No. 17 (1987) (Rev.1 Mar 2020) Guidelines for the Acceptance of Manufacturer's Quality Assurance Systems for Welding Consumables

1. General

1.1 Introduction

1.1.1 These guidelines supplement IACS UR W17 Approval of consumables for welding normal and higher strength hull structural steels - Rev.4 Jan 2016 and UR W23 Approval of Welding Consumables for High Strength Steels for Welded Structures - Rev.2 Apr 2018 to facilitate a uniform procedure for the acceptance of manufacturer's quality assurance systems for welding consumables as an alternative to the annual procedures given in the above documents. Grades Y89 and Y96 are excluded from these guidelines.

Although the adoption of these guidelines is not mandatory, it is recommended that, in case the Classification Society decides to implement them, all the clauses hereafter be fully complied with by the manufacturer, without exclusions.

1.1.2 By acceptance of the manufacturer's quality assurance system the Classification Society delegates to the manufacturer the responsibility for checking that the necessary inspections and tests are carried out.

1.1.3 By acceptance of the manufacturer's quality assurance system the Classification Society obliges the manufacturer to comply with the applicable requirements of the Classification Society Rules.

1.1.4 The Classification Society will check the effectiveness of the quality assurance system through verification of the Quality Management System (QMS).

1.2 Conditions

1.2.1 The conditions for the manufacturer to be granted the permission to carry out inspection and testing of welding consumables without the presence of a Surveyor are that:

- The manufacturer will implement a QMS according to a national or international standard certified by an accredited certification body or recognised by the Society.
- The QMS will be documented by the manufacturer, written hard copy or digitally. It should contain a statement that it has been approved and authorised for use by the company management. The latest version is be available to the Classification Society upon request.
- The manufacturer will undertake to implement the QMS and provide personnel with the roles and responsibilities for implementing the QMS.

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1.3 Scope

1.3.1 These guidelines and acceptance of any manufacturer's quality assurance system for welding consumables apply to maintenance of approvals already granted for welding consumables and auxiliary materials. Initial approval tests are to be carried out in accordance with the Classification Society Rules and in the Surveyor's presence.

1.3.2 The acceptance of a manufacturer's quality assurance system applies only to the manufacturing works, for which it has been granted.

1.4 Definitions*

1.4.1 Quality: The degree to which a set of inherent characteristics of an object fulfils the requirement.

1.4.2 Quality Assurance (QA): Part of quality management focused on providing confidence that the quality requirements will be fulfilled.

1.4.3 Quality Management System (QMS): Part of the management system relating to quality.

1.4.4 Audit: Systematic independent and documented process for obtaining evidence and evaluating it objectively to determine the extent

1.4.5 External provider: A provider of products and/or services which is not part of an organisation (the manufacturer).

* These definitions are in substantial agreement with ISO 9000:2015.

1.5 Acceptance Procedure

1.5.1 Application for acceptance of a manufacturers' QA system for welding consumables is to be submitted to the Classification Society in writing, attaching the documentation listed in Section 3. The works producing and packing the final product will be regarded as the manufacturer.

1.5.2 The Classification Society will carry out an initial audit, checking the QA system for compliance with these guidelines and Classification Society Rules.

1.5.3 The manufacturer will have to demonstrate that throughout the manufacturing process the QA system functions effectively and is capable of ensuring the quality required and of detecting nonconformity and initiating corrective and preventive actions.

1.5.4 The manufacturer will have to demonstrate that records will be kept on all QA measures, enabling the Classification Society to check the efficiency of the QA system at any time and to verify whether the product meets its quality requirements.

1.5.5 Following successful audit of the works, the Classification Society will issue a certificate of acceptance of the Quality Assurance System for Welding

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Consumables. The manufacturer is obliged to advise the Classification Society of any essential modifications to either the manufacturing process or the QA system.

1.5.6 Approval by another organisation will not be accepted as sufficient evidence that arrangements for manufacture and quality comply with these requirements.

1.6 Period of Validity

1.6.1 The period of validity of an acceptance in accordance with the these guidelines is a maximum of 5 years, provided that during this period approved welding consumables and/or auxiliary materials are manufactured without any major interruptions, the quality of which is checked by manufacturing quality controls and the effectiveness of the QA system is controlled by periodic quality audits.

1.6.2 Prior to expiry of the period of validity, it is the manufacturer's responsibility to apply for renewal.

1.6.3 The Classification Society may withdraw the acceptance, if the conditions under which it was granted no longer apply or if any major nonconformities are found in either the QA system or the product concerned.

2. Requirements

2.1 Organisation and Personnel

2.1.1 Within the plant the quality assurance function is to be independent of the production departments. The person placed in charge of the department is be directly responsible to the company management and have the authority necessary to enable planning of all the requisite QA functions and to implement them effectively.

2.1.2 Personnel responsible for planning and implementing QA functions are to demonstrate competency for the function through suitable qualifications and experience. The professional qualifications and experience of personnel are to be documented and available upon request.

