

Water-Activated, Dynamically Stabilized

GDResin AquaFuse PG

An innovative film-forming solution designed for highly sweat-resistant sunscreens and long-lasting base makeup.



Website: <https://greenzn.net/>



Limitations of Traditional Film-Formers

— Ordinary Films Face Severe Challenges Under Sweat and Friction

Uneven Coating: Patchy film formation.

Prone to Washing Off: Poor resistance.

Weak Longevity: Short-lasting; sudden makeup breakdown.

Heavy Texture: Lacks a refreshing feel; poor user experience.



The Technological Leap from "Static Water Resistance" to "Dynamic Film Stability"

01

Dynamic Wet-State Film Formation

The core of our technology is "***Film Formation First, Film Optimization Second***". Upon initial application, it delivers superior spreadability and skin adhesion. Upon contact with water, the film structure spontaneously optimizes, resulting in enhanced stability.

02

More Stable Upon Water Contact

Public research from IFSCC proves that the right film-forming system reduces wash-off when exposed to sweat, improving both film uniformity and durability. This is exactly where our material shines.

03

Achieving both lasting wear and skin adhesion

Specially designed to resolve the paradox between "moisturizing" and "long-lasting wear". While maintaining a hydrated feel on the skin, it significantly enhances makeup longevity and transfer resistance.

Product Introduction

Product name: GDResin AquaFuse PG

- ☆ **INCI:** ACRYLATES/OCTYLACRYLAMIDE COPOLYMER, POLYURETHANE-1, OCTYLDODECANOL, PENTYLENE GLYCOL
- ☆ **Appearance:** Colorless or yellowish liquid
- ☆ **Application:** Color cosmetics, skincare, and lip products
- ☆ **Recommended Addition Level:** 3-10%
- ☆ **Solubility:** Oil-soluble

Features:

- Excellent compatibility with highly polar substances and chemical sunscreens.
- More conformable and tougher film than V-216.
- Ideal for moisturizing & skin-fitting formulations.



Advantages over Traditional Film Formers

GDResin AquaFuse PG outperforms silicone film formers in skin adhesion, compatibility and wet makeup hold. Ideal replacement for chemical UV & summer long-wear base makeup.

Evaluation Dimensions	Silicone film former 	GDResin AquaFuse PG
Molecular Polarity & Skin Adhesion	Low polarity; film floats on the surface, easy to patchiness.	High polarity; fits tightly like a second skin.
Microscopic Film Morphology	Spherical particle aggregation with large voids.	Continuous network cross-linking; dense and uniform.
Compatibility with Chemical UV Filters	Incompatible; requires low-molecular volatile oils as co-solvents.	Naturally compatible; simple and stable formulation.
Powder Adhesion / Patchiness Performance	Uneven pigment encapsulation, prone to patchiness.	Even pigment encapsulation; natural and flawless finish.
Performance Upon Sweat & Water Exposure	Darkening and floating; diminished protection.	Secondary curing; enhanced skin adhesion.
Wet-State Film Stability	No enhancement upon water contact; film gradually breaks down.	Enhanced by water; simultaneous improvement in density and resilience.

AquaFuse PG outperforms the silicone film former in all six evaluation dimensions.

Amplified by Water: Self-Reinforcing Film Structure

01 Uniform Initial Spreadability

Upon application, the oil-phase carrier and polyols work in synergy to ensure the even spreadability of the film-forming polymer, delivering a smooth, seamless, and skin-hugging finish.

02 Film adjustment triggered by moisture

Upon contact with sweat or water, the more water-soluble components in the system (such as pentylene glycol) are selectively washed away, causing the polymer network to become relatively concentrated.

03 Self-Reinforcement of the Film Structure

The remaining film-forming polymer skeleton becomes denser due to the reduction of solvents, thereby delivering superior adhesion, transfer resistance, and durability, ultimately achieving the "Stronger Film When Meets Sweat" effect.

Maintains Film Integrity under Water Exposure

01

Minimizes the wash-off effect caused by sweat

Sweat typically weakens conventional film layers. Our medium-to-high hydrophobic film-forming system significantly reduces the wash-off of active ingredients caused by perspiration.

02

Improves Film Uniformity

The unique combination of film-forming polymers effectively minimizes film unevenness caused by friction and evaporation, maintaining a uniform and flawless protective or concealing finish.

