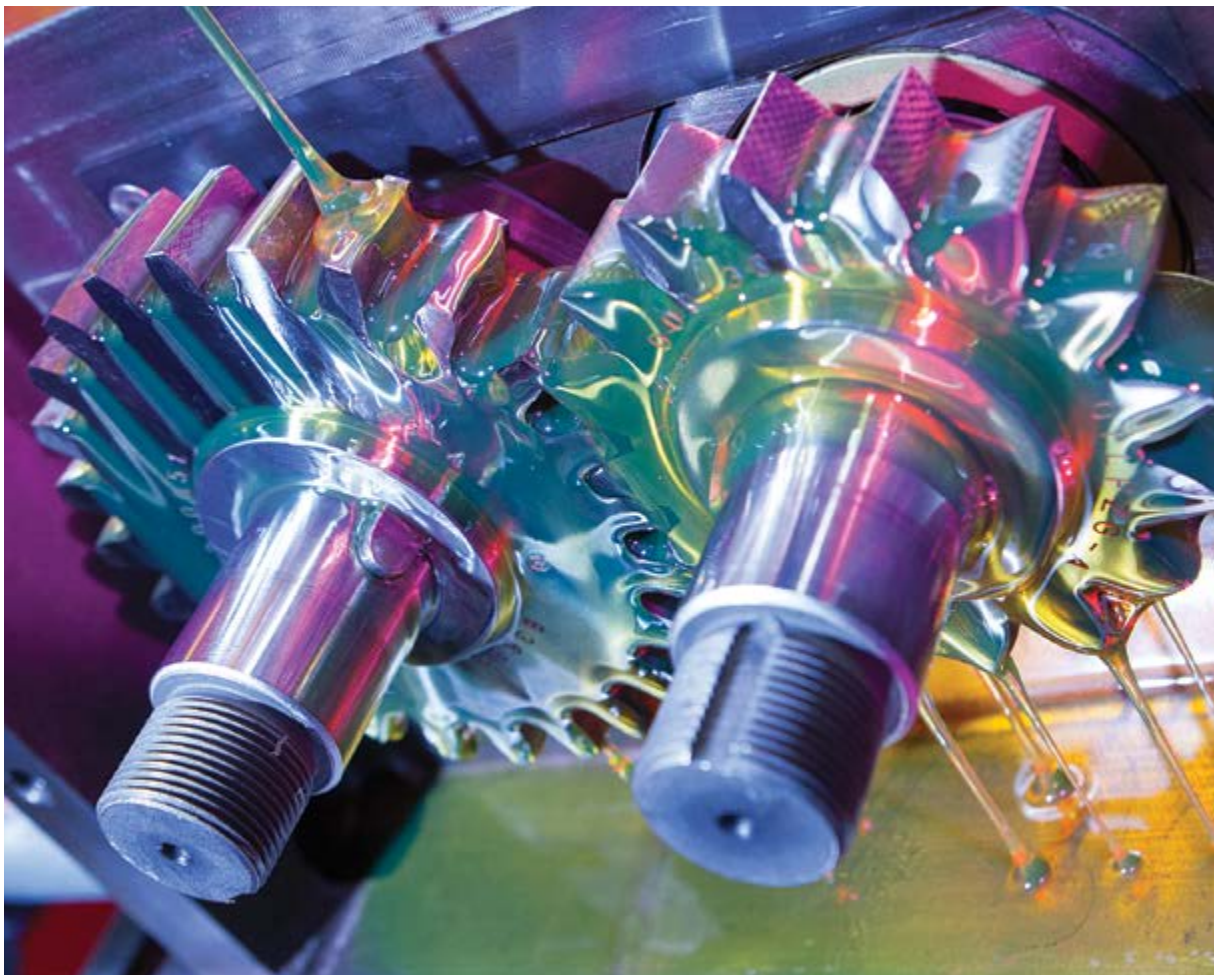


# VISCOBASE® Synthetic Base Fluids

ECONOMICAL SOLUTIONS FOR HIGH-PERFORMANCE  
AUTOMOTIVE AND INDUSTRIAL GEAR OILS



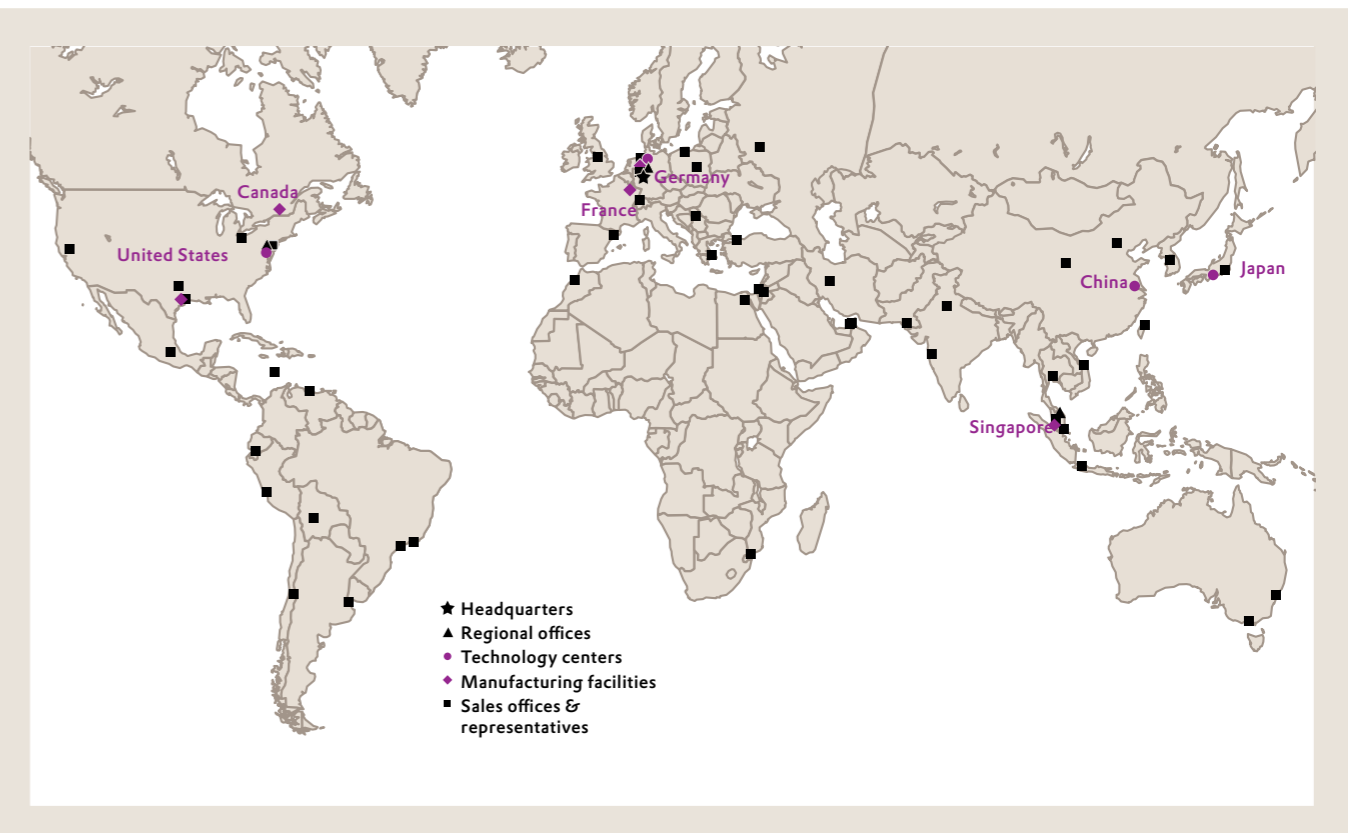
## HIGH-PERFORMANCE BASE FLUIDS AND LUBRICANT ADDITIVES

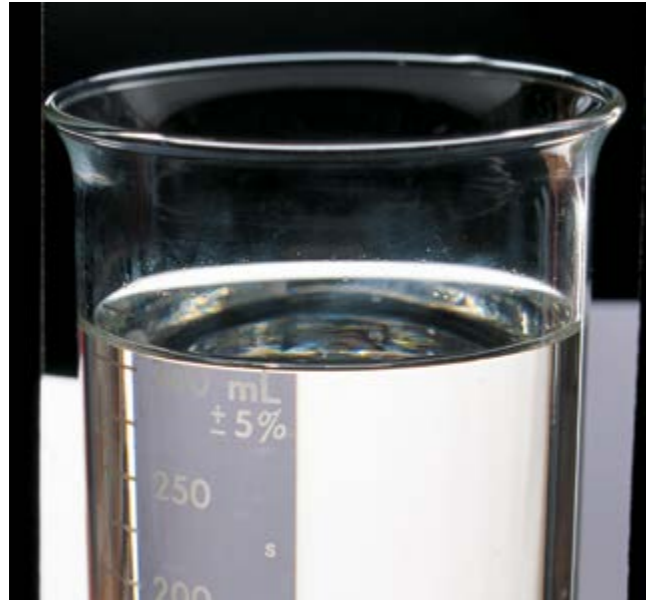
The Oil Additives specialists at Evonik are global leaders in the supply of high-performance lubricant additives for use in automotive, hydraulic and industrial lubricants. State-of-the-art regional technology centers and manufacturing facilities linked through a global supply chain enable Evonik to reliably provide high-quality customized products and solutions to customers worldwide.



