

Nouryon

Environmentally responsible oilfield solutions



Without compromising performance



World-class customer productivity empowered by innovative oilfield chemistries



Product name	GENERAL CHARACTERISTICS									SOLUBILITY			FUNCTIONALITY				ENVIRONMENTAL AND REGULATORY STATUS				
	Chemistry	Primary use	Active content	Physical form	CMC g/l	Surface tension mN/m	Pour point °C	Flash point °C	Viscosity mPas (°C)	Water	IPA	Aromatic	Foaming	Brine tolerance	Interfacial tension mN/m	Wetting	OECD 306	CEFAS classification	Norway classification	WGK	REACH registration
Alcoflow® 880	Hybrid polymer	Scale inhibitor, CaCO ₃ , BaSO ₄	38%	liquid	ND	ND	0	>100	ND	S	ND	I	ND	H	ND	ND	>20%	No substitution warning	Yellow 2	1	Yes
Armoclean® 4350	Alcohol alkoxylate	Cleaner, wetting agent	100%	liquid	1.1	26.5	-9	>100	30 (20)	D	S	S	LO	M	1.2	29	>60%	No substitution warning	Yellow 0	1	Yes
Armoclean® 4380	Alcohol alkoxylate	Cleaner, wetting agent, emulsifier	100%	liquid	1.6	29	12	>100	70 (20)	S	S	S	M	H	4.2	52	>60%*	No substitution warning	Yellow 1	1	Yes
Armoclean® 4400	Fatty acid ethoxylate	Cleaner, emulsifier, dispersant	100%	liquid	0.4	39	4	>100	800 (20)	S	S	S	M	M	4.8	72	>60%	No substitution warning	Yellow 0	1	Yes
Armoclean® 6000	Alkyl glucoside	Hydrotrope, cleaner, wetting agent	65%	liquid	14	33.4	ND	>100	160 (30)	S	I	I	LO	H	12.8	78	>60%	No substitution warning	Yellow 0	1	Yes
Armoclean® 6040	Alkyl glucoside	Hydrotrope, cleaner	75%	liquid	30	34	-9	>100	775 (20)	D	I	I	LO	H	7.1	87	>60%	No substitution warning	Yellow 0	1	Yes
Armoclean® 6250	Quat	Hydrotrope, cleaner, dispersant	60%	liquid	ND	36	-17	>100	210 (20)	S	S	I	M	M	ND	ND	>60%	No substitution warning	Yellow 0	2	Yes
Armohib® CI-5150	Polymeric ester quat	Corrosion inhibitor	55%	liquid	0.01	31	-5	90-94	3500 (20)	S	S	S	M	H	ND	ND	>60%	No substitution warning	Yellow 0	1	Yes
Witbreak™ GT-705	Block co-polymer	Demulsifier	55%	liquid	ND	ND	14	92	901(22)	D	S	S	ND	M	ND	ND	>20%	No substitution warning	Yellow 2	ND	Yes
Witbreak™ GT-750	Block co-polymer	Demulsifier	85%	liquid	ND	ND	19	>100	310 (50)	S	S/D	S	ND	M	ND	ND	>20%	No substitution warning	Yellow 2	ND	Yes
Witbreak™ GT-756	Block co-polymer	Demulsifier	80%	solid/paste	ND	ND	26	>100	261 (50)	S	S/D	S/D	LO	M	ND	ND	>20%	No substitution warning	Yellow 1	ND	Yes
Witbreak™ NEO-110	Glycol polyester	Demulsifier	80%	liquid	ND	ND	< -20	>100	761 (20)	I	I	S	ND	M	ND	ND	>60%	No substitution warning	Yellow 0	ND	Yes
Witbreak™ NEO-120	Glycol polyester	Demulsifier	80%	liquid	ND	ND	< -20	>100	1154 (20)	I	I	S	ND	M	ND	ND	>20%	No substitution warning	Yellow 1	ND	Yes
Witbreak™ NEO-130	Glycol polyester	Demulsifier	100%	liquid	ND	ND	< -14	>100	1749 (20)	I	I	S	ND	M	ND	ND	>60%	No substitution warning	Yellow 0	ND	Yes

Surface Tension acc. to Du Noüy, 0.1%

Solubility: S=Soluble; D=Dispersible; I=Insoluble
Foaming: LO=Low; M=Medium; H=High; ND=Not Determined
Brine tolerance: M=Medium; H=High
Wetting=Contact angle 0.1% hydrophobic surface

IFT is measured between 3.5% NaCl containing the surfactant and a typical North Sea crude

*OECD 301D

German Water Hazard Classification

Alcoflow 880 is an ultra-brine stable scale inhibitor that is most effectively used for CaCO₃ inhibition and also performs strongly in BaSO₄. Built on our hybrid polymer technology, this product has increased biodegradability while retaining or even improving the properties of fully synthetic polymers. The exceptional brine tolerance and contamination resistance when compared to typical synthetic polyacrylate products makes Alcoflow 880 suitable for blending with other production chemicals into combination formulations.

