

Strengthening Foundations for Growth

This section focuses on initiatives to strengthen foundations that are essential for maintaining the EBARA Group's growth. These initiatives include R&D and intellectual property activities aimed at bolstering core technologies to heighten product competitiveness. Also, we are increasing profitability through service and support (S&S) business and cementing corporate governance foundations.

R&D and Intellectual Properties

The EBARA Group has been an R&D-oriented company since its establishment in 1912. We completely revamped our R&D system in 2009. Since then, we have been heightening product competitiveness and corporate value through an approach of aligning R&D and intellectual property operations more closely with business activities in accordance with the BRDIP*1 strategy.

Basic Approach

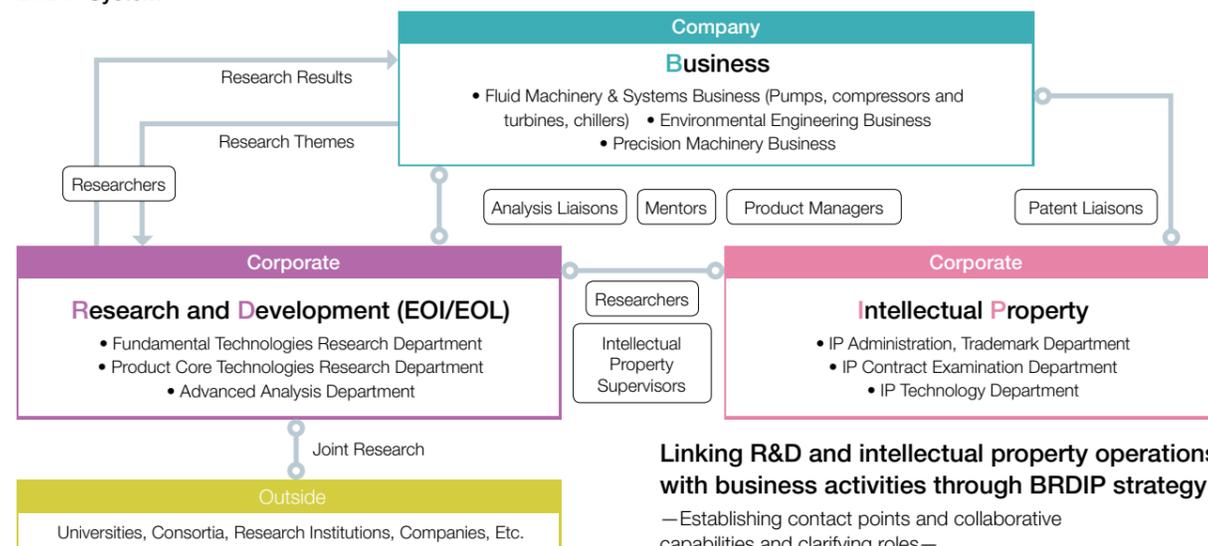
The BRDIP strategy reemphasizes that R&D and intellectual property operations are for businesses. The basic aim is to heighten product competitiveness by dovetailing R&D and intellectual property operations with business activities. Moreover, the strategy encapsulates our desire to trigger new advances by integrating the Fluid Machinery & Systems, Environmental Engineering, and Precision Machinery Businesses.

In R&D, each business segment is responsible for product development, while corporate divisions are responsible for research on core and fundamental technologies. We are strengthening basic research through Ebara Open Innovation (EOI)*2 and heightening product competitiveness through Ebara Open Laboratory (EOL)*3. Also, with a view to creating new businesses, we launched Ebara Innovation for "X" (EIX)*4.

For more than a century, we have exploited intellectual properties. Globalization has led us to shift from protecting intellectual properties to incorporating them into aggressive expansion strategies. Specifically, we are focusing on the needs of Group companies worldwide as we advance intellectual property initiatives. Furthermore, rather than patent numbers, we are focusing more on patent quality with a view to securing patents that will underpin competitive advantages.

- *1. An original EBARA Group acronym created from "business," "R&D," and "intellectual property"
- *2. An original EBARA Group collaborative format that fosters young researchers at outside research institutions and conducts research to resolve advanced technological issues
- *3. A corporate research organization that enables exchanges among researchers, open sharing of research themes in-house, and flexible use of resources
- *4. A new research system for business creation

BRDIP System



Linking R&D and intellectual property operations with business activities through BRDIP strategy

—Establishing contact points and collaborative capabilities and clarifying roles—

To ensure that R&D and intellectual property operations and business activities function cohesively and efficiently, we have created a system that defines the roles of each area and establishes links between them.

