THE MASTER TECHNICIAN'S

SERVICE REFERENCE BOOK

SESSION NO. 63-5

LUBRICATION SERVICE

MASTER TECHNICIANS SERVICE CONFERENCE
PREPARED BY CHRYSLER CORPORATION
PLYMOUTH · DODGE · CHRYSLER · IMPERIAL

Memo from the desk of...TECH

Chrysler Corporation's five-year, fifty-thousand-mile warranty is mighty convincing proof of their confidence in the superior design and quality they are putting into Chrysler-built cars and trucks. In short, Chrysler Corporation is the only American car producer that is willing to back up its claims of product superiority with its warranty pocketbook.

No doubt about it, the 1963 models are the best cars ever. They not only promise to deliver trouble-free driving for the original owner... they are going to give the second and third owner many more thousands of trouble-free miles backed up by the industry's first five-year, fifty-thousand-mile warranty. Just in case you didn't know it, you Master Technicians can make an important contribution to the success of this latest Chrysler "FIRST". That's what this Reference Book is all about!

In the first place, most of us in the automotive service business have a lot of things to "unlearn" about power-train lubricants and lubrication services... particularly engine oils and engine oil change intervals. You're even going to have to forget some of the things your old buddy Tech taught you about engine oil when the new A. P. I. (American Petroleum Institute) oil classifications were introduced some ten years ago. Remember those new terms... ML... MM... MS... Multi-Viscosity?

What I told you Master Technicians about those oils was okay for 1953 engines, but this is 1963 and we've come a long way in the past ten years. Some of the recommendations that were okay for those engines are dead wrong for engines built in the last 10 years and today's driving conditions. There are more new angles to modern engine lubrication than you might guess from a 30-degree difference between a 1963 Slant Six and the 1953 Flat-Head Six!

Here's what I want you Master Technicians to do. Study the Reference Book so you'll know and understand present-day oils and lubrication requirements. Do your part, on the job, to see that your customer's cars are serviced according to current Certified Car Care recommendations. On the job and off, do your best to explain to anyone who'll listen about MS engine oil and the facts of "engine life". These are the three things you Master Technicians can do to help insure the success of the industry's first five-year, fifty-thousand-mile warranty.

Your old friend,

Signed: Master Tech
MASTER TECH

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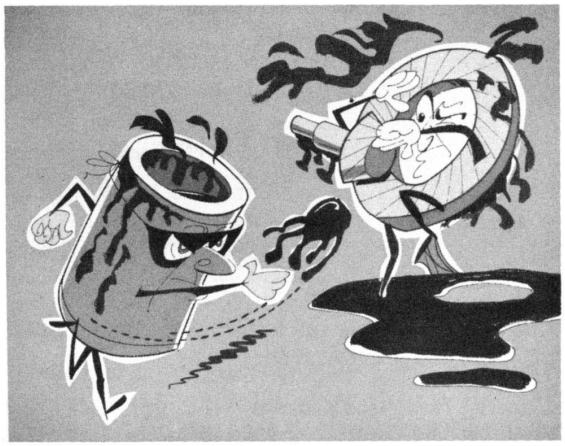
INTRODUCTION

EVOLUTION IN AUTOMOTIVE LUBRICATION

When the automobile business was still in its infancy, automotive and lubrication engineers teamed up to find ways to make cars more reliable, durable and trouble-free. Many of the most significant "breakthroughs" in automotive design have gone beyond the laboratory stage because design and lubrication engineers worked hand-in-glove to solve the lubrication problems before the new design was okayed for mass production.

A classic example is the hypoid rear axle. Design engineers figured out how to produce these revolutionary ring and pinion gears long before they reached the mass production stage. The design was good. The potential benefits were most desirable. The lubrication problems were staggering! None of the gear lubricants available at that time were capable of protecting these new gears against early failure. The very desirable hypoid rear axle design lived in the lab until a lubrication "breakthrough" came up with an entirely new family of *extreme pressure lubricants*. But that was only the beginning of EP lubricant story.

Producing the new extreme pressure lubricants in laboratory test quantities was one thing; mass production, quality control and mass distribution was quite another problem. Even after these new lubricants were readily available, a tremendous job of owner and service technician education remained. Many owners and some 1933-model service technicians refused to believe that the new light-colored, lightweight gear oils could possibly provide better lubrication than the old molasses-like gear oils. Many a hypoid gear set failed because it was fed a diet of 600-W instead of the new life-giving hypoid axle lube.



