

## 6312 Freund Corporation

### World's Leader in Pharmaceutical Product Use Machinery, Expanding Sales of Highly Profitable Pharmaceutical Excipients

May 16, 2019

#### Key Points

- In the wake of the expansion in products on the back of the generic drug boom, Freund has encountered difficulties cultivating business opportunities in overseas markets. And during fiscal year February 2019, a decline in formulation equipment sales contributed to a large contraction in profits. During the coming fiscal year February 2020, Freund's earnings estimates call for a continued decline in profits based on their cautious outlook for a recovery in demand to materialize. Furthermore, the Company is currently assessing the potential impact of the next drug pricing revision and its marketing of new products to get a better handle on trends in the coming term.
- Formulation equipment orders for generic drug applications fell by a large margin, and cultivation of opportunities for tablet printing equipment is being delayed. However, a general bottoming in machinery orders should allow for marketing efforts to become more effective. Furthermore, near term trends in Freund's earnings are above those called for in its earnings estimates.
- Pharmaceutical excipients, which are another major product realm for Freund, are seeing favorable growth in both Japan and overseas. During the previous term, profits of the chemical and food business exceeded those of the machinery segment to become the main driver of the Company's overall earnings. Freund's in-house excipient product, known as "Nonpareil", is seeing strong growth, and SmartEx, jointly developed with Shin Etsu Chemical Co., Ltd., saw strong growth. Freund is unable to keep up with strong demand for products manufactured internally, and is therefore constructing a new plant at the site of its facilities in Hamamatsu, Shizuoka. Start of production at this new plant is expected to begin from 2020 and to contribute to large increases in its supply capabilities.
- Investments for development of high potency active pharmaceutical (HPAPI) and other anti-cancer agents are expanding. Furthermore, these investments entail formulation equipment systems with rigorous containment functions to avoid various hazards. Consequently, this realm of products is becoming highly important. In addition, market cultivation of cutting edge continuous production capable formulation equipment has begun. Also, applications for this equipment in the highly

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profitable realm of pharmaceutical excipients is anticipated to grow both within Japan and overseas.

- Freund's Five Year Medium Term Business Plan assumes an abating of the generic drug boom and calls efforts to be implemented for new drug formulation equipment development, market cultivation, global deployment of its unique pharmaceutical excipients, lithium ion battery electrode coating equipment development, and development of opportunities outside of the realm of formulation equipment.
- Freund has identified financial targets to be achieved in fiscal year February 2022 for sales, operating profit, operating margins and return on equity (ROE) of JPY30.0 billion, JPY3.0 billion, 10% and over 8% respectively. Earnings are not expected to undergo a full blown recovery during fiscal year February 2020, but the contributions from new business realms are expected to grow and allow profits to begin a growth phase in the following fiscal year. Furthermore, the highly competitive standing of Freund remains unchanged and is expected to allow it to cultivate global markets for its various products.

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Company Rating: B

Share Price (2019/5/15): JPY784

Market Capitalization: JPY14.4billion (18.4 million shares)

PBR: 0.99x

ROE: 6.0%

PER: 16.4x

Dividend Yield: 2.6%

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(Units: JPY Million)

FY End	Sales	Operating Profit	Current Profit	Net Profit	EPS (Yen)	Dividend (Yen)
2012.2	15236	1065	1123	608	35.3	7.5
2013.2	16396	1470	1618	765	44.4	10.0
2014.2	17616	1286	1341	787	45.7	12.5
2015.2	17424	1150	1249	695	40.4	15.0
2016.2	19027	1346	1394	961	55.7	12.5
2017.2	21164	2041	2097	1064	61.7	20.0
2018.2	19801	1971	1994	1477	85.7	20.0
2019.2	18408	1223	1326	843	50.2	20.0
2020.2 (Est.)	19000	1200	1200	800	47.8	20.0
2021.2 (Est.)	21000	1600	1600	1050	62.7	20.0

(Based upon data as of February 2019)

Total Assets: JPY17.465 billion

Net Assets: JPY13.250 billion

Capital Adequacy Ratio: 75.9%

Book Value per Share: JPY791.3

(Note) ROE, PER, Dividend Yield are based upon fiscal year February 2020 earnings estimate data. Stock splits of 2 for 1 were conducted in June 2009 and February 2016, and EPS and dividends have been adjusted to reflect these splits. A special dividend of JPY2.5 per share (Revised basis) has been issued in fiscal year February 2015 to commemorate the 50 anniversary of operations, and a special JPY5.0 per share dividend was paid in fiscal year February 2017 to commemorate the 20<sup>th</sup> anniversary of Freund's listing.

Chief Analyst: Yukio Suzuki

(Chief Analyst, Belle Investment Research of Japan)

**Company Rating Definition:** Corresponding companies are evaluated on the following qualitative criteria of 1) strength of management, 2) growth and sustainability of business, and 3) potential for downward earnings revisions. Based upon evaluations of the above mentioned qualitative criteria, the following four ratings are assigned to each company.

A: Favorable

B: Some improvement needed

C: Significant improvement needed

D: Extremely difficult conditions

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## 1. Characteristics: Development of Unique Pharmaceutical Product Formulation Equipment

### **Main Products of Pharmaceutical Product Formulation Equipment and Excipients**

Freund Corporation's business is comprised of the main products of granulating and coating equipment used in the process of manufacturing pharmaceutical products, and the manufacture and sale of pharmaceutical excipients. In these realms, the Company is highly unique as it is the only one in the world to produce both equipment and the consumable products used by its equipment.

The longstanding relationship between these equipment and products is similar to that of "pen and ink", and the development of this relationship has evolved in recent years. Currently, Freund maintains a business strategy that focuses upon 1) the equipment and chemical products (Hardware) and 2) technologies used to manufacture these products (Software). Furthermore, the core competence of Freund lies in its development technologies used to manufacture products.

The term equipment refers to manufacturing machinery and equipment for drug formulations which use adjuvants (Excipients) as the main constituent of drugs to make them into tablet forms which are easier to ingest. They are not made in the form of liquid pharmaceuticals, but as orally ingested solid agents. Nearly half of the world's pharmaceuticals are made in the form of tablets, capsules, granules, powders and other solid agents.

In some instances, the pharmaceutical and food manufacturers produce pharmaceuticals on their own, and in other instances they outsource the manufacture of these products. In both cases, there is a high possibility that the drug formulation manufacturing equipment they use are made by Freund.

Freund Corporation, Freund Vector (United States), and Freund Turbo are involved in the machinery business. Freund Vector is responsible for covering the markets in North, Central and South Americas, Europe, and the Middle East. Freund Turbo was acquired in 2010 and manufactures mainly industrial equipment used to make cosmetics, toners and other non-pharmaceutical products. In the machinery business, the Freund Group boasts of 70% share of the granulating and coating use equipment used within Japan, and it ranks as one of the top three companies globally.

With regards to the chemical and food business, pharmaceutical excipients, food quality preserving agents, dietary supplements and other products are manufactured. With regards to tablets and powder pharmaceutical excipients, the active ingredients used in drugs account for only 1% to 3% of the total, with harmless secondary materials including lactose, starch and other sugars added to make up the rest. With regards to food quality preserving agents, ethanol based transpiration agents are commonly used to preserve "baumkuchen" and other partially cooked cakes and confectionaries to prevent spoilage by blocking the growth of bacteria.

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## Freund Business Overview

(%)

	Sales		Operating Profit		Characteristics
	FY2/18	FY2/19	FY2/18	FY2/19	
Machinery	72.7	67.2	67.1	41.8	Pharmaceutical, food, fine chemical use Granulating, coating equipment manufacture, sales Coating Equipment domestic share 70%, Global rank #3
Pharmaceutical	83	82			
Industrial	17	18			
Subtotal	100	100			
Chemical, Foods	27.3	32.8	32.9	58.2	Pharmaceutical excipients, food quality preserving agents, dietary supplement manufacture, sales Good manufacturing practices compliant manufacturing facilities
Pharmaceutical Excipients	47	53			
Food Quality Preserving Agent	39	36			
New Products	14	11			
Subtotal	100	100			

### Expanding Product Range from Pharmaceutical Excipients to Food Quality Preserving Agents, Dietary Supplements

Drug formulation technologies and equipment are also used in the food realm. Strong growth in health foods is leading to the creation of new business models. For example, food and houseware manufacturers are marketing dietary supplements for sale mainly through catalog channels. These dietary supplements often take the form of tablets and are commonly manufactured using Freund equipment that leverage its highly advanced drug formulation technologies. A main difference between supplements and pharmaceutical products is that supplements lack the active agents used in pharmaceutical products.

In addition, food product quality preserving agents are manufactured and used to preserve the quality and flavor of “baumkuchen”, “castella” and other partially cooked cakes and confectionaries. Spoilage of these and other foods is caused by oxidation. So to prevent spoilage, foods must be prevented from oxidizing by limiting their contact with oxygen. There are two main ways to prevent spoilage, the first through use of deoxidants, and the second through use of ethanol alcohol transpiration agents. Deoxidants often cause drying out of cakes and confectionary products and contributes to degradation in their texture.

In these examples, silica impregnated with alcohol is packaged in small bags for use as alcohol transpiration agents to prevent the occurrence of fungus. Freund is a pioneer in alcohol transpiration agents and began developing them in 1977.

The Japanese market for deoxidants and alcohol transpiration agent type food quality preserving agents is estimated to total JPY20.0 and between JPY3.5 to JPY4.0 billion respectively. And while market scale of the alcohol transpiration agents is smaller than that of deoxidant type agents, Freund

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maintains a superior position within this market. Because the Company has long promoted development of the ethanol transpiration agent segment of the market, its share is currently over 50%. At the same time, Freund also maintains a product lineup of and participates in the deoxidant agent segment of the market.

#### Freund's Main Products

Machinery	Chemicals and Foods
Granulating Equipment	Pharmaceutical Excipients
Flow Coater (Fluid bed granulation coating equipment)	Direct Compression Manitol Lactose
Flow Coater High Speed Granulating Model (Fluid bed granulation drying equipment)	Spherical granules
Granuformer (Continuous granulating equipment)	Absorbents, solidifying agents, fluidizers
Coating Equipment	Food Quality Preserving Agents
High Coater Model FZ (Fully Automated Sugar Film Coating Equipment)	Food additives
Tablet Printing Equipment	Food quality preserving agents
Tabrex	Dietary Supplements
Seamless Capsules	Seamless mini-capsules
Spherex	Drug delivery system responses
Pulverizing Equipment	AQ shelax supplement
V Turbo, Balance Gran	Coenzyme Q10, lactoferrin
	Bifidobacteria

(Note: DDS is an acronym for drug delivery system)

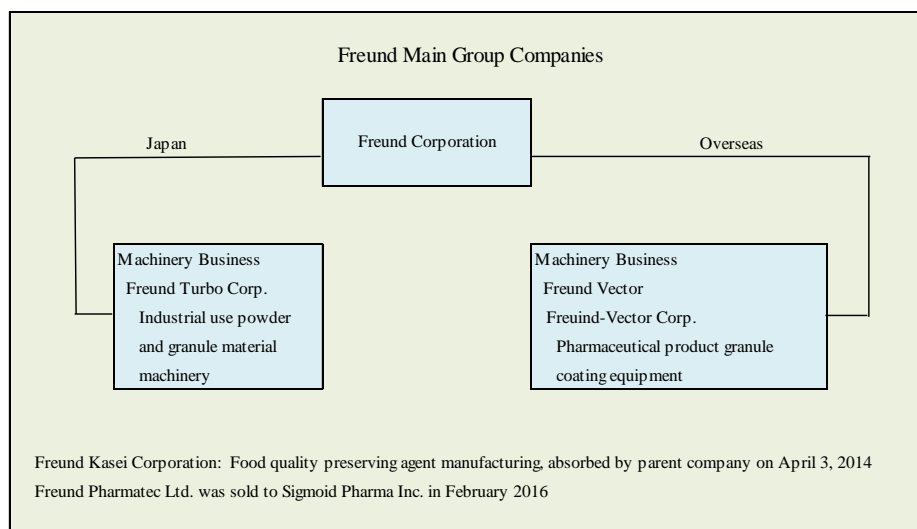
#### Independent Development at the Hamamatsu Technology Development Research Center

At the core of Freund lies its “Technology Development Research Center” in Hamamatsu City. Based upon its corporate philosophy of “Paving the Way to the Future through Creativity”, the Company’s driving force is its ability to develop unique technologies. Research and development activities are conducted by 40 staff within this division with a focus upon developing technologies in the three main realms of drug formulation equipment, excipients and food quality preserving agents.

In the realm of drug formulation equipment, research and development based upon powder, granule and coating processing technologies is conducted for both pharmaceutical product and other applications. With regards to excipients, Freund conducts unique research and development not only for applications within Japan but also for global applications as well. In addition, the Company also prioritizes research and development in the realms of food quality preserving agents and dietary supplements.

