take the legal form of a lease.

(9) Impairment of non-financial assets

At the end of each reporting period, the Group assesses the carrying amounts of non-financial assets, excluding inventories and deferred tax assets, to determine whether there is any indication of impairment of each asset or each cash-generating unit to which an asset belongs. If any such indication exists, impairment of each asset or each cash-generating unit is tested. Goodwill is tested annually, regardless of any indication of impairment.

Assets that are not individually tested are integrated into the smallest identifiable group of assets that generates cash inflows from continuing use that are largely independent of the cash inflows from other assets or groups of assets (cash-generating unit). When testing for impairment of goodwill, the goodwill is allocated to cash-generating units which are not larger than an operating segment and represent the lowest level at which the goodwill is monitored for internal management purposes.

The recoverable amount of an asset or a cash-generating unit is the higher of its fair value less costs to disposal and its value in use. In calculating an asset's value in use, estimated future cash flows are discounted to the present value using a pre-tax discount rate that reflects the time value of money and the risks specific to the asset.

If the carrying amount of an asset or a cash-generating unit exceeds the recoverable amount, an impairment loss is recognized. The impairment loss recognized with respect to a cash-generating unit is allocated first to reduce the carrying amount of any goodwill allocated to the cash-generating unit, and then to the other assets of the unit on a pro-rata basis based on the carrying amount of each asset in the unit.

An impairment loss on other non-financial assets recognized in prior periods is reversed if there are indications of the possibility of reversing such an impairment loss and if the recoverable amount exceeds the carrying amount as a result of an estimation of the recoverable amount. An impairment loss is reversed up to the carrying amount that would have been determined if there had been no impairment loss recognized for the asset in prior years and depreciation or amortization had been continuously recognized up to the reversal. An impairment loss for goodwill is not reversed in subsequent periods.

(10) Non-current assets held for sale

The Group classifies an asset or asset group which is expected to be recovered through a sale transaction rather than through continuous use as a non-current asset or disposal group held for sale when the following conditions are met: it is highly probable that the asset or asset group will be sold within one year, the asset or asset group is available for immediate sale in its present condition, and there is assurance of a plan to sell the asset or asset group. In such cases, the non-current asset is not depreciated or amortized and is measured at the lower of its carrying amount and its fair value less costs to sell.

(11) Employee benefits

Employee benefits include post-employment benefit plans, short-term employee benefits, and share-based payments. Post-employment benefit plans comprise defined benefit plans and defined contribution plans.

i) Defined benefit plans

Obligations for defined benefit plans are recognized as the present value of defined benefit obligations less the fair value of any plan assets.

The present value of defined benefit obligations is calculated annually by qualified actuaries using the projected unit credit method. The discount rates are based on the market yields of high quality corporate bonds at the end of each reporting period that have terms consistent with the discount period, which is established as the estimated term of the post-employment benefit obligations through to the estimated dates for payments of future benefits in every fiscal year.

Actuarial gains and losses are recognized immediately in other comprehensive income when incurred, while past service costs and gains or losses on settlement are recognized in profit or loss.

ii) Defined contribution plans

Expenses related to post-employment benefits for defined contribution plans are expensed as the related services are provided.

iii) Short-term employee benefits

Short-term employee benefit obligations are measured on an undiscounted basis and are recognized as expenses as the related service is provided.

For bonus payments, a liability is recognized for the amount expected to be paid under short-term cash bonuses if the Group has a present legal or constructive obligation to pay this amount as a result of past service provided by the employee, and the obligation can be estimated reliably.

iv) Share-based payments

The Company provides the Group's directors, executive officers, and other employees with stock options, which grant the holder the right to purchase the Company's stock until the year ended December 31, 2017. The fair value of stock options at the grant date is recognized as a profit or loss over the vesting period from the grant date, with a corresponding increase in equity.

The Group has elected to adopt the exemptions of IFRS 1 *First-time Adoption of International Financial Reporting Standards* ("IFRS 1"). Accordingly, the Group has elected not to retrospectively apply IFRS 2 *Share-based Payment* ("IFRS 2") to stock options granted after November 7, 2002 that vested before the transition date to IFRS.

From the year ended December 31, 2018, the Company has employed a framework referred to as the Board Incentive Plan Trust (hereinafter referred to as the "BIP Trust") as equity-settled share-based payment arrangement granted to directors and executive officers (excluding non-residents of Japan). The shares of the Company held by the BIP Trust are recognized as treasury shares. The Company recognizes the consideration as an expense measured at the grant-date fair value of its shares, with corresponding increase in equity over the vesting period of the awards.

(12) Provisions

A provision is recognized when the Group has a reasonably estimable legal or constructive obligation as a result of a past event, and it is probable that an outflow of resources embodying economic benefits will be required to settle the obligation. Where the effect of the time value of money is material, the estimated future cash flows are discounted to the present value using a pre-tax rate that reflects the time value of money and the risks specific to the liability. The unwinding of the discount is recognized as finance costs.

The Group has established a provision for restructuring costs arising from restructuring actions to improve the business structure and the reorganization of certain operations. Such costs are recognized when they can be reasonably estimated and include an expansion in the severance compensation program.

(13) Revenue

During the year ended December 31, 2017, revenue from the sales of goods in the course of ordinary activities is measured at the fair value of the consideration received or receivable, less returns, trade discounts and volume rebates. The Group recognizes revenue from the sale of goods when: the Group has transferred to the buyer the significant risks and rewards of ownership of the goods; it is probable that the economic benefits associated with the transaction will flow to the Group; the costs incurred or to be incurred in respect of the transaction and the possibility of product returns can be estimated reasonably; and the Group does not retain continuing managerial involvement over the goods sold; and the amount of revenue can be measured reliably.

From the year ended December 31, 2018, the Group has adopted IFRS 15 *Revenue from Contracts with Customers*, ("IFRS 15") and revenue is recognized based on the following five-step model.

Step 1: Identify the contract with a customer

Step 2: Identify the performance obligations in the contract

Step 3: Determine the transaction price

Step 4: Allocate the transaction price to the performance obligations in the contract

Step 5: Recognize revenue when the entity satisfies a performance obligation

The Group sells a range of products including architectural glass, automotive glass, glass substrates for displays, electronic materials, chlor-alkali & urethane, fluorochemicals & specialty chemicals, and life science products. For the sales of these products, revenue is recognized upon delivery of these products as its performance obligation is satisfied when customers obtain control over these products at the time of delivery. For revenue associated with construction works such as the installation of architectural glass, revenue is recognized according to the progress toward completion of the performance obligation. Progress toward completion is measured by the input method based on the costs incurred, etc. Also, revenue is measured based on the consideration specified in contracts with customers, less discounts, rebates, returned products, and other items.

(14) Operating profit and business profit

"Operating profit" in the Group's consolidated statements of profit or loss is an indicator that facilitates continuous comparisons and evaluations of the Group's business performance. Main items of "other income" and "other expenses" are foreign exchange gains and losses, gains on sale of non-current assets, losses on disposal of non-current assets, impairment losses and expenses for restructuring programs. "Business profit" includes all income and expenses before finance income, finance costs and income tax expenses.

(15) Finance income and finance costs

Finance income mainly comprises interest income, dividend income and gains on hedging instruments that are not recognized in other comprehensive income. Interest income is recognized as incurred using the effective interest method. Dividend income is recognized as of the date when the Group's right to receive payment is established.

Finance costs mainly comprise interest expenses and losses on hedging instruments that are not recognized in other comprehensive income.

(16) Income tax

Income tax comprises current income tax and deferred income tax. These are recognized in profit or loss, except to the extent that it relates to a business combination, or items recognized directly in equity or in other comprehensive income.

Current income tax is measured at the amount that is expected to be paid to or refunded from the taxation authorities using the tax rates enacted or substantively enacted at the end of the reporting period.

Deferred income tax is recognized on temporary differences between the carrying amounts of assets and liabilities for accounting purposes and their tax basis, using the tax rates that are expected to apply to the period when the temporary differences will reverse, based on tax laws that have been enacted or substantively enacted by the end of the reporting period. Deferred tax assets are recognized for all deductible temporary differences, and the carry forward of unused tax losses and unused tax credits to the extent that it is probable that future taxable profit will be available against which they can be utilized. Deferred tax assets are reviewed at the end of each reporting period and are recognized only to the extent that it is probable that the tax benefits can be realized.

However, deferred tax assets are not recognized if the initial recognition of an asset or liability in a transaction that is not a business combination affects neither accounting profit nor taxable profit at the time of the transaction.

Deductible temporary differences associated with investments in subsidiaries, associates and interests in joint arrangements are recognized only to the extent of the following circumstances:

— The temporary difference will reverse in the foreseeable future; and

— Taxable profit will be available against which the temporary difference can be utilized.

Deferred tax liabilities are recognized for all taxable temporary differences, in principle.

However, deferred tax liabilities are not recognized in the following circumstances:

— On the initial recognition of goodwill.

— On the initial recognition of an asset or liability in a transaction that is not a business combination affecting neither accounting profit nor taxable profit at the time of the transaction.

— There are taxable temporary differences associated with investments in subsidiaries, associates and interests in joint arrangements to the extent that the parent company is able to control the timing of the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future.

Deferred tax assets and deferred tax liabilities are offset when there is a legally enforceable right to offset current tax assets against current tax liabilities and in either of the following circumstances:

— Income taxes are levied by the same taxation authority on the same taxable entity; or

— Different taxable entities intend either to settle current tax assets and liabilities on a net basis, or to realize the current tax assets and settle the current tax liabilities simultaneously.

(17) Earnings per share

Basic earnings per share is calculated by dividing profit for the year attributable to owners of the parent by the weighted average number of ordinary shares outstanding during the period, adjusted by the number of treasury shares during the period.

Diluted earnings per share is calculated by adjusting the effects of all dilutive potential ordinary shares.

(18) New standards and interpretations not yet adopted

New standards, interpretations, and amendments to standards and interpretations that have not been adopted in the year ended December 31, 2018, and which the Group has yet to apply to the preparation of the consolidated financial statements, are mainly as follows.

IFRS	Title	Effective date (annual periods beginning on or after)	Adoption by the Group (annual periods ending)	Summaries of new IFRS and amendments
IFRS 16	Leases	January 1, 2019	Fiscal year ending December 2019	Definitions and changes in accounting treatment of leases

Under IFRS 16 *Leases* (“IFRS 16”), entities are permitted to apply one of two methods. One is the method of retrospectively applying the new standard to each past reporting period (the retrospective approach) in accordance with IAS 8 *Accounting Policies, Changes in Accounting Estimates and Errors*, the other method is to recognize the cumulative effect of initially applying the standard as an adjustment to equity at the date of initial application (the modified retrospective approach). Moreover, the Group expects that the application of IFRS 16 will primarily affect the recognition and measurement of assets and liabilities arising from the lease transactions. The Group plans to apply IFRS 16 using the modified retrospective approach. As a result of recognizing and measuring the lease transactions in accordance with IFRS 16, the Group estimates that property, plant and equipment and interest-bearing debt as of the beginning of the year ending December 31, 2019 will be increased by approximately ¥38,300 million and ¥38,700 million, respectively, and retained earnings as of the beginning of the year ending December 31, 2019 will be decreased by approximately ¥300 million. The Group estimates that cash flows from operating activities will be increased and cash flows from financing activities will be decreased due to changes in the presentation of operating lease expenses.

The potential impacts on the consolidated financial statements by the application of standards and interpretations other than the above are currently being evaluated and cannot be estimated as of the date of the report.

IFRS	Title	Effective date (annual periods beginning on or after)	Adoption by the Group (annual periods ending)	Summaries of new IFRS and amendments
IFRIC 23	Uncertainty over Income Tax Treatments	January 1, 2019	Fiscal year ending December 2019	Clarification of accounting treatment for income taxes when there is uncertainty
IAS 19 (amended in February 2018)	Employee Benefits	January 1, 2019	Fiscal year ending December 2019	Clarification of accounting treatment for plan amendments, curtailments and settlements
IAS 28 (amended in October 2017)	Investments in Associates and Joint Ventures	January 1, 2019	Fiscal year ending December 2019	Clarification of accounting treatment for long-term interests in an associate or a joint venture
IFRS 3 (amended in October 2018)	Business Combinations	January 1, 2020	Fiscal year ending December 2020	Clarification of business definitions
IAS 1 IAS 8 (amended in October 2018)	Presentation of Financial Statements Accounting Policies, Change in Accounting Estimates and Errors	January 1, 2020	Fiscal year ending December 2020	Clarification of business definitions

Note 4: Segment information

The Group's reportable segments are components of the Group for which discrete financial information is available, and whose operating results are reviewed regularly by the Group's chief operating decision maker to make decisions about resources to be allocated to the segment and assess performance.

The Group had four in-house companies by product and service: Building & Industrial Glass, Automotive, Electronics and Chemicals. Each in-house company operates worldwide, formulating comprehensive domestic and overseas strategies for its products and services.

The Building & Industrial Glass Company and Automotive Company shares the same float glass manufacturing facilities (glass melting furnace), etc., which are the largest assets and are located at the highest point in the supply chain. The two in-house companies share assets and liabilities, and the ratio of utilization is influenced by fluctuations in supply and demand. Considering these situations, it is difficult to divide financial statements for the two in-house companies. Therefore, the Group prepares the financial statements of the Building & Industrial Glass Company and Automotive Company as the Glass segment. In addition, decisions on assigning management resources are closely tied to the results of each business and inseparable from their performance evaluation. Therefore, with the participation of presidents of both in-house companies, the Group has established a Glass Segment Council, which primarily functions to maintain synergies and maximize overall production in the Glass segment, and collaborates to maximize profits for the Group. Based on these circumstances, the Group reports the Glass segment as one segment.

Thus, the Group has three reportable segments: Glass, Electronics, and Chemicals.

