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Trdna biogoriva - Vodilo za zagotavljanje sistema kakovosti

Solid biofuels - A guide for a quality assurance system

Feste Biobrennstoffe - Leitlinie für ein Qualitätssicherungssystem

Biocombustibles solides - Guide pour un systeme d'assurance Qualité

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Solid biofuels - A guide for a quality assurance system

Biocombustibles solides - Guide du système d'assurance Qualité

Feste Biobrennstoffe - Leitlinie für ein Qualitätssicherungssystem

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Management Centre: Avenue Marnix 17, B-1000 Brussels

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Foreword

This document (CEN/TR 15569:2009) has been prepared by Technical Committee CEN/TC 335 “Solid Biofuels”, the secretariat of which is held by SIS.

CEN/TC 335 has received a mandate from the European Commission (EC) to develop Standards for solid biofuels.

The documents produced by CEN/TC 335 Solid biofuels were based on the information available at the time when they were developed. The BioNorm project (EC part-funded) was designed to provide supporting information to CEN/TC 335 on solid biofuels. Part of the BioNorm Project (ENK6-CT2001-00556) was designed to fill the gaps in the understanding of Quality Assurance in this field [16].

This guide has been developed from the outcomes of the BioNorm-project by Working Group 2 of CEN/TC 335 and provides information on how to develop and implement a Quality Assurance system within the solid biofuels industry.

Introduction

Quality Assurance is defined as the "part of Quality Management focussed on providing confidence that quality requirements will be fulfilled" (CEN/TS 15234). To achieve this, the processes in the supply chain need to be in control. Effective control can be achieved, if Quality Assurance is being applied by each operator in the supply chain. A well designed Quality Assurance system for solid biofuels can contribute to a more transparent and efficient biofuel market. Based upon the requirements of the customer, and the known strengths and weaknesses of a raw material and a process, operators can demonstrate they have taken the measures to provide the desired quality. This establishes a confidence in the products. In this guide "product" refers to the solid biofuel.

Clause 4 sets out the reasoning behind using a Quality Assurance system for solid biofuels, and Clause 6 defines the intentions of this guide and its interconnection with the CEN/TS 15234, *Solid Biofuels — Fuel Quality Assurance*, from now on called "CEN/TS 15234" in this guide. The terms used in this guide are set out in CEN/TS 14588 and CEN/TS 15234.

Clause 7 sets out a step-by-step methodology to help operators within the solid biofuel supply chain to design a Quality Assurance System. The methodologies used in this guide are compliant with the requirements of CEN/TS 15234. However, this guide does not distinguish between different groups of operators (e.g. producer, supplier, etc.); it provides general guidance for the Quality Assurance applicable to each group of operators.

Annex A provides some guidance on the relevant parts of ISO 9001:2008 [1] and Annex B lists CEN/TC 335 Technical Specifications and Technical Reports.

It is recommended that a company specific manual is produced to reflect the Quality Assurance System.

The guidance and instructions given in this guide are recommendations, not requirements. The requirements to be fulfilled for Quality Assurance are set out in CEN/TS 15234.

1 Scope

This guide has been developed to provide information about the Solid Biofuel Quality Assurance, and presents a methodology that helps operators in the solid biofuels industry design an appropriate Quality Assurance system according to their demands. It acts as a supporting document for the application of CEN/TS 15234, *Solid biofuels — Fuel quality assurance,* developed by CEN/TC 335.

This guide is applicable for all operators dealing with solid biofuels within the scope of CEN/TC 335 from the following sources (CEN/TS 14961):

— products from agriculture and forestry;

— vegetable waste from agriculture and forestry;

— vegetable waste from food processing industry;

— wood waste, with the exception of wood waste which may contain halogenated organic compounds or heavy metals as a result of treatment with wood preservatives or coating, and which includes in particular such wood waste originated from construction and demolition waste;

— fibrous vegetable waste from virgin pulp production and from production of paper from pulp, if it is co-incinerated at the place of production and heat generated is recovered;

— cork waste.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 14588:2003, *Solid biofuels — Terminology, definitions and descriptions*

CEN/TS 14961:2005, *Solid biofuels — Fuel specification and classes*

CEN/TS 15234:2006, *Solid biofuels — Fuel Quality Assurance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in CEN/TS 14588:2003 and CEN/TS 15234:2006 (CEN—Terminology, definitions and descriptions for solid biofuels) and the following apply.