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The Hamamatsu “Technology Development Research Center” also boasts of a library of over 300 intellectual properties (Patents and trademarks), and it provides customers with the faculty to conduct tests of sample products because it operates various machinery and equipment developed in-house. Clients can also access knowhow on various applied uses of machinery in the realms of new drugs and food related products. In this manner, Freund is able to leverage this facility in its marketing strategy and come up with improvements of its machinery.



### 55 Years of Operations since Its Founding, President Iwao Fusejima Leads Global Marketing

This year marked the 7<sup>th</sup> year since Iwao Fusejima took on the responsibility of President in in 2012, and April 2019 marked the 55<sup>th</sup> year of operations of Freund since Yasutoyo Fusejima (Currently 80 years of age, Honorary Chairman) founded the Company in 1964. His father’s company manufactured industrial use rubber products and Yasutoyo himself became aware of and impressed by the high profit margins of pharmaceutical products at the time he graduated from the Commerce Department of Waseda University in Japan.

While his friends joined trading companies, Yasutoyo decided to work in his father’s business of rubber product manufacture and considered the potential to cultivate other new businesses. After graduating from university, he decided to start up his own business while continuing to work at his father’s rubber product company. At the time, Yasutoyo visited one of his high school classmates who worked for a major pharmaceutical company and discovered that drugs were manufactured in a labor intensive process using tweezers and a spray bottles. Upon seeing this highly labor intensive manufacturing process, he recognized the strong potential for automation to be introduced to this

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manufacturing process and he created his first machine in 1963. In principle, this machine used a spray gun to spray liquid on to tablets, which were then dried in a drying machine. This is the basic principle for coating technologies used today.

Because he was interested in machinery, he had his friend's steel factory make this machine. The film coating agent used was purchased from Shin-Etsu Chemical Co., Ltd. When shown the final machine he created, his friend was impressed by how well it was made. In the following year of 1964, Yasutoyo and his friend Shimesu Motoyama (Worked at the major pharmaceutical company, and later to become a managing director at Freund) established Freund (The German word meaning "friend").

At the age of 25, Yasutoyo Fusejima created his first prototype equipment, and established his company at the age of 26. The strong sales of both the first and second machines allowed his business to get off to a strong start. Film coating machine FM2 (This product name FM was taken from the two initials of the founders of Freund, Fusejima and Motoyama) were sold to pharmaceutical companies. This machine continued to sell strongly, despite having doubled in price because of its reputation for being too cheap. He developed automated film coating equipment, and started manufacture of coating liquids as well. Because of the strong sales of the first machine, Freund became profitable in its first year of operations. Since then, Freund has focused upon the two main business segments of machinery, and chemicals and foods.

He learned about the business model of copying machines from his uncle, who was the president of a copying machine company at the time, and how profits were generated by manufacture and sale of consumables which were used in wet type copying machines. Therefore, Yasutoyo decided to manufacture film coating use fluids within his company. At the time, the color of organic solvents was important and he was able to expand sales and profits by developing a coating technology that other companies could not duplicate.

The Company got its start in the tablet coating business. He used plasticizer in coating fluids to make it soft and acquired patents for both this fluid and machinery, in addition to acquiring patents in the United States for drug formulation equipment.

Yasutoyo Fusejima is the founder, and the next President Hori is the brother of Yasutoyo's wife. And in March 2012, Iwao Fusejima (The eldest son of Yasutoyo) became President of Freund. Iwao Fusejima was born in 1969. He boasts of overseas experience since he attended Coe College in Cedar Rapids, Ohio of the United States where he studied management. In 1997 at the age of 28, he joined Freund. After spending a number of years working in the overseas division of the Company, and also holding positions of manager of the machinery business and chemical and food business before

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he became President of Freund.

### **Founder and Corporate Governance**

Along with the retirement of Director Narimichi Takei effective as of the general shareholders' meeting held in May, the total number of directors declined from six to five, including the two directors with executive responsibilities, President Iwao Fusejima and Managing Director Norio Shiratori, and three outside directors. At the same time, one of the four external audit and supervisory board members became a full-time auditor, with all four remaining as external auditors.

The number of corporate auditors has been increased to four from three as of the general meeting of shareholders held in May 2017, and three outside corporate auditors were newly appointed. Of the five managing directors, two are outside directors to provide objective direction and advice. President Iwao Fusejima views 1) performance of functions that cannot be fulfilled within the Company and 2) provision of opinions about our management as the most important capabilities of these outside directors.

Under the direction of President Iwao Fusejima, Freund maintains a structure that employs five general managers responsible for the machinery, chemical and food, domestic sales, overseas sales, and management functions. In the future, the Company expects to strengthen its management system by introducing an executive officer system and other measures.

As part of the Company's efforts to fortify its corporate governance structure, the number of outside directors has been increased by one to three as of the general shareholders' meeting in May 2018. Outside Director Tomohiko Manabe is an accountant with extensive knowledge of accounting, and Outside Director Ryuji Nakatake is a specialist in sports coaching with strong experiences in cultivating teamwork. Furthermore, the newly appointed Outside Director Osamu Imada is a specialist in finance with a strong track record in mergers and acquisition activities. President Iwao Fusejima sees the most important roles of the outside directors as 1) fulfilling functions that he cannot perform himself, and 2) providing objective opinions and advice to himself and the board of directors.

The total number of shareholders as of end February 2019 stood at 13,769. By shareholder type, individuals and financial institutions accounted for 60.88% and 16.48% respectively of total shares issued. Members of the founding Fusejima family held less than 20% of total shares issues.

The founder and Honorary Chairman Yasutoyo Fusejima has led the company using his keen insight to develop highly unique products, and poured his passion into the development process. To this day, Yasutoyo still comes up with numerous ideas for business opportunities and still maintains an active support role within the company that is important to the operations of Freund.

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Of the total number of five directors, only two also have responsibilities as executive officers. Therefore, a key topic is what type of management structure Freund needs to adopt to pursue future growth. And while an executive officer structure has yet to be implemented, Freund is currently implementing measures to cultivate staff who are capable of becoming executive officers.

Another key issue is how the overall executive structure will be strengthened for not only Freund but its main subsidiaries including Freund Vector and Freund Turbo. At the same time, Freund must consider how to implement an effective corporate governance structure. The implementation of these fortified structures is expected to be a positive step in achieving an effective global consolidated management system.

## Group Company Earnings

(JPY mn, %)

		Sales	Operating Profit	Operating Margin
Freund Corporation	FY2/11	10,669	495	4.9
	FY2/12	12,248	839	6.8
	FY2/13	13,506	1,350	10.0
	FY2/14	13,694	1,241	9.1
	FY2/15	13,364	1,126	8.4
	FY2/16	13,741	1,096	8.0
	FY2/17	15,696	1,537	9.8
	FY2/18	14,282	1,729	12.1
	FY2/19	13,114	1,180	9.0
Freund Vector Corporation	FY2/11	2,757	112	4.0
	FY2/12	2,812	277	9.9
	FY2/13	2,943	147	5.0
	FY2/14	3,892	169	4.3
	FY2/15	3,905	291	7.5
	FY2/16	4,686	293	6.3
	FY2/17	4,727	388	8.2
	FY2/18	4,354	86	2.0
	FY2/19	4,132	30	0.7
Freund Turbo Corporation	FY2/11	561	63	11.2
	FY2/12	930	15	1.6
	FY2/13	1,022	81	7.9
	FY2/14	782	-8	-1.0
	FY2/15	999	-12	-1.2
	FY2/16	1,205	94	7.8
	FY2/17	1,641	79	4.8
	FY2/18	1,722	114	6.6
	FY2/19	1,866	-25	-1.3

(Note) Freund Turbo was acquired in June 2010

Freund Pharmatec was sold to Sigmoid Pharma in February 2016

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### **Freund Vector of the United States Is a Cornerstone of Freund**

Freund Vector manufactures and sells drug formulation equipment at its own plant in the state of Iowa in the United States. Freund in Japan and Freund Vector mutually share technologies, and in principle Freund Vector develops and manufactures its own products with a limited number of parts such as spray guns being imported from Japan.

The total number of employees of the Freund Group stood at 372 at the end of February 2019, of which 208 worked at the parent company, 121 at Freund Vector, and 43 at Freund Turbo.

Freund Corporation established a local sales agent in the United States in 1966. In the following year, marketing activities for its machinery to major pharmaceutical companies within the United States began being conducted. Initially, the automated coating machinery received high regard. In 1979, a collaborative arrangement was formed with Vector Corporation of the United States, which was thereafter turned into a subsidiary. Vector is based in Marion, Iowa (Next to Cedar Rapids), and manufactures tableting and coating machinery. This company is responsible for the markets in North and South Americas, Europe and the Middle East.

Vector was turned into a subsidiary in 1997. Vector's largest shareholder was its founder, whom Yasutoyo Fusejima knew well and trusted highly. Vector developed equipment that matched the needs of United States customers based upon a license from Freund and was able to establish a strong track record.

Iwao Fusejima, the current President of Freund Corporation, is the Chief Executive Officer of Vector, and Masaaki Kubota took on the position of Chief Operating Officer, also responsible for technology, from the previous COO Steve Jensen in February 2014. While the President of Freund Vector is a Japanese national, local staff, some with 25 years of experience, assume responsibility for marketing and technology functions. Moreover, Iwao and Masaaki have been able to establish strong communications with and understanding of the staff of Freund Vector.

### **Freund Vector Business Deployment – Headquarters in Marion, Iowa**

Freund Vector maintains its headquarters in Marion, Iowa of the United States. Marion is adjacent to Cedar Rapids and only a one hour airplane flight from Chicago. The state capitol of Iowa is Des Moines and Cedar Rapids is the second largest city after Des Moines in the state of Iowa. Marion is a small city with a population of only about 170,000 people.

While manufacturing and sales of drug formulating equipment is conducted, Freund Vector does not currently deal in the foods and chemicals business. And while manufacturing began under a licensing agreement, Vector is manufacturing equipment similar to those in Japan that have been

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modified to match the needs of the local market. Consequently, the basic technologies are acquired and applications of machinery are developed to match the needs of global drug manufacturing companies in the United States and other countries.

Freund Corporation in Japan implements a “fabless” manufacturing process where the machinery manufacturing process is outsourced after technology development and design processes have been completed in-house. However, Vector in the United States performs its own manufacturing in-house at its own plant, with final assembly being done after parts are purchased externally. In this manner, they have placed a high priority upon developing manufacturing technologies in-house. Over 90% of Vector’s sales are derived from drug formulating equipment, with the remaining sales derived from manufacture of equipment for foods and agricultural chemical products. Consigned manufacture of seed coating and other processes are conducted within the contracted services business.

Freund Geographical Sales

(JPY mn)

		Japan	North America	Europe	South Central America	Asia	Total	Overseas
FY2/15	Sales	13,056	1,599	450	1,071	1,246	17,424	4,367
	% Share	[74.9]	[9.2]	[2.6]	[6.1]	[7.2]	[100.0]	[25.1]
FY2/16	Sales	13,547	2,190	937	1,325	1,027	19,027	5,480
	% Share	[71.2]	[11.5]	[4.9]	[7.0]	[5.4]	[100.0]	[28.8]
FH2/17	Sales	15,601	3,331	553	830	847	21,164	5,563
	% Share	[73.7]	[15.7]	[2.6]	[3.9]	[4.0]	[100.0]	[26.3]
FH2/18	Sales	13,676	1,913	1,787	1,065	1,357	19,801	6,124
	% Share	[69.1]	[9.7]	[9.0]	[5.4]	[6.9]	[100.0]	[30.9]
FH2/19	Sales	12,999	1,526	410	1,826	1,645	18,408	5,408
	% Share	[70.6]	[8.3]	[2.2]	[9.9]	[8.9]	[100.0]	[29.4]

### Strengthening of Group Capabilities – Fabless Manufacturing Process for Equipment in Japan

Freund Corporation is a fabless manufacturer without its own manufacturing plant, and therefore needs to increase the number of cooperating manufacturing companies to match its growing demand. The Company had conducted business with four manufacturing companies, but they added two new companies during 2015, bringing the total to six companies.

Freund’s first collaborative partnership was formed with Okawara Manufacturing Co., Ltd. back in 1980. Okawara Manufacturing became one of the companies to which manufacturing of equipment

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was outsourced. Currently, Freund outsources the manufacturing of its equipment to six different companies, but Okawara Manufacturing still maintains a high share of Freund's outsourced equipment manufacturing.

Furthermore, Freund entered the market for alcohol tablet type food quality preserving agents in between 1977 to 1978. Freund Kasei Corporation, which was responsible for manufacturing of food quality preserving agents, was merged with Freund Corporation in March 2014 to pursue management efficiencies.

Freund also acquired the company Turbo Corporation eight years ago at a cost of JPY400 million. Turbo is a powder processing equipment manufacturer with numerous patents. Turbo decided to sell itself to Freund as it faced the issue of a lack of appropriate persons to take over management. Turbo had sales of JPY900 million and was included into the machinery business segment. While it is a manufacturer dealing mainly in powder processing equipment, Turbo boasted of specialization in realms differing from those of Freund, including chemical and food industry applications.

