Best Practice Guidelines for the Cleaning of dry bulk polymer transport tanks

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Table of Contents

Disclaimer

This document is intended for information only and sets safety and quality best practice guidelines for the cleaning of dry bulk polymer transport tanks. The information provided in these guidelines is provided in good faith and, while it is accurate as far as the authors are aware, no representations or warranties are made with regards to its completeness. It is not intended to be a comprehensive guide. Each company, based on their individual decision-making process, may apply these guidelines, in full or partly or apply any other adapted measures.

No responsibility will be assumed by EFTCO/ECTA/CEFIC in relation to the information contained in these Guidelines.

1. Introduction

For polymer materials supplied via bulk silo tank trailers, one major concern is the potential cross-contamination from previous products. The tank may contain residues from the previous cargo and requires cleaning before its next loading. To ensure the tank is clean, dry, and odour-free, the cleaning program must address all of the likely and known contamination risk points.

Over the years, polymer suppliers and hauliers have developed their own specific cleaning requirements which vary slightly between organizations. This variation can create confusion for the haulier, the cleaning station and the shipper.

The purpose of this document is to provide best practice guidelines for the cleaning of dry bulk polymer transport. This cleaning program will be referred to as the “Polymer Industry Cleaning Specification”

Specific cleaning methods may occasionally vary depending on the previous product. Based on this, it is up to the expertise of the cleaning station to provide specific cleaning recommendations to the transport company. The EFTCO cleaning codes indicated on the checklist are the minimum requirements expected by the polymer industry.

This Polymer Industry Cleaning Specification is based on the experiences, knowledge and agreement of the shippers, carriers and the cleaning station operators. While the design of the tank and ancillary equipment may vary slightly, the principles of an effective cleaning program remain the same.

The operational activities and responsibilities related to unloading bulk polymers are described in the “Safety and Quality guidelines for the Unloading of bulk Polymers”. This cleaning guidance is also referenced as part of that document.

2. Roles and Responsibilities

The following section outlines the responsibilities of each member of the supply chain in ensuring the preparation and delivery of a tank that is clean, dry, odour-free and free from contamination.

The Polymer shipper is responsible for:

a) Communicating the requirement for the “Polymer Industry Cleaning Specification” to the carrier, including any additional requirements.
b) Verifying that the tank has been cleaned according to the requested specification prior to loading.
c) Retaining a copy of the cleaning documentation, to address any potential future claims related to contamination.

The carrier (haulier) is responsible for:

a) Specifying the “Polymer Industry Cleaning Specification” and any additional requirements as requested by the supplier, to the tank cleaning station.
b) Ensuring that the cleaning program has been completed according to “Polymer Industry Cleaning Specification”, and verifying that the tank is free from contamination.
c) Obtaining documentation that verifies the details of the cleaning process.
d) Reviewing the cleaning document before signing. If the driver does not make any reservations or remarks on the cleaning document, it indicates that the cleaning was performed in accordance with the driver’s order and that the driver has accepted the performed cleaning, having attended and participated in the process.
e) Retaining the cleaning documentation, in case of potential future claims related to contamination.

The cleaning station is responsible for:

a) Executing the cleaning requirements as specified by the haulier.
b) Conducting a visual inspection that the tank and components that are cleaned are clean, dry and odour-free.
c) Providing cleaning documentation identifying the detailed cleaning program that has been completed.
d) Disposing of any residual products removed during the cleaning process in a responsible manner.

The unloading site is responsible for:

a) Ensuring the safety and quality aspects of the unloading activity as outlined in the “Safety and Quality Guidelines for the unloading of Bulk Polymers”.
b) Performing a visual inspection of the cleanliness of the hose and ancillary connections between the tanker and destination silo.

3. Polymer Industry Cleaning Specification

The Polymer Industry Cleaning Specification is divided into 4 main areas:

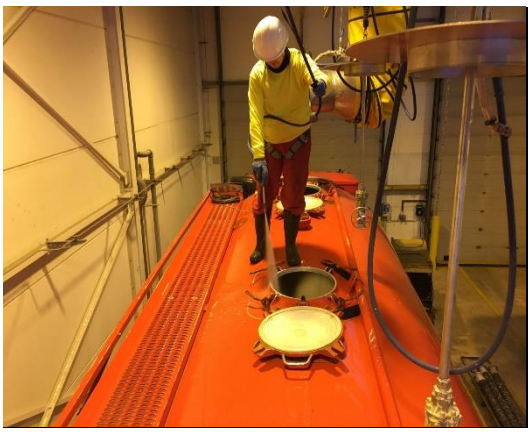
a) Inside the tank.
b) Outside of the tank.
c) Hoses and Hose boxes.
d) Additional components and ancillaries.

