

NGK INSULATORS, LTD. and Consolidated Subsidiaries

Consolidated Financial Statements
for the Year Ended March 31, 2019, and
Independent Auditor's Report

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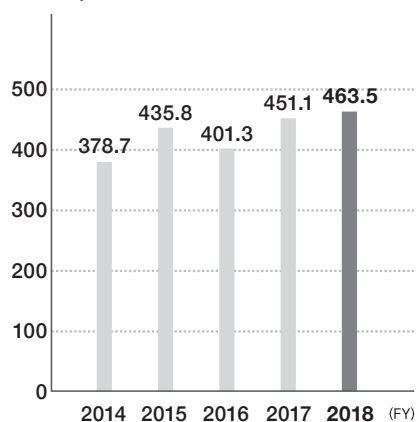
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Financial Highlights

The following data includes financial results of consolidated subsidiaries
(21 domestic, 36 overseas companies as of March 31, 2019)

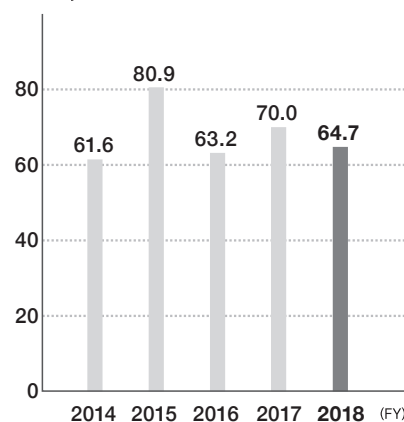
Net Sales

(Billions of yen)



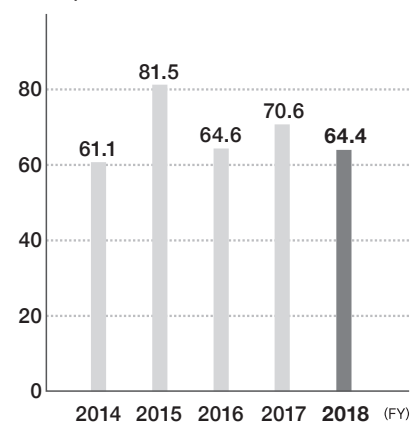
Operating Income

(Billions of yen)



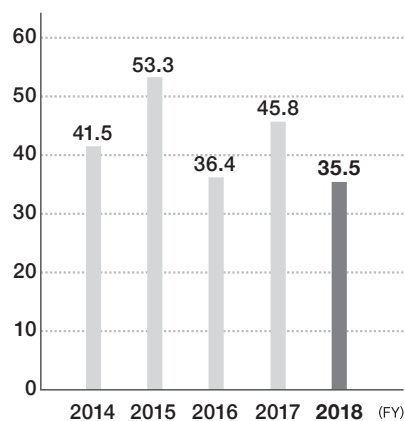
Ordinary Income

(Billions of yen)



Net Income

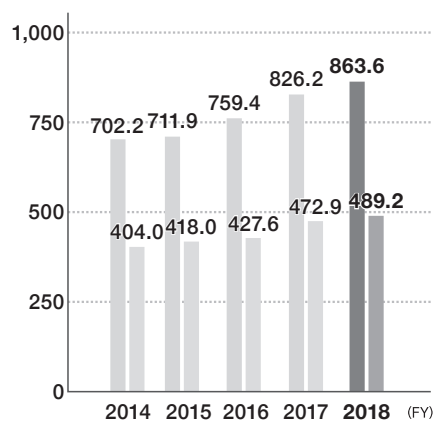
(Billions of yen)



Total Assets / Net Assets

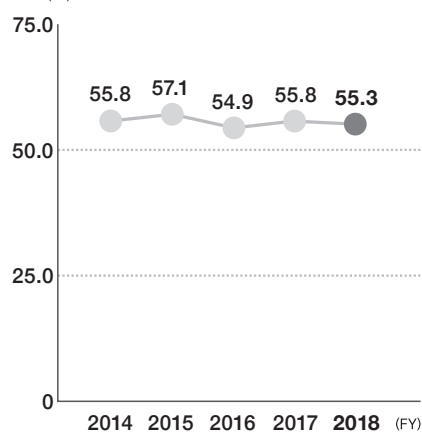
(Billions of yen)

■ Total Assets ■ Net Assets



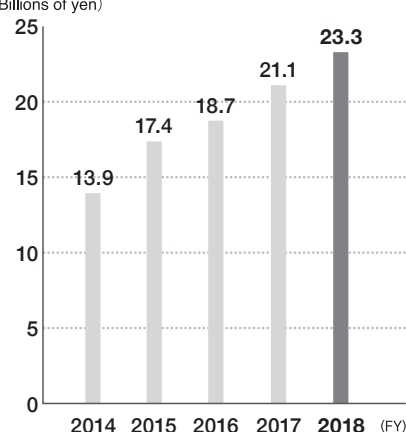
Equity Ratio

(%)

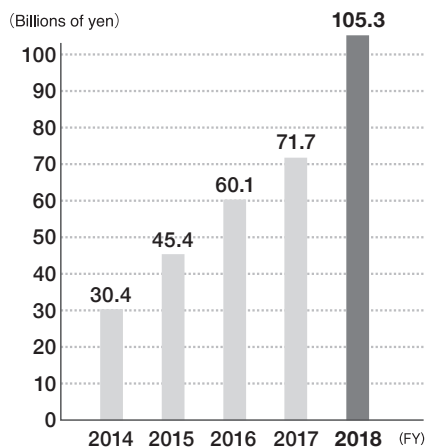


Research and Development Expenses

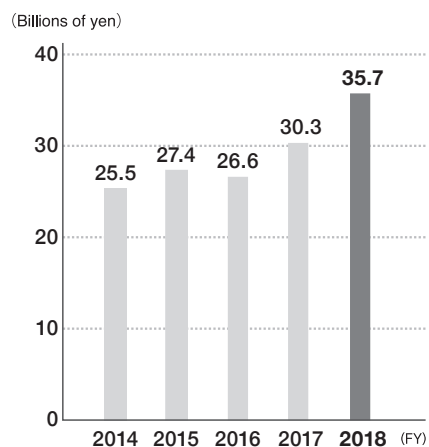
(Billions of yen)



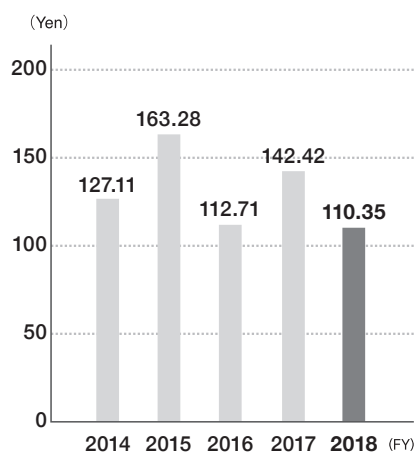
Capital Expenditures



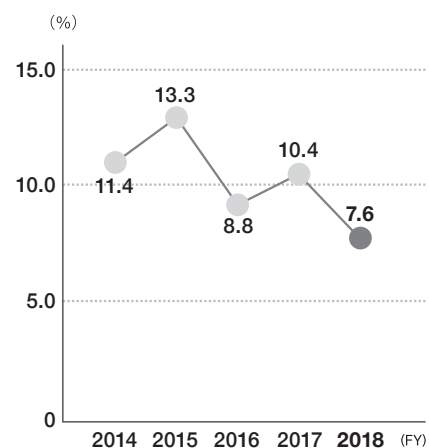
Depreciation and Amortization



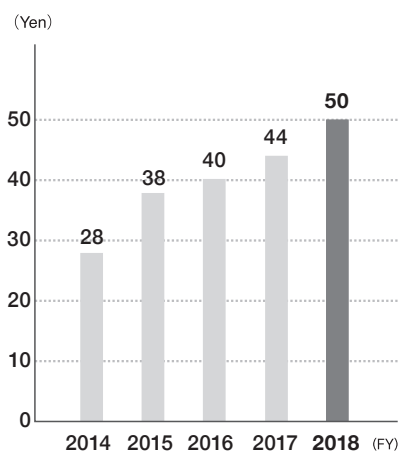
Net Income per share



Return on Equity



Dividends



Stock Price

FY	2014	2015	2016	2017	2018
Highest(Yen)	2,827	3,345	2,578	2,563	2,131
Lowest(Yen)	1,864	1,904	1,800	1,768	1,400

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES

CONSOLIDATED BALANCE SHEET **MARCH 31, 2019**

ASSETS	Millions of Yen		Thousands of U.S. Dollars (Note 1)
	2019	2018	2019
CURRENT ASSETS:			
Cash and cash equivalents (Note 14)	¥ 123,984	¥ 169,918	\$ 1,116,976
Time deposits (Note 14)	4,149	3,410	37,380
Marketable securities (Notes 3 and 14)	36,029	29,029	324,587
Notes and accounts receivable:			
Trade notes and accounts (Note 14)	106,414	104,030	958,682
Other	14,052	12,498	126,594
Allowance for doubtful accounts	(125)	(124)	(1,123)
Total	120,341	116,404	1,084,153
Inventories (Note 4)	148,032	130,817	1,333,620
Prepaid expenses and other current assets	10,835	6,356	97,612
Total current assets	443,370	455,934	3,994,328
PROPERTY, PLANT AND EQUIPMENT (Note 5)			
Land	30,919	27,672	278,549
Buildings and structures	197,447	174,612	1,778,798
Machinery and equipment	480,933	451,894	4,332,733
Construction in progress	58,145	36,722	523,829
Total	767,444	690,900	6,913,909
Accumulated depreciation	(441,382)	(420,799)	(3,976,415)
Net property, plant and equipment	326,062	270,101	2,937,494
INVESTMENTS AND OTHER ASSETS:			
Investment securities (Notes 3 and 14)	48,751	54,682	439,201
Investments in unconsolidated subsidiaries and associated companies	21,109	19,967	190,174
Intangible assets	3,701	3,659	33,338
Net defined benefit assets (Note 7)	7,468	7,816	67,283
Deferred tax assets (Note 11)	10,442	11,021	94,069
Other assets	2,733	3,063	24,621
Total investments and other assets	94,204	100,208	848,686
TOTAL	¥ 863,636	¥ 826,243	\$ 7,780,508

(Continued)

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES
**CONSOLIDATED BALANCE SHEET
MARCH 31, 2019**

LIABILITIES AND EQUITY	Millions of Yen		Thousands of U.S. Dollars (Note 1)
	2019	2018	2019
CURRENT LIABILITIES:			
Short-term borrowings (Notes 6 and 14)	¥ 4,231	¥ 5,970	\$ 38,115
Current portion of long-term debt (Notes 6 and 14)	29,198	10,572	263,045
Notes and accounts payable:			
Trade notes and accounts (Note 14)	51,032	45,697	459,744
Other	22,180	18,231	199,827
Total	73,212	63,928	659,571
Accrued expenses	21,492	19,408	193,622
Provision for NAS Battery safety measures	2,029	2,561	18,281
Provision for loss related to competition law	1,178	1,175	10,610
Income taxes payable (Notes 11 and 14)	11,731	16,510	105,687
Other current liabilities	4,716	6,776	42,481
Total current liabilities	147,787	126,900	1,331,412
LONG-TERM LIABILITIES:			
Long-term debt (Notes 6 and 14)	195,994	195,032	1,765,716
Net defined benefit liability (Note 7)	20,935	20,910	188,600
Provision for product warranties	1,632	2,837	14,698
Deferred tax liabilities (Note 11)	1,869	1,569	16,840
Other long-term liabilities	6,174	6,132	55,628
Total long-term liabilities	226,604	226,480	2,041,482
CONTINGENT LIABILITIES (Note 16)			
EQUITY (Note 9):			
Common stock:			
Authorized — 735,030 thousand shares			
Issued — 327,560 thousand shares at March 31, 2019 and 2018	69,849	69,849	629,272
Capital surplus	71,978	71,948	648,454
Stock acquisition rights (Note 10)	923	858	8,317
Retained earnings (Note 18)	343,324	322,622	3,093,007
Treasury stock — at cost: 5,780 thousand shares and 5,794 thousand shares at March 31, 2019 and 2018, respectively (Note 9.c)	(12,122)	(12,153)	(109,208)
Accumulated other comprehensive income			
Unrealized gain on available-for-sale securities	21,260	24,659	191,534
Deferred loss on derivatives under hedge accounting	(136)	(31)	(1,229)
Foreign currency translation adjustments	(11,057)	(7,990)	(99,608)
Defined retirement benefit plans	(5,580)	(7,920)	(50,274)
Total	478,439	461,842	4,310,265
Noncontrolling interests	10,806	11,021	97,349
Total equity	489,245	472,863	4,407,614
TOTAL	¥ 863,636	¥ 826,243	\$ 7,780,508

See notes to consolidated financial statements.