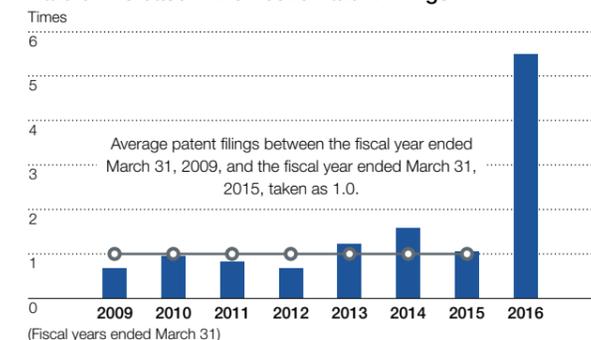
Competitive Advantages

In R&D, Ebara Open Innovation (EOI) is responsible for some of our basic research and accounts for 50 research themes, which 56 research departments are implementing at 32 universities. Using the findings of this research, Ebara Open Laboratory (EOL) focuses on increasing the competitiveness of products. Numerical evaluation shows that current research's quality, volume, and contribution to business activities has surpassed that of research in 2009, when we completely revamped our R&D system through such measures as breaking up EBARA Research Co., Ltd. Furthermore, research efficiency has doubled (please see the chart below). For the time being, we are giving priority to research focused on business goals and aiming to increase product competitiveness with the number of EOI and EOL research themes and target achievement percentage as key performance indicators.

Regarding intellectual properties, as a result of introducing the Precision Machinery Company's corporate culture to the Fluid Machinery & Systems Company, the pumps business increased patent filings in Japan roughly fivefold in one year. Our intellectual properties strategy is to focus on patent quality

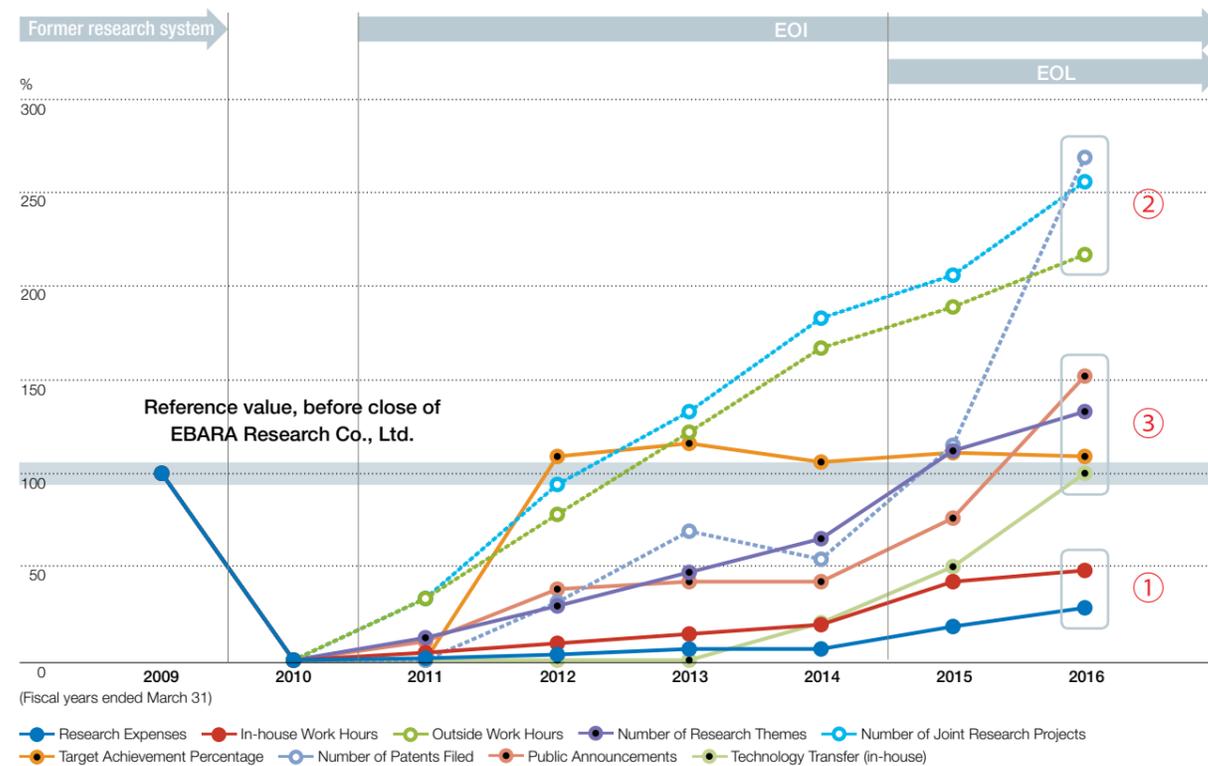
rather than numbers with a view to developing intellectual properties that will underpin competitive advantages. Our key performance indicators are the numbers of filings and registrations of patents, utility model applications, and designs.

