



GreenZn Co., Ltd.
*Where **Green** Meets **Zenith***

Titanium Dioxide Series

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PART.01
**Powder Surface
Treatment**

Our Factory



Self-operated full-industrial-chain powder surface-treatment system.

- Cost-effective conventional treatment
- Eco-friendly surface treatment
- Custom powder-treatment services



Certificates obtained



Certificate under application

To enter the Southeast Asian market, we are applying for halal certification to meet the requirements of various halal countries.



Mechanical Mixing

Liquid surface modifiers are atomized and sprayed onto the powder surface

Mechanical forces (compression/impact/friction/shear) ensure uniform distribution

Facilitates inter-component diffusion to form functionalized coatings

Solid-State Reaction

Raw materials and surface agents are precisely pre-mixed per formulation

Grinding mechanical energy initiates solid-state chemical reactions

A dense coating is formed on the surface of the particles

Wet Grinding Process

Raw materials/surface agents/dispersants are ground with zirconia bead media

Bead milling shear forces achieve submicron dispersion and coating

Liquid phase environment ensures coating uniformity and stability

Why is Powder Surface Treatment Necessary?

Main Purpose:

To optimize substrate-surface properties and overcome its inherent limitations, **delivering overall enhancement of key functional properties** including hydrophobicity, lipophilicity and dispersibility.

Uniform surface treatment is crucial for the stability of the system and the color of the product!

Uneven coating causes inconsistent particle distribution and color distortion in the formula.

Moreover, during application, the particle distribution changes under shear force, resulting in a different color after blending.



Advantages of Powder Surface Treatment



- **Hydrophobic**
- **Lipophilic**



**Reduces
Agglomeration**



**Stable
Dispersion**



**Improves
Skin Feel**



Surface Treatment Agent



Customized Available

Treatment Agents	Typical Agent	Dispersion Medium	Typical Application
Metal Soap	Magnesium Myristate	Oil	Pressed powder, Loose powder, Eyeshadow
Silicone Oil	Polydimethylsiloxane	Silicone Oil	Liquid foundation, BB cream
Silane	Triethoxycaprylylsilane	Oil / Ester / Silicone Oil	Sunscreen, Foundation
Fluorinated Silane	Perfluorooctyltriethoxysilane	Fluorinated Oil	Long-wearing Foundation, Sports Sunscreen
Amino Acid	Lauroyl Lysine	Oil	Japanese-style Base Makeup, Sensitive Skin Formula
Lecithin	Hydrogenated Lecithin	Oil & Water Dispersible	Moisturizing Base Makeup, Cushion Compact
TMS	Trimethylsiloxysilicate	Oil	Long-wear Liquid Foundation
Composite Treatment	Multiple combined treatment agents	Multi-medium	High-end cosmetic products

