



**CCS Rule Change Notice For:
RULES FOR MATERIALS
AND WELDING**

Version: Dec 2018. RCN No.2

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Beijing

Brief Introduction

1. The latest revisions of UR W13, W17, W23 are incorporated and will enter into force on 1 July 2019.
2. Relevant provisions on non-destructive personnel are revised and will enter into force on 1 July 2019.

PART ONE METALLIC MATERIALS

CHAPTER 1 GENERAL

Section 2 TESTING AND SURVEY

1.2.5 Non-destructive testing

1.2.5.1 Non-destructive testing personnel are to pass the tests specified in CCS ~~Rules for Qualification and Certification of Non-destructive Testing Personnel or corresponding standards~~ [Guidelines for Level Assessment and Certification of Non-destructive Testing Personnel](#), and hold a valid “Qualification Certificate of Non-destructive Testing Operator” issued or accepted by CCS.

CHAPTER 3 STEEL PLATES, FLAT BARS AND SECTIONS¹

Section 1 GENERAL PROVISIONS

3.1.3.4 Unless otherwise agreed mutually in the contract, the thickness of steel plates, wide flats equal to or over 600 mm in width and sections mentioned in this Chapter is to comply with the following requirements:

(1) The tolerances on nominal thickness for steel plates and flat bars below 5 mm may be accepted in accordance with a recognized standard, [the minus tolerance shall not exceed 0.3mm](#).

Under Thickness Tolerance of Steel Plates and Wide Flats for Machinery Table 3.1.3.4(4)

Nominal thickness t (mm)	Minus tolerance (mm)
3 ≤ t < 5	< 0.3
$5 \leq t < 8$	< 0.4
$8 \leq t < 15$	< 0.5
$15 \leq t < 25$	< 0.6
$25 \leq t < 40$	< 0.7
t 40 ≤ t < 80	< 1.0 < 0.9
80 ≤ t < 150	< 1.1
150 ≤ t < 250	< 1.2
t ≥ 250	< 1.3

[\(8\) These requirements do not apply to products intended for the construction of lifting appliances](#)

¹ [Changes introduced in this revision are to be uniformly implemented from 1 July 2019.](#)

PART THREE WELDING²

CHAPTER 2 WELDING CONSUMABLES

Section 1 GENERAL PROVISIONS

2.1.3.5 For all grades of welding consumables, the grade of steels used for the preparation of test assemblies may be selected from those listed in Table 2.1.3.5, and a toughness grade lower than that required in the Table may also be selected. For testing the deposited weld metal, any steel grade may be selected for welding consumables of grade Y40 and below; steels compatible with the properties of the weld metal may be selected for grade Y42 and above, or prepared edges of the base metal is to be built up with welding consumables which are to be approved; and for low-alloy steel containing nickel and stainless steel, the side walls of the weld are in general to be buttered with a weld metal of the same composition. When the building-up method is to be used, it is recommended that one or two layers be built up using appropriate welding consumables before the test assembly is fitted.

Grade of Steel for Approval Test				Table2.1.3.5	
Grade of welding consumables	Grade of steel for test	Grade of welding consumables	Grade of steel for test	Grade of welding consumables	Grade of steel for test
1	A	5Y42	FH420	3Y69	DH690
2	B、D	3Y46	DH460	4Y69	EH690
3	E	4Y46	EH460	5Y69	FH690
1Y	AH32、AH36	5Y46	FH460	3Y89	DH890
2Y	DH32、DH36	3Y50	DH500	4Y89	EH890
3Y	EH32、EH36	4Y50	EH500	5Y89	①
4Y	FH32、FH36	5Y50	FH500	3Y96	DH960
2Y40	DH40	3Y55	DH550	4Y96	EH960
3Y40	EH40	4Y55	EH550	5Y96	①
4Y40	FH40	5Y55	FH550	1.5Ni	1.5Ni
5Y40	FH40	3Y62	DH620	3.5Ni	3.5Ni
3Y42	DH420	4Y62	EH620	5Ni	5Ni
4Y42	EH420	5Y62	FH620	9Ni	9Ni

Note①: Choose the suitable steel grade

Section 2 MECHANICAL PROPERTIES OF WELDING CONSUMABLES

² Changes introduced in this revision are to be uniformly implemented from 1 July 2019.

2.2.2.3 The mechanical properties of consumables for welding structural steels are to comply with the requirements given in Table 2.2.2.3.

Mechanical Properties of Consumables for Welding Structural Steels **Table 2.2.2.3**

Grade of welding consumables		1、2、3	1Y、2Y、3Y、4Y ^①	2Y40、3Y40、4Y40、5Y40	3Y42、4Y42、5Y42	3Y46、4Y46、5Y46	3Y50、4Y50、5Y50	3Y55、4Y55、5Y55	3Y62、4Y62、5Y62	3Y69、4Y69、5Y69	3Y89 、 4Y89 、 5Y89	3Y96 、 4Y96 、 5Y96	1.5Ni	3.5Ni	5Ni	9Ni	
Deposited metal test	Yield strength ^⑦ <i>R_{eh}</i> (N/mm ²)	≥305	≥375	≥400	≥420	≥460	≥500	≥550	≥620	≥690	≥890	≥960	≥375				
	Tensile strength ^⑧ <i>R_m</i> (N/mm ²)	400-560	490-660	510-690	530- 520 -680	570- 540 -720	610- 590 -770	670-830- 640 - 820	720- 700 -890	770-940	940-1100	980-1150	≥460	≥420	≥500	≥600	
	Elongation A(%)	≥22			≥20			≥18			≥17	≥14	≥13	≥22	≥25		
	Charpy V-notch impact test	Test temp. (°C)	②											-80	-100	-120	-196
	Average impact energy ^⑨ (J)	≥47 ^③	≥47			≥50	≥55	≥62	≥69	≥69	≥69	≥69					
Butt Butt weld test test	Transverse tensile strength (N/mm ²)	≥400	≥490	≥510	≥530- 520	≥570- 540	≥610-590	≥670- 640	≥720- 700	≥770	940	980	≥490	≥450	≥540	≥640	
	Charpy V-notch impact test	Test temp. (°C)	②											-80	-100	-120	-196
	Average impact energy ^⑨ (J)	≥47 ^③	≥47			≥50	≥55	≥62	≥69	≥69	≥69	≥69					
	Bend test	After testing, the test specimens are not to reveal any open defects in any direction greater than 3 mm ^⑤															

