BYK

PLASTICS NEWS

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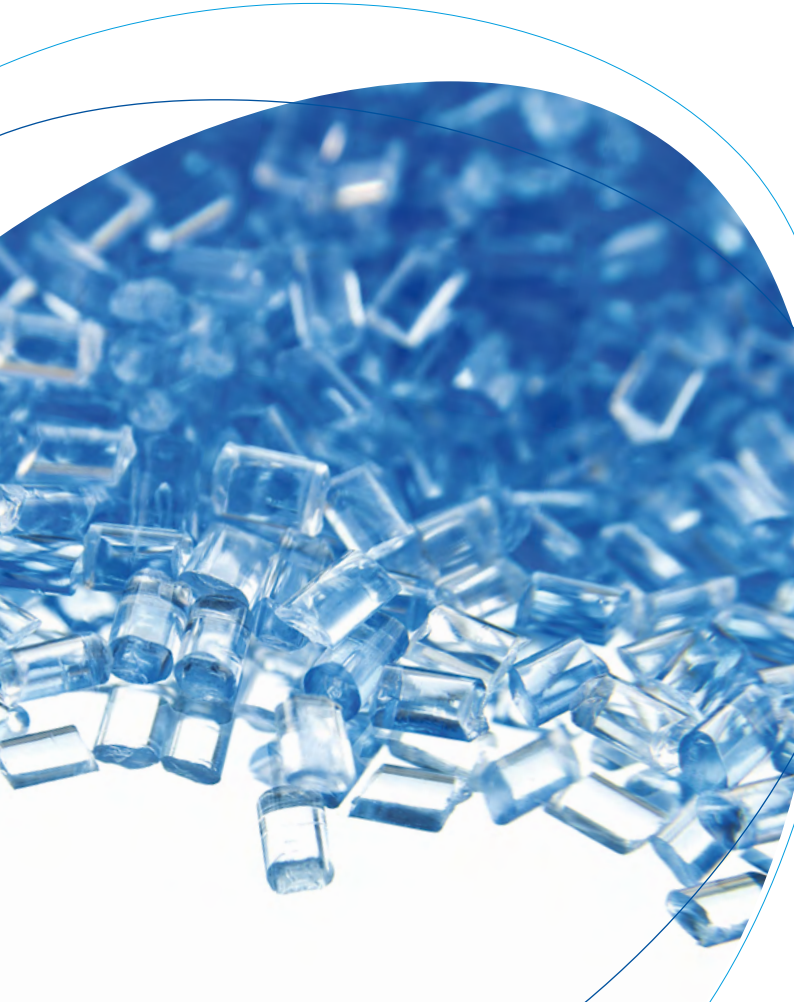

BYK plastics additives – **solutions for your challenge**

We are a leading global supplier of additives and additive solutions, aiming to help our customers to fulfill their customers' needs.

As life without plastics has become inconceivable, additives are crucial. They ensure material quality and functionality.

We offer innovative additives and additive solutions for plastics converters and compounders, for formulators and OEMs worldwide. Discover our extensive portfolio for plastics production and processing of reinforced composites, PVC plastisols, and a broad range of thermoplastic materials.

Sustainability is a key trend in many end-use markets driven by legislation, society, non-governmental organizations, etc. Subtrends such as source reduction, lightweighting, recycling, biodegradable materials, and less-hazardous materials are aiming to create an environmentally friendly and circular economy. Visit the BYK booth to explore how our innovative solutions help to create a more sustainable plastic economy.

The RECYCLOBYK family includes formulated additive solutions designed to improve the recyclates' quality, enabling new high-quality applications for used plastics rather than downcycling them. By utilizing RECYCLOBYK additive solutions, our customers can close the loop in multiple applications such as battery cases, bottle caps, bins, or crates.

Our extensive offering of SCONA modifiers optimize the adhesion of carbon fibers or glass fibers to polymers in lightweight materials, or act as toughener for polyamide automotive applications. Ongoing changes in regulations and legislation are a key driver for BYK to provide innovative environmentally friendly products to the market.

Under the BYK-MAX brand we offer numerous formulations for the thermoplastic industry based on our unique process technologies, which include co-extrusion and compacting processes, and make it possible to use greater additive concentrations. Along with other benefits, they enable functionalities such as flame retardancy, thermal and UV stability, as well as nucleation and anti-fog. These properties are in high demand – particularly for applications in the automotive, electronics, construction, and packaging industries – and require advanced solutions to enlarge the sustainable footprint.

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Technical brochures

Content

ADDITIVES

INSTRUMENTS

Discover more about the BYK brand

Welcome to BYK!

Discover how we can make your product development even more efficient and sustainable by means of differentiating solutions.

In practice, what this means for you is:

- **PFAS-free solutions:** Develop PFAS-free systems without compromising on performance – with our innovative, even more sustainable additives. Our additives meet the highest quality standards and help you to reduce the impact on the environment while delivering outstanding performance.

- **Shortened development cycles:** With our unique digital lab, the HTS facility, we can efficiently test up to 220 samples in just 24 hours. This speeds up your product development enormously and launches your customized solutions faster on the market.

- **Sustainability in all areas:** Our more sustainable wax additives or our environmentally friendlier powder defoamers help you to achieve your ecological goals. Are you looking for something else? Then talk to us, we're sure to find a solution!

Since our foundation in 1873, we at BYK have been striving for innovation and customer benefit. Let us show you how we can also drive your development forward in the future with first-class additive solutions and in-depth industry expertise.

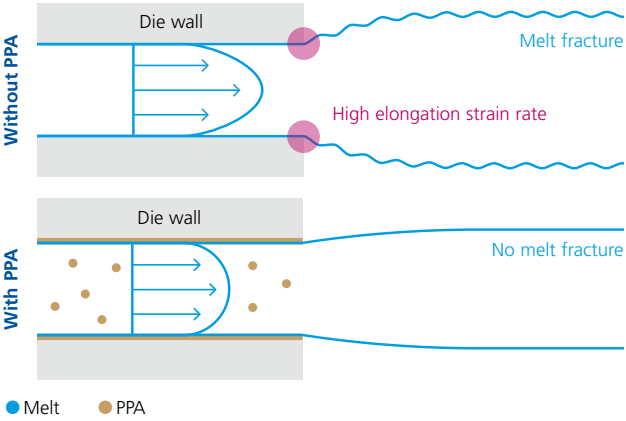
Simply change with us – to a more efficient and sustainable future!

