



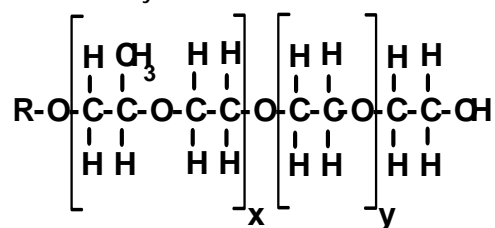
# PROCETYL™ AWS

## PPG-5 Ceteth-20

PROCETYL AWS is an alcohol and water soluble nonionic liquid surfactant. Chemically, the material is a saturated, mixed alkoxy ether of cetyl alcohol. This composition gives the ingredient tremendous multi-functionality, conferring to it properties as an emollient, fragrance solubilizer, humectant, plasticizer, emulsifier and wetting agent. The resultant composite of highly desirable characteristics renders PROCETYL AWS extremely useful in the formulation of bath oils, shampoos, clear gels and other hydroalcoholic systems.

PROCETYL AWS is produced by reacting cetyl alcohol with a mixture of ethylene oxide and propylene oxide. What is crucial here is the choice of stoichiometry—an optimum ratio of components specifically selected to yield an optimized mixed alkoxy heteropolymer.

### Optimized PO-EO/EO Hetero/Block Polymer



Like other ethoxylates and propoxylates (materials formed by the reaction of fatty compounds with either ethylene or propylene oxide), PROCETYL AWS is classified as an ether. As a mixed ether, it shares certain physical and performance characteristics inherent to each. Acquiring its fluidity from the propylene oxide adduct and its water solubility from that of the ethylene oxide, PROCETYL AWS possesses a unique character which manifests itself primarily in the form of enhanced functionality and increased mildness.

The following table is a comparative summary of ethoxylates, propoxylates and alkoxyates and their associated properties. It may be helpful as a means of clarifying what distinctions exist among the three ingredient classes.

Ethoxylates	Mixed Alkoxyates (PROCETYL AWS)	Propoxylates
Nonionic Liquids/Solids	Nonionic Liquids	Nonionic Liquids
Primary/Secondary Emulsifiers	Primary/Secondary Emulsifiers	No Emulsifying Character
Water-in-Oil Emulsifiers if n=1-4; Oil-in-Water Emulsifiers if n=over 5	Intermediate HLB 'Heterophase' Emulsifiers	—
Water Solubility Increases	Broad Range of Solubility and Compatibility	Oil/Alcohol Solubility Increases w/Increasing n

Stable at High and Low pH	Stable at High and Low pH	Stable at High and Low pH
Electrolyte Tolerant	Electrolyte Tolerant	Electrolyte Tolerant
Good Solubilizers	Solubilizers/Coupling Agents	Solubilizers/Coupling Agents
Good Dispersing Agents	Suspending/Dispersing Agents	Suspending/Dispersing Agents
—	Plasticizers	Plasticizers
—	Emollients/Humectants	Oily Occlusive Film-Formers
—	Anti-cracking Agent for Soaps	—
Moderate-to-Severe Irritants	Non-irritating Mildness Enhancers	Non-irritants

## Applications/Functions

### Soluble Bath Oils and Essences: Perfume Solubilizer

PROCETYL AWS is recommended as a solubilizer for soluble bath oils, bath essences and other hydroalcoholic systems requiring the incorporation of fragrances or similar ingredients that would otherwise be insoluble in aqueous alcohol. Since fragrances are notorious for their incompatibility with many of the ingredient components of emulsions, their inclusion is often a cause of emulsion instability. This problem in itself is one reason PROCETYL AWS is so highly recommended as a solubilizer, since its presence can be helpful in preventing any potential instability. Bath essences are preparations consisting of perfume, herbal extracts, etc. and are solubilized into bath water by the aid of a surfactant acting as a solubilizing agent. The solubilizer is typically incorporated at levels several times higher than the concentration of the material to be solubilized.

### Shampoos: Superfating Agent/Conditioner/Solubilizer

As an emollient, PROCETYL AWS has superfating properties, which can help reduce the harsh, degreasing effects most anionic surfactants exhibit in shampoos. PROCETYL AWS is also useful as a conditioner in hair care products where it imparts anti-static, emollient and humectant properties to help give hair more sheen, softness and manageability. Because of its powerful solubilizing action, PROCETYL AWS is able to assist in solubilizing fragrances into the surfactant solution, doing so without adversely affecting foam generation or the stability of the emulsion.

### Hair Sprays: Plasticizer

The non-sticky, transparent films PROCETYL AWS produces help plasticize the resin and provide conditioning in hair sprays. Compatible with most of the resins used, PROCETYL AWS is particularly effective in those systems based on butyl esters of polymethyl vinyl ether/malic acid. Its ability to migrate to the surface of the film enables PROCETYL AWS to add lubricity and give hair better combability.