Application Scenarios



Sunscreen products

Recommended dosage: 2-25%



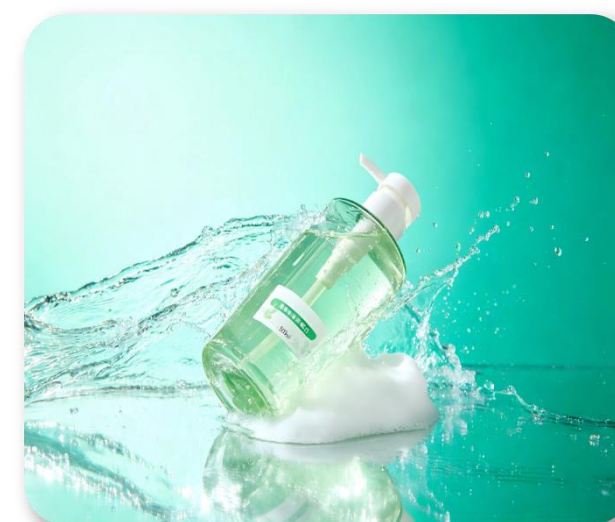
Skincare products

Recommended dosage: 0.5-5%



Base makeup & color cosmetics

Recommended dosage: 0.5%-25%



Rinse-off products

Recommended dosage: 0.1-1%



PART.02
**Product
Introduction**

Key products

——Cost-Effective & General-Purpose Series



Code	Product Name	INCI Name	Particle Size/nm	Dispersion	Product Features
611700	GD Pearl KT-100	CI 77891	350-400	Water dispered	Suitable for water-based formulations, high cost-efficiency.
611611	GD Pearl KT-620AS	CI 77891 & Aluminum Hydroxide & Triethoxycaprylylsilane	280	Oil dispersed	Good oil-phase dispersion, ideal for oil-based & makeup systems.
611200	GD Pearl TI-903	CI 77891 & Aluminum Hydroxide	280-300	Water/Oil dispered	High versatility, compatible with water-based & oil-based formulas.
611902	GD Pearl TI-09DM	CI 77891 & Aluminum Hydroxide & Dimethicone	220-280	Oil dispered	Smooth skin feel, anti-agglomeration, ideal for foundations & oil pastes.
611115	GD Pearl CR-50AS	CI 77891 & Aluminum Hydroxide & Triethoxycaprylylsilane	250	Oil dispered	Great water resistance & adhesion, ideal for long-wear makeup formulas.

Key products

——Special Surface-Treatment Series



Code	Product Name	INCI Name	Particle Size/ nm	Dispersion
611108	GD Pearl CR-50ASM	CI 77891 & Aluminum Hydroxide & Triethoxycaprylylsilane & Galactoglucan	250	Oil dispered
611115	GD Pearl CR-50TMS	CI 77891 & Aluminum Hydroxide & Trimethylsiloxysilicate	250	Oil dispered
NEW ! 611201	GD Pearl TR-586AS	CI 77891 & Aluminum Hydroxide & Triethoxycaprylylsilane	280-300	Oil dispersed
NEW ! 611206	GD Pearl TR-586AS-LL-MQ-ITT	CI 77891 & Aluminum Hydroxide & Triethoxycaprylylsilane & Lauroyl Lysine & Trimethylsiloxysilicate & Isopropyl Titanium Triisostearate	280-300	Oil dispersed



Product Brief

GDPearl CR-50ASM

✦ Appearance: White to off-white powder

✦ Component

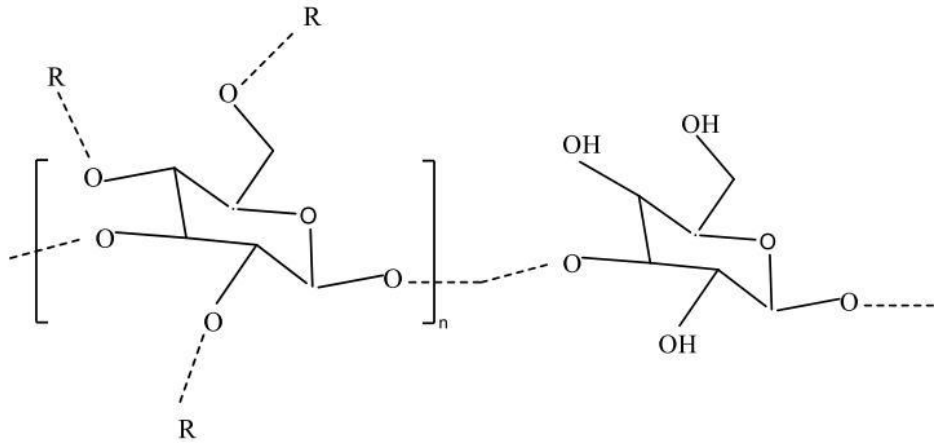
INCI	CAS-No.
CI 77891	13463-67-7
ALUMINUM HYDROXIDE	1333-84-2
TRIETHOXYCAP RYLYLSILANE	2943-75-1
GALACTOGLUCAN	120112-82-5



