

Swansolv

Non-flammable oxygen standard precision cleaning solvent

Introduction

Swansolv is a new generation fast evaporating, environmentally safer solvent formulation, specifically developed as an environmentally better, non-flammable 'drop in' replacement for trichloroethane, HCFC 141b and other chlorinated solvents, with no loss in cleaning effectiveness.

The development of Swansolv was driven by performance criteria to achieve an industry leading standard for oxygen duty cleaning. This makes it a highly versatile solvent of choice for the highest standard of solvent cleaning.

With the added benefit of a specially stabilised formula to resist acidification in use and prevent corrosion, Swansolv users know they have the best possible product for use across a very diverse range of industrial applications.

Versatile performance

Swansolv has been shown to perform comparably with, or better than, trichloroethane.

Suitable for enclosed system vapour degreasing, ultrasonic cleaning and hand cleaning applications.

Swansolv has proven excellence in solvency power and soil loading capacity for a wide range of materials including:

- Mineral and synthetic oils and greases
- Solder fluxes
- Waxes
- Resins
- Adhesives
- Metalworking lubricants
- Anti-seize compounds
- Coolants

and virtually all other industrial soiling.

Applications

- Ultra high performance cleaner and degreaser for metal/ceramic components.
- Cleaning of oil, grease and other contamination from gaseous and liquid oxygen systems.
- Degreasing metal parts prior to painting, coating or plating.
- Precision cleaning of optics, aerospace components and spaceflight hardware.
- Removal of flux residues from critical electronics.
- Cleaning of oxygen systems in medical, diving and other breathing gas applications.
- Final wash for high vacuum components.

Product features

- Non-flammable (ASTM-D-56 tested).
- Chlorine free.
- Specialist inhibitor package neutralises acidic soiling to prevent corrosion of metals.
- Fast evaporating (comparison data below).
- Excellent solvency and soiling loading capacity for a wide range of industrial soiling.
- Leaves no measurable residue.
- Safe to use on all common metals and most plastics and elastomers (full compatibility data below).
- Tested and approved for cleaning to oxygen duty standards for both LOX and GOX.
- Swansolv is environmentally assessed to have a 10 day atmospheric lifetime, a near zero ODP & GWP, and is free from ozone depleting chemicals and CFCs.

User benefits

- Class leading cleaning performance.
- Environmentally safer than other alternatives.
- Compatible with a wide range of metals, plastics and elastomers.
- Reduces costs by reducing cleaning time and lowering reject rate.
- Improves workplace safety by replacing a range of other flammable solvents.

Approvals

- Swansolv is approved for oxygen standard cleaning by BOC Group.
- Approved by Rolls Royce (corrosion prevention materials database).
- Approved for cleaning aluminium and gold for use in space programme manufacturing.
- Conforms to ASTM and major aerospace manufacturers' cleaning standards.
- Approved by major UK explosives manufacturer for critical parts cleaning.

Availability

Swansolv is available in the following packs:

- 12 x 400ml aerosol (non-flam propellant)
- 13kg (9.7litre)
- 25kg (18.6 litre)
- 250kg (186 litre)

Physical properties

Property	Value
Specific gravity	1.33 kg/L
Boiling point	69°C
Evaporation rate (n-butyl acetate = 1)	4.5 (ASTM-D-3539-76)
Melting point	< -110°C
Viscosity @ 25°C	0.49 cp
Vapour pressure @ 25°C	143 torr
Vapour density (air = 1)	4.3
Specific heat @25°C	0.27
Latent heat of vaporisation	58.8 cal/g
Water solubility	0.25 g/100ml
Surface tension @ 20°C	25.9 dynes/cm
Dielectric constant @ 20°C	7.98
Dielectric strength	18,000V
Flash point	none (Tag closed cup, ASTM D56)
Flammability limits	4.6% to 8.2 % by volume
Decomposition	> 400°C
Appearance	Clear colourless liquid
Odour	Characteristic solvent
Colour	50 max (APHA)
Water content	0.004% max
Acidity	0.002 wt % (as HCl)
Acid acceptance	0.19 wt % NaOH
Free halogen	none
Global warming potential	almost zero (0.00005 - 0.00020)
Ozone depletion potential	almost zero (0.006)
Atmospheric lifetime	10 days
PEL (US EPA / OSHA)	25 ppm
Hildebrand parameter	17.9
Kauri butanol number	129
Hansen parameter non-polar	16.0
Hansen parameter polar	5.8
Hydrogen bonding	4.2