The main products of each reportable segment are as follows:

Reportable segment	Main products
Glass	Float flat glass, Figured glass, Polished wired glass, Low-E glass, Decorative glass, Fabricated glass for architectural use (Heat Insulating/shielding glass, Disaster-resistant/Security glass, Fire-resistant glass, etc.), Automotive glass, etc.
Electronics	LCD glass substrates, Specialty glass for display applications, Cover glass for car-mounted displays, Display related materials, Glass for solar power systems, Fabricated glass for industrial use, Semiconductor process materials, Optoelectronics materials, Lighting glass products, Laboratory use ware, etc.
Chemicals	Polyvinyl chloride, Vinyl chloride monomer, Caustic soda, Urethane, Fluorinated resins, Water and oil repellents, Gases, Solvents, Pharmaceutical and agrochemical intermediates and active ingredients, Iodine-related products, etc.

(1) Reportable segments

FY2017 (Jan. 1 through Dec. 31, 2017)

(Unit: Millions of yen)

	Reportable segment						
	Glass	Electronics	Chemicals	Ceramics/ Others	Total	Adjustments	Amount reported on consolidated financial statements
Sales to external customers	¥733,953	¥260,626	¥435,145	¥33,807	¥1,463,532	¥ —	¥1,463,532
Inter-segment sales or transfers	1,166	1,765	2,459	41,607	46,998	(46,998)	—
Total sales	735,119	262,391	437,605	75,415	1,510,531	(46,998)	1,463,532
Segment profit [Operating profit]	27,064	27,334	63,671	1,428	119,499	147	119,646
Profit for the year	—	—	—	—	—	—	79,297
Other items							
Depreciation and amortization	45,413	51,346	29,440	2,136	128,336	(110)	128,226
Impairment losses [Non-financial assets]	7	1,783	1,095	—	2,885	—	2,885
Capital expenditure	63,794	48,004	50,521	2,817	165,139	(43)	165,095
Investments accounted for using equity method	31,715	2,022	3,047	2,790	39,575	—	39,575

The amounts of inter-segment sales or transfers are primarily based on market prices and manufacturing costs.

"Ceramics/Others" mainly handles ceramics products, logistics and financial services.

FY2018 (Jan. 1 through Dec. 31, 2018)

(Unit: Millions of yen)

	Reportable segment: Glass	Electronics	Chemicals	Ceramics/ Others	Total	Adjustments	Amount reported on consolidated financial statements
Sales to external customers	**¥756,160**	**¥250,285**	**¥482,097**	**¥34,361**	**¥1,522,904**	**¥ —**	**¥1,522,904**
Inter-segment sales or transfers	**1,296**	**2,361**	**2,253**	**44,669**	**50,581**	**(50,581)**	**—**
Total sales	**757,457**	**252,646**	**484,350**	**79,030**	**1,573,485**	**(50,581)**	**1,522,904**
Segment profit [Operating profit]	**22,522**	**24,041**	**71,138**	**2,818**	**120,520**	**34**	**120,555**
Profit for the year	**—**	**—**	**—**	**—**	**—**	**—**	**101,991**
Other items							
Depreciation and amortization	**46,958**	**41,149**	**32,507**	**1,171**	**121,786**	**(118)**	**121,668**
Impairment losses [Non-financial assets]	**—**	**521**	**—**	**262**	**783**	**—**	**783**
Capital expenditure	**89,031**	**79,527**	**60,955**	**1,216**	**230,730**	**(132)**	**230,598**
Investments accounted for using equity method	**27,177**	**2,146**	**3,051**	**2,870**	**35,245**	**—**	**35,245**

The amounts of inter-segment sales or transfers are primarily based on market prices and manufacturing costs. "Ceramics/Others" mainly handles ceramics products, logistics and financial services.

(2) Products and services

Disclosure is omitted as the same information is shown in segment information.

(3) Major customers

Disclosure is omitted as sales to external customers did not exceed 10% to any single external customer.

(4) Geographical segments

The analysis of sales by geographical area for the years ended December 31, 2017 and 2018 is as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Japan	¥ 521,924	**¥ 522,932**
Asia	451,463	**482,721**
America	160,921	**166,269**
Europe	329,222	**350,980**
Total	¥1,463,532	**¥1,522,904**

Note: Sales are based on the location of each company, and "Brazil" is included in "America."

The analysis of non-current assets by geographical area as of December 31, 2017 and 2018 is as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Japan	¥ 300,973	**¥ 305,469**
Asia	528,923	**585,151**
America	104,400	**118,358**
Europe	274,110	**259,132**
Total	¥1,208,408	**¥1,268,111**

Notes: 1. Non-current assets do not include "investments accounted for using equity method," "other financial assets" and "deferred tax assets."
2. Non-current assets are based on the location of assets, and "Brazil" is included in "America."

Note 5: Cash and cash equivalents

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Cash on hand and deposits	¥126,881	**¥122,053**
Negotiable certificates of deposit	5	**5**
Repurchase agreements	—	**2,100**
Time deposits due over three months	(470)	**(656)**
Total	¥126,417	**¥123,503**

The balances of cash and cash equivalents on the consolidated statements of financial position as of December 31, 2017 and 2018 agree to the respective balances on the consolidated statements of cash flows.

Note 6: Trade and other receivables

Trade receivables

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Notes receivable	¥ 17,172	**¥ 18,099**
Accounts receivable	246,133	**244,752**
Allowance account for credit losses	(2,808)	**(2,740)**
Total	¥260,497	**¥260,111**

The Group's exposure to currency risk with respect to trade and other receivables, and impairment losses, are presented in Note 25 "Financial instruments."

Other receivables

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Other accounts receivable	¥22,207	**¥22,608**
Others	21,567	**28,228**
Total	¥43,774	**¥50,836**

Note 7: Inventories

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Merchandise and finished goods	¥115,964	**¥120,792**
Work in progress	55,640	**56,783**
Raw materials and supplies	90,103	**99,439**
Total	¥261,708	**¥277,014**

The amount of write-downs of inventories recognized as expenses and the amount of reversal of write-downs are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Amount of write-downs of inventories recognized as expenses	¥(6,154)	**¥(8,467)**
Amount of reversal of write-downs	4,624	**5,884**

Note 8: Property, plant and equipment

(1) Reconciliation

"Construction in progress" includes expenditures on property, plant and equipment under construction.

The amount in "additions" for each "property, plant and equipment" includes the amount which is transferred from "construction in progress."

Depreciation is recorded in "cost of sales" and "selling, general and administrative expenses" on the consolidated statements of profit or loss.

FY2017 (Jan. 1 through Dec. 31, 2017)

Cost

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥649,971	¥1,942,279	¥128,917	¥96,549	¥ 62,928	¥2,880,645
Additions	15,644	77,187	11,019	199	55,178	159,227
Acquisitions due to business combinations	16,902	45,676	446	1,073	1,792	65,891
Disposals	(15,773)	(65,970)	(6,878)	(3,205)	(1,905)	(93,733)
Net foreign exchange differences on translation	18,534	69,151	1,341	1,672	936	91,635
Others	(811)	(1,221)	(76)	(15)	(43)	(2,169)
Balance as of December 31	¥684,466	¥2,067,102	¥134,769	¥96,272	¥118,886	¥3,101,497

Accumulated depreciation and impairment losses

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥(378,002)	¥(1,441,550)	¥(108,973)	¥(13,858)	¥(390)	¥(1,942,775)
Depreciation	(20,260)	(90,577)	(8,556)	—	—	(119,394)
Impairment losses	(307)	(2,049)	(23)	—	(339)	(2,720)
Disposals	14,115	62,926	6,063	131	215	83,452
Net foreign exchange differences on translation	(9,812)	(50,113)	(960)	—	(25)	(60,912)
Others	960	452	41	—	—	1,454
Balance as of December 31	¥(393,306)	¥(1,520,912)	¥(112,409)	¥(13,727)	¥(540)	¥(2,040,895)

Carrying amounts

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥271,969	¥500,728	¥19,944	¥82,690	¥ 62,537	¥ 937,869
Balance as of December 31	¥291,159	¥546,190	¥22,360	¥82,545	¥118,346	¥1,060,601

FY2018 (Jan. 1 through Dec. 31, 2018)

Cost

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥684,466	¥2,067,102	¥134,769	¥96,272	¥118,886	¥3,101,497
Additions	25,714	76,923	9,822	33	109,029	221,523
Acquisitions due to business combinations	576	284	3	34	23	921
Disposals	(7,862)	(43,151)	(7,176)	(16,456)	(4,388)	(79,035)
Net foreign exchange differences on translation	(22,699)	(73,962)	(2,943)	(1,721)	(6,434)	(107,761)
Others	980	(663)	37	—	775	1,130
Balance as of December 31	¥681,174	¥2,026,532	¥134,514	¥78,162	¥217,891	¥3,138,275

Accumulated depreciation and impairment losses

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥(393,306)	¥(1,520,912)	¥(112,409)	¥(13,727)	¥(540)	¥(2,040,895)
Depreciation	(21,050)	(83,546)	(8,837)	—	—	(113,434)
Impairment losses	(22)	(192)	(59)	(470)	(35)	(780)
Disposals	6,027	39,334	5,269	11,447	35	62,114
Net foreign exchange differences on translation	10,128	51,589	2,287	1	13	64,021
Others	83	(432)	(16)	—	—	(365)
Balance as of December 31	¥(398,141)	¥(1,514,159)	¥(113,766)	¥(2,747)	¥(526)	¥(2,029,340)

Carrying amounts

(Unit: Millions of yen)

	Buildings and structures	Machinery, equipment and vehicles	Tools, fixtures and fittings	Land	Construction in progress	Total
Balance as of January 1	¥291,159	¥546,190	¥22,360	¥82,545	¥118,346	¥1,060,601
Balance as of December 31	¥283,033	¥512,373	¥20,747	¥75,414	¥217,365	¥1,108,934

(2) Impairment losses

Property, plant and equipment is grouped into a cash-generating unit, based on business units. The cash-generating unit is the smallest identifiable group of assets that generates cash inflows that are largely independent of the cash inflow from other assets or groups of assets.

The recoverable amount of a cash-generating unit is recorded as the higher of its fair value less costs of disposal and its value in use. Value in use is calculated based on the following major assumptions.

On an annual basis, future cash flows for each cash-generating unit are based on the most recent budgets and medium-term business forecasts, while future cash flows for subsequent periods take into account the growth potential of businesses. The cash flow projection periods are set appropriately according to the business of each cash-generating unit.

The discount rate applied to each cash-generating unit is calculated mainly based on the pre-tax weighted average cost of capital, and adjusted to properly reflect risks and other factors related to the business using information from external and internal sources.

During the year ended December 31, 2017, the Group recognized indications of impairment, due to significant decrease in profitability in groups of assets such as several business units included in the Electronics segment and Chemicals segment. This was mainly due to sluggish market conditions and other market developments. Due to the downturn of market conditions and changes, the Group recognized an impairment loss of ¥2,720 million. The recoverable amounts are based on value in use and calculated by discounting estimated future cash flows to the present value. The discount rates used to calculate value in use are 7 to 11%, the majority of the value in use resulted to be zero.

During the year ended December 31, 2018, the Group identified impairment indications that the Groups of assets, mainly included in the Electronics segment, experienced decreases in profitability, which was due to sluggish market conditions and changes in market developments. Accordingly, the Group estimated recoverable amounts and recognized an impairment loss of ¥780 million. The recoverable amounts are based on fair value less costs of disposal.

Impairment losses are included in and shown as “other expenses” on the consolidated statements of profit or loss.

(3) Leased assets

The Group leases certain production facilities, which are accounted for based on the contractual terms. The carrying amounts of these leased assets less accumulated depreciation and accumulated impairment losses, as of December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Buildings and structures	¥ 972	**¥8,321**
Machinery, equipment and vehicles	621	**662**
Tools, fixtures and fittings	258	**194**
Total	¥1,853	**¥9,178**

Several lease contracts contain renewal or purchase options. There are no sublease contracts, escalation clauses or restrictions imposed by lease contracts (restrictions concerning dividends, additional borrowings and further leasing, etc.).

Note 9: Goodwill and intangible assets

(1) Reconciliation

Cost

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	¥ 55,605	¥ 1,375	¥126,585	¥127,960
Additions	—	—	5,867	5,867
Additions through business combinations	38,708	28,994	2,734	31,729
Disposals	—	—	(3,052)	(3,052)
Net foreign exchange differences on translation	7,225	924	4,070	4,995
Others	—	—	(116)	(116)
Balance as of December 31	¥101,539	¥31,294	¥136,089	¥167,384

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	**¥101,539**	**¥31,294**	**¥136,089**	**¥167,384**
Additions	**—**	**—**	**9,075**	**9,075**
Additions through business combinations	**14,222**	**—**	**207**	**207**
Disposals	**—**	**—**	**(10,473)**	**(10,473)**
Net foreign exchange differences on translation	**(5,301)**	**(995)**	**(3,530)**	**(4,526)**
Others	**76**	**—**	**0**	**0**
Balance as of December 31	**¥110,537**	**¥30,298**	**¥131,368**	**¥161,667**

Accumulated amortization and impairment losses

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	¥(20,745)	¥ (49)	¥(100,511)	¥(100,560)
Amortization	—	(1,388)	(7,443)	(8,832)
Impairment losses	—	—	(164)	(164)
Disposals	—	—	2,914	2,914
Net foreign exchange differences on translation	(2,036)	(40)	(2,741)	(2,782)
Others	—	—	79	79
Balance as of December 31	¥(22,781)	¥(1,478)	¥(107,867)	¥(109,346)

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	**¥(22,781)**	**¥(1,478)**	**¥(107,867)**	**¥(109,346)**
Amortization	**—**	**(1,495)**	**(6,739)**	**(8,234)**
Impairment losses	**—**	**—**	**(2)**	**(2)**
Disposals	**—**	**—**	**10,158**	**10,158**
Net foreign exchange differences on translation	**1,320**	**71**	**2,331**	**2,403**
Others	**—**	**—**	**—**	**—**
Balance as of December 31	**¥(21,460)**	**¥(2,902)**	**¥(102,119)**	**¥(105,021)**

Carrying amounts

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	¥34,859	¥ 1,326	¥26,073	¥27,400
Balance as of December 31	¥78,757	¥29,816	¥28,222	¥58,038

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)			
		Intangible assets		
	Goodwill	Customer relationships	Other	Total
Balance as of January 1	**¥78,757**	**¥29,816**	**¥28,222**	**¥58,038**
Balance as of December 31	**¥89,076**	**¥27,396**	**¥29,248**	**¥56,645**

Amortization is recorded in “cost of sales” and “selling, general and administrative expenses” on the consolidated statements of profit or loss.

