Center for Water and Sanitation (CWAS), CRDF, CEPT University
in partnership with
Global Sanitation Centre of Excellence (GSCOE), TECHIN, IIT Palakkad, and
Bill & Melinda Gates Foundation (BMGF)

ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units
General safety and performance requirements for design and testing

7th November 2023
16:30 to 18:00 (IST)

CWAS CENTRE FOR WATER AND SANITATION
CRDF CEPT UNIVERSITY

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Webinar 2

ISO 30500: Non-sewered sanitation systems
Prefabricated integrated treatment units — General safety and performance requirements for design and testing
November 7th, 2023, | 16:30 – 18:00 (IST)

Time (IST)	Sessions	Presenters
16:30-16:35	Welcome address	GSCoE, BMGF and CWAS
16:35-16:40	Why is ISO 30500 needed?	Mr. Sun Kim ISO PC 305 Chair Non Sewered Sanitation (NSS) Standards and Compliance
16:40– 16:50	Details of ISO 30500 - The scope of the standard	Ms. Leslie Mc Dermott Senior Director-International Development American National Standards Institute (ANSI)
16:50– 17:20	Technical requirements of ISO 30500	Mr. Chris Chan Manager, Project TÜV SÜD
17:20– 17:30	ISO 30500 certification process	Mr. Chris Chan Manager, Project TÜV SÜD
17:30– 17:45	Country example for ISO 30500 implementation– USA, South Africa	Mr. Sun Kim ISO PC 305 Chair Non Sewered Sanitation (NSS) Standards and Compliance
17:45– 18:00	Q&A	

Session Moderator

Dr. Sarosh Kothandath

Project Manager
Technology Innovation
Foundation of IIT Palakkad
(TECHIN)

Key Speakers

Mr. Sun Kim

ISO PC 305 Chair
Non-Sewered Sanitation (NSS)
Standards and Compliance

Ms. Leslie Mc Dermott

Senior Director
International Development
American National Standards Institute
(ANSI)

Mr. Chris Chan

Manager, Projects
TÜV SÜD

ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units

Session-1
Why ISO 30500 is needed?

Sun Kim
ISO PC 305 Chair
SGK Consulting

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ISO STANDARDS FOR NON-SEWERED SANITATION (NSS)

Why ISO 30500 is needed

Sun Kim
ISO PC 305 Chair
SGK Consulting
7 November 2023

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Modern Toilets, what everyone wants

.... but where does it go?

The Sanitation Crisis

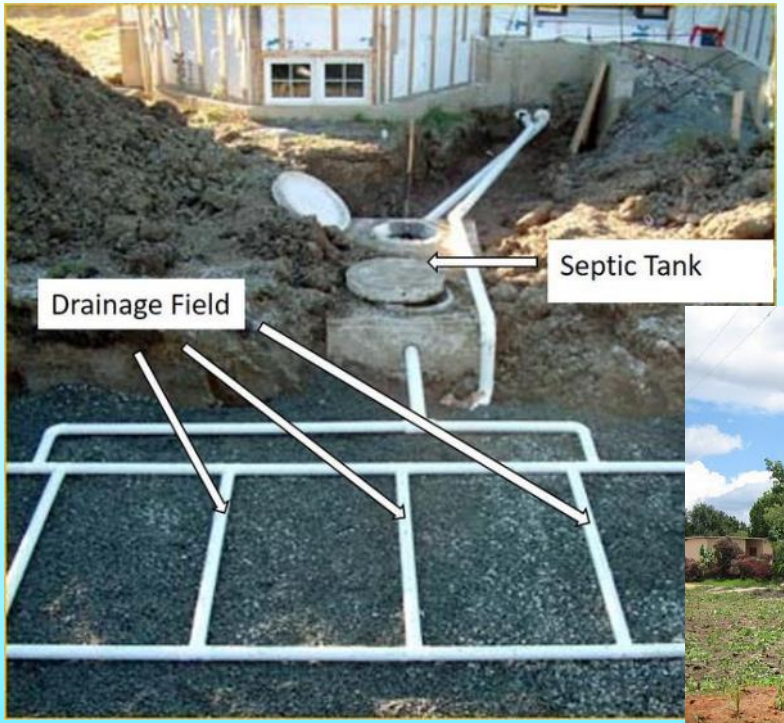
- **2.2 billion** people lack safely managed services for water*
- **3.5 billion** people lack safely managed sanitation*
- **419 million** people still open defecate*
- Diarrheal disease kills **>400,000** children under the age of 5, every year

Women and Girls

- **Imprisonment by daylight**
  - The only time available to defecate maybe after dark.
- **Reduced school enrollment and attendance**
  - The lack of safe, separate and private sanitation and washing facilities particularly during menstruation.
- **Burden of caring for the sick**
  - Caring for the sick adds to their already heavy workload.
- **Impact on pregnant women**
  - About 44 million pregnant women have sanitation-related hookworm infections that pose a considerable health burden in developing societies.

* WHO & UNICEF Joint Monitoring Programme (JMP) "Progress on household drinking water, sanitation and hygiene | 2000-2022: special focus on gender (2023)

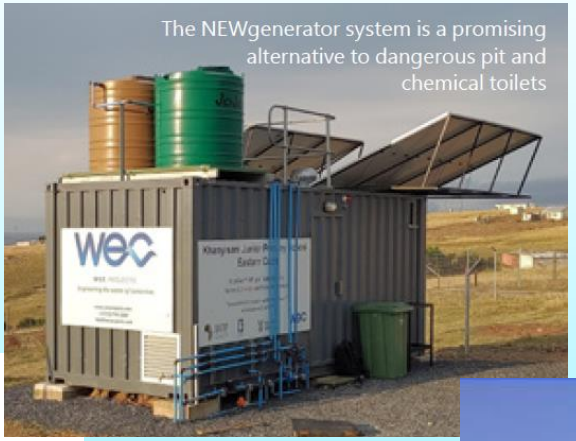
.... Non-Sewered Sanitation



Problems with current on-site sanitation systems

- Often built on-site
  - Treatment is typically minimal
  - Build variations can also impact treatment effectiveness and usability
- Often dependent on local soil conditions
  - For drain field and soak pits
  - Proximity to water supply is problematic
- Does not fully treat on-site
  - May have some aerobic and/or anaerobic digestion
  - But incomplete or no treatment
- Requires regular desludging
  - Of untreated or under treated feces and urine
  - Treatment after desludging is problematic
- Expensive to
  - Install
  - Maintain
  - Decommission
  - Human and environmental health

Community Toilet & Treatment Systems – ISO 30500



Household Toilet & Treatment Systems – ISO 30500

ISO 30500

- **Prefabricated, Factory built**
  - Minimizes variations and performance
  - Systems can be certified
- **Able to operate in the majority of climates and geographies**
  - 5 to 50°C, 20 to 100% relative humidity, 0 to 2,500 m altitude
  - Water and technical tightness
- **Fully treat on-site**
  - Human enteric pathogens
  - Environmental parameters for effluent, gas emissions, odor, noise,
- **No desludging**
  - Effluent safe for discharge
  - Removal of ash or dry solids only
- **Enable lower unit cost via mass production**
  - Low installation cost via prefabricated units

New Non-Sewered Sanitation Industry

Enabling environment

Enhanced demand for affordable aspirational sanitation

Implementation of quality standards

Marketplace readiness

Supportive regulatory environment

Access to financing

Readily available competitive products

THANK YOU

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ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units

Session-2
Details of ISO 30500- scope of the standard

Ms. Leslie Mc Dermott

Senior Director-International Development

American National Standards Institute (ANSI)

Link to the session

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ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units

Session-3
Technical Requirements of ISO 30500

Mr. Chris Chan

Manager, Project

TÜV SÜD

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Introduction to ISO 30500

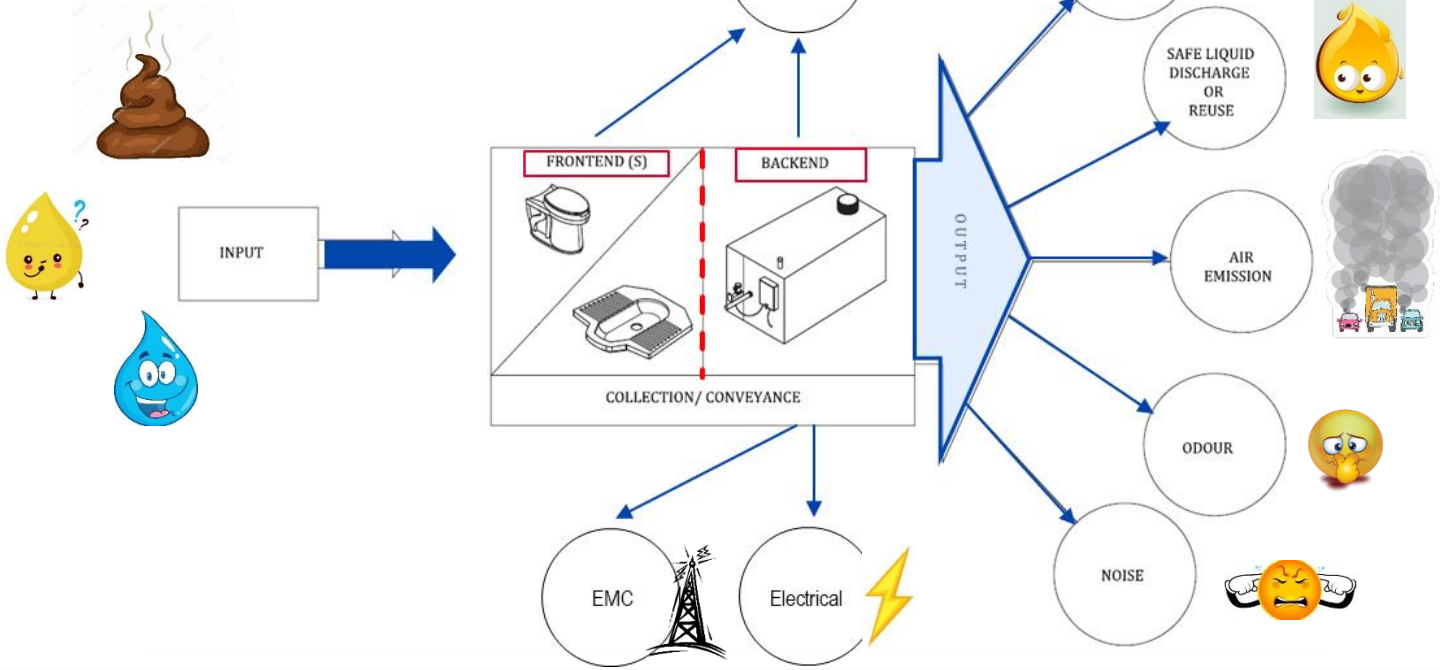
Non-sewered sanitation systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing.

Mehr Wert.
Mehr Vertrauen.

Add value.
Inspire trust.

Scope of ISO 30500

Certification bodies – ISO 17076 accreditated
All laboratories – ISO 17025 accreditated

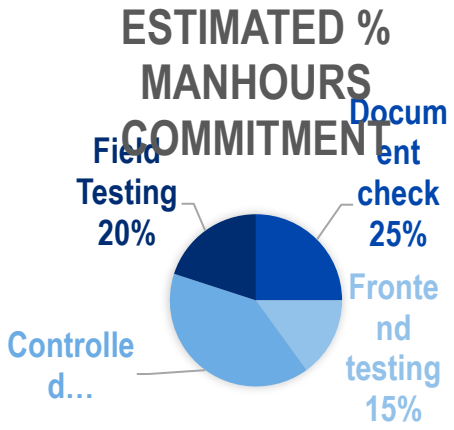


ISO 30500 Certification Classes & Test Duration

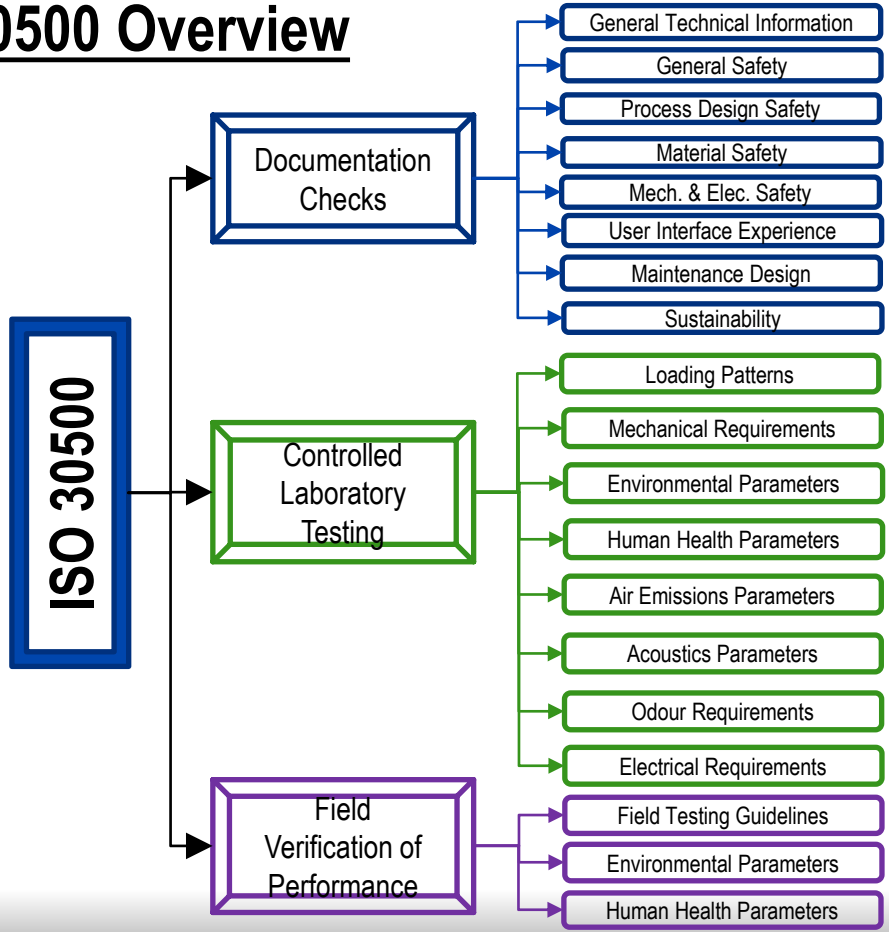
- **Class 1 System**
  - A. Document Checks
  - B. Controlled Laboratory Testing ≥ **32 days**
  - C. Field Testing for ≥ **30 days**

- **Class 2 & 3 System**
  - A. Document Checks
  - B. Controlled Laboratory Testing ≥ **32 days**
  - C. Field Testing for ≥ **5 months**

