



Visual comparison of the distillate produced by a conventional evaporator with the distillate produced by a VACUDEST evaporator equipped with Clearcat technology shows, that the future proof Clearcat technology sets benchmarks regarding quality of the treated industrial wastewater.

Vacuum Distillation Plants for the treatment of emulsions and oil containing wastewater

The innovative Clearcat technology allows separation of dissolved hydrocarbons and free oils without additional process steps.

As an alternative to disposal of spent coolants and other oil containing waste waters distillation is a feasible and state of the art processing technology. The distillate can be reused for the preparation of fresh emulsions, can be used for other purposes in the work shop or can be disposed off into the public sewer.

In metal processing work shops many oil containing waste water streams occur. Emulsions for different processing technologies contain among others, oil, wax, fat, and preservatives as well as ingredients improving product properties. After being used up these emulsions often are disposed off at high cost.

Starting from 150 m³ per year such waste emulsions can be processed feasibly by vacuum distillation resulting in important reduction of disposal cost. As a

general rule ROI periods of less than 2 years are achieved.

The distilled water leaving the vacuum evaporator can either be reused in the work shop, to produce new emulsions for instance, or disposed off into the public sewer. Both variants require excellent water qualities. When using conventional evaporation systems significant amounts of hydrocarbons and free oils are carried over into the distillate. Thus distillate post treatment using coalescence separators, active carbon filters or membranes is required to match legal disposal limits or quality standards for internal reuse of the distillate.

Thanks to the innovative H₂O Clearcat technology these additional process steps are not needed any more,

Advantages of the VACUDEST Clearcat technology compared to common evaporation plants

Undercut of legal limits for disposal into the public sewer regarding carbohydrates without post treatment of the distillate in all cases up to now

Reduction of COD by 98.2 % in average*

Excellent distillate quality, free of germs, free of heavy metals, almost free of salts

Low running cost

Simple, reliable process

Is applicable for changing emulsion compositions

Lowest amounts of residues, thus lowest disposal cost

* Statistical average based on a field study of the H2O GmbH. The COD reduction depends on the chemicals used.

since crystal clear and virtually oil free distillates are produced. All users so far could either reuse or dispose of the distillate directly, without any further treatment.

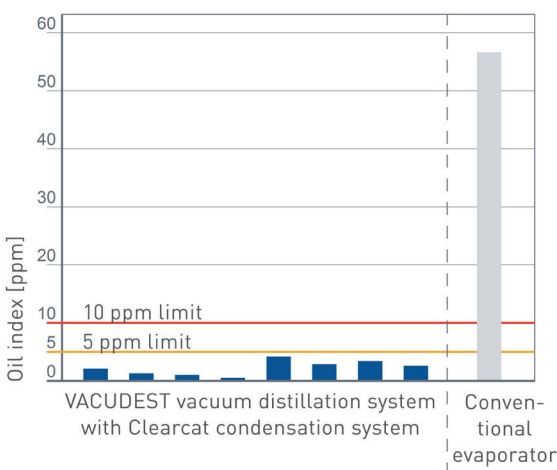
The innovative H2O Clearcat technology is available since beginning of 2007. Since more than 50 plants are in operation currently it is adequate to present results from practical experience. It was announced that the new VACUDEST Clearcat series for the processing of oil containing feeds would produce improved distillate qualities at similar concentration factors and reduced

consumption figures. Could the evaporation plant keep all these promises in industrial practice?

Promise 1: Crystal clear distillate

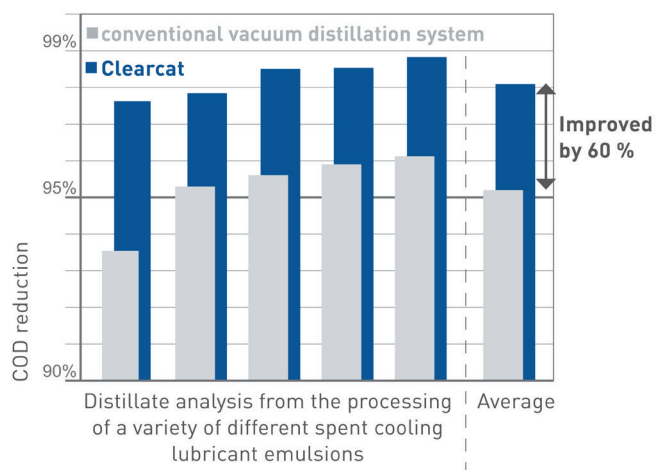
In the meantime the H2O laboratory screened more than two dozen distillate samples from different VACUDEST Clearcat evaporators. About the same amount of samples have been analysed by the end-users themselves. Whilst distillates from common evaporators show considerable milky turbidity and free oils, unexceptionally all Clearcat distillates have been colourless clear without any noticeable turbidity. No

Less than 10 mg/l oil*
(Hydrocarbon Oil Index, DIN EN ISO 9377-2)



The future proof Clearcat condensation system allows better reduction of the oil index than conventional evaporators combined with post treatment steps.

COD reduction of more than 98 %*



The Clearcat condensation system stands for crystal clear distillate, including a COD reduction improved by 60 percent compared to conventional evaporators.

* Depending on the type of industrial wastewater to be treated

expensive post treatment is required; the distillates can instantly be reused or disposed off into the public sewer.

Promise 2: Distillate free of oil according to DIN ISO 9377-2

All samples show extremely low carbohydrate values and undercut the demanding legal disposal limits according to the German water resources law by far. As can be seen in the figure, even the limit of 5 mg / l which becomes valid in France eventually in the future was undercut in all cases. Carbohydrate reduction in the distillate was up to 99.9 %.

Promise 3: Additional COD reduction of more than 25 % in the distillate compared to common evaporation plants without Clearcat technology

To prove additional COD reduction a field study was carried out. The total COD reduction was examined. All samples came from VACUDEST Clearcat evaporators installed in metal processing workshops all over Europe. Even experts were surprised by the results. As the figure shows the COD reduction achieved by

the VACUDEST Clearcat technology was in average 98.2 %. This is by 63 % better than results achieved with common evaporators and more than expected. Thus even strict COD limitations for disposal into public sewer can be undercut often in industrial practice without post treatment. An example is the COD reduction in a coolant emulsion from 50.000 to 900 mg/l in the distillate.

Conclusion: The Clearcat technology sets new benchmarks

The Clearcat technology is momentarily the most interesting and most feasible possibility available on the market to treat oil containing waste water. Not only emulsions, degreasing water and die casting emulsions but also oil containing waste waters like penetrants can be treated feasibly.

Author:
Dipl.-Ing. Matthias Fickenscher
Managing Director H2O GmbH