- ✦ Crystal structure: Rutile
- ✦ Average particle size: 250nm
- ✦ Dispersibility: Oil-dispersible

Galactoglucan

— Glacier-Derived Active Ingredient: "Natural Self-Repairing Power"



R= $\rightarrow$ 2,3,4,6) β -Glcp (1 $\rightarrow$
Chemical Structure of Galactoglucan

- **Originated from Western Sichuan in the Pan-Himalayan region**
 - **The core strain is isolated from the 3,700-m glacial plateau of Aba**
 - **Full safety assessment, in-vitro & in-vivo tests**
- ✦ Strengthen skin barrier, promote wound healing, anti-inflammatory & soothing



Microbial-Derived

L-configuration

Helical Structure

Galactoglucan Properties

Polyglycosidic Bonds

Supramolecular

Naturally Water-Soluble



GDPearl CR-50ASM

——Core Functional Features



◆ Repair-oriented Long-wear Makeup

Galactoglucan can strengthen skin barrier, provide anti-inflammatory and soothing effects, and accelerate skin repair. It enables the foundation to deliver makeup-with-skincare-benefits while offering coverage.

◆ Anti-Dullness & Antioxidation

Galactoglucan effectively inhibits melanin recruitment, reduces UV-induced erythema and pigmentation, and helps the foundation maintain long-lasting color without darkening.

◆ Moisturization & Barrier Support

Galactoglucan improves the water-retention capacity of the stratum corneum. Tests verify that it can significantly reduce Transepidermal Water Loss (TEWL), making it suitable for dry and sensitive-prone skin.

***Repair First,
Nurture Beyond***

GDPearl CR-50ASM

——Makeup Effect & Skin-Feel



✦ Lightweight & Skin-adherent

Alkylsilane surface treatment endows the powder with lipophilic-hydrophobic properties, improving powder dispersibility and skin adherence to deliver a sheer, breathable makeup finish.

✦ Long-wearing Performance

Hydrophobic treatment improves wear time, sweat and oil resistance for extended makeup wear.

***Repair First,
Nurture Beyond***

Contact-angle Measurement

Figure 1. GDPearl CR-50AS

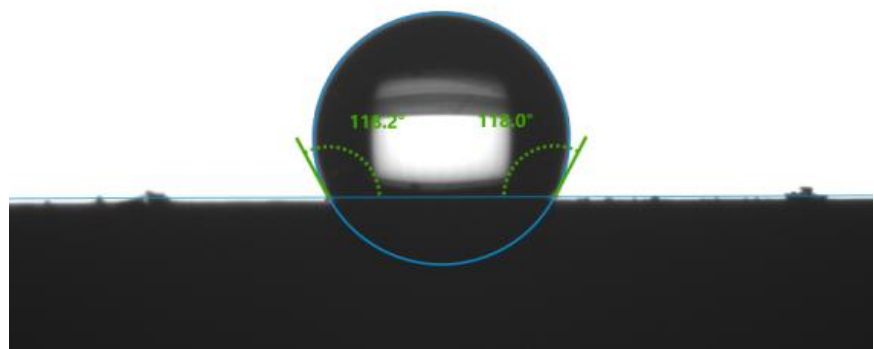
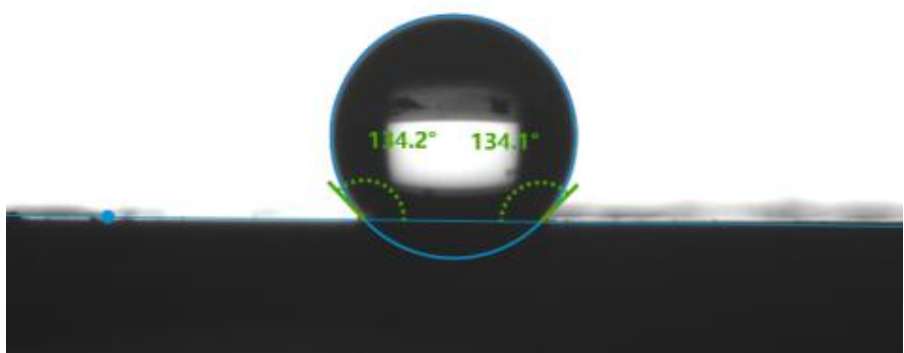


Figure 2. GDPearl CR-50ASM



 **A larger contact-angle indicates stronger hydrophobicity.**

A surface becomes hydrophobic when its contact angle is above 90°, and a higher angle delivers better water resistance.