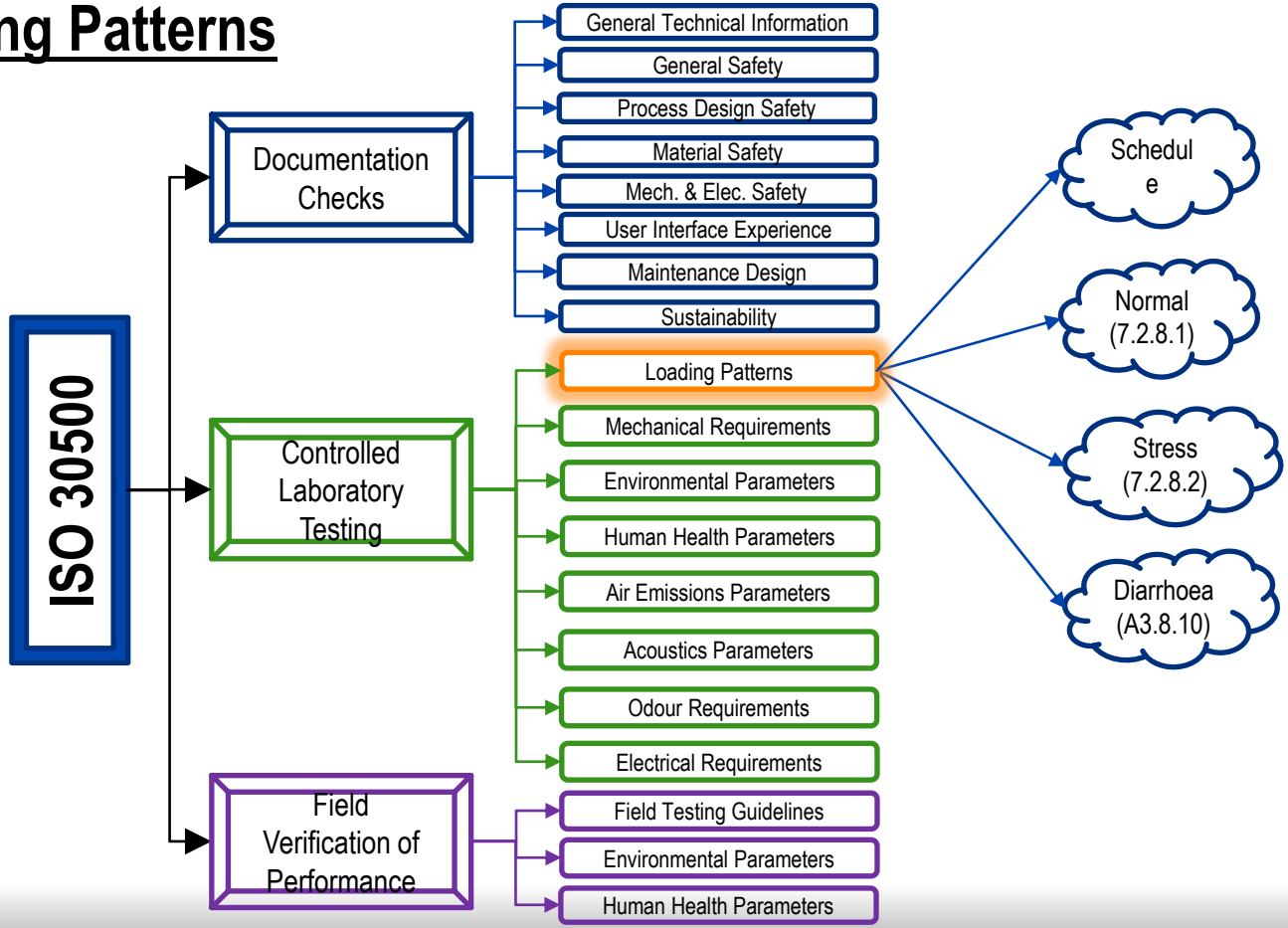
Class
Class 1: Non-biological treatment processes one frontend – backend
Class 2: Biological treatment processes one frontend – multiple backends
Class 3: NSSSs – Anything more than one frontend



ISO 30500 Overview



Loading Patterns



Controlled Laboratory Test Schedule

Table 3 — Test sequence of relevant testing procedures

Testing procedure	Pattern	Suggested schedule	Suggested timeframe
Start-up: Follow start-up procedure according to the manufacturer's instructions		Start-up duration specified by manufacturer	The timeframe depends on the duration of the start-up period required to achieve system operability and stability. This duration shall be specified by the manufacturer.
— Intentional stopping of NSSS operation — Intentional starting of NSSS operation — Emergency stop — Restart	Normal	Day 1 and Day 2	2 days
[none]	Normal	Day 3	1 day
— Solid output and effluent (health and environmental parameters)	Normal	Day 4	1 day

Table 3 *(continued)*

Testing procedure	Pattern	Suggested schedule	Suggested timeframe
[none]	Diarrhoea	Day 5	1 day
— Solid output and effluent (health and environment parameters)	Diarrhoea	Day 6	1 day
— None	Normal	Day 7	1 day
— Non-usage of NSSS	No load	Day 8 to Day 10	3 days
[none]	Normal	Day 11	1 day
— Short-term shut down of NSSS	No load	Day 12 to 14	3 days
— None	Normal	Day 15	1 days
— Solid output and effluent (health and environmental parameters)	Normal	Day 16	1 day
— Separation and isolation from energy sources — Energy discharge (Reliability and safety of energy supply, A.3.8.4)	No load	Day 17	1 days
[none]	Normal	Day 18	1 day
— Long-term shut down of NSSS	No load	Day 19 to Day 21	3 days
[none]	Normal	Day 22	1 day
— Solid output and effluent (health and environment parameters)	Normal	Day 23	1 day
— Visibility of faeces	Normal	Day 24	1 day
— Normal odour day test	Normal	Day 25	1 day
— Simulant odour day test	Simulant faeces	Day 26	1 day
— Noise and air emissions	Normal	Day 27	1 day
— Normal odour day test	Normal	Day 28	1 day
— Overload protection and continuous use	Overload (use of simulant faeces acceptable, see A.3.8.6)	Day 29	1 day
— Noise and air emissions	Stress	Day 30	1 day
— Normal odour day test — Solid output and effluent (health and environmental parameters)	Stress	Day 31	1 day
— Discharge and cleaning	No load	Day 32	1 day

Legend

Human health and Environment Parameters

Odour Test

Noise and Air emissions

Normal Loading Pattern (7.2.8.1)

- The loading of the system shall be performed as a percentage of daily load (kg/day of faeces, l/day of urine)

- Capacity calculations **indicated by the manufacturer**
  - uses per day (faecal uses/day and urine uses/day)
  - the average amount of faeces (kg/use) and urine (l/use) per use

- Loading shall be conducted at the corresponding timing:
  - 35 % from 6 am to 9 am;
  - 25 % from 11 am to 2 pm;
  - 40 % from 5 pm to 8 pm

Normal Loading Pattern		Example	
(12 pax design)	ISO30500 (7.2.8)	Faeces (g)	Urine (l)
Total		3000	15.6
6am to 9am	35%	1,050	5.46
11am to 2pm	25%	750	3.90
5pm to 8pm	40%	1,200	6.24

Stress (7.2.8.2)

Sanitation system is loaded with treatment capacity + “Sn”, where Sn is 80% of the difference between maximum capacity and treatment capacity.

- Loading shall be conducted at the corresponding timing:
  - 35 % from 6 am to 9 am;
  - 25 % from 11 am to 2 pm;
  - 40 % from 5 pm to 8 pm.

Example

Treatment capacity = 12 pax
Max capacity = 15 pax
Sn = (15 -12) x 80% = 2.4 pax
Stress loading = 12 + 2.4 = 14.4 pax

Normal Loading Pattern	Example		
(14.4 pax design)	ISO30500 (7.2.8)	Faeces (g)	Urine (l)
Design		3000	15.6
Max		3750	19.5
Stress		3600	18.7
6am to 9am	35%	1,260	6.6
11am to 2pm	25%	900	4.7
5pm to 8pm	40%	1,440	7.5

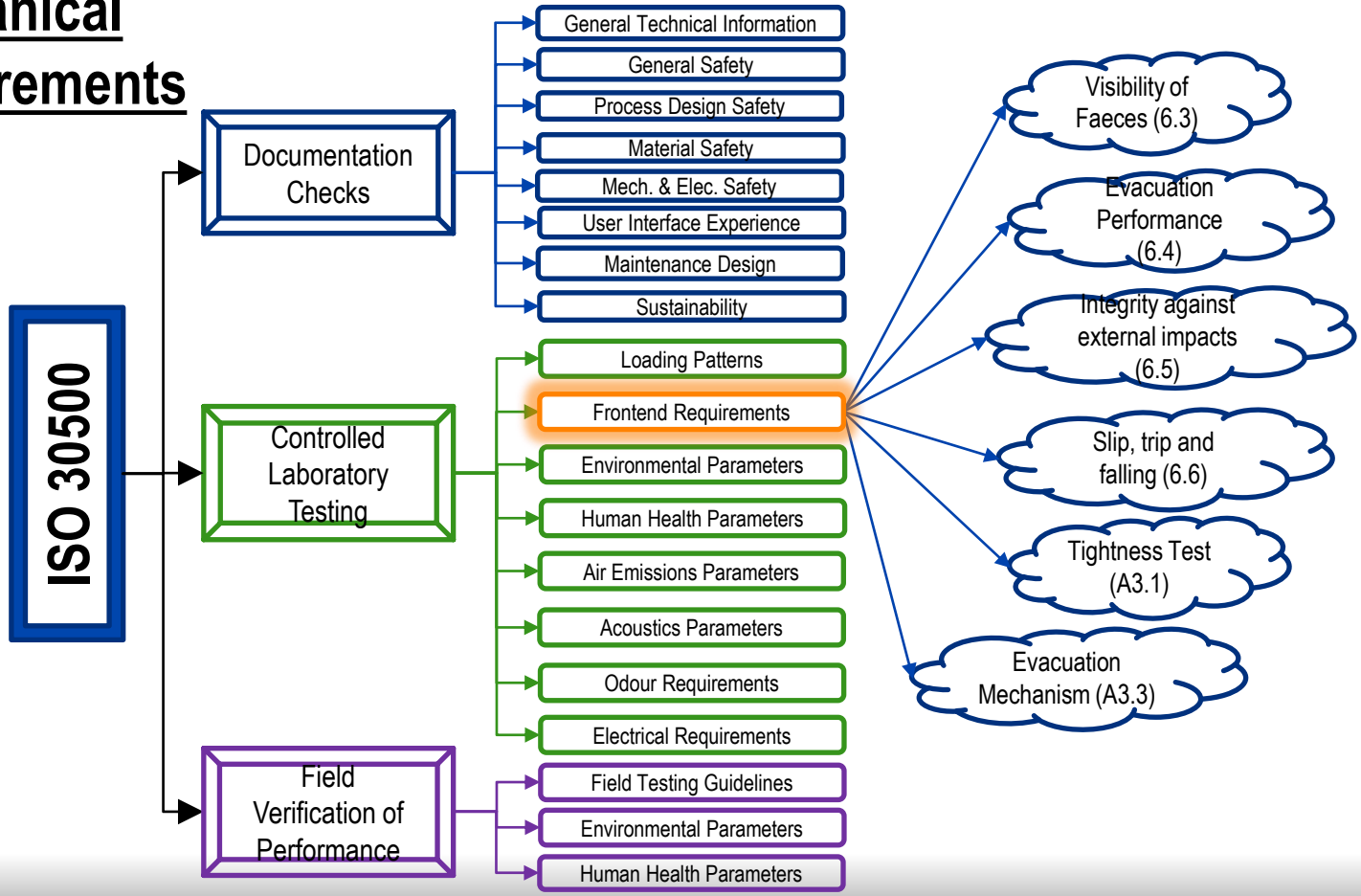
Diarrhoea (A3.8.10)

For the diarrhoea test days, 50 % of the normal faeces loading shall be ‘diarrhoea input’ instead of solid faeces.

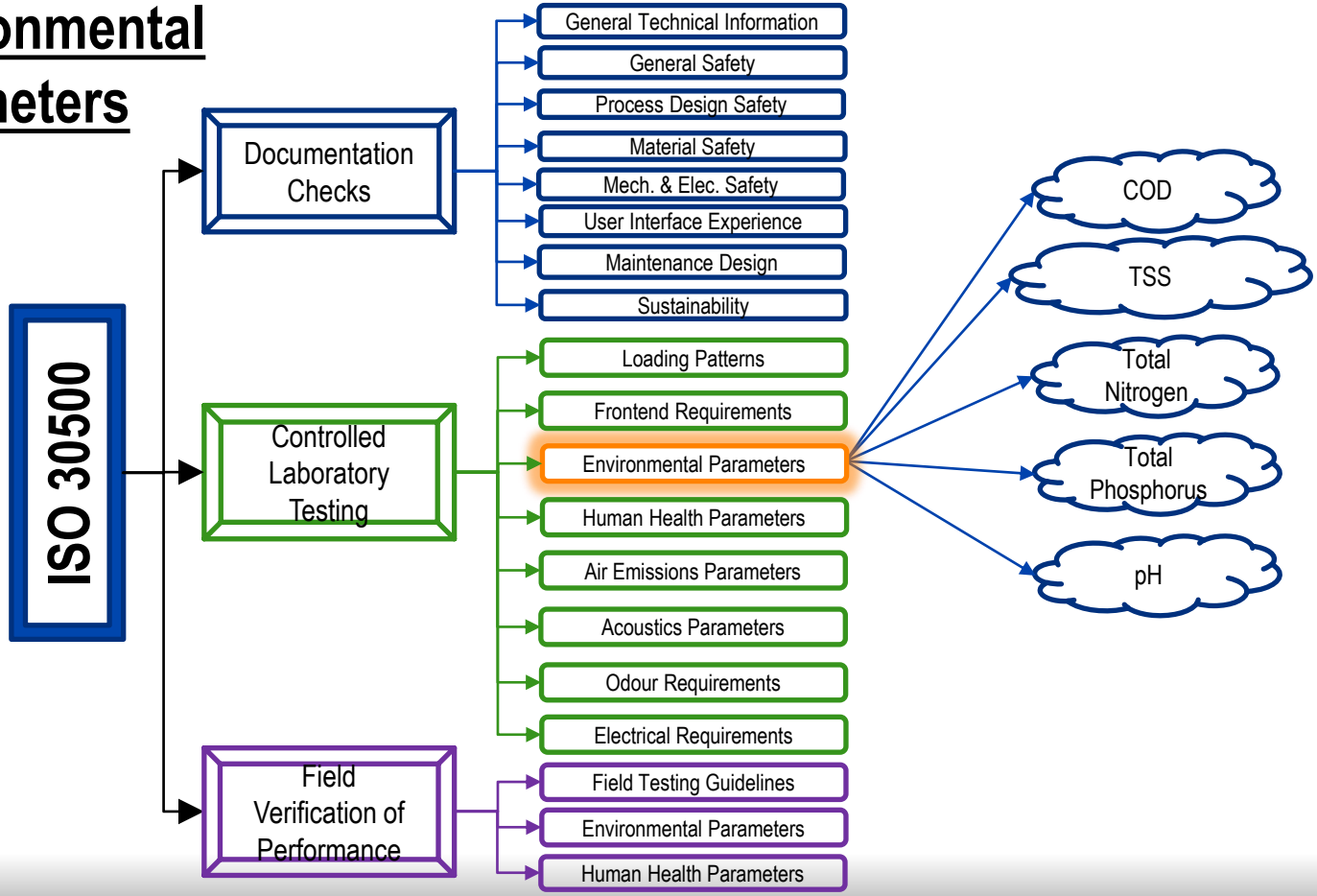
- Half of this load is to be as normal faecal load (solid faeces), the other half diluted as diarrhoea input.
- Combine fresh faeces with water at a ratio of
  - 2 L of water : 1 kg of fresh faeces.

