Welcome to AGC Chemicals, one of the world’s leading producers of fluorochemicals and fluoropolymer materials.

This is Kemmy, our company mascot.

Kemmy takes the shape of a benzene ring, symbolising chemistry, with a green leaf, signifying our natural environment.

Kemmy inspires everyone at AGC Chemicals to work together to find ways in which chemistry can contribute to sustainable solutions.

Chemistry for a Blue Planet is our company slogan, summing up our mission and serving as a guiding beacon to lead us in the right direction.

This mission is supported by four pillars:

**Environment:**
We are proud to supply the chemicals needed to make products that contribute to sustainability, such as coatings to make solar panels work more efficiently and polyurethane foam to insulate homes. At the same time we are constantly developing and improving processes that save energy and prevent environmental pollution.

**Safety:**
“Safety first” is the byword at every AGC Chemicals workplace. The safety of the end users of our products and of those who work at our facilities around the world, is at the forefront of everything we do.

**Security:**
We insist that the products and chemicals we manufacture serve society and give people a sense of security. We are committed to doing business in a socially responsible way and to earning the trust of all of the stakeholders we deal with.

**Comfort:**
We believe that human comfort and convenience are absolutely compatible with environmental stewardship. Chemistry has the potential to deliver solutions that satisfy both consumer demands and environmental imperatives.

In short, the products we produce must benefit the earth and its people.
In 1917 we started with the production of soda ash for glassmaking. During the following decades we branched out in several directions, including fluorochemicals, and have become a major supplier of commodity and performance chemicals to international markets. The result is a remarkably integrated product chain, starting with basics obtained by electrolysis of brine and extending to a full array of fluorinated compounds. Our experience with all facets of manufacturing helps us assure thorough process safety and consistently high product quality, while taking comprehensive measures for environmental protection.
Polytetrafluoroethylene (PTFE) is a synthetic fluoropolymer used the world over in thousands of applications ranging from industrial to surgical uses.

At AGC our Fluon® PTFE is available in the following forms:

**Fluon® Aqueous Dispersions (ADs)** have been developed for coating metal, impregnating glasscloth and packings and for coagulation with pigments or fillers.

**Applications:**
- conveyor belts,  
- kitchen cookware  
- electronics  
- textile architecture  
- industrial applications

**Fluon® Granular PTFE** is used in the form of pre-sintered powder for ram extrusion and in the form of non free flow powder for moulding and as feedstock for filled compounds.

**Applications:**
- blending with fillers  
- general moulding  
- billets for skived tape  
- ram extrusion  
- additive to coating systems

**Fluon® Lubricant Powders** are manufactured from virgin PTFE feedstock and are used either as dry lubricants or as additives in other materials such as plastic compounds, rubbers, fluoroelastomers, inks, paint, oils and greases. Fluon® lubricant powders are FDA 21CFR 177:1550 (U.S. Food and Drug Administration) and EU food contact approved so are ideal as additives in coatings which are in contact with food and drink, such as food processing equipment and can coatings. They also give enhanced lubricity, non-stick properties and reduce friction, all of which are important in a wide range of applications.

**Applications:**
- additive in gravure and flexographic printing inks  
- general purpose lubricant  
- friction reducing additive in thermoplastics  
- food contact coatings

**Fluon® Coagulated Dispersions (CDs)** have been developed for paste extrusion into pressure hoses (e.g. hydraulic systems), tubes, pipe liners, electrical wire insulation and tape. Fluon® CD grades are also used to make filtration membranes and technical fibres for textiles and industrial applications.

**Applications:**
- high performance hose  
- wire coating  
- small diameter transparent tubing  
- electrical tape  
- pipeliners

**Fluon® Filled PTFE Compounds (FPCs)** are composed of pigments and fillers such as glass, carbon, graphite and metal powders. They are moulding powders that enhance wear resistance, creep resistance, thermal conductivity and electrical conductivity over virgin PTFE resins.

**Applications:**
- pipe and valve seals  
- bearings, gaskets, valve seals and sealing rings  
- crankshaft seals  
- machined parts used in chemical processing and oil exploration
A fluorine based plastic, ETFE (ethylene tetrafluoroethylene) offers impressive corrosion resistance and strength over a very wide temperature range. ETFE lends itself to a vast range of applications because it is melt-processable.

