



Your Dreams, Our Challenge

Fluorinated Solvents



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AGC Chemicals is one of the world's leading producers of fluorochemicals and fluorochemical materials. AGC's venture into the field of chemistry first began over a 100 years ago, with in-house production of soda ash, a raw material for flat glass. Guided by the vision of "Chemistry for a Blue Planet", at AGC Chemicals we continue to provide a wide variety of products that contribute towards a fulfilling, safe and comfortable society and environment, from basic chemicals to fluoride-based high-performance chemicals.

There is a team of dedicated product and marketing managers and customer service representatives located at the commercial office of AGC Chemicals Europe, in Amsterdam, The Netherlands. A wide range of fluorinated and speciality chemicals are available for customers throughout Europe, the Middle East and Africa.

The fluorinated solvent range, manufactured by AGC Inc. in Japan, was designed to address environmental problems such as ozone depletion and global warming. AGC offers non-flammable and safer solvents as well as solvent-based blends, which are used for the degreasing of metal products, precision cleaning and defluxing of electronic circuitry. Other applications include carrier for silicone and fluorinated lubricants, heat transfer fluid and drying.

Solvents from AGC have no flash point and therefore explosion-proof equipment is not required when using them. The full product range consists of pure solvents and solvent blends, marketed under the brand names ASAHIKLIN™ and AMOLEA™.

Cleaning Applications

The selection of the most appropriate solvent depends largely on the type of pollution:

- Heavy (waxes, pitches or glues) – AMOLEA™ AS-300AT
- Medium (processing oils or fluxes) – AMOLEA™ AS-300 or AMOLEA™ AT1
- Light (dust particles) – ASAHIKLIN™ AE-3000

Other Applications

Application	Examples	Recommended Product
Drying	De-watering after aqueous cleaning	ASAHIKLIN™ AE-3100E
	Co-solvent after Hydrocarbon cleaning	ASAHIKLIN™ AE-3000
Diluent	Fluorinated oils	AMOLEA™ AS-300
		ASAHIKLIN™ AE-3000
	Silicone oils	AMOLEA™ AS-300
		AMOLEA™ AT1
		AMOLEA™ AS-300AT
	Others	AMOLEA™ AS-300
AMOLEA™ AT1		
ASAHIKLIN™ AE-3000		
Heat Transfer	Brine	AMOLEA™ AS-300
		ASAHIKLIN™ AE-3000

AMOLEA™ AS-300

Rising environmental awareness in recent years has created a strong demand for new fluorinated solvents with decreased Ozone Depletion Potential (ODP) and Global Warming Potential (GWP). AMOLEA™ AS-300 is our next-generation, fluorinated, non-flammable solvent with low environmental impact and maximum cleaning power. With an ODP of 0.00002 and a GWP of less than 1, AMOLEA™ AS-300 is the first ever fluorinated solvent that exerts minimal impact on our global environment, while still delivering excellent solvency and an optimal boiling point.

Features

- Very low GWP (Global Warming Potential)
- Almost zero ODP (Ozone Depletion Potential)
- Excellent solvency (high Kb value) without trans-1,2-dichloroethylene
- Ideal boiling point for cleaning applications (54°C)
- Improved safety – high AEL (Allowable Exposure Limit) and no flash point
- Contributes to lower consumption of solvent

Applications

- Substitution of bromine-based solvents
- Degreasing of metal and precision parts
- Degreasing of aerospace parts
- Degreasing of semiconductors and electronic parts
- Defluxing of printed circuit boards
- Cleaning during pre-plating
- Dilution of silicone oils and fluorinated greases
- Carrier for fluorinated oils and greases
- Substitution of trans-1,2-dichloroethylene blended solvents

Product Comparison by Application

Application	AS-300	AK*-225 (HCFC)	HFE
Degreasing	✓	✓	
Particle cleaning	✓	✓	✓
Metal cleaning	✓	✓	
Precision cleaning	✓	✓	✓
Defluxing	✓	✓	
Dilution of fluorinated oils	✓	✓	✓
Dilution of silicone oils	✓	✓	

*ASAHIKLIN™ AK-225 shown for comparison only. Not available in Europe.



