Environmentally Friendly Solvent Degreasing with DESTA 20

Christine Batsch of Jürgen Batsch Maschinenbau Apparatebau describes how the addition of the Desta 20 vacuum distillation plant to an existing solvent degreasing unit inexpensively converts the process to be totally environmentally friendly.

Oil free surfaces are a precondition for numerous technical applications. This is most effectively achieved with solvent degreasing. However, solvent degreasing has the reputation of being hazardous, posing threats to operators and the environment. The result is that solvent degreaser users have been looking for alternative degreasing processes, mainly aqueous based processes, to improve their ecological footprint.

Nearly 100% of solvent can be recovered and recycled

The coupling of the DESTA 20 system, manufactured by the German still specialist, Jürgen Batsch Maschinenbau Apparatebau, to existing solvent degreasing processes inexpensively converts the process to be totally environmentally friendly whilst eliminating any risk to operators. With this conversion nearly 100% of solvent can be recovered and recycled and all the oil can be separated to a level containing less than 1% solvent. Consequently, no waste is generated. Even if the user cannot internally re-use the recovered oil, it can be disposed of as a non-hazardous product to oil recycling companies.

Besides the advantage of waste reduction, the degreasing process is further optimised with the introduction of DESTA 20. Effective solvent degreasing is only achieved with a high concentration of solvent. This cannot be maintained with conventional solvent degreasing, as the oil builds up in the degreasing solution. The DESTA 20 makes use of vacuum distillation and is connected directly to the boil sump of the vapour degreaser's internal evaporator. Here oil from the oil/solvent mixture of the vapour degreasing machine is continuously extracted during operation and clean recycled solvent is returned.

The process initiates a cycle of self-purification of the solvent. As the DESTA 20 keeps the oil to solvent ratio low in the degreasing unit's internal evaporator it can now work at its optimum. The maximum amount of pure distilled solvent is generated by the DESTA 20's own internal evaporator from the oil/solvent mixture. This is directed back to a clean tank that feeds the vapour degreaser's boil sump. Thus, the oil/solvent mixture in the sump gets continuously boosted with clean solvent. One can describe the DESTA 20 as acting as an "artificial kidney" for the degreasing system. Since no oil builds up in the degreasing

unit's evaporator, solvent no longer needs to be replenished and the evaporator never needs to be cleaned.

In conventional systems the oil to solvent ratio builds up

The purity of the solvent degreaser in the boil sump influences several steps of the degreasing process. In conventional systems the oil to solvent ratio builds up progressively during the degreasing process.

This causes the boiling temperature of the oil/solvent mixture to increase, demanding more energy to maintain the necessary level of solvent vapour production.

In many cases, the application of extensive heat initiates a chain-reaction of acidification of the oil and solvent, which can only be arrested by adding expensive stabilizers. The introduction of the DESTA 20 to the system keeps the oil to solvent ratio low, thus keeping the heat demand low and consequently preventing acidification and eliminating the need for stabilizers.

The DESTA 20 processes the solution under vacuum which requires relatively low temperatures to achieve the best distillation results. The distiller is so designed that the solvent evaporates from thin films of the solution, leaving the oil behind. Consequently, even with increasing oil to solvent ratios, the same low heating temperature can be maintained during the entire recycling process.

The DESTA 20 extracts a maximum of 6 litres oil/solvent solution from the degreasing system during one cycle of it's operation. As soon as the oil/solvent mixture enters the DESTA 20 unit, clean solvent evaporates and the oil remains as a liquid. The volume is maintained and is replenished with oil/solvent as the evaporation reduces the volume. When the demand for additional oil/solvent falls below a certain level a high concentration of oil inside the DESTA 20 distiller is indicated. This initiates the post-processing phase. After this phase the oil gets discharged automatically and the unit switches into the initial process phase where it charges itself automatically with fresh solvent for the next cleaning cycle. Despite the small volume of liquid that is processed, the DESTA 20 has the capacity of extracting up to 96 litres of oil from the degreasing system per day.

Up to 96 litres of oil per day may be removed from the system

Vapour degreasing relies on solvent vapour condensing on the work piece. The condensed liquid solvent then dissolves the grease so that it can run down with the liquid beads. For the condensation to effectively take place, a temperature difference between the hot vapour and cold parts has to exist. If too much oil is present in the boil sump, the amount of solvent vapour available for degreasing is reduced. Consequently, the parts need to be exposed for longer to the solvent vapours to achieve the same degreasing effect.

As the parts are exposed for longer periods to the limited solvent vapours the condensation is less rapid and the parts gradually become warmer and warmer.

The result is that the potential to condense the solvent vapours is reduced even further.

With the DESTA 20 connected to the degreaser´s boil sump, it ensures that the maximum amount of solvent vapour is generated since the oil is removed from the solution. Hence, the cold parts are exposed to the highest possible amount of solvent vapour in the shortest time. The result is that the parts are degreased and heated up quickly, saving energy. A knock-on benefit is that the subsequent drying process is optimised, allowing a simple chilling zone to be used that also greatly reduces the contamination and treatment of process air.

Overall, the entire vapour degreasing process becomes quicker and more energy efficient, and, since the solvent is recovered and recycled, the degreasing operation becomes cheaper and less affected by increasing solvent prices.

To summarise, the DESTA 20 enables a reduction in waste disposal, energy consumption, purchasing of fresh solvent degreaser and stabilizer and downtimes of the degreasing machine. All of these benefits are achieved while increasing the throughput and cleanliness of the surfaces of the parts to be cleaned.

A rental machine can be provided to test the technology risk free under your own conditions.

DESTA 20 Schematic Diagram