

## Certificate of Analysis

<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	032222P00114
<b>Manufacture Date</b>	03/2022
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
Identification (IR)	- -	Pass
C10 Capric	0.0 - 10.0	5.2
C12 Lauric	10.0 – 60.0	51.1
C14 Myristic	14.0 – 25.0	21.5
C16 Palmitic	7.0 – 15.0	11.3
C18 Stearic	0.0 - 11.0	3.6
C18:1 Oleic	0.0 – 11.0	3.4
C18:2 Linoleic	0.0 – 3.0	0.0
C6 Caproic	0.0 – 1.0	0.1
C8 Caprylic	0.0 – 10.0	3.9
Identification FCC	- -	Pass
Lauric Acid (C12) content, g/100g	15.0 – 17.0	15.2
Acid Value (C12) mgKOH/g	250.0 – 275.0	250.2
Oxyethylene Content %	70.0 – 74.0	70.8
Dioxane pmm	0 - 10	0
Ethylene oxide ppm	0 – 1	0
Hydroxyl Value	96.0 – 108.0	102.4
Sulfated ashes	0.000 – 0.250	0.04
Acid value	0.0 – 2.0	1.5
Viscosity, 25C,BKF, cP	275.0 – 480.0	377.6
Arsenic, as As, pmm	0.0 – 1	1
Lead, as Pb, ppm	0.0 – 1	1
Heavy metals, ppm	0 – 10	10
pH 5% aqueous solution, 25C	5.0 – 7.0	6.3
Peroxide value	0.0 – 10.0	2.0
Density, 25C	1.080 – 1.120	1.096
Saponification Value	40.0 – 60.0	50.0
Moisture	0.0 -3.0	2.3
Gardner color, 25C	0.0 -3.0	2.3

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<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	064-B-PSB20-10-2021
<b>Manufacture Date</b>	10/2021
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
General Appearance (@30 °C)	Pale yellow to amber colored viscous liquid	Pass
Color Gardner	7.0 Max	4.5
Water	3.0 Max	1.99
Acid value	2.0 Max	1.14
Saponification Value	40 - 50	46.24
Hydroxyl Value	96 – 108	101.59
pH Of 5% Aq	5 - 7	6.85

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<b>Lot #</b>	032222P00114
<b>Manufacture Date</b>	03/2022
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
Identification (IR)	- -	Pass
C10 Capric	0.0 - 10.0	5.2
C12 Lauric	10.0 – 60.0	51.1
C14 Myristic	14.0 – 25.0	21.5
C16 Palmitic	7.0 – 15.0	11.3
C18 Stearic	0.0 - 11.0	3.6
C18:1 Oleic	0.0 – 11.0	3.4
C18:2 Linoleic	0.0 – 3.0	0.0
C6 Caproic	0.0 – 1.0	0.1
C8 Caprylic	0.0 – 10.0	3.9
Identification FCC	- -	Pass
Lauric Acid (C12) content, g/100g	15.0 – 17.0	15.2
Acid Value (C12) mgKOH/g	250.0 – 275.0	250.2
Oxyethylene Content %	70.0 – 74.0	70.8
Dioxane pmm	0 - 10	0
Ethylene oxide ppm	0 – 1	0
Hydroxyl Value	96.0 – 108.0	102.4
Sulfated ashes	0.000 – 0.250	0.04
Acid value	0.0 – 2.0	1.5
Viscosity, 25C,BKF, cP	275.0 – 480.0	377.6
Arsenic, as As, pmm	0.0 – 1	1
Lead, as Pb, ppm	0.0 – 1	1
Heavy metals, ppm	0 – 10	10
pH 5% aqueous solution, 25C	5.0 – 7.0	6.3
Peroxide value	0.0 – 10.0	2.0
Density, 25C	1.080 – 1.120	1.096
Saponification Value	40.0 – 60.0	50.0
Moisture	0.0 -3.0	2.3
Gardner color, 25C	0.0 -3.0	2.3

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<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	J30426F17022
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
General Appearance (@25 °C)	Yellow Liquid	Pass
Acid value	2.0 Max	1.12
Color Gardner Method	3.0 Max	1.0
Peroxide Value	10.0 Max	2.0
Saponification Value	40.0 – 50.0	45.0
Hydroxyl Value	96.0 – 108.0	97.0
Water Content %	3.0 Max	2.81
pH ( 5% aqueous solution)	5.0 – 6.5	6.44
1,4 Dioxane, ppm	10.0 Max	1.3
Residue on Ignition %	0.25 Max	<0.25
Arsenic, ppm	1.0 Max	<1.0
Heavy Metals, ppm	10.0 Max	<10.0
Free Ethylene Oxide, ppm	1.0 Max	0.0
Oxyethylene Content	70.0 – 74.0	Conforms
Identification	Passes Tests A&B	Pass
Caproic %	1.0 Max	<1.0
Caprylic %	10.0 Max	<10.0
Capric %	10.0 Max	<10.0
Lauric %	40.0 – 60.0	Conforms
Myristic %	14.0 - 25.0	Conforms
Palmitic %	7.0 – 15.0	Conforms
Stearic %	11.0 Max	Conforms
Oleic %	11.0 Max	Conforms
Linoleic %	3.0 Max	Conforms

