

Brüggemann
Chemical

**ADDITIVES FOR
POLYAMIDES**

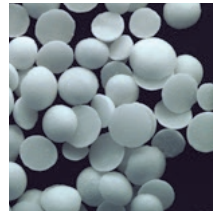
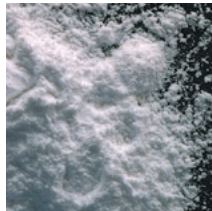
POLYMER ADDITIVES

PRODUCT INNOVATIONS TARGETED TO CUSTOMER DEMANDS

BrüggemannChemical continuously develops speciality additives in response to the requirements of the market. More than 30 years experience in the polymer industry, along with the technical expertise and close partnerships with customers, are the basis for the timely development of innovative solutions. This enables customers to enhance the value of their products to meet the ever increasing technical demands of the marketplace.

The product range mainly comprises tailor-made and well-balanced speciality additives. These are mixtures of several active components and present solutions for specific applications in customized product forms, such as powder, compacted granules or polymeric granules.

BrüggemannChemical produces key active ingredients in these additive packages on its own state of the art production plants and based on **BrüggemannChemical** know-how. This includes various chemical synthesis on speciality plants and a broad range of dedicated drying processes.



Significant advantages for polymer producers and converters:

- Improved dosing accuracy
 - Less off-spec material
 - Homogeneous resin quality
 - Simplified manufacturing
 - Efficient purchasing, warehousing and quality control
- **Reduced operating cost!**

Dust-free compacted granules or polymeric granules provide further benefits:

- Improved flowability, easier conveying and feeding
 - Better workspace hygiene
- **Analogous to masterbatch utilization, but more efficient due to practically 100% concentration of active components!**



HIGH PERFORMANCE ADDITIVES FOR POLYAMIDES AND OTHER ENGINEERING POLYMERS

BRUGGOLEN® H – Copper Based Antioxidants

Most Efficient Heat Stabilization of Polyamides up to 180°C

Classic Copper Salt based Heat Stabilizers

**BRUGGOLEN® H320 / H321*
H324 / H325*
H328F / H329F***

Highly effective copper iodide based antioxidants

- powerful long-term protection
- characteristic bluish or greenish color after conditioning
- excellent quality and homogeneity via specific production know-how
- variety of stabilizers to serve all customer requirements

Copper Complex based Heat Stabilizers (Proprietary) retaining Natural Color after Conditioning

**BRUGGOLEN® H3386 / H3387*
H3350 / H3351****

Powerful long-term protection / natural color

- excellent UV-stabilization
- very good dispersion
- H3351** masterbatch is suited for monofilament and fiber applications

BRUGGOLEN® H3376 / H3377*

Especially suited for electrical and electronic applications

- high comparative tracking index (CTI) up to 600V
- H3377* compacted granules suited for fiber and monofilament applications
- high extraction resistance; no plate-out

Copper Complex based Heat Stabilizers (Proprietary) generating Characteristic Bluish Color after Conditioning

**BRUGGOLEN® H3336 / H3346*
H3344 / H3345***

- cost-efficient
- excellent dispersion
- high extraction resistance; no plate-out
- H3345* compacted granules suited for fiber and monofilament applications
- H3344 allows high CTI up to 600V; suited for E&E applications

Next Generation: Much longer Thermal Resistance over a Broad Temperature Range

BRUGGOLEN® TP-H1606*

Outperforming phenolic based stabilizers / natural color

- extended stabilization of the mechanical properties
- low copper and low halogen content; allows classification according to IEC 61249-2-21 (Halogen-Free)
- allows high CTI up to 600V; suited for E&E applications
- retaining natural color
- superior to phenolic/phosphite based blends also at low to medium temperature range
- excellent dispersion, easy handling; accurate dosing
- not classified according to Globally Harmonized System (GHS)



BRUGGOLEN® H – Heat Stabilizers with Focus on Polyamides

Processing Stabilizer

BRUGGOLEN® H10

Best protection of polyamides against discoloration during processing

- reduced yellowing during melt processing
- protection against discoloration after ageing by heat and by UV-light
- H10 is superior to organic phosphites because of its:
 - excellent resistance against high shear stress and elevated temperatures
 - non volatility
 - resistance against hydrolysis
- especially suited for glass fiber reinforced Polyamides

Heat and Processing Stabilizers based on Phenolic Antioxidants + Synergists

BRUGGOLEN® H164

Long term protection of polyamides for technical applications against heat ageing

- non discoloring
- excellent in glass fiber reinforced or mineral filled Polyamides

BRUGGOLEN® H161

Long term protection of polyamide fibers and of unfilled injection / extrusion grades

- very good color stabilization, e.g. during storage
- non-extractable; no plate-out

BRUGGOLEN® H175

Very efficient color and long-term heat stabilization of engineering thermoplastics

- non-extractable, no plate-out
- effective also in Polyesters, Polycarbonates and Styrenics
- excellent color stabilization

BRUGGOLEN® H180

Excellent processing stabilizer and antioxidant package for polyacetals

- scavenges formaldehyde

Stabilization of Polyamides against Hot Oils on Basis of Secondary Aromatic Amines + Synergists

BRUGGOLEN® H20

Protection of polyamides against hot oils, fats and glycols

- good long term thermal stabilization up to 150°C
- characteristic brownish translucent discoloration



BRUGGOLEN® P – Processing Agents for Polyamides and Polyesters

Nucleating Agents

BRUGGOLEN® P22 FOR POLYAMIDES

Highly efficient nucleating agents for polyamides (P22) and polyesters (P252)