Fluon® ETFE is available in a number of forms:

**FLUON® ETFE Resins**
Melt processable copolymers composed of tetrafluoroethylene, Fluon® ETFE resins offer excellent processability and heat resistance, as well as superior physical toughness and adaptability to meet a wide range of applications.

The mechanical and electrical insulation properties of these exceptional fluoropolymers are outstanding. They maintain stable mechanical and electrical properties while exposed to temperatures ranging from -200°C to +150°C. Superior tensile elongation and strength ensure no breakage by impact at room temperature. They are even resistant to low-temperature impact down to at least -80°C. Tolerant to almost all chemical agents and solvents, Fluon® ETFE resins are also resistant to ultra-violet light, making them very suitable for outdoor use.

Available in pellet form, Fluon® ETFE resins can be processed by extrusion, injection moulding and blow moulding. Applications include wire and cable coating for automotive applications, robotics and electronic equipment, tubes, films, sheets, tape and parts for the semi-conductor industry.

**FLUON® LM-ETFE Resins**
Fluon® LM-ETFE has even better thermal stability, heat resistance, stress crack resistance and is more flexible and transparent than standard ETFE. The LOI (limiting oxygen index) is also improved. It can be processed at a wider range of temperatures due to its improved thermal stability and lower melting point.

**FLUON® LM-ETFE Adhesive Resins**
Fluon® LM-ETFE adhesive resins have been engineered to provide enhanced adhesion when bonding with polyamides (PA). They are ideal for co-extrusion applications, such as fuel hoses where ETFE barrier properties are crucial. An anti-static version is also available. Fluon® LM-ETFE Adhesive Resins are used in the SUNBESTA® fuel hose system.

**FLUON® ETFE Heat Resistant Resins**
This range gives a higher service temperature and greater thermal stability compared with conventional ETFE. It was designed for wire and cable extrusion and has an operating temperature window of -180°C - +180°C.

**FLUON® ETFE Compound Grades**
Fluon® ETFE Compound Grades are used where improved properties over standard ETFE resin are needed and a variety of custom reinforcements and conductivity levels are available. Various filled grades are available to provide enhanced properties, such as reduced mould shrinkage, improved wear resistance and increased flexural strength.

**FLUON® ETFE Powder Grades**
Fluon® ETFE is also available in powder form for electrostatic coating, fluid bed dip coating and rotolining in non-stick and corrosion-resistant applications.
PFA and Colour Concentrates

Fluon® PFA (or perfluoroalkoxy) is a fluoropolymer with excellent thermal and chemical resistance. PFA is similar in composition to the fluoropolymers PTFE and FEP (fluorinated ethylene propylene), sharing low coefficient of friction, non-stick properties and non-reactivity characteristics. PFA resists UV light and has better heat resistance, higher melt strength and can be used within a temperature range of -200°C to 260°C.

PFA also offers stability at high processing temperatures, excellent crack and stress resistance whilst maintaining more than ten times the flex life of FEP. A low dielectric constant allows PFA to be used in semiconductor manufacturing and many electrical applications. PFA coating is ideal when extended services are required in hostile environments including chemical, thermal and mechanical stress.

As with other thermoplastic resins Fluon® PFA can be extruded, injection moulded, blow moulded and transfer moulded for applications such as tubing, receptacles, lining and wire coating.

Fluon® Colour Concentrates are a range of colour masterbatches suitable for use with standard ETFE, high melt flow rate ETFE, high melt flow rate FEP and PFA. They are supplied as cylindrical pellets in a colour range including red, brown, orange, pink, violet, yellow, green, blue, black, grey and white. Giving excellent surface finish, colour consistency and dispersion even at high production line speeds they are typically used in colour-coded wire insulation, tubing and moulded parts.

Commercial & technical information available from AGC Chemicals Europe, Ltd. Tel +44 (0) 1253 861800 or email: info@agcce.com
AFLAS® is the fluoroelastomer of choice for products and systems that have to work in tough environments. It is used worldwide in all kinds of industrial applications where ultimate reliability is required, along with the elastomeric properties of a synthetic rubber.

