SVENSK STANDARD
SS-ISO 4689:2018

Fastställd/Approved: 2018-05-18
Utgåva/Edition: 2
Språk/Language: engelska/English
ICS: 73.060.10

SWEDISH STANDARDS INSTITUTE

Järnmalm – Bestämning av halt svavel – Bariumsulfat gravimetrisk metod (ISO 4689:1986, IDT)

Iron ores – Determination of sulfur content – Barium sulfate gravimetric method (ISO 4689:1986, IDT)

Standarder får världen att fungera

SIS (Swedish Standards Institute) är en fristående ideell förening med medlemmar från både privat och offentlig sektor. Vi är en del av det europeiska och globala nätverk som utarbetar internationella standarder. Standarder är dokumenterad kunskap utvecklad av framstående aktörer inom industri, näringsliv och samhälle och befrämjar handel över gränser, bidrar till att processer och produkter blir säkrare samt effektiviserar din verksamhet.

Delta och påverka
Som medlem i SIS har du möjlighet att påverka framtida standarder inom ditt område på nationell, europeisk och global nivå. Du får samtidigt tillgång till tidig information om utvecklingen inom din bransch.

Ta del av det färdiga arbetet
Vi erbjuder våra kunder allt som rör standarder och deras tillämpning. Hos oss kan du köpa alla publikationer du behöver – allt från enskilda standarder, tekniska rapporter och standard-paket till handböcker och onlinetjänster. Genom vår webbtjänst e-nav får du tillgång till ett lättnavigerat bibliotek där alla standarder som är aktuella för ditt företag finns tillgängliga. Standarder och handböcker är källor till kunskap. Vi säljer dem.

Utveckla din kompetens och lyckas bättre i ditt arbete
Hos SIS kan du gå öppna eller företagsinterna utbildningar kring innehåll och tillämpning av standarder. Genom vår närhet till den internationella utvecklingen och ISO får du rätt kunskap i rätt tid, direkt från källan. Med vår kunskap om standarders möjligheter hjälper vi våra kunder att skapa verklig nytta och lönsamhet i sina verksamheter.

Vill du veta mer om SIS eller hur standarder kan effektivisera din verksamhet är du välkommen in på www.sis.se eller ta kontakt med oss på tel 08-555 523 00.

Standards make the world go round

SIS (Swedish Standards Institute) is an independent non-profit organisation with members from both the private and public sectors. We are part of the European and global network that draws up international standards. Standards consist of documented knowledge developed by prominent actors within the industry, business world and society. They promote cross-border trade, they help to make processes and products safer and they streamline your organisation.

Take part and have influence
As a member of SIS you will have the possibility to participate in standardization activities on national, European and global level. The membership in SIS will give you the opportunity to influence future standards and gain access to early stage information about developments within your field.

Get to know the finished work
We offer our customers everything in connection with standards and their application. You can purchase all the publications you need from us - everything from individual standards, technical reports and standard packages through to manuals and online services. Our web service e-nav gives you access to an easy-to-navigate library where all standards that are relevant to your company are available. Standards and manuals are sources of knowledge. We sell them.

Increase understanding and improve perception
With SIS you can undergo either shared or in-house training in the content and application of standards. Thanks to our proximity to international development and ISO you receive the right knowledge at the right time, direct from the source. With our knowledge about the potential of standards, we assist our customers in creating tangible benefit and profitability in their organisations.

If you want to know more about SIS, or how standards can streamline your organisation, please visit www.sis.se or contact us on phone +46 (0)8-555 523 00

Den internationella standarden ISO 4689:1986 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av ISO 4689:1986.

The International Standard ISO 4689:1986 has the status of a Swedish Standard. This document contains the official English version of ISO 4689:1986.

Upplysningar om sakinnehållet i standarden lämnas av SIS, Swedish Standards Institute, telefon 08-555 520 00. Standarder kan beställas hos SIS som även lämnar allmänna upplysningar om svensk och utländsk standard.

Information about the content of the standard is available from the Swedish Standards Institute (SIS), telephone +46 8 555 520 00. Standards may be ordered from SIS, who can also provide general information about Swedish and foreign standards.

Denna standard är framtagen av kommittén för Järnmalm, SIS/TK 149.

Har du synpunkter på innehållet i den här standarden, vill du delta i ett kommande revideringsarbete eller vara med och ta fram andra standarder inom området? Gå in på www.sis.se - där hittar du mer information.

