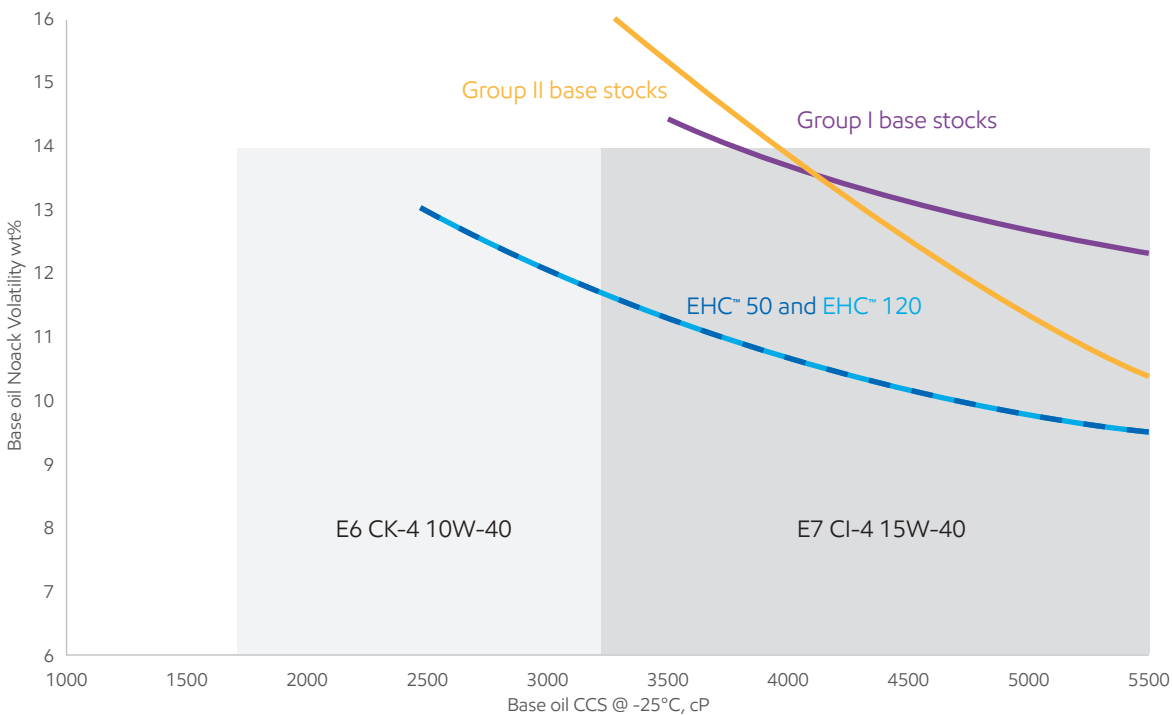


## ExxonMobil EHC™ Group II/II+ base stocks offer advantages in HDEO formulations

It all begins with the design of our base stocks, which are engineered to enable high-performing lubricants.

Example  
10W-XX oils

EHC™ base stocks are well designed to formulate SAE 10W-XX lubricants.



EM assesment of CCS and Noack properties of main base stocks blend currently available in Europe compared to base oil requirements for specific European engine oils.

- Very low Noack volatility and CCS can be achieved
- No addition of correcting Group III base stock needed

# ExxonMobil EHC™ Group II/II+ base stocks offer advantages in HDEO formulations

**Example**  
15W-40 oils

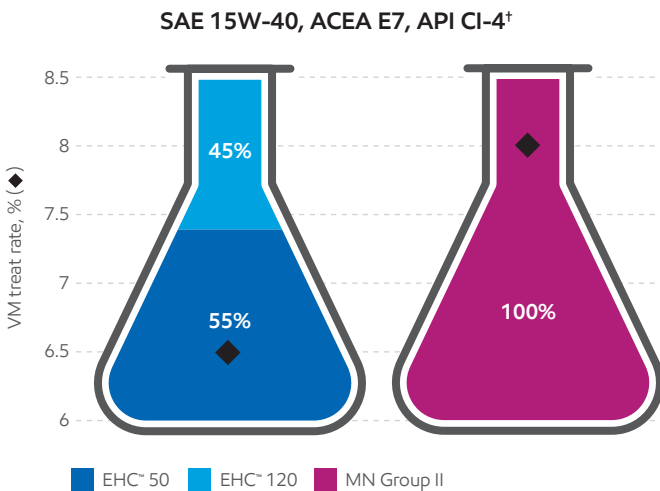
## Base oil properties

	EHC™ 50/120	MN Group II
KV @ 100°C, cSt (ASTM D445)	7.54	6.24
VI	113	100
CCS @-20°C, cP (ASTM D5293)	3429	3001
Noack volatility, % (ASTM D5800)	7.3	10.8

Base stock blends for an SAE 15W-40, ACEA E7 lubricants at equal KV100 and CCS @ -20°C.

