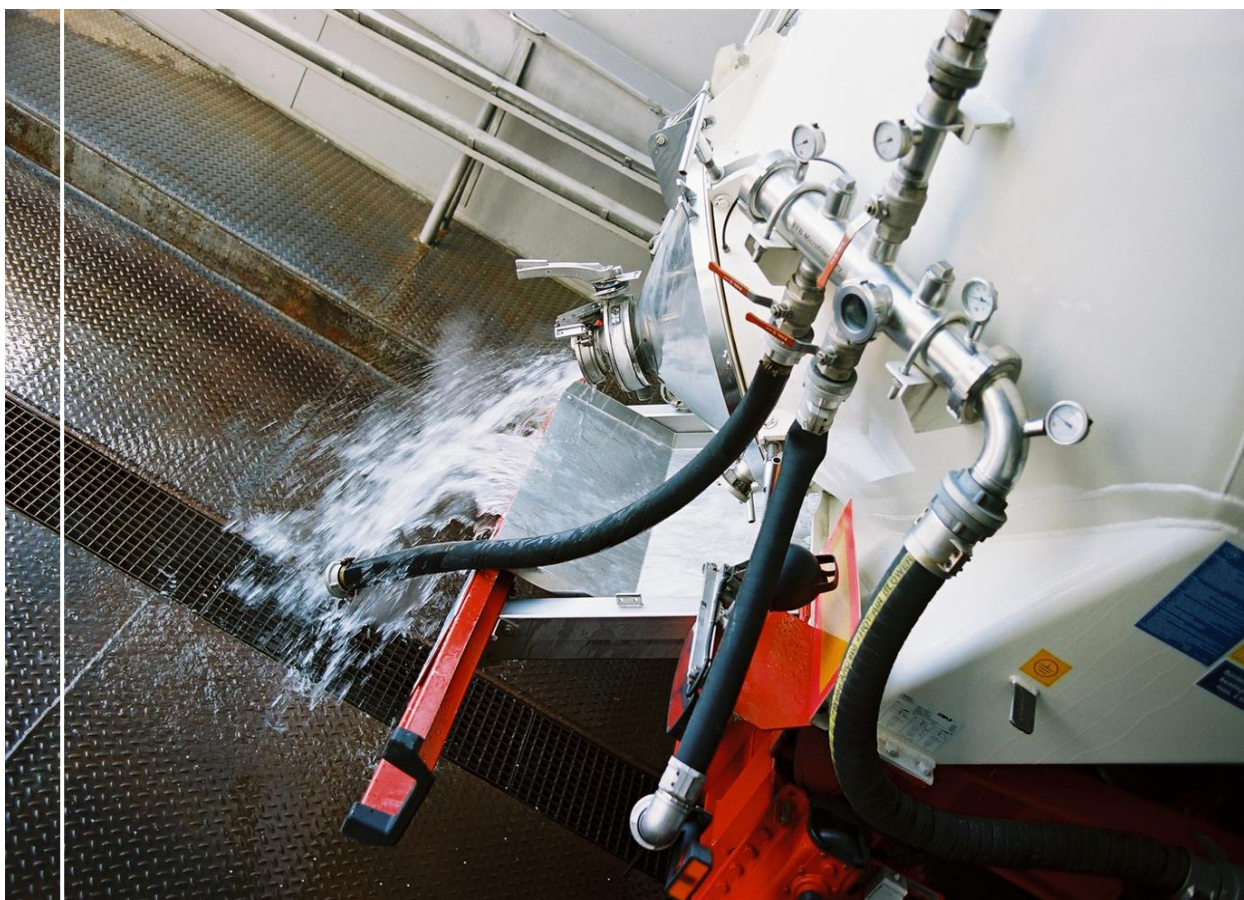


# Best Practice Guidelines for the Cleaning of dry bulk polymer transport tanks



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*In memory of Marc Twisk † 26-7-2016 and  
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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 (hauler) 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) Obtaining documentation which verifies the details of the cleaning
- d) 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) Providing cleaning documentation identifying the detailed cleaning program which has been completed
- d) 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 categorised 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”