Normal Loading Pattern		Example		
			Diarrhoea	
(12 pax design)	ISO30500 (7.2.8)	Faeces (g)	Faeces (g)	Water (l)
Total		1500	1500	3
6am to 9am	35%	525	525	1.1
11am to 2pm	25%	375	375	0.7
5pm to 8pm	40%	600	600	1.2

Mechanical Requirements



Environmental Parameters



Environmental Parameters Threshold

Public Exposure

Controlled Area

Table ... ent performance thresholds for environmental parameters

	Category A usage: Threshold for unrestricted urban uses	Category B usage: Threshold for discharge into surface water or other restricted urban uses
COD (mg/l)	≤ 50	≤ 150
TSS (mg/l)	≤ 10	≤ 30

NOTE 1 In accordance with Reference [81], Category A usage refers to unrestricted urban uses that comprise all uses where public access is not restricted (e.g. landscape irrigation, toilet flushing).

NOTE 2 In accordance with Reference [81], Category B usage refers to discharge into surface water and other restricted urban uses that comprise all uses where public access is controlled or restricted by physical or institutional barriers (e.g. fences, temporal access restriction).

NOTE 3 COD refers to total COD unfiltered.

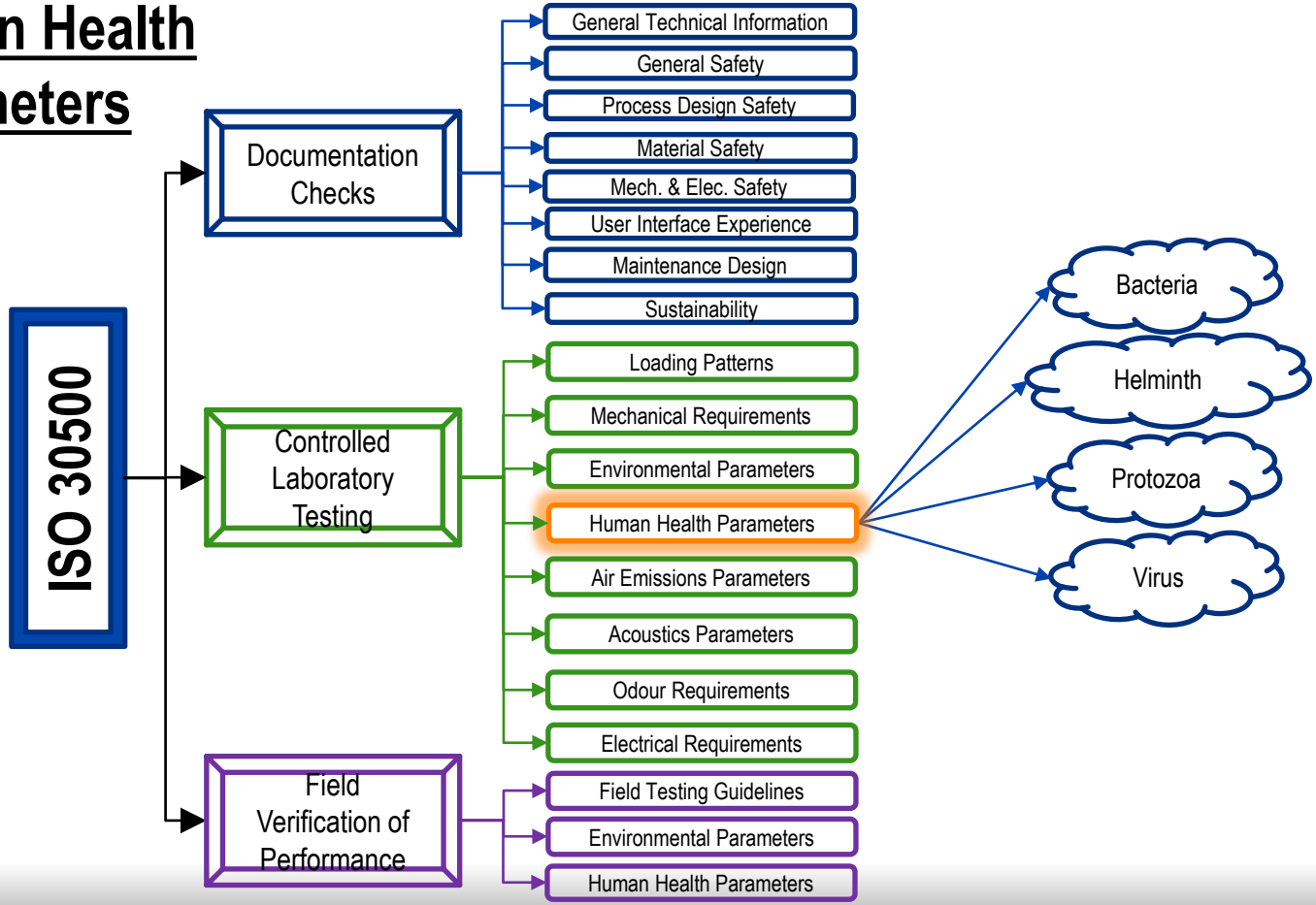
Table 7 — Effluent performance load reduction percentage for nutrients (Environmental requirement)

	Minimum load reduction percentage %
Total nitrogen	70
Total phosphorus	80

Table 8 — Effluent performance range for pH (Environmental requirement)

	Range for all reuse purposes
pH	6 to 9

Human Health Parameters



Human Health Parameters Spiking

Spiking values

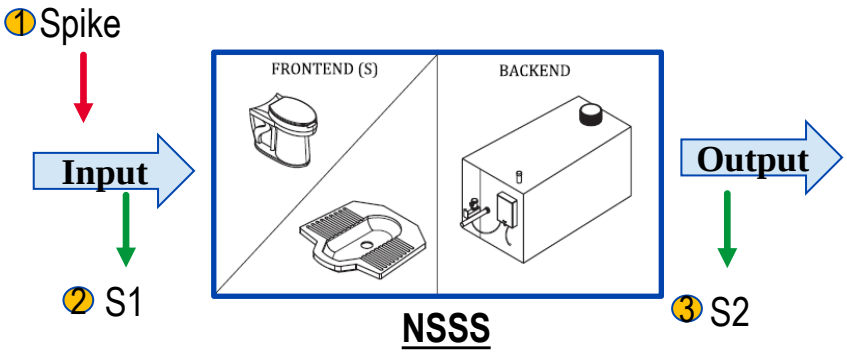
Parameter (Pathogen class)	Human enteric Bacterial pathogens	Human enteric viruses	Human enteric Helminths	Human enteric Protozoa
Surrogate	using *E. coli* as a surrogate, measured in CFU or MPN	using MS2 Coliphage as surrogate, measured in PFU	using *Ascaris suum* viable oval as surrogate	using viable *Clostridium perfringens* spores as surrogate, measured in CFU
Min. faeces spike [number/g, (dry solids)]	10^8	10^8	10^4	10^6
Min. urine spike (number/l)	10^8	10^8	10^4	10^6

Thresholds and log reduction values requirements.

Parameter (Pathogen class)	Human enteric bacterial pathogens	Human enteric viruses	Human enteric Helminths	Human enteric Protozoa
Surrogate	using *E. coli*[b] as surrogate, measured in CFU or MNP	using MS2 Coliphage as surrogate, measured in PFU	using *Ascaris suum* viable ova as surrogate	using viable *Clostridium perfringens* spores as surrogate, measured in CFU
Max. concentration in solids [number/g (dry solids)]	100	10	< 1	< 1
Overall LRV for solid[a]	≥ 6	≥ 7	≥ 4	≥ 6
Max. concentration in liquids (number/l)	100	10	< 1	< 1
Overall LRV for liquid[a]	≥ 6	≥ 7	≥ 4	≥ 6

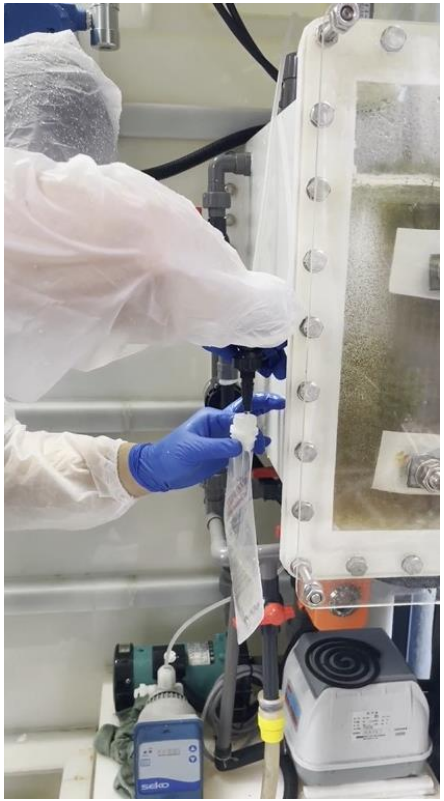
[a] Log-reduction values (LRVs) were derived from a quantitative microbial risk assessment (QMRA) as described by WHO 2016. For further information, see Reference [61] and Reference [72].

[b] *E. coli* strain KO11 (ATCC 55124) is used because it is chloramphenicol resistant. Therefore, this antibiotic may be added to the plating medium to suppress the growth of other, interfering bacteria.



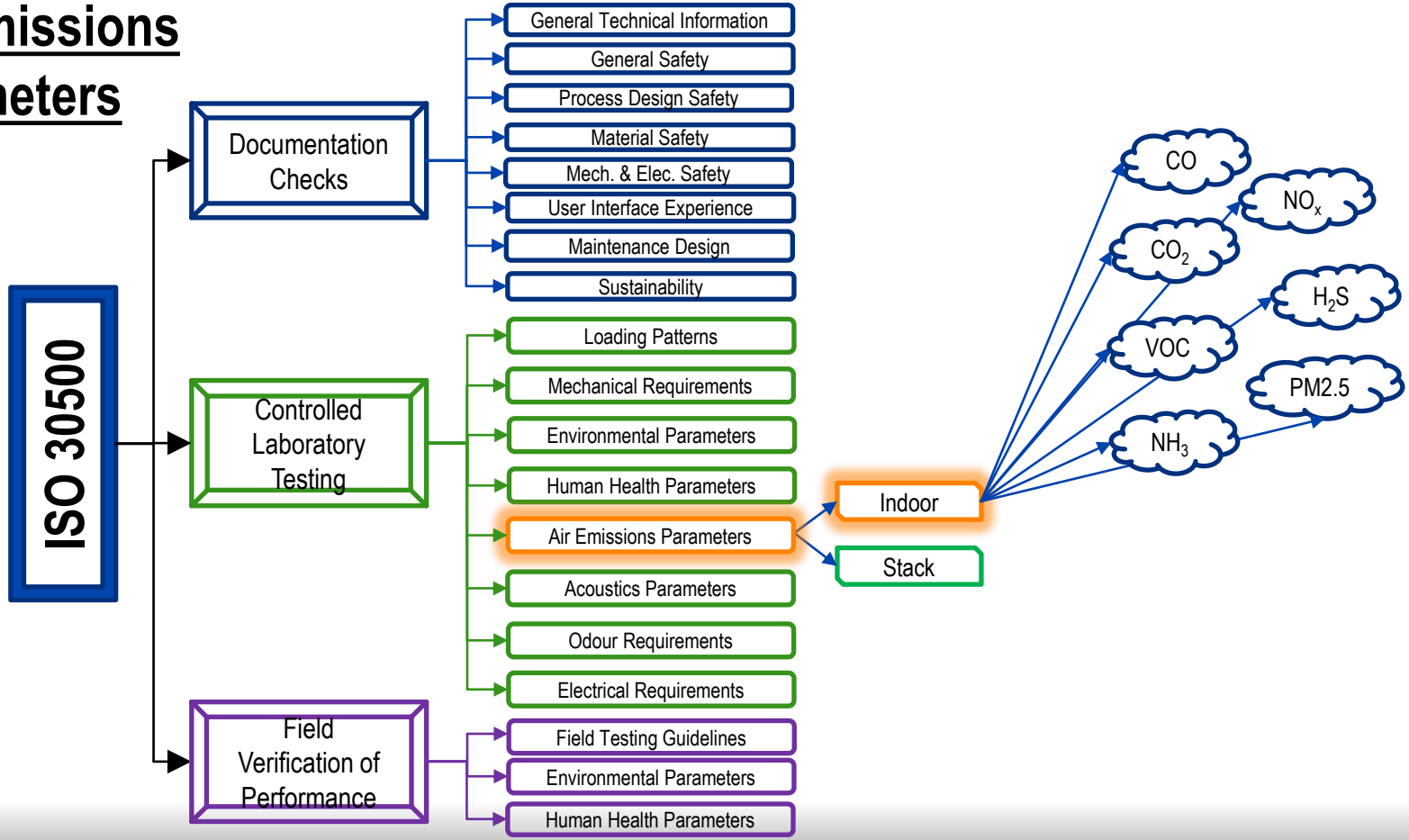
Microbial Testing

Microbe spiking



Microbe testing (Sample Taking)

Air Emissions Parameters



Air Emissions - Indoor

Sampling Methods and Location

1. About 1 to 1.5 m **from the ground** above the squat or seat pan
2. Superstructure door to remain closed during entire sampling

Atmospheric air sampling pump

Thresholds

Parameter	Emission thresholds (average levels over indicated timeframe)
CO (ppmv)	1 h: 28
NO_x (ppbv)	1 h: 99
SO_2 (ppbv)	1 h: 6,8
CO_2 (ppmv)	1 h: 1 000
H_2S (ppbv)	30 min: 4,6
VOCs (ppbv)	1 h: 187
$PM_{2,5}$ ($\mu g/m^3$)	1 h: 25
NH_3 (ppmv)	1h: 25
NOTE 1 NOx is the sum of NO and NO_2. Measurement values are given as NO_2.	
NOTE 2 ppmv is parts per million by volume, ppbv is parts per billion by volume.	

