

Water-resistant sunscreen lotion with Eastman AQ™ 38S polymer

SPF 30¹ sunscreen lotion

Part A: Water Phase	wt %
Deionized water	60.82
Amphisol™ K Potassium Cetyl Phosphate ²	2.00
Glycerin	3.00
Disodium EDTA	0.05
Carbopol™ Ultrez 20 Acrylates/ C10–30 Alkyl Acrylate Crosspolymer ³	0.20
Sodium Hydroxide, 30% in water	0.04
Eastman AQ™ 38S Polyester-5	2.00
Part B: Oil Phase	
Crodamol™ AB C12–15 Alkyl Benzoate ⁴	5.00
Hallbrite™ BHB Butyloctyl Salicylate ⁵	2.00
Parsol™ MCX Ethylhexyl Methoxycinnamate ²	7.50
Parsol™ 340 Octocrylene ^{2,6}	2.39
Eusolex™ OS Ethylhexyl Salicylate ⁷	5.00
Parsol™ 1789 Butyl Methoxydibenzoylmethane ^{2,6}	3.00
Crodamol™ MM Myristyl Myristate ⁴	3.00
Cutina™ GMS V Glyceryl Stearate ⁸	3.00
Lanette™ O Cetearyl Alcohol ⁸	1.00
Part C: Preservative	
Preservative	q.s. ⁹

¹SPF determined by in vivo testing on five subjects ²DSM ³Noveon ⁴Croda
⁵RTD Hall Star, Inc. ⁶See EP0780, 119B1 ⁷Merck ⁸Cognis ⁹Quantity sufficient

Part A

- Combine all Part A ingredients, except Eastman AQ™ 38S polymer, and heat to 75°C with stirring.
- Add Eastman AQ™ 38S polymer pellets at 75°C; continue stirring until pellets are completely dispersed.

Part B

- Combine Part B ingredients.
- Heat to about 85°C, stirring continually until mixture is completely dissolved.

With Part A at 75°C and Part B at 85°C, gradually add Part B to Part A with rapid stirring. Continue stirring until combined Parts A and B pre-emulsion is homogenous.

Homogenize^a combined Parts A and B pre-emulsion at high speed for 10 minutes with no additional heating; cover container to prevent water loss.

With stirring, cool combined Parts A and B emulsion to 40°C or less.

Part C

- Add preservative at 40°C or less with stirring.

If necessary, adjust pH to 6.0–7.0 with dilute sodium hydroxide solution.

^aSuitable laboratory homogenizers include rotor-stator, slotted-head mixers — with a head diameter of 4.5 cm or more — available from Silverson Machines, Inc. or Janke & Kunkel.

The mean particle diameter of this homogenized emulsion is about 0.7–1.2 micron, which is in a desired range for formula stability. Since homogenizer type, homogenizer head design, and rotor speed may produce different mean particle sizes, it is up to the formulator to obtain their required particle size.

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