International Standard 5453

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Ferroniobium — Specification and conditions of delivery

Ferro-niobium — Spécifications et conditions de livraison

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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 5453 was developed by Technical Committee ISO/TC 132, *Ferroalloys*, and was circulated to the member bodies in November 1979.

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

Australia	Germany, F.R.	Romania
Austria	India	South Africa, Rep. of
Brazil	Italy	Sweden
Canada	Japan	United Kingdom
China	Norway	USA
Czechoslovakia	Poland	USSR
France	Portugal	Yugoslavia

No member body expressed disapproval of the document.

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Ferroniobium — Specification and conditions of delivery

1 Scope and field of application

This International Standard specifies requirements and conditions of delivery for ferroniobium usually supplied for steelmaking and foundry use.

2 References

ISO 565, *Test sieves — Woven metal wire cloth and perforated plate — Nominal sizes of apertures.*

ISO 3713, *Ferroalloys — Sampling and preparation of samples — General rules.* [1)]

3 Definition

3.1 ferroniobium : A master alloy of iron and niobium with a minimum niobium content of 55,0 % by mass, and a maximum niobium content of 70,0 % by mass, obtained by reduction.

4 Information for ordering

Orders for ferroniobium shall include the following information.

a) Quantity.

b) Constitution of consignment.

c) Chemical composition in accordance with the designations given in table 1.

d) Particle size ranges in accordance with the classes given in table 2.

e) Necessary requirements for analysis reports, packing, etc., as appropriate.

5 Requirements

5.1 Constitution of consignment

Ferroniobium shall be delivered in consignments constituted by one of the following methods.

5.1.1 Tapped lot method

A consignment constituted by the tapped lot method consists of a ferroniobium mass of one melt (or one part of a continuous tap).

5.1.2 Graded lot method

A consignment constituted by the graded lot method consists of a number of melts (or parts of continuous taps) of one ferroniobium designation.

The niobium content of the melts (or parts of continuous taps) constituting the consignment shall not differ from each other by more than 3 % absolute.

5.1.3 Blended lot method

A consignment constituted by the blended lot method consists of a number of melts (or parts of continuous taps) of one ferroniobium designation, which have been crushed to a particle size less than 50 mm and thoroughly mixed.

The content of the main constituent of the melts (or parts of continuous taps) constituting the consignment may vary between the minimum and maximum limits specified for the appropriate ferroniobium designation.

5.2 Chemical composition

5.2.1 The chemical composition of ferroniobium shall be as specified in table 1. The limits stated correspond to particle size ranges in classes 1 to 4 in accordance with table 2.

1) At present at the stage of draft.

5.2.2 The chemical compositions given in table 1 show only the main constituent elements and usual impurities. If the purchaser requires closer ranges for the main element contents and/or different limits for specified elements and/or limits for non-specified elements, this shall be agreed upon between supplier and purchaser.

5.2.3 The chemical compositions given in table 1 are subject to the precision of the methods of sampling and analysis for ferroniobium (see clause 6).

5.3 Particle size ranges

5.3.1 Ferroniobium is supplied in lumps or as crushed and screened particles. The particle size ranges and tolerances shall be in accordance with table 2. The undersize values shall be valid at the point of delivery to the purchaser.[1)]

The particle sizes specified refer to screening on a steel sieve with square openings; see ISO 565.

5.3.2 If the purchaser requires particle size ranges and/or tolerances other than those given in table 2, these shall be agreed upon between supplier and purchaser.

5.4 Extraneous contamination

The material shall be as free as possible from extraneous contamination.

6 Testing

6.1 Sampling for chemical analysis and sieve analysis

6.1.1 Sampling for chemical analysis and sieve analysis[2)] shall preferably be carried out by the method specified in ISO 3713, but other methods of sampling having similar precision may also be used.

6.1.2 Sampling is usually carried out at the supplier's stockyard, unless otherwise agreed. Wherever sampling is carried out, representatives of both supplier and purchaser may be present.

