

## Standards for Analysis of Important Raw Materials in ISO Technical Committee 226

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### Abstract

ISO/TC 226 is the ISO Technical Committee for “Materials for the production of primary aluminium”, with the raw materials alumina, fluorides, anodes, carbon cell lining and carbon binders. In 2021 the stewardship of ISO/TC 226 was transferred from Norway to Switzerland, with Matthieu Arlettaz as new Chair and the SNV (Schweizerische Normen-Vereinigung) as Secretariat. Norway had headed the Secretariat for 16 years and the paper outlines some developments through those years. The main message is how to maintain and improve the standards, and the plans and ambitions of the new leadership of the committee.

The work in TC 226 is done in small, dedicated teams and needed work is mostly routine reapprovals. Sometimes there is a need for modernization as instruments improve or raw materials change and today there is an urgent need for Technical Experts in metal producing companies to support the ISO standards.

**Keywords:** ISO/TC 226 committee, ISO Standards for materials for primary aluminium production, Alumina standards, Carbon fluorides analysis.

### 1. The Technical Expert in the ISO World

From the outside, ISO might sometimes seem to be a quite difficult world to enter for a new and interested technical expert due to the specialized terms, the body of formalities and the several stages of ballots needed for revisions. This is unfortunate, as what ISO most of all needs is the totally practical experience of the users. We all use the sampling and analysis standards in TC 226 – the practical ISO business is taken care of by ISO itself. For maintaining and modernizing the standards we already have, we need the analysts with experience.

To a new, participating technical expert we can say that the formalities of ISO work will be handled by an ISO person in your national ISO body like Standards Australia, or Switzerland's SNV, or Standards Norway, DIN or ANSI. This person within ISO is responsible for the ISO/TC226 formalities on behalf of your country and the role of you, technical expert, will be to receive a draft, to review or revise as needed, adding comments from your experiences, and to return this to the technical expert who is responsible for the standard review or revision and who will collate and prepare for balloting.

At this stage it is worthwhile to list the material working groups, and in ISO/TC226, the material Working Groups (WGs) are as shown in Table 1.

**Table 1. Material Working Groups in ISO/TC226.**

ISO/TC226/WG 1	Carbonaceous binders, including pitch
ISO/TC226/WG 2	Cathodes and ramming paste
ISO/TC226/WG 3	Smelter grade alumina
ISO/TC226/WG 4	Smelter grade fluorides
ISO/TC226/WG 6	Anodes and coke

As can be seen, these are materials where the material quality is of critical importance for the metal production.

### 1.1 Information About ISO at the ISO Homepage

Everyone has a general idea about what standards are, and what ISO is. Go to [iso.org](https://www.iso.org) for general pages, then to the next link here for a page with information on the different technical committees (this is a [https](https://www.iso.org/technical-committees.html) page, but only the text is shown so as to not have live links in the paper).

[www.iso.org/technical-committees.html](https://www.iso.org/technical-committees.html)

### 1.2 Information About ISO/TC226 on the ISO Website

Go here specifically for ISO/TC226 (this is also a [https](https://www.iso.org/committee/363319.html) page)

[www.iso.org/committee/363319.html](https://www.iso.org/committee/363319.html)

<h2>ABOUT</h2> <p><b>SECRETARIAT: <a href="#">SNV</a></b> Committee Manager: <a href="#">Mr Marcel Schulze</a></p> <hr/> <p>Chairperson (until end 2023): <a href="#">Mr Matthieu Arlettaz</a></p> <hr/> <p>ISO Technical Programme Manager [TPM]: <a href="#">M Stéphane Sauvage</a> ISO Editorial Programme Manager [EPM]: <a href="#">Mr David Reid</a></p> <hr/> <p>Creation date: 2004</p> <h2>SCOPE</h2> <p>Standardization in the field of materials for the production of primary aluminium, including aluminium oxide, cryolite, aluminium fluoride, sodium fluoride, carbonaceous products and ceramic materials.</p>
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**Figure 2. ABOUT ISO/TC226 (from iso.org).**

Referring to Figure 2, the TPM and TPM managers sit in Geneva, at the ISO Central Secretariat. Mr. Marcel Schulze is Committee Manager or Secretary, and is with SNV, sitting in Winterthur, Switzerland. The Chair Matthieu Arlettaz represents SNV and R&D Carbon Ltd.