BYK-MAX P 4109
BYK-MAX P 4110

PFAS-free processing aid formulations for various polyolefins

When processing polyolefins, high shear forces, temperatures, and friction sometimes occur in the machinery, leading to melt fracture or die build-up. In order to prevent these undesirable

Mode of action of BYK-MAX P 4109 and BYK-MAX P 4110 – Prevention of melt fracture



side effects and optimize production, fluorine-containing processing aids have often been used to ensure good throughput and defect-free finished parts. However, there are currently international legal initiatives to restrict the use of fluoropolymers (PFAS). For this reason, alternative polymer processing aids (PPA) are being developed that are PFAS-free and still have the usual positive effect on the process and result.

BYK-MAX P 4109 and BYK-MAX P 4110 are two new processing aid formulations from BYK that precisely meet these requirements: They are PFAS-free and at the same time allow a high production speed while preventing melt fracture and reducing die build-up. The rapid effectiveness of the two additives cuts long rinsing times and allows fast product changes.

Benefits

- For producing high-quality finished parts under optimized process conditions
- Prevent melt fracture
- Reduce the viscosity of the melt
- Minimize die build-up
  → less maintenance and shorter downtime
- For faster material changes compared to conventional fluorinated PPA
- Reduced die pressure and power consumption
  → higher production speed during processing
- Temperature stable up to 290 °C
- No negative influence on printability
- Easy handling – no significant process adjustments required

RECYCLOBYK: additive solutions for recycling applications

Restabilizing recyclates

Ecological and economic interests, regulatory demands from politicians, and public opinion are creating an increased interest across all industries to recycle plastics and to increase sustainability in all areas. However, recycling for high-value applications is often not possible or only possible to a very limited extent. Contaminants, fillers used in previous

applications, expended stabilizers, odors, and lack of performance limit the areas of use to the lowest price range for applications with inferior quality. RECYCLOBYK products have been specially developed to restabilize the plastics during reprocessing and for their subsequent new applications, improving the mechanical properties.

	Dosage	Application
RECYCLOBYK 4370	0.1–0.5 %	Retaining the flowability of the melt and the long-term thermal stability of polyolefin recyclates.
RECYCLOBYK 4371	0.1–1.0 %	Restabilizing HDPE with PP contaminants, recycling battery housings.
RECYCLOBYK 4372	0.1–0.5 %	Improving the processability and the long-term light stability and thermal stability of polyolefin recyclates.
RECYCLOBYK 4373	0.1–2.0 %	Restabilizing and compatibilizing PP/EPDM bumpers contaminated with paint residue.
RECYCLOBYK 4374	1.0–5.0 %	Restabilizing and compatibilizing multi-layer films and PO compounds with polar contaminants (such as PA, polyester).
RECYCLOBYK 4375	0.2–1.0 %	Used in PO compounds in recycling applications to improve the processability and long-term stability of the recyclate.
RECYCLOBYK 4379	0.2–2.0 %	Improves processability and long-term aging resistance of PO recyclates. Ideal for single-screw extruder applications.

The granulated, non-dusting product form of RECYCLOBYK products ensures safe handling and dosing. Improved mechanical and long-term thermal stability, while maintaining rheological properties, provide added value and increase the recyclate's potential uses. For example, RECYCLOBYK additives help to stabilize plastic recyclates by providing protection against the negative effects of contamination, such as paint or ink residues, during processing and against heat aging.

These contaminants can also contain acid or metal residues that are typically found in plastic recyclates and are exposed to aggressive substances during their useful life (cleaning solvents, battery acids, etc.). Despite cleaning, the recyclates still contain residues that have a negative impact on the aging properties.

RECYCLOBYK 4379

Heat stabilizer and processing aid formulation for polyolefin recyclates, especially for use in single-screw processes such as injection molding.

The use of heat stabilizers in recycling enables high-quality and more durable end products to be produced from recycled materials. Stabilizing additives have therefore become indispensable in recycling processes. The recycling of polyolefins poses both material- and process-related challenges. On the one hand, the highly variable plastic compositions and contaminants require additives that work reliably in different material systems. On the other hand, single-screw extruders and injection molding machines are often used, which have only limited dispersion capabilities. Powdered or compacted additives are therefore often insufficiently dispersed. This leads to limited effectiveness, for example with regard to thermal degradation, and results in an unevenly stabilized recyclate.

RECYCLOBYK 4379 for long-term thermal stabilization of high-quality polyolefin recyclates

With RECYCLOBYK 4379, BYK has developed a high-performance heat stabilizer in concentrate form that, thanks to its LDPE carrier, enables uniform distribution even in single-screw processes. This effectively improves the thermal stability of the recyclate over the long term. The stabilized materials are thus also suitable for technically demanding applications and challenging environmental conditions. In addition, it acts as a processing aid by improving melt flow properties and neutralizing acids.

Benefits

- Improved long-term thermal stability
  - Increased quality and wider range of applications for the recycled end product
- Excellent homogenization in the recycled material
  - Uniform distribution of the additive even with varying material compositions
- Optimized for single-screw processes
  - Ideal for injection molding machines and similar applications
- Easy and precise dosing
- Improved melt flow properties
- Neutralizes acids from previous processing and use of the recycled material

Defoamers and air release agents

BYK-1810/BYK-1811/ BYK-1815/BYK-1816/ BYK-1818

PFAS-free, silicone-containing defoamers for solvent-borne and solvent-free systems.

Per- and polyfluoroalkyl substances (PFAS) are widely used in everyday life as components of, for example, non-stick coatings, fire-fighting foams, or paints. However, since PFAS are now suspected of having the potential to be harmful to health, their use is being viewed increasingly critically worldwide.

