

## Freund Corporation (6312)

### World's Leader in Pharmaceutical Product Use Granulating, Coating Machinery Technologies

January 19, 2017

JASDAQ

#### Key Points

- Earnings are extremely strong due in part to continued growth in new orders for revolutionary tablet printing equipment, and expectations of increases in overall new orders and rise in order backlogs to record high levels after the start of the fourth quarter. Japanese generic drug manufacturers are also placing new orders. Furthermore, the influence of new product development in fiscal year February 2018 is also contributing to earnings and current profits are expected to rise by 16% year-on-year to a new record high of JPY2.5 billion.
- The Japanese Government is promoting a strategy to reduce medical expenditures by raising the usage of generic drugs to 80% by 2020. This figure represents a 1.5 fold increase in the current market scale and therefore demand for tablet manufacturing equipment is also expected to remain strong. Freund is a company that boasts of both drug formulating equipment and chemical products used as pharmaceutical excipients. Its technological development capability is highly advanced and its tablet manufacturing and coating equipment boast of a high 70% share of the Japanese market. At the same time, it ranks just behind GLATT Corporation and GEA Corporation of Europe in the global market.
- Based upon its Three Year Medium Term Business Plan that runs until February 2017, Freund is expected to continue its basic strategy of focusing upon cultivating opportunities within the market and developing new products. The Company has been able to capture orders for concept products that enable continuous manufacturing of drug formulations to be conducted. Sales of the second generation of TABREX Rev. tablet printing equipment with improved quality performance was launched in September 2016. Orders for this new and improved equipment are strong and expected expand.
- Along with expansion in overseas markets, Freund is currently endeavoring to raise its overseas sales ratio from its current level of 25% to 40% over the medium term. Freund will also promote efforts to develop new applications for its drug formulation coating equipment in India and other emerging markets, and equipment for generic drug markets in Europe. The United States subsidiary Freund Vector, which is responsible for North and South Americas, Europe, Middle East and Asia

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regions, will develop products that match the needs of these respective markets as a means of differentiating its function from the Japan operations. At the same time, it will promote close collaboration with Japan.

- According to the outlook for the coming three to five years, Freund seeks to raise its global position a step further as a research and development based company that leverages its unique drug formulation technologies to expand its overseas market share, while taking advantage of the anticipated expansion in demand within Japan over the next several years. Therefore, it is critical for the Company to develop products for developing markets. Freund expects to achieve record high profits in fiscal year February 2017, along with operating profit margin of 10% and return on equity (ROE) of over 10%. At the same time, the Company will endeavor to achieve sales and operating profit of JPY32.0 and JPY4.0 billion respectively over the next five years. Subsequently, a more favorable view of Freund in the stock market may enable it to move to the First Section of the Tokyo Stock Exchange at an early stage.

## Index

1. Characteristics: Development of Unique Pharmaceutical Product Formulation Equipment
2. Strengths: Top Ranking Company within Japan, Third Placed in Global Markets
3. Medium Term Business Plan: Strengthen Efforts to Cultivate Overseas Markets and Invigorate the Japanese Market
4. Near Term Earnings: Expected to See Continued Favorable Orders, Record High Profits
5. Company Valuation: Profit Margins to Rise on Contributions of New Tablet Printing and Other Equipment Development

Corporate Rating: A

Data as of January 18, 2017

Share Price:	JPY1,515
Market Capitalization:	JPY27.9 billion (18.4 million shares)
PBR:	2.23x,
ROE:	10.5%,
PER:	21.2x
Dividend Yield:	1.3%

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(Units: JPY Million)

FY End	Sales	Operating Profit	Current Profit	Net Profit	EPS (Yen)	Dividend (Yen)
2010.2	12,943	970	951	563	32.7	7.5
2011.2	13,257	680	698	516	30.0	7.5
2012.2	15,236	1,065	1,123	608	35.3	7.5
2013.2	16,396	1,470	1,618	765	44.4	10.0
2014.2	17,616	1,286	1,341	787	45.7	12.5
2015.2	17,424	1,150	1,249	695	40.4	15.0
2016.2	19,027	1,346	1,394	961	55.7	12.5
2017.2 (Est.)	21,500	2,150	2,150	1,230	71.3	20.0
2018.2 (Est.)	23,500	2,500	2,500	1,550	89.9	20.0

(Based upon November 2016 data)

BPS 679.8 円

Assets: JPY18.411 billion

Net Assets: JPY11.722 billion

Capital Adequacy Ratio: 63.7%

BPS: JPY679.8

(Note) ROE, PER, Dividend Yield are based upon fiscal year February 2016 earnings estimate data. Stock splits of 2 for 1 were conducted in June 2009 and February 2016. 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<sup>th</sup> anniversary of operations, and a special JPY5.0 per share dividend is expected to be paid 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 unique pharmaceutical product formulation equipment

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

Freund Corporation bases its business on the main products of granulating and coating equipment used in the process of manufacturing pharmaceutical products and manufacturing and sale of pharmaceutical excipients. In these realms, the Company is highly unique as it is the only company in the world to produce both equipment and the 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 third 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 non-fully cooked cakes and confectionaries to prevent spoilage by blocking the growth of bacteria.

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## Freund Business Overview

(%)

	Sales		Operating Profit		Characteristics
	FY2/15	FY2/16	FY2/15	FY2/16	
Machinery	62.8	68.5	70.0	69.6	Pharmaceutical, food, fine chemical use Granulating, coating equipment manufacture, sales Coating Equipment domestic share 70%, Global rank #3
Pharmaceutical	91	88			
Industrial	9	12			
Subtotal	100	100			
Chemical, Foods	37.2	31.5	30.0	30.4	Pharmaceutical excipients, food quality preserving agents, dietary supplement manufacture, sales Good manufacturing practices compliant manufacturing facilities
Pharmaceutical Excipients	33	36			
Food Quality Preserving Agent	30	33			
New Products	37	31			
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. The strong growth in health foods is leading to formation 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 half-cooked cakes and confectionaries. Spoilage of foods is caused by oxidation. So to prevent spoilage, foods must be prevented from oxidizing by keeping them from coming in 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 lead to 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 JPY3.0 billion respectively. And while market scale of the alcohol transpiration agents is smaller than that of deoxidant type agents, Freund 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.

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## 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	Coenzyme Q10, lactoferrin
	Bifidobacteria

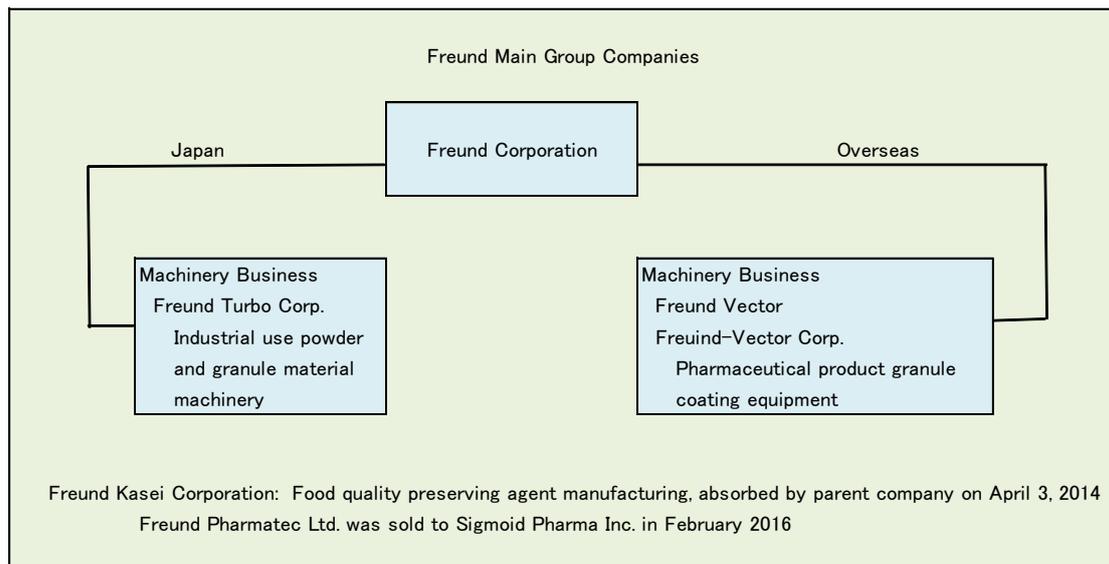
**Independent Development at the Hamamatsu Technology Development Research Center**

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 30 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.

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 facility to conduct tests of sample products because it maintains various machinery and equipment which has been 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.

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## 52 Years of Operations, President Iwao Fusejima Leads Global Marketing

Freund celebrated its 50<sup>th</sup> year of operations in April 2014. Yasutoyo Fusejima (Currently 78 years of age, Honorary Chairman) founded Freund in 1964. His father's company manufactured industrial use rubber products and Yasutoyo himself was aware of and impressed by the high profit margins of pharmaceutical products when he graduated from the Commerce Department of Waseda University.

While his friends joined trading companies, Yasutoyo decided to work at 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 process of manufacturing, he recognized the strong potential for automation to be introduced to this manufacturing process and he created his first machine in 1963. In principle, this machine used a spray gun to spray liquid on 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 1964, Yasutoyo and his friend Shimesu Motoyama (The friend working at the major pharmaceutical company, and later to become a managing director at Freund) established Freund (The German word meaning friend).

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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 the 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 copy 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 could 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 and is 47 years of age. 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 he became President of Freund.

### **Cultivating Human Resources, Corporate Culture Based upon the Four "S's"**

President Iwao Fusejima spoke with us at the start of the year about his views on "cultivating human resources based upon the four S's". The four S's are represented by 1) sense (maintaining curiosity about all things), 2) speed (coming up with responses quickly) 3) study (studying up on competitors and understanding our own company) and 4) smile (always remembering to smile and stay healthy). Efforts will also be made to strengthen the corporate culture of taking proactive steps to prioritize and uphold compliance.

