

# ▶ **Process-integrated quality assurance of Solid Recovered Fuels**



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europaean cement research academy

- Seminar „Alternative Fuels: Quality and  
Environmental Control“

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## Agenda

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- ▶ Introduction
- ▶ Definition of Solid Recovered Fuels
- ▶ Advantages by using qualified SRF
- ▶ Guarantee by quality assurance
- ▶ Conclusion

## Introduction

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- ▶ The Gütegemeinschaft Sekundärbrennstoffe and Recyclingholz e. V. (BGS)
  - ➔ BGS e. V. was established in 1999 to promote the production and use of Solid Recovered Fuels (SRF).
  - ➔ Bodies of the association are the meeting of members, the managing-committee and the quality committee.
  - ➔ In these bodies manufacturers and users of SRF as well as other interested persons are represented.

## Introduction

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- ▶ **The goal:** Verify and confirm a high quality of SRF by displaying the **RAL quality label** to reduce CO<sub>2</sub> emissions and saving fossil fuels!
  
- ▶ **The way:**
  - ➔ Deliberate production of SRF as well as a **closed system of quality assurance**.
  
  - ➔ High quality standards in particular with the regard of **low heavy metals guiding values**.
  
  - ➔ Strict regulation for **sampling and analyze SRF** lay down in specific guidelines.
  
  - ➔ **Qualification of laboratories** by round robin tests carried out annually.
  
  - ➔ **European Standardization**

### ▶ Solid Recovered Fuels



- Quality assured SRF e. g. RAL-GZ-724 brand name SBS®
- Production-specific commercial waste or high calorific fractions from municipal solid waste
- Higher depth of treatment
- **Co-incineration**

### ▶ High Calorific Fraction



- E. g. high calorific fraction from MBT
- Lower depth of treatment
- kein Gegenstand der Güte- und Prüfbestimmungen nach RAL 724
- Lower calorific value
- **Mono-incineration**

## Advantages by using qualified SRF

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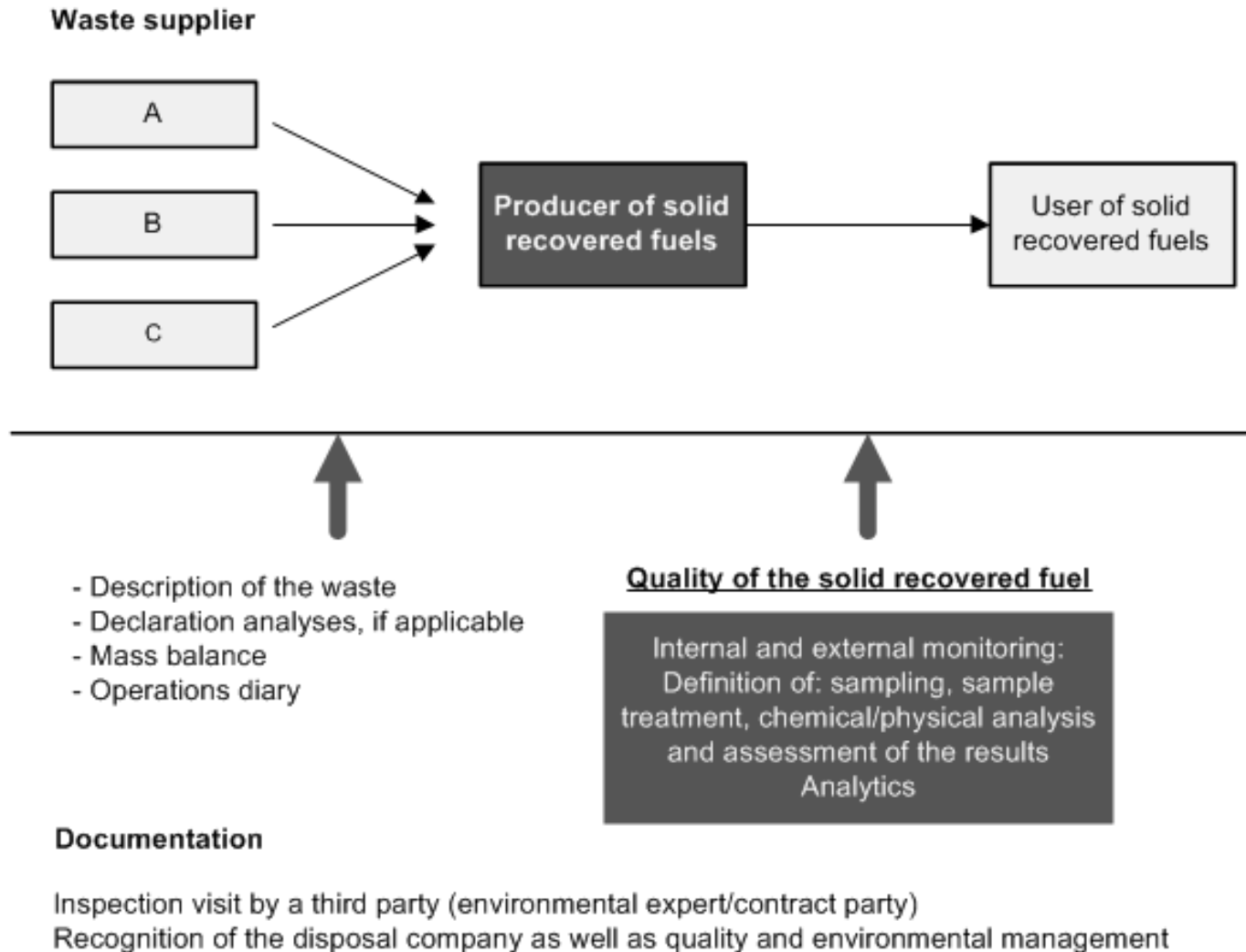
- ▶ RAL quality assurance supplies the evidence for:
  - ➔ **Constant** as well as **continuous** high quality!
  - ➔ **No accumulation of pollutions** regard of low heavy metals guiding values!
  - ➔ Established quality assurance - in most cases it´s a part of official authorisation
  - ➔ Reproducible and accepted methods for the determination of calorific value and the **biogenic content!**
  - ➔ Regulated relationship between producer and users of SRF by **transparent and comparable analysis** results!
  - ➔ **CEN** conformity!

