Akem
Kimya San. ve Tic. Ltd. Şti.

CATALOGUE 2026

TYPE I · TYPE II

PLAS P AIRCRAFT®

Monopropylene glycol based de-icing and anti-icing fluids for aircraft surfaces. AMS 1424 / ISO 11075 and AMS 1428 / ISO 11078.



AMS 1424
ISO 11075 · TYPE I

AMS 1428
ISO 11078 · TYPE II

MPG
PROPYLENE GLYCOL BASED

24 mo
SHELF LIFE

AKEM KIMYA

Specialised chemical solutions for winter conditions

Akem Kimya San. ve Tic. Ltd. Şti. manufactures snow and ice control chemicals for municipalities, road and tunnel operators, airports, the defence industry and industrial sites. From our facility in Istanbul we supply customers throughout Türkiye and abroad in drums, IBC tanks and bulk tankers.

Every surface has different needs in winter operations: roads and pavements require fast action at low cost, airport runways need chloride-free, material-friendly formulations, and aircraft surfaces demand full compliance with international aviation specifications. The Akem Kimya winter product family was developed separately for each of these three needs.

Winter product family

PLAS ICE®

Roads and sites
Magnesium or calcium chloride based liquid de-icer and anti-icer. Effective down to −40 °C.

POLIDE ICE®

Runways and aprons
Potassium acetate based, chloride-free runway de-icer. AMS 1435; freezing point below −50 °C.

PLAS P AIRCRAFT®

Aircraft surfaces
Monopropylene glycol based Type I and Type II de-/anti-icing fluids. AMS 1424 / 1428.

3
dedicated formulations for three fields of use

Production
own production and stocked Istanbul warehouse

Drum
IBC tank and bulk tanker delivery

Support
dosage planning and tender support

Why Akem Kimya?

- Pre-season stock and delivery planning
- Fast delivery for urgent winter demands
- Documentation and references for public tenders
- Packaging to suit your needs: drum, IBC, bulk
- Application equipment and dosage advice
- Long-standing references in public, aviation and industry

ABOUT THE PRODUCT

Aviation-grade fluids for flight safety

The PLAS P AIRCRAFT® series are aviation fluids developed to remove ice, snow and frost from the wing, tail and fuselage surfaces of aircraft (de-icing) and to prevent re-freezing for a certain time before flight (anti-icing).

Based on monopropylene glycol (MPG), the product is manufactured in two classes: Type I (80–88% MPG; AMS 1424 / ISO 11075) and Type II (50–55% MPG; AMS 1428 / ISO 11078). Special corrosion inhibitors protect the materials of the aircraft exterior.

Vital for flight safety, these fluids protect the surface without impairing aerodynamics and are applied in the field in accordance with regulations at dilutions such as 100/0, 75/25 and 50/50, depending on the outside temperature.

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80–88%	50–55%	4	24 mo
MPG · TYPE I	MPG · TYPE II	SPECIFICATIONS	SHELF LIFE

FUNDAMENTALS

Why is aircraft icing critical?

Icing conditions arise when the air temperature drops below freezing and atmospheric moisture turns into precipitation or condenses on the surface. Precipitation may be rain, sleet or snow; icing also occurs when fog condenses.

Ice forms even when the outside air temperature is above freezing if the aircraft surface is below 0 °C and there is moisture in the air. Drizzle falling on a wing below 0 °C leaves a thin, transparent ice layer — the hardest form of icing to see with the naked eye.

Weight

Ice, frost and snow accumulating on the surface increase take-off weight.

Aerodynamics

Even millimetre-scale roughness on the upper wing reduces lift and increases drag.

> **The rule is clear:** An aircraft ready for flight must have no ice, snow, frost or slush on its critical surfaces.

De-icing and anti-icing

DE-ICING

Removing ice

Removal of ice, frost and snow from the fuselage and wings. A heated mixture of water and de-icing fluid is sprayed onto the surface; the fluid removes contamination but gives no subsequent protection.

ANTI-ICING

Preventing ice

Prevents renewed accumulation of snow, frost and ice on the cleaned surface for a certain period (holdover time). The fluid is applied mixed with water or undiluted.

In most operations the two procedures follow each other: first the surface is cleaned by de-icing, then protected by anti-icing until take-off. They are carried out shortly before departure, close to the runway threshold.

FLUID CLASSES

What are Type I / II / III / IV?