(2) Impairment test of cash-generating units including goodwill

The total carrying amount of goodwill allocated to each cash-generating unit is as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Glass	¥25,859	**¥25,086**
Electronics	7,083	**20,343**
Chemicals	45,815	**43,646**
Total	¥78,757	**¥89,076**

The recoverable amount of goodwill allocated to each cash-generating unit is mainly calculated based on value in use.

Assumptions for value in use are presented in Note 8 “Property, plant and equipment.”

During the year ended December 31, 2017, the Group acquired CMC Biologics, a contract development and manufacturing organization (CDMO) offering biological active pharmaceutical ingredient (API) manufacturing services. The goodwill in connection with this acquisition is included in the corresponding amount for the Chemicals segment. As of December 31, 2017 and 2018, the amount is ¥39,668 million and ¥37,628 million, respectively. In testing for the impairment of goodwill from this acquisition, the Group calculated the value in use by adding the perpetuity value to the future five-year cash flows, which takes into account the average growth rate of the biopharmaceutical market (estimated at 10%) and growth due to synergy effects within the Group. In addition, the discount rates (pre-tax) used to determine the outcome of the impairment test were 12% and 11% for the years ended December 31, 2017 and 2018, respectively. In the event that the growth rate falls below the projected rate, or the discount rate increases by 3 percentage points and 5 percentage points during the years ended December 31, 2017 and 2018, respectively, an impairment loss could be incurred.

The main discount rates (pre-tax) used for impairment tests for cash-generating units including goodwill, except for the above, ranged from 6 to 15% and 6 to 9% for the years ended December 31, 2017 and 2018, respectively. Goodwill for which impairment has not occurred is at risk of impairment if the major assumptions for the test of impairment change. If the discount rates increases by 6 percentage points for the years ended December 31, 2017 and 2018, there is a possibility that impairment losses would be incurred.

There were no impairment losses regarding goodwill recognized during the years ended December 31, 2017 and 2018.

(3) Impairment losses of intangible assets

During the year ended December 31, 2017, the Group recognized an impairment loss of ¥164 million for several business units included in the Electronics segment and Chemicals segment.

During the year ended December 31, 2018, the Group recognized an impairment loss of ¥2 million for several business units included in the Electronics segment.

Impairment losses are included in and shown as “other expenses” on the consolidated statements of profit or loss. Assumptions for value in use and circumstances that resulted in recognition of impairment loss are presented in Note 8 “Property, plant and equipment.”

Note 10: Equity method affiliates

The carrying amounts of investments accounted for using the equity method are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Investments accounted for using equity method	¥39,575	**¥35,245**

Share of profit and other comprehensive income of associates and joint ventures accounted for using the equity method are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Share of profit (loss) of associates and joint ventures accounted for using equity method	¥1,753	**¥1,463**
Share of other comprehensive income of associates and joint ventures accounted for using equity method	(93)	**134**
Total	¥1,659	**¥1,598**

During the years ended December 31, 2017 and 2018, there was no individually significant associate or joint venture accounted for using the equity method.

Note 11: Deferred tax assets and liabilities

(1) Unrecognized deferred tax assets

The Group recognizes deferred tax assets, taking into account deductible temporary differences, projected future taxable profit and tax planning. However, deferred tax assets have not been recognized for the following items:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Carry-forwards of unused tax losses	¥357,674	**¥326,054**
Deductible temporary differences	240,474	**221,290**
Total	¥598,149	**¥547,345**

The amounts of carry-forwards of unused tax losses, for which deferred tax assets have not been recognized, and the expiries of the carry-forwards are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
1st year	¥ 1,773	**¥ 3,351**
2nd year	1,947	**29,957**
3rd year	31,699	**5,554**
4th year	6,218	**2,886**
5th year and thereafter	316,035	**284,304**
Total	¥357,674	**¥326,054**

(2) Unrecognized deferred tax liabilities

As of December 31, 2017 and 2018, the total amounts of taxable temporary differences for which deferred tax liabilities have not been recognized, which relate to investment in subsidiaries, associates and interest in joint arrangements, were ¥283,525 million and ¥380,308 million, respectively.

The Group has not recognized deferred tax liabilities relating to the preceding taxable temporary differences because it is able to control the timing of the reversal of the temporary difference and it is probable that the temporary difference will not reverse in the foreseeable future.

(3) Recognized deferred tax assets and liabilities

Deferred tax assets and liabilities were attributable to the following items:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Deferred tax assets		
Post-employment benefit liabilities	¥ 20,006	**¥ 16,271**
Depreciation	7,765	**7,631**
Impairment losses	1,700	**1,225**
Carry-forwards of unused tax losses	16,688	**20,018**
Others	27,099	**19,898**
Total deferred tax assets	73,261	**65,046**
Deferred tax liabilities		
Financial assets measured at fair value through other comprehensive income	(45,603)	**(30,182)**
Gain on establishment of trust for retirement benefits	(8,352)	**(566)**
Depreciation	(21,602)	**(25,109)**
Deferred capital gain reserve	(4,579)	**(4,514)**
Others	(29,459)	**(19,521)**
Total deferred tax liabilities	(109,597)	**(79,894)**
Net deferred tax assets	¥ (36,335)	**¥(14,848)**

(4) Increase and decrease of deferred tax assets and liabilities

Increase and decrease of deferred tax assets and liabilities are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Balance as of January 1 (net amount)	¥ 7,311	**¥(36,335)**
Recognized in profit or loss	(24,198)	**3,019**
Recognized in other comprehensive income	(12,983)	**14,077**
Others (business combinations and others)	(6,465)	**4,388**
Balance as of December 31 (net amount)	¥(36,335)	**¥(14,848)**

Note 12: Trade and other payables

Trade payables

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Notes payable	¥ 1,413	**¥ 1,552**
Trade accounts payable	158,076	**155,041**
Total	¥159,489	**¥156,594**

Other payables

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Other accounts payable	¥ 63,067	**¥ 75,002**
Accrued expenses	36,976	**38,660**
Others	27,536	**29,539**
Total	¥127,580	**¥143,202**

Note 13: Interest-bearing debt

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Short-term bank loans	¥ 43,073	**¥ 48,535**
Commercial paper	30,593	**18,745**
Long-term bank loans due within one year	62,941	**41,087**
Corporate bonds due within one year	—	**30,000**
Short-term lease obligations	687	**809**
Total current liabilities	137,296	**139,178**
Long-term bank loans	279,401	**332,895**
Corporate bonds	69,876	**59,834**
Long-term lease obligations	2,511	**9,872**
Total non-current liabilities	351,789	**402,601**
Total interest-bearing debt	¥489,085	**¥541,780**

Please see Note 25 “Financial instruments” for further information on the Group’s interest rate risk, currency risk, and liquidity risk. Assets pledged as collateral are presented in Note 29 “Collateral.”

(1) Bonds

Company	Name of bond	Date of issuance	As of January 1, 2018 (Millions of yen)	As of December 31, 2018 (Millions of yen)	Interest rate (% annum)(Note 2)	Collateral	Date of maturity
Asahi Glass Co., Ltd.	12th straight bond	Jan. 29, 2009	**¥29,988**	**¥ 30,000**	1.94	None	Jan. 29, 2019
				(30,000)			
Asahi Glass Co., Ltd.	14th straight bond	Jun. 3, 2013	**19,958**	**19,966**	1.01	None	Jun. 2, 2023
Asahi Glass Co., Ltd.	15th straight bond	May 29, 2017	**19,928**	**19,936**	0.31	None	May 28, 2027
AGC Inc.	1st straight bond	Oct. 12, 2018	**—**	**19,931**	0.23	None	Oct. 10, 2025
Total(Note 1)	—	—	**¥69,876**	**¥ 89,834**	—	—	—
			(—)	**(30,000)**			

Notes: 1. The component figures disclosed in parentheses in the "As of January 1, 2018" and "As of December 31, 2018" columns represent balances due within one year.
2. The interest rate column shows the coupon rates applicable to each bond as of December 31, 2018. Accordingly, these rates are different from the effective annual interest rates.

(2) Borrowings

As of December 31, 2018, the weighted average effective interest rate for "short-term bank loans," "commercial paper," "long-term bank loans due within one year" and "long-term bank loans" are 1.5%, 0.7%, 1.2% and 1.0% per annum, respectively.

The maturities of "long-term bank loans" are from 2020 to 2030.

(3) Finance lease obligations

The balances by due date and present value of finance lease obligations are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)		**FY2018 (as of December 31, 2018)**	
	Balances by due date	Present value	Balances by due date	Present value
Due within one year or less	¥ 770	¥ 687	**¥ 1,544**	**¥ 809**
Due between one and five years	1,876	1,646	**4,934**	**2,263**
Due after five years	1,089	865	**13,012**	**7,608**
Total	¥3,737	¥3,199	**¥19,491**	**¥10,681**

(4) Liabilities arising from financing activities

The changes of liabilities arising from financing activities are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)				
	Borrowings	Commercial paper	Corporate bonds	Lease obligations	Total liabilities arising from financing activities
Balance as of January 1	¥360,481	¥ —	¥69,918	¥3,568	¥433,968
Cash flows	841	30,647	(76)	(769)	30,642
Non-cash changes					
Increase in finance lease obligations	—	—	—	388	388
Foreign exchange differences	8,541	(54)	—	14	8,501
Changes in the scope of consolidation	15,553	—	—	1	15,555
Others	—	—	33	(4)	29
Balance as of December 31	¥385,417	¥30,593	¥69,876	¥3,199	¥489,085

On the consolidated statements of cash flows, expenditure from payment for finance lease obligations is included in "others" of cash flows from financing activities.

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)				
	Borrowings	Commercial paper	Corporate bonds	Lease obligations	Total liabilities arising from financing activities
Balance as of January 1	¥385,417	¥ 30,593	¥69,876	¥ 3,199	¥489,085
Cash flows	46,407	(11,942)	19,929	(821)	53,572
Non-cash changes					
Increase in finance lease obligations	—	—	—	8,804	8,804
Foreign exchange differences	(9,462)	95	—	(501)	(9,868)
Changes in the scope of consolidation	156	—	—	—	156
Others	—	—	28	—	28
Balance as of December 31	¥422,518	¥18,745	¥89,834	¥10,681	¥541,780

On the consolidated statements of cash flows, expenditure from payment for finance lease obligations is included in "others" of cash flows from financing activities.

Note 14: Provisions

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	FY2018 (as of December 31, 2018)
Provisions for restructuring costs	¥ 1,362	¥ 432
Other provisions	530	497
Total current liabilities	¥ 1,893	¥ 929
Provisions for restructuring costs	¥ 762	¥1,616
Other provisions	9,283	6,433
Total non-current liabilities	¥10,045	¥8,049

"Other provisions" consists of various provisions for undetermined obligation related to identifiable risks, such as asset retirement obligations and environment-related provisions.

There is no significant balance of asset retirement obligations as of December 31, 2017 and 2018.

A reconciliation of opening and closing balances for each class of provision is as follows:

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)		
	Provisions for restructuring costs	Other provisions	Total
Balance as of January 1	¥ 2,125	¥ 9,813	¥11,938
Amounts increased during the period	2,089	974	3,064
Amounts used during the period	(847)	(2,073)	(2,921)
Unused amounts reversed during the period	(1,250)	(1,402)	(2,653)
Others	(67)	(380)	(448)
Balance as of December 31	¥ 2,048	¥ 6,930	¥ 8,979

During the year ended December 31, 2018, the Group recognized a reserve for restructuring programs measured at estimated future losses arising from restructuring actions such as an expansion in the additional severance compensation program to improve the business structure and the reorganization of certain operations. The timing of the payment may be affected by future business plans.

Note 15: Employee benefits

The Group has the following retirement benefit plans: defined benefit corporate pension plans, employees' pension fund plans, lump-sum severance payment plans, and defined contribution pension plans.

The level of defined benefit pension plans is determined based on a certain number of points conferred according to an individual employee's contribution during his or her period of service. Asset administration, investment, and benefits are provided mainly by corporate pension funds. The investment yield of the corporate pension is set in consideration of the sustainability of the plan.

(1) Defined benefit plans

The amounts for defined benefit plans recognized on the consolidated statements of financial position are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Present value of defined benefit obligations	¥(378,472)	**¥(363,984)**
Fair value of plan assets	328,381	**302,974**
Total	¥ (50,090)	**¥ (61,009)**
Prepaid pension expenses[Note]	¥ 495	**¥ 468**
Post-employment benefit liabilities	(50,585)	**(61,478)**

Note: Prepaid pension expenses are included in "other non-current assets" on the consolidated statements of financial position.

(Corporate pension plan of the Company)

The Company's pension plan is managed through a legally independent entity AGC Corporate Pension Fund (the "Fund"). The Fund has a Board of Representatives split evenly between representatives selected by the Company and representatives elected by the pension plan members through mutual vote. The representatives elect directors and a controller through mutual vote. After that, the president (the chairman of the Board of Representatives) is selected.

