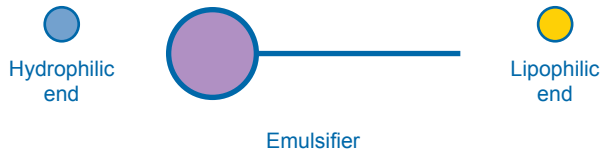
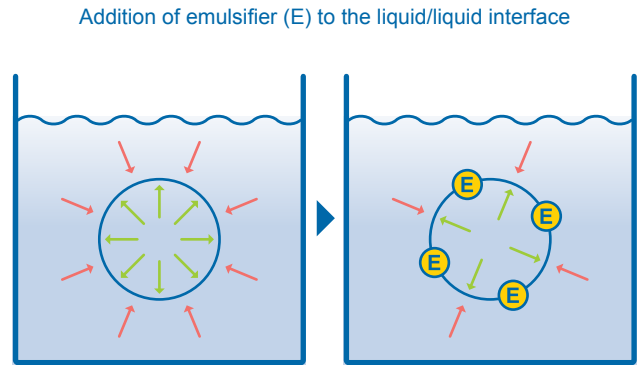


# HLB Balance



## Definitions

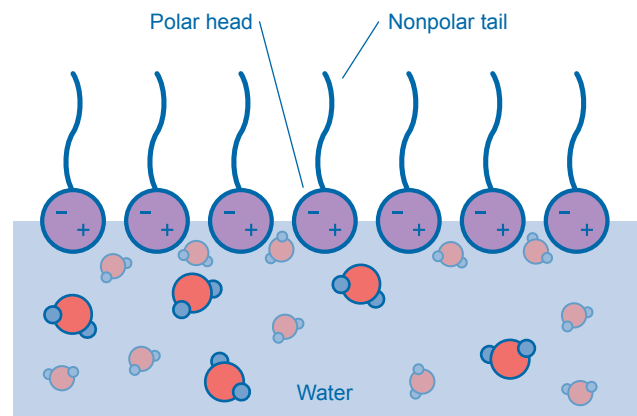
- An emulsifier is a molecule with ambiphilic properties. Part of the structure is hydrophilic and other moieties have lipophilic nature.
- In a multiphase system the emulsifier will take a position to reduce the surface tension between the two phases. This makes it easier to mix the oil and water together.



- reduces interfacial tension
- stabilizes emulsion

## HLB Balance

- HLB stands for Hydrophilic / Lipophilic / Balance.
- This is a concept for choosing emulsifiers.
- Measures the degree to which the emulsifier is hydrophilic or lipophilic.
- The value of HLB ranges from 1- 20.
- Low HLB emulsifiers are soluble in oil.
- High HLB emulsifiers are soluble in water.
- Applies to non-ionic surfactants only.



## Table of HLB Values

Emulsifier	HLB Number
Sucrose monoester	20
Polysorbate 80	15.0
Polysorbate 60	14.9
Decaglycerol monooleate	14
Hexaglycerol dioleate	9
DATEM	8
Soy lecithin	8
Calcium steroyl lactylate (CSL)	5.1
Sorbitan monostearate	4.7
Glycerol monostearate	3.8
Glycerol monooleate	3.4
Propylene glycol monostearate	3.4
Sorbitan tristearate	2.1
Glycerol dioleate	1.8

## Matching HLB to Applications

Application	HLB Value Required
Mixing unlike oils together	1 - 3
Making water-in-oil emulsions	4 - 6
Wetting powders into oils	7 - 9
Making self emulsifying oils	7 - 10
Making oil-in-water emulsions	8 - 16
Making detergent solutions	13 - 15
Solubilising oils into water (micro-emulsifying)	13 - 18