AFLAS® was launched by AGC Chemicals over 30 years ago and is based on an alternating copolymer of tetrafluoroethylene and propylene. Its unique properties are:

1. Excellent heat resistance with approx. 200°C continuous service temperature with even higher peaks
2. Excellent chemical resistance to strong acids and bases at high temperatures
3. Excellent steam and hot water resistance
4. Excellent electrical insulation properties with volume resistivity of $10^{16}$ Ω·cm

AFLAS® applications include:
- O-Rings and gaskets
- Manufacture of liquid crystal and semi-conductors
- Wire and cable
- Automotive oil seals

Commercial & technical information available from AGC Chemicals Europe, Ltd. Tel +44 (0) 1253 861800 or email: info@agcc.eu.com
Fluon® ETFE FILM is a high-performance film produced from AGC’s own ETFE resin. Films of thickness between 12µm and 250µm are manufactured using a unique film-forming method. Properties of the film are excellent heat resistance, chemical resistance, anti-stick properties, electrical insulation properties and long-term weatherability.

Due to its exceptional durability, UV light transparency and anti-fouling properties, Fluon® ETFE FILM is used in outdoor architectural applications, greenhouses, solar cells, interior design and various other innovative and ground-breaking areas where film is used. Due to its low surface energy and resistance to both heat and chemicals Fluon® ETFE FILM is also used as a mould release film for components in primarily the electronics and aerospace industries.

Solar cells are another major application. In the field of photovoltaics, white and black Fluon® ETFE FILM is used in the manufacture of backsheets. Transparent ETFE film is also used in front sheets. Used extensively in building integrated photovoltaic (BIPV) applications, Fluon® ETFE FILM is also the material of choice for curved surfaces like flexible solar modules, due to its flexibility.

F-CLEAN® is a thin ETFE film for use in greenhouses, designed to increase the yields of horticultural plants, fruit and vegetables. F-CLEAN® has low surface energy which gives it non-stick and self-cleaning properties which last over a decade.

F-CLEAN® allows maximum UV light transmission to ensure earlier harvest of better quality fruit and vegetables and more colourful flowers.

Commercial & technical information is available from AGC Chemicals Europe, Ltd. Tel +31 (0) 20 880 4170 or email: enquiries@agce.com
A Fluorinated Resin for Highly Durable Coatings

AGC first developed its solvent-soluble fluoropolymer LUMIFLON® in 1982 – and it did not take long for manufacturers to discover that this resin was different. LUMIFLON®-based coatings were highly durable and weatherable, lasting far longer than other coatings. They could be cured at room temperature, making them suitable for field application.

LUMIFLON®-based coatings and paints maintain the original appearance of buildings and other structures for decades, because LUMIFLON® technology efficiently protects against UV rays, oxidation, humidity, corrosion and even acid rain.

Applying a LUMIFLON®-based topcoat dramatically reduces the cost of maintenance such as repainting or cleaning during the lifetime of the coated structures.

Since its commercialisation, LUMIFLON® has demonstrated its exceptional durability on a variety of structures all over the world, e.g. the Akashi Bridge in Japan, one of the longest suspension bridges in the world, the Burj Al Arab hotel in Dubai, as well as the aeroplanes of the Japanese airline ANA.

FEATURES
- Fluoropolymer based on fluoroethylene and vinyl ether monomers
- Available as solvent borne, water based and powder grades
- Curable from room temperature to high temperatures, from 5°C to 220°C
- Highly transparent film

BENEFITS
- Outstanding UV light and weathering resistance
- Long-lasting colour and gloss retention
- Superior corrosion protection
- Excellent chemical resistance
- Low dirt pick-up, therefore giving easy-clean surface

APPLICATIONS
- Architecture - coil coatings - powder coatings
- Industrial maintenance
- Heavy duty, marine, bridges, windmills
- Transportation, aerospace
- Protective coatings for concrete, wood and plastics

Image by Satoru Mishima, Nikkei BP

‘Alpolic’ manufactured by Mitsubushi Plastics
Asahi Guard® is used in hundreds of applications in the food, drinks and packaging industries. It offers a high quality barrier to water, oil and grease and gives added durability to paper and board.

