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Carbon dioxide capture, transportation and geological storage — Pipeline transportation systems

*Captage du dioxyde de carbone, transport et stockage géologique —
Systèmes de transport par conduites*



Reference number
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Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols, abbreviated terms and units	4
4.1 Symbols.....	4
4.2 Abbreviated terms.....	4
4.3 Units.....	5
5 Properties of CO₂, CO₂ streams and mixing of CO₂ streams influencing pipeline transportation	5
5.1 General.....	5
5.2 Pure CO ₂	5
5.2.1 Thermodynamics.....	5
5.2.2 Chemical reactions and corrosion.....	5
5.3 CO ₂ streams.....	5
5.3.1 Thermodynamics.....	5
5.3.2 Chemical reactions.....	6
5.4 Mixing of CO ₂ streams.....	6
6 Concept development and design criteria	6
6.1 General.....	6
6.2 Safety philosophy.....	6
6.3 Design criteria.....	7
6.4 Reliability and availability of CO ₂ pipeline systems.....	7
6.5 Short-term storage reserve.....	7
6.6 Access to the pipeline system.....	7
6.7 System design principles.....	7
6.7.1 General.....	7
6.7.2 Pressure control and overpressure protection system.....	7
6.8 Pipeline dehydration — General principles.....	8
6.8.1 Particular aspects related to CO ₂	8
6.8.2 Maximum water content.....	8
6.8.3 Avoidance of hydrate formation.....	8
6.8.4 Reliability and precision of pipeline dehydration.....	8
6.9 Flow assurance.....	8
6.9.1 Particular aspects related to CO ₂ streams.....	8
6.9.2 Thermo-hydraulic model.....	9
6.9.3 Pipeline design capacity.....	9
6.9.4 Reduced flow capacity.....	10
6.9.5 Available transport capacity.....	10
6.9.6 CO ₂ temperature conditions.....	10
6.9.7 Internal lining.....	10
6.9.8 External thermal insulation.....	10
6.9.9 Leak detection.....	10
6.10 Pipeline layout.....	11
6.10.1 Valve stations.....	11
6.10.2 Block valves.....	11
6.10.3 Check valves.....	11
6.10.4 Pumping and compressor stations.....	11
6.10.5 Pigging stations and pigging.....	11
6.10.6 Onshore vent facility design.....	11
6.10.7 Offshore vent facilities.....	12

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7	Materials and pipeline design	12
7.1	Internal corrosion	12
7.2	Line pipe materials	12
7.2.1	General	12
7.2.2	External coating	13
7.2.3	Non-metallic materials	13
7.2.4	Lubricants	13
7.3	Wall thickness calculations	13
7.3.1	Calculation principles — Design loads	13
7.3.2	Determination of minimum wall thickness	14
7.3.3	Minimum wall thickness ($t_{\min DP}$) depending on internal pressure	14
7.3.4	Minimum wall thickness ($t_{\min HS}$) taking into account dynamic pressure alterations (hydraulic shock)	14
7.3.5	Minimum wall thickness ($t_{\min DF}$) against ductile fracture	14
7.3.6	Fracture toughness	15
7.3.7	Overview	15
7.4	Additional measures	17
7.4.1	Dynamic loads due to operation (alternating operation pressure)	17
7.4.2	Topographical profile	17
7.4.3	Fracture arrestors	17
7.4.4	Offshore pipelines	17
8	Construction	17
8.1	General	17
8.2	Pipeline pre-commissioning	17
8.2.1	Overview	17
8.2.2	Pipeline dewatering and drying	18
8.2.3	Preservation before pipeline commissioning	18
9	Operation	18
9.1	General	18
9.2	Pipeline commissioning	18
9.2.1	First/initial/baseline inspection	18
9.2.2	Initial filling and pressurization with product	18
9.2.3	Onshore vent facilities	18
9.2.4	Pipeline shut-in	19
9.2.5	Pipeline depressurization	19
9.3	Inspection, monitoring and testing	19
9.3.1	General	19
9.3.2	In line inspection procedure	19
9.3.3	Monitoring of water content	20
10	Re-qualification of existing pipelines for CO₂ service	20
	Annex A (informative) Composition of CO₂ streams	21
	Annex B (informative) CO₂ characteristics	24
	Annex C (informative) Internal corrosion and erosion	26
	Annex D (informative) Use of the modified Battelle Two-Curve Model	28
	Annex E (informative) Data requirements for an integrity management plan	30
	Bibliography	32

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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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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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*.

