

## **CHOOSING THE CORRECT MOTOR OIL FOR FLAT TAPPET ENGINES IS AS SIMPLE AS 1, 2, 3.**

### **1. FIRST UNDERSTAND YOUR APPLICATION :**

#### **A) Is my vehicle designed for passenger car use?**

Most vehicles are designed for passenger car use. They are street driven at moderate speeds.

#### **B) Does my vehicle require API service rated oil?**

Every manufactured vehicle owners manual, states which American Petroleum Institute (API) Service Oil is recommended for use in that particular vehicle. Failure to use the recommended oil may lead to engine failure.

#### **C) Do I have a catalytic converter?**

Vehicles with catalytic converters require engine oils with lower amounts of ZDDP than oils for flat tappet engines without catalytic converters. The new catalytic converters get clogged up when high amounts of ZDDP are in the oil.

#### **D) Do I use methanol, nitro or other racing fuels?**

Engines running methanol, nitro or other racing fuels require specific oils for that application. These oils have different additives which may harm conventional flat tappet engines.

### **2. NEXT SELECT A PRODUCT THAT HAS THE RIGHT VISCOSITY, THE RIGHT CHEMICAL CHARACTERISTICS FOR THE APPLICATION:**

#### **A) Is the oil brand meant for passenger car use?**

Read and understand the information on the oil bottle. Does it actually state that it can be used in a flat tappet engine.

#### **B) Does the oil brand have an API service rating?**

Does the oil bottle contain an API Service Donut, showing the API two letter code for the amount of ZDDP per litre.

#### **C) Is the oil brand rated for flat tappet engines?**

A flat tappet engine requires 1600ppm of ZDDP. Does the 2 letter code reflect the required amount of ZDDP. Or does the label actually state that the oil is for flat tappet engines.

#### **D) Do I understand the API two letter code.**

The API website will show the amount of ZDDP per two letter code.

#### **E) What is the ZDDP content based on the API rating?**

For a flat tappet engine, a minimum amount of ZDDP is 1350ppm with an optimum amount being 1600ppm.

#### **F) The brand label does not have a two letter code.**

Go to the brand website and search out the amount of ZDDP.

#### **G) Does the oil brand I use have too little or too much detergent?**

Diesel oils have a much higher concentrate of detergents. This detergent fights for the same space as ZDDP which may not allow the ZDDP in enough quantity to do its job.

### **3. NOW PICK THE OIL YOU TRUST TO DELIVER ALL OF THESE REQUIREMENTS:**

#### **A) Does the oil bottle label contain a warning against use in passenger cars requiring API service oils?**

Read the entire label. Both front and back. Understand what it says.

#### **B) Have I checked the webpage for the oil brand ?**

Labels on an oil bottle can be deceiving. Most give vague information. The oil brand website contains information on the oil that is important to know.

**C) Does the oil brand contain a warning against use in passenger cars?**

It is important when you have a hot rod or a classic vehicle to check the oil label and the website to totally understand the application of the oil.

**D) Have I read the technical data sheet of the oil brand ?**

The technical data sheet contains important information about the oil such as Total Base Number (TBN) the ability of the oil to absorb acid. Shear Value, the ability of the oil to cling to the moving parts when the engine is at high revs.

**THE MOST IMPORTANT THING TO DO IS TO READ THE OIL BOTTLE LABELS COMPLETELY AND UNDERSTAND WHAT IT IS ACTUALLY SAYING.**

**THERE ARE TWO DIFFERENT TYPES OF ENGINE OIL**

**MINERAL ENGINE OIL** - Mineral engine oil is a lubricant refined from natural crude oil.

**SYNTHETIC ENGINE OIL** - Synthetic Engine oil is a lubricant consisting of chemical compounds (which are artificially synthesized) from compounds other than the crude oil.

**Now that we have looked at the labels and website; have a better understanding of the oil we intend to use. We can look deeper into choosing the correct oil for our application.**

**FIRST UNDERSTAND YOUR APPLICATION :**

On a flat tappet lifter engine, high pressure between the lifters and cam, causes oil to be squeezed out, leaving no lubrication and causing extensive wear and damage to lifters and cam.

