

# ZIRKONAL® AP4G

## Enhanced Efficacy Antiperspirant Active

INCI Name: Aluminum Zirconium Tetrachlorohydrate Gly

Empirical Formula:  $Al_4Zr(OH)_{12}Cl_4 Gly \cdot x nH_2O$

### Description

ZIRKONAL® AP4G is an enhanced efficacy antiperspirant active, providing improved sweat reduction over standard Aluminium Zirconium Chlorohydrate Gly powder, ZIRKONAL® P4G. The increase in efficacy is attributed to an activation step, which causes a change in the polymer distribution. A typical HPLC trace, showing the characteristic polymer distributions for these compounds, can be seen below. The shift in polymers from band 2 to band 3 indicates an enhanced sweat reduction.

### Chemical Properties

ZIRKONAL® powders are stable under anhydrous conditions. Aqueous / alcoholic solutions of ZIRKONAL® are slightly acidic. At pH values > 5, insoluble Al/Zr Hydroxides precipitate out. On drying, the residue decomposes to HCl and Hydroxides. On further heating, to temperatures >100°C, the Hydroxides release water.

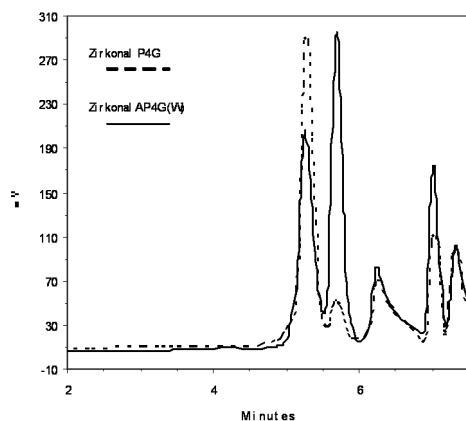
### Physiological Properties

According to the application area and concentration applied, ZIRKONAL® exhibits sweat reducing, deodorant, astringent, antibacterial and antiphlogistic properties.

### Application

ZIRKONAL® AP4G is primarily used in suspension formulations, e.g. sticks, suspension roll-ons, soft solids and creams, where an enhanced antiperspirant effect is required.

According to the FDA guidelines, only non-aerosol dosage forms are allowed. The maximum permitted concentration of ZIRKONAL® AP4G is 20 %, calculated on an anhydrous basis, omitting from the calculation any buffer component present in the compound.



### General Data

Form	fine powder
Aluminium	ca. 15 %
Zirconium	ca. 13,5 %
Chloride	ca. 18 %
Glycine	10,5 - 13,5 %
Iron	max. 100 ppm
Heavy metals [as Pb]	max. 20 ppm
pH [15 % solution]	3,5 - 4,5
Particle Size	98,5 % < 45 µm



Raw Materials/ Trade name	INCI name	w/w [%]
DC 345 Fluid (2)	Cyclopentasiloxane (and) Cyclohexasiloxane	34,50
Arlacel 165 (3)	Glyceryl Stearate (and) PEG-100 Stearate	1,00
Lanette 18 (4)	Stearyl Alcohol	19,00
Polyethylen- glycol 4000	PEG - 75	5,00
<b>Zirkonal® AP4G (1)</b>	Aluminum Zirconium Tetrachlorohydrate Gly	20,00
Cutina HR (4)	Hydrogenated Castor Oil	0,50
<b>Gilugel® SIL 5 (1)</b>	Cyclopentasiloxane (and) Cyclohexasiloxane (and) Aluminum/Magnesium Hydroxide Stearate	20,00

Raw Materials/ Trade name	INCI name	w/w [%]
DC 345 Fluid (2)	Cyclopentasiloxane (and) Cyclohexasiloxane	51,00
<b>Zirkonal® AP4G (1)</b>	Aluminum Zirconium Tetrachlorohydrate Gly	20,00
Aerosil R 805 (3)	Silica Silylate	6,00
<b>Gilugel® SIL 5 (1)</b>	Cyclopentasiloxane (and) Cyclohexasiloxane (and) Aluminum/Magnesium Hydroxide Stearate	20,00
DC 200 Fluid (2)	Dimethicone	3,00

## Antiperspirant Stick A 60

### Procedure

Combine the Arlacel, Lanette, PEG and Cutina, heat to 80 °C and mix well. Add the **Gilugel®** under agitation. When a homogeneous gel is formed, add the **Zirkonal®** and cool to 65 °C. When the dispersion is uniform, add the volatile Silicone, cool to 55 °C and fill into containers. Stir continuously during the filling operation.

### Suppliers

- 1) BK Giulini
- 2) Dow Corning
- 3) Uniquema
- 4) Cognis

## Antiperspirant Soft Solid A 61

### Procedure

Combine the ingredients under stirring and homogenise well. Once a homogeneous gel is formed, fill into containers, stirring continuously during the filling operation.

### Suppliers

- 1) BK Giulini
- 2) Dow Corning
- 3) Degussa

## Safety

ZIRKONAL® AP4G is an Aluminium Zirconium Tetrachlorohydrate Gly according to USP 32. The FDA Final Antiperspirant Monograph classifies ZIRKONAL® types under category 1, as safe and effective for use in non-aerosol, antiperspirant formulations.

## Packaging

ZIRKONAL® AP4G powder is available in 120 kg PE drums.

## Storage

ZIRKONAL® types can be stored for more than 3 years in original, unopened containers. Once opened, the powder should be used quickly and contact with moisture should be avoided.

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