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Environmental management — Environmental technology verification (ETV)

Management environnemental — Vérification des technologies environnementales (ETV)

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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).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 Technical Committee ISO/TC 207, *Environmental management*, Subcommittee SC 4, *Environmental performance evaluation*.

In the development of this document, ISO Guide 82 has been taken into account in addressing sustainability issues.

Introduction

The objective of environmental technology verification (ETV) is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

ETV contributes to protection and conservation of the environment by promoting and facilitating market uptake of innovative environmental technologies, especially those that perform better than relevant alternatives. ETV is particularly applicable to those environmental technologies whose innovative features or performance cannot be fully assessed using existing standards. Through the provision of objective evidence, ETV provides an independent and impartial confirmation of the performance of an environmental technology based on reliable test data. ETV aims to strengthen the credibility of new, innovative technologies by supporting informed decision-making among interested parties.

ETV was established in the United States in 1995, and similar programmes were later introduced in other countries, including Canada, several European Union member states, Japan, South Korea and the Philippines. The performance of many environmental technologies has since been verified in these countries under ETV programmes established at either the national or international level. Interest in joint, mutually recognized verifications performed under different ETV programmes has increased over the past decade. In 2008, the International Working Group on ETV (IWG-ETV), composed of international experts representing institutions operating an ETV scheme in Canada, the United States, Japan, South Korea, the Philippines and the European Union, was established with the aim of exploring ways to accelerate international harmonization and mutual recognition of ETV programmes. The IWG-ETV reached a consensus that standardization of the ETV process by means of an International Standard is an appropriate way to establish the credibility and robustness of ETV world-wide.

Environmental management — Environmental technology verification (ETV)

1 Scope

This document specifies principles, procedures and requirements for environmental technology verification (ETV).

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/IEC 17020:2012, *Conformity assessment — Requirements for the operation of various types of bodies performing inspection*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1 Terms related to organization

3.1.1
organization
person or group of people that has its own functions with responsibilities, authorities and relationships to achieve its objectives

Note 1 to entry: The concept of organization includes, but is not limited to, sole-trader, company, corporation, firm, enterprise, authority, partnership, charity or institution, or part or combination thereof, whether incorporated or not, public or private.

[SOURCE: ISO 14001:2015, 3.1.4]

3.1.2
verifier
organization (3.1.1) that performs *environmental technology verification* (3.3.5)

3.1.3
test body
organization (3.1.1) providing an environment for testing, test-implementation and means for performing and reporting on the testing of an *environmental technology* (3.3.4)

3.1.4
applicant
organization (3.1.1) proposing a *technology* (3.3.1) for which *performance* (3.4.1) will be verified through an *environmental technology verification* (3.3.5)

EXAMPLE Technology developer; manufacturer; provider; legally authorized representative of the organization.

3.1.5
interested party
person or *organization* (3.1.1) being concerned with, affecting, being affected by, or perceiving itself to be affected by the results of *environmental technology verification* (3.3.5)

EXAMPLE Customer; user; community; supplier; developer; manufacturer; investor; regulator; non-governmental organization.

3.2 Terms related to verification

3.2.1
verification
confirmation through the provision of objective evidence

3.2.2
verification plan
planning document detailing the implementation of *environmental technology verification* (3.3.5)

3.2.3
verification report
document detailing *environmental technology verification* (3.3.5) and its results

3.2.4
verification statement
document summarizing the results of *environmental technology verification* (3.3.5)

3.2.5
test plan
planning document detailing the principles, test methods, conditions, procedures and *data quality* (3.2.6) required to carry out testing and to produce test data

3.2.6
data quality
characteristics of data that relate to their ability to satisfy stated requirements

[SOURCE: ISO 14040:2006, 3.19]

3.2.7
test report
document describing conditions and results of testing

3.3 Terms related to technology

3.3.1
technology
application of scientific knowledge, tools, techniques, crafts or systems in order to solve a problem or to achieve an objective which can result in a *product* (3.3.2) or *process* (3.3.3)

3.3.2
product
any goods or service

[SOURCE: ISO 14050:2009, 6.2, modified — Notes to entry have been deleted]

3.3.3
process
set of interrelated or interacting activities which transforms inputs into outputs

[SOURCE: ISO 14001:2015, 3.3.3]

3.3.4
environmental technology
technology (3.3.1) that either results in an *environmental added value* (3.3.7) or measures parameters that indicate an *environmental impact* (3.3.6)

3.3.5
environmental technology verification
verification (3.2.1) of the *performance* (3.4.1) of an e*nvironmental technology* (3.3.4) by a *verifier* (3.1.2)

3.3.6
environmental impact
change to the environment, whether adverse or beneficial, wholly or partially resulting from material acquisition, design, production, use or end-of-use of a *technology* (3.3.1)

[SOURCE: ISO 14001:2015, 3.2.4, modified — The words "resulting from an organization's environmental aspects" have been replaced by "resulting from material acquisition, design, production, use or end-of-use of a technology".]

3.3.7
environmental added value
more beneficial or less adverse *environmental impact* (3.3.6) of a *technology* (3.3.1) with respect to the *relevant alternative* (3.3.8)

3.3.8
relevant alternative
technology (3.3.1) applied currently in a similar situation to the *environmental technology* (3.3.4) for which *performance* (3.4.1) will be verified through *environmental technology verification* (3.3.5)

3.4 Terms related to performance

3.4.1
performance
measurable result

Note 1 to entry: Performance relates to measurable results supported by numerical quantitative findings.

