POLYDERM Polyurethanes

ALZO International Inc.
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This guide illustrates ALZO International’s commitment to innovation in the global cosmetic and personal care market, wherein existing, performance proven, naturally derived raw materials are integrated with urethane technology. Key attributes of the POLYDERM polyurethanes are:

- thermolytic stability
- resistance to hydrolysis in high and low pH mediums
- ease of usage
- effectiveness at low formulation levels
- superior substantivity

The POLYDERM polyurethanes can readily be incorporated into a broad range of cosmetic applications and we have refined these materials to be functional as:

- conditioners
- coupling agents
- dispersants
- emollients
- emulsifiers
- film formers
- fragrance solubilizers
- slip additives
- thickeners

ALZO has also synthesized the POLYDERMS into multifunctional polymeric surfactants, which encompass:

- amine oxides
- betaines
- phosphates
- quaternaries
- tertiary amine salts

By utilizing our novel technology, an unlimited number of polymers can be designed to accommodate your specific needs and applications. Service and innovation being at the forefront of our 26 years of success, ALZO technical personnel are ready to customize a product to meet your individual requirements. For more information and for samples, please contact your ALZO representative or reach us directly at our headquarters:

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Hydroxyester and Triglyceride Emollients

Trade name: **POLYDERM PPI-CO**

**INCI Name:** Castor Oil/IPDI Copolymer  
**Appearance @ 25C:** Clear Viscous Liquid  
**Ionic Nature:** Nonionic  
**Solubility:** Oil  
**Description:** POLYDERM PPI-CO is a polymeric emollient where the triol is a natural derivative of castor oil.  

Trade name: **POLYDERM PPI-CO-H**

**INCI Name:** Hydrogenated Castor Oil/IPDI Copolymer  
**Appearance @ 25C:** Waxy Solid (M.P. 80C)  
**Ionic Nature:** Nonionic  
**Solubility:** Oil  
**Description:** POLYDERM PPI-CO-H is a polymeric solid emollient where the triol is a hydrogenated castor oil.  
**Applications:** Builds body and adds viscosity to skin care products. Emulsion stabilization. Adds rigidity to antiperspirant and deodorant sticks. High melting point solid (80C) for lipsticks and mascaras. Suspending agent. Use level 0.5-10%.

Trade name: **POLYDERM PPI-CO-40**

**INCI Name:** PEG-40 Hydrogenated Castor Oil/IPDI Copolymer  
**Appearance @ 25C:** Soft Opaque Paste (M.P. 30C)  
**Ionic Nature:** Nonionic  
**Solubility:** Water  
**Description:** POLYDERM PPI-CO-40 is a water soluble polyurethane where the triol is an ethoxylated (40 moles), hydrogenated castor oil.  
**Applications:** Hair and Skin Care for conditioning and emolliency. O/W emulsification (HLB 12.5). Fragrance coupling, retention and solubilization. Surfactant in personal cleansers. Slip and lubricity in antiperspirants and deodorants. Low color and low odor. Use level 0.5-5%.

Trade name: **POLYDERM PPI-CO-200**

**INCI Name:** PEG-200 Hydrogenated Castor Oil/IPDI Copolymer  
**Appearance @ 25C:** Solid (M.P. 50C)  
**Ionic Nature:** Nonionic  
**Solubility:** Water  
**Description:** POLYDERM PPI-CO-200 is a solid, water soluble polymer where the triol is an ethoxylated (200 moles), hydrogenated castor oil.  
**Applications:** Adds lubricity and emolliency to skin care formulations. Gives body and stability to emulsions. Rheology modifier for water phase. Solubilizer for fragrances (HLB 15.0). Helps create clear sticks. Helps reduce whitening of antiperspirants. Use level 0.5-10%.
Hydroxyester and Triglyceride Emollients (continued)

**Trade name: POLYDERM PPI-DGDIS**

**INCI Name:** Polyglyceryl-2 Diisostearate/IPDI Copolymer

**Appearance @ 25°C:** Clear Very Viscous Liquid

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-DGDIS is a plant sourced polyurethane based on glycerine and a long chain fatty acid.


**Trade name: POLYDERM PPI-PE**

**INCI Name:** Polydiethylene Glycol Adipate/IPDI Copolymer

**Appearance @ 25°C:** Clear Very Viscous Liquid*

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-PE is a liquid polyurethane with outstanding adhesive characteristics.

