



RULES
R002CN01-2025

CHINA CLASSIFICATION SOCIETY

RULES FOR MATERIALS AND WELDING

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PART ONE METALLIC MATERIALS

CHAPTER 6 STEEL CASTINGS

Section 1 GENERAL PROVISIONS

6.1.6 Test material and test specimens

6.1.6.1 Test material sufficient for the required tests and for possible re-test purposes is to be provided for each casting or batch of castings. ~~The test blocks are to be representative of the properties of the entire casting.~~ The test samples are to be either integrally cast or gated to the casting ~~and are to have a thickness (t_s) of not less than the ruling section of the casting (by referring to ISO4990, ISO683-1, ISO683-2 or determined by test) or 30 mm (whichever is greater).~~ In the case of quenched and tempered thin walled steel castings, the thickness of the test sample is to be at least 20 mm, and is to be appropriate to the thickness of the casting.

6.1.6.2 The preparation of steel casting specimens can choose from the following two options:

(1) to provide at least one 30mm test block;

(2) when agreed upon between the manufacturer and the purchaser, the size of the test blocks for mechanical testing may be determined by the ruling section of the casting (by referring to ISO4990, ISO683-1, ISO683-2 or determined by test) are to be submitted for approval by the Classification Society.

~~As shown in Figure 6.1.6.2, for large thickness castings other than stern tube, stern frame, anchor and rudder horn, t_s normally need not to exceed 150 mm. Length and width of the test block is normally to be at least three times t_s , unless otherwise agreed with by CCS. Shorter width or length may be accepted for test blocks where actual casting width or length is in the range between t_s and $3t_s$. For alloy steel castings the manufacturer is to propose dimensions for the test block which is to be agreed with by CCS.~~

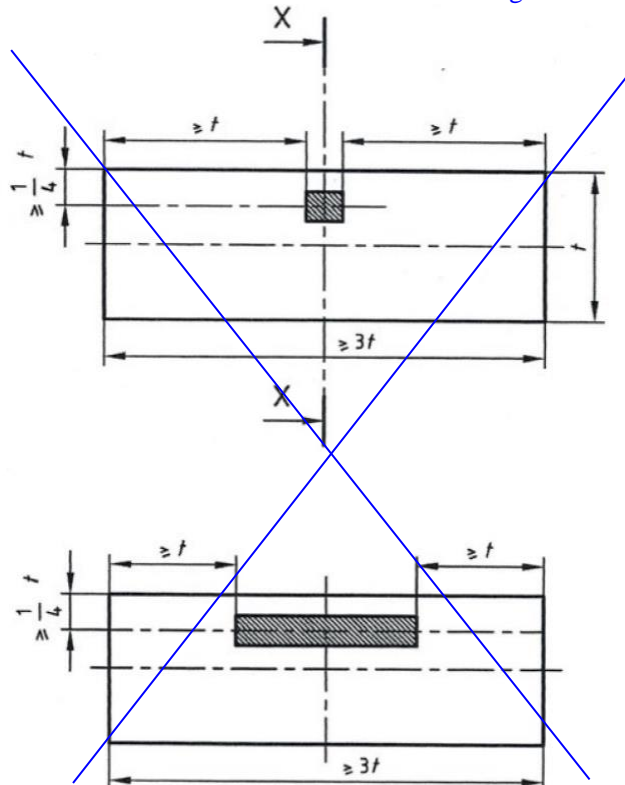


Figure 6.1.6.2 Specimen positions relative to the test block in accordance with ISO 4990

6.1.6.3 The test samples are not to be detached from the castings until heat treatment has been completed and they have been properly identified.

6.1.6.4 For a number of small castings submitted for batch testing as specified in 6.1.1.5 of this Section, the test samples may be separately made from the same cast. ~~The size of test samples is to be determined in accordance with a recognized standard (e.g. ISO 4990) not to be less than 28 mm in thickness.~~ Test samples

are to be properly identified and heat treated together with the castings they represent.

