

PRODUCTS

> Antiperspirant Actives



Aloxicoll®

Zirkonal®

Aluminium Chlorohydrate

Antiperspirant actives, based on inorganic Aluminium salts, have been marketed for more than 60 years in various application forms, e.g. in roll ons, sticks, aerosols and pump sprays. One of the first actives used was Aluminium Chloride. This was a very effective antiperspirant, but due to its low pH, caused significant skin irritation.

Further development led to the introduction of basic Aluminium Chlorohydrates, which, although less effective antiperspirants than Aluminium Chloride, are considerably more skin tolerant. The Aluminium Chlorohydrates became the most important antiperspirant actives, both in their own right and as starting materials for the further development of antiperspirants.

- **Aloxicoll® L** (50 % aqueous solution)
- **Aloxicoll® PF40** (powder , 97 % < 45µm)

Activation:

Sweat reduction levels of ca. 25% are achieved with standard Aluminium Chlorohydrate grades. Past development has focussed on improving this level of efficacy, and numerous patents on this topic have been granted during the last 25 years. By far the most important process describes the change in polymer distribution of basic Aluminium Chlorohydrate solutions by thermal activation. The polymer distribution is measured by HPLC. The method defines the columns, mobile phase and equipment settings. For standard compounds the chromatogram shows 3 relevant bands: band 1 - large polymers, band 2 - medium sized polymers and band 3 - small polymers. It is well known that the species responsible for sweat reduction are found under bands 2 and 3. The primary aim of activation is, therefore, to achieve a break down of band 1. Selected conditions during activation allow the production of concentrated Aluminium Chlorohydrate solutions with a band 2 content > 60%,

- **Aloxicoll® 51L** (activated 50% aqueous solution)
or powders with a band 3 content > 40%.
- **Activated Aloxicoll® SD100** (particle size: 99 % < 100 µm)
- **Activated Aloxicoll® P** (particle size: 99 % < 45 µm)

In both cases band 1 is almost completely broken down. Sweat reduction levels of upto ca. 30% can be achieved with the activated solution and upto ca. 38% with the activated powders.

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Aluminium/ Zirconium Actives

Sweat Reduction

In the past, many compounds have been tested for their antiperspirant efficacy. Zirconium Oxichloride was found to be a very effective substance, but like Aluminium Chloride, caused significant skin irritation due to its low pH. Further development led to the production of Aluminium Zirconium complexes in both aqueous solution and powder form. The pH of these compounds is buffered to the level of the Aluminium Chlorohydrates by the addition of amino acids.

These compounds are also available in an activated form. Sweat reduction levels of up to ca. 38% for non-activated and ca. 45% for activated compounds can be achieved.

- **Zirkonal® L435* G** (Al/Zr -**tetrachlorohydrax glycine solution**)
- **Zirkonal® L540*** (Al/Zr -**pentachlorohydrate solution**)
(* -35/-40, the solutions are available with different solids contents)
- **Zirkonal® P4(3)G** (Al/Zr -**tetra(tri)chlorohydrax glycine powder**)
- **Zirkonal® AP4(3)G** (**activated** Al/Zr -**tetra(tri)chlorohydrax glycine powder**)

Further development at BK Giulini led to the patenting of a process to produce more effective Aluminium Zirconium compounds. These actives are suspended in cyclomethicone and are offered with a particle size 99% < 15µm and an active content of 40 - 50%

- **Zirkonal® S4(3)50G** (**activated** Al/Zr -**tetra(tri)chlorohydrax glycine powder** in cyclomethicone)

Visible Deposits

The value of antiperspirants nowadays is generally recognised by consumers. Nevertheless, the white deposits left in the armpits are frequently a cause for complaint. This problem can be partly addressed by formulating with non-volatile oils with a high refractive index, but also by using actives with physically changed particles (**LR types**). These actives reduce the amount of reflected, visible light and, therefore, the amount of “visible deposits”.

- **Activated Aloxicoll® LR** (particle size: 99 % < 90 µm)

	Aloxicoll® L	Aloxicoll® PF40	Aloxicoll® 31L	Aloxicoll® 31P	Aloxicoll® 51L	Aloxicoll® 51P	Act.Aloxicoll® P	Avt.Aloxicoll® 71P	Act.Aloxicoll® LR	Zirkonal® SD100	Zirkonal® L435G	Zirkonal® L540	Zirkonal® P3G	Zirkonal® P4G	Zirkonal® AP3G	Zirkonal® AP4G	Zirkonal® AP4G W
Roll-Ons	✓		✓		✓				✓	✓							
Pump Sprays	✓		✓		✓												
Creams	✓		✓		✓				✓	✓							
Aerosols		✓		✓		✓	✓	✓	✓								
Suspension Roll-Ons		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓
Soft Solids / Sticks		✓		✓		✓	✓				✓	✓	✓	✓	✓	✓	✓
process :	standard	special			activated				standard	standard	activated						

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