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INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION

R 404

GENERAL TECHNICAL DELIVERY REQUIREMENTS FOR STEEL

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For each individual country the only valid standard is the national standard of that country.

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BRIEF HISTORY

The ISO Recommendation R 404, *General Technical Delivery Requirements for Steel*, was drawn up by Technical Committee ISO/TC 17, *Steel*, the Secretariat of which is held by the British Standards Institution (BSI).

Work on this question by the Technical Committee began in 1953 and led, in 1962, to the adoption of a Draft ISO Recommendation.

In October 1962, this Draft ISO Recommendation (No. 526) was circulated to all the ISO Member Bodies for enquiry. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies:

Australia	Hungary	Portugal
Austria	India	Romania
Belgium	Iran	Spain
Burma	Ireland	Sweden
Canada	Italy	Switzerland
Chile	Japan	Turkey
Czechoslovakia	Netherlands	U.A.R.
Denmark	New Zealand	United Kingdom
Finland	Norway	U.S.A.
France	Poland	U.S.S.R.
		Yugoslavia

No Member Body opposed the approval of the Draft.

The Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided, in December 1964, to accept it as an ISO RECOMMENDATION.

ISO Recommendation R 404 December 1964

GENERAL TECHNICAL DELIVERY REQUIREMENTS FOR STEEL

1. SCOPE

The general technical delivery requirements stated in this ISO Recommendation apply to crude and wrought semi-finished and finished steel products.

In cases where the product standards provide different requirements, these different requirements should apply.

In special cases, variations to the requirements, as stated in the order, may be agreed.

2. ORDERING

The user should select the grade of steel and the type of product. He may be advised in his selection by the manufacturer who, unless otherwise agreed in the order, is not bound by this advice.

The order should contain all the necessary information. This information is specified

either by reference to a standard, with, if necessary, the variations allowed by the said standard,

or by a precise statement of the characteristics required.

The products may be ordered with or without acceptance tests. All the conditions of inspection or acceptance should be stated in the order by reference either to a standard or to some special agreement.

In the case of a special agreement, the following may be specified:

1. the place of acceptance, in those cases where the tests cannot be made, as is usual, in the works of the manufacturer,
2. if necessary, one of the documents referred to in section 4, which should accompany the consignment,
3. the presence of an inspector in cases where inspection is called for,
4. the division of the consignment into batches for acceptance and the grouping of the remaining batches (see clause 5.2),
5. any special procedure for additional tests where this is different from that referred to in clause 6.5,
6. the methods of analysis to be used when they are not given in the product standard (see clause 7.7),
7. the permissible deviation on chemical analysis (see clauses 7.3 to 7.5),
8. the method of selecting samples and test pieces,
9. the number and the nature of the tests,
10. the test methods,
11. the detection of internal faults by means of special techniques (see clause 8.3),
12. other possible acceptance conditions.

3. MANUFACTURING PROCESSES

Unless otherwise agreed in the order, the processes used in making the steel and the product are left to the discretion of the manufacturer.

When he so requests, the user should be informed what steelmaking process is being used.

It is understood that

by the steelmaking process, one means the sequence of operations which include the solidification of the metal,

by the product-making process, one means the sequence of operations following the solidification of the metal and ending with the delivery of the product.

4. DOCUMENTS

If the order or the product standard requires that the consignment should comply with a certificate or report, this document may be one of the following types:

4.1 Ordered without user's inspection

4.1.1 *Statement of compliance with the order*

The manufacturer states that, based upon inspection previously undertaken and results previously obtained on the representative tests carried out, the delivered products conform to the requirements of the order.

4.1.2 *Report based on quality control*

The report, made out by the manufacturer, contains the results of control tests on current production carried out on products having the same method of manufacture as the consignment, but not necessarily from the delivered products themselves.

4.1.3 *Works certificate*

The certificate, made out by the manufacturer, contains the results of all the required tests and certifies that the tests have been carried out by the manufacturer on samples taken from the delivered products themselves.

4.2 Ordered with user's inspection

4.2.1 *Test certificate*

The test certificate, signed by an inspector chosen by the customer, * contains the results of all the required tests and certifies that the tests have been carried out by the manufacturer on samples taken from the delivered products themselves.

4.2.2 *Certificate of acceptance*

If, by special agreement, the test certificate is to be signed by both the manufacturer and the inspector, it is called "certificate of acceptance".

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* This agent may, for all or part of these operations and by mutual agreement, be a member of the personnel of the manufacturer's works.