Aircraft de-icing fluids are divided into four types according to viscosity and holdover time. The type used is determined together with the aircraft manufacturer's procedure, the airport's winter operations instructions and the prevailing weather.

Type	Characteristics	Purpose
Type I	Low viscosity; applied hot.	Removal of existing ice, frost and snow (de-icing). Short holdover time.
Type II	Thickened (pseudoplastic), more viscous.	Combines de-icing and anti-icing; remains on the surface to provide holdover time.
Type III	Viscosity between Type I and II.	For medium-sized aircraft with low rotation speeds; medium holdover time.
Type IV	High viscosity; usually applied cold.	Longest holdover time; prevents re-icing until take-off.

Pseudoplastic behaviour

Parked
Type II and IV fluids remain on the wing as a thick, non-flowing film.

›

Take-off run
Shear forces from the air flow reduce the fluid's viscosity.

›

Rotation
The fluid flows off, leaving a clean wing.

Type II and IV fluids are therefore used only on aircraft reaching sufficient take-off speed.

PLAS P AIRCRAFT® range

PLAS P AIRCRAFT® is manufactured as Type I (80–88% MPG) and Type II (50–55% MPG).

Type III and Type IV

Contact our technical team for Type III and Type IV requirements; information is available on request.

TYPE I · AMS 1424 · ISO 11075

PLAS P AIRCRAFT® Type I

A modern, propylene glycol based Type I aircraft de-icing fluid, mixed with hot water to remove ice, snow and frost from the fuselage, wing and tail surfaces.

Benefits

- Low foaming: remaining frozen deposits are easy to identify.
- Excellent wetting delays re-freezing of treated surfaces.
- Improved inhibitor package allows dilution even with hard water.
- Biodegradable additives, low surfactant content, triazole-free.
- Clearly exceeds the minimum water spray endurance test (WSET) requirement of 3 min.

> **Heating:** Type I is not critical with regard to heating and may be kept at up to +90 °C during the season. Avoid water evaporation.

Product properties

Property	Value
Chemical composition	Propylene glycol (80–88%) and corrosion inhibitors
Appearance	Clear liquid
Colour	Please consult us for colour options.
Refractive index (20 °C)	1.418 – 1.420
pH (as is)	8.0 – 9.5
Density (20 °C)	approx. 1.04 g/cm^3
Freezing point (1:1 with water)	< −25 °C
Kinematic viscosity (20 °C)	18 – 23 mm^2/s
Surface tension	37 – 45 mN/m
COD / BOD_5	1.3 / 0.66 kg O_2/kg

Aquatic toxicity

Parameter	Test	Value
LC_{50}	Zebra fish, 96 h, OECD 203	7,071 mg/L
EC_{50}	Daphnia magna, 48 h, OECD 202	> 10 g/L
EC_0	Bacteria, 3 h, OECD 209	> 25 g/L

TYPE II · AMS 1428 · ISO 11078

PLAS P AIRCRAFT® Type II

A modern, propylene glycol based, thickened Type II de-/anti-icing fluid. It forms a non-flowing protective film while the aircraft is parked and thins out and flows off during the take-off run.

Benefits

- Optimum viscosity profile and extremely low shear degradation; compatible with most spray equipment.
- Can be applied hot or cold, neat or diluted.
- Extended holdover time exceeding generic Type II tables.
- Low-residue formulation minimises re-hydrated residues.
- Biodegradable additives, triazole-free.

> **Handling:** Thickened fluids are heat-sensitive; limit standby heaters to +60 °C and avoid local overheating and UV light.

Product properties

Property	Value
Chemical composition	Propylene glycol (50–55%), corrosion inhibitors and thickener
Appearance	Clear, viscous liquid
Colour	Please consult us for colour options.
Refractive index (20 °C)	1.389 – 1.392
pH (as is)	7.0 – 7.5
Density (20 °C)	approx. 1.04 g/cm³
Freezing point (1:1 with water)	< −10 °C
Brookfield viscosity (0.3 rpm, 20 °C)	6,000 – 14,000 mPa·s
Surface tension	29.6 mN/m
COD / BOD_5	0.83 / 0.28 kg O_2/kg

Aquatic toxicity

Parameter	Test	Value
LC_{50}	Rainbow trout, 96 h, OECD 203	2.4 g/L
EC_{50}	Daphnia magna, 48 h, OECD 202	1.0 g/L
EC_{50}	Bacteria, 30 min, DIN EN ISO 11348-2	5.2 g/L