[SOURCE: ISO 14001:2015, 3.4.10, modified — Note 1 to entry has been modified and Note 2 to entry has been deleted because the definition refers to specific measurements related to technologies.]

3.4.2
performance claim
statement of *performance* (3.4.1) of the *environmental technology* (3.3.4) declared by the *applicant* (3.1.4)

3.4.3
performance parameter
numerical or other measurable factor of the *performance* (3.4.1) of a *technology* (3.3.1)

4 General principles and requirements

4.1 Principles

4.1.1 General

The purpose of environmental technology verification is to provide a credible and impartial account of the performance of environmental technologies. Environmental technology verification is based on a number of principles to ensure that verifications are performed and reported accurately, clearly, unambiguously and objectively.

4.1.2 Factual approach

Verification statements are based on factual and relevant evidence confirming objectively the performance of environmental technologies.

4.1.3 Sustainability

Environmental technology verification is a tool that supports sustainability by providing credible information on the performance of environmental technologies.

4.1.4 Transparency and credibility

Environmental technology verification is based on reliable test results and robust procedures. The process is facilitated such that, to the greatest extent possible, methods and data are fully disclosed and reports are clear, complete, objective and useful to the interested parties.

4.1.5 Flexibility

To maximize the utility of results, environmental technology verification allows for flexibility in the specification of the performance parameters and test methods. This is achieved through a dialogue between the applicant, verifier and interested parties.

4.2 Requirements

When verifying the performance of environmental technologies, the requirements of this document and ISO/IEC 17020:2012 shall be applied and demonstrated.

Annex A shows the relationship between this document and ISO/IEC 17020:2012.

5 Environmental technology verification

5.1 General

This clause outlines key procedures of the environmental technology verification:

— application;

— pre-verification;

— verification;

— reporting;

— post-verification.

Unless specified otherwise, these procedures are performed by the verifier.

Annex B shows an overview of the environmental technology verification and Annex C gives guidance for the use of this document.

5.2 Application

5.2.1 Application requirements

The applicant shall provide to the verifier the following information at a minimum:

a) information about the applicant, including its name and address(es) of its physical location(s)

b) description of the technology:

   1) a unique identifier for the technology (e.g. a commercial name, an identification number or version number);

   2) information about the intended application of the technology expressed in terms of:

      i) technology purpose,

      ii) type of material that the technology is intended for,

      iii) measurable property that is affected by the technology and the way in which it is affected;

   NOTE 1 More than one technology purpose, type of material and measurable property can be provided.

   3) information sufficient to understand the operation and performance of the technology;

   4) development status of the technology proposed for verification and its readiness for market;

   NOTE 2 Technology proposed for verification needs to be either already available on the market or available at least at a stage where no substantial change affecting its performance will be implemented before its market entry.

   5) information on relevant alternative of the technology; including its relevant performance and environmental impacts;

   6) information on significant environmental impacts of the technology proposed for verification and its environmental added value, if applicable.

c) performance claim including a proposed set of performance parameters and their numerical values to be verified;

d) relevant existing test data and methods for acquiring these data that were applied to support the performance claim;

e) any relevant legal requirements, or standards related to the technology and its use;

f) if relevant, a statement that the technology adheres to applicable regulatory requirements;

g) supporting information relevant to the interested parties including the following, but not limited to:

   1) installation and operating requirements and conditions;

   2) service and maintenance requirements;

   3) expected length of time for which a technology functions under normal operating conditions, and;

   4) any applicable health and safety requirements and considerations.

5.2.2 Application review

5.2.2.1 Administrative review

Administrative review shall ensure that all information requested for the application has been provided in accordance with the requirements specified in 5.2.1.

5.2.2.2 Technical review

Technical review shall ensure that:

a) the technology fulfils the definition of environmental technology (3.3.4);

b) the performance claim for the intended application of the technology addresses the needs of the interested parties;

c) the information on the technology is sufficient to review the performance claim.

Any issues related to the acceptance or rejection of the application that may arise from the administrative or the technical review shall be resolved prior to the verification. Acceptance or rejection of the application shall be communicated to the applicant with justification.

5.3 Pre-verification

5.3.1 Specification of performance to be verified

Performance to be verified shall be expressed by means of performance parameters in consultation with the applicant prior to the establishment of a verification plan. These performance parameters shall be specified considering, at a minimum:

a) they are relevant and sufficient for the verification of the performance of the environmental technology, and its environmental added value, if applicable;

b) they correspond in full to the needs of the interested parties;

c) they can be quantitatively verified through testing;

d) their numerical values can be verified under set operating conditions;

e) existing verification plans and relevant technical references including standard test methods, preferably international standards.

5.3.2 Verification planning

The verification plan shall detail the verification procedure specific to the technology and the performance to be verified. The test conditions specified in the verification plan shall be identical to the operating conditions of the technology defined in 5.3.1.

The verification plan shall include at a minimum:

a) identification of the verifier;

b) identification of the applicant in accordance with 5.2.1;

c) unique identification of the verification plan and date of issue;

d) a description of the technology in accordance with 5.2.1;

e) a list of performance parameters as defined in 5.3.1, their assigned numerical values and the description of how they will be verified;

f) technical and operational details of the planned verification;

g) specification of the requirements for the test data, including quality and quantity and test conditions;

h) a description of methods for the assessment of the test data and their quality.

NOTE 1 Requirements on data and data quality can refer to the quality level (e.g. regarding reproducibility, repeatability, ranges of confidence, accuracy, uncertainties) generally accepted for the technology by the scientific community or (by default) in the industrial sector concerned.

