

MEC COMPANY LTD. (4971 JP)

THE NEW CZ-8401 PRESENTS GROWTH POTENTIAL

QUARTERLY EARNINGS SUMMARY

3Q EARNINGS RESULT

MEC reported FY19 3Q cumulative earnings – OP of ¥1,366mil (-21.8% YoY) on sales of ¥8,104mil (-3.9% YoY), due to weak earnings in 1H.

In 3Q alone, the OP of ¥755mil (+6.6% YoY / +86.8% QoQ), which was the second highest quarterly figure in history, on sales of ¥3,128mil (+6.7% YoY / +18.1% QoQ), thanks to solid sales of CZ-8101 (adhesion enhancing chemicals used in package chips) for the seasonal increase in smartphone production and a rise in demand for data centre servers. Furthermore, sales of EXE, an etching chemical, was benefitted from increase in application on smartphone display.

3Q sales of adhesion enhancing chemicals, which includes the CZ series, hit an historical quarterly record of ¥1,718mil (+4.8% YoY / +8.4% QoQ). Weak sales of V-Bond – especially in the automobile-related business – and the CZ series, was partially offset by pick-up in demand for CZ-8101 (+3.7% YoY / -4.7% QoQ), however, CZ-8100 sales fell -5.5% YoY / -1.2% QoQ to ¥257mil. Adhesion enhancing chemicals, include pre- and post-processing agents for CZ series, helped offset the decline in sales of other adhesion enhancing chemicals.

Sales of Etching Chemicals rose 11.5% YoY / 32.0% QoQ to ¥1,200mil, with EXE sales of ¥369mil (+24.7% YoY) putting in a solid performance thanks to buoyant sales in COF (Chip on Film) for TV and smartphones. The SF (surface treatment) product – used in high-end smartphone panel sensors – generated ¥407mil (+17.3% YoY) in the 3Q, the highest quarterly revenue in history.

However, despite the recovery in the 3Q and having achieved 88% of its full-year guidance, MEC remains conservative in its outlook and has not changed its targets for the following reasons:

- A large part of 3Q recovery was due to the seasonal pick-up in smartphone production, although 3Q results were better than the firm's budget revised in August.
- Also, 3Q profit level usually tends to be higher as package makers look to replenish inventory again for the CY 4Q (Oct~Dec), after the seasonal peak.
- Management noted that the Japan-Korea trade friction over semiconductor materials has led to the Korean package makers stockpiling MEC's products (Jul~Sept sales ¥150mil), therefore, it is possible to see decline in the Oct~Dec quarter.

MEC is guiding for FY19 OP of ¥1,550mil (-30.3% YoY) on sales of ¥10,700mil (-5.6% YoY).

EXECUTIVE SUMMARY

- MEC reported 3Q cumulative OP of ¥1,366mil (-21.8% YoY) on sales of ¥8,104mil (-3.9% YoY). However, for the 3Q alone, OP was the second highest quarterly OP in history at ¥755mil (+6.6% YoY / +86.8% QoQ) on sales ¥3,128mil (+6.7% YoY / +18.1% QoQ).
- 3Q CZ-8101 sales recovered thanks to a seasonal pick-up in smartphone production and a rise in server demand. Etching chemical product EXE – used in COF for TV and smartphone displays – also saw an increase demand.
- Data centre server-related demand is expected to remain firm thanks to a pick-up in 5G infrastructure investment. In August, package makers – MEC's direct customers – announced ca. ¥300bil in CAPEX plans over the next 2~3 years in response to Intel's 2020 launch of its next generation CPU. It has been confirmed that MEC's CZ series will be used in the packages for 5G servers and a high-end smartphone.
- Opportunities for CZ-8401:
 - 1) It's been confirmed as the next generation copper roughening agent for AiP which will be used in new 5G high-end smartphone
 - 2) Packages manufactured by EMIB, Intel's unique super high-density packaging technology, will use CZ-8401.
- MEC sees a growth potential for EXE used in the subtractive method for fine wiring process of smartphone motherboard layers, replacing some made with the current MSAP method.