## 2. Strengths: Top Ranking Company within Japan, One of the Top Three Companies Globally

### Unique for Its Handling of Both Drug Formulation Equipment, Food and Chemical Products

Freund maintains a two segment business model where both segments complement each other. In the drug formulation equipment realm, excipients are used to form chemicals products and solid agents are used to make drugs and food products. Looking at the manufacturing process for tablet forms of drugs, the flow chart below shows the manufacturing processes for tablet drugs.

Pulverizing, Sorting→Mixing→Pelleting→Drying, Granulating→Tableting→Coating→Printing

Within the above mentioned process, Freund provides equipment for the pulverizing, sorting, pelletization (granulating), drying, coating and printing functions.

Moreover, equipment and machinery is a niche realm in which Freund boasts of 300 intellectual properties. At the same time, the Company is extremely well versed in the manufacturing processes and specifications of major pharmaceutical companies. Therefore, it is difficult for large machinery and equipment manufacturers to enter this niche market.

In addition to Freund, GLATT (Privately owned) and GEA (Publicly traded) of Germany are amongst the world's top three machinery manufacturers. Consolidation of German pharmaceutical

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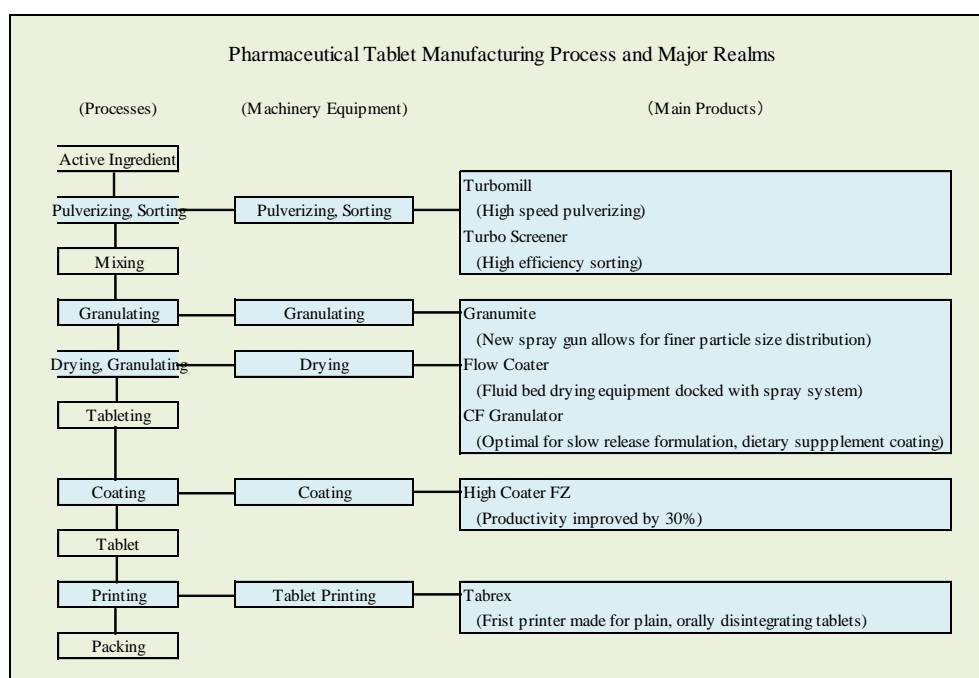
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companies has progressed through the formation of alliances along with Manety and Hutlin. While GEA manufactures tableting machinery, Freund outsources the manufacture of its equipment within Japan to Kikusui Seisakusho Ltd., Hata Tekkoshu Co., Ltd. and other specialized manufacturing companies. Furthermore, strengthened collaboration with Kikusui Seisakusho Ltd. is also being pursued.

Freund is the leader in Japan followed by the second placed company Powerex Corp. (Privately owned), which maintains a technological collaborative agreement with GLATT. Within Japan, Freund boasts of a share of over two thirds of the total market, with Powerex claiming the remaining one third of the market.

Within the Japanese market, Freund is in direct competition with the second placed Powerex, which has adopted a strategy of introducing lower priced products into the market by leveraging their license with an overseas company. In response, Freund has promoted a strategy of introducing products with strong brand image and high levels of functionality to avoid being drawn into pricing competition.

Freund Vector operating in North America is ranked second within the industry, and it is a key company in Freund's global business deployment strategy.



Freund ranks within the top five companies in the pharmaceutical excipients market behind the first, second and third placed companies Shin-Etsu Chemical Co., Ltd., Asahi Kasei Corp. and Sanwa

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Chemical Industry Co., Ltd respectively.

### **Expanding Its Specialized Business Globally**

Freund maintains major facilities within Japan and the United States and seeks to expand its business globally. In contrast, rival Powerex acts as both an import agent through its agreement with Glatt and maintains its own manufacturing capability.

Within the Japanese market, Freund is in direct competition with the second placed Powerex, which has adopted a strategy of introducing lower priced products into the market by leveraging their license with an overseas company. In response, Freund has promoted a strategy of introducing products with strong brand image and high levels of functionality to avoid being drawn into pricing competition.

Freund boasts of strengths in granulating and coating processes. Furthermore, Powerex (Glatt) and GEA (Japan offices) lack an adequate maintenance and service structure and cannot duplicate the ability of Freund to respond with services within 24 to 48 hours within Japan.

At the same time, GLATT and GEA maintain overwhelming position of strength within the European market. Freund Vector of the United States has opened a machinery sales function in Milan, Italy to cultivate the European market. Freund Vector's business is seeing growth in Brazil and other South American markets as a result of its efforts to cultivate business in South America from the United States.

Hosokawa Micron Group and Dalton Corp. manufacture powder processing equipment, but neither of these companies produces equipment for pharmaceutical industry applications and Freund actually uses some of their equipment.

### **Hamamatsu “Technology Development Research Center” – Advanced Application Development, Alliances**

The “Technology Development Research Center” is located about 13 kilometers north of Hamamatsu City at an elevation of 50 meters above sea level, at the foot of the Japan Southern Alps, with a reputation for having a relatively sound geological foundation. Research facilities, experiment facilities, two manufacturing facilities, and a distribution warehouse have been constructed at this location.

One of Freund's main products is called Flow Coater (Fluid bed granulation coating equipment) and it boasts of a capability for continuous production including uniform mixing and granulating, coating, and drying processes. Granulating is the process where granules are created from powders.

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## Freund's Main Facilities

<p>☆ Freund Hamamatsu Technology Development Research Center, Japan</p> <ul style="list-style-type: none"> <li>• Focus upon cutting edge product development as a R&amp;D company</li> <li>• Provide samples, application testing to clients</li> <li>• Patents for over 300 intellectual properties held</li> </ul>
<p>☆ Freund Turbo (Japan)</p> <ul style="list-style-type: none"> <li>• Freund Corporation's granulating, coating technologies complement Turbo's pulverizing, sorting technologies to create new applications of powder processing for lithium ion batteries electrode materials</li> <li>• Strengthen collaboration with Freund Vector</li> </ul>
<p>☆ Freund Vector (United States)</p> <ul style="list-style-type: none"> <li>• Development capabilities of Freund combined with the design, manufacturing capabilities of Freund Vector to develop products matching the local markets</li> <li>• Deploy business into Central, South Americas, Europe, Middle East, Asia</li> </ul>

(Note) Freund Pharmatec (Ireland) was sold in February 2016

Active pharmaceutical ingredient chemical compounds, which are active ingredients in pharmaceuticals, are combined with excipients in a predetermined ratio to control their function and made into particle format. Flow Coater uses a spray gun to spray mist upon the particles to increase their size and coat them. Actual production of this machinery is outsourced to Okawara Manufacturing Co., Ltd., with which Freund maintains a capital participation arrangement.

The large High Coater FZ (Fully automated sugar film coating equipment) is a revolutionary piece of equipment that allows for short and efficient coating of tablets and tablet shaped candies. This tablet surface coating allows for the control of the rate of dissolution of drugs within the human body. In addition, this coating also provides a masking function to hide the bitter taste of pharmaceuticals. In this coating process, polymer materials are used as a film and sugars as coverings.

High Coater FZ 1) increases the drying capability of the heated air by raising the heating efficiency, 2) raises the stirring and mixing efficiency and 3) improves the capability of the spray gun to spray mist more uniformly over a larger area. The improved capabilities of this revolutionary equipment cannot be duplicated by competitors.

Spherex (Seamless capsule manufacturing equipment) manufactures capsules from liquid and not solid materials. The surface tension of the liquid is used to make a near perfect sphere in continuous production. Thereby, a capsule is formed that has a hard outer shell and liquid center. The 1 to 7 millimeter in diameter liquid center is encapsulated by a gelatin, and then dipped in cooled food grade oil from top to bottom. After drying, this casing hardens and forms a seamless mini-capsule. This

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is a technology which only a few companies in the world possess.

While this containment technology was first developed in Europe and the United States, unique applications of this technology have been developed in Japan to match needs of the local market. Consequently, containment technology developed within Japan won the Nakai Award (Presented to companies for superior manufacturing technological developments) in 2013.

Continuous granulating equipment Granuformer forgoes the conventional batch type production format and allows for continuous production of granules, allowing mass production to be conducted in a more time effective manner. This capability allows the cost of pharmaceutical manufacturing to be reduced and eliminates the need for new manufacturing processes. Both of these capabilities are called for by the policies of the United States Food and Drug Administration. Freund's technology entails the continuous running of conventional chemical processes. While continuous running of chemical processes to manufacture liquid or gas products is easy, it is extremely difficult for solid products and Freund is one of the few companies to realize this difficult manufacturing process. Commercial applications of this drug formulation process were begun in Europe and the United States, and are expected to begin ramping up in full scale in Japan.

### **World Leading Drug Formulation Technology - Nonpareil (Spherical Granules)**

The food and chemical plant in Hamamatsu manufactures spherical granules. The ability to produce near perfectly round spheres is a unique core competence of Freund. Spheres are processed to facilitate them with the ability to maintain sustained-release (Gradually melt to prolong effectiveness). Pharmaceutical excipients are based upon the main raw material of sugar used as an outer coating for pharmaceutical products. The nucleus uses granulated sugars and they grow in size similar to snow balls.

Aside from this, a spherical granule method employing crystal cellulose added to lactose is also possible. Lactose is shaped like a spear, is low in calories, and inexpensive. And while the manufacturing process is more difficult because they have no nucleus, they can be made smaller in size. Freund has taken anticipatory steps to conduct research to achieve commercialization of this application.

The spherical granules come in sizes of between 710 to 850, 500 to 710, 355 to 500, 200, and 100 microns (Micro-meters) in size. Sizes below 300 microns are ideal for orally disintegrating tablet because they do not have a rough texture when ingested without water. Freund has developed Granutol F as an excipient used in orally disintegrating tablets to achieve an optimal balance between hardness and ease of dissolving, as has long been required by the market. Consequently, this product

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is expected to act as support for new drug formulation designs.

Dilactose is a direct tableting diluting agent made from granulated lactose, that is most commonly used. DFE Pharma of Europe is the largest manufacturer of lactose based pharmaceutical products in the world, and Freund outsources the manufacturing of Dilactose to this company. A future topic for consideration is whether or not this product should be manufacturing within the Freund Group.

There is a growing need for tablets that dissolve in the mouth and are easier to ingest due to the advance of the aging society, but dissolving of active ingredients of tablets increases the bitterness experienced by people taking tablets. In order to reduce this bitterness, there is a growing need for surface coating technologies to coat the fine particle active ingredients. These technologies using small spherical particles can only be accomplished by a company with advanced and unique technologies like Freund, which leads the world.

Freund's main pharmaceutical excipient product Nonpareil is close to a perfect sphere form, and is effective in controlling the release of the medicinal ingredients. Therefore, there are numerous proposals to use Nonpareil in scientific research.

Nonpareil 108 is a round form of Mannitol (Bar shaped crystal) that is made in extremely small sizes of 100 microns. Because of its extremely small size, it does not have a rough texture when ingested and matches the need to make medicines easier to swallow for the elderly. It also allows for medicines to be swallowed without water. Mannitol's limited reaction with drugs and refreshing feeling leads to increased usage. Nonpareil does not have any competitors globally.

Maltitol Granule and Isomalt Granule have been developed as food use direct compression excipients. Direct compression excipients can be used to efficiently manufacture tablets. Until now, there were no granulated products that had the appropriate flow property and formability for use in direct tableting. However, Freund developed a granulated product that solves this problem.

This new product has good flow property and is very stable at the time of compression. Maltitol Granule tablets are also strongly resistant to moisture absorption and deterioration in hardness. Isomalt Granule can be easily adjusted for use in tablets which have low formability such as glucosamine.