 **Water-drop Shape reflects hydrophobic performance.**

Water droplets in Figure 2 are closer to spherical, demonstrating stronger repellency toward water molecules and superior water-sweat resistance. When used in foundation or pressed powder, it effectively reduces makeup fading caused by sweat and water exposure. The more uniform and compact hydrophobic coating in Figure 2 also ensures better long-term waterproof stability.

Sample	Contact-angle	Wettability Judgement
GDPearl CR-50AS	118.2°	Hydrophobic (not reaching super-hydrophobic state)
GDPearl CR-50ASM	134.2°	Higher hydrophobicity, ↑16°

Product Brief



GDPearl CR-50TMS

- ✦ Appearance: White to off-white powder
- ✦ Average particle size: 250nm
- ✦ Dispersibility: Oil-dispersible
- ✦ Component

INCI	CAS-No.
CI 77891	13463-67-7
ALUMINUM HYDROXIDE	1333-84-2
TRIMETHYLSILOXYS ILICATE	68988-56-7

TMS-Treatment Properties

- **Long-lasting makeup effect**

TMS treatment creates **a continuous film** on powder particles, boosting skin adhesion and **blocking sebum ingress**. It extends wear time and minimizes makeup fading and smudging.

- **Formulation Compatibility**

TMS treatment agent features **good chemical inertness and excellent compatibility** with cosmetic ingredients such as oils, waxes and surfactants, without impairing the overall system stability.

GDPearl TR-586AS

- ✦ Appearance: White to off-white powder
- ✦ Average particle size: 280-300nm
- ✦ Dispersibility: Oil-dispersible
- ✦ **Wet Grinding Process**

Component

INCI	CAS-No.
CI 77891	13463-67-7
ALUMINUM HYDROXIDE	1333-84-2
TRIETHOXYCAPRYLYLSI LANE	2943-75-1



Wet Grinding Process Properties

Wet grinding process treatment is the mainstream surface-modification technology for titanium dioxide. Using **water** as the dispersion medium, a coating layer is formed on titanium-dioxide particles via deposition or chemical reaction.

Advantages over dry-process treatment:

- Bead milling shear forces achieve **submicron dispersion and coating**
- Liquid phase environment ensures **coating uniformity and stability**

GDPearl TR-586AS Properties



♦ Excellent Hydrophobic Modification

Firm hydrophobic coating greatly increases water contact angle, effectively improving dispersion and compatibility in organic systems.

♦ Uniform & Stable Coating

Uniform aqueous-phase dispersion ensures full reaction to form a continuous and even coating.

♦ Enhanced Stability & Anti-Agglomeration

The coating shields UV and moisture. Its hydrophobic surface prevents powder agglomeration for lasting stability.

