

Practical guidelines on the classification under waste legislation of bottom ash from household waste incineration

Selective extraction provides information on bonding forms

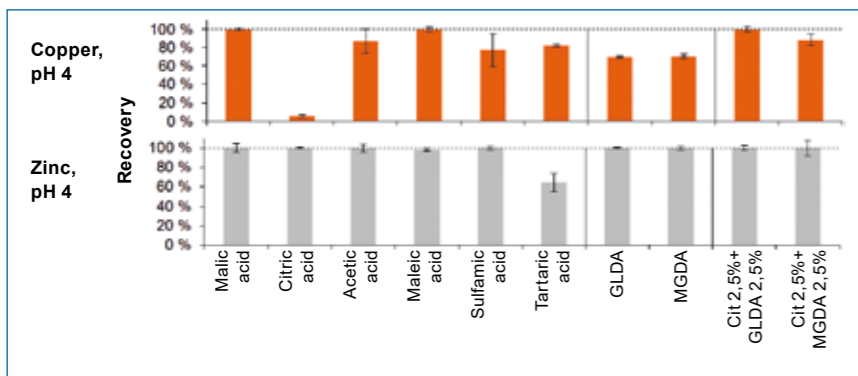
The ITAD and IGAM associations are producing practical guidelines on waste legislation classification of slag and bottom ash from household waste incineration (HMV ash). The "selective extraction" developed by bifa Umweltinstitut for differentiated consideration of bonding forms will be an important part of these guidelines.

Substances with high chronic toxicity for aquatic life (hazard code H410) are primarily relevant for the assessment of how environmentally hazardous HMV ash is. The approach for differ-

entiating between the bonding forms developed by bifa are based on the task of differentiating between substances that are harmful or have low toxicity for aquatic life (H411, H412...) and those with potentially high toxicity. This is done through selective extraction with weak acid at pH 4. Results determined with this method on the fractions to be classified as "non H410", "potentially 410" and "definitely H410" are now available for many bottom ash samples taken from a range of waste incineration plants. Plants with different grating and furnace de-

sign were considered, as well as those which primarily recover substitute fuels energetically. None of the HMV ash samples examined were to be deemed hazardous on differentiated consideration of the substance groups, so that the practical guidelines come to the conclusion that HMV ash is generally not hazardous, but requires periodic checking on a case-by-case basis. Optimisation of the method with regard to the recovery of substances classified to H410, the reproducibility and separation accuracy produced the best results with maleic acid (1.4 %) as the extractant and an extraction period of 24 h at room temperature. The approach of differentiating between bonding forms can also be adapted in principle to other issues such as classification with regard to the Hazardous Incident Ordinance; and work on this is already in progress.

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Resource efficiency in the Bavarian trades

bifa Umweltinstitut carries out analysis of potential

Resource efficiency is an important contribution to environmental protection and at the same time helps to increase competitiveness. Whether and to what extent Bavarian trades have examined this topic is not yet known.

Therefore, between June and July 2019, firms from eight Bavarian trades will be surveyed on their handling of materials and raw materials on behalf of the Bavarian State Environmental Agency (LfU) and in cooperation with the Bavarian Chamber of Trades. The survey is aimed at the bricklaying and concreting, roofing, carpenter, joiner, fitter and heating fitter, metal-worker, precision tool mechanic, and

baker trades. These trades are particularly interesting for the topic, as they are frequently represented in Bavaria, have many employees and also high material costs. bifa Umweltinstitut developed specific questionnaires for



each of these trades, which are intended to reveal in which areas material savings are possible, why material losses occur and which measures can be helpful for the implementation of resource savings. To make access to the questionnaire as easy as possible for the firms, not only an online tool but also a two-page questionnaire will be provided. The results of the survey should make it possible to offer Bavarian trade firms tailored information and help with this important topic.

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Clear way ahead for bifa research!

The Free State facilitates even more effective technology transfer in the environmental sector

In 2019, the Free State of Bavaria is increasing its annual institutional funding of bifa significantly, from half a million euros to 1.1 million euros per year, and wants to institutionalise this from 2020. This enables bifa to work on research projects funded by the Federal Government or the European Union, to a far greater extent than to date.

Since 1991, bifa has worked with partners in industry, municipalities and science on research projects paid for by public funds. During this time, however, we have also worked on well over 1,000 application-related commissioned research and consulting projects for businesses, municipalities

and politics in Bavaria, Germany and abroad, which were fully funded by the clients.