3.1
manual
process or site specific document reflecting all activities related to the quality assurance system implemented and applied in practise [16]

4 Background

4.1 General

The term “solid biofuel” encompasses a wide range of materials with different characteristics and properties, as well as supply chains. Standardisation of solid biofuel properties, their sampling and test methodologies will provide tools to facilitate the trade and use of solid biofuels within the market.

In order to increase the confidence of customers, it is essential that operators demonstrate that the specified quality is reached, and that adequate controls are in place throughout the supply chain. The specified quality can be influenced by a series of different factors, including technology and management of the processes.

Customers are becoming increasingly aware of the impact of variations in fuel quality; consequently, large customers often test for properties important to them. In extreme cases, deliveries may be rejected when the quality is outside an agreed specification tolerance. If operators want to avoid such rejections, they should introduce controls at suitable places across the whole supply chain, so called Critical Control Points (see 7.4)

By processing consistently, an operator will improve the stability, efficiency and effectiveness of the operation. The Quality Assurance System should be designed to support this. The effect of this will be to reduce the volume of sampling and testing required.

The term “specified quality” refers not only to fuel properties but also to the other customer requirements. Those requirements differ from case to case and can vary greatly. However, most fall within two sets of circumstances:

— small-scale end-users (especially domestic) who require high-grade fuels with narrow fuel specifications;

— large-scale end-users who can take advantage of lower-cost raw materials by the use of appropriately designed, fuel-flexible combustion plant [4].

It is important when designing and implementing a Quality Assurance System that it takes into consideration the existing operation. The Quality Assurance System should follow the process, not vice versa and be aware of the level and amount of sampling and testing required.

EXAMPLE: **Operational time of the die used in a pellet factory**

The longer the operational time the die runs in a pellet factory the more detrimental effect there is on the pellet quality due to ware on the die holes. Quality Assurance systems should require Quality Control data to be provided to assess the length of time the die has been running and hence the operational running time of each die and a comparison between the dies, can be reviewed against expected running times. From this data a number of different conclusions can be drawn and process changes made as appropriate.

Companies dealing with solid biofuels cover a wide range of activities. Some buy solid biomass, such as residues from agriculture and/or forestry and convert it into higher-grade biofuels, while others only need low-grade biofuels to produce electricity and heat. Each company requires a Quality Assurance System; however, their individual Quality Assurance requirements and systems are likely to be different in each case. This guide is recommended to cover the supply chain up to the delivery to the end-user.

4.2 Purpose of this guide

The purpose of this guide is to be of help when designing a Fuel Quality Assurance system based on CEN/TS 15234.

The approach and methods used in this guide are compatible with CEN/TS 15234 and gives an overview of the most relevant clauses in CEN/TS 15234 (see Table 1).

For those using or contemplating using EN ISO 9000:2005 [2] this document aims at bridging the gap between the generalised text of EN ISO 9001:2008 and the specific needs of operators in the solid biofuel market.

This guide does not discuss adaptations to production processes, nor does it set any pre-conditions in respect of specific technologies or technological processes.

5 Quality Assurance principles

5.1 General

Quality Management EN ISO 9000:2005/EN ISO 9001:2008 is based on four elements, as shown in Figure 1 below. The application of these elements and their different measures depends on the individual circumstances.

