# Sanitation Quality Standards for Emergencies

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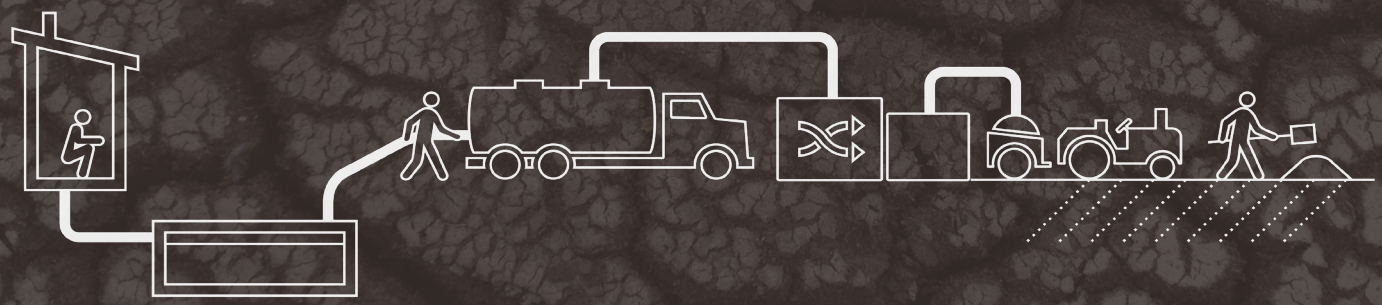
**FAECAL SLUDGE MANAGEMENT TWIG**

WASH Cluster
Water Sanitation Hygiene



**The FSM TWiG of the WASH Cluster will continue to work on improved and updated sanitation quality standards. Please check for the latest update on https://washcluster.net/twigs/FSM**

## Sanitation Quality Standards for Emergencies

The Faecal Sludge Management (FSM) Technical Working Group (TWiG) of the Global WASH Cluster has taken the initiative to create new sanitation quality standards for emergencies in addition to the sphere standards because:

1. The currently available standards do not explain under which conditions an onsite solution is a safe sanitation system, and under which conditions a sanitation service chain is required i.e. the desludging, transport and off-site treatment of faecal sludge.
2. The currently available standards do not focus sufficiently on standards for the full sanitation service chain (in those cases where the full sanitation service chain is required). Especially the safety of sanitation workers is not sufficiently addressed. The only effluent standards mentioned are national standards, while many countries do not have standards. Finally, the distinction between the emergency and subsequent phases is not well defined.

The following standards have been developed by the FSM TWiG for WASH practitioners addressing sanitation needs during emergencies. The improvement of these sanitation in emergencies standards is a continuous process. Please check for the latest version at https://washcluster.net/twigs/FSM.

### STANDARD 1: Environment free from human excreta

**Indicator 1.1** There are no human faeces present in the environment in which people live, learn and work.

**KEY ACTIONS:**

- Prioritize elimination of open defecation, followed by a rapid upscaling of access to safe sanitation systems universally implemented covering the full target population.
- Decontaminate/disinfect any faeces-contaminated living, learning and working spaces or surface water sources immediately

## STANDARD 2: Access is provided to safe sanitation systems

*The selection of safe sanitation systems should be context specific, thus respond to local physical, social and institutional conditions. Sanitation systems are considered safe when the below listed actions are taken.*

**Indicator 2.1** People have access to sanitation facilities that are adequately located respecting distances from surface or groundwater sources and with user interfaces based on user-centered designs.

**KEY ACTIONS:**

- Involve users before, during and after the design to ensure a user-centered approach i.e. the SaniTweaks or a similar approach.
- Incorporate the following specifications in the toilet design:
  - Minimum 1 toilet per 20 people.
  - Distance between dwelling and shared toilet is maximum 50 meters.
  - Distance between toilet and water sources at least 30 meters.
    This distance is not relevant when the containment (pit or tank) is fully lined without a supernatant overflow.
- Consult representative stakeholders about the siting, design and implementation of any shared or communal toilets.
  - Consider access and use by gender, age, disability, minority groups, people with HIV, people with incontinence or any other people with specific needs.
  - Locate communal toilets close enough to households to enable safe access, yet distant enough so that households are not stigmatised by proximity to toilets.
  - Distance between bottom of pits, infiltration trench, soak pits or leach fields and water table at least 1,5 meter. Increase distance for fissured rocks and limestone, Distance between bottom of pits, infiltration trench, soak pits or leach fields and water table at least 1.5 meter. Increase distance for fissured rocks and limestone.
  - Septic tanks fitted with an outlet should discharge to a soak pit, leach field or piped sewer and never to an open drain.
  - Toilet superstructure needs to prevent the intrusion of rainwater, stormwater runoff, animals and insects.
  - Toilet slab and pan or pedestal should be constructed using durable material that can be easily cleaned.
  - Ensure that handwashing facilities are included, including water and soap (or an alternative such as ash) after using toilets.
  - Ensure enough water, toilet paper or other anal cleansing material is available. Consult users about the most appropriate cleansing material and ensure safe disposal and sustainability of supply.