**Applications:** High shine and increased wear for color cosmetics. Extremely hydrophobic film former and emollient. Excellent adhesion for water resistant sunscreens. Barrier creams and protective lotions for exceptional durability. Use level 1-10%.

*Also available in a less viscous form, as a 60/40% blend with Disopropyl Adipate.

**Trade name: POLYDERM PPI-GRC**

**INCI Name:** Glyceryl Diricinoleate/IPDI Copolymer

**Appearance @ 25°C:** Clear Very Viscous Liquid

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-GRC is a highly substantive plant sourced polyurethane where the fatty acid is a derivative of castor oil.

**Applications:** Color cosmetics. Exceptional shine agent for lip products. Aids in moisturization. Decreases feathering. Excellent pigment dispersant and suspending agent. Water resistant film former. Mascaras, cosmetic pencils, pressed powders, lip treatments. Use level 1-10%.

**Trade name: POLYDERM PPI-GH**

**INCI Name:** Glycereth-7 Hydroxystearate/IPDI Copolymer

**Appearance @ 25°C:** Light Tan Paste

**Ionic Nature:** Nonionic

**Solubility:** Water Dispersible

**Description:** POLYDERM PPI-GH is polymeric emollient where the triol is a derivative of castor oil and glycerine.

**Applications:** Conditioner and humectant for skin and hair. Film former for styling products. Moisturizer for lip products. Non occlusive petrolatum replacement. Self emulsifiable in water. Presence of hydroxyl and ether groups enhance polarity. Use level 0.5-5%.
**Trade name:** POLYDERM PPI-PGR

**INCI Name:** Propylene Glycol Diricinoleate/IPDI Copolymer

**Appearance @ 25°C:** Clear Very Viscous Liquid

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-PGR is a highly substantive plant sourced polyurethane where the fatty acid is a derivative of castor oil.

**Applications:** Color cosmetics. Exceptional shine agent for lip products. Aids in moisturization. Decreases feathering. Excellent pigment dispersant and suspending agent. Water resistant film former. Mascaras, cosmetic pencils, pressed powders, lip treatments. Use level 1-10%.
**Silicone Copolyol Emollients**

 Trade Name: **POLYDERM PPI-SI-20**

**INCI Name:** Dimethiconol/IPDI Copolymer (and) Cyclomethicone

**Appearance @ 25°C:** Colorless Soft Gel/Viscous Liquid *

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-SI-20 is a blend of D-5 Cyclomethicone and a polymeric polyurethane of dimethiconol.

**Applications:** Conditioners, styling aids. Lubricity and slip for hair. Improves wet and dry comb. Enhances shine and conditioning. Antitack emolliency for skin care. Water resistant film former for sunscreens. Use level 1-10%.

* To liquefy, heat gently to 40°C. Do not shear.

 Trade Name: **POLYDERM PPI-SI-WI**

**INCI Name:** Bis-PPG-15 Dimethicone/IPDI Copolymer

**Appearance @ 25°C:** Clear Viscous Liquid

**Ionic Nature:** Nonionic

**Solubility:** Oil

**Description:** POLYDERM PPI-SI-WI is a liquid polymeric urethane where the diol is a propoxylated dimethicone copolyol.

**Applications:** Lubricity and slip for skin and hair. Helps wet comb in conditioners. Improves afterfeel of styling products. Water repellency/film forming in creams, lotions and sunscreens. Emollient in skin care. Wetting agent for pigments and inorganic sunscreens. Helps reduce tackiness in antiperspirants. Use level 0.5-5%.

 Trade Name: **POLYDERM PPI-SI-WS**

**INCI Name:** Bis-PEG-15 Dimethicone/IPDI Copolymer

**Appearance @ 25°C:** Clear Semi-Viscous Liquid

**Ionic Nature:** Nonionic

**Solubility:** Water

**Description:** POLYDERM PPI-SI-WS is a water soluble polymeric urethane where the diol is an ethoxylated dimethicone copolyol.

**Applications:** Lubricity and slip for skin and hair. Clear conditioners, body gels, facial cleansers, 2in1 clear shampoos, styling aids. Foam stabilization, wetting agent, water soluble emollient and surfactant for personal cleansing systems. Water soluble emollient/film former for creams and lotions. Secondary O/W emulsification (HLB 11-12). Fragrance coupler. Use level 0.5%-5%.
Hydroxy Amine Conditioners

**Trade name: POLYDERM PPI-CA-15**

**INCI Name:** PEG-15 Cocamine/IPDI Copolymer  
**Appearance at 25°C:** Clear Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 100  
**Solubility:** Water  
**Description:** POLYDERM PPI-CA-15 is a water soluble polymeric conditioner/emollient based on naturally derived coco.  
**Applications:** 2-in-1 systems, clear shampoos, conditioners, styling aids. Hair dye systems. Liquid soaps, personal washes. Creams, lotions as a substantive emollient. Excellent deposition on skin and hair. Use level 0.25-2%.

