

AIJN Guideline on tank cleaning

Special Quality Requirements for tanker transports (solid/liquids) in tankers and silo trucks as well as tank containers for the fruit juice industry

based on VdF Guideline on tank cleaning

Preamble

In order to improve hygiene in the fruit juice industry, VdF (German Fruit Juice Association) has developed minimum criteria for the good practice in tank cleaning and has created and published them in a clear and precise guideline (revision 2, 13.10.2015). The AIJN Code of Practice Expert Group adapted this guideline to European legislation and AIJN General Assembly adopted it. The AIJN Code of Practice Expert Group would like to thank VdF working group for the excellent document.

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1. Basic principles

a) BGL "Guidelines for good hygiene practices in food transport"

This VdF specification is understood to be a supplement to the "Guidelines for good hygiene practices in food transport" issued by the German association for road haulage, logistics and waste disposal (Bundesverband Güterkraftverkehr, Logistik und Entsorgung (BGL e.V.), Version 1, 2011 Edition.

b) Scope of application

It applies to all non-aseptic tanker deliveries to fruit juice plants which refer to this specification in their order, in particular for fruit juices, fruit juice concentrates, fruit puree, fruit puree concentrates, wine, fruit wine, basic ingredients, fruit preparations, fruit syrups, fruit sweetener, liquid sugar, crystal sugar, honey, aromas, vegetable juice, vegetable juice concentrate, vegetable puree, vegetable puree concentrate, additives for the manufacture of beverages, vinegar.

c) Cleaning Certificates

The ECD is currently recognized as cleaning certificate. Other cleaning certificates are also accepted if issued by a cleaning station with equivalent quality certification, it has also to be documented that the requirements of this guideline are met.

In the meantime, an "SGF approved" procedure will be established which will be offered as a qualification for cleaning stations after a transitional period at the latest.

d) Significance

If the conditions of these VdF guidelines are not complied with, the freight carrier must expect acceptance of the goods to be refused.

2. Preloading

In order to prevent contamination, the following information must be taken into consideration for the immediately preceding loads:

**Table A:
Inadmissible preceding loads**

	Foodstuffs and additives	Explanations and examples
01	Meat and meat products Animal fats and oils	Everything which contains meat, blood, slaughterhouse waste. All kinds of animal fats and oils.
02	Chicken egg, egg white	Albumin, conalbumin, egg, egg white, egg yolk, globulin, lecithin, lysozyme, mayonnaise, ovalbumin, ovomucoid, ovovitellin, ovomucin, ovosucrol, vitellin
03	Fish, seafood/shellfish and molluscs	Fresh and salt water fish, anything containing fish such as ketjap ikan, petis, fish sauce, anchovies paste or cream, surimi and crabmeat sticks, blood, unrefined fish oil; Shrimps, octopus, lobster, crawfish, scampi, crabs, cockles, mussels, oysters, snails (escargots, whelks), sea scallops
04	Wax	Waxes from animals, insects, minerals, petrol and synthetic fats
05	Paraffin	
06	Vegetable oils for the manufacture of fuel	All kinds of bio-diesel, raw materials for the manufacture of bio-diesel, also raps oil
07	Products containing GMO ingredients	

Table B:**Permissible previous loads when special cleaning conditions are followed**

	Foodstuffs and additives	Explanations and examples
01	Vegetable oils / fats	All kinds of vegetable oils and fats
02	Cocoa	Cocoa powder, cocoa paste, cocoa butter, gianduia, couverture
03	Chocolate	Chocolate, white chocolate, baking chocolate
04	Caramel	Caramel, caramel colouring, preparations containing caramel
05	Cereals and cereal products containing gluten	Wheat, rye, barley, oats, spelt wheat, bran
06	Peanuts and peanut products	Peanut oil, peanut paste
07	Soya and soya products	Soya lecithin, soya protein, soya flour, soya milk
08	Milk and dairy products	Lactose, whey
09	Nuts and nut products	Nuts, nut oil, nut paste, nougat, gianduia
10	Celery and celery products	
11	Mustard and mustard products	
12	Sesame and sesame products	Sesame oil
13	Products containing sulphites >10 mg/l SO ₂	Wine, grape juice, beverages containing wine and fruit wine, fruit preparations
14	Lupines and lupine products	Lupine flour, lupine protein
15	Molasses/vinasse	
16	Tomato juice, tomato puree and concentrates of same	
17	Beer	
18	Intensive aromatic substances which cannot be removed by cleaning as per clause 3 b.	e.g. flavourings, vinegar
19	Glycerol (E 422)	
20	Yeast	

Table C:**List of preceding loads which pose questions based on existing practice**

	Foodstuffs and additives	Explanation
01	Lysine	Standard cleaning procedures (as per clause 3 b)
02	Wheat syrup, also distilled	Containing gluten: Special cleaning requirements (as per clause 3 c); Containing no gluten: standard cleaning procedures (as per clause 3 b).
03	Brine	As regeneration agent for softening plants or additive to thermal baths: Inadmissible preceding load; As foodstuff: standard cleaning procedures (as per clause 3 b).

