	Principle of the PERO vacuum cleaning unit	14.04.2008

Principle of the PERO Vacuum Cleaning Unit, suitable for operation with Chlorinated Hydrocarbons and Hydrocarbons


Piping plan no. 4041506

The 2-bath machine is basically composed of 4 tanks:

1. A work chamber where the parts are cleaned
2. The Vapour generator which constantly generates solvent vapour
3. The cleaning tank Bath 1, where the clean solvent is ready for cleaning process.
4. The rinsing tank Bath 2 where the clean solvent is ready for rinsing process. This bath is optional. A further third bath which works at the same principle as the other two may be added on special request.

Sequential operation:

1. The work chamber door opens for receiving the basket filled with work pieces. The door closes to form a hermetically seal chamber
2. The air in the work chamber is evacuated by valve 67 and by vacuum pump M67. The here extracted air can be drained into an activated carbon unit.
3. The liquid of Bath 1 flows through valve 26 into the working chamber, until it is filled. Subsequently a certain treatment or ultrasonic cleaning (optional) can be performed.
4. The work chamber is emptied via valve 65 (V1-filter, V1-pump, back again into bath 1)
5. The solvent in Bath 2 flows through valve 25 into the working chamber. The solvent in Bath 2 has a higher cleanliness than Bath 1 which enables a better cleaning result for the work pieces. An ultrasonic cleaning process (optional) can be performed here as well.
6. The liquid in the work chamber is pumped via valve 66 via filter-V2 and pump-V2 into the Bath 2.
7. Vapour degreasing
The three-way-valve 59 changes over and allows the solvent vapour to get from the vapour generator into the working chamber. The vapour condenses on the parts continuing to clean potential residues from the parts and heat them up. The vapour degreasing process is controlled by a temperature sensor to assure that the parts reach the correct temperature for the following drying step before vapour degreasing is finished.

	Principle of the PERO vacuum cleaning unit	14.04.2008

8. The parts are dried in the working chamber by draining the vapours through valve 97 into the dryer where the vapour is condensing. Residual gas is sucked away by the vacuum pump M97. The drying procedure continues until the pressure gets below a specified level, which ensures that the parts are dry and free of solvent. After, the chamber is rinsed with air to ensure total evacuation of the solvents is achieved. The work chamber door opens only when there are less than 5 ppm of solvents left in the chamber, the basket can now be removed. The basket and work pieces are completely dry and free from odour.
9. During the drying process the vapour enters the condenser via valve 59. The condensed solvent is sent to the water separator. The water is separated from the solvent and the solvent is pumped back to Bath 2 (V2) by V2 pump.
10. The Baths are permanently supplied with pure distillate supplied either by the water separator or the vapour generator. The solvent enters the rinse tank first which overflows into the wash tank and then back to the vapour generator forming a continuous circulation of clean pure distillate.

G. Erbel, V. Kofler, C. Rickelmann