



International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

Ch. de Blandonnet 8 | CP 401, 1214 Vernier | Geneva, Switzerland | T: +41 22 749 01 11 | central@iso.org | www.iso.org

Your ref. TMB/NP Sustainable non-sewered
sanitation systems

Date 2016-01-25

TO THE ISO MEMBER BODIES

NWIP ‘Sustainable non sewered sanitation systems’ submitted by ANSI (USA)

Dear Sir or Madam,

Please find attached a proposal for a new Project Committee on *Sustainable non-sewered sanitation systems* proposed by ANSI (USA).

We would like to take this opportunity to inform you that ANSI previously submitted a proposal to develop an International Workshop Agreement (IWA) on this subject (approved by the TMB via [Resolution 4/2016](#)). ANSI is planning to hold the IWA workshop in late June 2016. It is ANSI's intention to begin the process of converting this IWA into an ISO standard as soon as possible after its publication. ANSI has therefore submitted this NWIP now, so that a Project Committee can be set up by the time the IWA is published (target date of August 2016).

The rationale for the process is to ensure the IWA is available for the marketplace as soon as possible, in order to address the human health concerns, to stimulate innovation and the market for manufacturers of such systems, and to learn from user experience of the ISO IWA in order to support its conversion into an ISO standard.

If you have any questions, please contact us at tmb@iso.org.

Yours faithfully,

Sophie Clivio
Secretary to the Technical Management Board

Encl: NWIP proposal form 4, patent information and draft outline



Form 4: New Work Item Proposal

Circulation date: 2016-01-26 Closing date for voting: 2016-04-26	Reference number: Click here to enter text. (to be given by Central Secretariat) ISO/TC Click here to enter text. / IS Click here to enter text. <input checked="" type="checkbox"/> Proposal for a new PC
Proposer ANSI	
Secretariat ANSI	

A proposal for a new work item within the scope of an existing committee shall be submitted to the secretariat of that committee with a copy to the Central Secretariat and, in the case of a subcommittee, a copy to the secretariat of the parent technical committee. Proposals not within the scope of an existing committee shall be submitted to the secretariat of the ISO Technical Management Board.

The proposer of a new work item may be a member body of ISO, the secretariat itself, another technical committee or subcommittee, an organization in liaison, the Technical Management Board or one of the advisory groups, or the Secretary-General.

The proposal will be circulated to the P-members of the technical committee or subcommittee for voting, and to the O-members for information.

IMPORTANT NOTE: Proposals without adequate justification risk rejection or referral to originator.

Guidelines for proposing and justifying a new work item are contained in [Annex C of the ISO/IEC Directives, Part 1](#).

The proposer has considered the guidance given in the [Annex C](#) during the preparation of the NWIP.

Proposal (to be completed by the proposer)

<p>Title of the proposed deliverable.</p> <p>English title: Sustainable non-sewered sanitation systems</p> <p>French title (if available): Click here to enter text.</p> <p><i>(In the case of an amendment, revision or a new part of an existing document, show the reference number and current title)</i></p>
--

Scope of the proposed deliverable.

The international standard will define criteria to qualify sanitation systems sufficiently especially in terms of safety, functionality, reliability, maintainability, usability, and that the discharge (treated effluent) are compliant with leading practices. The aim of the standard is to ensure safety aspects related to the operation of the sanitation systems in the intended areas of use and that the treated discharged products pose no user, operator health or environment risks. The standard is applicable to individual and community sanitation systems which are self-contained, meet defined discharge requirements, and aim for sustainability regardless of the on-site treatment technology.

Purpose and justification of the proposal*

According to the World Health Organization (WHO), an estimated 2.5 billion people have no access to safe, clean toilets and 1 billion are forced to defecate in the open. The devastating consequences of these practices include an estimated 1 million preventable deaths per year, primarily from dysentery-like diarrheal diseases.¹

In March 2013 the UN issued a global call to action for the comprehensive elimination of the practice of open defecation by 2025. According to the UN, countries where open defecation is most common have the highest levels of child death and disease, as a result of ingesting human fecal matter that has entered the food or water supply.² A lack of safe, private toilets is also associated with the highest overall levels of malnutrition, poverty, and disparity between rich and poor, and makes women and girls vulnerable to violence.³ Universal toilet access is the only acceptable goal, and it is achievable.

