SOLDER CONNECTION
Email: sales@solderconnection.co.uk | Tel: +44(0)1291 624 400

Issue 1 - 16/07/18

Technical Bulletin

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	Benefits
Wide choice of grades with different boiling point	Widest operating temperature range to optimize VPS process
Narrow molecular weight distribution	Maximum process stability and repeatability No boiling point drift
Low heat of vaporization Vapor density greater than air	Rapid and residue free drying Pre-heating and heating processes take place in an inert atmosphere
Excellent thermal and chemical stability Good compatibility with materials	No corrosion or reaction with materials of construction No formation of decomposition residues
No flash or fire points No auto ignition point No explosion hazards	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 (PBBs)

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

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 (PBCs). 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.

Issue 1 - 16/07/18

Technical Bulletin

Galden® LS and HS Vapor Phase Soldering Fluids

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	$1 \cdot 10^{15}$	$1 \cdot 10^{15}$	$1 \cdot 10^{15}$	$1 \cdot 10^{15}$	$1 \cdot 10^{15}$
Average molecular weight	amu	870	950	1,020	1,085	1,210