These areas are identified using the EFTCO codes utilized by the cleaning stations during this process. The following description outlines the components of the “Polymer Industry Cleaning Specification”.

A. Inside the tank

<u>The inside of the tank is clean, dry and odour-free</u>

P01 Cold water spin and/or P10 Hot water spin.

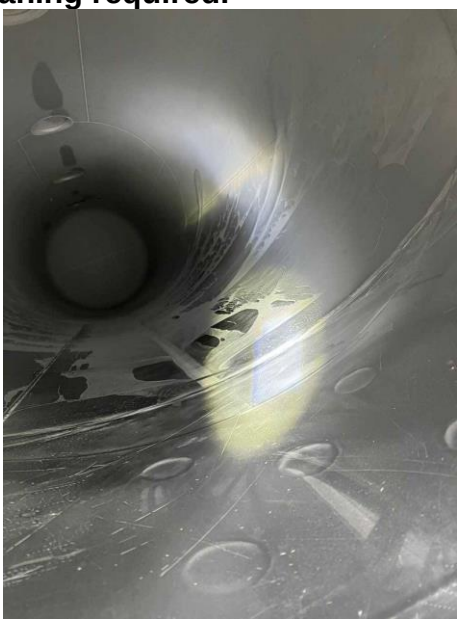


P30 drying or E35 hot air drying.

T01 Visual inspection.

Example of a deviation: **Additional cleaning required.**

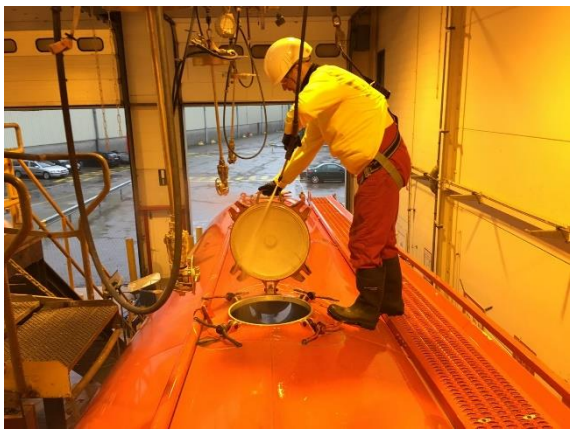
Few pellets remaining



Cement residues

B. Outside of the tank

<u>Fill openings and discharge opening clean and closed</u>



E78 Cleaning with high pressure water of fill- and discharge opening lids, rims included, lids and all joined parts.
E79 Cleaning of all gaskets of all fill- and discharge openings.

Upper airline is cleaned with water

E64 Internal cleaning of the upper airline with cold water and blowing the residual water out of the line.

Note:
Blowing the lines with compressed air can be done by the compressor of the truck or by the compressed air installation of the cleaning installation.

Lower airline is cleaned with water

E63 Internal cleaning of the lower airline with cold water and blowing the residual water out of the line

Note:
If a filter and/or a intercooler is present these must be part of the cleaning process.

Degassing Valve clean

E77 Internal cleaning of the degassing valve with high pressure

Note:
If the degassing valve is fitted with a hose also the hose must be part of the cleaning process. See example:

Air hoses are cleaned with water

E61 Cleaning of air connections.

E62 Cleaning of air-manifold

<u>Micro filter is cleaned and the internal filter body is cleaned with water and blown empty with air afterwards.</u>

E72 External cleaning of the micro-filter in the airline and internal cleaning of the filter body.

