

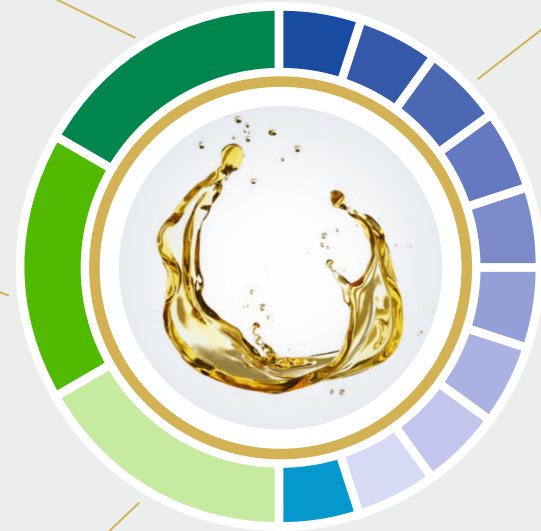
BASF Lubricant Base Stocks and Additives

PAG Base Stocks

- Water-Soluble PAG Base Stocks
- Water-Insoluble PAG Base Stocks
- High Viscosity PAGs (Thickeners)

Ester Base Stocks

- Monoesters
- Diesters
- Polyolesters
- Complex Esters



Lubricant Additives

- Antioxidants
- Viscosity Index Improvers
- Pour Point Depressants
- Friction Modifiers
- Anti-wear / Extreme Pressure Additives
- Corrosion Inhibitors
- Metal Deactivators
- Components for Metalworking Fluids

Polyisobutene

- Low Molecular Weight PIB
- Medium / High Molecular Weight PIB

Industrial Additive Packages

- Hydraulic Packages
- Turbine Packages
- Gear Packages



Our components for metalworking fluids keep things moving

BASF is one of the leading suppliers of high-performance components for metal working fluids – offering a comprehensive product range and tailored solutions to our customers globally. As a key supplier to metal working formulators, we understand our customers' needs and are committed to support their long-term success with high quality, supply reliability and innovations.

The lubricant industry is constantly looking for innovative solutions offering not only improved performance but also improved EHS profile. With our application expertise, dedicated team and resources we continuously develop innovative products and services which contribute to sustainable development and improve quality of life.

New additional sustainability options available to our customers

Mass Balance option



Customer benefits

- Significant CO₂ reduction
- 100% renewable feedstocks
- Proved performance
- 3rd party certified

Product example

Synative® RPE 1720
100% fossil feedstock

Synative® RPE 1720 BMBcert™
100% biogas feedstock



Option to replace fossil feedstocks by renewable feedstocks via mass balance approach.

RSPO Certification option



Customer benefits

- Significant CO₂ reduction
- Sustainable feedstocks
- Proved performance
- 3rd party certified

Product example

Synative® AL 90/95 V
Renewable feedstocks

Synative® AL 90/95 V
RSPO certified product



Option for RSPO certified products according to the RSPO standard 'Mass Balance'.