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## **Founder and Corporate Governance**

The number of Freund's shareholders stood at 3,684 at the end of February 2016. By shareholder type, individuals and financial institutions accounted for 35.7% and 32.6% of total shareholders, with the share of institutional shareholders is on the rise. The founding family shareholdings, including Yasutoyo Fusejima, stand at about 30% of the total.

The board of directors is comprised of five managing directors including President Iwao Fusejima, Managing Director Norio Shiratori, Director Narimichi Takei, Outside Director Tomohikio Manabe, and Outside Director Ryuji Nakatake. Iwao Fusejima has acted as President since 2012, and has led the global deployment of Freund's business and collaboration with overseas subsidiaries.

As part of the Company's corporate governance activities, two outside directors were appointed to the board in May 2015. Tomohikio Manabe is a certified public accountant, and Ryuji Nakatake previously assumed positions as the coach of Waseda University's rugby team and managing director of the Japan Rugby Football Union. They have been selected for their ability to take on an objective and fresh view of the management because of their roles outside of Freund.

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.

Despite the small number of five managing directors, two are outside directors. Furthermore, of the three corporate auditors, one is full time and the other two are outside members. And while the three managing directors responsible for execution of business tasks (President Iwao Fusejima, Managing Director Norio Shiratori, Director Narimichi Takei) may appear few in number, how their time and efforts are deployed to take care of their various responsibilities will be determined in the near future.

With regards to responsibility execution, managers are the next line of support following the directors. Efforts will be made to strengthen the overall business execution structure including that of Freund's main subsidiaries (Freund Vector, Freund Turbo). Another major topic is how the Company will conduct its corporate governance responsibility. And as part of this responsibility, Freund is expected to promote a global consolidated management strategy.

## **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 only some parts such as

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spray guns being imported from Japan.

### Group Company Earnings

(JPY Million, %)

		Sales	Operating Profit	Operating Margin
Freund Corporation	2011.2	10669	495	4.9
	2012.2	12248	839	6.8
	2013.2	13506	1350	10.0
	2014.2	13694	1241	9.1
	2015.2	13364	1126	8.4
	2016.2	13741	1096	8.0
Freund Vector Corporation	2011.2	2757	112	4.0
	2012.2	2812	277	9.9
	2013.2	2943	147	5.0
	2014.2	3892	169	4.3
	2015.2	3905	291	7.5
	2016.2	4686	293	6.3
Freund Turbo Corporation	2011.2	561	63	11.2
	2012.2	930	15	1.6
	2013.2	1022	81	7.9
	2014.2	782	-8	-1.0
	2015.2	999	-12	-1.2
	2016.2	1205	94	7.8
Freund Pharmatec Ltd.	2011.2	0	-67	—
	2012.2	0	-131	—
	2013.2	0	-134	—
	2014.2	0	-188	—
	2015.2	6	-190	—
	2016.2	0	-140	—

(Note) Freund Turbo was acquired in June 2010

Freund Kasei Corp. was merged with Freund Corp. in March 2014

Freund Pharmatec was sold to Sigmoid Pharma in February 2016

The total number of employees of the Freund Group as of end February 2016 stood at 341, of whom 186, 116 and 37 were employed by Freund Corporation, Freund Vector and Freund Turbo respectively.

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. Freund continued to conduct development of its machinery which allowed it to use water in place of organic solvents, which led to a tripling of the drying speed of new equipment.

The High Coater machine developed by Freund became a patented product for which the production rights were licensed. In 1979, a collaborative agreement was formed with Vector Corporation of the

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United States which was later turned into a consolidated subsidiary. Vector is headquartered in Marion, Iowa (Next to Cedar Rapids), and it manufactures and sells granulating and coating equipment in the North and South Americas, Europe, and the Middle East regions. At that time, there were no direct transactions of products between Freund and Vector.

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 the license from Freund and could establish a strong track record.

Functionality of equipment was raised to match the needs and practices of customers in the United States market, along with documentation created for the local market. Furthermore, equipment sales were expanded from the United States to include Europe and South America.

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 Geographical Sales

(JPY Million, %)

		Japan	North America	Europe	South Central America	Asia	Total	(Overseas)
2013.2	Sales (Composition)	12800 [78.1]	948 [5.8]	772 [4.7]	1875 [11.4]		15236 [100.0]	[3596] [21.9]
2014.2	Sales (Composition)	13233 [75.1]	1503 [8.5]	701 [4.0]	2177 [12.4]		17616 [100.0]	[4382] [24.9]
2015.2	Sales (Composition)	13056 [74.9]	1599 [9.2]	450 [2.6]	1071 [6.1]	1246 [7.2]	17424 [100.0]	[4367] [25.1]
2016.2	Sales (Composition)	13547 [71.2]	2190 [11.5]	937 [4.9]	1325 [7.0]	1027 [5.4]	19027 [100.0]	[5480] [28.8]

(Note) South and Central America, and Asia have been separated as of fiscal year February 2015

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

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 is the first voting location in the United States Presidential primary elections. Cedar Rapids is the second largest city after Des Moines in the state of Iowa. Marion is a small city with a population of about 170,000 people.

Marion saw a large influx of immigrants from Czechoslovakia and the founder of Vector was Jerry

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Zahradnik, the son of an immigrant family from Czechoslovakia. Vector was established in 1972 as a press machinery company.

At the time, Freund's founder Yasutoyo Fusejima visited various American companies with the goal of cultivating the market for his drug formulating equipment. And in 1974, Freund signed a licensing agreement with the newly formed Vector for the manufacture of drug formulating equipment. Consequently, Freund was able to establish a foothold in the United States market through this agreement.

At the same time, Danforth Jr., who was a major shareholder of Vector, was asked to liquidate his position in Vector. And while Freund acquired the position from a major shareholder amounting to 88.08% of the shares of Vector in 1998, the remaining 11.92% of shares were held by Jerry Zahradnik who was the President of Vector at the time.

In 2003, Steve Jensen took over the role of President of Vector from Danforth Jr. Steve Jensen had been the Chief Financial Officer of Vector, and Matsugaki from Vector Japan was sent to replace Steve in his former position as CFO. Matsugaki joined Freund Corporation from Sanwa Bank at the time and is still the CFO at Freund Vector to this day. After 10 years of service as the President of Vector, Steve Jensen resigned from his post three years ago. At that time, Kubota assumed the position of Chief Operating Officer and still maintains this role. Kubota previously worked at a Japanese automaker and a metal mold company in the United States and has bountiful experience in management and technologies.

Vector founder Zahradnik passed away in May 2015. Subsequently, Freund was able to acquire his stake of 11.92% of the outstanding shares of Vector and Freund was able to turn Vector into a 100% owned consolidated subsidiary. Reflecting upon the 43 years of operations of Vector, it has operated independently for 25 years since the licensed manufacturing agreement for Freund equipment was started, and ties have been strengthened with Freund during the past 10 years despite its maintenance of an independent management structure.

While manufacturing and sales of drug formulating equipment is conducted, Freund Vector does not deal in the chemicals and foods business like Freund in Japan. And while manufacturing began under a licensing agreement, Vector is manufacturing equipment that has been modified to match the needs of the local market.

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%

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of Vector's sales are derived from drug formulating equipment, with the remaining sales derived from manufacture of formulation equipment for foods and agricultural chemical products. Consigned manufacture of seed coating and other processes are conducted within the contracted services business.

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

Demand for manufacturing equipment from generic drug manufacturers remains strong. Freund Corporation is a fabless manufacturer without its own manufacturing plant and therefore needs to increase the number of cooperating manufacturing companies to match the 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 was outsourced. Currently, Freund outsources the manufacturing of its equipment to six different companies, but Okawara Manufacturing maintains a high share of Freund's outsourced equipment manufacturing.

Furthermore, Freund entered the market for alcohol tablet type food quality preserving agents in 1977. 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 five 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 problem of someone lacking appropriate persons to take over management. Turbo had sales of JPY900 million and was included into the machinery business segment. While it is also a powder processing equipment manufacturer, Turbo boasted of specialization in realms differing from those of Freund, including food and industrial powders use, and particularly hard powder equipment.

