

Introducing Japan's Two Main Production Facilities

TOHOKU KYUSHU

ULVAC TOHOKU, Inc. (ULVAC Tohoku) functions as a production center for ULVAC, Inc., with its headquarters and factory in an industrial park in Hachinohe City, Aomori Prefecture. Hachinohe is home to Hachinohe Port, which functions as both a fisheries port and an industrial port. Large-scale equipment is exported from this port to locations around the world. In this edition of VISITING ULVAC, we asked Kazuo Ikeda, ULVAC Tohoku's President and CEO, about current operations and his vision for the future.



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Producing the World's First G10.5 by "Conceptualizing Production Technology" Leading the Flat Panel Display Industry as Products Become Large-Scale

— Implementing cost reduction by pursuing production technology strengths



Company building
and cherry blossoms

With Hachinohe Port only a ten-minute drive away, ULVAC Tohoku is well-situated for exporting and importing.



Vacuum chamber soldering



Soldering sites with multiple vacuum chambers



Large-scale equipment uses many power sources

View of production facility for G10.5 LCD manufacturing equipment

Introduction

ULVAC Tohoku was established as Tohoku Vacuum Engineering Corporation in 1987. Its main business was the manufacture of vacuum heat-treatment furnaces for automobile parts, aimed at boosting the production capabilities of large-scale equipment produced by Japan Vacuum Engineering Co. Ltd. (now ULVAC, Inc.). Later, it expanded its business to include flat panel display (FPD) and electronic component manufacturing equipment, semiconductor fabrication diffusion furnaces, and decompression CVD systems. In 2010, the materials unit was consolidated.

At present, the company is engaged in an integrated production system for its various business areas: the equipment business (FPD, semiconductor fabrication equipment, general industrial equipment, etc.), the processing business (such as vacuum chambers), and the materials business (targeted toward semiconductor and electronic components and FPD).

In recent years, ULVAC Tohoku has become skilled in precision processing for increasingly large-scale equipment by producing G10.5 liquid crystal display fabrication equipment. It has become an important production site within the ULVAC Group, with FPD manufacturing equipment bringing in over 70% of the company's revenues.

As of May 2018, the company has 498 million yen in capital and 336 employees.

The only factory where G10.5 LCD manufacturing equipment production is possible

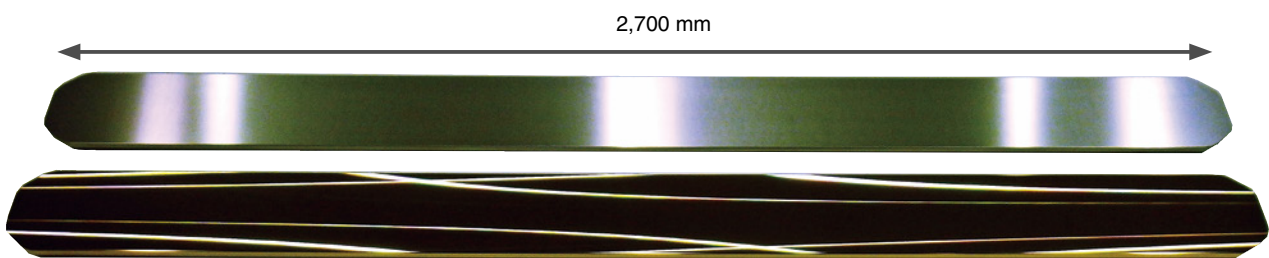
In 2016, ULVAC Tohoku became the world's first company to launch manufacturing of the "SMD-3400" sputtering system

for the manufacture of G10.5 liquid crystal displays. Since its introduction in 1992, this "SMD Series" has held more than 80% of the world's market share for sputtering systems designed for LCD manufacture (for TFT array), and in 2012 it delivered over 1,000 units. The latest model, "SMD-3400," has a height of 5 m and a length of approximately 35 m.

Among the ULVAC Group companies, FPD manufacturing equipment is produced by ULVAC Kyushu (in Kirishima City, Kagoshima) and at our group's companies in Korea, Taiwan, and China, but ULVAC Tohoku is the only place where G10.5 LCD manufacturing equipment is produced.

Normally, as the size of the glass substrate becomes larger, the equipment becomes larger as well, requiring the expansion of factory facilities. But at ULVAC Tohoku, G10.5 is produced using the same facility as G6* production. We were able to do this by asking ourselves the question: "How can we produce a larger glass substrate within the limited space of our factory?" Instead of investing in a larger facility, employees brainstormed with each other and found ways to respond gradually to increasing equipment sizes by "development of new production technology" for G6, G8*, and G10.5.

