

Alternatives to Isopropyl Alcohol (IPA)

Across the world, there are still many companies using Isopropyl alcohol (IPA) for cleaning applications. In addition to the safety concerns, IPA is not always the cheapest solution for cleaning. As companies look for a safer solution, alternative solvents and water-based products are replacing IPA.

DISADVANTAGES OF IPA

1. IPA has a low flashpoint of 12°C/53°F which presents a high risk of fire and/or explosion. It also requires special measures for storage and shipping due to its flammability.
 - a. Vapor may travel considerable distance to source of ignition and flash back.
 - b. May form an ignitable vapor/air mixture in closed tanks or containers.
 - c. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME.

KYZEN products, used in water-free, semi-aqueous and aqueous processes, have a higher or no flash point and are much safer to use than IPA.

2. IPA's high volatility has a great impact on emissions, which present a conflict with environmental regulations and laws. Its high volatility is also the reason why IPA is not truly cheaper than alternative solvents as IPA consumption is much higher and process cost can be actually higher than apparently more expensive alternative products.

KYZEN products are non-ozone depleting and have much lower emissions than IPA

3. Potential Chronic Health Effects:
 - a. Slightly hazardous in case of skin contact (sensitizer).
 - b. DEVELOPMENTAL TOXICITY: Classified reproductive system/toxin/female, development toxin [POSSIBLE]. The substance may be toxic to kidneys, liver, skin, central nervous system (CNS).
 - c. Repeated or prolonged exposure to the substance can produce target organs damage.

KYZEN products, when used as recommended, present low or no risk to the health and safety of the users. Contact KYZEN for all SDS requests.

PCB CLEANING

IPA is a very poor cleaning agent for reflow and wave fluxes. IPA is not able to solubilize effectively most fluxes (no-clean, lead-free, etc.) used in electronics manufacturing today. Consequently, it is a very poor choice for PCB defluxing in manual or automated cleaning applications. If used for manual cleaning, it requires a lot of labor to achieve an apparently clean surface which, in reality is not likely to be free of residue due to lack of solubility.

	IPA	CYBERSOLV 141-R (100%)	AQUANOX A4727 (10%)	AQUANOX A4625(B) (15%)	IONOX I3302 (100%)	CYBERSOLV C8882 (100%)
Performance – Reflowed Flux	Poor	Excellent	Excellent	Excellent	Excellent	Excellent
Flash Point	12°C/53°F	None	99°C/210°F	100°C/212°F	82°C/180°F	61°C/142°F
VOC, EPA Method 24	100%	1175 g/L	82.4 g/L	138.6 g/L	1034.9 g/L	875.6 g/L
HMIS	2-3-0	2-1-0	1-1-0	2-1-0	2-2-0	1-2-0
Transportation & Storage	CLASS 3: Flammable liquid.	*Non- Hazardous	Non- Hazardous	Non- Hazardous	Non- Hazardous	Non- Hazardous

*Aerosol: Non-flammable gas.

SYSTEM MAINTENANCE CLEANING

IPA is not a good choice either for maintenance cleaning of reflow and wave solder ovens. Burnt flux residues do not solubilize in IPA. Also, due to the hot environment, the rate of evaporation of IPA is very high and the result is very high consumption and cost for your cleaning process. The hot environment and high rate of evaporation makes for a very unsafe environment for the workers.

For cleaning of solder pallets and oven parts, IPA continues to be a very poor choice for cleaning.

	IPA	CYBERSOLV C8508 (100%)	KYZEN E5322 (10%)	KYZEN E5325 (10%)
Performance – Reflowed Flux	Poor	Excellent	Excellent	Excellent
Flash Point	12°C/53°F	None	None	None
VOC, EPA Method 24	100%	338.7 g/L	3.1 g/L	0.0 g/L
HMIS	2-3-0	0-0-0	3-0-0	3-0-0

SMT STENCIL CLEANING

Underside wipes in printers - IPA as a flammable product is not a safe choice to use in equipment with electrical contacts. Most printer manufacturers recommend that customers do not use IPA in their printers because of safety concerns due to the flammability and vapor emissions. Also, IPA is not a good cleaner in cleaning adhesives. IPA tends to dry (partially cure) the adhesive, making it more difficult to clean later on.

Manual cleaning - In addition to the poor cleaning ability of IPA, users are exposed to the vapors emitted by IPA.

Automated cleaning equipment - Explosion-proof equipment is required to use IPA due to the flammable and explosive nature of the product. The only advantage of IPA is its fast drying characteristics.

	IPA	CYBERSOLV C8882 (100%)	CYBERSOLV C3400 (100%)	KYZEN E5631 (15%)	KYZEN E5611 (15%)
Performance – Paste	Average	Excellent	Excellent	Excellent	Excellent
Performance – Adhesive	Poor	Excellent	Not Recommended	Test ($\geq 25\%$)	Excellent ($\geq 25\%$)
Flash Point	12°C/53°F	61°C/142°F	61°C/142°F	None	None
VOC, EPA Method 24	100%	875.6 g/L	762 g/L	131.1 g/L	123.3 g/L
HMIS	2-3-0	1-2-0	1-2-0	1-0-0	0-0-0
Transportation & Storage	CLASS 3: Flammable liquid	Non-Hazardous	Non-Hazardous	Non-Hazardous	Non-Hazardous

ADDITIONAL REFERENCES/RESOURCES

- ✘ <http://nj.gov/health/eoh/rtkweb/documents/fs/1076.pdf>
- ✘ <http://www.sciencelab.com/msds.php?msdsId=9924412>
- ✘ http://en.wikipedia.org/wiki/Isopropyl_alcohol