5. CARRYING OUT ACCEPTANCE TESTS

5.1 Place of acceptance

The selection of samples, the preparation of test pieces and the tests themselves should be carried out, unless otherwise agreed, in the works of the manufacturer.

5.2 Breaking down of the consignment for acceptance tests

The consignment may be subdivided in several ways for acceptance. The product standards should fix the composition and the size of the units for inspection and should state the conditions for regrouping the remaining quantities.

If there is no provision in the standard or any requirements stated in the order, the batches may consist of

(a) either products coming from the same cast (acceptance cast by cast),

(b) or products coming from the same cast and subjected to the same heat treatment at the works,

(c) or products coming from different casts or different manufacturing operations (acceptance by batches).

In the last case, the product can be

either taken from stock without taking account of the cast or of the heat treatment,

or taken from specific casts (or from heat treatment batches), but in quantities too small to form each of them a consignment.

5.3 Submission for inspection

The submission for acceptance of part or all of the consignment to the user or to his representative should be made by means of a written note, signed by the manufacturer or his qualified representative. Submission should be in accordance with clauses 4.2.1 or 4.2.2. This note should reproduce the information in the order, stipulate the number of pieces and their nominal dimensions, their theoretical mass, their markings and in general all the information necessary for the identification of the part of the consignment which is presented for acceptance.

In order to avoid interference with the normal progress of the work, the manufacturer and the user should fix by common agreement the date or dates of the inspection.

5.4 Rights of the inspector

The inspector should have access to the place where the goods for acceptance are kept and should be able to witness the selection of samples, the preparation of test pieces and the carrying out of the tests. He should indicate the pieces in the consignment from which the samples will be selected in accordance with the specification.

The selection of samples, the tests and, if agreed on the order, the preparation of test pieces, should be made in the presence of the inspector.

5.5 Acceptance

The products should be accepted only when all the required delivery conditions are satisfied. However products which do not meet all the requirements may be accepted by the user, if he considers that they are usable.

6. MECHANICAL TESTS

6.1 Selection and preparation of samples and test pieces

The selection and preparation of samples and test pieces should be carried out in accordance with ISO Recommendation R ..., *Selection and Preparation of Samples and Test Pieces for Steel*, at present Draft ISO Recommendation No. 527.

6.2 Testing machines

The calibration of the testing machines should be in accordance with the requirements of ISO Recommendations. *

6.3 Testing methods

The testing methods should be in accordance with the relevant ISO Recommendations.

6.4 Validity of tests

No account should be taken of unsatisfactory test results which are not attributable to the quality of the steel, but arise from

(a) either faulty manufacture of the test piece, whether these faults appear before, during or after the test,

(b) or a faulty mounting of the test piece or faulty working of the test machine.

In these cases, the test should be repeated.

6.5 Additional tests

Unless otherwise agreed,

In the case when test results are unsatisfactory, it is permissible to take additional tests in the proportion of two tests for each test which was unsatisfactory. The consignment is considered to conform to requirements if all the additional tests are satisfactory, but may be rejected if only one is met.

The maker reserves the right to re-heat treat the products in any suitable manner, either before or after additional testing and to present them again for inspection.

NOTE. — See Appendix, page 8.

7. CHEMICAL COMPOSITION

7.1 Selection of samples

The selection of samples should be carried out in conformity with the requirements of ISO Recommendation R ..., *Selection and Preparation of Samples and Test Pieces for Steel*, at present Draft ISO Recommendation No. 527.

7.2 Analysis results

When a chemical composition is specified, the results of the analysis should be given on the document, if any, accompanying the consignment.

7.3 Cast analysis

Unless otherwise agreed, the limits of chemical composition, as applied to cast analysis, are valid for acceptance.

7.4 Product analysis

The standards or special agreements on the order may prescribe the limits of chemical composition applicable to the product delivered for acceptance.

7.5 Verification of the chemical composition

It may be required to verify the cast analysis by analysis of the product. In that case, the range (or limits) of chemical composition specified for the cast analysis should be extended in order to take into account any deviations due, for example, to heterogeneity of the steel. The permissible deviations or extended limits should be stated in the product standard or order.

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* ISO Recommendations R 146 and R 156, respectively *Calibration of Vickers and Brinell Hardness Testing Machines* and Draft ISO Recommendation No. 522, *Calibration of Rockwell B and C Scale Hardness Testing Machines*, all three documents being now under revision.