Sustainable non-sewered sanitation systems are a practical solution to address sanitation-related death and disease. These reinvented toilets, or “next-generation” toilets remove pathogens completely on-site but do not require a sewer or water connection or electricity, ideally cost less than 5 cents per user per day, and are designed to achieve point-of-use reuse to meet individuals' health and safety needs, environmental concern and the targeted sustainability aspect

Some national standards and other guidelines have been developed that apply to certain elements of reinvented toilets, or to separate but related technology. However, no international standard has been found to contain the commonly accepted criteria by which to measure the performance of “reinvented toilets”. Such an international standard would enhance efforts to widely manufacture, market and deploy the technology where it is needed most.

Based on these considerations, and the fact that no ISO Technical Committee currently exists to address reinvented toilets, ANSI and the Bill and Melinda Gates Foundation took the first step by proposing the development of an International Workshop Agreement (IWA), currently in progress. Partners and grantees of the Foundation consist of stakeholders from around the globe, including developing countries, and a specific effort will be made to encourage participation from developing countries in the ISO activity. Once developed, the IWA may serve as the basis for a new international standard developed by the proposed ISO project committee. The IWA and the NWIP will overlap, but this will allow the expedited establishment of the project committee to be ready to begin work on the ISO standard when the IWA is completed and published. Having the IWA published is desirable to allow relevant products to be developed, tested and marketed while the ISO standard is being finalized.

Consider the following: Is there a verified market need for the proposal? What problem does this standard solve? What value will the document bring to end-users? See Annex C of the ISO/IEC Directives part 1 for more information.

See the following guidance on justification statements on ISO Connect:
<https://connect.iso.org/pages/viewpage.action?pageId=27590861>

¹ World Health Organization (WHO), Sanitation Factsheet, <http://www.who.int/mediacentre/factsheets/fs392/en/>

² United Nations, http://www.un.org/waterforlifedecade/waterforlifevoices/open_defecation.shtml

<p>Preparatory work (at a minimum an outline should be included with the proposal)</p> <p><input type="checkbox"/> A draft is attached <input checked="" type="checkbox"/> An outline is attached <input type="checkbox"/> An existing document to serve as initial basis</p> <p>The proposer or the proposer's organization is prepared to undertake the preparatory work required:</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p>
<p>If a draft is attached to this proposal,:</p> <p>Please select from one of the following options (note that if no option is selected, the default will be the first option):</p> <p><input type="checkbox"/> Draft document will be registered as new project in the committee's work programme (stage 20.00)</p> <p><input checked="" type="checkbox"/> Draft document can be registered as a Working Draft (WD – stage 20.20)</p> <p><input type="checkbox"/> Draft document can be registered as a Committee Draft (CD – stage 30.00)</p> <p><input type="checkbox"/> Draft document can be registered as a Draft International Standard (DIS – stage 40.00)</p>
<p>Is this a Management Systems Standard (MSS)?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>NOTE: if Yes, the NWIP along with the <u>Justification study</u> (see Annex SL of the Consolidated ISO Supplement) must be sent to the MSS Task Force secretariat (tmb@iso.org) for approval before the NWIP ballot can be launched.</p>
<p>Indication(s) of the preferred type or types of deliverable(s) to be produced under the proposal.</p> <p><input checked="" type="checkbox"/> International Standard <input type="checkbox"/> Technical Specification</p> <p><input type="checkbox"/> Publicly Available Specification <input type="checkbox"/> Technical Report</p>
<p>Proposed development track</p> <p><input checked="" type="checkbox"/> 1 (24 months) <input type="checkbox"/> 2 (36 months - default) <input type="checkbox"/> 3 (48 months)</p> <p>Note: Good project management is essential to meeting deadlines. A committee may be granted only one extension of up to 9 months for the total project duration (to be approved by the ISO/TMB).</p>
<p>Known patented items (see ISO/IEC Directives, Part 1 for important guidance)</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If "Yes", provide full information as annex</p>
<p>Co-ordination of work: To the best of your knowledge, has this or a similar proposal been submitted to another standards development organization?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If "Yes", please specify which one(s):</p> <p>Click here to enter text.</p>
<p>A statement from the proposer as to how the proposed work may relate to or impact on existing work, especially existing ISO and IEC deliverables. The proposer should explain how the work differs from apparently similar work, or explain how duplication and conflict will be minimized.</p> <p>The proposed standard will build on the ISO IWA on the same subject, to be published in 2016 (proposed).</p>

³ United Nations, <http://www.un.org/millenniumgoals/pdf/MDG%20Report%202012.pdf>

A listing of relevant existing documents at the international, regional and national levels.