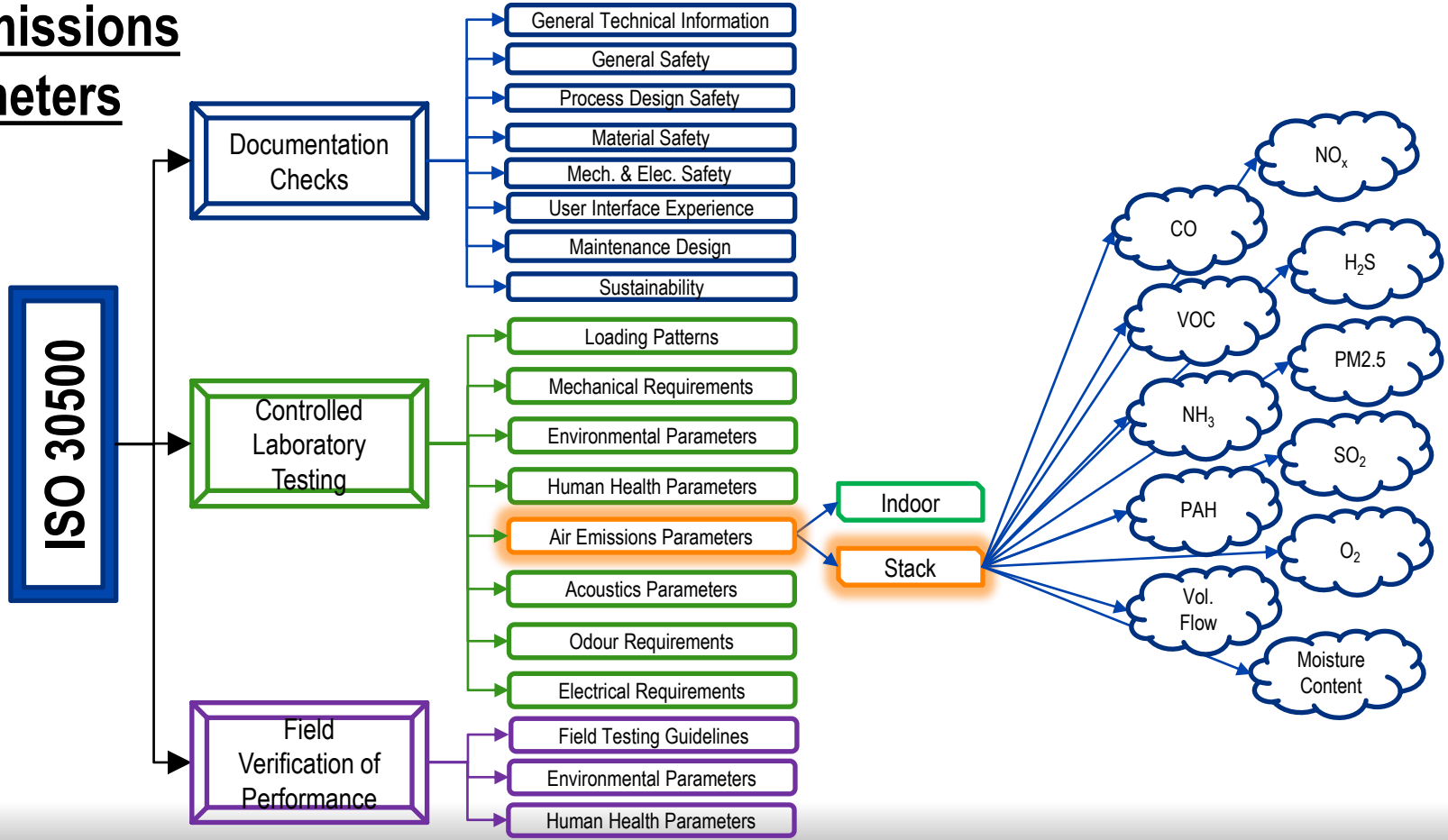
Recommended Methods

Component	Test method	Sampling method
CO	1) ISO 4224 2) NIOSH 6604	1) Continuous analysis 2) Grab sampling
NO_x	ISO 7996	Continuous analysis
CO_2	1) ISO 16000-26 2) NIOSH 6603	1) Continuous analysis 2) Grab sampling
H_2S	NIOSH 6013; OSHA6 ID 141, 1008	Grab sampling
VOC	ISO 16000-5	Grab sampling
SO_2	NIOSH 6004	Grab sampling
$PM_{2.5}$	NIOSH 0500	Grab sampling
NH_3	1) NIOSH 6015 2) NIOSH 6016	Grab sampling
NOTE 1 NO_x is the sum of NO and NO_2. Measurement values are given as NO_2.		
NOTE 2 For NIOSH methods, see Reference [63].		

Air Emissions Testing

Indoor

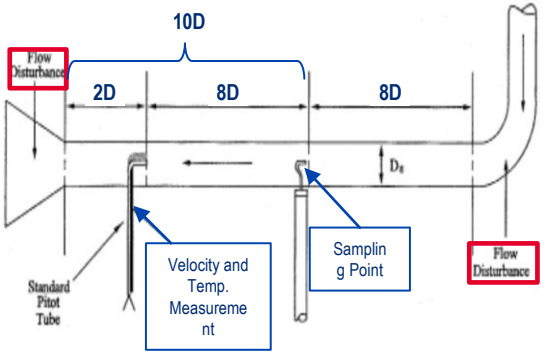
Air Emissions Parameters



Air Emissions - Stack

Sampling Methods and Location

1. Most significant sources of air pollutants within the NSSS
2. External gas vent/Stack as outlined in EPA Method 1A



Thresholds

Table 12 — Outdoor exhaust or vent air emissions thresholds

Parameter	Emission thresholds (1 h average)
CO (ppmv)	80
SO_2 (ppmv)	68
NO_x (ppmv)	195
VOC (ppmv)	12
H_2S (ppmv)	1,9
PAH (ppmv)	0,001
$PM_{2,5}$ (mg/m³)	10
NH_3 (ppmv)	50

NOTE 1 NOx is the sum of NO and NO_2. Measurement values are given as NO_2.

NOTE 2 There is no internationally recognized threshold value provided for ambient $PM_{2,5}$. The recognized percentage of total PM that is made up of $PM_{2,5}$ is approximately 15 % (for combustion processes without the use of a dust filter technology).

NOTE 3 See Table 11 for the meaning of ppmv.

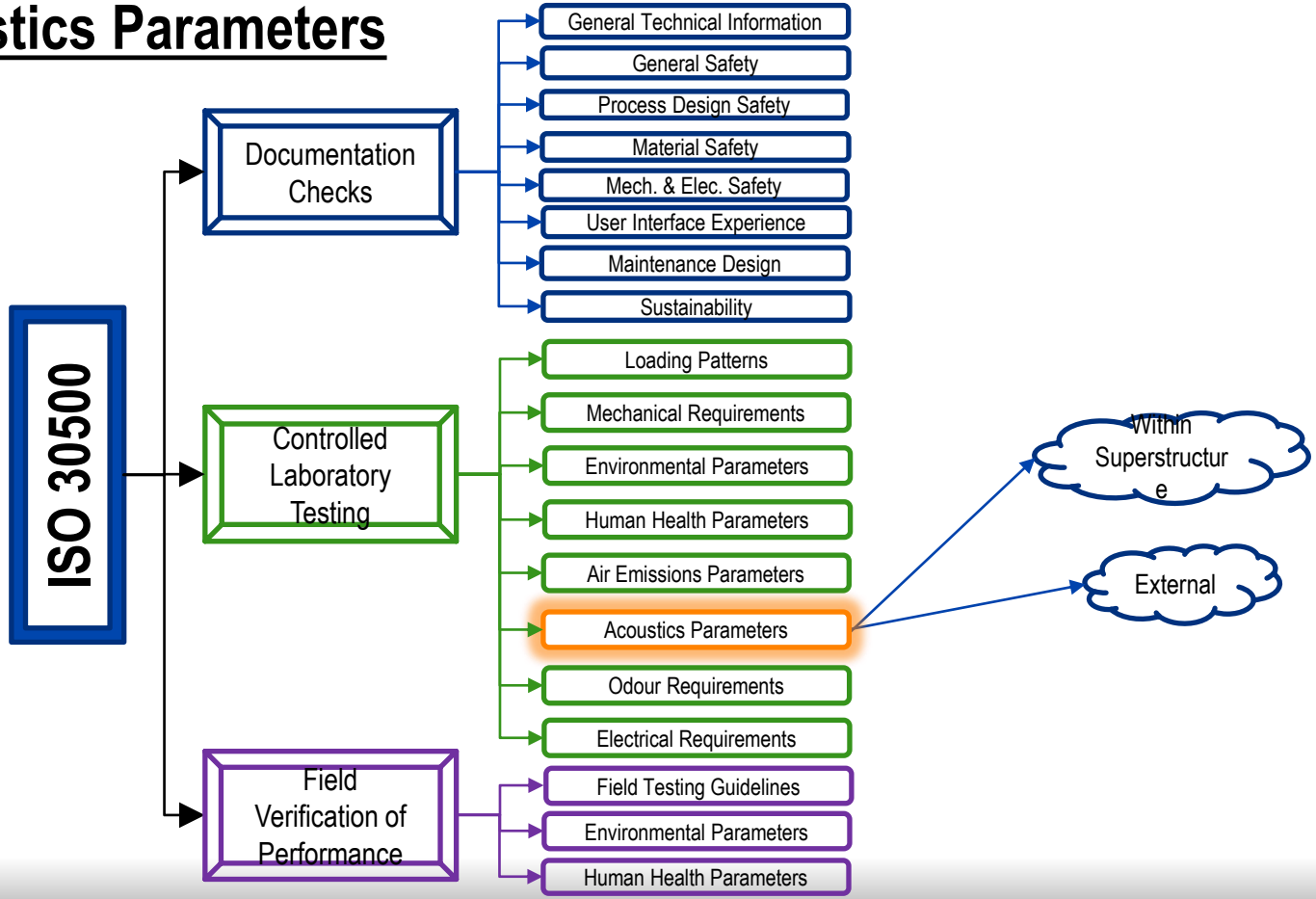
Recommended Methods

Table A.13 — Recommended test methods for analysis of ambient air emissions

Component	Recommended test methods
CO	EN 15058, US EPA, Method 10
SO_2	EN 14791, US EPA, Method 6C
NO_x	EN 14792, US EPA, Method 7E
VOC	EN 12619, US EPA, Method 25A
PAH	VDI 3874, US. EPA Compendium method TO-13A
H_2S	VDI 3486 Bl. 2, NIOSH 6013; OSHA6 ID 141, 1008
$PM_{2,5}$	VDI 2066 Bl. 10, US EPA, Method 5I; Method 201A
O_2	EN 14789, US EPA, Method 3A
NH_3	US EPA CTM-027
Volume flow	ISO 16911-1, US EPA, Method 2
Moisture content	EN 14790, US EPA, Method 4
Requirements for measuring sections	EN 15259, US EPA, Method 1A

NOTE For US EPA methods, see Reference [82].

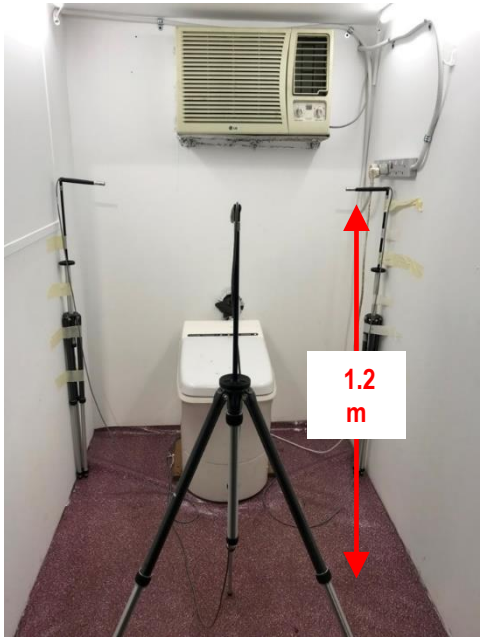
Acoustics Parameters



Acoustics Parameters

Within superstructure / Frontend

- For sanitation system that include a superstructure as part of the manufactured product, noise shall be measured within the superstructure at a single measurement point.
- The measurement point shall be **centred above the squatting or seat pan** of the frontend at a height of 1,2 m from the ground.
- Requirements: 60 dBA (average) & 85 dBA (max) across 24hrs

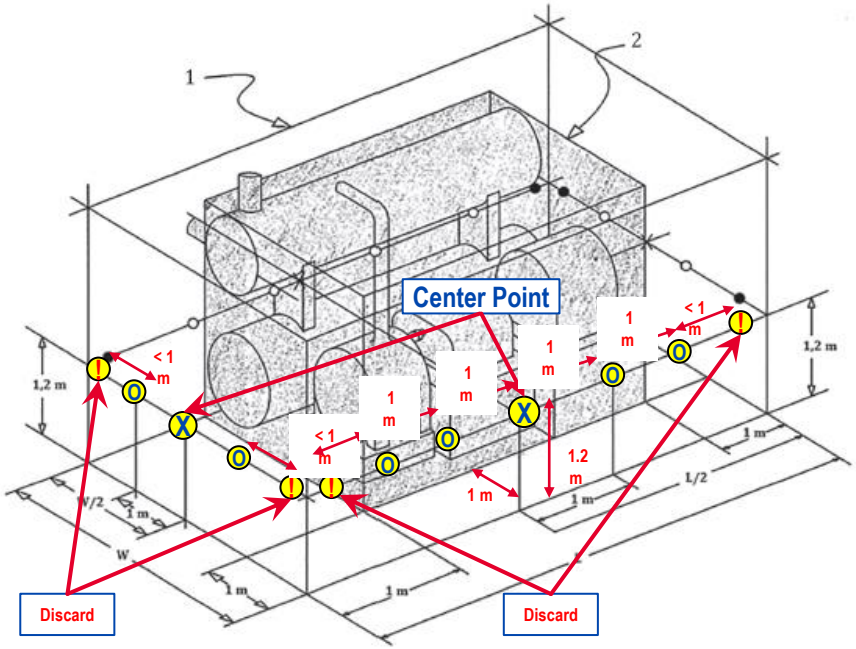


Acoustics Parameters (External)

External / Backend

- The measurement points shall be positioned on the surface of a measurement parallelepiped whose planes are each 1 m outward (relative to the system) from those of the reference parallelepiped.
- Requirements: 60 dBA (average) & 85 dBA (max) across 24hrs

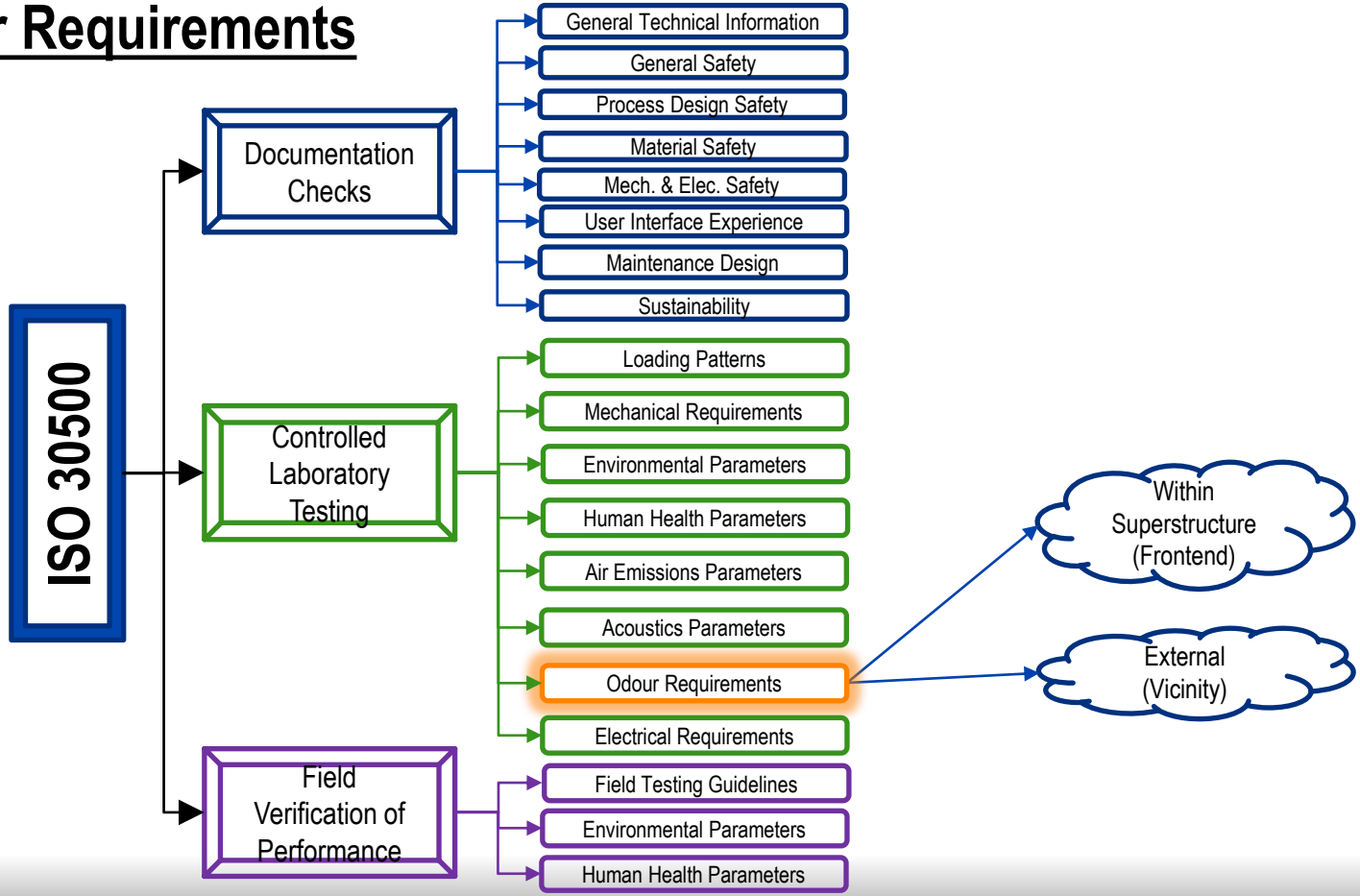
External / Backend Measurement



Noise Emissions Testing

Indoor and outdoor

Odour Requirements



Odour – Requirements

Per test

- Instruct the panelists to inhale the surrounding air and smell its odour at 10 s intervals, for total duration of 3 min per test