## VISCOBASE® SYNTHETIC BASE FLUIDS

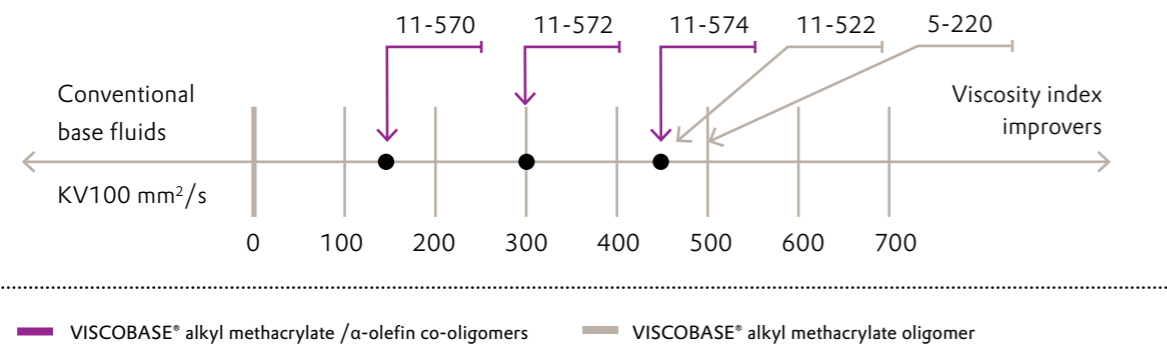
- High viscosity base fluids with widely adjustable viscosity range
- Exceptional high and low temperature performance
- Excellent miscibility with mineral oil, PAO and esters
- Good solvent capacity for performance additives
- Good elastomer compatibility
- Has potential to eliminate need for ester co-solvency and seal swell contribution
- Excellent thermal and oxidative stability
- Good shear stability, no temporary shear loss
- Offers competitive net treat cost vs. other synthetic stocks
- Perfectly suitable for formulating industrial gear oils
- With global manufacturing capabilities, Evonik delivers both supply assurance and optimized logistics costs



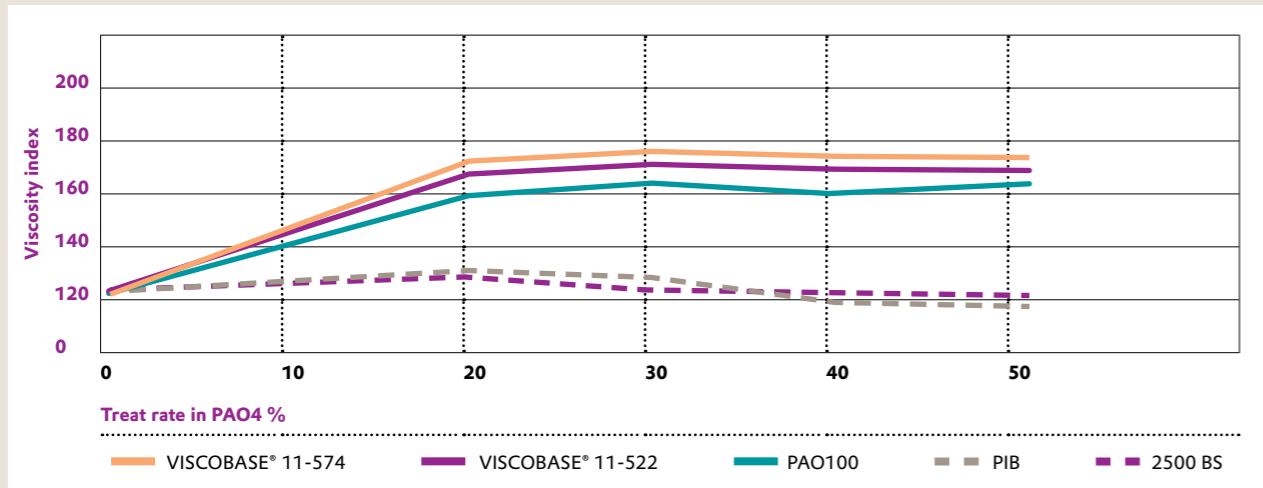


### Typical properties of VISCOBASE® products

	Unit	Method	11-522	11-570	11-572	11-574	5-220
<b>Application</b>			Automotive	Automotive	Automotive	Automotive	Industrial
<b>Appearance</b>		Visual	Clear	Clear	Clear	Clear	Clear
<b>Color</b>		ASTM D 1500	0.5	0.5	0.5	0.5	0.5
<b>Kinematic viscosity 40°C</b>	mm <sup>2</sup> /s	ASTM D 445	12,000	2,300	5,600	9,600	12,000
<b>Kinematic viscosity 100°C</b>	mm <sup>2</sup> /s	ASTM D 445	480	140	290	450	480
<b>Viscosity Index</b>		ASTM D 2270	188	158	182	198	188
<b>Density 15°C</b>	g/cm <sup>3</sup>	ASTM D 4052	0.94	0.93	0.93	0.93	0.94
<b>Flash point</b>	°C	ASTM D 92	220	220	220	220	>220
<b>Pour point</b>	°C	ASTM D 97	-6	-30	-21	-18	-6
<b>Noack volatility</b>	%	ASTM D 5800	3.1	4.6	4.7	5.1	3.1



