

# LUBE

# TECHNI-GRAM



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## Multi-Functional Gear Oils Bridge The Gap For Industrial Gear Oil Users

For many years, industrial gear oil end-users have operated on the premise that on-road or automotive gear oils were not to be used in industrial gear boxes. This caution stemmed from early gear box manufacturers warnings against using Sulfur-Phosphorus EP (Extreme Pressure) additives in industrial gear boxes due to concerns of corrosion. This problem stemmed from highly reactive forms of sulfur-containing EP additives having a corrosive effect on metal alloys, particularly yellow metals that contained copper as a major alloying element. As a result, many industrial gear boxes have operated on “industrial” gear oils that contain rust and oxidation inhibitors and anti-foam additives only. These products are commonly referred to as R&O Oils.

Fortunately, top-tier multifunctional EP gear oils such as SWEPCO’s 200 Series Multi-Purpose Gear Oils, are bridging the gap between highly-loaded enclosed industrial gear boxes and the need for EP protection without concerns of yellow metal corrosiveness. All of SWEPCO’s 200 Series Multi-Purpose EP Gear Oils contain thermally stable additives that promote system cleanliness and do not corrode yellow metals under severe operating conditions. They are formulated with next-generation EP protective additive chemistry that will carry high loads under boundary conditions and protect mating surfaces from wear while minimizing corrosiveness to yellow metals and keeping steel gear components clean.

Design changes have been made to improve gearbox efficiency. As a result, gearboxes have been downsized and operate at higher speeds and loads, resulting in higher operating temperatures. These smaller gearboxes also have smaller oil capacities, so less lubricant is available to cool the equipment and suspend contaminants.

To meet the needs of modern industrial gearboxes, lubricants must provide:

- Extended durability
- Improved thermal stability and cleanliness
- Improved high-temperature EP protection
- Extended water demulsibility life
- Improved contaminant resistance

Even typical “*industrial EP*” gear oils generally have a much lower quantity of EP additive and are not up to the task of providing protection for the increased demand modern industrial gearboxes place on lubricants. More and more industries, however, are finding SWEPCO’s more thermal and oxidation stable EP gear oils to be the answer for providing superior performance and protection in even the most severe industrial gearbox applications. These multi-purpose gear oils were specifically developed to meet the more severe automotive and heavy equipment driveline/manual gear box applications, while allowing for usage in industrial gear boxes as well. While conventional industrial EP gear oils have a lower quantity of EP additive and should **never** be used in an



... to keep it running

automotive/heavy equipment applications, gear oils with proven non-aggressive EP additive chemistry that meet API's MT-1 yellow metal compatibility classification can be used in both automotive/heavy equipment and industrial gear lubricant applications. This results in additional economic savings through consolidation and reduction of inventory.

**ISO or SUS VISCOSITY?**

Equipment manufacturer's owners manuals can describe the required viscosity of an oil in any number of different viscosity "classifications" or "grading" systems i.e. ISO, SAE or AGMA. Because SWEPCO's 200 Series Gear Oils are true multi-purpose gear oils, that are formulated for use in on-road and/or industrial gear boxes, SWEPCO's product literature references the lubricants viscosity in the multitude of viscosity grade designations that may be called for in the equipments owners manual.

ISO stands for the International Standards Organization. The American Petroleum Institute (API) adopted the ISO standards for viscosity measurement in 1977. The ISO VG grading system is generally used to describe industrial oils i.e. oils used in stationary plants (pumps, turbines, gear boxes, compressors etc.). The ISO numbers refer to the kinematic viscosity of the oil in centistokes at 40°C. This means that an ISO 150 has a kinematic viscosity of 150cSt at 40°C.

Generally, the lower viscosity oils are hydraulic/turbine oils and the higher viscosity oils are gear lubes. There is no exact cut-off point where gear oils become hydraulic oils, but ISO 150 is a good approximation.

Prior to the adoption of the ISO Viscosity Grades, viscosity was measured in Saybolt Universal Seconds (SUS) and is traditionally checked at either 100°F or 210°F. The SAE is a viscosity grading system for those products used in mobile equipment such as automotive, transportation and off-road. To avoid confusion it is divided into subclasses, one for gear oils and one for engine oils. A high number (greater than 60) means that the oil is formulated for a gear type component, while a low number corresponds to oil, which is used in the engine.

The American Gear Manufacturers Association (AGMA) is another grading system which is used strictly for viscosity grading of Industrial R&O inhibited or mild extreme- pressure type gear applications. When the AGMA system is used, it would refer to an ISO 150, EP gear oil as an "AGMA 4EP." if it were referring to an ISO 150 non-EP oil, the reference to EP would be dropped (i.e. "AGMA 4").

So, in looking at our previously mentioned ISO 150 example on a viscosity equivalent chart, it would look like this:

| ISO System | AGMA System | SAE System |
|------------|-------------|------------|
| ISO 150    | AGMA 4      | SAE 80/90  |

An owner's manual calling for ISO 220 Grade Gear Oil would look like the following on a viscosity equivalent chart:

| ISO System | AGMA System | SAE System |
|------------|-------------|------------|
| ISO 220    | AGMA 5      | SAE 90     |