15 years ago, bifa's shareholders gave it the brief to increase the turnover share of its application-related commissioned research. We have fulfilled our brief: In 2005, client-funded research, development and consulting accounted merely for around 20 % of bifa's turnover. By 2018 it had grown to 65 %.

In funded projects we develop new scientific methods and knowledge, which are then introduced into practice by businesses and municipalities through our commissioned research and consulting. Numerous practical commissions also >>

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Dear Readers, Dear Partners and Customers of bifa,

One universal rule is "Times change", a second one is "Nothing is so good that it can't be improved." This also applies to the bifa Umweltinstitut. For 15 years we have combined successful solutions-orientated practical projects with exploratory-orientated scientific projects. However, rising costs and modified basic conditions for funded projects means that we have to increasingly concentrate on commissioned work and cut back our exploratory-orientated research. Thanks to the support of many stakeholders, we have managed to find a future-proof solution. In future, bifa

will have even better options for combining practice and theory. Therefore, for a change, read a leading article about ourselves. But I promise you that this will remain an exception. The next issue of bifa-aktuell will once again focus on our projects.

W. Rommel

Yours, Wolfgang Rommel

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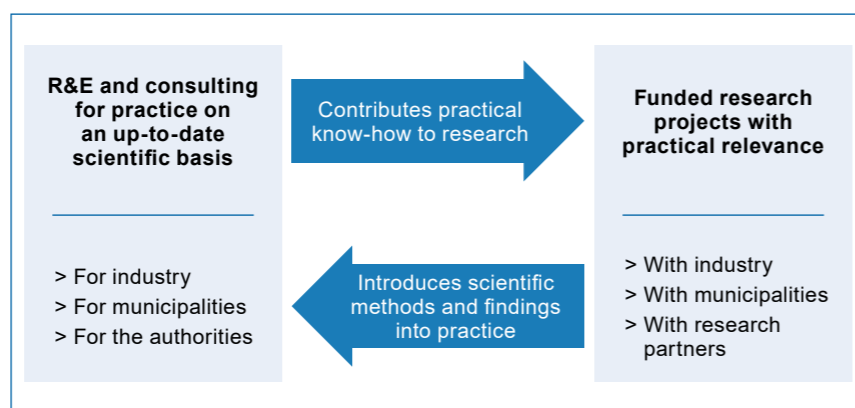
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>> ensure that we always bear in mind practical aspects, even in our funded projects. Both pillars of bifa's work benefit from each other. This is an essential bedrock of our success.

In funded research projects, however, only part of the costs, mostly only the unit costs, are funded by the funding body. The remaining share, especially the overhead costs, must be borne by the funded organisation itself as in-house work and services to be contributed. bifa was increasingly less able to do so in recent years, as the amount of our annual grant had remained unchanged since 2005 while costs had risen continuously. We increasingly had to cut back the funded projects we applied for due to the amount of own work and services to be contributed and increasing self-financing of the company. One of the two pillars of our work was thus in danger of losing significance.

Thanks to the additional funds, bifa will now again be able to work on more funded projects together with partners in industry, municipalities



Two pillars support the particular economic benefit of bifa.

and science. This will enable us anew to increasingly contribute the experience and knowledge acquired from our practical projects into innovative research projects and thus to increase technology transfer significantly. bifa will therefore have even better possible actions in its most important field of activity: environmental technology transfer. This includes, for example, climate protection, sustainable waste management, process engineering and integrated company environmental protection. The increase

in the share of institutional funding safeguards the continuation of bifa's successful work. It maintains all the business and economic policy advantages of the institute and establishes planning security for the shareholders and for bifa. By the way, even after this increase, the share of institutional funding of bifa is still significantly lower than that of comparable technology transfer and R&D institutes.

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Tantalum recycling life-cycle assessment

bifa compares the environmental performance of different process strategies for recovering tantalum from printed boards

The "Development and assessment of innovative recycling paths for recovering tantalum from electronic waste" project was undertaken under the management of the Fraunhofer Research Institution for Materials Recycling and Resource Strategies, IWKS, within the scope of the „KMU Innovative resource and energy efficiency" development scheme of the Federal Ministry of Education and Research. Within the project team, the task of bifa Umweltinstitut was to evaluate different process-based approaches to solutions with regard to their life-cycle assessment.