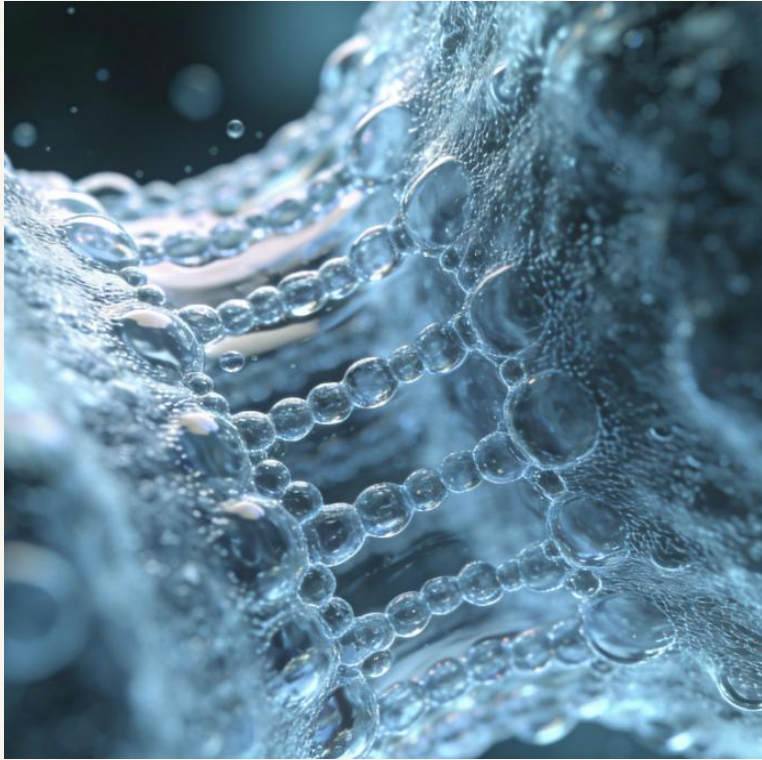
03

Boosts Long-Lasting Protection

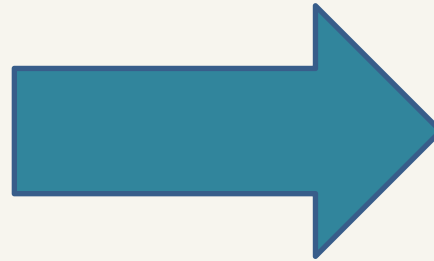
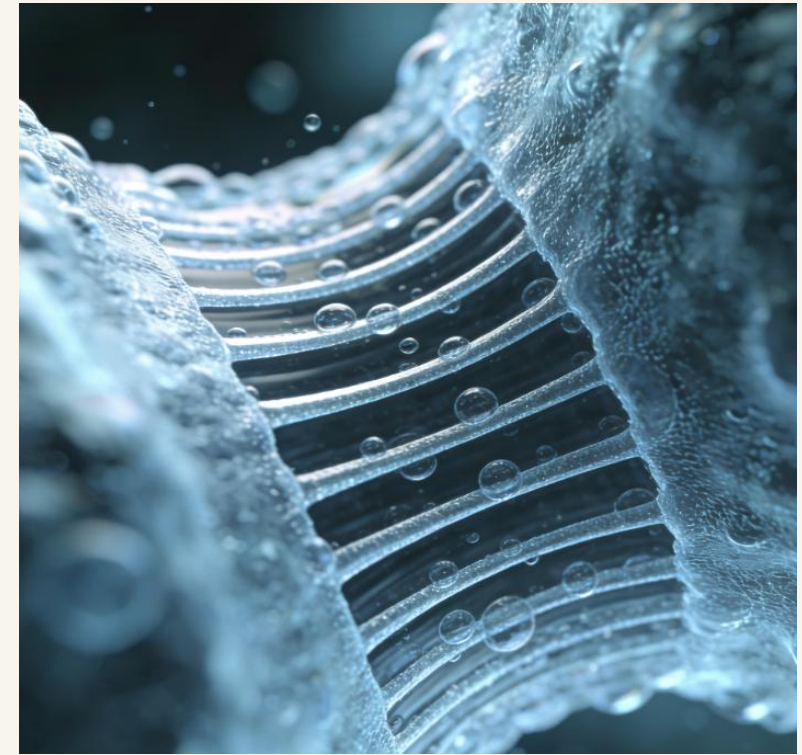
Upon contact with water, the film becomes tougher, stronger, and delivers longer-lasting protection.