2.1.3 Manufacturers shall prepare an organisation chart which clearly describes and defines the areas of responsibility and activity of each individual. Any change in the personnel occupying responsible positions or changes in areas of responsibility and activity are to be brought to the attention of the Classification Society.

2.2 Quality Planning

2.2.1 The requirements of subsequent sections are to be documented by the manufacturer to ensure the quality assurance of welding consumables.

2.2.2 The manufacturer’s quality assurance system for welding consumables is to specify the following quality assurance requirements:

a) Compliance with the Classification Society Rules and any additional applicable standards or specifications;

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b) Early identification of existing (and potential) nonconformity;

c) Customer requirements;

d) Effective corrective and preventative actions.

e) Maintenance and calibration of equipment which determines or influences quality.

2.3 Measuring and Testing Equipment

2.3.1 The manufacturer is to provide the measuring and testing appliances and equipment needed for the proper and competent performance of the controls and tests as required by the quality assurance system.

2.3.2 All measuring and testing equipment which determines or influences quality are to be regularly and competently maintained and are to be adjusted or calibrated in accordance with a recognised national standard. These operations shall be performed by competent persons appointed for that purpose.

2.3.3 The planning of maintenance and calibration activities, the persons responsible and the relevant records form part of the schedule under Section 2.2 and the associated documentation and shall be made available to Classification Society upon request.

2.4 Corrective and Preventive Actions

2.4.1 Manufacturers are required to devise and regularly implement methods of detecting and correcting and preventing any factors in the production process and in quality assurance which are detrimental to quality. With this in view, nonconformities detected and the improvements needed as well as the quality audits specified in Section 5 are to be subjected to constant analysis and evaluation. The causes of the faults are to be ascertained and effective measures applied to improve quality.

2.5 Documentation

2.5.1 The manufacturer is to keep suitable records of all QA functions, inspections and test results. The records should give details of the nature and extent of the nonconformities, of improvements and retests, where applicable, and should indicate any corrective and preventive actions needed.

2.5.2 The records (test reports, inspection reports, customer feedback, etc) are to be made available to the Classification Society on request, Additional records may be requested by the Classification Society. All records including control of changes (e.g. version control) shall be kept by the works for at least five years.

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3. Documents

3.1 The manufacturer is to compile the following documentation in the QMS:

a) Principles and scope of the system in accordance with Sections 1.1, and 1.3;

b) Description of the works production and testing facilities and methods;

c) Details of any computer facilities and the systems using those facilities for production and quality control;

d) Organisation of the works and the Quality Assurance Department in accordance with Section 2.1;

e) Description of quality assurance functions and procedures in accordance with Sections 2.2 to 2.5 and 4;

f) Details of systems and methods used to maintain a satisfactory standard of finished products which comply with the Rule requirements. This information is to be presented in the form of a flow chart indicating all stages where testing and inspection are carried out;

g) Work and inspection instructions in accordance with Sections 3.1 and 4;

h) Procedures for the handling of non-conforming products, see Section 4.6;

i) Corrective and preventive procedures in accordance with Section 2.4;

j) Procedures for authorisation and recording of concessions;

k) Instructions for the compilation and evaluation of the documentation described in Section 2.5;

l) Instructions for the performance and evaluation of quality audits in accordance with Section 5.1.

3.2 Work and Inspection Instructions

3.2.1 For the performance of quality assurance functions manufacturers shall compile and maintain documented work and inspection instructions which relate to the successive stages of manufacture and inspection.

3.2.2 The work instructions are to specify the sequence and interrelationship of the various QA functions and are to state who is responsible for carrying them out.

3.2.3 Instructions for the inspection of consumables should include the scope, method and equipment used and are to specify the acceptance criteria of in-process materials and final products.

3.2.4 Manufacturers shall ensure that the latest versions of work and inspection instructions are made available to all sections and individuals responsible for carrying out QA functions, and manufacturers shall verify that these are complied with.

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3.3 Standards and Manufacturers' Specifications

3.3.1 The performance and assessment of QA measures may also be based on generally accepted rules of technology, such as standards, and on manufacturers' specifications (data sheets). These documents shall be listed in the QMS and/or instructions for testing or attached to these and incorporated into the acceptance procedure (Section 1.5).

4. Quality Controls

4.1 External Providers

4.1.1 Raw materials, rather than finished products, may be supplied by external providers.

4.1.2 Services such as maintenance, calibration, etc. may be supplied by external providers.

4.1.3 The manufacturer is to ensure that there are sufficient controls from external providers to ensure compliance with Classification Society Rule requirements and/or any additional applicable standard, specification or customer requirement.

4.1.4 The manufacturer will evaluate and monitor the performance of external providers to ensure compliance is maintained. It shall retain documented evidence of these activities.

4.2 Manufacturing Control

4.2.1 During manufacture, the manufacturer is to carry out appropriate checks ensuring the suitability of the process, quality of the intermediate product and timely initiation of any corrective and preventive measures required.

