

AS 21457:2022



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# **Petroleum, petrochemical and natural gas industries — Materials selection and corrosion control for oil and gas production systems (ISO 21457:2010, MOD)**



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AS 21457:2022

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- Australian Industry Group
- Australian Organisation for Quality
- Australian Petroleum Production and Exploration Association
- Australian Pipelines and Gas Association
- Department for Energy and Mining, SA
- Department of Mines, Industry Regulation and Safety WA
- DNV-GL Oil and Gas
- Energy Safe Victoria
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and natural gas industries  
— Materials selection and  
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21457:2010, MOD)**

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## Preface

This Standard was prepared by the Standards Australia Committee ME-092, Materials, equipment, structures and related services for petroleum, petrochemical and natural gas industries.

The objective of this document is to identify the corrosion mechanisms and parameters for evaluation when performing selection of materials for pipelines, piping and equipment related to transport and processing of hydrocarbon production, including utility and injection systems. This includes all equipment from and including the well head, to and including pipelines for stabilized products.

Guidance is given for the following:

- (a) Corrosion evaluations.
- (b) Materials selection for specific applications, or systems, or both.
- (c) Performance limitations for specific materials.
- (d) Corrosion control.

This document is not applicable to downhole components. This document does not provide detailed material requirements or guidelines for manufacturing and testing of equipment.

This document is an adoption with national modifications, and has been reproduced from, ISO 21457:2010, *Petroleum, petrochemical and natural gas industries – Materials selection and corrosion control for oil and gas production systems*. The modifications are additional requirements and are set out in Appendix ZZ, which has been added at the end of the source text.

Appendix ZZ lists the modifications to ISO 21457:2010, for the application of this document in Australia.

As this document has been reproduced from an International document, the following apply:

- (i) In the source text “this International Standard” should read “this document”.
- (ii) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

# Contents

Preface .....	ii
Foreword .....	v
Introduction .....	vi
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms, definitions and abbreviated terms .....</b>	<b>1</b>
3.1 Terms and definitions .....	1
3.2 Abbreviated terms .....	5
<b>4 Design information for materials selection .....</b>	<b>6</b>
<b>5 Materials selection report .....</b>	<b>6</b>
<b>6 General guidelines for corrosion evaluations and materials selection .....</b>	<b>7</b>
6.1 General .....	7
6.2 Internal corrosion in oil and gas production and processing .....	7
6.2.1 Corrosion evaluation .....	7
6.2.2 Corrosion mechanisms .....	7
6.2.3 Corrosion parameters .....	9
6.3 Internal corrosion in injection systems .....	12
6.4 Internal corrosion in utility systems .....	12
6.5 Sand erosion .....	12
6.6 External corrosion .....	13
6.6.1 General .....	13
6.6.2 External marine atmospheric environments .....	13
6.6.3 External non-marine atmospheric environments .....	14
6.6.4 Buried and submerged installations .....	14
6.6.5 Corrosion under insulation .....	14
6.7 Polymeric materials .....	14
6.8 Glass-fibre-reinforced plastic .....	15
6.9 Mechanical properties and material usage limitations .....	15
6.9.1 General .....	15
6.9.2 Submerged installations .....	16
<b>7 Materials selection for specific applications and systems .....</b>	<b>16</b>
7.1 General .....	16
7.2 Oil and gas production and processing systems .....	16
7.2.1 General .....	16
7.2.2 Heat exchangers .....	17
7.2.3 Wellhead, production and process systems .....	17
7.2.4 Flare systems .....	18
7.2.5 Produced water .....	18
7.3 Injection systems .....	19
7.3.1 General .....	19
7.3.2 De-aerated seawater .....	19
7.3.3 Aerated seawater .....	19
7.3.4 Produced water and aquifer water .....	19
7.3.5 Gas injection systems .....	20
7.4 Utility systems .....	20
7.4.1 General .....	20
7.4.2 Fresh-water systems .....	20
7.4.3 Seawater carrying systems .....	21
7.4.4 Other utility systems .....	23
7.5 Pipelines and flowlines .....	24
<b>8 Corrosion control .....</b>	<b>25</b>

