



Energy Technologies



Powering next generation hydraulic systems

Cargill's portfolio of synthetic esters, PAGs, natural esters and additives help formulators meet evolving technical and sustainability demands.

Advanced solutions for next-generation hydraulic systems



Modern hydraulic systems operate under higher pressures and tighter tolerances, making fluid selection more complex. Formulators must balance performance, safety, and sustainability while meeting strict regulations such as EU Ecolabel, VGP/VIDA for marine applications and OSPAR for off-shore use.

OEM standards like Bosch* Rexroth RDE 90235 and Denison* HF-0 demand superior wear protection, cleanliness, and oxidative stability. Fire resistance remains critical in high-risk sectors, guided by ISO 12922 categories (HFA, HFB, HFC, HFDU).

Cargill's advanced chemistries - Priolube™ synthetic esters, Emkarox™ polyalkylene glycols (PAGs), Agri-Pure™ natural esters, Pluvia™ and Celevida™ emulsifiers, supported by Perfad™ friction modifiers and Vikolox™ acid scavengers - help formulators create hydraulic fluids that combine durability, biodegradable and bio-based options and high performance across all ISO 12922 categories.

Cargill™ hydraulic fluid solutions perform across many industrial applications:



Agriculture



Metal and mining



Off-shore oil and gas



Marine and transport



Cement production



General machinery



Manufacturing

*Bosch Rexroth and Denison are trademarks of their respective owners



Benefits of Cargill's solutions for hydraulic fluids

Safety & regulatory protection

Cargill's portfolio supports formulators in creating hydraulic fluids that meet stringent safety and compliance requirements. Priolube™ synthetic esters enable the formulation of HFDU fluids with high flash points and excellent lubrication to help reduce ignition risk in high temperature or high-pressure environments. Our solutions can also support compliance with EU Ecolabel, HX1, LuSC list requirements and OSPAR for offshore lubricant applications. Together, these capabilities help formulators meet demanding safety standards across industries where fire resistance and regulatory assurance are critical.

Sustainability

Cargill Priolube™ synthetic esters, Emkarox™ PAGs, and AgriPure™ natural esters, all include biodegradable and bio-based options enabling formulators to design environmentally acceptable lubricants (EAL) that support EU Ecolabel certification and compliance with marine and offshore environmental regulations. These chemistries offer reliable performance alongside strong sustainability credentials across sensitive applications such as marine transport and offshore operations.

Long lasting performance & equipment reliability

High oxidative stability and thermal resistance offered by Priolube™ polyol esters support extended fluid life, longer drain intervals, and reduced downtime. Cleaner running fluids help minimize varnish formation, surface deposits, and wear, further supported by Perfad™ friction modifiers for enhanced protection. These attributes help improve overall equipment reliability and reduce maintenance efforts across a range of hydraulic systems.

Formulation flexibility & energy efficiency

Cargill's broad chemistry toolbox gives formulators the versatility needed to design fluids for all ISO 12922 categories (HFA, HFB, HFC, HFDU). Options range from low viscosity synthetic esters to high viscosity thickeners such as Priolube™ synthetic ester 1929, as well as Pluvia™ and Celevida™ emulsifiers that ensure stability in HFA/HFB systems. High VI esters, Emkarox™ PAGs, AgriPure™ natural esters, and Vikolox™ acid scavengers help maintain optimal viscosity across temperature extremes, supporting energy efficiency, reducing power losses, and improving system responsiveness.

