

W9

(1978)
(Rev. 1
1995)
(Rev.2 May
2004)

Grey iron castings

W9.1 Scope (1978)

W9.1.1 All major grey iron castings, as defined in the relevant construction Rules, are as be manufactured and tested in accordance with the requirements of the following paragraphs.

W9.1.2 Alternatively, castings which comply with national or proprietary specifications may be accepted provided such specifications give reasonable equivalence to these requirements or otherwise are specially approved or required by the Classification Society.

W9.1.3 Where small castings are produced in large quantities, the manufacturer may adopt alternative procedures for testing and inspection subject to the approval of the Classification Society.

W9.2 Manufacture (1978)

W9.2.1 All major castings are to be made at foundries where the manufacturer has demonstrated to the satisfaction of the Classification Society that the necessary manufacturing and testing facilities are available and are supervised by qualified personnel. A programme of approval tests may be required in accordance with the procedures of individual Classification Societies.

W9.2.2 Suitable mechanical methods are to be employed for the removal of surplus material from castings. Thermal cutting processes are not acceptable, except as a preliminary operation to mechanical methods.

W9.2.3 Where castings of the same type are regularly produced in quantity, the manufacturer is to make any tests necessary to prove the quality of the prototype castings and is also to make periodical examinations to verify the continued efficiency of the manufacturing technique. The Surveyor is to be given the opportunity to witness these tests.

W9.3 Quality of castings (1978)

W9.3.1 Castings are to be free from surface or internal defects which would be prejudicial to their proper application in service. The surface finish is to be in accordance with good practice and any specific requirements of the approved plan.

W9.4 Chemical composition (1978)

W9.4.1 The chemical composition of the iron used is left to the discretion of the manufacturer, who is to ensure that it is suitable to obtain the mechanical properties specified for the castings. When required by individual Classification Societies the chemical composition of ladle samples is to be reported.

W9.5 Heat treatment (1978)

W9.5.1 Except as required by W9.5.2 castings may be supplied in either the as cast or heat treated condition.

W9.5.2 For some applications, such as high temperature service or where dimensional stability is important, castings may require to be given a suitable tempering or stress relieving heat treatment.

W9.6 Mechanical tests (Rev.2 May 2004)

W9.6.1 Test material sufficient for the required tests and for possible re-tests is to be provided for each casting or batch of castings.

W9.6.2 Separately cast test samples are to be used unless otherwise agreed between the manufacturer and purchaser and generally are to be in the form of bars 30 mm in diameter and of a suitable length. They are to be cast from the same ladle as the castings in moulds of the same type of material as the moulds for the castings and are not to be stripped from the moulds until the metal temperature is below 500°C. When two or more test samples are cast simultaneously in a single mould, the bars are to be at

least 50 mm apart as given in Fig. 1.

W9.6.3 Integrally cast samples may be used when a casting is more than 20 mm thick and its mass exceeds 200 Kg, subject to agreement between the manufacturer and the purchaser. The type and location of the sample are to be selected to provide approximately the same cooling conditions as for the casting it represents and also subject to agreement.

W9.6.4 With the exception of 9.6.7, at least one test sample is to be cast with each batch.

W9.6.5 With the exception of 9.6.6, a batch consists of the castings poured from a single ladle of metal, provided that they are all of similar type and dimensions. A batch should not normally exceed two tonnes of fettled castings and a single casting will constitute a batch if its mass is 2 tonnes or more.

W9.6.6 For continuous melting of the same grade of cast iron in large tonnages the mass of a batch may be increased to the output of 2 hours of pouring.

W9.6.7 If one grade of cast iron is melted in large quantities and if production is carefully monitored by systematic checking of the melting process, such as chill testing, chemical analysis or thermal analysis, test samples may be taken at longer intervals.

W9.6.8 All test samples are to be suitably marked to identify them with the castings which they represent.

W9.6.9 Where castings are supplied in the heat treated condition, the test samples are to be heat treated together with the castings which they represent. For cast-on-test samples the sample shall not be cut off from the casting until after the heat treatment.

W9.6.10 One tensile test specimen is to be prepared from each test sample and for 30mm diameter samples is to be machined to the dimensions given in W.2.4. Where test samples of other dimensions are specially required the tensile test specimens are to be machined to agreed dimensions.

W9.6.11 All tensile tests are to be carried out using test procedures in accordance with W2. Unless otherwise agreed all tests are to be carried out in the presence of the Surveyors.

9.7 Mechanical Properties (Rev.2 May 2004)

W9.7.1 Only the tensile strength is to be determined and the results obtained from tests are to comply with the minimum value specified for the castings being supplied. The value selected for the specified minimum tensile strength is to be not less than 200 N/mm² but subject to any additional requirements of the relevant construction Rules. The fractured surfaces of all tensile test specimens are to be granular and grey in appearance.

W9.7.2 Re-test requirements for tensile tests are to be in accordance with UR W2.

9.8 Inspection (1978)

W9.8.1 All castings are to be cleaned and adequately prepared for examination. The surfaces are not to be hammered, peened or treated in any way which may obscure defects.

W9.8.2 Before acceptance, all castings are to be visually examined including, where applicable, the examination of internal surfaces. Unless otherwise agreed, the verification of dimensions is the responsibility of the manufacturer.

W9.8.3 Supplementary examination of castings by suitable nondestructive testing procedures is generally not required except in circumstances where there is reason to suspect the soundness of the casting.

W9.8.4 When required by the relevant construction Rules, castings are to be pressure tested before final acceptance.

W9.8.5 In the event of any casting proving defective during subsequent machining or testing it is to be rejected notwithstanding any previous certification.

W9.9 Rectification of defective castings (1978)

W9.9.1 At the discretion of the Surveyor, small surface blemishes may be removed by local grinding.

W9.9.2 Subject to the prior approval of the Surveyor, castings containing local porosity may be rectified by impregnation with a suitable plastic filler, provided that the extent of the porosity is such that it does not adversely affect the strength of the casting.



W9.9.3 Repairs by welding are generally not permitted.

W9.10 Identification of castings (Rev. 1995)

W9.10.1 The manufacturer is to adopt a system of identification, which will enable all finished castings to be traced to the original ladle of metal. The Surveyor is to be given full facilities for so tracing the castings when required.

W9.10.2 Before acceptance, all castings which have been tested and inspected with satisfactory results are to be clearly marked by the manufacturer. At the discretion of individual Classification Societies any of the following particulars may be required:

- (i) Quality of cast iron.
- (ii) Identification number or other marking which will enable the full history of the casting to be traced.
- (iii) Manufacturer's name or trade mark.
- (iv) The Classification Society's name, initials or symbol.
- (v) Abbreviated name of the Classification Society's local office.
- (vi) Personal stamp of Surveyor responsible for inspection.
- (vii) Where applicable, test pressure.
- (viii) Date of final inspection

W9.10.3 Where small castings are manufactured in large numbers, modified arrangements for identification may be specially agreed with the Classification Society.

W9.11 Certification (1978)

W9.11.1 The manufacturer is to provide the Surveyor with a test certificate or shipping statement giving the following particulars for each casting or batch of castings which has been accepted:

- (i) Purchaser's name and order number.
- (ii) Description of castings and quality of cast iron.
- (iii) Identification number.
- (iv) Results of mechanical tests.
- (v) Where applicable, general details of heat treatment.
- (vi) When specially required, the chemical analysis of ladle samples.
- (vii) Where applicable, test pressure.