## **2. Strengths: Overwhelming Position as Leader in Japan, One of Top 3 Players Globally**

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

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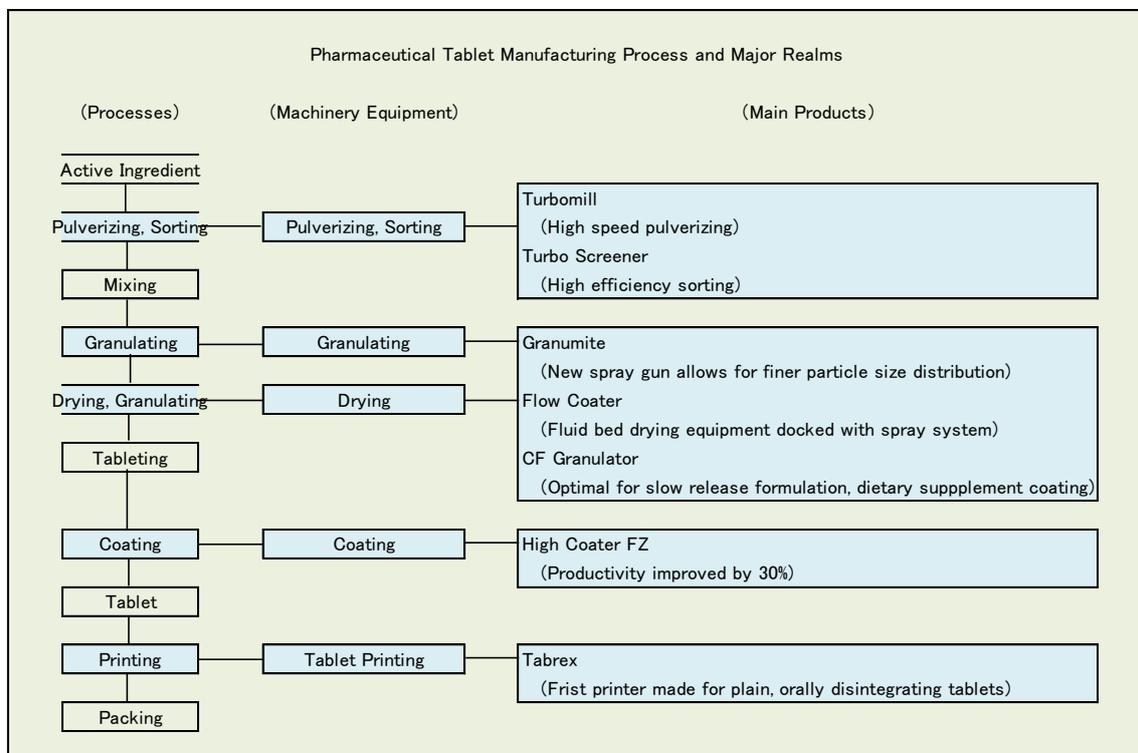
drugs, the flow chart below shows the process for tablet drugs.

**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 process 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 of Germany and GEA of Denmark (Both are privately owned companies) are amongst the world's top three machinery manufacturers. Consolidation of German pharmaceutical 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 Tekkosho Co., Ltd. and other specialized manufacturing companies. Furthermore, strengthened collaboration with Kikusui Seisakusho Ltd. is also being pursued.



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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 Chemical Industry Co., Ltd.

### **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. And while Freund Vector's business within the United States declined in the aftermath of the Lehman Shock in 2008, it has begun to recover recently. At the same time it 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 is actually a user of some of their equipment.

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### **Hamamatsu Technology Development Research Center – Advanced Application Development**

The “Technology Development Research Center” is located about 13 kilometers north of Hamamatsu City at the foot of the Japan Southern Alps in a region which is relatively well sheltered from natural calamities including earthquakes. Experiment facilities, two manufacturing facilities, and a distribution warehouse have been constructed at this location. Furthermore, there is ample space at this site and plans call for a third manufacturing facility to be constructed sometime in the future.

At the “Hamamatsu Technology Development Research Center”, two manufacturing facilities are operated. One of the main products called Flow Coater (Fluid bed granulation coating equipment) boasts of the capability for continuous manufacture including uniform mixing and granulating, coating, and drying processes. Granulating is the process where granules are created from powders. 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.

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 flavor 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 be able to spray a larger area more uniformly. 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 millimeters in diameter liquid center is encapsulated by a gelatin, and then dipped in glycerin from top to bottom. After drying, this glycerin casing hardens and forms a seamless mini-capsule. This is a technology which 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

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companies for superior manufacturing technological developments) in 2013.

Continuous granulating equipment Granuformer forgoes the conventional batch type production format and allows for continuous manufacture 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 issues 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, but they have yet to start in Japan.

Development of drug formulating equipment for emerging markets has been completed. Unnecessary functions of the most up-to-date version of High Coater FZ have been eliminated to create a new version for emerging markets. Furthermore, the highly detailed specifications required by clients in Japan have been reviewed, and functions which were deemed to be unnecessary in local emerging markets were eliminated to reduce the price of this machinery. Furthermore, ongoing efforts to tailor equipment to match the needs of emerging markets will be conducted while at the same time maintaining competitive capabilities.

#### Freund's Main Facilities

- ☆ Freund Hamamatsu Technology Development Research Center, Japan
  - Focus upon cutting edge product development as a R&D company
  - Provide samples, application testing to clients
  - Patents for over 300 intellectual properties held
- ☆ Freund Turbo (Japan)
  - Freund Corporation's granulating, coating technologies complement Turbo's pulverizing, sorting technologies to create new applications of powder processing for the medical, pharmaceutical product realms
  - Strengthen collaboration with Freund Vector
- ☆ Freund Vector (United States)
  - Development capabilities of Freund combined with the design, manufacturing capabilities of Freund Vector to develop products matching the local markets
  - Deploy business into Central, South Americas, Europe, Middle East, Asia

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

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## **World Leading Drug Formulation Technology**

The chemical and food 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 maintain effectiveness).

Pharmaceutical excipients are based upon the main raw material of sugar to be used as an outer coating for pharmaceutical products. The nucleus of granulated sugars is octahedron in shape, and they grow in size like snow balls.

The spherical granules come in sizes of between 710 to 850, 500 to 710, 355 to 500, 200, and 100 microns (Micro-nanometers) 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 Granulol F as an excipient used in orally disintegrating tablets to achieve a perfect balance between hardness and ease of dissolving, as has been long required by the market. Consequently, this product is expected to act as support for new drug formulation designs.

Aside from this, another method employs crystal cellulose to be added to lactose. Lactose is shaped like a spear, is low in calories, and inexpensive. Furthermore, they are easy to mix with medicines because they have no nucleus and are small in size. Freund has taken anticipatory steps to conduct research to achieve commercialization of this application. Lactose is now the most commonly used excipient. DFE Pharma of Europe is the largest manufacturer of lactose based pharmaceutical products in the world, and Freund imports products from this company.

Along with the advance of the aging society, the need for small diameter tablets, that are easy to swallow with sustained release to allow for prolonged drug efficacy, is on the rise. Therefore, drug formulation technologies which match this market need are also required. There is no need for nucleus and the key is to come up with near perfectly round forms. The ability to make near perfectly round forms can only be accomplished by a company with advanced and unique technologies like Freund, which leads the world.

Cellulose is added to lactose to act as a starch. Freund boasts of technology which does not require starch and allows for forming agents to be created from 100% lactose alone. There are instances where drugs do not respond to starches.

Freund's main pharmaceutical excipient product Nonpareil is close to a perfect sphere form, and represents the world's leading technology. 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

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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) reduce the bitterness of drugs and the sense of roughness 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. is conducted for excipient applications to leverage Freund's superior drug formulation technologies, and Shin-Etsu Chemical's superior excipients diversification capabilities and marketing in the United States.

While the manufacture of machinery and equipment is outsourced, chemical and food products are manufactured internally. In addition to alcohol type (Antimold Mild), deoxidant type (Negamold G) food quality preserving agents are manufactured. While Freund only has one manufacturing line for food quality preserving agents, they are considering addition of capacity to handle increased production internally with the possibility of adding a third manufacturing facility.

### **Chosen as "Global Niche Top 100 Company" by Ministry of Economy, Trade and Industry**

Freund was chosen by the Ministry of Economy, Trade and Industry as a "Global Niche Top 100 Company" in 2014. The criteria for selection included 1) balance between global market share and

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profits, 2) originality and autonomy, 3) ability to respond to risk, and 4) sustained ability to maintain global market share. Nittoku Engineering Co., Ltd. (Precise coil manufacturing automated winding equipment), Komori Corporation (Commercial use offset printing equipment), Aida Engineering Ltd. (Servo drive press equipment), Tsudakoma Co., Ltd. (Jet type weaving equipment) and Freund Corporation (Pharmaceutical and food use granulating and coating equipment) were chosen for this award. This award serves as additional proof of the Company's unique position.

### **3. Medium Term Business Plan: Strengthen and Cultivate Overseas Markets, Capture Domestic Demand**

#### **Japanese Generic Drug Market Active, Demand Continues to Mount**

Capital investments of generic drug manufacturers are growing by large margins. Based upon the outlook for usage of generic drugs to rise to 80% by 2020 due to the Government led efforts to restrain medical expenditures, generic pharmaceutical companies are increasing their capacity.

An increase in size of drug formulation equipment is progressing in response to the growing need for mass production. For example, there is a trend for flow bed equipment capacity to expand from the previous level of between 120 and 200 kilograms to 300 kilograms. In light of these trends, capital investments of generic drug manufacturers are expected to grow until 2018 as the rate of generic drug usage is expected to continue to rise. From that point onwards, generic drug manufacturers are expected to turn their attention to business opportunities in overseas markets. Furthermore, increases in the ratio of their overseas manufacture point to the potential for increased usage of Freund equipment.

The demands for high quality levels are no different for generic drug manufactures than new drug manufacturers. And while price negotiations are difficult, Freund leverages its superior quality and services to achieve appropriate pricing for its products.

The problem of achieving a balance of being able to handle increases in the amount of work and any subsequent rebound after the demand has abated is a critical issue. In response to this issue, Freund has adopted a strategy of using a "fables" structure where it does not have its own production facilities. Therefore, it is able to respond to increases in demand through expansion of capacity of its outsourcing manufacturing partners and addition of new cooperating outsourcing partners.

The expansion in orders is expected to continue for two to three years, and the Company is expected to carefully select which orders it chooses to take on during this period. Beyond this timeline, collaboration with Freund Vector is expected to be strengthened, and diligent efforts will be made to

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cultivate overseas markets. For the time being, Freund will focus its resources upon cultivating opportunities within the Japanese generic drug market.

