Aluminium Alloys

Amended Rules and Guidance

Rules for the Survey and Construction of Steel Ships Parts CS, and M
Rules for High Speed Craft

Reasons for Amendment

The Rules for the Survey and Construction of Steel Ships Part CS specify requirements for the hull construction and equipment of steel ships of with normal hull shape that are less than 90 m in length (i.e. small ships).

Since there are no requirements related to the use of aluminium alloys for the structural members of such ships specified in Part CS, the application of such alloys was handled on a case-by-case basis.

Accordingly, relevant requirements were amended in order to clarify the requirements for the handling of aluminium alloys in Part CS, with reference given to past application results.

For aluminium alloys, the weld joint strength (tensile strength and 0.2% proof stress) of the heat-affected zone of the base metal generally decreases due to welding. More specifically, it is known that the weld joint strength of 5000 series aluminium alloys decreases to about the temper condition O of the same material grade, and that the weld joint strength of 6000 series aluminium alloys decreases to about the temper condition T4 of the same material grade.

In the ClassNK Rules, as requirements considering the above-mentioned decrease in strength, the standerd value used for tensile strength in the butt weld joint tensile tests for the approval of welding procedures and the 0.2% proof stress when using aluminium alloys for hull structure of high speed craft are specified respectively in Part M of the ClassNK Rules and the Rules for High Speed Craft.

As a result of reviewing the requirements for aluminum alloys in Part M and the Rules for High Speed Craft in addition to the above-mentioned review of Part CS, it was discovered that some material grades that should be considered for strength reduction are not included and their handling is unclear; therefore, relevant requirements were amended in order to clarify their respective handling.

Outline of Amendment

The main contents of this amendment are as follows:

(1) Specified the 0.2% proof stress when using aluminium alloys in Part CS of the ClassNK Rules.
(2) Specified the material grades and tensile strengths of aluminium alloys to which values smaller than the standard minimum tensile strength of the base metal are to be applied as the standard value in Part M of the ClassNK Rules.
(3) Added aluminium alloys that are to be considered for decrease in strength of the base metal due to welding, and specifies that the standard value of proof stress is to be equivalent to the temper condition O.

Amended Requirements

Rules for the Survey and Construction of Steel Ships
Part CS: 1.3.1, Table CS1.3, 1.3.5
Part M: Table M4.7
Rules for High Speed Craft
Part 6: 1.2.2, Table 6.1.2