Pure Solvents

ASAHIKLIN™ AE-3000

ASAHIKLIN™ AE-3000 is a hydrofluoroether (HFE) with an Ozone Depletion Potential (ODP) of zero and a Global Warming Potential (GWP) of 580. It has low surface tension and high permeability, so it can even eliminate particles remaining in fine gaps. Its boiling point is low compared to a water/IPA (2-propanol)/hydrocarbon solvent. It is ideal for drying parts that could be damaged by heat or as a flame suppressant in t-DCE blends.

Features

- Low viscosity™
- Surface tension
- Recyclable through distillation
- Fast drying
- Good coating performance
- Non-flammable / no flash point
- Recoverable through distillation

Applications

- Precision cleaning
- Electronics cleaning
- Carrier fluid
- Co-solvent drying (solvent drying)
- Rinsing

	AMOLEA™ AS-300	ASAHIKLIN™ AE-3000
Chemical structure	HCFO	HFE
Boiling point	54°C	56°C
Freezing point	-82°C	-94°C
Ozone depleting potential	0.00	0.00
Global warming potential	<1	580*
AEL	250ppm	50ppm
Kb value	44	13
Packaging	20kg pail	20kg pail
	250kg drum	300kg drum

* Intergovernmental Panel on Climate/Technology & Economic Assessment Panel Report in 2007

** Calculated Value by the National Institute of Advanced Industrial Science and Technology (AIST)

Fluorinated Solvent Blends

ASAHIKLIN™ AE-3100E

ASAHIKLIN™ AE-3100E is a non-flammable mixture of Hydrofluoroether (HFE-347pc-f) and Ethanol that has excellent material compatibility, low surface tension, and zero ODP, which is ideally suited for drying plated carbide metals before coating.

AMOLEA™ AT1

AMOLEA™ AT1 is an azeotropic mixture of trans-1,2-dichloroethylene, HFE-347pc-f (ASAHIKLIN™ AE-3000) and ethanol. It is suitable for use as a carrier solvent of silicone oil.

AMOLEA™ AS-300AT

AMOLEA™ AS-300AT is the industry's newest non-flammable fluorinated solvent with excellent cleaning properties. Being a HCFO blend, AMOLEA™ AS-300AT is an azeotrope containing AMOLEA™ AS-300 and trans-1,2-DCE and has outstanding solvent power (Kb value 118). It can be used in a vapour degreaser and has a Global Warming Potential (GWP) of less than 1.

Features

- High Kb (Kauri-butanol) value
- Low GWP (Global Warming Potential)
- Zero ODP (Ozone Depletion Potential)
- Good compatibility with most metals
- Non-flammable / no flash point
- Recoverable through distillation
- Excellent thermal, chemical and hydrolytic stability

Applications

- Electronics industry (press oils, cutting oils, silicone oils, fluxes, greases, waxes and asphalt pitches)
- Medical devices (orthopaedic implants, catheters, tubes, scopes, needles, dental devices and surgical tools)
- De-watering / moisture displacement
- Carrier Fluid
- Optical lens

	AMOLEA™ AS-300AT	AMOLEA™ AT1	ASAHIKLIN™ AE-3100E
Chemical structure	HCFO + t-DCE	HFE / t-DCE / EtOH	HFE / EtOH
Boiling point	47°C	42°C	54°C
Freezing point	-	-50°C	-86°C
Ozone depleting potential	0.00	0.00	0.00
Global warming potential	<1	274	540
AEL	200ppm	100ppm	50ppm
Kb value	118	38	14
Packaging	20kg pail	20kg pail	20kg pail
	250kg drum	250kg drum	250kg drum