3. Cleaning**a) General cleaning requirements**

The cleaning line may only be used for vehicles transporting foodstuffs.

Internal cleaning of tanks is carried out using cleaning agents suitable for use with foodstuffs - use of QAC cleaning agents such as DDAC and BAC for example, is not permitted - and automatically rotating spray heads.

A complete record of the vehicles cleaned in the cleaning plant, including process data (temperature, duration of cleaning steps, cleaning agent, flow, and pressure) must ensure comprehensive IT-supported retracing for a period of 36 months.

b) Standard cleaning procedure (minimum requirements)

- Step 1: Rinsing with potable water for at least 5 minutes until all visible residues have been removed. Depending on the preceding load, high temperatures may be needed in order to achieve this.
- Step 2: Chemical cleaning with an alkali or other alternative cleaning agents suitable for use in foodstuff containers (spray on, rinse, valve lines and other fixed parts and accessories are cleaned manually or by attaching the rinsing water hose. Dome covers are cleaned with a high-pressure handgun and detergent) at a temperature of minimum 60 °C for a minimum of 5 minutes after this temperature has been reached at the tank outlet. Water temperature and concentration of detergent to be used should be as recommended by the manufacturer.
- Step 3: Rinsing with potable water for at least 5 minutes until the rinsing water temperature at the tank outlet is < 30 °C and the water is free of cleaning agent residues.
- Step 4: Final control of the tank by a sight and smell check and analytic examination of the last rinsing water at the tank outlet. If the cleaning was not successful, the procedure must be repeated, possibly using higher temperatures or more suitable cleaning agents. An additional cleaning is optional depending on the previous load, e.g. with acidic cleaning agents.

Criteria for the analytic final examination and cleanliness check:

ATP test: Reference values: < 150 RLU
NTU turbidity test: < 1,0 NTU
pH value: 6.5 - 9.5
(depending on the potable water used pH +/- 0.5)
Conductivity: < 2.500 µS/cm
(depending on the potable water used +/- 100 µS/cm)

The following must be documented on the cleaning certificate:

- a) sight check
- b) smell check
- c) NTU test
- d) ATP test
- e) pH value or conductivity.

c) Requirements for tank cleaning according to special cleaning regulations as per Table B (minimum requirements):

A validated and certified cleaning procedure, suitable for hygienic and complete removal of product residues and smell of the previous load is used.

- Step 1a: Cleaning of the tank with high-pressure steam suitable for use with foodstuffs is necessary for the removal of fatty (saturated fats) and pasty product residues or
- Step 1b: rinsing with potable water, temperature > 80 °C at the spray head; for at least 5 minutes until no more remaining product can be seen or
- Step 1c: rinsing with water at a temperature of < 40 °C for the removal of product residues containing fats (unsaturated fats) and proteins.
- Step 2: Chemical cleaning with an alkali or other alternative cleaning agent suitable for use in foodstuff containers (spray on, rinse, valve lines and other fixed parts and accessories are cleaned manually or by attaching the rinsing water hose. Dome covers are cleaned with a high-pressure handgun and detergent) at a temperature of minimum 80 °C for a minimum of 10 minutes after this temperature has been reached at the tank outlet. Water temperature and concentration of detergent used should be as recommended by the manufacturer.
- Step 3: Rinsing with potable water for at least 5 minutes until the rinsing water is free of cleaning agent residues.
- Step 4: For reduction of germs: steam treatment of all areas which come into contact with the product for at least 10 minutes after a condensate temperature of 93 °C has been reached at the tank outlet. The steam used must be suitable for use with foodstuffs. Cooling of the tank by rinsing with cold potable water until a temperature of < 30 °C is reached at the tank outlet. Or alternatively by using sterile compressed air.

Step 5: Final control of the tank by a sight and smell check and analytic examination of the last rinsing water at the tank outlet. If the cleaning was not successful, the procedure must be repeated, possibly using higher temperatures or more suitable cleaning agents. An additional cleaning is optional depending on the previous load, e.g. with acidic cleaning agents. Criteria for the analytic final examination and cleanliness check:

ATP Test: Reference values: < 150 RLU
NTU turbidity test: < 1,0 NTU
pH value: 6.5 - 9.5
(depending on the potable water used pH +/- 0.5)
Conductivity: < 2.500 µS/cm
(depending on the potable water used +/- 100 µS/cm)

The following must be documented on the cleaning certificate:

- a) sight check
- b) smell check
- c) NTU test
- d) ATP test
- e) pH value or conductivity.

d) Requirements for internal tank cleaning for transports limited solely to shuttle loads of white sugar (crystalline sugar).