The transition metal tantalum has manifold possible applications especially in electronics. However, the use of tantalum must be viewed critically with regard to the working conditions, the politically problematic circum-

stances of its mining and also the very low recycling rate. Against this background, the objective of the project was to install a recycling route for tantalum that is not only environmentally useful but also cost-effective. To this end, the following recycling paths were examined and assessed:

- > Chemical transport
- > Electrochemical separation
- > Hydrometallurgical dissolution or leaching

The three recycling strategies have in common firstly, that printed boards with tantalum capacitors are identified and dismantled in the first process step. Secondly, the tantalum capacitors extracted in this way are treated mechanically in the second process step. The three scenarios differ in the further processing of the treated tantalum fraction through to the extraction of a tantalum concentrate.



Recycling tantalum avoids all the emissions that would be produced in the conventional production of tantalum from primary raw materials. In all environmental effects of the life-cycle assessment it can be seen that all the recycling routes examined are associated with environmental relief due to these environmental credits. From a life-cycle assessment point of view, electrochemical separation produces better results overall than the two other alternatives, albeit, the environmental advantages are small compared to hydrometallurgical dissolution.

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Abfallratgeber Bayern – Waste information with a click

bifa prepares waste management topics for citizens and companies so that they are brief and to the point

The "Bavarian Waste Guide" (Abfallratgeber Bayern – ARBA) is an online information system (www.abfallratgeber-bayern.de) of the Bavarian State Ministry of the Environment and Consumer Protection (Bayerischen Staatsministerium für Umwelt- und Verbraucherschutz) and the Bavarian State Environmental Agency (Bayerischen Landesamt für Umwelt). bifa Umweltinstitut helped to develop the system at the end of the 1990s and since then has provided technical and editorial support.

The ARBA is a guide to the disposal and handling of waste. It gives users a fast and up-to-date overview of waste topics. It is directed not only at private persons but also at companies. The information system is also intended to provide support for competent persons.

The content of ARBA continues to develop and it can of course also be accessed and used via mobile devices. The site is currently accessed around 22,000 times a month and is thus one of the most frequently used environmental information systems of the Bavarian Ministry for the Environment. The ARBA is divided into different content areas. The "households" part provides offers and information for interested citizens, for example, waste avoidance tips or information on handling waste. The sector "trade" is aimed at the tradespeople, for example, with industry concepts or information on the import/export of waste. The "Regulations" tab collates the relevant legal frameworks from the EU, Germany, Bavaria and the Bavarian towns, cities and rural districts. A short description with reference, contents and scope and in some cases an explanation,



is enclosed with the legal requirements. "Publications" offers publications on different aspects of waste management. In the "Advice" part, users can contact local waste consultants as well as other waste experts.

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Analysis of different physical-chemical parameters of residual waste

bifa Umweltinstitut is analysing the physical-chemical composition of the delivered residual waste for AVA KU

The municipal enterprise AVA Abfallverwertung Augsburg KU operates a modern waste-fired CHP plant in Augsburg-Lechhausen. In addition to municipal household and bulk waste from Augsburg's joint waste local authority, among other things, it also recovers waste from other disposal areas and commercial waste thermally.

Loading the furnace lines with the delivered waste plays an important role in maintaining or achieving the necessary capacity utilisation and fault-free operation. Among other things, the calorific value of the waste plays a decisive role. It is currently assumed that the calorific value of municipal waste is approx. 8,000 kJ/kg. This value is based on an analysis carried out by the Bavarian State Environmental

Agency (Landesamt für Umwelt – LfU) in 2003. The statutory and everyday basic conditions for municipal waste collection have changed in the meantime (landfilling ban, recasting of the Packaging Ordinance, coming into effect of the Circular Economy Act and the Electrical and Electronic Equipment Act, etc.). Due to altered circumstances in many areas, it can be assumed that the values have changed since the LfU study in 2003. bifa Umweltinstitut is currently examining the extent to which this is the case. In addition to the calorific value (as well as the water content and loss on ignition), the (heavy)metal, chlorine and sulphur content in the waste mixture were also examined. Experienced bifa samplers took samples from selected deliveries and then analysed them in



Prepared residual waste samples for laboratory analyzes

our in-house laboratory. The study is organised in two campaigns. The first campaign was completed successfully in the spring. The second campaign will be carried out before the summer break.

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