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# Metallic Stearates

## INTRODUCTION

Metallic stearates are esters of stearic acid. These compounds consist of both long-chain fatty acids and a metal ion. Their various characteristics, such as metal content and particle size, can be manipulated for different markets and applications. They all have a high melting point as compared to other lubricants and can effectively repel water.

They are an active ingredient in an impressive variety of personal care products, polymers, paints, and other products used every day in homes and businesses. Metallic stearates are often cleared for food contact in several food industry applications. Metallic stearates are versatile products derived from a wide range of compositions.

The most important metallic stearates, in terms of number of applications are Aluminium, Calcium, Magnesium & Zinc.

We have range of stearates which are being supplied for Petrochemicals, Food, Personal Care, Pharmaceuticals, Plastics and Rubber, Master Batches, Cement and Coating Industries.

## Manufacture

Stearates of greatest commercial importance are produced from the commercial fatty acids derived from natural sources, with the predominance of those being sources containing mostly stearic acid and palmitic acids. Due to the OH-group present in the fatty acid molecule, 12-hydroxy stearates are usually more soluble in polar solvents and their melting point is higher than the metal salts of mixtures of predominantly stearic and palmitic acids.

## Applications

Because metallic stearates encompass numerous metal compositions, the number of industries and applications that use them is extensive.

- The plastics industry often chooses metallic stearates as lubricants, release agents, and acid scavengers. Recently, plastics manufacturers have also employed them for more streamlined melt processing. When used in melt processing, metallic stearates create finished products with less friction and smoother surfaces.
- The pharmaceutical and personal care industries also extensively use metallic stearates. Due to their gelling capabilities, metallic stearates are often found in creams, ointments, and topical gels, as well as stick deodorants. Low doses of metallic stearates are also favored in many cosmetics products like eyeliners, shampoos, lipsticks, sunscreens, and body powders.


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# Aluminium Stearate

Aluminium stearates are produced by the precipitation process only. There are three possible combinations of aluminium with fatty acids.

The ratio of aluminium to fatty acid does not necessarily correspond to the stoichiometric values. Any ratio is possible between the extremes 1:1 and 1:3. Therefore there are many varieties of aluminium stearates, generically referred to as aluminium mono-, di- or tri-stearate, whose properties differ from one another in respect to physical properties such as melting point, free fatty acid and particularly the gelling properties. Oils with a low viscosity are best thickened by aluminium tri- and di-stearates, whilst very viscous oils form stiffer gel when combined with aluminium di- or mono-stearates.

| | |
|---|---|
| **Synonyms** | Aluminium Octadecanoate |
| **CAS no.** | 637-12-7 |
| **EINECS no.** | 211-279-5 |
| **Molecular formula** | $C_{54}H_{105}AlO_6$ |
| **Molecular weight** | 877.4 |

### Applications

- In plastics it is used as a lubricant for the production of polyamides and thermosetting plastics.
- In printing inks, it is useful for thickening and suspension improving due to its high gelling properties.
- In lubricating oils and greases as it gives excellent properties of transparency, stringiness and water repellency.
- It also acts as a defoamer and provides high temperature resistance when added in lubricants.
- It acts as a lubricant in metal processing and produces brighter products.
- In paints, it is used for improving pigment suspension, control of viscosity and gloss, water resistance and improving brushing and penetration.
- In rubber industry it is used as dusting powder to prevent sticking of unvulcanised rubber sheets.
- In construction, it improves water resistance of concrete and cement.


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## SPECIFICATIONS – Aluminium Stearate

| Test | Unit | Specification |
|---|---|---|
| Appearance | - | White powder |
| Ash | % wt. | 9.5 - 13.5 |
| Free fatty acid | % wt. | Max 8.0 |
| Moisture | % wt. | Max 2.0 |
| Melting Point | ℃ | 154 -166 |
| Bulk density | gm/cc | 0.20 - 0.35 |
| Sieve Residue 200 mesh | % wt. | Max 1.0 |


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# Calcium Stearate

Calcium stearates, which are recognized as physiologically safe, have become increasingly important in the last few years. They are insoluble in most solvents. They dissolve only slightly when heated in aromatic compounds, chlorinated hydrocarbons or vegetable and mineral oils and waxes.

| | |
|---|---|
| **Synonyms** | Calcium Octadecanoate |
| **CAS no.** | 1592-23-0 |
| **EINECS no.** | 216-472-8 |
| **Molecular formula** | $C_{36}H_{70}CaO_4$ |
| **Molecular weight** | 607.02 |

### Applications

- As a water repellant in paints and other coatings
- As lubricants, mold release agents and acid scavengers by the plastics industry
- As lubricant to improve gloss in papers also help prevent dusting and fold cracking
- The building industry uses it as hydrophobic agent for inhibiting moisture absorption and preservation of building materials and construction
- The pharmaceutical and cosmetics industry uses calcium stearate as an anti-caking additive for powders and granules and as an excipient for pressing tablets