Film Layer Changes Before and After Water Exposure: Film Stabilization



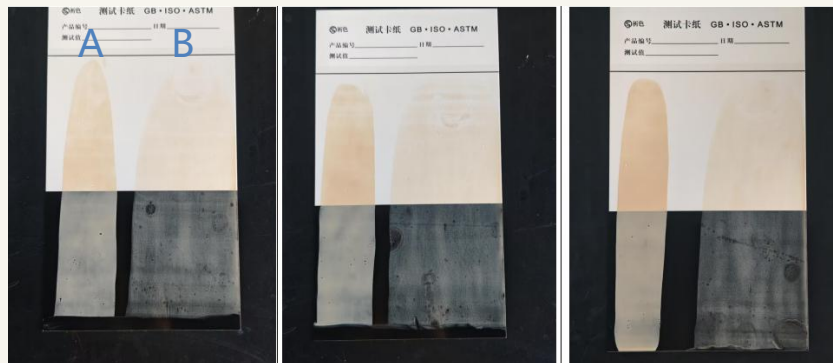
Prior to Water Contact
(Containing Pentylene Glycol)



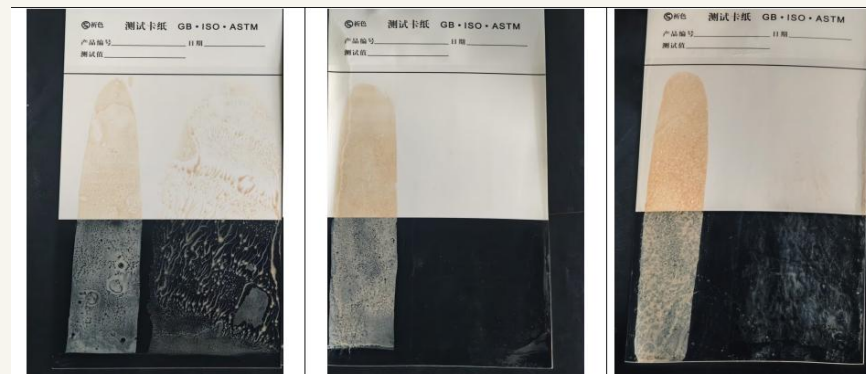
After Water Contact (Pentylene
Glycol Removed by Water)

GDResin AquaFuse PG Water Rinse Test (Card)

Before Rinsing / Sweat Test



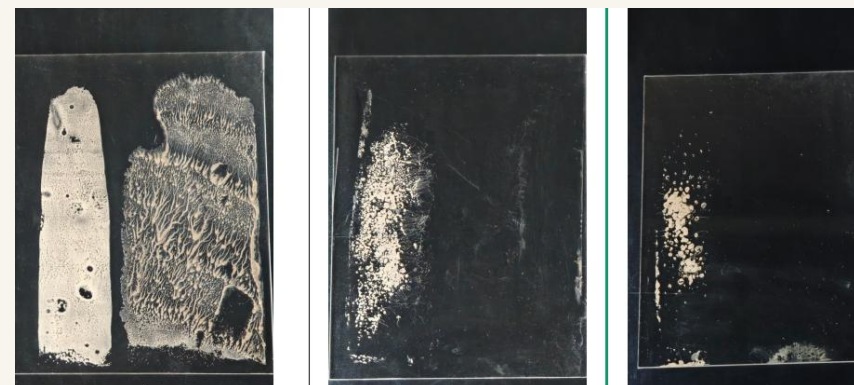
Post-Rinsing / Sweat Adhesion



A: AquaFuse PG pigment solution; B: Tricaprylin pigment solution. From left to right: No rinsing, Post-rinsing, Post-sweat test.

Test Method:

1. Preparation: Prepare 10% pigment solutions of GDResin AquaFuse PG and Tricaprylin.
2. Coating: Apply evenly onto card paper (5 um thickness).
3. Pre-test: Dry for 5 min, then photograph (Before Flushing / Sweat).
4. Flushing & Adhesion: Flush for 1 min. Cover with a transparent plate and photograph both the card paper and plate (Post-flush / Sweat Adhesion).
5. Evaluation: Less residue on the plate indicates better film formation.



Transparent Plate Adhesion

GDResin AquaFuse PG Water Rinse Test (Arm)

Before Rinsing / Sweat Test (Arm)



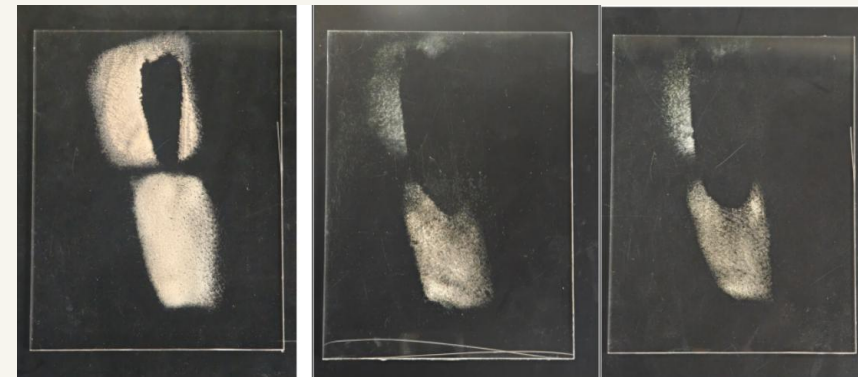
After Rinsing / Sweat Test (Arm)



A: AquaFuse PG pigment solution; B: Tricaprylin pigment solution. From left to right, the conditions are: No rinsing, Post-rinsing, Post-sweat test.

