

# **RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**

GUIDANCE FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS

**Part D**

**Machinery Installations**

**Rules for the Survey and Construction of Steel Ships**

**Part D**

**2015 AMENDMENT NO.1**

**Guidance for the Survey and Construction of Steel Ships**

**Part D**

**2015 AMENDMENT NO.1**

Rule No.30 / Notice No.33      8th May 2015

Resolved by Technical Committee on 2nd February 2015

Approved by Board of Directors on 23rd February 2015

**ClassNK**  
NIPPON KAIJI KYOKAI

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# **RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS**

**Part D**

**Machinery Installations**

**RULES**

## **2015 AMENDMENT NO.1**

Rule No.30      8th May 2015

Resolved by Technical Committee on 2nd February 2015

Approved by Board of Directors on 23rd February 2015

“Rules for the survey and construction of steel ships” has been partly amended as follows:

## Part D MACHINERY INSTALLATIONS

### Chapter 6 SHAFTINGS

#### 6.2 Materials, Construction and Strength

##### 6.2.2 Intermediate Shafts

Table D6.2 has been amended as follows.

Table D6.2 Values of  $k_1$

Shaft with integral flange coupling	Shaft with flange coupling either shrink fit, push fit or cold fit <sup>(1)</sup>	Shaft with keyway <sup>(2)</sup>	Shaft with transverse hole <sup>(3)</sup>	Shaft with longitudinal slot <sup>(4)</sup>	Shaft with splines <sup>(5)</sup>
1.0	1.0	1.1	1.1	1.2	1.15

Notes:

((1) to (3) are omitted.)

(4) The shape of the slot is to be in accordance with the following: any edge rounding other than by chamfering is to be avoided in principle; the number of slots is to be 1, 2 or 3 and they are to be arranged 360, 180 or 120 degrees apart from each other respectively.

(a)  $l < 0.8d_a$

(b)  $d_i < \del{0.8} 0.7d_a$

(c)  $\del{0.15} 0.15d_a < e \leq 0.2d_a$

(d)  $r = e / 2$

where

$l$  : slot length

$d_a$  : outside diameter of the hollow shaft

$d_i$  : inside diameter of the hollow shaft

$e$  : slot width

$r$  : end rounding of the slot

((5) is omitted.)

## EFFECTIVE DATE AND APPLICATION

1. The effective date of the amendments is 1 July 2015.
2. Notwithstanding the amendments to the Rules, the current requirements may apply to ships for which the date of contract for construction\* is before the effective date.  
\* “contract for construction” is defined in the latest version of IACS Procedural Requirement (PR) No.29.

### IACS PR No.29 (Rev.0, July 2009)

1. The date of “contract for construction” of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding.
2. The date of “contract for construction” of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder.  
For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a “series of vessels” if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided:
  - (1) such alterations do not affect matters related to classification, or
  - (2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval.The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed.
3. If a contract for construction is later amended to include additional vessels or additional options, the date of “contract for construction” for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a “new contract” to which **1.** and **2.** above apply.
4. If a contract for construction is amended to change the ship type, the date of “contract for construction” of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder.

Note:

This Procedural Requirement applies from 1 July 2009.

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**Part D**

**Machinery Installations**

**GUIDANCE**

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Notice No.33      8th May 2015

Resolved by Technical Committee on 2nd February 2015

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## Part D MACHINERY INSTALLATIONS

### D8 TORSIONAL VIBRATION OF SHAFTINGS

#### D8.2 Allowable Limit

##### D8.2.6 Detailed Evaluation for Strength

Sub-paragraph -3 has been amended as follows.

**3** In cases where intermediate shafts with longitudinal slots given in **Table D8.1, Part D of the Rules** are equipped, the value of  $C_K$  may be determined by using the following formulae:

$$C_K = 1.45/scf$$
$$scf = \alpha_{t(hole)} + 0.80 \frac{(l-e)/d_a}{\sqrt{\left(1 - \frac{d_i}{d_a}\right) \frac{e}{d_a}}}$$

where

$scf$  : Stress concentration factor at the end of slots defined as the ratio between the maximum local principal stress and  $\sqrt{3}$  times the nominal torsional stress determined for the hollow shafts without slots (Values obtained through Finite Element Calculation may be used as well)

$l$  : Slot length

$e$  : Slot width

$d_i$  : Inside diameter of the hollow shaft at the slot

$d_a$  : Outside diameter of the hollow shaft

$\alpha_{t(hole)}$  : Stress concentration factor of radial holes (in this context,  $e$  = hole diameter) determined by the following formula (an approximate value of 2.3 may be used as well)

$$\alpha_{t(hole)} = 2.3 - 3 \frac{e}{d_a} + 15 \left( \frac{e}{d_a} \right)^2 + 10 \left( \frac{e}{d_a} \right)^2 \left( \frac{d_i}{d_a} \right)^2$$

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Note:

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