C. Hoses and Hose boxes

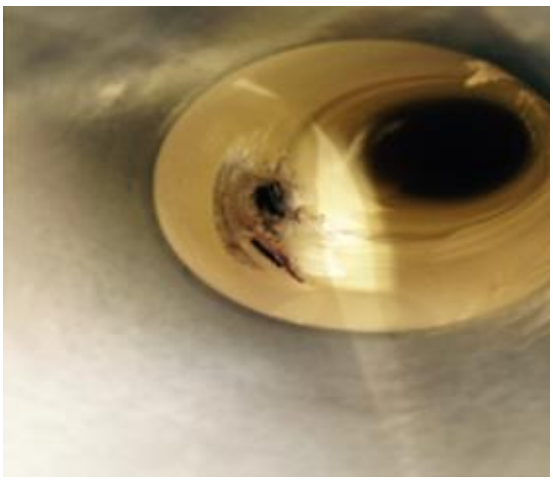
The driver is responsible for removing the hose(s) from the hose box.

Hose cleaned inside and out, and a visual inspection for damaged inside surfaces.

This visual inspection can only detect obvious signs of hose damage as it is not a comprehensive full-length detailed inspection. Ultimately, the haulier remains responsible for the condition of the hoses.

E56 In- & external hose cleaning over the full length with a High Pressure (HP) mole and draining the water out of the hose.

T01 Visual Inspection.



The picture above illustrates a pipe with internal damage.

According to best practice guidelines, intact gaskets and two individual hoses with a combined length of 10m should be present on the truck. Consequently, this will be the standard number of hoses cleaned and sealed in the hose box.

Any deviation from this best practice should be recorded on the cleaning document.

Hose box is cleaned and sealed with clean hoses

E57 Internal hose box cleaning over the full length with a HP mole.
E90 Sealing.

D. Ancillaries and Components

The driver indicates the loose components to clean.

E58 Internal and external cleaning of ancillaries and components having contact with the product (discharge curve, reduction parts, lock- and anti-return valves)

4. Intermodal transport units

Some transport units such as Alubox containers or pressurized containers are increasingly used for transporting polymers due to their suitability for intermodal transport.

These transport units, however, do not come with hoses, hose boxes, micro filter, filter body etc. unlike silo trucks.
Alubox containers are discharged using external rotary valves and hoses attached to the interchangeable trailer.
Pressurized containers are discharged using the compressor, cooler, micro filter, filter body, etc. and hoses attached to the interchangeable trailer.

This process is detailed in the ECTA guideline available at www.ecta.com . See BEST-PRACTICE-GUIDELINE-FOR-CLEANLINESS-OF-ROTARY-VALVE-AND-UNLOADING-EQUIPMENT-FOR-BULK-DELIVERIES.pdf (ecta.com)

Pictures of Alubox containers (not pressurizable)

A Polymer Industry Cleaning statement is useful in such cases, but it may sometimes be infeasible due to the requirement of including certain mandatory EFTCO codes on the cleaning document.

In these instances, when specific EFTCO codes cannot be included, the cleaning station is permitted to mention the statement along with the executed codes.

The following EFTCO codes are mandatory and must be included in the cleaning document for these transport units (details can be found in previous chapter):

P01 and/or P10	Cold water spin and/or Hot water spin.
T01	Visual/ odour inspection.
P30 or E35	Drying or Hot air drying.
E78	Cleaning with high pressure of fill- and discharge opening lids, rims included, lids and all joined parts.
E79	Cleaning of all gaskets of all fill- and discharge openings.

Images of pressurized containers and connection details for depressurization.

Following EFTCO cleaning codes are mandatory when present on the transport units.

E62:	Cleaning of air manifold.
E64:	Internal cleaning of the upper airline with cold water and blowing the residual water out of the line. (pressurized containers)
E72:	External cleaning of the micro filter in the airline and internal cleaning of the filter body.
E77:	Internal cleaning of the degassing valve with high pressure. (including hose if present on the pressurized container)

Note:

Hoses are not part of the cleaning process on these transport units.

5. Documentation

After cleaning, the tank cleaning station should provide a cleaning document which identifies each of the EFTCO codes of components which have been cleaned. A commonly used cleaning document is the EFTCO European Cleaning Document (see www.eftco.org).
If all the minimum requirements of the “Polymer Industry Cleaning Specification” have been completed it will include the following statement:
Tank and ancillaries cleaned to the “Polymer Industry Cleaning Specification”.

This cleaning document will be provided by the carrierr to the loading site before loading and retained at the loading site for future audit purposes if needed. The cleaning document is not intended to be transferred to the final customer destination. Transport service providers are expected to use tanks free from contamination and are responsible for ensuring this. In case of contamination investigations, the cleaning document will be made available for all parties involved.