Under the Defined-Benefit Corporate Pension Act, the Company is obligated to make pension contributions to the Fund which provides pension benefits. The directors of the Fund are responsible for faithfully executing operations related to the administration and investment of pension reserves for the Fund in compliance with laws and regulations, any orders issued by the Minister of Health, Labour and Welfare, and the director-generals of Regional Bureaus of Health and Welfare based on laws and regulations, as well as the rules of the Fund and the resolutions of the Board of Representatives. Furthermore, directors are prohibited from engaging in any actions that could hinder proper administration and investment of the pension reserves for the purpose of furthering their own interests or the interests of third parties other than the Fund.

i) Changes in the present value of defined benefit obligations

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
As of January 1	¥(377,430)	**¥(378,472)**
Benefits paid by the plan	20,797	**17,935**
Current service cost	(9,467)	**(10,744)**
Interest cost	(4,540)	**(4,098)**
Past service cost and settlement	(1,607)	**(560)**
Actuarial gains and losses	(3,802)	**5,548**
Due to changes in demographic assumptions	(358)	**2,277**
Due to changes in financial assumptions	2,025	**3,186**
Others	(5,469)	**83**
Foreign exchange differences	(1,458)	**6,236**
Others	(962)	**173**
As of December 31	¥(378,472)	**¥(363,984)**

The weighted average duration of defined benefit obligations was mainly 16 years as of December 31, 2017 and 2018, respectively.

ii) Changes in the fair value of plan assets

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
As of January 1	¥310,969	**¥328,381**
Employer contributions	11,263	**7,182**
Benefits paid by the plan	(18,999)	**(16,144)**
Interest income(Note)	2,888	**2,698**
Settlement	—	**—**
Income related to plan assets (excluding interest income)	21,711	**(13,310)**
Foreign exchange differences	602	**(5,660)**
Others	(53)	**(173)**
As of December 31	¥328,381	**¥302,974**

Note: Interest income is measured as the fair value of plan assets multiplied by the discount rate.

The Group plans to contribute ¥7,034 million to retirement benefit plans during the year ending December 31, 2019.

In accordance with the rules of the Fund, every five years the Company is required to recalculate the amount of pension contributions, with the end of the Fund's business year set as the record date. This is to maintain the Fund's financial stability into the future.

In the recalculation process, the Company reviews the base rates related to the pension contributions (assumed interest rate, assumed mortality rate, assumed withdrawal rate, assumed salary increase rate, assumed number of new pension plan members, etc.) in order to re-examine the appropriateness of the pension contributions.

iii) Components of plan assets

Plan assets are invested with the aim of ensuring the sustainability of the defined benefit plans. Plan assets are invested mainly in bonds and equities, and are exposed to market risk in each area. The Group has formulated a policy on risk and return targets for the investment of plan assets. The Group properly monitors investment performance, and regularly reviews this policy, taking into account the funding status and market developments surrounding investments.

The components of plan assets are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)			**FY2018 (as of December 31, 2018)**		
	Assets with quoted market prices in an active market	Assets without quoted market prices in an active market (Note)	Subtotal	Assets with quoted market prices in an active market	Assets without quoted market prices in an active market (Note)	Subtotal
Equity securities	¥ 87,504	¥ 57,951	¥145,456	**¥ 68,869**	**¥ 50,864**	**¥119,733**
Bonds	49,077	92,729	141,806	**48,076**	**89,994**	**138,071**
Others	1,651	39,466	41,118	**6,598**	**38,570**	**45,169**
Total	¥138,234	¥190,147	¥328,381	**¥123,545**	**¥179,429**	**¥302,974**

Note: Equity securities include privately placed investment trusts that do not have quoted market prices in an active market, and comprise publicly traded shares in Japan and overseas. Others include cash equivalents.

iv) Analysis of post-employment benefit expenses

Amounts recognized as expenses related to post-employment benefits are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Current service cost	¥ (9,467)	**¥(10,744)**
Interest cost	(4,540)	**(4,098)**
Interest income	2,888	**2,698**
Past service cost and gains or losses on settlement	(1,607)	**(560)**
Total	¥(12,733)	**¥(12,705)**

The foregoing expenses are included in "cost of sales," "selling, general and administrative expenses" and certain other accounts on the consolidated statements of profit or loss.

v) Actuarial assumptions

Principal actuarial assumptions as of December 31, 2017 and 2018 are as follows:

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Discount rate (%)	0.6	**0.6**

In addition to the above, actuarial assumptions include future salary increases, the mortality rate and the expected retirement rate.

vi) Sensitivity analysis of actuarial assumptions

The followings are changes in defined benefit obligations that would result from the changes below in the discount rate as of December 31, 2018. This analysis assumes that all other variables are held constant.

(Unit: Millions of yen)

	FY2018 (as of December 31, 2018)
Discount rate (0.5% increase)	**¥ 23,445**
Discount rate (0.5% decrease)	**(26,580)**

(2) Defined contribution plans

Amounts recognized as expenses related to defined contribution plans are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Expenses related to defined contribution plans	¥(2,099)	**¥(2,094)**

The abovementioned expenses are included in "cost of sales" and "selling, general and administrative expenses" on the consolidated statements of profit or loss.

Note 16: Share-based payments

(1) Stock options

i) Description of stock options

Until the year ended December 31, 2017, the Company granted the Group's directors, executive officers and other employees with stock options, which confer the right to purchase the Company's shares. Under the plan, 200 shares of common stock per one stock acquisition right are granted to the grantees. Stock options that are not exercised during the exercisable period will expire.

The general terms and conditions for stock options are as follows. The presentation is based on the numbers when the shares were granted.

Grant date	Number of shares granted	Vesting conditions	Exercisable period	Exercise price (Yen)
July 2, 2007 (Compensation-type)	53,200	(Note 1)	From July 3, 2007 to July 2, 2037 (Note 1)	¥ 1
July 1, 2008 (Compensation-type)	53,000	(Note 1)	From July 2, 2008 to July 1, 2038 (Note 1)	1
July 1, 2009 (Compensation-type)	129,400	(Note 1)	From July 2, 2009 to July 1, 2039 (Note 1)	1
July 1, 2010 (Compensation-type)	86,400	(Note 1)	From July 2, 2010 to July 1, 2040 (Note 1)	1
September 1, 2010 (Ordinary-type)	41,000	An option holder must remain in continued service from the grant date (September 1, 2010) to the vesting date (August 31, 2013).	From September 1, 2013 to August 31, 2019	4,310
July 1, 2011 (Compensation-type)	86,000	(Note 1)	From July 2, 2011 to July 1, 2041 (Note 1)	1
July 1, 2011 (Ordinary-type)	35,200	An option holder must remain in continued service from the grant date (July 1, 2011) to the vesting date (June 30, 2014).	From July 1, 2014 to June 30, 2020	4,820
July 2, 2012 (Compensation-type)	204,000	(Note 1)	From July 3, 2012 to July 2, 2042 (Note 1)	1
July 2, 2012 (Ordinary-type)	61,600	An option holder must remain in continued service from the grant date (July 2, 2012) to the vesting date (July 1, 2015).	From July 2, 2015 to July 1, 2021	2,810
March 26, 2013 (Compensation-type)	55,600	(Note 1)	From March 27, 2013 to March 26, 2043 (Note 1)	1
July 1, 2013 (Compensation-type)	118,400	(Note 1)	From July 2, 2013 to July 1, 2043 (Note 1)	1
July 1, 2013 (Ordinary-type)	66,200	An option holder must remain in continued service from the grant date (July 1, 2013) to the vesting date (June 30, 2016).	From July 1, 2016 to June 30, 2022	3,805
July 1, 2014 (Compensation-type)	128,800	(Note 1)	From July 2, 2014 to July 1, 2044 (Note 1)	1
July 1, 2014 (Ordinary-type)	66,000	An option holder must remain in continued service from the grant date (July 1, 2014) to the vesting date (June 30, 2017).	From July 1, 2017 to June 30, 2023	3,035
January 27, 2015 (Compensation-type)	4,800	(Note 1)	From January 28, 2015 to January 27, 2045 (Note 1)	1
July 1, 2015 (Compensation-type)	90,200	(Note 1)	From July 2, 2015 to July 1, 2045 (Note 1)	1
July 1, 2015 (Ordinary-type)	75,200	An option holder must remain in continued service from the grant date (July 1, 2015) to the vesting date (June 30, 2018).	From July 1, 2018 to June 30, 2024	4,000
February 22, 2016 (Compensation-type)	12,200	(Note 1)	From February 23, 2016 to February 22, 2046 (Note 1)	1
July 1, 2016 (Compensation-type)	139,200	(Note 1)	From July 2, 2016 to July 1, 2046 (Note 1)	1
July 1, 2016 (Ordinary-type)	76,000	An option holder must remain in continued service from the grant date (July 1, 2016) to the vesting date (June 30, 2019).	From July 1, 2019 to June 30, 2025	3,260
March 24, 2017 (Compensation-type)	24,200	(Note 1)	From March 25, 2017 to March 24, 2047 (Note 1)	1
July 3, 2017 (Compensation-type)	60,200	(Note 1)	From July 4, 2017 to July 3, 2047 (Note 1)	1

Notes: 1. Vesting conditions and exercisable period

Within the abovementioned exercisable periods, option holders may exercise their subscription rights within 10 years from the day after they lose their position as a director or an executive officer of the Company.

2. Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares granted and exercise price are calculated on the assumption that the consolidation of shares has been conducted on the grant date.

ii) Number and average exercise price of stock options

The number and weighted average exercise prices of stock options granted during the period are as follows. The number of stock options is shown after conversion into the number of shares.

	FY2017 (Jan. 1 through Dec. 31, 2017)		**FY2018 (Jan. 1 through Dec. 31, 2018)**	
	Number (Shares)	Weighted average exercise price (Yen)	Number (Shares)	Weighted average exercise price (Yen)
Outstanding as of January 1	1,397,000	¥1,034	**1,401,400**	**¥ 955**
Granted during the period	84,400	1	**—**	**—**
Forfeited during the period	—	—	**—**	**—**
Exercised during the period	80,000	1,319	**65,400**	**1,478**
Expired during the period	—	—	**2,800**	**1**
Outstanding as of December 31	1,401,400	¥ 955	**1,333,200**	**¥ 932**
Exercisable as of December 31	1,251,800	¥ 636	**1,257,200**	**¥ 791**

Note: Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares and weighted average exercise price are calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017.

The weighted average remaining contractual period was 20.3 years and 19.5 years as of December 31, 2017 and 2018, respectively.

The weighted average share price on the exercise dates of stock options exercised in the years ended December 31, 2017 and 2018 were ¥4,559 and ¥4,448, respectively.

iii) Fair value of stock options

The fair value of stock options granted during the year ended December 31, 2017 was estimated using the Black-Scholes formula, taking into account the following assumptions:

	Grant date	
	March 24, 2017 (Compensation-type)	July 3, 2017 (Compensation-type)
Fair value as of the measurement date (Yen)	¥3,380	¥3,555
Stock price (Yen)	4,555	4,730
Exercise price (Yen)	1	1
Expected volatility	35%	34%
Remaining contractual period	15 years	15 years
Expected dividends	90 yen/share	90 yen/share
Risk-free interest rate	0.34%	0.31%

The expected volatility is estimated based on the historical share price over the most recent period corresponding to the remaining contractual period.

Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Fair value as of the measurement date, stock price, exercise price and expected dividends are calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017.

There were no stock options granted during the year ended December 31, 2018.

iv) Equity-settled share-based payment transactions for which IFRS 2 is not applied

Out of the description in i) above, due to optional exemptions by IFRS 1, details of stock options for which IFRS 2 has not been applied are as follows:

Grant date	Number of shares granted	Vesting conditions	Exercisable period	Exercise price (Yen)
July 2, 2007 (Compensation-type)	53,200	(Note 1)	From July 3, 2007 to July 2, 2037 (Note 1)	¥1
July 1, 2008 (Compensation-type)	53,000	(Note 1)	From July 2, 2008 to July 1, 2038 (Note 1)	1
July 1, 2009 (Compensation-type)	129,400	(Note 1)	From July 2, 2009 to July 1, 2039 (Note 1)	1
July 1, 2010 (Compensation-type)	86,400	(Note 1)	From July 2, 2010 to July 1, 2040 (Note 1)	1
July 1, 2011 (Compensation-type)	86,000	(Note 1)	From July 2, 2011 to July 1, 2041 (Note 1)	1

Notes: 1. Vesting conditions and exercisable period

Within the abovementioned exercisable periods, option holders may exercise their subscription rights within 10 years from the day after they lose their position as a director or an executive officer of the Company.

2. Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares granted is calculated on the assumption that the consolidation of shares has been conducted on the grant date.

v) Expenses recorded under stock options

Expenses recorded under stock options were ¥332 million and ¥19 million during the years ended December 31, 2017 and 2018, respectively.

These expenses were included in “cost of sales” and “selling, general and administrative expenses” on the consolidated statements of profit or loss.

(2) Share-based compensation plan that uses a structure called BIP Trust

i) Description of share-based compensation plan that uses a structure called BIP Trust

The Company has introduced a plan to its directors and executive officers (excluding non-residents of Japan; hereinafter referred to as “directors, etc.”) from the year ended December 31, 2018, the purpose is to further motivate the contributions to the increase of the Group’s corporate value in medium-to-long-term, and the achievement of performance targets as set out in the medium-term management plan.

In the plan, the BIP Trust acquires the Company’s shares, and delivers the shares and provides the amount of money equivalent to the value of the shares to directors, etc., based on their positions and the level of achievement of the performance targets and other factors.

ii) Expenses recorded under the share-based compensation plan that uses a structure called BIP Trust

Expenses recorded under the plan were ¥249 million during the year ended December 31, 2018.

These expenses were included in “cost of sales” and “selling, general and administrative expenses” on the consolidated statements of profit or loss.

iii) Weighted average fair value of the Company’s shares granted during the period

Weighted average fair value of the Company’s shares granted during the period is measured based on observable market prices, including expected dividends, etc.

Weighted average fair value of the Company’s shares granted during the year ended December 31, 2018 was ¥4,441.

Note 17: Equity

(1) Share capital and share premium

(Unit: Thousands of shares)

	Fully paid issued shares (No par value ordinary shares)	
	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
As of January 1	237,341	**235,177**
Decrease due to cancellation of treasury shares	(2,163)	**(7,736)**
As of December 31	235,177	**227,441**
Number of authorized shares	400,000	**400,000**

Note: Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017. In accordance with the resolutions of the Board of Directors meeting held on May 9, 2017, the Company canceled its treasury shares during the year ended December 31, 2017. The Company canceled 3,199,600 and 4,536,800 treasury shares in accordance with the resolutions of the Board of Directors meetings held on March 9, 2018 and November 13, 2018, respectively.

Out of the amount generated from the equity transaction, capital surplus consists of the amount which is not included in share capital.

Under the Companies Act of Japan, at least 50% of the proceeds of certain issues of common shares shall be credited to share capital.