Armoclean 4350 is a highly surface active nonionic surfactant with features relevant to multiple oilfield applications. For example, the product's low surface tension and excellent wetting in combination with low foam and odour makes it suitable for cleaning and stimulation operations. It has also proven to be a powerful component in non-emulsifier formulations for acidizing. Although not fully water soluble in itself, Armoclean 4350 can gain great brine- and temperature stability by formulation with compatibility agents such as Armoclean 6000 or 6040.

Armoclean 4380 being a more hydrophilic version of Armoclean 4350, is water soluble and has increased emulsifying properties, while maintaining a strong wetting performance, e.g. on sandstone, and a low odour profile. Use in non-emulsifier formulations can be recommended. Blending Armoclean 4350 and 4380 often gives super edge to cleaning formulations for various applications such as casing cleaning.

Armoclean 4400 is a powerful emulsifier in the medium HLB (Hydrophilic/Lipophilic Balance) range based on a natural raw material for the hydrophobic part. The product performs effectively on a stand-alone basis or can be blended with Armoclean 4350/4380 for specific purposes. For example, a blend of Armoclean 4400 and 4350 has shown great promise in cold degreaser formulations based on renewable components like fatty acid methyl esters. These cold degreasers can successfully replace traditional harmful solvent-based cleaners in various rig cleaning operations.

Armoclean 6000 has strong solubilizing/hydrotrope properties, while also being low foaming and highly salt/brine tolerant. The sugar based hydrophilic part of this product makes it insensitive to temperature changes, a positive benefit to many other nonionic surfactants. Further, the somewhat longer hydrophobic tail makes Armoclean 6000 slightly more surface active than 6040.

Armoclean 6040 is a high performance hydrotrope/compatibility agent with extreme brine and temperature tolerance. Therefore it can make less compatible chemistry blends perform in challenging oilfield conditions. Armoclean 6040 can be formulated for several applications such as cleaning-, corrosion inhibitor- wetting agent- and non-emulsifier formulations. The low foam is built-in in the package, as well as the temperature insensitivity that it shares with Armoclean 6000.

Armoclean 6250 is the preferred option for a cationic, quarternary ammonium hydrotrope and likely the only product in this chemistry class that is fully approved for North Sea operations. Substantially more surface active than the Armoclean 6000 range, it provides extreme performance for cleaning formulations due to unmet dilutability with retained cleaning power. The constant positive charge gives adsorption to negatively charged surfaces when needed. In addition, Armoclean 6250 is very acid stable and a strong dispersing agent. Relative to the 6000 series, Armoclean 6250 is more temperature sensitive in its hydrotropic functionality.

Armohib CI-5150 is a high performance, patented corrosion inhibitor featuring multiple binding sites to the steel surface. In addition to being extremely easy to formulate due to its very broad solubility profile, it has a superb brine tolerance, even at elevated temperatures, which makes it suitable for use in completion brines as well. This product is fully North Sea compliant and shows aquatotoxicity values 10-100 times better than standard corrosion inhibitor chemistries such as fatty acid imidazolines and alkyl benzyl quats. It is non-emulsifying and can be combined with green enhancers such as Na-thiosulfate. Armohib CI-5150 can be used as a direct drop-in to water-, methanol- or hydrocarbon solvent-based formulations. Further, it has shown great promise in formulations for organic acid inhibition.

Witbreak GT-705, GT-750 and GT-756 constitute our original series of environmentally improved demulsifiers. Delivered in a "green" solvent, these products contain patented and degradable links to improve biodegradation. The entire GT range provides robust blend components for improving the interface - even down to around +30°C separation temperature. Witbreak GT-705 is especially strong in this respect, and in addition it is a very good drier for certain crudes. The best effectiveness is reached by blending it with a dropper. Witbreak GT-750 and GT-756 on the other hand have clear dropper properties, especially in 50-70°C separation temperature region. Witbreak GT-756 has a higher RSN and thus a bit more hydrophilic character than GT-750.

Witbreak NEO-110, NEO-120 and NEO-130 are our second generation of OSPAR compliant demulsifier bases, developed to cater to the growing need for chemistries that are sustainable and have a low environmental impact. They have features such as excellent biodegradability in seawater, being BTEX- as well as NP-free and based on new sustainable building-blocks. Furthermore, these are high activity and low pour point demulsifier bases allowing customized blending and may be formulated and diluted in non-aromatic solvents. Further features are that they cover a range of RSN values from treater/drier to high RSN emulsion resolver/water droppers. An additional advantage is improved cost/performance compared to current alternatives.

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We operate in over 80 countries around the world and our portfolio of industry-leading brands includes Alcoflow, Armovis, Aromox, Armoclean, Armohib, Witbreak and Versa.

For more information visit surfacechemistry.nouryon.com

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