

# RS sets new ice class standards

Having over 500 Arc4 and higher units plus more than 40 icebreakers under its wing, the Russian classification society is strongly involved in supporting industry demands with up-to-date ice class standards

In order to reflect the wide range of modern-day ship design features, more than 20 new class notations have been implemented by the Russian Maritime Register of Shipping (RS) over the last three years, along with amendments concerning hull structure of ice class ships.

To introduce the latest developments to the industry parties concerned, as well as to encourage an open dialogue between the classification society and the maritime community RS has established a dedicated programme of meetings. The RS Rules Update conference, which took place during the NEVA 2019 international exhibition in St. Petersburg, Russia, following up the spring and summer meetings as well as an earlier one in 2018.

A capstone of the conference was the introduction of the new distinguishing mark for double-acting ships (DAS) – DAS ( ) indicating the ice class for stern-first operation in brackets. The new DAS requirements cover:

- Aft end design, in way of skegs and azimuth thrusters
- New approximate dependencies for shape functions
- Termination of ice loads on the aft region

By the end of 2019, RS is to complete the development of the relevant requirements for machinery, propulsion and navigation equipment. More information can be found at: <https://rs-class.org/en/news/general/rs-rules-update-distinguishing-mark-das/>

The conference's inaugural speaker, RS director general Konstantin Palnikov, emphasised that classification rules are one of the fundamental parts of the maritime industry, providing a shipowner with the long-term planning opportunity. However, Palnikov pointed out, that to meet the demands of RS clients, the rules require timely updating. Today, all the amendments of the RS Rules throughout the current year are available online at

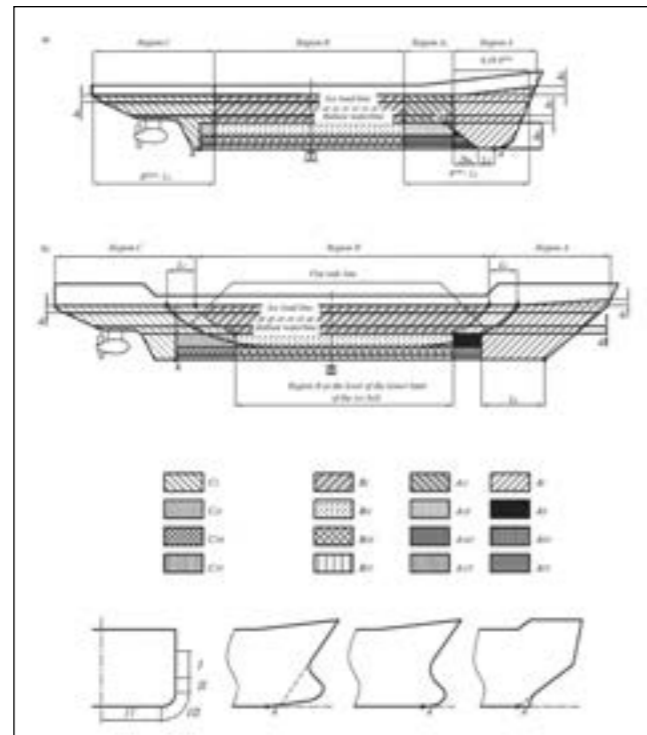


Figure 1: DAS Class Notation: requirements for hull structure in the ice strengthening area

rs-class.org in the RS Publications section. (<https://lk.rs-class.org/regbook/rules>)

## Ice class for the hull and machinery

“During recent years, RS continuously came up across a situation where the hull and propulsion of a designed ship complied with different ice classes. Starting from 2019, RS Rules provide a possibility of the separate ice class indication for the hull and machinery,” explains head of RS Classification Division, Sergey Shishkin. If the ship's hull and machinery fall under different ice class requirements, the class notation will reflect this by indicating two ice classes respectively, e.g. KM(\*) Arc4 (hull) Ice3 (machinery). Whereas, if a ship complies with the rules in full scope, the (hull; machinery) sign is indicated after the ice class notation. “The gradation also enables us to assign an ice class to non-self-propelled vessels,” adds Shishkin.

## Max draught in fresh water

Since 2019, RS Rules specify maximum draught in fresh water for ice class ships that have restricted ice draught. “This amendment is dedicated to meet the operational demands of shipowners who load ships in fresh water ports and afterwards enter sea waters. At the shipowner's discretion, maximum draught in fresh water can be additionally indicated in the class notation,” Shishkin says.

### For example:

Arc7 (hull at  $d/df \leq 11.0$  m/11.265 m; machinery)

$df$  — max draught in fresh water, corresponding to ice class requirements.

## Key hull requirements

The key requirements in terms of ice class hull have been reviewed by RS, such as slopes of load waterline and frame, transom stern, bulbous bow as well as stem design and allowances for abrasive wear and corrosion. “Ship designers

often misinterpreted previous version of the RS requirements to abrasive wear and corrosion. This sometimes lead to a significant weighting up of the designed ship's hull,” Shishkin says. In 2018, RS introduced abrasive wear allowances update for outer shell with due account for corrosion/abrasion rate and application of ice resistant coating. The new requirements introduce gradation into class I and II coatings. For example, class I enables 50% reduction of the annual average outer shell corrosion wear and abrasive thinning rate.

