

Safe and reliable shipping of crude oil



Mastera is a double-acting ship which can manage independently in all Baltic ice conditions. Photo by Neumann Horst.

Neste Corporation ordered two Aframax-size crude oil tankers from Hyundai Heavy Industries in South-Korea last year. Aker Arctic has assisted in the acquisition process to help Neste find the optimal solution for their transport needs.

A few years ago, the Finnish fuel company Neste began to plan for the future of their crude oil shipments. The main question was to decide what kind of vessels they want to use in the coming decades when their current fleet reaches the end of its lifecycle.

Neste is currently using two different tankers for shipments from Primorsk and Ust-Luga harbours in Russia to their refineries in Porvoo and Naantali in Finland. *Mastera* is a double-acting ship which can manage independently in all ice conditions. *Stena Arctica* is a conventional tanker which has good general performance in ice, but needs icebreaker assistance in hard-ice conditions.

Feasibility study

Having had positive experiences from previous projects, Neste decided to order a feasibility study from Aker Arctic with the aim of evaluating which ship type would be optimal for their crude oil transportation in the Baltic Sea, what capacity the vessels should have, and how many ships would be most efficient to use.

In the study, three ship concepts were compared: a double-acting ship, a conventional ice class 1A vessel and a new Aframax vessel concept with an icebreaker bow. The analysis focused on use in three different winter conditions: mild, severe and average winter. Additionally, an evaluation was made of which type of these vessels would be optimal for the amount of oil shipped to the two refineries, as well as an analysis of acquisition costs and operational costs.

"The results of this study formed the base for our decisions on how to continue with the project," says Paavo Kojonen, Head of Fleet Operations at Neste.

Improved ice capabilities

Neste decided to proceed with a conventional ship of ice class 1A but with improved ice capabilities and with important technical requirements especially suited for operations in the Baltic Sea. At the same time, they opted to modify an existing vessel model instead of designing a completely new vessel.

"When deciding on which shipyard would build our desired ship, a few aspects were essential," Kojonen highlights. "We wanted the shipyard to be a reliable constructor of quality ships and have previous references of building ice-going vessels. Additionally, we wanted the shipyard to be prepared to work not only with us, but also with Aker Arctic."

Four shipyards submitted vessel proposals which Aker Arctic then evaluated for their ice performance. *Stena Arctica* was used as a reference vessel. Aker Arctic also provided advice on possible modifications to each vessel in order to improve ice performance.

Verification with model tests

"We evaluated different designs together with Aker Arctic and listed the requirements for ice performance to be included in the contract," says Project Manager Antti Kettunen from Neste.

"Part of the deal with the shipyard was that ice model tests were to be done at Aker Arctic, so that they could verify that requirements were fulfilled. We also wanted the shipyard to collaborate with Aker Arctic during the design phase, especially regarding the bow."

The contract with Hyundai was signed in June 2019 and ice model tests were performed in Aker Arctic's test basin in August to verify the design. Construction will begin in summer 2020 and the delivery of the first vessel is planned for September next year. The second vessel will be ready at the end of 2021.

Comparing ice performance

When the current ships *Mastera* and *Stena Arctica* were on order, Aker Arctic performed ice model tests on them. As an additional service,

Neste received an ice-performance comparison for these two ships and the newbuilds.

“We are very happy with the results,” says Kojonen. “The new vessel will have many technical improvements compared to *Stena Arctica*, though both are conventional vessels. *Mastera* was built with a different technology and is in a class of her own.”

Custom features

The operational profile and the area of operation are very specific and, as a result, Neste wanted to customise critical parts of the vessel and not stay within standard requirements. Safety has been a top priority.

“Good ice capabilities are above all a safety feature for Neste,” Kettunen adds. “We could have used the shipyard’s standard 1A or 1A Super bow form, but we decided to look at things from a new perspective and optimise the bow for our area of operations. For example, breaking out from an ice channel would not have been possible with a typical 1A bow design.”

The hull structure will be reinforced, bow thrusters will improve manoeuvrability, and custom-designed winterization features have been planned according to wishes from end users and harbours. Selected equipment is heated or protected properly and safe to use in all weather conditions.

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“One particular feature of our ships is that they spend more time in harbours than out at sea because the transport distances are short,” Kettunen says. “Therefore, energy efficiency both at sea and during harbour operations has been emphasised.”

Excellent partners

Kettunen and Kojonen are extremely pleased with Aker Arctic’s work. “All schedules were kept to and our questions were answered promptly, even at short notice when we needed information or advice during negotiations with the shipyards.”

They noticed that shipyards all over the world see Aker Arctic as a reliable and recognised cooperation partner. Working with Hyundai Heavy Industries has also proven efficient.

“At Neste, we need good ships in our toolbox which we can rely on to work properly at all times. We believe we have realized a ship which will fulfil our needs extremely well and be a pleasure to work on. Safe, sustainable and reliable shipping of crude oil; that is what we strive for.”

ABOUT NESTE

Neste creates sustainable solutions for transport, business, and consumer needs. With a wide range of renewable products, Neste enables their customers to reduce climate emissions.

Neste is the world’s largest producer of renewable diesel refined from waste and residues, introducing renewable solutions also to the aviation and plastics industries.

In 2018, Neste’s revenue stood at EUR 14.9 billion. In 2020, Neste placed 3rd on the Global 100 list of the most sustainable companies in the world.

Photo courtesy of Neste Oyj.