In some cases, no cleaning document will be available, as the haulier has previously carried the same or a compatible material. The haulier should have robust procedures in place to manage this process and it is recommended as best practice to use the proof previous load document within the digital e-ECD process.

Note:
EFTCO, ECTA and Cefic recommend the use of the EFTCO Cleaning Document (ECD) as best practice document for polymer tank cleaning.
However, in certain parts of Europe, some cleaning stations do not yet use the ECD, limiting access for loading stations to cleaning stations issuing an ECD within reasonable distance.
EFTCO, ECTA and Cefic continue to promote the use of the ECD across Europe.

EFTCO, ECTA and essencia have developed a digital version of the EFTCO Cleaning Document, to gradually replace the paper system.

e-ECD 2.0: Electronic digital cleaning document.

EFTCO, ECTA and essenscia initiated a project to replace the paper ECD.

The electronic EFTCO Cleaning Document (e-ECD) is the new digital variant of the paper EFTCO cleaning document or paper ECD.
The system is operational and supported by the EFTCO, ECTA and Cefic members.

All info can be found on eECD SOLUTION - Eclic

6. Special cleaning programs

There are specific customer applications where there may be a request for more specific cleaning requirements. These typically pertain for certain pharmaceutical goods or materials intended for indirect food contact applications.
These special cleaning programs might include the use of potable water and/or detergents approved for indirect food contact.
Additional cleaning requirements beyond the standard polymer industry cleaning requirements should only be specified when it is justifiable for the customer application to prevent variations and complexities within the supply chain.

For instance, specifying only potable water has direct impacts:

a) Limited availability of this cleaning method. Some cleaning stations may not have access to potable water, or may have limited capacity.
b) Limited capacity at the cleaning station can result in additional queuing time.
c) Increased costs for the cleaning station due to the use of a potable water supply.
d) The need for the testing the quality of the water supply.
e) Environmental impacts from using more fresh water.

This type of cleaning program must be explicitly requested by the supplier via the carrier, and it should be noted that the cleaning scope is identical in all cases.

The final cleaning documentation should include a clarification statement detailing any additional requests, such as:
Tank and ancillaries cleaned to "the Polymer Industry Cleaning Specification" and including XXXX (e.g. where XXXX could be "potable water" or "food approved detergent" etc.). The EFTCO code can also be used in this case i.e.
Tank and ancillaries cleaned to "the Polymer Industry Cleaning Specification" and including F01 and F50

Definition of potable water

Potable water, also known as drinking water, is water that is suitable for human and animal consumption. It may be naturally potable, such as water from pristine springs, or it may require additional treatment to ensure its safety.
The quality and safety of potable water are determined through rigorous testing for potentially harmful contaminants.

7. Further considerations related to polymer tank cleaning

The cleaning specification is designed to provide a tank free from contamination. The cleaning program outlines the areas to be cleaned and typical methods to achieve this cleanliness. There is however some flexibility required for the cleaning stations to determine the best approach. Cleaning station operators may use hot water, detergents or other methods, based on their experience to achieve the final cleaning result.

For areas where it is not possible to dry with warm air (such as pipes and airlines), the process involves draining the free water and blowing with purged air. Depending on ambient conditions, this may not completely remove all water droplets from the pipes. This should not cause any discharge issues for polymer pellets.

T01 – Visual inspection is not considered a thorough examination of hoses or equipment. It is a brief visual inspection to identify any obvious signs of damage or contamination visible to the naked eye.

The cleaning checklist included in this document serves as an example of a potential checklist format. This checklist is intended as an “aide memoir” for the tank cleaner and is not part of any formal documentation. The official documentation of tank cleaning is the cleaning certificate provided by the cleaning station.

In some cases, it is unnecessary to clean the ancillary container or boxes every time. If the box is visibly clean upon arrival, the cleaning station may omit this cleaning step, and consider it cleaned for the purposes of the cleaning program.

If the cleaning station cannot complete or verify all steps of the “Polymer Industry Cleaning Specification”, exceptions can be noted in section 11 of an ECD.
For instance, if hoses are not present on the vehicle during cleaning, the program can be verified with the exception that hoses were not cleaned.
If the hoses were found to be damaged, this can also be mentioned as an exception, allowing the loading site to investigate the deviation while the remaining components are cleaned. This saves the haulier a potentially wasted journey. A new hose brought to the loading site may be accepted after inspection.