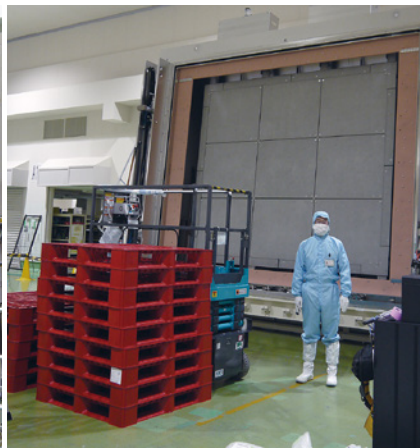
Furthermore, larger equipment tends to limit the number of partner companies that can be involved in production processes. But ULVAC Tohoku has achieved efficiency in the work process and a reduction in shipping costs by stationing the company in charge of surface processing (electrolytic polishing) within its grounds. This has allowed for mechanical processing of large-scale equipment, surface polishing (electrolytic polishing), and assembly of the equipment.



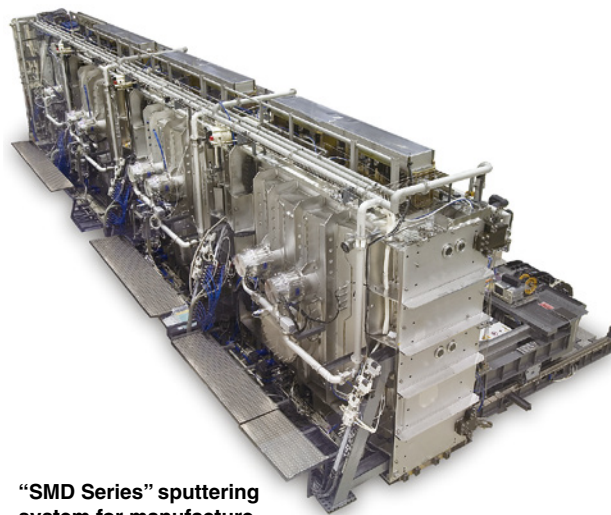
Target material for G8 liquid crystal display manufacturing equipment (from top: MoTi, Cu)



Assembly in clean room



Equipment height can reach 5 m



“SMD Series” sputtering system for manufacture of liquid crystal displays

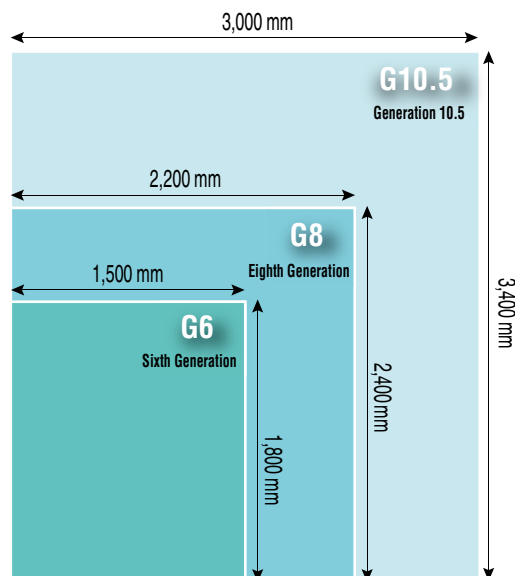
Aiming to become a “model factory” for a shared services company with advances in production engineering capabilities

Processing techniques involve high levels of technical skill, which workers gain only through extensive training. In particular, soldering for vacuum equipment requires a level of technical expertise that, until very recently, depended largely on an individual worker’s abilities. We are training technicians by turning production techniques into “formalized knowledge,” so that in the future, the desired quality standard can be maintained regardless of the worker’s abilities. We are also building a smart factory system that allows real-time information sharing and maintenance by advancing “explicit knowledge” for test data and tracking the progress of certain processes.

ULVAC Tohoku is not merely a production sharing facility. It promotes “conceptualizing production technology” by leveraging its experience and tenacity in becoming the world’s first G10.5 manufacturer. President Ikeda speaks enthusiastically [pictured at right] about ULVAC Tohoku’s production technology.

The ULVAC Group companies “want to learn from ULVAC Tohoku’s ‘monozukuri’ methods,” making Tohoku the ULVAC Group’s “model factory.”

* Substrate size



• Future Vision •

ULVAC Tohoku:
Pioneering spirit
ULVAC Kyushu:
Explosive power
Harnessing the strengths
of both companies



ULVAC TOHOKU, Inc.
President and CEO
Kazuo Ikeda

Since FY 2017 I have been president of ULVAC Tohoku, and for a year I have had a joint appointment as president of both ULVAC Tohoku and ULVAC Kyushu. Being in charge of these two companies with entirely different sets of characteristics has been invigorating.