When solely crystalline sugar is transported in vehicles as shuttle loads, cleaning between the individual transports is generally not required due to the similarity of the products transported as well as the technical equipment and continuous monitoring of production, storage and loading facilities. Cleaning of silo-trucks (without feed hoses) should be carried out at least at 14-day intervals and otherwise when necessary (e.g. formation of sugar crusts or caking which endanger quality levels) and when other qualities of sugar apart from refined sugar or white sugar has been transported. It must be shown separately, that all transports carried out since the last cleaning have been only with these similar products, including a list of sugar types transported as per the European Union legislation governing kinds of sugar better (Council Directive 2001/111/EC in its current version).

Step 1: Cleaning may only be carried out using potable water. Use only of steam or of cleaning agents is not permitted.

Step 2: Cleaning of the tank internal walls with water, temperature at least 75 °C using rotating high-pressure spray heads for at least 20 minutes.

Step 3: Cleaning of all outlets, fittings and feed lines
The dome cover undersides, collar, cover seals, air vent outlets and all fittings must be given an intense cleaning with a high-pressure cleaning system. Particular attention should be paid to ensure that all sugar residue is removed from the collar of the dome cover.
Internal cleaning of feed lines is only to be carried out when crusted sugar, for example, can be seen to endanger product quality. This must be monitored through regular inspections. In cases of external dirt, tube sleeves, connectors, seals and closures are to be cleaned.

Step 4: Cleaning of pipe lines for conveying air
Air conveying lines for the tank wagon need to be checked regularly for dirt and, when necessary, to be cleaned thoroughly in the cleaning plant with hot water at a temperature of at least 75°C.

Step 5: Drying (of silo containers, container apertures, fittings, feed lines, pipe lines for conveying air).

Warm, filtered, oil-free air is used for drying. The transport container and other equipment coming into contact with the product as well as the air conveying pipe-line system are dried with a compressor or other air blower. The drying air is introduced via a dome cover and is released through a dome cover and a container outlet, with closed conveying lines, if required. The drying process is to be carried out in such a way that when finished, all parts of the silo tank wagon which come into contact with the sugar are completely dry.

After the drying phase, the dome cover and shut-off valve in the outlet of the silo container are closed and sealed with a lead seal. To minimize or prevent formation of condensation, especially in the winter months, the air remaining in the silo tank should contain as little moisture as possible.

e) Requirements for internal tank cleaning for transports limited solely to shuttle loads of liquid sugar.

When solely liquid sugar is transported in vehicles as shuttle loads, cleaning between the individual transports is generally not required due to the similarity of the products transported as well as the technical equipment and continuous monitoring of production, storage and loading facilities. It must be shown separately, that all transports carried out since the last cleaning have been only with these similar products, including a list of sugar types transported as per the European Union legislation governing kinds of sugar (Council Directive 2001/111/EC in its current version).

After 7 days at the latest, all tank vehicles must be cleaned according to point 3b. Every cleaning and every check carried out must be documented by a cleaning certificate from a recognised cleaning plant. The cleaning steps taken and the parts and components cleaned (including hoses and connectors) must also be shown. The driver is responsible for unloading procedures which ensure that the cleanliness and hygiene of the vehicle is not negatively affected in any way. If any contamination occurs, the vehicle must undergo an unplanned cleaning procedure.

4. Sealing

The following sealing procedures are mandatory:

a) Cleaning facility

After cleaning and before loading:

The tank must be sealed with tamper-evident seals by the cleaning staff.

The seal numbers must be given in the cleaning document.

The following access points must be sealed: dome cover and hatch, tank outlets, hose tube covers, air vent caps, pump outlets.

b) Loading

Before loading:

The loader must check conformity of the numbers of the seals on the vehicle with the cleaning document. If these do not correspond, the vehicle must be cleaned again.

After loading:

The seals removed to enable the vehicle to be loaded must be replaced again with tamper-evident seals. The seal numbers must be noted in the CMR waybill or delivery note. The following access points must be sealed: dome cover and hatch, tank outlets, hose tube covers, air vent caps, pump outlets.

c) Forwarding agent

The seals may only be removed when the recipient has confirmed that they were undamaged.

5. Temperature

General requirements:

Tank vehicles which are used for the transport of foodstuffs requiring temperature control, must be able to maintain the products at a certain and constant transport temperature.

