AGC
Your Dreams, Our Challenge

Environmentally Friendly Fluorinated Fluids

ASAHIKLIN™

AE-3000 AE-3100E AC-6000

AGC Inc.

Chemicals Company

Head Quarters
Shin-Marunouchi Bldg., 1-5-1 Marunouchi Chiyoda-ku, Tokyo 100-8405 JAPAN
Phone: +81-3-3218-5574
https://www.agc-chemicals.com

AGC Chemicals Americas. Inc.
55 East Uwchlan Ave. Suite 201, Exton, PA 19341, USA
Phone: +1-610-423-4300

AGC Chemicals Asia Pacific Pte Ltd.
460 Alexandra Road #32-01 mTower 119963 SINGAPORE
Phone: +65-6273-5656

AGC Chemicals Europe Commercial Centre
World Trade Center Zuidplein 80, 1077 XV Amsterdam, NETHERLANDS
Phone: +31-20-880-4170

AGC Vinythai Public Company Limited
944 Mitrtown Office Tower, 14th Floor, Rama 4 Road, Wangmai Sub-District, Pathumwan District, Bangkok 10330 THAILAND
Phone: +66-2-092-6499

AGC Chemicals Trading (Shanghai) Inc.
Unit 4008-09, 40F, Raffles City Changning Office Tower 1, No.1133 Changning Road, Shanghai 200051 CHINA
Phone: +86-21-6386-2211

AGC Vidros do Brasil Ltda.
Estrada Municipal Fazenda São Pedro, 500 - Jardim Vista Alegre, City of Guaratinguetá, State of São Paulo 12523-671 BRASIL
Phone: +55 12 3127-7100
email: quimica@agc.com

Handling Precautions

- Please read the Safety Data Sheet (SDS) and observe all precautions when handling the product.
- SDS can be downloaded from our website.
- Please note that toxic gases (hydrogen fluoride, carbon monoxide, carbonyl fluoride, etc.) may be generated when exposed to naked flames.
- Do not inhale highly concentrated gases.

2023.04

The ASAHIKLIN series are environmentally friendly fluorinated fluids.

Safety

Non-flammable

The ASAHIKLIN series have no flash point, thus not required explosion proof equipment.

Secureness

Stability

The ASAHIKLIN series is chemically and thermally stable.

Reliability

The ASAHIKLIN series is compatible with a wide range of materials.

Convenience

Versatility

The ASAHIKLIN series can be used for a variety of customer applications

Cost-saving

The ASAHIKLIN series offers energy-saving advantages and reduces waste.

Environment

ODP zero *1

The ASAHIKLIN series does not affect the ozone layer.

Low GWP *2

The ASAHIKLIN series reduces the impact on global warming.

Recyclable

The ASAHIKLIN series can be recycled by distillation.

*1 ODP: Ozone Depletion Potential
*2 GWP: Global Warming Potential

Lineup of ASAHIKLIN series

- **ASAHIKLIN AE-3000**
  Zero ODP fluorinated fluids.

- **ASAHIKLIN AE-3100E**
  The mixture of ASAHIKLIN AE-3000 and ethanol, non-flammable grade.

- **ASAHIKLIN AC-6000**
  Zero ODP and low global warming potential, which can be used in a wide range of temperatures.

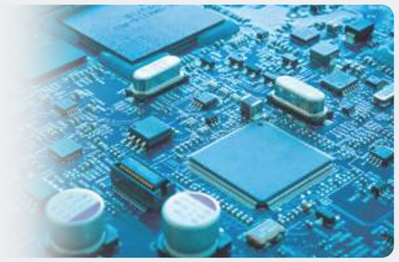
	AE-3000	AE-3100E	AC-6000
Boiling Point (˚C)	56	54	114.7
Freezing Point (˚C)	-93	-86	-76
Ozone Depletion Potential (CFC-11=1)	0	0	0
Global Warming Potential (CO_2=1 100yr ITH)	889 *3	889 *3	136 *4
Package	1kg Plastic bottle 20kg Pail 300kg Drum	1kg Plastic bottle 20kg Pail 250kg Drum	1kg Plastic bottle 5kg Plastic bottle 20kg Pail 300kg Drum

*3 Intergovernmental Panel on Climate Change/ Technology & Economic Assessment Panel Report in 2014
*4 Calculated Value by the National Institute of Advanced Industrial Science and Technology (AIST)

Usage example 1

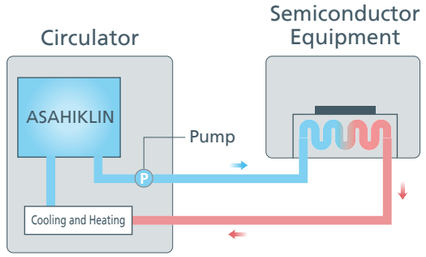
Heat Transfer Fluids

- It remains liquid over a wide temperature range.
- High thermal and chemical stability.
- High unit heat transportation capacity.
- High electrical insulation.
- Non-flammable.
- A wide range of materials can be used due to its excellent material compatibility.
- Low kinematic viscosity reduces load on pump.



