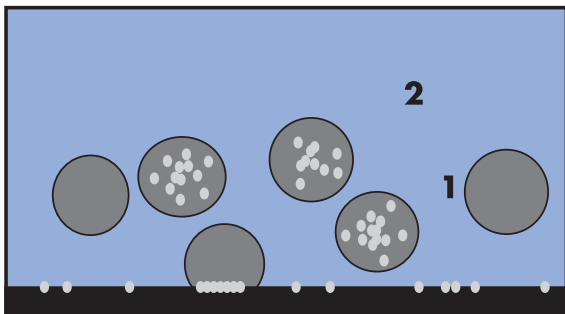


MPC[®] TECHNOLOGY

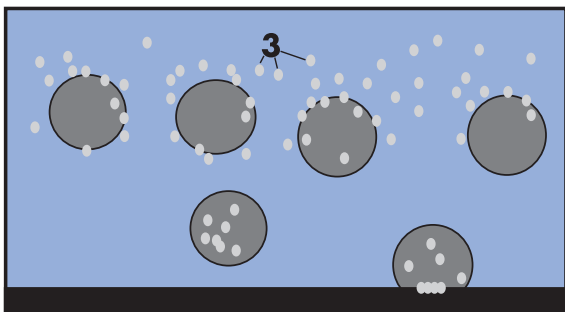
Combining the advantages of aqueous and solvent-based cleaners

MPC[®] stands for "micro phase cleaning" and defines an innovative surfactant-free cleaner developed and patented by ZESTRON[®]. This new technique combines the advantages of solvent-based and aqueous media without their respective disadvantages. An MPC[®] cleaner consists of a mixture of water and highly active agents. Heat and/or agitation results in the formation of a MPC[®] emulsion that is able to remove all the contaminants present on substrate surfaces in the course of electronics manufacture.

The MPC[®] emulsion removes the contaminants from the substrate surface and transfers them to the surrounding aqueous medium. The contaminants are not dissolved during this process. Consequently, as a result of this unique property, the dirt particles can be easily filtered out of the cleaning bath, thereby assuring that the bath has an extremely long service life and significantly reducing operating costs.



The contaminants are dissolved by the MPC[®] cleaner

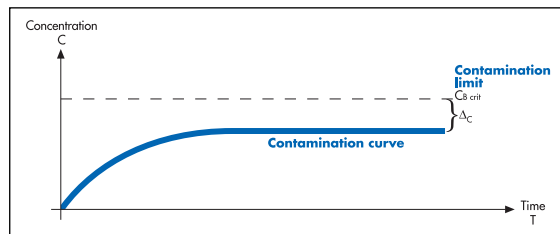


Self-generation of the MPC[®] cleaner

The special properties and unique cleaning action of MPC[®] cleaners are observed at temperatures between 20°C and 50°C, depending on the given type of cleaner.

At the application temperature some of the cleaner's active agents are present in the aqueous phase (2) of the cleaner in the form of microscopic "droplets" (1). These "micro-phases" remove greases, fluxes and even epoxy adhesives from the substrate surface.

The contamination particles (3) removed by the micro-phases are once again released by the cleaner so that they can be removed by simple filtration or skimmed off. Consequently, the MPC[®] bath does not become progressively depleted of active agents and is therefore self-regenerating, unlike surfactant cleaners.



$C_{B \text{ crit}} \triangleq$ critical contamination limit

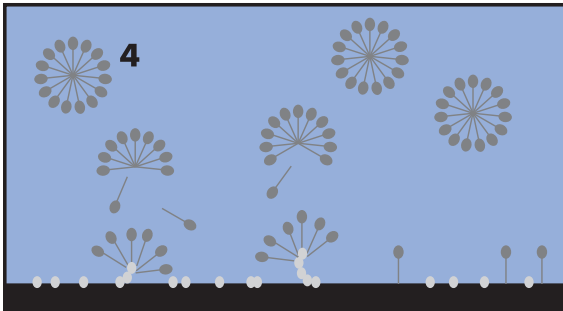
$\Delta c \triangleq$ process window

The service life of MPC[®] cleaners is only limited by filtration effectiveness. The service life is considerably lengthened resulting in a number of benefits, among them:

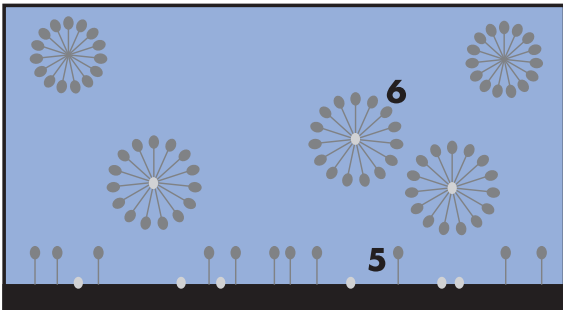
- The critical bath loading limit is not reached, thereby providing an additional process window for the user.
- The long service life of the cleaner results in a much lower consumption rate, which significantly reduces bath changing, waste disposal and transportation costs.

Surfactant cleaners method of operation

With conventional surfactant cleaners active agents (4) permanently bond to the contaminants, yet surfactants (5) also remain adhered to the substrate surface. These surfactants often cause problems during subsequent manufacturing processes, for instance during wire bonding or coating, and are therefore unsuitable for precision cleaning.

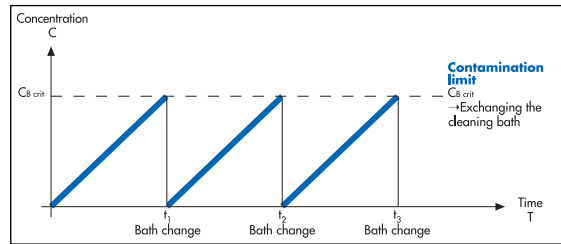


Dissolving the contaminants with surfactant cleaners



Depletion of the surface-active agents and residues on the surface

The permanent bonding of the surfactants to contaminants (6) results in a progressive depletion of the surface-active agents. This limitation on bath loading $C_{B \text{ crit}}$ can only be counteracted by a complete bath change ($t_1, t_2, t_3, \dots, t_n$). This is associated with intensive work and high costs for the cleaning medium and for the disposal and transport of the spent cleaner. Contrary to MPC[®] cleaners, surfactants cannot remove epoxy adhesives.



$C_{B \text{ crit}} \triangleq$ critical bath contamination limit

$t_1, t_2, t_3, \dots, t_n \triangleq$ Bath change

The advantages of MPC[®] cleaners seen at a glance

- High efficiency as a result of an extremely long service life.
- Broad cleaning spectrum (adhesives, pastes, fluxes, particles, salts, ...).
- Residue-free drying
- Simple reconditioning and bath control.
- Halogen-free, low VOC values and non-combustible.
- Low odor.

Cleaning media with MPC[®] technology:

- Assembly cleaners:
VIGON[®] A 200, VIGON[®] US
- Stencil/misprint cleaners:
VIGON[®] SC 202, VIGON[®] SC 200,
VIGON[®] SC