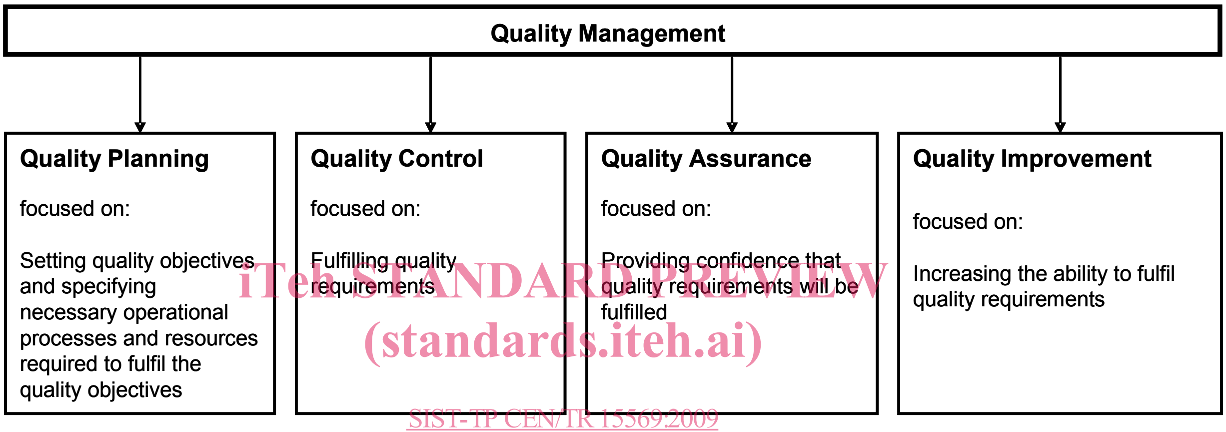

Figure 1 — EN ISO 9000:2005 - Main elements of Quality Management

Each of these elements has its own measures and approaches. The Technical Specification for Fuel Quality Assurance (CEN/TS 15234) covers Quality Control and Quality Assurance.

5.2 Comparison of Quality Control and Quality Assurance

It is important to understand the differences between Quality Control and Quality Assurance.

Quality Control is fundamentally about controlling the quality of a product or process to enable the delivery of the product or service within agreed parameters in the most efficient and effective way. The consequences of having good Quality Control will be a cost effective product and process.

EXAMPLE 1: **Quality control of a pellet factory**

A pellet factory operator will sample and record the pellet moisture content over the shift. If the moisture alters outside given parameters the process will be adjusted to bring the moisture content back within specification. If the process of drying the feedstock is known to be problematic and the operator does not monitor the moisture content in an appropriate timescale, the company could have produced many hours worth of non-conforming pellets before the issue is picked up. If the problem occurred in the first hour and the test is carried out at the end of a twelve-hour shift, there could be eleven hours worth of product that is non-conforming. This is potentially very costly to the company.

EXAMPLE 2: **Quality control of a wood chip producer**

A wood chip producer has an agreement with a customer to provide no more than 5 % oversized chips. When the chipper blades are blunt the producer knows the chipper makes out of specification chips. If the producer has a tendency to keep using the same blades without sharpening them or changing them to reduce the chipper's downtime, the consequences could be to produce more than the 5 % oversized chips that the customer requires, with the potential outcome of the chips being rejected, a blending of additional material has to take place or a reduction in price to keep the customer happy.

Quality Assurance on the other hand, is about reviewing the products and processes, primarily through data provided from the Quality Control records and using this data

a) to establish that products are produced within the required specification and processes are operated as they should be, and

b) over a longer term assures either consistency is being maintained (stability in process results) or that quality improvements are making the required impact.

Quality Assurance tools are excellent at providing data that allows the company to manage a process through exception reporting.

NOTE Exception Reporting – reporting issues or activities that fall outside the normal pattern or are outside the selected minimum or maximum range. Exception reporting enables the quality team to only investigate those incidences that are outside the norm. Exception Reporting also reduces the volume of data to be reviewed.

From the two examples above for Quality Control, practical examples of Quality Assurance will be demonstrated:

EXAMPLE 3: **Quality assurance of a pellet factory**

In the example of the pellet factory, if the processing moisture content data was trended and shown to be a particular problem every three weeks on a particular nightshift, the issue could be identified as being a particular delivery of feedstock or that a particular operator who co-insides with that shift requires additional training.

EXAMPLE 4: **Quality assurance of a wood chip producer**

The chip producer after reviewing a series of months customer service and blade sharpening data realises that his customer's satisfaction is reduced at the same time as the chipper blades' running hours have been extended over a specific number of hours, however, the producer now has an understanding of the additional blade running hours before there is a detrimental effect on his customer service and the cost benefits over the life of the blades due to the time saved and additional life gained by extending the run hours between blade sharpening or change.

By trending and reviewing the data through the Quality Assurance system, these issues are more easily established.

Quality Assurance measures should

— be simple to operate;

— not cause undue bureaucracy;

— support regimes for cost reductions.

However, as stated, Quality Control is important in assessing the properties of the fuel produced and the processes used.

In the context of the CEN/TS 15234, Quality Control includes the selection and use of appropriate sampling and sample reduction techniques, as well as test methods for physical and chemical properties.