PAST EARNINGS SUMMARY TO 1H

MEC's FY19 1H – OP of ¥610mil (-41.3% YoY) on revenues of ¥4,976mil (-9.5% YoY) – were negatively affected by the stronger yen and a YoY drop in sales of adhesive enhancers and etching chemicals. However, there are signs of recovery in two core products:

- 1) CZ8101, which recorded quarterly sales of ¥789mil (+7.6% YoY and +46% QoQ) in 2Q due to an increase in applications for CPUs used in data centre servers, as well as those used in PCs, and
- 2) The EXE series, used for COF (Chip on Film) fine wiring formation, which generated ¥349mil in sales for the quarter.

However, although the sales of other chemical products remain sluggish and demand related to smartphones remained weak in the 2Q, MEC reckons that earnings bottomed in the 1Q.

Chemical Sales by Products

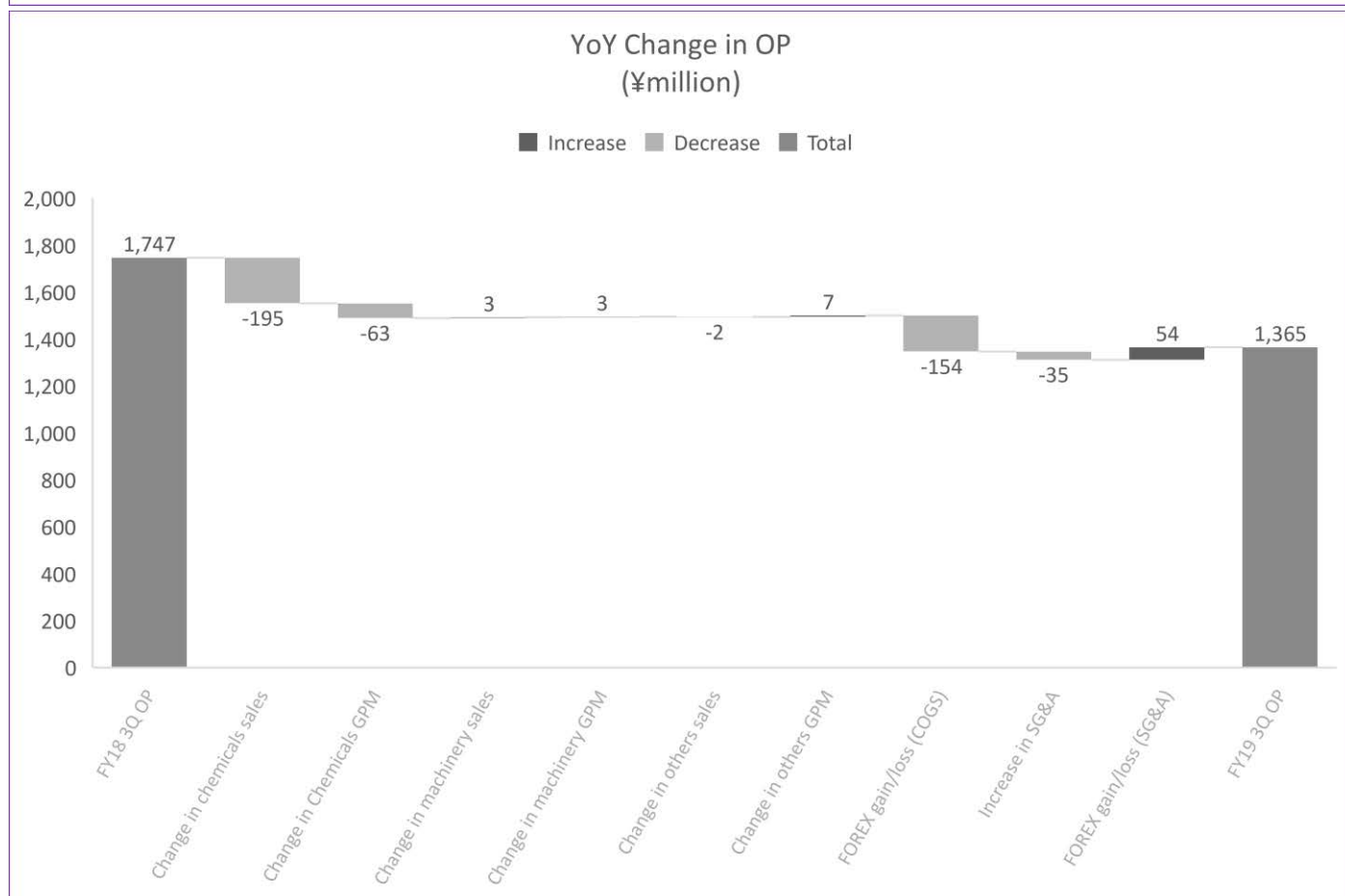
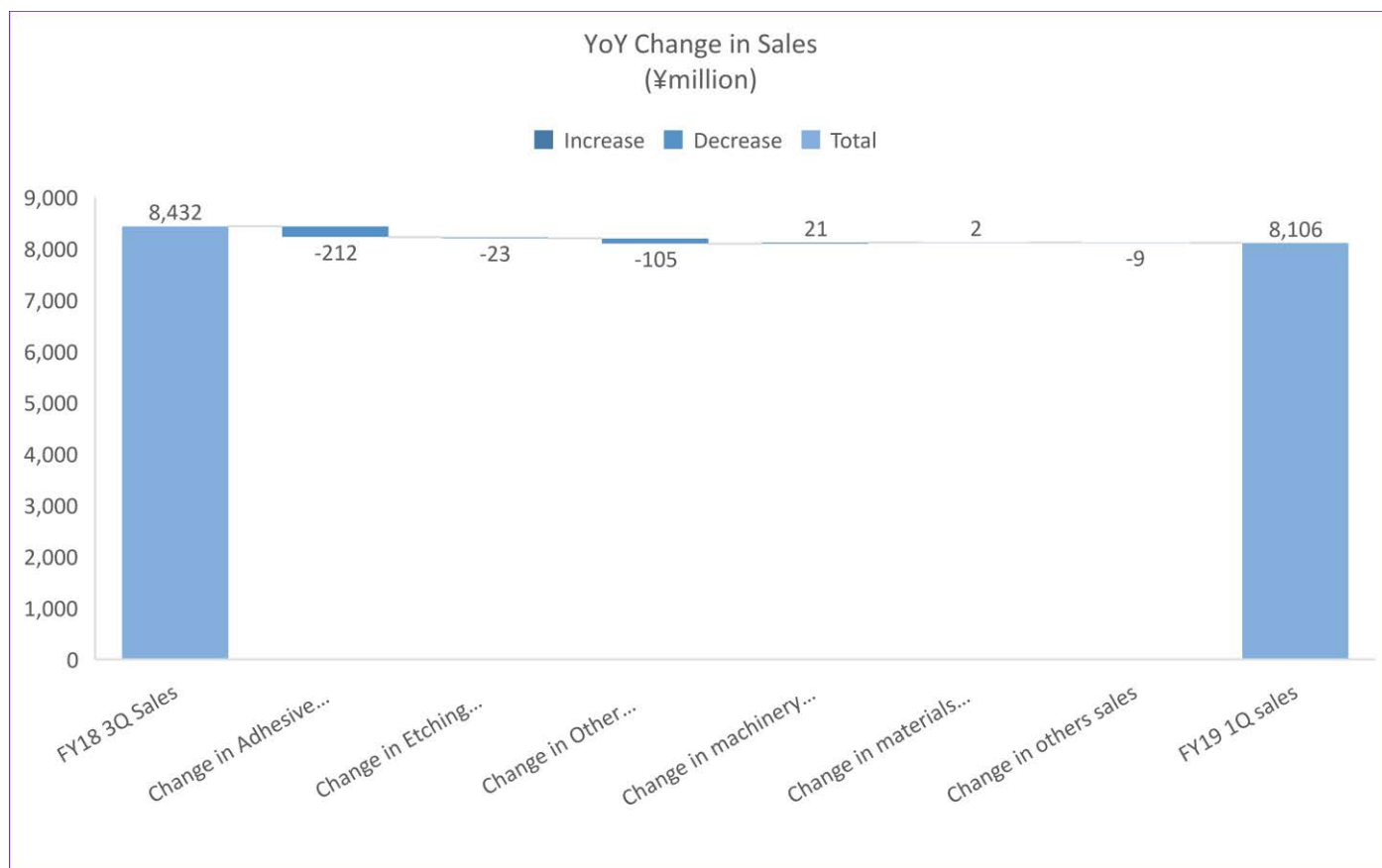
(¥million)	FY2018				FY2019				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	QoQ (%)	YoY (%)
Copper surface treatment chemicals	2,454	2,617	2,716	2,685	2,134	2,497	2,919	16.9	7.5
Adhesive enhancer (CZ,V-Bond, FlatBOND, UT)	1,598	1,641	1,640	1,577	1,360	1,588	1,718	8.2	4.8
CZ-8100	270	279	272	253	232	260	257	-1.2	-5.5
CZ-8101	723	733	725	713	540	789	752	-4.7	3.7
Etching chemicals (EXE, SF etc.)	855	975	1,076	1,108	773	909	1,200	32.1	11.6
Other surface treatment chemicals	158	156	181	162	132	125	133	6.4	-26.4
Chemical Sales Total	2,612	2,773	2,898	2,847	2,266	2,623	3,052	16.4	5.3