Pumps Business: Rate of Increase in Domestic Patent Filings



At the initial stage, we increased numbers. Going forward, we will heighten quality.

Research Efficiency Indices



We are using less management resources (①) to achieve higher performance (②) and equivalent results (③). Research efficiency is increasing each year.

Priority Strategies and Progress

Technologies, R&D: R&D activities that are fully integrated with intellectual property activities aimed at supporting competitiveness and growth strategies

- Strategy**
 - Lead the way in research and development based on marketing
 - Progress**
 - We have established survey capabilities, conducted surveys tightly focused on target fields, and established research themes based on the results of these surveys.
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- Strategy**
 - Contribute to businesses by expanding EOI and EOL and strengthening fundamental technology development and product core technology
 - Progress**
 - We have entrenched R&D based on EOI and EOL and increased the number of research themes. Also, we are moving forward with practical application in specific businesses.
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- Strategy**
 - Establish such fundamental technologies as numerical analysis technology and analytical techniques, strengthen business foundations, and promote research and development
 - Progress**
 - We have prepared and implemented a plan for the establishment of infrastructure for numerical and other types of analysis. Related departments contribute to businesses by conducting analysis in response to requests from business segments and cooperate with R&D activities.

- Strategy**
 - Establish a system for information security and confidential information management and manage risks

- Progress**
 - We have revised review methods for public announcements, begun sharing review results, and established a system for managing technological information.

Intellectual Property: Promoting strategic intellectual property activities that fully utilize the Group's intellectual properties

- Strategy**
 - Acquire intellectual property rights strategically and on a global basis
- Progress**
 - Through activities reflecting pre-litigation strategy, we are shifting our focus from patent numbers to patent quality and ultimately patents that will underpin competitive advantages.

- Strategy**
 - Establish a system for the management of risks accompanying global intellectual property rights

- Progress**
 - We have established a system for patent litigation and begun conducting patent litigation training.

- Strategy**
 - Enhance and protect the value of the EBARA brand

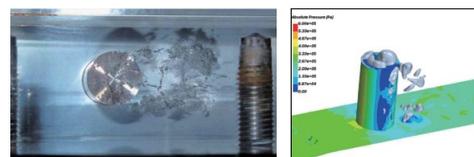
- Progress**
 - We are optimizing the acquisition and maintenance of trademarks for the Company's logo.

Example of Foundation Strengthening

Through visualization and numerical analysis, it has become possible to analyze and predict the mechanisms of phenomena that we were unable to understand. Based on this approach, we will introduce optimal design methods, establish design parameters, and explore effective countermeasures for harmful phenomena.

(1) Clarification of Cavitation Phenomena through Numerical Analysis

Through numerical analysis, we will predict and examine countermeasures for various phenomena that result from cavitation, which harms pumps.

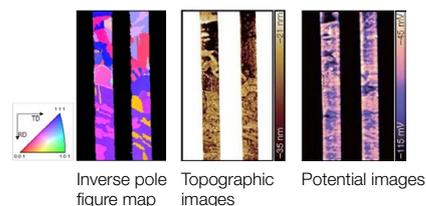


Cavitation in the fluid channel of a downstream column

Result of fluid analysis of cavitation in a downstream column

(2) Visualization of Corrosion Tendencies in Copper Wiring Due to Fluid Environment

We will visualize corrosion phenomena in the fine wiring of semiconductors, clarify mechanisms, and explore corrosion countermeasures.



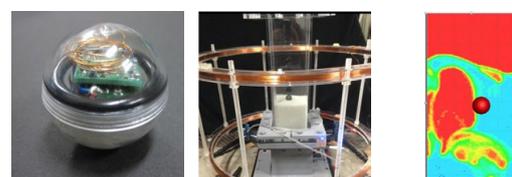
Inverse pole figure map

Topographic images

Potential images

(3) Clarification of the Behavior of Bulky Objects in Fluidized Layers

Through tests using sensor particles and large-scale numerical analysis, we will clarify the movement of bulky objects in fluidized layers and develop high-performance fluidized bed incinerators.



Sensor particle

Using sensor particles to test fluidized layers

Numerical analysis result