The strength of ULVAC Tohoku is its pioneering spirit. No one there says something can't be done, even if Tohoku is the first of the Group companies to take on a task or type of production. Tohoku employees think about what needs to be done, and then work earnestly, persistently and diligently to make it possible. The people at ULVAC Kyushu, on the other hand, are very lively. They argue passionately until something has been decided. But once a decision has been made, they have the explosive power needed to sprint ahead as one.

A key strength of both of these companies, Tohoku and Kyushu, is their ability to grow by taking advantage of each other's standout capabilities.

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TOHOKU KYUSHU

ULVAC KYUSHU CORPORATION (ULVAC Kyushu) is located in Yokogawa-cho, within the Kokubu Hayato Technopolis, with a view of the Kirishima mountain range. It is a convenient twenty-minute drive from Kagoshima Airport and a five-minute drive from the Yokogawa interchange of the Kyushu Expressway. Since the opening of the ULVAC Kagoshima Industrial Park in 1982, the company has grown with the development of Kyushu, which is often referred to as "Silicon Island," by producing semiconductor manufacturing equipment. In this edition of VISITING ULVAC, we introduce ULVAC Kyushu, one of ULVAC Group's two major domestic production facilities.

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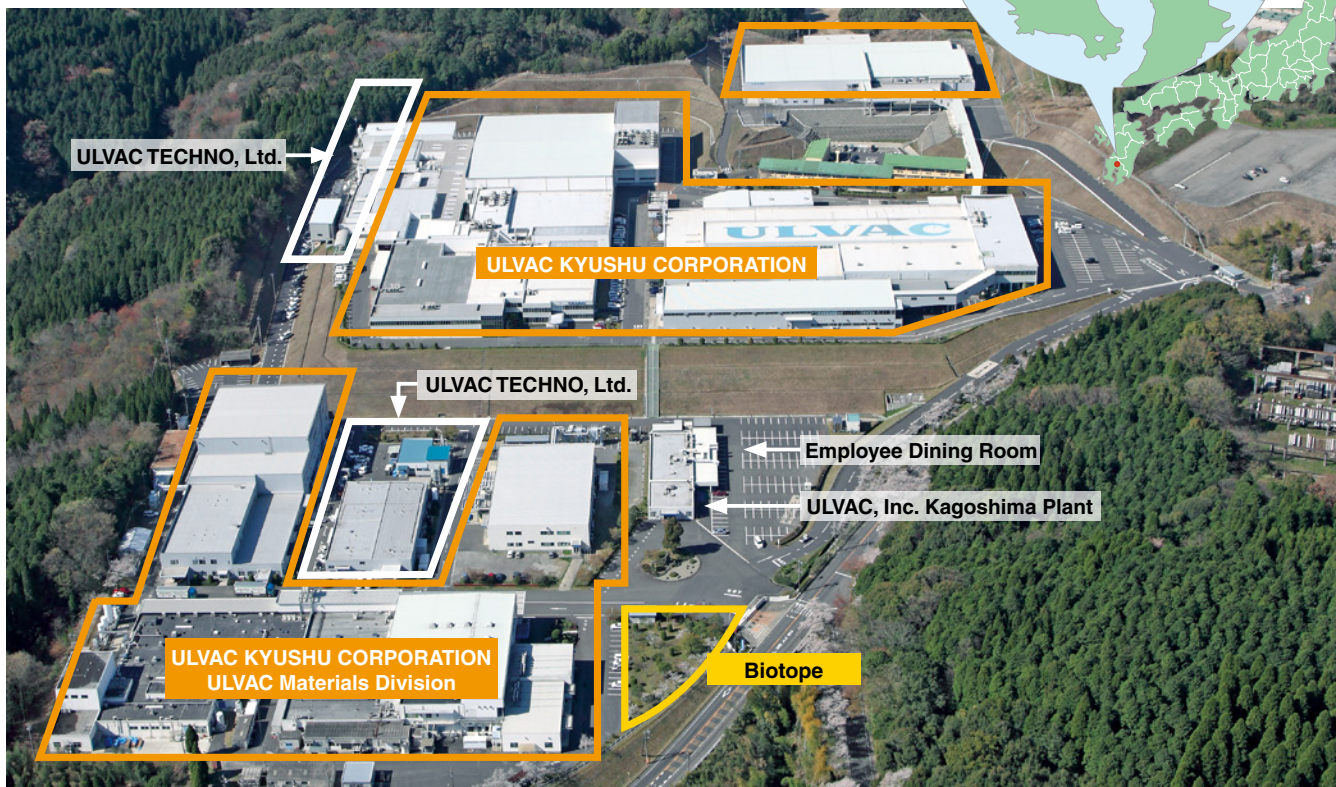
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Driving the ULVAC Group's Global Supply System