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## SPECIFICATIONS – Calcium Stearate

| Test | Unit | Specification | | | |
|---|---|---|---|---|---|
| | | PF | EI - 40 | TM | GF |
| Appearance | - | White powder | White powder | White powder | White granules |
| Ash (as CaO) | % wt. | 9.5 - 10.2 | 9.3 - 9.8 | 9.5 - 12.0 | 9.5 - 10.2 |
| Free fatty acid | % wt. | Max 0.5 | Max 1.0 | Max 0.5 | Max 1.0 |
| Moisture (105 ℃ for 1 hour) | % wt. | Max 3.0 | Max 3.0 | Max 3.0 | Max 3.0 |
| Melting Point | ℃ | 145 -155 | 145 -155 | 145 -155 | 145 -155 |
| Bulk density typical | gm/l | 200 - 300 | 200 - 300 | 200 - 350 | 600 - 700 |
| Sieve Residue on 325 mesh | % wt. | Max 1.0 | Max 1.0 | Max 1.0 | - |


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# Magnesium Stearate

Like calcium stearates, magnesium stearates are almost insoluble in normal solvents. They are able to hold considerable quantities of water and take on a creamy consistency. Magnesium stearates are therefore used to improve the retention of creams and semi-rigid wax articles as well as to produce waxes. Since they are recognized as physiologically safe, they are used by the cosmetics and pharmaceutical industry. Magnesium stearates improve the free-flowing properties and are added as anti-caking agents to powders.

| | |
|---|---|
| **Synonyms** | Magnesium Octadecanoate |
| **CAS no.** | 557-04-0 |
| **EINECS no.** | 209-150-3 |
| **Molecular formula** | $C_{36}H_{70}O_4Mg$ |
| **Molecular weight** | 591.27 |

## Applications

- Used by the rubber and plastic industries as an effective elastomer processing aid and release agent
- It is an excellent dusting agent to prevent surface adhesion in ABS plastic and in other thermoplastics with minimal discoloration
- As an acid scavenger in polymers processing
- Thermostable magnesium stearates are used as lubricants and release agents for the processing of thermoplastics and thermosets
- As a pharmaceutical ingredient for tablet coating
- As a diluent in the manufacture of medical tablets, capsules and powders
- As a food additive or pharmaceutical excipient


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## SPECIFICATIONS – Magnesium Stearate

| Test | Unit | Specification |
|---|---|---|
| Appearance | - | Fine white powder |
| Ash (as MgO) | % wt. | 7.2 - 8.3 |
| Free fatty acid | % wt. | Max 2.0 |
| Loss on drying (105 ℃) | % wt. | Max 3.0 |
| Melting Point | ℃ | 115 -145 |
| Bulk density | gm/ml | 0.20 - 0.30 |
| Sieve Residue in 325 mesh | % wt. | Max 1.0 |


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# Zinc Stearate

Zinc stearate is a white solid that repels water. It is insoluble in polar solvents, but more soluble in aromatic compounds and chlorinated hydrocarbons when heated.

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|---|---|
| **Synonyms** | Zinc Octadecanoate |
| **CAS no.** | 557-05-1 |
| **EINECS no.** | 209-151-9 |
| **Molecular formula** | $C_{36}H_{70}O_4Zn$ |
| **Molecular weight** | 632.33 |

## Applications

- Main application areas are the plastics and rubber industries where they are used as release agents and lubricants which can be easily incorporated
- It is used in the manufacture of thermal sensitive papers. These papers are used in fax machines, point of sale receipts and labels
- The outstanding clarity and heat stability properties of zinc stearate grades make them particularly suitable for impact and crystal grade polystyrene and other clear polymers
- It functions as an acid scavenger and processing aid in certain polyolefin applications
- The paint and coatings industry uses zinc stearates for pigment suspension and to improve grindability and matting
- The building industry uses powdered, precipitated zinc stearates as hydrophobic agents for plasters
- Used as stabilizer and lubricant in Cosmetics


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## SPECIFICATIONS – Zinc Stearate

| Test | Unit | Specification | | | |
|---|---|---|---|---|---|
| | | PE | SS | TM | GF |
| Appearance | - | White powder | White powder | White powder | White granules |
| Ash (as ZnO) | % wt. | 13.0 - 14.0 | 13.0 - 14.0 | 12.0 - 15.0 | 13.0 - 14.0 |
| Free fatty acid | % wt. | Max 1.0 | Max 1.0 | Max 1.0 | Max 1.0 |
| Moisture (105 ℃ for 1 hour) | % wt. | Max 0.5 | Max 0.5 | Max 0.5 | Max 0.5 |
| Melting Point | ℃ | 119 -125 | 119 -125 | 115 -130 | 119 -125 |
| Bulk density typical | gm/l | 200 - 300 | 200 - 300 | 200 - 350 | 600 - 750 |
| Sieve Residue on 325 mesh | % wt. | Max 1.0 | Max 0.1 | Max 1.0 | - |


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## REACH status

Calcium & Zinc Stearate offered by ExSyn are registered under EU REACH regulations. Whereas Aluminium, Magnesium, Sodium, Potassium & Lithium are exempted from REACH.

## STORAGE

Store in a cool & dry location and in well-ventilated area.

## PACKING

20/25 kg bags and Jumbo bags

ExSyn also offers other stearates – **Sodium**, **Potassium** & **Lithium**. All these stearates are available on commercial scale. No matter the quantity you need, our exceptional quality and service will make ExSyn your supplier of choice! If you need any additional information or SDS, please get in touch with us.