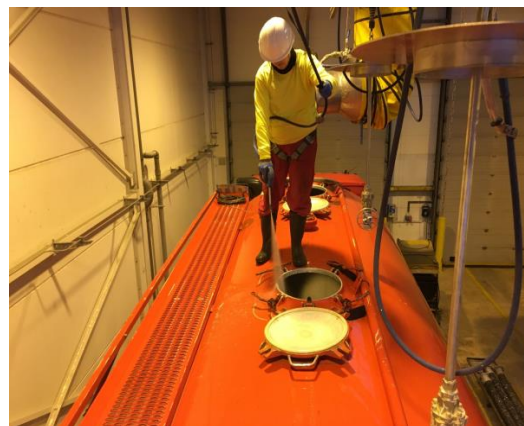
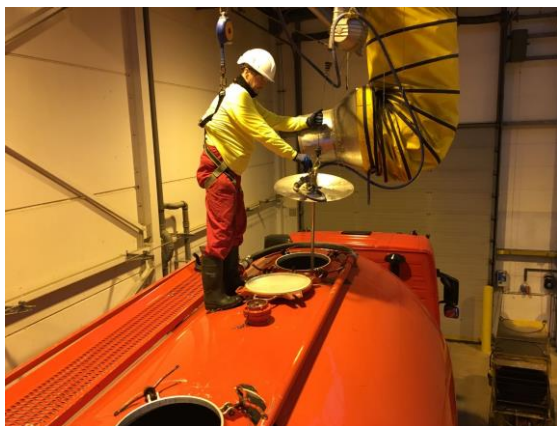
### a) Inside the tank

The inside of the tank is clean, dry and odour free

P01 Cold water spin and/or P10 Hot water spin

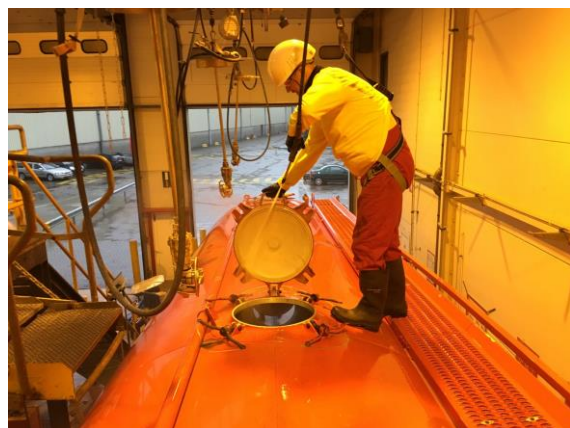
T01 Visual inspection

P30 drying or E35 hot air drying



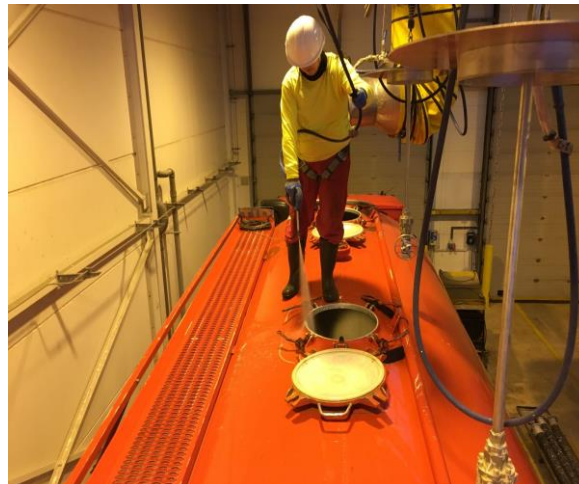
### b) Outside the tank

Fill openings and discharge opening clean and closed



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

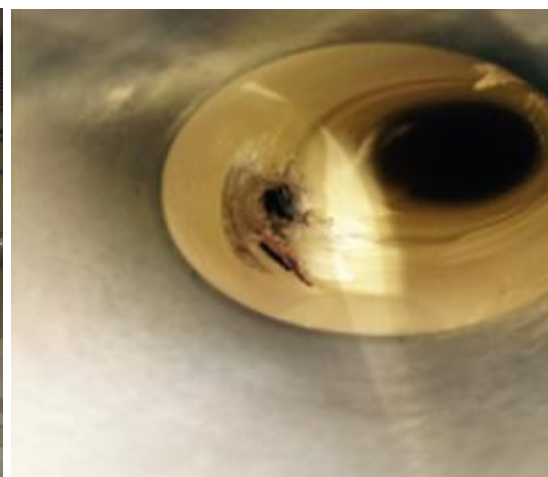
E72 External cleaning of the micro-filter in the airline and internal cleaning of the filter body.



