



BI

Bio-Lubricants

Ester Base Stocks  
for Marine Lubricants



## DRIVING INNOVATION in natural-based lubricants for a sustainable tomorrow

### Sustainable Lubricant Solutions

Emery Oleochemicals products are used to improve processing efficiencies, provide outstanding technical performance, and enhance environmental safety in lubricant applications including oilfield chemicals, hydraulic fluids, base oils, greases, and lube base stocks. We offer environmentally sustainable products including azelaic acid, pelargonic acid, dimer acid, isostearic acid, esters, and other types of natural-based fatty acids and esters.

### Preferred Global Partner

Emery Oleochemicals is committed to being your preferred partner in innovative and high performance natural-based ingredients for lubricant applications designed for a sustainable tomorrow.



### Esters in Marine Lubricants

**DEHYLUB®** Esters are based on renewable raw materials, offering value-add by providing high- performance properties like superior lubricity, excellent low temperature behavior and high viscosity index. Combined with its environmentally- friendly characteristics, including good bio-degradability and low aquatic toxicity, esters are the right choice when formulating fluids for demanding applications and special regulations such as the Vessel General Permit (VGP). Backed by the Environment Protection Agency (EPA), all vessels navigating to United States' shores greater than 27 meters must be fitted with Environmentally Acceptable Lubricants (EAL).



The definition of EAL's that the EPA has adopted includes amongst others the widely accepted European Eco Label (EEL). The EEL defines strict standard for ecotoxicity, environmental acceptance and renewability. Also The EEL supports formulators and marketers of lubricants by providing the Lubricant Substance Classification (LUSC). This positive list provides an overview of base stocks and

additives along with maximum treat rates which can be readily used to formulate EEL-complaint fluids and facilitates the approval as an EEL fluid. Therefore, Emery Oleochemicals is providing products which are part of the LUSC list to support its customers towards the design of EAL 's for Marine applications.



**Esters are currently the only base stocks capable of fulfilling the demand for renewable content** with our solutions welcomed across all continents and in the seven seas.

## Product and Applications :

Product Name	Kinematic Viscosity at 40°C [mm <sup>2</sup> /s]	Viscosity Index [VI]	Flash Point [°C]	Gear Oil for Transmission & Thrusters	Stern Tubes	Stabilizers/ Hydraulics	Compressor Lubes	Wire Ropes
DEHYLUB® 4022	18 - 21	140	> 270			●		
DEHYLUB® 4030	42 - 50	180	> 310			●		
DEHYLUB® 4059	105 - 120	150	> 270	●	●	●	●	●
DEHYLUB® 4060	61 - 75	180	> 310	●	●	●	●	
DEHYLUB® 4062	125 - 165	180	> 310	●	●		●	●
DEHYLUB® 4064	288 - 352	180	> 310	●	●			●
DEHYLUB® 4071	43 - 51	140	> 270	●	●	●	●	
DEHYLUB® 4100	425 - 465	110	> 300	●				●

### Note:

Products above are compliant or are currently being registered with the Lubricant Substance Classification (LUSC) of the European Ecolabel.