- Toilets should include appropriate containers for the disposal of menstrual hygiene materials in order to prevent blockages of sewerage pipes or difficulties in desludging pits or septic tanks. Consult with women and girls on the design of toilets to provide space, access to water for washing, and drying areas.
- Shared toilets should provide safety and privacy with lockable doors, sex segregation and lighting.
- A sufficient number of toilets should be equipped with adequate facilities for people with specific needs and should be sufficiently large for users with limited mobility.
- A small number of toilets should not contain sex segregation to ensure safe access for the trans community and to allow care-takers to assist children, elderly or people with specific needs.

- Ensure that toilets are well maintained and regularly cleaned, limiting bad smell and flies. Ensure that people have the information, means, tools and materials to clean, repair and maintain their toilets.
- Ensure that people have the information, means, tools and materials to dispose of children's and babies' faeces safely.
- Identify if a need exists for the desludging, transport and treatment of faecal sludge or if the on-site sanitation facility by itself can be considered as a safe sanitation system. If the following conditions apply, an on-site sanitation facility like a pit latrine or septic tank (without the emptying, transport and off-site treatment of faecal sludge) is considered a safe sanitation systems. These conditions generally apply in rural contexts. An on-site sanitation facility like a pit latrine or septic tank is considered safe sanitation system if:
  - The groundwater level is more than 1.5 meter deeper than the bottom of the pit or the bottom of the infiltration trench, soak pit or leach field.
  - The pit or septic tank of the toilet does not need to be fully lined, because the distance between toilet and water sources is at least 30 meters.
  - The containment (the pit or septic tank) does not need to be fully lined and an supernatant overflow is acceptable, as the toilet location does not have a flood risk.
  - Each household has its own toilet, resulting in a slow fill-up rate as it is used by few people.
  - There is sufficient space available to dig new containments (pits or tanks) once the existing ones fill up. It is advisable to construct superstructures and slabs that are reusable on a new pit or tank.
  - People have the information, means, tools and materials to safely fill and decommission used used containments (like pits or tanks). It is adviced to plant a tree on top of a decomissioned pit or tank.

- If above conditions do not apply and toilets are not connected to a sewer and wastewater treatment plant, plan for appropriate Faecal Sludge Management (FSM). FSM refers to the emptying of onsite sanitation systems like pits or septic tanks, and the transport, treatment and reuse or disposal of faecal sludge. This is generally the case in:
  - Urban contexts
  - Refugee and IDP contexts with many users per toilet
  - Contexts with high groundwater tables or flood risks
- Where FSM is required, ensure the following aspects are added to the toilet design.
  - Containment (like pits or tanks) need to allow for safe desludging, i.e. pits or septic tanks location must ensure access and the design must ensure that hoses and tools can reach the bottom of the pit to fully remove all liquids, solids and debris, without increasing the risk of damage or collapse. This means pits and tanks should be lined.
  - In situations with a high groundwater table or flood risks, groundwater contamination must be minimized. Especially when the groundwater is used as a drinking water source. This can be done through elevated toilets, containerized toilets or fully lined pits to contain excreta.
- All sanitation interventions should include a robust sanitation promotion/ behavior change programme (including monitoring and evaluation), with all stakeholders and participants aligned around the same set of objectives and strategies. To influence behaviour through succesful hygiene promotion, it is important to understand the existing sanitation behaviors and the determinants of those behaviors, noting that specific population groups will have different sanitation needs, opportunities for change and barriers to improvement.

### Guidance Note

The indicators below only apply in those cases where Faecal Sludge Management (FSM) is required. See indicator 2.1 for guidance on the decision if FSM is required or not. If FSM is required, connection needs to be made with local service providers and operational sanitation service chains, if they are present. These operational sanitation service providers need to be supported in meeting minimal standards, if this is not the case. If FSM is required, the FSM needs of the host community should also be considered.