(2) Retained earnings

Retained earnings include amounts transferred from accumulated gains or losses recognized in other components of equity upon the sale of financial assets measured at fair value through other comprehensive income.

Furthermore, retained earnings include the amount of accumulated foreign currency translation adjustments that had been recognized based on previous standards (JGAAP), and transferred to retained earnings as of the transition date to IFRS.

(3) Treasury shares

(Unit: Thousands of shares)

	Treasury shares	
	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
As of January 1	6,069	**9,204**
Increase due to acquisition of treasury shares in accordance with the resolution of the Board of Directors	5,367	**4,536**
Decrease due to cancellation of treasury shares	(2,163)	**(7,736)**
Decrease due to sales of less-than-one-unit shares	(0)	**(0)**
Increase due to purchases of less-than-one-unit shares	10	**6**
Decrease due to exercise of stock options	(80)	**(65)**
Increase due to purchases by the BIP Trust	—	**312**
As of December 31	9,204	**6,256**

Note: Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. The number of shares is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017. In accordance with the resolutions of the Board of Directors meeting held on May 9, 2017, the Company canceled its treasury shares during the year ended December 31, 2017. The Company canceled its treasury shares in accordance with the resolutions of the Board of Directors meetings held on March 9, 2018 and November 13, 2018, respectively.

(4) Other components of equity

The following is a breakdown of other components of equity:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Remeasurement of the net defined benefit liability (asset)	¥ (32,480)	**¥ (37,767)**
Net gain (loss) on revaluation of financial assets measured at FVTOCI	105,270	**70,288**
Net gain (loss) in fair value of cash flow hedges	548	**103**
Exchange differences on translation of foreign operations	226,377	**174,399**
Total	¥299,716	**¥207,023**

Remeasurement of the net defined benefit liability (asset)

Remeasurement of the net defined benefit liability (asset) includes the effects of differences between the actuarial assumptions at the beginning of the period and the actual numbers at the end of the period, and differences between actual income from plan assets and projected interest income from plan assets.

Net gain (loss) on revaluation of financial assets measured at FVTOCI

This includes the cumulative amount of net gain (loss) on revaluation of financial assets measured at FVTOCI.

Net gain (loss) in fair value of cash flow hedges

This is the effective portion of the cumulative amount of the net gain (loss) in fair value of cash flow hedges relating to hedge transactions that have not yet been realized.

Exchange differences on translation of foreign operations

These are foreign currency differences arising from the translation of the financial statements of foreign operations.

(5) Dividends

Dividends paid during the years ended December 31, 2017 and 2018 are as follows:

(Year ended December 31, 2017)

Date of approval	Type of share	Total amount of dividends (Millions of yen)	Dividends per share (Yen)	Record date	Effective date
Shareholders' meeting held on March 30, 2017	Ordinary shares	¥10,407	¥ 9.00	December 31, 2016	March 31, 2017
Board of Directors meeting held on August 1, 2017	Ordinary shares	11,457	10.00	June 30, 2017	September 8, 2017

Note: The interim dividend was paid out based on the number of shares before the share consolidation.

(Year ended December 31, 2018)

Date of approval	Type of share	Total amount of dividends (Millions of yen)	Dividends per share (Yen)	Record date	Effective date
Shareholders' meeting held on March 29, 2018	Ordinary shares	**¥12,428**	**¥55.00**	December 31, 2017	March 30, 2018
Board of Directors meeting held on July 31, 2018	Ordinary shares	**12,430**	**55.00**	June 30, 2018	September 7, 2018

Note: The interim dividend includes dividend payment of ¥17 million paid for the shares held by the BIP Trust.

Dividends for which the effective date falls in the period subsequent to the fiscal year are as follows:

(Year ended December 31, 2017)

Date of approval	Type of share	Total amount of dividends (Millions of yen)	Dividends per share (Yen)	Record date	Effective date
Shareholders' meeting held on March 29, 2018	Ordinary shares	¥12,428	¥55.00	December 31, 2017	March 30, 2018

(Year ended December 31, 2018)

Date of approval	Type of share	Total amount of dividends (Millions of yen)	Dividends per share (Yen)	Record date	Effective date
Shareholders' meeting held on March 28, 2019	Ordinary shares	**¥13,289**	**¥60.00**	December 31, 2018	March 29, 2019

Note: Total amount of dividends includes dividend payment of ¥18 million paid for the shares held by the BIP Trust.

Note 18: Other comprehensive income

Changes in other comprehensive income during the years ended December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)			**FY2018 (Jan. 1 through Dec. 31, 2018)**		
	Before tax effects	Tax effects	Net amount	Before tax effects	Tax effects	Net amount
Remeasurement of the net defined benefit liability (asset)	¥17,908	¥ (5,520)	¥12,388	**¥ (7,762)**	**¥ 2,711**	**¥ (5,050)**
Financial assets measured at FVTOCI	24,487	(7,279)	17,207	**(36,255)**	**10,999**	**(25,256)**
Net gain (loss) in fair value of cash flow hedges	444	(76)	367	**(690)**	**154**	**(535)**
Exchange differences on translation of foreign operations	36,385	(84)	36,301	**(55,565)**	**204**	**(55,361)**
Share of other comprehensive income of associates and joint ventures accounted for using equity method	(72)	(21)	(93)	**126**	**8**	**134**
Total	¥79,153	¥(12,983)	¥66,170	**¥(100,146)**	**¥14,077**	**¥(86,068)**

As of December 31, 2017, the reclassification adjustments of exchange differences on translation of foreign operations were ¥(425) million (before tax effects) and ¥131 million (tax effects). As of December 31, 2018, the reclassification adjustments of exchange differences on translation of foreign operations were ¥(746) million (before tax effects) and ¥239 million (tax effects).

Amounts attributable to non-controlling interests are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)			**FY2018 (Jan. 1 through Dec. 31, 2018)**		
	Before tax effects	Tax effects	Net amount	Before tax effects	Tax effects	Net amount
Remeasurement of the net defined benefit liability (asset)	¥(420)	¥ 98	¥(321)	**¥ 341**	**¥(17)**	**¥ 324**
Financial assets measured at FVTOCI	(1)	(0)	(2)	**(19)**	**5**	**(14)**
Net gain (loss) in fair value of cash flow hedges	20	0	20	**(35)**	**2**	**(32)**
Exchange differences on translation of foreign operations	601	8	609	**(3,374)**	**(8)**	**(3,382)**
Total	¥ 200	¥105	¥ 306	**¥(3,087)**	**¥(17)**	**¥(3,104)**

Note 19: Revenue

(1) Disaggregation of revenue

As disclosed in Note 4 “Segment information,” the Group has three reportable segments: Glass, Electronics, and Chemicals. In addition, sales are disaggregated by product groups and geographical segments. The reconciliations of the disaggregated revenue with the Group’s sales components are as follows.

When applying IFRS 15 *Revenue from Contracts with Customers*, (“IFRS 15”) the Group applies this standard retrospectively with the cumulative effect of initially applying this standard recognized at the date of initial application. Thus, comparative information was not restated.

i) Disaggregation by product groups

(Unit: Millions of yen)

		FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Glass	Building & Industrial glass	¥ 347,931	**¥ 358,858**
	Automotive glass	386,021	**397,301**
	Subtotal	733,953	**756,160**
Electronics	Display	195,538	**183,364**
	Electronics materials	65,087	**66,920**
	Subtotal	260,626	**250,285**
Chemicals	Chlor-alkali & urethane	280,039	**316,629**
	Fluorochemical & specialty	118,496	**120,518**
	Life science	36,608	**44,949**
	Subtotal	435,145	**482,097**
Ceramics/Others		33,807	**34,361**
Total		¥1,463,532	**¥1,522,904**

ii) Disaggregation by geographical segments

FY2017 (Jan. 1 through Dec. 31, 2017)

(Unit: Millions of yen)

	Glass	Electronics	Chemicals	Ceramics/Others	Total
Japan/Asia	¥313,643	¥246,485	¥379,450	¥33,807	¥ 973,388
America	121,267	10,217	29,437	—	160,921
Europe	299,041	3,923	26,257	—	329,222
Total	¥733,953	¥260,626	¥435,145	¥33,807	¥1,463,532

FY2018 (Jan. 1 through Dec. 31, 2018)

(Unit: Millions of yen)

	Glass	Electronics	Chemicals	Ceramics/Others	Total
Japan/Asia	¥320,998	¥232,691	¥417,603	¥34,361	¥1,005,654
America	118,822	13,307	34,139	—	166,269
Europe	316,339	4,286	30,354	—	350,980
Total	¥756,160	¥250,285	¥482,097	¥34,361	¥1,522,904

Note: Sales by region are based on the location of each company, and "Brazil" is included in "America."

In the Glass segment, the Group sells architectural glass and automotive glass and delivers and installs related products, etc. Main customers are domestic and overseas housing, building and automotive companies.

In the Electronics segment, the Group delivers glass for display such as LCD glass, optoelectronics materials, semiconductor-related products, etc. Main customers are domestic and overseas panel manufactures and electronics companies.

In the Chemicals segment, the Group delivers chlor-alkali & urethane, fluorochemical & specialty chemicals, and life science products, etc. and sells products worldwide through trading companies and the Group's sales companies.

These are accounted for in accordance with the accounting policy described in Note 3 "Significant accounting policies." The consideration for performance obligations is mainly recovered within one year after performance obligations are satisfied. In addition, the consideration for performance obligations does not include a significant financing component.

(2) Contract balances

Information on contract assets and liabilities arising from contracts with customers is as follows:

(Unit: Millions of yen)

	The date of initial application (January 1, 2018)	FY2018 (as of December 31, 2018)
Interest income	¥1,943	¥ 629
Dividend income	9,018	11,381

Contract assets primarily relate to the Group's rights to receive consideration for performance obligations that have been completed, but not yet billed for, as of the reporting date. Contract assets are reclassified as receivables when the Group's right to payment becomes unconditional.

Contract liabilities mainly relate to consideration received from customers before the Group delivers products to them, based on receivables management and other considerations. There are no significant amounts of revenue from the balance of contract liabilities as of January 1, 2018, the beginning of the fiscal year under review, that the Group will recognize in the following fiscal year onward. There are no significant amounts of revenue recognized during the year ended December 31, 2018 from performance obligations satisfied in the prior fiscal year.

(3) Transaction price allocated to the remaining performance obligations

The Group applies the practical expedients for exemption on disclosure of information on remaining performance obligations that have original expected duration of one year or less. The Group has no significant transactions with original expected duration exceeding one year. In addition, there are no significant amounts in consideration from contracts with customers that are not included in transaction prices.

(4) Assets recognized from the costs of obtaining or fulfilling contracts with customers

There are no assets recognized from the costs of obtaining or fulfilling contracts with customers as of the year ended December 31, 2018. In addition, if the amortization period of the assets that the Group otherwise would have recognized is one year or less, the Group applies the practical expedient of recognizing the incremental costs of obtaining the contract as an expense when incurred.

Note 20: Classification of expenses by nature

The classification of expenses by nature and reconciliation with business profit are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Net sales	¥1,463,532	**¥1,522,904**
Personnel expenses	(292,714)	**(308,238)**
Depreciation and amortization	(128,226)	**(121,668)**
Others	(922,945)	**(972,441)**
Operating profit	119,646	**120,555**
Foreign exchange gain	—	**4,928**
Gains on sale of non-current assets	2,773	**4,143**
Reversal of provisions for restructuring programs	917	**1,250**
Gain on sale of shares of subsidiaries	—	**1,607**
Others	3,288	**3,243**
Other income	6,979	**15,174**
Foreign exchange loss	(986)	**—**
Losses on disposal of non-current assets	(5,664)	**(5,327)**
Impairment loss	(2,885)	**(743)**
Expenses for restructuring programs	(1,992)	**(3,607)**
Others	(1,183)	**(3,551)**
Other expenses	(12,711)	**(13,230)**
Business profit	¥ 113,915	**¥ 122,499**

The total amounts of research and development expenses were ¥43,912 million and ¥45,755 million during the years ended December 31, 2017 and 2018, respectively.

The total amount of impairment losses included in expenses for restructuring programs was ¥39 million during the year ended December 31, 2018 and no such impairment losses were recognized during the year ended December 31, 2017.

Note 21: Operating leases

Leases as lessee

The Group leases certain buildings and other assets under operating leases.

Several lease contracts contain renewal or purchase options. There are no sublease contracts, escalation clauses or restrictions imposed by lease contracts (restrictions concerning dividends, additional debt and further leasing, etc.).

Future minimum lease payments under non-cancelable operating leases are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Due within one year or less	¥ 3,082	**¥ 8,162**
Due after one year through five years	7,976	**22,914**
Due after five years	7,149	**10,854**
Total	¥18,208	**¥41,931**

The total amounts of minimum lease payments recognized in profit and loss were ¥2,846 million and ¥8,268 million during the years ended December 31, 2017 and 2018, respectively.

Note 22: Finance income and finance costs

(1) Finance income

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Interest income	¥3,326	**¥ 6,239**
Dividend income	4,832	**5,311**
Others	103	**4,500**
Total	¥8,262	**¥16,050**

(2) Finance costs

	(Unit: Millions of yen)	
	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Interest expense	¥(7,228)	**¥ (9,351)**
Others	(523)	**(794)**
Total	¥(7,752)	**¥(10,145)**

Interest income and interest expense are generated primarily from financial assets and financial liabilities measured at amortized cost.

Dividend income is generated mainly from financial assets measured at fair value through other comprehensive income.

The "Others" component of "Finance income" during the year ended December 31, 2018, mainly represents gains on settlement of contingent consideration liability.

Note 23: Income tax expenses

(1) Composition of income tax expenses

	(Unit: Millions of yen)	
	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Current income tax expenses	¥(10,928)	**¥(29,432)**
Deferred income tax expenses	(24,198)	**3,019**
Total	¥(35,127)	**¥(26,412)**

Deferred income tax expenses include the amounts of the benefits from previously unrecognized tax losses, tax credits, or temporary differences of prior periods that were used to reduce deferred income tax expenses. During the years ended December 31, 2017 and 2018, the amounts of decrease in deferred income tax expenses due to these benefits were ¥559 million and ¥169 million, respectively.