Defoamers also often contain fluorine-modified silicones for a spontaneous and fast defoaming effect. BYK has expanded their portfolio and now offers PFAS-free sustainable alternatives to fluorine-modified silicone defoamers: BYK-1810, BYK-1811, BYK-1815, BYK-1816, and BYK-1818.

These five new additives provide high efficiency and excellent spontaneous defoaming on a par with PFAS-containing products, yet are completely fluorine-free. They can be used in a wide range of solvent-borne and solvent-free systems and cover a broad spectrum of applications overall.

Benefits

- Excellent defoaming properties in solvent-borne and solvent-free systems (wide range of applications)
- Spontaneous defoaming even at low dosage levels
- Prevention of pinholes
- Reduction of surface tension
- Positive influence on leveling and surface appearance
- Good storage stability

Defoamers and air release agents

BYK-A 560 N

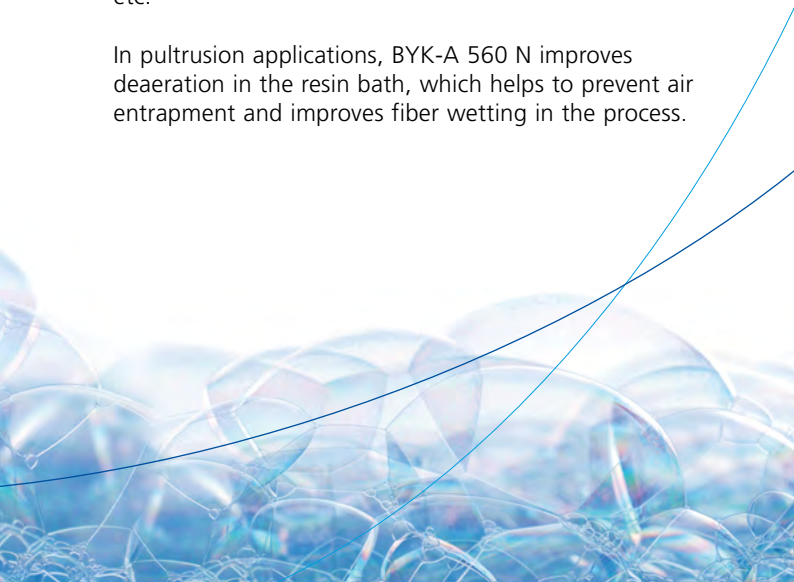
Silicone-free air release additive for solvent-based and solvent-free UP systems with additional improvement of fiber wetting

BYK-A 560 N combines excellent deaerating performance with extremely good fiber wetting properties. Air release additives may cause haze in the finished part in some resins.

The additive is recommended for all fiber-reinforced, unsaturated polyester applications. BYK-A 560 N also displays excellent deaerating properties in some gelcoats, specifically in systems in which the airless process is used.

BYK-A 560 N is frequently used to improve fiber wetting. The better fiber wetting is seen in all typical application methods like RTM, injection, infusion, winding, lamination, etc.

In pultrusion applications, BYK-A 560 N improves deaeration in the resin bath, which helps to prevent air entrapment and improves fiber wetting in the process.



Defoamers and air release agents

BYK-A 516

Silicone- and aromatic-free, polymer-based air release additive for solvent-borne and solvent-free resin systems, in particular for thermoset applications, and for improved fiber wetting of glass fibers.

BYK-A 516 is a universal, highly surface active air release additive. In fiber composite applications with unsaturated polyester and vinylester resins, the additive also exhibits fiber wetting properties on glass fibers. Particularly in vinylester resin applications, BYK-A 516 does not tend to create whitening that can be caused by standard air release additives.

In thixotropic systems, BYK-A 516 can be combined with additives such as BYK-A 501 or BYK-A 555 to optimize the air release properties.

BYK-A 516 prevents air entrapment in acrylic-based resins (syrup), and in epoxy resins and PUR resins. In the pultrusion process, BYK-A 516 improves the fiber wetting of glass fibers and results in a higher quality surface of pultrusion parts.

Universal air release agent for ambient curing resin systems based on unsaturated polyester resins, vinylester resins, acrylics, epoxy resins, and PUR resins, and pultrusion systems based on acrylics, unsaturated polyesters, or vinylester resins.

Heat stabilizer

BYK-MAX HS 4314

Heat stabilizer formulation for use in polypropylene compositions to ensure long-term thermal stability

BYK-MAX HS 4314 provides a complete stabilization package designed for unfilled, mineral-filled, and glass-filled polypropylene composites. The stabilization package inhibits thermo-oxidative decomposition by intercepting radicals and decomposing reactive peroxides. Depending on the glass fiber content and dosage, the BYK-MAX HS 4314 can help achieve a long-term heat aging duration beyond 1000 hours at 150 °C. BYK-MAX HS 4314 is manufactured with a tight concentration specification for reliable performance. It provides long-term thermal stabilization, is safe, and easy to handle.

Recommended use	
Extrusion and blow molding parts	●
Injection and compression molding parts	●
Thick films and sheets	●
Fibers	○

● especially recommended ○ recommended

Light stabilizer

BYK-MAX LS 4128

Light stabilizer formulation for use in polyamides and multiple polyolefin compositions to increase long-term UV stability

BYK-MAX LS 4128 provides excellent UV stability to thick polyamide and polyolefin products and articles. The proprietary blend of HALS stabilizers present in BYK-MAX LS 4128 inhibits the light induced degradation of the substrate. BYK-MAX LS 4128 is manufactured with a tight concentration specification for reliable performance. It provides long-term stabilization, is safe, easy to handle, and dust-free.

Recommended use	
Injection and compression molding	●
Extrusion and blow molding	●
Thick film and sheets	●
Fibers	○
Thin film	○

● especially recommended ○ recommended

Flame retardant synergist

BYK-MAX FR 4145

Efficient halogen-free flame retardancy in thermoplastic applications

Thermoplastics are versatile and economic materials, making them useful for many applications. If these applications require effective flame retardancy, such as in the construction or automotive sector, flame retardants must be added to thermoplastics in order to meet requirements.

