Propanediol is different than Propylene Glycol in three major ways.

1) STRUCTURE

Propanediol and Propylene Glycol have the same Empirical Formula ($C_3H_8O_2$), however the molecular *structure* of each compound is different.

INCI name Propanediol = Chemical name 1,**3** Propanediol molecular structure:

$OH\text{-}CH_2\text{-}CH_2\text{-}CH_2\text{-}0H$

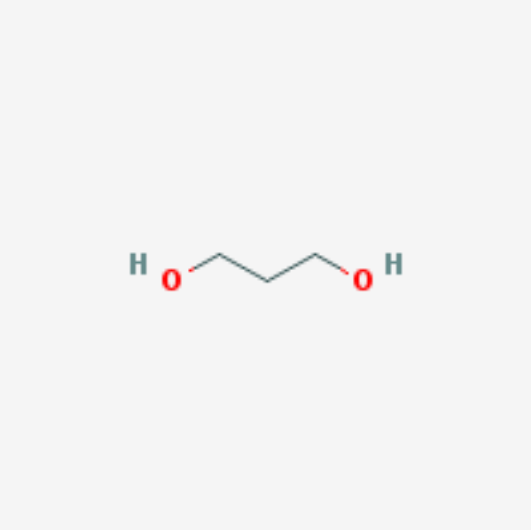

image source: PubChem

INCI name Propylene Glycol = Chemical name 1,2 Propanediol molecular structure:

$CH_2\text{-}CH\text{-}CH_2\text{-}OH$
$\quad\quad\quad\ \ |$
$\quad\quad\quad OH$

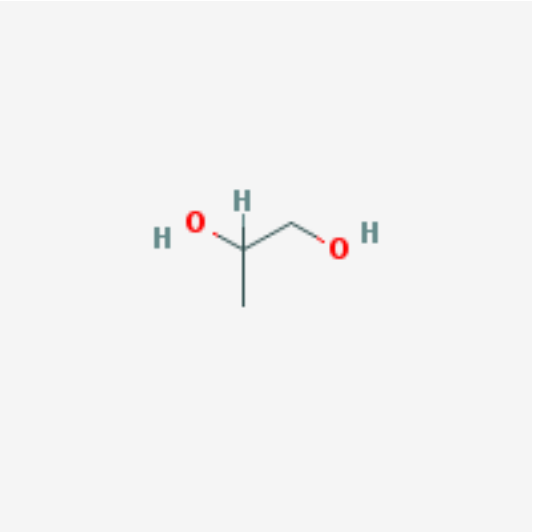

image source: PubChem

It is the *structural difference* between Propanediol and Propylene Glycol that makes the two compounds distinctly different. Therefore, each compound:

- is listed separately in the Personal Care Products Counsel International Cosmetic Ingredient Dictionary and Handbook monographs

- has a different International Nomenclature Cosmetic Ingredient (INCI) name

- has a different Chemical Abstracts Services (CAS) number

- has a different European Inventory of Existing Chemical Substances (EINECS) number

- has a different European List of Notified Chemical Substances (ELINCS) number.

2) PHYSICAL & CHEMICAL PROPERTIES

The *structural difference* between Propanediol and Propylene Glycol cause them to each have *different physical and chemical properties*:

	Propanediol	Propylene Glycol
Boiling Point	214C	188.2C
Melting Point	- 25C	- 60C
Density	1.053 @ 20C	1.0361 @ 20C
Vapor Pressure	0.044mm Hg @ 25C	0.129mm Hg @ 25C
Flash Point	268C	99.04C
Autoingintion	400C	371C

(Note that the Flash Point of Propanediol is significantly higher than that of Propylene Glycol. Flash Point is defined as the lowest temperature at which a material can vaporize to form an ignitable mixture in air.)

The physical and chemical differences between Propanediol and Propylene Glycol cause the two compounds to have *different toxocology profiles*. The Environmental Working Group (EWG) Hazard Score for Propanediol is a 1 (= low hazard); the EWG Hazard Score for Propylene Glycol is 3 (= moderate hazard). The score difference is attributable to some allergy and immunotoxicity concerns associated with Propylene Glycol that are not associated with Propanediol. The complete EWG reports can be viewed at:
www.ewg.org/skindeep/ingredient/705315/PROPYLENE_GLYCOL/
and
www.ewg.org/skindeep/ingredient/723043/PROPANEDIOL/.

3) SOURCE AND MANUFACTURING PROCESS

- Propanediol is mainly derived from a sustainable and renewable corn sugar fermentation process.

- Propylene Glycol is mainly synthesized from Propylene Oxide, a petrochemical.

- Manufacturing corn-derived Propanediol emits up to 40% less greenhouse gases than chemically-derived Propylene Glycol[1].

- Corn-derived Propanediol uses up to 35% less non- renewable energy than chemically-derived Propylene Glycol[1].

[1]According to life cycle analysis from design data by Dupont Tate & Lyle (www.duponttateandlyle.com/life_cycle.html).