The main fluctuations in deferred income tax expenses due to changes in tax rates during the year ended December 31, 2017 were as follows. In December 2017, tax reform bills were enacted in the United States and Belgium, and accordingly deferred income tax expenses decreased by ¥3,037 million and increased by ¥3,040 million, respectively.

There were no material fluctuations in deferred income tax expenses due to changes in tax rates during the year ended December 31, 2018.

(2) Income tax recognized in other comprehensive income

Income tax recognized in other comprehensive income is presented in Note 18 "Other comprehensive income."

(3) Reconciliation between effective statutory tax rate and effective income tax rate

Income tax expenses applicable to the Company and its domestic consolidated subsidiaries consist of corporate income tax (national), enterprise tax (local) and resident income tax (local). The effective statutory tax rates calculated by using these taxes for the years ended December 31, 2017 and 2018 are 30.7%.

Foreign subsidiaries are subject to corporate income tax and other taxes in their respective jurisdiction.

The following is a reconciliation between the effective statutory tax rates and the effective income tax rates for corporate income tax expenses appearing on the consolidated statements of profit or loss.

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Effective statutory tax rate of the Company	30.7%	**30.7%**
Entertainment expenses, etc., nondeductible	1.8	**0.2**
Dividend income, not taxable	(0.3)	**(0.6)**
Difference in tax rates applied to overseas subsidiaries	(2.0)	**(6.4)**
Changes in unrecognized temporary differences	0.6	**(0.9)**
Others	(0.1)	**(2.4)**
Effective income tax rate after tax effect accounting applied	30.7%	**20.6%**

Note 24: Earnings per share

(1) Basic earnings per share

Basic earnings per share and the basis for calculating basic earnings per share are as follows:

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Profit for the year attributable to owners of the parent (Millions of yen)	¥ 69,225	**¥ 89,593**
Weighted average number of ordinary shares outstanding (Thousands of shares)	229,134	**224,259**
Basic earnings per share (Yen)	¥ 302.12	**¥ 399.51**

Note: Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Basic earnings per share is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017.

(2) Diluted earnings per share

Diluted earnings per share and the basis for calculating diluted earnings per share are as follows:

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Profit for the year attributable to owners of the parent (Millions of yen)	¥69,225	**¥89,593**
Adjustments to profit or loss used to calculate diluted earnings per share (Millions of yen)	—	**—**
Profit or loss used to calculate diluted earnings per share (Millions of yen)	¥69,225	**¥89,593**
Weighted average number of ordinary shares outstanding (Thousands of shares)	229,134	**224,259**
Effects of dilutive potential ordinary shares		
Stock options based on subscription rights (Thousands of shares)	1,117	**1,087**
Diluted weighted average number of ordinary shares outstanding (Thousands of shares)	230,252	**225,346**
Diluted earnings per share (Yen)	¥300.65	**¥397.58**

Note: Effective from July 1, 2017, the Company consolidated its common shares at a ratio of five shares to one share. Diluted earnings per share is calculated on the assumption that the consolidation of shares has been conducted at the beginning of the year ended December 31, 2017.

Note 25: Financial instruments

(1) Capital management

The Group has adopted return on equity attributable to owners of the parent (ROE) and the debt-to-equity ratio (ratio of interest-bearing debt to equity) as its financial targets. The Group aims to attain those financial targets by improving not only profits but also the asset turnover ratio.

(2) Credit risk

Credit risk is the risk of financial losses to the Group if a counterparty to a financial instrument fails to meet its contractual obligations.

Trade and other receivables including notes receivables, accounts receivables, and other financial assets are exposed to customer credit risks. To manage these risks, each Group company performs due date controls and balance controls for each customer, and identifies and mitigates risks regarding the collection of receivables caused by factors such as deterioration of financial conditions at an early stage, in accordance with each Group entity's credit management rules.

In its derivative transactions, the Group uses only creditworthy financial institutions to reduce its credit risks.

The total carrying amount of financial assets represents the maximum amount of exposure to credit risk.

FY2017 (Jan. 1 through Dec. 31, 2017)

i) Aging analysis

The analysis of the aging of trade receivables which are past due but not impaired is as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)
Past due by 3 months or less	¥14,501
Past due over 3 months but within 1 year	2,941
Past due over 1 year	2,522
Total	¥19,965

ii) Allowance for doubtful debts

The Group uses an allowance account for credit losses to record the amount of individually significant financial assets at the uncollectible amounts, and to record impairment losses on financial assets that are not individually significant at an amount based on the historical loan loss ratio at the end of the reporting period. The allowances for doubtful debts against the financial assets are included in "trade receivables" and "other financial assets" on the consolidated statements of financial position.

Changes in the allowance account for credit losses on trade receivables and other financial assets are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)
As of January 1	¥6,836
Additions during the year	1,574
Amounts used during the year	(558)
Unused amounts reversed during the year	(102)
Others	318
As of December 31	¥8,068

FY2018 (Jan. 1 through Dec. 31, 2018)

i) Credit risk exposure

An analysis of the aging of trade receivables, other receivables and other financial assets is as follows:

(Unit: Millions of yen)

	FY2018 (as of Dec. 31, 2018)			
		Financial assets of which lifetime expected credit losses are measured as allowance for doubtful accounts		
	Financial assets of which 12-month expected credit losses are measured as allowance for doubtful accounts	Financial assets whose credit risk increased significantly since initial recognition	Financial assets of which expected credit losses are always measured at their expected lifetime as allowance for doubtful accounts	Total
Not past due	¥32,465	¥ —	¥244,465	¥276,930
Past due not later than 30 days	24	—	12,498	12,522
Past due over 30 days but within 90 days	—	—	4,068	4,068
Past due over 90 days	—	3,998	4,852	8,850
Total	¥32,489	¥3,998	¥265,884	¥302,372

ii) Allowance for doubtful debts

Changes in the allowance account for credit losses on trade receivables, other receivables and other financial assets are as follows:

There was no significant increase or decrease in gross carrying amount of the financial instruments which contributed to changes in the allowance account for credit losses during the year ended December 31, 2018.

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)			
		Lifetime expected credit losses		
	12-month expected credit losses	Financial assets whose credit risk increased significantly since initial recognition	Financial assets of which expected credit losses are always measured at their expected lifetime as allowance for doubtful accounts	Total
As of January 1	¥567	¥2,963	¥ 4,537	¥ 8,068
Write-off	—	(0)	(1,256)	(1,257)
Remeasurements	(52)	56	780	783
Others	1	—	121	123
As of December 31	¥516	¥3,019	¥ 4,182	¥ 7,717

(3) Liquidity risk

Liquidity risk is the risk that the Group will encounter difficulty in discharging its financial liabilities using cash or other financial assets.

Financial liabilities such as loans and corporate bonds are exposed to liquidity risks. The Group manages these risks by diversifying fund procurement methods, establishing commitment lines with various financial institutions, and keeping an appropriate balance between direct and indirect fund procurements and a proper mixture of short-term and long-term loans and bonds.

An analysis of the contractual maturities of financial liabilities is as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)							
	Carrying amount	Contractual cash flows	Due within one year or less	Due between one year and two years	Due between two years and three years	Due between three years and four years	Due between four years and five years	Due after five years
Non-derivative financial liabilities								
Loans payable	¥385,417	¥400,692	¥110,549	¥40,719	¥59,985	¥56,329	¥57,003	¥ 76,104
Commercial paper	30,593	30,660	30,660	—	—	—	—	—
Corporate bonds	69,876	72,319	845	30,311	263	263	263	40,374
Finance lease obligations	3,199	3,737	770	641	570	404	260	1,089
Total interest-bearing debt	489,085	507,409	142,825	71,672	60,819	56,997	57,527	117,568
Others(Note)	259,513	259,513	258,937	576	—	—	—	—
Total	¥748,599	¥766,923	¥401,762	¥72,249	¥60,819	¥56,997	¥57,527	¥117,568

Note: Others consist of “trade payables,” “other payables” and “other non-current liabilities.” “Contingent consideration liabilities” have been excluded.

	Carrying amount	Contractual cash flows	Due within one year	Due after one year
Derivative financial liabilities				
Foreign exchange contracts	¥1,908	¥1,908	¥1,316	¥ 591
Interest rate contracts	1,311	1,357	559	797
Commodity contracts	158	158	158	—
Total	¥3,377	¥3,423	¥2,033	¥1,389

(Unit: Millions of yen)

	FY2018 (as of December 31, 2018)							
	Carrying amount	Contractual cash flows	Due within one year or less	Due between one year and two years	Due between two years and three years	Due between three years and four years	Due between four years and five years	Due after five years
Non-derivative financial liabilities								
Loans payable	**¥422,518**	**¥438,176**	**¥ 94,093**	**¥72,029**	**¥66,218**	**¥75,927**	**¥30,312**	**¥ 99,593**
Commercial paper	**18,745**	**18,869**	**18,869**	**—**	**—**	**—**	**—**	**—**
Corporate bonds	**89,834**	**91,789**	**30,357**	**309**	**309**	**309**	**20,208**	**40,296**
Finance lease obligations	**10,681**	**19,491**	**1,544**	**1,463**	**1,290**	**1,140**	**1,039**	**13,012**
Total interest-bearing debt	**541,780**	**568,326**	**144,865**	**73,802**	**67,817**	**77,377**	**51,560**	**152,902**
Others(Note)	**277,606**	**278,361**	**269,338**	**1,028**	**—**	**7,993**	**—**	**—**
Total	**¥819,387**	**¥846,687**	**¥414,203**	**¥74,831**	**¥67,817**	**¥85,370**	**¥51,560**	**¥152,902**

Note: Others consist of “trade payables,” “other payables” and “other non-current liabilities.”

	Carrying amount	Contractual cash flows	Due within one year	Due after one year
Derivative financial liabilities				
Foreign exchange contracts	**¥1,684**	**¥1,684**	**¥1,684**	**¥ —**
Interest rate contracts	**815**	**1,142**	**378**	**763**
Commodity contracts	**627**	**629**	**445**	**184**
Total	**¥3,127**	**¥3,454**	**¥2,508**	**¥945**

The Group does not expect the cash flows included in the maturity analysis to occur much earlier than anticipated or to differ significantly from the anticipated monetary amounts.

(4) Currency risk

The Group operates businesses globally, and is therefore exposed to currency fluctuation risks associated with transactions undertaken in currencies other than the functional currency of the individual Group companies. To manage such risks, the Group hedges the risks with foreign exchange forward contracts, currency swap contracts, and other instruments.

The principal exchange rates are as follows:

(Unit: Yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)		**FY2018 (Jan. 1 through Dec. 31, 2018)**	
	Average rate	Rate at the end of the reporting period	Average rate	Rate at the end of the reporting period
U.S. dollars	¥112.19	¥113.00	**¥110.43**	**¥111.00**
Euros	126.67	134.94	**130.42**	**127.00**

i) Currency risk exposure

The Group's maximum amount of exposure to currency fluctuation risk is as follows.

The exposure excludes amounts for which currency fluctuation risk is hedged using foreign exchange forward contracts, currency swap contracts, and other instruments.

	FY2017 (as of December 31, 2017)		**FY2018 (as of December 31, 2018)**	
	Thousands of U.S. dollars	Thousands of euros	Thousands of U.S. dollars	Thousands of euros
Financial instruments dominated in foreign currency	$(76,333)	€(24,594)	**$(54,382)**	**€(3,782)**

ii) Sensitivity analysis of currency fluctuation risk

In the event of a 1% appreciation against the U.S. dollar and euro at the end of the reporting period, the monetary impact of this exchange rate movement on profit before tax is shown below.

This analysis is performed by multiplying the currency fluctuation risk exposures by 1%, assuming that movements in various exchange rates have no impact on other variables (other exchange rates, interest rates, etc.). It was conducted on the same basis as the analysis for the year ended December 31, 2017.

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
U.S. dollars (1% yen appreciation)	¥86	**¥60**
Euros (1% yen appreciation)	33	**4**

(5) Interest rate risk

Interest-bearing debts with floating rates are exposed to interest rate fluctuation risks. For some long-term floating-rate loans, the Group uses derivative transactions (interest rate swaps) as hedging instruments to avoid the interest rate fluctuation risks and convert the floating rates into fixed rates.

i) Exposure to interest rate risk

The Group's exposure to interest rate fluctuation risk is as follows.

The monetary amount of exposure excludes monetary amounts for which currency fluctuation risk is hedged using interest rate swap contracts.

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)			**FY2018 (as of December 31, 2018)**		
	Due within one year	Due after one year	Total	Due within one year	Due after one year	Total
Loans payable	¥43,073	¥ —	¥ 43,073	**¥48,535**	**¥ —**	**¥ 48,535**
Commercial paper	30,593	—	30,593	**18,745**	**—**	**18,745**
Current interest-bearing debt	¥73,666	¥ —	¥ 73,666	**¥67,281**	**¥ —**	**¥ 67,281**
Loans payable	¥49,229	¥130,426	¥179,655	**¥25,810**	**¥186,707**	**¥212,517**
Non-current interest-bearing debt	¥49,229	¥130,426	¥179,655	**¥25,810**	**¥186,707**	**¥212,517**

ii) Sensitivity analysis of interest rate risk

In the event of a 1% interest rate increase, the monetary impact of financial instruments affected by the interest rate movement on profit before tax is shown below.

This analysis is performed by multiplying the currency fluctuation risk exposures by 1%, assuming that movements in various exchange rates have no impact on other variables (other exchange rates, etc.). It was conducted on the same basis as the analysis for the year ended December 31, 2017.

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Floating interest rate financial instruments	¥(2,533)	**¥(2,797)**

(6) Fair value

i) Fair value measurement approach

The fair values of financial assets and financial liabilities are determined as follows:

(Derivatives)

Foreign exchange contracts are mainly based on forward exchange rates and prices quoted by financial institutions with which contracts are concluded. Interest rate contracts are mainly based on prices quoted by financial institutions with which contracts are concluded. Commodity contracts are mainly based on prices quoted by counterparties with whom contracts are concluded.

(Financial assets measured at fair value through other comprehensive income)

When market values are available, such values are used as fair values of the financial instruments. The fair values whose market values are unavailable are measured by using the method of discounted future cash flows, by third party appraisals, or by other appropriate measurement techniques.

