

ExxonMobil

EHC™ 50 and EHC™ 110

Enabling enhanced formulations

Energy lives here™

Advanced lubricants begin with advanced base stocks

ExxonMobil Basestocks is committed to delivering an advanced product slate designed to help you formulate better. Our Group II EHC 50 and EHC 110 base stocks are part of our global Group II slate for formulation and qualification of automotive lubricants. With base oil interchange (BOI) and viscosity grade read-across (VGRA) capabilities, our EHC base stock slate offers broad blend coverage and simplified qualification testing across the globe.

EHC base stocks may also be used in industrial and marine applications where formulations benefit from increased oxidation stability and higher viscosity index (VI).



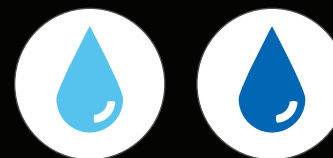
EHC™ 50

- Group II
- Excellent low-temperature performance
- Excellent volatility
- High saturates



EHC™ 110

- Group II
- Good low-temperature performance
- High saturates



Both

- Designed to cover most API, ACEA and industrial lubricants
- Can formulate 10W HDEO without Group III corrector stocks
- Reduces Group III required for 5W and dexos® lubricants



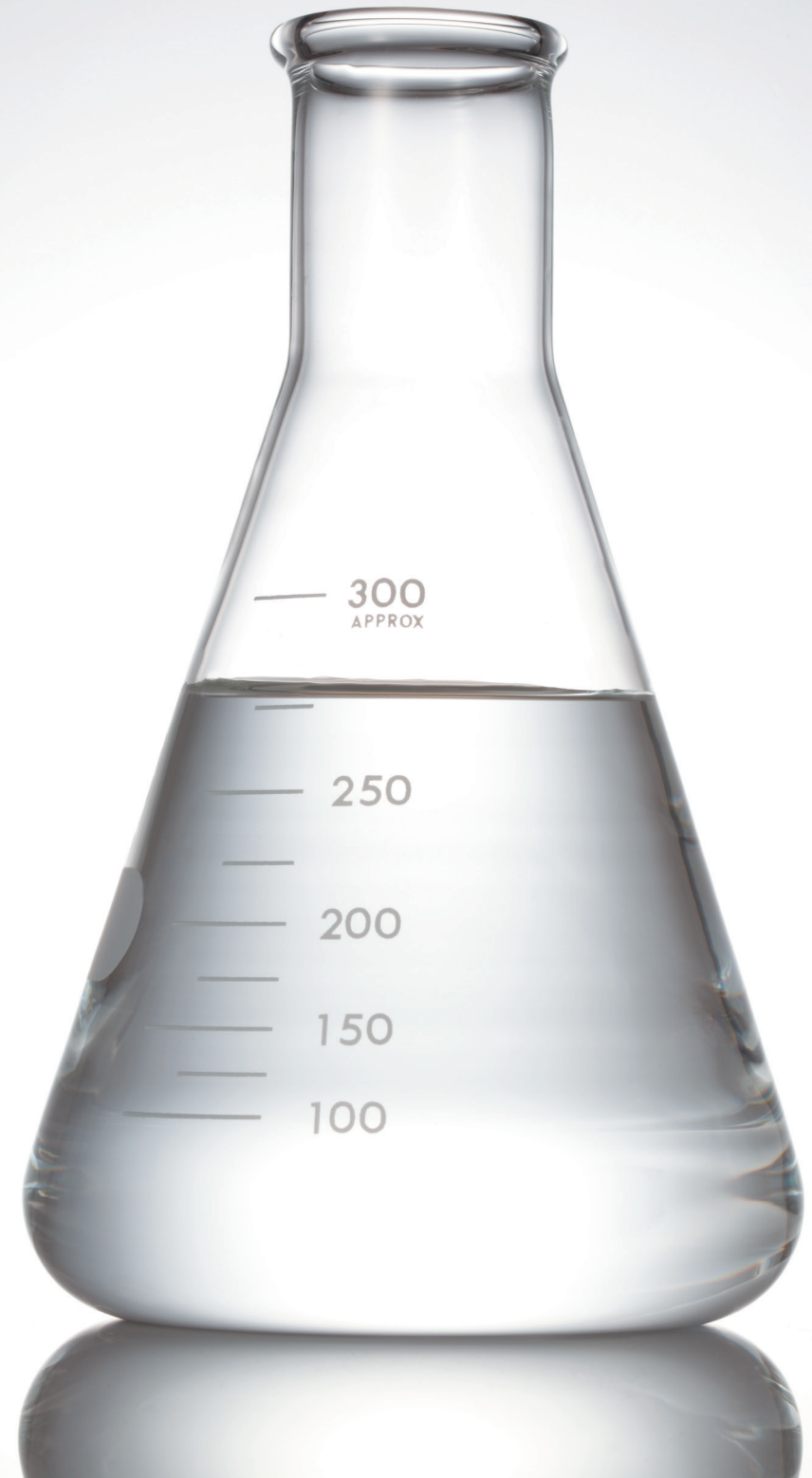
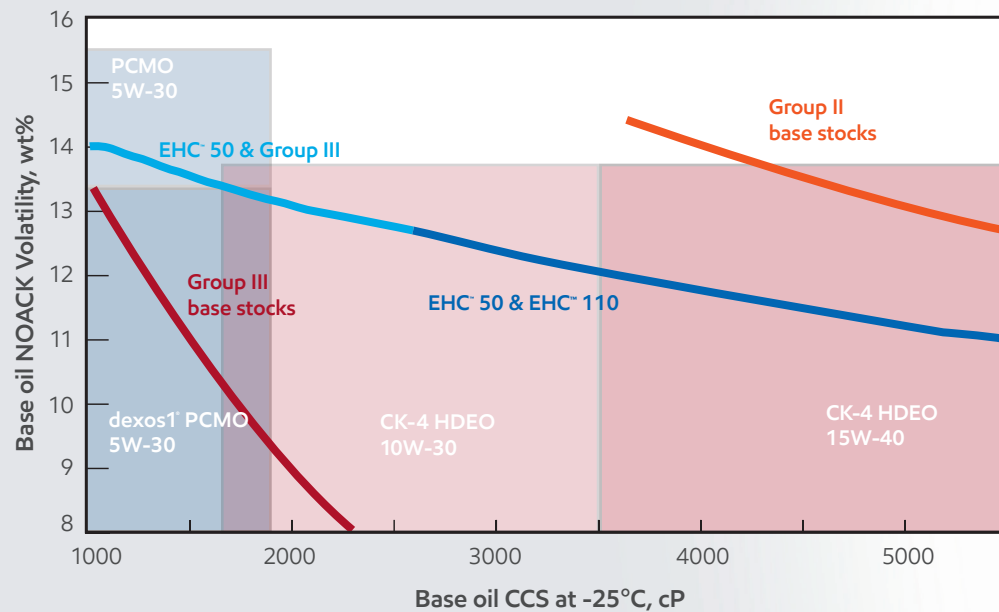
Formulation queries?
Just ask **BOB!**

BOB is a revolutionary new tool for lubricant innovators. Ask your ExxonMobil representative for further details.

Smart product design

EHC[®] 50 and EHC[®] 110 base stocks can be used together to meet the requirements of the most popular lubricants. This outstanding capability provides blenders with increased flexibility and a broader blending range, helping to reduce the need for Group III.

Base oil CCS and volatility needs for latest major engine oils



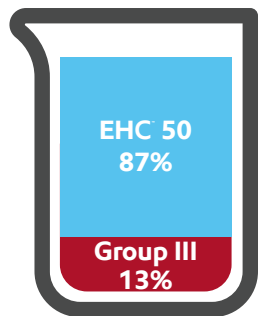
5W-30 formulation

Lower your 5W-30 PCMO formulation costs

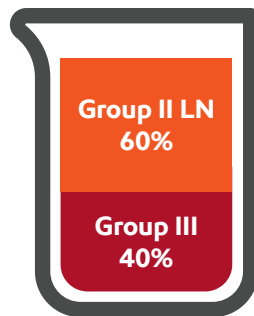
- Help to reduce the need for Group III "corrector" stocks and viscosity modifier