• Brine for Semiconductor Devices

[Examples]
- Dry Etching Equipment
- Semiconductor Lithography Equipment
- CVD Lithography
- Plover
- IC Tester

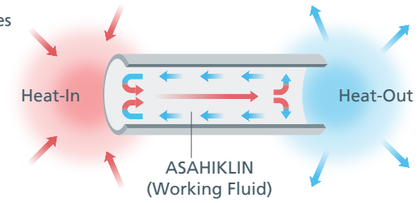


• Other Brines

[Examples]
- Coolant for Computer Server, Condenser, Sensor, Precision and Electronics Devices
- Coolant for Chemical and Medical industrial Equipment
- Temperature control for environmental testroom
- Heat Transfer Fluid for Thermostat Chamber
- Ultra-low temperature brine below -40°C

• Working Fluids

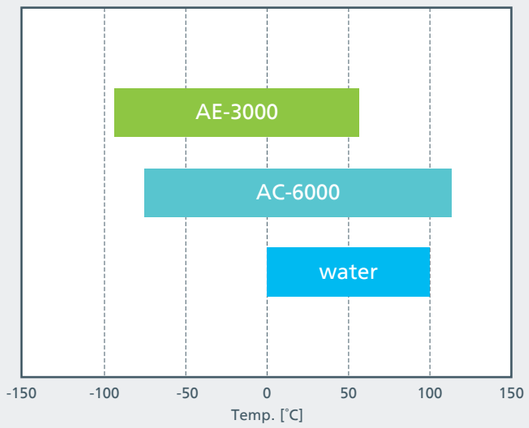
[Examples]
- Working Fluid for Heat Pipes
- Coolant for Rectifier, LED and Laser Generator



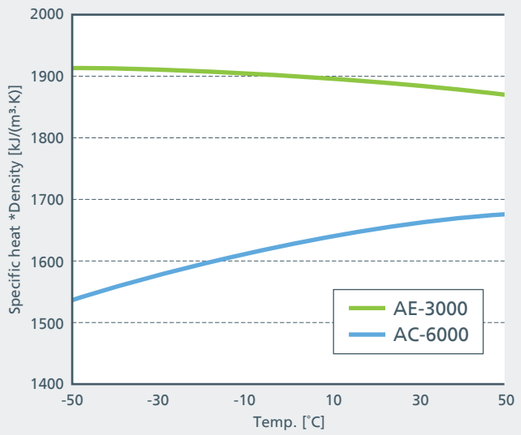
• Other Applications

[Examples]
- Working Fluid of Exhaust Heat from Plants
- Leak test fluid for electronic components, filters and valves
- Reliability test liquids for electronic components

Liquid Temperature Range of the liquid phase of the ASAHIKLIN series



Heat Transport Ratio



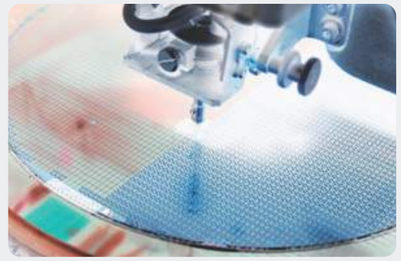
Usage example 2

Solvents

- Low surface tension and low viscosity allow the liquid to wet and spread evenly.
- Excellent drying properties due to uniform volatilization at a moderate rate.
- Excellent dispersibility due to high specific gravity.
- Non-flammable.

