CCS Rule Change Notice For

GUIDELINES FOR INSPECTION OF HULL WELDS

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CHAPTER 3 QUALIFICATION TESTS OF WELDERS

Section 1 General Provisions

3.1.1.2 ~~In general, the~~ The qualification tests for fully mechanized and automatic ~~submerged arc~~ welding operators ~~may~~ are to be carried out according to Section 3 of this Chapter.

~~3.1.2.2 A welder will be qualified to take the test for his operational skill only after he has successfully passed the basic knowledge test. The content of the basic knowledge test is to correspond to the welding processes to be used in the test for the operational skill and mainly include the basic knowledge of common parent materials, welding consumables, welding equipment, welding procedures, welding defects and how to prevent such defects as well as safety knowledge of welding.~~

3.1.2.2~~3~~ Welders who have been engaged in the welding of test plates for an approved welding procedure, may be qualified to the corresponding welding conditions (welding processes, positions and consumables), subject to prior agreement by CCS Surveyor.

The whole Section 3 is replaced by the following:

Section 3 Requirements for Qualification Tests of Welding Operators

3.3.1 Applications

3.3.1.1 The welding operator responsible for setting up and/or adjustment of fully mechanized and automatic equipment must be qualified whether he operates the equipment or not.

3.3.1.2 The test requirements and coverage in this Section apply to common welding processes for steel and aluminum alloys. And these may be taken as reference if the base metal and welding method are different from those in this Section.

3.3.1.3 However a welding operator, who solely operates the equipment without responsibility for setting up and/or adjustment (e.g. the operator who only starts button in the production line of automatic welding), does not need qualification provided that he has experience of the specific welding work concerned and the production welds made by the operators are of the required quality.

3.3.2 Terms and definitions

3.3.2.1 For the terms of this Section, the following terms and definitions apply.

(1) automatic welding

Welding in which all operations are performed without welding operator intervention during the process (Manual adjustment of welding variables by the welding operator during welding is not possible.).

(2) mechanized welding

Welding where the required welding conditions are maintained by mechanical or electronic means but may be manually varied during the process.

(3) welding equipment

Individual apparatus used in welding, such as a power source or wire feeder.
(4) welding unit
Welding installation including auxiliary apparatus such as jigs and fixtures, robot manipulators and rotating devices.

3.3.3 General requirements

3.3.3.1 The welding operator is to take basic knowledge tests in relation to the knowledge of welding equipment used for test or the system. The test result is to be submitted to CCS.
3.3.3.2 The operational skill test of welding operator normally adopt the test method as specified in this Section. Welding operator who successfully completes the welding procedure approval test will be deemed to have passed relevant welding qualification test.
3.3.3.3 Welding of test assemblies and test of samples are to be witnessed by the surveyor.
3.3.3.4 If the initial test failed, the requirements for retests are the same as those in 4.1.5 of Chapter 4 of PART THREE of Rules for Materials and Welding.

3.3.4 Type and dimensions of test assemblies

3.3.4.1 Type and dimensions of test assemblies for operational skill test include butt welding of plates, butt welding of pipes, fillet welding of plates, see Figure 4.2.2.1 of Chapter 4, PART THREE of Rules for Materials and Welding, however, the length of test assemblies for butt welding and fillet welding of plates is not to be less than 500 mm.
3.3.4.2 Specific types of butt welded joints (both sides, one side, with or without backing) and dimensions of edge preparation (included angle, root face, gap) may be determined by the shipbuilder/manufacturer according to the actual production.
3.3.4.3 Both ends of the test assembly are to be provided with temporary run-on and run-off tabs of the texture and thickness similar to those of the base metal.

3.3.5 Preparation of test assemblies

3.3.5.1 Testing materials are to comply with the relevant provisions of PART ONE of the Rules for Materials and Welding. Welding consumables are to match testing materials in performance.
3.3.5.2 The test assembly is to be edge welded according to a welding procedure specification (WPS or pWPS) simulating the conditions in production, as far as practicable.
3.3.5.3 The assembly of the test plates, adjustment of welding parameters and groove cleaning etc. are to be performed by the welder himself.
3.3.5.4 Each layer is to be completed continually, without any intermediate joint.
3.3.5.5 On completion of welding, there is to be no grinding or repairs on the surface of the weld.

3.3.6 Test or inspection

3.3.6.1 Test or inspection items for different types of test assemblies are shown in Table 3.3.6.1.

Test and Inspection Items **Table 3.3.6.1**

Type of assembly	Test or inspection items	Number
Butt welding	1. Visual inspection 2. Bend test[①②]	Visual inspection: weld length Bend: two for face bend test and two for root bend test (when thickness <12 mm) or four side bends (when

		thickness ≥12mm
Fillet welding	1. Visual inspection 2. Macro section③	Visual inspection: weld length Macro: two

Notes: ① Radiographic test or fracture test may be carried out in lieu of bend test except the gas-shielded welding processes with solid wire or metal cored wire and aluminum alloy welding.

② Radiographic inspection + bend test for welders engaged in welding of marine boilers and pressure vessels.

③ For fillet welding, fracture test may be taken in lieu of two macro sections.

3.3.6.2 For sampling positions, test methods and acceptance standards of different test or inspection items, refer to relevant requirements of 4.2.4 of Chapter 4, PART THREE of Rules for Materials and Welding.