In cases where FSM is required, it is not acceptable to construct toilets without giving due care and consideration to the safe disposal of faecal sludge on the long-term. In cases where FSM is required, the whole sanitation service chain already needs to be considered in the emergency phase, even if fully functional sanitation service chains/FSM cannot be implemented directly. E.g. space needs to be reserved for a treatment plant from the very beginning before the entire area is settled. In cases where FSM is required, immediate efforts to provide sanitation services are vital to avoid outbreaks of disease. However, these early efforts risk becoming medium to long term public health and environmental hazards if the management of the accumulated faecal sludge is not considered.

**Indicator 2.2** The health risk of sanitation workers (all staff, including desludging, transport and treatment) is minimized.

**KEY ACTIONS:**

- Ensure sanitation workers' safety through the provision of:
  - Personal Protective Equipment (PPEs), i.e gloves, masks, full overalls and enclosed waterproof footwear. Particularly where manual sewer cleaning or manual emptying is required.
  - Facilities to wash with water and soap after work.
  - Facilities for cleaning, disinfection, maintenance and on-site storage of tools and PPEs.
  - Vaccination and deworming against diseases relevant to their working conditions.
- Ensure sanitation workers are trained on the risks of handling wastewater and/or faecal sludge and on standard operating procedures (SOPs).
  Avoid quick rotation of causal workers and monitor proper and safe tasks of sanitation workers.

**Indicator 2.3** Toilet pits and tanks are safely desludged and the faecal sludge is safely transported.

**KEY ACTIONS:**

- Avoid direct contact between untreated faecal sludge and sanitation workers or beneficiaries. Use technologies that minimize contact and splashing.
- Wherever possible motorized emptying and transport should be prioritized over manual emptying and transport.
- Ensure workers safety according to indicator 2.3.

**Indicator 2.4** Faecal sludge is safely treated and disposed of.

**KEY ACTIONS:**

- Design and operate the treatment plant according to the local disposal possibilities and specific end use/disposal objectives as described in table 2.4. Use a risk assessment and risk management approach to identify, manage and monitor risk throughout the system.
- Ensure that regardless of the source (i.e. wastewater from sewer-based technologies or faecal sludge from on-site sanitation facilities) both the liquid and solid fractions are treated before end use/disposal.
- A process control and monitoring system needs to be in-place, based on most suitable disposal route (see table 2.4).
- Adopt a phased approach. The progression from the provision of emergency sanitation towards sustainable sanitation services should be seen as an on-going process:
  - During emergency phase:
    - ✔ Focus on public health.
    - ✔ Focus on a rapid scale up, work towards servicing 100% of the population.
    - ✔ Focus on pathogen reduction, monitor E coli in liquid effluent (<1000 CFU/100 ml) and helminth eggs in the solid effluent (< 1 n/g).
  - After emergency phase:
    - ✔ Both treated liquid and solids should comply with national standards.
    - ✔ In cases where national standards cannot be met, deviation is permissible with the agreement of the host government, when reasons are carefully documented. In these cases, the disposal-based standards as shown in table 2.4 should be met. The treatment plant should be designed and operated according to the most suitable disposal route and the standards corresponding to this disposal route. Table 2.4 should be used to define the most suitable disposal route for both the liquid treated effluent and for the solid treated effluent and to identify the relevant standards. Basic separation in a more or less liquid and more or less solid fraction is assumed, so the disposal routes for both fractions need to be defined.

Table 2.4

## Treated liquid effluent fraction

**Are conditions in place for safe reuse?**

- There is enough space for on-site controlled reuse (i.e. treated effluent as irrigation water for low-risk crops). This means that reuse of the treated liquid effluent is ONLY supported if it can be done on-site of the treatment plant.
- Information, means, tools and materials for safe handling and monitoring of treated effluent are available, for the full duration of the implementation.

YES

Reuse must conform with national legislation or standards. If not available, comply with WHO guidelines for the safe use of wastewater, excreta and greywater.

The implementing agency is required to prove that the reuse practice is safe for the serviced communities, sanitation workers and users of end-products, using effluent quality data and safe management plans in place.