Source: Nippon-IBR based on MEC's 3Q Result Presentation

Chemical Sales Volume by Products

(ton)	FY2018				FY2019				
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	QoQ (%)	YoY (%)
Adhesive enhancer	6,341	6,546	6,527	6,286	5,575	6,356	6,833	7.5	4.7
Etching chemicals	1,978	2,186	2,504	2,462	1,758	1,986	2,777	39.8	10.9
Other surface treatment chemicals	360	377	424	399	338	316	320	1.3	-24.5

Source: Nippon-IBR based on MEC's 3Q Result Presentation



Source: MEC's FY19 3Q Results Presentation

ONGOING BUSINESS TREND AND FORECAST

Data centre server-related demand is expected to remain strong thanks to a pick-up in 5G-related infrastructure investment. In August, package makers – MEC’s direct customers – announced CAPEX plans that altogether amounted to circa ¥300bil over the next 2~3 years. This is in response to requests from customers, such as Intel – which has announced a 2020 launch of its next generation CPU – and AMD, amid growth in demand for high-function CPUs used in high-capacity servers. It has been confirmed that MEC’s CZ series will be used in 5G servers and a high-end smartphone.

Demand for CZ810I and EXE continues to be favourable through to the 3Q. Additionally, SF used in touch sensor panels for the high-end smartphone have started recovering since July. The better than expected demand for one of the latest high-end smartphone models has led to a 10% increase in production of the phone. However, the firm does not yet anticipate a pick-up in demand for new generation products such as CZ840I – a product that is expected to be used for package technologies such as AiP (Antenna-in-Package) and EMIB (Embedded Multi-die Interconnect Bridge) this FY. Furthermore, although the current sales trend of SF is favourable, the firm expects a decline of 40% YoY to ca. ¥1,000mil in FY20 as it is expected that some high-end smartphone models to be launched in 2020 might not include a touch panel sensor. However, the firm reckons that the decline in SF sales will likely be offset by higher sales of CZ840I and EXE in FY2020 and onwards.

While there are opportunities for sales to grow going forward, profit growth is expected to be limited because there has been a delay in customer approval on MEC’s new factory in Thailand, completed in July 2019, which incurs associated costs.