Elastomer compatibility

Test 1: Elastomer test effect

Test 2: Vapour degreaser vapour layer test effect

Elastomer material	Test 1	Test 2
Acrylonitrile butadiene	1	1
Butadiene nitrile	✓	✓
Butadiene styrene	✓	✓
Butyl	✓	✓
Chloroprene	✓	✓
Chlorosulfonate polyethylene	✓	✓
Epichlorohydrin 956	✓	✓
Ethylene propylene	✓	✓
Ethylene propylene (Terpolymer)	1	✓
Fluoroelastomer (Viton A, B)	✓	✓
Isobutylene isoprene (Butyl)	1	1
Natural rubber	2	2
Perfluorelastomer (Chemraz)	✓	✓
Polychloroprene (Neoprene)	2	2
Polyether urethane	✓	✓
Polysiloxane (Silicone)	✓	1
Polysulfide	✓	✓
Polyurethane	✓	1
Vinyl methyl siloxane	0	0

Key: ✓ - No change; 1 - Moderate change; 2 - Significant change

Evaporation rate

This table shows the evaporation rate of Swansolv and some other solvents, measured with respect to n-Butyl acetate. Higher numbers imply faster evaporation.

Solvent	Evaporation rate
Methylene chloride	7.0
Acetone	5.7
1.1.1-Trichloroethane	4.6
Swansolv	4.5
Methyl ethyl ketone	3.9
Trichloroethylene	3.0
Methyl alcohol	2.1
Perchloroethylene	1.5
Ethanol (95% EtOH, 5% H ₂ O)	1.4
n-Butyl acetate	1.0

Plastic compatibility

Substrates exposed to Swansolv and examined for degradation or other negative effects.

Substrate	Result
ABS	✗
Acrylic	✗
Arlon (Polyether ether ketone)	✓
Chlorinated polyvinyl chloride	✓
Delrin	✓
Epoxy resins	✓
Furane resins	✓
Fluoroethylpropylene	✓
High density polyethylene	✓
Ionomer resin	✓
Kynar (Polyvinylidene fluoride)	✓
Lexan	✗
Methylmethacrylate	✓
Mylar	✓
Nylon	✓
Polyamide	✓
Polyethylene terephthalate	✓
Polyimide	✓
Polyoxymethylene	✓
Polypropylene	✓
Polystyrene	✗
Polyurethane	✓
PVC (rigid, pipe compound)	✓
Teflon (Polyvinylidene fluoride)	✓
Ultem (Polyetherimide)	✓

Key: ✓ - Acceptable; ✗ - Unacceptable

Metal compatibility

Corrosion resistance of metals and alloys when exposed to Swansolv.

Metal	Mil Spec for vapour degreasers	Immersed for 2 weeks at 50°C	Immersed for 1 month at 50°C	Immersed for 2 months at 50°C	Immersed in vapour layer for 60 minutes
Beryllium	✓	✓	✓	✓	✓
Aluminium	✓	✓	✓	✓	✓
Beryllium	✓	✓	✓	✓	✓
Boron	✓	✓	✓	✓	✓
Naval brass	✓	✓	✓	✓	✓
Bronze	✓	✓	✓	✓	✓
Carbon steel	✓	✓	✓	✓	✓
Chromium	✓	✓	✓	✓	✓
Copper	✓	✓	✓	✓	✓
Hastelloy-B	✓	✓	✓	✓	✓
Hastelloy-C	✓	✓	✓	✓	✓
Hastelloy-D	✓	✓	✓	✓	✓
Incontel	✓	✓	✓	✓	✓
Iron (cast)	✓	✓	✓	✓	✓
Iron (high silicon)	✓	✓	✓	✓	✓
Lead	✓	✓	✓	✓	✓
Magnesium	✓	✓	✓	✓	✓
Manganese	✓	✓	✓	2	✓
Nickel	✓	✓	✓	✓	✓
Platinum	✓	✓	✓	✓	✓
Silver	✓	✓	✓	✓	✓
316 Stainless steel	✓	✓	✓	✓	✓
Tin	✓	✓	✓	✓	✓
Titanium	✓	✓	✓	✓	✓
Uranium	1	✓	✓	2	2
Vanadium	✓	✓	✓	✓	✓
Zinc	✓	✓	✓	✓	✓
Zirconium	✓	✓	✓	✓	✓

Key: ✓ - Passed / no corrosion; 1 - Not tested; 2 - Trace corrosion

Further technical or sales assistance is available from your Swantek representative.