FSSC 22000




FSSC 22000

GUIDANCE DOCUMENT: TRANSPORT TANK CLEANING

Version 2 | July 2023

CONTENTS

REVISION HISTORY

Date Published	Issue	Changes
December 2020	1	First publication
July 2023	2	Updates made in line with Version 6 of the FSSC 22000 Scheme

1. PURPOSE

Guidance Document for FSSC 22000 certified organizations on how to include and control transport tank cleaning in their food safety management systems. This would include food manufacturers using transport tanks either as part of their own business or as a service provider and transport organizations who use transport tanks within their scope of certification.

2. INTRODUCTION

Throughout the food supply chain, foodstuffs are transported in bulk. Unique to this kind of transportation is that the foodstuff is unpacked and comes into direct physical contact with the transport equipment, which poses a potential food safety risk. For this reason, the cleanliness of the tank/container is crucial to the food processing industry to avoid cross contaminations with previous cargo, food safety and/or quality issues due to improper or insufficient hygiene, missing traceability, or misdeclarations in case of allergens in previous cargo loaded.

The method of cleaning and the design of equipment could have an impact on food safety and therefore need to be considered. Transport tanks can be cleaned using different methods and at different locations, for example, with CIP (Cleaning in Place) provisions or COP (Cleaning out Place) with external spray heads at a cleaning station. Cleaning can be done at the premises of the shipper or at an external (commercial) cleaning station. The majority of tank cleanings take place at external cleaning stations with high-pressure spinners.

There are different definitions of what constitutes “clean” in the industry and how verification of cleaning is addressed, ranging from visual inspections to extensive microbiological testing.

However, visual inspection from a distance (inspection from the man-lids) is inadequate for the food industry as it does not fit the demand of ISO/TS 22002-5:2019 clause 4.5.1 “*Vehicles, conveyances, and containers shall be cleaned between loads or lots, as appropriate to control the potential of cross-contamination.*”

Given the discrepancy of definitions between the commercial tank cleaning sector and the expectations of the food industry, it is important for the industry to ensure the quality of the cleaning prior to loading their cargo into a transport tank by creating awareness and setting clear requirements.

3. SCOPE

This FSSC 22000 Guidance document is meant as a guideline for the food industry to provide practical information and guidance on transport tank cleaning relating to the requirements in ISO 22000:2018, ISO/TS 22002-5:2019, in context to relevant legislation and in line with the GFSI requirements. This document is neither designed nor intended for use in other parts of the food supply chain or in isolation.

This document focuses on Transport Tank Cleaning and includes road tankers, (multi-modal) tank containers, reusable Intermediate Bulk Containers (IBC’s), and railroad tank wagons. Equipment design is not included in the scope of this Guidance document.

4. FSSC 22000 SCHEME REQUIREMENTS

Based on the ISO22000 approach, a logical, systematic, and risk-based approach should be followed to address any hazards related to Tank transport and cleaning. Guidance and aspects to consider are provided in this section on specific clauses in the ISO 22000: 2018 standard and the supporting technical specification, ISO/TS 22002-5:2019. The technical specification provides requirements for establishing, implementing, and maintaining prerequisite programs (PRPs), specifically for transport and storage in the food chain, to assist in controlling food safety hazards.

5. FSSC 22000 VERSION 6 ADDITIONAL REQUIREMENT

2.5.10 TRANSPORT, STORAGE, AND WAREHOUSING (ALL FOOD CHAIN CATEGORIES)

d) Where transport tankers are used, the following shall apply in addition to clause 8.2.4 of ISO 22000:2018:

i. Organizations that use tankers for the transportation of their final product shall have a documented risk-based plan to address transport tank cleaning. It shall consider potential sources of cross-contamination, and appropriate control measures, including cleaning validation. Measures shall be in place to assess the cleanliness of the tanker at the point of reception of the empty tanker prior to loading.

ii. For organizations receiving raw materials in tankers, the following shall be included in the supplier agreement as a minimum to ensure product safety and prevent cross-contamination: tanker cleaning validation, restrictions linked to prior use, and applicable control measures relevant to the product being transported.