(Concluded)

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES

CONSOLIDATED STATEMENT OF INCOME **YEAR ENDED MARCH 31, 2019**

	Millions of Yen		Thousands of U.S. Dollars (Note 1)
	2019	2018	2019
NET SALES	¥ 463,505	¥ 451,125	\$ 4,175,718
COST OF SALES (Note 12)	323,224	312,107	2,911,929
Gross profit	140,281	139,018	1,263,789
SELLING, GENERAL AND ADMINISTRATIVE EXPENSES (Note 12)	75,575	68,991	680,852
Operating income	64,706	70,027	582,937
OTHER INCOME (EXPENSES):			
Interest and dividends income	1,942	2,223	17,491
Interest expense	(2,763)	(2,418)	(24,896)
Loss on sales of and disposals of property, plant and equipment — net	(352)	(319)	(3,172)
Equity in earnings of unconsolidated subsidiary and associated company	1,565	1,280	14,100
Reversal of allowance for doubtful accounts	33	750	295
Foreign exchange loss	(736)	(2,070)	(6,630)
Gain on sales of investment securities — net	676	1,236	6,089
Impairment loss on fixed assets (Note 5)	(10,935)	(3,769)	(98,515)
Provision of reserve for loss related to competition law (Note 16.b)	(389)	(2,146)	(3,508)
Loss on liquidation of subsidiaries (Note 8)	(1,425)	(1,804)	(12,842)
Loss on the dissolution of a subsidiary (Note 8)	(2,961)	-	(26,680)
Other — net	1,087	2,782	9,822
Other expenses — net	(14,258)	(4,255)	(128,446)
INCOME BEFORE INCOME TAXES	50,448	65,772	454,491
INCOME TAXES (Note 11):			
Current	13,824	18,773	124,542
Deferred	1,013	664	9,129
Total income taxes	14,837	19,437	133,671
NET INCOME	35,611	46,335	320,820
NET INCOME ATTRIBUTABLE TO NONCONTROLLING INTERESTS	104	521	941
NET INCOME ATTRIBUTABLE TO OWNERS OF THE PARENT	¥ 35,507	¥ 45,814	\$ 319,879
	Yen		U.S. Dollars
PER SHARE OF COMMON STOCK (Notes 2.w and 18):			
Basic net income	¥ 110.35	¥ 142.42	\$ 0.994
Diluted net income	110.17	142.18	0.993
Cash dividends applicable to the year	50.00	44.00	0.450

See notes to consolidated financial statements.

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME
YEAR ENDED MARCH 31, 2019

	Millions of Yen		Thousands of U.S. Dollars (Note 1)
	2019	2018	2019
NET INCOME	¥ 35,611	¥ 46,335	\$ 320,820
OTHER COMPREHENSIVE INCOME (LOSS) (Note 17):			
Unrealized (loss) gain on available-for-sale securities	(3,453)	1,195	(31,108)
Deferred loss on derivatives under hedge accounting	(110)	(13)	(987)
Foreign currency translation adjustments	(3,046)	7,731	(27,445)
Share of other comprehensive income in associated companies	106	97	958
Defined retirement benefit plans	2,056	2,809	18,522
Total other comprehensive (loss) income	(4,447)	11,819	(40,060)
COMPREHENSIVE INCOME	¥ 31,164	¥ 58,154	\$ 280,760
TOTAL COMPREHENSIVE INCOME (LOSS) ATTRIBUTABLE TO:			
Owners of parent	¥ 31,276	¥ 57,284	\$ 281,766
Noncontrolling interests	(112)	870	(1,006)

See notes to consolidated financial statements.

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES

CONSOLIDATED STATEMENT OF CHANGES IN EQUITY
YEAR ENDED MARCH 31, 2019

	Thousands					
	Outstanding Number of Common Stock	Common Stock	Capital Surplus	Stock Acquisition Rights	Retained Earnings	Treasury Stock
Balance at April 1, 2017	321,645	¥ 69,849	¥ 72,055	¥ 899	¥ 289,996	¥ (12,408)
Net income attributable to owners of the parent	-	-	-	-	45,814	-
Cash dividends, ¥ 41 per share	-	-	-	-	(13,188)	-
Purchase of treasury stock	(1)	-	-	-	-	(4)
Disposal of treasury stock	122	-	(107)	-	-	259
Net change in the year	-	-	-	(41)	-	-
Balance at March 31, 2018	321,766	69,849	71,948	858	322,622	(12,153)
Cumulative effect of accounting change	-	-	-	-	640	-
Net income attributable to owners of the parent	-	-	-	-	35,507	-
Cash dividends, ¥ 48 per share	-	-	-	-	(15,445)	-
Purchase of treasury stock	(3)	-	-	-	-	(5)
Disposal of treasury stock	18	-	(6)	-	-	36
Change in the parent's ownership interest due to transactions with noncontrolling interests	-	-	36	-	-	-
Net change in the year	-	-	-	66	-	-
Balance at March 31, 2019	321,781	¥ 69,849	¥ 71,978	¥ 923	¥ 343,324	¥ (12,122)

	Common Stock	Capital Surplus	Stock Acquisition Rights	Retained Earnings	Treasury Stock
Balance at March 31, 2018	\$ 629,272	\$ 648,184	\$ 7,727	\$ 2,906,507	\$ (109,491)
Cumulative effect of accounting change	-	-	-	5,765	-
Net income attributable to owners of the parent	-	-	-	319,879	-
Cash dividends, \$0.43 per share	-	-	-	(139,144)	-
Purchase of treasury stock	-	-	-	-	(42)
Disposal of treasury stock	-	(58)	-	-	325
Change in the parent's ownership interest due to transactions with noncontrolling interests	-	328	-	-	-
Net change in the year	-	-	590	-	-
Balance at March 31, 2019	\$ 629,272	\$ 648,454	\$ 8,317	\$ 3,093,007	\$ (109,208)

See notes to consolidated financial statements.

Millions of Yen

Accumulated Other Comprehensive Income						
Unrealized Gain on Available-for-Sale Securities	Deferred Loss on Derivatives under Hedge Accounting	Foreign Currency Translation Adjustments	Defined Retirement Benefit Plans	Total	Noncontrolling Interests	Total Equity
¥ 23,458	¥ (21)	¥ (15,474)	¥ (10,714)	¥ 417,640	¥ 9,953	¥ 427,593
-	-	-	-	45,814	-	45,814
-	-	-	-	(13,188)	-	(13,188)
-	-	-	-	(4)	-	(4)
-	-	-	-	152	-	152
1,201	(10)	7,483	2,794	11,427	1,069	12,496
24,659	(31)	(7,991)	(7,920)	461,841	11,022	472,863
-	-	-	-	640	(30)	610
-	-	-	-	35,507	-	35,507
-	-	-	-	(15,445)	-	(15,445)
-	-	-	-	(5)	-	(5)
-	-	-	-	30	-	30
-	-	-	-	36	-	36
(3,399)	(105)	(3,066)	2,339	(4,165)	(186)	(4,351)
¥ 21,260	¥ (136)	¥ (11,056)	¥ (5,580)	¥ 478,439	¥ 10,806	¥ 489,245

Thousands of U.S. Dollars (Note 1)

Accumulated Other Comprehensive Income						
Unrealized Gain on Available-for-Sale Securities	Deferred Loss on Derivatives under Hedge Accounting	Foreign Currency Translation Adjustments	Defined Retirement Benefit Plans	Total	Noncontrolling Interests	Total Equity
\$ 222,154	\$ (281)	\$ (71,988)	\$ (71,349)	\$ 4,160,735	\$ 99,293	\$ 4,260,028
-	-	-	-	5,765	(269)	5,496
-	-	-	-	319,879	-	319,879
-	-	-	-	(139,144)	-	(139,144)
-	-	-	-	(42)	-	(42)
-	-	-	-	267	-	267
-	-	-	-	328	-	328
(30,620)	(948)	(27,620)	21,075	(37,523)	(1,675)	(39,198)
\$ 191,534	\$ (1,229)	\$ (99,608)	\$ (50,274)	\$ 4,310,265	\$ 97,349	\$ 4,407,614

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES
**CONSOLIDATED STATEMENT OF CASH FLOWS
YEAR ENDED MARCH 31, 2019**

	Millions of Yen		Thousands of U.S. Dollars (Note 1)
	2019	2018	2019
OPERATING ACTIVITIES:			
Income before income taxes	¥ 50,448	¥ 65,772	\$ 454,491
Adjustments for:			
Income taxes — paid	(18,407)	(23,306)	(165,826)
Depreciation and amortization	35,729	30,316	321,880
Impairment loss on fixed assets	10,935	3,769	98,515
Decrease of provision for NAS battery safety measures	(532)	(1,089)	(4,792)
Increase (decrease) of provision for loss related to competition law	3	(7,993)	25
Equity in earnings of unconsolidated subsidiary and associated company	(1,565)	(1,280)	(14,100)
Gain on sales of investment securities — net	(676)	(1,236)	(6,089)
Changes in assets and liabilities:			
Increase in notes and accounts receivable — trade	(3,595)	(10,196)	(32,390)
Increase in inventories	(18,193)	(10,342)	(163,902)
Increase in other current assets	(6,352)	(427)	(57,228)
Decrease in net defined benefit assets	1,821	2,691	16,407
Increase in notes and accounts payable — trade	5,454	7,318	49,134
Increase (decrease) in other current liabilities	1,996	(2,856)	17,980
Other — net	4,159	(587)	37,470
Total adjustments	10,777	(15,218)	97,084
Net cash provided by operating activities	61,225	50,554	551,575
INVESTING ACTIVITIES:			
Purchases of marketable securities	(68,000)	(57,400)	(612,612)
Proceeds from sales and redemption of marketable securities	62,220	55,805	560,542
Proceeds from sales and redemption of investment securities	831	12,182	7,482
Purchases of property, plant and equipment	(102,826)	(67,062)	(926,361)
(Increase) decrease in time deposits	(807)	6,481	(7,270)
Other — net	(1,161)	580	(10,458)
Net cash used in investing activities	(109,743)	(49,414)	(988,677)
FINANCING ACTIVITIES:			
(Decrease) increase in short-term borrowings — net	(1,919)	14	(17,286)
Proceeds from long-term debt	31,853	42,444	286,963
Repayments of long-term debt	(10,845)	(6,825)	(97,698)
Cash dividends	(15,445)	(13,188)	(139,144)
Other — net	(80)	101	(723)
Net cash provided by financing activities	3,564	22,546	32,112
FOREIGN CURRENCY TRANSLATION ADJUSTMENTS ON CASH AND CASH EQUIVALENTS	(980)	1,539	(8,830)
NET (DECREASE) INCREASE IN CASH AND CASH EQUIVALENTS	(45,934)	25,225	(413,820)
CASH AND CASH EQUIVALENTS, BEGINNING OF YEAR	169,918	144,693	1,530,796
CASH AND CASH EQUIVALENTS, END OF YEAR	¥ 123,984	¥ 169,918	\$ 1,116,976

See notes to consolidated financial statements.

NGK INSULATORS, LTD. AND CONSOLIDATED SUBSIDIARIES

Notes to Consolidated Financial Statements Year Ended March 31, 2019

1. BASIS OF PRESENTATION OF CONSOLIDATED FINANCIAL STATEMENTS

The accompanying consolidated financial statements have been prepared in accordance with the provisions set forth in the Japanese Financial Instruments and Exchange Act and its related accounting regulations and in accordance with accounting principles generally accepted in Japan ("Japanese GAAP"), which are different in certain respects as to the application and disclosure requirements of International Financial Reporting Standards("IFRS").

In preparing these consolidated financial statements, certain reclassifications and rearrangements have been made to the consolidated financial statements issued domestically in order to present them in a form which is more familiar to readers outside Japan. In addition, certain reclassifications have been made in the 2018 consolidated financial statements to conform to the classifications used in 2019.

The consolidated financial statements are stated in Japanese yen, the currency of the country in which NGK INSULATORS, Ltd. (the "Company") is incorporated and operates. The translations of Japanese yen amounts into U.S. dollar amounts are included solely for the convenience of readers outside Japan and have been made at the rate of ¥111 to \$1, the approximate rate of exchange at March 31, 2019. Such translations should not be construed as representations that the Japanese yen amounts could be converted into U.S. dollars at that or any other rate.

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

- a. Consolidation*—The consolidated financial statements as of March 31, 2019 and 2018, include the accounts of the Company and its 57 significant subsidiaries (together, the "Group").

Under the control and influence concepts, those companies in which the Company, directly or indirectly, is able to exercise control over operations are fully consolidated, and those companies over which the Group has the ability to exercise significant influence are accounted for by the equity method.

Investments in one unconsolidated subsidiary and one associated company are accounted for by the equity method.

Investments in the remaining unconsolidated subsidiaries and associated company are stated at cost. If the equity method of accounting had been applied to the investments in these companies, the effect on the accompanying consolidated financial statements would not be material.

The excess of the cost of acquisition over the fair value of the net assets of an acquired subsidiary at the date of acquisition is amortized over a period of five years.

All significant intercompany balances and transactions have been eliminated in consolidation. All material unrealized profit included in assets resulting from transactions within the Group is also eliminated. The fiscal years of subsidiaries are not necessarily the same as that of the Company. Nine foreign consolidated subsidiaries in China and Mexico, etc. have different fiscal years. Those subsidiaries prepared provisional financial information at March 31 for the consolidation.