Medium Term Business Plan “Change and Challenge 2014–2016” Overview

<p>〈Quantitative Targets〉</p> <ul style="list-style-type: none"><li>•Sales, operating profit of ¥23.0, ¥2.3 billion respective (¥100/US\$, ¥145/Euro)</li></ul> <p>〈Fundamental Strategy〉</p> <ol style="list-style-type: none"><li>① Realize Sustained Growth in Creativity<ul style="list-style-type: none"><li>•Establish structure for growth that does not over dependent upon excessive market growth</li><li>•Implement full scale efforts to cultivate overseas markets</li><li>•Accelerate new product development, strengthen product capability by leveraging group resources</li><li>•Fortify product lineup</li></ul></li><li>② Transform Corporate Structure to Lean Operations<ul style="list-style-type: none"><li>•Promote corporate culture to take on new challenges, cultivate human resources</li><li>•Further improvements in development, manufacturing process</li><li>•Maximize corporate value through structural reforms (New business development team established)</li><li>•Maximize profits by reducing overall costs (Absorption of Freund Kasei)</li></ul></li></ol> <p>〈Important Measures〉</p> <ul style="list-style-type: none"><li>* Global Business Deployment<ul style="list-style-type: none"><li>•Freund Vector establishes Milano laboratory facility, strengthen sales in Europe, begin sales of Freund Turob products</li><li>•Freund forms distributor agreement in India, introduce emerging country prototype product, considers overseas parts manufacture</li></ul></li><li>* Leverage Group Resources<ul style="list-style-type: none"><li>•Share information globally, assess market needs quickly</li><li>•Increase speed of product provision matching market needs in the machinery business, chemical and food business, Freund Turbo</li></ul></li><li>* Machinery business: Accelerate global deployment, strengthen product development</li><li>* Chemical and food business: Fortify new products, full scale participation in battery industry<ul style="list-style-type: none"><li>•Increase speed of development, introduce at least one product per year</li></ul></li></ul>
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**Medium Term Business Plan “Change and Challenge 2014-2016” – Targets Expected to Be Achieved One Year Behind Schedule**

The Medium Term Business Plan identifies targets of overseas sales ratio, operating profit margin and ROE of 40%, 10% and over 8% as key performance indicators (KPI). The sixth three-year plan entitled “Change and Challenge 2014-2016 – The Second Founding Period to Achieve 100 Years of Operations” has called for 1) realization of sustained growth in creativity, and 2) transformation of structure to lean operations.

Growth is anticipated in emerging markets including China, India and Central and South Americas.

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As a basic assumption to capitalize on this growth, a basic strategy has been created that calls for 1) creation of a structure to achieve growth without over dependence upon excessive market growth, 2) acceleration of new product development by leveraging Group resources, 3) full scale efforts to cultivate overseas markets and 4) organizational reforms and human resources cultivation to achieve these strategies.

Specifically, collaboration with Freund Vector for new product development, cooperation with Shin-Etsu Chemical to promote open innovation, and division of the “Hamamatsu Technology Development Research Center” into three differing sections by function will be conducted.

Freund Vector of the United States has established a marketing and testing facility in Milan, Italy to cultivate business from the large number of generic drug manufacturers that operate in Europe. This facility will allow potential clients to use the equipment prior to purchase and eliminate the need for them to travel to Iowa in the United States to test equipment. Therefore, Freund Vector is expected to cultivate market opportunities in Europe, while Freund will cultivate business opportunities in India and South East Asian markets.

Freund Corporation, Freund Vector, and Freund Turbo conduct close collaboration to develop new products that match the needs of the global market. Moreover, efforts will be made to strengthen and accelerate this process.

Freund Turbo’s pulverizing and sorting equipment and Freund Corporation’s granulating and coating technologies complement each other and allow new applications for pharmaceutical products to be developed. In addition, Freund will further strengthen the collaboration between pulverizing, sorting, granulating, coating and printing (Ink) equipment within the machinery business, and consigned excipients and other products within the chemical and food business. At the same time it will leverage its core competency of drug formulation technologies to capture new customers.

Product development capabilities will be strengthened within the machinery business, and deployment of businesses into the global market will also be accelerated. In addition to generic drug applications, industrial machinery for use in next generation lithium ion battery applications are also growing. Furthermore, Freund will also provide maintenance, refurbishing and other services to be launched as part of its strategy of expanding the weight of new businesses along with its sales of machinery.

In the chemical and food business, efforts are being made for the sale of consigned products including dietary supplements. Freund will leverage its technologies for the effective delivery of new substance applications including amino acids. In the realm of food quality preserving agents, the Company has entered the deoxidant type segment of the preservatives market to cultivate niche demand from confectionaries and noodle products. Collaboration with Shin-Etsu Chemical has been

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started for development of new products through promotion of open innovation.

The quantitative targets of the Medium Term Business Plan include sales, operating profit and operating margin of JPY23.0 and JPY2.3 billion, and 10% respectively. Of this JPY23.0 billion, JPY14.2 and JPY8.8 billion in sales are expected to be derived from the machinery business and chemical and food business respectively. Also, the ratio of overseas sales will also be raised from the current level of 25% to 40%.

The participation of Freund Vector is critical to the expansion of the overseas market. Freund Vector has cultivated the markets in Central and South Americas, and is now focusing its attention upon developing the European market (EU5 region, including the Eastern European region and Turkey).

3 Year Medium Term Business Plan Key Performance Indicators

(¥1bn, %)

	FY2/14	FY2/15	FY2/16	FY2/17 Est.	FY2/15 Initial Est.	FY2/16 Initial Est.	FY2/17 Est.
Sales	176	174	190	200	180	185	230
Machinery	110	109	130	142	112	130	142
Chemical and Food	66	65	60	58	68	55	88
Operating Profit	13	12	13	19	13	14	23
Operating Margin	7	7	7	10	7	7	10
Overseas Sales Ratio	25	25	29	–	–	–	40

(Note) “–” represents undisclosed information

### Epoch Making New Tablet Printing Equipment TABREX – Highly Competitive Products

The second generation TABREX Rev. tablet printing machine was launched in July 2016. We attended an exhibition (Interphex Japan) in June where we saw and listened to explanations of the new machine and were able to confirm the superiority of the new machinery.

The new machinery is compact in size, but boasts of large improvements in performance and the capability to respond to demands for increases in output. Capacity can easily be increased by using machinery in module format and increasing their numbers. The machine has been kept to a compact size because it employs a guideless transport mechanism that does not use guides. In addition, the yields of the printing function have increased dramatically due to increases in the accuracy of the optical inspection function. Moreover, the ink used comes in a cartridge format that allows for easy replacement of ink and contributes to reductions in loss of ink.

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.

TABREX is also expected to be a product that can compete in the global market as well. Therefore, product development and marketing structures will be strengthened a step further.

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While all of the first generation TABREX machines introduced until now are still in operation, efforts were conducted for the development of the second generation machine during 2015. And while there are seven companies within the industry making similar machinery, the second generation TABREX machine is highly differentiated from competitors' equipment.

Highly skilled development staff have been hired from outside Freund to work on the development of TABREX, and they have contributed to an increase in the development capability of Freund overall. 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 machinery 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 dot-on-demand (DOD) ink jet printing format to print characters that are four times finer than conventional methods. In addition, this new machine allows for printing on both sides of tablets and parallel printing for secant and non-secant applications. Patent applications for this printing technology have been submitted.

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

Capital Investment, Research and Development Expenses

	2011.2	2012.2	2013.2	2014.2	2015.2	2016.2	2017.2 (Est.)
							(¥mn, %)
Capital Investment	469	218	221	477	545	266	300
Depreciation	257	264	232	303	308	321	320
R&D	355	390	435	464	592	687	700
R&D to Sales Ratio (%)	2.7	2.6	2.7	2.6	3.4	3.6	3.5

(Note) FY2/17 represents company estimates

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## Highly Competitive TABREX

Sales of TABREX REV were launched in September, and inquiries from 18 different companies have already been received and trial usages currently being conducted. The modular system used in this equipment allows for 100,000 tablets to be produced per hour. Furthermore, using two or three TABREX REV equipment in parallel can also increase the output capacity even further and provides flexibility in methods of expanding capacity.

Conventional printing equipment can produce 300,000 tablets, and by using three equipment costing 78 million yen each allows for adequate capacity. Characteristics of the current second generation of equipment include 1) elimination of wasted ink through use of module type system, 2) internalized visual inspection capability that eliminates external inspection equipment, 3) easy to replace cartridge type ink system, and 4) simple system that allows for quick disassembly and assembly of equipment (15 minutes).

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 shown on the printed tablet. This technology can be used as a method to prevent falsification of products.

Compared with conventional equipment, TABREX is in the process of 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.

Delivery of TABREX equipment may begin in the coming fiscal year should orders be booked during the second half of fiscal year February 2017. 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.

## Revolutionary Continuous Granulating Machinery Development

Other new activities have also been started, including the continuous production of pharmaceuticals. And while batch production of pharmaceuticals is currently the normal practice throughout the world, major pharmaceutical manufacturers are beginning to switch to systems that allow for continuous

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production. This switch entails the use of single equipment that can allow for both small and large quantity production volumes.

The trend of shift in tablet manufacturing from batch processing to continuous processing started in Europe. In addition, the need for formulation equipment containment is on the rise.

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.

Freund developed the granulating equipment Granuformer to replace conventional batch production and realize continuous production for granules, and launched sales in 2014. 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.

Granuformer will be displayed at exhibitions in spring 2017 as part of marketing efforts to expand sales. Furthermore, collaboration with Freund Vector of the United States is expected to be strengthened for marketing of this product in overseas markets.

### **Cultivate the Global and Asian Markets**

A laboratory was opened in Milan, Italy to cultivate the European market. Similarly Freund deems that there is now a need for a similar laboratory in Asia to cultivate markets in the Asia region. Furthermore, responses will be developed to answer the growing need for multiple function equipment in the Indian market.

The superior uniformity quality of the Granulex (Centrifugal rolling granulation and coating equipment) with both granulating and coating functions that eliminate the need for a separate granule sizing process is believed to match the needs of the India market.