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BASF
We create chemistry

Components for Metalworking Fluids Selection Guide

BASF Lubricant Components
Make the difference

Components for metalworking fluids

Product name	Description	Emulsion type (i.e. semisynthetic and soluble oil)	Fully synthetic
Emulsifiers			
Synative® AC 3370 V	Alcohol ethoxylates	nonionic	●
Synative® AC 3370 LK	Alcohol ethoxylates	nonionic	●
Synative® AC 3412 V	Alcohol ethoxylates	nonionic	●
Synative® AC 3830	Alcohol ethoxylates	nonionic	●
Synative® AC EP 5 LV	Alcohol ethoxylates	nonionic	●
Synative® AC ET 5 V	Alcohol ethoxylates	nonionic	●
Synative® AC 2142	Alcohol ethoxylates	nonionic	●
Synative® X AO 3	Alcohol ethoxylates	nonionic	●
Synative® AC RT 5	Alcohol ethoxylates	nonionic	●
Synative® AC RT 40	Alcohol ethoxylates	nonionic	●
Synative® X LF 403	Alcohol alkoxyates	nonionic	●
Synative® AC LF 420	Alcohol alkoxyates	nonionic	●
Synative® AC LS 54	Alcohol alkoxyates	nonionic	●
Synative® X 720	Guerbet alcohol ethoxylate	nonionic	●
Synative® AC B 33 V	Monomeric alkyl epoxy oleate	nonionic	●
Synative® AC 3499	Unsaturated fatty acid monoethanolamide derivative, free from secondary amines	anionic	●
Synative® AC K 100	Unsaturated cocoamine ethoxylate	cationic	●
Lubricity enhancers			
Synative® 17 R 2	EO/PO block co-polymer	nonionic	●
Synative® 17 R 4	EO/PO block co-polymer	nonionic	●
Synative® 25 R 2	EO/PO block co-polymer	nonionic	●
Synative® RPE 1050	EO/PO block co-polymer	nonionic	●
Synative® RPE 1720	EO/PO block co-polymer	nonionic	●
Synative® RPE 1740	EO/PO block co-polymer	nonionic	●
Synative® RPE 2520	EO/PO block co-polymer	nonionic	●
Synative® PE 61	EO/PO block co-polymer	nonionic	●
Synative® PE 81	EO/PO block co-polymer	nonionic	●
Synative® PE 10100	EO/PO block co-polymer	nonionic	●
Synative® PE 121	EO/PO block co-polymer	nonionic	●

Chemical and physical properties*

Appearance/Form	HLB	Kinematic viscosity mm ² /s [40°C]	pH	Density g/cm ³ [20°C]	Hydroxyl value mg KOH/g	Cloud point		Pour point °C	Flash point °C	Surface tension mN/m	Solubility ^[3]				Low foaming ^[4]
						°C	°C				In demineralized water	In naphthenic mineral oil	In paraffinic mineral oil	In vegetable oil (rapeseed)	
		ASTM D445/ DIN 51562	DIN EN 1262, Solution B	DIN 51757	AOCS Cd 13-60 DIN 53240	DIN EN 1890 [Method A, B, D or E]	ISO 3015	ASTM D-97/ DIN ISO 3016	ASTM D-92/ DIN EN ISO 2592	EN 14370 1g/l surfactant in Dist H ₂ O, 23°C					
Clear yellow liquid	5.0	18	6.0–7.5	0.8946	157–167	30–34 (E)	15	15	202		t	c	c	c	++
Clear yellow liquid	5.0	18	6.0–7.5	0.8946	157–167	30–34 (E)	15	15	202		t	c	c	c	++
Clear to cloudy yellow liquid	5.5	21	6.0–7.5	0.8720	155–165	37–42 (E)	22	24	198		t	t	c	c	+
Clear yellow liquid	6.6	21	5.0–7.5	0.9164	148	–	–7	–6	212		t	c	c	c	+
Clear yellow liquid	8.5	30	6.0–7.5	0.9478	116–123	65–68 (E)	< 15	6	232		t	c	–	t	+++
Yellow cloudy liquid	9.1	31	6.0–7.5 ^[1]	0.9518	115–125	69–72.5 (E)	17	12	220		t	c	–	t	++
Clear yellow liquid	8.0	69	6.0–7.5	0.9641	150–155	44–48 (E)	–3	0	162		t	–	–	c	+++
Clear/slightly cloudy liquid, may have sediment	8.0	17	7	0.9207	165	45 (E)	–3	–3	130	28	–	c	–	c	+++
Colorless liquid	4.0	287	6.5–7.5	0.9864	142	–	–65	–39	266		–	–	–	c	+++
Liquid	13.0	312	7	1.0295		78 (E)	11	9	> 300	41	–	–	–	–	+
Clear/slightly cloudy liquid		27	7	0.9481	85	41 (E)	–31	–30		30	–	t	–	c	+++
Clear yellow liquid		50.8				41–45 (E)	13	11		27	c	c	c	c	+++
Colorless to slightly yellow liquid	14.7		6.5–7.5 ^[1]	0.930–0.9380	87–99	28–31 (A)					c	t	–	c	++
Cloudy liquid, may have sediment	14.0		7	1.02	90	69 (A)	69		> 180	27	c	–	–	–	+
Clear light yellow liquid		16	Acid < 0.3 mg KOH/g	0.9015	22	–	–21	–24	208		–	c	c	c	+++
Clear light brown liquid	3.7	94	9.7–10.7	0.9605	142–172	–	–11	–15	246		–	c	t	c	+
Yellow to brown liquid	14.2	75	8.0–11.0	1.0275	205	93–97 (B)	–25	–30	> 250	38	c	–	–	–	++
Liquid	6	183	5.5–6.7 ^[1]	1.02	50	37		–25		42	c				+++
Liquid	12	286	5.5–6.7 ^[1]	1.03	40	46		18		44	c				++
Liquid	4	214	5.0–7.5 ^[1]	1.02	36	29		–5	> 227	38	t				+++
Liquid	15	173				70		3							++
Liquid	6	174	7	1.02	50	37 (A)	–63	–39	229	38	t				+++
Liquid	12	218	7	1.03	50	50 (A)	4	0	238	41	c				++
Liquid	4	214	1.02	36		30–32 (E)		–10	250	40	t				+++
Liquid	3		5.0–7.5		54–59	15–19 ^[2]		–29							+++
Liquid	2		5.0–7.5		39–43	14–18 ^[2]		–37							+++
Liquid	1	292	7	1.02	34	17 (A)	–63	–36	236	36	–				+++
Liquid	1–2		6.0–7.4		24–27	8–12 ^[2]		5							+++