NOTE 2 Other existing verification plans, similar relevant technical references, including applicable legislation and standardized test methods, preferably International Standards, can be used or referred to where available.

5.4 Verification

5.4.1 General

The verification of the performance shall be organized as follows:

a) acceptance of existing test data;

b) generation of additional test data if needed;

c) confirmation of the performance based on the results of the test data assessment.

5.4.2 Acceptance of existing test data

Test data provided by the applicant that were generated prior to verification shall be accepted for the verification if they meet the following requirements:

a) are relevant for the performance to be verified;

b) are produced and reported according to the requirements of ISO/IEC 17025;

c) meet the requirements specified in the verification plan.

If the existing test data do not meet the above requirements then additional test data shall be generated.

This shall be communicated to the applicant.

5.4.3 Generation of additional test data

If any additional test data are required, they shall be produced meeting the requirements specified in 5.4.2.

This shall be communicated to the applicant.

5.4.4 Confirmation of performance

Existing test data, accepted in 5.4.2 and additional test data as generated in 5.4.3, shall be assessed against the performance specified in the verification plan.

The result of the assessment shall be a confirmation of the performance of the technology, achieved under the same conditions, constraints and limitations as those specified for the generation of the test data used for verification.

5.5 Reporting

5.5.1 Verification report

A verification report shall be developed. It shall adhere to the verification plan and shall include at a minimum:

a) identification of the verifier;

b) identification of the applicant in accordance with 5.2.1;

c) unique identification of the report and date of issue;

d) date of verification;

e) description of the technology in accordance with 5.2.1;

f) test results;

g) verification results including the verified performance, test conditions, constraints and limitations under which they are met;

h) description on how the requirements for the verification of the performance and for the test data, as specified in the verification plan, were met, including reporting of any deviations;

i) signature or other indication of approval by verifier.

If it is necessary to include information not verified under the environmental technology verification, this shall be clearly stated and explained.

The report shall be submitted to the applicant for review and comment. The comments may be incorporated as deemed appropriate.

5.5.2 Verification statement

A short document summarizing the verification report shall be developed. It shall include at a minimum:

a) identification of the verifier;

b) identification of the applicant;

c) unique identification of the statement and date of issue;

d) a summary description of the technology in accordance with 5.2.1;

e) a summary of the verification results including the verified performance, test conditions, constraints and limitations under which they are met;

f) description on how the requirements of the verification specified in the verification plan were met including reporting of any deviations;

g) any other information necessary to understand and use the verification statement signature or other indication of approval by the verifier.

If it is necessary to include information not verified under the environmental technology verification this shall be clearly stated and explained.

The statement shall be submitted to the applicant for review and comment. The comments may be incorporated as deemed appropriate.

5.6 Post-verification

5.6.1 Publication

At a minimum, the verification statement shall be made publicly available. The publication shall be included in a publicly available directory (e.g. website).

The applicant shall make the statement available to interested parties in full and shall not use parts of the statement for any purpose.

5.6.2 Validity of the verification report/verification statement

The applicant shall:

a) ensure that the technology for which performance has been verified is conforming to the conditions as per its verification, published verification statement and report, if relevant;

b) inform the verifier, in writing, of any changes that have been made to the technology.

Based on the information provided by the applicant, the verifier shall determine the impact of these changes on the verified performance of the technology to the verification conditions, and therefore the validity of the verification statement and the verification report.

If it is determined that the verification statement and verification report are no longer valid, it shall be communicated to the applicant and made publicly available.

An expiration date may be established on the verification statement. After the defined time period, upon demonstration that no changes affecting the verified performance have occurred in the technology, the validity of the verification statement could be extended under the same conditions.

Annex A
(informative)

Relationship between ISO/IEC 17020:2012 and this document

The purpose of this annex is to explain the relationship between ISO/IEC 17020:2012 and this document, in the context of verifying the performance of environmental technologies (see 4.2).

More specific rules and procedures may apply when performing environmental technology verification, providing these do not subtract from or modify the provisions of ISO/IEC 17020:2012 or this document, but only further detail these provisions.

Table A.1 shows the correspondence between ISO/IEC 17020:2012 and this document, with specific comments clarifying the relationship between them.

Table A.1 — Key items of correspondence between ISO/IEC 17020:2012 and this document

Clauses in ISO/IEC 17020:2012	**Implications for this document**
1 Scope	ISO/IEC 17020 applies to all activities performed in accordance with this document throughout the environmental technology verification.
3.1 inspection examination of a product, process, service, or installation or their design and determination of its conformity with specific requirements or, on the basis of professional judgment, with general requirements	Although ISO/IEC 17020 refers to organizations performing inspection, it can be applied to organizations performing verification as described in this document. See definition of "verification" (3.2.1).
3.5 inspection body body that performs inspection	As defined in this document, verifiers can apply the ISO/IEC 17020 definition for inspection bodies. ISO/IEC 17020 refers to requirements for the operation of various types of bodies performing inspection, which, in this case, means verifiers. See definition of "verifier" (3.1.2).
3.6 inspection system rules, procedures, and management for carrying out inspection	In the context of ETV, this document can be considered an inspection system.
3.7 inspection scheme inspection system to which the same specified requirements, specific rules and procedures apply. NOTE 1 Inspection schemes can be operated at international, regional, national or sub-national level. NOTE 2 Schemes are sometimes also referred to as programmes. NOTE 3 Adapted from ISO/IEC 17000:2004, 2.8.	In the context of this document, ETV programmes, typically operating at a regional, national or international level, can be considered as an inspection scheme in accordance with ISO/IEC 17020.
4.1 Impartiality and independence	In the context of ETV, it is essential that activities performed by the verifier in accordance with this document are performed in an impartial and independent manner, in accordance with ISO/IEC 17020:2012, 4.1.