In overseas markets, Freund has switched its distributing agents in both India and Korea, and is strengthening its collaboration with Freund Vector to cultivate business in the Asian markets. Moreover, measures to improve the coating equipment High Coater Original for emerging markets in Asia are being promoted.

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With regards to cultivation of the India market, marketing for both equipment made in Japan by Freund and the United States by Freund Vector are being conducted, and orders have been received for manufacturing equipment made by Freund Vector. These orders reflect the characteristic of Freund Vector machinery being designed with global standards in mind.

While both the India and China markets are large, pharmaceutical manufacturers operating in these markets are about to enter a mature phase on par with developed countries, but the pricing of machinery and equipment manufactured in Japan remains to be an issue. In Asia, it is important to consider the needs of the local markets in terms of quality, access, procedural specifications and pricing when designing equipment. Therefore, establishing Freund facilities in Asia is an important issue and collaboration with Freund Vector will be conducted as part of the process of establishing functions there.

In cultivating global markets, the anticipated strong growth in generic drug usage around the world must be considered. With regards to developing markets, demand for Freund's high end drug formulation equipment is expected to grow. There are some 2,000 pharmaceutical related companies within Japan, 5,000 in China (200 are publicly traded) and 20,000 in India (Only 100 are recognized by the United States Food and Drug Administration). Therefore, demand for Freund equipment is expected to rise along with growth in the construction of clean and highly precise manufacturing facilities in these markets.

The main markets in Asia are Korea, China, India and Taiwan, but other markets including Turkey and Indonesia are also becoming attractive. And while marketing for these markets is conducted from Japan, both equipment made in Japan by Freund Corporation and in the United States by Freund Vector are being sold, depending upon the needs of the customers in those markets.

Particular efforts to sell excipients will be made in Korea, China and India. Marketing will be conducted for unique products in cooperation with companies with strengths in chemicals.

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

Freund Turbo's earnings are turning positive. 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. In addition, 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.

The over 300 tests of pharmaceutical products conducted at the Hamamatsu Technology

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

The industrial machinery company Freund Turbo established an office in Shinagawa in June 2014 as part of its efforts to strengthen its marketing structure and integrate its manufacturing and sales functions. 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.

Freund Turbo has taken the decision to avoid relying upon Freund Corporation by establishing its own marketing function. By doing so, the overall structure has been strengthened to realize a recovery in profitability. While Freund Turbo's products are primarily focused upon industrial usage, they can also be used in and have a track record of pulverization in pharmaceutical product applications. Therefore, new developments with regards to the manufacturing process (Value chain) for pharmaceutical use tablet production may be anticipated.

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 process powders in sorting equipment to form solid materials, then process 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).

### **Freund Vector Expands Capacity**

Freund Vector of the United States completed construction of facilities to house a new manufacturing line in January 2015. The assembly space is 1.6 times the size of existing facilities. Furthermore, the construction of this new facility is timed perfectly to capture orders from the current strong demand.

This new facility was originally planned as a response to capture growing demand from South America and Europe as Freund Vector exports products to Central and South Americas. This increase in demand from overseas is the result of transfer of manufacturing facilities by United States pharmaceutical companies to overseas and it is expected to contribute to a decline in sales within North America and a rise in sales within Central and South Americas. The sales agent in Brazil maintains test equipment and provides them to customers on a rental basis as part of its marketing strategy. However, the use of sales agents in Central and South America leads to reductions in profit margins.

In order to advance into emerging markets, the best characteristics of Freund Vector of the United States and Freund Corporation of Japan need to be leveraged. With regards to markets in Asia,

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equipment needs to be adjusted to match the specifications required in the local markets. Therefore maintaining facilities in these regions is crucial, and facilities have already begun operating within China. With regards to market entry strategies for India and China, detailed after sales services similar to those offered in Japan are required and will help differentiate the Freund brand from its competitors. The highly unique mini-capsule manufacturing machinery, which only Freund has, is a strength being leveraged in India. This machine is highly effective in enabling the manufacture of next generation drugs.

A key issue for Freund Vector is its marketing capability. While it maintains both manufacturing and sales facilities at its headquarters in Cedar Rapids, Iowa, a one hour plane ride from Chicago, Illinois, it needs to strengthen its marketing capabilities to be able to service the numerous pharmaceutical product manufacturer facilities located in the eastern portion of the United States.

### **Pharmaceutical Product Manufacturing Recovery in North America**

There appears to be a trend for manufacturing to be brought back in-house within the United States and North America overall. United States pharmaceutical manufacturers had shifted production overseas, with products being imported back to the United States. But in order to raise the quality of pharmaceutical products, pharmaceutical companies are bringing production back to the United States to be manufactured in-house. Furthermore, pharmaceutical product manufacturers in India and China are also opening up manufacturing facilities in the United States. Consequently, Freund Vector is seeing increases in business opportunities, which can offset weakness seen in Brazil.

### **Leveraging Unique Products Made in Japan**

Granurex (GXR Rotor) is a unique product which has no competitors in the United States market. While the technology packed into this product was developed in Japan, the fluid bed is equipped from below. Also, Freund has a patent on this technology that allows it to quickly manufacture near perfect spheres. The increased recognition of this product recently has led to orders being booked. Granurex processes powders on a rotating disk using centrifugal force to twirl the substance like a rope. The liquidity created in this product allows for near perfect spherical shapes to be formed in the granulating process. This technology has been adapted to meet the needs of the United States market and four to five machines have been sold, and Freund expects to receive orders for about 150 units per year.

### **Strong Demand for Control System COMPU5 Anticipated**

The Freund Vector product COMPU4 used to control machines is a unique and distinguishing

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product. Currently, COMPU5 is being developed and is expected to increase the competitive positioning of the Company. COMPU4 is a control system that allows for manufacturing to be changed to match various conditions. COMPU5 is 1) adaptable to various countries, 2) has upgraded software and 3) has improved control functionality.

With regards to this system, it will also be adaptable for Japan. Furthermore, its ability to be used to control machinery made by other companies will contribute to easy marketing of this product as well.

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

Freund estimates that while it is ranked second within the United States overall, 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. And since Freund Vector opened a facility in Milan, Italy in November 2014, the number of inquiries about its products is on the rise.

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 local 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 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.

### **From the United States to South America, 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.

As part of its sales services, Freund also provides rental of equipment, which is a service unique to Freund within the industry. This service allows customers to use their smaller machinery for between two to three months. Customers can conduct actual production using this machinery, which leads to purchases by 20% to 30% of the customers to which the machines have been loaned. In addition,

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sale of spare and repair parts for equipment has become another income stream for Freund. The lifespan of equipment is long at between 10 to 20 years, but during this period parts need to be replaced. Consequently, parts sales account for between 10% and 15% of total sales and profitability on parts is high.

### **Securing Profits amidst the Stronger Dollar**

Freund Vector has been able to grow sales within the United States from 2015. Because of the higher profitability of machinery sold within the United States, profitability in general is on the rise. Sales within the United States are expected to rise from about 40% to 60%.

Exports from Japan have regained a competitive advantage due to the weakening of the yen from 80 to 110 yen to the dollar. At the same time, the strengthening of the dollar has reduced the competitive advantage of exports from the United States, as most of the exports from that market are based in dollars. While spray guns and some other parts are imported into the United States, the bulk of parts used in machinery are sourced locally within the United States. Currently, Freund Vector has been able to cover the negative effect of strengthening of the dollar and maintain profitability at the gross profit level.

Vector recorded sales growth during 2015, but anticipatory investments caused profits to trend sideways. Depreciation accompanying expansion of the factory, establishment of facilities in Milan, and hiring of new staff contributed to increases in costs.

### **Resolving Marketing Issues – Strengthening Staffing Quickly**

Freund Vector employs 116 staff in total, of whom 36 work as engineers, 20 as assembly workers, 9 in procurement, 14 in service, 7 at the Milan laboratory, 17 in marketing, and 10 in administration. In the past one to two years, efforts have been made to strengthen staffing at the Milan laboratory. While there is no mandatory retirement system in the United States, retiring employees have increased during the past several years.

There are three issues which management will have to resolve in the future. The first is the issue of strengthening human resources. While Freund Vector is a unique company in the region where it is headquartered, it has earned a reputation as a small to medium sized company with highly skilled and qualified staff. The local technicians and marketing staff boast of 25 years of experience within the Company, and some have also grown into management roles.

The second issue is how to increase cost competitiveness including dealing with the strength in the dollar. Chief Operating Officer Kubota is responsible for directing model changes. They have been able to reduce the cost significantly while at the same time securing more than adequate functionality

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of the compact fluid bed equipment (GMXB Pilot). Revisions of the design have been able to obtain results from value analysis and value engineering. Freund has been able to achieve cost of sales of 65 and sales, general and administrative expenses of 25 relative to a retail price index of 100 due to effective design reforms and careful efforts in procurement. Following on the success in reducing costs, Freund will take on new challenges in the manufacture of new versions of this machine.

The third issue is how to expand business through introduction of new products. Realizing continuous drug formulation manufacturing process is an industry wide issue, and the competitive standing of the continuous manufacturing equipment Granuformer can be strengthened if manufacturing can be conducted in the United States. In addition, expansion of the chemical and food business is another consideration. Collaboration with chemical product manufacturers is another way for Freund to raise the competitive advantage of its equipment.

### **Leveraging Strength of Collaboration with Japan**

According to Freund Vector, 1) the competitive capability of products can be raised by leveraging the development capabilities of Freund within Japan, 2) there is ample room to reduce costs through reviews of design, 3) COMPU5 can be leveraged in applications within Japan, and 4) both the volume and quality of human resources need to be improved for expansion of overseas business.

