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

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In memory of Marc Twisk † 26-7-2016

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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 of the major concerns is the potential cross contamination from previous products. The tank may contain residues from the previous cargo, and will require cleaning prior to its next loading. In order to ensure the tank is clean, dry, and odour free the cleaning program must address all of the likely and known contamination risk points.

For many years, all of the polymer suppliers and hauliers have identified their own specific cleaning requirements which have differed slightly from organisation to organisation. This can create confusion for the haulier, the cleaning station and the supplier.

The purpose of this document is to provide best practice guidelines for the cleaning of dry bulk polymer transport. This cleaning program will be known as the “Polymer industry cleaning specification”

The specific cleaning methods may on occasion vary depending on the previous product, and it is the expertise of the cleaning station which will determine this. The EFTCO cleaning codes indicated on the checklist are the minimum requirements expected by the polymer industry.

This polymer industry cleaning specification has been developed based on the experiences, knowledge and agreement of the suppliers, carriers and the cleaning station operators. Whilst the tank and ancillary equipment may differ slightly in design, the principles of an effective cleaning program remain the same.

The operational activities and responsibilities related to the unloading operations of 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 identifies the responsibilities of each member of the supply chain for the preparation and supply of a clean, dry, odour free tank, free from contamination.

The Polymer supplier is responsible for:

a) Communicating the requirement for the “Polymer industry cleaning specification” to the carrier, along with any additional requirements
b) Checking the tank has been cleaned to the requested specification prior to loading
c) Retaining a copy of the cleaning documentation, in case of future potential claims for 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 the cleaning program has been completed according to “Polymer industry cleaning specification”, as requested and that the tank is free from contamination
c) Signing off (approving) the Cleaning and Equipment Checklist for the "Polymer Industry Cleaning Specification"
d) Obtaining documentation which verifies the details of the cleaning
e) Retaining the cleaning documentation, in case of future potential claims for contamination

The cleaning station is responsible for:

a) Completing the cleaning requirements as specified by the haulier
b) Checking and verifying that the tank and components are clean, dry and odour free.
c) Signing off the Cleaning and Equipment Checklist for the "Polymer Industry Cleaning Specification”
d) Providing cleaning documentation identifying the detailed cleaning program which has been completed
e) Responsibly disposing of any residual products which have been removed during the cleaning process

The unloading site is responsible for:

a) The safety and quality aspects of the unloading activity as described in the “Safety and Quality Guidelines for the unloading of Bulk Polymers”
b) 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 can be catagorised into 4 main areas:

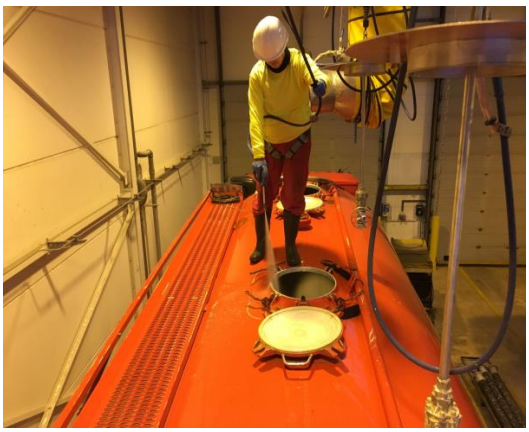
a) Inside the tank
b) Outside of the tank
c) Hoses and Hose boxes
d) Additional components and ancillaries

These areas are identified by detailing the EFTCO codes used by the cleaning stations as part of this cleaning. The following description describes 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
T01 Visual inspection



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.

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 the internal filter body is cleaned with water

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

c) Hoses and Hose boxes

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

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

T01 Visual Inspection

The above picture shows an example of a pipe with damaged internals. This visual inspection can only identify signs of obvious hose damage as it is not a full length detailed inspection. The responsibility for the condition of the hoses ultimately remains with the haulier.

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

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

4. 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 widely used cleaning document is the EFTCO European Cleaning Document (see www.eftco.org).
If all of the minimum requirements of the “Polymer industry cleaning specification” have been completed it will bear the following statement:
Tank and ancillaries cleaned to the “Polymer industry cleaning specification”

This documentation will be provided by the carrier to the loading site prior to loading, and retained at the loading site for future audit purposes (if required). The documentation is not designed to be transferred to the final customer destination. All suppliers are expected to use a tank free from contamination and it is their responsibility to ensure this is the case. However, in case of contamination (investigations) the cleaning documentation will be made available for all parties involved.

There are occasions when no cleaning documentation will be available, as the haulier has previously carried the same or a compatible material. The supplier should have robust procedures in place to manage this process.

5. Special cleaning program for Pharma and Indirect Food contact

There are some specific customer applications where there is a request or desire for a higher level of cleanliness. These are typically pharmaceutical goods, and materials destined for indirect food contact applications.
This special cleaning program, available at some cleaning stations, uses only potable water and specially approved detergents suitable for indirect food contact.
This type of cleaning program should only be specified in cases where it is justifiable and applicable, as there are several distinct disadvantages of this type of cleaning program.

a) Much less availability of this type of cleaning method. Some cleaning stations may not be able to access potable water, or they may have a limited capacity
b) Limited capacity at the cleaning station will often mean additional queuing time
c) More costly for the cleaning station to complete due to the use of a potable water supply
d) The need for the testing of the quality of the water supply
e) The environmental impacts of using more fresh water.

This type of cleaning program must be explicitly requested by the supplier, via the carrier.

It should be noted that the cleaning scope is identical in both cases, and only the water supply and cleaning agents may be different.