6.1.3 If required, arbitration sampling shall be carried out by an arbitrator chosen by mutual agreement between supplier and purchaser. Sampling shall be carried out by the method specified in ISO 3713, but other methods of sampling having similar precision may be agreed upon between supplier, purchaser and arbitrator.

The sample obtained by arbitration shall be accepted by both parties.

6.2 Analysis

6.2.1 The chemical analysis of ferroniobium will form the subject of a future International Standard, and shall preferably be carried out by the method to be standardized, but other methods of chemical analysis having similar precision may also be used.

6.2.2 Ferroniobium shall be furnished with an analysis certificate, established by the supplier, for the niobium content and, if agreed, the contents of other elements either specified in table 1 or additionally agreed and, upon request of the purchaser, with a sample representative of the consignment.

6.2.3 In case of dispute, one of the following two procedures may be used.

6.2.3.1 Contradictory analysis

The chemical analysis shall be carried out on the same sample and preferably by the method to be standardized. Other methods of chemical analysis having similar precision may be used, but shall be agreed upon between supplier and purchaser.

If the difference between the results of the two analyses is within x %[3)], the mean value shall apply. If the difference exceeds x %, then, provided that no other agreement is reached, arbitration analysis shall be carried out by an arbitrator chosen by mutual agreement between supplier and purchaser.

1) The point of delivery is defined as that point where the responsibility for the consignment passes from supplier to purchaser. If neither the supplier nor the purchaser is responsible for the transportation, then the point at which the values become valid shall be agreed upon.

2) Sieve analysis of ferroalloys will form the subject of ISO 4551.

3) The value of x will be specified later. In the meantime, the value should be agreed upon between purchaser and supplier.

6.2.3.2 Arbitration analysis

Arbitration analysis shall preferably be carried out by the method to be standardized. Other methods of chemical analysis having similar precision may be used, but shall be agreed upon between supplier, purchaser and arbitrator.

The arbitrator's result is final, provided it is within the two disputed values or not more than y %[1] outside one of these values.

7 Despatch and storage

Ferroniobium shall be packed, stored and transported according to international regulations.[2]

Table 1 — Chemical composition

Designation	Chemical composition, %									
	Nb	Ta	Al max.	Si max.	Ti max.	C max.	P max.	S max.	Sn max.	Co max.
FeNb65	60,0 to 70,0	< 0,5	1,0	2,5	0,4	0,15	0,10	0,05	0,10	0,05
FeNb60Ta1Al3Sn	55,0 to 70,0	< 2,0	3,0	4,0	2,5	0,25	0,10	0,10	0,30	—
FeNb60Ta1Al3,5	55,0 to 70,0	< 2,0	3,5	4,0	2,5	0,15	0,15	0,05	0,10	—
FeNb60Ta1Al6	55,0 to 70,0	< 2,0	6,0	4,0	2,5	0,2	0,20	0,10	0,15	—
FeNb60Ta5Al2	55,0 to 70,0	2,0 to 8,0	2,0	2,5	2,5	0,25	0,10	0,10	0,2	—
FeNb60Ta5Al6	55,0 to 70,0	2,0 to 8,0	6,0	4,0	2,5	0,2	0,20	0,10	0,15	—
FeNb60Ta5Al6Sn	55,0 to 70,0	2,0 to 8,0	6,0	4,0	2,5	0,2	0,20	0,05	3,0	—

Table 2 — Particle size

Class	Particle size range mm	Undersize, max. % by mass	Oversize, max. % by mass
1	2 to 100	8	10
2	2 to 50	8	No piece to exceed 1,15 × the maximum limit of the size range specified in two or three directions.
3	2 to 25	8	
4	up to 2	—	

1) This value, as an overall precision, will be specified as β_{SDM}.

2) Examples of appropriate international regulations are :

a) RID : Règlement International concernant le transport des marchandises dangereuses par chemin de fer, Annexe C.

b) International maritime dangerous goods code.

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