Efficient viscosity index lift by VISCOBASE® compared to conventional thickeners and bright stocks



VISCOBASE® formulation example: SAE 75W-90 fully synthetic formulation

VISCOBASE® products	Specification	11-522	11-570	11-572	11-574
VISCOBASE®	%	27.6	35.7	27.8	25.2
D/I Package	%	6.5	6.5	6.5	6.5
PAO6	%	65.9	57.8	65.7	68.3
Kinematic viscosity at 40°C	mm <sup>2</sup> /s	89.7	99.5	94.2	93.2
Kinematic viscosity at 100°C	mm <sup>2</sup> /s	13.5-18.5	14.4	14.7	14.7
Viscosity index		167	153	161	164
Brookfield viscosity at -40°C	mPa·s	≤150,000	38,000	58,000	50,000
Stay-in-grade after 20hrs KRL		Yes	Yes	Yes	Yes

## VISCOBASE® 5-220: A NEW OPTION IN SYNTHETIC BASE STOCKS



VISCOBASE® 5-220 synthetic base fluid is a new, innovative alkyl methacrylate oligomer. Like the rest of the VISCOBASE® product family, it offers an ideal balance between high viscosity index, high shear stability and excellent solvency. VISCOBASE® 5-220 was specifically designed to be applied in industrial gear oils such as wind turbine lubricants.

## SOLUTIONS FOR COST-EFFICIENT, HIGH-PERFORMANCE GEAR OILS

Gear oil formulation examples

Industrial gear oil ISO class		150	220	320	460	680
VISCOBASE® 5-220	%wt	28.4	37.0	45.1	51.5	58.5
VISCOPLEX® 1-180	%wt	0.7	0.7	0.7	0.7	0.7
Afton HiTEC® 307	%wt	2.65	2.65	2.65	2.65	2.65
NEXBASE® 3080	%wt	68.25	59.65	51.55	45.15	38.15
VISCOPLEX® 14-520, used as a top treat	%wt	0.2	0.2	0.2	0.2	0.2
KV40°C	mm <sup>2</sup> /s	151	223	320	465	688
KV100°C	mm <sup>2</sup> /s	20.6	27.7	37.0	48.8	65.5
VI		159	160	164	165	167
Brookfield -26°C	mPa·s	40,500	53,000	82,000	152,000	292,000
Pour Point	°C	-39	-36	-36	-36	-33

HiTEC® is a trademark of Afton Chemical Corporation.  
 NEXBASE® is a registered trademark of Neste Corporation.  
 Formulation of low viscosity grades (such as VG 68 and VG 100) is also possible.

## FEATURES OF THE VG 320 WIND TURBINE GEAR OIL FORMULATION MADE WITH VISCOBASE® 5-220



- Matches performance of fully synthetic PAO formulations
- Meets and exceeds common industry standards like DIN 51517-3, ANSI/AGMA 9005-E02 and IEC 61400-4
- Received field trial approval from wind turbine gearbox manufacturers Siemens Winergy, Moventas and bearing manufacturer Schaeffler FAG
- More economical than conventional PAO formulations in combination with NEXBASE® 3080 Group III base oil
- The Oil Additive specialists at Evonik provide a global and secured supply chain for VISCOBASE® 5-220

This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether express or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the product described herein should be verified by testing, which should be carried out only by qualified experts and is the sole responsibility of the customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

VISCOPEX® and VISCOBASE® are registered trademarks of Evonik Resource Efficiency GmbH. ©10/2017 **EVONIK INDUSTRIES AG** – v3

#### **EUROPE, AFRICA, MIDEAST**

Evonik Resource  
Efficiency GmbH  
Kirschenallee  
64293 Darmstadt  
Germany

PHONE +49 6151 1809  
FAX +49 6151 18-4100

[oil-additives@evonik.com](mailto:oil-additives@evonik.com)  
[www.evonik.com/oil-additives](http://www.evonik.com/oil-additives)

#### **AMERICAS**

Evonik Oil Additives USA, Inc.  
723 Electronic Drive  
Horsham, PA 19044-4050  
USA

PHONE +1 215 706-5800  
FAX +1 215 706-5801  
TOLL-FREE +1 888 876-4629

#### **ASIA PACIFIC**

Evonik Oil Additives Asia  
Pacific Pte. Ltd.  
3 International Business Park  
07-18 Nordic European Centre  
Singapore 609927

PHONE +65 6809-6571  
FAX +65 6809-6707