The site has information on the:

- 102 PUBLISHED ISO STANDARDS under the direct responsibility of ISO/TC226
- 2 ISO STANDARDS UNDER DEVELOPMENT
- 11 PARTICIPATING MEMBERS
- 14 OBSERVING MEMBERS



**Figure 3. Some numbers about ISO/TC226 (from iso.org).**

Here we are at a key point of this paper. There are 11 participating member ISO national bodies, potentially a good source of technical experts, but today there are too few technical experts able to participate in actual standardization work.

The main reasons for this are time constraints all meet in everyday work, and probably a lack of awareness of this situation in the metal companies. This apparent lack of awareness of the need to maintain ISO standards is a surprising statement to make for us who work inside TC226, as any list showing the standards we are talking about is a list of critical properties for material procurement for any metal producer.

Examples? Go to the site and click on the number 102. and you can probably and quickly find 50 standards your company is using regularly, many of which your company has been using regularly for years.

**Table 2. At iso.org you will find these and many more critically important standards for sampling and analysis, these are just some examples.**

ISO 18515:2014 Carbonaceous materials for the production of aluminium — Cathode blocks and baked anodes — Determination of compressive strength
ISO 23201:2015 Aluminium oxide primarily used for production of aluminium — Determination of trace elements — Wavelength dispersive X-ray fluorescence spectrometric method
ISO 18843:2015 Aluminium oxide primarily used for the production of aluminium — Method for the determination of flow time
ISO 12926:2012 Aluminium fluoride for industrial use — Determination of trace elements — Wavelength dispersive X-ray fluorescence spectrometric method using pressed powder tablets
ISO 8007-2:1999 Carbonaceous materials used in the production of aluminium — Sampling plans and sampling from individual units — Part 2: Prebaked anodes

## 2. An Appeal for Expertise

More companies must be actively engaging in the maintenance of these standards. An appeal is being made in the form of a letter, penned by the new Secretary of TC 226, Mr. Marcel Schulze of SNV, to promote participation.

*Dear ISO/TC 226 Members,*

We of the ISO/TC 226 leadership aim to promote the standardization activities. You can use this promotion letter to approach national stakeholders.

Kind regards  
Marcel Schulze

## 2.1 Promotion of ISO/TC 226 Standardization

The standardization activities of ISO/TC 226 “Materials of the production of primary aluminium” have been very successful since its foundation in 2004. Since then, the committee developed over 30 standards and maintained more than 70. The committee is responsible for 102 standards on sampling and analysis covering smelter grade alumina, smelter grade fluorides, pitch, petroleum coke, ramming paste and solid carbon bodies including anodes and cathodes. The majority of the standards have been developed beforehand by ISO/TC 41 “Chemistry”. Please note - TC 226 is a direct continuation of TC 47/SC 7, the same Chair, experts, Secretariat, so it should not be TC 41 “Chemistry” but TC 47/SC 7 “Raw Materials for Aluminium Electrolysis,”.

In the beginning, ISO/TC226 was actually ISO/TC47/SC7, a sub-committee of TC47 Chemistry. In 2005, at the Jeju meeting, ISO/TC226 was established, with exactly the same set of standards as TC47/SC7. The ISO Central Secretariat likes to count meeting numbers for TC226 from then.

The above said underlines that the market needs the standards in care of the committee. For the time being there are 11 countries which committed to participate actively in the maintenance of the standards and that are very few! Further 14 countries have the status as observing members. For countries, organizations and experts who actively contribute and collaborate in the standardization work profit from first-hand information of technical developments and global trends in standardization strategies and implementation. The structure and long-lived culture in the organization ISO enables stakeholders to exchange with partner organizations and also competitors to find market-suitable solutions (Standards). Participation in standardization enables to creatively shape standards instead of being standardized. The P-members of TC 226 reflect a reasonable distribution among regions of the world, except North America and Africa. However, some P-members could preferably participate more actively in the daily work of TC 226. The very strict requirements of the international aluminium industry make the benefits of ISO standards essential. For instance, changes in lining materials may lead to catastrophic cell failure, changes of alumina may affect the very critical heat balance and the metal output, changes in carbon raw materials may need adjustment of anode recipes. ISO standards are also essential safeguards for suppliers.