Efforts are being conducted to collaborate with companies in the United States, with a collaboration being formed between Freund Vector and Dow Pharma and Food, a subsidiary of Dow Chemicals. Research is being conducted for polymer powder coating techniques using Vectors' drug formulating equipment Granurex.

This research is investigating the potential for coating using 10 micron polymers instead of liquids to 1) dramatically shorten the production process, and 2) control the dissolving of medicinal

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ingredients when dissolved by saliva in the mouth.

Internal manufacture of pharmaceutical excipients and food quality preserving agents is being raised. Currently, about 60% to 70% of excipients and 10% to 20% of food quality preserving agents are manufactured within the Company. However, Freund will endeavor to raise in-house manufacture of both products. Excipients are required for both new and generic drugs, and they become long selling products once adopted by pharmaceutical companies.

### **Collaboration with Shin Etsu Chemical Co., Ltd. for Joint Development of SmartEx™**

SmartEx™ was developed in 2013, and cultivation of market applications for this product are rapidly expanding recently. Freund's directly compression diluting agent Mannitol is a granulated form of Shin Etsu Chemical Co., Ltd.'s binding agent (PVA) and disintegrant (L-HPC). This product is a co-process product formed using special drug formulation technologies to raise its functionality. This direct compression diluting agent boasts of ease of formability, manufacture (High speed tableting, automated packagability), meltability (Superior disintegration qualities) and smoothness (Sense of texture within the mouth).

Freund is responsible for the manufacture of this product, and Shin Etsu Chemical Co., Ltd. is responsible for sales. And while collaboration is conducted with Shin Etsu Chemical Co., Ltd. on excipients, Freund's superior drug formulation technologies will be combined with the superior marketing functions of Shin Etsu Chemical Co., Ltd. in the highly diverse market for excipients in the United States.

### **Second Place in the United States, Brazil**

Freund Vector is ranked second within the United States market overall, and it ranks as the top manufacturer of fluid bed equipment. While it boasts of strong market position of second place in both the United States and Brazil, its position within Europe is not as strong. However this suggests that the potential for growth in the European Community and neighboring countries is strong. Freund Vector opened a facility in Milan, Italy in November 2014.

Sales are conducted directly in the United States and divided into four geographic sales regions. Because the bulk of Freund's business is derived from repeat customers, efforts to increase the number of geographic sales regions may prove to be ineffective but the marketing capability still needs to be strengthened. Within the sales force, Freund Vector maintains one sales person each for South America and Europe and relies upon sales agents in the local markets. The sales agent in Brazil has been effective in growing Freund's presence in the local markets. And while the use of sales agents

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reduces the profits derived from sales, this structure is deemed to be the most effective at this point in time. Consequently, Freund will take steps to strengthen its own marketing capability for both South America and Europe.

While the bulk of Freund's business 10 years ago was derived from the United States, exports to this region are on the rise. Exports to South America and Europe now account for about half each. Shipments of products to generic drug manufacturers in Brazil are a large part of the shipments to South America. And in Europe, products are sold to clients in countries such as Ireland, Iceland, Turkey, Israel and others where competition from Freund's German competitors is not as fierce.

### **3. Medium Term Business Plan: Strengthening New Product Development Capabilities, Overseas Market Development Efforts**

#### **Currently in Third Year of the Five Year Medium Term Business Plan**

During the first three years of its Five Year Medium Term Business Plan, Freund is endeavoring to establish a foundation to become a launching board to capture strong growth in the last two years of this Plan. Freund has established the concept of "One Freund" (Number One, Only One, Be One) as a key theme for its new (Seventh) Five Year Medium Term Business Plan, which started in fiscal year February 2018, and seeks to achieve sales, operating profit, operating profit margin and return on equity ratio of JPY30.0 billion, JPY3.0 billion, 10% and over 8% respectively by fiscal year February 2022. This reflects an average compound annual growth rate of 9.3%.

The New Five Year Medium Term Business Plan will address the issues of strengthening trend for drug price reductions and outlook for further restraint in capital investments within the pharmaceutical industry. In order to overcome these issues, Freund management has decided that it needs to adopt a vision that covers a longer time period and has subsequently extended its Medium Term Business Plan to cover five years.

In the New Medium Term Business Plan, a new vision for management has been created based upon a goal of "contributing to the future of medicine and the health of people around the world, and cultivating technologies to support rich lifestyles and safety of foods".

The concept of "One Freund" calls for Freund to 1) achieve "Number One" top position in each of its business realms through "creation of special value", 2) becoming of the "Only One" partner of its customers by "fully understanding customers' view point", and 3) realizing "Be One" unity of the entire Freund Group through active "networking".

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Five Year Medium Term Business Plan Overview  
 (From FY2/18 to FY2/22)

(Corporate Philosophy)	Paving the Way to the Future through Creativity
(Management Vision)	Freund Group will contribute to the future treatments and health of people around the world, and create, cultivate technologies that support rich lifestyles, safety and security of foods
(Corporate Image)	Value: ONE FREUND Number One (Creating Extraordinary Value) Become the number one company in various realms, businesses Only One (Adopting the Client Viewpoint) Become the "Only One" company to effectively serve clients, society Be One (Networking) Creating a united Group
(Basic Strategy)	Responding to client needs with technological capabilities, creating a management structure able to achieve sustained growth in profits
(Management Targets)	Sales: JPY30.0bn, Operating Profit: JPY3.0bn, Operating Profit Margin: Over 10%, ROE: Over 8%

The three main directives of the new Plan include 1) further strengthening of efforts to develop new products, 2) increasing the synergies between machinery and chemical products, and 3) expanding sales channels in the global market.

The New Five Year Medium Term Business Plan is based upon the outlook for a weakening of the boom in generic drugs within Japan and is created in two steps, including the first three year and second two year periods. The three main directives of the Plan mentioned above will be implemented during the first three year period, and the decline in machinery orders resulting from the termination of the generic drug boom will be covered by other anticipatory measures to ensure the continued growth of the Company.

Main Overall Strategies

- Corporate Culture Reform Promotion Project
- Establishing services as 3rd cornerstone of business including machinery, chemical and foods
- Investing in promising business realms
- Strengthen technology development capability, output capacity, overseas laboratories
- Cultivate next generation of leaders, global human resources
- Fundamental reforms of business processes for development of management systems
- Improving the supervisory levels as a Tokyo Stock Exchange First Section listed company
- Fortify ESG, promote CSR in line with the United Nations Global Compact (10 Principles)
- Promote IR activities including constructive communications with investors, shareholders in line with disclosure policies

In the near term, President Iwao Fusejima recognizes the importance of these three directives.

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First, efforts will be implemented to promote the diffusion of the tablet printing machine TABREX Rev.. Second, a stable supply structure for pharmaceutical excipients will be established from a global supply chain standpoint. And third, the Freund Group will strengthen its overseas marketing capability.

5 Year Medium Term Business Plan Key Performance Indicators

(JPY mn)

	FY2/14 5th Plan		FY2/17 5th Plan			FY2/22 7th Plan	
	Sales	OP	Sales	OP	Revisions	Sales	OP
Machinery	11,004	1,242	14,914	1,750	1,430	21,340	2,260
Freund Corp.	7,081	1,032	9,946	1,537	963	13,540	1,460
Freund Vector	3,892	169	4,727	388	388	6,600	500
Freund Turbo	782	-8	1,641	79	79	2,400	300
Chemical, Foods	6,612	379	6,249	748	611	8,660	740
SG&A		-335		-456			
Total	17,616	1,286	21,164	2,041	2,041	30,000	3,000
Operating Profit Margin		7.3		9.6	9.6		10.0

Note: Revised operating profit include unallocatable SG&A costs

7th Medium Term Business Plan Operating Profit include unallocatable SG&A costs

## Efforts to Deal with Important Issues

Freund is implementing aggressive measures to address important topics as follows. 1) Strengthen businesses in the United States and Asia (Machinery, and chemical and food businesses) to enable aggressive overseas deployment, 2) realize full scale contributions from new products (Continuous granulating manufacturing systems, tablet printing equipment) for which there is strong market demand, 3) enter industrial use machinery business related to new materials for lithium ion battery applications, 4) strengthen collaboration with academia based upon open innovation, and 5) cultivate human resources through exchange of technologies.

Main Strategies by Business Segment

Machinery	Pharmaceutical Products	Industrial, Lifestyle Related
	Expand tablet printing machine sales	Expand development, sales of lithium battery machinery
	Expand development, sales of inspection equipment	Develop new materials equipment
	Commercialize continuous manufacturing equipment	Expand sales of high speed fluid bed granulation equipment for foods
Chemicals	Expand business in India, China	
	Integrate sales for machine, excipients	Cultivate ASEAN markets for food quality preserving agents
	Expand sales of excipients globally	
	Cultivate market for excipients in India	

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## Responses to Abating of the Generic Drug Investment Boom

Within the realm of generic drugs, the influence of authorized generics (AG) is being closely monitored. Authorized generics are off-patent drugs that contain the exact same active and inactive ingredients and are manufactured using identical processes as branded drugs, and may lead to selection and differentiation of specific generic drug manufacturers.

Orders for drug formulating equipment within Japan fell by a large margin, with orders in Japan falling to half of their recent peak over fiscal years February 2016, 2017 and 2018 from JPY6.1, to JPY8.3 and then to JPY4.2 respectively. In fiscal year February 2019, orders recovered slightly to JPY5.4 billion.

At the same time, orders in overseas markets failed to offset the declines seen in Japan with orders of JPY5.1, JPY5.7, JPY5.2 and JPY4.7 billion being booked over fiscal years February 2016, 2017, 2018 and 2019 respectively. In order to offset the reduced level of orders within Japan, overseas orders of between JPY6.0 to JPY7.0 billion need to be achieved.

Furthermore, the decline in orders within Japan can be significantly offset if orders of the new TABREX equipment can be grown by JPY1.0 to JPY2.0 billion. Growth in overall machinery business orders can be secured if orders for lithium ion battery applications can be booked.

## Laboratory Fortification

Freund always conducts tests of equipment purchased by its clients. Therefore, Freund maintains testing facilities in Hamamatsu City in Japan, Freund Vector facilities in Iowa in the United States, Milan in Italy, and China. In addition, Freund has started a joint venture company with Parle Co. of India and received its first equipment order.

Regarding its laboratory and testing facilities, Freund expects to add facilities in Brazil in the future. Furthermore, the Company expects to fortify its services in other overseas markets rather than sending representatives from Japan and the United States.

Freund expects to also be able to test Freund Vector products at its laboratory facility in Hamamatsu City, Japan in the future. Because Freund Vector products differ from those sold by Freund in Japan, the ability to have these products tested within Japan is advantageous for Japanese customers conducting business on a global basis.

## Local Production in India

Freund established a joint venture company in February 2019 with Parle Co., which had previously acted as a sales representative for Freund in India. Freund paid 51% of the capital for the joint

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venture company, with Parle and its President contributing 48% and 1% respectively.

The joint venture company has established a local manufacturing plant in the State of Maharashtra neighboring Mumbai. Until now, Freund Vector products had been sold in India, but going forward Freund will send major parts from Japan, with other parts to be locally sourced by the joint venture company.

The business appears to be set up for success with both product quality and pricing in line with the needs of the local market. The joint venture company has established a target of achieving orders for five units within the coming year. Furthermore, the joint venture company seeks to expand into other markets within Asia after it has established a foothold in India. Also, Freund has seconded one of its staff from Japan to provide support for the marketing efforts in India.

### **Freund Vector to Expand Its Business**

Freund Vector will expand the number of products that it markets in the United States. Manufacturing equipment including spray dryers are sourced in Japan for sale in the United States. The Granuformer continuous manufacturing equipment will also be displayed and marketed in the United States as well. Preparations are also being made for the start of sales of TABREX.

Because equipment facilitated in Freund Vector's laboratory facilities is old, it will be replaced with the most advanced equipment for customers to use in tests performed at the laboratory. Moreover, Freund Vector has hired engineers to work in business development roles and to cultivate new business realms. They have already proposed several new business opportunities, and commercialization of these proposals is being considered.

Freund Vector completed expansions to its plant facilities in January 2015 and the assembly space was expanded by 1.6 times in response to expansion of demand from South America and Europe. Freund Vector has already begun exports to South and Central Americas. Along with the United States pharmaceutical manufacturers' moves into overseas markets, the dependency of orders derived from the United States is on the decline and those from South and Central Americas is on the rise. Also, the Brazilian sales agent has acquired equipment to be used for testing by clients, and marketing to expand rental of equipment is also being strengthened. However, profitability on sales within South and Central Americas is reduced because of margins paid to sales agents in the region.

One of the main issues confronting Freund Vector is its sales capabilities. While the manufacturing and sales function is located a one hour flight away from Chicago in Cedar Rapids, Iowa, the Company is aware of the need to strengthen its sales capability to the numerous pharmaceutical manufacturers located in the eastern part of the United States and is ready to implement

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measures to resolve this issue.