Test Method:

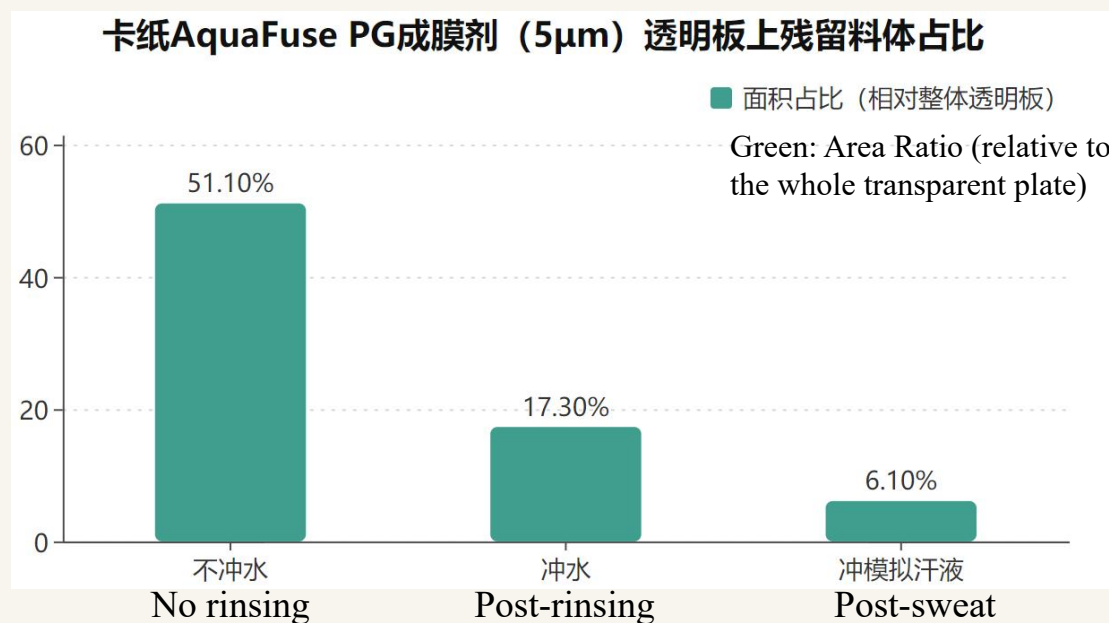
1. Preparation: Prepare 10% pigment solutions of GDResin AquaFuse PG and Tricaprylin.
2. Application: Apply 0.05 g evenly onto the same area of the arm.
3. Pre-test: Dry for 5 min, then photograph (Before Flushing / Sweat).
4. Flushing: Flush for 1 min, air-dry for 10 min, then photograph (After Flushing / Sweat).
5. Adhesion Test: Press a transparent plate onto the arm and photograph (Transparent Plate Adhesion).
6. Evaluation: Less residue on the plate indicates better film formation.



