International Standard 6629

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Chromium ores and concentrates — Methods of chemical analysis — General instructions

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6629 was developed by Technical Committee ISO/TC 65, *Manganese and chromium ores*, and was circulated to the member bodies in February 1980.

It has been approved by the member bodies of the following countries:

Australia	France	Poland
Austria	Hungary	Portugal
Bulgaria	India	Romania
China	Italy	South Africa, Rep. of
Czechoslovakia	Japan	United Kingdom
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	USSR

No member body expressed disapproval of the document.

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Chromium ores and concentrates — Methods of chemical analysis — General instructions

1 Scope and field of application

This International Standard gives general instructions concerning the methods of chemical analysis of chromium ores and concentrates.

2 Reference

ISO 6129, *Chromium ores — Determination of hygroscopic moisture content in analytical samples — Gravimetric method.*[1]

3 General instructions

3.1 Reagents

3.1.1 All the reagents used shall be of recognized analytical grade.

3.1.2 Distilled or deionized water shall be used in the preparation of reagents and throughout the analysis and redistilled or deionized water shall be used in the determination of trace element contents.

3.1.3 Before solutions are diluted to the mark in volumetric flasks, their temperature shall be brought to 20 °C.

3.1.4 The expression "hot water (or solution)" means that the temperature of the liquid is greater than 60 °C, unless otherwise specified. The expression "warm water (or solution)" means that the temperature of the liquid is within the range 40 to 60 °C.

3.1.5 In the expressions "diluted 1 + 1, 1 + 2, 1 + 5, etc.", the first figure indicates the number of parts by volume of concentrated solution; the second, the number of parts by volume of water.

3.1.6 The concentrations of solutions are expressed in one of the following forms :

a) % (*m*/*m*), meaning the mass, in grams, of component in 100 g of solution;

b) g/l, meaning the number of grams of component in 1 litre of solution;

c) % (*V*/*V*), meaning the volume, in millilitres, of component in 100 ml of solution;

d) mol/l, meaning the amount-of-substance concentrations with the unit mole per cubic decimetre (mol/dm^3) or mole per litre (mol/l).

3.1.7 In each run, the standardization of a standard volumetric solution shall be carried out by not less than three titrations.

3.2 Apparatus

3.2.1 Weighing shall be carried out on an analytical balance to the nearest 0,000 2 g.

3.2.2 The weighing device and laboratory measuring equipment (pipettes, burettes, volumetric flasks, thermometers, etc.) shall be verified and appropriate corrections shall be made during the calculation of the analytical results.

3.2.3 Cells for measurement of the absorbance of coloured solutions shall be chosen so that measurements may be carried out in the optimum range of absorbance.

3.3 Sample[2]

Analysis shall be carried out on an air-dried sample or the sample dried at 105 to 110 °C.

1) At present at the stage of draft.

2) International Standards on the sampling of chromium ores, and on the preparation of samples, are in preparation.

3.4 Procedure

3.4.1 Number of test portions

To determine the content of a particular element in a chromium ore or concentrate, two test portions (or three, if specified in the relevant International Standard, or by agreement between the interested parties) shall be analysed simultaneously.

The arithmetic mean of the values obtained from the duplicate analysis of the test sample shall be accepted as the final result. The range of the values obtained shall not exceed the limits of permissible tolerance for the corresponding range of the element content specified in the sub-clause entitled "Permissible tolerances on results of duplicate [or parallel] determinations" in the relevant International Standard.

When the range of the two values obtained from analysis of the test sample is outside the limits of permissible tolerance, the cause of this deviation shall be ascertained and eliminated and the determination shall be repeated on three new test portions.

3.4.2 Blank test

In parallel with the determination and under the same conditions, except as modified in the relevant International Standard, two blank tests shall be carried out so that the appropriate correction may be made to the result of the determination.

3.4.3 Check test

In parallel with the determination and under the same conditions, a check analysis shall be carried out on two test portions of a standard sample of chromium ore or concentrate taken from the same type of ore or concentrate as the test sample.

The arithmetic mean of the values obtained from the duplicate analysis of the standard sample of chromium ore or concentrate shall not differ from the result shown in the certificate by more than half the value of the permissible tolerance for the corresponding range of the element content specified in the sub-clause entitled "Permissible tolerances on results of duplicate [or parallel] determinations" in the relevant International Standard. Otherwise, after elimination of the causes of such deviations, the analysis of the test sample and the standard sample shall be repeated.

3.4.4 Determination of hygroscopic moisture content

In parallel with the determination, two test portions shall be taken to determine the hygroscopic moisture content in accordance with ISO 6129. For the determination of the phosphorus content, only one test portion shall be taken to determine the hygroscopic moisture content.

To calculate the content of an element on the dry basis, the numerical result of the determination shall be multiplied by the conversion factor K calculated to the third decimal place from the formula

$$K = \frac{100}{100 - A}$$

where A is the hygroscopic moisture content, as a percentage by mass, determined in accordance with ISO 6129.

3.5 Calibration graphs

Calibration graphs shall be constructed in rectangular coordinates by plotting the relationship between the mass, in milligrams, of the element being determined (abscissa) and the measured value (absorbance, current, etc.) (ordinate).

Calibration graphs of absorbance shall be constructed on the basis of three measurements of the absorbance of the series of standard matching solutions carried out simultaneously with the determination.

Calibration graphs constructed on the basis of standard solutions shall be checked with one or two standard samples.

3.6 Test report

The test report shall include the following information :

a) indications necessary for the identification of the sample;

b) reference to the method employed;

c) results and the form in which these are expressed;

d) any particular points observed in the course of the test and any operations not specified in the method or regarded as optional which might affect the results.