



NOVEL® 23 and NOVEL® TDA High Mole Ethoxylates

Description

Sasol offers two lines of nonionic surfactants as alternatives for high mole alkylphenol ethoxylates (APEO). The NOVEL® 23 Ethoxylate line is a Fischer-Tropsch based alcohol consisting of a C12/C13 alcohol blend that is approximately 50% branched. The NOVEL® TDA Ethoxylate line is based on a 100% branched C13 alcohol. Both product lines are available with 20 to 50 moles of EO and yield surfactants that:

- Are classified as “Readily Biodegradable” according to standard OECD methodology
- Will not break down to toxic compounds or metabolites
- Provide excellent emulsification properties
- Have similar HLB values and properties to APEO
- Contain < 1 wt.% residual alcohol
- Contain low glycol content (< 3 wt.%)
- Have a very low 1,4-dioxane content (< 1 ppm)
- Are 100% active products- White solids that melt to slightly hazy to clear liquids

Alkylphenol Ethoxylates vs. Alcohol Ethoxylates: Physical Properties

All of Sasol North America’s NOVEL® 23 and TDA Ethoxylates have a water content of <1%, free EO levels of <1ppm, and a pH (1% in a IPA solution) of 6-8. The physical properties of the NOVEL® 23 and TDA Ethoxylates are given along with other 30 mole industry standards in the table below.

Surfactant	Moles of EO	Active Content, %	Cloud Point*, °C	HLB	Appearance
NOVEL® TDA-30 Ethoxylate	30	100	76	17.3	White Solid
NOVEL® 23E30 Ethoxylate	30	100	75	17.5	White Solid
Nonylphenol Ethoxylate	30	100	74	17.1	White Solid
Octylphenol Ethoxylate	30	70	72	17.3	Pale Yellow Liquid
Secondary Alcohol Ethoxylate	30	100	74	17.4	White Solid
Modified Linear Alcohol Ethoxylate	30	70	77	17.5	Water-White to Pale Yellow Liquid

*1% in a 10% NaCl solution

Looking for something easier to handle?

Sasol North America’s NOVEL® 23 and TDA Ethoxylates can be blended with water to obtain products that are liquid and easier to handle. For more information on these blends, please contact us.

Contact Information

For further information on these or other Sasol products, contact a sales representative at:

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For technical inquiries or samples contact:

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Surfactant Evaluation Data

The following data compares emulsions prepared with one of several 30 mole ethoxylates. The results show that Sasol ethoxylates perform equal to or better than industry standards. The emulsion formula and procedure used is given below.

Surfactant	pH	Solids (%)	Wet Coagulum (%)	Conversion (%)	Particle Size (nm)	MFFT (°C)
NOVEL® TDA-30	3.42	45.1	0.07	99.2	343	19.8
NOVEL® 23E30	3.55	45.2	0.03	99.4	313	22.4
NPE-30 ⁽¹⁾	3.83	45.3	0.18	99.6	269	18.8
OPE-30 ⁽²⁾	3.20	45.0	0.07	98.9	385	20.0
SAE-30 ⁽³⁾	3.88	45.1	0.21	99.3	317	17.9
MLAE-30 ⁽⁴⁾	3.65	45.2	0.40	99.3	359	19.6

(1) Nonylphenol (2) Octylphenol (3) Secondary Alcohol (4) Modified Linear Alcohol

Latex Emulsion Formulation

The following is the latex recipe used for testing various surfactants in emulsion systems. All of the surfactants were ethoxylated to an average of 30 moles starting with nonylphenol, octylphenol, secondary, modified linear, isotridecyl, and a branched Fischer-Tropsch based alcohol. The NOVEL® TDA-30 and NOVEL® 23E30 Ethoxylates were produced using a narrow range ethoxylation catalyst to give a distribution similar to that of an alkylphenol ethoxylate.

Ingredient	Grams	Parts bom*
Water	361.14	81.3
Monomer Mixture (4hours feed)		
Butyl acrylate	222.1	50.0
Styrene	211.0	47.5
Acrylic Acid	6.7	1.51
Methacrylic Acid	4.4	0.99
Aqueous Mixture (4 hours feed)		
Anionic Surfactant (45%)	5.13	0.52**
Surfactant	2.49	0.56**
Water	88.4	19.9
Sodium Hydroxide (20% Solution)	2.22	0.10
Initiator Solution (4h 10min feed)		
Water	88.8	19.99
Potassium Persulfate	3.11	0.7
Total	995.5	

Procedure:

- Heat kettle to 80°C while purging with nitrogen. Maintain nitrogen blanket throughout run.
- Prepare monomer mixture and aqueous mixture separately.
- Prepare initiator solution.
- Feed the monomer mixture, aqueous mixture, and initiator solution separately into the reaction kettle in the time mentioned. Maintain emulsion temperature at 80°C.
- After addition is complete, hold for 2 hours at 80°C.
- Cool with water and hold for an additional 2 hours. Adjust pH to 7 with ammonia.

* bom-based on monomer ** based on active species

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For detailed safety and handling information regarding these products, please refer to the respective Sasol North America Material Safety Data Sheet.