~~6.1.6.5—Where the thickness of test samples is less than or equal to 56 mm, the axis of test specimens is to be taken at 14 mm from the surface. For test blocks with thickness > 56 mm, the longitudinal axis of the test specimens is to be located at $\geq \frac{1}{4} t_s$ from the surface. As shown in Figure 6.1.6.2, other parts of the test specimens taken are to be located not less than t_s from the surface. All test specimens are to be prepared in accordance with the requirements of Chapter 2 of this PART. Tensile test specimens are to have a cross-sectional area of greater than 150 mm^2 .~~

CHAPTER 9 OTHER NON-FERROUS MATERIALS

Section 1 COPPER ALLOY PROPELLERS

9.1.5 Test samples

9.1.5.1 For cast copper alloy propellers, separately cast keel block type test samples as given in Figure 9.1.5.1 are generally used. Where possible, test bars attached on blades are to be located in an area between $0.5 R$ and $0.6 R$ (R being the radius of the propeller). Separately cast test samples in accordance with other recognized standards may be used.

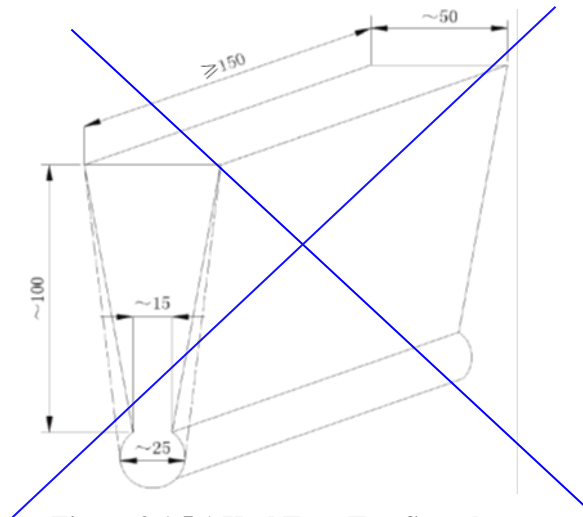
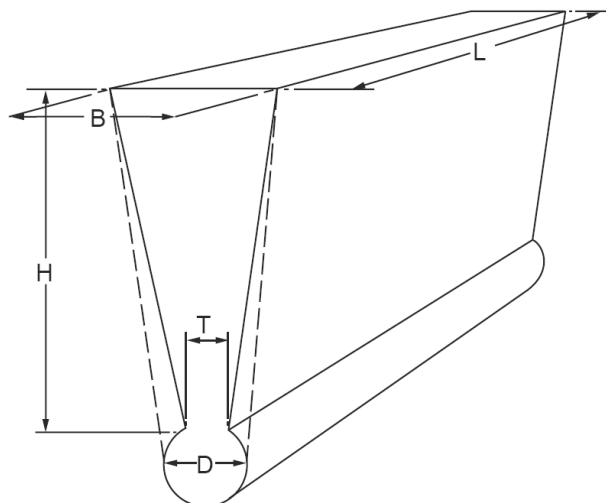


Figure 9.1.5.1 Keel Type Test Sample



$H > 100 \text{ mm}$; $B > 50 \text{ mm}$; $L > 150 \text{ mm}$; $T > 15 \text{ mm}$; $D > 25 \text{ mm}$

Figure 9.1.5.1 Keel Type Test Sample

PART THREE WELDING

CHAPTER 8 WELDING OF IMPORTANT MACHINERY COMPONENTS

Section 4 NON-DESTRUCTIVE INSPECTION AND WELD REPAIRS OF PROPELLERS

8.4.3 Non-destructive inspections

8.4.3.7 A distinction is made between non-linear, linear and aligned liquid penetrant indications, as shown in Figure 8.4.3.7. The indications detected are, with respect to their size and number, not to exceed the values given in Table 8.4.3. 7.

Indication: In the liquid penetrant testing an indication is the presence of detectable bleed-out of the penetrant liquid from the material discontinuities appearing at least 10 minutes after the developer has been applied.

Relevant indication: Only indications which have any dimension greater than 1.5mm shall be considered relevant for the categorization of indications.