- b. *Unification of Accounting Policies Applied to Foreign Subsidiaries for the Consolidated Financial Statements***—Under Accounting Standards Board of Japan ("ASBJ") Practical Issues Task Force ("PITF") No. 18, "Practical Solution on Unification of Accounting Policies Applied to Foreign Subsidiaries for the Consolidated Financial Statements", the accounting policies and procedures applied to a parent company and its subsidiaries for similar transactions and events under similar circumstances should in principle be unified for the preparation of the consolidated financial statements. However, financial statements prepared by foreign subsidiaries in accordance with either International Financial Reporting Standards or generally accepted accounting principles in the United States of America (Financial Accounting Standards Board Accounting Standards Codification) tentatively may be used for the consolidation process, except for the following items that should be adjusted in the consolidation process so that net income is accounted for in accordance with Japanese GAAP, unless they are not material: (a) amortization of goodwill; (b) scheduled amortization of actuarial gain or loss of pensions that has been recorded in equity through other comprehensive income; (c) expensing capitalized development costs of R&D; and (d) cancellation of the fair value model of accounting for property, plant and equipment and investment properties and incorporation of the cost model of accounting.
- c. *Unification of Accounting Policies Applied to Foreign Associated Companies for the Equity Method***—ASBJ Statement No. 16, "Accounting Standard for Equity Method of Accounting for Investments," requires adjustments to be made to conform the associate's accounting policies for similar transactions and events under similar circumstances to those of the parent company when the associate's financial statements are used in applying the equity method, unless it is impracticable to determine such adjustments. In addition, financial statements prepared by foreign associated companies in accordance with either International Financial Reporting Standards or generally accepted accounting principles in the United States of America tentatively may be used in applying the equity method if the following items are adjusted so that net income is accounted for in accordance with Japanese GAAP, unless they are not material: (a) amortization of goodwill; (b) scheduled amortization of actuarial gain or loss of pensions that has been recorded in equity through other comprehensive income; (c) expensing capitalized development costs of R&D; and (d) cancellation of the fair value model of accounting for property, plant and equipment and investment properties and incorporation of the cost model of accounting.
- d. *Business Combinations***—Business combinations are accounted for using the purchase method. Acquisition-related costs, such as advisory fees or professional fees, are accounted for as expenses in the periods in which the costs are incurred. If the initial accounting for a business combination is incomplete by the end of the reporting period in which the business combination occurs, an acquirer shall report in its financial statements provisional amounts for the items for which the accounting is incomplete. During the measurement period, which shall not exceed one year from the acquisition, the acquirer shall retrospectively adjust the provisional amounts recognized at the acquisition date to reflect new information obtained about facts and circumstances that existed as of the acquisition date and that would have affected the measurement of the amounts recognized as of that date. Such adjustments shall be recognized as if the accounting for the business combination had been completed at the acquisition date. A parent's ownership interest in a subsidiary might change if the parent purchases or sells ownership interests in its subsidiary. The carrying amount of noncontrolling interest is adjusted to reflect the change in the parent's ownership interest in its subsidiary while the parent retains its controlling interest in its subsidiary. Any difference between the fair value of the consideration received or paid and the amount by which the noncontrolling interest is adjusted is accounted for as capital surplus as long as the parent retains control over its subsidiary.

- e. **Cash Equivalents**—Cash equivalents are short-term investments that are readily convertible into cash and that are exposed to insignificant risk of changes in value.

Cash equivalents include time deposits, certificates of deposit, and investment trusts that represent short-term investments, all of which mature or become due within three months of the date of acquisition.

- f. **Inventories**—Inventories are stated at the lower of cost, determined principally by the average method for finished products, work in process, and raw materials, or net selling value (see Note 4). Write-downs (reversal of write-down) of inventories in the amounts of ¥239 million (\$2,154 thousand) and ¥(289) million for the years ended March 31, 2019 and 2018, respectively, were included in cost of sales. Costs of contracts in progress are stated at cost, determined by the specific identification method.

- g. **Allowance for Doubtful Accounts**—To provide for the loss from doubtful accounts, the allowance for doubtful accounts is calculated using the historical rate of actual losses for normal receivables and the estimated nonrecoverable amount for specific doubtful receivables after considering the recoverability of each account.

- h. **Marketable and Investment Securities**—Marketable and investment securities are classified and accounted for, depending on management's intent, as follows: (1) held-to-maturity debt securities, for which there is the positive intent and ability to hold to maturity, are reported at amortized cost; and (2) available-for-sale securities, which are not classified as held-to-maturity debt securities, are reported at fair value, with unrealized gains and losses, net of applicable taxes, reported in a separate component of equity.

Nonmarketable available-for-sale securities are stated at cost, determined by the moving-average method. For other-than-temporary declines in fair value, investment securities are reduced to net realizable value by a charge to income.

- i. **Property, Plant and Equipment**—Property, plant, and equipment are stated at cost. Depreciation of property, plant and equipment of the Company and its consolidated subsidiaries is computed by the straight-line method.

The range of useful lives is principally from 10 to 50 years for buildings and structures and from 3 to 12 years for machinery and equipment.

- j. **Long-Lived Assets**—The Group reviews its long-lived assets for impairment whenever events or changes in circumstance indicate the carrying amount of an asset or asset group may not be recoverable. An impairment loss is recognized if the carrying amount of an asset or asset group exceeds the sum of the undiscounted future cash flows expected to result from the continued use and eventual disposition of the asset or asset group. The impairment loss would be measured as the amount by which the carrying amount of the asset exceeds its recoverable amount, which is the higher of the discounted cash flows from the continued use and eventual disposition of the asset, or the net selling price at disposition.

- k. **Retirement and Pension Plans**—Net defined benefit liability (asset) is accounted for based on the projected benefit obligations and plan assets at the balance sheet date. The projected benefit obligations are attributed to periods on a benefit-formula basis. Actuarial gains and losses and past service costs that are yet to be recognized in profit or loss are recognized within equity (accumulated other comprehensive income) after adjusting for tax effects. Actuarial gains and losses are amortized and charged to expense on a straight-line basis over 10 years within the expected average remaining service period of the employees from the consolidated fiscal year following the year when they occur. Past service costs are

amortized and charged to expense on a straight-line basis, mainly over 10 years, within the expected average remaining service period of the employees.

In some consolidated subsidiaries in the United States, the costs of postretirement benefits other than pension plans are allocated to each period based on the estimated service period of employees, and are included in net defined benefit liability because they are similar to retirement benefits.

Certain domestic consolidated subsidiaries apply the simplified method to state the liability based on the amount that would be paid if employees retired at the consolidated balance sheet date.

- l. Stock Options*—The cost of employee stock options is measured based on the fair value at the date of grant and recognized as compensation expenses over the vesting period as consideration for receiving goods or services. In the consolidated balance sheet, the stock options are presented as stock acquisition rights as a separate component of equity until exercised.
- m. Research and Development Costs*—Research and development costs are charged to income as incurred.
- n. Provision for Product Warranties Costs*—The Company and some consolidated subsidiaries estimate and accrue the costs of warranty repair for products sold in reserve for future expenses.
- o. Provision for NAS Battery Safety Measures*—In September 2011, Company-manufactured NAS® (sodium-sulfur) batteries used for storing electricity caught fire. The Company, in connection with this incident, reserved an allowance as "Provision for NAS Battery safety measures" for anticipated future expenses related to safety measures necessary to expand the NAS battery business, to the extent that such amount can be reasonably estimated.
- p. Provision for Loss Related to Competition Law*—The Company estimated and recorded an allowance for estimated losses related to competition law.
- q. Revenue Recognition*—The Group recognizes revenue mainly upon the delivery of products, based on the contract terms and other relevant factors. Effective April 1, 2018, foreign consolidated subsidiaries, which apply IFRS, adopted IFRS 15, Revenue from Contracts with Customers. The effect of the adoption was immaterial to the consolidated statement of income for the year ended March 31, 2019.
- r. Construction Contracts*—Construction revenue and construction costs are recognized by the percentage-of-completion method if the outcome of a construction contract can be estimated reliably. When total construction revenue, total construction costs, and the stage of completion of the contract at the balance sheet date can be reliably measured, the outcome of a construction contract is deemed to be estimated reliably. If the outcome of a construction contract cannot be reliably estimated, the completed-contract method should be applied. When it is probable that the total construction costs will exceed total construction revenue, an estimated loss on the contract should be immediately recognized by providing for a loss on such construction contracts.
- s. Income Taxes*—The provision for current income taxes is computed based on the pretax income included in the consolidated statement of income. The asset and liability approach is used to recognize deferred tax assets and liabilities for the expected future tax consequences of temporary differences between the carrying amounts and the tax bases of assets and liabilities. Deferred taxes are measured by applying currently enacted income tax rates to the temporary differences.

- t. Foreign Currency Transactions**—All short-term and long-term monetary receivables and payables denominated in foreign currencies are translated into Japanese yen at the exchange rates at the balance sheet date. The foreign exchange gains and losses from translation are recognized in the consolidated statement of income to the extent that they are not hedged by forward exchange contracts.
- u. Foreign Currency Financial Statements**—The balance sheet accounts of the consolidated foreign subsidiaries are translated into Japanese yen at the current exchange rate as of the balance sheet date except for equity, which is translated at the historical rate. Differences arising from such translation are shown as "Foreign currency translation adjustments" under accumulated other comprehensive income in a separate component of equity. Revenue and expense accounts of consolidated foreign subsidiaries are translated into yen at the average exchange rate.
- v. Derivatives and Hedging Activities**—The Group uses derivative financial instruments to manage its exposures to fluctuations in foreign exchange and interest rates. Foreign exchange forward contracts, interest rate and currency swaps, and interest rate swaps are utilized by the Group to reduce foreign currency exchange and interest rate risks. The Group does not enter into derivatives for trading or speculative purposes.

Derivative financial instruments are classified and accounted for as follows: (1) all derivatives are recognized as either assets or liabilities and measured at fair value, and gains or losses on derivative transactions are recognized in the consolidated statement of income; and (2) for derivatives used for hedging purposes, if such derivatives qualify for hedge accounting because of high correlation and effectiveness between the hedging instruments and the hedged items, gains or losses on derivatives are deferred until maturity of the hedged transactions.

Foreign currency forward contracts employed to hedge foreign exchange exposures for export sales and import purchases are measured at fair value and the unrealized gains/losses are recognized in income. Forward contracts applied for forecasted (or committed) transactions are also measured at fair value but the unrealized gains/losses are deferred until the underlying transactions are completed.

Interest rate swaps which qualify for hedge accounting and meet specific matching criteria are not remeasured at market value, but the differential paid or received under the swap agreements is recognized and included in interest expense.

Long-term debt denominated in foreign currencies for which currency and interest rate swaps are used to hedge the foreign currency and interest rate fluctuations is also translated at the contracted rate and the differential paid or received under the swap agreements is recognized and included in interest expense when currency and interest swaps meet the above criteria.

- w. **Per Share Information**—Basic net income per share is computed by dividing net income attributable to common shareholders by the weighted-average number of common shares outstanding for the period, retroactively adjusted for stock splits.

Diluted net income per share reflects the potential dilution that could occur if securities were exercised or converted into common stock. Diluted net income per share of common stock assumes full exercise of outstanding stock acquisition rights.

Cash dividends per share presented in the accompanying consolidated statement of income are dividends applicable to the respective fiscal years, including dividends to be paid after the end of the year.

- x. **Change in Presentation**— On February 16, 2018, the ASBJ issued ASBJ Statement No. 28, "Partial Amendments to Accounting Standard for Tax Effect Accounting," which requires deferred tax assets and deferred tax liabilities to be classified as investments and other assets and long-term liabilities, respectively. Deferred tax assets were previously classified as current assets and investments and other assets, and deferred tax liabilities were previously classified as current liabilities and long-term liabilities under the previous accounting standard. The revised accounting standard is effective for annual periods beginning on or after April 1, 2018. The Company retrospectively applied the revised accounting standard effective April 1, 2018, and deferred tax assets of ¥16,538 million and deferred tax liabilities of ¥6 million which were previously classified as current assets and current liabilities, respectively, as of March 31, 2018, have been reclassified as investments and other assets and long-term liabilities, respectively, in the accompanying consolidated balance sheet.

- y. **New Accounting Pronouncements**

Revenue recognition—The International Accounting Standards Board issued IFRS 15, Revenue from Contracts with Customers, together with the introduction of Topic 606 into the Financial Accounting Standards Board's Accounting Standards Codification. IFRS 15 is effective for annual reporting periods beginning after January 1, 2018, and Topic 606 is effective for annual reporting periods beginning after December 15, 2018. These are comprehensive accounting standards regarding revenue recognition. These require the entities to recognize revenue at the estimated transaction price when the entity satisfies a performance obligation.