3.3.7 Certificate and validity

3.3.7.1 After satisfactory qualification test of the welding operator, CCS will issue the qualification certificate. Each shipbuilder/manufacturer is responsible for the application and validity of the certificate.

3.3.7.2 Welding operator's qualification certificate contains:

(1) Coverage of base metals, welding processes, welding equipment or unit, types of welded joint, welding position and other major parameters.

(2) Expiry date of the validity of the qualification.

(3) Name, date of birth, identification and the photograph of the welding operator.

(4) Name of shipbuilder/manufacturer.

3.3.7.3 Normally the validity of the welder's approval begins from the issue date of qualification certificate when all the required tests are satisfactorily completed.

3.3.7.4 The certificate is to be signed at six-month intervals by the shipyards/manufacturers personnel who is responsible for production weld quality. This confirms that the welding operator has worked within the range of qualification and an interruption for a period is no longer than six-month.

3.3.7.5 In order to extend the validity of the certificate, the skill of the welding operator is to be periodically verified by one of the following:

(1) The welding operator is to be tested every 6 years, the methods are the same as those in 3.3.4 to 3.3.6, but the number of test samples may be reduced by half if bend test is adopted.

(2) Every 3 years, two welds made during the last 6 months of the 3 years validity period are to be tested by radiographic or ultrasonic testing or destructive testing and are to be recorded. The weld tested are to reproduce the initial test conditions except for the thickness. These tests revalidate the welder operator's qualifications for an additional 3 years.

3.3.7.6 CCS has to verify compliance with the above conditions and sign the maintenance of the welding operator's qualification certificate.

3.3.8 Coverage of welding operator's qualification

3.3.8.1 The common welding methods and codes for fully mechanized and automatic welding in ship building are shown in Table 3.3.8.1. A re-test is to be taken if the welding method code changes.

Welding Methods for Welding Operator's Test **Table 3.3.8.1**

Symbol	Fully mechanized and automatic welding methods in actual welding works	ISO 4063
SAW	Submerged-arc welding	12
GMAW	Gas metal arc welding (MIG、MAG、FCAW included)	13
GTAW	Gas tungsten arc welding	141
GFW	Gravity feed welding	112
EGW	Electro-gas welding	73
LBW	Laser beam welding	52

3.3.8.2 After satisfactory welding operator's test, the coverage of base metal is the same as that specified by welder's qualification test (see 4.3.4 of Chapter 4, PART THREE of Rules for Materials and Welding for details), but the thickness and pipe diameter are not limited.

3.3.8.3 The coverage of welding positions is the same as that specified by welder's qualification test (see 4.3.7.1 of Chapter 4, PART THREE of Rules for Materials and Welding for details).

3.3.8.4 Coverage of joint types and processes are as follows:

(1) Satisfactory butt welding test may cover fillet welding but not the reverse.

(2) One-sided welding without backing may cover one-sided welding with backing (Double-welded groove welds are considered welding with backing) but not the reverse.

(3) A change from single pass per side to multiple passes per side but not the reverse.

(4) Multiple electrode welding may cover single electrode welding but not the reverse.

3.3.8.5 For mechanized welding, the following changes require re-qualification:

(1) change from direct visual control to remote visual control and vice versa;

(2) deletion of automatic arc length control;

(3) deletion of automatic joint tracking;

(4) deletion of consumable inserts.

3.3.8.6 For automatic welding, the following changes require re-qualification:

(1) welding with or without arc sensor and/or joint sensor;

(2) change of type of welding unit (including change in the robot control system).

3.3.8.7 A welding operator shall be requalified whenever a change from automatic to machine welding is made for the same welding process.

3.3.8.8 Welding operators who passed the qualification test for welding boilers and pressure vessels can be deemed as qualified for welding ships and offshore structures when the welding variables above are same.

A new Appendix 3B is added:

Appendix 3B Example of Welder's Qualification Certificate[①②]

WELDER'S QUALIFICATION CERTIFICATE

Welder's name:	Date of birth:	Photograph
Cert. No:	Sex:	
Identification No.		
WPS/pWPS No.		
Employer's name and address		
Date of initial approval	Product type	
This is to certify that the welder has passed the qualification test [/and re-validation record audit] according to the rules of CCS, and is qualified to undertake welding operation specified in range of qualification of this certificate.		

Items	Test piece	Range of qualification
Welding process		
Base metal		
Filler metal type		
Plate /pipe wall thickness		
pipe outside diameter		
Type of welded joint		
Welding position		
Other details		

This certificate is issued at [place] , and valid until [DD/MM/YYYY] .

Signature/seal of surveyor: Issued on [DD/MM/YYYY] .

RECORDS OF SUPERVISION BY EMPLOYER EVERY SIX MONTHS

	Report No. to be reviewed	Date of report	Signature of Employee	Date of signature
1				
2				
3				
4				
5				
6				

TEST RECORD

Type of test	Performed and accepted	Not required
Visual examination		
Radiographic examination		
Surface examination		
Macro examination		
Fracture test		
Bend test		
Additional tests		

Notes: ① Certificate is to be re-issued after periodical verification is carried out, with this form of welder's qualification certificate, in accordance with Rules for Materials and Welding (retest every 3 years or verification every 2 years). This form of certificate apply to initial test and periodical verification.

② "Test Record" can be as the back page of a certificate, and also can be as a separate file.