### Antiperspirants: Anti-staining Agent/Dispersing Agent/Emollient

With an HLB of 16 and surface tension measuring 28 dynes/cm (as is) and 32.5 dynes/cm (as a 1% solution), PROCETYL AWS possesses surface activity in the range considered to be effective for good suspension and wetting of the actives used in antiperspirant sticks. Because of its ability to improve the water dispersability of these actives, PROCETYL AWS lessens the tendency of the stick to cause fabric staining. For this reason, PROCETYL AWS is particularly desirable in aluminum salt systems\*, since these formulations are prone to fabric staining. It is extremely effective as a dispersing agent for the finely divided powders used in these dry systems, since it is able to provide better re-dispersion of the active.

\* Although used in sticks and roll-ons, zirconium salts like the aluminum/zirconium tetrachlorohydrate-gly-complexes (AZG and ZAG) cannot be used in aerosols, since their use in these products is prohibited in the United States. Aluminum chlorhydrate salts (ACH) are the only active ingredient approved for aerosols.

#### **After Shave Lotions/Skin Toners: Emollient/Auxiliary Emulsifier**

The use of PROCETYL AWS in after shave preparations, even at low concentration, is sufficient to improve the emolliency of these systems. In emulsified systems it can be used as a primary or secondary emulsifier.

#### **Soap Bars: Anti-cracking Agent/Processing Aid**

PROCETYL AWS can be used in the production of bar soaps where it helps to prevent or reduce the incidence of wet cracking of the bar. In the case of primary manufacturing, PROCETYL AWS should be added at the wet soap stage prior to drying. On the other hand, when remilling, PROCETYL AWS should be added prior to milling and incorporated with the perfume and other ingredients at the mixer stage. Recommended use level is 2%. While its primary function is as an anti-cracking agent for these soap bar systems, PROCETYL AWS also acts as a processing aid since its inclusion facilitates the interaction of other additives.

#### **Other Applications**

PROCETYL AWS can be used as a wetting and dispersing agent for the pigments in aqueous make-up preparations. In curl activators it acts as a gloss enhancer and perfume solubilizer.

Recommended use levels: 0.5-5%

#### *Typical Analysis*

APPEARANCE	Clear to slightly hazy liquid
COLOR (Gardner)	1 max.
ODOR	Mild, fruity
pH (3%, 25°C)	5.5-7.5
ACID VALUE	2.0 max.
HYDROXYL VALUE	35.0-50.0
MOISTURE CONTENT	1% max.
CLOUD POINT (5% Saline)	60-66°C
SOLUBILITY (10%)	
in SD40 Alcohol	Complete
in Distilled Water	Complete

#### **Non-warranty**

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**Dispersible Bath Oil****BP-6**

Easily formulated, this dispersible bath oil is an aqueous/alcohol based formula that eliminates the need for heavy oil by using ARLAMOL™ PC10 and PROCETYL™ AWS to provide emolliency. ARLAMOL PC10 is an excellent spreading agent and coupler for the fragrance. PROCETYL AWS is an emollient and humectant that also helps to solubilize the fragrance. The addition of the alcohol assists in perfume lift.

Ingredients	%
<b>Part A</b>	
ARLAMOL PC10 (PPG-10 Cetyl Ether)	15.00
PROCETYL AWS (PPG-5-Ceteth-20)	15.00
Alcohol SDA40	30.00
Deionized Water	37.00
Perfume	3.00

Suppliers: 1. Croda

**Procedure**

Combine ingredients with mixing. Mix until uniform and fill.

**Antiperspirant Stick****AA-14**

This antiperspirant formula uses CRODACOL™ C95 to minimize the tackiness that could otherwise develop in the stick due to high levels of the active, aluminum chlorohydrate. PROCETYL™ AWS, a fragrance solubilizer, emollient and humectant, is particularly recommended in antiperspirant sticks to reduce staining.

Ingredients	%
<b>Part A</b>	
PROCETYL AWS (PPG-5 Ceteth-20)	51.90
CRODACOL C95 (Cetyl Alcohol NF)	21.00
PEG-8	2.00
<b>Part B</b>	
Micro-Dry, Ultra Fine Impalpable (Aluminum Chlorohydrate) <sup>1</sup>	25.00
Silicone Fluid 200 <sup>2</sup>	0.10

Suppliers: 1. Croda 2. Reheis 3. Dow Corning

**Procedure**

Combine ingredients of Part A with mixing and heat to 60-65°C. Cool to 50°C and dust in ingredients of Part B, mixing carefully to avoid aeration. Cool to desired fill temperature.

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