### **Epoch Making New TABREX Tablet Printing Equipment – Wins Prestigious “Nakai Award”**

In 2018, the next generation ink jet type tablet printing equipment TABREX was awarded the 18<sup>th</sup> Annual Nakai Award (Japan Society of Pharmaceutical Machinery and Engineering) because of the high regard for TABREX’s 1) switch from a belt conveyor transfer system to a disc type transfer system, 2) introduction of advanced recognition technologies, 3) improved general printing applications, and 4) low cost design.

The second generation TABREX Rev. tablet printing equipment was launched in July 2016 and the new equipment has come to be regarded as highly superior because of its compact size and large improvements in performance with a capability to flexibly respond to demands for increases in output. 1) Capacity can easily be increased by using machinery in module format and increasing their numbers. 2) The machine has been kept to a compact size because it employs a guideless transport mechanism that does not use guides. 3) The yields of the printing function have improved dramatically due to improvement in the accuracy of the optical inspection function. 4) Moreover, the ink used comes in a cartridge format that allows for easy replacement of ink and contributes to reductions in loss of ink.

The new TABREX machinery costs about JPY100 million and is capable of printing 100,000 tablets per hour. Cartridges cost about several hundreds of thousands of yen, and color ink cartridges are available. Freund leads the industry and has created a “stock type business model” where they can derive sustained income from sales of cartridges. Strong orders are also anticipated.

A team of engineers with particular strengths in mechatronics and semiconductors have been assembled and have been highly effective in the development process.

The new machine allows for printing directly to iodine tablets, which had proven to be a technological challenge until now. While iodine tablets are difficult to distinguish from other tablets visually, the ability to clearly print on these tablets will reduce the risk of mistaken administration. While coating tablets before they can be printed on increases the price of their manufacture, it is not yet clear whether or not printing made directly to the surface of the tablet will remain intact or not.

While initial versions of this machine were developed through collaboration between Okabe Kikai Kogyo Co., Ltd. and major pharmaceutical manufacturing companies, the addition of Freund’s revolutionary drug formulation ink (pharmaceutical excipient) technologies have contributed the development of this most advanced machine in the world.

The character legibility of the new tablet printing machinery has improved dramatically compared to conventional machines. This new machine uses drop-on-demand (DOD) ink jet printing format

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to print characters that are four times finer than conventional methods. In addition, this new machine allows for printing on both sides of tablets.

One of the main points of superiority of TABREX is the light resistance quality and the easy of handling of the cartridge package for ink. Furthermore, this ink cartridge will lead to sustained income after the sale of the printing machinery.

### **Highly Competitive TABREX**

Freund has already received 14 different patents for TABREX. The leading quality and performance of TABREX makes it superior to its competitors. Conventional printing equipment can produce 300,000 tablets per hour. Consequently, use of three machines in parallel applications could satisfy conventional capacity demands. The new second generation equipment allows for 1) high levels of flexibility in output capacity due to its modular format, 2) elimination of separate inspection equipment due to internalized ability to conduct external inspection, 3) easy replenishment of ink by simply replacing a cartridge, and 4) easy disassembly and assembly (15 minutes) due to the use of a simple mechanical system.

TABREX REV also uses a new technology that allows for printing over engraved marks on tablets which cannot be duplicated by competitors. Also, the edges of the tablet can also be printed and invisible printing can be conducted. Invisible printing uses special ink that is invisible to the human eye under normal light but can be seen when special lighting is shone on the printed tablet. This technology can be used as a method to prevent falsification of products.

Compared with conventional equipment, TABREX is becoming the industry standard with its ability for mass production. Sales of tableting equipment will also contribute to sustained sales of ink, which can become another significant contributor to profits.

Sales efforts will also be made to sell TABREX in overseas markets. Falsified products are estimated to account for more than 10% of the market in Europe and represent a loss of about JPY1 trillion. TABREX equipment will allow for each tablet to be printed with a unique identification number. Therefore, Freund Vector will assume responsible for marketing this product in Europe and North America. TABREX is highly effective because it has been developed internally and is compact in size. Moreover, it can be expected to contribute largely to profits as it is a high value added product.

### **Progress in Improvements of TABREX**

Orders and sales of the new and second generation of TABREX have begun, but it has encountered difficulties as adjustment to equipment have been required to achieve the initial performance

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specifications and various information was required to respond to the need to handle a wide range of pharmaceutical products. Consequently, Freund was kept busy in 2018 responding to these needs of equipment supplied and new order acquisition activities have been delayed.

And while the ability to print in color has been well received, time has been required to adjust the equipment after it has been installed. Also, the various sizes and shapes of tablets has led to prolonged printing time for each tablet and restricted the ramping up of production. Thus, Freund was kept busy responding to these various manufacturing process adjustments.

Freund has made improvements to TABREX to satisfy the needs of its clients. As part of this improvement process, Freund was busy making adjustments to both its hardware and software and was unable to respond to inquiries for new orders. However, the issues revolving around TABREX appear to have been resolved in 2018 and order taking activities have been reinstated on a full scale basis.

At the same time, adjustment of inks has been required for overseas markets and development of inks specifically for overseas markets are nearly complete.

### **Revolutionary Continuous Granulating Machinery Development**

The commercialization of continuous manufacturing facilities is about to begin. Consequently, Granuformer made by Freund Vector was displayed in 2018 at the Interphex Japan Exhibition. The basic principles and systems used in this equipment has been developed by Freund, but was adapted to match needs in the United States market. Marketing for this product is expected to be conducted not only in the United States, but globally as well.

Continuous integrated production allows for the processes ranging from pharmaceutical product raw material weighing, mixing, granulating, drying and tableting to be conducted. Also, Vector's control systems allow for the most recent version of COMPU to be applied.

Globally, GEA has delivered continuous production equipment to Pfizer. And while attempts at making continuous manufacturing equipment had failed 10 years ago, success has been achieved in practical applications within the past several years.

Freund has also established its own unique continuous production system and created commercial applications of this technology which will become a driver of growth in the future. The ability to continuously production of drug formulations will allow for 1) equipment to be reduced in size in response to needs of individual customers, 2) increases in efficiency by reducing the manufacturing time and 3) improvements in design quality.

GEA developed a continuous production machine and it has begun being adopted by pharmaceutical

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manufacturers in Europe from 2015 to 2016. The guidelines for continuous production are being solidified as modular and full line equipment applications are being tried. It has already received approval from the United States Food and Drug Administration and is expected to receive approval in Japan shortly. Freund and Powerex Corp. are both promoting development.

The merits of continuous production include 1) flexibility in the control of production volumes, 2) the ability to use the same equipment after research and development is conducted for actual manufacturing, and 3) offers reductions in capital investments and other resources. At the same time, some of the main concerns surrounding the introduction of continuous production equipment include the quality and cost of products manufactured, the ability to respond to various regulations and others.

Currently, there are applications where certain products are better suited for continuous production and batch production in striking a balance between drug unit pricing and production volumes. Because both options can provide a set volume through continuous production, the ability to develop new products on an anticipatory basis is a key.

The most difficult aspect of continuous production is the mixing process for drugs and excipients. In order to mix both successfully, both need to be of similar quality depending upon the drugs being manufactured and consequently high levels of knowhow and expertise are required. Inability to achieve high quality levels in the initial stages of manufacturing can lead to defective products being manufactured in the continuous production process.

Freund will form alliances with other companies to conduct joint development of continuous production systems for tablets. The newly developed systems will not use batch processing, but instead use granulating, drying, tableting, coating and printing processes on a continuous basis. All of these processes will be created in cooperation with other companies involved with tableting. This continuous production system will duplicate the integrated manufacturing structures of chemical plants for drug formulation processes functions.

Capital Investment, Research and Development Expenses

(JPY mn, %)

	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18	FY2/18	FY2/19 Est.	5 Year Plan
Capital Investment	477	545	266	564	524	627	700	JPY2.8 billion expected over 5 years JPY1.2bn,JPY1.2bn for Machinery, Chemical & Food JPY0.4bn company wide
Depreciation	303	308	321	338	344	344	350	
R&D	464	592	687	640	862	832	750	JPY1.9 billion expected over 5 years
R&D / Sales Ratio	2.6	3.4	3.6	3.0	4.4	4.5	4.3	JPY1.2bn, JPY0.7bn for Machinery, Chemical & Food JPY1.5bn, JPY0.4bn for new product, component development

Note: Estimates for FY2/20 are those of the Company

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Freund developed the granulating equipment Granuformer to replace conventional batch production and realize continuous production for granules. Raw powder materials are mixed with binders in two axis extruders to be turned into granules in a dome type vertical granulating machine. Uniform granules with minimal variation in granule size distribution can be manufactured using a newly developed spiral drying mechanism for continuous production and recovery in a cyclone mechanism after hot air drying is completed. And while GEA manufactures continuous manufacturing equipment, Freund's equipment is more advanced and leads the continuous production machinery industry.

### **Continuous Production System Order**

While still at a test equipment level, Freund received its first order for a continuous production system in fiscal year February 2018. While the order was received later than had been anticipated, this order is expected to be filled within the coming fiscal year.

Freund will be able to allow clients to convert their conventional batch production systems to continuous production systems using Granuformer as its core. A key to enabling clients to make the switch is its process analysis technology (PAT). And while quality can be maintained in each production process using a batch production system, quality needs to be continually checked in the continuous production system.

Freund's feedback control function allows for quality data to be acquired in a short period of time to allow for quick control of process parameters. Consequently, this ability to stably control quality is another cutting edge technology that is unique to Freund.

Continuous production is an automated process. Automation of the overall process had not been introduced globally until now, but in recent years there are some signs that automation is beginning to be developed for the production of drugs, which have a profound effect upon human lives. Automation entails the ability to 1) eliminate manual processes, 2) stop processes in the event of abnormalities, 3) signal alerts and make adjustments whenever necessary and 4) free up personnel to perform other tasks. In addition, the abilities to 5) predict and control deviation of product quality from initial specifications and 6) reject defective products are also called for by clients and are unique to Freund.

The continuous production system includes direct compression, and dry and wet type manufacturing processes. The leading manufacturing processes in Europe are direct compression and dry types, while Freund boasts of superiority in wet type process as well. Freund will market its products in the United States due to its outlook for strong underlying demand for its wet type manufacturing

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process.

With regard to the dry manufacturing process, Freund Turbo boasts of its own unique dry manufacturing process and will leverage them in the development of continuous production systems. Powerex Corp., a competitor to Freund, has a cooperative agreement with GLATT to provide competing products in the realm of dry production process. Freund Turbo is expected to also launch a new product in the dry production process realm.

### **Pharmaceutical Excipients Product Development – Contribute to Improved Profitability**

Profitability of the chemical and food business is improving dramatically for two reasons including 1) reductions in low profitability consigned production of supplements and subsequent improvements in product mix, and 2) growth in new excipient product sales.

Formulation equipment orders are highly dependent upon pharmaceutical manufacturers' capital investment trends and are therefore susceptible to fluctuations. However, pharmaceutical excipients are required to manufacture drugs using this equipment, so stable demand is expected for consumable products like excipients. Furthermore, the overall demand for excipients is on the rise.

Sales of new pharmaceutical excipient products were launched in 2015. Freund has succeeded in developing a version of the Nonpareil 105 series with even finer granule size. Traditional granule sizes have ranged between 355 to 500  $\mu\text{m}$  and 180 to 300  $\mu\text{m}$ , but a new size of between 106 to 212  $\mu\text{m}$  has been developed. Consequently, the rough texture of orally disintegrating tablets has been reduced a step further, and capsule sizes can now be reduced. At the same time, enteric and controlled release, and precise drug design can now be performed. This technology leads the industry and is expected to contribute to earnings.

Nonpareil is a product used in the manufacturing process of these production equipment that is only made by Freund. Consequently, Freund can realize continuous sales of excipients to customers who have purchased its equipment.

SmartEx is a direct compression use excipient that is highly efficient because it eliminates the granulating process and can be used directly in tableting machinery. Consequently, Freund expects to cultivate demand for this product through collaboration with Shin Etsu Chemical Co., Ltd. and expects the market potential of this product to be large.

In addition, Freund had outsourced the manufacture of some portions of its CMEC (Enteric film coating base) excipients, but has strengthened its output capacity for this product based on the outlook for strong growth in demand.

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### **New Excipient Plant Constructed – Increase Internal Output Capacity of Nonpareil, SmartEx**

Nonpareil has seen strong sales growth from two years ago due to the strong increase in demand caused by the going off-patent of a new drug and its release as a generic formulation. Subsequently, production could not keep up with demand. Therefore, Freund has expanded output capacity at its Hamamatsu Plant from 12 to 35 tons based upon 3 shift, 24 hour operations. Consequently, the Company needs to expand capacity a step further.

In addition, demand for SmartEx, which was jointly developed with Shin Etsu Chemical five years ago, is also expanding rapidly. For this product, Freund is responsible for manufacture and Shin Etsu Chemical is responsible for sales, and production has expanded from 3 to 14 tons over the past two years. Furthermore, the marketing division for this product expects sales to continue to rise by 10 fold over the next three to five years.