REDUCED LUBRICATION COST

The history of the hypoid rear axle and hypoid gear lubricants is just one classic example of automotive design and lubrication teamwork. There have been hundreds of less dramatic examples of how special lubricants have played a key role in the success of new automotive designs.

Automotive and lubrication engineers have worked diligently through the years to find ways to *reduce* the cost of car maintenance and, at the same time, *increase* the reliability and durability of the customer's car. In the past few years there have been a series of dramatic "breakthroughs" in automotive lubrication requirements. Most of the grease fittings are gone! Less frequent maintenance and adjustment services are required . . . particularly for chassis components. Far less frequent lubrication is required on most of the parts and components of Chrysler-built automobiles. Extended lubrication and maintenance requirements were not realized by chance. They are the result of sound research, sound design, rigid quality control and improvements in materials, seals and lubricants. These all add up to a dramatic reduction in the cost of car maintenance and lubrication.

THE FIVE-YEAR, FIFTY-THOUSAND-MILE WARRANTY

Reducing the cost of maintaining Chrysler-built vehicles is only part of the story. Intensive research and testing has proved that Chrysler-built vehicles are more reliable and durable than ever before. This proof of superiority gave birth to the new five-year, fifty-thousand-mile warranty . . . the first in the industry and a Chrysler Corporation *first*.

1963 CERTIFIED CAR CARE

New extended maintenance and lubrication periods became effective with the 1963 Chrysler-built cars. These recommendations tie in with the provisions of the Certified Car Care Program to assure Chrysler Corporation automobile owners long, dependable car life with a minimum of cost.

Many units of the cars are lubricated at manufacture for the life of the car. Other units require lubrication or inspection, at only six-month periods. Engines, because of factors not common to other units of the car, require more frequent attention.

CAR OWNER BENEFITS

The car owner benefits greatly by this new program as it relieves him of the expense and inconvenience of frequent maintenance and lubrication services. By the same token, the customer's investment in his automobile is greatly safeguarded by the many technical advances in design and quality. By following the recommendations set forth in the Certified Car Care Program, your customer will achieve greater enjoyment and peace of mind with his Chrysler-built car.

OWNER EDUCATION IS MIGHTY IMPORTANT

Both the five-year, fifty-thousand-mile warranty and the new Certified Car Care are extremely practical and desirable. However, the success of these programs will depend to a large degree on how good a job dealers do of educating owners on Certified Car Care. It is particularly important that every Master Technician know and understand present-day lubrication requirements.

In the past year or two, very rapid progress has been made in both automotive design and lubricants. Almost all of us have a great deal to learn and a few things to "unlearn". The sooner we all get our lubrication facts straight, the better equipped we'll be to do our part of educating owners on lubrication and maintenance requirements.

THE ENGINE OIL STORY

Today's precision-built, high-performance engines are remarkably durable and trouble-free . . . providing they are properly lubricated and cared for. Only MS oils contain sufficient chemical additives to protect the engine against scuffing, premature wear, corrosion and harmful varnish and sludge deposits.

"STRAIGHT MINERAL" OILS OR "NON-DETERGENT" OILS SHOULD NOT BE USED UNDER ANY CIRCUMSTANCES.

It is impossible to overemphasize the importance of this warning. That's why we are going to take time to set the record straight by explaining the shortcomings of straight mineral oil and life-giving virtues of MS oil.

ENGINE OIL PERFORMS FIVE IMPORTANT JOBS

Lubricating or preventing metal-to-metal contact is just one of the important jobs required of an engine oil. An engine oil must perform five jobs.

Lubricate: Engine oil must lubricate all moving parts to prevent wear.

Control Rust and Corrosion: Engine oil must protect the engine against corrosive acids

which are a by-product of normal combustion, moisture and other contaminants.

Cool: The ability of the engine oil to cool engine parts is very important. In this capacity, the oil must be capable of withstanding extremely high temperatures.

Seal: Engine oil must provide an adequate oil film to aid in sealing piston rings against excessive loss of compression and blow-by.

Clean: Engine oil must have the ability to keep the engine parts clean and to prevent the accumulation of undesirable deposits which would interfere with engine operation.

