

Vapour Phase Process




PERFORMANCES

3M™ NOVEC™ HFE and PROMOSOLV™ products have been specially developed as specific solvents for High Tech cleaning, degreasing, rinsing, decontaminating and drying a large range of materials used in a vapour phase cleaning process.

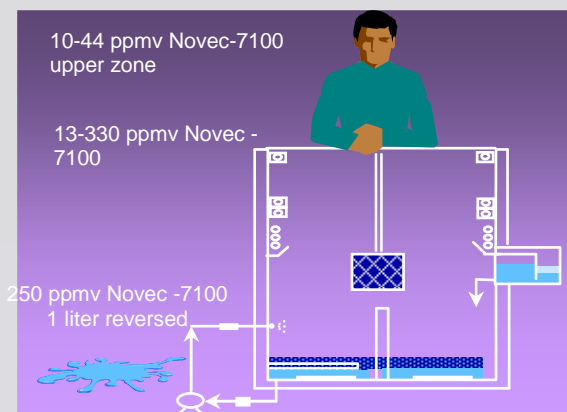
3M™ NOVEC™ HFE and PROMOSOLV™ products are basically made of methoxy-nonafluorobutane (C₄F₉OCH₃), transparent liquid, colourless and with a very low odour to replace chlorinated and brominated products. Their boiling point and their very low surface tension, confer to these products, outstanding cleaning properties when implemented in vapour phase process using neat azeotropic products or with an Inventec co-solvent (Topklean™ range).

These exclusive fluids have no ozone depleting potential, they are chemically and thermally stable, they are not flammable or toxic, and thus become the most sustainable cleaning fluids.

As an illustration, hereunder parameters comparison between chlorinated and non-chlorinated vapour phase processes:

| PROCESS PARAMETERS | TRICHLOROETHYLENE * VAPOUR PHASE | CO-SOLVENT VAPOUR PHASE |
|-----------------------|--|--|
| TOXICITY |   H350 H412 |  R 65 R 66 |
| CORROSIVITY | CHLORINATED | NON-CHLORINATED |
| BIODEGRADABILITY | FORMATION OF VINYL CHLORIDE (NON BIODEGRADABLE | NO FORMATION OF VINYL CHLORIDE |

* TRICHLOROETHYLENE (CAS 79-01-6) has been definitely classified as SVHC substance by European Chemicals Agency



All components inside formulation are compliant with new regulations concerning chemical substances (REACH*, RoHS*, FGas*, not CMR*...) and are implemented by INVENTEC and our recommended list of cleaning plant manufacturers.

* **REACH** a new normative document to be implemented in next years concerning chemicals substances for Registration Evaluation and Authorisation of Chemicals.
* **RoHS** European Directive from 2006 concerning the Restriction of Hazardous Substances.
* **FGas** European Directive from 2006 concerning in prevent and thereby reduce emissions of fluorinated greenhouse gases covered by Kyoto protocol.
* **CMR** Carcinogenic, Mutagenic Reprotoxic substances.

Security: Workers exposition limit = 750 ppmv

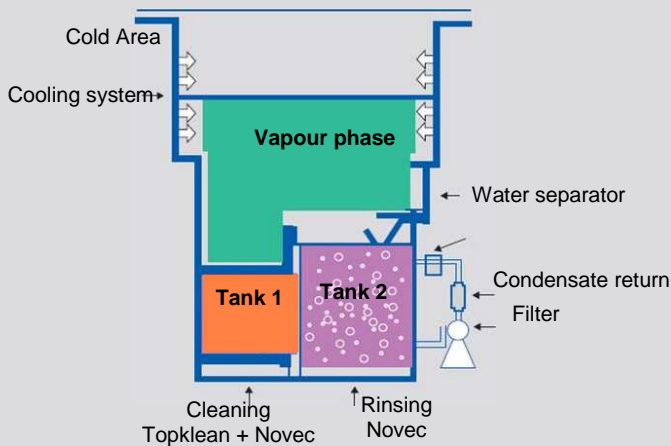
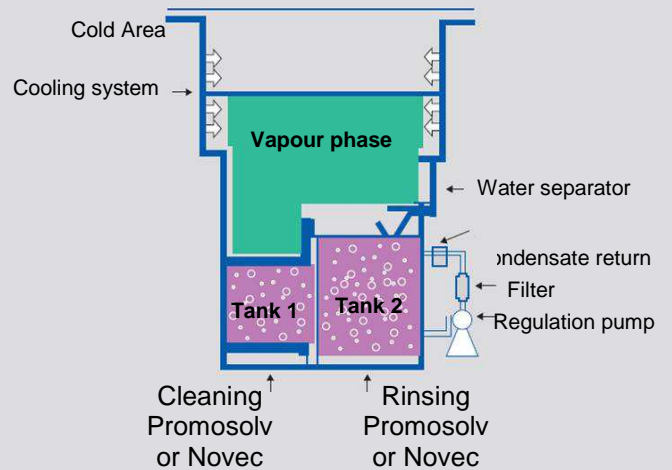
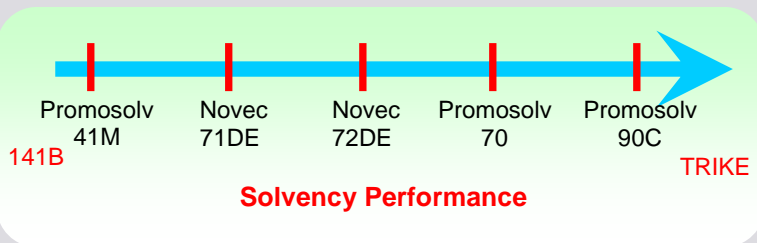


CLEANING CYCLE STEPS



MONO-SOLVENT PROCESS (AZEOTROPIC PROCESS)

- Parts are immersed in tank 1 of co-solvent to be cleaned
- Immersion in tank 2 to be rinsed off
- Put in the vapour phase for the final rinsing
- The drying is finally made in the cold area.



CO-SOLVENT PROCESS (MIXED PROCESS)

- Parts are immersed in tank 1 of co-solvent to be cleaned
- Immersion in tank 2 to be rinsed off
- Put in the vapour phase for the final rinsing.

| Core Products |
|-------------------------------------|
| Topklean MC1007 / Novec 7100 |
| Topklean MC20A / Novec 71IPA |
| Topklean MC1153 / HFE-Based product |

SEPARATED CO-SOLVENT PROCESS

- Parts are immersed in tank 1 of Topklean to be cleaned
- Immersion in tank 2 to be rinsed off
- Immersion again in tank 3 for a second rinsing
- Put in the vapor phase for the final rinsing
- The drying is finally made in the cold area.

Specially dedicated for complex designs of parts OR heavy pollution