Cargill's product range

Synthetic ester base fluids

Function	Type	Product Name	Chemistry	Region	Key Specifications							Regulatory Compliance					
					Recommended for fire resistant formulations	Kinematic viscosity at 40°C (mm²/s)	Kinematic viscosity at 100°C (mm²/s)	Viscosity index	Pour point (°C)	Acid value (mgKOH/g)	Flash point (°C)	NSF HX-1 (for use in incidental food contact)	LuSC list (EU Ecolabel)*	OSPAR Compliant	Readily biodegradable OECD 301B	Bio-based carbon content % (ASTM D6866)	
Base Fluids	Synthetic Esters	Innovatti™ 4322	Polyol ester (unsaturated)	South America	●	24	-	-	-	1.9	260						
		South America		●	46	-	-	-	1.5	250							
		South America		●	68	-	-	-	1.5	280							
		South America			7.5	1.8	-	-50	0.02	165							
		South America			10	2.6	86	-50		176							
		South America			45	5.9	59	5	0.02	200							
		Priolube™ 1415	Mono ester	Global	●	8.7	2.8	187	-27	0.2	220				●	67	
		Priolube™ 1426	Polyol ester (unsaturated)	Global	●	65	13	208	-27	1.8	310				●	85	
		Global		●	67	12.5	188	-30	0.5	290		●		●	93		
		Global			30	7	207	-30	0.6	295		●		●	90		
		Global		●	35	7.5	193	-42	0.1	295		●		●	89		
		Priolube™ 1847	Complex ester	Global		1040	90	167	-24	0.1	300		●		●	81	
		Global			495	49	153	-36	0.1	300		●		●	95		
		Global			1700	125	175	-21	0.1	310							
		Priolube™ 1935		Diester	Global		14.5	3.7	149	-72	0.05	226				●	
		Global			26	5.3	139	-54	0.05	244		●		●			
		Priolube™ 1973	Polyol ester (saturated)	Global		46	8	148	-44	0.05	280		●	●	●	87	
		Priolube™ 2020		South America	●	20	4.5	143	-63	0.1	250						
		Priolube™ 2065	Polyol ester (unsaturated)	Global	●	48	9.8	196	-39	1	300	●	●		●	90	
		Priolube™ 2087	Complex ester	Global		320	35	150	-40	0.5	260		●		●	88	
		Priolube™ 2088		Global		320	35	150	-40	0.15	260	●	●		●	94	
		Priolube™ 2089	Polyol ester (unsaturated)	Global		44	8.7	181	-54	0.05	315		●	●	●	92	
		Priolube™ 2101		Global	●	46	9.5	187	-47	0.48	325					90	
		Priolube™ 2500	Polyol ester (saturated)	Global		90	13	143	-24	0.5	280	●	●		●	80	
		Priolube™ 3959	Diester	Global		7.7	2.4	135	-81	0.05	203				●		
		Priolube™ 3970	Polyol ester (saturated)	Global		20	4.4	140	-51	0.05	250	●	●	●	●	81	
		Priolube™ 3987		Global		145	18.2	140	-33	0.1	320		●		●	95	
		Priolube™ 3999	Polyol ester (unsaturated)	Global		90	14	144	-27	0.05	290	●			●	87	
	Emulsifiable Esters	Priolube™ 3952	Emulsifiable ester	Global		380	34	142	-36	330	33					61	
		Priolube™ 3955	Emulsifiable ester	Global	●	420	41	147	-21	50	320					68	
	Polyalkylene glycol	Emkarox™ H 60H	Polyalkylene glycol, high viscosity, water soluble	Global	●	2400	1650	-	-	-							
		Global		●	45000	6500	489	7	-	240							
		Global		●	1895	566	452	-33	-	240							
		Global			1052	171	284	-24	-	240	●						
		Emkarox™ VG 100 NS	Polyalkylene glycol, water soluble	Global		107	17.6	181.6	-49	-	280		●		●		
		Global			152.2	24.9	197.7	-49	-	260		●		●			

*Can be used up to 100% in the formulation (EEL Biodegradation 100%A)

Natural ester base fluids

					Key Specifications					
Function	Type	Product Name	Chemistry	Region	% C 12:0 [lauric acid]	% C 14:0 [myristic acid]	% C 16:0 [palmitic acid]	% C 18:0 [stearic acid]	% C 18:1 [oleic acid]	% C 18:2 [linoleic acid]
Base Fluids	Natural esters	Agri-Pure™ 20	Coconut oil	North and South America	46	19	9.5	3.4	6.7	1.7
		Agri-Pure™ 25	Soybean oil			0.1	10.5	4.4	23	52.9
		Agri-Pure™ 315	High oleic blend							
		Agri-Pure™ 40	Corn Oil				11	1.8	29.2	55.2
		Agri-Pure™ 60	Canola oil			0.7	4.1	1.9	62.9	19.7
		Agri-Pure™ 75	High oleic blend						75	
		Agri-Pure™ 80	High oleic sunflower				3.7	3.3	84.7	6
		Agri-Pure™ AP 15	Palm kernel oil	Europe Middle East and Africa	45.9	15.9	9.2	2.8	16.1	2.7
		Agri-Pure™ AP 20	Coconut oil		46	19	9.5	3.4	6.7	1.7
		Agri-Pure™ AP 22	Soybean oil			0.1	10.5	4.4	23	52.9
		Agri-Pure™ AP 25	Sunflower oil			0.1	6.4	3.3	27.5	60.5
		Agri-Pure™ AP 45	Palm olein		0.3	1	39.6	4.3	42.1	11.3
		Agri-Pure™ AP 60	Rapeseed oil			0.7	4.1	1.9	62.9	19.7
		Agri-Pure™ AP 75	71% HO Sun + 29% Can							
		Agri-Pure™ AP 80	High oleic sunflower oil				3.7	3.3	84.7	6

