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

1. General

1.1 Introduction

1.1.1 The present guidelines are to serve as a supplement to the IACS "Unified Requirements for Approval of Consumables for Welding Normal and Higher Strength Hull Structural Steels" to facilitate a uniform procedure for the acceptance of manufacturer's quality assurance systems as an alternative to the annual procedures given in the above document.

1.1.2 By acceptance of a quality assurance system the Classification Society delegates to manufacturers the responsibility for proper performance of part of the prescribed checking and testing.

1.1.3 By acceptance of the quality assurance system the Classification Society obliges the manufacturer to comply with the requirements laid down in the Rules and with the requirements as laid down in the approvals granted and/or in the present guidelines and to furnish proof thereof to the Classification Society.

1.1.4 The Classification Society will check the efficiency of the quality assurance system on the basis of documentation to be prepared by the manufacturer, within the scope of an initial and later periodical workshop inspection(s). The maintenance of the approval(s) granted is conditional on a positive result of such checks.

1.2 Scope

1.2.1 The present guidelines and acceptance of any manufacturer's quality assurance system granted in accordance therewith exclusively applies to maintenance or extension of approvals already granted for welding consumables and auxiliary materials. Initial approval tests are to be carried out in accordance with the Rules and in the Surveyor's presence.

1.2.2 The acceptance of a manufacturer's quality assurance system applies only to the works or part of works, for which it has been granted. Any independent branches or licensees operating at some other place may on application be included in the approval, if fully covered by the quality assurance system approved.

1.3 Definitions*

1.3.1 Quality:
Conformance with specified requirements.

1.3.2 Quality Assurance (QA):
Measures to attain the required quality.

1.3.3 Quality assurance system (QA System):
A fixed organisational and sequential procedure for the implementation of quality assurance.

1.3.4 Quality (system) audit:
Independent assessment of the effectiveness of a quality assurance system or its parts.

* These definitions are in substantial agreement with ISO 8402.

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1.4 Acceptance Procedure

1.4.1 Application for acceptance of a manufacturers' QA system 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 manufacturers.

1.4.2 The Classification Society will carry out a quality audit, checking the QA system for compliance with the approved documentation.

1.4.3 Manufacturers will have to furnish proof that throughout the manufacturing process the QA system functions efficiently and is capable of ensuring the quality required and of detecting deficiencies and initiating corrective actions.

1.4.4 Manufacturers will have to furnish proof 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.

1.4.5 Following successful checking of the works, the Classification Society will issue a certificate of acceptance of the QA system. Manufacturers are obliged to automatically advise the Classification Society of any essential modifications to either the manufacturing process or the QA system.

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

1.5 Period of Validity

1.5.1 The period of validity of an acceptance in accordance with the present regulations is 3 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 regular quality controls and the efficiency of the QA system for which is controlled by regular quality audits.

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

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

2. Requirements

2.1 Quality Policy Statement

2.1.1 Manufacturers will have to make a statement, by which they undertake to concentrate all their efforts on implementing the QA system and to provide the personnel entrusted therewith with all relevant powers and facilities. This statement must be signed by the management and the head of the QA department.

2.2 Organisation and Personnel

2.2.1 Within the plant the quality assurance function is to be entrusted to an internal department which is independent of the production departments. The person placed in charge of the department must be directly responsible to the company management and must be vested with the authority necessary to enable him to plan all the requisite QA functions and to implement them effectively.

2.2.2 Personnel responsible for planning implementing QA functions must hold the necessary qualifications for the work. The professional qualifications of personnel are to be attested by certificates, documentary evidence of professional activity or similar documentation.

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2.2.3 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 immediately drawn to the attention of the Classification Society.

2.3 Quality Planning

2.3.1 All quality assurance functions are to be described and set out by the manufacturers within a clearly defined schedule compatible with the manufacturing process. The schedule must ensure compliance with the requirements of the Rules and with those of any additional standards or specifications applicable throughout all stages of production.

2.3.2 The schedule must provide for the early detection of existing (and potential) deficiencies, trends or circumstances which might result in quality defects, and must ensure speedy and effective corrective actions. The schedule shall include as a minimum requirement the quality controls specified in Section 4.

2.3.3 Manufacturers shall programme and carry out quality assurance functions, inspections and checks at a sufficiently early stage to ensure that any improvements needed can still be performed without difficulty and that the characteristics of any component which cannot be verified later are duly tested and placed on record according to schedule.

2.4 Measuring and Testing Equipment

2.4.1 Manufacturers must provide the measuring and testing appliances and equipment needed for the proper and competent performance of the controls and tests called for by the quality assurance system. Manufacturers must also equip their plant with the measuring and control devices required to ensure the quality demanded.

2.4.2 All measuring and testing appliances and other equipment which determines or influences quality are to be regularly and competently maintained according to a fixed schedule and are to be adjusted or calibrated where this is specified. These operations shall be performed by the works personnel or by persons appointed by the work for that purpose.

2.4.3 The programme, the persons responsible and the relevant records form part of the schedule under Section 2.3 and the associated documentation and shall be made available to the Surveyor of the Classification Society on demand.

2.5 Corrective Actions

2.5.1 Manufacturers are required to devise and regularly implement methods of detecting and correcting any factors in the production process and in quality assurance which are detrimental to quality. With this in view, the faults detected and the improvements needed as well as the quality audits called for 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.

