FACT-SHEET

EUROPEAN CHLORINATED SOLVENT ASSOCIATION

Closed equipment technology for metal degreasing with trichloroethylene

The European producers of Trichloroethylene have signed a *'Charter for the safe use of Trichloroethylene in metal cleaning'* to ensure compliance with the best possible product stewardship principles along the entire supply chain. The Charter has been developed in consultation with the European Commission and European Member States aiming to adequately control the risks related to the use of Trichloroethylene in metal cleaning as identified in the EU Risk Assessment.

To achieve this goal, the signatories voluntarily agree to:

- urge all end-users in metal cleaning to install and use closed systems
- require their distributors to inform end-users about this voluntary industry commitment and to provide end-users with essential information about closed systems and the importance of using closed systems for metal cleaning with trichloroethylene.

Trichloroethylene is classified as a carcinogen. For any Carcinogenic, Mutagenic or Reprotoxic (CMR) substance it is important to control human exposure. In the context of the metal cleaning application this is best achieved by using solvents in sealed or enclosed open systems that ensure compliance with the national exposure limit values. Such control measures are important not only for Trichloroethylene but also for some solvents marketed as alternatives (for example, solvents based on n-Propyl Bromide, which is also a CMR substance).

Scope

The aim of this document is to provide all necessary background information to facilitate the future transition from open to closed cleaning technology throughout the entire supply chain. The European Standard EN 12921-4[1] (June 2005) describes both sealed and enclosed open machines for surface cleaning and pre-treatment of industrial items. ECSA strongly recommends sealed machines that are able to fulfil the emission requirements of the European VOC directive[2] but also the safe handling, transfer and take-back of the solvent. These machines are available from all leading manufactures of cleaning machines for metal surface cleaning.

In any case every user of cleaning machines has to make sure that the concentration of Trichloroethylene vapour in the workplace does not exceed the applicable national occupational exposure limit (OEL).

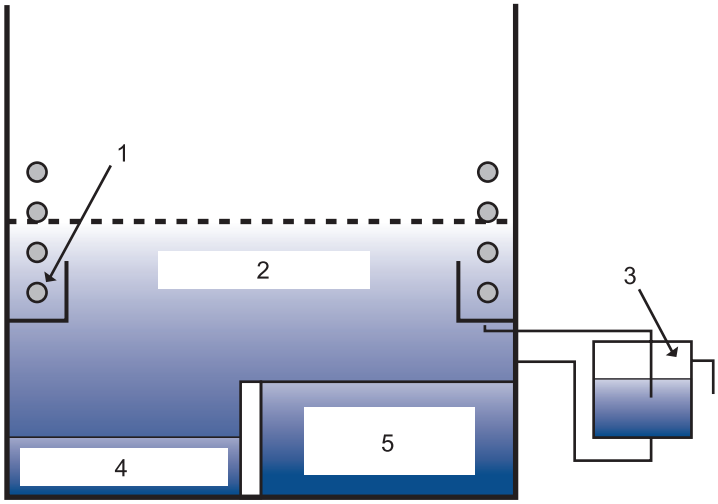
1: This standard is not downloadable from a website and should be purchased from your national standards authority.

2: Council Directive 1999/13/EC of 11 March 1999 on the limitations of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations (http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?url=CONSLEG:1999L0013:19990329:EN:PDF)

Open cleaning equipment

After December 31, 2010 customers using open cleaning machines for metal cleaning will no longer be supplied with trichloroethylene by the European manufacturers of Trichloroethylene. Illustrated in Figure 1 is an example of an open cleaning machine configured with two cleaning compartments. Single compartment and multi-compartment versions with ultrasonic stages are also common.