 Optimized Wet-Process Technology

 Ethanol-Free Residue

 No Explosion-proof Requirements

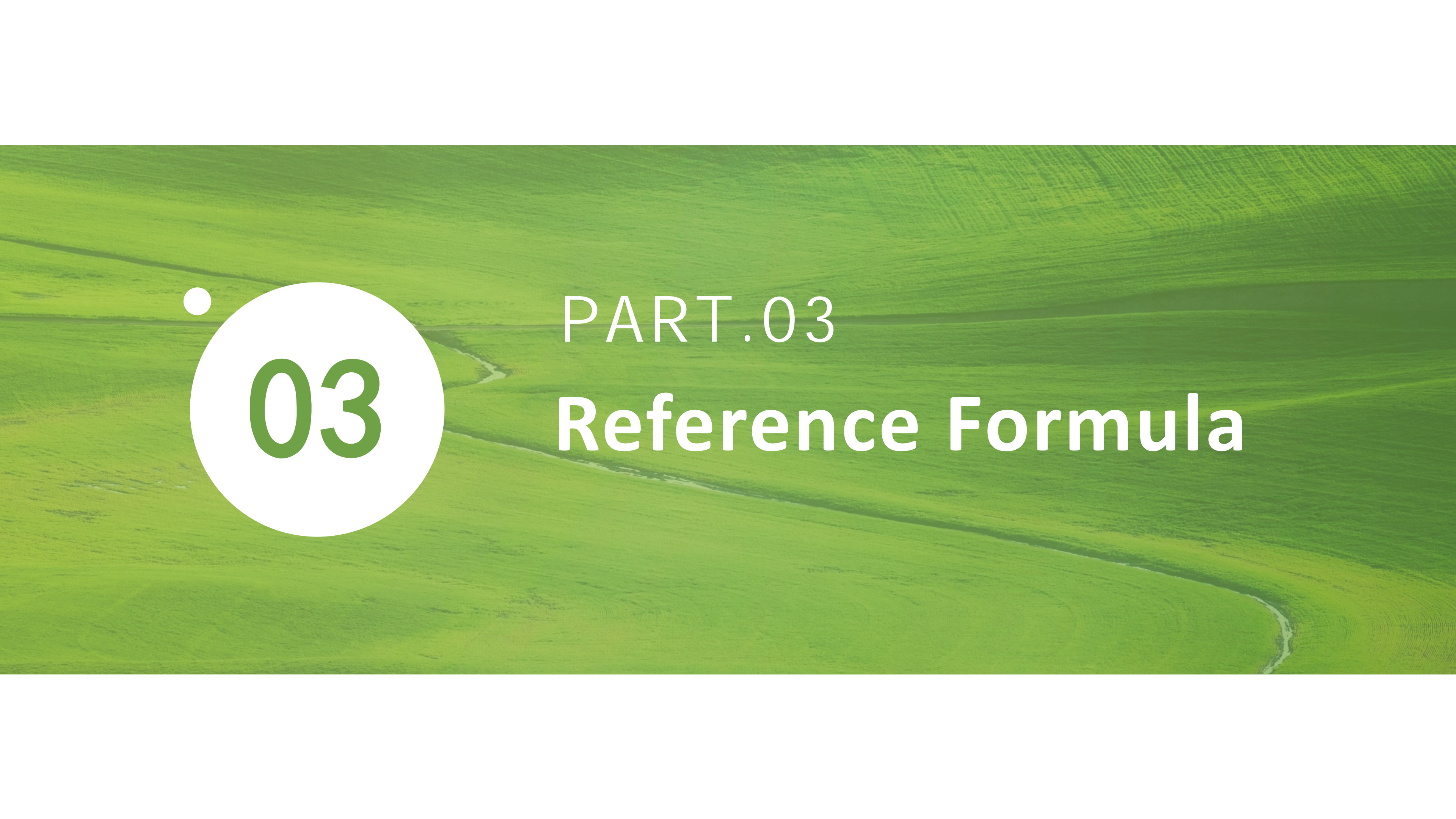
GDPearl TR-586AS-LL-MQ-ITT

- ✦ Appearance: White to off-white powder
- ✦ Average particle size: 280-300nm
- ✦ Dispersibility: Oil-dispersible
- ✦ Component

INCI	CAS-No.
CI 77891	13463-67-7
ALUMINUM HYDROXIDE	1333-84-2
TRIETHOXYCAP RYLYLSILANE	2943-75-1
LAUROYL LYSINE	52315-75-0
TRIMETHYLSILOXYSILICATE	68988-56-7
ISOPROPYL TITANIUM TRIISOSTEARATE	61417-49-0