GUIDANCE FOR IMPLEMENTING ADDITIONAL REQUIREMENTS 2.5.10 (d):

2.5.10 (D) (I) ORGANIZATIONS THAT USE TANKERS FOR TRANSPORTATION OF THEIR FINAL PRODUCT

- Document a risk-based plan to address transport tank cleaning:
  - Conduct a risk assessment - Refer to aspects to consider under Section 6.1 below on guidance for ISO 22000:2018: clause 8.5.1 and 8.5.2.2. Consider potential sources of cross-contamination.
  - Refer to the aspects to consider under Section 6.1 below, listed in the section titled hazard control in ISO 22000:2018, clause 8.5.1.
  - Establish and document a plan - Refer to aspects to consider under Section 6.2 below on guidance for ISO/TS 22002-5:2019, clause 4.6.2.
- Consider appropriate control measures, including cleaning validation:
  - According to the risks identified from potential sources of contamination related to allergens, chemical, microbiological, and physical hazards, establish and implement control measures for each hazard.
  - Conduct a cleaning validation and take into consideration aspects considered under Section 6.1 below on guidance for ISO 22000:2018: clause 8.5.3.

- Refer to Section 6 of this document for further guidance on other prerequisites and control measures to be considered.

- Measures to assess the cleanliness of the tanker:
  - Refer to the aspects to consider under Section 6.1 below on guidance for ISO 22000:2018: clause 8.5.3.

2.5.10 (D) (II): ORGANIZATIONS RECEIVING RAW MATERIALS IN TANKERS

- Establish a supplier agreement:
  - Draft a supplier agreement with service providers providing the delivery of raw materials to the organization's site in tankers. Refer to the aspects considered under Section 6.1 below on guidance for ISO 22000:2018, clause 7.1.6.
  - Tanker cleaning validation shall be addressed in the supplier agreement; consider the aspects under Section 6.1 below on guidance for ISO 22000:2018, clause 8.5.3.
  - Include the expectation for disclosure of prior loads and evidence of documented verification of cleaning in between loads.

6. ADDITIONAL GUIDANCE FOR CATEGORY G CERTIFICATION

In addition to the guidance for the additional requirement, 2.5.10 (d) detailed above, the below guidance for ISO 22000:2018 and ISO/TS 22002-5:2019 should also be considered for Category G certification.

6.1 ISO 22000:2018 GUIDANCE

Reference to Standard	Title of Chapter	Aspects to consider
ISO 22000:2018, 4.1	Understanding the organization and its context	- Even if the certified organization does not order tank cleaning, the tank is in direct contact with the product, and the impact on food safety must be considered[1]. - Cleaning Station is part of the "Farm to Fork" chain, and therefore, relevant legislation is applicable.

[1] **Potential risks to consider related to transport tank cleaning:**

- Competitive, market, and economic environments.

  It is quite common that the transporter outsources the tank cleaning to a third-party supplier and offers a service, including tank cleaning. In this case, the cleaning becomes a cost element of the transport price.

Reference to Standard	Title of Chapter	Aspects to consider
ISO 22000:2018, 6.1	Actions to address risks and opportunities	- Take the cleaning of food transport tank units into consideration as appropriate.
ISO 22000:2018, 7.1.2	People	- Ensure competence with regard to food tank cleaning within the organization, e. g. establish a Transport Tank Cleaning expertise team (suggestion: add to responsibilities of the HACCP-Team). - Ensure employees are trained, for example, loading/unloading personnel, maintenance, or cleaning personnel, on the risks related to food transport tank cleaning and the outcome of the internal risk assessment, including measures to be taken (PRPs, OPRPs, or CCPs). - Ensure that the drivers are aware of the risks related to transport tank cleaning. - Train internal auditors as appropriate, e.g., in case audits are performed by your organization at cleaning stations directly or at the transport organization, including the topic cleaning stations.

[1] **Potential risks to consider related to transport tank cleaning continued:**

As the transport market is a highly price-sensitive market, so is the tank cleaning market. Price pressure could potentially increase the risk of short and poor cleaning with due effect on the cleaning quality. It should be taken into consideration so as not to jeopardize the quality of cleaning. Next to this, the basic principles of foodstuff hygiene are not always well known by all cleaning suppliers.

- The liability of the transporter for product and consequential damages is limited, for example, under the CMR convention under which most European international transports are done. The liability of the cleaning stations is often limited under the commonly used conditions to a free re-clean only.
- Contract responsibilities: The clear definition of cleaning frequency is due to avoid issues related to approaching when cleaning is due, whomever responsibility it is as per the contract.