2.6 Documentation

2.6.1 Manufacturers must keep suitable records of all QA functions, inspections and checks which substantiate the efficiency of the system and the required quality of the components. The records must give details of the nature and extent of the discrepancies and faults, of improvements and retests, where applicable, and must indicate any corrective actions needed.

2.6.2 The records (test reports, inspection reports, etc) are to be made available to the Classification Society on request at any time, or, where appropriate, a copy shall be passed to the Society for examination. The Classification Society may, in addition, stipulate the regular submission of certain project-related records, All records shall be preserved by the works for at least three years, but in any case up to the next works inspection.

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3. Documents

3.1 QA Manual

3.1.1 Manufacturers are required to compile a QA manual describing the QA system. The QA manual must have been approved, signed and authorised for use by the company management. The latest version must be available to all concerned.

3.1.2 The QA manual shall contain at least the following information:

a) Principles and scope of the system in accordance with Sections 1.1, 1.2 and 2.1
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 2.2
e) Description of quality assurance functions and procedures in accordance with Sections 2.3 to 2.6 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 3.2 and 4
h) Procedures for the handling of non-conforming products, see Section 4.6
i) Corrective procedures in accordance with Section 2.5
j) Procedures for authorisation and recording of concessions
k) Instructions for the compilation and evaluation of the documentation described in Section 2.6
l) Instructions for the performance and evaluation of quality audits in accordance with Section 5.1

3.1.3 The QA manual is to be submitted for approval to the Classification Society together with the application described in Section 1.4 and provides the basis for the assessment and approval of the works QA system.

3.2 Work and Inspection Instructions

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

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

3.2.3 Besides details of the nature and scope of the inspections and the inspection methods and equipment (appliances) used, the inspection instructions must specify criteria governing the acceptance, repair and rejection of preliminary or in-process materials or 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.

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 QA manual and/or instructions for testing or attached to these and incorporated into the acceptance procedure (cf. Section 1.4).

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4. Quality Controls

4.1 Bought-in Materials

4.1.1 By appropriate purchase specifications to suppliers, by inspections of incoming goods and by proper storage and marking manufacturers are to ensure that only conforming materials are used.

4.1.2 The supply, identification, marking and follow-up of materials during manufacture must conform to fixed rules and be duly recorded. The appropriate materials certificates are to be appended to the relevant documentation.

4.2 Manufacturing Control

4.2.1 During current manufacture, depending on the manufacturing method and product, manufacturers will have to carry out appropriate checks ensuring suitability of the process, adequate quality of the intermediate product and timely initiation of any corrective measures required.

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

4.3 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 performance of these checks.

4.4 Final Inspection, Packing and Storage

4.4.1 Manufacturers must ensure by regular checks of the final products that only unobjectionable and intact welding consumables and auxiliary materials are packed and delivered. Depending on the kind of product, these include checks of dimensions and/or weights, of appearance (i.e. checks for damages), as well as regular weldability checks.

4.4.2 Records are to be prepared on the checks and results obtained thereby. A relevant note printed on the packing (batch no and the like) must provide traceability of the process of manufacture and tests and checks performed, which will have to include checks of transportation and storage at the manufacturers.

4.5 Test Weldings and Testing of the Mechanical Properties

4.5.1 At least once per year, counting from the date of approval, the manufacturer shall make welded assemblies and mechanical tests, as stipulated in the Society's Rules, of all approved welding consumables.

4.5.2 The welded assemblies and tests, including all - even unsatisfactory - results shall be reported. The protocols should be signed by the tester and the head of the QA department and handed to the Classification Society's Surveyor before or on the occasion of the audits, as per Section 5.2. Any corrective actions effected, too, shall be indicated in the protocols.

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4.6 Rejected Materials and Products

4.6.1 Manufacturers are required to establish a procedure for the detection and subsequent treatment of defective materials and products. This procedure must encompass the prompt detection and withdrawal of defective materials, decisions concerning subsequent action, how this action is to be performed and the necessary retesting to be applied.

4.6.2 The procedure must preclude the unauthorised further use of defective and withdrawn materials. It is to be made clear where responsibility lies for the decision concerning the subsequent action to be taken.

4.6.3 Records are to be kept covering the nature and extent of defects, the subsequent treatment and, where applicable, retests and any corrective 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.

5. Quality Audits

5.1 Internal Quality Audits

5.1.1 During the period of validity of approval of a works QA system systematic checks (quality audits) are to be carried out at regular intervals on the whole, or parts of, the system. The procedure followed is to be set down in writing and is to be approved by the Classification Society. The audits are to be performed by personnel specially trained for the purpose who are not themselves employed in, or responsible for, the areas of activity concerned.

5.1.2 Quality audits are to include verification that:

a) Manufacture and quality assurance are being carried out in accordance with valid documents and established procedures and no inadmissible modifications have been introduced;
b) Manufacture, inspection and monitoring equipment is in good working order compatible with the satisfactory performance of quality assurance functions;
c) Faults in manufacture are detected without fail and the necessary steps taken to overcome them and retest;
d) The necessary care is being taken to identify and eliminate the causes of deficiencies;
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 pertinent documents are to be presented to the Surveyor, and shall be kept together and held in readiness for the (repeat) works inspection for extension of the Classification Society's approval.

5.2 Quality Audits by the Classification Society

5.2.1 Quality audits will be made by the Classification Society as follows:

a) Upon expiry of the period of validity (see 1.5.1) a comprehensive 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 For this purpose the Surveyor of the Classification Society shall at all times 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 him to perform his duties.