TECHNOLOGIES THAT LEAD GROWTH BEYOND FY2020

As 5G gets rolled out, MEC sees growth opportunities for CZ-840I – which boasts the most advanced adhesion enhancement technology. CZ-840I will be able to deliver 0.1µm in roughness compared to the previous version of the CZ series, CZ810I, which has 1µm coarse surface widely used for IC packages in applications such as smartphones and tablets. Finer roughened surfaces require less etching – a feature required as 5G devices will be ultrafast, having to cope with high volumes of data and deal with multiple connectivity without latency. There are two growth opportunities for CZ-840I that are already confirmed – AiP (Antenna in Package), a new type of antenna in 5G devices, and EMIB, a unique super high-density packaging technology by Intel.

Furthermore, MEC is anticipating the replacement of the current dominant fine wiring technology used in (high-end) smartphone HDI motherboards called MSAP (modified semi-additive Process) with the subtractive fine wiring process in which the EXE series can be used.

AIP (ANTENNA-IN-PACKAGE)

5G mobile communications system services, the successor to LTE / 4G communications, are starting up worldwide. In 5G communications, radio waves in the millimetre wave band are used to achieve ultrafast large-capacity services, multiple concurrent connectivity, and ultra-low latency.

5G communication will use a 28~100GHz frequency range compared to 3.6~4.5GHz used in the 4G environment. The characteristics of such wave bands are:

- Each base station can cover shorter-distanced areas
- Millimetre waves are prone to shielding by objects

Due to these characteristics, multiple small cell base stations will be required in order to have 10X+ faster and seamless communications without latency compared to 4G. Antennas used in the 4G environment cannot sufficiently perform under the millimetre wave environment, therefore, they need to be replaced with a package that is loaded with antenna (AiP). Around 2~5 AiP will be mounted inside a 5G high-end smartphone.

MEC’s new adhesion enhancing solution, CZ-840I, has already been confirmed to be used in AiP for a high-end 5G smartphones for the millimetre wave environment. The Fuji Chimera Research Institute, Inc., argues in its publication “Future Perspective of Core Technology to Realize 5G / High Speed Large Capacity Communication 2018” published

in July 19, that 5G smartphones will typically be loaded with 2~5 5G RF modules (with each module being equipped with AiP, filter, switch IC, RF and RFIC) per handset.

The 5G infrastructure investment is expected to gradually start from 2020. The publication suggests that the global market for 5G-related products is predicted to be worth \$38bil in 2023, 70% of which is estimated to be products and services related to small cell base stations. As smartphone handsets gradually shift to millimetre wave applicable models from CY2020 onwards, it is estimated that the penetration of fully 5G applicable smartphones will make up 40% of total smartphone in the market in 2025.

Smartphone Market Trend by Shipment Volumes – Read-across to AiP Growth Potential

(mil units)	CY18	CY19EST	CY20F/C	CY21F/C	CY22F/C	CY23F/C	CY24F/C	CY25F/C	CAGR (%) CY19-25
3Q/4Q compatible	1,400	1,324	1,220	1,120	1,040	940	860	780	-8.4
YoY (%)		-5.4	-8.9	-8.2	-7.1	-9.6	-8.1	-9.3	
5G compatible		26	150	260	320	400	460	520	64.8
YoY (%)			5.8x	73.3	23.1	25	15	13	
Total	1,400	1,350	1,370	1,380	1,360	1,340	1,320	1,300	-0.6
YoY (%)		-4.6	1.5	0.7	-1.4	-1.5	-1.5	-1.5	
5G / Total (%)		1.9	10.9	18.8	23.5	29.9	34.8	40.0	

Source: Estimate by Fuji Chimera Research Institute

EMIB (EMBEDDED MULTI-DIE INTERCONNECT BRIDGE), 2.5D PACKAGING

Another promising opportunity for CZ-840I lies with Intel's 2.5-dimensional packaging technology, Embedded Multi-die Interconnect Bridge (EMIB). The aforementioned boost in CAPEX plans by package makers is mainly for EMIB.

