

**PETER GREVEN –  
Competence  
in plastics**



PETER  
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Partner of industry

# **PETER GREVEN –** **Competence** **in plastics**

*The Peter Greven Company has been producing and developing metallic soaps, lubricants and special stabilizers for both the plastics industry and stabilizer manufacturers for many years. Our philosophy as a company of the oleochemical industry is to deliver high-quality single additives to our customers.*

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## **PVC**

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PVC is now used in a wide number of areas, from standard technical products to special medical applications. This development would never have been possible without the use of appropriate stabilizers which protect PVC from decomposition when exposed to heat or light. Probably the most important class of the stabilizers are metallic soaps. Metallic soaps not only have excellent stabilizing properties, they are also good lubricants.



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## **Metallic soaps**

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### **LIGA CALCIUMSTEARAT 600**

This stearate is characterized by its slightly alkaline nature and low electrolyte content. These features provide remarkable better stabilization in comparison to neutral stearates. Calcium stearate is widely used in the manufacture of non-toxic stabilizers, in many cases in connection with zinc stearate. It is dosed in quantities of between 0.2 and 0.6 phr. Calcium stearate is approved by the BgVV (i.e. Bundesinstitut für gesundheitlichen Verbraucherschutz und Veterinärmedizin or "Federal Institute for Consumer Health Protection and Veterinary Medicine"). It is used mainly for manufacturing foil and plastisols, but is also finding increasing use in the production of profiles, tubes and cables. Calcium stearate is used in lead-stabilized formulations due to its short melting time which opposes the effect of the lead stearate.

### **LIGA CALCIUMSTEARAT 600 G**

Low-dust version of LIGA CALCIUMSTEARAT 600.

### **LIGA ZINKSTEARAT 101/6**

LIGA ZINKSTEARAT 101/6 is especially suitable for use as a stabilizer for PVC in connection with calcium or barium stearate. It has good colour properties and high initial stability. This product offers high free flowing abilities and can be dosed easily. Zinc stearate is approved for use in the manufacture of requisites, made of PVC, in accordance with the recommendations of the BgVV.

### **LIGA BLEISTEARAT 28**

Lead stearate can be used as a sole stabilizer for PVC. The reasons for this lie in the excellent complex-chemical properties of divalent lead ions necessary for substitution of unstable chlorine atoms. The lead chloride formed during the stabilization reaction has no negative effects on the stability of the PVC. Therefore, it is not necessary to use co-stabilizers. Lead stabilizers and their decomposition products do not increase conductivity, making them popular stabilizers in the manufacture of PVC cable insulation. However, lead stabilizers are not suitable for applications where transparency is required.

LIGA BLEISTEARAT 28 used for PVC is usually dosed in quantities of 0.2 to 0.8 phr.

### **LIGA BLEISTEARAT 28 G 1**

This low-dust granulate of neutral lead stearate provides better working hygiene and product handling. It also reduces the tendency of the dry blend to separate.

### **LIGA BARIUMSTEARAT**

Barium stearate is used in similar applications to calcium stearate and addition levels are also similar.

### **LIGA MAGNESIUMSTEARAT techn.**

Magnesium stearate can also be used in non-toxic stabilizers as a partial replacement for calcium stearate. It is approved for use by the BgVV. It has slightly better solubility in PVC compared to calcium stearate.

### **LIGA CALCIUMLAURAT LIGA ZINKLAURAT LIGA BARIUMLAURAT**

Calcium, barium and zinc are also offered in the form of laurate. Compared to stearates, these compounds provide much better stabilization due to their higher metal content. Their high solubility in PVC means they are less likely to plate out, which is particularly advantageous in the case of barium laurate.

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## **Lubricants**

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Lubricants are just as indispensable as additives in the manufacture of PVC as stabilizers. Lubricants usually are based on straight-chain hydrocarbons with different functional groups. The properties for technical applications vary depending on the ratio between the two components. A distinction is made between internal and external lubrication. Internal lubricants are clearly polar and reduce the friction between the individual PVC chains. This results in a reduction in the viscosity of the melted PVC, fine transparency

and a low tendency for plate out. External lubricants reduce the friction between the plastics (polymers) and the tool surface. This improves the quality of the surface of the plastics. However, this usually leads to an increase in the melting time. By nature, the materials are more prone to the plate out effect.

It should also be noted that most lubricants cannot be definitively assigned to either one of these groups – many of them fall somewhere in between.