MS OIL DOES ALL FIVE . . . BEST

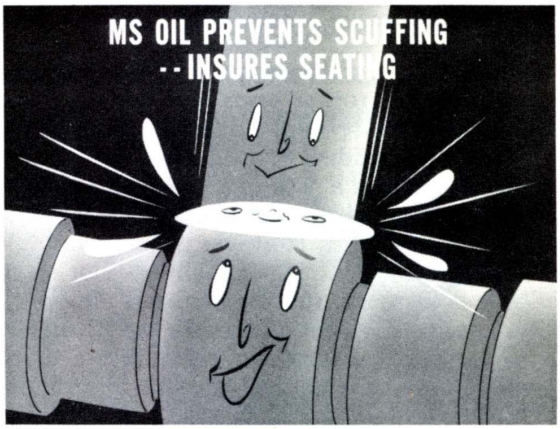
The engine oil story is actually the story of the amount and the kind of additives contained in MS engine oil. Let's see what each of these additives can do that ordinary oils cannot and what happens to these additives under various driving conditions.

THE SCUFFING PROBLEM

Some parts, like cam lobes, tappets, piston rings and cylinder walls present a difficult lubrication problem because of the constant high-speed rubbing action between these parts. These parts will scuff and wear excessively if straight mineral oil is used.

ANTI-SCUFF ADDITIVES

The anti-scuff additives in MS oil prevent scuffing and actually promote the polishing of moving parts. For example, the anti-scuff additives in MS oil insure the proper polishing and seating of cams and piston rings. This polishing and seating action is a *must* to insure proper engine break-in and to protect these parts against scuffing after break-in.

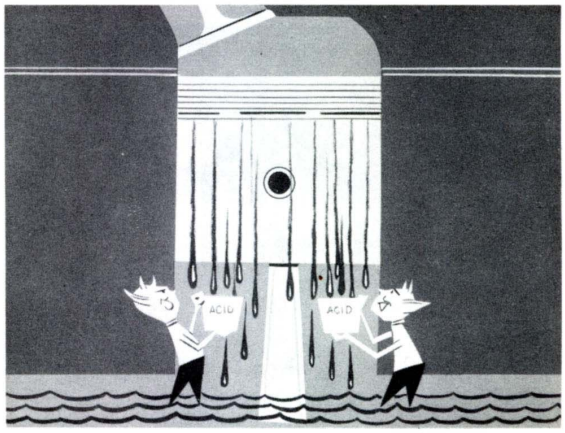


WHAT HAPPENS TO ANTI-SCUFF ADDITIVES

Engine heat gradually destroys the anti-scuff additives. Once the anti-scuff additive is used up, the oil can no longer prevent scoring and excessive wear. The anti-scuff additives are good for about 4,000 miles of highway driving. Since engine heat is the prime enemy of the anti-scuff additives, extreme operating conditions which produce excessive engine heat may further reduce the life of these additives.

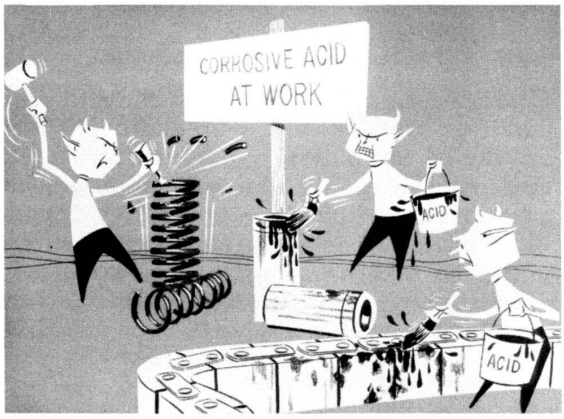
CORROSIVE ACIDS AND RUST

Corrosive acids are a normal by-product of combustion. Partially burned fuel and moisture are the main acid-forming ingredients. Water in the engine oil promotes the forma-



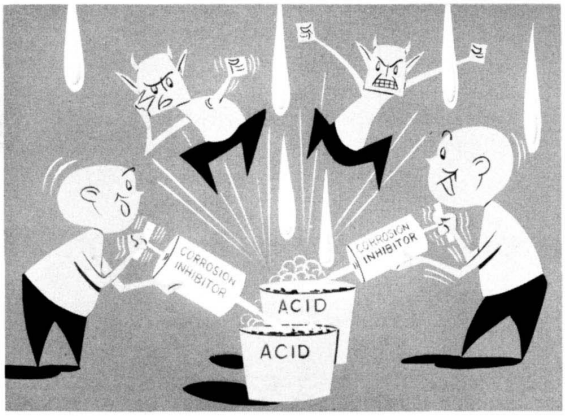
tion of rust on vital engine parts. When the acid-forming by-products of combustion combine with moisture, rusting and corrosion of these engine parts is greatly accelerated. As a matter of fact, corrosive acids in the engine oil cause most of the wear in an engine.

