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## Fuel Efficiency of Vessels – Improvement by 10%

### Mixing Water Particles in Heavy Oil

NANOMIZER Inc., dealing with pulverization equipment (Yokohama City; CEO – Takehiko Matsumura), has developed a fuel processing equipment that can improve the fuel performance of vessels including container ships by approximately 10%. By mixing minute water particles at the size of 300 nanometer diameter (nano is one billionth) to heavy oil fuel, the combustion efficiency inside the engine is improved. By this, it is anticipated that 10% of carbon dioxide (CO<sub>2</sub>) emission will be reduced. Verification tests are being conducted with Universal Shipbuilding and others, and the company aims at commercializing (the product) within this year.

### NANOMIZER Processing Equipment

#### TESTS WITH SHIPBUILDING COMPANY

Many of the ship engines burn heavy oil in the form of fine mist. Depending on the size of the droplets of oil, there are cases when oil would not be burnt and some remain in the exhaust gas. NANOMIZER focused on the technology of “water emulsion fuel”, which mixes water particles to heavy oil. At the time the heavy oil burns, the water particles contained within the oil are gasified and vaporized, and scatter the oil in further pulverized particles, thereby making it easier for complete combustion.

The developed processing equipment makes use of NANOMIZER’s unique technology that generates nano-level particles, and plunges water and oil at high pressure through the piping that integrates special mechanism. By making the water particles as small as the size of 300 nanometer diameter, the mixture of the water particles and oil becomes not easy to be separated. The company has successfully achieved making the droplets of oil to be scattered in further minute particles. Even when heat is added to the water-oil mixture, it is not easy to be separated.

The company has concluded a joint research agreement with Universal Shipbuilding and Nihon Kaiji Kyoka (ClassNK). A fuel processing equipment that produces 3 tons of fuel per hour is installed on a container vessel that Universal Shipbuilding built, and fuel economy improvement and other effects will be verified over a year. It is mentioned that the CO<sub>2</sub> and nitrogen oxides (NO<sub>x</sub>) emissions can be reduced at the same time.

The transfer price of a processing equipment differs according to the types of vessels, but it is anticipated that the price would range from JPY 30 million to 100 million (approximately S\$470,000 to S\$1,560,000) per unit. In addition to newly built vessels of Universal Shipbuilding, the company will promote the adoption of the equipment by existing vessels of shipping lines.

Relating to the emissions from marine vessels, International Maritime Organization (IMO) plans to introduce a regulation in and after 2016 to reduce the emission of NOx by 80% for newly built vessels. It is anticipated that this fuel processing equipment will enhance competitiveness of domestic shipbuilding and shipping industries. The company aims at receiving the placements of orders for 100 units per year within two to three years, thereby aiming at generating the revenue of approximately JPY 5 billion (approximately S\$77.8 million).