Formulate competitive 5W-30 PCMO with reduced Group III

Base oil composition*



ExxonMobil base stocks



Competitor base stocks

Potential to reduce Group III* use by up to

68%

and VM treat rate* by up to 15%

5W-30 PCMO API SN/GF-5

Composition %	EHC	Group II/III
EHC 50	72.2	—
Group II LN (150N)	—	48.6
Group III (4 cSt)	10.4	32.6
VM	7.8	9.2
DI	9.6	9.6
Estimated properties	EHC	Group II/III
KV at 100°C, cSt	10.7	10.9
CCS (@-30°C), cP	6300	6270
NOACK Volatility, wt%	11.7	12.6
HTHS at 150°C, cP	3.2	3.3
MRV @ -35°C Apparent viscosity, cP	17700	21400

*Dependent on additive chemistry and formulation approvals. ExxonMobil estimates with applicable additive packages. External factors, such as price and quality variation, VM diluent oil, etc. may cause deviations from these estimates; they are intended to be starting points for formulation evaluations. Lubricant blender is responsible for obtaining appropriate approvals and licensing of all formulations.

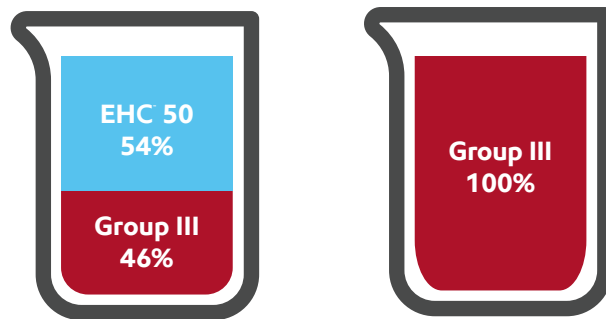
Enabling dexos®-quality lubricants with EHC™ base stocks

EHC™ base stocks enable dexos®-quality 5W-30 PCMO

- Potential to blend dexos® with EHC 50 vs full Group III
- Consistent base stock quality and supply security assured by ExxonMobil's product integrity process

Formulate dexos® 5W-30 PCMO with less Group III

Base oil composition*



ExxonMobil
base stocks

Competitor
base stocks

Potential to reduce Group III* use by up to **50%**
and VM treat rate* by up to 12%

dexos® 5W-30 PCMO		
Composition %	EHC™	Group III
EHC™ 50	45.0	—
Group III LN (4 cSt)	28.2	62.5
Group III MN (6 cSt)	9.8	19.4
VM	7.8	8.9
DI	9.2	9.2
Estimated properties	EHC™	Group III
KV at 100°C, cSt	10.9	10.9
CCS (@-30°C), cP	5900	4100
NOACK Volatility, wt%	12.0	12.0
HTHS at 150°C, cP	3.1	3.0

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10W-40 formulation

Optimize your 10W-40 HDEO formulations

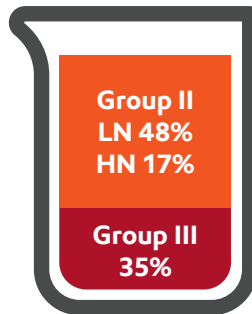
- No need for Group III "corrector" stocks and heavy neutral base stock*
- Reduce blending complexity
- Potential to lower VM treat rate due to better CCS

Blend competitive HDEO 10W-40 without Group III* and with superior CCS

Base oil composition*



ExxonMobil base stocks



Competitor base stocks

Potential to reduce Group III* use by up to

100%

10W-40 HDEO API CK-4

Composition %	EHC ¹	Group II/III
EHC ¹ 50	76.0	—
Group II LN (150N)	—	36.7
Group II HN (500N)	0.0	12.6
Group III (4 cSt)	0.0	26.9
VM	9.8	9.6
DI	14.2	14.2
Estimated properties	EHC ¹	Group II/III
KV at 100°C, cSt	14.4	14.4
CCS (@-25°C), cP	5890	6740
NOACK Volatility, wt%	11.3	11.3
HTHS at 150°C, cP	4.1	4.1
MRV @-30°C Apparent viscosity, cP	23200	29200