In response to said issuance, on March 30, 2018, the ASBJ issued ASBJ Statement No. 29, "Accounting Standard for Revenue Recognition," and ASBJ Guidance No. 30, "Implementation Guidance on Accounting Standard for Revenue Recognition." These establish a comprehensive framework for recognizing revenue from contracts with customers.

The main purpose for developing the accounting standards regarding revenue recognition by the ASBJ, was to enhance the comparability between financial statements under IFRS 15 and under ASBJ Statement No. 29 and Guidance No. 30; the accounting standards fundamentally incorporate the basic policies of IFRS 15, where there are items which should be considered according to business practices in Japan, and alternative policies will be added to the extent that difference between IFRS 15 and ASBJ Statement No. 29 and Guidance No. 30 is immaterial.

The Company and subsidiaries in Japan expect to apply ASBJ Statement No. 29, "Accounting Standard for Revenue Recognition," and ASBJ Guidance No. 30, "Implementation Guidance on Accounting Standard for Revenue Recognition." for annual periods beginning on or after April 1, 2021, and are in the process of measuring the effects of applying the accounting standard and guidance in future applicable periods.

For subsidiaries in foreign countries, Topic 606 is effective for annual reporting periods beginning on or after April 1, 2019. The effects of applying Topic 606 in future applicable periods are in the process of being measured.

Leases—The International Accounting Standards Board issued IFRS 16. Leases, together with the introduction of Topic 842 into the Financial Accounting Standards Board's Accounting Standards Codification. These standards require lessees to recognize all leases as both assets and liabilities on their balance sheets in principle. There are no significant changes in the accounting standards for lessors. IFRS 16 is in effect for annual reporting periods beginning on or after April 1, 2019, and Topic 842 is in effect for annual reporting periods beginning on or after April 1, 2020. The effects of applying IFRS 16 are insignificant, and the effects of applying Topic 842 are in the process of being measured.

3. MARKETABLE AND INVESTMENT SECURITIES

Marketable and investment securities as of March 31, 2019 and 2018, consisted of the following:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Current:			
Investment trusts and other	¥ 16,786	¥ 14,029	\$ 151,230
Debt securities	19,243	15,000	173,357
Total	¥ 36,029	¥ 29,029	\$ 324,587
Noncurrent:			
Equity securities and other	¥ 48,751	¥ 53,380	\$ 439,201
Debt securities	—	1,302	—
Total	¥ 48,751	¥ 54,682	\$ 439,201

The costs and aggregate fair values of marketable and investment securities at March 31, 2019 and 2018, were as follows:

	Millions of Yen			
	Cost	Unrealized Gains	Unrealized Losses	Fair Value
March 31, 2019				
Securities classified as:				
Available-for-sale:				
Equity securities	¥ 17,385	¥ 30,591	¥ 1,311	¥ 46,665
Investment trusts and other	16,148	720	82	16,786
Held-to-maturity:				
Debt securities	19,243	5	4	19,244
March 31, 2018				
Securities classified as:				
Available-for-sale:				
Equity securities	¥ 17,515	¥ 33,978	¥ 222	¥ 51,271
Investment trusts and other	13,368	746	85	14,029
Held-to-maturity:				
Debt securities	16,302	18	7	16,313
	Thousands of U.S. Dollars			
	Cost	Unrealized Gains	Unrealized Losses	Fair Value
March 31, 2019				
Securities classified as:				
Available-for-sale:				
Equity securities	\$ 156,624	\$ 275,594	\$ 11,812	\$ 420,406
Investment trusts and other	145,477	6,491	738	151,230
Held-to-maturity:				
Debt securities	173,357	49	34	173,372

Proceeds from sales of available-for-sale securities (including marketable securities and investment securities) for the years ended March 31, 2019 and 2018, were ¥832 million (\$7,498 thousand) and ¥4,077 million, respectively. Realized gains on these sales, computed on the moving-average cost basis, were ¥676 million (\$ 6,089 thousand) and ¥1,453 million for the years ended March 31, 2019 and 2018, respectively. Realized losses on these sales, computed on the moving-average cost basis, were ¥1 million (\$ 9 thousand) and ¥50 million for the years ended March 31, 2019 and 2018, respectively.

4. INVENTORIES

Inventories at March 31, 2019 and 2018, consisted of the following:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Finished products	¥ 56,747	¥ 52,443	\$ 511,233
Work in process	14,981	14,631	134,960
Raw materials and supplies	75,406	62,937	679,339
Cost of contracts in progress	898	806	8,088
Total	¥ 148,032	¥130,817	\$ 1,333,620

5. LONG-LIVED ASSETS

The Group reviewed its long-lived assets for impairment as of March 31, 2019. As a result, the Group recognized an impairment loss of ¥10,935 million (\$98,515 thousand) as other expense mainly in the following groups which deteriorated in profitability or included assets to be disposed of and the carrying amounts of the relevant assets were written down to their recoverable value for the year ended March 31, 2019. The recoverable value of those assets were measured at their net selling values, based on appraisal values assessed by a third party.

Groups	Asset Category	Location	Millions of Yen	Thousands of U.S. Dollars
			2019	2019
Package business	Buildings and structures, Machinery and equipment, and other	Japan and Malaysia	¥ 5,494	\$ 49,496
Insulator business	Buildings and structures, Machinery and equipment, and other	Japan and China	3,134	28,230
Other	Buildings and structures and Land	Japan	1,708	15,387

The Group recognized impairment losses for the year ended March 31, 2019, as follows:

	Millions of Yen	Thousands of U.S. Dollars
	2019	2019
Buildings and structures	¥ 2,081	\$ 18,747
Machinery and equipment	6,051	54,509
Construction in progress	265	2,386
Land	1,476	13,296
Other	1,062	9,577
Total	<u>¥ 10,935</u>	<u>\$ 98,515</u>

The Group reviewed its long-lived assets for impairment as of March 31, 2018. As a result, the Group recognized an impairment loss of ¥3,769 million as other expense mainly in the following groups which deteriorated in profitability due to changes in the market and business environment, and the carrying amounts of the relevant assets were written down to their recoverable value for the year ended March 31, 2018. The recoverable values of those assets were measured at their net selling values, based on appraisal values assessed by a third party, or the value in use calculated by discounting future cash flows with a discount rate of 7.1%.

Groups	Asset category	Location	Millions of Yen
			2018
Package business	Buildings and structures, Machinery and equipment, Land and other	Mine-shi, Yamaguchi-ken and other	¥ 2,366
Insulator business	Machinery and equipment and other	Ena-shi, Gifu-ken	966
NAS battery business	Machinery and equipment, Construction in progress and other	Kasugai-shi, Aichi-ken and other	216

The Group recognized impairment losses for the year ended March 31, 2018 as follows:

	Millions of Yen
	2018
Buildings and structures	¥ 767
Machinery and equipment	2,181
Construction in progress	85
Land	692
Other	44
Total	<u>¥ 3,769</u>

6. SHORT-TERM BORROWINGS AND LONG-TERM DEBT

Short-term borrowings at March 31, 2019 and 2018, consisted of notes to banks. The weighted-average interest rates on short-term borrowings as of March 31, 2019 and 2018, were 1.8% and 2.9%, respectively.

Long-term debt at March 31, 2019 and 2018, consisted of the following:

	Millions of Yen	Thousands of U.S. Dollars
	2019	2018
Borrowings from banks and other financial institutions due serially through 2036, with weighted-average interest rates of 1.2% (2019) and 0.9% (2018)	¥ 200,192	¥ 195,604
Unsecured 0.657% yen bonds due July 27, 2032	10,000	10,000
Unsecured 0.860% yen bonds due July 26, 2038	15,000	—
Total	<u>225,192</u>	<u>205,604</u>
Less: portion due within one year	<u>(29,198)</u>	<u>(10,572)</u>
Long-term debt, less current portion	<u>¥ 195,994</u>	<u>\$ 1,765,716</u>

Annual maturities of long-term debt at March 31, 2019, were as follows:

Year Ending March 31	Millions of Yen	Thousands of U.S. Dollars
2020	¥29,198	\$263,045
2021	9,605	86,533
2022	21,215	191,123
2023	16,360	147,384
2024	24,158	217,643
2025 and thereafter	<u>124,656</u>	<u>1,123,033</u>
Total	<u>¥225,192</u>	<u>\$2,028,761</u>

7. RETIREMENT AND PENSION PLANS

The Company and certain consolidated subsidiaries have severance payment plans for employees.

The Company and certain domestic subsidiaries have unfunded lump-sum payment plans, defined benefit pension plans, smaller enterprise retirement allowance mutual aid plans, and specific retirement allowance mutual aid plans.

Furthermore, additional retirement benefits that are not included in net defined benefit liability are paid in certain cases.

Some of the domestic subsidiaries participate in multiemployer contributory funded plans, and the plans are accounted for as if the plans were defined contribution plans in cases where the plan assets attributable to the contributions by the subsidiaries cannot be rationally determined.

Certain U.S. subsidiaries have defined benefit plans and defined contribution plans. The simplified calculation method was applied to measure the liability and the cost of defined benefit plans and lump-sum payment plans in immaterial domestic subsidiaries.

a. Defined Benefit Pension Plans

- (1) The changes in defined benefit obligation for the years ended March 31, 2019 and 2018 (except for the plans to which the simplified method was applied), were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Balance at beginning of year	¥ 92,093	¥ 92,052	\$ 829,670
Current service cost	3,533	3,290	31,831
Interest cost	763	811	6,872
Actuarial losses	390	376	3,511
Benefits paid	(3,649)	(3,732)	(32,873)
Past service cost	—	68	—
Decrease associated with abolishment of retirement benefit plans	(3,463)	—	(31,194)
Others	681	(772)	6,129
Balance at end of year	¥ 90,348	¥ 92,093	\$ 813,946

Note: "Decrease associated with abolishment of retirement benefit plans" accounts for the abolishment of the retirement benefit plan of the Company's subsidiary in the U.S.

- (2) The changes in plan assets for the years ended March 31, 2019 and 2018 (except for the plans to which the simplified method was applied), were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Balance at beginning of year	¥ 81,050	¥ 80,023	\$ 730,184
Expected return on plan assets	1,065	1,089	9,597
Actuarial (losses) gains	(1)	1,102	(13)
Contributions from the employer	2,986	2,329	26,902
Benefits paid	(3,271)	(3,343)	(29,471)
Decrease associated with abolishment of retirement benefit plans	(3,352)	—	(30,196)
Others	519	(150)	4,677
Balance at end of year	¥ 78,996	¥ 81,050	\$ 711,680

Note: "Decrease associated with abolishment of retirement benefit plans" accounts for the abolishment of the retirement benefit plan of the Company's subsidiary in the U.S.

- (3) The changes in net defined benefit liability, where the simplified method was applied to measure the liability, for the years ended March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Balance at beginning of year	¥ 2,051	¥ 1,973	\$ 18,480
Pension costs	321	250	2,890
Benefits paid	(203)	(120)	(1,830)
Contributions to pension plans	(54)	(52)	(489)
Balance at end of year	¥ 2,115	¥ 2,051	\$ 19,051

- (4) Reconciliation between the asset and the liability recorded in the consolidated balance sheet and the balances of defined benefit obligation and plan assets as of March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Funded defined benefit obligation	¥ 77,524	¥ 83,047	\$ 698,418
Plan assets	(79,919)	(81,978)	(719,992)
	(2,395)	1,069	(21,574)
Unfunded defined benefit obligation	15,862	12,025	142,891
Net liability arising from defined benefit obligation	¥ 13,467	¥ 13,094	\$ 121,317

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Net defined benefit liability	¥ 20,935	¥ 20,910	\$ 188,600
Net defined benefit asset	(7,468)	(7,816)	(67,283)
Net liability arising from defined benefit obligation	¥ 13,467	¥ 13,094	\$ 121,317

- (5) The components of net periodic benefit costs for the years ended March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Service cost	¥ 3,533	¥ 3,289	\$ 31,831
Interest cost	763	811	6,872
Expected return on plan assets	(1,065)	(1,089)	(9,597)
Recognized actuarial losses	2,610	3,635	23,513
Amortization of past service cost	(235)	(336)	(2,119)
Benefit costs measured by the simplified method	321	250	2,890
Other	(1)	(361)	(3)
Net periodic benefit costs	¥ 5,926	¥ 6,199	\$ 53,387

Note: In addition to the above, the Company recognized "Loss on liquidation of subsidiaries" under other expenses for the year ended March 31, 2019. This loss includes the abolishment of the retirement benefit plan of the Company's consolidated subsidiary in the U.S.