Properties

- **Ultra-high Hydrophobicity**
Dual-silane composite treatment achieves WCA over 130° .
Excellent water and sweat resistance improves makeup staying power and weather durability.
- **Skin-friendly & Mild**
Lauroyl lysine offers high biocompatibility, forming **a breathable protective film** for silky, lightweight feel and mild, skin-nourishing effects.
- **Enhanced Mechanical & Processing Performance**
Isopropyl Titanium Triisostearate **improves the surface smoothness of finished products** and **reduces system viscosity** for better flow-ability.



03

PART.03

Reference Formula

Longwear Matte Foundation

GDS260921FD-1



Trade Name	INCI	Content%
ES-5300	LAURYL PEG-10 TRIS(TRIMETHYLSILOXY)SILYLETHYL DIMETHICONE	3.00
5225C	CYCLOPENTASILOXANE, PEG/PPG-18/18 DIMETHICONE	5.00
KF995	CYCLOPENTASILOXANE	0.50
SF-906(5)	DIMETHICONE	6.00
GDSOft 56A	PHENYL METHICONE	1.00
222	DIISOSTEARYL MALATE	0.50
SF-942A	CAPRYLYL METHICONE	6.00
GDSOft 721	DIMETHICONE, DIMETHICONE/VINYL DIMETHICONE CROSSPOLYMER	4.00
BENTONE GEL® VS-5 PC V HV	CYCLOPENTASILOXANE, DISTEARDIMONIUM HECTORITE, PROPYLENE CARBONATE	5.00
R974	SILICA DIMETHYL SILYLATE	0.50
KF-6106	POLYGLYCERYL-3 POLYDIMETHYLSILOXYETHYL DIMETHICONE	0.50
GDPearl SC 135DM	SILICA, METHICONE	2.00
KF995	CYCLOPENTASILOXANE	5.50
GDPearl EM 05AS	MICA, TRIETHOXYCAPRYLYLSILANE	2.45
GDPearl CR 50TMS	CI 77891, ALUMINUM HYDROXIDE, TRIMETHYLSILOXYSILICATE	12.00
GDPearl IY 32AS	CI 77492, TRIETHOXYCAPRYLYLSILANE	1.20
GDPearl IR 75AS	CI 77491, TRIETHOXYCAPRYLYLSILANE	0.25
GDPearl IB 33AS	CI 77499, TRIETHOXYCAPRYLYLSILANE	0.10
Water	WATER	36.85
Butylene Glycol	BUTYLENE GLYCOL	3.00
Glycerin	GLYCERIN	3.00
Magnesium Sulfate	MAGNESIUM SULFATE	0.80
CPS	CHLORPHENESIN	0.05
PH91	PHENOXYETHANOL, ETHYLHEXYLGLYCERIN	0.60
SLA1170	PARFUM	0.20

Formula Highlights:

- No additional film-formers needed
- MQ silicone resin-encapsulated TiO₂ powder delivers inherent setting effect
- Lightweight makeup finish

Quadra-Coat Soft Matte Foundation

GDS260917FD-1



Trade Name	INCI	Content%
KF995	CYCLOPENTASILOXANE	4.50
KSG-210	DIMETHICONE, DIMETHICONE/PEG-10/15 CROSSPOLYMER	3.00
KF-6017	PEG-10 DIMETHICONE	2.10
SF-906(5)	DIMETHICONE	2.20
SF-906(10)	DIMETHICONE	3.00
GDSoft 556	PHENYL TRIMETHICONE	3.50
GDSoft 56A	PHENYL METHICONE	3.50
GDResin 850C	CYCLOPENTASILOXANE, TRIMETHYLSILOXYSILICATE	8.00
GDResin EB-200	BIS-HYDROXYETHOXYPROPYL DIMETHICONE/IPDI COPOLYMER ETHYLCARBAMATE, DIMETHICONE, TRIMETHYLSILOXYSILICATE	1.50
GDPearl PQ 05	POLYMETHYLSILSESQUIOXANE	0.60
GDSoft 721	DIMETHICONE, DIMETHICONE/VINYL DIMETHICONE CROSSPOLYMER	4.40
BENTONE GEL® VS-5 PC V HV	CYCLOPENTASILOXANE, DISTEARDIMONIUM HECTORITE, PROPYLENE CARBONATE	4.00
R974	SILICA DIMETHYL SILYLATE	0.50
KF-6106	POLYGLYCERYL-3 POLYDIMETHYLSILOXYETHYL DIMETHICONE	0.25
KF995	CYCLOPENTASILOXANE	2.75