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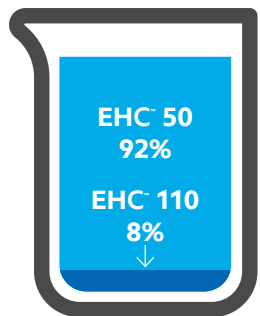
10W-40 formulation

Enhance your 10W-40 HDEO API CJ-4 blends

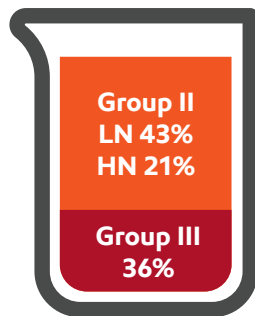
- EHC[®] base stocks enable competitive formulation of 10W-40 HDEO without Group III
- Minimize the need for heavy neutral Group II
- Option for VM optimization

Formulate competitive
10W-40 HDEO
without Group III*

Base oil composition*



ExxonMobil
base stocks



Competitor
base stocks

Potential to reduce
Group III* use by up to

100%

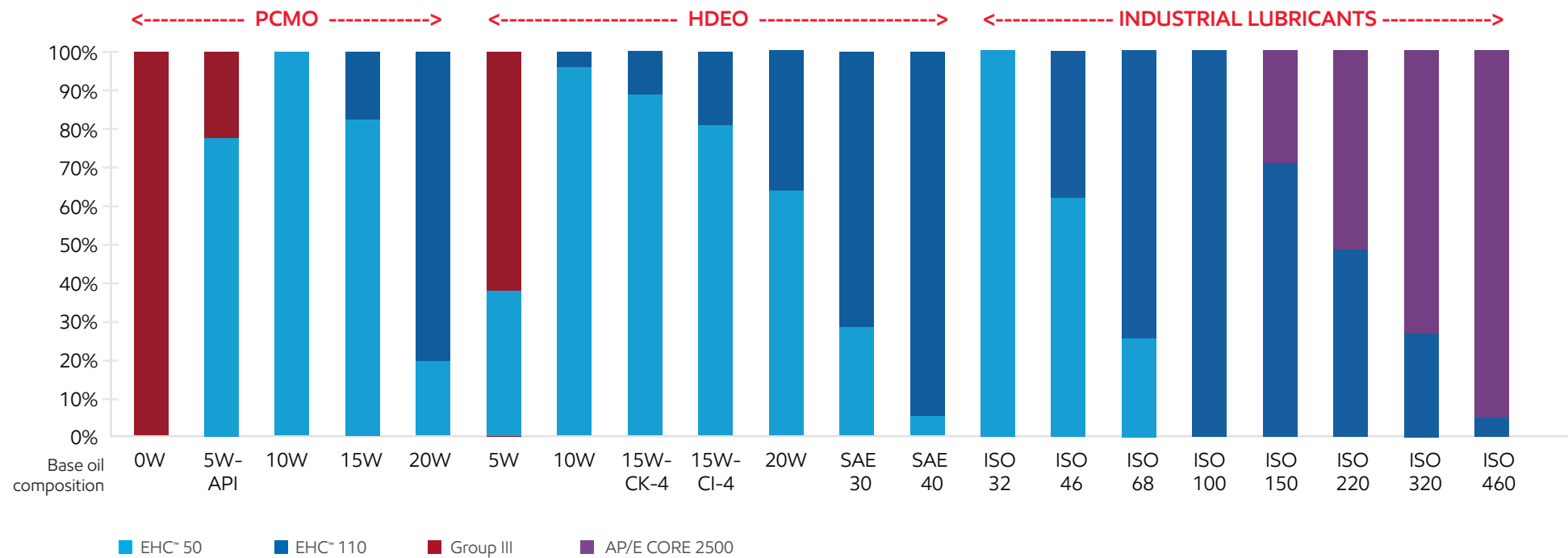
10W-40 HDEO API CJ-4		
Composition %	EHC [®]	Group II/III
EHC 50	72.0	—
Group II LN (150N)	—	33.4
Group II HN (500N)	6.0	16.5
Group III (4 cSt)	0.0	27.9
VM	8.6	8.8
DI	13.4	13.4
Estimated properties	EHC [®]	Group II/III
KV at 100°C, cSt	14.4	14.4
CCS (@-25°C), cP	6250	6700
NOACK Volatility, wt%	11.6	11.9
HTHS at 150°C, cP	4.0	4.0
MRV @-30°C Apparent viscosity, cP	24400	34700