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## Certificate of Analysis

<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	J30426D16587
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
General Appearance (@25 °C)	Yellow Liquid	Pass
Color Gardner Method	3.0 Max	1.0
Acid value	2.0 Max	1.4
pH ( 5% aqueous solution)	5.0 – 6.5	6.2
Residue on Ignition %	0.25 Max	<0.25
Hydroxyl Value	96.0 -108.0	98.0
Saponification Value	40.0 – 50.0	45.0
1,4 Dioxane, ppm	10.0 Max	0.9
Heavy Metals, ppm	10.0 Max	<10.0
Arsenic, ppm	1.0 Max	<1.0
Myristic %	14.0 – 25.0	Conforms
Palmitic %	7.0 – 15.0	Conforms
Stearic %	11.0 Max	<11.0
Oleic %	11.0 Max	<11.0
Linoleic %	3.0 Max	<3.0
Peroxide Value	10.0 Max	3.0
Free Ethylene Oxide, ppm	1.0 Max	0.0
Identification	Passes test A&B	Pass
Caproic %	1.0 Max	<1.0
Capric %	10.0 Max	<10.0
Caprylic %	10.0 Max	<10.0
Lauric %	40.0 – 60.0	Conforms
Oxyethylene Content %	70.0 – 74.0	Conforms

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<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	J30426A21471
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
General Appearance (@25 °C)	Yellow Liquid	Pass
Color Gardner Method	3.0 Max	1.0
Acid value	2.0 Max	1.0
pH ( 5% aqueous solution)	5.0 – 6.5	5.88
Moisture % (KF)	3.0 Max	2.80
Residue on Ignition %	0.25 Max	<0.25
Hydroxyl Value	96.0 -108.0	97.0
Saponification Value	40.0 – 50.0	45.0
1,4 Dioxane, ppm	10.0 Max	1.3
Heavy Metals, ppm	10.0 Max	<10.0
Arsenic, ppm	1.0 Max	Conforms
Myristic %	14.0 – 25.0	Conforms
Palmitic %	7.0 – 15.0	Conforms
Stearic %	11.0 Max	Conforms
Oleic %	11.0 Max	Conforms
Linoleic %	3.0 Max	Conforms
Peroxide Value	10.0 Max	1.5
Free Ethylene Oxide, ppm	1.0 Max	0.0
Identification	Passes test A&B	Pass
Caproic %	1.0 Max	Conforms
Capric %	10.0 Max	Conforms
Caprylic %	10.0 Max	Conforms
Lauric %	40.0 – 60.0	Conforms

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<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	J9825D30447
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
Appearance @ 25 Degrees C	Clear Liquid	Conforms
Acid Value	2.0 Maximum	1.2
Saponification Value	40.0 – 50.0	46.8
Hydroxyl Value	96.0 – 108.0	100.8
Moisture % (KF)	3.0 Maximum	2.6
Color (Gardner)	2.0 Maximum	1.1
Heavy metals, PPM	10.0 Maximum	0.4
Arsenic, PPM	1.0 Maximum	0.0
1.4 Dioxane, PPM	10.0 Maximum	1.8
Residue on Ignition % w/w	0.25 Maximum	0.15
Free EO, ppm	1.0 Maximum	0.7
pH (5% Solution)	5.0 – 6.5	6.1
C10 Capric, %	10.0 Maximum	5.2
C12 Lauric, %	40.0 – 60.0	52.0
C14 Myristic %	14.0 – 25.0	20.6
C16 Palmitic %	7.0 – 15.0	10.3
C18:1 Oleic %	11.0 Maximum	2.4
C18:2 Linoleic %	3.0 Maximum	0.0
C18:0 Stearic %	11.0 Maximum	3.3
C6 Caproic %	1.0 Maximum	0.5
C8 Capric %	10.0 Maximum	4.4
Oxyethylene Content %	70.0 – 74.0	70.2
Peroxide Value (meq/kg) @Time of Drumming	10.0 Maximum	2.4
Identification	Pass Test A&B	Conforms

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<b>Product</b>	POLYSORBATE 20
<b>Lot #</b>	J9824C01889
<b>Shelf Life</b>	2 years

Properties	Specifications	Results
Appearance @ 25 Degrees C	Clear Liquid	Conforms
Acid Value	2.0 Maximum	1.4
Saponification Value	40.0 – 50.0	47.8
Hydroxyl Value	96.0 – 108.0	102.1
Moisture % (KF)	3.0 Maximum	2.6
Color (Gardner)	2.0 Maximum	1.8
Heavy metals, PPM	10.0 Maximum	0.4
Arsenic, PPM	1.0 Maximum	0.0
1.4 Dioxane, PPM	10.0 Maximum	3.1
Residue on Ignition % w/w	0.25 Maximum	< 0.25
Free EO, ppm	1.0 Maximum	< 1.0
pH (5% Solution)	5.0 – 6.5	6.2
C10 Capric, %	10.0 Maximum	6.0
C12 Lauric, %	40.0 – 60.0	51.9
C14 Myristic %	14.0 – 25.0	19.8
C16 Palmitic %	7.0 – 15.0	11.1
C18:1 Oleic %	11.0 Maximum	3.4
C18:2 Linoleic %	3.0 Maximum	0.0
C18:0 Stearic %	11.0 Maximum	2.3
C6 Caproic %	1.0 Maximum	0.1
C8 Capric %	10.0 Maximum	5.2
Oxyethylene Content %	70.0 – 74.0	70.3
Peroxide Value (meq/kg) @Time of Drumming	10.0 Maximum	2.4
Identification	Pass Test A&B	Conforms

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