Reference to Standard	Title of Chapter	Aspects to consider
ISO 22000:2018, 7.1.6	Control of externally provided processes, products, or services	- Consider the food tank cleaning in the transport and/or cleaning purchase conditions to the contract with the applicable service provider. This shall include the cleaning conditions and cleaning processes, expected results of the cleaning, including the documentation thereof, as well as for the transport tank: design, conditions, and maintenance schedules (as appropriate). - Cleaning stations shall validate the effectiveness of their particular cleaning programs and prove that the agreed programs were used on individual cleanings. - An updated list of approved suppliers, service providers, and subcontractors, including those used infrequently, shall be maintained as documented information. The subcontractor's list and process agreements should include all who have a direct product impact on their rendered service. - Ensure compliance with the requirements by continued monitoring of your contract partner and/or their service providers.[2]

[2] **Auditing a transport tank cleaning organization**:

A suitable Food safety management system shall take the following into consideration:

- An assessment of risks, including the necessity of an electronical tracking system. In case of an electronic tracking system, sensor positions and the verification steps thereof shall be periodically audited by an independent surveyor;
- Documented training of operators regarding foodstuff-related services;
- Strict and traceable physical separations of cleaning foodstuff tanks and chemicals/non-foodstuff tanks for example only foodstuff tanks are allowed to enter the food cleaning bays;
- Cleaning with potable water;
- External testing results of the water quality at a frequency based on risk;
- Usage of food-grade detergents and additives only and assurance that those applied conform to the supplier prescriptions;
- Prescribed cleaning protocols for different previous cargos in combination with the next cargo to be loaded including cleaning equipment and suitability thereof (e.g., cleaning cloths for final drying and possibility to leave particles); recording (preferred automated electronic) of the key process parameters (time, temperature, pressure, additives, steam) linked to individual cleanings at a sufficient sampling frequency to ensure that the programs were met on each individual cleaning;
- Validation of the cleaning processes;
- Defined verification methods.
- Verification of cleaning operation efficiency/performance; previous cargo registration shall be based on a documented proof by the transport organization of the last load(s) (as been contracted);
- Process parameters to be monitored at the spray heads are water flow, temperature, pressure, time, detergent concentration, and for air: filtration (& filter saturation), pressure, throughput, temperature, and time; microbiological sampling test should be performed at a frequency based on risk.

Reference to Standard	Title of Chapter	Aspects to consider
ISO 22000:2018, 8.3	Traceability system	- Cleaning process traceability shall ensure that the actual cleaning processes align with the agreed process and have been verified. A cleaning certificate alone is not sufficient. Full traceability to the transport vehicle, prior cargo loads, and cleaning records shall be available. - All information related to the identification of the tank to be cleaned needs to be recorded and fully traceable, including the identification number. - Correct traceability requires minimum compatibility between various potential traceability systems used throughout the supply chain. That can include paper records, digital systems, automatic measurement, registration equipment, etc. - If seals are used – the location and number of security seals, their traceability detail, and the design of seals. If electronic/digital locks are used, also include accessibility, traceability, and records.
ISO 22000:2018, 8.5.1	Hazard Control	- The Operations mapping is key for the implementation of the risk management system. The mapping should at least identify the following steps: determination of the cleaning program – cleaning – cleaning verification - release of the tank. - Relevant hazards should be assessed, namely physical, chemical, microbiological, and allergens, through a methodological approach such as 5M (Man – Method – Machine – Material – Management). - Consider the risks related to the organization's facility and transport provision – internal and external risks, e.g., provision of tanker cleaning in-house vs using outsourced services.
ISO 22000:2018, 8.5.2.2	Hazard identification and determination of acceptable levels	- Take (improper) food tank cleaning into consideration when carrying out the risk analysis of all processes. - Define measures on how to ensure compliance with the set requirements (e. g. internal auditing, necessary training, required documentation, checks before loading, and actions in case of detected non-compliance). - It is the responsibility of the Food Safety team to propose actions of mitigation and define the different levels of control points.