1. Test Frequency

	5 min after a faecal event	5 min after a urinary event	When process operations are expected to release the most odours	Randomly during the test day
Normal odour day test – number of tests to be conducted	4	2	2	2

2. Threshold

	Maximum percentage of observations reported as "unpleasant" %	Maximum percentage of observations reported as "unacceptable" %
Normal odour day	10	2
Simulant odour day	10	2

Sample Odour Assessment Report Sheet

Panel member: Joe Doe
Date: March 26, 2016
Start time: 14:25
Stop time: 14:28
Measurement round: After faecal, round 2
Measurement point and notes: comments appear here

Odour codes
Type of odour
0 – No odour
F – Faecal odour
X – Other odour
Odour attributes
1 – Pleasant
2 – Acceptable
3 – Unpleasant
4 – Unacceptable

1st minute

F4	F3	X3	X2	X2	X3

2nd minute

X2	X2	X2	X2	X2	X2

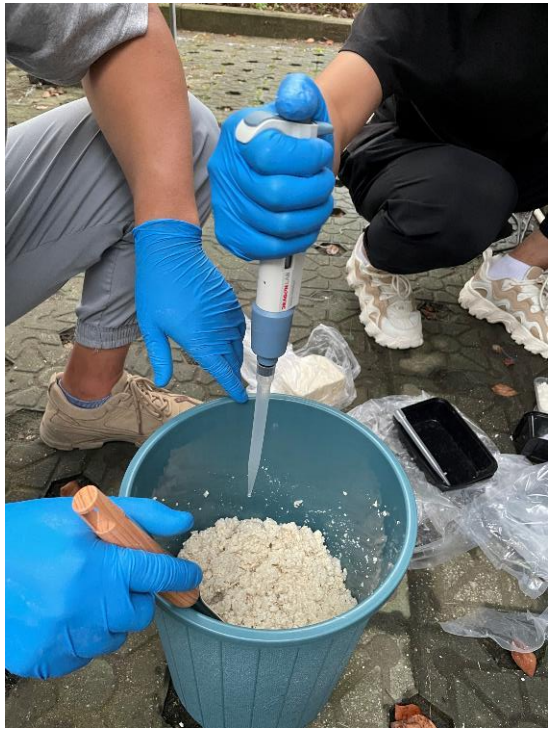
3rd minute

X2	F2	F2	X2	0	0

Key

faecal odour	odour that can easily be attributed to faeces and/or urine
other odour	non-faecal odour (e.g. perfume, cleaning products, process odour)
pleasant	enjoyable odour
acceptable	mild odour, not offensive, easily tolerated
unpleasant	odour that is not enjoyable, mildly offensive, but does not meet the criteria of unacceptable
unacceptable	severely offensive, nauseating and/or sufficiently revolting to cause one to avoid using the sanitation system

Odour Emissions Testing

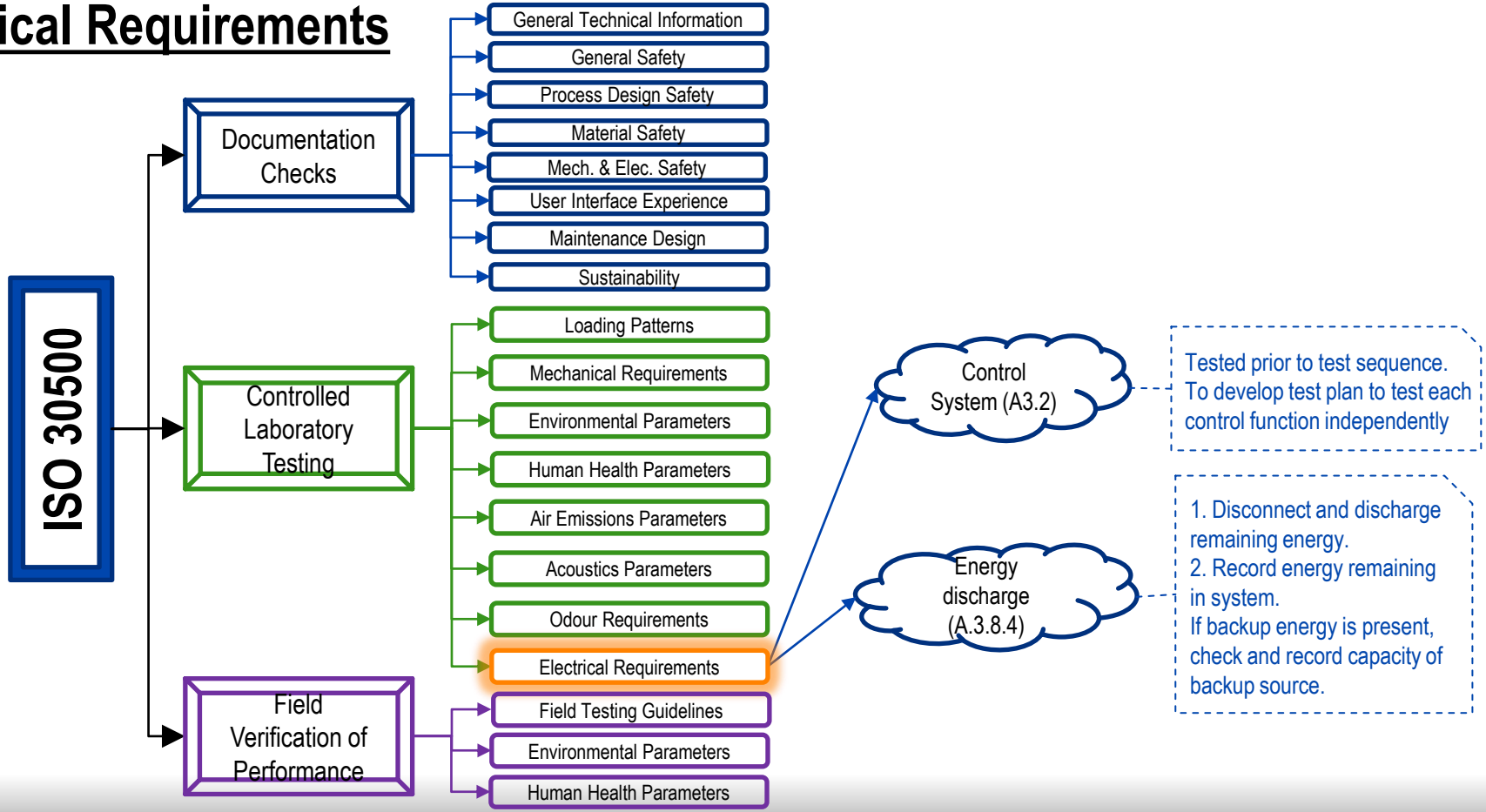


Simulant Preparations

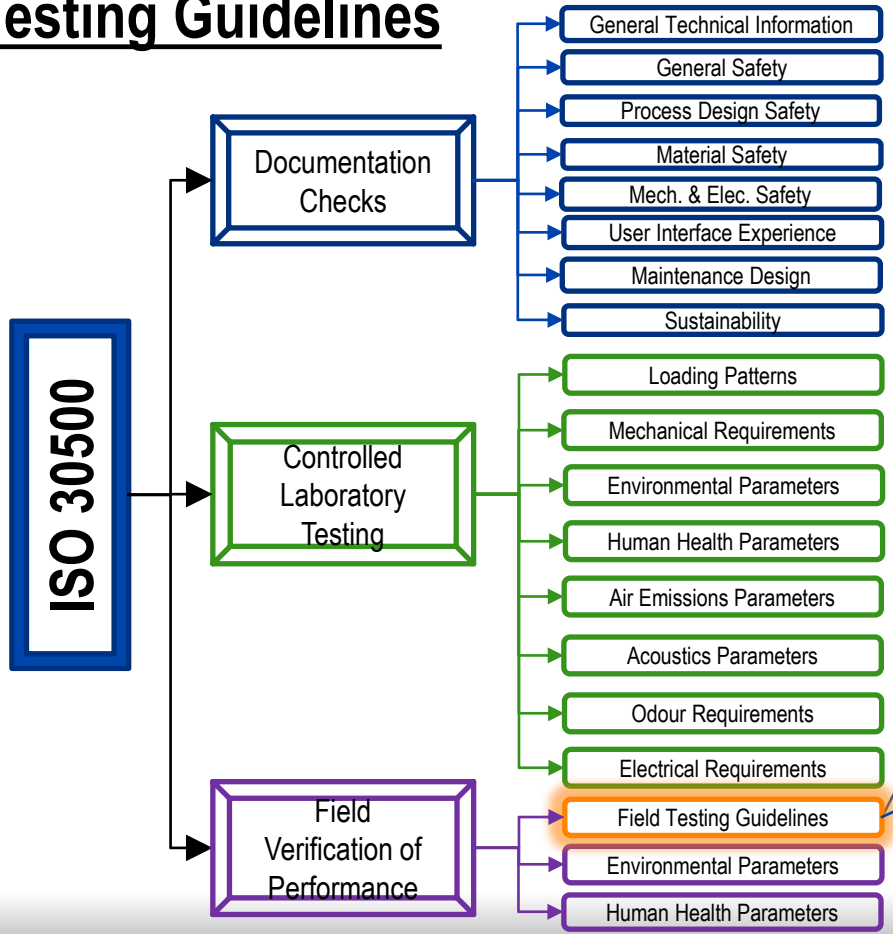
Panelist odour screening

Odour Assessment by panelist

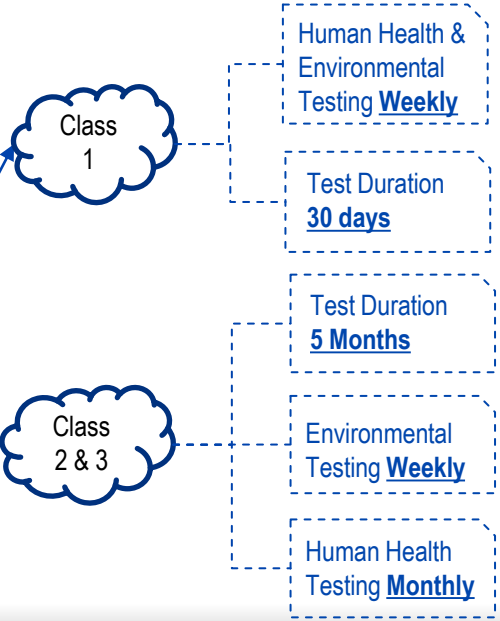
Electrical Requirements



Field Testing Guidelines



Class
Class 1: Non-biological treatment processes one frontend – backend
Class 2: Biological treatment processes one frontend – multiple backends
Class 3: NSSSs – Anything more than one frontend



Field Testing Guidelines

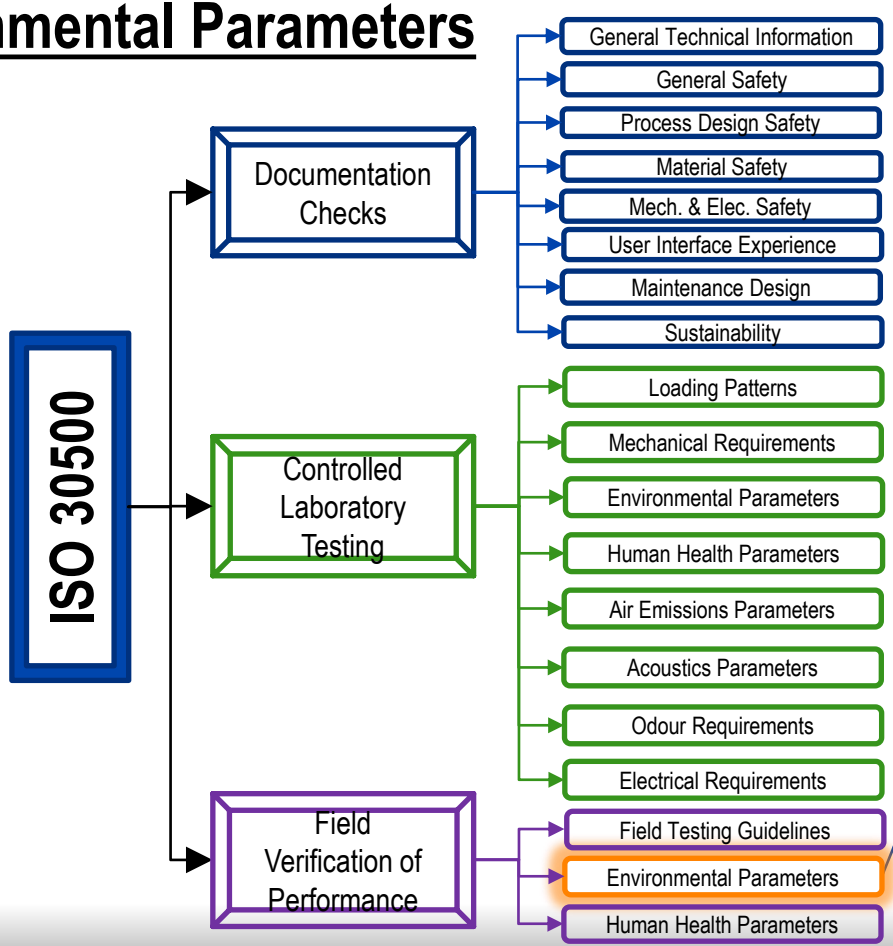
		Month 1				Month 2				Month 3				Month 4				Month 5				Month 6				
Week	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Class 1																										
Environmental	D	W	W	W	W	C																				
Human Health		W	W	W	W	C																				
Class 2 & 3																										
Environmental	D	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	W	C
Human Health		M				M				M				M				M				M				C

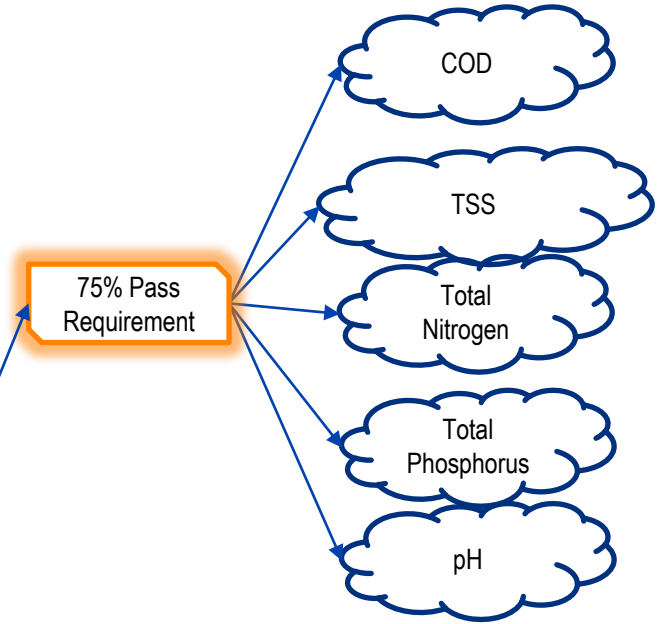
Legends

B = Inlet Baseline study (daily). Total N & P only
D = Daily sampling
W = Weekly sampling
M = Monthly sampling
C = Complete

Environmental Parameters (Field)

- Input samples to be collected and analysed daily for a period of 1 week to collect total nitrogen and total phosphorus baseline values.





