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LOOKING FOR A VIABLE ALTERNATIVE TO FLUORINATED SOLVENTS?

FUTURE-PROOF YOUR PARTS CLEANING WITH MODIFIED ALCOHOLS

INCREASING REGULATORY PRESSURE ON PFAS COULD IMPACT USE OF FLUORINATED SOLVENTS

Due to acceleratory global regulatory pressure on PFAS (per- and polyfluoroalkyl substances), many hydrofluoroethers (HFEs) and hydrofluoroolefins (HFOs) which fall under the definition of PFAS are now facing an uncertain future. Their use as fluorinated solvents in industrial parts cleaning could be restricted or prohibited.

There are variations of HFEs and HFOs which are PFAS-free and can be used as drop-in replacements in open degreaser.

HOWEVER – in light of the increasing regulatory requirements placed on health, safety and the environment – **do drop-in replacements with open and semi open (normal atmospheric) equipment make for a future-proofing cleaning approach?**

In addition, fluorinated solvents are often blended with Trans-1,2 dichloroethylene (t-DCE) – and t-DCE is under legislative pressure itself.

WHAT IS A FUTURE-PROOF CLEANING SOLUTION?

A viable cleaning solution should not only deliver quality cleaning results, but should also enable cost-efficiency, safety and sustainability.

Our DOWCLENE™* 16-Series as well as DUALENE™ 1601 S – **modified alcohol solvents that are chlorine-free, bromine-free and fluorine-free** – used in combination with closed vacuum cleaning machine, or the so-called airtight degreaser, can help you achieve just that.

BENEFITS OF CLOSED VACUUM CLEANING MACHINE

Compared to the high consumption of fluorinated solvents (PFAS-free or not) and the running costs due to emissions and drag out losses, a closed cleaning machine can practically pay itself back due to the many cost savings it enables – in addition to increased process safety and minimized environmental impact – making it an excellent return on investment.

COST EFFICIENCY

- Solvents used in closed machines are much cheaper than fluorinated products
- Solvent can be recycled and reused much more efficiently thanks to built-in vacuum distillation unit
- Solvent lifespan can be further expanded by stabilizers, resulting in less consumption and fewer bath exchanges
- Solvent in waste stream is minimized due to efficient recycling with vacuum distillation
- Working chamber opens following vacuum drying – no solvent residues left on parts
- The capability of modified alcohols to process both polar and non-polar contamination may reduce the need for additional cleaning processes

PROCESS SECURITY

- Solvent condition can be regularly monitored on-site using simple test kits
- Reliable good cleaning result
  - » High solvent quality in rinsing step enables required level of cleanliness
  - » Efficient vapor degreasing as last cleaning step thanks to high temperature difference between parts and vapor
- Vacuum drying ensures that risk of solvent being trapped in blind holes/small crevices is minimized even when rotation isn't used

ENVIRONMENTAL PROTECTION

- Virtually no air emissions – a cost, environmental and safety benefit
- Hermetically sealed construction means there is minimal risk of contaminating ground water
- Operators have virtually no contact with the chemical
- Safety containers such as the SAFE-TAINER™ System further ensures emission-free and spill-free transfer of solvent to/from the closed cleaning machine

The deployment of an airtight degreaser can dramatically reduce, in the example* below, the solvent consumption by almost 5 times compared to an open machine.

With the support of Chemical Product Services (CPS), such as consistent solvent monitoring and stabilization, solvent consumption can drop even further while emissions and waste are kept to an absolute minimum.

Amounts per 100 kg (220 lb) oil removed

Solvent 754 kg (1662 lb)	OPEN MACHINE	**Air emissions** 520 kg (1146 lb) **Waste** 233 kg (514 lb)
Solvent 160 kg (353 lb)	CLOSED MACHINE	**Air emissions** 10 kg (22 lb) **Waste** 150 kg (331 lb)
Solvent 15 kg (33 lb)	CLOSED MACHINE & CHEMICAL PRODUCT SERVICES (CPS)	**Air emissions** 10 kg (22 lb) **Waste** 5 kg (11 lb)

* Source: Chemical Product Services in the European Union, European Commission, January 2006, where perchloroethylene is examined in the example. Similar reductions are also possible with modified alcohols.