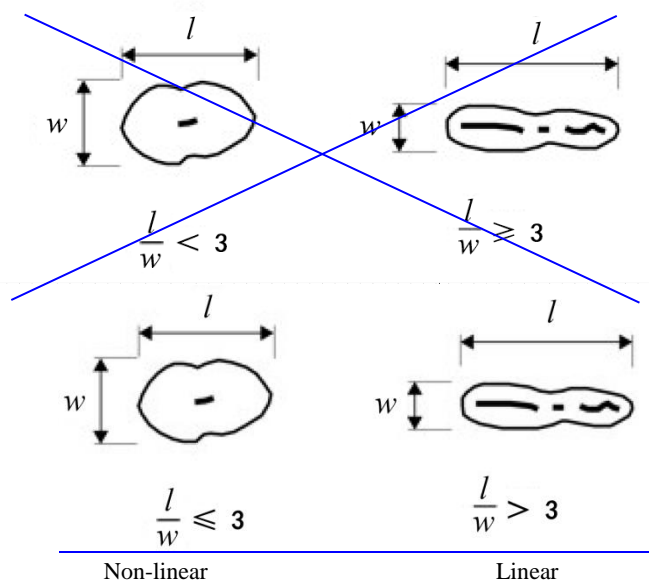
Non-linear indication: indication having a length (l) less than or equal to three times its width (w)(i.e. $l \leq 3w$). ~~an indication with a largest dimension(l) less than three times its smallest dimension (w).~~

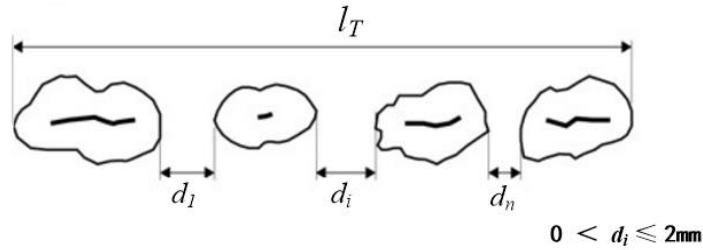
Linear indication: indication having a length (l) greater than three times its width (w)(i.e. $l > 3w$). ~~an indication with a largest dimension (l) three or more times its smallest dimension (w).~~

Aligned indications:

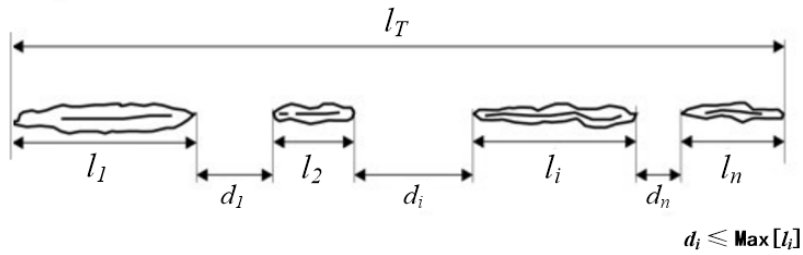
a) Non-linear indications form an alignment when the distance between indications (d_i) is equal to or less than 2mm and at least three indications are aligned. An alignment of indications is considered to be a unique indication and its length is equal to the overall length (l_T) of the alignment.

b) Linear indications form an alignment when the distance between two indications (d_i) is same as or smaller than the length of the longest indication ($\text{Max}[l_i]$).





(a) Alignment of non-linear indications



(b) Alignment of linear indications
Aligned

Figure 8.4.3.7 Shape of Indications

Allowable Number and Size of Indications in a Reference Area Table 8.4.3.7

Severity zone	Max. total number of indications	Indication type	Max. number for each type ^{①②}	Max. size of indication (mm)
A	7	Non-linear indication	5	4
		Linear	2	3
		Aligned	2	3
B	14	Non-linear indication	10	6
		Linear	4	6
		Aligned	4	6
C	20	Non-linear indication	14	8
		Linear	6	6
		Aligned	6	6

Notes: ① Single non-linear indications less than 2 mm in zone A and less than 3 mm in other zones are not considered relevant.

② The total number of non-linear indications may be increased to the maximum total number, or part thereof, represented by the absence of linear or aligned indications.

8.4.4 General requirements for repairs

8.4.4.6 Weld repairs of defects in zone A are to be as follows:

(1) In zone A, repair welding is generally not allowed unless specially approved by CCS. Where such weld repair is applied, all welds are to be stress relieved by heat treatment, and the heat treatment procedure is to be agreed by CCS Surveyor.

(2) Grinding is to be carried out to an extent which maintains the blade thickness of the approved drawing.

(3) The possible repair of defects which are deeper than those referred to in (2) above is to be specially considered by CCS.

~~(4) In some cases the propeller designer may submit technical documentation to propose a modified zone A based on detailed hydrodynamic load and stress analysis for consideration by CCS.~~