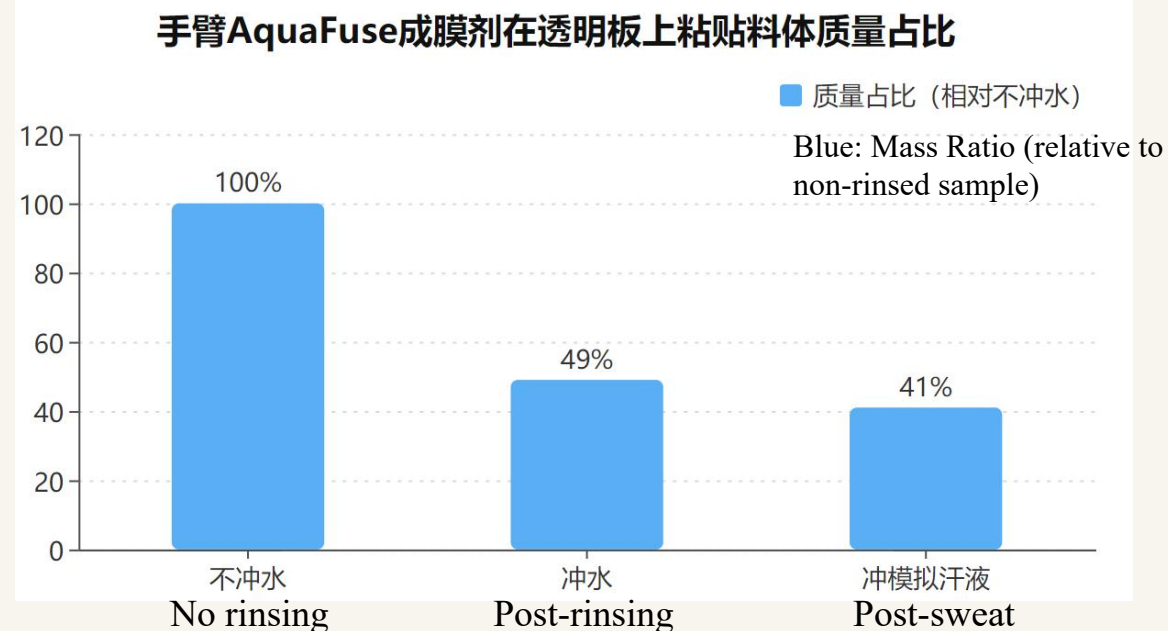
Transparent Plate Adhesion

GDResin AquaFuse PG Water Rinse Test

AquaFuse PG (5 μ m) on Card – Residue Area Ratio on Transparent Plate



AquaFuse PG (5 μ m) on Arm – Residue Area Ratio on Transparent Plate

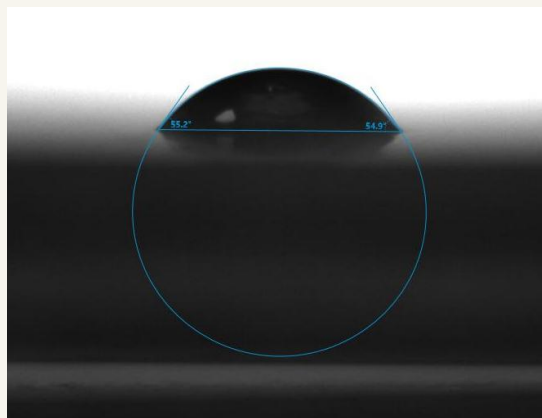


- Water & Sweat Resistance
- Anti-transfer performance significantly improves upon exposure to water or sweat. AquaFuse PG transitions from a soft to a firmly set film, preventing migration to contacting surfaces and greatly increasing the color fixation rate.

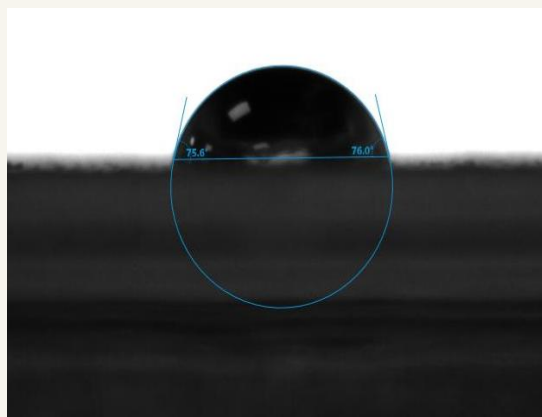
Conclusion: Water and sweat densify the AquaFuse PG film, enhancing adhesion, anti-migration, and durability for a "stronger when wet" effect.

GDResin AquaFuse PG Contact Angle Test

Pre-flush



Post-flush



Sample	Sample Treatment	Average Contact Angle (°)	Wettability Assessment
GDResin AquaFuse PG	Pre-flush	54.102(±1.929)	Weakly Hydrophilic Surface
	Post-flush	76.224(±1.687)	Enhanced Hydrophobicity & Reduced Wettability (↑22°)

Test Method:

Weigh 0.0500 g AquaFuse PG onto a PMMA plate, apply the sample to form an even spot. Spread uniformly with finger cots. Keep away from light for 15–20 min, then measure contact angles at 5 selected points on the PMMA plate. Rinse the PMMA plate with water, dry with cool air, and re-measure contact angles at another 5 selected points.

Conclusion:

- ✓ **Significantly increased contact angle and reduced surface wettability.**
- ✓ **Denser film structure**

Film self-reinforces upon moisture exposure, boosting water resistance and transfer resistance. Suitable for sunscreens and long-wear base makeup under sweaty and wet conditions.

Strong Adhesion and High Extensibility

— Balancing Skin-Fitting with Long-Lasting Wear

01 Synergy of Hard and Soft Films

The acrylate backbone provides the strength and adhesion of a "hard film," while the polyurethane network delivers the flexibility and comfort of a "soft film," achieving a perfect balance.

02 Flexible & Anti-Cracking

Once formed, the film exhibits outstanding flexibility, seamlessly adapting to skin movements. It effectively prevents cracking and peeling caused by facial expressions or environmental changes.