• Dilution Coating Solvents

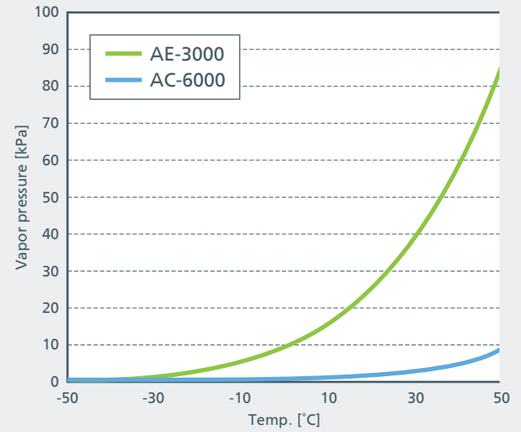
[Examples]
- Lubricant for HDDs
- Fluorinated Greases
- Fluorinated Oils
- Water-Repellant Agents
- Antifouling Agents



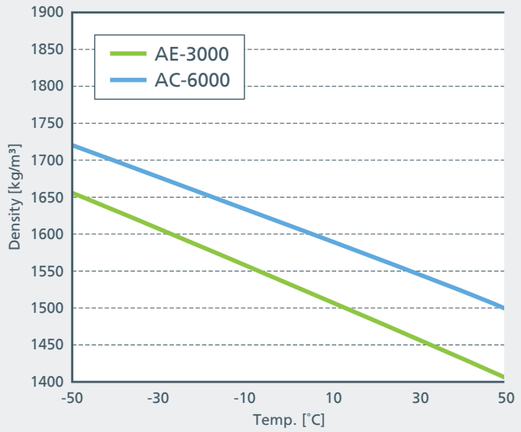
• Dispersion Agents and Others

[Examples]
- Fluoropolymers
- Graphite, Nano-Carbons
- Fireproof Agents
- Reaction Solvent for Fluoropolymers

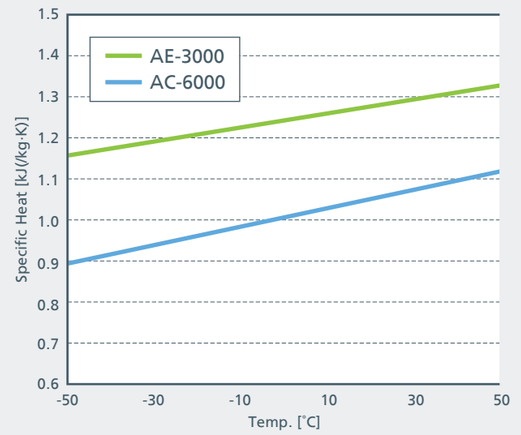
Vapor Pressure - Temperature Curve



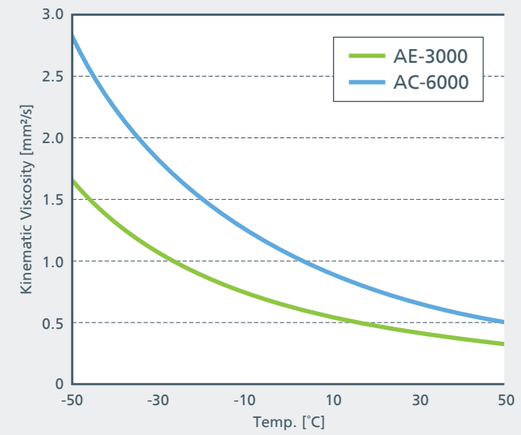
Density - Temperature Curve



Specific Heat - Temperature Curve



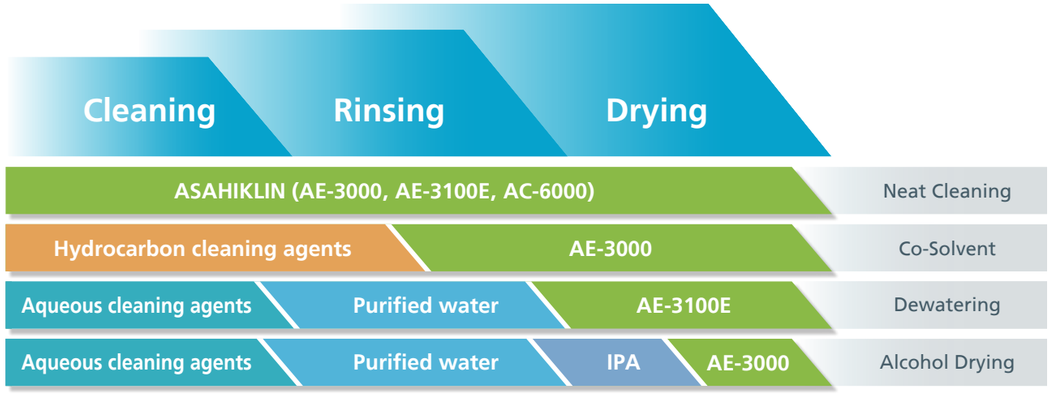
Kinematic Viscosity - Temperature Curve



Usage example ❸

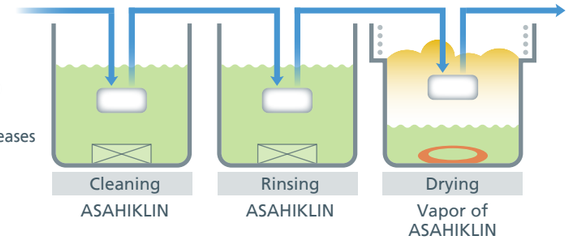
Cleaning

- Low surface tension allows to remove the dirt in a small gaps.
- Reduced drying temperature and drying time.
- No spots after drying.
- Excellent material compatibility enables cleaning of a wide range of components.
- Non-flammable.