- (6) Amounts recognized in other comprehensive income (before income tax effect) in respect of defined retirement benefit plans for the years ended March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Actuarial losses	¥ 3,096	¥ 4,453	\$ 27,891
Prior service cost	(235)	(286)	(2,119)
Net periodic benefit costs	¥ 2,861	¥ 4,167	\$ 25,772

- (7) Amounts recognized in accumulated other comprehensive income (before income tax effect) in respect of defined retirement benefit plans as of March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Unrecognized actuarial gains	¥ (8,905)	¥ (12,001)	\$ (80,226)
Unrecognized past service cost	1,513	1,749	13,634
Total	¥ (7,392)	¥ (10,252)	\$ (66,592)

- (8) Plan assets

a. Components of plan assets

Plan assets as of March 31, 2019 and 2018, consisted of the following:

	2019	2018
Assets in an insurer's general account	40 %	40 %
Equity investments	14 %	15 %
Debt investments	36 %	36 %
Cash and cash equivalents	1 %	1 %
Others	9 %	8 %
Total	100 %	100 %

b. Method of determining the expected rate of return on plan assets

The expected rate of return on plan assets is determined considering the long-term rates of return which are expected currently and in the future from the various components of the plan assets.

(9) Assumptions used for the years ended March 31, 2019 and 2018, were set forth as follows:

	2019	2018
Discount rate	Primarily 0.6%	Primarily 0.6%
Expected rate of return on plan assets	Primarily 1.0%	Primarily 1.0%
Expected rate of future salary increase	Primarily 3.4%—4.6%	Primarily 3.6%—4.4%

b. Funded Status of the Multiemployer Contributory Funded Pension Plans

Some subsidiaries participate in a multiemployer plan where the amount of plan assets corresponding to the contributions made by the subsidiaries cannot be reasonably calculated. Therefore, it is accounted for using the same method as a defined contribution plan.

The contributions to said multiemployer plan, which are accounted for using the same method as a defined contribution plan, were ¥106 million (\$955 thousand) and ¥105 million for the years ended March 31, 2019 and 2018, respectively.

(1) The funded status of the multiemployer plan as of March 31, 2019 and 2018, was as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Plan assets	¥ 130,909	¥127,444	\$ 1,179,360
Sum of actuarial liabilities of pension plan and minimum actuarial reserve	(146,380)	(149,316)	(1,318,743)
Net balance	¥ (15,472)	¥ (21,872)	\$ (139,383)

The net balance above is mainly a result of the following:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Prior service cost	¥ 18,835	¥ 20,385	\$ 169,683
Retained earnings	4,850	6,160	43,696
General reserve	(1,487)	(7,647)	(13,396)

Prior service cost under the plan is amortized on a straight-line basis over 20 years.

(2) The contribution ratios of the Group in the multiemployer plan for the years ended March 31, 2019 and 2018, were 2.0%.

c. Defined Contribution Pension Plans

The Group's contributions to defined contribution pension plan funds for the years ended March 31, 2019 and 2018, were ¥254 million (\$2,286 thousand) and ¥212 million, respectively.

8. OTHER EXPENSE

- (1) Loss on liquidation of subsidiaries
This loss relates to the liquidation of consolidated subsidiaries resolved in the past fiscal year and the abolishment of retirement benefit plans.
- (2) Loss on the dissolution of a subsidiary
This loss relates to the dissolution of a consolidated subsidiary, NGK Insulators Tangshan co., LTD., resolved in March, 2019.

9. EQUITY

Japanese companies are subject to the Companies Act of Japan (the "Companies Act"). The significant provisions in the Companies Act that affect financial and accounting matters are summarized below:

a. Dividends

Under the Companies Act, companies can pay dividends at any time during the fiscal year in addition to the year-end dividend upon resolution at the shareholders' meeting. Additionally, for companies that meet certain criteria including (1) having a Board of Directors, (2) having independent auditors, (3) having an Audit & Supervisory Board, and (4) the term of service of the directors being prescribed as one year rather than the normal two-year term by its articles of incorporation, the Board of Directors may declare dividends (except for dividends-in-kind) at any time during the fiscal year if the company has prescribed so in its articles of incorporation. However, the Company does not meet all the above criteria.

Semiannual interim dividends may also be paid once a year upon resolution by the Board of Directors if the articles of incorporation of the company so stipulate. The Companies Act provides certain limitations on the amounts available for dividends or the purchase of treasury stock. The limitation is defined as the amount available for distribution to the shareholders, but the amount of net assets after dividends must be maintained at no less than ¥3 million.

b. Increases/Decreases and Transfer of Common Stock, Reserve, and Surplus

The Companies Act requires that an amount equal to 10% of dividends must be appropriated as a legal reserve (a component of retained earnings) or as additional paid-in capital (a component of capital surplus), depending on the equity account charged upon the payment of such dividends, until the aggregate amount of legal reserve and additional paid-in capital equals 25% of the common stock. Under the Companies Act, the total amount of additional paid-in capital and legal reserve may be reversed without limitation. The Companies Act also provides that common stock, legal reserve, additional paid-in capital, other capital surplus, and retained earnings can be transferred among the accounts within equity under certain conditions upon resolution of the shareholders.

c. Treasury Stock and Treasury Stock Acquisition Rights

The Companies Act also provides for companies to purchase treasury stock and dispose of such treasury stock by resolution of the Board of Directors. The amount of treasury stock purchased cannot exceed the amount available for distribution to the shareholders, which is determined by a specific formula. Under the Companies Act, stock acquisition rights are presented as a separate component of equity. The Companies Act also provides that companies can purchase both treasury stock acquisition rights and treasury stock. Such treasury stock acquisition rights are presented as a separate component of equity or deducted directly from stock acquisition rights.

10. STOCK OPTIONS

The stock options outstanding as of March 31, 2019 were as follows:

Stock Option Scheme	Persons Originally Granted	Number of Options Originally Granted	Date of Grant	Exercise Price	Exercise Period
2005 Stock Option Scheme	12 directors 2 full-time audit and supervisory board members 10 officers	Common shares 180,000 shares	August 5, 2005	¥1 (\$0.01)	From August 5, 2005 to June 30, 2035
2006 Stock Option Scheme (2-1)	12 directors 2 full-time audit and supervisory board members	Common shares 113,000 shares	August 11, 2006	¥1 (\$0.01)	From August 12, 2006 to June 30, 2036
2006 Stock Option Scheme (2-2)	10 officers	Common shares 41,000 shares	August 11, 2006	¥1 (\$0.01)	From August 12, 2006 to June 30, 2036
2007 Stock Option Scheme	12 directors 10 officers	Common shares 62,000 shares	August 30, 2007	¥1 (\$0.01)	From August 31, 2007 to June 30, 2037
2008 Stock Option Scheme	11 directors 9 officers	Common shares 57,000 shares	August 13, 2008	¥1 (\$0.01)	From August 14, 2008 to June 30, 2038
2009 Stock Option Scheme	12 directors 10 officers	Common shares 62,000 shares	August 17, 2009	¥1 (\$ 0.01)	From August 18, 2009 to June 30, 2039
2010 Stock Option Scheme	12 directors 11 officers	Common shares 64,000 shares	August 16, 2010	¥1 (\$0.01)	From August 17, 2010 to June 30, 2040
2011 Stock Option Scheme	11 directors 11 officers	Common shares 62,000 shares	August 15, 2011	¥1 (\$0.01)	From August 16, 2011 to June 30, 2041

Stock Option Scheme	Persons Originally Granted	Number of Options Originally Granted	Date of Grant	Exercise price	Exercise Period
2012 Stock Option Scheme	10 directors 14 officers	Common shares 66,000 shares	August 15, 2012	¥1 (\$0.01)	From August 16, 2012 to June 30, 2042
2013 Stock Option Scheme	9 directors 16 officers	Common shares 61,000 Shares	August 16, 2013	¥1 (\$0.01)	From August 17, 2013 to June 30, 2043
2014 Stock Option Scheme	10 directors 13 officers	Common shares 57,000 Shares	August 19, 2014	¥1 (\$0.01)	From August 20, 2014 to June 30, 2044
2015 Stock Option Scheme	10 directors 10 officers	Common shares 52,000 Shares	August 18, 2015	¥1 (\$0.01)	From August 19, 2015 to June 30, 2045
2016 Stock Option Scheme	10 directors 13 officers	Common shares 60,000 Shares	August 16, 2016	¥1 (\$0.01)	From August 17, 2016 to June 30, 2046
2017 Stock Option Scheme	10 directors 12 officers	Common shares 58,000 Shares	August 16, 2017	¥1 (\$0.01)	From August 17, 2017 to June 30, 2047
2018 Stock Option Scheme	9 directors 13 officers	Common shares 55,000 Shares	July 12, 2018	¥1 (\$0.01)	From July 13, 2018 to June 30, 2048

The stock option activity is as follows:

	2005 Stock Option	2006 Stock Option (2-1)	2006 Stock Option (2-2)	2007 Stock Option	2008 Stock Option
			(Shares)		
<u>For the year ended March 31, 2018</u>					
<u>Non-vested</u>					
April 1, 2017					
— Outstanding	-	-	-	-	-
Granted	-	-	-	-	-
Canceled	-	-	-	-	-
Vested	-	-	-	-	-
March 31, 2018					
— Outstanding	-	-	-	-	-
<u>Vested</u>					
April 1, 2017					
— Outstanding	66,000	54,000	8,000	24,000	31,000
Vested	-	-	-	-	-
Exercised	34,000	33,000	4,000	11,000	12,000
Canceled	-	-	-	-	-
March 31, 2018					
— Outstanding	32,000	21,000	4,000	13,000	19,000
<u>For the year ended March 31, 2019</u>					
<u>Non-vested</u>					
March 31, 2018					
— Outstanding	-	-	-	-	-
Granted	-	-	-	-	-
Canceled	-	-	-	-	-
Vested	-	-	-	-	-
March 31, 2019					
— Outstanding	-	-	-	-	-
<u>Vested</u>					
March 31, 2018					
— Outstanding	32,000	21,000	4,000	13,000	19,000
Vested	-	-	-	-	-
Exercised	-	-	-	-	2,000
Canceled	-	-	-	-	-
March 31, 2019					
— Outstanding	32,000	21,000	4,000	13,000	17,000
Exercise price	¥1	¥1	¥1	¥1	¥1
	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)
Average stock price at exercise	N/A	N/A	N/A	N/A	¥1,914 (\$17.24)
Fair value price at grant date	-	¥1,506 (\$13.57)	¥1,506 (\$13.57)	¥3,658 (\$32.95)	¥1,434 (\$12.92)

	2009 Stock Option	2010 Stock Option	2011 Stock Option	2012 Stock Option	2013 Stock Option
			(Shares)		
<u>For the year ended March 31, 2018</u>					
<u>Non-vested</u>					
April 1, 2017					
— Outstanding	-	-	-	-	-
Granted	-	-	-	-	-
Canceled	-	-	-	-	-
Vested	-	-	-	-	-
March 31, 2018					
— Outstanding	-	-	-	-	-
<u>Vested</u>					
April 1, 2017					
— Outstanding	34,000	39,000	43,000	48,000	46,000
Vested	-	-	-	-	-
Exercised	6,000	5,000	7,000	7,000	4,000
Canceled	-	-	-	-	-
March 31, 2018					
— Outstanding	28,000	34,000	36,000	41,000	42,000
<u>For the year ended March 31, 2019</u>					
<u>Non-vested</u>					
March 31, 2018					
— Outstanding	-	-	-	-	-
Granted	-	-	-	-	-
Canceled	-	-	-	-	-
Vested	-	-	-	-	-
March 31, 2019					
— Outstanding	-	-	-	-	-
<u>Vested</u>					
March 31, 2018					
— Outstanding	28,000	34,000	36,000	41,000	42,000
Vested	-	-	-	-	-
Exercised	3,000	-	3,000	2,000	2,000
Canceled	-	-	-	-	-
March 31, 2019					
— Outstanding	25,000	34,000	33,000	39,000	40,000
Exercise price	¥1	¥1	¥1	¥1	¥1
	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)
Average stock price at exercise	¥1,914	N/A	¥1,675	¥1,681	¥1,965
	(\$17.24)		(\$15.09)	(\$15.14)	(\$17.70)
Fair value price at grant date	¥2,072	¥1,289	¥1,100	¥923	¥1,276
	(\$18.67)	(\$11.61)	(\$9.91)	(\$8.32)	(\$11.50)

	2014 Stock Option	2015 Stock Option	2016 Stock Option	2017 Stock Option	2018 Stock Option
			(Shares)		
<u>For the year ended March 31, 2018</u>					
<u>Non-vested</u>					
April 1, 2017					
— Outstanding	-	-	-	-	
Granted	-	-	-	58,000	
Canceled	-	-	-	-	
Vested	-	-	-	58,000	
March 31, 2018					
— Outstanding	-	-	-	-	
<u>Vested</u>					
April 1, 2017					
— Outstanding	52,000	52,000	60,000	-	
Vested	-	-	-	58,000	
Exercised	-	-	-	-	
Canceled	-	-	-	-	
March 31, 2018					
— Outstanding	52,000	52,000	60,000	58,000	
<u>For the year ended March 31, 2019</u>					
<u>Non-vested</u>					
March 31, 2018					
— Outstanding	-	-	-	-	-
Granted	-	-	-	-	55,000
Canceled	-	-	-	-	-
Vested	-	-	-	-	55,000
March 31, 2019					
— Outstanding	-	-	-	-	-
<u>Vested</u>					
March 31, 2018					
— Outstanding	52,000	52,000	60,000	58,000	-
Vested	-	-	-	-	55,000
Exercised	5,000	-	-	-	-
Canceled	-	-	-	-	-
March 31, 2019					
— Outstanding	47,000	52,000	60,000	58,000	55,000
Exercise price	¥1	¥1	¥1	¥1	¥1
	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)	(\$0.01)
Average stock price at exercise	¥1,775	N/A	N/A	N/A	N/A
	(\$15.99)				
Fair value price at grant date	¥2,510	¥2,850	¥2,060	¥1,897	¥1,725
	(\$22.61)	(\$25.68)	(\$18.56)	(\$17.09)	(\$15.54)

The Assumptions Used to Measure the Fair Value of the 2018 Stock Option

Estimate method:	Black-Scholes option-pricing model
Volatility of stock price:	33.01%
Estimated remaining outstanding period:	Four and a half years
Estimated dividend:	¥44 per share
Risk-free interest rate:	(0.102%)

11. INCOME TAXES

The Company and its domestic subsidiaries are subject to Japanese national and local income taxes which, in the aggregate, resulted in normal effective statutory tax rates of approximately 30.5% and 30.7% for the years ended March 31, 2019 and 2018.