The importance of Freund Vector in the global strategy of the entire Freund Corporation Group is growing, and integration of the Group's overall management function is also necessary. President Iwao Fusejima, who was an exchange student studying in Cedar Rapids and is also the Chief Executive Officer of Freund Vector, will demonstrate his leadership qualities in the management of both companies.

### **Promote Internal Development of New Products in the Chemical and Food Business**

Freund is marketing pharmaceutical excipients developed in-house to generic drug manufacturers, and they should become a stable source of earnings due to sustained demand if they are used by generic drug manufacturers. The Company has promoted efforts to internalize the manufacture of food quality preserving agents along with the merger of Freund Kasei Corporation and the move of the in-house plant to Hamamatsu.

At the same time, consigned manufacture of supplements has lost the momentum it had seen two years earlier. This slowing is attributed to the arrival of an adjustment period for Freund's dietary supplements. And while new products are being developed that can lead to a recovery, demand near term is likely to remain weak.

Freund's granulating and coating technologies can be leveraged in the production of newer

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supplements. The effectiveness of supplements depends upon how high in quality and uniformity they can be manufactured, and how they are absorbed. The profitability of excipients and quality preserving agents manufactured in-house is higher than supplements manufactured on a consigned basis and they contribute to overall profits.

Freund currently manufactures over 10 different supplements, with some of the products whose manufacturing has been consigned by large companies becoming hit products and growing in volume. One of the strengths of the Company is its drug formulation technologies and applications of special coating technologies to protect important agents of these supplements from dissolving in the stomach to allow them to remain intact until they can reach the intestines. This superior sustained release control technology is a strength of Freund.

Freund manufactures on a consigned basis enclosed capsules that can deliver bifidobacteria safely to the intestine. Bifidobacteria is in general susceptible to degradation within the stomach and small intestine and most die in the stomach. Freund's capsule technology allows the bifidobacteria to reach the large intestines where they are designed to aid the healthy digestion process. Sales of products made using this formulation technology, which has been jointly developed with companies with advance expertise and for which patents have been acquired, have been launched. Manufacturing is done on a consignment basis and contributions from this technology are expected to boost future earnings.

### **Pharmaceutical Excipients and New Product Development**

Sales of new pharmaceutical excipient products were launched in October 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 the 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.

### **Commercialization of Drug Formulation Technologies in Ireland, Facilities Sold**

Freund Pharmatec Ltd. was sold to Sigmoid Pharma in February 2016.

Sigmoid Pharma is a start-up new drug development company established in 2003 which uses Freund's seamless mini-capsule technology and has plans to list its shares in the United States capital markets. Because Freund maintains patents on this technology in the United States, the listing of Sigmoid could contribute to expanded use and lead to further recognition of this technology within

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the pharmaceutical industry.

Sigmoid Pharma has leveraged this mini-capsule technology as a drug delivery system for an orally administered ulcerative colitis treatment, which shows promise of growth. Freund has also invested in Sigmoid Pharma, creating a strong relationship that can continue to bear fruit after it becomes more successful in the future.

Freund is the only company in the world able to produce this cutting edge seamless mini-capsule manufacturing equipment (Spherex). Freund Pharmatec endeavored to realize commercialization for main applications of this “key super fine granule technology as a new drug formulation development”. Spherex turns this technology into capsules, allowing medicines to be administered as oral agents, which were previously administered in liquid form through injection.

Freund Pharmatec was established in January 2010 and incurred losses of between JPY100 to JPY200 million per year. It sought to cultivate dosage form knowhow, achieve sales of machines, and capture orders for consigned manufacturing of drug formulations. And because Sigmoid sought to develop drug delivery systems, the timing of this sale was good.

## Earnings by Business Segment

(¥mn, %)

	Machinery	YY	Chemical, Food	YY	Adjustment	Total
FY2/12						
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
FY2/13						
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
FY2/14						
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
FY2/15						
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
FY2/16						
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

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

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#### 4. Near Term Earnings: Strong Orders Expected to Allow Continued Record Earnings to be Achieved

##### Steady Recovery in Fiscal Year February 2016

Sales and operating, current and net profits rose by 9.2%, 17.1%, 11.6%, and 38.1% year-on-year to JPY19.027, JPY1.346, JPY1.394 and JPY0.961 billion respectively during fiscal year February 2016 due in part to favorable orders for machinery and sales of pharmaceutical excipients for generic drug applications. While the first generation of TABREX tablet printing equipment was sold during fiscal year February 2015, the focus of efforts upon developing the second generation of this equipment during the current term led to an increase in development expenses despite a lack of sales of TABREX.

New orders, order backlog, and sales of the machinery business during fiscal year February 2016 rose by 5.7%, 6.0% and 19.2% year-on-year to JPY13.112, JPY7.086, and JPY13.037 billion respectively. When the fact that sales and order backlog for TABREX were over JPY300 and about JPY200 million respectively during the previous term is considered, conditions within the machinery business were favorable.

Machinery Business New Orders, Order Backlog Trends

	(¥mn, %)			
	FY2/13	FY2/14	FY2/15	FY2/16
New Orders	9,280 (-8.4)	10,067 (+8.6)	12,407 (+23.2)	13,112 (+5.7)
Sales	9,914 (+3.5)	11,004 (+11.0)	10,941 (-0.6)	13,037 (+19.2)
Order Backlog	5,271 (-9.3)	4,991 (-5.2)	6,682 (+33.9)	7,086 (+6.0)

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

Operating profit growth for the machinery business segment of 7.3% year-on-year to JPY1.189 billion was lower than growth in sales. Profits of Freund Vector trended sideways and that of Freund Corporation suffered from increases in development expenses. In overseas markets, growth in North America and Europe was strong, but growth in Brazil and other South American countries and Turkey was weak.

The chemical and food business benefited from growth in high value added in-house developed products which boosted profitability despite stagnant sales of pharmaceutical excipients. Manufacturing efficiency of food quality preserving agents improved along with the transfer of production to the Hamamatsu facility. Sales of new dietary supplements continued to decline and negatively impacted sales.

Sales of the chemical and food business declined by 7.6% year-on-year to JPY5.990 billion, but

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operating profit rose by 9.6% year-on-year to JPY519 million. This growth in profits was achieved despite the JPY140 million loss (Compared with a JPY190 million loss in the previous term) incurred by Freund Pharmatec, which belonged to the chemical and food business segment.

Sales by Geographic Region

	FY2/13		FY2/14		FY2/15		FY2/16		YY
	(Share)	(%)							
Japan	12,800	78.1	13,233	75.1	13,056	74.9	13,547	71.2	(+3.8)
Overseas	3,596	21.9	4,382	24.9	4,367	25.1	5,480	28.8	(+25.5)
North America	948	5.8	1,503	8.5	1,599	9.2	2,190	11.5	(+37.0)
Europe	772	4.7	701	4.0	450	2.6	937	4.9	(+108.2)
Asia, Central South Americas	1,875	11.4	2,177	12.4	2,317	13.3	2,352	12.4	(+1.5)
Central South Americas					1,071	6.1	1,325	7.0	(+23.7)
Asia, Others					1,246	7.2	1,027	5.4	(-17.7)
Total	16,396	100.0	17,616	100.0	17,424	100.0	19,027	100.0	(+9.2)

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

Orders for pharmaceutical excipients from new drug manufacturers declined, while orders from generic drug manufacturers rose. While generic drug manufacturers seek to reduce costs by raising manufacturing efficiencies, they are also seeking ways to increase their value addition. Excipients for use in direct tableting applications are growing because of the efforts by manufacturers to improve efficiency by simplifying their manufacturing lines. The shift to orally disintegrating tablet that can be taken without water is expected to contribute to stronger demand for Freund's spherical granule technology. Products sold to these types of applications are growing and profitability is increasing.

Balance Sheet

	FY2/12					FY2/13					FY2/14					FY2/15					FY2/16				
	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)	(¥mn.)	(%)			
Current Assets	10,554		11,084		11,331		12,782		13,053																
Cash equivalents	3,035		3,617		4,600		4,870		4,042																
Receivables	4,954		4,764		4,409		5,272		5,694																
Inventories	251		210		202		296		330																
Uncompleted products	1,219		1,497		937		931		1,511																
Raw materials	403		394		535		543		590																
Noncurrent Assets	3,787		3,886		4,219		4,495		4,153																
Tangible assets	2,861		2,910		3,052		3,403		3,135																
Investments, others	898		946		988		944		835																
Total Assets	14,342		14,971		15,550		17,277		17,206																
Current Liabilities	5,204		5,015		4,402		5,427		5,315																
Payables	2,810		2,478		2,068		2,786		2,580																
Prepayments	1,223		1,279		926		1,242		1,288																
Noncurrent Liabilities	647		640		754		669		361																
Net Assets	8,489		9,315		10,392		11,180		11,529																
Capital adequacy ratio	58.3		61.4		65.8		63.6		67.0																

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

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The lackluster growth in Freund Corporation's earnings is attributed to an increase in development expense arising from work on the second generation of TABREX machinery and despite growth in profits of the chemical and food business. At the same time, Freund Turbo turned profitable and began contributing to overall profits. An extraordinary loss of JPY217 million arising from the sale of Freund Pharmatec during fiscal year February 2016 was incurred on a consolidated basis.

### Strong Balance Sheet, Ample Free Cash Flow

Uncompleted products rose on the back of the increase in orders and are expected to be delivered as completed products during the coming term. Prepayments are payments paid at the time orders are placed and are equivalent to one third of the total cost of orders. The bulk of products manufactured by Freund are booked as sales at the time they are delivered. However, longer projects that require over two years to complete, which are unusual, are booked on a percentage of completion basis.