### **LIGALUB SE**

Lubricant with external lubrication properties based on special carbonic acids. LIGALUB SE is a free flowing powder, which reduces stickiness. It is suitable for use with both rigid and flexible PVC. LIGALUB SE is also appropriate for transparent applications. BgVV approved.

### **LIGALUB 10 GE**

Liquid, internal lubricant based on a glycerine partial ester. This product is suitable for all forms of processing and is very soluble in PVC. It improves the surface lustre and dispersibility of pigments. BgVV approved.

### **LIGALUB 40/1 F**

For the same applications as LIGALUB 10 GE with improved viscosity and handling properties, especially at low temperatures.

### **LIGALUB 36 FE**

Universal, free flowing powder lubricant. This neutral ester wax is readily soluble, improves viscosity and reduces the stickiness of PVC. BgVV approved.

### **LIGALUB 45 FE**

LIGALUB 45 FE is an internal lubricant for easy processing of rigid and flexible PVC. It is suitable for transparent applications and improves the surface properties. The distribution of pigments is improved due to its dispersing effect. LIGALUB 45 FE is compatible with nearly all stabilizing systems.

### **LIGALUB FAE**

Internal powder lubricant based on a dicarbonic acid ester. This product is extremely soluble in PVC and is especially suitable for manufacturing complex injection-moulding parts or profiles made of rigid PVC. LIGALUB FAE has no adverse effects on melting.

### **LIGALUB 11 GE**

Partial ester of glycerine. For use as an internal lubricant for extrusion of rigid PVC. BgVV approved.

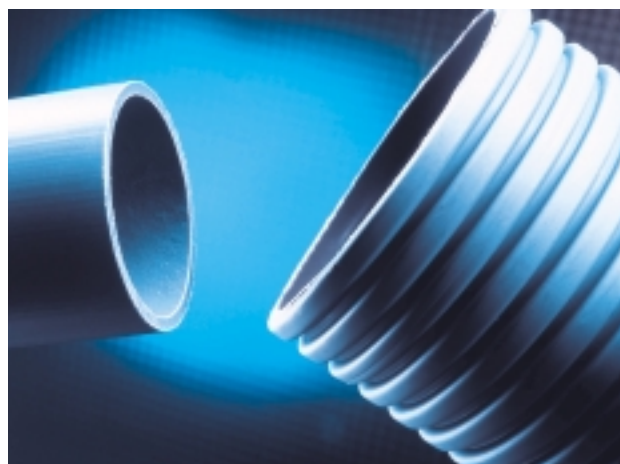


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# Polyolefines

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Compared to PVC, polyolefines are easy-to-work plastics with naturally favourable working properties and good thermal stability in the absence of oxygen. The additives mainly used to stabilize this plastic are antioxidants. However, most catalysts contain chloride, and there is a risk of hydrochloric acid formation during processing which can affect the performance of and easily corrode working tools. To prevent this, 0.05 to 0.2% calcium or zinc stearate is added to the formulations. Calcium stearate has proved especially beneficial in this regard due to its higher affinity to chloride.



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## Metallic soaps

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### **LIGA CALCIUMSTEARAT 800** **LIGA CALCIUMSTEARAT 860**

Neutral calcium stearate for use in PE/PP, for neutralization of catalysts containing chloride. These free flowing powders feature a low content of heavy metals, especially iron. This prevents the graying of plastics containing DLTDP. The dosed quantity is usually between 0.05 and 0.2%. Calcium stearate is BgVV approved for the manufacture of of requisites.

### **LIGA CALCIUMSTEARAT 820**

This calcium stearate compound is particularly pure with an extremely low iron and carbonate content. Additionally, it is suitable for the same areas of applications as the two products described above. LIGA CALCIUMSTEARAT 820 has also proved very useful in special applications such as the production of special foils.

### **LIGA CALCIUMSTEARAT 350**

Very fine-particled calcium stearate with a low iron content. This product is particularly useful in the manufacture of fibres. In addition, LIGA CALCIUMSTEARAT 350 also features high thermal stability.

### **LIGA CALCIUMSTEARAT CPR-2-V**

Calcium stearate precipitate of vegetable origin with extremely fine particle size. This product is also available in kosher and halal grades.

### **LIGA CALCIUMSTEARAT CPR-5-V**

Calcium stearate precipitate from a vegetable fatty acid with high transparency and extremely high heat stability.