Additives

						Key Specification		Regulatory Compliance		
Function	Type	Product Name	Chemistry	Region	Recommended for fire resistant formulations	Pour point (°C)	NSF HX-1 (for use in incidental food contact)	LuSC list (EU Ecolabel)*	OSPAR Compliant	Readily biodegradable OECD 301B
Additives	Acid scavenger	Vikolox™ 16	Epoxidized olefin	Global		6				
	Emulsifier	Vikolox™ 68	2-Ethylhexyl cyclohexene carboxylate epoxide	Global		12				
		Celevida™ 4500	Polymeric nonionic surfactant	Global	●	21				
		Celevida™ 6300		Global	●	26			60	
		Celevida™ 6400		Global	●	45				
		Pluvia™ S 80	Sorbitan ester	Global	●	25				100
	Friction modifier	Perfad™ FM 3336	Mono ester	Global		-25		●	●	100
	Thickner	Priolube™ 3986	Complex ester	Global	●	6		●		85

Technical proof points

Some of our synthetic esters, like Priolube™ synthetic ester 2089, are designed to retain flow properties at extremely low temperatures and are therefore suitable for use in off-shore applications where very low temperatures can be reached.

Priolube™ 2089 low temperature flow performance

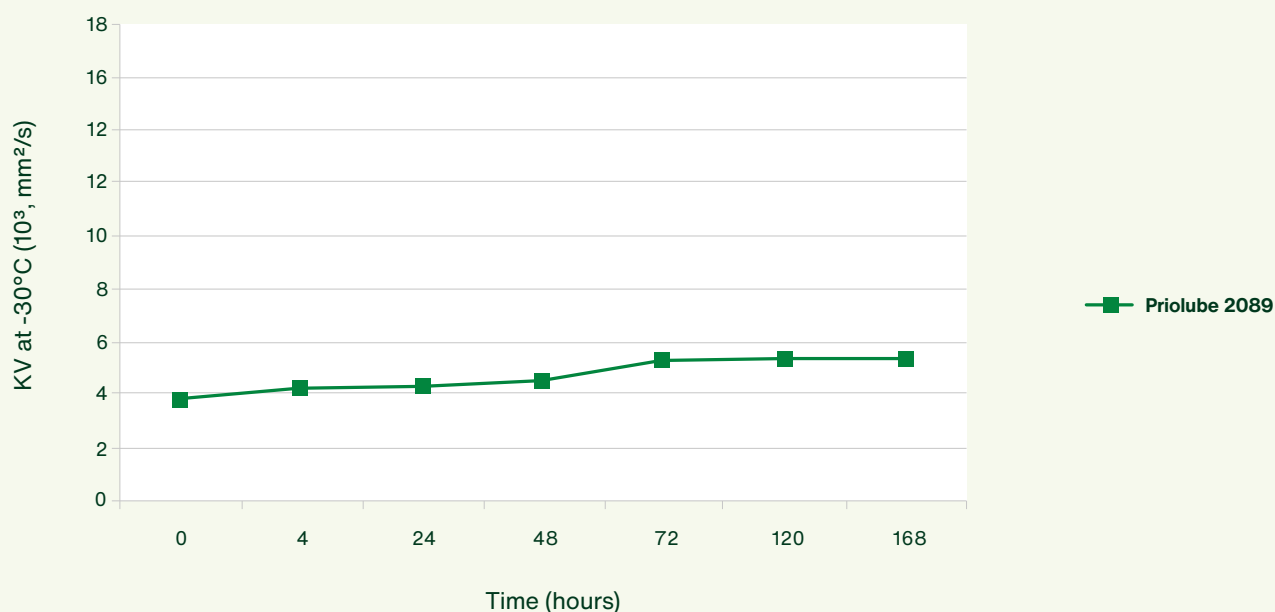


Figure 1: For extreme low temperature environments (-30°C) Cargill recommends the use of Priolube™ 2089, as it retains its low temperature flow properties even after 72 hours.