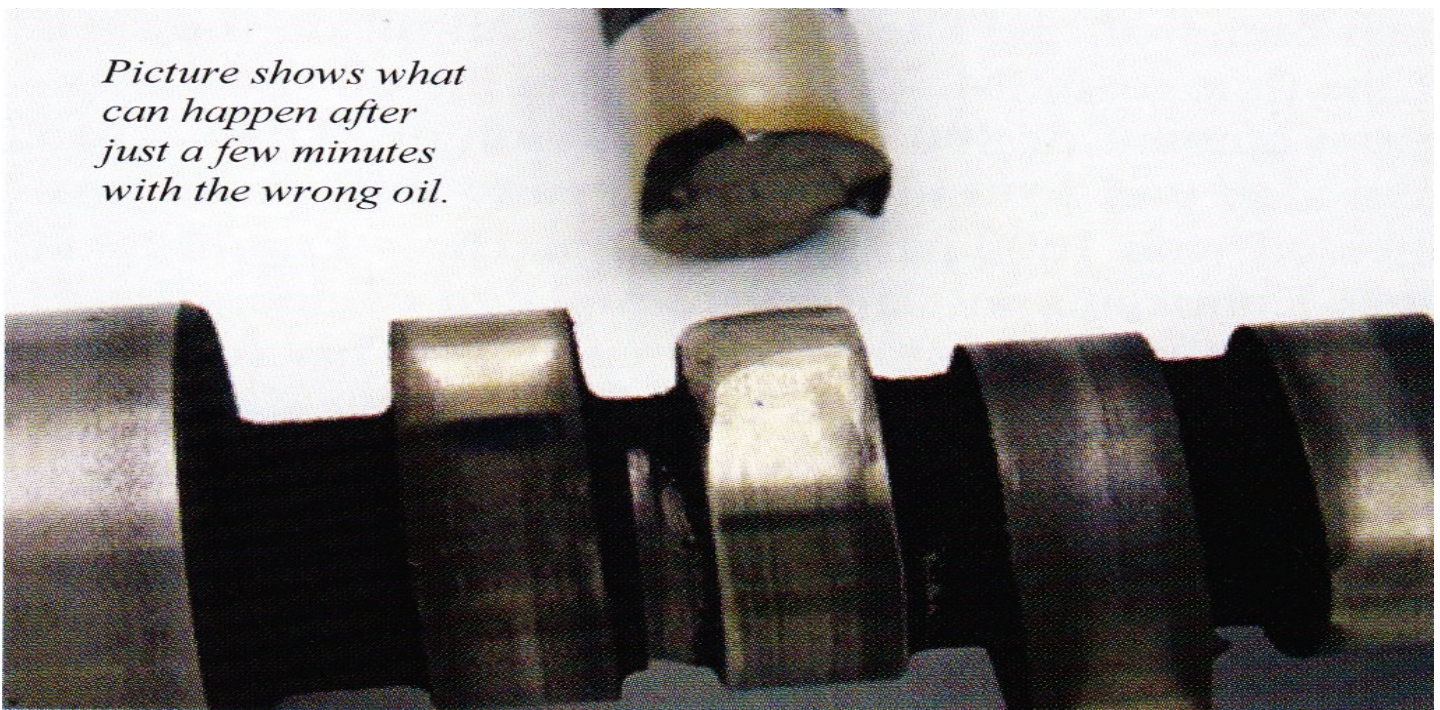
The phosphate in **ZDDP** creates a chemical change that allows the zinc to adhere to the metal parts. The Zinc acts as a sacrificial layer, being pulled off as the two parts pass each other. Modern roller lifter engines can run with less **ZDDP**.

For a flat tappet cam gasoline engine with moderate valve spring pressures (such as a flat head engine) the generally accepted **minimum level of protection** is 1200 to 1300 ppm of Zinc. For muscle cars and hot rods with higher valve spring pressures, 1600 ppm will give uncompromised protection.

The EPA has mandated that automobiles get more than 150,000 miles from the modern catalytic converter. To achieve this goal, automotive manufacturers have pressured oil suppliers to remove substances from motor oils that would shorten the service life of converters, including the proven anti-wear additive **ZDDP**.

The **SN & SM** present categories of motor oil has reduced the **ZDDP** concentration, unfortunately, this can increase the engine friction and wear in our antique, classic cars, truck, boats, tractors, and stationary engines. The latest **SP** category engine oil (released May 2020) is the first oil to not have been tested on an OHV pushrod or a flat tappet engine.

*Picture shows what can happen after just a few minutes with the wrong oil.*



## AUTOMOBILE OIL

Flat tappet lifter engine oils requiring an uncompromised protection level of 1600 parts per million per litre of ZDDP. For street driven automobiles the correct levels of detergents and dispersants are required to prevent deposit formation (particularly at the piston rings), and sludge formation, from contaminants.

Things have changed. Addition of sensitive emissions equipment like O2 sensors and catalytic converters. Better fuel economy via more efficient engines (roller valvetrains, geo rotor oil pumps, thinner piston rings, etc.)

Introduction of ethanol in gasoline (first E10, now E15) Increased levels of detergents, extending oil change intervals. Modern parts store oil is engineered with all of these things in mind. Obviously, your Defenbaker – era cam-in-block engine has a different set of engineering challenges. **It needs different oil.**

### SELECT A PRODUCT THAT HAS THE RIGHT VISCOSITY, THE RIGHT CHEMICAL CHARACTERISTICS FOR THE APPLICATION:

#### ADDITIVES

Engine oil additives are chemical compounds that improve the lubrication performance of base oil (or oil “base stock”).