03 Skin-Fitting and Crease-Free

The incorporation of components such as pentylene glycol greatly enhances the skin affinity and spreadability of the film-forming agent. This ensures a smooth application and seamless skin adhesion, effectively preventing makeup caking and the settling of product into fine lines.

Recommended Applications

- | | | |
|----|---|---|
| 01 | High Sweat-Resistant Sunscreen | Perfectly meets sunscreen needs in high-humidity environments such as outdoors and sports, ensuring sunscreen efficacy is not compromised by sweating. |
| 02 | Moisturizing Long-Lasting Foundation | Solves the longevity challenge of moisturizing foundations, harmoniously unifying the two key demands of "moisturizing" and "long-lasting" in a single product. |
| 03 | Anti-Transfer Primer | Used in primers or isolation creams, it significantly enhances foundation adhesion, preventing makeup loss caused by mask friction or clothing rubbing. |
| 04 | Non-Stick Lip Products | Provides long-lasting color lock that resists transferring to cups, while keeping lips hydrated. Maintains makeup integrity while drinking or eating, combining moisture and lasting color. |



Base Makeup Reference Formula — Water Tone Foundation XYDW26062601

Trade Name	Content	INCI
Z-Emuslix PI-100F	4.00%	C20-22 ALKYL PHOSPHATE, CETEARYL ALCOHOL, PEG-100 STEARATE, GLYCERYL STEARATE, SILICA, ISONONYL ISONONANOATE
GTB	1.00%	TRIBEHENIN
TEGOSOFT G20	3.00%	OCTYLDODECANOL
KF-56A	5.00%	PHENYL DIMETHICONE
DISM	5.00%	DIISOSTEARYL MALATE
GDResin AquaFuse PG	3.00%	ACRYLATES/OCTYLACRYLAMIDE COPOLYMER, POLYURETHANE-1, OCTYLDODECANOL, PENTYLENE GLYCOL
LANOL 37T	3.50%	TRIHEPTANOIN
Ti-02SG	8.00%	CI77891, SODIUM STEAROYL GLUTAMATE, ALUMINUM HYDROXIDE
YP-75SG	0.36%	CI77492, SODIUM STEAROYL GLUTAMATE, ALUMINUM HYDROXIDE
RP-29SG	0.10%	CI77491, SODIUM STEAROYL GLUTAMATE, ALUMINUM HYDROXIDE
BP-50SG	0.02%	CI77499, SODIUM STEAROYL GLUTAMATE, ALUMINUM HYDROXIDE
Water	57.22%	WATER
1,3-Butylene glycol	5.00%	1,3-BUTANEDIOL
Glycerin	2.00%	GLYCERIN
Arocos-RK	0.500%	RASPBERRY KETONE
AroHydro-H	0.50%	1,2-HEXANEDIOL
Pemulen TR-1 Polymeric Emulsifier	0.35%	ACRYLATES/C10-30 ALKYL ACRYLATE CROSSPOLYMER
AMP-ULTRA PC 2000	0.40%	AMINOMETHYL PROPANOL
SIMULGEL™ 600	1.00%	ACRYLAMIDE/SODIUM ACRYLOYLDIMETHYLTAURATE COPOLYMER, ISOHEXADECANE, POLYSORBATE 80, WATER, SORBITAN OLEATE

4%

Z-Emuslix PI-100F

O/W base with light breathable feel. Superior film-forming & longwear power. Shear & skin temperature trigger shift to W/O, forming moisture-locking film for silky hydration. Siloxane offers smooth spreadability for sheer "no-makeup" finish.

3%

GD Resin AquaFuse PG

Formula Highlights

Golden-triangle system (hydration + film + powder). Only 3% GD Resin AquaFuse PG boosts **longwear & waterproof performance** while preserving **lightweight hydrating texture**, balancing finish and skin feel.

Water Resistance Test — Water Tone Foundation XYDW26062601

水粉霜防水测试XYDW26062601

本次针对馨研创水粉霜（测试样品）与市售水粉霜（对照样品）开展防水性能对比测试，实验流程为：取等量样品涂抹于手臂成膜后，分别在2h、4h、6h、8h时间节点以流动水冲洗1min，同步观察涂抹区域水珠附着状态，并通过纸巾按压去检测残留情况。

A comparative water resistance test was conducted between the GREEZN Water Cream (test sample) and a commercially available Water Cream (control sample). Experimental Procedure: Equal amounts of the samples were applied to the forearm and allowed to form a film. At the 2h, 4h, 6h, and 8h time points, the test areas were rinsed under running water for 1 minute. The water bead formation on the applied area was visually observed, and the residual product was evaluated using a tissue blotting method.