The to-be-published ISO IWA will serve as a base document for the international standard. In addition, ANSI has identified the following documents that may be of relevance, in whole or in part, to the project:

- AS/NZS 1546.2: On-site domestic wastewater treatment units; Part 2: Waterless composting toilets
- EN 12566-3: Small wastewater treatment systems for up to 50PT – part 3: Packaged and/or site assembled domestic wastewater treatment plants
- EN 16194:2012 Mobile non-sewer-connected toilet cabins. Requirements of services and products relating to the deployment of cabins and sanitary products
- NSF/ANSI 41: Non-liquid saturated treatment systems
- NSF/ANSI 40: Residential wastewater treatment systems
- NSF/ANSI 350, Onsite Residential and Commercial Water Reuse Treatment Systems
- ISO 24511: activities related to drinking water and wastewater services – Guidelines for the management of wastewater utilities and for the assessment of wastewater services
- ISO/DIS 24521: Activities relating to drinking water and wastewater services -- Guidelines for the management of basic onsite domestic wastewater services
- EN 997: WC pans and WC suites with integral trap
- ASME A112.19.2/CSA B45.1, Ceramic Plumbing Fixtures
- WHO Guidelines for the safe use of wastewater, excreta and grey water
- American Public Health Association, American Water Works Association, Federation WE. (2012). Standard methods for the examination of water and wastewater. 22nd ed: American Public
- U.S. Environmental Protection Agency (EPA). (2012). Guidelines for water reuse. Vol EPA/600/R-12/618 | September 2012.
- ISO Guide 64 Guide for the inclusion of environmental aspects in product standards
- ISO Guide 82: Guidelines for addressing sustainability in standards
- ISO Guide 51: Safety aspects – Guidelines for their inclusion in standards
- ISO Directives, Part 2: Rules for the structure and drafting of International Standards

A simple and concise statement identifying and describing relevant affected stakeholder categories (including small and medium sized enterprises) and how they will each benefit from or be impacted by the proposed deliverable(s)

While there are several relevant standards there is no integrated single standard applicable to sustainable non-sewered sanitation systems. This lack of a standard hinders the innovation process by developers/manufacturers, market acceptance by purchasing bodies to support broad commercial adoption and allows risks to exist for end-users through lack of access to technology or deployment of poor-fit technologies. A standard would benefit stakeholder groups in different ways. For developers/manufacturers a standard provides a transparent and common basis for competition that guides innovation and is a way to attest their product quality. For purchasing bodies and end-users it provide certainty that minimal health & safety criteria are met and that performance results are comparable. Additionally, market adoption and investment in the sector would be fostered through a maturation and improved attractiveness of the targeted market. This opening of the market provides opportunities for small and medium sized enterprises to act as local licensees, distributors, operators or as developers and marketers of own products. A single certification would open access to numerous countries improving the business case for all technology / product suppliers. Finally, improved market efficiency is achieved as product information will be available and comparable thereby lowering transaction costs.

<p>Liaisons: A listing of relevant external international organizations or internal parties (other ISO and/or IEC committees) to be engaged as liaisons in the development of the deliverable(s). ISO TC 224 ISO TC 282</p>	<p>Joint/parallel work: Possible joint/parallel work with:</p> <p><input type="checkbox"/> IEC (please specify committee ID) Click here to enter text.</p> <p><input type="checkbox"/> CEN (please specify committee ID) Click here to enter text.</p> <p><input type="checkbox"/> Other (please specify) Click here to enter text.</p>
<p>A listing of relevant countries which are not already P-members of the committee. India; Senegal; Singapore; South Africa; United States of America; all countries that require solutions for sustainable non-sewered sanitation.</p> <p>Note: The committee secretary shall distribute this NWIP to the countries listed above to see if they wish to participate in this work</p>	
<p>Proposed Project Leader (name and e-mail address) Click here to enter text.</p>	<p>Name of the Proposer (include contact information) Steven Cornish, ANSI scornish@ansi.org</p>
<p>This proposal will be developed by:</p> <p><input type="checkbox"/> An existing Working Group (please specify which one: Click here to enter text.)</p> <p><input type="checkbox"/> A new Working Group (title: Click here to enter text.) (Note: establishment of a new WG must be approved by committee resolution)</p> <p><input type="checkbox"/> The TC/SC directly</p> <p><input type="checkbox"/> To be determined</p>	
<p>Supplementary information relating to the proposal</p> <p><input checked="" type="checkbox"/> This proposal relates to a new ISO document;</p> <p><input type="checkbox"/> This proposal relates to the adoption as an active project of an item currently registered as a Preliminary Work Item;</p> <p><input type="checkbox"/> This proposal relates to the re-establishment of a cancelled project as an active project.</p> <p>Other: Click here to enter text.</p>	
<p><input type="checkbox"/> Annex(es) are included with this proposal (give details) Annex 1 provides information on relevant patents. Annex 2 provides a draft outline for the proposed ISO standard.</p>	