The majority of increasing halogen-free flame retardants for technical and environmental reasons are based on metal hydroxides, which often need to be used in high

Excellent flame retardancy in a halogen-free, thermoplastic compound with BYK-MAX FR 4145

Control – without synergist,
ATH content 58 %
Sample thickness: 3 millimeters
The UL 94 standard is not satisfied.

With 12.5 %* **BYK-MAX FR 4145**, ATH content reduced to 53 %
Sample thickness: 3 millimeters
The UL 94 standard is satisfied and meets the V-0 classification.

Test system: halogen-free, ATH flame-retardant LLDPE/EVA compound
*The recommended level of 12.5 % additive (as supplied) based on the total formulation corresponds to 5 % phyllosilicate content

concentrations and are difficult to incorporate. In addition, they can negatively affect the mechanical properties of the final product. BYK has therefore developed phyllosilicate-based flame-retardant synergists, which increase the effect of conventional halogen-free flame retardants and therefore allow less of them to be used.

BYK-MAX FR 4145 results in a significant increase in the efficiency of the flame retardant, reduces dripping tendency, and improves crust formation. Because it is supplied as a concentrate, it is very easy to incorporate and does not produce dust, meaning that additional occupational safety measures are not required.

BYK-MAX FR 4145 increases the effect of standard metal hydroxide flame retardants such as ATH and prevents ignition and dripping. This means that the ATH content of the compound can be reduced.

Benefits

- Optimal delivery form: Easy to incorporate and dust-free
  → No additional occupational safety measures required
- Increases the flame retardancy in halogen-free thermoplastic compounds (in accordance with UL 94)
  → Enables lower flame retardent content (e.g. ATH) in the formulation
- Improves crust formation
- Reduces dripping tendency and water absorption
- Maintains important mechanical and electrical properties of the compound

Nucleating agent

BYK-MAX NU 4233

Nucleation aid composition for use in polypropylene to promote ß-crystal formation and enhance impact strength, elongation at break and visual opacity in injection molding, extrusion and thermoforming applications.

BYK-MAX NU 4233 is an effective, thermally stable additive concentrate that controls the formation of the ß-crystal structure in polypropylene. It is based on finely dispersible crystalline particles that can produce a controlled ß-crystal content of 90 % or higher.

ß-crystallisation significantly increases impact strength and tensile elongation, as well as improving resistance to crack propagation, even at low temperatures. It is also resistant to impact stress.

These properties make the additive particularly advantageous for applications where mechanical strength is required alongside a high deformation capacity. The lamellar structure of the ß-crystallites also produce intense light scattering, giving the material a uniform, opaque appearance, without the addition of white pigments.

BYK-MAX NU 4233 Product benefits supporting sustainability

Resource efficiency
ß-nucleation increases opacity, enabling thinner parts and reducing raw material use.

Design for recycling
White appearance without TiO_2 minimises pigment contamination, improving recyclability.

Recycle enhancement
Improves the quality of recycled PP for use in higher-value applications.

In packaging or visible applications, this enables material savings to be made. This can be achieved by reducing wall thickness while maintaining the same opacity. It can be used with both virgin and recycled materials, thereby contributing to property optimization in recycling applications.

Key benefits

- Improvement in impact strength & elongation at break
- Concentrated formulation – suitable for single-screw processing
- Compatible with PP recyclates

Areas of application

- Injection and compression molding parts
- Extrusion and blow molding parts
- Thermoformed parts
- Thick films and sheets

SCONA modifiers

SCONA 12031 N

Dispersing aid for polyethylene color concentrates to reduce the tendency to warp. Compatibilizer for blends of polyethylene with polar polymers to improve mechanical and optical properties.

SCONA 12031 N is a high-performance polymeric modifier based on high-density polyethylene (HDPE) functionalized with maleic anhydride. The additive is an excellent dispersing aid for polyethylene color concentrates improving the dispersion quality and especially reducing the tendency to warp caused by the pigment. SCONA 12031 N works also with untreated pigments having a high tendency to create warpage such as phthalocyanine or diketopyrrolopyrrole (DPP) pigments. In addition to that the additive is an excellent compatibilizer for blends of polyethylene and polar polymers such as polyamides and ethylene vinyl alcohol and improves the dispersion of the polar polymer. This results in better mechanical and optical properties of the compatibilized material. SCONA 12031 N also acts as an excellent coupling agent for polyethylene wood and glass fiber compounds.

Recommended use

Compatibilizer	●
Dispersing aid	●
Coupling agent	○

● especially recommended ○ recommended

SCONA modifiers

SCONA TSPE 3219 GAHD

MAH-free dispersing aid for polyethylene color concentrates and composites for reducing warpage

SCONA TSPE 3219 GAHD is an acid-functionalized high-density polyethylene (HDPE). The product is an excellent dispersing aid for polyethylene color concentrates as well as for composites made of polyethylene and filler (e.g. aluminum hydroxide). Therefore the additive improves the dispersion quality and especially the warping tendency caused by the pigment or filler. SCONA TSPE 3219 GAHD is effective with untreated pigments that have a high tendency to warp, such as phthalocyanine or diketopyrrolopyrrole (DPP) pigments. The additive also acts as an excellent coupling agent for polyethylene-wood and polyethylene-glass fiber compounds. In addition, it improves the mechanical properties of highly filled polyethylene compounds.

Recommended use	
Dispersing aid	●
Coupling agent	○

● especially recommended ○ recommended

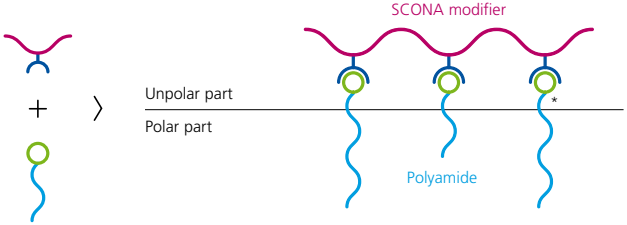
SCONA modifiers

SCONA TSPOE 1012 GBLL

Impact modifier for polyamide compositions to provide optimized performance under high heat processing conditions, superior flowability and high impact strength.

