Mitsubishi Turbocharger Manufacturing and Technical Support Center for North American Market

Mitsubishi Heavy Industries Engine & Turbocharger, Ltd.
Turbocharger Division

Mitsubishi Turbocharger and Engine America, Inc. (MTEA), which is the North American base of the Turbocharger Division of Mitsubishi Heavy Industries Engine & Turbocharger, Ltd. (MHIET), provides manufacturing and design support for turbochargers for automobiles. MTEA serves as the contact point for North American automobile manufacturers and as the plant for manufacturing finished products of Mitsubishi Turbochargers.

1. Introduction

The decarbonization movement has been accelerating globally in recent years and many countries, one after another, have tightened regulations. The North American market is no exception. Especially, California has set a 100% zero-emission goal for 2035 and after and is expected to impose strict regulations, along with Europe. Other states in the U.S. are also moving in the same direction. On the other hand, since electrification technologies have many issues in terms of engineering, production and infrastructure, it is difficult for electric vehicles to rapidly increase their market share, so it is expected that the demand for internal-combustion engines will remain unchanged for the time being.

A turbocharger consists of a turbine which receives exhaust gas discharged from the engine and a compressor connected to the turbine by the same shaft and supplies compressed air to the engine, thereby contributing to the increase in efficiency and reduction of exhaust gas, it has become established as an essential technology to meet strict emission regulations.

MTEA has enhanced its function as a manufacturing plant of turbochargers for automobile manufacturers that have plants in North America. It has also established a system as a technical support base for development so that it can quickly respond to customer requests.

2. History of MTEA

MTEA is headquartered in Chicago in the Midwest region of the United States. In order to respond to the increased demand in the North American market, it established a turbocharger plant in Franklin, Indiana in 2015 (**Figure 1**). The main history is as follows.

1985	Mitsubishi Engine North America, Inc. (MENA) established
2010	Technical support office established in Detroit
2015	Franklin Plant established
	Production of Mitsubishi turbochargers in North America started
2016	Name changed to Mitsubishi Turbocharger and Engine America, Inc. (MTEA)
2022	Cumulative production of 5 million units achieved

The existing compressor plant for car air-conditioners of Mitsubishi Heavy Industries Climate Control, Inc. (at that time), a subsidiary of the Mitsubishi Heavy Industries Group in Franklin was used to set up a production line in the existing building and the extension area. This shared factory method realized the rapid startup of the plant with a shared use of the indirect and physical distribution departments. In addition, it has good access to the production plants of major automobile manufacturers scattered throughout North America and can rapidly supply products to

customers.

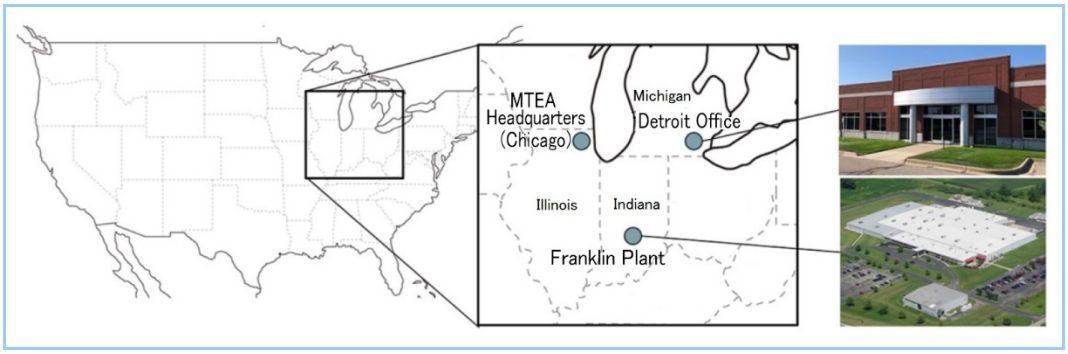

Figure 1 Office and Plant Locations of MTEA

3. Products of MTEA

MHIET offers a wide-ranging product lineup of turbochargers for automobiles and MTEA manufactures products for gasoline engine cars.

Figure 2 shows examples of turbochargers that MTEA manufactures. These turbochargers feature low prices, compact sizes and high efficiency and have been adopted for many gasoline engine cars with small displacement volumes. These products not only contribute to complying with environmental regulations and improving fuel efficiency, but also contribute to increasing end-user satisfaction by improving engine output and drivability.