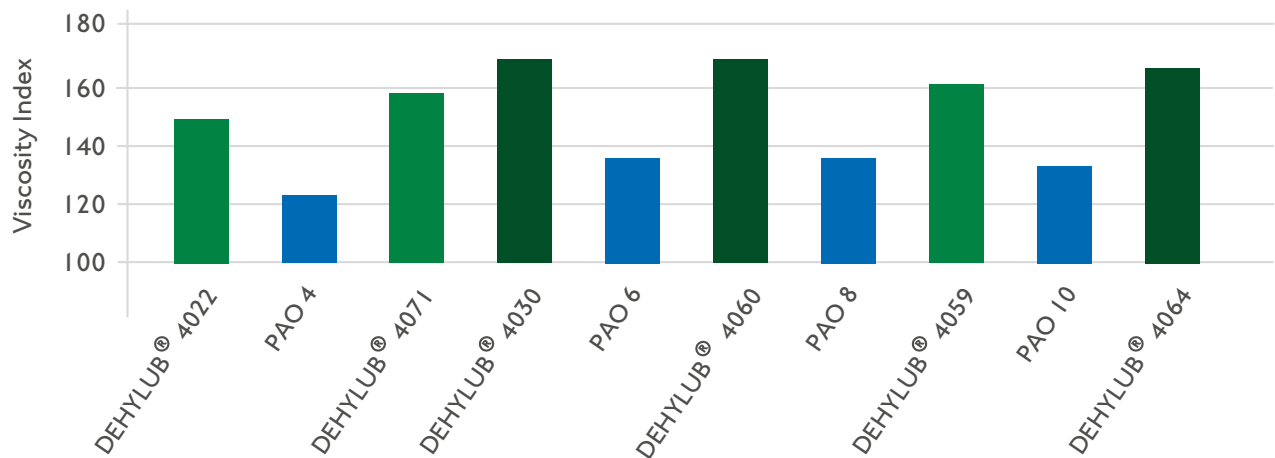


## Advantages our solutions provide:

- Available in all viscosity grades and miscible with conventional fluids
- Applicable for low and high performance marine lubricants
- High flash points, intrinsic lubrication & low volatility
- High viscosity index base stocks for wide temperature range application
- Readily bio-degradable according to OECD 301B
- Minimally aqua toxic with no visible sheen on water surface
- Not bio-accumulative

## Viscosity Index Comparison

Provides stable oil film for good protection to Marine equipment operating under extreme temperature conditions.



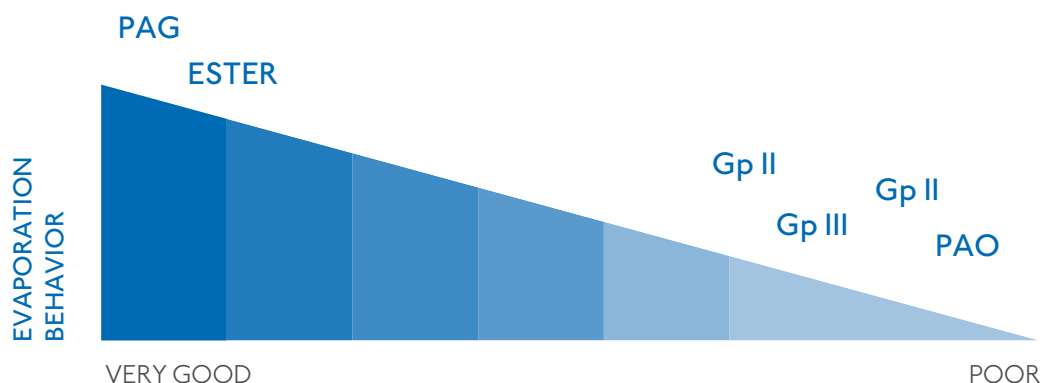
## Volatility and Evaporation Comparison

Low volatility allows lubricants to be used outdoors under severe conditions and minimizes product loss.



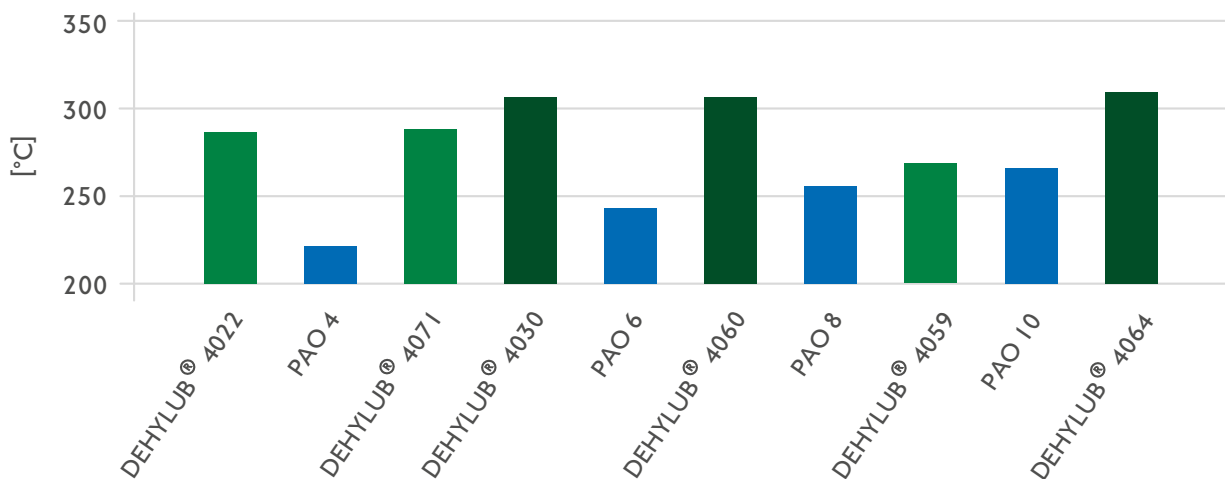
## Lubrication Comparison

Esters have outstanding intrinsic lubricity behavior for formulation.



## Flash Point Comparison

Esters provide higher Flash Points based on Viscosity related comparison.



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