5.3 Previous, Current and Following Processes

Solid biofuel supply chains consist of one or several processes. Each process can either be a single operation or multiple operations. The operations may be distributed among different companies (external customer) or within the same company or department (internal customer). In this guide, the customer is defined as the next operator in the process, whether within the organisation or across separate organisations (Figure 2). This document is specifically looking at the Current process, however, it is important to understand the relationship between the Previous and the Current Process, as well as the Current Process and the Following Process.

Each Following Process step (Customer) within the supply chain can be involved in defining the specified quality. Figure 3 illustrates that using a typical pellet production and is shown from the producers´ point of view.

For ease of understanding and identification, in this guide, the Current Process is shown in a heavy Bold Box.

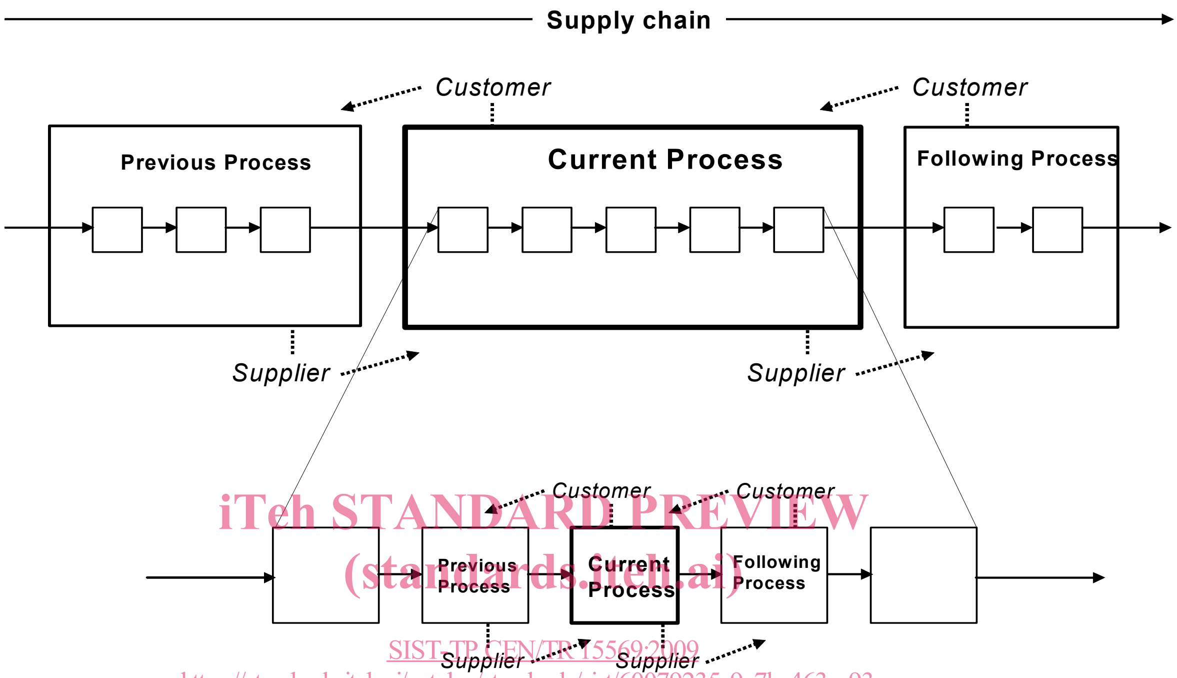

Figure 2 — Descriptions of the Previous, Current and Following Processes

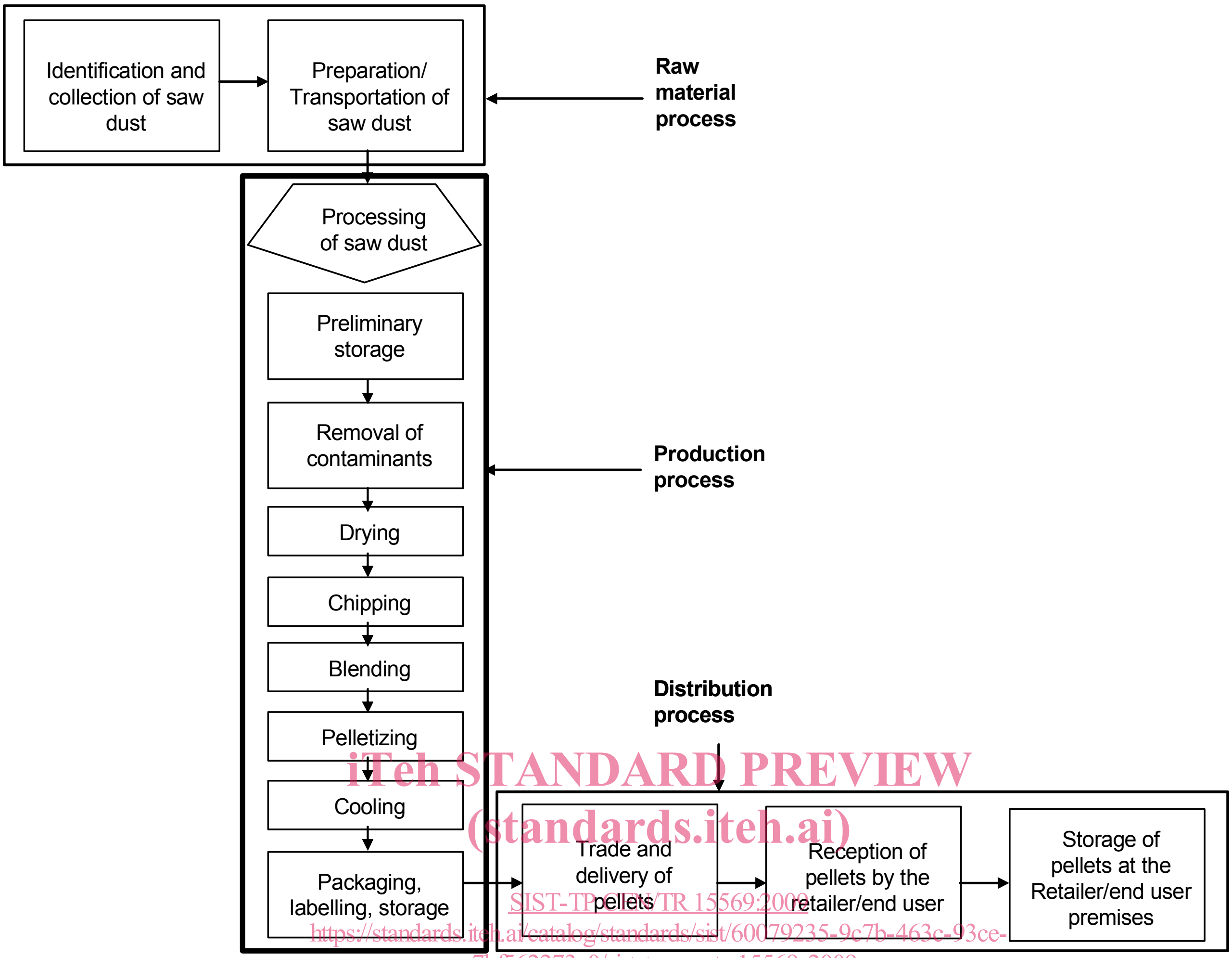

Figure 3 — Example of the process steps in a pellet factory

5.4 Quality requirements

Quality Assurance aims to provide confidence that a stable or defined quality is continually achieved in accordance with the customer requirements. It means that specified requirements are fulfilled; however, it does not necessarily mean a high product quality. Customer requirements include, among other things, a specified fuel quality and in many circumstance the quality of the performance of the company, in relation to the service (such as timing, logistics and proper documentation).

Quality performance is mainly controlled by a company's management [6, 7]. The Quality Assurance System should ensure the product or service is provided within agreed tolerances and service parameters.

EXAMPLE: **Quality requirement of raw material moisture content in pellet production**

If a pellet producer requires sawdust at 10 w-% moisture content, because the company does not have a dryer. There is no point for the raw material supplier, providing the sawdust at 30 w-% (problems in production) or 5 w-% (causes unnecessary extra costs for raw material supplier).

For solid biofuels to be accepted in the marketplace, it is important that the customer requirements, in terms of the fuel properties, are fulfilled whether or not those requirements follow a fuel specification.

The quality of solid biofuels can be defined in terms of a number of key properties that relate to the suitability of the fuel for a specific use. The selection of these indicators can differ from case to case, depending on the application, the production processes and the occurrence of natural variations in the fuel characteristics.