Freund boasts of a healthy balance sheet with no loans payables, and any increases in inventories can be offset by growth in prepayments. As a research and development driven company, Freund does not require large amounts of capital investments. Also, the ability to respond to increases in working capital with internal funds allows the Company to avoid reliance upon external funding. Furthermore, with ample levels of free cash flow, Freund has a strong ability to pay dividends.

Cash Flow Trends

	(¥mn)				
	FY2/14	FY2/15	FY2/16	FY2/17 Est.	FY2/18 Est.
Operating Cash Flow	1,227	822	290	1,070	1,450
Net profit after tax	574	895	642	1,150	1,550
Depreciation	303	308	321	320	300
Receivables	453	-781	-430	-300	-300
Inventories	552	12	-620	-500	-500
Payables	-113	345	-170	200	200
Prepayments	-447	252	45	200	200
Profit on sale of subsidiary			217		
Investing Cash Flow	-423	-240	-432	-450	-500
Tangible assets	-264	-453	-304	-450	-500
Free Cash Flow	804	582	-142	620	950
Financing Cash Flow	-226	-284	-331	-300	-400
Dividends	-172	-215	-258	-260	-350
Cash and Equivalents at Term End	4,107	4,548	4,042	4,442	4,912

### Strong Earnings in First to Third Quarters of Fiscal Year February 2017

During the first to third quarters of fiscal year February 2017, sales and operating, current and net profits rose by 12.9%, 98.2%, 89.6% and 93.1% year-on-year to JPY14,767, JPY1,441, JPY1,486,

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and JPY815 million respectively.

Results trended basically in line with forecasts. Freund on a non-consolidated basis was able to exceed forecasts, but Freund Vector and Freund Turbo fell slightly short of forecasts. However, the overall earnings of the group actually exceeded forecasts.

## New Orders, Order Backlog

(¥mn, %)

	1Q-3Q FY2/16		1Q-3Q FY2/17	
Machinery				
New Orders	9,671	(+5.0)	12,243	(+26.6)
Sales	8,663	(-6.8)	10,003	(+15.5)
Order Backlog	7,976	(+10.4)	9,288	(+16.5)
Chemical and Food				
New Orders	1,612	(+1.2)	1,733	(+7.5)
Sales	4,417	(+2.1)	4,763	(+7.8)
Order Backlog	376	(+28.2)	419	(+11.4)
Total				
New Orders	11,284	(+4.4)	13,977	(+23.9)
Sales	13,081	(+8.9)	14,767	(+12.9)
Order Backlog	8,352	(+11.1)	9,708	(+16.2)

(Note) Figures within parenthesis represent percent year-on-year change

Expansion in the capital investments of generic drug manufacturers is continuing and contributing to favorable orders for machinery. Pharmaceutical excipients within the chemical and food business segment are trending favorably, and research and development expenses are being reduced along with the sales of the subsidiary in Ireland. Also, dietary supplements, which had trended weakly, are also trending favorably.

By geographic region, sales in Japan are trending favorably along with growth in North America. Freund Vector is seeing growth in machinery outside of the pharmaceutical product realm with sales of agricultural use coating equipment increasing. At the same time, sales in Brazil and other parts of the South and Central America region declined by large margins and Europe trended weakly. Growth in Asia stagnated.

While the annual investment budget had been JPY300 million, Freund exceeded this upper limit and spent JPY318 million during the first half alone. This spending includes expenses for the move of the headquarters in June of JPY161 million, which were not included in the initial budget, and therefore spending remains in line with the initial budget if this moving expense is excluded.

An one off extraordinary loss of JPY250 million was recorded due to retirement benefit for the founder Yasutoyo Fusejima, who retired from his position as director to become honorary chairman. This is a special reward for his long years of service to the Company and Freund has eliminated this

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retirement benefit system for directors. In the future, the Company expects to introduce a system that bases its compensation paid to directors upon increases in corporate value of Freund over the medium to long term. Director retirement benefits built up as accrued long term payments declined due to payment to Yasutoyo Fusejima upon his retirement.

3Q Sales by Geographic Region

		(¥mn, %)						
		Japan	North America	Europe	Central, South America	Asia	Total	Overseas
3Q FY2/16	Sales (Share)	9,632 [73.6]	1,337 [10.2]	686 [5.2]	676 [5.2]	749 [5.7]	13,081 [100.0]	3,449 [26.3]
3Q FY2/17	Sales (Share) (% YY)	11,725 [79.4] +21.7	1,645 [11.1] +23.1	423 [2.9] -38.3	261 [1.8] -61.4	711 [4.8] -5.1	14,767 [100.0] +12.9	3,042 [20.6] -11.8

### Accounting Period Change of Subsidiaries

From the fiscal year February 2017, all of the companies of the Freund Group will change their accounting year end to February. Freund Vector had been consolidated with a fiscal year ending in December, but this will be changed to February. Therefore, the two main consolidated subsidiaries Freund Vector and Freund Turbo will have irregular accounting periods of 14 months in the current fiscal year. And while the January to February period is not a busy season for both companies, this change in accounting period is expected to add between JPY0.5 and JPY0.8 billion in sales, and several tens of millions of yen in profits. However, this additional two months of earnings will disappear in the coming term when the two consolidated subsidiaries will see a normal 12 month accounting period.

### Full Scale Orders for Tabrex Start

While orders for Tabrex have yet to be booked in the third quarter, negotiations for purchases were conducted. Therefore, Freund expects to book orders for three to five units in the fourth quarter and over 10 units in the coming fiscal year. Machinery is usually delivered between three to six months after orders have been booked. The price of each machine ranges from JPY80 to JPY100 million and an adequate level of profitability is expected to be achieved. Therefore, the contribution of this product to profits is expected to grow in line with growth in orders.

### Record High Profits Achieved

During the aggregated first to third quarters of fiscal year February 2017, gross profit margin rose from 31.7% in the previous term to 31.8% in the current term, and sales, general and administrative expense to sales ratio declined by a large margin from 26.2% to 22.1% over the same period. This

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large improvement is attributed to the disappearance of one off developmental expenses in the previous term.

Orders steadily expanded and rose by 26.6% year-on-year to JPY12.243 billion during the aggregated first to third quarter period, and orders are expected to trend at the current pace in the near term. Furthermore, the addition of orders for TABREX and other new products is expected to boost gross profit margins. Should this potential be realized, the operating profit margin during the first to third quarter period of 9.8% (Compared with 5.6% in the previous term) may grow a step further. At the same time, demand in Japan and the United States is growing, but demand in other overseas markets is weakening in relative terms. Consequently, Freund will implement efforts to strengthen product development and marketing for emerging countries.

During fiscal year February 2017, developmental expenses (JPY0.3 billion) that occurred in fiscal year February 2016 and losses arising from the sale of Freund Pharmatec (JPY0.15 billion) will disappear. These factors have contributed to the favorable performance of both the machinery and chemical and food businesses.

Freund's earnings estimates for fiscal year February 2017 call for sales and operating, current and net profits to rise by 5.1%, 41.1%, 36.2% and 22.8% year-on-year to JPY20.000, JPY1.900, JPY1.900 and JPY1.180 billion respectively, and results may exceed these figures.

Due to the strengthening of the yen from JPY121.1 in the previous term to JPY110 relative to the dollar in the current fiscal year February 2017, profits of Freund Vector are expected to remain flat. Development expenses for TABREX machinery are expected to disappear in fiscal year February 2017. In addition, the extraordinary loss of JPY0.2 billion arising from the sale of Freund Pharmatec to Sigmoid during fiscal year February 2016 will also disappear in the coming term. While the overseas sales ratio rose to 29% during fiscal year February 2016, strong sales within Japan are expected to lead to a slight decline in overseas sales ratio in the coming year.

Fiscal year February 2017 represents the third year of the current Three Year Medium Term Business Plan, and Freund maintains its targets for sales and operating profit of JPY23.0 and JPY2.3 billion respectively. At the same time, its estimates for sales and operating profit of JPY20.0 and JPY1.9 billion appear to be relatively solid.

Relative to intermediate term goals, 1) delays in sales have been noted due to the eminent full scale launch of the second generation of TABREX, 2) declines in the wake of the boom in dietary supplements sales, and 3) delays in cultivation of overseas markets have been recorded.

At the same time, positive factors including 1) better than expected sales to Japanese generic drug manufacturers, 2) launch of new products including TABREX, 3) leveraging of Freund Vector of the United States to cultivate developing markets, 4) reductions in cost burdens due to the sale of the

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Ireland subsidiary and 5) the establishment of a laboratory facility in Milan, Italy covering the European market are present. Consequent to these developments, targets for sales and operating profit are now expected to be achieved one year late in fiscal year February 2018.