Reference to Standard	Title of Chapter	Aspects to consider
ISO 22000: 2018, 8.5.3	Validation of control measure(s) and combination of control measures	- The validation shall confirm that the established cleaning protocols are suitable and effective to ensure the food safety hazards are controlled. This may be based on microbiological testing and supporting validation data provided by the cleaning agent suppliers/cleaning service provider/transportation service provider.
ISO 22000:2018, 8.8	Verification related to PRPs and the hazard control plan	- Define how the specific measures and process parameters relating to PRPs, OPRPs, and/or CCPs are to be verified (e. g., evaluation of non-compliant trucks, performance evaluation of service providers, testing, and internal audits).
ISO 22000:2018, 9.2	Internal audits	- Internal audits shall include the aspects of food tank cleaning and the implemented measures, including the documentation thereof. The internal auditor shall be suitably trained in the aspects of transport tank cleaning.
ISO 22000:2018, 10.1	Nonconformity and corrective actions	- Ensure documentation on non-conformities on improper truck cleaning is maintained and follow up with the relevant stakeholders within the specified timelines. - Take the deviations into consideration when evaluating suppliers/service providers.

6.2 ISO/TS 22002-5:2019 GUIDANCE

Reference to Standard	Title of Chapter	Aspects to consider
ISO/TS 22002-5:2019; 4.3.1	Food contact equipment shall be designed and constructed to facilitate cleaning and disinfection.	- It is important to realize that the transport tank is food contact equipment. As such, the materials used, the design of the tank and its fixed and movable equipment, and ancillaries such as airlines, outlets, valves, hoses, connectors, pumps, etc., must be designed and constructed to facilitate cleaning and disinfection. - The tank unit must be constructed to facilitate: - cleaning and disinfection - drying if relevant - inspection, maintenance, and sealing This also relates to any fixed and semi-fixed parts, e. g. the fluidization devices. - In the case of transporting different types of products, transport tanks should not have one central bottom pipe where all chambers are connected to. This creates a risk of cross-contamination between tank chambers as they all flow through the same pipe. - In case the hoses from the vehicle are used, it shall be ensured that the particular hose and its storage compartment were cleaned (and dried if needed) and that hoses are suitable for the transported product. - Appendages, such as airpipes and inlet filters, shall be considered in cleaning and designed in such a way that cleaning is possible/that there is no risk of contamination. - In case the pump of the truck is used, it must be ensured that this was cleaned as well.
ISO/TS 22002-5:2019; 4.3.2	Food contact surfaces	- Ensure that food contact surfaces (incl. hoses and pumps, if applicable) are constructed from materials designated for food use and that the truck chamber has no visual impermeable damage and is free from incrustation and corrosion, e.g., rust. - Check if the welding has been smoothed to ensure that the cleaning process allows it to reach all areas inside the tank unit.

Reference to Standard	Title of Chapter	Aspects to consider
ISO/TS 22002-5:2019; 4.4.1	Management of purchased materials and services – General Requirements	- Ensure that the tank unit is permanently identified as "For foodstuff only" (pay special attention to removable stickers or stickers at the hose tubes only). - The tank cleaning service does have a direct impact on food safety and quality. As such, it is insufficient to delegate responsibility here to the transporter. For the shipper, it is essential to control whether the agreed service has actually been delivered (based on contractual agreements in place). - Depending on the responsibilities defined in the agreements made, a list of approved suppliers/service providers, including contractors, shall be established (either by the transport organization or by the organization ordering the truck). This list shall be based on defined criteria. Also, refer to ISO 22000 clause 7.1.6.
ISO/TS 22002-5:2019; 4.5.3	Loading	- Documented information on the cleaning shall be detailed enough to verify that the cleaning process was sufficient and in line with the agreed cleaning procedures. - A verification checklist or similar document must be in place against the specification for cleaning services. Depending on the risk, this can vary from visual checks to verification of the cleaning process data or microbiological testing at a frequency based on risk.
ISO/TS 22002-5: 2019; **4.6.2**	Cleaning and disinfection	- The condition of the cleaning facility used needs to be recorded and traceable for aspects such as water source and treatment, air filtration and treatment, steam treatment, waste treatment, cleaning agent specification and their suppliers, maintenance of the equipment, and maintenance service providers, cleaning of the station itself and premises, pest control, sealing procedures, etc. - Cleaning programs for different cleaning conditions or demands (e.g., previous cargo) are to be documented, tested, and validated as being suitable and effective. - Individual cleanings shall be traceable in terms of process validation to the agreed cleaning programs. - Where outsourced services are used, ensure that the requirements are understood and agreed upon.