There are over 18 different additives in engine oil. Motor oil additives have three basic roles:

1. Enhance existing base oil properties with antioxidant.
2. Corrosion inhibitors.
3. Anti-foam agents and demulsifying agents.

Increasing the percent of a certain additive may improve one property of an oil while at the same time degrade another. When the specified concentrations of additives become unbalanced, overall oil quality can be affected.

If a high concentration of an anti-wear agent is added to the oil, the corrosion inhibitor may become less effective. The result may be an increase in corrosion related problems. High levels of ZDDP can begin clogging the lubricant carrying crevices in the cylinder wall, which can then cause the engine to burn oil.

It is safer and more economical to use quality tested and ‘packaged’ premium oils.

Do not waste your money on additives.

#### COLLECTOR AUTOMOBILE MOTOR OIL

Is produced from high grade mineral oil by **Boss Lubricants** of Calgary Alberta and is available in 15W40 grade.

**Has 1600** parts per million, of **ZDDP**.

Has the **correct detergents and dispersants** to prevent deposit formation and sludge formation from contaminants.

Has **primary ZDDP**, and **secondary ZDDP** (which activates at lower temperatures).

Has **polymers** that have both shear stability and thickening efficiency capability to protect bearings.

Has **an additive that aids the oil to cling** to the moving parts when the engine is stored for long periods of time to help prevent dry starts.



*The old formula motor oil seen on the left, had many impurities. Our engines have tolerances to allow for the impurities which are no longer present. Today’s oil seen on the right are very clean allowing for play in your engine.*

#### CAM Oil is a 15W40 grade oil

*This takes up the space left by the impurities that are no longer in oil.*

As different additives were introduced or reduced, the API changed the category of the oil. From **SA** to today’s rating of **SP**.



## DIESEL OIL

The API's new heavy-duty engine oil categories effectively eliminate backwards compatibility. The **ZDDP** that is generally used in diesel formulas is **primary ZDDP** (which activates at higher temperatures), since a diesel engine runs predominantly at operating temperature.

Diesel engine oil has more additives per volume. The most prevalent are over base detergent additives. When you put this extra additive load in a gasoline engine, the effects can be devastating to performance. The detergent will work as it is designed and to try to clean cylinder walls. This can have an adverse effect on the seal between the rings and liner, resulting in lost compression and efficiency.

Diesels operate at essentially the same rpm all day long and need polymers that are shear stable to protect bearings. Many of the polymers in diesel oil are temperature sensitive and will not be activated in the lower temperature running gasoline engines.

## EUROPEAN OILS

ACEA stands for "Association des Constructeurs Européens de l'Automobile".

This classification system is the European equivalent of the API classification system, but is stricter and has more severe requirements. Hence an oil that meets both API & ACEA specifications uses a better additive package than one that is designed to meet only API specifications.

Unlike the API, ACEA has three main groups –  
“**A/B**” for petrol (**A**) and light duty diesel, (**B**) engines.

“**C**” for light duty three way catalyst (TWC) and Diesel Particulate filter (DPF compatible) oils, usually Low and Mid SAPS (Sulphated Ash Phosphorus Sulphur).

“**E**” for heavy duty diesel engines.

An example is: “**ACEA E9-16**”

**E9** Designed for Euro 4, Euro 5 & Euro 6 emission diesel engines, with and without DPFs. SAPS limits line up with API CJ-4 & TBN 7 minimum.

**16** stands for 2016 the year the oil came out.

ACEA specification oils have tighter shear stability and oil volatility requirements than equivalent API specification oils.

## HIGH MILAGE OIL

High milage oils are formulated to benefit vehicles with 75,000 miles or more. High milage oils contain seal conditioners and additives that cause O-rings, gaskets and seals to swell. Once used you can not go back to conventional as the seals will shrink. High milage oils do not contain the required amount of ZDDP for flat tappet engines.

## RACING OIL

Racing oils have between 1850-2400ppm of ZDDP, but reduced detergents to reduce drag. Using this type of oil in a street car may cause sludge build up around the rings. The high ZDDP level will cause spalling, (pulling off metal the cam). It also contains a higher level of acid that may eat your engine from the inside. Racing engines are torn down frequently, cleaned and rebuilt.

## SYNTHETIC OIL

Synthetic oils are so slippery, that there may be less force to turn the lifter. Major after market manufacturers state not to use synthetic oil during break-in and one states not to use synthetic oil for at least 5,500 miles after break-in of flat tappet cams.

**NOW PICK THE OIL YOU TRUST TO DELIVER**  
**ALL OF THE REQUIREMENTS FOR YOUR FLAT TAPPET ENGINE.**

For more information or questions, contact: [specialtyoils@gmail.com](mailto:specialtyoils@gmail.com) or phone 1-403-828-7168.