(Loans payable)

As short-term loans payable are settled on a short-term basis, their fair values approximate their carrying amounts.

The fair values of long-term loans payable are calculated by the total sum of the principal and interest discounted by the interest rates that would apply if similar borrowings were conducted anew. For long-term loans payable at floating interest rates, however, the fair values approximate the carrying amounts because the interest rates are adjusted regularly at fixed intervals.

(Corporate bonds)

Fair values of corporate bonds are calculated based on market prices.

(Contingent consideration liabilities)

Contingent consideration liabilities are calculated based on the estimated amount of payment by taking future elements such as earnings into consideration.

(Financial instruments other than above mentioned)

Financial instruments other than above mentioned are settled mainly on a short-term basis, and their fair values approximate their carrying amounts.

ii) Fair values of financial instruments

The carrying amounts and fair values of financial instruments as of December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)		**FY2018 (as of December 31, 2018)**	
	Carrying amount	Fair value	Carrying amount	Fair value
Financial assets measured at fair value				
Other current assets and other financial assets				
Derivatives not designated as hedges	¥ 1,538	¥ 1,538	**¥ 1,174**	**¥ 1,174**
Derivatives designated as hedges	1,454	1,454	**499**	**499**
Other financial assets				
Financial assets measured at FVTOCI	224,688	224,688	**169,247**	**169,247**
Financial assets measured at amortized cost				
Cash and cash equivalents	126,417	126,417	**123,503**	**123,503**
Trade receivables	260,497	260,497	**260,111**	**260,111**
Other receivables	24,461	24,461	**24,472**	**24,472**
Other financial assets	9,948	9,948	**9,440**	**9,440**
Financial liabilities measured at fair value				
Other current liabilities and other non-current liabilities				
Derivatives not designated as hedges	3,219	3,219	**2,755**	**2,755**
Derivatives designated as hedges	158	158	**371**	**371**
Contingent consideration liabilities	6,768	6,768	**—**	**—**
Financial liabilities measured at amortized cost				
Trade payables	159,489	159,489	**156,594**	**156,594**
Interest-bearing debt (short-term and long-term)				
Loans payable	385,417	391,671	**422,518**	**428,051**
Commercial paper	30,593	30,593	**18,745**	**18,745**
Corporate bonds	69,876	71,467	**89,834**	**91,059**
Finance lease obligations	3,199	3,199	**10,681**	**10,681**
Other payables	99,447	99,447	**112,744**	**112,744**
Other non-current liabilities	576	576	**8,267**	**8,267**

iii) Fair value hierarchy

The following table is an analysis of financial instruments measured at fair value by valuation methods. The fair value hierarchy categorizes financial instruments into three levels based on inputs used to measure fair value, as follows:

Inputs include stock prices, exchange rates, and interest rates as well as indexes related to commodity prices, etc.

Level 1: Fair value measured at quoted market prices in active markets

Level 2: Fair value calculated using inputs other than quoted market prices included within Level 1 that are observable for the asset or liability, either directly or indirectly

Level 3: Fair value calculated from valuation techniques including inputs not based on observable market data

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)			
	Level 1	Level 2	Level 3	Total
Derivative financial assets	¥ —	¥2,992	¥ —	¥ 2,992
Derivatives not designated as hedges	—	1,538	—	1,538
Derivatives designated as hedges	—	1,454	—	1,454
Equity instruments	216,712	—	7,975	224,688
Financial assets measured at FVTOCI	216,712	—	7,975	224,688
Derivative financial liabilities	—	3,377	—	3,377
Derivatives not designated as hedges	—	3,219	—	3,219
Derivatives designated as hedges	—	158	—	158

(Unit: Millions of yen)

	FY2018 (as of December 31, 2018)			
	Level 1	Level 2	Level 3	Total
Derivative financial assets	**¥ —**	**¥1,673**	**¥ —**	**¥ 1,673**
Derivatives not designated as hedges	**—**	**1,174**	**—**	**1,174**
Derivatives designated as hedges	**—**	**499**	**—**	**499**
Equity instruments	**160,905**	**—**	**8,342**	**169,247**
Financial assets measured at FVTOCI	**160,905**	**—**	**8,342**	**169,247**
Derivative financial liabilities	**—**	**3,127**	**—**	**3,127**
Derivatives not designated as hedges	**—**	**2,755**	**—**	**2,755**
Derivatives designated as hedges	**—**	**371**	**—**	**371**

The presence of any financial instruments subject to significant transfers between fair value hierarchy levels is determined at the end of every period. There were no financial instruments subject to significant transfers between the fair value hierarchy levels during the years ended December 31, 2017 and 2018.

Financial assets and liabilities categorized as Level 3 include the abovementioned financial assets measured at fair value through other comprehensive income for which quoted market prices are not available, in addition to contingent consideration liabilities presented in Note 26 "Business combinations." The fair value of financial assets and liabilities categorized as Level 3 is measured using calculations that conform to the Group's accounting policies. When calculating the fair value, the Group reasonably estimates the inputs, and determines the optimal valuation techniques, including third-party appraisals, based on the characteristics of the assets and other considerations.

Changes in financial instruments categorized within Level 3 of the fair value hierarchy during the year are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Balance as of January 1	¥ 9,796	**¥7,975**
Purchases	609	**468**
Sales	(139)	**(114)**
Other comprehensive income	354	**164**
Other changes(Note)	(2,644)	**(152)**
Balance as of December 31	¥ 7,975	**¥8,342**

Note: As a result of an additional purchase of equity, an account transfer of ¥2,329 million to "investments accounted for using equity method" is included during the year ended December 31, 2017.

iv) Equity instruments

Equity instruments such as equity securities are held mainly for the purpose of maintaining and strengthening business relationships over the medium and long terms, and are designated as financial assets measured at FVTOCI. The following is a breakdown of the major stocks within equity instruments and their fair values:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Mitsubishi Estate Co., Ltd.	¥ 40,809	**¥ 32,737**
Toyota Motor Corporation	26,342	**23,395**
Mitsubishi Corporation	33,829	**21,871**
Others	123,707	**91,242**
Total	¥224,688	**¥169,247**

Equity instruments are sold taking into consideration the fair value such as market value of shares and the need to hold shares for business purposes. The fair values of and cumulative gains or losses (Before tax effects) recognized in other components of equity on stocks sold during the years ended December 31, 2017 and 2018 are shown below. The cumulative gains or losses recognized are transferred on sale from other components of equity to retained earnings.

(Unit: Millions of yen)

FY2017 (Jan. 1 through Dec. 31, 2017)		**FY2018 (Jan. 1 through Dec. 31, 2018)**	
Fair value	Cumulative gains or losses (Before tax effects)	Fair value	Cumulative gains or losses (Before tax effects)
¥19,839	¥10,811	**¥19,495**	**¥14,032**

The following is a breakdown of dividend income recognized from equity instruments:

(Unit: Millions of yen)

FY2017 (Jan. 1 through Dec. 31, 2017)		**FY2018 (Jan. 1 through Dec. 31, 2018)**	
Financial assets derecognized during the year	Financial assets held as of the end of the reporting year	Financial assets derecognized during the year	Financial assets held as of the end of the reporting year
¥288	¥4,544	**¥312**	**¥4,998**

(7) Derivatives and hedge accounting

The Group uses commodity futures and foreign exchange forward contracts to hedge variations in cash flows associated with forecast transactions and interest rate swaps and instruments to hedge variations in cash flows associated with loans payable with floating interest rates. The Group uses these derivatives only for transactions justified by actual demand, and does not hold these derivatives for speculative or trading purposes.

When applying hedge accounting, at the inception of hedges, the Group formally designates and documents hedging relationships to which hedge accounting is applied and the objectives and strategies of risk management for undertaking hedges. Moreover, at the inception of hedges, the Group evaluates whether or not the hedging instrument can be predicted to be effective. Thereafter, the Group continuously evaluates whether the derivative is highly effective in offsetting changes in future cash flows from the hedged item.

For the purpose of hedging variations in cash flows associated with raw material and fuel costs, the Group enters into raw material and fuel swap contracts for natural gas, oil and other commodities to hedge the risk of price fluctuations. The Group has determined that there is an economic relationship between the raw materials and fuel it uses, which reflects market prices, and the hedging instruments that are correlated with market prices for raw materials and fuel. The risk of price fluctuations has an impact on the Group's consolidated financial statements through not only fluctuations in raw material and fuel costs but also currency fluctuations and other factors. Therefore, the Group applies hedge accounting by designating only raw material and fuel costs as risk factors. The designated risk factor accounts for most of the risk of price fluctuations. Moreover, at the inception of hedging relationships, the Group sets an appropriate hedge ratio based on the quantity of the hedged item and the quantity of hedging instruments. In principle, the Group sets the hedge ratio so as to obtain a one-to-one relationship between those quantities.

The ineffective portion of hedging instruments arises mainly because changes in the fair value of the hedging instruments are unable to fully cover the fluctuations in the hedged item, namely the fluctuations in raw material and fuel costs.

Details on cash flow hedges for raw material and fuel costs are as follows:

i) Impact of hedge accounting on the consolidated statements of financial position

As of December 31, 2017 and 2018, the carrying amount of hedging instruments on the consolidated statements of financial position and the changes in the fair value of hedging instruments used as a basis for calculating hedge ineffectiveness are as follows:

(Unit: Millions of yen)

		FY2017 (as of December 31, 2017)		
Type of risk	Hedging instrument	Carrying amount of hedging instrument		Changes in fair value of hedging instrument
Commodity price risk	Swap contract	Other current assets	¥1,193	¥977
		Other financial assets	261	
		Other current liabilities	158	
		Other non-current liabilities	—	

The delivery month of foregoing contracts are expected to mature within two years from December 31, 2017 and most parts of contracts are expected to mature within one year from December 31, 2017.

(Unit: Millions of yen)

		FY2018 (as of December 31, 2018)		
Type of risk	Hedging instrument	Carrying amount of hedging instrument		Changes in fair value of hedging instrument
Commodity price risk	Swap contract	Other current assets	**¥339**	**¥(1,169)**
		Other financial assets	**160**	
		Other current liabilities	**358**	
		Other non-current liabilities	**13**	

The delivery month of foregoing contracts are expected to mature within three years from December 31, 2018 and most parts of contracts are expected to mature within one year from December 31, 2018.

The notional amount of hedging instruments as of December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

Type of risk	Hedging instrument	FY2017 (as of December 31, 2017) Notional amount
Commodity price risk	Swap contract	¥8,809

(Unit: Millions of yen)

Type of risk	Hedging instrument	**FY2018 (as of December 31, 2018)** Notional amount
Commodity price risk	Swap contract	**¥7,187**

The changes in value of the hedged items used as the basis for calculating hedge ineffectiveness and the balances remaining in the cash flow hedge reserve as of December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	
Type of risk	Changes in value of hedged item	Cash flow hedge reserve
Commodity price risk	¥(495)	¥814

(Unit: Millions of yen)

	FY2018 (as of December 31, 2018)	
Type of risk	Changes in value of hedged item	Cash flow hedge reserve
Commodity price risk	**¥1,169**	**¥127**

ii) Impact of hedge accounting on the consolidated statements of profit or loss and consolidated statements of comprehensive income

Profit or loss items recorded on the consolidated statements of profit or loss and consolidated statements of comprehensive income during the years ended December 31, 2017 and 2018 are as follows:

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)		
Type of risk	Hedging gains or losses that were recognized in other comprehensive income	Hedge ineffectiveness recognized in profit or loss reclassification adjustment	Amount reclassified from cash flow hedge reserve into the cost of inventories as reclassification adjustment
Commodity price risk	¥495	¥482	¥(318)

During the year ended December 31, 2017, no cash flow hedges were discontinued as a result of not executing forecast transactions within the initially anticipated time period.

(Unit: Millions of yen)

	FY2018 (Jan. 1 through Dec. 31, 2018)		
Type of risk	Hedging gains or losses that were recognized in other comprehensive income	Hedge ineffectiveness recognized in profit or loss reclassification adjustment	Amount reclassified from cash flow hedge reserve into the cost of inventories as reclassification adjustment
Commodity price risk	**¥(1,169)**	**¥—**	**¥(1,296)**

During the year ended December 31, 2018, no cash flow hedges were discontinued as a result of not executing forecast transactions within the initially anticipated time period.

Note 26: Business combinations

FY2017 (Jan. 1 through Dec. 31, 2017)

Acquisition of shares of Vinythai Public Company Limited

(1) Outline of the acquisition

1. Name of the acquiree and main business
   Name of the acquiree: Vinythai Public Company Limited
   Main business: Manufacturing and sales of chemicals products
2. Main reason for the acquisition
   The Group puts strategic focus on the enhancement of its chlor-alkali business in Southeast Asia. The caustic soda and polyvinyl chloride (PVC) markets in Southeast Asia are projected to grow at around 5% per year. The acquisition of Vinythai will give the Group a PVC production base in Thailand, following Indonesia and Vietnam.
3. Acquisition date: February 22, 2017
4. Legal structure of acquisition: Acquisition of shares
5. Name of the acquiree after acquisition of shares: No change
6. Voting rights ratio after acquisition of shares: 58.77%

(2) Consideration transferred

(Unit: Millions of yen)

	Acquisition price
Cash consideration	¥33,097
Total	¥33,097

(3) Acquisition-related costs are ¥811 million and are recognized in "selling, general and administrative expenses" in the consolidated statements of profit or loss.

(4) Amount of goodwill and factors that make up the goodwill
1. Amount of goodwill: ¥1,237 million
   The amount of goodwill has been confirmed after allocating the acquisition price.
2. Factors that make up the goodwill
   The goodwill was recognized from reasonable estimates of future excess earning power expected to be generated from the business development. None of the goodwill recognized is expected to be deductible for tax purposes.