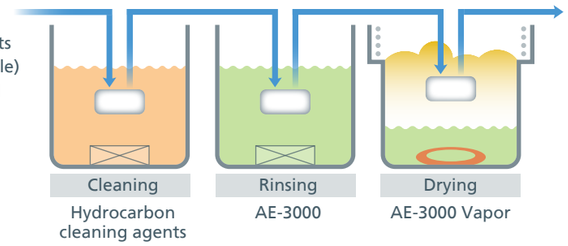
• Neat Cleaning

[Examples]
- Particle Removal (Image sensors, Crystal Oscillator Devices, Wafers, Plastics Moldings)
- Cleaning for Refrigeration Cycle
- Cleaning for Fluorinated Oils and Greases
- Dry Cleaning



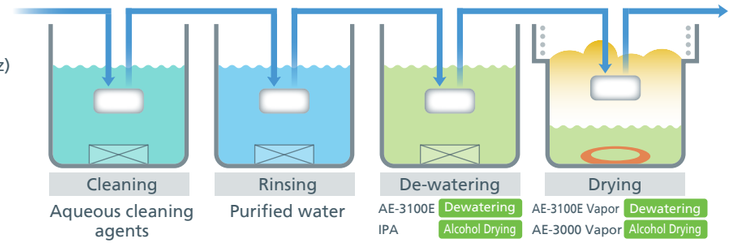
• Co-Solvent

[Examples]
- Degreasing for Precision Metal Parts (Lead Frame, Engine for Automobile)
- Defluxing for Printed Circuit Board
- Removing Wax and Pitch for Lens
- Removing Liquid Crystal and Organic EL Materials



• Dewatering・Alcohol Drying

[Examples]
- Drying after Aqueous Cleaning (Glass Lens, Glass Substrate, Quartz)
- Drying after Wet Plating
- Drying for Carbide Metal before coating



Physical Properties

Items	Unit	AE-3000	AE-3100E	AC-6000
Component	—	HFE-347pc-f	HFE-347pc-f / Ethanol	HFC-76-13sf
Structural formula	—	$CF_3CH_2OCF_2CF_2H$	$CF_3CH_2OCF_2CF_2H$ / CH_3CH_2OH	$CF_3(CF_2)_5CH_2CH_3$
Boiling Point	˚C	56	54	114.7
Freezing Point	˚C	-93	-86	-76
Density (25˚C)	—	1.47	1.40	1.56
Surface Tension (25˚C)	mN/m	16	16.1	15.5
Viscosity (25˚C)	mPa·s	0.65	0.60	1.109
Kinematic Viscosity (25˚C)	mm^2/s	0.44	—	0.71
Kinematic Viscosity (-40˚C)	mm^2/s	1.31	—	1.65
Vapor Pressure (25˚C)	kPa	31	28	2.6
Specific Heat (25˚C)	kJ/kg·K	1.3	—	1.189
Thermal Conductivity (25˚C)	W/(m·K)	0.090	—	0.067
Latent Heat of Vaporization (Boiling Point)	kJ/kg	163	—	78
Relative Evaporation Rate	Ether=100	67	66	11
Solubility of Water	ppm	900	5,300	50
Solubility in Water	ppm	800	—	—
Flash Point	˚C	None	None	None
Dielectric constant (25˚C,1MHz)	—	6.5	—	5.1
Electrical Resistivity (23˚C)	Ω·m	1.3×10^{9}	—	3.4×10^{10}(21˚C)
Electrical Conductivity (23˚C)	μS/m	7.7×10^{-4}	—	2.9×10^{-3}(21˚C)
Dielectric Breakdown Voltage (25˚C, 2.5mmGap)	kV	40	—	27

Material Compatibility

[Effect on Metals] No determental effects are found when cleaning Stanless Steel, Aluminum, Copper, Brass or other metals with ASAHIKLIN series.

[Effect on Plastics and Elastomers]

Test Condition Samples were immersed for 3 days into AE-3000 and AE-3100E at boiling point, for AC-6000 at 50˚C