Sustainability

Renewable content (%)	Biodegradability (> 60%) ^[5]	No aqua tox label	Mass Balance option	RSPO option (applicable)	Additional benefits
75	●		–	●	
75	●		–	●	Low potassium
72	●		–	●	
67	●		–	●	
55	●		–	●	
53	●		–	●	
79	●		–	●	
0	●		●	–	
80	n/a	●	–	n/a	
31	●	●	–	n/a	
0	●	●	●	–	
43	●	●	–	n/a	
30	●		●	●	
0	●		–	–	
64	●	●	–	●	
68	●		–	n/a	Anti-corrosion
28	●		●	●	
0	●	●		–	
0	●	●		–	
0	●	●		–	
0	●	●	●	–	
0	●	●	●	–	
0	●	●	●	–	
0	–	●	●	–	Demulsifying
0	–	●	●	–	Demulsifying
0	–	●	●	–	Demulsifying

Features and benefits

<p>Emulsifiers</p> <p>Key performance benefits</p> <ul style="list-style-type: none"> ■ Broad emulsifier portfolio ■ Excellent compatibility with each other ■ Compatible with non-ionic, anionic and cationic surfactants ■ Easy to handle and formulate ■ Formulation stability in water-based metalworking fluids ■ Corrosion protection ■ Low foaming tendency ■ Good oil solubility ■ Hard water and electrolyte stability ■ Meeting health and environmental requirements ■ Good wetting, dispersing and emulsification properties ■ Wide range of HLB values ■ High solubility in concentrates
<p>Lubricity enhancers</p> <p>Key performance benefits</p> <ul style="list-style-type: none"> ■ Excellent lubrication properties ■ Ease of emulsification and formulation stability ■ Low foaming properties ■ Co-emulsification ■ Improved wetting & detergency characteristics ■ Superior environment-health-safety profile ■ Good hydrolytic stability ■ Neutral pH values ■ Hard water stability
<p>Coupling agents/Solubilizers</p> <p>Key performance benefits</p> <ul style="list-style-type: none"> ■ Good solubility in esters & mineral oils ■ Stabilize concentrated formulations ■ Good low temperature properties ■ High additive compatibility ■ Excellent lubricity in rolling application ■ Superior environment-health-safety profile ■ High thermal and oxidative stability ■ Antifoaming properties
<p>Foam control agents</p> <p>Key performance benefits</p> <ul style="list-style-type: none"> ■ Excellent defoaming in neat oils in small concentrations ■ Soluble in esters and mineral oils
<p>Corrosion inhibitors</p> <p>Key performance benefits</p> <ul style="list-style-type: none"> ■ Protect ferrous metals against rust and oxidation ■ In some cases even multi-metal protection is possible ■ Oil-soluble and water-soluble products are available ■ Low foaming tendency and excellent air release ■ Use of ashless corrosion inhibitors can also reduce heavy metal contamination of the environment