**Trade name: POLYDERM PPI-G7/CA**

**INCI Name:** Glycereth-7-Diglycerol-PEG-15 Cocamine/IPDI Copolymer  
**Appearance @ 25C:** Clear Viscous Liquid  
**Ionic Nature:** Cationic  
**Solubility:** Water  
**Description:** POLYDERM PPI-G7/CA is a water soluble polyurethane derived from 3 natural sources: glycerol, diglycerol and cocamine.  
**Applications:** Mild surfactant/humectant for personal cleansers. Conditioner for skin and hair. Fragrance solubilizer (HLB 13-14). Mildly cationic polymer adds emolliency and substantivity to creams and lotions. Use level 1-5%.

**Trade name: POLYDERM PPI-RC**

**INCI Name:** Ricinoleamidopropyl Dimethylamine/IPDI Copolymer  
**Appearance at 25C:** Clear Amber Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 100  
**Solubility:** Oil  
**Description:** POLYDERM PPI-RC is a polymeric conditioner/emollient based on naturally derived castor oil.  
**Applications:** Shampoos, conditioners, styling aids. Hair dye systems. Liquid soaps, bar soaps. Creams, lotions as a substantive emollient. Superior deposition on skin and hair. Use level 0.25-2%.

**Trade name: POLYDERM PPI-SA**

**INCI Name:** Di-PEG-2 Soyamine/IPDI Copolymer  
**Appearance at 25C:** Clear Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 100  
**Solubility:** Oil  
**Description:** POLYDERM PPI-SA is a polymeric conditioner/emollient based on naturally derived soya.  
**Applications:** Shampoos, conditioners, styling aids. Hair dye systems. Liquid soaps, bar soaps. Creams and lotions as a substantive emollient. Superior deposition on skin and hair. Use level 0.25-2%. 
Trade name: **POLYDERM PPI-SA-5**

**INCI Name:** PEG-5 Soyamine/IPDI Copolymer

**Appearance at 25°C:** Clear Liquid

**Ionic Nature:** Cationic

**Activity, %:** 100

**Solubility:** Water Dispersible

**Description:** POLYDERM PPI-SA-5 is a water dispersible polymeric conditioner/emollient based on naturally derived soya.

**Applications:** Shampoos, conditioners, styling aids. Hair dye systems. Liquid soaps, bar soaps, personal washes. Creams, lotions as a substantive emollient. Excellent deposition on skin and hair. Use level 0.25-2%.

Trade name: **POLYDERM PPI-SA-15**

**INCI Name:** PEG-15 Soyamine/IPDI Copolymer

**Appearance at 25°C:** Clear Amber Liquid

**Ionic Nature:** Cationic

**Activity, %:** 100

**Solubility:** Water

**Description:** POLYDERM PPI-SA-15 is a water soluble polymeric conditioner/emollient based on naturally derived soya.

**Applications:** 2in1 systems, clear shampoos, conditioners, styling aids. Hair dye systems. Liquid soaps, personal washes. Cream, lotions as a substantive emollient. Excellent deposition on skin and hair. Use level 0.25-2%.

Trade name: **POLYDERM PPI-SA-15 Salicylate**

**INCI Name:** PEG-15 Soyamine/IPDI Copolymer (and) Salicylic Acid

**Appearance at 25°C:** Clear Viscous Liquid

**Ionic Nature:** Cationic

**Solubility:** Water Dispersible

**Description:** POLYDERM PPI-SA-15 Salicylate is a cationic polyurethane soyamine complexed with salicylic acid.

**Applications:** Hair care, skin care. This unique combination provides a good free source of salicylic acid. Use level 1-5%.
Resinous Polyurethane Emulsions

Trade name: **POLYDERM PE/PA**

**INCI Name:** Polyether-Propionic Acid/TMXDI Copolymer

**Appearance at 25°C:** Translucent Liquid

**Ionic Nature:** Anionic

**PH @ 25°C:** 8.0

**Activity, %:** 33

**Solubility:** Water Dispersible

**Description:** POLYDERM PE/PA is a water based polyurethane polyether microemulsion resin.

**Applications:** Low VOC pump and aerosol hairsprays, styling gels, aerosol and non-aerosol mousses. Acts as a fixative and film former in styling products. Produces a durable, flexible, water resistant film. Use level: 2-10%.