Table A.1 *(continued)*

Clauses in ISO/IEC 17020:2012	**Implications for this document**
4.1.6 The inspection body shall be independent to the extent that is required with regard to the conditions under which it performs its services. Depending on these conditions, it shall meet the minimum requirements stipulated in Annex A, as outlined below. a) An inspection body providing third party inspections shall meet the type A requirements of Clause A.1 (third party inspection body).	For the purpose of Environmental technology verification, third-party verification, as defined in the requirements of ISO/IEC 17020:2012, Clause A.1 (Type A, inspection bodies), is recommended.
4.2 Confidentiality **4.2.1** The inspection body shall be responsible, through legally enforceable commitments, for the management of all information obtained or created during the performance of inspection activities. The inspection body shall inform the client, in advance, of the information it intends to place in the public domain. Except for information that the client makes publicly available, or when agreed between the inspection body and the client (e.g. for the purpose of responding to complaints), all other information is considered proprietary information and shall be regarded as confidential. NOTE Legally enforceable commitments can be, for example, contractual agreements. **4.2.2** When the inspection body is required by law or authorized by contractual commitments to release confidential information, the client or individual concerned shall, unless prohibited by law, be notified of the information provided. **4.2.3** Information about the client obtained from sources other than the client (e.g. complainant, regulators) shall be treated as confidential.	The verifier needs to maintain the confidentiality of information as agreed with the applicant, including publication (see subclause 5.6.1 of this document) of verification report and statement. The verifier might be required to share confidential information with other organizations participating in environmental technology verification, in which case this clause applies.
5.1 Administrative requirements	The verifier is required to meet all requirements outlined in ISO/IEC 17020:2012, 5.1.
5.2.2 The inspection body shall be organized and managed so as to enable it to maintain the capability to perform its inspection activities. NOTE Inspection schemes can require that the inspection body participates in the exchange of technical experience with other inspection bodies in order to maintain this capability.	The verifier is required to meet all requirements outlined in ISO/IEC 17020:2012, 5.2. To maintain its capability of performing environmental technology verification, the verifier might be required to participate in the exchange of technical experience referred to in the note of this clause, including professional development and training activities. Such activities shall be documented in support of ISO/IEC 17020:2012, 5.1.3. (This also true for ISO/IEC 17020:2012, 5.2.5 and 5.2.6.)
5.2.4 Where the inspection body forms a part of a legal entity performing other activities, the relationship between these other activities and inspection activities shall be defined.	The verifier and test body should be separate to ensure impartiality. It is possible however for the verifier and test body to be part of the same organization (legal entity) but the two entities need to demonstrate separation and impartiality.
6 Resource requirements	In the context of environmental technology verification, the human resources identified in ISO/IEC 17020:2012, Clause 6, are related to the verifier and other parties being sub-contracted as per the verification process.

Table A.1 *(continued)*

Clauses in ISO/IEC 17020:2012	**Implications for this document**
6.3 Subcontracting **6.3.1** The inspection body shall itself normally perform the inspections that it contracts to undertake. Where an inspection body subcontracts any part of the inspection, it shall ensure and be able to demonstrate that the subcontractor is competent to perform the activities in question and, where applicable, complies with the relevant requirements stipulated in this International Standard or in other relevant conformity assessment standards.	When performing the environmental technology verification of environmental technology verification requires an activity to be performed by and sub-contracted to parties other than the verifier, this is considered as subcontracting, as provided in this clause. This also means that the verifier would be responsible for assuring the quality of the work submitted and performed by another party.
7 Process requirements	In the context of environmental technology verification, ISO/IEC 17020:2012, Clause 7, provides key information on the procedures defined in Clause 5 of this document, as well as mandatory part of the reporting.
7.1.1 The inspection body shall use the methods and procedures for inspection which are defined in the requirements against which inspection is to be performed. Where these are not defined, the inspection body shall develop specific methods and procedures to be used (see 7.1.3). The inspection body shall inform the client if the inspection method proposed by the client is considered to be inappropriate. NOTE The requirements against which the inspection is performed are normally specified in regulations, standards or specifications, inspection schemes or contracts. Specifications can include client or in-house requirements.	For the purposes of environmental technology verification, the overall requirements of this document, and, where applicable, additional requirements related to specific technologies being verified, could be considered as methods and procedures referenced to in ISO/IEC 17020:2012, 7.1.1.
7.1.2 The inspection body shall have and shall use adequate documented instructions on inspection planning and on sampling and inspection techniques, where the absence of such instructions could jeopardize the effectiveness of the inspection process. Where applicable, the inspection body shall have sufficient knowledge of statistical techniques to ensure statistically sound sampling procedures and the correct processing and interpretation of results.	This clause defines the requirements for the verification plan that include statistical and other methods that define the data-quality requirements. ISO/IEC 17020:2012, 7.1.2, applies particularly to subclauses 5.3 (Pre-verification) and 5.4 (Verification) of this document.
7.1.3 When the inspection body has to use inspection methods or procedures which are non-standard, such methods and procedures shall be appropriate and fully documented. NOTE A standard inspection method is one that has been published, for example, in international, regional or national standards, or by reputable technical organizations or by co-operation of several inspection bodies or in relevant scientific text or journals. This means that methods developed by any other means, including by the inspection body itself or by the client, are considered to be non-standard methods.	The verification requirements in this document should be considered as a standard inspection procedure, as referenced in the note to this clause. ISO/IEC 17020:2012, 7.1.3, generally applies to Clause 5 of this document.
7.1.6 When the inspection body uses information supplied by any other party as part of the inspection process, it shall verify the integrity of such information.	This requirement includes data submitted by a test body and ensures that the test body meets the requirements of ISO/IEC 17025. This also applies to sub-contracting by the verifier in accordance with ISO/IEC 17020:2012, 6.3.