Trade Name	INCI	Content%
GDPearl EM 05AS	MICA, TRIETHOXYCAPRYLYLSILANE	0.58
GDPearl TR-586AS-LL-MQ-ITT	CI 77891, ALUMINUM HYDROXIDE, TRIETHOXYCAPRYLYLSILANE, LAUROYL LYSINE, TRIMETHYLSILOXYSILICATE, ISOPROPYL TITANIUM TRIISOSTEARATE	8.00
Iron Oxide Slurry	Iron Oxides, TRIETHOXYCAPRYLYLSILANE	1.42
Water	WATER	36.45
Butylene Glycol	BUTYLENE GLYCOL	4.00
Glycerin	GLYCERIN	3.00
Sodium Chloride	SODIUM CHLORIDE	0.80
Disodium EDTA	DISODIUM EDTA	0.05
Panthenol	PANTHENOL	1.00
CPS	CHLORPHENESIN	0.10
PH91	PHENOXYETHANOL, ETHYLHEXYLGLYCERIN	0.60
SLA1170	PARFUM	0.20

Formula Highlights:

- Composite modified powder reduces unnatural whiteness
- Multi-elastomer delivers skin-smoothing & oil-control effects
- Ideal for combination oily skin

Skin-Fusing Soft Glow Cushion

GDS260916FD-1



Trade Name	INCI	Content%
KF6048	CETYL PEG/PPG-10/1 DIMETHICONE	1.50
KF6017	PEG-10 DIMETHICONE	2.40
KF995	CYCLOPENTASILOXANE	9.75
DISM	DIISOSTEARYL MALATE	0.70
GDS <i>Soft</i> 556	PHENYL TRIMETHICONE	1.00
SF-906(5)	DIMETHICONE	3.50
GDR <i>Resin</i> 850C	CYCLOPENTASILOXANE, TRIMETHYLSILOXYSILICATE	10.00
GDR <i>Resin</i> EB-200	BIS-HYDROXYETHOXYPROPYL DIMETHICONE/IPDI COPOLYMER ETHYLCARBAMATE, DIMETHICONE, TRIMETHYLSILOXYSILICATE	0.50
GDS <i>Soft</i> 721	DIMETHICONE/VINYL DIMETHICONE CROSSPOLYMER, DIMETHICONE	2.00
GDP <i>earl</i> PQ 05	POLYMETHYLSILSESQUIOXANE	1.00
R974	SILICA DIMETHYL SILYLATE	0.70
BARENATE BENTONE GEL	ISONONYL ISONONANOATE, BENTONITE, PROPYLENE CARBONATE	4.00
KF-6106	POLYGLYCERYL-3 POLYDIMETHYLSILOXYETHYL DIMETHICONE	0.25
KF995	CYCLOPENTASILOXANE	3.50
GDP <i>earl</i> EM 05AS	MICA, TRIETHOXYCAPRYLYLSILANE	0.70

