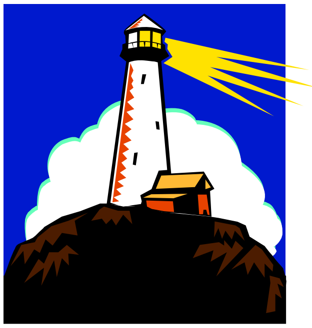


TECHNICALLY SPEAKING

ITW Chemtronics
8125 Cobb Center Drive
Kennesaw, GA 30152

Tel: 800-645-5244 x166

Fax: 770-423-0748

Technical Support:

800-TECH-401

or

mwatkins@chemtronics.com

Website:
www.chemtronics.com

Attention to Detail Improves Cost and Performance of Vapor Degreasing

Vapor-phase degreasing, or vapor degreasing has been used for decades as a reliable method for cleaning and degreasing metal parts, aviation components, electronic and electrical components, surgical tools and medical implants. In many cases it is the only method that can be used to reliably clean pieces that have a complex structure. Vapor degreasing offers other advantages as well. The degreasing solvents used are non-flammable, so there's no fire hazard. Vapor degreasing requires little operator training, low operating cost and minimal floor space. It complies with VOC and HAP air emissions requirements if operated properly. But all these advantages can only be realized if the equipment is operated properly.

Vapor degreasing is entering a new era of both challenges and opportunities as environmental regulations become more stringent, limiting the use of traditional chlorinated solvents in vapor degreasing equipment. The performance of a vapor degreasing operation is intimately tied to the choice of the degreasing solvent used, and the selection of approved solvents is growing smaller each day. ITW Chemtronics offers two liquid cleaners that are recommended and approved for use in vapor degreasing systems. These products have a range of boiling points and solubility values that lets the customer tailor the degreasing solvent to his particular requirements.

Let's briefly review the vapor degreasing process and equipment. A simple vapor degreaser usually consists of a heated sump in which the degreasing solvent is brought to boiling. The heated vapor from the boiling solvent rises until it contacts a cooling jacket and/or condenser coil, at which point the vapor condenses and falls back into the sump. Parts to be cleaned are lowered into the heated vapor where the vapor condenses onto the part and dissolves any grease and oil. The oil-contaminated solvent then dips back into the heated sump. The self-distilling nature of this cleaning method means that the cleaning is always performed with pure, distilled solvent.

In commercial practice the efficiency of vapor degreasing equipment is increased by equipping the system with a wand that also sprays clean solvent onto the part even as it is being cleaned by the condensing vapor. In such systems there is usually a second sump that collects condensed vapor from the heated sump. Part of this clean condensate is then pumped over the part through the spray wand. The remaining solvent collected in the second sump overflows into the heated sump. In cases where parts are stacked in a manner that prevents them from being effectively cleaned by

TECHNICALLY SPEAKING

ITW Chemtronics
8125 Cobb Center Drive
Kennesaw, GA 30152

Tel: 800-645-5244 x166

Fax: 770-423-0748

Technical Support:

800-TECH-401

or

mwatkins@chemtronics.com

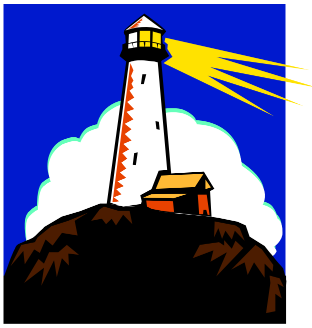
Website:
www.chemtronics.com

the solvent spray, the parts are briefly immersed in the boiling solvent, then transferred to the second sump and sometimes to a third sump. All transfers are done within the vapor phase and care is taken to maintain low condenser temperatures so that the solvent vapor is kept well within the free-board height of the degreasing equipment. Parts are moved from sump to sump counter to the direction of solvent flow and are usually held within the vapor phase until they reach the temperature of the boiling liquid, so that they are essentially dry when removed from the degreaser

The practice of passing the part through a series of solvent sumps means that the oil and grease concentration in each successive sump is dramatically lower than in the previous sump. The addition of a solvent still to the system greatly increases the total solvent flow through the equipment and lowers the oil and grease concentration in each successive sump by a factor of 1000 or more, which is the method normally used when cleaning surgical instruments and medical implants. Such a cleaning procedure lowers the contaminant concentration to that of essentially pure solvent.

The selection of the best solvent to be used in the vapor degreaser should take into consideration a number of factors, including the boiling point of the solvent, its solvent power (usually expressed in terms of its Kauri Butanol Value) and its regulatory status. The higher the boiling point of the solvent the greater the amount or weight of solvent that condenses onto the work load. This means that as the size of the part to be cleaned increases, a solvent with a higher boiling point should be used. The boiling points of Chemtronics solvent products recommended for use in vapor degreasing products range from 90 ºF for Electro-Wash CZ and Flux-Off CZ to 156 ºF for New and Improved Electro-Wash NR. Solvent power (Kauri Butanol Value) ranges from 36 to 125. Therefore the CZ products are the choice for degreasing relatively small parts, while New and Improved Electro-Wash NR should be used for cleaning larger assemblies.

How the parts to be cleaned are handled and how the vapor degreasing equipment is operated to minimize solvent loss, will determine the efficiency of the cleaning operation, its cost and its emission level. Parts should be oriented so that they fill and drain readily; they should remain in the sump long enough to remove all contaminants and allow the part to heat to the vapor temperature so that when removed they are dry. All part transfers between sumps should be done within the vapor phase to minimize solvent emissions. The use of baskets, conveyors, chains and racks should be restricted to minimize solvent loss by dragout.



TECHNICALLY SPEAKING

ITW Chemtronics
8125 Cobb Center Drive
Kennesaw, GA 30152

Tel: 800-645-5244 x166

Fax: 770-423-0748

Technical Support:

800-TECH-401

or

mwatkins@chemtronics.com

Website:
www.chemtronics.com

Operating cost and solvent emission are kept low by employing proper equipment operation procedures so that a charge of solvent can be used for a considerable time. Physical dragout of solvent liquid, as the part moves from one sump to the other, is the major cause of solvent loss. Also air movement over the top of the open degreaser can disrupt the air layer over the vapor phase and lead to the loss of solvent vapor. Diffusion of the solvent vapor through the overlying air layer and convection of the air layer as it contacts heated parts and vapor are also factors that contribute to solvent loss. Most vapor degreasers are equipped with lids, usually placed just above the top of the condenser coils, that seal the equipment against air movement, diffusion and convection losses. Dragout losses are minimized by making sure the parts heat long enough within the vapor phase to insure they are essentially dry when removed.

Paying attention to the details of proper part handling, operating the equipment with covers to prevent vapor loss due to air movement, diffusion and convection, maintaining the condenser coil and cooling jacket at the optimum temperature, minimizing solvent dragout by chains, conveyors, racks and baskets, and selection of the proper solvent for the task at hand, will all help to improve the performance and, by lowering solvent loss, the cost of the vapor degreasing operation.

Michael Watkins
ITW Chemtronics
Technical Support