Irish Standard
I.S. EN 16900:2017

Fast pyrolysis bio-oils for industrial boilers - Requirements and test methods

I.S. EN 16900:2017

Incorporating amendments/corrigenda/National Annexes issued since publication:

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):

NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.

This document is based on:	*Published:*
EN 16900:2017	2017-03-15

This document was published under the authority of the NSAI and comes into effect on:	ICS number:
2017-04-02	75.160.20
	NOTE: If blank see CEN/CENELEC cover page

NSAI	T +353 1 807 3800	Sales:
1 Swift Square,	F +353 1 807 3838	T +353 1 857 6730
Northwood, Santry	E standards@nsai.ie	F +353 1 857 6729
Dublin 9	W NSAI.ie	W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

National Foreword

I.S. EN 16900:2017 is the adopted Irish version of the European Document EN 16900:2017, Fast pyrolysis bio-oils for industrial boilers - Requirements and test methods

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

For relationships with other publications refer to the NSAI web store.

Compliance with this document does not of itself confer immunity from legal obligations.

In line with international standards practice the decimal point is shown as a comma (,) throughout this document.

This page is intentionally left blank

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 16900

March 2017

ICS 75.160.40

English Version

Fast pyrolysis bio-oils for industrial boilers - Requirements and test methods

Huiles de pyrolyse rapide pour application chaudières - Spécifications et méthodes d'analyses

Schnellpyrolyse-Bioöle für industrielle Kesselanlagen - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 16 January 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 16900:2017 E

Contents

page

European foreword

This document (EN 16900:2017) has been prepared by Technical Committee CEN/TC 19 “Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin”, the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate [1] given to CEN by the European Commission and the European Free Trade Association.

Annex C contains the precision data generated on the test methods, which are the results of inter-laboratory testing, carried out by Working Group 41 of CEN/TC 19. Many of the test methods included in this standard were the subject of inter-laboratory testing to determine the applicability of the method and its precision. In Annex D also the needed modifications to the test methods are presented.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Fast pyrolysis bio-oils (FPBO) or fast pyrolysis liquids are completely different from petroleum fuels both in their physical properties and chemical composition. They are brownish liquids with a distinct and smoky odour. They can be produced from woody[2] biomass and agrobiomass (herbaceous[2]) and there is a wide range of reactor types are suitable for fast pyrolysis bio-oil production. Contrary to fossil fuels, they are highly polar, mainly water-soluble containing typically about 25 % (*m/m*) on wet basis) of water, acidic in nature, dense, and are viscous liquids, very poorly or not miscible with hydrocarbons [3, 6, 18, 19].

1 Scope

This European Standard specifies requirements and test methods for fast pyrolysis bio-oils for boiler use at industrial scale (>1 MW thermal capacity), not for domestic use. Two different grades are specified.

It is recommended to draw attention to differences especially in those properties, which can have an effect on the required flue gas treatment system, such as ash, nitrogen, and sulfur content. National and local regulations determine the requirements for flue gas treatment system.

In addition to the quality requirements and test methods for fast pyrolysis bio-oils, further instructions on storage (Annex A), sampling, and materials compatibility (Annex B) are given.

NOTE For the purposes of this European Standard, the term "% (*m/m*)" is used to represent respectively the mass fraction.

2 Normative references

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

EN 16476, *Liquid petroleum products - Determination of Sodium, Potassium, Calcium, Phosphorus, Copper and Zinc contents in diesel fuel - Method via Inductively Coupled Plasma Optical Emission Spectrometry (ICP OES)*

EN ISO 2719, *Determination of flash point - Pensky-Martens closed cup method (ISO 2719)*

EN ISO 3104, *Petroleum products - Transparent and opaque liquids - Determination of kinematic viscosity and calculation of dynamic viscosity (ISO 3104)*

EN ISO 3170:2004, *Petroleum liquids - Manual sampling (ISO 3170:2004)*

EN ISO 4259, *Petroleum products - Determination and application of precision data in relation to methods of test (ISO 4259)*

EN ISO 6245, *Petroleum products - Determination of ash (ISO 6245)*

EN ISO 9038, *Determination of sustained combustibility of liquids (ISO 9038)*

EN ISO 12185, *Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method (ISO 12185)*

EN ISO 20846, *Petroleum products - Determination of sulfur content of automotive fuels - Ultraviolet fluorescence method (ISO 20846)*

ISO 3016, *Petroleum products — Determination of pour point*

ASTM E70, *Standard Test Method for pH of Aqueous Solutions with the Glass Electrode*

ASTM E203, *Standard Test Method for Water Using Volumetric Karl Fischer Titration*

ASTM D5291, *Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants*

ASTM D7579, *Standard Test Method for Pyrolysis Solids Content in Pyrolysis Liquids by Filtration of Solids in Methanol*