Product name	Description	Kinematic viscosity	Hydroxyl value	Cloud point index	Pour point	Flash point	Acid value	Iodine value	Saponification value	Solidification point	Renewable content	No aqua tox label
		mm ² /s [40°C]	mg KOH/g	°C	°C	°C	mg KOH/g	g l/100 g	mg KOH/g	°C	%	
		ASTM D 445/DIN 51562	AOCS Cd 13-60	ISO 3015	ASTM D-97/DIN ISO 3016	ASTM D-92/DIN EN ISO 2592	ASTM D-974/DGF C-V 2	DGF C-V 11b	DIN 53401	DIN ISO 3841		
Synative® AL 80/85 V	Oleyl/Cetyl alcohol based on vegetable raw materials	–	210	–	–	~ 180	< 0.2	85–90	< 1.0	6–16	100	●
Synative® AL 90/95 V	Oleyl/Cetyl alcohol based on vegetable raw materials	19	210	< 12	–	~ 190	< 0.2	90–98	< 1.0	2–12	100	●
Synative® AL G 16	Guerbet alcohol	–	212	–20	–75	160	< 0.5	< 10	< 6	–	100	●
Synative® AL G 20	Guerbet alcohol	26	182	–35	–36	~ 180	< 0.1	< 8.0	< 3	–	100	●
Synative® AL S	Fatty alcohol C 12 to C 14	13	289	–	–	~ 140	< 0.1	< 0.3	< 0.5		100	

^[1] pH 1% solution in aq. 0.03% KCl.
^[2] In 10% water.
^[3] – Not soluble, t = Turbid, c = Clear.
^[4] + Low foaming.
^[5] ++ Very low foaming.
^[6] +++ Outstanding low foaming.

^[7] Typical treat rate in lubricants.
^[8] Triethanol amine.
^[9] When pH adjusted with Triethanol amine (TEA) or another base.
^[10] Test comparable to DIN EN 1262 method.

* Values given in this table represent only typical characteristics. Detailed product specifications are given in the relevant product data sheets or MSDS.

Product name	Description	Kinematic viscosity		Density	Cloud point	Pour point	Flash point	Acid value
		mm ² /s [40°C]	mm ² /s [100°C]	g/cm ³ 20°C	°C	°C	°C	mg KOH/g
		ASTM D 445/DIN 51562		DIN 51757	DIN EN 1890 [1% in H ₂ O]	ASTM D-97/DIN ISO 3016	ISO 2592/DIN 51758	DFG C-V 11b
Synative® AC AMH 2	Mixture of foam control agents	7	3	0.825	–	–51	70	< 5

Product name	Description	Appearance	Treat level ^[6]	Kinematic viscosity	Melting point/range	pH	Density	Solubility in water		Solubility in mineral oil	
			wt %	mm ² /s [40°C]	°C		g/cm ³ 20°C	%		%	
				ASTM D445/DIN 51562		DIN EN 1262, 1% in water	DIN 51757	pH = 7	pH > 8 ^[7]		
Synative® AC 3499	Fatty acid monoethanolamide derivative	Oil-soluble	Clear light brown liquid		n/a	9.7–10.7	0.96				
Irgacor® L 190	Organic polycarboxylic acid	Water soluble	White wet cake	0.2–1.1	Solid	180–182	Approx. 6 ^[7]	solid	< 0.01	> 5	< 0.01
Irgacor® L 190 PLUS	Organic polycarboxylic acid	Water soluble	White-free-flowing solid	0.2–1.5	Solid	180–182	Approx. 6 ^[7]	solid	< 0.01	> 5	< 0.01
Irgacor® L 184	Irgacor® L 190 neutralized with TEA ^[8] in water	Water soluble	Liquid	0.5–2.2	80	< –20	Approx. 8	1.15	< 0.01	> 5	< 0.01
Sarkosyl® O	N-oleyl sarcosine	Oil-soluble	Liquid	0.03–1.0	350	–	4 ^[8]	0.96	< 0.01	< 0.01	10.0
Amine® O	Imidazoline derivative	Oil-soluble	Liquid	0.05–2.0	114	≤ –15	10.5 ^[8]	0.94	< 0.01	< 0.01	10.0