MEC has been the sole supplier of copper roughening agent CZ series to package makers since Intel started changing the PWB material from ceramic to organic resin. Hence, Intel's unique EMIB technology should provide another growth opportunity for MEC's CZ-840.

EMIB is expected to become the packaging technology applicable for ultra-high-speed processors for cloud storage and AI deep learning as well as next generation PCs and laptops.

Server Market Trend – Growth Implication for EMIB

No. of servers (mil units)	CY18	CY19EST	CY20F/C	CY21F/C	CY22F/C	CY23F/C	CY24F/C	CY25F/C	CAGR (%) CY19-25
Non-AI applicable	15.0	15.6	16.4	17.1	17.9	18.4	18.9	19.4	3.7
YoY (%)		4.0	5.1	4.3	4.7	2.8	2.7	2.6	
AI-applicable	1.2	1.5	1.9	2.4	2.8	3.4	4.0	4.7	21.5
YoY (%)		25.0	26.7	26.3	16.7	21.4	17.6	17.5	
Total	16.2	17.1	18.3	19.5	20.7	21.8	22.9	24.1	5.8
YoY (%)		5.6	7.0	6.6	6.2	5.3	5.0	5.2	
AI-applicable (%)		8.8	10.4	12.3	13.5	15.6	17.5	19.5	14.8

Source: Estimate by Fuji Chimera Research Institute

GROWTH POTENTIAL OF MEC'S FINE WIRING FORMATION TECHNOLOGY – THE EXE SERIES

In the 1H, sales of the EXE series hit ¥646mil of which ca. 90% was for COF (chip-on-film) and less than 10% for HDI (high-density interconnect) motherboard used in smartphones. High-end smartphone HDI motherboard circuit wiring presents another business opportunity for the firm's subtractive method.

The fine wiring technology that is mainly employed today for high-end smartphone motherboards is MSAP (modified semi additive process). MSAP is a wiring technology using the additive method along with SAP (Semi-Additive Process).

There are two types of wire pattern formation methods – the subtractive process and the additive process. MEC's anisotropic solution for fine wiring, the EXE series, is one example of the subtractive process. The subtractive process is based on etching technology and mainly used in HDI substrates today, to form fine wires on the substrates by removing and dissolving non-wire part of copper surface by the etching chemical solution. An example of the additive process is the MSAP currently used in a high-end smartphone motherboard. In the MSAP process, a thin seed layer of copper ($>1.5\mu\text{m}$) is coated on the substrate first, followed by a negative pattern design. Copper is then electroplated to the desired thickness and the seed layer is finally removed.

MSAP is not new to the electronics industry. It originated from the IC packaging technology and was reinvented in 2017 for HDI motherboards in smartphones. Compared to fine wiring by the subtractive process, MSAP has the advantage of having a thinner L/S (current major L/S is $30/30\mu\text{m}$. In the high-end smartphone, L/S is as advanced as $25/25\mu\text{m}$). While MSAP is considered more advanced in terms of L/S size vs the subtractive method, there are certain issues:

- Technological complicatedness – especially in regulating the thinness of the plating
- Costly – the process is based on electroplating, therefore, requires an investment in a plating facility
- Low production yield – due to technological complicatedness, the production yield of MSAP tends to be low.

As battery requirements for smartphones and tablets increase, smaller electronic parts – including multi-layered (10 layers) motherboards, with each of the ten-layer having finer and thinner wiring patterns – are required. MSAP is considered a more suitable method for fine wiring, however, it is more expensive and less efficient. Therefore, the number of MSAP layers was reduced from 6 in the previous high-end model to just 4 in the current model due to these issues. However, number of motherboard layers made using the subtractive method increased from 4 layers to 6 layers. MEC sees this as an opportunity to promote the EXE series to be used in high-end smartphone motherboards that will further advance with finer and thinner wiring patterns.