Compatibility enhancement mechanism of SCONA TSPOE 1012 GBLL

Amphiphilic compatibilizer "tenside molecule"



Acidic/Anhydride group
Amine group
SCONA modifier
Polyamide

* Simplified reaction scheme with the amine end-group, however the internal amide groups can also take part in the reaction.

SCONA TSPOE 1012 GBLL is an impact modifier based on a maleic anhydride modified polyolefin elastomer. The additive performance under high heat processing conditions provides a superior flowability in the final composition and improves the notched and unnotched impact strength of polyamides (e.g. polyamide 6, polyamide 6.6). Furthermore, SCONA TSPOE 1012 GBLL can be used as a compatibilizer for blends of polyolefins (e.g. LLDPE) and polar polymers (e.g. PA 6) as well as to incorporate impurities in polyolefin recycling streams. The benefits can be found in consequently optimized mechanical and optical properties.

Key benefits

- Superior toughness modification
- Excellent flowability
- Improved notched impact strength
- Particularly thermostable
- High heat processing

SCONA TSPOE 1012 GBLL is the next generation of impact modifier for polyamide compositions. It provides optimized performance under high-heat processing conditions and offers superior flowability and high impact strength for PA6 and PA6.6 applications.

Areas of application

1. Impact modifier for polyamide compounds
2. Compatibilizer for mixtures of polyolefins and polar polymers (PA, PET)
3. Compatibilizer in recycling streams to improve mechanical and optical properties

SCONA modifiers

SCONA TPPET 4214 PA

Viscosity modifier for polyethylene terephthalate-based compounds to increase melt strength and molecular weight during compounding and to improve processability of the material

SCONA TPPET 4214 PA is a high-performance polymer modifier based on a polyethylene terephthalate (PET) functionalized with glycidyl methacrylate.

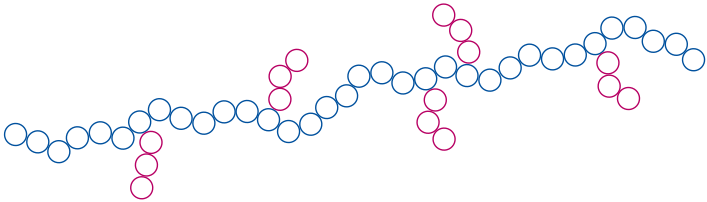
Thanks to its reactive epoxide groups, the additive works as a viscosity enhancer in polycondensation polymers by increasing the molecular weight and therefore the viscosity during incorporation into the base polymer. In this way, excellent processability is achieved during extrusion and thermoforming. Because the additive is PET-based, it is especially suitable for use in PET-based compounds.

Recommended use

Viscosity modifier	●
Compatibilizer	○
Coupling agent	○

● Especially recommended ○ Recommended

Schematic illustration of a grafted polymer



○ PET polymer backbone ○ GMA grafting

Surface additives

BYK-L 9566

OH-functional, silicone-containing surface additive for solvent-borne and high-solid polyurethane (PU), especially in coated fabrics. Also suitable for use in polymerization processes of PU and polyurethane dispersions (PUD).

BYK-L 9566 improves the leveling properties and wetting of release papers and is ideal for universal use, irrespective of the type of coating and the pattern of the release paper. The additive also enhances the wetting of woven and non-woven substrates, reduces the formation of pinholes, improves scratch and abrasion resistance, and provides better anti-blocking properties. Due to the OH functionality, the additive can also be used in PU and PUD polymerization processes to impart permanent surface slip, flexibility, and a soft-feel effect.

Recommended use

Wet process	●
Dry process	●
Solvent-borne PU polymerization processes	●
Aqueous PUD polymerization processes	●

● especially recommended ○ recommended

Surface additives

BYK-L 9569

OH-functional, silicone-containing surface additive for solvent-borne polyurethane (PU), especially in coated fabrics. Also suitable for use in polymerization processes of PU and polyurethane dispersions (PUD).

In the wet process, BYK-L 9569 produces improved flow/leveling of the PU solution during coating, as well as a soft-feel effect, and better anti-blocking properties in the final PU-coated fabric. In the dry process, the additive provides optimized wetting and better leveling of the PU solution on the release paper, facilitates release from the paper after drying, and improves the anti-blocking properties. In addition, scratch and abrasion resistance is improved, and the formation of craters and pinholes reduced. Due to the OH functionality, it can also be used in PU and PUD polymerization processes to impart permanent surface slip, flexibility, and a soft-feel effect.

Recommended use

Wet process	●
Dry process	●
Solvent-borne PU polymerization processes	●
Aqueous PUD polymerization processes	●

● especially recommended ○ recommended

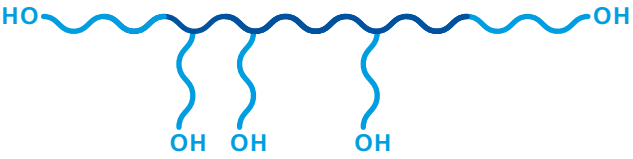
Surface additives

BYK-SILCLEAN 3725

PFAS-free, silicone-containing surface additive for a permanent easy to clean effect in aqueous coatings.

For many years, BYK has been investing considerable research efforts and resources in replacing products containing per- and polyfluoroalkyl substances (PFAS) with more environmentally friendly alternatives. This is resulting in a sustainable, PFAS-free portfolio with versatile product properties for a wide range of applications.

Structure of BYK-SILCLEAN 3725



- Polysiloxane backbone, non-polar
- Hydrophilic modification, polar

The new BYK-SILCLEAN 3725 is one such additive. It is hydroxy-functional and, thanks to its special structure, highly effective in aqueous, crosslinking coating systems. In this type of application, it permanently improves the resistance to contamination by water- or oil-containing substances and the cleanability (easy to clean effect). It is therefore a perfect addition to the BYK-SILCLEAN product range.