Reference to Standard	Title of Chapter	Aspects to consider
ISO/TS 22002-5: 2019; 4.6.3.1	Waste disposal and recycling – General requirements	- Residue remaining in a tank unit after transportation is considered waste, and removal and destruction of waste shall be carried out by approved contractors.

7. DEFINITIONS

For the purposes of this document, the terms and definitions given in ISO 22000 apply, and the following ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at IEC 60050 - International Electrotechnical Vocabulary - Welcome (electropedia.org)
- ISO Online browsing platform: available at Online Browsing Platform (OBP) (iso.org)

Bulk – food ingredients or (semi)finished products that are not stored in self-contained packaging.

Clean – removing any material or condition from the inside of the tank unit, any fixed external parts of the tank, ancillaries, and any non-fixed equipment parts needed for the service and that could interact with the product to be loaded in the tank having a potential negative impact on the final application and food safety of the product.

Cleaning in place (CIP) – cleaning of equipment by impingement or circulation of flowing chemical solutions, cleaning liquids without dismantling.

Cleaning out of place (COP) – cleaning of equipment by disassembling and cleaning in a tank or in an automatic washer by circulating a cleaning solution.

Cleaning station – a facility that provides cleaning services for transport tanks, which may include internal cleaning of the tank container, external cleaning, or both. It can be owned by the shipper or operated as a separate business.

CMR – The CMR Convention (full title Convention on the Contract for the International Carriage of Goods by Road) is a United Nations convention that was signed in Geneva on 19 May 1956. It relates to various legal issues concerning the transportation of cargo by road. The majority of European states has ratified it.

Food contact equipment – equipment that comes in contact with food during the normal course of operations and includes utensils and food-contact surfaces of equipment packaging (*source*: NTA 8059:2016)

Intermediate Bulk Containers (IBC's) – reusable, multi-use industrial-grade containers engineered for the mass handling, transport, and storage of liquids, semi-solids, pastes, or solids. (*source*: https://en.wikipedia.org/wiki/Intermediate_bulk_container).

Cargo – goods transported in a tank container or IBC. See also: Previous cargo. Also used in the text of this document: Load.

Previous cargo – goods that were transported in the tank container or IBC before the current load, regardless of whether the cleaning has been carried out between these two cargo loads or not.

Shipper – The party that loads the cargo into the tank for transportation.

Tractor compressor – part of the motor vehicle and can be used as an optional piece of equipment for unloading. When used, this piece must be considered in the risk assessment by whichever party is in charge of cleaning and maintaining it.

Transporter – an organization that provides freight transportation services and delivers foodstuffs from the point of dispatching to the receiving destination.

Transport Tank – a transportable unit designed to carry liquid or dry bulk cargo on roads. In this document, we focus on transport tanks dedicated to foodstuffs only. The tank unit can consist of multiple chambers in which different products can be loaded. The tank unit can either be a fixed road tank or a liftable tank container that can be used for intermodal transportation.

Unpacked goods – Goods that are unwrapped or not stored in self-contained packaging and include large-scale logistic units such as vessels, road tanks, or tank containers.

8. REFERENCES

- ISO/TS 22002-5:2019 Prerequisite programs for food safety – Part 5: Transport and storage.
- ISO 22000:2018 Food safety management systems – Requirements for any organization in the food chain.
- CMR – book IV art 17.4b: "liability of the transporter": https://www.bws.net/media/8d861168d66b74a/cmr-convention.pdf

9. RELATED INDUSTRY INFORMATION

- Codex Alimentarius CAC/RCP 47-2001.

- DIN: Bulk transport of Foodstuff:
  - https://www.din.de/en
  - 10502-1 regarding tankers,
  - 10502-2 regarding cleaning stations.

- European Union – on biological safety
  https://food.ec.europa.eu/safety/biological-safety_en

- EHEDG (European Hygienic Engineering & Design Group)
  https://www.ehedg.org/

- EFTCO – definition of clean:
  https://www.eftco.org/eftco-cleaning-document/explanation-and-guidance

- ENFIT – International Association – Supply Chain Safety
  https://www.enfit.eu/en/

- SGF – Sure Global Fair - Voluntary Control System (VCS) for Tank Cleaning – Food example of audit scheme for tank cleaning stations for the food industry
  www.sgf.org/voluntary-control-system/tank-cleaning-stations