Freund has decided to construct a new manufacturing facility within its Hamamatsu Plant by summer of 2020 to expand manufacturing lines for Nonpareil by two and SmartEx by three. The completion of this facility is expected to boost sales of excipients by a large margin in fiscal year February 2022.

### **Global Deployment of Pharmaceutical Excipients**

Freund will focus particular emphasis on its excipients business in the United States, India and China, with efforts to strengthen its network of sales agents to market the strengths of Freund excipients. With regard to China, Government efforts to raise the quality of drugs is expected to lead to increases in demand for the Company's excipient products.

Recently, Freund is focusing its efforts upon exports of excipients to India where the market is expanding. While the value amount of exports of the chemical and food business remains small at JPY353 million, this amount represented strong 64.1% year-on-year growth.

With regard to overseas excipients, efforts have been made in recent years to 1) create marketing and other documents targeting overseas markets, 2) strengthen sales agent network, and 3) acquire certifications. Also, Freund is implementing efforts to get their excipients on lists of approved excipients in various countries in order for them to be used in those respective markets. But because of the high quality and functionality of the Company's products, gaining entry to these lists should be a matter of course and documentation is being prepared for listing.

Agreements with sales agents have been formed in Korea, India, the United States and China. With regard to China, the Government efforts to raise the quality of western medicines is a strong opportunity to cultivate business for Freund. Furthermore, the Company will endeavor to strengthen

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various collaborations while at the same time sharing technologies with local companies.

In addition to the organizational restructuring performed in March 2017 for the machinery, cosmetics and management divisions, Japanese and overseas marketing divisions have also been newly established. A decision has been made to integrate the marketing efforts, which had been conducted separately, and to reduce the number of repeated marketing visits to the same clients for both machinery and cosmetic products, which had commonly occurred.

In addition, the Japanese and overseas marketing divisions have been situated on the same floor so that coordinated marketing for both Japan and overseas markets can be conducted. The ability to coordinate marketing functions for both Japan and overseas markets is becoming increasingly important due to the recent aggressive moves by Japanese generic drug manufacturers to enter overseas markets. Moreover, collaboration on marketing with Freund Vector and Freund Turbo has been strengthened most recently.

### **Strong Underlying Demand for Quality Preserving Agents**

Freund's food quality preserving agent Anti-Mold celebrated its 40<sup>th</sup> year of sales since its launch in 1978 and was awarded the "21<sup>st</sup> Superior Food Material Division Award" (The Japan Food Journal) in 2018. This product has recorded cumulative sales of over JPY10.0 billion and been used in a wide range of applications in the confectionary and bread industry because of its effective bacteriostatic and texture preserving functions.

Freund is endeavoring to expand its capacity for quality preserving agents by building a new manufacturing facility in response to a shortage of output capacity. Anti-Mold sees strong sales growth in summer in confectionary applications due to the high heat and humidity in Japan. Furthermore, demand in other Asian nations arising from increased attention paid to food quality is contributing to use of quality preserving agents in products sold at convenience stores in Asia. Use of these products is expanding as they help to prolong the freshness of foods and eliminate wastes.

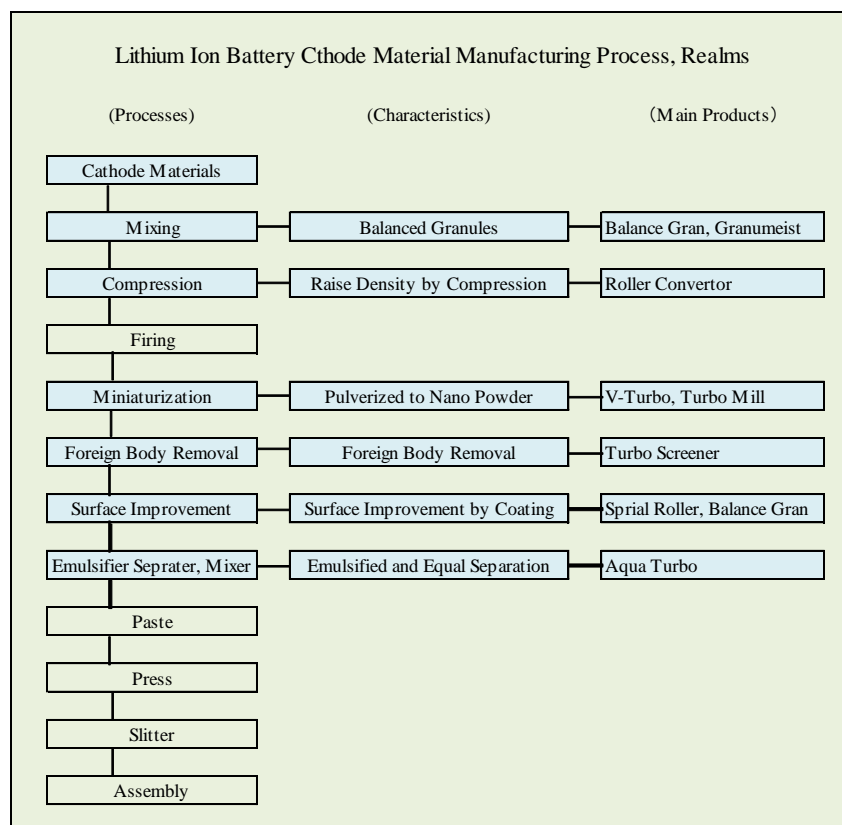
### **Lithium Battery Manufacturing Equipment Development, Market Cultivation**

Freund's machinery is used in the manufacturing process for cathode and negative electrode materials for lithium ion batteries because of its strong reputation amongst clients for having high levels functionality. Various coating equipment for surface modification are available including Turbo Screener used for of raw material introduction, Roller Compactor for granulating, and V Turbo for pulverizing. In addition to Freund Turbo equipment, Freund equipment (roller compactor, coating equipment) is also used to create high performance electrodes.

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Lithium ion battery applications that call for increased performance of particle coating of electrodes and miniaturization on the rise. These trends are expected to contribute to growth in demand for Freund's coating technologies. Lithium ion batteries are beginning to utilize industrial coating applications and Freund is developing specialized equipment for these applications.

V Turbo new industrial use products utilize drug formulation equipment technology applications, but efforts to develop new products that are improved to better match lithium battery applications. Product development is being conducted through a collaboration between Freund and Freund Turbo, with Turbo assuming responsibility for marketing.

### **Highly Competitive Cathode, Negative Electrode Material Use Equipment: Leveraging Pharmaceutical Technologies**

With regard to secondary batteries that are used primarily in lithium ion batteries, Freund is producing manufacturing equipment for cathode and negative electrode materials. Mixed cathode and negative electrode material are combined (Equipment names: Balance Gran, Granumeist),

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compacted (Roller compactor), miniaturized (V Turbo), removed of foreign bodies (Turbo Cleaner), surface modified (Balance Gran, Spira-Flow), emulsifying separated, and mixed (Aqua Turbo). They are thereby turned into a paste form which is then pressed, slitted and assembled.

In the pulverizing process, they are made into even greater miniaturized nano-powders. By doing so, the capacity of batteries can be increased. Furthermore, the surfaces can be improved further by using smaller particles than those used in pharmaceutical products in the coating process. After the combining process, pressure is used to increase the density using compressed powder adjustment technology. Surface area can be increased by miniaturizing powders to expand capacity. Nickel, cobalt, and manganese spheres of 17 nanometers are used in coating processes. This is smaller than particles used in pharmaceutical products, and allows for improved conductivity.

Commercialization of new manufacturing process equipment is being conducted continuously with Aqua Turbo launched into the market in November 2017. Over the coming ten years, the market for cathode and negative electrode materials is expected to grow by between five to ten times. Factors behind this rapid growth include accelerated growth in electric vehicles, and the implementation of revolutionary technologies for self driving automobiles.

While Freund is a late participant to the market for these materials, its miniaturization technologies developed in the realm of pharmaceutical products is a strength that can be used to cultivate clients in this new business realm.

The ability of Freund's coating technologies to improve conductivity will become even more important in next generation battery applications. Freund's dominant position in this technology is likely to become a strong differentiating factor. In the realm of pharmaceutical products, roller compactors boast of a market share of about 90%. This precision technology is also expected to have applications within the battery materials realm.

There are only three manufacturers of equipment for lithium ion battery electrodes for electric vehicles, including Freund and another company within Japan, and another company in Germany. The main clients are in companies in China, Korea and Taiwan, with which Japanese companies are collaborating with for next generation electric vehicle applications. Product systems that leverage Freund's technological strengths are expected to act to elevate the Company to a position of superiority relative to competitors.

### **Akira Kiko Acquisition**

In order to strengthen mixing equipment, Freund Turbo acquired Akira Kiko Co., Ltd. in 2017. Akira Kiko owns patents for high speed stirring granulating equipment (Balance Gran) and is

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conducting ongoing development of new equipment. Akira Kiko, located in Kobe, Japan, is expected to contribute to growth of the Freund as a Group company. The acquisition price is said to be relatively small given the small scale of sales of Akira Kiko of JPY80 million.

Akira Kiko is a start-up company launched 10 years ago by President Iwata. The main product of this company is a high speed mixing and agitation granulator equipment Balance Gran that uses unique technologies. Clients have placed orders for several units of this equipment and Freund has sought to use this equipment as well.

The inclusion of Akira Kiko to the Freund Group is expected to accelerate its growth by bolstering its weak management foundation. The some five to six employees working for President Iwata in Akira Kiko have joined Freund Turbo. The acquisition price of Akira Kiko was small given that it was operating at a loss. Despite the losses, the positive affects expected to be derived from synergies within the Freund Group are large.

### **Cultivate Fine Chemical Machinery Market – Leverage Freund Turbo’s Strengths**

Freund Turbo also replaced its top management team in March 2014, with Iwao Fusejima becoming Chairman and Shuichi Watanabe, who used to work at a trading firm selling Freund Turbo products, being appointed as President. An office was established in Shinagawa in June 2014 as part of its efforts to strengthen its marketing structure and integrate its manufacturing and sales functions.

President Souichi Watanabe has led efforts to strengthen the marketing function, and achieve results from new product development. Pulverizing equipment has matched new needs in the market for toner and chemical products and are growing. Freund Turbo’s ultrasonic screen type turbo cleaner is also expected to see strong demand in pharmaceutical product applications. This machinery uses a mechanism to eliminate foreign matter at ultrasonic speeds and was developed for pharmaceutical product applications. This product is also expected to be marketed by Freund Vector as well in the future.

Freund Turbo also boasts of strengths in fine chemical products commonly used as materials in cosmetics, toner, and lithium ion battery related applications. Granulating machinery processes powders in sorting equipment to eliminate foreign objects, form solid materials, then processes them in mixing and pulverizing equipment to turn them into micron sized granules, and finally run them through dry mill equipment to be turned into ink. This process turns micron sized powders into nano sized granules. Freund Vector of the United States has begun selling Freund Turbo’s Turbo Screener (Sorting equipment).

Over 300 tests of pharmaceutical products are conducted at the Hamamatsu Technology

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Development Research Center each year, and testing of industrial use products including batteries (Machinery used to create materials used in automobile use lithium ion batteries) is also rapidly growing.

### **Strengthen Lithium Ion Battery Application Related Research and Development**

Research and development for lithium ion battery applications is being conducted through joint industry and academic collaboration with Yamagata University. Lithium ion batteries are comprised of comprised 1) cathode materials, 2) negative electrode materials, 3) separators and 4) electrolyte solutions. Of these components, Freund produces manufacturing equipment for cathode and negative electrode materials, and boasts of strong competitive advantages despite being a late comer to the market.

Freund's machinery boasts of superiority in the surface modification processes including mixing, pulverizing and surface modification for cathode and negative electrode materials. The mixing machinery Balance Gran has begun being delivered with orders booked in the previous term. And because this machinery is used in pairs, a single order consists of two units with each unit having a large capacity of 600 liters. There have been orders placed for even larger 2000 liter versions of Balance Gran. The ceramic flame suppressing feature in the pulverizing process has won V Turbo high regard amongst clients. Furthermore, the larger version of VT-300C called VT-400C have also been launched into the market and is designed to satisfy next generation lithium ion battery applications needs.

This flame suppressant feature of Freund's machinery uses ceramic coating to prevent the powdered materials from coming into direct contact with metal parts of the machinery and helps to prevent metal contamination. Chinese and other manufacturers are trying to replicate this highly sophisticated feature but none have been able to replicate it successfully. In addition, Chinese and other manufacturers have yet to be able to produce machinery that can uniformly mix materials of differing specific weight and spherical diameter. These capabilities are the source of Freund's competitive advantage.

### **Disappointing Market in China for Lithium Ion Battery Related Machinery**

Actual orders for lithium ion battery related manufacturing equipment in China were disappointing in light of the strong inquiries received. Furthermore, the boom in lithium ion battery investments appears to have subsided. Also, demand within Japan is centered primarily on test related equipment and overall demand was weaker than expected.