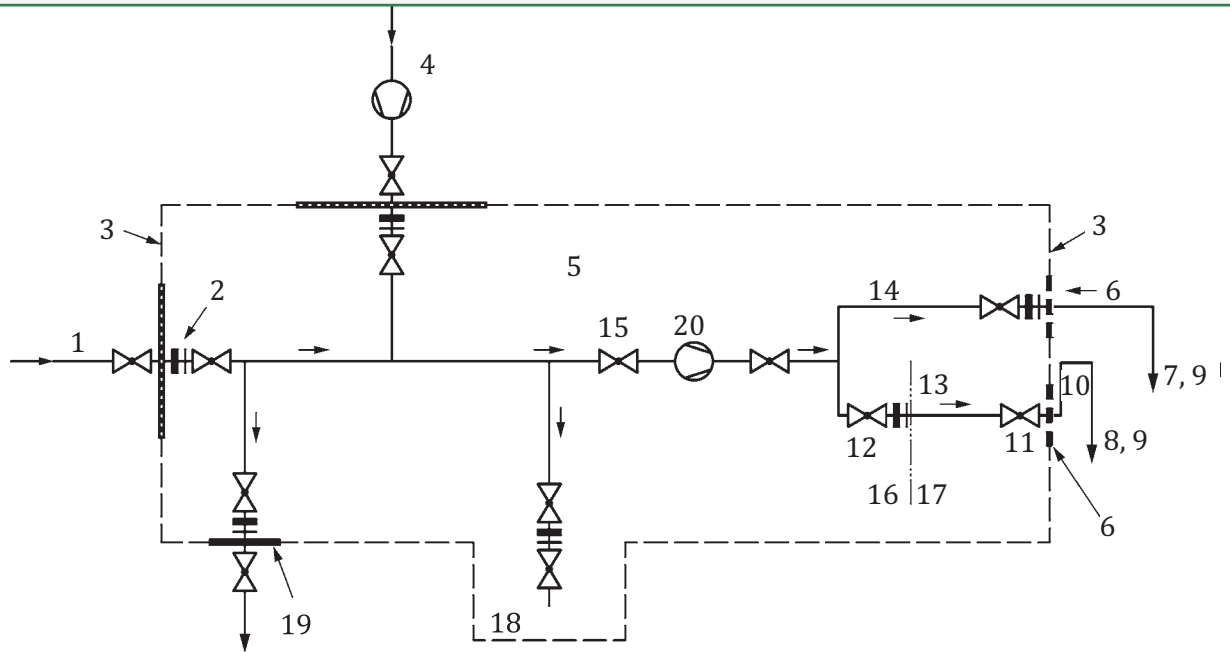
Introduction

Carbon dioxide (CO₂) capture and storage (CCS) has been identified as a key abatement technology for achieving a significant reduction in CO₂ emissions to the atmosphere. Pipelines are likely to be the primary means of transporting CO₂ from the point-of-capture to storage (e.g. depleted hydrocarbon formations, deep saline aquifers), where it will be retained permanently or used for other purposes [e.g. Enhanced Oil Recovery (EOR)] to avoid its release to the atmosphere. While there is a perception that transporting CO₂ via pipelines does not represent a significant barrier to implementing large-scale CCS, there is significantly less industry experience than there is for hydrocarbon service (e.g. natural gas) and there are a number of issues that need to be adequately understood and the associated risks effectively managed to ensure safe transport of CO₂. In a CCS context, there could be a need for larger CO₂ pipeline systems in more densely populated areas and with CO₂ coming from multiple sources. Also, offshore pipelines for the transportation of CO₂ to offshore storage sites are likely to become common.

The objective of this document is to provide requirements and recommendations on certain aspects of safe and reliable design, construction and operation of pipelines intended for the large scale transportation of CO₂ that are not already covered in existing pipeline standards such as ISO 13623, ASME B31.4, EN 1594, AS 2885 or other standards (see Bibliography). Existing pipeline standards cover many of the issues related to the design and construction of CO₂ pipelines; however, there are some CO₂ specific issues that are not adequately covered in these standards. The purpose of this document is to cover these issues consistently. Hence, this document is not a standalone standard, but is written to be a supplement to other existing pipeline standards for natural gas or liquids for both onshore and offshore pipelines.

Transport of CO₂ via ship, rail and road is not covered in this document.

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Key

- | | | | |
|---|---|----|---------------------------------------|
| 1 | source of CO ₂ from capture, e.g. from power plant, industry; see ISO/TR 27912 (capture) | 10 | riser (out of transport scope) |
| 2 | isolating joint | 11 | subsea valve (inside transport scope) |
| 3 | boundary limit | 12 | beach valve |
| 4 | other source of CO ₂ | 13 | offshore pipeline |
| 5 | ISO 27913 (transportation system inside) | 14 | onshore pipeline |
| 6 | boundary to storage facility | 15 | valve |
| 7 | onshore storage facility | 16 | landfall |
| 8 | offshore storage facility | 17 | open water/sea |
| 9 | EOR | 18 | third party transport system |
| | | 19 | export to other uses than 7, 8 and 9 |
| | | 20 | intermediate compression or pumping |

Figure 1 — Schematic illustration of the system boundaries of this document