In the North American market, longer-distance and longer-life automobiles are required compared to other markets and the customer requirements for durability and quality tend to be strict. In order to address such requirements, we thoroughly conduct durability evaluation in design and development and quality control of parts purchased from suppliers. As a result, we are highly evaluated as we have received Quality Awards from several customers.

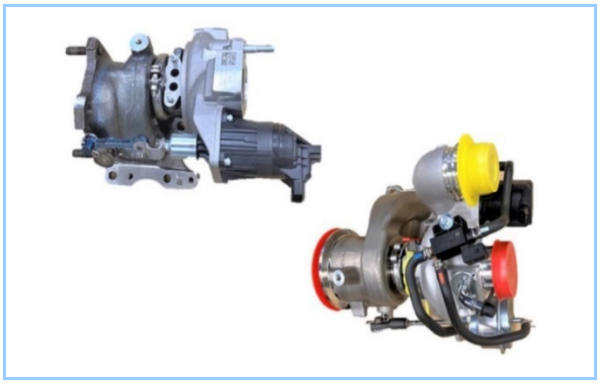

Figure 2 Turbochargers manufactured by MTEA

4. Manufacturing/supply chain

Our turbochargers for automobiles are finely customized according to customer requests and the final assembly is conducted on a dedicated line for each product (**Figure 3**). For each assembly line, we adopt the common facility design and concept among MTEA, MHIET and other production plants, and work to standardize the turbo assembly process and in-process quality control. We are thus striving to reduce production costs and maintain/improve quality. On the other hand, since there are differences in the characteristics and the planned production volume among plants, the level of automatization needs to be changed by each plant and the optimization of programs may be required. MTEA can utilize the advantages of being a small-scale production plant and the manufacturing, production engineering and quality assurance departments can closely cooperate to implement daily production improvements quickly, which contributes to maintaining the stable operation and low percentage of defective products.

For the procurement of parts, MTEA has established a global supply chain together with other affiliated companies and the commonality of parts has allowed procurement costs to be

reduced. Since a plant in the neighborhood of a supplier can provide support as appropriate, the stable procurement of parts from suppliers around the world has been realized.

Figure 3 MTEA's turbocharger production line

5. MTEA's technical support function

The design, development and evaluation of products manufactured by MTEA are conducted by the engineering department of the parent company, MHIET. On the other hand, considering the risk of communication problems with customers who have their development bases in North America due to time differences and distances, MTEA has established a technical support office in Detroit where American automobile manufacturers have their development bases. The Detroit office provides regular reports on development progress, primary responses to customer requests and engineering consultations with customers based on the results of technical studies and evaluations conducted by MHIET and contributes to the smooth promotion of development projects.

In addition, the MHIET Group develops electric compressors for fuel cell vehicles (FCVs) (**Figure 4**) and actively promotes sales expansion in North America, which is a promising market. MTEA reports to and shares with MHIET's development department the findings obtained through the research on market and technology trends and the technology exchanges with potential customers in trade shows and related seminars, thereby contributing to the enhancement of product appeal. Furthermore, MTEA is looking to establish evaluation facilities in North America in the future.

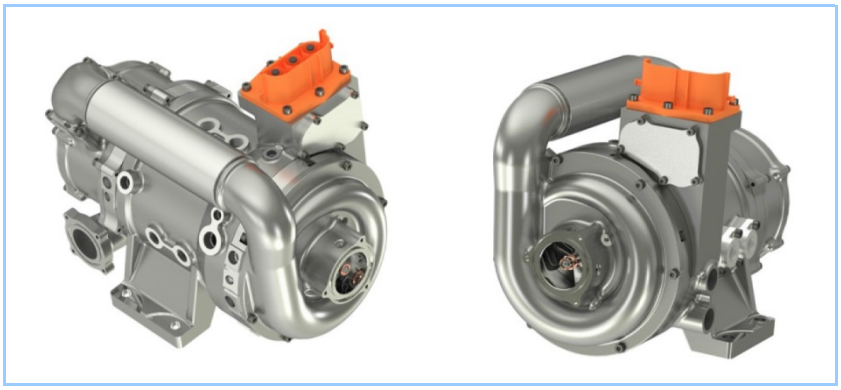

Figure 4 Electric compressors for fuel cells

6. Future prospect

As the decarbonization and electrification trends are accelerating in the automobile industry, MTEA will continue to offer high-quality turbochargers and contribute to the stable production of high-efficiency and low-emission gasoline engine cars for customers even during the energy transition phase. We will also provide support toward the achievement of carbon net zero through development and supply of electric compressors for FCVs for a future hydrogen age by utilizing our turbo technologies.