Trade name: **POLYDERM PES/PA**

**INCI Name:** Polyester-Propionic Acid/TMXDI Copolymer

**Appearance at 25°C:** Translucent Liquid

**Ionic Nature:** Anionic

**PH @ 25°C:** 8.5

**Activity, %:** 33

**Solubility:** Water Dispersible

**Description:** POLYDERM PES/PA is a water based polyurethane polyester microemulsion resin.

**Applications:** Low VOC pump and aerosol hairsprays, styling gels, aerosol and non-aerosol mousses. Acts as a fixative and film-former in styling products. Produces a durable, flexible, water resistant film. Use level: 2-10%.
**Trade name: POLYPHOS PPI-CO**

**INCI Name:** Castor Oil Phosphate/IPDI Copolymer  
**Appearance at 25°C:** Very Viscous Amber Liquid  
**Ionic Nature:** Anionic  
**PH 10% (aq. Dispersion):** 3.4  
**Activity, %:** 100  
**Solubility:** Oil  
**Description:** POLYPHOS PPI-CO is a complex phosphate ester based on castor oil polyurethane in free acid form.  
**Applications:** Creams, lotions, hair preparations. Serves as a secondary W/O emulsifier (HLB 3.5). As an acid phosphate ester polyurethane, neutralization will vary the degrees of solubility, thickening and emulsification. Because of its urethane backbone, Polyphos PPI-CO provides superior substantivity and resistance to hydrolysis. Use level 0.5-5%.

**Trade Name: POLYPHOS PPI-CO-40**

**INCI Name:** PEG-40 Hydrogenated Castor Oil Phosphate/IPDI Copolymer  
**Appearance at 25°C:** Very Viscous Opaque Liquid  
**Ionic Nature:** Anionic  
**PH 10% (aq. Dispersion):** 2.35  
**Activity, %:** 100  
**Solubility:** Water Dispersible  
**Description:** POLYPHOS PPI-CO-40 is a complex phosphate ester based on ethoxylated-hydrogenated castor oil polyurethane in free acid form.  
**Applications:** Creams, lotions, hair preparations. Serves as a secondary W/O and O/W emulsifier (HLB 12.4). As an acid phosphate ester polyurethane, neutralization will vary the degrees of solubility, thickening and emulsification. Because of its urethane backbone, Polyphos PPI-CO-40 provides superior substantivity and resistance to hydrolysis. Use level 0.5-5%.
Trade name: **POLYMOX PPI-CA-15**

- **INCI Name:** PEG-15 Cocamine Oxide/IPDI Copolymer
- **Appearance at 25°C:** Clear to Slightly Hazy Viscous Liquid
- **Ionic Nature:** Nonionic
- **Activity, %:** 75
- **Solubility:** Water

**Description:** POLYMOX PPI-CA-15 is a highly concentrated polymeric amine oxide derived from natural coco.

**Applications:** Shampoos, detergents, personal washes as a viscosity builder, often used in place of alkanolamides, especially in combination with PEG-150 Distearate. Mild cationic conditioning at acid pH, reducing static charge and fly away in hair care products. Use level 0.25-5%.

Trade name: **POLYMOX PPI-SA**

- **INCI Name:** PEG-2 Soyamine Oxide/IPDI Copolymer
- **Appearance at 25°C:** Clear to Slightly Hazy Viscous Liquid
- **Ionic Nature:** Nonionic
- **Activity, %:** 75
- **Solubility:** Water Dispersible

**Description:** POLYMOX PPI-SA is a highly concentrated polymeric amine oxide derived from natural soya.

**Applications:** Shampoos, detergents, personal washes as a rheology modifier, often used in place of alkanolamides, especially in combination with PEG-150 Distearate. Cationic conditioning at acid pH, reducing static charge and fly away in hair care products. Use level 0.25-3%.