Cooling is carried out to hamper multiplication of micro-organisms. It can slow the reproduction rate of the micro-organisms but cannot prevent it.

1. Only insulated tank vehicles are used which guarantee that the temperature will not change by more than 1 °C over a period of 24 hours.
2. After loading, the temperature at the tail gate must be recorded.
3. The delivery temperatures are given in the raw material specifications and must be kept to.

6. Loading and unloading

a) Loading

Loading can only be carried out if the tanks have been cleaned according to the stipulations given in this guideline. The loader must ensure that this is the case by controlling the cleaning document and making additional sight and smell tests. The result of these tests must be documented and verified in a suitable manner if necessary.

A period of maximum 24 hours is permissible between cleaning and loading. In exceptional cases, when loading takes place before 12.00 noon on a Monday, this period may be extended to 72 hours.

b) Unloading

It must be possible to take samples before and during unloading and the driver is obliged to help do this.

Acceptance by the receiver is required before unloading can be started.

When taking samples during loading and unloading, the specific plant hygiene and safety regulations of the recipient must be observed (especially headwear, clean working clothes without external pockets above belt height, clean hands, no eating, drinking or smoking).

For high-viscosity citrus juice concentrates the outlets must be at least DN 100 size, in all other cases at least DN 80. When unloading liquid sugar, DN 50 size outlets are also possible. Basically, the principle applies: No collective pipelines, short suction distance.

If different products are transported in the same tank vehicle, each product must have a separate outlet to ensure that the different products can be loaded and unloaded without coming into contact with each other.

Following the recipient's directions, any residue material must be removed by scraping or spraying.

7. Accompanying Documents

The following confirmation documents are relevant:

- a) Waybill / CMR / delivery note completed with the seal numbers of the load.
- b) Cleaning document (the original must be given to the recipient of the goods). For liquid and white sugar, and similar pre-products without intermediate cleaning, the last cleaning certificate as per art. 1c and a list of all sugar products transported according to the European Union legislation governing kinds of sugar (Council Directive 2001/111/EC in its current version) are required.

All necessary cleaning steps and processes, cleaning agents used (including concentration), duration and temperature of the cleaning each time and the cleaning of fixtures and accessories as well as the dome cover must be noted on the cleaning certificate together with the degree of success of cleaning and confirmation that no traces of cleaning agent remain.

Certificates should generally be kept on file for at least 36 months.

8. Abbreviations

CMR:	Convention relative au contrat de transport international de Merchandises par Route (Convention on the Contract for the International Carriage of Goods by Road)
ECD:	European Cleaning Document
QAC:	Quaternary Ammonium Compound
DDAC:	Dicetyl dimethyl ammonium chlorid
BAC:	Benzalkonium chlorid
NTU:	Nephelometric Turbidity Unit
ATP:	Adenosin triphosphat
RLU:	Relative light unit, a unit for measuring cleanliness by measuring the levels of Adenosine Triphosphate

Appendix:

Check list tank unloading as per VdF specifications

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AIJN Technical Committee in Brussels, 22.02.2018
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Appendix: Check list tank unloading as per VdF specifications

Date:

Employee:

Control of the vehicle:

Licence number of truck:	Licence number of tank/tank container:
Forwarding agent	Previous load:

Licence nr. vehicle: Only for foodstuffs	Set: present
Overall state of vehicle:	Set: clean
Condition of cleanliness of outlets:	Set: clean
Seals complete (all access points)	Set: All access points undamaged, all numbered
Seals undamaged:	Number:
Seals numbers:	
For multi-compartment vehicles with diff. prod.:	Set: yes
Different outlet for each product:	Set: As per product requirements
With temperature requirements: Temperature:	

Control of documents:

Check: Prohibited product as previous load: yes / no	Set: no
Check: Product as per Table B as previous load: yes/no	If yes: Set: Special cleaning requirements carried out
ECD / guideline-conform certificate: yes / no	Set: yes
Seal nos. documented and corresponding:	Set: Documented and corresponding
Date of cleaning:	Set: max. 24 hours, Monday before 12 noon, max. 72 hours
Period between cleaning and loading:	Set: min. one alkaline or alternative food-stuff suitable agent
Cleaning agent:	Set: Standard min. 5 mins. With previous load as per Table B: min. 10 min.
Duration of cleaning:	Set: Standard min 60°C, with previous load as per Table B: 80°C
Cleaning temperature:	Set: Only for previous load as per Table B: min. 10 min, min. 93°C
Steam Conditions:	
Summary of complaints:	

Decision: Unloading yes / no

Measures:

Signature unloading person:

Signature driver / QA...