Earnings Estimates by Business Segment

(¥mn, %)

	FY2/12	FY2/13	FY2/14	FY2/15	FY2/16	FY2/17 (Co. Plan)	FY2/17 (Co. Est.)	FY2/18 (Co. Est.)	FY2/17 (Co. Target)	FY2/22 (Co. Est.)
Machinery	9,582	9,914	11,004	10,941	13,037	14,150	14,900	17,000	14,200	21,500
Freund Corp.	6,595	7,024	7,081	6,887	7,784		9,200	11,300		
Freund Vector	2,799	2,983	3,892	3,905	4,686		5,000	5,300		
Freund Turbo	1,093	1,022	782	999	1,205		1,500	1,400		
Operating Profit	907	1,172	1,242	1,108	1,189		1,800	2,200		3,200
Operating Margin (%)	9.5	11.8	11.3	10.1	9.1		12.1	12.9		14.9
Chemical and Food	5,653	6,482	6,611	6,482	5,990	5,850	6,100	6,500	8,800	8,500
Pharmaceutical Excipients	1,948	2,041	1,971	2,135	2,132		2,300	2,600		
Food Quality Preserving	1,892	1,889	1,916	1,952	2,004		1,900	1,900		
Dietary Supplements	1,812	2,552	2,723	2,394	1,853		1,900	2,000		
Operating Profit	470	565	379	474	519		750	850		1,200
Operating Margin (%)	8.3	8.7	5.7	7.3	8.7		12.3	12.9		14.1
Adjustments (Company wide administrative expense)	-312	-267	-335	-432	-362		-450	-550		-800
Sales	15,236	16,396	17,616	17,424	19,027	20,000	21,000	23,500	23,000	30,000
Operating Profit	1,065	1,470	1,286	1,150	1,346	1,900	2,100	2,500	2,300	3,600
Operating Margin (%)	7.0	9.0	7.3	6.6	7.1	9.5	10.0	10.6	10.0	12.0
Overseas Sales	3,442	3,596	4,382	4,368	5,480		5,500	6,000	9,200	12,000
Overseas Sales Ratio (%)	22.6	21.9	24.9	25.1	28.8		26.2	25.5	40.0	40.0

(Note) (Co. Plan) are publicly announced data, (Co. Est.) are analyst estimates, (Co. Target) are those of the Medium Term Business Plan

## Medium Term Deployment Capability

A new Medium Term Business Plan will start from fiscal year February 2018. Based upon the outlook for a completion of the shift to generic drugs within three years, Freund will release a new Business Plan that covers a five year term and considers responses to the issue of the end of the shift to generic drugs.

While Freund expects to implement a strategy focusing upon 1) new product development and 2) overseas market cultivation to achieve sales and current profits of JPY32.0 and JPY4.0 billion in five years time, it is also carefully considering the potential for decline in the market resulting from the completion of the switch to generic drugs.

Capital investments by the generic drug manufacturers remain at very high levels. And while the current strong capital investment trends point to the potential for overcapacity and a potential for

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weakening demand in the future, near term demand for equipment is expected to remain strong.

Freund Corporation will focus its resources upon cultivating Japanese market demand while Freund Vector will focus upon cultivating overseas markets. In June 2016, Freund moved its headquarters from the eastern to the western side of Shinjuku, as it moved into a new office with 1.6 times the floor space of its previous office in preparation for expansion of its business.

Fiscal year February 2017 marks the third year of the Sixth Medium Term Business Plan. Initially, Freund had announced targets for sales, operating profit, overseas sales, operating profit margin and ROE of JPY23.0 billion, JPY2.3 billion, 40%, 10% and 8% respectively. And in fiscal year February 2017, it now appears that the Company can possibly exceed its estimates for sales and operating profit of JPY20.0 and JPY1.9 billion respectively, thereby allowing it to achieve its targets for operating profit margin of 10% and ROE of over 8%.

However, it now appears that the overseas sales target of 40% may not be achieved due to the national policy within Japan to raise the generic drug usage target from 60% to 80% and the subsequent rapid increase in equipment orders within Japan. Consequently, Freund has decided to allocate resources to capturing this strong demand within Japan. And despite diligent efforts of Freund Vector, weakness in Brazil and Turkey are being encountered. While strength in the United States is helping to offset weakness in these other overseas markets, it is not strong enough to help raise the overseas sales ratio.

A peak in capital investments by generic drug manufacturers is expected to be recorded after the near-term growth phase ends during the next three years until fiscal year February 2020. However, growth in equipment sales is anticipated to be accompanied by growth in sales of pharmaceutical excipients, which are consumables and can be expected to see continued sales even after the peaking in equipment sales. Furthermore, the high profitability of excipients suggests that they will contribute significantly to overall profits going forward.

Therefore, a key to earnings will be how effectively Freund can capture growth opportunities in India and other markets within Asia after the boom in capital investments by Japanese generic drug manufacturers peaks out. Therefore, the overseas sales target of 40% is expected to be an important key performance indicator in dependent upon the popularity of new products.

Consequently, a close watch should be kept on Freund's progress in achieving its three year targets for sales and operating profit in fiscal year February 2020 of JPY28.5 and JPY3.2 billion, and five year targets in fiscal year February 2022 of JPY30.0 to JPY32.0 billion and JPY3.6 to JPY4.0 billion respectively.

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## 5. Corporate Value: Tablet Printing Equipment and New Product Development Contributions, Profitability Improvements

### Strong Demand from Generic Drug Manufacturers Drives Earnings Growth

Demand for drug formulation equipment is strong, due in part to the expansion in capital investments of generic drug manufacturers. Against this backdrop, strong sales of TABREX are anticipated. TABREX has been chosen for use in the manufacture of Pletaal tablets for the first time. This equipment has been designed using both Freund's machinery and excipient technologies, and is a newly developed version of the TABREX Rev printing equipment with tablet inspection function. Furthermore, the tablet printing market is expected to grow largely in the future.

Tablet printing equipment is a main focus within the machinery business, but it is also expected to lead to opportunities to expand sales of industrial use excipients. While regulations governing excipients in Japan, North America and Europe are strict, these regulations can be applied to applications in Korea, Taiwan and other markets to cultivate new business opportunities.

With regards to Europe, a facility with laboratory and display functions has been established in Milan, Italy. This facility is expected to contribute to an expansion in orders from generic drug manufacturers, many of which are located in Italy, Ireland, Portugal, Egypt and Turkey.

Freund is developing products for emerging markets as products like High Coater FZ which cost three times as much as the price of similar machinery available in India. This pricing disparity is attributed to the fact that many users in India do not currently require the high specifications of this product. Therefore, Freund needs to develop products that better match the needs of the local emerging markets. One solution to this issue is marketing of Freund Vector products, which have already successfully secured orders.

The active ingredients in cancer medications are extremely effective, and the risk that they can negative influence the health of non-cancer patients is large. Therefore, the need to label the drug efficacy of drug formulation equipment (Containment specification) is necessary. Furthermore, this need for containment specification labeling in generic drug manufacturing applications is also expected to become necessary.

Important business strategies for Freund include 1) consigned manufacturing orders need to be acquired in order to raise capacity utilization rates at plants, 2) greater emphasis needs to be placed upon pharmaceutical excipients and other higher profitability product realms, and 3) development and cost reductions efforts for products to be sold in emerging markets need to be increased.

From the perspective of strengthening developmental capability and increasing value addition of products, there is a need to strengthen the output function for chemical and food products for the

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Japanese machinery business. While Freund Vector conducts machinery assembly at its plant in the United States, Freund will maintain its policy of being a “fables” manufacturer with expansion in output expected to be resolved by fortification of its manufacturing partner network to which it outsources product manufacture.

### **Maximizing Global Management Capabilities**

Freund expects to cultivate market opportunities by leveraging its cooperation with Freund Vector. Over the medium to long term, Freund will be responsible for cultivating business opportunities in Asia, and Freund Vector will be responsible for Central and South Americas, Middle East, and other emerging markets. At the same time, Freund Turbo will continue to focus upon materials used in cosmetics, lithium ion batteries and other high value added applications, and will leverage formulation technologies to capture orders for consigned manufacture of supplements.

The next Medium Term Business Plan is expected to include targets for sales and operating profit of JPY32.0 and JPY4.0 billion respectively. Based upon its strong product development capability, efforts will be made to aggressively cultivate opportunities in global markets and measures will be conducted to strengthen its overseas functions. At the same time, Freund will increase its efforts to cultivate both Japanese and foreign human resources, hire mid-career professionals, make anticipatory investments in facilities, and improve profitability of overseas operations.

The goal of achieving 10% operating profit margin now appears within reach. Freund boasts of a high capital adequacy ratio and to 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 to 40%, leverage proprietary technologies to raise value addition of products, and review pricing of products.

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 because of the sustained strengthening of their capabilities, we rate the corporate value of Freund as “A”.

(Definition of corporate value is described in the cover of this report)

### **A View to Freund’s Move to the First Section of the Tokyo Stock Exchange**

Freund expects to pay a dividend of JPY20 per share, including a special JPY5 dividend to commemorate the 20<sup>th</sup> anniversary of its listing. The Company decided to raise its dividends because of its dividend payout ratio target of 30%.

In order to move its shares to the First Section of the Tokyo Stock Exchange, Freund needs to have a minimum number of 2,200 shareholders. As of end August 2016, the number of shareholders stood

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at 4,130. Along with the two for one stock split conducted to increase liquidity at the end of February, volatility was reduced but the share price continued to rise. And Freund can now move to the First Section as its market capitalization exceeds the JPY25.0 billion minimum requirement. We anticipate Freund to make this move sooner or later.

Freund was awarded a prize during the fiscal year 2015 Superior Investor Relations Awards ceremony held by the Japan Investor Relations Association, in reflection of the Company's diligent efforts to conduct proactive investor relations. In addition, Freund has also established the Merger and Acquisition Promotion Office under the direct management of President Iwao Fusejima. Also, a corporate social responsibility committee was launched from March 2016, along with efforts to improve the working conditions for employees.

While the portion of shares held by institutional investors is expected to rise, the maintenance of a strong individual investor fan 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 0.6% in dividend yield terms. In other words, the actual dividend yield to shareholders holding 100 shares for over three years would be equivalent to 2.6%.

Freund is expected to focus even more efforts in achieving the goals to be defined in the next Medium Term Business Plan, and President Iwao Fusejima is expected to take even more aggressive role as leader of Freund. At the current share price as of January 18, 2017, the price to book ratio (PBR) and price to earnings ratio (PER) stood at 2.23 and 21.2 times respectively, and return on equity and dividend yield were 10.5% and 1.3% respectively. Freund may garner attention of the market as it is expected to achieve a new record high level of profits in fiscal year February 2017 and return on equity of over 10%.

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