(5) Assets acquired and liabilities assumed as of the acquisition date

(Unit: Millions of yen)

	Fair value
Assets	
Cash and cash equivalents	¥10,396
Trade receivables	8,506
Property, plant and equipment	35,051
Intangible assets	2,001
Others	7,782
Total assets	¥63,739
Liabilities	
Trade payables	¥ 5,641
Long-term interest-bearing debt due within one year	1,632
Others	2,251
Total liabilities	¥ 9,525

As a result of the completion of the allocation of acquisition cost, goodwill was reduced by ¥579 million from the provisionally estimated amount. The main changes in the assets and liabilities accepted from the initial provisionally estimated amounts were an increase in property, plant and equipment of ¥289 million, an increase in intangible assets of ¥1,038 million, and an increase of ¥341 million in deferred tax liabilities. As a result, the fair value of non-controlling interests calculated in proportion to equity in the recognized amounts of the abovementioned assets and liabilities was ¥22,353 million.

(6) Disclosure is omitted as there was only a negligible impact from the net sales and profit for the year of the acquired company after the acquisition date, and from the net sales and profit for the year of the Company after the business combination, assuming the business combination had been conducted at the beginning of the fiscal year.

Acquisition of shares of CMC Biologics

(1) Outline of the acquisition
1. Name of the acquiree and main business
   Name of the acquiree: CMC Biologics
   Main business: Offering contract services for the development and manufacturing of biologics APIs
2. Main reason for the acquisition
   The Group launched the biopharmaceuticals contract manufacturing business in the early 2000s and has since been engaged in the microbial CMO business mainly in Japan. The acquisition of CMC Biologics is part of the Company's strategy to expand its biologics CDMO operations by acquiring its mammalian biopharmaceuticals manufacturing technologies as well as its customer base in Europe and the U.S., the major markets for biopharmaceuticals. The business integration with CMC Biologics will enable the Company to offer world-leading biologics CDMO API services globally, backed by advanced technologies and reliable quality, and contribute to pharmaceutical manufacturers, patients, and society.
3. Acquisition date: February 1, 2017
4. Legal structure of acquisition: Acquisition of shares
5. Name of the acquiree after acquisition of shares: AGC Biologics
   (CMC Biologics changed its corporate name to AGC Biologics during the year ended December 31, 2018.)
6. Voting rights ratio after acquisition of shares: 100.0%

(2) Consideration transferred

(Unit: Millions of yen)

	Acquisition price
Cash consideration(Note)	¥55,870
Contingent consideration	6,139
Total	¥62,010

Note: Cash consideration includes deferred consideration which is recognized in “other non-current liabilities” in the consolidated statements of financial position.

(3) Contingent consideration in a business combination shall be determined by future earnings, etc., of CMC Biologics, and the acquisition price may be subject to certain adjustments. The maximum potential future amount the Group may be required to pay based on the contingent consideration agreement is €50 million (undiscounted). The contingent consideration is classified in Level 3 of the fair value hierarchy, and the fair value measurement of the contingent consideration has been completed.

(4) Acquisition-related costs are ¥698 million and are recognized in “selling, general and administrative expenses” in the consolidated statements of profit or loss.

(5) Amount of goodwill and factors that make up the goodwill

1. Amount of goodwill: ¥36,766 million
   The amount of goodwill has been confirmed after allocating the acquisition price.
2. Factors that make up the goodwill
   The goodwill was recognized from reasonable estimates of future excess earning power expected to be generated from the business development. None of the goodwill recognized is expected to be deductible for tax purposes.

(6) Assets acquired and liabilities assumed as of the acquisition date

(Unit: Millions of yen)

	Fair value
Assets	
Cash and cash equivalents	¥ 1,236
Trade receivables	2,172
Other receivables	2,725
Property, plant and equipment	9,563
Intangible assets	29,719
Others	2,315
Total assets	¥47,732
Liabilities	
Other payables	¥ 7,646
Short-term interest-bearing debt	4,433
Deferred tax liabilities	9,182
Others	1,225
Total liabilities	¥22,488

As a result of the completion of the allocation of acquisition cost, goodwill was reduced by ¥20,249 million from the provisionally estimated amount. The main changes in the assets and liabilities accepted from the initial provisionally estimated amounts were an increase in property, plant and equipment of ¥1,050 million, an increase in intangible assets of ¥28,393 million, and an increase in deferred tax liabilities of ¥10,427 million.

(7) Disclosure is omitted as there was only a negligible impact from the net sales and profit for the year of the acquired company after the acquisition date, and from the net sales and profit for the year of the Company after the business combination, assuming the business combination had been conducted at the beginning of the fiscal year.

FY2018 (Jan. 1 through Dec. 31, 2018)

With the acquisition of shares of CMC Biologics, the contingent consideration liabilities that the Group had recognized at €50 million have been finalized at €17 million and the settlement has been completed. The settlement difference is recognized in Finance Income during the year ended December 31, 2018.

Acquisition of Park Electrochemical's electronics business

(1) Outline of the acquisition

1. Name of the acquiree and main business
   Name of the acquiree: Neltec, Inc. and 3 other entities
   Main business: Manufacturing, development and sales of rigid CCL (Copper Clad Laminate)
2. Main reason for the acquisition
   The Group puts strategic focus on proactive expanding of its business as a high-end materials and solutions manufacturer in the next-generation high-speed communications market. The acquiree holds outstanding technological expertise and a high-quality product portfolio relating to "extremely low loss CCL," which is needed in next-generation high-speed communications such as 5G and automated vehicles. The acquiree has supplied these materials to worldwide from the US, Singapore and France. The Group plans to combine its fluorine and glass material products with Park's products, technologies and know-how to better satisfy the needs of customers in the high-end CCL Market.
3. Acquisition date: December 4, 2018
4. Legal structure of acquisition: Acquisition of shares
5. Name of the acquiree after acquisition of shares: No change
6. Voting rights ratio after acquisition of shares: 100.0%

(2) Consideration transferred

(Unit: Millions of yen)

	Acquisition price
Cash consideration	¥17,131
Total	¥17,131

Note: Adjustment of consideration after acquisition of shares has not been completed, therefore acquisition price has not yet been determined.

(3) Acquisition-related costs are ¥510 million and are recognized in "selling, general and administrative expenses" in the consolidated statements of profit or loss.

(4) Amount of goodwill and factors that make up the goodwill

1. Amount of goodwill: ¥13,854 million
   The allocation of the acquisition price has not been completed, therefore the amount of goodwill has not been confirmed.
2. Factors that make up the goodwill
   The goodwill was recognized from reasonable estimates of future excess earning power expected to be generated from the business development.

(5) Assets acquired and liabilities assumed as of the acquisition date

(Unit: Millions of yen)

	Fair value
Assets	
Cash and cash equivalents	¥ 958
Trade receivables	1,382
Inventories	1,152
Property, plant and equipment	675
Others	85
Total assets	¥4,254
Liabilities	
Trade payables	¥ 486
Others	491
Total liabilities	¥ 978

Note 27: Transfer of subsidiary

During the year ended December 31, 2018, the Company transferred all its shares of AGC Flat Glass Philippines, Inc. to TQMP Glass Manufacturing Corp. The classifications between the consideration received from the transfer of the shares and the income and expenses resulting from the transfer are as follows:

(Unit: Millions of yen)

Consideration received	**¥ 5,972**
Other accounts receivable among the above	**(993)**
Cash and cash equivalents of subsidiaries transferred	**(1,118)**
Proceeds from sale of shares of subsidiary	**¥ 3,860**

Note 28: Commitments

As of December 31, 2017 and 2018, significant contractual commitments relating to the acquisition of property, plant and equipment amounted to ¥22,958 million and ¥14,021 million, respectively.

Note 29: Collateral

Assets pledged as collateral and debt secured by collateral are as follows:

Assets pledged as collateral

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Property, plant and equipment	¥16,899	**¥1,607**
Total	¥16,899	**¥1,607**

Debt secured by collateral

(Unit: Millions of yen)

	FY2017 (as of December 31, 2017)	**FY2018 (as of December 31, 2018)**
Short-term bank loans	¥ 30	**¥ —**
Long-term bank loans	9,078	**186**
Total	¥9,108	**¥186**

Other than the abovementioned, no ownership restrictions or rights of pledge as collateral for debt have been established.

Note 30: Contingencies

The Group provides guarantees, etc., for borrowings from financial institutions taken out by companies outside the Group amounting to ¥154 million and ¥115 million as of December 31, 2017 and 2018, respectively. This includes commitments to guarantees, etc., amounting to ¥68 million and ¥51 million as of December 31, 2017 and 2018, respectively.

Note 31: Related parties

Related party transactions

Related party transactions were made on terms equivalent to those that prevail in arm's length transactions.

Breakdown of compensation to directors

(Unit: Millions of yen)

	FY2017 (Jan. 1 through Dec. 31, 2017)	**FY2018 (Jan. 1 through Dec. 31, 2018)**
Monthly compensation and bonuses	¥403	**¥411**
Share-based payment	107	**147**
Total	¥510	**¥559**

Note 32: Group entities

Major subsidiaries as of December 31, 2018 are as follows:

Subsidiary name	Location	Capital	Main business	Voting rights held by the Company (%)
Consolidated subsidiaries				
Glass				
AGC Glass Kenzai Co., Ltd.	Japan	¥450 million	Production and sales of flat glass, fabricated glass for architectural use and building materials	100.0 (0.0)
AGC Glass Products Co., Ltd.	Japan	¥1,287 million	Production and sales of fabricated glass for architectural use, and cutting and sales of flat glass	70.0 (0.0)
AGC Automotive China Co., Ltd.	China	542 million yuan	Production and sales of automotive glass	100.0 (0.0)
PT Asahimas Flat Glass Tbk (Note 3)	Indonesia	217 billion rupiah	Production and sales of flat glass, automotive glass and fabricated glass for industrial use	43.9 (0.0)
AGC Flat Glass North America, Inc.	U.S.A.	US$250 million	Production and sales of flat glass and automotive glass	100.0 (100.0)
AGC Vidros do Brasil Ltda.	Brazil	1,234 million real	Production and sales of flat glass and automotive glass	100.0 (0.0)
AGC Automotive Europe S.A.	Belgium	€148 million	Production and sales of automotive glass	100.0 (100.0)
AGC Glass Europe S.A.	Belgium	€346 million	Production and sales of flat glass	100.0 (0.0)
AGC Flat Glass Czech A.S.	Czech Republic	3,560 million koruna	Production and sales of flat glass	100.0 (100.0)
AGC Flat Glass Klin LLC.	Russia	4,259 million rubles	Production and sales of flat glass	100.0 (100.0)
AGC Bor Glassworks	Russia	418 million rubles	Production and sales of flat glass and automotive glass	94.1 (94.1)
Electronics				
AGC Techno Glass Co., Ltd.	Japan	¥7,233 million	Production and sales of glass products for illumination, industrial use, laboratory and other medical uses, and production of optical membranes	100.0 (0.0)
AGC Display Glass Taiwan Co., Ltd.	Taiwan	NT$3,120 million	Production and sales of glass for electronics	100.0 (100.0)
AGC Display Glass (Shenzhen) Co., Ltd.	China	¥14,200 million	Production and sales of glass for electronics	100.0 (0.0)
AGC Display Glass (Huizhou) Co., Ltd.	China	¥20,600 million	Production and sales of glass for electronics	100.0 (0.0)
AGC Fine Techno Korea Co., Ltd.	South Korea	227,000 million won	Production and sales of glass for electronics	100.0 (33.0)

Subsidiary name	Location	Capital	Main business	Voting rights held by the Company (%)
Chemicals				
Ise Chemicals Corporation*	Japan	¥3,599 million	Production and sales of iodine-related products and metallic compounds, extraction and sales of natural gas	53.2 (0.0)
P.T. Asahimas Chemical	Indonesia	US$84 million	Production and sales of vinyl chloride, vinyl chloride monomer and caustic soda	52.5 (0.0)
Vinythai Public Company Limited	Thailand	7,111 million baht	Production and sales of vinyl chloride, vinyl chloride monomer and caustic soda	58.8 (0.0)
Ceramics/Others				
AGC Ceramics Co., Ltd.	Japan	¥3,500 million	Production and sales of various ceramic products	100.0 (0.0)
AGC Singapore Services Pte. Ltd.	Singapore	US$88 million	Procurement of funds and financing services for affiliates in Asia, and holding of shares in affiliates	100.0 (0.0)
AGC America, Inc.	U.S.A.	US$640 million	Holding of shares in affiliates in North America, and information collection	100.0 (0.0)
Other consolidated subsidiaries		191		
Total consolidated subsidiaries		213		
Equity method affiliates		36		

Notes: 1. Figures disclosed in parentheses in the "Voting rights held by the Company" column represent voting rights held indirectly by the Company.
2. Subsidiaries marked with * in the "Subsidiary name" column have filed a marketable securities report.
3. Although the Group holds less than half of the voting rights, it includes the entity in consolidated subsidiary because it substantially controls the entity.

Other than the above, during the year ended December 31, 2017, the Company acquired all shares of AGC Biologics (formerly known as CMC Biologics) and made it a subsidiary. AGC Biologics holds development facilities in Denmark and the United States, and offers contract services for the development and manufacturing of biologics APIs. Please see Note 26 "Business combinations" for details.

During the years ended December 31, 2017 and 2018, there was no individually significant subsidiary having non-controlling interests.

Information for equity method affiliates is presented in Note 10 "Equity method affiliates."

Note 33: Subsequent events

No items to report.

KPMG

Independent Auditor's Report

To the Shareholders and Board of Directors of AGC Inc.:

We have audited the accompanying consolidated financial statements of AGC Inc. (formerly Asahi Glass Co., Ltd.) and its consolidated subsidiaries, which comprise the consolidated statement of financial position as at December 31, 2018, and the consolidated statement of profit or loss, statement of comprehensive income, statement of changes in equity and statement of cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Consolidated Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with International Financial Reporting Standards, and for such internal control as management determines is necessary to enable the preparation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on the consolidated financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in Japan. Those standards require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on our judgement, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, while the objective of the financial statement audit is not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of AGC Inc. (formerly Asahi Glass Co., Ltd.) and its consolidated subsidiaries as at December 31, 2018, and their financial performance and cash flows for the year then ended in accordance with International Financial Reporting Standards.

KPMG AZSA LLC

March 28, 2019
Tokyo, Japan

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