Asahi Guard® offers added protection to interior fabrics without affecting their colour or texture in any way. It gives longer life to upholstery and linen keeping them looking new for longer and extending their life.

Asahi Guard® offers ultimate protection to rugs and carpets keeping them cleaner for longer and making accidental spills easier to remove.

Asahi Guard® has a wide range of uses as a weatherproof coating for clothing, shoes and accessories in the sports and leisure world. It is also used extensively on workwear, school uniforms and other clothing for its protective and stain-repellent properties, whether applied to leather, wool, cotton or man-made fibres.

Surface Tension; Water and Oil Repellency

Whether an object tends to become wet or not is determined by its surface tension. When a liquid touches a solid surface it is repelled to form beads if the surface tension of the liquid is larger than the surface tension of the solid. The solid becomes wet if its surface tension is larger than the surface tension of the liquid.

Fabric becomes wet because its surface tension is higher than that of water.

Asahi Guard® has particularly low surface tension.

Wax is used as a water repellent because of its low surface tension, however wax does not repel oil, since oil has a lower surface tension.

Surface tension of fluororesin is very low, therefore fluororesin repels water and oil.

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AGC Fine Chemicals

AGC has a unique position as a producer of pharmaceutical and agricultural fine chemicals with over twenty years’ experience in fluorine chemistry.

AGC’s product range includes various fluorine compounds such as fluoroanilines, fluorobenzoic acid and fluoroquinolones, as well as advanced intermediates and bulk pharmaceuticals. In response to customer demand, AGC has increased capacity of its multi-purpose cGMP plant where APIs and intermediates are produced.

We specialise in:

Synthetic Organic Chemistry
- Fluorination (HF, Balz-Schiemann, TFEDMA, FAR, F2)
- Chlorination, Iodination, Bromination
- Friedel-Crafts Reaction, Grignard Reaction, Suzuki Coupling
- Low Temperature Reaction (-100°C)
- Hydrogenation (up to 4.5 MPa)
- Peptides

Biochemistry
- Enzymatic reactions

Active Pharmaceutical Ingredients (APIs)
- Bulk Actives for Injection Use
- Highly Potent Bulk Actives

cGMP Multi-Purpose Plant
SUS and Hastelloy glass-lined reactors from 0.1 to 6m³ capacity are configured to produce various products in quantities from 10kg to several tonnes.

AGC can carry out reactions under high pressure (4.5MPa) or at low temperatures in Hastelloy reactors of 0.1 and 1m³. Products are discharged into a PTFE-lined centrifuge of 600mm diameter or into a stainless steel filter dryer (1m³) and then into a conical dryer or a vibrating vacuum dryer for final processing. This equipment is all located in a clean room.

Environmental Certification
- AGC’s Chiba plant is registered to ISO 14001.
AGC Polyols

The vertically integrated plant in Kashima has been producing polyether polyols from propylene oxide for the polyurethane industry since 1975.

The polyol grades produced are used in rigid foams, CASE (coatings, adhesives, sealants and elastomers) and polyurethane coatings and specialities.

The Environment

AGC’s plant in Kashima complies fully with the international quality management standards ISO 9001 and ISO 14001.

Polyol Grades from AGC

PREMINOL® is a range of polyols for CASE polyurethanes and PU foam. The use of low monol technology enables the manufacture of ultra-low unsaturated value polyols that give enhanced chemical and mechanical characteristics to the CASE polyurethane end product.

ADVANOL® is a range of copolymers of polyether/polyester with new characteristics for use in CASE polyurethanes. ADVANOL® has the advantage of using both polyether and polyester properties bonded in one material.

EXCENOL® polyols are available for both rigid and flexible polyurethane foams. AGC produces both conventional and speciality polyols for rigid foam applications include building insulation, refrigeration and pipework. Flexible polyurethane applications include car seats, bed mattresses and furniture.

Polyols Flowchart
Silica products are designed as a perfect complement for any application where gentle tactile feel is paramount. Fine silica particles have a lower coefficient of friction than titanium dioxide and other popular fillers. Being perfectly spherical in shape, fine silica particles are able to offer a high degree of flexibility. When combined with resins, fine silica also offer greater surface smoothness and dispersibility. Fine silica products have found widespread use from cosmetics, synthetic leather, catalyst support and as a matting agent for paints.