Trade Name: **POLYMOX PPI-SA-15**

- **INCI Name:** PEG-15 Soyamine Oxide/IPDI Copolymer
- **Appearance at 25°C:** Clear to Slightly Hazy Viscous Liquid
- **Ionic Nature:** Nonionic
- **Activity, %:** 75
- **Solubility:** Water

**Description:** POLYMOX PPI-SA-15 is a highly concentrated polymeric amine oxide derived from natural soya.

**Applications:** Shampoos, detergents, personal washes as a rheology modifier. Often used in place of alkanolamides, especially in combination with PEG-150 Distearate. Cationic conditioning at acid pH, reducing static charge and fly away in hair care products. Use level 0.25-3%.
**Polymeric Surfactants** (continued)

**Quaternaries**

**Trade name: POLYQUAT PPI-CA-15**

**INCI Name:** PEG-15 Cocamine Ethylidimonium Ethosulfate/IPDI Copolymer  
**Appearance at 25°C:** Clear Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 100  
**Solubility:** Water  
**Description:** POLYQUAT PPI-CA-15 is a substantive polyquaternary conditioner plant derived from coco.  
**Applications:** Shampoos, conditioners, crème rinses. Cationic creams and lotions. Substantive deposition due to urethane bond and positive (cationic) charge. Anti-static agent, providing body and manageability, and reducing fly away in hair applications. Use level 0.5-2%.

**Trade name: POLYQUAT PPI-RC**

**INCI Name:** Ricinoleamidopropyl Ethylidimonium Ethosulfate/IPDI Copolymer  
**Appearance at 25°C:** Clear Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 80  
**Solubility:** Water  
**Description:** POLYQUAT PPI-RC is a substantive polyquaternary conditioner plant derived from castor oil.  
**Applications:** Shampoos, conditioners, crème rinses. Cationic creams and lotions. Substantive deposition due to urethane bond and positive (cationic) charge. Anti-static agent providing body and manageability, and reducing fly away in hair applications. Use level 0.5-2%.

**Trade name: POLYQUAT PPI-SA**

**INCI Name:** PEG-2 Soyamine Ethylidimonium Ethosulfate/IPDI Copolymer  
**Appearance at 25°C:** Clear Amber Viscous Liquid  
**Ionic Nature:** Cationic  
**Activity, %:** 80  
**Solubility:** Water  
**Description:** POLYQUAT PPI-SA is a substantive polyquaternary conditioner plant derived from soya.  
**Applications:** Shampoos, conditioners, crème rinses. Cationic creams and lotions. Substantive deposition due to urethane bond and positive (cationic) charge. Anti-static agent, providing body and manageability, and reducing fly away in hair applications. Use level 0.5-2%.
Betaines

**Trade name: POLYTAINE PPI-CA-15**

**INCI Name:** PEG-15 Cocamine Betaine/IPDI Copolymer  
**Appearance at 25°C:** Slightly Hazy Viscous Liquid  
**Ionic Nature:** Amphoteric  
**Activity, %:** 50  
**Solubility:** Water  
**Description:** POLYTAINE PPI-CA-15 is an amphoteric polyurethane surfactant based upon naturally derived coco.  
**Applications:** Low irritation surfactant for shampoos, personal washes and bath products. Wetting agent, fragrance solubilizer. Good rinse off properties with a light afterfeel. Excellent solubility over a wide pH range. Specialty performance enhancer for traditional foaming agents. Use level 1-7%.

**Trade name: POLYTAINE PPI-RC**

**INCI Name:** Ricinoleamidopropyl Betaine/IPDI Copolymer  
**Appearance at 25°C:** Clear to Slightly Hazy Liquid  
**Ionic Nature:** Amphoteric  
**Activity, %:** 45  
**Solubility:** Water  
**Description:** POLYTAINE PPI-RC is an amphoteric polyurethane surfactant based upon a derivative of castor oil.  
**Applications:** Low irritation surfactant for shampoos, personal washes and bath products. Wetting agent, fragrance solubilizer. Good rinse off properties with a light afterfeel. Excellent solubility over a wide pH range. Specialty performance enhancer for traditional foaming agents. Use level 1-7%.

**Trade name: POLYTAINE PPI-SA-15**

**INCI Name:** PEG-15 Soyamine Betaine/IPDI Copolymer  
**Appearance at 25°C:** Slightly Hazy Viscous Liquid  
**Ionic Nature:** Amphoteric  
**Activity, %:** 50  
**Solubility:** Water  
**Description:** POLYTAINE PPI-SA-15 is an amphoteric polyurethane surfactant based upon naturally derived soya.  
**Applications:** Low irritation surfactant for shampoos, personal washes and bath products. Wetting agent, fragrance solubilizer. Good rinse off properties with a light afterfeel. Excellent solubility over a wide pH range. Specialty performance enhancer for traditional foaming agents. Use level 1-7%. 

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**Polymeric Surfactants (continued)**
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