8.1	Chemical treatment	25
8.2	Internal corrosion allowance	26
8.3	Selection of internal and external coatings	27
8.4	External splash zone protection	27
8.5	Cathodic protection	27
8.5.1	Offshore	27
8.5.2	Onshore	28
8.6	Corrosion protection of closed compartments	28
8.7	Connection of dissimilar materials	28
8.7.1	Piping systems	28
8.7.2	Submerged installations	29
8.7.3	Structural installations	29
8.8	Sealing materials	29
8.9	Fasteners	29
8.10	Weld overlay	30
8.11	Preferential weld corrosion	30
8.12	Corrosion management	30
<b>Annex A</b>	(informative) <b>Design basis for hydrocarbon systems</b>	<b>31</b>
<b>Annex B</b>	(informative) <b>Corrosion monitoring</b>	<b>33</b>
<b>Annex C</b>	(informative) <b>Chemical composition of some typical oils and alloys</b>	<b>34</b>
<b>Bibliography</b>		<b>38</b>
<b>Appendix ZZ</b>	(normative) <b>Modifications to ISO 21457:2010 for Australia</b>	<b>40</b>

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 21457 was prepared by Technical Committee ISO/TC 67, *Materials, equipment and offshore structures for petroleum, petrochemical and natural gas industries*.

## Introduction

The provision of well-established and robust material selection guidelines offers a means of satisfying long-term materials performance that meet the minimum requirements for a broad range of end users in the petroleum, petrochemical and natural gas industries. An additional benefit can be to enable product suppliers to develop, manufacture and provide off-the-shelf equipment that meets these requirements.

Oil and gas production projects benefit from a structured evaluation of materials used for the different fluids being handled. Therefore, the main objective of this International Standard is to provide general requirements with guidelines for the selection of materials for systems and components, with due consideration to the transported fluids and the external environment.

It is the end user's responsibility to provide a project document with respect to implementation of the requirements and guidelines of this International Standard, and to specify the design conditions for material selection. In addition to the end user, the organization responsible for the facility or for the equipment design, or for both, is regarded as responsible for materials selection.

This International Standard is developed to provide responsible parties with a structured process to carry out materials selection in a consistent manner as a part of the engineering work, based upon a design basis for a particular installation. This International Standard is intended for use by oil companies and engineering contractors.

Users of this International Standard are advised that further or differing requirements might be needed for individual applications. This International Standard is not intended to inhibit a vendor from offering, or the purchaser from accepting, alternative equipment or engineering solutions for the individual application. This can be particularly applicable where there is innovative or developing technology. Where an alternative is offered, it is advisable that the vendor identify any variations from this International Standard and provide details.

# Australian Standard<sup>®</sup>

## Petroleum, petrochemical and natural gas industries — Materials selection and corrosion control for oil and gas production systems (ISO 21457:2010, MOD)

### 1 Scope

This International Standard identifies the corrosion mechanisms and parameters for evaluation when performing selection of materials for pipelines, piping and equipment related to transport and processing of hydrocarbon production, including utility and injection systems. This includes all equipment from and including the well head, to and including pipelines for stabilized products. This International Standard is not applicable to downhole components.

Guidance is given for the following:

- corrosion evaluations;
- materials selection for specific applications, or systems, or both;
- performance limitations for specific materials;
- corrosion control.

This International Standard refers to materials that are generally available, with properties that are known and documented. It also allows other materials to be evaluated and qualified for use.

This International Standard does not provide detailed material requirements or guidelines for manufacturing and testing of equipment. Such information can be found in particular product and manufacturing standards.

### 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.

ISO 15156-1<sup>1)</sup>, *Petroleum and natural gas industries — Materials for use in H<sub>2</sub>S-containing environments in oil and gas production — Part 1: General principles for selection of cracking-resistant materials*

ISO 15156-2<sup>2)</sup>, *Petroleum and natural gas industries — Materials for use in H<sub>2</sub>S-containing environments in oil and gas production — Part 2: Cracking-resistant carbon and low-alloy steels, and the use of cast irons*

ISO 15156-3<sup>3)</sup>, *Petroleum and natural gas industries — Materials for use in H<sub>2</sub>S-containing environments in oil and gas production — Part 3: Cracking-resistant CRAs (corrosion-resistant alloys) and other alloys*

### 3 Terms, definitions and abbreviated terms

#### 3.1 Terms and definitions

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

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- 1) ISO 15156 (all parts) has been adopted by NACE as NACE MR0175/ISO 15156.
  - 2) ISO 15156 (all parts) has been adopted by NACE as NACE MR0175/ISO 15156.
  - 3) ISO 15156 (all parts) has been adopted by NACE as NACE MR0175/ISO 15156.