Table A.1 *(continued)*

Clauses in ISO/IEC 17020:2012	**Implications for this document**
7.4 Inspection reports and inspection certificates **7.4.2** Any inspection report/certificate shall include all of the following: identification of the issuing body; unique identification and date of issue; date(s) of inspection; identification of the item(s) inspected; signature or other indication of approval, by authorized personnel; a statement of conformity where applicable; the inspection results, except where detailed in accordance with 7.4.3.	The requirements for the content of the verification report and statement, as outlined in subclause 5.5 of this document, include the minimum requirements identified in ISO/IEC 17020:2012, 7.4.2. NOTE For the purposes of this document, the verification statement is the equivalent of the inspection certificate and the verification report is the equivalent of the inspection report.
7.4.3 An inspection body shall issue an inspection certificate that does not include the inspection results [see 7.4.2 g)] only when the inspection body can also produce an inspection report containing the inspection results, and when both the inspection certificate and inspection report are traceable to each other.	The verification statement should include a summary of the verification results, as provided in subclause 5.5 of this document, the full results being included in the verification report in accordance with this clause.
7.5 Complaints and appeals **7.6 Complaints and appeals process**	Any complaints and appeals in accordance with this document should encompass the requirements identified in ISO/IEC 17020:2012, 7.5 and 7.6.
8 Management system requirements	In the context of ETV, activities performed by any party in accordance with this document should follow the management system requirements described in ISO/IEC 17020:2012, Clause 8.

Annex B
(informative)

Overview of environmental technology verification process

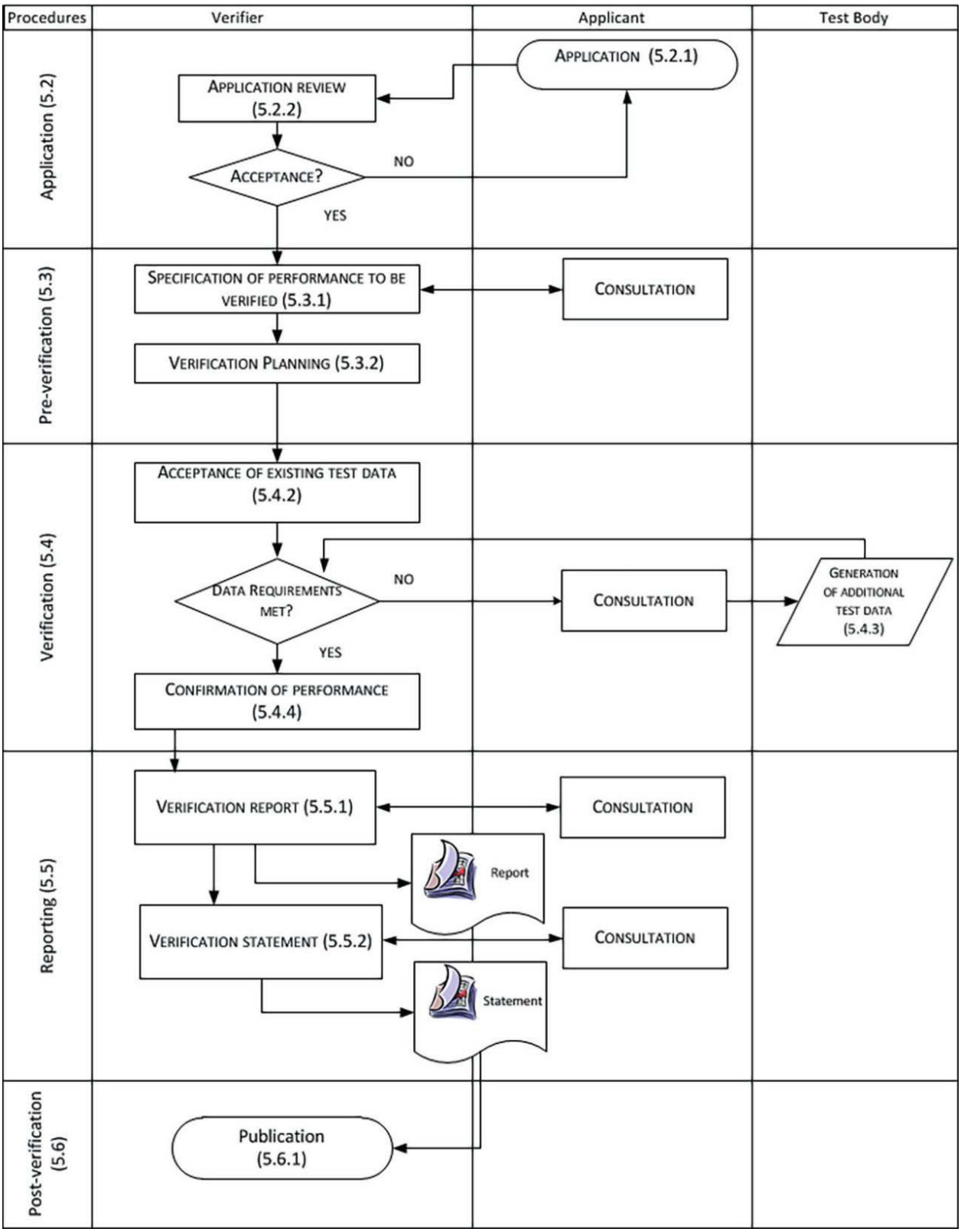

Figure B.1 — Overview of environmental technology verification process

Annex C
(informative)

Guidance on the use of this document

The guidance given in Table C.1 is informative and is intended to prevent misinterpretation of the requirements contained in Clause 5. This guidance addresses and is consistent with the requirements of Clause 5; it is not intended to add to, subtract from, or in any way modify them.