项目 Item	取等量样品涂抹 Apply an equal amount of the sample	初始 Initial	2h	4h	6h	8h
水珠附着测试 Water Bead Adhesion Test						
残留测试 Residue Test						
搓洗测试 Rubbing Test						

实验步骤：

- 馨研创水粉霜样品与市售水粉霜样品两者取等量样品涂抹在手臂等待成膜
- 确认样品成膜后，在2h、4h、6h、8h时间点用流动水冲洗1min；观察手臂上涂抹区域的水珠状况；拍照登记表格
- 取一张干净洁白的纸巾按压在手臂涂抹区域揭开后观察有无残留样品；拍照登记表格
- 搓洗两个样品涂抹部位，用纸巾按压观察残留情况，拍照登记表格

Experimental Procedure:

- Apply equal amounts of both the GREEZN water cream sample and the commercial water cream sample on the arm and wait for film formation.
- After confirming film formation, rinse the applied areas with running water for 1 min at 2h, 4h, 6h, and 8h time points; observe the water bead condition on the applied areas; take photos and record in the table.
- Press a clean white tissue onto the applied area on the arm, then lift and observe for any residue; take photos and record in the table.
- Rub and wash the applied areas of both samples, press with a tissue to observe residue, and take photos and record in the table.

结果：

- 防水持久性：经流动水冲洗后，两款样品在8h测试周期内均未出现明显脱落现象，在2h至8h的持续测试周期内，经流动水冲洗1分钟后，两款样品在手臂涂抹区均呈现出明显的荷叶效应（水珠呈圆润颗粒状滚动而非铺展）
- 抗转移性：各时间节点（2h、4h、6h、8h）的纸巾按压测试中，两款样品均无残留痕迹，产品不易因水分接触发生转移或晕染；
- 抗摩擦性：在模拟高强度摩擦的“搓洗”测试环节中，馨研创样品表现优于市售产品
- 横向对比：馨研创水粉霜与市售对照样品的防水表现无显著差异，整体防水性符合“较好”等级预期；满足基础防水需求。

Results:

- Waterproof Durability:** After being rinsed under running water, neither sample showed any significant peeling throughout the 8-hour test cycle. During the continuous testing period from 2 hours to 8 hours, both samples exhibited a distinct lotus leaf effect on the applied areas after 1 minute of rinsing (water beads rolled off as round droplets rather than spreading).
- Anti-Transfer Performance:** In the tissue blotting tests at each time point (2h, 4h, 6h, 8h), neither sample left any residue marks. The products are not prone to transferring or smudging upon contact with moisture.
- Anti-Friction Performance:** In the "rubbing" test simulating high-intensity friction, the GREEZN sample outperformed the commercial product.
- Horizontal Comparison:** The waterproof performance of the GREEZN water cream showed no significant difference compared to the commercial control sample. Its overall waterproofness meets the expected "good" grade, satisfying basic waterproofing requirements.

Reference Sunscreen Formula — Kids Macromolecule Sun Lotion SPF50+ XYDW26062901

Trade Name	Content	INCI
Z-Emuslix PI-100F	4.00%	CETEARYL ALCOHOL, C20-22 ALKYL PHOSPHATE, PEG-100 STEARATE, GLYCERYL STEARATE, ISONONYL ISONONANOATE, SILICA
TEGOSOFT G20	5.00%	OCTYLDODECANOL
GTB	0.50%	TRIBEHENIN
LANOL 37T	5.00%	TRIHEPTANOIN
DBA	5.00%	DIBUTYL ADIPATE
TEGOSOFT TN	5.00%	C12-15 ALKYL BENZOATE
HYSELL T150	2.00%	ETHYLHEXYL TRIAZONE
HYSELL HEB	4.00%	DIETHYLHEXYL BUTAMIDO TRIAZONE
HYSELL SORB-S	3.00%	BIS-ETHYLHEXYLOXYPHENOL METHOXYPHENYL TRIAZINE
GDResin AquaFuse PG	3.00%	ACRYLATES/OCTYLACRYLAMIDE COPOLYMER, POLYURETHANE-1, OCTYLDODECANOL, PENTYLENE GLYCOL
Water	45.20%	WATER
1,3-Butylene glycol	7.00%	BUTYLENE GLYCOL
Glycerin	2.00%	GLYCERIN
Aroc-RK	0.500%	RASPBERRY KETONE
AroHydro-H	0.50%	1,2-HEXANEDIOL
PC 2000	0.30%	AMINOMETHYL PROPANOL
Carbopol® Aqua SF-1 Polymer	2.00%	ACRYLATES COPOLYMER, WATER
HYSELL SORB-M	5.00%	METHYLENE BIS-BENZOTRIAZOLYL TETRAMETHYLBUTYLPHENOL, WATER, DECYL GLUCOSIDE, PROPYLENE GLYCOL, XANTHAN GUM
Zenipoly ASP	1.00%	ACRYLAMIDE/SODIUM ACRYLOYLDIMETHYLTAURATE COPOLYMER, C13-14 ISOPARAFFIN, LAURETH-7, WATER

SPF50+ High Protection

Long-lasting UVA/UVB defense for safe outdoor activities.