The tax effects of significant temporary differences and tax loss carryforwards which resulted in deferred tax assets and liabilities at March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars	
	2019	2018	2019	
Deferred tax assets:				
Inventories	¥ 8,311	¥ 9,112	\$ 74,876	
Accounts payable and accrued expenses	3,383	2,902	30,474	
Enterprise taxes payable	574	549	5,167	
Property, plant and equipment	11,764	8,599	105,978	
Pension and severance cost	5,987	5,869	53,935	
Tax loss carryforwards	5,269	3,232	47,473	
Investment securities	1,248	1,799	11,244	
Tax deduction of foreign subsidiaries	2,527	3,665	22,761	
Provision for NAS Battery safety measures	620	781	5,588	
Provision for loss related to competition law	360	358	3,243	
Provision for product warranties	456	884	4,112	
Other	3,293	3,739	29,673	
Total	43,792	41,489	394,524	
Less: valuation allowance (Note)	(14,117)	(9,828)	(127,182)	
Offset with deferred tax liabilities	(19,233)	(20,640)	(173,273)	
Net deferred tax assets	¥ 10,442	¥ 11,021	\$ 94,069	
Deferred tax liabilities:				
Unrealized gain on				
available-for-sale securities	¥ 8,335	¥ 9,480	\$ 75,094	
Deferred gains on sales of property	964	1,024	8,686	
Undistributed earnings of	6,150	5,775	55,402	
foreign subsidiaries				
Fixed asset	1,945	1,743	17,521	
Net defined benefit asset	2,014	2,075	18,143	
Securities contributed to	1,418	1,415	12,779	
retirement benefit trust				
Other	276	697	2,488	
Total	21,102	22,209	190,113	
Offset with deferred tax assets	(19,233)	(20,640)	(173,273)	
Net deferred tax liabilities	¥ 1,869	¥ 1,569	\$ 16,840	

Note: Valuation allowance increase ¥4,289 million (\$38,638 thousand) mainly due to recognizing ¥1,167 million (\$10,516 thousand) in connection with impairment loss on tangible assets of the consolidated company, NGK Electronics Device, INC., ¥1,012 million (\$9,117 thousand) in connection with tax loss carryforward of NGK Electronics Device, INC. and ¥615 million (\$5,541 thousand) in connection with an additional impairment loss on tangible assets of the consolidated company, NGK Insulators Tangshan co., LTD..

A reconciliation between the normal effective statutory tax rates and the actual effective tax rates reflected in the accompanying consolidated statement of income for the year ended March 31, 2019, with the corresponding figures for 2018, is as follows:

	2019		2018
Normal effective statutory tax rate	30.5 %		30.7 %
Expenses not deductible for income tax purposes	1.4		0.6
Income excluded from income tax, such as dividends received	(0.2)		(0.9)
Change in valuation allowance	8.4		0.7
Undistributed earnings of foreign subsidiaries	0.7		(1.0)
Effect of tax rate reduction	(0.1)		0.6
(Lower) higher income tax rates applicable to income in certain foreign countries	(1.0)		1.1
Tax credit of foreign subsidiaries	(1.0)		(0.9)
Tax credit of research and development costs	(3.6)		(2.2)
Equity in earnings of unconsolidated subsidiaries and associated companies	(0.9)		(0.6)
Effect of liquidation of subsidiaries	(6.6)		—
Expire of tax loss carryforward	1.4		0.3
Transfer pricing adjustment	—		0.6
Other — net	0.4		0.4
Actual effective tax rate	<u>29.4 %</u>		<u>29.4 %</u>

Prior to April 1, 2017, “Expire of tax loss carryforward” was included in “Other — net”. During the year ended March 31, 2019, the materiality of the amount increased, and such amount is separately disclosed. A reconciliation for the year ended March 31, 2018 is also separately disclosed using the new classification. The amount included under “Other — net” is reclassified to 0.3 % of tax loss carryforward and 0.4% of other — net.

Notes: Action filed for the revocation of correction and correction for the subsequent fiscal years based on transfer pricing taxation

With respect to transactions between the Company and its Polish subsidiary from the year ended March 31, 2007 through the year ended March 31, 2010, the Company received a correction based on transfer pricing taxation issued by the Nagoya Regional Taxation Bureau in March 2012. While the Company made a payment of approximately ¥6.2 billion in tax penalties, including local taxes, it filed a compliant. The Company later requested the Nagoya National Tax Tribunal to carry out an administrative review, and on June 24, 2016, received a written verdict, which partially rescinded the correction. However, it went only so far as to refund approximately ¥0.1 billion of corporation taxes and local taxes, etc. Believing that cancellation should be made in the full amount, the Company filed an action for revocation of the correction with the Tokyo District Court on December 20, 2016.

While the Company believes that it could still take a considerable amount of time before judgment is passed on the claim, on June 23, 2017 the Company received a correction notice based on transfer pricing taxation for the year ended March 31, 2011 through the year ended March 31, 2015. Accordingly, based on the premise that the Company would be subject to the said correction for the year ended March 31, 2016 and the year ended March 31, 2017 as well, ¥8.5

billion in tax penalties for the years ended March 31, 2011 through March 31, 2015, and estimated tax amounts for the year ended March 31, 2016 and the year ended March 31, 2017 were added and factored into the financial statements for the year ended March 31, 2017. In addition, estimated tax amounts for and after the year ended March 31, 2018 were recognized under “Income taxes —current” for and after the year ended March 31, 2018.

12. RESEARCH AND DEVELOPMENT COSTS

Research and development costs charged to income were ¥23,271 million (\$209,649 thousand) and ¥21,101 million for the years ended March 31, 2019 and 2018, respectively, which included consigned research costs of ¥1,898 million (\$17,101 thousand) and ¥1,015 million for the years ended March 31, 2019 and 2018, respectively.

13. LEASES

The minimum rental commitments under noncancelable operating leases at March 31, 2019, were as follows:

	Millions of Yen	Thousands of U.S. Dollars
Due within one year	¥ 563	\$ 5,070
Due after one year	1,248	11,246
Total	<u>¥ 1,811</u>	<u>\$ 16,316</u>

14. FINANCIAL INSTRUMENTS AND RELATED DISCLOSURES

(1) Group policy for financial instruments

The Group raises funds through borrowings from banks or other financial institutions. Temporary excess funds are invested mainly in low-risk financial assets. It is the Group's policy to use derivatives not for speculation, but for hedging the risks from operating receivables, payables, and borrowings.

(2) Nature and extent of risks arising from financial instruments and risk management for financial instruments

The credit risks from receivables, such as trade notes and trade accounts, are managed by each business unit according to the characteristics of the customers. Although receivables in foreign currencies are exposed to the market risk of fluctuation in foreign currency exchange rates, a certain percentage of the position, net of payables in foreign currencies, is hedged by using forward foreign currency contracts.

Marketable and investment securities, which consist mainly of held-to-maturity bonds and the capital stocks of customers or suppliers, are exposed to market risk. The risk is insignificant with respect to the held-to-maturity bonds because investments in bonds are limited to highly rated bonds. To manage the risk, the market price and the financial position of the issuers are reviewed constantly. Moreover, with respect to those other than held-to-maturity, the portfolio is constantly reviewed considering market circumstances and relationships with the issuers.

Payment terms of almost all trade payables, including notes and accounts, are less than four months.

The borrowings from banks, other financial institutions, and debenture bonds are principally raised for capital investment, and their maximum maturities do not exceed 19 years and 5 months after the balance sheet date.

Derivatives consist of forward currency contracts, which are for hedging currency risks from the trade receivables and payables denominated in foreign currencies; currency and interest rate swaps, which are for hedging foreign exchange risks from the borrowings denominated in foreign currencies; and interest rate swaps, which are for reducing cash outflow from interest payments of borrowings. The Company's management believes that the credit risks from those transactions are not significant because the transactions are entered into only with highly rated financial institutions. Derivative transactions are strictly managed complying with internal policies for approval and reporting. For more details about hedge accounting, including hedging instruments, hedged items, hedge policies, and hedge effectiveness, please see Note 2.v.

(3) Supplemental remarks on fair values of financial instruments

The contract or notional amounts of derivatives that are shown in Note 15 do not represent the amounts exchanged by the parties and do not measure the Group's exposure to credit or market risk.

(a) Fair values of financial instruments

March 31, 2019	Millions of yen		
	Carrying Amount	Fair Value	Unrealized Gain/Loss
Cash and cash equivalents	¥ 123,984	¥ 123,984	-
Time deposits	4,149	4,149	-
Notes and accounts receivable:			
Trade notes and accounts	106,414	106,373	¥ (41)
Marketable and investment securities	103,327	106,096	2,769
Short-term borrowings	(4,231)	(4,231)	-
Notes and accounts payable:			
Trade notes and accounts	(51,032)	(51,032)	-
Income taxes payable	(11,731)	(11,731)	-
Long-term debt, including current portion	(225,192)	(230,937)	(5,745)
Derivatives	(141)	(141)	-

March 31, 2018	Millions of yen		
	Carrying Amount	Fair Value	Unrealized Gain/Loss
Cash and cash equivalents	¥ 169,918	¥ 169,918	-
Time deposits	3,410	3,410	-
Notes and accounts receivable:			
Trade notes and accounts	104,030	103,979	¥ (51)
Marketable and investment securities	101,093	106,551	5,458
Short-term borrowings	(5,970)	(5,970)	-
Notes and accounts payable:			
Trade notes and accounts	(45,697)	(45,697)	-
Income taxes payable	(16,510)	(16,510)	-
Long-term debt, including current portion	(205,604)	(210,778)	(5,174)
Derivatives	688	688	-

March 31, 2019	Thousands of U.S. Dollars		
	Carrying Amount	Fair Value	Unrealized Gain/Loss
Cash and cash equivalents	\$ 1,116,976	\$ 1,116,976	-
Time deposits	37,380	37,380	-
Notes and accounts receivable:			
Trade notes and accounts	958,682	958,316	\$ (366)
Marketable and investment securities	930,876	955,819	24,943
Short-term borrowings	(38,115)	(38,115)	-
Notes and accounts payable:	(459,744)	(459,744)	-
Trade notes and accounts			
Income taxes payable	(105,687)	(105,687)	-
Long-term debt, including current portion	(2,028,761)	(2,080,516)	(51,755)
Derivatives	(1,268)	(1,268)	-

Cash and cash equivalents and time deposits

The carrying values of cash and cash equivalents and time deposits approximate fair value because of their short maturities.

Notes and accounts receivable

The fair values of the majority of receivables are measured at the carrying amount because of their short maturities, while those of some receivables are measured at the amount to be received at maturity discounted at the Group's assumed discount rate determined considering credit risks.

Marketable and investment securities

The fair values of the majority of marketable and investment securities are measured at the quoted market price. The carrying amount of some securities represents the fair value because the fair value approximates such carrying amount. The fair value information for the marketable and investment securities by classification is included in Note 3.

Notes and accounts payable, short-term borrowings, and income taxes payable

The fair values of these financial instruments approximate the carrying amount because of their short maturities.

Long-term debt, including current portion

The fair values of long-term debt, including the current portion, are determined by discounting the cash flows related to the debt at the Group's assumed corporate borrowing rate.

Some of the long-term debt with floating interest rates and related interest rate swaps and interest rate and currency swaps are accounted for together, and the fair values of such debt are measured by discounting the total cash flows from the payables and hedging swaps at the Group's assumed corporate borrowing rate.

Derivatives

The fair value information for derivatives is included in Note 15.