The aim of TC 226 is to develop and maintain unique international standard testing methods that can provide rational and reliable property data in order to facilitate clear and easy technical judgement and business decision-making in international trade through the provision of a common international scale. Standard work aims to ensure that reliable analysis methods are available. ISO standards are commercially important and are recognised and used by suppliers and customers around the world. Reliable analysis enables the suppliers to describe their materials using common standards for well-established material properties, and the standards are a support for smelters when evaluating and comparing sources of materials. The main work is done through dedicated work groups, one for each of the material groups. The need for modernisation of the standards is continuous as instruments improve and raw materials change.

The quality and usefulness of standards benefit from a broad international participation. This is the reason why we approach you, as we think that the aluminium-industry in your country is important for the global market. The latter could profit in a win-win frame if your country would participate as P-Member in ISO/TC 226.

### 3. What the Committee Does

#### 3.1 Role of the Chair, or Chairperson

The authors are the current Chair, Matthieu Arlettaz, and the previous Chair, Lorentz Petter Lossius. (Lorentz Petter Lossius will give a short textual picture of some history of the committee and what life as an ISO/TC Chair is like, from his 9-year tenure 2012 to 2020 (maximum years possible)).

Lorentz Petter Lossius:

I'd like to start this part with thanking the companies that have supported work in the committee, especially those sponsoring

- Plenary Meetings
- The Committee Secretary
- Technical Experts.

It would be nice to say that life as a TC Chair is easy, but that is not entirely so. We do have very nice meetings, the plenary meetings for the Technical Committee, but in-between quite a lot of work is going on and must be monitored by the Chair.

I will come back to Plenary Meetings, which like many things sort of stopped in 2020, first a bit of history.

#### 3.2 History of ISO/TC226 – Chairs and Plenary Meetings

Considering that ISO/TC226 was actually ISO/TC47/SC7 at the beginning, we can say that the earliest standards of ISO/TC226 go back to 1973 (!) and this was a collaboration of mostly fluorides interests and alumina interests. Ms. Landi of Italy presided as Chair over ten meetings from 1973 to 1986 supporting pioneering work to establish standards, some of which are still active. The meetings usually were, and still are, sponsored by a producer inviting the committee, and formally arranged by an ISO national body. Given here are cities where the meeting were held; the relevant ISO national body can be deduced.

- 1973 Budapest (1)
- 1974 London (2)
- 1975 Paris (3)
- 1977 Capo Boi, Sardinia (4)
- 1978 Köln (5)
- 1980 Oslo (6)
- 1981 Zermatt (7)
- 1983 Stockholm (8)
- 1984 Paris (9)
- 1986 Milano (10)

Werner Schmidt-Hatting of Switzerland was Chair from 1989 to 2002 and oversaw the establishing of important standards for carbonaceous materials.

- 1989 Montréal (11)
- 1991 Rotterdam (12)
- 1993 Montana-Vermala (13)
- 1995 London (14)
- 1996 Balestrand (15)
- 1997 Seattle (16)

- 1999 Berlin (17)
- 2000 Delft (18)
- 2002 Switzerland, Rigi (19)

Professor Harald A. Øye then continued this work, including actively promoting and completing a suite of standards for ramming paste. Plenary meetings through this period were:

- 2003 Tromsø (MS) (20)
- 2005 Jeju, Korea (21)
- 2006 Paris (22)
- 2008 Beijing (23)
- 2009 Aalesund (24)
- 2011 Bratislava (25)

Dr. ing. Lorentz Petter Lossius then continued as Chair, in a more general monitoring capacity. An important step in this period was Standard Australia generously moving the world-wide used SA alumina standards into ISO. This work was overseen by Mr. Raymond Brown of Australia (Alcoa Alumina, retired) as Convenor of WG3. This is described in the 2014 TMS paper [1]. This period also saw the start of work to update the Smelter Grade Fluorides standards, many of which stem from the original 1973 work. The plenary meetings were in:

- 2012 Sierre (26)
- 2014 Wiesbaden (27)
- 2015 Winterthur (28)
- 2017 Delft, NEN (29)
- 2018 Jiaozuo City (30)

The situation with COVID has paused plenary meetings. The simultaneous change of Chair also made web-meetings to replace the physical plenary meeting impractical.

With Matthieu Arlettaz as new Chair from 2021 we are looking forward to plenary meetings again.