Human Health Parameters (Field)

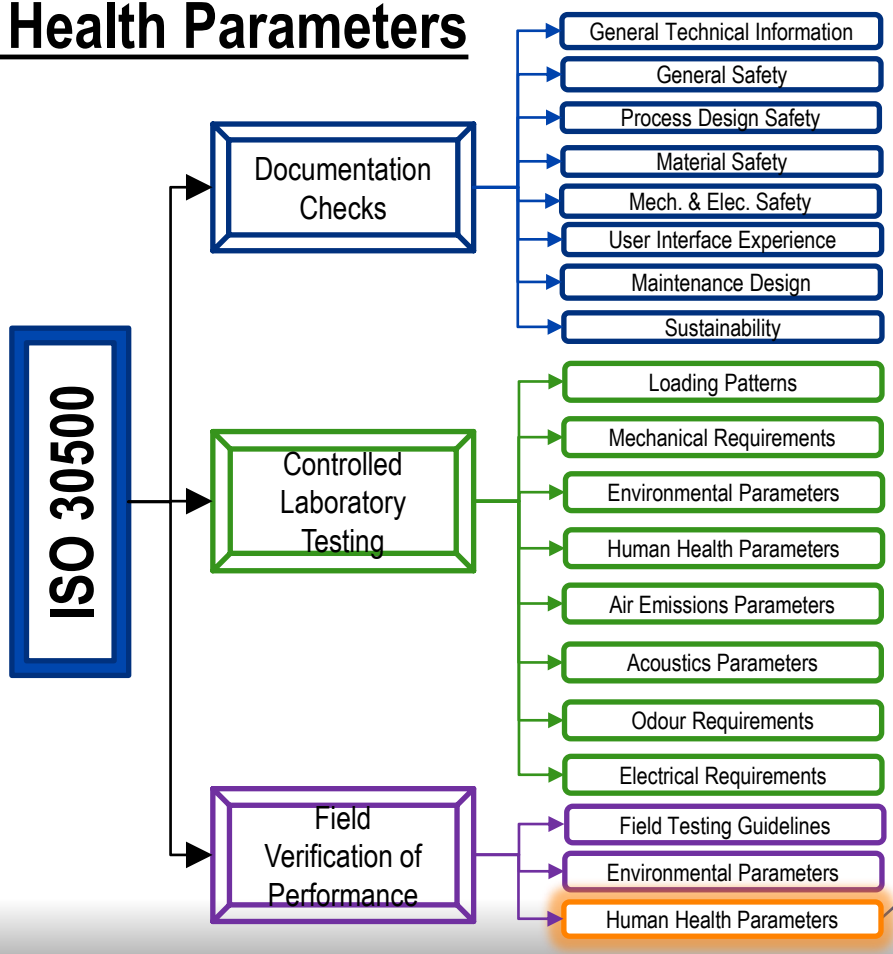
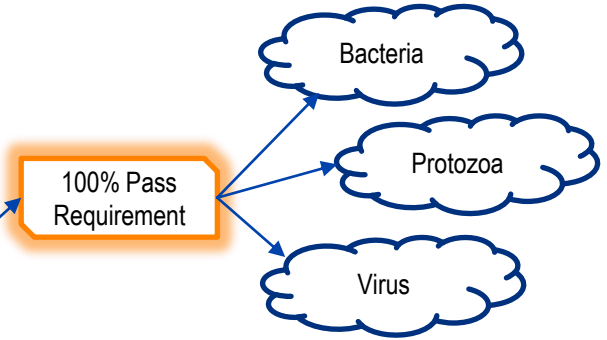


Table 13 — Solid output and liquid effluent field verification of performance thresholds

Parameter (Pathogen class)	Human enteric bacterial pathogens	Human enteric viruses	Human enteric Protozoa
Surrogate	using *E. coli* as surrogate, measured in CFU or MPN	using somatic coliphage as surrogate, measured in PFU	using *viable Clostridium perfringens* spores as surrogate, measured in CFU
Max. concentration in solids [number/g, (dry solids)]	100	10	< 1
Max. concentration in liquids (number/l)	100	10	< 1

- Human enteric Protozoa validates treatment efficiency for human enteric Helminths



Thank You!

Dakar, Senegal
Laboratories Kickoff Meeting

Yixing, China
ISO 30500 Preliminary Testing

Kathmandu, Nepal
ISO 30500 Project Committee

Coimbatore, India
ISO 30500 Validation Testing

Durban, South Africa
ISO 30500 Validation Testing

ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units

Session-4
ISO 30500 Certification Process

Mr. Chris Chan

Manager, Project

TÜV SÜD

CWAS CENTRE FOR WATER AND SANITATION
CRDF CEPT UNIVERSITY

BILL & MELINDA GATES foundation

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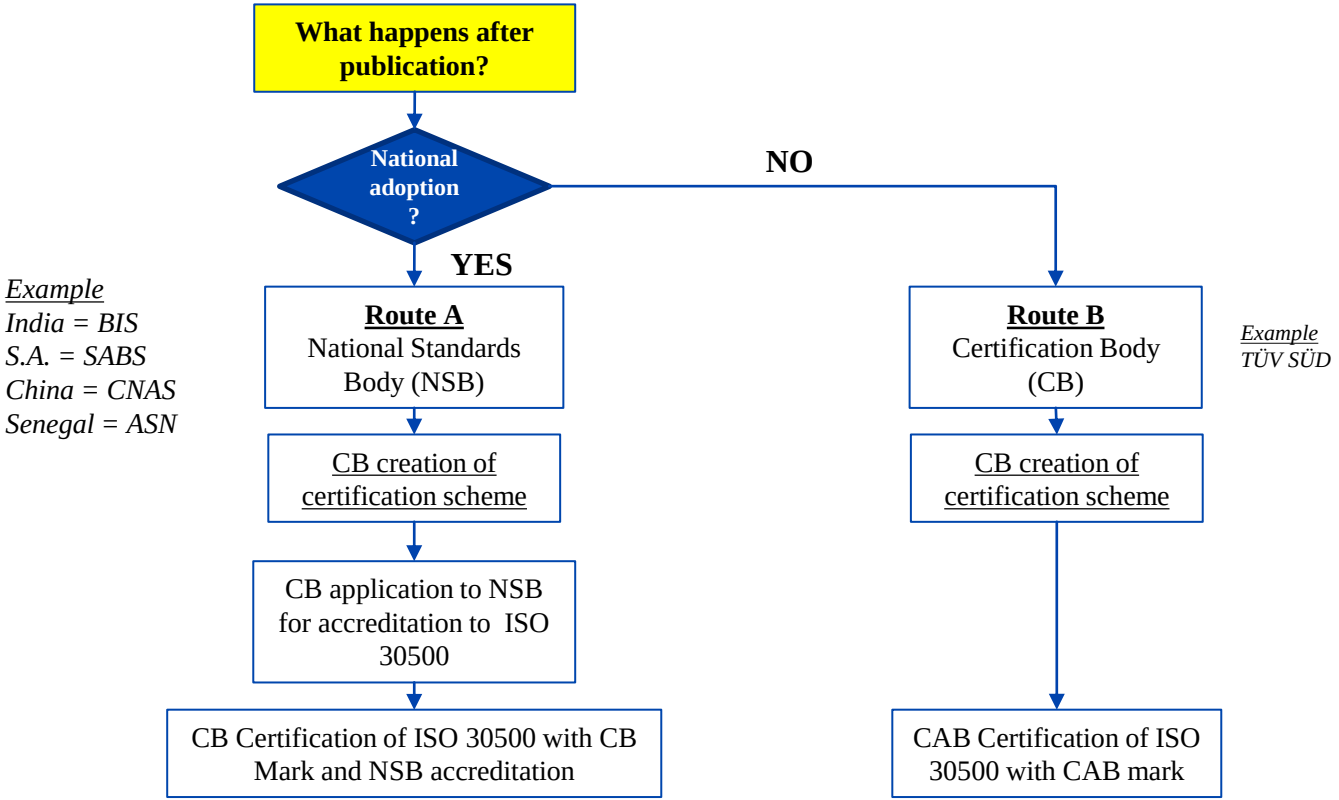
ISO 30500
Certification Process

.

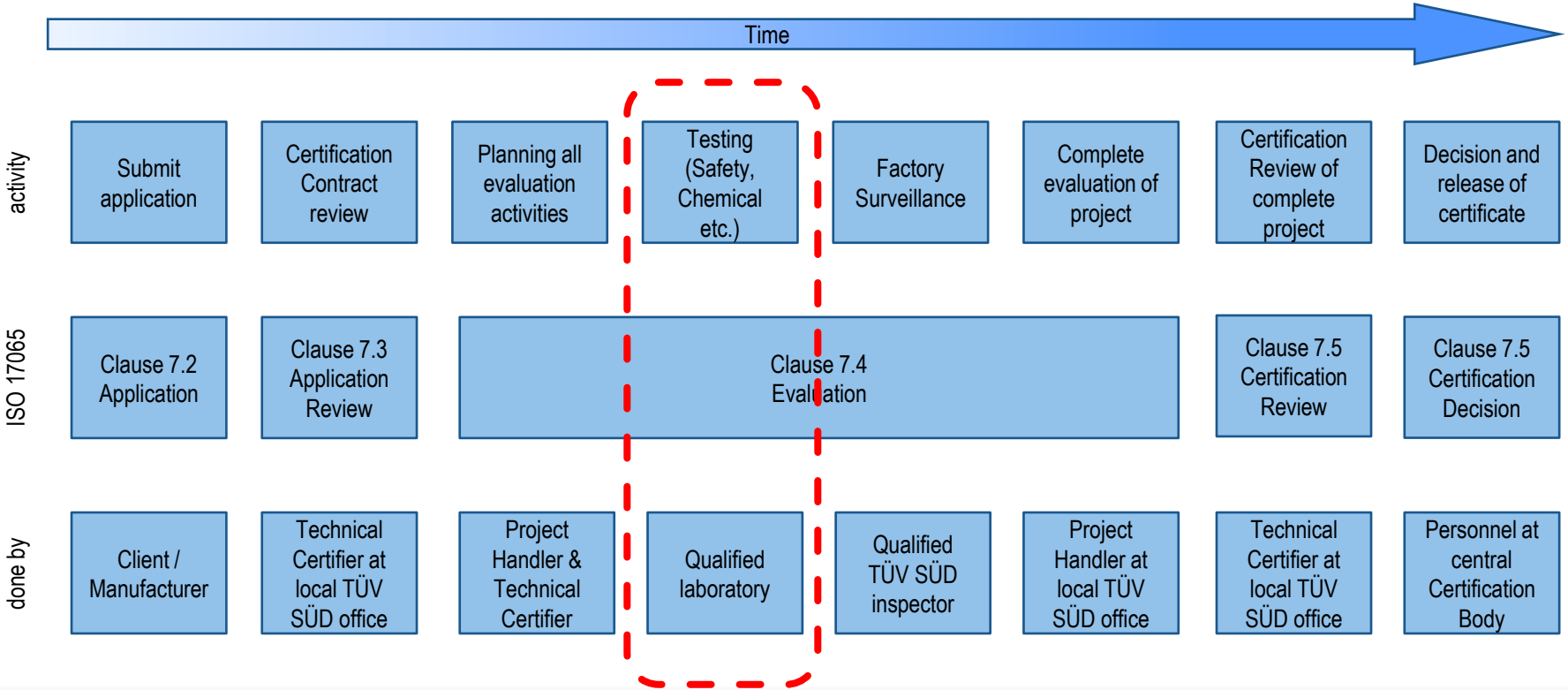
Mehr Wert.
Mehr Vertrauen.

Add value.
Inspire trust.

What happens after standards publication?



Basic process for product certification – By Certification Assessment Body



Generic Certification Timeline for ISO 30500

Phase	Description	Class 1	Class 2	Class 3	Responsibility
Preparation Phase	Review of technology	4 months			CB
	Discussion and iteration of test plan				CB & M
	Contract review				CB & M
Testing Phase	**Site preparation**	**3 months**			**M**
	Factory Inspection				**CB & M**
	Document checks				**CB & M**
	Laboratory Testing				**CB & M**
	Site preparation				**M**
	Field Testing	**1 month**	**5 months**	**5 months**	**CB & M**
Certification application phase	Consolidation and reviewing of all test reports	2 months			CB
	Submission to certification department for issuing of Certificate	1 month			CB
	Estimated Total Time	11 months	15 months	15 months	

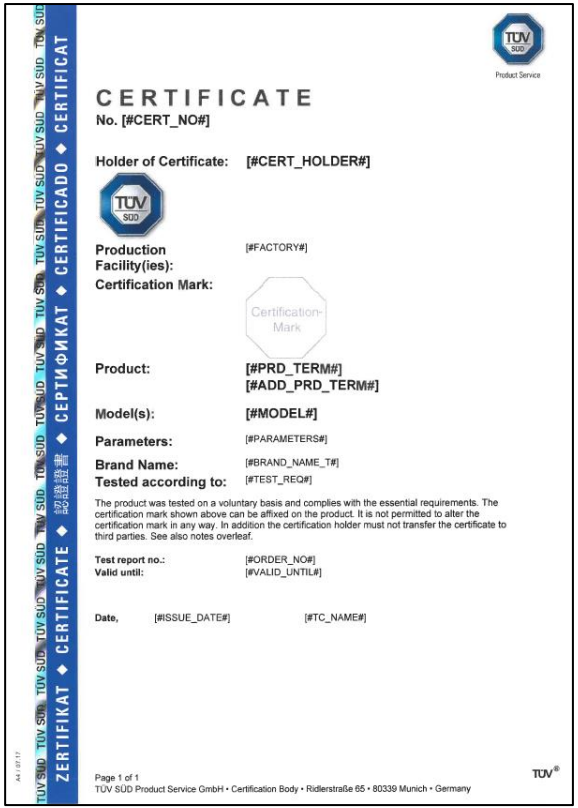
Class
Class 1: Non-biological treatment processes one frontend – backend
Class 2: Biological treatment processes one frontend – one or more backends
Class 3: NSSSs – Anything more than one frontend

CB – Certification Body
M - Manufacturer

Note: Estimated timeline is based on best case scenario and minimal non-compliances are found

Certification Mark for ISO 30500 (mock-up)

After successful certification, the client/ manufacturer is awarded a certification mark and certificate



CERTIFICATE

No. [#CERT_NO#]

Holder of Certificate: [#CERT_HOLDER#]

Production Facility(ies): [#FACTORY#]

Certification Mark:

Certification-Mark

Product: [#PRD_TERM#] [#ADD_PRD_TERM#]

Model(s): [#MODEL#]

Parameters: [#PARAMETERS#]

Brand Name: [#BRAND_NAME_T#]

Tested according to: [#TEST_REQ#]

The product was tested on a voluntary basis and complies with the essential requirements. The certification mark shown above can be affixed on the product. It is not permitted to alter the certification mark in any way. In addition the certification holder must not transfer the certificate to third parties. See also notes overleaf.