Recommended use	
Coated fabrics	●
Leather coatings	●

● especially recommended ○ recommended

Benefits

- PFAS-free and low cyclic siloxanes content
- Creates permanent properties such as
  - Hydrophobicity and oleophobicity for water- and oil-repellent coating surfaces
  - Reduced dirt adhesion to the coating surface and easier cleaning
  - Improved substrate wetting, leveling, and surface slip of coatings
  - Anti-blocking
- Very compatible in many aqueous systems

Processing additive

BYK-P 9911

Processing additive for improving the hydrophilic properties of polyurethane (PU) foams and high-solid polyurethane systems for coated fabrics

Leather finishes and coated fabrics

BYK-P 9911 improves the hydrophilic properties of high-solid polyurethane systems (polyether/polyester). It optimizes moisture absorption and therefore improves comfort when used in shoe uppers, linings, and garments.

Recommended use	
Polyether polyurethanes	●
Polyester polyurethanes	●

● especially recommended ○ recommended

Thermosets

BYK-P 9911 improves the hydrophilic properties of polyether/polyester PU foams for e.g. cosmetic sponges, printer ink cartridges, or imitation sea sponges. The additive is readily soluble in common polyol systems and is resistant to hydrolysis. It increases the water absorption rate of PU foams and can be used either on its own or in combination with a portion of a polyether polyol with high ethylene oxide (EO) content. For example, 1 phr of BYK-P 9911 can increase water absorption up to 250 %, or up to 300 % in combination with 10 phr of a high-EO polyol.

Recommended use	
Polyether foams	●
Polyester foams	●

● especially recommended ○ recommended

Rheology additives

RHEOBYK-D 7460
RHEOBYK-7460 CA

Lithium-chloride-free, liquid rheology additives for the adjustment of a highly thixotropic flow behavior in medium-polar solvent-borne and solvent-free systems to improve the sag resistance and anti-settling properties.

Benefits

- For outstanding
  - Anti-sagging
  - Anti-settling
  - Storage stability

  in various systems and a wide range of applications
- Lithium chloride-free → for the most stringent regulatory requirements
- Liquid – easy to dose and handle

Regulatory requirements are increasing continuously, not only for new products but also for established ones. For example, it is expected that in the near future all products containing 0.3 % (within the EU) or 0.1 % (outside the EU) lithium chloride will have to be labeled as reprotoxic, i.e. will receive the H360F addition.

For many years, BYK has been proactively developing alternatives to the existing portfolio that also meet future regulatory requirements. As part of this initiative, three new urea-based liquid rheology additives have now been developed, which are variants of known thixotropic agents:

The lithium chloride-free variants work very similarly, but not completely identically.

Lithium chloride-containing additive	Lithium chloride-free variant	
RHEOBYK-7410 CA	**RHEOBYK-7460 CA**	For medium-polar solvent-based and -free systems
RHEOBYK-7420 CA	**RHEOBYK-7470 CA**	For aqueous and high-polar systems
RHEOBYK-D 410	**RHEOBYK-D 7460**	For medium-polar solvent-based and -free systems

By replacing the stabilizer, the new additives are lithium chloride-free. Like the existing products, they provide a strong thixotropic flow behavior and significantly reduce the sagging and settling tendency of the application systems.

BYK Instruments

The world is in a continuous change. The trends of 'globalization and standardization' within a more and more 'digital world' not only change consumer behavior but also your requirements for testing solutions:

Global communication

- Global specifications are prerequisite for seamless communication and ask for digital standard distribution.
- Excellent technical performance in compliance with international standards is a must.

Standardized QC management system

- Standardized QC procedures and QC reports need to be easy to set up globally.
- Routine QC checks and documentation are the key to product and process optimization.

Increase efficiency

- Innovative technologies are needed to guarantee objective and reliable measurement data.

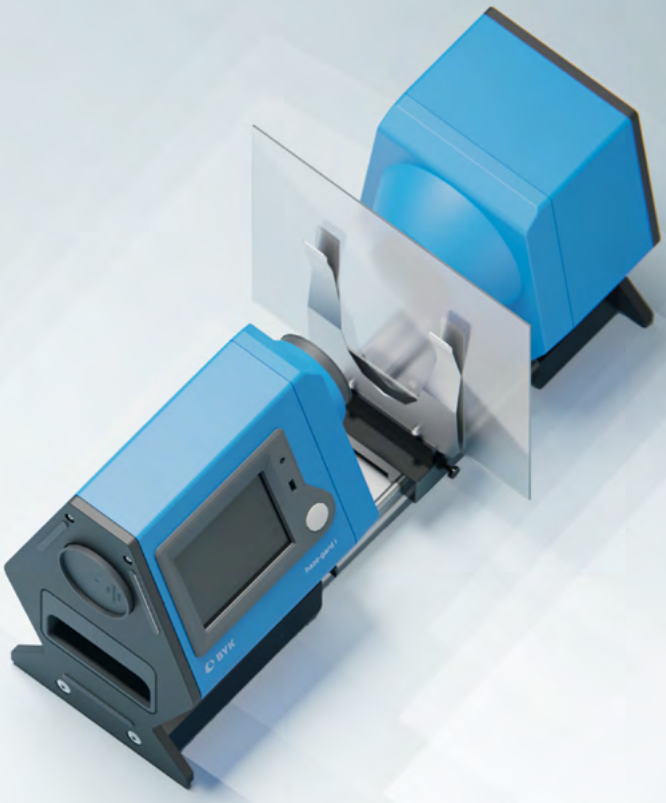
Figures and facts instead of feelings!

QC solutions for transparent products

Did you ever walk into a glass door? Was the wrapping of the cookies unvisible?

Films and foils are used in thousands of different packaging applications available as shrink film, blister or medical films and dependent on its useage should be crystal clear (flower packaging) or very hazy (grocery bags). The same is true for transparent sheets used as organic glass for example as protection panels in ice hockey arenas (highly transparent) or as green house panels (highly diffusing).