(b) Financial instruments with fair values that cannot be reliably determined

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Investments in equity instruments that do not have a quoted market price in an active market			
Stock of associated companies	¥ 476	¥ 477	\$ 4,291
Other	2,086	2,109	18,795

(4) Maturity analysis for financial assets and securities with contractual maturities

Millions of Yen				
March 31, 2019	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years
Cash and cash equivalents	¥ 123,984	-	-	-
Notes and accounts receivable:				
Trade notes and accounts	106,028	¥ 386	-	-
Held-to-maturity securities				
Debt securities	19,243	-	-	-
Available-for-sale securities				
Investment trusts and other	12,300	-	-	-
Total	¥ 261,555	¥ 386	-	-

Thousands of U.S. Dollars				
March 31, 2019	Due in one year or less	Due after one year through five years	Due after five years through 10 years	Due after 10 years
Cash and cash equivalents	\$ 1,116,976	-	-	-
Notes and accounts receivable:				
Trade notes and accounts	955,205	\$ 3,477	-	-
Held-to-maturity securities				
Debt securities	173,357	-	-	-
Available-for-sale securities				
Investment trusts and other	110,811	-	-	-
Total	\$ 2,356,349	\$ 3,477	-	-

Please see Note 6 for annual maturities of long-term debt.

15. DERIVATIVES

The Group enters into derivative financial instruments ("derivatives"), including foreign exchange forward contracts, interest rate and currency swaps, and interest rate swap contracts. The foreign exchange forward contracts are entered into in order to hedge foreign exchange risk associated with certain assets and liabilities denominated in foreign currencies. The interest rate and currency swaps are entered into as a means of managing interest rate risk and foreign exchange risk for loans denominated in foreign currencies. The interest rate swap contracts are entered into as a means of managing the interest rate risk for loans from financial institutions. The Group does not hold or issue derivatives for trading or speculative purposes.

Because the counterparties to these derivatives are limited to major international financial institutions, the Group does not anticipate any losses arising from credit risk.

Derivative transactions entered into by the Group have been made in accordance with internal policies that require approval and reporting of all derivative transactions.

Derivative transactions to which hedge accounting is not applied at March 31, 2019 and 2018, were as follows:

Millions of Yen				
March 31, 2019	Contract Amount	Contract Amount Due After One Year	Fair Value	Unrealized Gain/(Loss)
Foreign currency forward contracts:				
Selling U.S.\$	¥ 23,102	-	¥ (84)	¥ (84)
Selling Euro	8,327	-	107	107
Buying U.S.\$	139	-	2	2
Buying Euro	26	-	(0)	(0)
Buying Japanese yen	-	-	-	-
Total	¥ 31,594	-	¥ 25	¥ 25

Millions of Yen				
March 31, 2018	Contract Amount	Contract Amount Due after One Year	Fair Value	Unrealized Gain/(Loss)
Foreign currency forward contracts:				
Selling U.S.\$	¥ 17,149	-	¥ 623	¥ 623
Selling Euro	4,033	-	114	114
Buying U.S.\$	251	-	(1)	(1)
Buying Euro	23	-	(0)	(0)
Buying Japanese yen	28	-	1	1
Total	¥ 21,484	-	¥ 737	¥ 737

Thousands of U.S. Dollars				
March 31, 2019	Contract Amount	Contract Amount Due after One Year	Fair Value	Unrealized Gain/(Loss)
Foreign currency forward contracts:				
Selling U.S.\$	\$ 208,127	-	\$ (758)	\$ (758)
Selling Euro	75,018	-	968	968
Buying U.S.\$	1,255	-	15	15
Buying Euro	233	-	(3)	(3)
Buying Japanese yen	-	-	-	-
Total	\$ 284,633	-	\$ 222	\$ 222

The fair value of derivative transactions is measured at the quoted price obtained from the financial institutions.

Millions of Yen				
	Contract Amount	Contract Amount Due after One Year	Fair Value	Unrealized Gain/(Loss)
March 31, 2019				
Interest rate swaps: (Fixed rate payment, fixed rate receipt)	¥ 5,000	¥ 5,000	¥ (32)	¥ (32)
Total	¥ 5,000	¥ 5,000	¥ (32)	¥ (32)
Millions of Yen				
	Contract Amount	Contract Amount Due after One Year	Fair Value	Unrealized Gain/(Loss)
March 31, 2018				
Interest rate swaps: (Fixed rate payment, fixed rate receipt)	¥ 5,000	¥ 5,000	¥ (35)	¥ (35)
Total	¥ 5,000	¥ 5,000	¥ (35)	¥ (35)
Thousands of U.S. Dollars				
	Contract Amount	Contract Amount Due after One Year	Fair Value	Unrealized Gain/(Loss)
March 31, 2019				
Interest rate swaps: (Fixed rate payment, fixed rate receipt)	\$ 45,045	\$ 45,045	\$ (290)	\$ (290)
Total	\$ 45,045	\$ 45,045	\$ (290)	\$ (290)

The fair value of derivative transactions is measured at the quoted price obtained from the financial institutions.

Derivative transactions to which hedge accounting is applied at March 31, 2019 and 2018, were as follows:

		Millions of Yen		
		Contract Amount	Contract Amount Due after One Year	Fair Value
March 31, 2019	Hedged Item			
Interest rate swaps: (Fixed rate payment, floating rate receipt)	Long-term debt	¥ 8,803	¥ 8,803	¥(53)
Interest rate swaps: (Fixed rate payment, floating rate receipt) (※)	Long-term debt	25,000	25,000	-
Total		¥ 33,803	¥ 33,803	¥(53)

		Millions of Yen		
		Contract Amount	Contract Amount Due after One Year	Fair Value
March 31, 2018	Hedged Item			
Interest rate swaps: (Fixed rate payment, floating rate receipt)	Long-term debt	¥ 8,744	¥ 8,744	¥(14)
Interest rate swaps: (Fixed rate payment, floating rate receipt) (※)	Long-term debt	25,000	25,000	-
Total		¥ 33,744	¥ 33,744	¥(14)

		Thousands of U.S. Dollars		
		Contract Amount	Contract Amount Due after One Year	Fair Value
March 31, 2019	Hedged Item			
Interest rate swaps: (Fixed rate payment, floating rate receipt)	Long-term debt	\$ 79,310	\$ 79,310	\$(473)
Interest rate swaps: (Fixed rate payment, floating rate receipt) (※)	Long-term debt	225,225	225,225	-
Total		\$304,535	\$304,535	\$(473)

(※) The above interest rate swaps that qualify for hedge accounting and meet specific matching criteria are not premeasured at market value, but the differential paid or received under the swap agreements is recognized and included in interest expense or income. In addition, the fair value of such interest rate swaps is included in that of hedged items (i.e., long-term debt) in Note 14.

		Millions of Yen		
			Contract Amount Due after One Year	Fair Value
March 31, 2019	Hedged Item	Contract Amount		
Currency swaps: (Japanese yen payment, U.S.\$ receipt) (※)	Long-term debt	¥ 6,500	¥ 6,500	-
Currency swaps: (U.S.\$ payment, Thai baht receipt)	Long-term debt	¥ 3,795	¥ 3,795	¥ (81)
Total		¥ 10,295	¥ 10,295	¥ (81)

		Millions of Yen		
			Contract Amount Due after One Year	Fair Value
March 31, 2018	Hedged Item	Contract Amount		
Currency swaps: (Japanese yen payment, U.S.\$ receipt) (※)	Long-term debt	¥ 6,500	¥ 6,500	-

		Thousands of U.S. Dollars		
			Contract Amount Due after One Year	Fair Value
March 31, 2019	Hedged Item	Contract Amount		
Currency swaps: (Japanese yen payment, U.S.\$ receipt) (※)	Long-term debt	\$ 58,559	\$ 58,559	-
Currency swaps: (U.S.\$ payment, Thai baht receipt)	Long-term debt	\$ 34,185	\$ 34,185	\$ (727)
Total		\$ 92,744	\$ 92,744	\$ (727)

(※) The above currency swaps that qualify for hedge accounting are not remeasured at market value, but the fair value of the swap is included in that of hedged items (i.e., long-term debt) in Note 14.

The fair value of derivative transactions is measured at the quoted price obtained from the financial institution.

The contract or notional amounts of derivatives which are shown in the above table do not represent the amounts exchanged by the parties and do not measure the Group's exposure to credit or market risk.

Forward exchange contracted amounts, which are assigned to associated assets or liabilities and are reflected in the balance sheet at year-end, are not subject to the disclosure of market value information.

16. GUARANTEES OBLIGATION AND OTHER

a. *Guarantee obligations*

At March 31, 2019, the Group had guarantee obligations as follows:

	Millions of Yen	Thousands of U.S. Dollars
Guarantees for bank borrowings of employees	¥ 6	\$ 58
Guarantee for deposit of subsidiary	2,197	19,794
Guarantees for bank borrowings of a business-related company	144	1,298

b. *Contingent liability*

The Group is subject to an international investigation on the situation of competition. Since the receiving of a subpoena by a U.S. subsidiary of the Company from the U.S. Department of Justice (DOJ) in 2011, the Company has cooperated in the investigation concerning ceramic substrates for catalytic converters including establishing the Independent Committee in 2012. In September, 2015, the Company entered into a Plea Agreement with DOJ, agreeing to pay a fine of US\$65.3 million based on charges that it violated U.S. laws including the antitrust law in connection with some transactions for ceramic substrates for catalytic converters, and paid the total amount in November 2015. The Company has entered into negotiations for compensation for damages with the relevant customers. In addition to some customers requiring monetary compensation, civil lawsuits (class action) have also been filed.

In consideration of such progresses, the Group made an estimate of potential losses, and recognized the estimated amount as of the end of the year ended March 31, 2019, as “provision for loss related to competition law,” however, additional losses may arise with the emergence of new facts. Overall details of the investigation and negotiations are not disclosed because they may put the Group at a disadvantage.

17. OTHER COMPREHENSIVE (LOSS) INCOME

The components of other comprehensive (loss) income for the years ended March 31, 2019 and 2018, were as follows:

	Millions of Yen		Thousands of U.S. Dollars
	2019	2018	2019
Unrealized gain on available-for-sale securities:			
(Losses) gains arising during the year	¥ (3,830)	¥ 2,762	\$ (34,502)
Reclassification adjustments to profit or loss	(667)	(1,193)	(6,013)
Amount before income tax effect	(4,497)	1,569	(40,515)
Income tax effect	1,044	(374)	9,407
Total	¥ (3,453)	¥ 1,195	\$ (31,108)
Deferred loss on derivatives under hedge accounting:			
Losses (gains) arising during the year	¥ (119)	¥ 2	\$ (1,075)
Reclassification adjustments to profit or loss	-	-	-
Amount before income tax effect	(119)	2	(1,075)
Income tax effect	9	(15)	88
Total	¥ (110)	¥ (13)	\$ (987)
Foreign currency translation adjustments:			
Adjustments arising during the year	¥ (3,046)	¥ 7,731	\$ (27,445)
Reclassification adjustments to profit or loss	-	-	-
Total	¥ (3,046)	¥ 7,731	\$ (27,445)
Share of other comprehensive income in associates—			
Gains arising during the year	¥ 106	¥ 97	\$ 958
Defined retirement benefit plans:			
Losses (gains) arising during the year	¥ (454)	¥ 869	\$ (4,090)
Reclassification adjustments to profit or loss	3,315	3,298	29,862
Amount before income tax effect	2,861	4,167	25,772
Income tax effect	(805)	(1,358)	(7,250)
Total	¥ 2,056	¥ 2,809	\$ 18,522
Total other comprehensive income (losses)	¥ (4,447)	¥ 11,819	\$ (40,060)

18. NET INCOME PER SHARE

Reconciliation of the differences between basic and diluted net income per share ("EPS") for the years ended March 31, 2019 and 2018, were as follows:

	Millions of Yen	Thousands of Shares	Yen	U.S. Dollars
	Net Income Attributable to Owners of the Parent	Weighted-Average Shares	EPS	
<u>Year Ended March 31, 2019</u>				
Basic EPS—Net income available to common shareholders	¥35,507	321,773	<u>¥110.35</u>	<u>\$0.994</u>
Effect of dilutive securities:				
Stock options	<u>-</u>	<u>523</u>		
Diluted EPS—Net income for computation	<u>¥35,507</u>	<u>322,296</u>	<u>¥110.17</u>	<u>\$0.993</u>
<u>Year Ended March 31, 2018</u>				
Basic EPS—Net income available to common shareholders	¥45,814	321,694	<u>¥142.42</u>	
Effect of dilutive securities:				
Stock options	<u>-</u>	<u>543</u>		
Diluted EPS—Net income for computation	<u>¥45,814</u>	<u>322,237</u>	<u>¥142.18</u>	

19. SUBSEQUENT EVENTS

a. Appropriation of Retained Earnings

The following appropriation of retained earnings at March 31, 2019, was approved at the Company's shareholders' meeting held on June 21, 2019:

	Millions of Yen	Thousands of U.S. Dollars
Year-end cash dividends, ¥25 (\$0.23) per share	¥8,045	\$72,473

20. SEGMENT INFORMATION

Under ASBJ Statement No. 17, "Accounting Standard for Segment Information Disclosures" and ASBJ Guidance No. 20, "Guidance on Accounting Standard for Segment Information Disclosures," an entity is required to report financial and descriptive information about its reportable segments. Reportable segments are operating segments or aggregations of operating segments that meet specified criteria. Operating segments are components of an entity about which separate financial information is available and such information is evaluated regularly by the chief operating decision maker in deciding how to allocate resources and in assessing performance. Generally, segment information is required to be reported on the same basis as is used internally for evaluating operating segment performance and deciding how to allocate resources to operating segments.