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However, the adoption of a longer term outlook may be beneficial as the market has high expectations for the next generation of lithium ion battery equipment applications. Furthermore, Freund's products are superior to its competitors in terms of both quality and functionality, so the only uncertain factors are pricing and the negative influence of trade frictions between the United States and China according to President Iwao Fusejima.

### **Plan to Launch a Service Business**

Freund boasts of having about 8,000 of its formulation equipment operating within Japan currently. Consequently, the Company is working diligently to quickly establish a service business to provide maintenance services for these equipment.

Machinery maintenance service is one of the new businesses currently being considered for launch in the future. Nearly 10% to 15% of machinery business sales are repair parts and services. While Freund has not actively pursued the maintenance and service business, Freund Vector of the United States has promoted efforts to conduct the service business. Within the next year, Freund expects to establish the foundations of a maintenance service business within Japan.

## **4. Near Term Earnings: Improvement in Orders in Current Term, Growth in Profits in Next Term**

### **Large Decline in Orders in Fiscal Year February 2018**

During fiscal year February 2018, sales fell by 6.4% year-on-year to JPY19.801 billion and operating and current profits declined by 3.4% and 4.9% year-on-year to JPY1.971 and JPY1.994 billion respectively, while net profit rose by 38.8% year-on-year to JPY1.477 billion.

Pharmaceutical companies restrained their capital investments as they chose to observe the influence of drug pricing revisions, causing investments in drug formulation equipment within Japan fall by a large margin. However, relatively strong order backlogs limited the decline in Freund's profits.

By reported business segments, the machinery business segment recorded a 29.3% year-on-year decline in sales to JPY11.513 billion, with sales within Japan of pharmaceutical related and industrial products falling by 48.8% and 13.7% year-on-year to JPY4.261 and JPY1.956 billion respectively, and overseas sales of pharmaceutical related products falling by 8.2% year-on-year to JPY5.296 billion.

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## Machinery Business New Orders, Order Backlog Trends

(JPY mn, %)

	FY2/13	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18	FY2/19
Machinery							
New Orders	9,280 (-8.4)	10,067 (+8.6)	12,407 (+23.2)	13,112 (+5.7)	16,358 (+24.8)	11,513 (-29.6)	11,839 (+2.8)
Sales	9,914 (+3.5)	11,004 (+11.0)	10,941 (-0.6)	13,037 (+19.2)	14,914 (+14.4)	14,403 (-3.4)	12,368 (-14.1)
Order Backlog	5,271 (-9.3)	4,991 (-5.2)	6,682 (+33.9)	7,086 (+6.0)	8,561 (+20.8)	5,822 (-32.0)	5,428 (-6.8)

(Note) Figures in parenthesis are percent year-on-year change

**Profits Fall by Large Margin in Fiscal Year February 2019**

During fiscal year February 2019, sales, and operating, current and net profits fell by 7.0%, 37.9%, 33.5% and 42.9% year-on-year to JPY18.408, JPY1.223, JPY1.326, and JPY0.843 billion respectively.

The reason for the declines in both sales and profits include sales of lower profitability Freund Vector products and weakness in lithium ion battery related products of Freund Turbo. Return on equity fell below the target of 8% to 6.4%.

By reported segments, sales and operating profit of the machinery business fell by 14.1% and 54.8% year-on-year to JPY12.368 and JPY0.737 billion.

While Freund received an order for one new continuous granulating equipment system, sales from this order will be booked in the current term. The Company booked sales from four TABREX tablet printing equipment orders booked in the previous term, but adjustments required for equipment already delivered prevented marketing activities from being conducted.

## Sales by Geographic Region

(JPY mn, %)

	FY2/15 (Share)	FY2/16 (Share)	FY2/17 (Share)	FY2/18 (Share)	FY2/19 (Share)	(YY)
Japan	13,056 74.9	13,547 71.2	15,601 73.7	13,676 69.1	12,999 70.6	(-5.0)
Overseas	4,367 25.1	5,480 28.8	5,563 26.3	6,124 30.9	5,408 29.4	(-11.7)
North America	1,599 9.2	2,190 11.5	3,331 15.7	1,913 9.7	1,526 8.3	(-20.2)
Europe	450 2.6	937 4.9	830 2.6	1,787 9.0	410 2.2	(-77.1)
Central South Americas	1,071 6.1	1,325 7.0	553 3.9	1,065 5.4	1,826 9.9	(+71.4)
Asia, Others	1,246 7.2	1,027 5.4	847 4.0	1,357 6.9	1,645 8.9	(+21.2)
Total	17,424 100.0	19,027 100.0	21,164 100.0	19,801 100.0	18,408 100.0	(-7.0)

(Note) YY represents year-on-year growth rates

The adjustments required for large orders delivered caused Freund Vector to see a decline in its profitability. In addition, fixed costs also rose on the back of efforts to expand its business realm and hurt profits.

Freund Turbo promoted anticipatory investments for development of new products despite stagnant

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sales in the China for lithium ion battery applications and impairment accounting related to the acquisition of Akira Kiko, which contributed to a JPY91 million impairment loss at the extraordinary income level.

With regards to internal transactions of Freund Vector within the Freund Group, Freund will be responsible for marketing in India with sales of Freund Vector equipment being booked by Freund. Also, Freund will also collaborate with Freund Turbo on some products.

At the same time, the chemical and food business saw favorable trends and recorded increases in sales and operating profit of 11.9% and 27.9% year-on-year to JPY6.040 and JPY1.024 billion respectively.

This strong earnings performance is attributed to the strong increase in demand within Japan, progress in cultivation of overseas markets, and an increase in gross profit margin due to a rise in capacity utilization rates. And while sales of food quality preserving agents rose, profitability trended sideways.

Inbound related applications saw new developments, with demand for manufacturing equipment for supplements and new cosmetics in the realm of health foods and cosmetics on the rise.

In overseas markets, orders for large equipment were received in Brazil, and operations in India are beginning to ramp up. Furthermore, excipients sales are on the rise with new sales agents boosting their marketing efforts. The Chinese Government is also implementing measures to improve the local pharmaceutical product industry, with the goal of raising product quality levels that are in line with global standards. Consequently, Freund has already received numerous inquiries for its excipients and expects to cultivate the market there for its products.

Freund Vector has a strong reputation in Brazil, and is taking aggressive steps to boost its global marketing capabilities under the leadership of the President at its overseas sales agent convention. Freund Vector also has a strong presence in Ireland, Israel and Turkey due in part to the highly effective management of its sales agents in those respective regions. Freund Vector will continue to implement efforts to fortify its sales agent network across all regions.

Freund expects the excipients markets in India and China to be very promising. A joint venture has been formed with a local company in India for the deployment of business there. In China, a supply system must be created in order to effectively deploy its business in that market.

The efforts being made to market Anti-Mold food quality preserving agents in overseas markets are beginning to bear fruit, with cultivation of markets in Taiwan and Korea progressing smoothly.

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### Begin Contributing to Profits

During fiscal year February 2019, the chemical and food business trended strongly on the back of strong growth in highly profitable new excipient products. The strong performance of this division helped to cover some of the weakness in the machinery business. Previously, the share of operating profits derived from the machinery business and chemical and food business segments accounted for 67% to 33% respectively, but this ratio reversed in the most recent term to 42% and 58% respectively.

The overseas business deployment is ramping up with exports rising by 64.1% year-on-year to JPY350 million and accounting for over 5% of the total sales of JPY6.0 billion

### Earnings by Business Segment

		Machinery		Chemical, Food		Adjustment	Total
		YY	YY	YY	YY		(JPY mn, %)
2012.2	Sales	9,582	(+18.4)	5,653	(+9.5)	-1	15,236
	Operating Profit	907	(+46.3)	470	(+20.9)	-312	1,065
	% margin	9.5		8.3			7.0
2013.2	Sales	9,914	(+3.4)	6,482	(+14.7)	—	16,396
	Operating Profit	1,172	(+29.2)	565	(+20.2)	-267	1,470
	% margin	11.8		8.7			9.0
2014.2	Sales	11,004	(+8.6)	6,611	(+2.0)	—	17,616
	Operating Profit	1,242	(+6.0)	379	(-32.9)	-335	1,286
	% margin	11.3		5.7			7.3
2015.2	Sales	10,941	(-0.6)	6,482	(-2.0)	—	17,424
	Operating Profit	1,108	(-10.8)	474	(+24.9)	-432	1,150
	% margin	10.1		7.3			6.6
2016.2	Sales	13,037	(+19.2)	5,990	(-7.6)	—	19,027
	Operating Profit	1,189	(+7.3)	519	(+9.6)	-362	1,346
	% margin	9.1		8.7			7.1
2017.2	Sales	14,914	(+14.4)	6,249	(+4.3)	—	21,164
	Operating Profit	1,750	(+47.1)	748	(+44.0)	-456	2,041
	% margin	11.7		12.0			9.6
2018.2	Sales	14,403	(-3.4)	5,398	(-13.6)	—	19,801
	Operating Profit	1,631	(-6.8)	801	(+7.1)	-461	1,971
	% margin	11.3		14.8			10.0
2019.2	Sales	12,368	(-14.1)	6,040	(+11.9)	—	18,408
	Operating Profit	737	(-54.8)	1,024	(+27.9)	-568	1,223
	% margin	6.0		17.0			6.6

(Note) % margin represents ratio of operating profit to sales

### Strong Balance Sheet, Adequate Free Cash Flow

With regard to the balance sheet, capital adequacy ratio rose from 69.2% at the end of the previous term to 75.9% at the end of the term that just ended. Cash position declined slightly from JPY6.568

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to JPY5.534 billion over the same period. The fall in orders contributed to declines in unfinished products and prepayments from JPY2.046 to JPY1.053 billion and JPY1.498 to JPY0.666 billion respectively.

Customers are required to make a prepayment worth one third of the value of their orders for products at the time of their order. The majority of products are booked as sales at the time of their delivery. Sales for longer term projects of over three years are booked on a percentage of completion basis, but account for a small amount of Freund's overall sales.

Balance Sheet

(JPY mn, %) PY mn, %)

	FY2/13	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18	FY2/19
Current Assets	11,084	11,331	12,782	13,053	14,938	14,784	12,881
Cash equivalents	3,617	4,600	4,870	4,042	6,982	6,568	5,534
Receivables	4,764	4,409	5,272	5,694	4,403	4,451	4,332
Inventories	210	202	296	330	404	263	414
Uncompleted products	1,497	937	931	1,511	1,712	2,046	1,053
Raw materials	394	535	543	590	649	876	1,007
Noncurrent Assets	3,886	4,219	4,495	4,153	4,162	4,341	4,583
Tangible assets	2,910	3,052	3,403	3,135	3,234	3,370	3,769
Investments, others	946	988	944	835	872	868	797
Total Assets	14,971	15,550	17,277	17,206	19,101	19,125	17,465
Current Liabilities	5,015	4,402	5,427	5,315	6,592	5,564	3,938
Payables	2,478	2,068	2,786	2,580	3,058	2,823	2,169
Prepayments	1,279	926	1,242	1,288	1,831	1,498	666
Noncurrent Liabilities	640	754	669	361	323	318	275
Net Assets	9,315	10,392	11,180	11,529	12,185	13,242	13,250
Capital adequacy ratio	61.4	65.8	63.6	67.0	63.8	69.2	75.9

(Note) Freund had no interest bearing liabilities as it maintains no loans payable

During fiscal year February 2019, cash flows from operations saw a net inflow of JPY435 million, investments saw a net outflow of JPY566 million, and free cash flow was negative.

Freund maintains a healthy balance sheet with zero debt. Furthermore, any potential future increases in the levels of inventories are expected to be offset by the ability to increase prepayments. Because Freund is a research and development based company, large capital investments are a requirement of its business cycle. Working capital can be paid for using internal funds and there is no need for external funding. And because Freund is able to secure the required amounts of free cash flow, its ability to pay dividends is adequate.

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Freund is expected to use its cash flow for research and development investments, overseas capital investments, capital collaboration within and outside of Japan, and for M&A activities.

Cash Flow Trends

	(JPY mn)					
	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18	FY2/19
Operating Cash Flow	1,227	822	290	3,605	594	435
Net profit after tax	574	895	642	1,655	1,401	645
Depreciation	303	308	321	338	344	344
Receivables	453	-781	-430	1,243	-66	138
Inventories	552	12	-620	-382	-415	615
Payables	-113	345	-170	409	-152	-700
Prepayments	-447	252	45	571	-315	-843
Profit on sale of subsidiary			217			
Investing Cash Flow	-423	-240	-432	-351	-493	-566
Tangible assets	-264	-453	-304	-436	-592	-569
Free Cash Flow	804	582	-142	3,253	100	-131
Financing Cash Flow	-226	-284	-331	-277	-499	-921
Dividends	-172	-215	-258	-215	-343	-343
Cash and Equivalents at Term End	4,107	4,548	4,042	6,982	6,568	5,534

## Orders Bottom

While machine orders rose by a small margin of 3.7% during fiscal year February 2019, order backlog declined by 6.0% year-on-year. TABREX has yet to see a recovery in demand, and the delivery of the first continuous production equipment has been delayed into the coming year.