Trade Name	INCI	Content%
GDP <i>earl</i> TR-586AS	CI 77891, ALUMINUM HYDROXIDE, TRIETHOXYCAPRYLYLSILANE	8.00
Iron Oxide Slurry	Iron Oxides, TRIETHOXYCAPRYLYLSILANE	1.30
Water	WATER	39.65
Butylene Glycol	BUTYLENE GLYCOL	5.00
Glycerin	GLYCERIN	3.00
Xanthan Gum	XANTHAN GUM	0.05
CPS	CHLORPHENESIN	0.10
Sodium Chloride	SODIUM CHLORIDE	0.60
PH91	PHENOXYETHANOL, ETHYLHEXYLGLYCERIN	0.60
SLA1170	PARFUM	0.20

Formula Highlights:

- Special treated **wet grinding** fine powder
- Silicone resin provides **soft & smooth texture**
- Suitable for **cushion** formulations
- **Dry-skin** friendly

Skin-Caring Longwear Foundation

GDS261013FD-1



Trade Name	INCI	Content%
GDSOft 9041	DIMETHICONE, DIMETHICONE/VINYL DIMETHICONE CROSSPOLYMER	2.00
DT101	CETYL PEG/PPG-10/1 DIMETHICONE	1.00
SC95	LAURYL PEG-8 DIMETHICONE	2.73
300R	POLYHYDROXYSTEARIC ACID	0.37
GDPearl CR-50ASM Slurry (60% Pigments)	60% CR-50ASM, 2% POLYGLYCERYL-3 POLYDIMETHYLSILOXYETHYL DIMETHICONE, 2% LAURYL PEG-8 DIMETHICONE, 1% POLYHYDROXYSTEARIC ACID, 35% CYCLOPENTASILOXANE	13.50
2EHS	ETHYLHEXYL STEARATE	4.00
SF PCA	PCA DIMETHICONE	0.50
KF995	CYCLOPENTASILOXANE	13.00
GDPearl IY 32AS Slurry (60% Pigments)	60% CI 77492, 3% POLYGLYCERYL3 POLYDIMETHYLSILOXYETHYL DIMETHICONE, 3% POLYHYDROXYSTEARIC ACID, 34% CYCLOPENTASILOXANE	1.20
GDPearl IR 75AS Slurry (60% Pigments)	60% CI 77491, 3% POLYGLYCERYL3 POLYDIMETHYLSILOXYETHYL DIMETHICONE, 3% POLYHYDROXYSTEARIC ACID, 34% CYCLOPENTASILOXANE	0.50
GDPearl IB 33AS Slurry (40% Pigments)	40% CI 77499, 2% POLYGLYCERYL3 POLYDIMETHYLSILOXYETHYL DIMETHICONE, 2% POLYHYDROXYSTEARIC ACID, 56% CYCLOPENTASILOXANE	0.20
GDPearl MS	MAGNESIUM STEARATE	0.80
GDResin 102A	TRIMETHYLSILOXYSILICATE	2.00
RB-24	DIMETHICONE, TRIMETHYLSILOXYSILICATE	2.00
GDPearl EM 05AS	MICA, TRIETHOXYCAPRYLYLSILANE	3.00

Trade Name	INCI	Content%
GDPearl PQ 05	POLYMETHYLSILSESQUIOXANE	1.20
BENTONE 38 V CG	DISTEARDIMONIUM HECTORITE	0.50
Alcohol	ALCOHOL	0.20
THIXCIN® RPC	TRIHYDROXYSTEARIN	0.30
Xanthan Gum	XANTHAN GUM	0.05
Sodium Chloride	SODIUM CHLORIDE	1.00
Glycerin	GLYCERIN	5.00
Butylene Glycol	BUTYLENE GLYCOL	5.00
PE91	PHENOXYETHANOL, ETHYLHEXYLGLYCERIN	0.60
Water	WATER	38.65
AC15	CYCLOPENTASILOXANE, ACRYLATES/DIMETHICONE COPOLYMER	0.50
SLA1170	PARFUM	0.20

Formula Highlights:

- Longwear & pore-blurring effect
- Galactoglucan treated titanium dioxide
- Delivers coverage while soothing and moisturizing the skin
- Improves the dry feeling of conventional silicone-based foundations



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Thank You

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