### ▶ **General demands for Solid Recovered Fuels used in mono- or co-incineration plants:**

- ➔ a predefined calorific value and a low chlorine content
- ➔ a defined grain size and bulk density
- ➔ few impurities
- ➔ low heavy metal component (especially for co-incineration)
- ➔ the availability of sufficient quantities of the right quality
- ➔ Determination of the biomass content

# Guarantee by quality assurance

RAL-GZ 724





# Guarantee by quality assurance

Parts of RAL-GZ 724

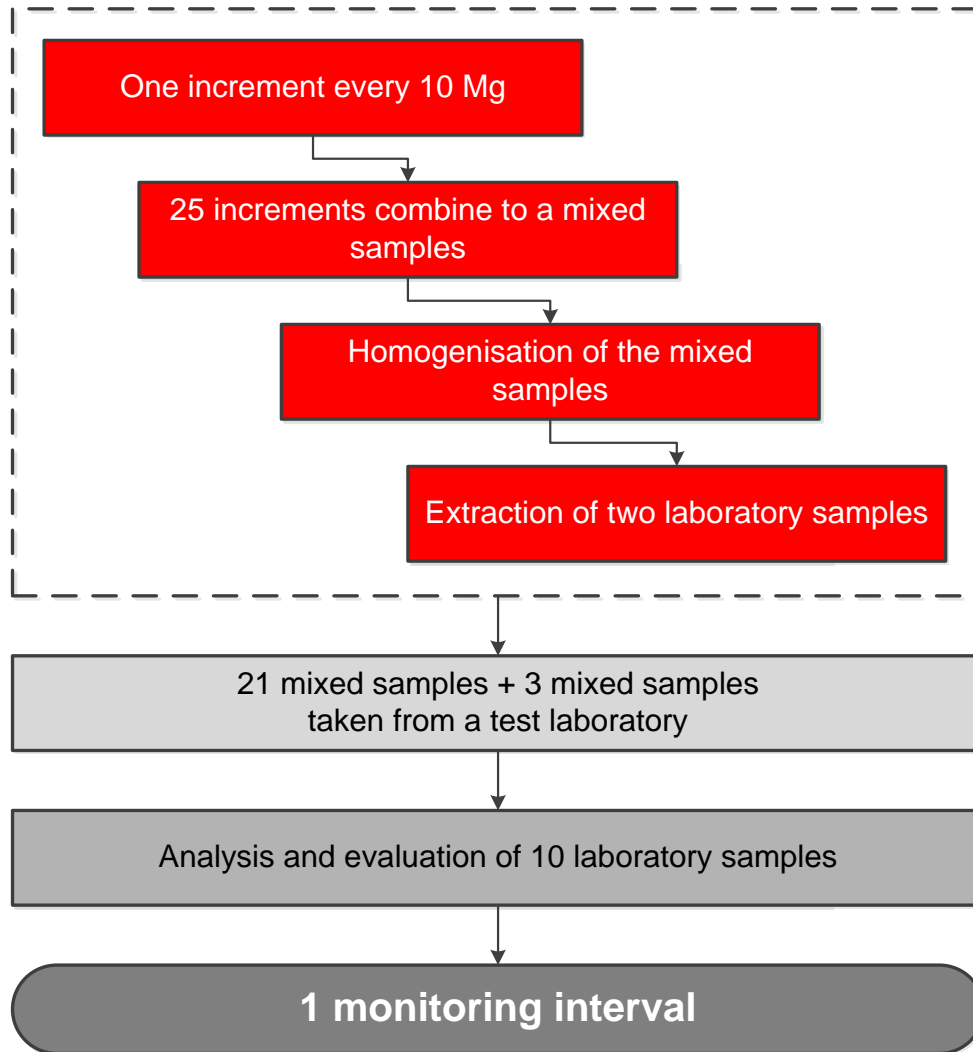
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- ▶ Recognition procedure and monitoring procedure
- ▶ Self monitoring and independent supervision
- ▶ Input monitoring
- ▶ Quality requirements
- ▶ Sampling
- ▶ Sample treatment and analysis
- ▶ Statistical evaluation of data
- ➔ **Award/revocation of the quality label RAL-GZ 724**

# Guarantee by quality assurance

## Sampling and analysis – RAL-GZ 724



▶ **At least 2 per year**

# Guarantee by quality assurance

Quality requirements – RAL- GZ 724



- ▶ calorific value instead of the mass as reference for heavy metal guidance value since 2012
- ▶ Copper only needs be documented due to difficulty by chemical analysis

Parameter	Heavy metal concentrations	
	Median [mg/MJ DS]	"80.-Percentile" [mg/MJ DS]
Cadmium	0,25	0,56
Mercury	0,038	0,075
Thallium	0,063	0,13
Arsenic	0,31	0,81
Cobalt	0,38	0,75
Nickel	5,0	10
Antimony	3,1	7,5
Lead	12	25
Chromium	7,8	16
Copper	-	-
Manganese	16	31
Vanadium	0,63	1,6
Tin	1,9	4,4

- ▶ Documentation of the **calorific value**, the **moisture content**, the **ash content** and the **chlorine content**

- ▶ SRF represent considerable deviations ins spite of pre-treatment
- ▶ Waste analysis should never consider individual values and compare them with the guidance value
- ▶ RAL-GZ 724:
  - ➔ Evaluation based on 10 samples
  - ➔ Calculation of median value and 80th percentile value and compared to the guidance value
  - ➔ Distribution free values