Transparency is more than just the ability to transmit light. The perceived quality of a transparent product is dependent on how "good" we can see the objects behind it. It can appear crystal clear, hazy or unsharp. Consistent transparency can only be guaranteed if the key material and process factors are under control and a standardized sample preparation is used.



References

ISO 13468	Determination of the total luminous transmittance of transparent materials
ISO 14782	Determination of haze for transparent materials
ASTM D1003	Haze and luminous transmittance of transparent plastics

Sample holders for ease of handling

Thick film and sheet holder
guarantees film is placed flush and cease-free at the measurement port

Thin film holder
guarantees film is placed flush and cease-free at the measurement port

Taber abrasion holder
Haze a measure to evaluate abrasion resistance of PMMA sheets.

haze-gard i

The industry standard for transparency control

- Three measurements in one:
  Total transmittance – transmission haze – clarity
- Repeatable results guaranteed due to reference beam and innovative LED technology
- Open design for small and large specimens
- Large touch display in color for onboard analysis
- Versatile sample holder for films and sheets
- ASTM and ISO: two standard methods in one unit

Color quality control solutions for plastic raw material

There are almost as many different types and forms of plastic raw materials as there are different areas of end use. As most of plastic pellets are typically translucent, non-uniform in size and inhomogeneous in color, guaranteeing lot-to-lot color consistency is the ultimate challenge.

Repeatable and reproducible measurement results with minimal operator sample handling can only be achieved using a high-performance benchtop spectrophotometer with accessories specially designed to save sample preparation time and to increase measurement accuracy of the plastic raw material.

color2view and automatic rotator
Perfect partner for pellets

- The only benchtop spectrophotometer that combines 45°c:0° color and 20°/60° gloss measurement with an integrated fluorimeter. Control color harmony and analyze long-term color stability based on fluorescence.
- Thanks to the powerful LED technology and many years of experience, an outstanding technical performance is guaranteed. The superior accuracy and excellent inter-instrument-agreement allow use of digital standards.
- The Automatic Rotator attached to the color2view automatically rotates the pellets during the measurement – manual refilling is no longer needed. Thus, excellent repeatability and reproducibility are guaranteed!

Color quality control solutions for final products

Color harmony has a major influence on the impact of perceptual quality on a product and thus, plays a key role in purchasing decision. The quality of a multi-component product is the immediate result of the cooperation of many partners along the entire supply chain. Whether directly on the production line, during the assembly or immediately before shipping: Portable spectrophotometers offer consistent and accurate color and gloss control wherever they are needed.

		spectro2guide	spectro2go	color2go	color2check
Measuring Geometry	45°c:0°	●	●	●	●
	d:8° (Spin/Spex)	●	●		
	d:8° (Spin)			●	●
MeasuringArea	8 mm	●	●	●	●
	4 mm		●		
Measuring Capability	Color	●	●	●	●
	Gloss	●	●	●	
	Fluorescence	●		○	
	Jetness	●			
Reproducability	Digital Standards	●	●	○	
	ΔE94 0.1	●	●	●	
	ΔE94 0.3				●
Delivery Content	Dockingstation	●	●		
	Garage			●	●
	WiFi	●	●	○	○
	Software	●	●	●	

BYKs solution task force for color quality control

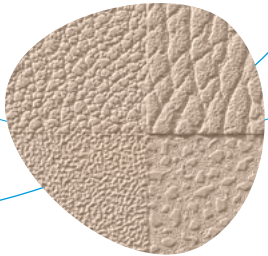
The new color2go is a portable spectrophotometer with horizontal alignment for professional color quality control. It not only combines color and 60° gloss measurement with a compact design, but also state-of-the-art and intuitive operation via touch display. In addition, the color2go includes two licenses for the smart-chart data analysis software – a complete package to get your color quality control started right away.

The new color2check is a cost-effective entry-level model into the world of portable color measurement. With its compact yet robust design and equipped with a garage for safe storage, it offers beginners a simple and inexpensive start to color quality control.

Although fluorescent materials have been used in plastics manufacturing for decades, their quality control has always been a major challenge. The portable spectrophotometer spectro2guide has the world's smallest fluorimeter built in for accurate quality control of fluorescent material. In addition to color and 60° gloss measurement, it predicts how much a fluorescent sample is likely to change due to exposure to sunlight.

Measurement needs are different within a supply chain. A manufacturer of plastic pellets prefers a benchtop instrument to repeatably measure granulates, while finished goods need to be directly controlled at the production line where portable devices are required. Due to the excellent agreement between color2view and spectro2guide, digital standards can be exchanged between benchtop and portable color instruments for the first time ever in the industry. The seamless use of digital standards has become reality – without any extra-profiling.

Overall color and grain harmony



Structured surfaces can be found everywhere – either created by nature or purposely made by a special manufacturing process. From leather like grain up to fine eroded surfaces, textures are used as a design tool or to achieve certain technical properties.

In automotive interior the assembled parts are made of different materials and are often manufactured by different suppliers using different processes. But in the end, they all should have the same grain. In addition to color control the overall harmony can only be achieved by objectively controlling grain size as well as perceived depth.

Eroded plastic parts have very fine structures that result in a visually perceived roughness. The visual perception is also influenced by the reflectivity of the surface. This "glossy appearance" is mainly dominated by the contrast between sparkling and non-sparkling spots.

spectro2profiler
Supports you through ups and downs

- 45°c:0° color measurement to measure color as you see it
- 3D topography measurement to determine grain size, grain depth and texture uniformity
- 2D gloss measurement to determine reflectivity contrast, which correlates with the visual perception of structure depth
- Traditional 60° gloss measurement according to international standards
- Smart high-tech LEDs with peak performance for digital standards
- Efficient data analysis and documentation with smart-chart software

Standardized viewing conditions for color judgement

No surprising mismatches anymore!