<u>Inventor(s)</u>	<u>Institution - Assignee (if applicable)</u>	<u>Patent (Application) Number</u>	<u>Patent (Application) Title</u>	<u>Countries</u>
	Asian Institute of Technology	1501000026	Wormhole separator	
	Asian Institute of Technology	1401004209	Hydro-cyclone for solid-liquid separation	
	University of the West of England (UWE), Bristol	Chinese Patent Application No. 2012800227584, European Patent Application No. 12710778.7, Indian Patent Application No. 7998/DELNP/2013, United States Patent Application No. 14/003,882	Microbial Fuel Cell (MFC)	China European Indian Unites States
	University of the West of England (UWE), Bristol	United Kingdom Patent Application No. 1501570.4	3rd and 4th pins for modulation, control and sensing	United Kingdom
	Janicki	62/088,285 - Filing Date: December 5, 2014	Toilet Systems and Methods	
Daniel Yeh, Robert Bair, Onur Ozcan, George Dick, Jorge Calabria, Matthew Woodham	University of South Florida	U.S. Provisional Patent Application No. 61/955,450, filed March 19, 2014	A Compact System for Decentralized Sanitation and Waste Resource Recovery	US
Daniel Yeh, Robert Bair, Onur Ozcan, George Dick, Jorge Calabria, Matthew Woodham	University of South Florida	Patent Cooperation Treaty (PCT) Patent Application No. PCT/US15/21473, filed March 19, 2015	Portable Wastewater Treatment Systems	PCT
Daniel Yeh, Onur Ozcan, Robert Bair	University of South Florida	US Provisional Patent Application No. 61/947,664, filed March 4, 2014	Concentrically-Baffled Reactor (CBR) for Water or Wastewater Treatment	US
Daniel Yeh, Onur Ozcan, Robert Bair	University of South Florida	PCT Patent Application No. PCT/US15/18495, filed March 3, 2015	Concentrically-Baffled Reactors and Systems that Incorporate Them	PCT
Daniel Yeh, George Dick, Robert Bair, Onur Ozcan, Jorge Calabria	University of South Florida	US Provisional Patent Application No. 62/128,696, filed March 5, 2015	Systems and Methods for Wastewater Treatment and Resource Recovery Incorporating Combinations of Separation, Conversion and Polishing Stages	US (PCT filing expected)
HOFFMANN, Michael, R.; (US). ARYANFAR, Asghar; (US). CHO, Kangwoo; (US). CID, Clement, A.; (US). KWON, Daejung; (KR). QU, Yan; (US)	California Institute of Technology	WO2014058825	Self-contained, PV-powered domestic toilet and wastewater treatment system	International https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2014058825&recNum=2&maxRec=2&office=&prevFilter=&sortOption=Pub+Date+Desc&queryString=FP%3A%28pv+powered+toilet+california%29&tab=PCT+Biblio

Hoffmann Michael R.
Aryanfar Asghar
Cho Kangwoo
Cid Clement A.
Kwon Daejung
Qu Yan

California Institute of Technology US20140209479

SELF-CONTAINED, PV-POWERED DOMESTIC TOILET AND
WASTEWATER TREATMENT SYSTEM

US

<https://patentscope.wipo.int/search/en/detail.jsf?docId=US106045304&recNum=1&maxRec=2&office=&prevFilter=&sortOption=Pub+Date+Desc&queryString=FP%3A%28pv+powered+toilet+california%29&tab=NationalBiblio>

Content

Foreword.....	6
Introduction	7
1. Scope.....	8
2. Normative references	9
3. Terms and definitions	10
4. Components of non-sewered sanitation systems	14
4.1. General.....	14
4.2. Types of non-sewered sanitation systems.....	15
4.3. Backend treatment technologies/processes	15
5 General requirements.....	17
5.1 User group requirements.....	17
5.2 Metric system	17
5.3 Economic costs.....	17
5.4 Operating conditions	17
5.4.1 Expected technical lifetime	17
5.4.2 Ambient temperature range.....	17
5.4.3 Ambient air humidity	17
5.4.4 Atmospheric pressure.....	17
5.5 Sanitary requirements	17
5.5.1 Sanitary design.....	17
5.5.2 Sanitary agents and additives	18
5.6 Material requirements.....	18
5.6.1 Material selection	18
5.6.2 Quality of used materials	18
5.6.3 Corrosion resistance	18
5.6.4 Resistance to impacts under operating conditions	18
5.6.5 Safety of edges, angles and surfaces	18
5.6.6 Fitting or refitting of materials and parts	18
5.6.7 Mechanical coding of connection in order to avoid failures	19
5.7 Technical tightness.....	19