- EHC™ base stock\* blends have:
- A **32% lower** Noack volatility vs. traditional MN Group II base stocks
  - A **13% higher** VI vs. traditional MN Group II base stocks

## EHC™ differentiation in SAE 15W-40 ACEA E7 API CI-4 lubricant



- EHC™-based lubricant advantages
- **19% less** VM
  - **27% lower** Noack volatility (7.7% vs 10.6%)

\*ExxonMobil only guarantees the product specifications of its base stocks as defined in the contractual product specifications. The data information provided is derived from existing data on our products generally, and is not specific to a product batch supplied to your company. Such information is not necessarily indicative of future production, does not form part of the contractual product specifications, and may be subject to change without notice.

<sup>†</sup>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.

# ExxonMobil EHC™ Group II/II+ base stocks offer advantages in HDEO formulations

**Example**  
10W-40 oils

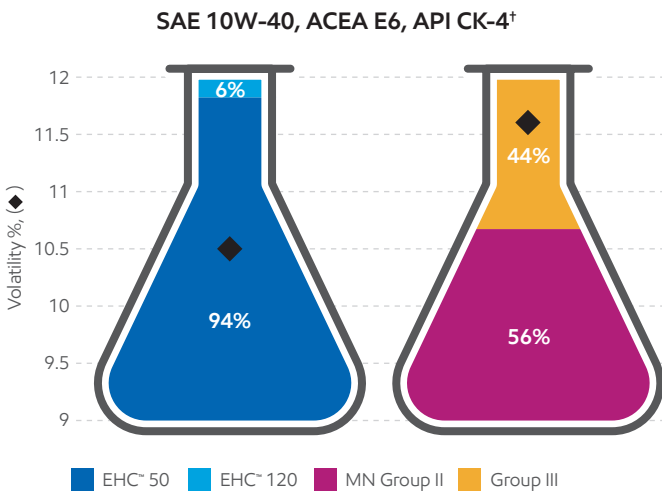
## Base oil properties

	EHC™ 50/120	MN Group II/Group III
KV @ 100°C, cSt (ASTM D445)	5.6	5.5
VI	112	120
CCS @ -25°C, cP (ASTM D5293)	2740	2240
Noack volatility, % (ASTM D5800)	10.5	10.5

Base stock blends for an SAE 10W-40, ACEA E6 lubricants at equal KV100 and CCS @ -25°C.

EHC™ base stock\* blends have an **identical** Noack volatility vs. Group II/III blends

## EHC™ differentiation in SAE 10W-40 ACEA E6 API CK-4 lubricant



EHC™-based lubricant advantages

- **0%** Group III
- **9.5% lower** Noack volatility

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# ExxonMobil EHC™ Group II/II+ base stocks offer advantages in HDEO formulations

Example  
10W-40 oils

## Base oil properties

	EHC™ 50/Group III	Group III
KV @ 100°C, cSt (ASTM D445)	5.7	5.7
VI	121	134
CCS @ -25°C, cP (ASTM D5293)	2420	1846
Noack volatility, % (ASTM D5800)	9.7	9

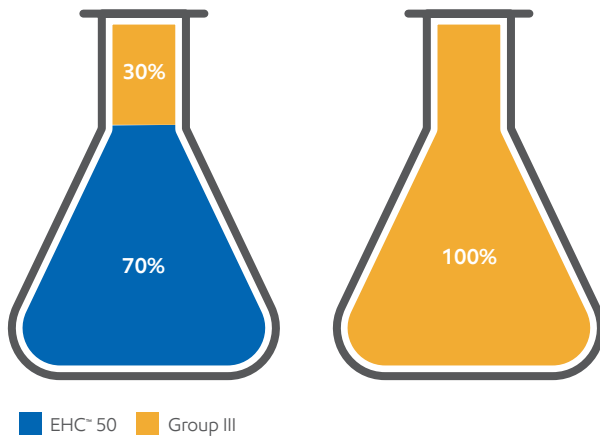
Base stock blend for an SAE 10W-40, ACEA E4 lubricant at equal KV100 and CCS @ -25°C.

EHC™ 50/Group III base stock\* blends have:

- An **identical** Noack volatility vs. the Group III blend
- A higher VI vs. traditional MN Group II base stocks

## EHC™ differentiation in SAE 10W-40 ACEA E4 lubricant

SAE 10W-40, ACEA E4, API CI-4<sup>†</sup>



EHC™-based lubricant advantages

- **Up to 70%** potential reduction of Group III
- **Identical** Noack volatility (10.5%)

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