Notes: ① Manual arc welding electrodes are to comply with Grade 2Y and above.

- ② The temperature of impact test for welding consumables of Grade 1 and Grade 1Y is to be 20°C; for those of Grades 2, 2Y, 2Y40 to be 0°C; for those of Grades 3, 3Y, 3Y40, 3Y42, 3Y46, 3Y50, 3Y55, 3Y62, 3Y69, [3Y89](#), [3Y96](#) to be -20°C; for those of Grades 4Y, 4Y40, 4Y42, 4Y46, 4Y50, 4Y55, 4Y62, 4Y69, [4Y89](#), [4Y96](#) to be -40°C; for those of Grades 5Y40, 5Y42, 5Y46, 5Y50, 5Y55, 5Y62, 5Y69, [5Y89](#), [5Y96](#) to be -60°C. [for those of impact grade F is not applicable for 890 N/mm2 and 960 N/mm2 yield strength levels, and especially considered by CCS](#)

- ③ The average impact energy of deposited metal test of submerged arc automatic welding is not to be less than 34 J for welding consumables with $R_{eH} < 400$ N/mm²; not to be less than 39 J for those with $R_{eH} \geq 400$ N/mm².

- ④ The average impact energy of butt joints of vertical welding and submerged arc automatic welding is not to be less than 34 J for welding consumables with $R_{eH} < 400$ N/mm²; not to be less than 39 J for those with $R_{eH} \geq 400$ N/mm².

- ⑤ Except for 5Ni and 9Ni steel specimens to be bend tested with a former of diameter four times the plate thickness, the diameter of former is to comply with the requirements of 1.2.4.2 of this PART.

- ⑥ Energy values from individual impact test specimens are not to be less than 70% of the specified values.
- ⑦ In case of no marked yield stress, the proof stress $R_{p0.2}$ is to be reported.
- ⑧ Where the tensile strength exceeds the specified maximum value, special consideration is to be given by CCS.

2.2.2.4 Welding consumables with grade Y89 are considered suitable for welding steels in the same strength level only. Welding consumables with grade Y96 are also considered suitable for welding steels in the one strength level below that for which they have been approved.

Section 3 ELECTRODES FOR MANUAL ARC WELDING

Required Hydrogen Content for Welding Consumables Table 2.3.1.1

Grade of welding consumables	Diffusible hydrogen content
1, 2, 3, 1Y, 2Y, 3Y	Not mandatory
4Y, 2Y40, 3Y40, 4Y40	H15
3Y42, 4Y42, 5Y42, 3Y46, 4Y46, 5Y46, 3Y50, 4Y50, 5Y50	H10
3Y55, 4Y55, 5Y55, 3Y62, 4Y62, 5Y62, 3Y69, 4Y69, 5Y69	H5
<u>3Y89, 4Y89, 5Y89, 3Y96, 4Y96, 5Y96</u>	<u>H5</u>

Note: For grades Y69 to Y96 annual hydrogen test is required.

Section 4

WIRE-FLUX COMBINATIONS FOR SUBMERGED ARC AUTOMATIC WELDING

2.4.5.1. Each test plate is not to be less than 150 mm in width and of sufficient length to allow the cutting out of test specimens of the prescribed number and size.

Butt Weld Test Plate Thicknesses Required for Different Grades of Welding Consumables in Respect to Two-Run Technique

Table 2.4.5.1

Grade of welding consumables	Thickness of thinner test plate (mm)	Thickness of thicker test plate (mm)
1, 1Y	12 ~ 15	20 ~ 25
2, 2Y, 3, 3Y, 4Y, 2Y40, 3Y40, 4Y40, <u>5Y40</u>	20 ~ 25 ^①	30 ~ 35 ^①

Note: ① A limitation of the approval to the medium range (up to the maximum welded plate thickness) may be agreed to by CCS. Test assemblies are then to be welded using plates of 12 to 15 mm and 20 to 25 mm irrespective of the grade for which the approval is requested. This is applicable to thicknesses up to 25 mm only.

Section 6

CONSUMABLES FOR USE IN ELECTRO-SLAG OR ELECTRO-GAS VERTICAL WELDING

2.6.1.2 For welding consumables of Grades 1Y, 2Y, 3Y, 4Y, 2Y40, 3Y40 and 4Y40 [and 5Y40](#) used for electro-slag or electro-gas vertical welding, the approval may be restricted for use only with specific types of higher strength steel. This is in respect of the content of grain refining elements and if general approval is required, a niobium treated steel is to be used for approval tests.