MEC's EXE currently offers $40/40\mu\text{m}$ with the subtractive process. MEC has already achieved seamlessness in wires of $40/40\mu\text{m}$ L/S that are currently used in some smartphone models. The firm has already developed the upgraded version EXE with $30/30\mu\text{m}$ L/S, yet the L/S $25/25\mu\text{m}$ that is currently made available for motherboard layers by MSAP will be difficult to achieve by the subtractive method.

While the firm sees an opportunity and aims to supply to the high-end smartphone motherboard fine wiring, it is still unclear if the EXE's latest $30/30\mu\text{m}$ L/S technology will be used for HDI in future high-end models.

MEC (4971 JP) : Financial Summary

(¥million)	FY3/2015	FY3/2016	FY3/2017	FY12/17	FY12/18	FY12/19
Sales	9,057	9,078	9,259	9,641	11,328	10,700
Operating Profit	2,008	2,185	1,887	1,993	2,222	1,550
Recurring Profit	2,129	2,207	1,888	2,063	2,236	1,600
Net Profit	1,344	1,514	1,642	1,567	1,778	1,150
EPS (JPY)	66.98	76.26	84.86	81.77	92.85	60.60
Adjusted EPS (JPY)	-	-	-	-	-	-
Cash flow from operation (CFO)	1,489	1,796	1,633	1,591	1,928	-
Cash flow from investment (CFI)	-399	-1,372	-2,461	-832	-706	-
Cash flow from finance (CFF)	-220	-912	1,128	-885	-1,228	-
Cash and cash equivalent	3,997	3,422	3,723	3,664	3,599	-
Free cash flow (FCF)	1,090	424	-828	759	1,222	-
CFO per share (JPY)	74.19	90.42	84.37	110.65	100.67	-
FCF per share (JPY)	54.31	21.35	-42.78	52.79	63.80	-
Total asset	14,449	15,518	17,797	18,985	18,601	-
Liabilities	2,606	3,465	4,883	4,660	3,731	-
Net asset	12,039	12,250	13,110	14,587	15,166	-
Capital	594	594	594	594	594	-
Shareholders' equity	12,039	12,250	13,110	14,587	15,166	-
BPS (JPY)	599.85	632.41	683.86	760.92	799.46	-
OPM (%)	22.17	24.07	20.38	20.67	19.62	14.49
ROE (%)	12.05	12.47	12.95	11.30	11.95	-
ROA (%)	15.70	14.68	11.34	11.20	11.78	-
Shareholder equity ratio (%)	82.20	77.95	72.86	75.79	80.26	-
D/E ratio (%)	21.65	28.29	37.25	31.95	24.60	-
Total asset turnover (X)	0.66	0.60	0.55	0.69	0.59	-
Interest coverage (x)	408.60	556.00	318.00	335.00	373.33	-
Current ratio (%)	465.02	293.52	279.82	290.46	321.00	-
Interest-bearing debt	0	0	1,750	1,250	750	-
EBIT	2,134	2,211	1,894	2,069	2,242	-
EBIT Margin (%)	23.56	24.36	20.46	21.46	19.79	-
EBITDA	2,470	2,571	2,262	2,541	2,851	-
EBITDA margin (%)	27.27	28.32	24.43	26.36	25.17	-
Dividend (JPY)	14.00	18.00	20.00	22.00	26.00	26.00
Dividend payout ratio (%)	20.90	23.60	23.60	26.90	28.00	42.90
Shares outstanding (shares)	20,071,093	20,071,093	20,071,093	20,071,093	20,071,093	20,071,093
Treasury (shares)	34	700,089	900,089	900,089	1,100,232	1,100,232

Source: Nikkei Value Search

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For further enquiry, please contact:

Nippon Investment Bespoke Research UK Ltd
First Floor,
35 Little Russell Street
London WC1A 2HH
TEL: +44 (0)20 7993 2583
Email: enquiries@nippon-ibr.com



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Japanese Equity Specialist

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