Test report no.: [#ORDER_NO#]

Valid until: [#VALID_UNTIL#]

Date, [#ISSUE_DATE#] [#TC_NAME#]

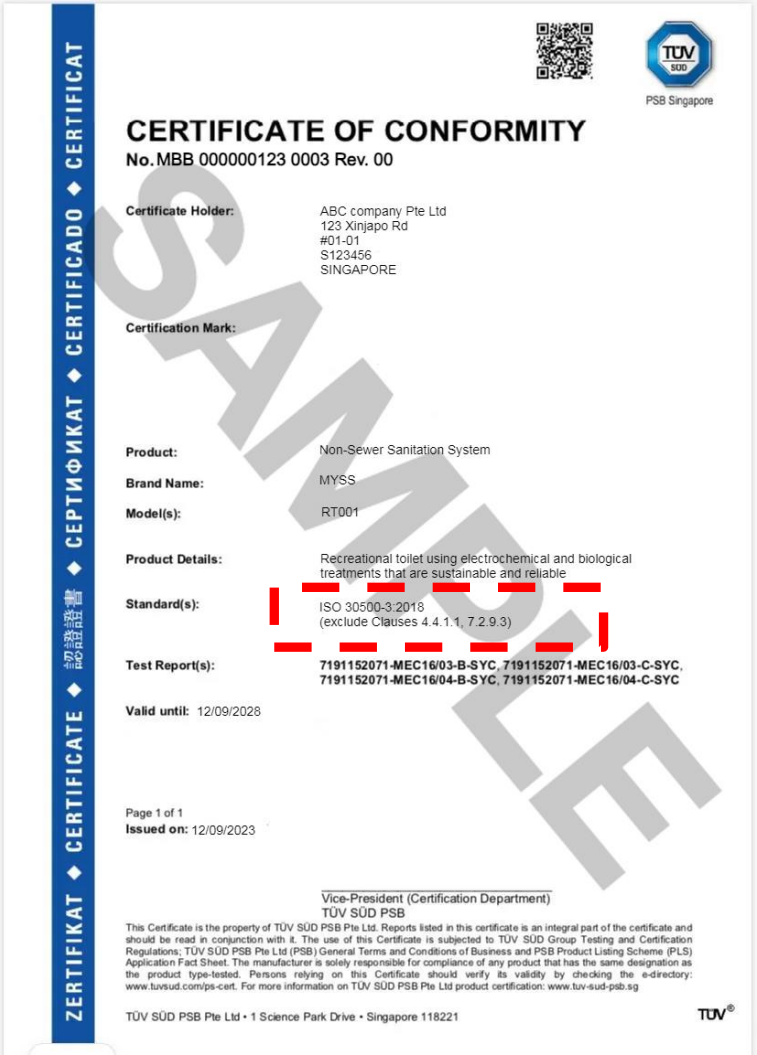
Page 1 of 1

TÜV SÜD Product Service GmbH • Certification Body • Ridlerstraße 65 • 80339 Munich • Germany

ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

Certificate of conformity (Partial certification)

- TIC bodies can create a Certificate of conformity (COC) scheme to prove a particular system is compliant to particular clauses. **This will be only a certificate and without a mark.**
- This is usually done for special circumstances or needs.



ZERTIFIKAT ◆ CERTIFICATE ◆ 認證證書 ◆ СЕРТИФИКАТ ◆ CERTIFICADO ◆ CERTIFICAT

PSB Singapore

CERTIFICATE OF CONFORMITY

No. MBB 000000123 0003 Rev. 00

Certificate Holder: ABC company Pte Ltd
123 Xinjapo Rd
#01-01
S123456
SINGAPORE

Certification Mark:

Product: Non-Sewer Sanitation System

Brand Name: MYSS

Model(s): RT001

Product Details: Recreational toilet using electrochemical and biological treatments that are sustainable and reliable

Standard(s): ISO 30500-3:2018
(exclude Clauses 4.4.1.1, 7.2.9.3)

Test Report(s): **7191152071-MEC16/03-B-SYC, 7191152071-MEC16/03-C-SYC, 7191152071-MEC16/04-B-SYC, 7191152071-MEC16/04-C-SYC**

Valid until: 12/09/2028

Page 1 of 1
Issued on: 12/09/2023

Vice-President (Certification Department)
TÜV SÜD PSB

This Certificate is the property of TÜV SÜD PSB Pte Ltd. Reports listed in this certificate is an integral part of the certificate and should be read in conjunction with it. The use of this Certificate is subjected to TÜV SÜD Group Testing and Certification Regulations; TÜV SÜD PSB Pte Ltd (PSB) General Terms and Conditions of Business and PSB Product Listing Scheme (PLS) Application Fact Sheet. The manufacturer is solely responsible for compliance of any product that has the same designation as the product type-tested. Persons relying on this Certificate should verify its validity by checking the e-directory: www.tuvsud.com/ps-cert. For more information on TÜV SÜD PSB Pte Ltd product certification: www.tuv-sud-psb.sg

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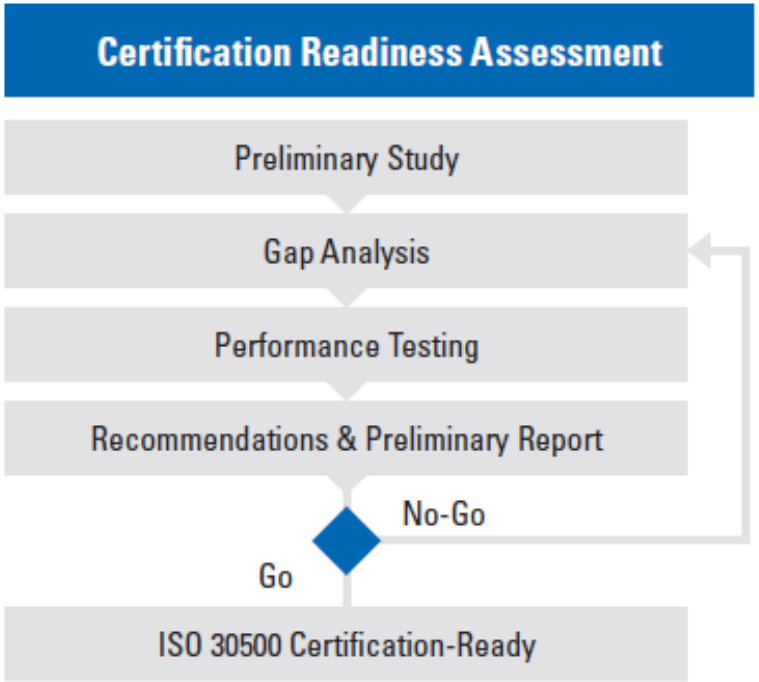
TÜV®

SAMPLE

Sanitation Readiness Index (SRI) from TÜV SÜD

- **Simplified/ Digital** survey customised to allow quick analysis of technologies' gap to certification
- **Identification** of technologies' pain points and required improvement
- **Guidance** to manufacturers for design optimisation.
- **Provides confidence** to manufacturers to effectively optimise time and cost



Thank you!

ISO 30500: Non-Sewered Sanitation Systems

Prefabricated integrated treatment units

Session-5
ISO 30500 Certification Process

Sun Kim
ISO PC 305 Chair
SGK Consulting

CWAS CENTRE FOR WATER AND SANITATION
CRDF CEPT UNIVERSITY
BILL & MELINDA GATES foundation
IIT PALAKKAD

ISO STANDARDS FOR
NON-SEWERED SANITATION (NSS)

ISO 30500 National Implementation Examples

Sun Kim

ISO PC 305 Chair

SGK Consulting

7 November 2023

CWAS CENTER FOR WATER AND SANITATION
CRDF CEPT UNIVERSITY

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IIT PALAKKAD

New Non-Sewered Sanitation Industry

Enabling environment

Enhanced demand for affordable aspirational sanitation

Implementation of quality standards

Marketplace readiness

Supportive regulatory environment

Access to financing

Readily available competitive products

ISO 30500 Applications

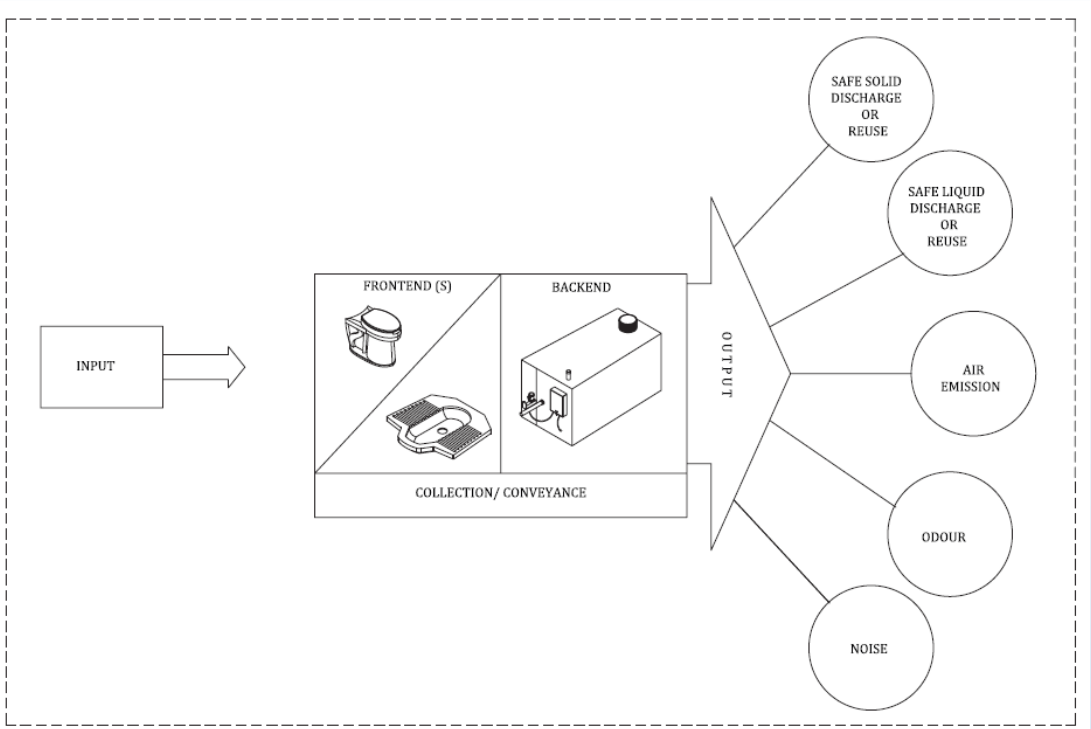


Figure 1 — Concept of a non-sewered sanitation system

https://www.iso.org/standard/72523.html

Technology & Commercial Demonstration Examples - Community

India
- USF (through Elefo Biotech) I-CRT at East Delhi Municipal Corporation, Delhi
- USF (through Eram Scientific) Newgenerator I-CRT at Kotivakkam Beach, Chennai
- SCG (through Swachh) I-CRT at Rabindra Sarobar (bio-diversity park), Kolkata
- SCG (through Banka Bioloo) I-CRT at Kovalan Nagar, Chennai

China
- 1 Clear b-CRT unit in a rural village (DaHuaShan Village)
- 9 EcoSan b-CRT units in rural villages (outside Beijing; and Sichuan, Liaoning, and Gansu provinces)

South Africa
- 1 EnviroOptions b-CRT unit in an informal settlement (Slovoville Informal Settlement, City of Johannesburg) – *Clear technology*
- 1 WEC Projects I-CRT unit in an informal settlement – *USF technology*
- 4 EnviroOptions b-CRT units in public schools (started 08/2020) – *Clear technology*
- 1 WEC Projects I-CRT unit in public schools – *USF technology*
- 1 Prana I-CRT unit in an industrial building – *SCG technology*

Other
- 5 SCG I-CRT units in industrial settings in Thailand (DOS factory, policy flats, tourist site, etc.)
- 1 SCG I-CRT unit in a school (Minburi Muslim School), Bangkok, Thailand
- 1 SCG b-CRT unit, Bangchak Gas Station, Chiang Mai, Thailand (started 10/2020)

Community Toilet & Treatment Systems – ISO 30500

Technology & Commercial Demonstration Examples - Household

India
- G2RT

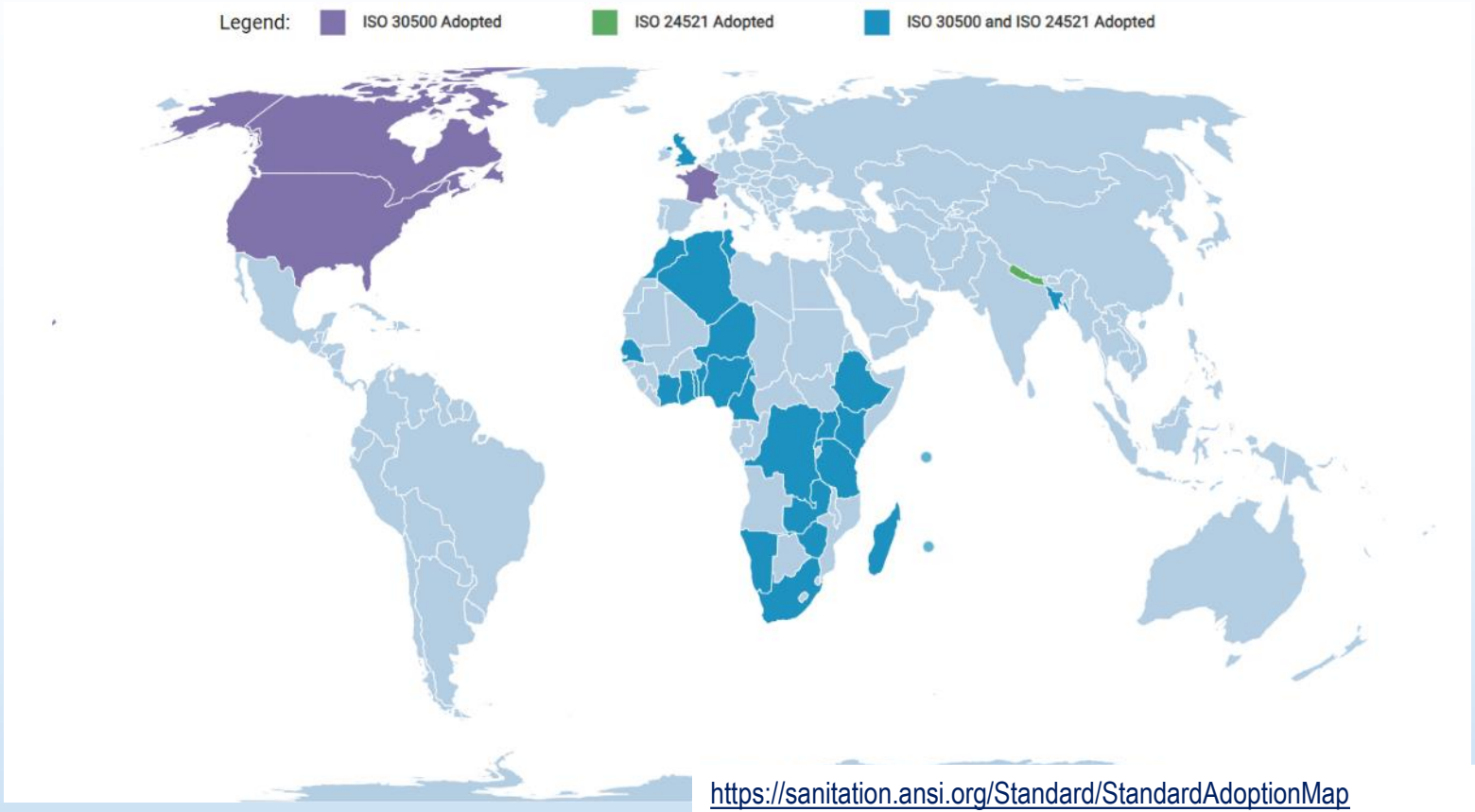
China
- 4 EcoSan gb-HRT in Jiangsu Province as septic tank replacement for families of 3-5

