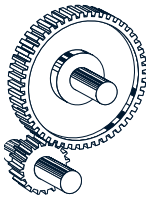

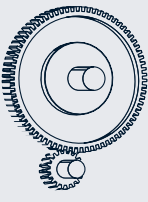
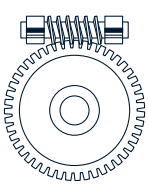




# INDUSTRIAL GEAR OILS FAQS

## >> Why do different gear boxes require different oils?

Different types of gears are used for different applications, and selection depends on several variables including gear ratio, load, and noise tolerance. The key types of industrial gears include spur, helical, bevel and worm, and in each type the gear teeth mesh in a different way, meaning the metal-to-metal contact and therefore lubrication requirements vary:

Gear type		Lubrication requirements
Spur 	Bevel 	The application needs to be 'low slide' i.e. a certain amount of friction is necessary for the gears to work. Applications are generally low speed, so a higher viscosity oil is required, and low load.
Helical 		The application needs to be 'moderate slide', and protect against moderate to high loading.
Worm 		The oil needs to allow sliding, tooth loads are relatively low but rubbing speeds are high so oil needs to disperse heat effectively.



## >> How do you select the right gear oil?

Gear oil should match the recommendations of the original equipment manufacturer (OEM), which will either be stated on the gear box itself or found in the manual.

Often there will be several products that could be suitable for your application. Millers Oils Tech Help Desk can advise the best product to match both the OEM recommendation and your particular application.

Key properties of gear oil include:

- Viscosity: gear oil must be thick enough to maintain lubricating film, but not to cause drag and energy wastage.
- Oxidation stability: anti-oxidant additives boost oxidation resistance so the oil lasts longer – this is particularly important at higher operating temperatures.
- Thermal stability: synthetic oils offer superior thermal stability so the oil lasts longer, especially at higher temperatures.
- Extreme pressure performance: high loads result in high pressures that squeeze out the oil between the gear teeth - EP additives prevent wear and damage in these conditions.
- Demulsibility: gear oil should separate quickly from water (with the exception of PAG based oil).

## >> What is micropitting?

Micropitting, also called grey staining, is a type of wear caused by metal-to-metal contact at microscopic level and leaves the metal surfaces with a 'dull' appearance. Although the surfaces of gear teeth may look smooth to the naked eye, microscopic inspection reveals roughness and asperities that break through the oil film – especially at high temperature and high load, and high speed and low torque. Micropitting can be avoided by selecting the correct viscosity of oil (i.e. high enough to provide a good film thickness), and by using oil with extreme pressure additives.

## >> What are the benefits of synthetic gear oil?

Although modern gear oil additive technology is extremely advanced, using base oils that offer inherently better properties can reduce the additive level required, and/or further improve the performance of the gear oil.

In general, synthetic oils offer:

- Better lubricity for better gear teeth protection and reduced wear, extending the life of the gears.
- Improved viscosity index, meaning better and more consistent performance across a wider range of operating temperatures.
- Higher thermal and oxidative resistance, so the oil is less likely to degrade due to high temperature or contamination, meaning fewer deposits and less sludge, as well as extended drain intervals.
- Reduced volatility, evaporation and flammability, making them safer to work with.

## >> What's the difference between mineral, PAO and PAG based gear oils?

Mineral oil is the most commonly used base oil in gear oil. It offers good lubricity and corrosion protection to protect gear teeth against wear, and is often formulated with EP additives for extra protection at high loads.

The most common synthetic base oils used in gear oil are Polyalpha olefin (PAO) and Polyalkylene glycol (PAG). Both PAO and PAG have high viscosity indexes, meaning better and more consistent performance across a wide range of operating temperatures compared with mineral oil. They also have better thermal and oxidative resistance, so the oil is less likely to degrade due to high temperature or contamination, and will offer extended drain intervals relative to mineral oil.

PAG oils are often recommended for worm gear applications, as they are very effective at dispersing the heat generated by the high speeds and friction created when the worm gear teeth mesh.

It's important to note that PAG oils are not compatible with mineral or PAO oil. If you are changing from one type of product to another, you must do a full clean out and flush of the equipment.

Millers Oils offers three different ranges of industrial gear oils that use different base oils:

Product	Base oil type	Description
Millgear EP	Mineral oil	<ul style="list-style-type: none"><li>• Ideal for industrial applications with spur, helical and bevel gears.</li><li>• A high level of extreme pressure additives mean gear teeth are protected, even at high loads.</li></ul>
Millgear SHC	Polyalpha olefin	<ul style="list-style-type: none"><li>• Ideal for industrial applications with spur, helical and bevel gears.</li><li>• Extreme pressure additives mean gear teeth are protected at moderate to high loads.</li><li>• High viscosity index gives consistent film thickness over wide operating temperature range.</li><li>• Excellent oxidation and thermal stability extends oil life.</li></ul>
Millgear SY	Polyalkylene glycol	<ul style="list-style-type: none"><li>• Ideal for industrial applications with worm gears.</li><li>• High viscosity index and low pour point provide protection over wide operating temperature range.</li><li>• Excellent oxidation and thermal stability extends oil life.</li></ul>

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For further information contact the **Millers Oils technical team 01484 475060**

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