The principal advantage of M.S. GEL®, SUNSPHERE® and SUNLOVELY® is that they enable control over sphere size and pore size of the spherical structure, making it possible to provide long lasting physicochemical characteristics.

SUNSPHERE®

SUNSPHERE® consists of spherical particles of micro-porous silica (amorphous silicon dioxide). Consisting of freely rolling particles, SUNSPHERE® is soft and smooth to the touch, whilst its multiporous composition maintains an excellent capacity for absorption. Derived from silica, SUNSPHERE® also has excellent heat resistance properties as well as being white, odourless and chemically stable so suitable for contact with people.

SUNSPHERE® has a variety of uses from cosmetics and toiletries to industrial applications such as a matting agent for paints and as a filler for coated printing paper. SUNSPHERE® is also used as a catalyst support carrier and in synthetic leather.

SUNLOVELY

SUNLOVELY is the trade name of ultra thin scaly silica particles developed by AGC-Si Technologies. SUNLOVELY particles are formed by nano-sized ultra-thin silicon dioxide (SiO₂) fine particles (primary particles) overlapping with tertiary particles formed by three-way cohesion of the secondary particles.

Applications of SUNLOVELY range from a filler for polymeric resins and inorganic coatings to heat and chemical resistant paint materials. It is also used in cosmetics and is available in powder form or as a slurry dispersed in water.

M.S. GEL®

M.S.GEL® (microspherical gel) is a silica-based high-purity spherical gel. When formed in a perfectly spherical shape, M.S.GEL® enables higher loading capacity with lower back pressure and good separation performance.

M.S.GEL® is a key component in HPLC technology. Spherical silica gel has outstanding performance levels and maintains far higher rigidity even in a scaled-up system. M.S.GEL®’s outstanding characteristics are not only utilised in HPLC packings, but can be supplied from analytical to large-scale preparative chromatography. M.S.GEL® is also anticipated to add impressive potential in the refinement of solvents for electronic fields.

M.S.GEL® is used widely in pharmaceutical, biochemistry and agrichemical fields in high performance liquid chromatography packing to separate specified substances. It is also used as a release carrier for cosmetics and fragrances.
ASAHIKLIN™ Precision Cleaning Solvents

The ASAHIKLIN™ series is a range of fluorinated fluids which deliver technological cleaning solutions for applications where previously ozone layer depletion and climate change were major concerns.

ASAHIKLIN™ AE-3000 has an ODP (ozone depletion potential) of zero, contributes to the reduction of VOC (volatile organic compounds) emissions and is classified as a non-greenhouse gas*. AE-3000 can be used as a drying agent for water-washed optical parts, a coolant for use in ultra-low temperatures and a heat transfer fluid as well as being used for removing particles from precision parts.

ASAHIKLINTM AC-6000 also has an ODP of zero and its global warming potential† is over 30 times lower than that of perfluorocarbons (PFCs) and perfluoropolyethers (PFPEs). AC-6000 can be used from -70ºC to 100ºC, and is mainly used as brine for semiconductor devices or heat transfer fluids.

Cytop™ is an amorphous fluoropolymer. An innovation in its field, its amorphous state makes it quite different from conventional fluoropolymers.

Cytop™ has good solubility in certain fluorinated solvents. It maintains a low refractive index, low coefficient of optical dispersion and good lamination properties. These factors, coupled with its thermoplastic characteristics make Cytop™ a popular choice in the electronics industry as a dielectric coating for electronic material.

Cytop™ gives an extremely high optical transparency of over 95% visible ray transmissivity. As a result it is also used as an anti-reflective coating in the optical industry. Alongside these exceptional characteristics, Cytop™ maintains the traditional advantages of conventional fluoropolymers, including excellent fire and chemical resistance, thermoplastic mouldability and water repellency.

Cytop™ is available in a variety of concentrations in perfluorinated solvents and Cytop™ resin is available as a solution with sub-micro particle filtration and with adhesion promoters.

*Classification by Kyoto Protocol of Global Warming Countermeasures
†Indicator that shows the relative global warming effect of individual greenhouse gases in comparison with the global warming effect of CO2, over various time horizons.
Worldwide Contacts

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REF: CB E 03-2013