Color harmony is a key quality criterion and dependent on the products' usage often guaranteed for different lighting conditions such as daylight, fluorescent and tungsten illuminations. The visual assessment is highly influenced by the type of light sources, surroundings and the observer. The most important color match is under natural daylight. Depending on daytime and weather conditions, natural daylight varies in color and intensity. Therefore, daylight illuminants were defined by international standards.

It can happen that you approve a metameric sample pair outdoors in natural daylight but reject it when evaluated in a light booth with "daylight". The reason for this is how well natural daylight can be simulated with artificial light sources.

byko-spectra *pro*
See things the right way

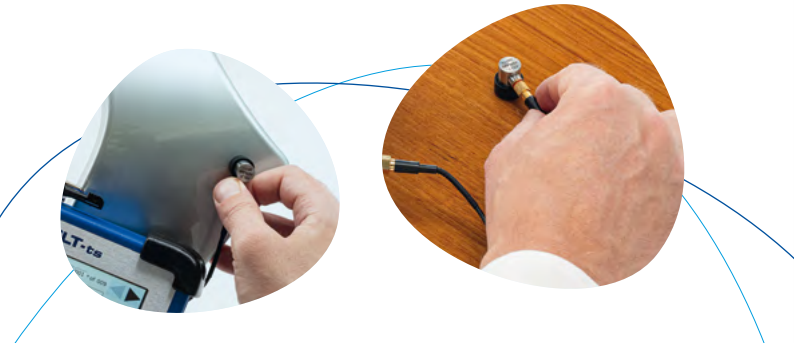
A smart combination of filtered tungsten-halogen lamps and LEDs masters the challenge to bring true daylight into your lab – as if you were outside.

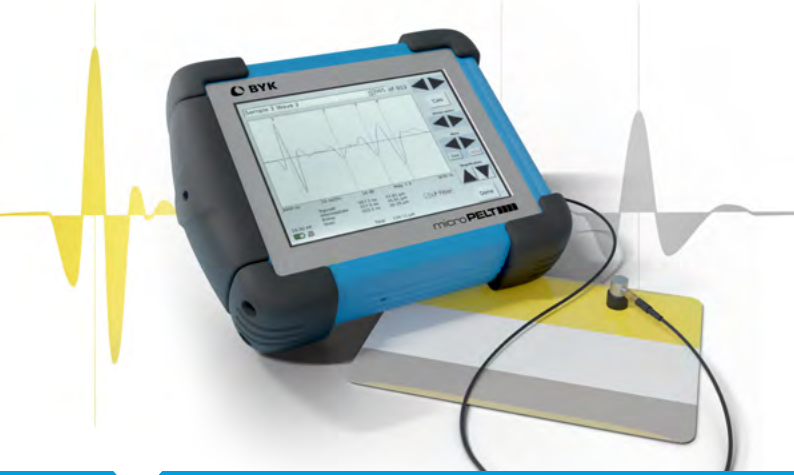
- Light booth with highest MIvis class A for daylight simulation of CIE D65: Combination of filtered halogen lamps with LEDs
- Seven certified light sources: D65, A, HZ, CWF, TL84, U30 and UV
- Simultaneous visualization of color temperature and light intensity in lux ensures 100 % controlled illumination
- Auto sequence mode for standardized and efficient color evaluation
- Available as luminaire. Mount on the ceiling or a wall and conveniently appraise large products

Multi-layer film thickness measurement for any substrate

Film thickness variation has a significant impact on paint durability, color and appearance harmony. Accurate monitoring will avoid excess material usage. Multi-layer systems could only be measured accurately using destructive methods combined with a high-cost microscope which is very time consuming and requires expert knowledge. The BYK-PELT family is the solution for non-destructive multi-layer film thickness measurement with highest precision – available as a handheld measurement tool or an automated version to mount on a robot for process control.

A game changer in your quality control that saves time and money while giving you accuracy and valuable data for optimization you didn't have before.





BYK-PELT

Accurate echoes from layer to layer

- Non-destructive measurement of multi-layer systems on any substrate material.
- Reports individual layer thickness and total thickness at each measurement location.
- Compact and lightweight with color touch-screen display.
- smart-chart software for professional documentation and data analysis with SPC charts.
- Innovative transducer technology for a wide thickness range:
  - Low frequency transducers for thick layers up to 5 mm
  - Medium frequency transducers for layers 18–500 µm
  - High frequency transducers for thin layers down to 5 µm

BYK by numbers

About
1,000
samples a day

More than
30
laboratories
across the globe

40
markets

More than

2,600

employees around the world

Investment in R&D 

3 times higher than the industry average

More than

150

years of **expertise**

What do we mean by...

...innovation?

Continually offering the most modern and advanced additives. To do this, we invest about 8 percent of our annual turnover in research and development – 3 times more than most in the sector. Research and development and application technology staff make up 22 % of our workforce.

...expertise?

We host more than 40 customer seminars annually, sharing valuable know-how and insights into product solutions and application techniques.

byk.com

...closeness?

Our global footprint and end-use structure enable us to deliver regional, tailor-made solutions to our customers with specialized industry and application focus.

Welcome to the **interactive world** of BYK additives

byk.com/ebooks

Our multimedia ebooks support your work with interactive graphics, fascinating animations, and videos to illustrate chemical processes.

BYK: world's largest and most versatile flexshuttle facility

- Significant time-to-market advantage for customers
- BYK doubles capacity in application technology

Would you like to learn more?

Feel free to talk to our HTS experts:
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Do you know BYK's solutions and products for sustainability?

What does sustainability mean at BYK?
Sustainability is of high value at BYK and has many facets. The search for alternative raw materials, the reorientation of research and development towards more sustainable products, sustainability in the applications of our customers, and the safest possible recycling in the sense of the circular economy are also among our most important topics.

We integrate the three dimensions of ecology, economy, and social commitment into all decision-making processes at BYK.

Unfortunately, we cannot be THE solution to climate change – but we can be part of the solution. With our sustainable solutions, we want to create value – not only for our customers, but also for our environment, our employees and future generations.

Discover
byk.com/sustainability