Table C.1 — Guidance on the use of this document

Requirement in Clause 5	Guidance
5.2 Application	This clause provides the information required to verify an environmental technology. Prior to initiating the verification process, the verifier should check that all necessary information has been provided.
5.2.1 Application requirements	
a) information about the applicant, including its name and address(es) of its physical location(s)	If the applicant is a collective body of organizations that together form a consortium, regardless of whether they enter into a separate written consortium agreement, it should be represented by a legally authorized representative organization that is the sole intermediary for conducting arrangements with the verifier. All documents produced during the verification process should mention all organizations forming the consortium.
b) 2) information about the intended application of the technology	The intended application of the technology can be expressed in terms of the purpose of the technology (e.g. the problem it addresses), the type of material for which the technology is intended (e.g. soil, drinking water, groundwater) and the measurable property affected by the technology and how it is affected. Information about the intended application of the technology may be expressed differently, depending on whether the technology is a technology resulting in an environmental added value (e.g. water/air/soil clean-up technologies, recycling technologies, recycled material-based products, energy production technologies, technologies improving energy efficiency) or a technology measuring parameters reflecting environmental impacts and/or state of the environment (e.g. monitoring technologies, test kits, probes, analysers). For example, the intended application of the technology resulting in an environmental added value can be expressed as follows: the purpose of the technology is to remove nutrients from municipal wastewater (type of material) by reducing (way of affecting) nitrate concentrations (measurable property affected by the technology expressed as mg NO_3-/l). The intended application of a technology measuring parameters reflecting environmental impacts and/or state of the environment can be expressed as follows: the purpose of the technology is to detect (way of affecting) total coliforms (measurable property affected by the technology expressed as number of organisms per ml) in drinking water (type of material).
b) 3) detailed information in order to understand the operation and performance of the technology	Detailed information on the technology provided by the applicant may include a conceptual design of the technology, the technical or scientific principles on which it is based, etc. If needed, the verifier may request an operations manual for the technology to supplement the description.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
b) 4) status of the technology development process and its readiness for market	A technology proposed for verification should be either already available on the market or available at least at a stage where no substantial change affecting its performance will be implemented after the verification before introducing the technology to the market. The development status of a technology proposed for verification may be expressed in terms of technology readiness level. For prototype technologies, the development status should be clearly indicated in the verification statement, with necessary information provided on representativeness of a full-scale commercial unit and conditions on scale-up to the commercial version.
b) 5) information on relevant alternatives to the technology	Relevant alternatives are identified to allow for a determination of the benefits of an environmental technology. Relevant alternatives provide a baseline for benchmarking performance and could include, for example: — current best available technology; — existing technologies on the market with similar applications and purposes; — conventional technologies having a similar application or producing similar outputs; — state-of-the-art technologies. It is important to avoid the selection of poor performing or otherwise irrelevant alternatives so as to ensure that a comparison of the technologies does not result in a more positive impression of the proposed technology. If the technology proposed for verification is a completely new solution to a problem, the relevant alternative could be a commercially available technology (or a combination of technologies) currently used to address this problem. For example, in the case of an entirely new process for recycling a certain waste that has never been recycled before, the relevant alternative could be its disposal without recycling, e.g. landfilling, incineration. The relevant alternative should be suggested by the applicant based on its knowledge of the market and the problem its technology is addressing, including the specific environmental impacts or added value. During the pre-verification procedure, the verifier, in consultation with the applicant, will review the relevant alternative, with input from interested parties, to ensure it provides an appropriate benchmark for determination of environmental technology performance.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
b) 6) information on significant environmental impacts and environmental added value related to the technology	This information is particularly relevant for environmental technologies that are claimed to deliver an environmental added value and may be less relevant for technologies measuring environmental impacts and/or state of the environment. Together with the relevant alternative, this information is used during the technical review to assess whether the technology proposed for verification fulfils the definition of an environmental technology. As much qualitative and quantitative information as possible should be provided regarding the significant differences in the environmental impacts (e.g. use of raw materials, water, energy and other consumables, together with all types of emissions, products and wastes) likely to be generated by the technology as compared to the relevant alternative. The scope of information requested on the significant environmental impacts of a technology may depend on a number of issues, such as: — whether a technology proposed for verification is a process, product or service; — the innovative features of the technology; — the performance to be verified; — the concerns of interested parties. The stage at which the significant environmental impacts likely to be generated by the technology may occur (e.g. material acquisition, design, manufacturing, use or end-of-use) in comparison with the relevant alternative, should also be taken into account. EXAMPLE If a technology uses biodegradable materials rather than conventional materials, as used in the relevant alternative, information on the environmental impacts related to the material acquisition and end of use of this technology should be provided in addition to information on the manufacture and use phases. If a technology proposed for verification uses a different manufacturing process than that of the relevant alternative in order to increase its efficiency during its use phase, but uses natural resources similar to those used by the relevant alternative, information on the environmental impacts for the manufacturing and use of the technology should be provided.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