# Guarantee by quality assurance

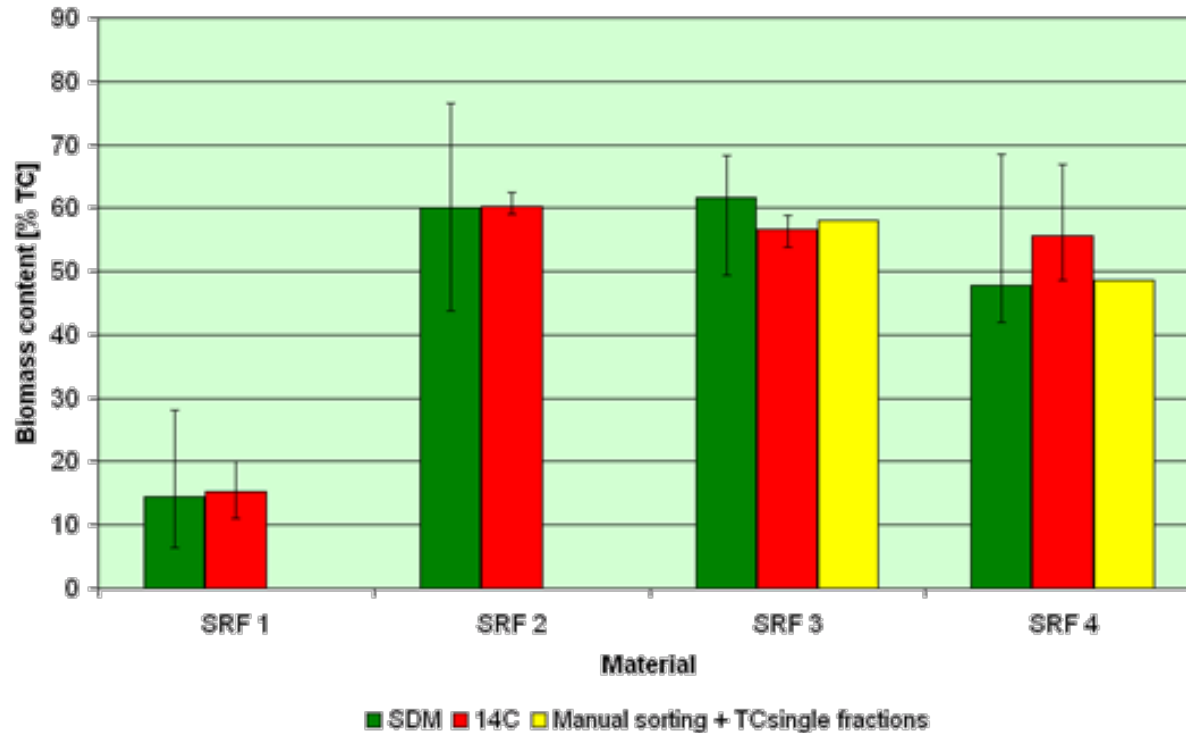
## Determination of biomass content



- ▶ In the context of emission trading the biomass content must be determined!
- ▶ Comparison of different methods in the framework of CEN standardization

Manual Sorting Analysis	Selective digestion method	<sup>14</sup> C-method
<ul style="list-style-type: none"><li>• Ingredients sorted into the fractions: biogenic, non-biogenic, inert</li><li>• Biomass content is calculated by dry mass</li><li>• Not applicable for SRF &lt; 10 mm</li></ul>	<ul style="list-style-type: none"><li>• Selective digestion with nitric acid and hydrogen peroxid</li><li>• Biomass content can be related to the weight, carbon content and energy</li></ul>	<ul style="list-style-type: none"><li>• Based on the knowledge that the share of <sup>14</sup>C in a living organism is largely constant</li><li>• The concentration of <sup>14</sup>C isotope defines the ratio of renewable non-renewable energy sources</li></ul>

### ► Validation



SRF 1: SRF from commercial wastes

SRF 2: SRF from the high calorific fraction of household wastes

SRF 3: SRF reassembled out of used materials

SRF 4: SRF reassembled out of new material

# Guarantee by quality assurance

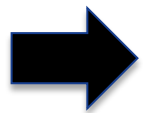
## Determination of the biomass content

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- ▶ Manual sorting analysis for SRF with a particle size of more than 10 mm is suitable, but very time-consuming.
- ▶ While validation 14C-method causes significantly higher costs and waiting periods between sampling and results.
- ▶ Actually the Selective dissolution is still sufficiently comprehensible, manageable and applicable.
- ▶ The BGS e. V. adopted a test method including the selective dissolution to determine the biomass content from the work in CEN/TC 343
  - ➔ Approved by DEHst (German Emissions Trading Authority)

- ▶ Steadily **increasing** utilisation of Solid Recovered Fuels...
- ▶ Permanent **availability** and **constant quality** for efficient utilisation...
- ▶ Technical requirements of the co-incineration plant in particular the feeding system and the firing technology...
- ▶ Immission control...
- ▶ Emission trading...



**...requires the utilisation of qualified SRF!**



▶ **Thank you for your attention!**

For further information, please visit the website:  
[www.bgs-ev.de](http://www.bgs-ev.de)