Figure 1: Example of an open cleaning machine

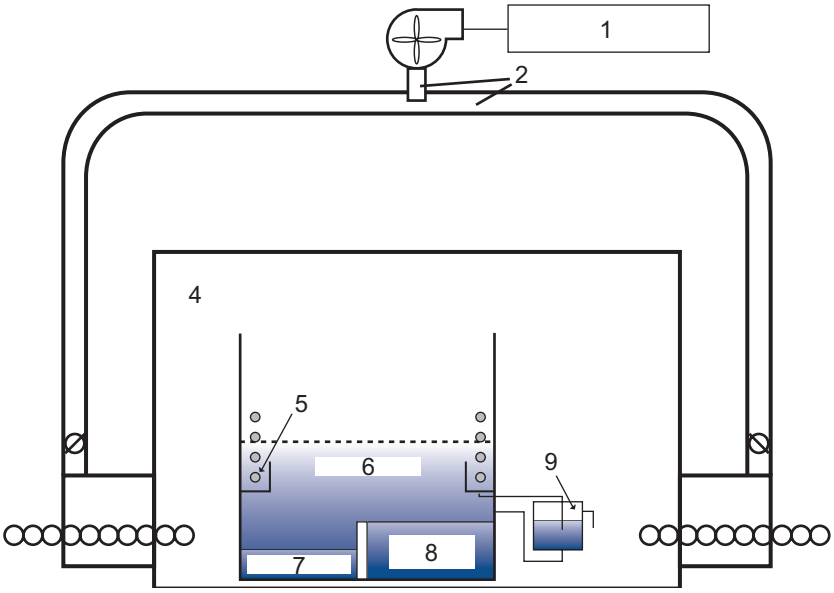


Key
1: condensate trough
2: vapour zone
3: water separator
4: boiling sump
5: liquid immersion

Enclosed open cleaning equipment

The European Standard EN 12921-4 describes in detail the requirements for halogenated solvent emission control for the enclosed open type of machine. An illustration of this kind of configuration is given in Figure 2.

Figure 2: Example of an enclosed open cleaning machine

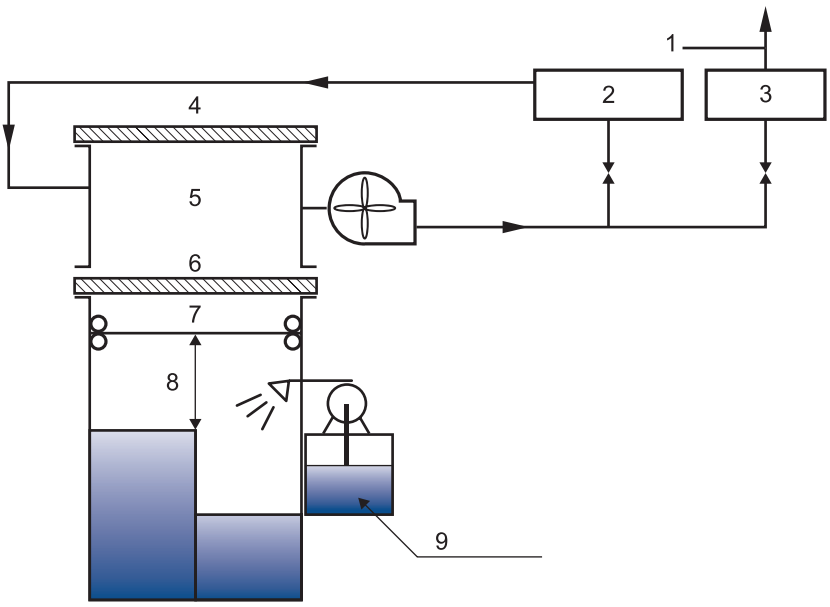


Key
1: activated carbon recovering unit
2: air exhaust ducts
3: enclosure
4: vent box
5: condensate trough
6: vapour zone
7: boiling sump
8: liquid immersion
9: water separator

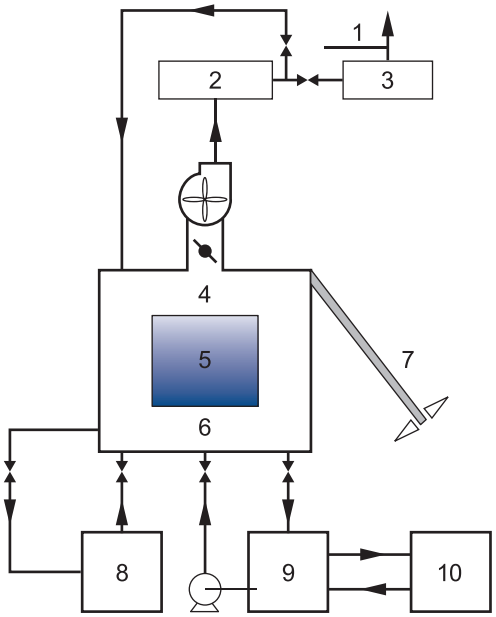
Sealed cleaning equipment

Sealed cleaning machines represent the best designs for containing emissions and are therefore recommended by ECSA. These machines, which are designed specifically for the bulk treatment of small parts, operate a virtually closed loop with complete re-use of the solvent. Two typical sealed machine configurations are shown in Figure 3, below. They are designed to wash the parts by flooding liquid solvent and then by vapour degreasing in the same cleaning chamber.