Tank cleaning is not a perfect solution. Some areas within a tank may occasionally trap individual pellets or trace elements of the previous product. While the cleaning steps are thorough, achieving a 100% solution would require fully dismantling all tank components in a workshop, which is neither practical nor cost-effective.
Nevertheless, this cleaning protocol will provide a fully clean tank in the vast majority of cases.

Seals added at the cleaning station can be removed to load or inspect various parts of the silo tank equipment at the loading site. These seals will be replaced after inspection for security reasons, ensuring that the tank has not been tampered during transit.

Some polymer shippers may have specific products which they prefer to avoid as a previous load due to particular quality requirements. Shippers should clearly communicate any list of prohibited products to the carriers before allocating a tank to a requested delivery.

Best practice guidelines indicate that trucks should be equipped with intact gaskets and two individual hoses with a total length of 10m. This will be the standard number of hoses cleaned and sealed in the hose box.

If there is a requirement for additional hoses at the unloading site, it is the site's responsibility to either provide these dedicated site hoses to the haulier or inspect any additional hoses for cleanliness before use.

For intermodal tanks, the hoses that were cleaned may accompany the tank to the unloading site due to different chassis being used. In such cases, the haulier must ensure that any supplied hoses have been properly cleaned prior to use.

Hose boxes should be constructed robustly enough to prevent the ingress of road debris and maintain the hose cleanliness.

Hoses stored in the hose box are not sealed individually to avoid bacterial mould growth, which can occur if left unopened for a period of time. It is acceptable for a few drops of water to remain after cleaning.

8. Operation Clean Sweep® - Zero pellet Loss.

1. The marine litter issue

There is a growing concern regarding the presence of plastics in the environment. Plastic litter can end up in soils, waterways and ultimately the ocean, contributing to global pollution. The majority of plastics pollution stems from improperly managed waste. The vast majority of this waste originates from land-based sources. Most of these items are debris of used consumer goods, potentially carelessly discarded or unintentionally lost.

Plastics should not be present in our environment, our food or our drinking water. To address this issue, it is crucial to develop appropriate waste management infrastructures, invest in continuous innovations, and engage openly with stakeholders. This effort requires collaboration from all value chain actors, including manufacturers, brand owners, consumers, recyclers, as well as policy makers, in order to achieve necessary behavioral and systemic changes. Plastics play a vital role in our future. As an industry, we are committed to ensuring that plastics continue to provide essential societal benefits without adversely affecting the environment or health. This includes supporting the European Union's Green Deal ambitions, serving as a collective blueprint for accelerating our transformation to a more sustainable future. We are dedicated to implementing long-lasting positive change.

2. Plastic pellets: a raw material not to be wasted

Part of this litter, consists of pellets intended for manufacturing into plastic products. While consumers are responsible for the proper disposal of used products, the plastics industry must ensure the containment of plastic pellets, flakes and powders. Operation Clean Sweep® (OCS) aims to prevent these materials from discharging into water flows and to the marine environment.

Despite high environmental, safety and quality management controls throughout the plastics industry, unintentional loss of pellets can occur at various stages along the value chain. Spills in closed areas with no possible route into the environment will be contained. However, when spillages happen outside closed areas, pellets may be washed down drains and into waterways, eventually reaching the ocean, leading to environmental impacts. It is crucial for all workers handling pellets to be trained to quickly react and take the appropriate measures to contain these spills. Pellets loading and unloading operations pose the highest risk of loss at all stages of the value chain.

Operation Clean Sweep® (OCS) (Home : OpCleanSweep) focuses on preventing the discharge of pellets into waterways and the marine environment.

The plastics industry and their end users should focus on proper containment of plastic pellets to avoid them entering waterways that lead to the sea. If pellets reach drains, options for capturing them should be considered.