- reduction of cycle time during injection molding
- improved dimensional stability - significant reduction of warping in glass fiber reinforced compounds
- improved mechanical properties (tensile strength, stiffness, etc.)
- increase of heat distortion temperature
- non-volatile; non-extractable

BRUGGOLEN® P252 FOR POLYESTERS

BRUGGOLEN® TP-P1401**

New nucleating agent for polyamides – in granular form

- suited for higher processing temperatures
- easy to dose, disperse and process
- improved surface properties of nucleated compounds
- for application in compounding and in injection molding

Flow Enhancer for Polyamides

BRUGGOLEN® TP-P1507**

Easy flow + excellent mechanical performance

- superior melt flow; significantly longer spiral flow length
- no influence on the mechanical properties (E-modulus, tensile strength, elongation, impact strength are maintained)
- improved processing of glass fiber filled compounds
- enables advantages during injection molding such as shorter cycle times, lower energy consumption, possibility of more complex design geometries
- easy to dose and disperse

Processing Agents

BRUGGOLEN® P14 P130

Combination of internal and external lubricants for polyamides (P14 and P130) and polyesters (P130)

- very efficient due to low volatility and high thermal stability
- high gloss and good surface protection
- excellent mold release
- broadened processing window

Processing One-Packs for Polyamides (Virgin Grades / Recyclates)

BRUGGOLEN® P30 / P31* P32 / P33* P34 / P35*

Ready-to-use synergistic packages for injection molding

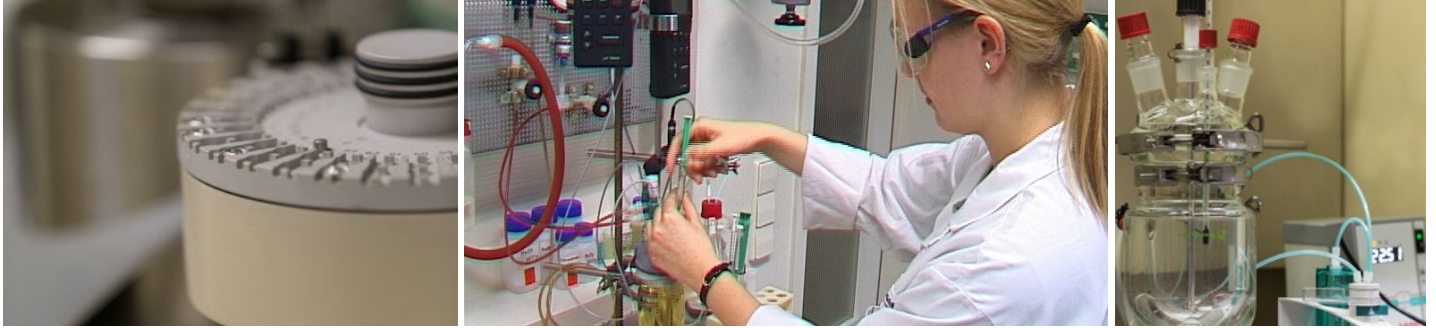
- P30/P31* is specifically suited for recycling of fiber waste or regrind
- improved melt flow, good mold release, reduced cycle times
- efficient color protection / processing stabilization
- P34/P35* includes basic heat stabilization

Processing Auxiliary (liquid) for Dry Blending

BRUGGOLEN® P60

Improved quality of dry blends (polymer chips + additive powder)

- reduced separation during transport
- improved additive dispersion



BRUGGOLEN® M – Modifiers for Polyamides

Chain Extenders for Polyamides

BRUGGOLEN® M1251**
M1253**

Unique increase of molecular weight via linear chain extension

- no cross-linking
- upgrade of injection molding grades to extrusion grades
- increase of impact strength
- increase of elongation at break
- typical applications in extrusion, blow-molding, recycling and injection molding
- M1253 micro-granules are also suited for monofilament and fiber applications

Chain Breaking Agent for Recycling of High Viscosity Polyamide Waste

BRUGGOLEN® TP-M1417**

Controlled and reproducible reduction of molecular weight

- exact adjustment of the relative viscosity to specific target values
- upcycling to injection molding grades
- generating flow properties and mechanical performance comparable to that of virgin material
- allowing cost advantages through usability of waste material

BRUGGOLEN® L – Light Stabilizers

Light Stabilizers / Optical Brightener for Engineering Thermoplastics

BRUGGOLEN® L11

Very efficient optical brightener + stabilizer package

- brightening colors
- improved color stability due to resistance to high processing temperatures
- masking of yellowish discoloration

BRUGGOLEN® L20
L206

Effective protection against ageing caused by UV-light and heat

- synergistic UV-stabilization packages
- L20 for pigmented , L206 for unpigmented systems

Further commercial BRUGGOLEN® – Polymer Additives and new test products are available on request.

Products are typically in powder form except: *compacted granules, **polymeric granules

FURTHER PRODUCT GROUPS

AP-NYLON® Additives for Cast Nylon and NYRIM®

BrüggemannChemical is the leading supplier of raw materials and additives for nylon casting. The product portfolio comprises special catalyst and activator systems, impact modifiers, heat stabilizers and processing auxiliaries. Complementary, **BrüggemannChemical** provides the monomer AP-Caprolactam. **NYRIM®** stands for specific nylon block copolymers which are processed via Reaction Injection Molding (RIM) and exhibit inherent excellent low temperature impact resistance (down to -30°C). **BrüggemannChemical** supports customers via a team of experts and with a sophisticated Technical/R&D Center.

Toll Production

BrüggemannChemical offers diverse advanced production plants or chemical synthesis, mixing, grinding and drying. A variety of products are produced in constant quality and according to customer requirements.



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