### **3.3 The Secretariat**

The Committee Secretary has the critical role of enabling all this work by ensuring the formalities of balloting stages are followed. Ms. Landi of Italy was supported by Mr. Lawendel. Werner Schmidt-Hatting was supported, first by Mr. Aebi (SNV) and later by Mr. David Stockton (BSI) and Mr. Einar Braathu (Standards Norway). Einar Braathu also supported Harald A. Øye, then the relay baton went to Mrs. Elisabeth Hovda (Standards Norway) who also supported Lorentz Petter Lossius. For the last eight years, Mr. Knut Aune (Standards Norway) has been Secretary.

Reading between the lines, it is evident that SNV and R&D Carbon of Switzerland, and Standards Norway and the aluminium industry in Norway have been especially engaged in supporting the Secretariat up through the years since 1989. For Hydro, support to Harald Øye and Lorentz Petter Lossius' work has amounted to well over one million euros.

### **3.4 What is a Working Group Convenor and What Do They Do?**

Today, in ISO/TC226, the Convenor generally organizes work. The Convenor is nominated by the Technical Committee and the role has a 3-year scope. A Convenor can either be for specific project (standard), or, as has become norm in TC226, responsible for an entire set of standards for one material.

**Table 3. Current Convenors in ISO/TC226. The country national standard body is given, and (business association). Status is how long this Convenor is nominated as of today.**

Working Group	Material	Convenor	Status
WG 1	Carbonaceous binders, including pitch	Mr. Nigel Turner, BSI (retired from Koppers)	2021
WG 2	Cathodes and ramming paste	Dr. L.P. Lossius, Standards Norway (Hydro Aluminium)	2022
WG 3	Smelter grade alumina	none	
WG 4	Smelter grade fluorides	Mr. Wu Lin, SNC (Do Fluorides Ltd.)	2021
WG 6	Anodes and coke	Francesco Baccalà, SNV (R&D Carbon)	2024

### 3.5 Supporting Technical Experts

Besides R&D Carbon of Switzerland and Hydro Aluminium of Norway, several companies have been supportive in sponsoring and allowing their technical experts to take part in the ISO work, including but not limited to.

- Alcoa Alumina, Australia
- SGL, Sigri-Great Lakes, Germany
- Do-Fluorides Chemical, China
- Aluchemie, Netherlands
- Elkem Carbon, Norway

This list is not very long, and it is quite evident that relatively few companies are actively supporting the ISO work. With this paper we appeal for both, more of past support and possible new support.

There are a number of companies that take part in ISO-related round robins, and thereby show there is good technical expertise for analysis related work in their company. It is to these companies we address this appeal.

Finally, we would like to add that some scientists with considerable technical insight participate with voluntary work, none more so than Mr. Nigel Turner (BSI) who as retiree is still Convenor of WG1, binders including pitch.

### 3.6 Practical Work – The 5-Year Review Issue

Through the years of chairing TC 226 there has been some dark clouds. These are due to the 5-year review; this is obligatory and should not be difficult, except for this:

- ISO national body representatives do not always vote to confirm.

In the Secretariat, we in the beginning did not understand why there was so often a vote to abstain. After some time, we understood that the ISO persons responsible for voting are not technical and prefer not to give an opinion without the backing of a technical expert – *so technical experts are critically needed to advise ISO what to vote.*

Without the vote to confirm, the standard risks getting withdrawn, and will then subsequently become outdated. So here is again the key issue of this paper, the lack of support to ISO/TC 226 from the metal producing industry.

#### **4. Conclusions**

The work in TC 226 is done by small, dedicated teams and the work needed is mainly routine re-approvals. Occasionally, upgrading is necessary due to improved instrumentation or changes in raw materials. It is important that observer members become participants. And it is important that metal producing companies support ISO standard work with technical experts. There is an urgent need for technical experts to enable ISO to supporting technical and trade specifications.

#### **Acknowledgement**

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#### **5. References**

1. Raymond Brown, Jean-Claude Fischer, Xujin Xue, Lin Wu, Andreas Schnittker, Nigel Turner, Harald A. Øye, Lorentz Petter Lossius, Standard development work in ISO Technical Committee 226 “Materials for the Production of Primary Aluminium”, *Light Metals* 2015, 715-720.