Macromolecular Film-forming Tech

Breathable surface film, non-penetrating, mild for delicate skin.

Phase-Inversion Smart Tech

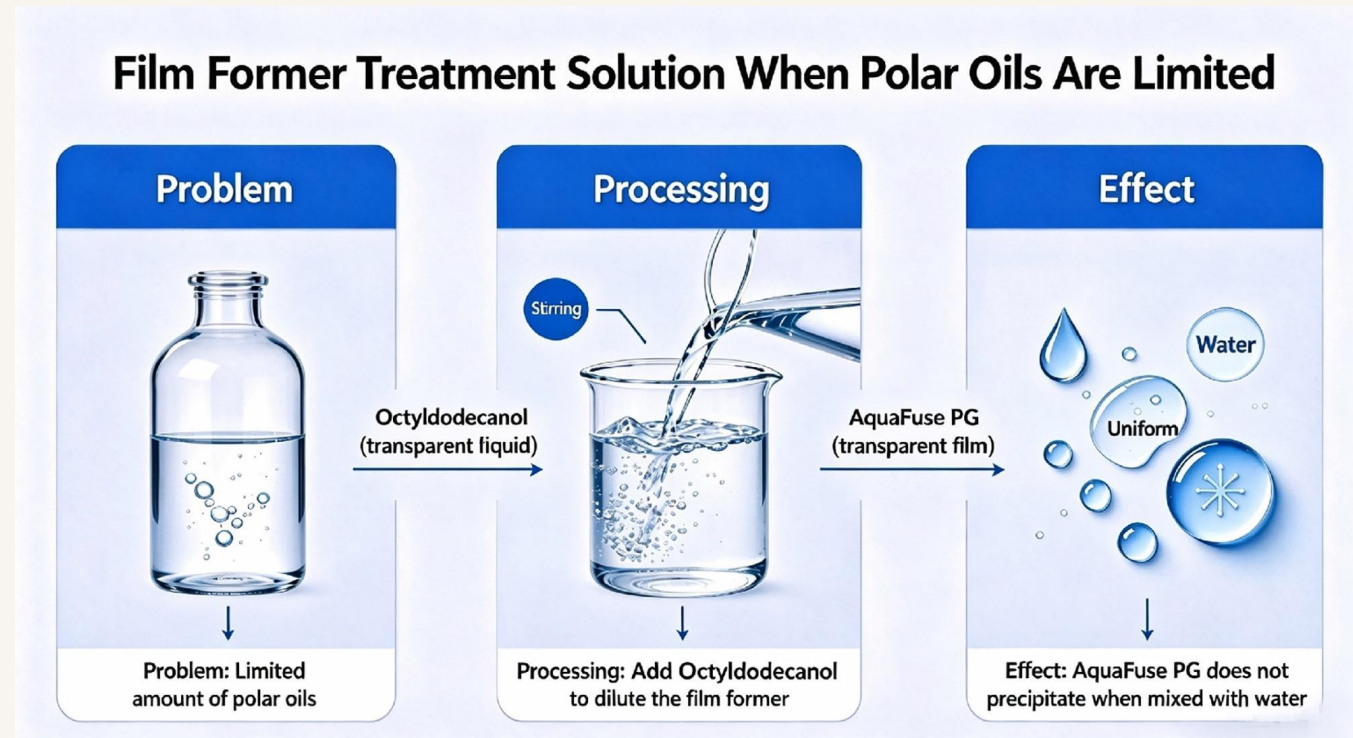
Watery, non-sticky texture. Light film, no heavy white cast.

Application Scenarios

Kindergarten activities, family trips, beach vacations, daily school commute

Application Guide

1. When the formulation contains a low amount of polar oils, consider adding a certain amount of *Octyldodecanol* to pre-dilute the film former. This ensures that the water-boosting film former will not precipitate in the formulation due to reduced solubility.
2. When applying GDResin AquaFuse PG to O/W base makeup products, it is recommended to prioritize amino acid-treated titanium dioxide and color pigments for better compatibility, as the polarity of the surface treatment agents directly affects their compatibility with the film former.
3. Stir and mix GDResin AquaFuse PG and Octyldodecanol in the oil phase until uniform, then heat to 80°C before participating in emulsification.



THANK YOU

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