(1) *Description of Reportable Segments*

The Group's reportable business segments are components of the NGK Group about which separate financial information is available that is evaluated regularly by the Company's management in deciding how to allocate resources and in assessing performance. The Group develops and conducts its operations under four business segments: the Power Business Segment, Ceramics Business Segment, Electronics Business Segment, and Process Technology Business Segment while planning a comprehensive strategy for domestic and overseas markets. Consequently, the NGK Group defines those four business segments as its reportable business segments.

Business segment	Main products
Power	Insulators, hardware for insulator assemblies, current limiting arching horn, bushing shells, fuse cut-outs, APM, line arrester and NAS® (sodium-sulfur) batteries
Ceramics	Automotive ceramics for exhaust gas purification
Electronics	Ceramic components for electronics, beryllium copper products, and molds
Process Technology	Components for semiconductor manufacturing equipment, corrosion-resistant ceramic apparatuses, for chemical industries, gas analyzer, industrial heating systems, refractory products and radioactive waste treatment systems

From the beginning of fiscal year ended March 31, 2019, following organizational changed, the segment classification of the NGK Group has been changed from the "Power Business Segment," "Ceramics Business Segment," and "Electronics Business Segment" to the "Power Business Segment," "Ceramics Business Segment," "Electronics Business Segment," and "Process Technology Business Segment." Figures in each business segment for the previous fiscal year have been restated to reflect the change in segment classification to facilitate year-on-year comparisons of business performance.

(2) *Methods of Measurement for the Amounts of Sales, Profit (Loss), Assets, and Other Items for Each Reportable Segment*

The accounting policies of each reportable segment are consistent with those disclosed in Note 2, "SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES."

(3) Information about Sales, Profit (Loss), Assets, and Other Items

Millions of Yen							
2019							
Reportable segments						Reconciliations	Consolidated
	Power	Ceramics	Electronics	Process Technology	Total		
Sales							
Sales to customers	¥ 49,802	¥ 251,443	¥ 58,839	¥ 103,421	¥ 463,505	-	¥ 463,505
Intersegment sales or transfers	51	8	4	3,087	3,150	¥ (3,150)	-
Total	¥ 49,853	¥ 251,451	¥ 58,843	¥ 106,508	¥ 466,655	¥ (3,150)	¥ 463,505
Segment (loss) profit	¥ (8,498)	¥ 55,920	¥ (315)	¥ 17,630	¥ 64,737	¥ (31)	¥ 64,706
Segment assets	65,720	417,790	65,559	110,821	659,890	¥ 203,746	863,636
Other:							
Depreciation and amortization	2,376	24,403	4,337	4,613	35,729	-	35,729
Impairment losses on assets	3,227	254	5,780	-	9,261	1,674	10,935
Increase in property, plant, and equipment and intangible assets	1,698	61,960	4,952	23,937	92,547	12,790	105,337

Millions of Yen							
2018							
Reportable segments						Reconciliations	Consolidated
	Power	Ceramics	Electronics	Process Technology	Total		
Sales							
Sales to customers	¥ 54,408	¥ 240,660	¥ 61,316	¥ 94,741	¥ 451,125	-	¥ 451,125
Intersegment sales or transfers	44	11	5	2,720	2,780	¥ (2,780)	-
Total	¥ 54,452	¥ 240,671	¥ 61,321	¥ 97,461	¥ 453,905	¥ (2,780)	¥ 451,125
Segment (loss) profit	¥ (4,715)	¥ 56,720	¥ 917	¥ 17,096	¥ 70,018	¥ 9	¥ 70,027
Segment assets	72,624	381,119	75,518	75,845	605,106	¥ 221,137	826,243
Other:							
Depreciation and amortization	2,544	20,676	3,981	3,115	30,316	-	30,316
Impairment losses on assets	1,284	-	2,378	107	3,769	-	3,769
Increase in property, plant, and equipment and intangible assets	3,566	45,208	5,660	11,307	65,741	5,973	71,714

Thousands of U.S. Dollars							
2019							
	Reportable segments					Reconciliations	Consolidated
	Power	Ceramics	Electronics	Process Technology	Total		
Sales	\$448,667	\$2,265,247	\$530,080	\$931,724	\$4,175,718	-	\$4,175,718
Sales to customers							
Intersegment sales or transfers	460	71	40	27,809	28,380	\$ (28,380)	-
Total	<u>\$449,127</u>	<u>\$2,265,318</u>	<u>\$530,120</u>	<u>\$959,533</u>	<u>\$4,204,098</u>	<u>\$ (28,380)</u>	<u>\$4,175,718</u>
Segment (loss) profit	\$(76,561)	\$503,784	\$(2,837)	\$158,828	\$583,214	\$ (277)	\$582,937
Segment assets	592,074	3,763,878	590,623	998,384	5,944,959	1,835,549	7,780,508
Other:							
Depreciation and amortization	21,407	219,841	39,075	41,557	321,880	-	321,880
Impairment losses on assets	29,072	2,286	52,073	-	83,431	15,084	98,515
Increase in property, plant, and equipment and intangible assets	15,295	558,197	44,614	215,651	833,757	115,221	948,978

Notes:

1. Reconciliation of segment profit is the adjustment of intersegment transactions.
2. The amount of general corporate assets included in the reconciliation of segment assets was ¥216,415 million (\$1,949,689 thousand) and ¥245,548 million at March 31, 2019 and 2018, respectively, mainly consisting of surplus funds (cash and marketable securities), long-term investment funds (investment securities), and the assets of administrative departments.
3. The increase in property, plant, and equipment and intangible assets in reconciliations relates to the increase in corporate departments.

Information about Geographical Areas

(1) Sales

Millions of Yen								
2019								
Japan	North America		Europe		Asia		Other Areas	Total
	USA	Others	Germany	Others	China	Others		
¥134,141	¥95,473	¥5,985	¥60,080	¥50,642	¥46,661	¥52,281	¥18,242	¥463,505
Millions of Yen								
2018								
Japan	North America		Europe		Asia		Other Areas	Total
	USA	Others	Germany	Others	China	Others		
¥123,831	¥101,251	¥8,097	¥41,627	¥54,041	¥49,276	¥57,624	¥15,378	¥451,125
Thousands of U.S. Dollars								
2019								
Japan	North America		Europe		Asia		Other Areas	Total
	USA	Others	Germany	Others	China	Others		
\$1,208,476	\$860,120	\$53,918	\$541,264	\$456,238	\$420,369	\$471,001	\$164,332	\$4,175,718

Sales are attributed to countries based on the location of the customers.

(2) Property, plant, and equipment

Millions of Yen							
2019							
Japan	North America		Europe		Asia	Other	Total
	USA	Others	Poland	Others		Areas	
¥149,227	¥17,441	¥17,054	¥78,658	¥2,865	¥60,263	¥554	¥326,062

Millions of Yen							
2018							
Japan	North America		Europe		Asia	Other	Total
	USA	Others	Poland	Others		Areas	
¥118,726	¥16,156	¥18,322	¥69,463	¥3,114	¥43,555	¥765	¥270,101

Thousands of U.S. Dollars							
2019							
Japan	North America		Europe		Asia	Other	Total
	USA	Others	Poland	Others		Areas	
\$1,344,386	\$157,122	\$153,639	\$708,627	\$25,807	\$542,909	\$5,004	\$2,937,494

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Subsidiaries and Affiliated Companies

As of March 31, 2019

JAPAN

	Company's Direct and Indirect Ownership (%)	Principal Products and Services
■ENERGY SUPPORT CORPORATION	100	Power distribution equipment
■AKECHI INSULATORS, LTD.	100	Electrical insulators
■IKEBUKURO HORO KOGYO CO., LTD.	100	Glass-lined reactors & tanks for chemical processing industries
■NGK CHEM-TECH, LTD.	100	Chemical equipment and maintenance
■NGK FILTECH, LTD.	100	Membrane separation systems
■NGK ADREC CO., LTD.	100	Refractories/kiln furniture
■NGK KILNTECH CORPORATION	100	Thermal process engineering & products
■NGK OKHOTSK, LTD.	100	Jig for ceramics production
■NGK METEX CORPORATION	100	Beryllium copper wrought products
■NGK FINE MOLDS, LTD.	100	Molds
■NGK CERAMIC DEVICE CO., LTD.	100	Ceramic electronic components
■SOSHIN ELECTRIC CO., LTD.	40.6	Electronic components and devices
■NGK ELECTRONICS DEVICES, INC.	100	Ceramic packages for semiconductors and ceramic electronic components
●METAWATER CO., LTD.	28.9	Environmental protection systems
●NGK LIFE CO., LTD.	100	Insurance agency service and golf cours management

Other Group Companies

■KANSAI ENERGYS CORPORATION	■KYUSUYU ENERGYS CORPORATION	■HOKURIKU ENERGYS CORPORATION	■TOKAI ENERGYS CORPORATION
■ENERGYS SANGYO CORPORATION	■SOSHIN DEVICE CO., LTD.	■RISSHIN ELECTRONICS CO., LTD.	■SOSHIN POWERTECH CO., LTD.
NGK SPORTS PLANNING CO., LTD.	NGK YU-SERVICE CO., LTD.	NGK TECHNICA, LTD.	
NGK LOGISTICS, LTD.			

NORTH AMERICA

	Company's Direct and Indirect Ownership (%)	Principal Products and Services
■NGK NORTH AMERICA, INC.	100	Holding company
■NGK-LOCKE, INC.	100	Electrical insulators
■NGK-LOCKE POLYMER INSULATORS, INC.	100	Electrical polymer insulators
■NGK INSULATORS OF CANADA, LTD.	100	Electrical insulators and ceramic products
■NGK CERAMICS USA, INC.	100	Automotive ceramics
■NGK AUTOMOTIVE CERAMICS USA, INC.	100	Automotive ceramics
■NGK CERAMICS MEXICO, S. DE R.L. DE C.V.	95	Automotive ceramics
■NGK METALS CORPORATION	100	Beryllium copper products
■NGK ELECTRONICS USA, INC.	100	Ceramics for semiconductor manufacturing equipment
■FM INDUSTRIES, INC.	100	Modules for semiconductor production equipment

EUROPE AND AFRICA

	Company's Direct and Indirect Ownership (%)	Principal Products and Services
■NGK CERAMICS EUROPE S.A.	100	Automotive ceramics
■NGK EUROPE GMBH	100	Ceramic products
■NGK CERAMICS POLSKA SP. Z O.O.	95	Automotive ceramics
■NGK CERAMICS SOUTH AFRICA (PTY) LTD.	100	Automotive ceramics
■NGK BERYLCO FRANCE	100	Beryllium copper products
■NGK BERYLCO U.K. LTD.	100	Beryllium copper products
■NGK DEUTSCHE BERYLCO GMBH	100	Beryllium copper products

ASIA PACIFIC

	Company's Direct and Indirect Ownership (%)	Principal Products and Services
■NGK STANGER PTY. LTD.	100	Power distribution equipment
■NGK INSULATORS (CHINA) INVESTMENT CO., LTD.	100	Electrical insulators and beryllium copper products
■P.T. NGK CERAMICS INDONESIA	97.8	Automotive ceramics
■SIAM NGK TECHNOCERA CO., LTD.	100	Refractories/kiln furniture
■NGK CERAMICS (THAILAND) CO., LTD.	95	Automotive ceramics
■NGK CERAMICS SUZHOU CO., LTD.	100	Automotive ceramics
■NGK TECHNOCERA SUZHOU CO., LTD.	100	Thermal process engineering & products, refractories/kiln furniture

Other Group Companies

■ENERGY ELECTRIC (SHANGHAI) CORPORATION	■SOSHIN ELECTRONICS OF AMERICA INC	NGK AUTOMOTIVE CERAMICS KOREA CO., LTD.
■NGK MATERIAL USA, INC.	■SOSHIN ELECTRONICS (HK) LIMITED	NGK TECHNOLOGIES INDIA PVT. LTD.
■NGK AUTOMOTIVE CERAMICS MEXICO, S. DE R.L. DE C.V.	■SOSHIN ELECTRONICS (SZ) LIMITED	NGK ITALY S.R.L.
■NGK ELECTRONICS DEVICES (M) SDN. BHD.	■SOSHIN ELECTRONICS (M) SDN. BHD.	TAIWAN SOSHIN ELECTRIC CO., LTD.
■NGK GLOBETRONICS TECHNOLOGY SDN. BHD.	■NGK INSULATORS TANGSHAN CO., LTD..	SOSHIN ELECTRONICS EUROPE GMBH
■NGK ELECTRONICS DEVICES SUZHOU CO., LTD.	■LOCKE INSULATORS, INC.	NGK ELECTRONICS DEVICES ASIA SDN. BHD.
		NGK ENERGYS MYANMAR CO., LTD.

- Consolidated companies
- Affiliated companies accounted for by the equity method