The cleaning documentation should carry the alternative statement:
Tank and ancillaries cleaned to "the pharma and food polymer industry cleaning specification".

Definition of potable water
Potable water is water which is fit for human consumption and other animals. It is also referred to as drinking water, in a reference to its intended use. Water can be naturally potable, as is the case with pristine springs, or it may need further treatment in order to be safe.
In either case, the safety of water is assessed with tests which look for potentially harmful contaminants.

6. Further considerations related to polymer tank cleaning

The cleaning specification has been designed to provide a tank free from contamination. The cleaning program determines the areas to be cleaned, and the most typical methods to achieve this cleanliness. There is however some flexibility required for the cleaning stations to determine how best to achieve this cleanliness. The experience of the cleaning station operators will identify if they need to use hot water, detergents or other methods, in order to achieve the final cleaning result.

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

Tank cleaning is not a 100% perfect cleaning solution. There are several areas within a tank which on occasion may be able to trap or harbor individual pellets or trace elements of the previous product. Whilst the cleaning steps are thorough, the only way to provide a 100% solution would be to fully strip down all of the tank components in the workshop which is not a practical or cost effective possibility.
The vast majority of the time this cleaning protocol will however provide a 100% clean tank.

Seals added at the cleaning station may be removed in order to load or inspect various parts of the silo tank equipment at the loading site. These seals will be replaced after inspection for security purposes, so that the unloading site can be sure the tank has not been tampered while on route.

Some polymer suppliers may have some products which they wish to avoid as a previous load due to special quality requirements. Any list of banned products should be made clear by the suppliers to the carriers prior to them allocating a tank to a requested delivery.

Best practice guidelines identify that two individual hoses with a total length of 10m will be present on the truck, and therefore this will be the standard amount of hoses cleaned and sealed in the hose box. If for any reason the unloading site has a requirement for further hoses, they should ensure they are either provided to the haulier (dedicated site hoses) or they should inspect any further hoses to be used by the haulier for cleanliness.

For Intermodal tanks then the hoses cleaned may not be the ones which arrive with the tank at the unloading site (different chassis used). In this case the haulier is responsible to ensure that any hoses supplied have also been cleaned prior to use.

Hose boxes should be of sufficient construction to prevent the ingress of road debris and maintain the cleanliness of hoses.

The hoses stored in the hose box are not sealed individually because this has been known to lead to bacterial mould growth when left unopened for a period of time. A few drops of water may still be visible after the cleaning.

7. Zero pellet Loss

Since a couple of years, marine scientists have reported more frequently that birds, turtles and fish ingest a wide variety of plastic objects which can be harmful to their health or even be fatal. Most of these items are debris of used consumer goods, potentially carelessly thrown away or non-intentionally lost.
Part of this litter, however, consists of pellets meant to be used to manufacture plastic products. Mixed with the other marine debris, these pellets are more easily ingested by marine animals. The pellets are small and look similar to organisms, which are the preys for certain animals and potentially cause malnutrition and starvation.
While consumers are responsible for the proper disposal of used products, the plastics industry must, for its part, ensure containment of the products it handles, namely the plastic pellets.
Operation Clean Sweep® (OCS) is specifically aimed to prevent discharge of pellets into water flows and to the marine environment

The plastics industry and their end users should therefore focus on proper containment of the plastic pellets.
It should be prevented that the pellets get into waterways that finally lead to the sea. If they do make their way to the drains, options for catching these pellets should be considered.

Plastics Europe (http://www.plasticseurope.org/plasticssustainability.aspx) has developed a communication toolkit with audiovisual material, guidelines and suggestions to improve performance.

Cleaning and Equipment Checklist for the "Polymer Industry Cleaning Specification"					
Checklist version: V5 3/11/16	Entry of ECD reference makes (ECD)marked fields optional.				
ECD reference:	Transport ECD reference: company name (ECD):				
	Date (ECD):	Time (ECD):			
Food contact material	→ Include Food contact material field as part of cleaning requirements (on special request)				
Previous Load					
Previous load, mentioned in ECD box 6 and 8, should be specific (e.g. No general remarks like "plastics")					
Previous load must be aligned with the requirements of the next shipper.					
Food contact material (on special request)			**Cleaner**		**Driver**
The silo tank, including ancillaries and components, is cleaned according to specific food application cleaning guidelines					
F01 Cleaning with potable water only					
F50 Food approved detergent					
F51 Food approved sanitizing agent (if required)					
Inside Tank					
			Cleaner		**Driver**
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		**Driver**
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 white or transparent, made of Neoprene or PTFE , in a good condition. Not worn out or damaged such that it is likely that (small) particles get into the product while unloading.					
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**		**Driver**
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.					
The inside of the hose is made of white neoprene or stainless steel. (unless otherwise specific defined between Haulier and Customer)					
T01 Visual Inspection					
The inside neoprene and gaskets are not worn or damaged such that it is likely that (small) particles get into the product while unloading. 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		**Driver**
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.					
If previous cargo information is available and seal numbers are recorded and all boxes above are ticked by cleaner and driver,					
the ECD box 11 shall mention: "According to Polymer Industry Cleaning Specification", or when special cleaning program for Pharma and					
Indirect Food contact is applied: "According to pharma and food polymer industry cleaning specification".					
Only then the ECD will be accepted and truck is allowed to load at those chemical shippers applying this specification.					
Driver seals outlet valve and hose box. Cleaning station checks that seals are applied correctly.					
I declare to have cleaned and checked the above mentioned items:					
Name and signature of the cleaning operator:		**Name and signature of the driver:**			

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