Figure 3: Examples of sealed cleaning machines

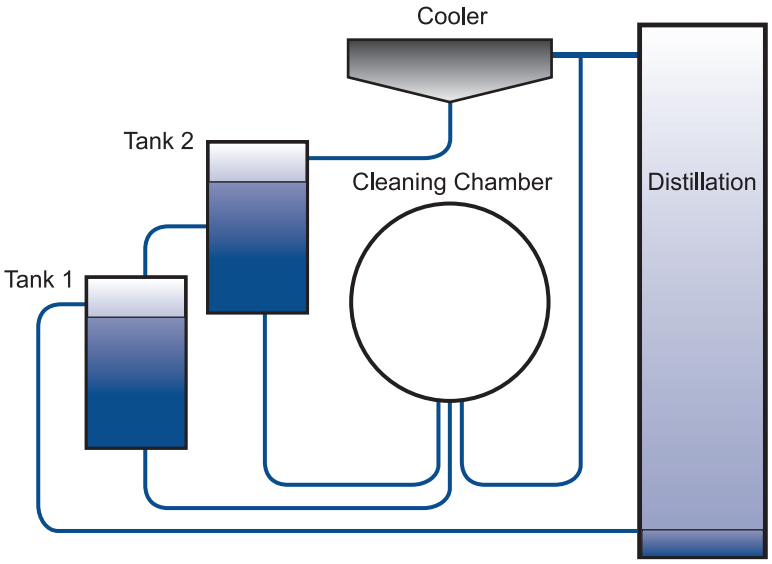


Key
1: monitoring point
2: refrigeration
3: activated carbon recovery unit (ACRU)
4: door 2
5: collection chamber
6: door 1
7: process chamber
8: internal lift
9: spray liquid tank



Key
1: monitoring point
2: refrigeration
3: activated carbon recovery unit (ACRU)
4: chamber
5: work load
6: process and collection
7: door
8: vapour generation
9: liquid rinse
10: still

Illustrative description of a cleaning process using a single chamber sealed machine



1. Pre-washing – flooding of the cleaning chamber with solvent from tank 1.
2. Evacuation of the cleaning chamber and transfer of the solvent back to tank 1.
3. Cleaning/degreasing – either by spray or immersion from tank 2 (clean solvent tank) into the cleaning chamber. Cleaning power is improved by use of ultrasonic (optional).
4. Evacuation of the cleaning chamber and transfer of the solvent to the distillation unit.
5. Vapour cleaning – pure solvent vapour generated by the distillation unit is sent to the cleaning chamber and condenses on the cooler parts. Any residual oil film is completely removed.
6. Vacuum drying – by applying a vacuum to the cleaning chamber the evaporation of the solvent is accelerated.
7. Ventilation of the cleaning chamber to normal atmospheric conditions. The solvent concentration in the cleaning chamber is controlled, and the door opens only if the concentration is below the values specified by the VOC Directive.

As an option, the complete cleaning equipment can be operated under a vacuum. This enables distillation at lower temperatures and allows permanent control of the vapour emissions from the cleaning machine.

Vapour recovery and workplace safety

The vapour which is withdrawn from the cleaning chamber is condensed and returned to the clean solvent tank. In addition, the machines are typically equipped with activated carbon recovery systems.

The cleaning machines operate with virtually no emissions and thus respect the health and safety needs of workers.

Ground and water protection

As a result of the product-specific risks of solvents, all machines are supplied in a spill tray in order to protect ground and water from contamination.

WHERE TO GET MORE INFORMATION

ECSA have established a 'Trichloroethylene Charter' section on their website (visit www.eurochlor.org/solvents). You can obtain additional information about the Charter at this site and post any questions that you have regarding the Charter.

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