South Africa
- 10 Prana I-HRT units in an informal settlement (Durban, 20 additional units to be commissioned) – *SCG technology*
- 1 Prana I-HRT unit in a private residential household in Johannesburg – *SCG technology*
- G2RT

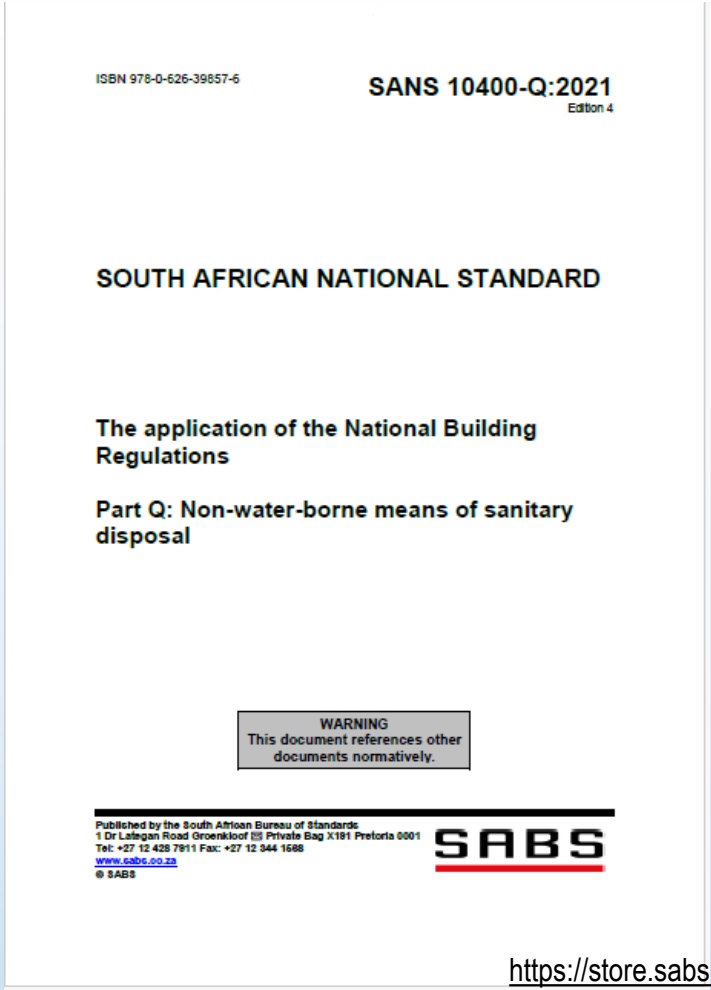
Other:
- SCG I-HRT in Bandung, Indonesia
- Cranfield Circular Toilet in Marysville, WA

Household Toilet & Treatment Systems – ISO 30500

ISO 30500 National Adoptions



https://sanitation.ansi.org/Standard/StandardAdoptionMap



In addition to chemical toilets and ventilated improved pit latrines,

paragraph 4.5 identifies SANS 30500 compliant toilets as acceptable alternative

https://store.sabs.co.za/catalog/product/view/id/2145147/s/sans-10400-q-ed-4-00/

4.5 Non-sewered sanitation systems — Prefabricated integrated treatment units

4.5.1 User requirements

The system shall be designed in such a way as to ensure that the users are able to use the system safely and in the manner intended by the manufacturer. The design and implementation of the system shall ensure that users with little or no literacy or those who do not have technical expertise are able to safely and effectively use the system frontend and perform routine user maintenance as intended by the manufacturer.

4.5.2 Design capacity

4.5.2.1 The system shall be capable of treating, at a minimum, human faeces and uri
d bile, flushing water, anal cleansing water, toilet paper, and other bod
sers may identify additional categories of input as acceptable for treatme
household waste
ed by the manufacturer.

4.5.3 Performance requirements

4.5.3.1 The sanitation system shall be such that when operated, maintained, and used, the requirements in are met under all operating conditions.

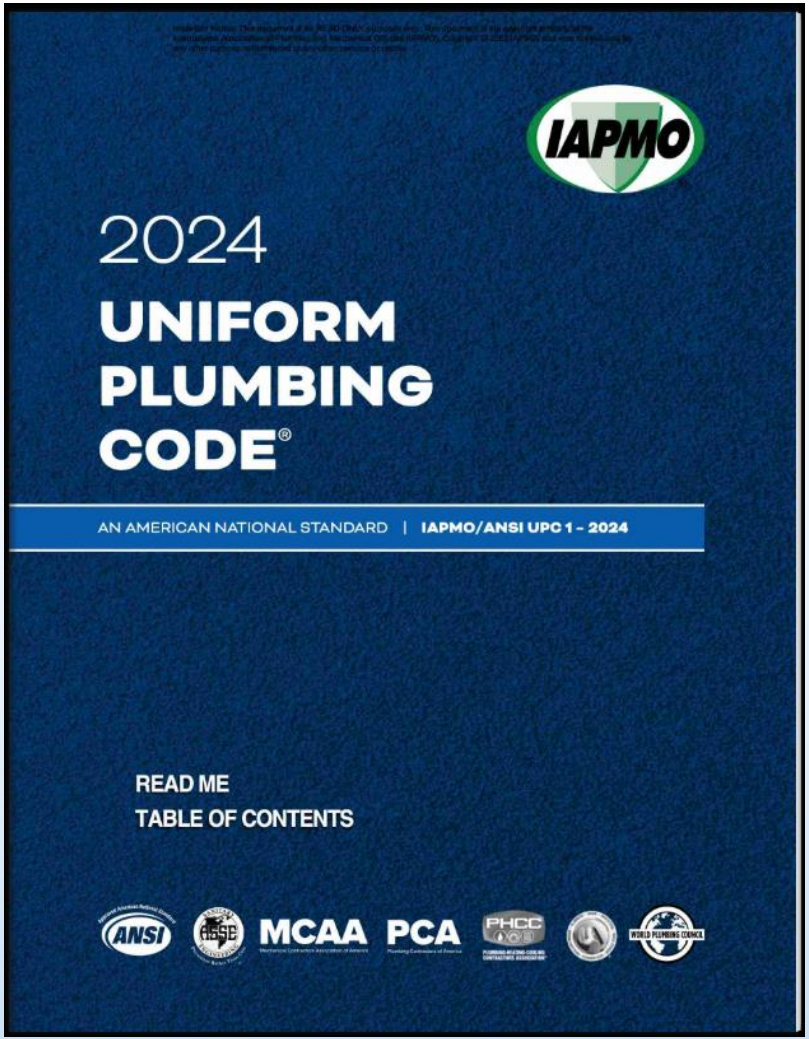
4.5.3.2 Solid output and effluent shall be fully treated within the sanitation system allowing for safe reuse or disposal. Solid output and effluent shall meet the requirements specified in SANS 30500 at all times including the start-up period when tested in accordance with SANS 30500.

4.5.3.3 In order to minimize odour emissions from the sanitation system, the requirements in SANS 30500 shall be met when tested in accordance with SANS 30500.

4.5.3.4 The system shall be designed for a serviceable life of a minimum of 10 y, at the loading
ates or frequency stipulated by the manufacturer, assuming use and maintenance according to the
nufacturer's specifications.

The system shall operate safely and reliably in ambient air humidity conditions at a
nge from 20 % to 100 %. Technologies designed for use in environments with ambient
20 % shall additionally demonstrate their capability to operate safely and reliably
t air humidity ranges.

https://store.sabs.co.za/catalog/product/view/id/2145147/s/sans-10400-q-ed-4-00/



Appendix O includes ANSI/CAN/IAPMO/ISO 30500 compliance for Non-Sewered Sanitation Systems

https://epubs.iapmo.org/2024/UPC/ page 439

APPENDIX O

NON-SEWERED SANITATION SYSTEMS

O 101.0 General.

O 101.1 Applicability. The provisions of this appendix shall apply to the installation of non-sewered sanitation systems.

O 101.2 System Requirements. Non-sewered sanitation systems shall comply with ANSI/CAN/IAPMO/ISO 30500.

O 201.0 Definitions.

O 201.1 General. For the purpose of this appendix, the following definitions shall apply:

Conditioned Space. An area, room, or space normally occupied and being heated or cooled for human habitation by any equipment.

Non-Sewered Sanitation System. A prefabricated integrated sewage treatment unit that is not connected to a public sewer or private sewage disposal system.

O 401.0 Manual Required.

O 401.1 Operation and Maintenance Manual. Non-sewered sanitation systems shall have an operation and maintenance manual provided by the manufacturer.

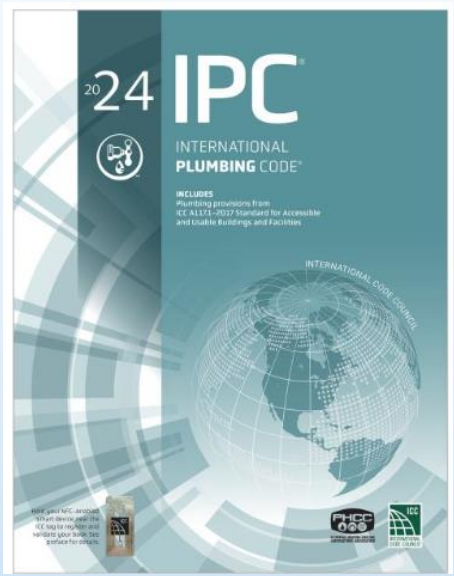
O 501.0 System Output.

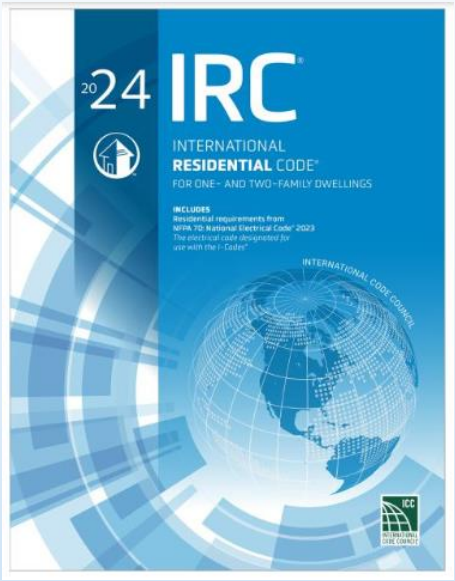
O 501.1 General. The use or disposal of all substances exiting the non-sewered sanitation system shall be determined by the Authority Having Jurisdiction.

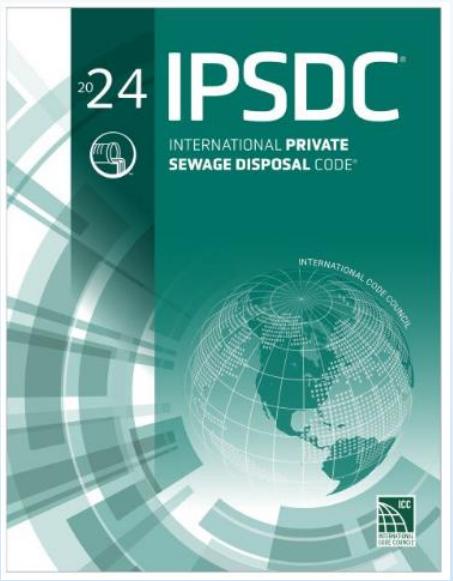
https://epubs.iapmo.org/2024/UPC/ page 439

ISO 30500 compliant systems are included in ICC 2024 editions of:

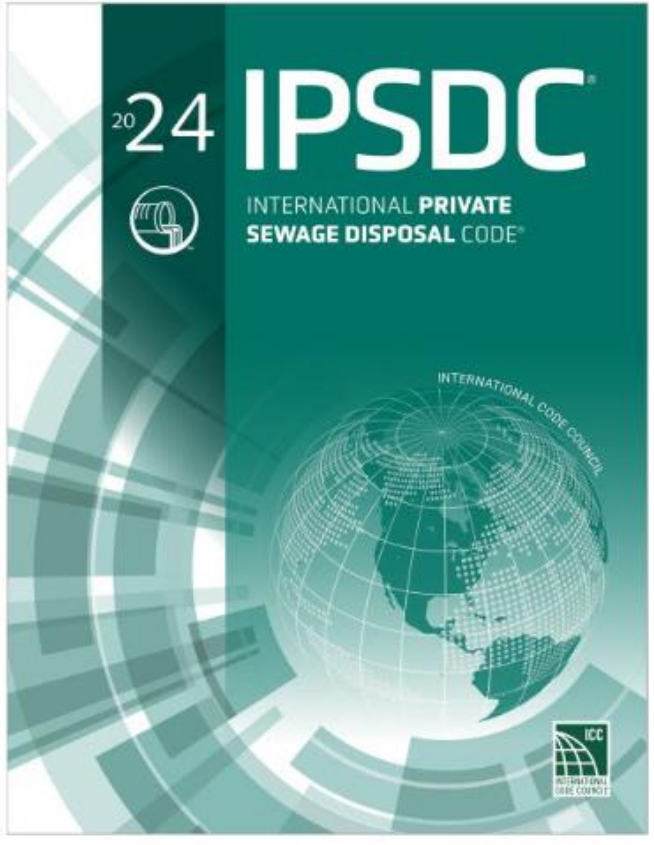
- International Plumbing Code
- International Residential Code
- International Private Sewage Development Code







https://shop.iccsafe.org/



For example:

Section 1101.2 of the 2024 IPSDC reads as follows:

1101.2 Residential wastewater treatment systems. The regulations for materials, design, construction and performance shall comply with NSF 40 or with IAPMO/ISO 30500.

https://shop.iccsafe.org/2024-international-private-sewage-disposal-coder.html

Learn More @

ISO 30500:2018 – Non-sewered sanitation systems – Prefabricated integrated treatment units – General safety and performance requirements for design and testing

Sustainable Sanitation Services

Georgia Tech - G2RT video

Samsung development videos

Why the world deserves a better toilet

THANK YOU

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