— Aiming to become the "mother ship" of the shared services corporation with advanced technology and development capabilities cultivated by producing semiconductor manufacturing equipment



Headquarters factory exterior



Testing sputtering target material



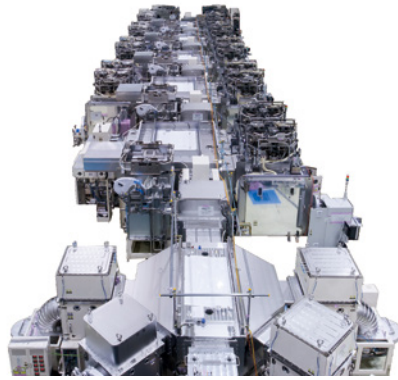
Kumamoto Processing Technology Center



Manufacturing of large-scale vacuum equipment



“QAM Series” vacuum deposition system for research and development



“ZELDA Series” organic EL manufacturing equipment



ULVAC Kyushu manufactures “ENTRON™ Series” sputtering system for semiconductor manufacturing, for delivery to a major U.S. semiconductor manufacturer

Introduction

ULVAC Kyushu was established in 1977 as Kyushu ULVAC Corporation, a sales company. In 1981, it changed its name to ULVAC KYUSHU CORPORATION and expanded its business to shared production of various equipment and after-sales service for Japan Vacuum Engineering Co., Ltd (now ULVAC, Inc.).

In 2003, the vacuum equipment production plants at several Kyushu locations (Oita, Kumamoto, Kagoshima) were consolidated at the Kagoshima site. In 2010, the sales unit was shifted to ULVAC ES Corporation (now ULVAC EQUIPMENT SALES, Inc.) and the service, surface treatment, and wet cleaning businesses were transferred to ULVAC TECHNO, Ltd. Merging with ULVAC Seiki Corporation, and adding a materials production division, the new ULVAC KYUSHU CORPORATION started operations. In the same year, the headquarters moved from Fukuoka to Kagoshima, where it operates today.

Currently, ULVAC Kyushu engages in equipment production for semiconductors, electronics components, FPD manufacturing equipment, and general production equipment; and component production and machine processing for various types of vacuum pumps and valves.

As of May 2018, the company has 490 million yen in capital and 378 employees.

Strengthening global alliances through interaction with Group companies

Using production techniques cultivated by producing semiconductor manufacturing equipment in accordance with strict customer requirements, and drawing upon its field support experience, the company has expanded to produce FPD manufacturing equipment, such as organic EL materials. It now delivers many types of equipment both domestically and abroad.

ULVAC Kyushu also participates in frequent personnel

exchanges with Group companies abroad. Since production of organic EL display manufacturing equipment is centered in ULVAC Kyushu but also takes place at facilities in Korea, Taiwan, and China, mutual visits between Group company employees for technical support are frequent. All work is performed following standardized procedures because modules produced at various domestic and overseas manufacturing facilities must be assembled at the customers’ sites. Therefore, close cooperation among Group companies is extremely important.

ULVAC Kyushu has gained its expertise in production techniques from its role in shared production. By sharing this know-how, it aims to be the “mother ship” of the overseas production locations, which will grow in the future.

Development of “QAM Series” vacuum film deposition system for R&D purposes

In 2014, ULVAC Kyushu developed the “QAM Series” vacuum deposition system for R&D purposes. This is small-scale vacuum deposition system for substrates of less than four inches, accommodating the needs of universities and research institutions and leveraging the rich deposition technology offered by the ULVAC Group. Low cost and high performance were achieved, and various functions can be added on after the equipment is purchased.

Thanks to the “Firefly Project,” fireflies flit around the factory grounds

At ULVAC’s Kagoshima Plant and ULVAC Kyushu, a biotope was constructed on the grounds using waste water from the factories with the aim of engaging in nature conservation and promoting corporate social responsibility. Fireflies are raised from the larval stage and can be seen flitting about each year. The companies also help local grade school students learn about the environment by inviting them to take part in the release of Japanese medaka fish into the water.



Festival at Nanpu community center. Involvement in the community is encouraged through a variety of activities: cleaning seniors’ homes and local areas, walking events in the local Yamagano district, and relay races with local people.



Biotope where fireflies fly



Releasing Japanese medaka fish