

Galden®



SOLVAY

asking more from chemistry®

Galden® LS/HS

Vapor Phase Soldering Fluids

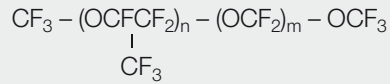
**SPECIALTY
POLYMERS**

Galden® LS and HS

Vapor Phase Soldering Fluids

Galden® LS/HS is a line of fully fluorinated fluids specifically designed for the Vapor Phase Soldering process. The narrow molecular weight distribution as well

as the very strong carbon-fluorine bond and the flexible ether link provide the properties which make Galden® LS/HS ideal for use in VPS.



Features

Wide choice of grades with different boiling point

Narrow molecular weight distribution

Low heat of vaporization
Vapor density greater than air

Excellent thermal and chemical stability
Good compatibility with materials

No flash or fire points
No auto ignition point
No explosion hazards

Benefits

Widest operating temperature range to optimize VPS process

Maximum process stability and repeatability
No boiling point drift

Rapid and residue free drying
Pre-heating and heating processes take place in an inert atmosphere

No corrosion or reaction with materials of construction
No formation of decomposition residues

Enhanced safety
Safe to use at high temperature

Lead Free and Vapor Phase Soldering

RoHS (Restriction of Hazardous Substances) is also known as "lead free" but this law deals with other five substances as well:

- Lead
- Mercury
- Cadmium
- Hexavalent Chromium
- Polybrominated biphenyls (PBBs)
- Polybrominated diphenyl ethers (PBDEs)

Particular emphasis is being placed on lead; lead is a concern when released to the environment as it can cause damage to the human body, it can also accumulate in the environment and has acute and chronic effects on plants,

animals and microorganism. Because of RoHS, manufacturers of electronic equipment will have to produce and deliver lead-free equipment; one of the first evidence of this has been the development of lead free printed circuit boards (PCBs). Solder traditionally used ~60% of tin (Sn) and ~40% of lead (Pb), now alternative solder materials have been studied, the most common replacements for lead are silver (Ag), Copper (Cu) and Bismuth (Bi). These alternative materials, however, bring a main challenge: higher melting temperature. Traditional tin/lead solders melt at ~180°C while lead free solder melts at ~227°C. Soldering temperatures, as well as heating issues, are ongoing concerns for PCBs assemblers.

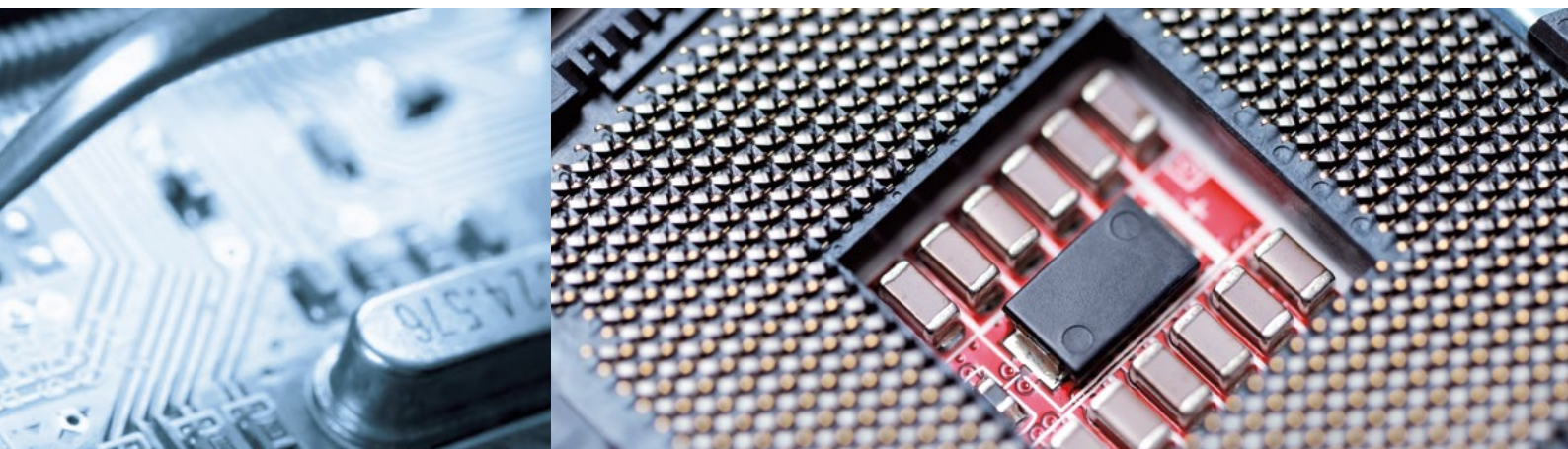


Galden® LS and HS grades for vapor phase soldering offer the right lead free process solution:

- Galden® LS and HS fluids are RoHS compliant and can be sold in Europe
- Galden® LS and HS fluids offer the widest temperature range for lead free solders up to 260 °C
- Galden® LS and HS fluids precise vapor temperatures eliminate overheating

Vapor phase soldering (Typical Properties at 25 °C)

| Properties | Units | LS200 | LS215 | LS230 | HS240 | HS260 |
|-------------------------------|--------------------------------------|--------|--------|--------|--------|--------|
| Boiling point | °C | 200 | 215 | 230 | 240 | 260 |
| Density | g/cm ³ | 1.79 | 1.80 | 1.82 | 1.82 | 1.83 |
| Kinematic viscosity | cSt | 2.50 | 3.80 | 4.40 | 5.30 | 7.00 |
| Vapor pressure | Pa | 21 | 12 | 3.4 | 1 | 1 |
| Specific heat | J/Kg·°C | 973 | 973 | 973 | 973 | 973 |
| Heat of vap. at boiling point | J/g | 63 | 63 | 63 | 63 | 63 |
| Thermal conductivity | W/m·°C | 0.07 | 0.07 | 0.07 | 0.07 | 0.07 |
| Coefficient of expansion | cm ³ /cm ³ ·°C | 0.0011 | 0.0011 | 0.0011 | 0.0011 | 0.0011 |
| Surface tension | dyne/cm | 19 | 20 | 20 | 20 | 20 |
| Dielectric strength | kV (2.54 mm gap) | 40 | 40 | 40 | 40 | 40 |
| Dielectric constant | | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 |
| Volume resistivity | Ohm·cm | 1015 | 1015 | 1015 | 1015 | 1015 |
| Average molecular weight | amu | 870 | 950 | 1,020 | 1,085 | 1,210 |





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