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

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. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 4689 was prepared by Technical Committee ISO/TC 102, *Iron ores*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

Iron ores — Determination of sulfur content — Barium sulfate gravimetric method

1 Scope and field of application

This International Standard specifies a barium sulfate gravimetric method for the determination of the sulfur content of iron ores.

This method is applicable to a concentration range of 0,01 to 1,0 % (*m/m*) of sulfur in natural iron ores, and iron ore concentrates and agglomerates including sinter products.

2 References

ISO 3081, *Iron ores — Increment sampling — Manual method.*

ISO 3082, *Iron ores — Increment sampling and sample preparation — Mechanical method.*

ISO 3083, *Iron ores — Preparation of samples — Manual method.*

ISO 7764, *Iron ores — Preparation of predried test samples for chemical analysis.*

3 Principle

Decomposition of a test portion by treatment with potassium chlorate and hydrochloric and nitric acids followed by evaporation to dryness. Dissolution of the salts in hydrochloric acid and filtration of the insoluble residue. Removal of the major portion of the iron in the filtrate by extraction with methyl isobutyl ketone.

Ignition of the insoluble residue and removal of silicon dioxide by evaporation with hydrofluoric and nitric acids. Fusion of the residue with sodium carbonate followed by leaching and filtration. Acidification of the filtrate and combination with the main solution.

Reduction of any remaining iron to the bivalent state, adjustment of the acidity and addition of barium chloride solution. Filtration of barium sulfate and gravimetric determination.

4 Reagents

During the analysis, use only reagents of recognized analytical grade, and only distilled water or water of equivalent purity.

4.1 Potassium chlorate ($KClO_3$), powder.

4.2 Sodium carbonate (Na_2CO_3), anhydrous.

4.3 Zinc.

Use zinc with the lowest available sulfur content and with a particle size of 1 to 3 mm.

4.4 Hydrochloric acid, ϱ 1,16 to 1,19 g/ml.

4.5 Hydrochloric acid, ϱ 1,16 to 1,19 g/ml, diluted 2 + 1.

4.6 Hydrochloric acid, ϱ 1,16 to 1,19 g/ml, diluted 1 + 1.

4.7 Hydrochloric acid, ϱ 1,16 to 1,19 g/ml, diluted 2 + 100.

4.8 Nitric acid, ϱ 1,4 g/ml.

4.9 Hydrofluoric acid, 40% (*m/m*), ϱ 1,13 g/ml, or 48 % (*m/m*), ϱ 1,185 g/ml.

4.10 Acid mixture: hydrochloric acid (4.4) + nitric acid (4.8), 4 + 1.

NOTE — Do not store this mixture; prepare immediately before use.

4.11 Barium chloride ($BaCl_2 \cdot 2H_2O$), 100 g/l solution.

Dissolve 100 g of crystalline barium chloride dihydrate ($BaCl_2 \cdot 2H_2O$) in 1 litre of water, cover and heat to boiling point. Keep warm on a water bath for a minimum of 2 h and allow to cool to room temperature overnight. Store the solution in a plastics bottle and before each use, filter the required volume through a close-texture filter paper.

4.12 Hydrochloric acid wash solution, containing barium chloride.

Filter 10 ml of barium chloride solution (4.11) through a close-texture filter paper, and dilute to 1 000 ml with hydrochloric acid solution (4.7).

4.13 Sodium nitrate ($NaNCO_3$), saturated solution.

4.14 Sodium carbonate (Na_2CO_3), 20 g/l solution.

Store in a plastics bottle.

4.15 Ammonium thiocyanate (NH_4SCN), 100 g/l solution.

4.16 Silver nitrate, 20 g/l solution.

4.17 Methyl orange, 0,1 g/100 ml solution.

Dissolve 0,10 g of methyl orange in 100 ml of water.

4.18 Methyl isobutyl ketone [$CH_3COCH_2CH(CH_3)_2$] (4- Methylpentan-2-one).

Pre-treat as follows before use : transfer 200 ml of methyl isobutyl ketone and 100 ml of hydrochloric acid solution (4.6) to a 500 ml separating funnel, and shake thoroughly for about 1 min. Allow the layers to separate and discard the lower aqueous layer.

5 Apparatus

Ordinary laboratory apparatus.

6 Sampling and samples

6.1 Laboratory sample

For analysis, use a laboratory sample of minus 100 µm particle size which has been taken in accordance with ISO 3081 or ISO 3082 and prepared in accordance with ISO 3082 or ISO 3083. In the case of