5.8	Welds and welding methods	20
5.8.1	Welded seams and weld material.....	20
5.8.2	Welds and welding methods.....	20
5.9	Integrity against external impacts and loads.....	20
5.10	Access to adjustment and maintenance points.....	20
5.11	Lifting facilitations.....	20
5.12	Tools and devices.....	21
5.13	Information and warnings.....	21
5.14	Marking and labeling	21
6	General technical requirements	22
6.1	Functional performance requirements.....	22
6.1.1	Design loads	22
6.1.2	Availability on demand	22
6.2	Backend material requirements	22
6.2.1	Quality of backend materials	22
6.2.2	Surfaces of the backend.....	22
6.2.3	Hygienic design requirements	23
6.3	Energy supply	23
6.3.1	Safety requirements for energy supply	23
6.4	Mechanical requirements.....	24
6.4.1	Structural requirements.....	24
6.4.2	Pressurized equipment	24
6.4.3	Pipes, hoses and tanks.....	24
6.4.4	Moving and rotating parts	25
6.5	Requirements for energy emissions	25
6.5.1	High temperatures of part and surfaces.....	25
6.5.2	Low temperatures of parts and surfaces	25
6.5.3	Fire and explosion	25
6.5.4	Noise emissions.....	25
6.5.5	Radiation	25
6.6	Electrical and electronic equipment	26
6.6.1	Safety and reliability of electrical and electronic equipment.....	26

6.6.2	Control system and measuring and automation equipment.....	26
6.6.3	Safety-related function of the control system.....	27
6.6.4	Failure sensing and signaling equipment.....	27
6.7	Component requirements	28
6.8	Transport of substances.....	28
6.8.1	Reliability of transport devices	28
6.8.2	Performance of transportation device	28
7	Requirements for the frontend.....	29
7.1	Design requirements.....	29
7.1.1	Aspirational design.....	29
7.1.2	Cultural requirements.....	29
7.1.3	Aesthetics.....	29
7.1.4	Integrity against external impacts	29
7.2	Material requirements for frontend	30
7.2.1	Cleanability.....	30
7.2.2	Fire resistance	30
7.3	Ease of use and operation.....	31
7.3.1	General ease of use requirements.....	31
7.3.2	Starting of toilet operation	31
7.3.3	Stopping of toilet operation.....	31
7.3.4	Emergency stop.....	32
7.3.5	Frontend maintenance activities	32
7.4	Flushing mechanism.....	32
7.4.1	Functionality	32
7.4.2	Usability.....	32
7.5	Transitions from the backend	33
7.6	Slipping, tripping or falling.....	33
8	Requirements for optional auxiliary systems	34
8.1	Superstructure	34
8.2	Photovoltaic modules	34
8.3	Fans	34
8.4	Electrical pumps.....	34

8.5	Blowers and compressors	34
8.6	Biogas reactors.....	35
8.7	Thermal devices	35
8.8	Membranes for separation	35
9	Maintenance	36
9.1	Minimization of adjustment and maintenance activities	36
9.2	Location of adjustment and maintenance points	36
9.3	Evacuation and cleaning	36
9.4	Instruction to user and service personnel	36
10	Performance, functionality and robustness testing	37
10.1	General testing requirements.....	37
10.2	Controlled testing	37
10.3	Field testing.....	38
10.4	Performance criteria	38
10.4.1	Performance criteria for liquid outputs.....	38
10.4.2	Performance criteria for solid outputs	39
10.4.3	Performance criteria for noise emissions	40
10.4.4	Performance criteria for olfactory emissions	41
10.4.5	Performance criteria for air emissions.....	42
11	Sustainability requirements.....	43
Annex I	– Normative – Test methods	45
A.	Test methods	45
Annex II	– Informative – Risk assessment and list of significant hazards	47
A.	Risk Assessment based product design process	47
B.	List of significant hazards	49
Annex III	– Informative.....	52
A.	Product literature.....	52
Bibliography	53