



BSI Standards Publication

Carbon dioxide capture — Carbon dioxide capture systems, technologies and processes

National foreword

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Carbon dioxide capture — Carbon dioxide capture systems, technologies and processes

*Capture du dioxyde de carbone — Systèmes de capture du dioxyde de
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 265, *Carbon dioxide capture, transportation, and geological storage*.

Introduction

Carbon capture and storage (CCS) is a technology to mitigate climate change. Many demonstration projects have been conducted worldwide, and CO₂ capture is an important process in CCS and is cost and energy intensive.

CO₂ capture in power industry could be classified through pre, post and oxy combustion. Technologies such as chemical and physical absorption, adsorption, and membrane separation are currently under development and are in various stages of maturity from commercial (110 MW)^[1] large-scale demonstrations to laboratory-scale evaluation, and should be delivered at low cost and low energy consumption.

The objectives of this Technical Report are to specify and review existing capture technologies, equipment and processes and comprehend CO₂ capture systems so that this Technical Report can provide stakeholders with the guidance and knowledge necessary to develop a series of standards for CO₂ capture and build consensus on this standardization work in advance.

This Technical Report describes CO₂ capture systems based on published papers and other documents and then summarizes the different issues deemed most important by ISO/TC 265. This includes the following:

- boundary for CO₂ capture systems;
- technologies, equipment and processes;
- CO₂ streams, gas streams and emissions, processes and waste products;
- evaluation procedures for capture performance;
- safety issues on each capture system;
- reliability issues on each capture system;
- management system.

Carbon dioxide capture — Carbon dioxide capture systems, technologies and processes

1 Scope

This Technical Report describes the principles and information necessary to clarify the CO₂ capture system and provide stakeholders with the guidance and knowledge necessary for the development of a series of standards for CO₂ capture. This Technical Report also covers technologies, equipment and processes specific to CO₂ capture from the viewpoints of the international standardization for the implementation of CCS.

The purpose of this Technical Report is to provide guidance for the development of an ISO document related to CO₂ capture as part of a CCS chain. This Technical Report covers CO₂ capture systems applicable to CO₂ emission sources and their respective boundaries, as well as capture technologies, equipment and processes. In addition, it can be used for the development of International Standards under TC 265.

The following issues are to be excluded from this Technical Report:

- industrial use of CO₂;
- compression of CO₂ (not described in detail);
- terminologies not used in this Technical Report.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

absorbent

substance able to absorb liquid or gas

3.2

affinity

tendency of substances to react with each other

Note 1 to entry: Also defined as the decrease in Gibbs energy on going from the reactants to the products of a chemical reaction.

[SOURCE: IUPAC Compendium of Chemical Terminology]

3.3

air separation unit

unit separating oxygen, nitrogen and other inert gases from air which delivers the required oxygen for gasification or combustion applications in the context of CCS

3.4

alkanolamine

chemical compound that carries hydroxy (–OH) and amino (–NH₂, –NHR, and –NR₂) functional groups on an alkane backbone