OPERATIONAL DATA

Dilution and in-service limits

Type I dilution table

Concentrate : Water	Refractive index (+20 °C)	Freezing point	LOUT
100 : 0	1.418	does not freeze	do not use
71 : 29	1.397	−48 °C / −54 °F	−33 °C / −27 °F
70 : 30	1.396	−47 °C / −53 °F	−33 °C / −27 °F
65 : 35	1.392	−39 °C / −38 °F	−29 °C / −20 °F
60 : 40	1.388	−34 °C / −29 °F	−24 °C / −11 °F
55 : 45	1.384	−28 °C / −18 °F	−18 °C / 0 °F
50 : 50	1.379	−25 °C / −9 °F	−13 °C / +9 °F
45 : 55	1.375	−19 °C / −2 °F	−9 °C / +16 °F
40 : 60	1.371	−15 °C / +5 °F	−5 °C / +23 °F
35 : 65	1.366	−12 °C / +10 °F	−2 °C / +28 °F
30 : 70	1.361	−9 °C / +16 °F	+1 °C / +34 °F
25 : 75	1.356	−7 °C / +19 °F	+3 °C / +37 °F
20 : 80	1.351	−5 °C / +23 °F	+5 °C / +41 °F

Type II in-service limits

Property	Neat	75 : 25	50 : 50
pH	7.0 – 7.5	6.5 – 7.5	6.5 – 7.5
Min. on-wing viscosity (LV 1)	3,340	13,000	10,500
Max. on-wing viscosity (LV 2)	20,500	47,800	63,000
LOUT	−29 °C	−14 °C	−3 °C

Viscosities in mPa·s; Brookfield LV, 0.3 rpm, 20 °C. LOUT: lowest operational use temperature.

STANDARDS

AMS and ISO specifications

PLAS P AIRCRAFT® is manufactured to the latest revisions of international aviation specifications.

Specification	Issued by	Scope
AMS 1424	SAE International	Type I aircraft de-icing fluids
AMS 1428	SAE International	Type II / III / IV aircraft de-/anti-icing fluids
ISO 11075	ISO	Type I aircraft de-/anti-icing fluids
ISO 11078	ISO	Type II / III / IV aircraft de-/anti-icing fluids

What the specifications test

These specifications test not only de-icing performance but also compatibility with every material on the aircraft:

01 Corrosion of aluminium and alloys

02 Sandwich (galvanic) corrosion

03 Cadmium and titanium compatibility

04 Effect on aircraft paint and coatings

05 Acrylic (canopy) crazing test

06 Elastomer seal and hose compatibility

07 Aerodynamic acceptance (flow-off) test

08 Water spray (WSET) and high humidity endurance

09 Stability, storage and pH behaviour

Aircraft and road de-icers are not the same

Road de-icers are chloride-based and cause pitting corrosion in aircraft aluminium. Aircraft fluids are subject to a separate specification and acceptance regime — the difference is not price but an entirely different approval process.

HOLDOVER TIME

Holdover Time (HOT)

HOT is the estimated time from application during which the anti-icing fluid can prevent renewed ice / snow accumulation. When it expires, protection is considered ended and the treatment is repeated if the aircraft has not taken off.

Variables affecting HOT

Variable	Effect
Fluid type	Type IV > Type II > Type III > Type I
Fluid / water ratio	Higher concentration, longer time
Precipitation type	Snow, sleet, freezing drizzle — each in a different table
Intensity	Light / moderate / heavy
Outside air temperature (OAT)	Lower temperature, shorter time
Wind and jet blast	Mechanically thins the film
Aircraft skin temperature	Cold-soaked wings shorten the time

Published tables

HOT tables are published each winter season by SAE and the competent aviation authorities. The value read from the table is an estimate, not a guarantee.

Final responsibility

The final decision rests with the pilot-in-command's pre-take-off contamination check.

Operational rule: If take-off has not occurred as the lower HOT limit approaches, the pre-take-off check is renewed.

APPLICATION

Dilution and application

For de-icing the fluid is mixed with hot water; heat accelerates the mechanical removal of ice. For anti-icing the fluid is applied cold, neat or with a small proportion of water.