### **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](http://www.eftco.org)).

If all 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.

Note:

EFTCO, ECTA and Cefic are recommending the use of the EFTCO Cleaning Document as best practice document for polymer tank cleaning.

In certain parts of Europe there are however still cleaning stations that do not yet use the ECD and therefore some loading stations in these areas have no access within a reasonable distance to cleaning stations issuing an ECD.

EFTCO, ECTA and Cefic will continue to promote the use of the ECD across Europe.

EFTCO, ECTA and Cefic/essenscia are currently developing a digital version of the EFTCO Cleaning Document, to gradually replace the paper system.

## 5. Special cleaning programs

There are some specific customer applications where there may be a special request or desire for more specific cleaning requirements. These are typically for certain pharmaceutical goods, or materials destined for indirect food contact applications.

These special cleaning programs, could include the use of potable water and/or detergents approved for indirect food contact.

Requirements in addition to the standard polymer industry clean should only be specified in cases where it is justifiable for the customer application to prevent additional variations and complexities within the supply chain.



As an example, there are several direct impacts of specifying only potable water.

- 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 and it should be noted that the cleaning scope is identical in all cases.

The final cleaning documentation should carry the clarification statement of any additional requests e.g.

*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 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.

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

The cleaning checklist added to this document is meant as an example of how a checklist could look. This checklist document is designed purely as an “aide memoir” for the tank cleaner and does not form part of any formal documentation. The official documentation of tank cleaning should always be considered the cleaning certificate provided by the cleaning station.

In some cases, it makes no sense to clean the ancillary container or boxes on every occasion. In cases where the box is visibly clean on arrival then the cleaning station may omit this cleaning step, and consider it cleaned for the purposes of the cleaning program.

Where it is not possible for the cleaning station to complete or verify all steps of the “Polymer industry cleaning specification” then these exceptions can be identified in section 8 of an ECD e.g. If no hoses are present on the vehicle during cleaning then the program can be verified with the exception that hoses were not present and therefore not cleaned.

If the hoses were visually identified to be damaged then this can also be mentioned as an exception. This allows the loading site to investigate the deviation whilst allowing the remaining components to be cleaned (saving the haulier a wasted journey). If he arrives at the loading site with a new hose then this may be accepted after checking.

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 (<https://www.plasticseurope.org/en/focus-areas/marine-litter>) has developed a communication toolkit with audiovisual material, guidelines and suggestions to improve performance.

<https://www.marinelittersolutions.com/projects/preventing-pellet-loss/>

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





| Example of an Internal Cleaning and Equipment Checklist for the "Polymer Industry Cleaning Specification"  |  |   |  |         |  |  |  |  |         |
|--|--|---|--|---------|--|--|--|--|---------|
| Checklist version: V7 6/11/17  |  | Entry of ECD reference makes (ECD)marked fields optional. |  |         |  |  |  |  |         |
| ECD reference:   |  | Transport ECD reference: company name (ECD):              |  |         |  |  |  |  |         |
| Previous Load  |  |   |  |         |  |  |  |  |         |
| Previous load, mentioned in ECD box 6 and 8, (Try to avoid general remarks 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 or P11 Hot water spin   |  |   |  |         |  |  |  |  |         |
| P30 Drying or E35 or E36 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 white or transparent and in a good condition.                                  |  |   |  |         |  |  |  |  |         |
| 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 cleaned and no obvious signs of damage   |  |   |  |         |  |  |  |  |         |
| 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 rubber or stainless steel. (unless otherwise specific defined between Haulier and Customer)                        |  |   |  |         |  |  |  |  |         |
| T01 Visual Inspection  |  |   |  |         |  |  |  |  |         |
| No obvious signs of hose damage. Note - A few drops of water may be visible as a result of cleaning.   |  |   |  |         |  |  |  |  |         |
|  |  |   |  |         |  |  |  |  | Cleaner |
| 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 separeate 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 additi            |  |   |  |         |  |  |  |  |         |
| Name and signature of the cleaning operator:   |  |   |  |         |  |  |  |  |         |



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