Physical Properties

	Unit	Pure Solvents		Blends		
		AMOLEA™ AS-300	ASAHIKLIN™ AE-3000	AMOLEA™ AS-300AT	AMOLEA™ AT1	ASAHIKLIN™ AE-3100E
Boiling point	°C	54	56	47	42	54
Freezing point	°C	-82	-94	-	-50	-86
Ozone depleting potential	-	0.00	0.00	0	0.00	0.00
Global warming potential	-	<1	580	<1	274	540
AEL	ppm	250	50	200	100	50
Kb value	-	44	13	118	38	14
Flash point	°C	none	none	none	none	none
Viscosity (25°C)	mPa·s	0.57	0.65	0.42	-	0.6
Kinematic viscosity (25°C)	µm ² /s	0.41	0.44	0.33	-	0.43
Density (25°C)	kg/m ³	1390	1470	3.8	1300	1400
Surface tension (25°C)	mN/m	21.7	16.4	22	17.9	16.1
Vapour pressure (25°C)	kPa	32.7	31	45.5	56	28
Specific heat (25°C)	KJ/kg·K	1.34	1.28	-	1.34	1.33
Latent heat of vaporisation	KJ/kg	213	163	275	200	200
Relative evaporation rate	Ether=100	64	67	261	98	66
Solubility of water	ppm	1500	900	-	1670	5300
Dielectric constant (23°C)	-	12.3	6.6	-	-	-
Electrical resistivity	Ω·m	8.7 × 10 ⁶	1.3 × 10 ⁹	-	-	-
Electrical conductivity (23°C)	µS/m	1.1 × 10 ⁻¹	7.7 × 10 ⁻⁴	-	-	-
Dielectric breakdown voltage (23°C)	kV	-	39.5	-	-	-
Critical temperature	°C	-	190	-	-	-
Critical pressure	MPa	-	2.7	-	-	-
Kinematic viscosity (-40°C)	µm ² /s	-	1.31	-	-	-
Thermal conductivity (25°C)	mW/(m·K)	108	89	-	-	-

Material Compatibility

Effect on Metals

No detrimental effects when the ASAHIKLIN™ or AMOLEA™ series are used to clean stainless steel, aluminium, copper, brass or other metals.

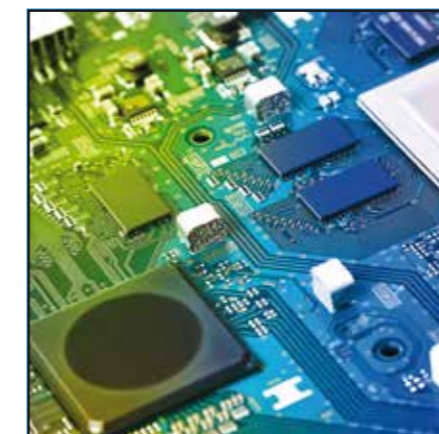
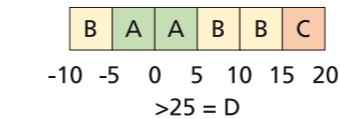
Effect on Plastics and Elastomers

Test Conditions: Samples were immersed for 3 days in AMOLEA™ AS-300, ASAHIKLIN™ AE-3000, ASAHIKLIN™ AE-3100E at boiling point, at 50°C.

Material	AMOLEA™ AS-300		ASAHIKLIN™ AE-3000		ASAHIKLIN™ AE-3100E	
	Weight Change (%)	Linear Swell (%)	Weight Change (%)	Linear Swell (%)	Weight Change (%)	Linear Swell (%)
Polypropylene	A	A	A	A	A	A
Polystyrene	D	D	A	A	A	A
Polymethyl Methacrylate	D	D	C	C	C	C
ABS	D	D	A	A	B	A
PTFE	A	A	A	A	A	A

Fluoroelastomer	D	D	D	C	D	C
Silicone Rubber	D	D	B	A	C	A
EPDM	B	A	A	A	A	A

Key



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The logo for AGC, featuring the letters 'AGC' in a bold, white, sans-serif font. A small red square is positioned at the top right corner of the letter 'C'.**European Office:**

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