c) performance claim	The performance claim proposed by the applicant should be a concise statement describing the performance of a technology for a specified, intended application under specified installation and operational conditions, including constraints and limitations. It should reflect the innovative features of the technology. The following are examples of performance parameters that can be proposed for verification in the case of a measuring technology and a technology resulting in an environmental added value: — Limit of detection: Achieved cleaning effects — Range of application: Variation of cleaning effects — Precision (repeatability/reproducibility): By-product formation — Robustness: Residual chemical — Accuracy: Emissions to water, air, soil — Specificity: Waste generation — Interferences: Energy efficiency — Linearity: Resource use Examples of a performance claim for a measuring technology and a technology resulting in an environmental added value include the following. EXAMPLE 1 Technology resulting in an environmental added value: a water disinfection technology. An example of a claim related to a water disinfection technology could be that technology ABC for treating industrial wastewater for reuse in industry removes bacteria with a 99,9 % efficiency, with chloride content in the output below 0,5 mg/l and with trihalomethanes content in the output below 100 µg/l under the following operating conditions: conductivity above 250 µS/m, ambient temperature of 5 °C to 35 °C and chloride content in the input above 15 ppm (parts per million). EXAMPLE 2 Measuring technology: a vehicle exhaust emissions measuring technology. A claim related to a measurement technology could be that technology XYZ mounted in a vehicle measures vehicle exhaust emissions such as carbon monoxide (CO), carbon dioxide (CO_2), hydrocarbons (HC) and nitrogen oxide (NO_X) in in real-time with measurement accuracy for the following test ranges: — CO — Test range: 0 to 13 g/km — Accuracy: 2,54 ± 1,12 — CO_2 — Test range: 300 to 620 g/km — Accuracy: 3,17 ± 1,40 — HC — Test range: 0 to 1 g/km — Accuracy: 6,04 ± 2,66 — NO_x — Test range: 0 to 1,4 g/km — Accuracy: 4,03 ± 1,78 EXAMPLE 3 Measuring technology: measurement efficiency. A measurement technology could also claim to yield results more quickly and cost-effectively than the relevant alternatives. For example, a detection technology that is able to estimate fungal or bacterial biomass concentrations on site in less than one hour offers an advantage over a technology that requires a long analysis time. This claim would support applications such as on-site screening and monitoring of water and air quality to help prevent and control microbial outbreaks, expedite remediation efforts and protect public health.
d) relevant existing data and the methods for acquiring these data that were applied to support the performance claim	Any test data generated prior to the application for verification may be used, in part or in full, for the verification of performance. During technical review, these data should be accepted conditionally, subject to assessment and final acceptance as a part of the verification procedure.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
e) any relevant legal requirements, or standards related to the technology and its use	It is important to identify any relevant standards applicable to a technology already at the application stage, especially if they relate to the performance and use of the technology, to the test and measurement methods required to produce relevant test data needed to verify its performance or to the quantification of relevant environmental impacts.
f) if relevant, a statement that the technology adheres to applicable regulatory requirements	The purpose of this statement is to potentially dismiss from environmental technology verification some technologies that would not meet applicable regulatory requirements regarding both the intended application of the technology and the market(s) targeted by the technology. Where relevant, the statement should refer to the regulatory requirements directly applicable to the technology or to its intended use.
5.2.2 Application review	The application review includes a formal administrative review of the completeness of the documents submitted by the applicant and a technical review that involves expert judgment leading either to the recommendation of a technology for verification or to its exclusion from the process.
5.2.2.2 Technical review	When performing a technical review of the technology proposed for verification, the relevance of the performance claim for the intended technology application should be assessed, taking into account, at a minimum, the following: — Are the performance parameters quantitatively measurable and expressed in a specific and unambiguous way using absolute figures? — Are the parameters relevant to the performance claim and sufficient to meet the interested parties' needs for this intended application? For example, some additional parameters may need to be provided to describe the environmental impacts and/or added value. — Are the specified operating conditions valid for the performance claim? Are they described in a relevant and adequate way? Any request for additional information should be communicated to the applicant. In some cases, the applicant may be required to redraft the description of the technology and/or the performance claim.
5.3 Pre-verification	This clause provides the information required by the verifier to plan the verification. It involves discussion between the applicant and the verifier to ensure that the environmental technology verification is properly planned and agreed upon between the applicant and the verifier.
5.3.1 Specification of performance to be verified	Examples of the performance parameters that may be verified in the environmental technology verification include: — parameters related to the performance of the technology in fulfilling its purpose; this is also referred to as technical or functional performance (examples include power output, water quality, precision of measurement); — parameters related to operating conditions and requirements of the intended application (examples include production capacity, maximum temperature and concentrations of non-target compounds in the material for which the technology is intended); — parameters related to the environmental added value and/or impacts of the technology, such as resource use during production of equipment, resource use during use (e.g. consumption of city water, electricity, raw materials, consumables), use of hazardous substances, air emissions, recyclability (fully or in part), end of life decommissioning and disposal, etc. If, upon completion of the review, the verifier proposes modifications to the parameters and their numerical values for verification, the applicant is requested to comment on and approve these modifications.
5.4 Verification	