1. Apply with the airport de-icing vehicles in accordance with the authority's winter operations instructions and the aircraft manufacturer's procedures.
2. For de-icing, PLAS P AIRCRAFT® is mixed with hot water and sprayed under pressure.
3. For anti-icing, Type II is applied cold neat (100/0) or at 75/25 or 50/50. Type I is mainly for de-icing.
4. Select the ratio according to OAT and expected holdover time; the mixture's freezing point must be at least 10 °C below OAT (buffer rule).
5. Cover the upper wing, horizontal and vertical stabilisers and upper fuselage completely; protect engine inlets, pitot tubes, static ports and sensors per procedure.
6. Read the holdover time from the current season's HOT tables; renew the pre-take-off check when it expires.

100/0	75/25	50/50
neat – longest protection	moderate conditions	mild conditions

Buffer rule: The fluid proportion is increased as temperature falls and precipitation intensifies. Check the dilution with the refractive index (see page 8).

Pre-application checklist

- Verify the mixing ratio with a refractometer.
- Check heater temperatures (Type II ≤ +60 °C).
- Check nozzles and pumps regularly for shear effect.
- Compare on-wing viscosity samples with in-service limits.

COMPATIBILITY

Material compatibility

Material	Status
Aluminium and alloys	Protected by corrosion inhibitors; subject to AMS/ISO corrosion tests
Composite panels	Compatibility tested within the specification
Paint and coatings	No softening, blistering or discolouration of paint
Acrylic (canopy)	Subject to crazing test
Elastomer seals and hoses	Subject to swelling and hardening tests
Cadmium-plated fasteners	Covered by the sandwich corrosion test

Why propylene glycol?

Lower toxicity

Ethylene glycol (MEG) performs similarly but is toxic. Propylene glycol (MPG) has significantly lower toxicity for airport runoff and ground staff exposure.

Civil aviation standard

For this reason MPG-based formulations have become the standard in civil aviation.

Corrosion protection

A special inhibitor package protects aircraft metals.

Triazole-free

Biodegradable additive package.

Conformity

Analysis reports and documents on request.

SUPPLY AND SAFETY

Packaging, storage and safe handling

60 kg

drum

For small fleets and training operations



200 kg barrel



1,000 kg IBC tank

Storage

- Store in the closed original packaging in a cool, dry place away from direct sunlight.
- Shelf life is 24 months in the unopened original packaging.
- Type II: limit standby heaters to +60 °C; protect from UV light.
- Type I: may be heated up to +90 °C; avoid evaporation.
- Do not mix storage and application equipment with other products.

Safe handling summary

- Monopropylene glycol based; refer to the SDS for classification details.
- Avoid eye and skin contact; do not breathe spray mist.
- On eye contact, rinse with plenty of water for at least 5 minutes.
- Absorb spills with suitable material; wash the area with plenty of water.

This summary is for information only. Read the current SDS before use; SDS and TDS are available in Turkish and English on request.

Quality control on delivery

Refractive index

Quick on-site check of concentration.

pH

pH range check of product and dilutions.

Viscosity

Brookfield viscosity check for Type II.

USERS

Areas of use and users

- Commercial airliners – pre-departure de-/anti-icing
- Military air bases and main jet bases
- UAV / UCAV production, test and operation sites
- Cargo airline operations
- Business jet and general aviation terminals (FBO)
- Aviation schools and training fleets
- Helicopter operations
- Ground handling companies

PLAS P AIRCRAFT® is used at Turkish Air Force main jet bases, in TGS, Çelebi and Havaş ground handling operations and at the UAV / UCAV facilities of Baykar and Vestel Defence.

MILITARY AVIATION

Turkish Air Force – Main Jet Bases | 8th Main Jet Base | 11th Air Transport Main Base | 12th Air Transport Main Base | U.S.A. Air Force Base – Afghanistan

GROUND HANDLING AND AIRPORTS

TGS (Turkish Ground Services) | Çelebi Aviation | Havaş | Anadolu University – Eskişehir Airport

UAV / UCAV PRODUCTION

Baykar – UAV / UCAV production | Vestel Defence – UAV production

Technical support

The product is supplied as Type I or Type II, concentrated or diluted, according to the user's operation. Contact our technical team for analysis reports, SDS, TDS and tender documents.

THK
Main jet and air transport bases

TGS · Çelebi · Havaş
Ground handling operations

UAV
Baykar and Vestel Defence facilities

Akem
Kimya San. ve Tic. Ltd. Şti.

We stand by you in your winter operations.

Contact our technical team for product selection, dosage planning, tender specifications and delivery. Safety Data Sheets (SDS), Technical Data Sheets (TDS) and test reports are available on request.

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