SAFECHEM'S END-TO-END CLEANING SOLUTION

SAFECHEM offers companies a **fully integrated cleaning solution** covering chemicals, services and consultancy – where risks are properly managed and kept to a minimum, employee welfare and safety is looked after, and sustainability and regulatory compliance are well demonstrated.

Virgin-grade, high-performance modified alcohols

With both non-polar and polar properties, our modified alcohols of DOWCLENE™* 16 Series as well as DUALENE™ 1601 S can effectively clean off non-polar contaminants such as oils and greases, just as effectively as certain polar contaminations like cooling emulsions or solids such as particles and abrasives.

- All grades have a low toxicity and are chemically highly stable to ensure a secured process
- As non-halogenated solvents, they are not under further evaluation for neither REACH in Europe nor TSCA (The Toxic Substances Control Act) in the US
- There is a wide range of formal approvals for DOWCLENE™* 1601 in the aerospace industry
- DOWCLENE™* 1601 can achieve biocompatible surfaces, certified by the Fraunhofer Institute according to DIN ISO 10993-5, 20091[1] for medical cleaning applications

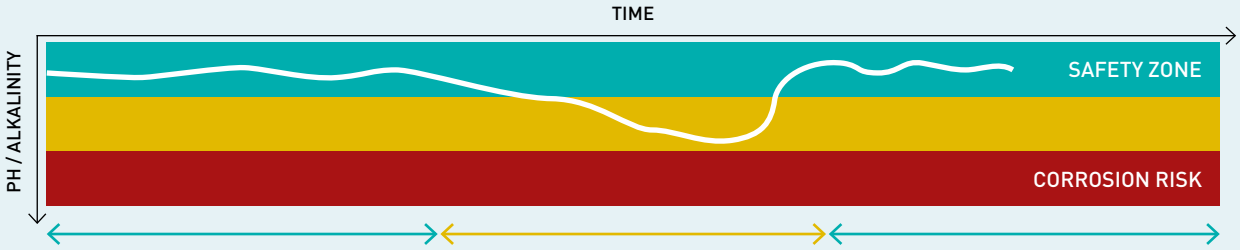
Additional service elements to extend solvent lifespan

MAXICHECK™ Test Kits enable easy on-site testing and monitoring of solvent quality.

MAXISTAB™ S-Series Stabilizers can counteract the effects of organic acids, sulphur compounds, hydrochloric acid and chlorides – and to prevent their build-up in cleaning systems. The stabilizers can enable a stable process and extend bath lifetime, even when cleaning highly chlorinated oils.

PROCESS SAFETY

Thanks to the possibility to regularly check the condition of modified alcohols in the cleaning machine via test kit and to add stabilizer if necessary, solvent bath quality can be maintained for as long as possible – thereby enabling consistent cleaning results while reducing solvent consumption and related costs.



DOWCLENE™* 16-Series as well as DUALENE™ 1601 S are in a safe working range in the beginning.

Regular monitoring of solvent condition via test kits reveals potential challenging situations and provides recommendation on addition of stabilizer if required.

Continuous solvent monitoring and stabilization (if required) safeguard equipment and extend solvent lifespan.

1 The extract of the metal plates of titanium alloy, Grade 5 Ti-6Al-4V, cleaned with the solvent DOWCLENE™* 1601 was tested non-cytotoxic by the Fraunhofer-Institut für Grenzflächen-und Bioverfahrenstechnik in February 2014

SAFE AND RESPONSIBLE SOLVENT HANDLING WITH THE SAFE-TAINER™ SYSTEM

The SAFE-TAINER™ System enables virtually emission-free and spill-free transfer of solvent to/ from the closed cleaning machine. It is considered to be the best available technology (BAT) for safe solvent handling when used in combination with closed cleaning equipment.

If you are seeking a cost-effective, efficient and sustainable alternative to fluorinated solvents, come talk to us.

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