4.2.2 Production controls are to be carried out in accordance with a fixed plan and all (including negative) results obtained are to be recorded and made available for review by the Classification Society upon request. Depending on the kind of product concerned, the controls are to include the checking of surfaces, drying, marking, and dimensions, as well as concentricity.

4.2.3 A relevant note printed on the packaging, such as a batch number, is to provide traceability of the materials used, the process of manufacture and the inspection and tests performed.

4.3 Identification and Marking

4.3.1 Manufacturers shall establish, apply and supervise a marking system enabling intermediate products to be identified at any stage of manufacture without any confusion.

4.3.2 The system is to be checked, i.e. the materials being manufactured are to be identified in accordance with a fixed plan. Relevant documents shall be prepared on the performance of these checks.

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4.4 Final Inspection and Testing

4.4.1 The manufacturer should implement a system of inspecting and testing of the final products so that only welding consumables and auxiliary materials conforming to rule requirements or any additional applicable standard, specification or customer requirement are packed and delivered. The system should include regular weldability checks.

4.5 Weld Assemblies and Testing of the Mechanical Properties

4.5.1 At least once per year, from the date of approval, the manufacturer shall make welded assemblies and perform required tests of all approved welding consumables to ensure compliance with the annual test requirements of UR W17 and UR W23.

4.5.2 All test results, including unsatisfactory results, are to be reported to the Classification Society before or during the audit as per section 5.2. Any corrective and preventive actions as a result of unsatisfactory tests are to be included.

4.6 Non-conforming Materials and Products

4.6.1 The manufacturer is to establish a procedure for the detection and subsequent rectification of non-conforming materials and products. This procedure is to include the prompt detection and withdrawal of non-conforming material and product, the corrective and preventive actions required, and the necessary retesting required.

4.6.2 The manufacturer is to ensure that the use of non-conforming materials and products is prevented.

4.6.3 Records are to be kept covering the nature and extent of non-conforming materials and products, the subsequent treatment and, where applicable, retests and any corrective and preventive measures which may be introduced. These records are to be compiled and evaluated in such a way as to enable conclusions to be drawn regarding the current quality level and hence the effectiveness of the QA system for welding consumables.

5. Quality Audits

5.1 Internal Quality Audits

5.1.1 During the period of validity of approval of a works QA system of welding consumables, systematic checks (quality audits) are to be carried out by the manufacturer at regular intervals on the whole, or parts of, the system. The audit scope and schedule are to be documented by the manufacturer and approved by the Classification Society. The audits are to be performed by competent personnel and who are not employed in, or responsible for, the areas of activity concerned.

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5.1.2 Quality audits are to include verification that:

a) Manufacture and quality assurance are being carried out in accordance with documented procedures;

b) Manufacture, inspection and monitoring equipment is in good working order and is properly calibrated;

c) Non-conformance in manufacture are detected without fail and the necessary steps are taken to overcome them and retest;

d) The necessary care is being taken to identify and eliminate the causes of non-conformances;

e) The documentation is complete and provides a reliable history of all QA functions and their effectiveness.

5.1.3 Records are to be kept of all quality audits. These records are to contain full details of the checks carried out on the whole, or parts of, the QA system including the results obtained and any corrective measures introduced. On request, these records together with the relevant documents are to be presented to the Surveyor.

5.2 Quality Audits by the Classification Society

5.2.1 In addition to the internal audit required by paragraph 1.5.2 ~~Q~~quality audits will be made by the Classification Society as follows:

a) Upon expiry of the period of validity (see 1.5.1) a renewal audit is to be made;

b) Intermediate audits are to be made at intervals not exceeding 1 (one) year;

c) Spot checks are to be made, sufficient in frequency and character to satisfy the Surveyors that the originally established procedures are being maintained.

5.2.2 A renewal audit includes checks that throughout the manufacturing process the quality assurance system functions effectively and is capable of assuring the quality required and detecting non-conformity and initiating corrective and preventive actions.

5.2.3 An intermediate audit includes the items as 5.2.2 but it will cover less detail of the manufacturer’s quality assurance system.

5.2.4 A spot check is a random check throughout the approval period covering specific aspects of the quality assurance system. (For example, during other visits by a surveyor, as a follow up to checking non-conformity of the quality assurance system discovered during renewal/intermediate audits).

5.2.5 The results of all audits and spot checks are to be documented and retained for the approval period.

5.2.6 For this purpose the Surveyor of the Classification Society shall be given access to the manufacturing plant and to the manufacturing documents and records. The works shall also provide the Surveyor with reasonable human and material assistance e (e.g. services, premises and instruments) to enable the duties to be carried out.

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5.3 Management review of QA System

5.3.1 The manufacturer's management shall review the accepted quality assurance system at planned intervals to ensure its continued suitability and effectiveness. Records of the review are to be maintained.

5.3.2 Each review is to include an assessment of the internal quality audits (see 5.1).

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