### **LIGA ZINKSTEARAT 101** **LIGA ZINKSTEARAT 101 CG**

Very fine neutral zinc stearate precipitate with a low heavy metal content for use in polyolefines, especially for fibre production. LIGA ZINKSTEARAT 101 CG also features high heat stability and high transparency.

### **LIGA ZINKSTEARAT 101/6**

Produced by direct conversion, free flowing zinc stearate with a low heavy metal content. This product has high colour stability.

### **LIGA ZINKSTEARAT ZPR-2-V**

Zinc stearate precipitate from a vegetable stearic fatty acid. This product is also available in kosher and halal grades.

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## Lubricants

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In most cases, polyolefines can be processed without the use of additional lubricants since the stearates used have a certain lubricating effect. However, the use of lubricants has proved worthwhile in some applications.

### **LIGALUB 10 GE**

Liquid lubricant and antistatic additive based on a glycerine partial ester. Mainly used in the manufacture of foils and injection-moulding. It is dosed in quantities of between 0.1 and 0.5%.

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# Thermosetting Plastics

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Metallic soaps and oleochemical additives serve as release agents. Stearates are mainly used as release agents for the subsequent moulding process. Zinc stearate, especially, has

shown to perform very well due to its low moisture content and low melting point.

## **LIGA ZINKSTEARAT 101**

This product is a precipitated stearate with a very low particle size. Its high primary fineness gives very good distribution in initial process which leads to considerably improved release properties during the final moulding compared to the 'directly converted' stearates. The normal addition level is approx. 1%.

## **LIGALUB SE**

Release agent for the manufacture of SMC and BMC. Use of this product is beneficial for applications requiring subsequent treatment of the surface of the material. It has a very good release effect even at the high filler amount of some formulations.

## **LIGA CALCIUMSTEARAT 860**

This free flowing stearate has proved itself as a very effective solution for difficult release problems. This is due amongst other effects to favourable melting point and melt viscosity of calcium stearate.

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# Polystyrenes

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Polystyrene has a comparatively high thermal stability and, therefore, can be processed mainly without stabilizers. However, it loses this property upon copolymerisation, requiring the use of antioxidants. The use of oleochemical additives is usually limited to lubricants and separating

agents, which must be added to the plastics in bigger quantities to ensure optimum workability. The effects of lubricants here are very similar to those in PVC, especially with some copolymers such as ABS.

## **LIGA ZINKSTEARAT 101/6**

LIGA ZINKSTEARAT 101/6 is mainly used as a lubricant in polystyrene and ABS. This product meets the stringent demands for purity and solubility.

## **LIGA ZINKSTEARAT ZPR-2-V**

This stearate is suitable for use in many of the same applications as LIGA ZINKSTEARAT 101/6. However, it is derived from a vegetable fatty acid and is also available as kosher and halal grade.

## **LIGA MAGNESIUMSTEARAT techn.**

Magnesium stearate has both internal and external lubricating and good separating properties. It is mainly used in the manufacture of injection molding items. It is dosed in quantities of 0.2 to 0.8%.

## **LIGALUB PE**

This complex ester based on fatty acid is used as a separating and antiblocking agent. This product improves surface lustre with a very minimal effect on heat resistance. Dosed quantities of 0.5% result in a significant reduction in the sticking temperature.

## **LIGALUB 11 GE**

Saturated partial ester of glycerine. When used as an internal lubricant, this product effects a clear reduction in the Vicat softening temperature.

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# Further applications

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Various stearates, LIGA CALCIUMSTEARAT 860, LIGA ZINKSTEARAT 101/6, LIGA MAGNESIUMSTEARAT techn. or LIGA ALUMINIUMSTEARAT D2 and TR are used in polyamides, polycarbonates and acrylic resins. Which additive is the right one depends on the processing conditions and its solubility in the respective plastic. In general, free flowing properties and workability of the components are improved. LIGA ALUMINIUMSTEARAT TR is particularly suitable for transparent applications in acrylic glass.

LIGA ALUMINIUMSTEARAT D2 is suitable for colour stabilization during melt-extrusion of polyester fibres. LIGA CALCIUMSTEARAT 860, LIGA ZINKSTEARAT 101/6, LIGA MAGNESIUMSTEARAT techn. or LIGA ALUMINIUMSTEARAT D2 are added to hot-melt adhesive formulations during pulverization and improve the lubricating and separating properties as well as free flowing ability of the initial products. LIGA NATRIUMSTEARAT and LIGA KALIUMSTEARAT have proved useful as effective emulsifiers for emulsion polymerization.



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