Sustainability built in

At Cargill, we aim to create solutions that deliver environmental and in-use performance benefits throughout their lifecycle. Our portfolio for hydraulic fluids formulation includes an extensive range of ingredients which offer intrinsic sustainability advantages such as high biodegradability and low aquatic toxicity. Many are also derived from renewable feedstocks, supporting circular economy principles. But we go further.

These fluids can also help deliver excellent in-use benefits to the formulator:



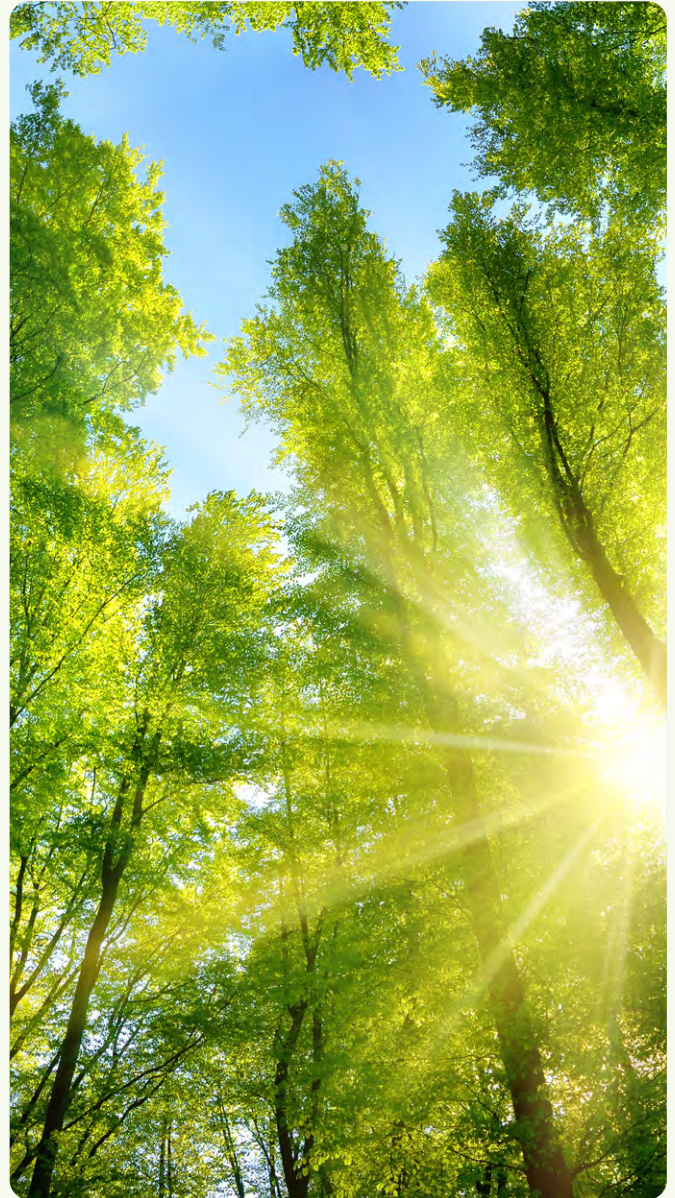
Superior oxidative stability helps extend oil life, which can reduce waste and maintenance.



High lubricity and thermal stability protect components, which can lower energy losses and prolong equipment life.



In the event of leaks or spills, biodegradable ingredients mitigate environmental risk.



We use innovation to develop products that help you navigate the regulatory landscape and be considerate of the environment without compromise on performance.

Product Carbon Footprint

We provide Product Carbon Footprint (PCF) information for many of our products, calculated in line with the latest industry recommended methodologies. Please contact your Cargill representative for further information.



Let's solve what's next – *together*

Whether you're optimizing performance, or tackling formulation challenges, our technical experts are here to help. Connect with us to explore tailored solutions that meet your specific needs.



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