

Technical Bulletin

Demulsifiers for Oilfield Applications

Indorama Ventures is a global supplier of amines, surfactants and other chemicals widely used in oilfield operations. These products are used in a variety of applications throughout the oil production process. Indorama's SURFONIC® OFD series oilfield demulsifiers are effective components of demulsifier formulations. These materials are not formulated, and should be formulated on the basis of bottle field tests with other materials to create an effective demulsifier formulation.

The Indorama Ventures demulsifier base can be grouped into three families:

Anionic

- SURFONIC® OFD 750 Demulsifier
- SURFONIC® OFD 775 Demulsifier
- XOF-22S Demulsifier
- XOF-25S Demulsifier

These products are resistant to over-treating. They offer solids wetting capability and can help destabilize emulsions containing fine particles. They do not drop water as quickly as other classes of demulsifiers.

Polyol

- SURFONIC® OFD 101 Demulsifier
- SURFONIC® OFD 104 Demulsifier
- SURFONIC® OFD 328 Demulsifier
- SURFONIC® OFD 335 Demulsifier
- SURFONIC® POA-L61 Surfactant
- SURFONIC® POA-17R2 Surfactant
- UNIMAX™ WL-660 Fluid
- UNIMAX™ WL-5000 Fluid

The polyol demulsifiers are effective emulsion breakers and are available in a wide range of Relative Solubility Number (RSN) values. High RSN value polyols may cause water clarity issues. This can be corrected with combinations of low RSN alkylphenol resin alkoxyates.

The polyol demulsifiers can give good emulsion breaking but often need other materials to complete the separation of the water. SURFONIC® OFD 101 demulsifier is a diol, while SURFONIC® OFD 328 and OFD 335 demulsifiers are triols. SURFONIC® OFD 328 and 335 demulsifiers have found wide range applicability in eastern European crudes.



Oxyalkylated Polyamines

- SURFONIC® OFD 150 Demulsifier
- SURFONIC® OFD 301 Demulsifier
- SURFONIC® OFD 302 Demulsifier
- SURFONIC® OFD 360 Demulsifier

The oxyalkylated polyamine demulsifiers exhibit good emulsion-breaking characteristics. They tend to be slow water-coalescing agents. In some cases though, water drop can be rapid. Some products in this class are good overall demulsifiers for heavy oils and oil sands production. In some crude oils these materials have a water-shedding capability.

RSN Values

Indorama Ventures uses a modification of the traditional Relative Solubility Number (RSN) test based on benzene and 1,4-dioxane. Demulsifiers were tested in a toluene/ethylene glycol dimethyl ether (EGDE) system as described in "Development of a Method for Measurement of Relative Solubility of Nonionic Surfactants" by J. Wu, Y. Xu, T. Dabros, and H. Hamza in *Colloids and Surfaces A: Physicochem. Eng. Aspects* 232 (2004) 229-237. Test results indicate the system is comparable to the benzene/dioxane system. Relative Solubility Numbers for the demulsifiers are presented in the solvent miscibility table below.

Formulation Guidelines

Solubility data is offered below for the Indorama Ventures demulsifier families. In general, demulsifiers should be formulated in an aromatic solvent like xylene or heavy aromatic naphtha. Isopropanol can be added to give a clear formulation and for pour point reduction.

The following solvent miscibility chart with solubility parameters is provided to give the formulator guidance on solubility characteristics for specific formulations.

Demulsifier Type And Product Name	Relative Solubility Number, 25°C	Solvent Miscibility							
		10% H ₂ O	50% H ₂ O	10% Xylene	50% Xylene	10% IPA	50% IPA	10% Diesel	50% Diesel
ANIONIC									
SURFONIC® OFD 750 demulsifier	<0.1	S	S	S	S	S	S	S	S
XOF-22S	24	S	S	S	S	S	S	S	S
XOF-25S	14.5	S	S	S	S	S	S	S	S
POLYOL									
SURFONIC® OFD 101 demulsifier	8.9	SS	S	S	S	S	S	S	S
SURFONIC® OFD 328 demulsifier	9.2	S	S	S	S	S	S	S	S
SURFONIC® OFD 335 demulsifier	10.5	S	S	S	S	S	S	S	S
SURFONIC® POA-17R2 surfactant	13.4	S	S	S	S	S	S	S	S
UNIMAX™ WL-660 fluid	17.3	S	S	S	S	S	S	S	S
UNIMAX™ WL-5000 fluid	14.8	S	S	S	S	S	S	IS	IS
OXYALKYLATED POLYAMINE									
SURFONIC® OFD 150 demulsifier	27.3	S	S	S	S	S	S	IS	IS
SURFONIC® OFD-301 demulsifier	17.4	S	S	S	S	S	S	IS	IS
SURFONIC® OFD-302 demulsifier	15.8	S	S	S	S	S	S	IS	IS

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