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Optimize and simplify formulations

- Broader API engine oils and industrial lubricants coverage with limited number of base stocks
- EHC slate allows BOI and read-across, reducing development cost and increasing flexibility
- EHC base stocks support lower-cost PCMO and HDEO formulations and ease complexity by:
 - Limiting the amount of more expensive Group III required*
 - Potential additive savings; ability to blend at reduced viscosity modifier treat levels*
- A higher-saturates, lower pour point EHC is highly suited for hydraulic, gear and circulating oils
- EHC offers advantages when higher oxidation stability and/or lower air release is needed in industrial lubricants

Product coverage with EHC™ slate



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EHC™ Group II base stocks

EHC base stocks comprise a global Group II slate as defined within API/ATIEL guidelines for formulation and qualification of automotive lubricants. With base oil interchange and viscosity grade read-across capabilities, EHC base stocks offer broad coverage that enables supply chain flexibility and simplified qualification testing requirements. EHC base stocks may also be used in industrial and marine applications where formulations benefit from increased oxidation stability and higher viscosity index (VI). Our rigorous processes ensure reliable delivery of consistent quality base stocks.

ExxonMobil

Key benefits

Consistent quality to help formulators produce high-performance blends that:



Meet or exceed
industry
requirements



Achieve exceptional
oxidation stability



Meet or exceed
engine oil quality
requirements



Sales specifications and availability of EHC™ Group II base stocks

Sales specifications			EHC 45	EHC 50	EHC 65	EHC 110	EHC 120
Property	Limits	Standard method (a)					
Appearance		Visual	Clear and bright	Clear and bright	Clear and bright	Clear and bright	Clear and bright
ASTM color	Max	ASTM D1500	L0.5	0.5	L0.5	0.5	0.5
CCS viscosity -25°C mPa•sec	Max	ASTM D5293	1550				
CCS viscosity -20°C mPa•sec	Max	ASTM D5293		1500	3100		
Flash point, COC Deg C	Min	ASTM D92	204	210	214	230	255
Kinematic viscosity @ 100°C mm2/sec	Min-Max	ASTM D445	4.4-4.7	5.2-5.6	6.3-6.6	10.0-12.0	11.1-12.7
NOACK Volatility, wt%	Max	ASTM D5800	15	13.5	10		
Pour point, Deg C	Max	ASTM D97	-18	-18	-18	-15	-15
Viscosity index	Min-Max	ASTM D2270	113-119	110-119	103-109	95-110	105-115

Availability	EHC 45	EHC 50	EHC 65	EHC 110	EHC 120
Americas	■		■		■
Europe, Africa, Middle East		■			■
Asia/Pacific		■		■	

(a) In lieu of standard test method, alternate test methods may be used for the certification of a product property.
 Note 1: Products are certified on release to meet the values specified. Actual values may deviate within the established reproducibility of the test method specified.
 Note 2: For purpose of determining conformance with specification, observed or calculated values shall be rounded off to the nearest unit in the last significant digit used in expressing the limiting value in accordance to the ASTM E 29 method.

Health and Safety
 Detailed health and safety information for this product is provided in the material safety data sheet (MSDS), available upon request through your local sales representative or from www.ExxonMobil.com.


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ExxonMobil Asia Pacific Pte. Ltd.
1 HarbourFront Place
#06-00 HarbourFront Tower One, Singapore 098657

Email: APNewBusiness@exxonmobil.com

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[exxonmobil.com/basestocks](https://www.exxonmobil.com/basestocks)

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