NO

**Are conditions in place for safe infiltration?**

- The groundwater level is at least 1.5 m deeper that the bottom of the infiltration trench. Increase this distance for fissured rocks and limestone.
- The closest water source is more than 30 meter away from the infiltration point.
- The soils infiltration capacity is sufficient, this should be determined with an infiltration test.

YES

Impact is minimal on environmental and public health, so no monitoring of liquid effluent is required.

Proper separation of solids and liquids before infiltration is essential for sustainable long-term operations.

NO

**Are conditions in place for safe discharge to a surface water body?**

- Information, means, tools and materials for safe monitoring of treated effluent are available, for the full duration of the implementation. Monitoring can be done through a simple field lab or a professional lab can be contracted if available.
- In cases where the receiving water body has a very large flow relative to the discharged effluent flow, less stringent effluent standards can be discussed and agreed with local government.

YES

These standards are based on a trade-off between the impact of treatment (considering health and environment), and the feasibility to achieve them. These parameters can be measured using field kits except for helminth eggs analysis (research is ongoing to simplify analysis).

pH 5-9
E.coli < 1000 CFU/100ml
Helminth eggs < 1 n/l
TSS < 200 mg/l
COD < 250 mg/l
TN < 25 mg/l

If means are not available to analyze the helminth concentration, it is acceptable to ensure that treatment targets helminth removal. Helminths are removed by e.g. sand filtration, high-temperature drying/composting and will accumulate to a large extent in the solid fraction.

## Treated solid fraction

**Are conditions in place for safe reuse?**

- There is enough space for on-site controlled reuse.
- Information, means, tools and materials for safe handling and monitoring of the treated solid fraction are available for the full duration of the implementation.
- There is specific focus on helminth egg reduction during the treatment process.

YES

Reuse must conform with national legislation or standards. If not available, comply with WHO guidelines for the safe use of wastewater, excreta and greywater.

The implementing agency is required to prove that the reuse practice is safe for the serviced communities, sanitation workers and users of the end-product, using effluent quality data and safe management plans in place.

For most types of reuse of the treated solid fraction, extensive drying is required. Treatment technology selection and design should allow for this.

NO

**Are conditions in place for safe burying of treated solids fraction?**

- The groundwater level is at least 1.5 m deeper than the bottom of the pit. Increase this distance for fissured rocks and limestone.
- The closest water source is more than 30 meter away from the infiltration point.
- The burying site is fenced (considering long term risks buried helminth, up to 10 years).

YES

Impact is minimal on environmental and public health, so no monitoring of the to be buried treated solid fraction is required.

NO

**Are conditions in place for safe burning of treated solid fraction?**

- Burning is only possible if the treated solid fraction is extensively dried, treatment plant technology selection and sizing need to allow for this.
- A chimney is used to mitigate risks of particulate emissions (minimum chimney length of 2 meter above roofs).

YES

Impact is minimal on environmental and public health, so no monitoring of the to be burned treated solid fraction is required. In order to burn the treated solid fraction, extensive drying is required.

Please note that table 2.4 should be used to identify the most suitable disposal route and the corresponding standards in case of deviation from national standards. Based on this identified disposal route and corresponding standards, the treatment plant design (technology selection & sizing) and operation & management plans should be produced.

- Incorporate the following specifications in each faecal sludge treatment plant design.
  - Treatment plants should be fenced.
  - Treatment plants should be located at least 50 meter from domestic houses and relevant commercial or public properties. Where this is not possible, risks (smell, splashing, topping over, smoke, affecting water resources) should be identified and mitigated as part of the design and management of the facility.
  - Facilities should be provided for cleaning, disinfection, maintenance and on-site storage of tools and PPEs.
  - Treatment plants should include additional space for future upgrades.
  - Treatment plants shouldn't be in flood and/or landslides prone areas.
  - Treatment plants should be accessible by trucks or other transport means.
  - Treatment plants should include a process and performance control system with all the necessary human, financial, equipment resources.

### Useful references:

The FSM Handbook
www.sandec.ch/fsm_book

Guide to the FSM book with design examples
www.sandec.ch/fsm-hebook

Compendium of Sanitation Technologies in Emergencies
https://www.emersan-compendium.org/en/

Guidelines on Sanitation and Health
http://apps.who.int/iris/bitstream/handle/10665/274939/9789241514705-eng.pdf

The Octopus platform
https://octopus.solidarites.org/

The Sphere Handbook
https://spherestandards.org/

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