Plastics Europe has developed a communication toolkit with audiovisual material, guidelines and suggestions to improve performance.
Info can be found on Tools & manual : OpCleanSweep

3. The OCS EUROPE CERTIFICATION SCHEME

In 2020, Plastics Europe, the association representing plastics manufacturers in Europe and EuPC, the association of European Plastics Converters committed to jointly developing an OCS Europe certification scheme. This initiative aims to control and document compliance with requirements targeting the minimization of pellet loss across the entire plastic supply chain. The scheme's requirements are based on the six pillars of the Operation Clean Sweep pledge and will support the effective, harmonized and quantifiable implementation of the Operation Clean Sweep program. The certification scheme was developed in consultation with Industry experts, trade associations, NGOs, policy makers and certification bodies. In May 2022, a public consultation was conducted to gather feedback from various stakeholders. Plastics Europe and EuPC aim to achieve maximum coverage of the certification within their membership.

The OCS Europe certification seeks to control and document the compliance of companies throughout the entire plastics supply chain with requirements on preventing the release of plastic pellets, powders and flakes into the environment.

Info can be found on: OCS-Certification (ocscertification.eu)

In late 2022, the OCS board, consisting of representatives from environmental authorities, the European Commission, NGOs, certification bodies and industry, agreed to recognize SQAS as an alternative assessment system for logistics service providers to the "Operation clean Sweep Certification Scheme".

Info can be found on: SQAS

Please note that this attached checklist is an example document which could be used internally for the tank cleaning staff. It is not a requirement of the guidance and the final documentation should always be considered to the cleaning certificate.

Cleaning and Equipment Checklist for the "Polymer Industry Cleaning Specification"			
Checklist version: V6 21/03/24	Entry of ECD reference makes (ECD)marked fields optional.		
ECD reference:	Transport ECD reference: company name (ECD):		
	Date (ECD):	Time (ECD):	
Previous Load			
Previous load, mentioned in ECD box 6 and 8, (try to avoid general remaks like "plastics" and be more specific e.g. PP, PVC, PE, etc)			
Additional Cleaning Requests			
F01 Cleaning with potable water only			
F50 Food approved detergent			
F51 Food approved sanitizing agent (if required)			
Inside Tank			
			Cleaner
The inside of the tank is clean, dry and odor free			
P01 Cold water spin and/or P10 Hot water spin			
P30 Drying or E35 Hot air drying			
T01 Visual inspection			
Outside Tank			
			Cleaner
Fill openings and discharge opening clean and closed			
E78 Cleaning with high pressure of fill- and discharge opening lids, rims included, lids and all joined parts			
E79 Cleaning of all gaskets of all fill- and discharge openings			
All gaskets (fill openings, discharge opening, product unloading valve) are intact.			
Upper airline is cleaned with water			
E64 Internal cleaning of the upper airline with cold water and blowing the residual water out of the line.			
Lower airline is cleaned with water			
E63 Internal cleaning of the lower airline with cold water and blowing the residual water out of the line			
Degassing valve clean			
E77 Internal cleaning of the degassing valve with high pressure			
Air hoses are cleaned with water			
E61 Cleaning of air connections.			
E62 Cleaning of air-manifold			
Micro filter is cleaned with air and internal filter body is cleaned with water			
E72 External cleaning of the micro-filter in the airline and internal cleaning of the filter body.			

Hoses and Hose Boxes		
Number of hoses on vehicle:	**Number of hoses cleaned:**	**Cleaner**
Hoses clean and inside not worn out or damaged		
E56 In- & external hose cleaning over the full length with HP mole and draining the water out of the hose.		
T01 Visual Inspection		
No obvious sign of hose damage. Note - A few drops of water may be visible as a result of cleaning.		
Hose Boxes clean		
E57 Internal hose box cleaning over the full length with a HP mole.		
The box(es) to be used to store the cleaned hoses to unload polymers.		
A few drops of water may be visible as a result of cleaning.		
E90 Sealing		
Cleaned hose boxes containing cleaned hoses or seperate cleaned hoses need to be sealed and seal numbers must be mentioned on the ECD		

Additional Components	
	Cleaner
Ancillaries and components clean	
E58 In- & external cleaning of ancillaries and components having contact with the product (discharge curve, reduction parts, lock- and anti-return valves)	
A few drops of water may be visible as a result of condensation.	
T01 Visual Inspection	
Ancillaries and components box to be clean and odor-free	
Pressure gauge and Temperature gauge present, not showing apparent defects.	
Pressure relief valve (PRV) present, not showing apparent defects.	

the ECD box 11 or cleaning certificate shall mention: "According to Polymer Industry Cleaning Specification" and include mention of any addional remarks

Name and signature of the cleaning operator:	**Name and signature of the driver:**

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