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
5.4.2 Acceptance of existing test data	In addition to the review of the documentation and test data, one or more of the following actions may be undertaken to evaluate the quality and acceptability of the existing test data, particularly in the absence of ISO/IEC 17025 accreditation of the laboratory that generated the test data (e.g. when the test data were produced by the applicant or other bodies): — spot checks (test report review); — witness checks (retrospective test performance audit); — test system audits (in combination with one of the above); — conditional acceptance of existing data, subject to re-testing of specific requirements or essential measurements. The accepted, existing test data should be summarized in the format to be used when reporting test data.
5.4.3 Generation of additional test data	If additional or new tests are needed, the applicant is responsible for ensuring that the tests are performed according to the requirements of the test design and data quality specified in the verification plan. Either a test body designated by the applicant prepares the test plan based on the test design and data quality requirements specified in the verification plan, performs the tests and drafts a test report, or the applicant may perform the necessary test using its own in-house facilities in accordance with the requirements of ISO/IEC 17025.
5.4.4 Confirmation of performance	Upon acceptance by the verifier, the data acquired from testing serve as objective evidence for confirming the performance of the technology. The performance confirmed based on the test data may differ from the performance specified in the verification plan.
5.5 Reporting	The verification report will contain extensive information, data, procedures, test results, and potentially, proprietary or confidential information regarding the technology. It is a detailed record of the verification meant to ensure complete transparency. The verification statement should be a short publically available document summarizing the verification report and should not include any proprietary or confidential information. Both the verification statement and report are submitted to the applicant for review and comment prior to finalization of the documents. This serves several purposes: — it ensures that technology description and applicant information included in the documents are accurate and complete; — it ensures that the applicant understands the results and details of the verification and that the documents are clear and concise; and — it ensures that input from the applicant is provided and considered. The applicant either accepts the confirmed performance or may decide to alter the technology specification, design and/or operating conditions and to modify the values of the performance parameters from those specified in the verification plan. Any change to the technology or performance parameters would require modification of the verification plan and a repeat of the verification procedure, if agreed to by both parties. Although the applicant can provide feedback and comments on the verification statement and report, it is solely up to the verifier to decide whether to incorporate the applicant's input into the final documents. In making any changes to the report or verification statement, the verifier should consider the applicant's comments with impartiality and transparency.
5.6 Post-verification	

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
5.6.1 **Publication**	In addition to the verification statement, other documents such as verification reports, verification plans and test plans may also be published if agreed to by the applicant. Publication implies that documents are made available to the public without restricted access. There are many potential means of publication, but the primary means are as follows: — posting of documents to a public website, including, for example: — the ETV programme website with a directory of verifications; — the verification organization's website. — printing of documents that are available upon request by any public entity.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
5.6.2 Validity of the verification report/verification statement	Verifications are completed for technologies operating under specific conditions. The performance that is verified is, therefore, verified only for those conditions. However, technologies often change during their development, commercialization and use. A new generation of a technology may function differently than a previously verified technology, or application. To prevent confusion in the market and to protect the credibility of verifications, applicants should not imply that the verification applies to such unverified conditions. As a result, it is imperative that an applicant notifies the verifier of any changes in the technology, its operating conditions or its application. The verifier will review any changes and ensure that the verification statement is still valid. The verifier may determine that a verification statement is no longer valid for many reasons, for example: — a significant change in the technology was made that affects its performance and environmental impact, such as a new model with significant changes in equipment, consumables, or operating conditions; or a fundamental change in the scientific approach to the technology (e.g. change from combustion process to a catalytic process for pollution control); — the conditions to which the technology applies change significantly and no longer apply (e.g. as temperature, pressure, or ambient conditions); or operational range (e.g. contaminant concentrations); — the type of material for which the technology is intended or the intended application of the technology changes, e.g. a filter verified for diesel particulate removal (a valid application) is used for particulate removal from biomass boiler exhaust (invalid - not verified); — the verified technology is no longer manufactured. Changes made to the verified technology may result in a requirement to repeat all or part of the environmental technology verification procedure.
Potential changes not affecting verification statements	Administrative changes related to the technology, such as changes to the manufacturer or company name, product name or model number, should not impact the validity of the verification, but should be noted in revised verification statements, based on the judgment of the verifier, to ensure that application of the verification statement to products in the market is clear and obvious. Minor changes to a technology that do not affect performance or environmental impact as verified should not result in invalidation of a verification statement. Examples include: — like-for-like replacement of technology components, for example replacement of a pump from one manufacturer with a pump of identical specifications from another manufacturer; — minor changes to technology interfaces, software packages, or controls for improved user experience, which do not impact technology performance, for example upgraded software to allow for mobile data access to technology operational information; — minor improvements that provide operational or performance benefits (verification would still only apply to the conditions verified) such as: — expanded range of ambient operating conditions due to improved insulation; — improved detection limits for a monitoring device.

Table C.1 *(continued)*

Requirement in Clause 5	Guidance
Expiration date	It should also be noted that a verifier may decide to put an expiration date on verifications, especially for those technologies that are in a rapidly changing field or have short lifecycles. Verifiers may review data and extend verifications or require a new environmental technology verification.

Bibliography

[1] ISO 14001:2015, *Environmental management systems — Requirements with guidance for use*

[2] ISO 14025, *Environmental labels and declarations — Type III environmental declarations — Principles and procedures*

[3] ISO 14040:2006, *Environmental management — Life cycle assessment — Principles and framework*

[4] ISO 14050:2009, *Environmental management — Vocabulary*

[5] ISO Guide 82, *Guidelines for addressing sustainability in standards*

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