Previously, bulbous bow was accepted by RS for ice classes up to Arc4. Upon the industry demand and R&D since 2019, RS Rules introduce bulbous bow

structure specifications for Arc4 – Arc7 as well as transom stern in way of ice belt for ice class Arc4 and Arc5. This year, formulation of ice load parameters, where the hull form angles are outside the Rule limits, were introduced.

“For a long time RS accepted only cast stems for ice class ships due to high structural reliability. Due to the steadily growing gross tonnage increase of ice class ships the size of the cast increased respectively, which lead to compromise in the quality of the cast,” says Shishkin. “Therefore, since 2017, the RS Rules application of welded stems is allowed for Arctic classes from Arc4 to Arc7, Icebreaker6 and Icebreaker7,” he adds.

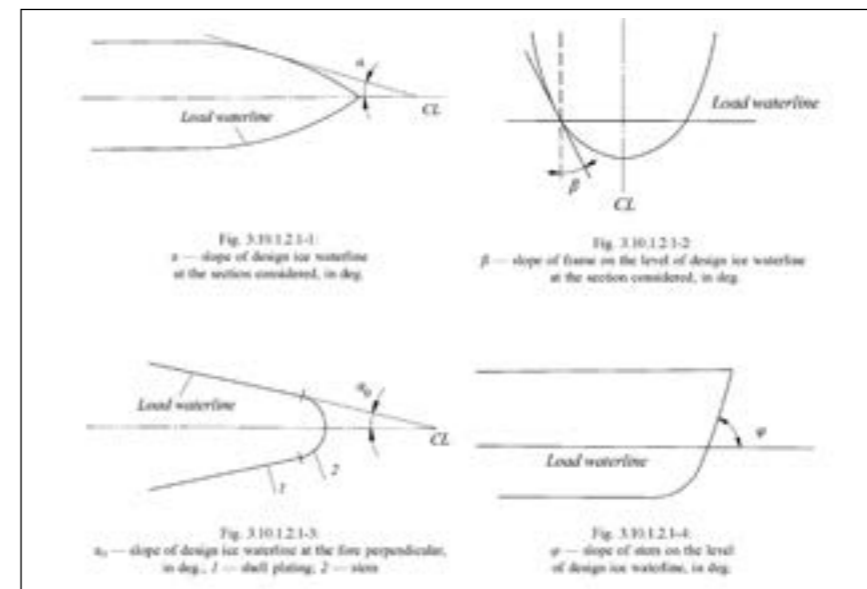
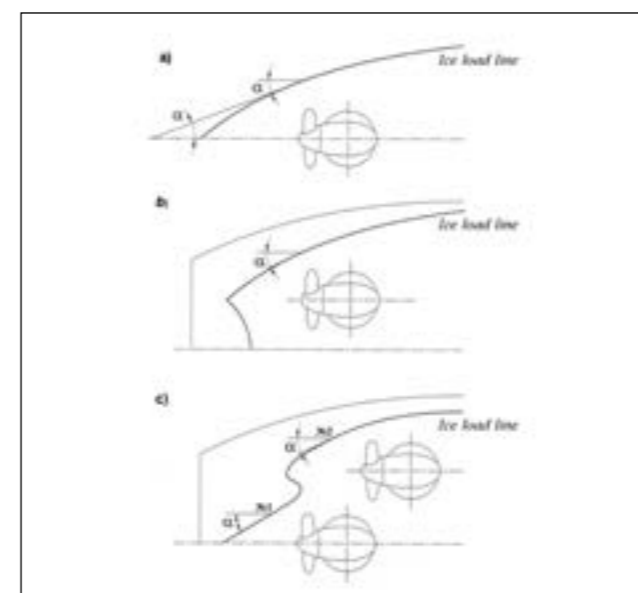


Figure 2: Formulation of ice load parameters where the hull form angles are outside the Rule limits



## LNG carriers

Recently RS has granted the Approval in Principle (AiP) for the new LNG containment systems, designed by Gaztransport & Technigaz (GTT) for Arc7 ice class ships. The new containment systems Mark III Flex and NO 96 L03+ by GTT are based upon proven LNG containment systems designs, enabling, in addition, to reduce the in-service boil-off rate. RS and GTT analysed the containment systems in terms of safety of operation aboard a ship navigating in ice-covered waters.

Under the AiP procedure, RS and GTT considered containment system strength under hull vibrations, as well as fatigue endurance of the containment system elements. Additionally, containment systems safety in case of possible interaction with floating ice or icebergs, and also structural strength of the membrane systems to potential impacts (sloshing events) related to liquefied gas movements in the cargo tanks have been analysed and validated.

RS gradually implements a comprehensive programme of the development and promotion of services for marine transportation of LNG. RS possesses a successful track record of gas carrier construction surveys at world leading shipyards and has developed in-house professional training programmes on gas carrier surveys under construction and during operation. In March 2019, RS and GTT signed a bilateral cooperation agreement covering experience exchange and membrane cargo containment systems installation aboard RS-classed ships. The agreement foresees communication during the development of technical requirements and additions to the RS rules as well as the RS approval of materials, products, technologies and GTT-designed LNG containment systems. Under the agreement, RS surveyors undertake a training course on technical know-how of the LNG containment systems. *NA*

## Reference

Russian Maritime Register of Shipping (RS) is a leading classification society. Established in 1913. RS is recognised by the largest flag states and the EU. It has been an IACS member since 1969.