Machinery Business Quarterly Order Trends

	(JPY mn)											
	FY2/17				FY2/18				FY2/19			
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Machinery Business												
New Orders	3,689	4,716	3,836	4,115	3,624	2,360	2,762	2,766	2,553	3,966	2,102	3,218
Japan	2,569	2,892	3,032	2,089	1,649	1,711	1,376	1,479	1,592	2,273	1,197	2,021
Pharmaceutical Products	1,896	2,375	2,555	1,493	1,153	1,195	1,039	875	963	1,899	924	1,662
Industrial Products	674	517	477	596	497	517	337	604	629	374	273	357
Overseas	1,119	1,824	804	2,025	1,974	648	1,385	1,286	961	1,690	904	1,196
Sales	2,413	3,284	4,305	4,911	3,198	3,973	2,576	4,655	3,433	3,712	1,578	3,645
Order Backlog	8,318	9,765	9,289	8,561	9,045	7,465	7,681	5,822	4,828	6,233	5,818	5,428

The machinery business suffered from the negative effect of the abating of the boom in generic drug manufacturing equipment investments, and efforts to offset the anticipated declines were delayed. Furthermore, the inability to book new orders for TABREX was compounded with weak orders for lithium ion battery related equipment due to a slowing in China and despite strong inquiries there.

While orders for drug formulation equipment remained strong during the generic drug related investment boom from fiscal years February 2015 to 2017, demand has slowed. Drug formulation

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equipment orders appear to have bottomed within Japan thereafter, but Freund is adopting a cautious stance due to the potential for uncertainties caused by drug price revisions.

Generic drug manufacturers are increasingly shifting from in-house to consigned manufacturing. However, Freund is adopting a strategy of focusing its marketing activities upon a wider range of manufacturers that happen to be increasing their capacity and therefore orders are not expected to be that much of an issue. Regarding the coming year, Freund expects order growth to remain restrained despite a bottoming in demand

In overseas markets, sales in Europe fell by a large margin due to the disappearance of large projects booked in the previous year. And while demand remained weak in North America, sales in Brazil rose by a large margin. However, sales in Brazil were for low profitability projects so their contribution to profits was less than ideal.

Machinery Business Order forecasts

(JPY mn)

	FY2/17	FY2/18	FY2/19	FY2/20 Est.
Japan				
Pharmaceutical Products	8,318	4,261	5,451	6,200
Industrial Products	2,266	1,956	1,634	1,800
Overseas	5,774	5,296	4,753	5,000
Total	16,358	11,513	11,839	13,000

(Note) Analyst prediction

### Freund Adopts Cautious Earnings Outlook for Fiscal Year February 2020

According to the Company's earnings estimates for fiscal year February 2020, sales, and operating, current and net profits are all expected to decline by 4.9%, 18.2%, 24.6% and 17.0% year-on-year to JPY17.500, JPY1.000, JPY1.000 and JPY0.700 billion respectively.

Freund was required to revise downward its earnings estimates due to the weak demand for its new products during the last fiscal year, and this appears to be a reason for its adoption of cautious estimates for the coming year. Based on this interpretation of the current estimates, they may be considered overly conservative with the potential for better earnings.

Freund is implementing new measures to capture opportunities for its chemical and food business in overseas market, along with full scale efforts to expand sales of TABREX overseas. Also, efforts are being made to expand sales of lithium ion battery applications. Because these efforts have not been considered in the new estimates, there may be some positive surprises for earnings from these efforts during the latter half of the year.

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The expansion of new product sales and cultivation of business opportunities in overseas markets, which were the main reasons for the downward revision to earnings in the fiscal year just ended, will be a key to the coming year's earnings. And while the attractiveness of TABREX for its superior tablet printing capabilities is expected to lead to strong demand in the future, a relatively long time may be required for companies to actually make the investments in equipment which could lead to actual orders of TABREX being booked.

Demand for excipients is expected to remain strong, but weakness in other product areas is expected to lead to a one year delay in the recovery in earnings. Consequently, a key will be to what extent Freund can offset various weaknesses in its product range.

Earnings Estimates by Business Segment

(JPY mn, %)

	2016.2	2017.2	2018.2	2019.2	2020.2		2021.2
					Co Plan	Est.	Est.
Machinery	13,037	14,914	14,403	12,368	11,000	12,500	14,000
Freund Corp.	7,784	9,446	8,883	7,075		7,400	8,000
Freund Vector	4,686	4,727	4,353	4,132		4,000	4,500
Freund Turbo	1,205	1,641	1,722	1,866		1,800	2,200
Operating Profit	1,189	1,750	1,631	737		700	1,100
Operating Margin (%)	9.1	11.7	11.3	6.0		5.6	7.9
Chemical and Food	5,990	6,249	5,398	6,040	6,500	6,500	7,000
Pharmaceutical Excipients	2,132	2,357	2,546	3,195		3,600	4,000
Food Quality Preserving Agents	2,004	1,951	2,091	2,151		2,200	2,300
Dietary Supplements	1,853	1,941	760	693		700	700
Operating Profit	519	748	801	1,024		1,100	1,200
Operating Margin (%)	8.7	12.0	14.8	17.0		16.9	17.1
Adjustments (Company wide admin expense)	-362	-456	-461	-538		-600	-700
Sales	19,027	21,164	19,801	18,408	17,500	19,000	21,000
Operating Profit	1,346	2,041	1,971	1,223	1,000	1,200	1,600
Operating Margin (%)	7.1	9.6	10.0	6.6	5.6	6.3	7.6
Overseas Sales	5,480	5,563	6,124	5,408		5,700	6,500
Overseas Sales Ratio (%)	28.8	26.3	30.9	29.4		29.5	31.0

(Note) Based upon Freund Business Plan data, Analyst estimates Earnings

### Progress in Achieving Medium Term Business Plan Objectives – Earnings to Recover from Next Term

While Freund has internal goals of selling between five to ten units of TABREX, the Company has chosen to adopt a conservative stance and has not included new orders for TABREX into its earnings

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estimates.

Following on the heels of the one unit of continuous manufacturing equipment sold in the term just ended, Freund seeks to sell three in the current term but has not included their sales in its earnings estimates.

Inquiries for lithium ion battery parts related applications are still strong, but a clear cut trend in orders has yet to surface.

In an effort to avoid a repeat of the downward revision to earnings in the term just ended, Freund has avoided including sales from uncertain product orders. At the same time, the Company has established internal targets that are higher than the estimates, and a close watch should be kept to see how much of these internal targets it can actually achieve.

Therefore, contributions from 1) TABREX, 2) lithium ion battery related materials, 3) overseas machinery product orders and 4) excipient sales could allow better than expected earnings to be realized. Based on the potential for additional earnings to be derived from these four factors, our analyst forecasts call for sales and operating profit of JPY19.0 and JPY1.2 billion respectively.

The coming year marks the fourth year of the Five Year Medium Term Business Plan, with the first three years designated as a period to establish the foundations to capture future growth. The excipient product sales have ramped up strongly within the chemical and food business segment and are continuing to trend favorably. However, strong demand and subsequent shortages in output capacity require Freund to expand output capacity at its plants. At the same time, Freund is confronting delays in order acquisition for new equipment including TABREX and an inability to expand orders for industrial use lithium ion battery materials related applications.

Freund maintains its fundamental strategy of focusing upon sales of new products and cultivation of opportunities in overseas markets. Furthermore, the fiscal year February 2022 sales and operating profit targets of JPY30.0 and JPY3.0 billion respectively remain unchanged. With regards to fiscal year February 2021, the sales and operating profit target of JPY21.0 and JPY1.6 billion respectively are based on the assumption of contributions from new products and cultivation of opportunities in overseas markets.

## **5. Company Evaluation: Strong Expectations for Start Up of New Business Realms**

### **Medium Term Growth Potential**

The awarding of the tablet printing equipment TABREX with the 18<sup>th</sup> Annual Nakai Award is

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particularly noteworthy. The earlier versions of TABREX were developed by the founder based on his unique ideas and creativity, and the most recent versions have been developed by the current President Iwao Fusejima and his team of highly talented staff, who he headhunted from other companies, and have become the industry's leading product worldwide.

This combination of unique ideas and highly talented staff are expected to enable Freund to continue to make equipment that satisfy customers. President Iwao Fusejima will focus his efforts on implementing a "task force" type project structure that leverages his team's high skill levels to develop new products and are based on his philosophy of contributing to future health through medical advances. Therefore, President Iwao Fusejima's efforts to strengthen the management and organizational structure of Freund should be watched closely.

Freund will implement a strategy to offset declines in formulation equipment orders by 1) cultivating the market using new TABREX and continuous manufacturing equipment, 2) cultivating global markets for highly profitable pharmaceutical excipients and 3) expanding sales of lithium ion battery related equipment.

Freund Vector of the United States will strengthen its staffing a step further because it is responsible for a wide operating territory including North America, South and Central Americas, and Europe. Freund Vector products will be combined with products made by Freund in Japan to conduct marketing in the Asia region. Furthermore, the expansion of sales in India and China are another crucial factor for Freund.

And while fiscal year February 2022 sales and operating targets of JPY30.0 and JPY3.0 billion may not be appeared to be that high, the abating of the boom in demand for generic drug related equipment will require a recovery in Freund's businesses to achieve these targets.

Excipients manufactured on a consigned basis have exceeded the Medium Term Business Plan's targets and contributed positively to earnings. Furthermore, expansions being made through the construction of a new plant should also allow excipients' earnings contribution to expand a step further. Consequently, a main issue is how Freund will be able to raise the profitability of its machinery. Also, the ability to raise the key performance indicator of overseas sales ratio through the introduction of new products is also critical.

The goal of achieving 10% operating profit margin appears possible. Freund boasts of a high capital adequacy ratio, but higher levels of operating profitability need to be achieved in order to raise return on equity a step further. At the same time, efforts will be made to raise the ratio of overseas sales, increase profitability of overseas businesses, leverage proprietary technologies to raise value addition of products, and reviews pricing of products.

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In order to raise its position to become a top player in the global market, Freund needs to achieve further successes in cultivating opportunities in overseas markets over the long term. And while the Company boasts of adequate strengths in various capabilities, we believe a further expansion in earnings is necessary and therefore assign a company rating of Freund as “B”. (Definition of corporate value is described in the cover of this report)

### **Attention Should Be Paid to a Recovery in Orders, New Business Realms**

Freund performed a stock buyback of 500,000 or 2.9% of total shares outstanding for an acquisition cost of JPY572 million in April 2018. The shares were purchased from the founder Yasutoyo Fusejima through a matched purchase of treasury shares transaction conducted by the Tokyo Stock Exchange. Yasutoyo Fusejima had been the top shareholder of Freund with 9.90% of total outstanding shares as of end February 2018, but the sale of his shares to Freund caused his holdings to fall to 7.89% to become the second largest shareholder as of end August 2018.

Freund has paid a dividend of JPY20 per share, including a special JPY5 dividend to commemorate the 20<sup>th</sup> anniversary of its listing in fiscal year February 2017, and has maintained dividend payment of JPY20 per share thereafter. Freund maintains a dividend payout ratio target of 30%.

These changes in the shareholder structure suggests that institutional investors could increase their holdings in Freund should a recovery in earnings become apparent. At the same time, the securing of individual investors is also important.

While the portion of shares held by institutional investors is expected to rise, the maintenance of a strong individual investor base is also important. Because of the large number of shareholders holding the minimum lot of 100 shares, the shareholder benefit program (A JPY1,000 prepaid QOL Card given to shareholders with minimum trading lot) is also another attractive feature for shareholders in addition to the increase in dividends. The shareholder benefit program specifies that prepaid cards worth JPY1,000 will be given to shareholders holding the minimum of 100 shares for over one year, and JPY2,000 to those holding the minimum of 100 shares for over three years. This JPY1,000 prepaid card is equal to 1.2% in dividend yield terms. In other words, the actual dividend yield to shareholders holding 100 shares for over three years is equivalent to 5.0%.

Freund will focus its efforts upon achieving the goals defined in its Medium Term Business Plan, and President Iwao Fusejima is expected to adopt an aggressive role as the leader of Freund. At the current share price as of May 15, 2019, the price to book ratio (PBR) and price to earnings ratio (PER) stood at 0.99 and 16.4 times respectively, and return on equity and dividend yield were 6.0% (7.9% anticipated in the coming term) and 2.6% respectively. In the near term, a close watch should be kept

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on a recovery in orders and the speed by which new businesses are ramped up. Based on the outlook for earnings to grow over the medium term and the potential for improvement in return on equity to over 10%, Freund may garner positive attention of the market again.

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