CAS Data Field	Description	Formulation Relevance
Molecular Mass	The mass of one mole of the molecule, usually expressed in g/mol.	Molecular size influences how easily an ingredient penetrates skin, diffuses through a formulation, dissolves, and reacts with other ingredients. Smaller molecules generally move more easily through a product and may penetrate skinmore readily, while larger molecules often remain on the surface to provide film-forming or moisturizing effects.
Density	The mass of a substance per unit volume typically expressed in g/cm3.	Density helps predict whether an ingredient will sink, float, or remain suspended. It is essential when converting between weight and volume, calculating batch sizes, predicting emulsion stability, and estimating sedimentation rates of powders.
Melting Point	The temperature at which a solid becomes a liquid.	Determines processing temperatures and manufacturing methods. Ingredients with high melting points may require heating, while low melting point materials may soften during storage or shipping. It also provides clues about crystallization risk and product texture.
Boiling Point	The temperature at which a liquid beomes a vapor.	Indicates how volatile an ingredient is. Low boiling point ingredients may evaporate during manufacturing or after application, while high boiling point ingredients tend to remain in the formulation longer. This affects drying time, stability and sensory feel.
Flash Point	The lowest temperature at which a liquid produces enough vapor to ignite in the presence of a spark or flame.	Critical for manufacturing safety, shipping regulations, and storage requirements. Ingredients with low flash points require careful handling and may limit heating temperatures during production.
Refractive Index	A measurement of how much light bends when passing through a substance.	Helps predict clarity, opacity, gloss, and optical appearance. Ingredients with similar refractive indices create clearer formulations, while large differences increase light scattering, making products appear cloudy or opaque. It is also useful for estimating emulsion appearance and verifying ingredient purity.
Water Solubility	The amount of an ingredient that dissolves in water.	One of the first properties a formulator checks. It determines whether an ingredient belongs in the water phase, whether heating is needed for dissolution, and whether precipitation or crystallization may occur.
Oil Solubility	The ability of an ingredient to dissolve in oils or lipids.	Determines whether the ingredient belongs in the oil phase and whether it can be delivered through anhydrous products, emulsions, or facial oils. Poor oil solubility may require solubilizers or emulsifiers.
Ethanol Solubility	The ability to dissolve in ethanol (alcohol).	Useful for tinctures, fragrance systems, hydroalcoholic products, botanical extracts, and certain preservatives. Some ingredients dissolve readily in ethanol but not in water or oils, making ethanol an effective carrier solvent.
Glycol Solubility	The ability to dissolve in glycols such as propylene glycol, butylene glycol, pentylene glycol, or propanediol.	Glycols are common cosmetic solvents. Good glycol solubility often improves ingredient loading, reduces crystallization, enhances stability, and can improve skin delivery of difficult to dissolve actives like azelaic acid, salicylic acid, or ferulic acid.
Silicone Compatibility	Indicates whether an ingredient can dissolve or remain stable in silicone fluids such as dimethicone, cyclopentasiloxane, or phenyl trimethicone.	Important for silicone serums, primers, water-free formulations, and hybrid emulsions. Poor compatibility can cause phase separation, graininess, or instability, while good compatibility allows smooth incorporation into silicone-based products.