

# Guidance for Temperature Gradient ESSO Tests and Double Tension Tests

## Amended Rules and Guidance

Rules for the Survey and Construction of Steel Ships Part K

Guidance for the Survey and Construction of Steel Ships Part K

Guidance for the Approval and Type Approval of Materials and Equipment for Marine Use

## Reason for Amendment

In 2007, ClassNK established the Committee on Brittle Crack Arrest Design for the purpose of evaluating and standardizing test procedures and conditions, etc. related to the brittle crack arrest toughness  $K_{ca}$  test method. As a result, the “Guidelines on Brittle Crack Arrest Design” were published in September 2009. Requirements related to temperature gradient ESSO tests based upon this aforementioned Guidelines are specified as “Annex K3.12.12-1 Guidance for Temperature Gradient ESSO Test”, in the Guidance for the Survey and Construction of Steel Ships Part K.

Thereafter, ClassNK and the Iron and Steel Division of the Japan Welding Engineering Society launched a joint research project in April 2010 to establish testing criteria for quantitatively evaluating brittle crack arrest properties. The outcome of this project was the establishment of WES2815 “Test method for brittle crack arrest toughness,  $K_{ca}$ ” on 1 January 2014.

Accordingly, relevant requirements were amended based upon WES2815 (Test method for brittle crack arrest toughness).

## Outline of Amendment

The main details of this amendment are as follows:

- (1) Specified examples of the shapes of tab plates and pin chucks.
- (2) Specified requirements for the welding of test specimens and tab plates.
- (3) Specified temperature control methods and recommended ranges of impact energy.
- (4) Specified measuring methods for arrest crack lengths in the case of brittle crack re-initiation or crack branching.
- (5) Specified evaluation criteria judgment on arrest crack and assessment of impact energy.
- (6) Specified calculation methods for obtaining  $K_{ca}$  values at certain specific temperatures.
- (7) Specified requirements for temperature gradient double tension tests.