Cylinder bores, piston rings, hydraulic tappets, timing chains, rocker arms and valve springs are all prime targets of corrosive acids. A fine pitting, or a reddish brown, rust-like coating on these parts is a sign of corrosive acid damage. Corrosive acid results in excessive cylinder bore and ring wear. However, when overhauling an engine, the rings usually do not show visible evidence of rust or corrosion. The rust-like coating is most apt to show up on the cylinder bores. Corrosive acid is also a common cause of premature valve spring failure.



CORROSION INHIBITOR ADDITIVES

The corrosion inhibitors in MS oil cannot prevent the formation of acids in an internal combustion engine. Their job is to neutralize the corrosive acids as fast as they are formed. This is a mighty big order when you stop to consider that about one gallon of water is formed by the burning of each gallon of gasoline. In addition, fuel combustion products are constantly being produced in the combustion chamber. Some of the moisture and acid combustion compounds are blown past the piston rings and into the crankcase. Even under ideal operating conditions, the acid neutralizing additives in MS engine oil must work full time to protect the engine against rust and premature wear.



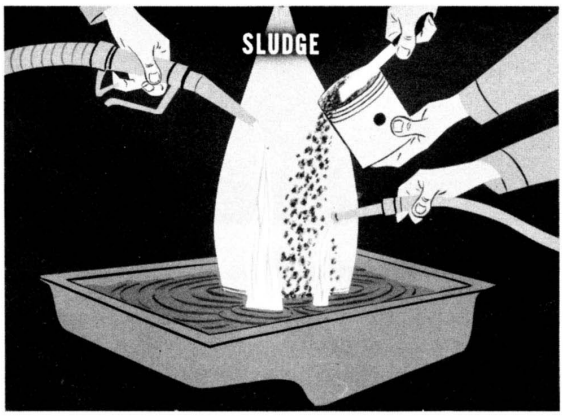
THE LIFE SPAN OF CORROSION INHIBITORS

The amount of acid and water produced in an engine depends primarily on the type of driving, temperature and humidity and the condition of engine tune. So, driving conditions affect the useful life of the corrosion inhibitors more than oil mileage.

Normal combustion, particularly when the engine is cold, produces relatively large amounts of acid and other contaminants. A rich fuel mixture or a poorly tuned engine increases acid formation. That is why cold weather and short trips, that don't give the engine and the oil time to warm up, consume the corrosion inhibitors in MS oil quite rapidly. That's why the oil should be changed every two months under normal driving conditions and more frequently under conditions that produce excessive acid. This will be covered in greater detail when we get to the subject of oil change intervals.

SLUDGE AND SLUDGE FORMATION

The chemistry of sludge formation is



extremely complicated. The word "sludge" may not be a scientific chemical term but it certainly is descriptive of the thick, dirty condition frequently found when engine oil changes and engine condition are neglected. Partially burned gasoline, combustion soot and moisture are the primary sludge ingredients. Any driving or engine condition that reduces combustion efficiency, increases moisture and sludge formation.

VARNISH FORMATION

Varnish is manufactured in an engine by cooking the basic sludge ingredients at high engine temperatures. Like the chemistry of sludge, the chemistry of varnish is quite complex. For example, small amounts of varnish-like material may be formed by heating oil until it starts to break down. In addition, all fuels contain ingredients that produce varnish-like deposits.

THE HARMFUL EFFECTS OF SLUDGE AND VARNISH

Since sludge restricts oil flow, the harmful effects of sludge are fairly obvious. The harmful effects of varnish are somewhat more subtle. Varnish does most of its dirty work by causing moving parts to stick or bind. For example, badly varnished piston rings stick in the piston ring grooves and cannot do an effective job of controlling oil consumption or sealing against excessive combustion blow-by. Varnish on hydraulic tappet plungers creates serious hydraulic valve lifter troubles. The only effective way to prevent varnish is to use a good-quality MS oil and change it at the proper interval.

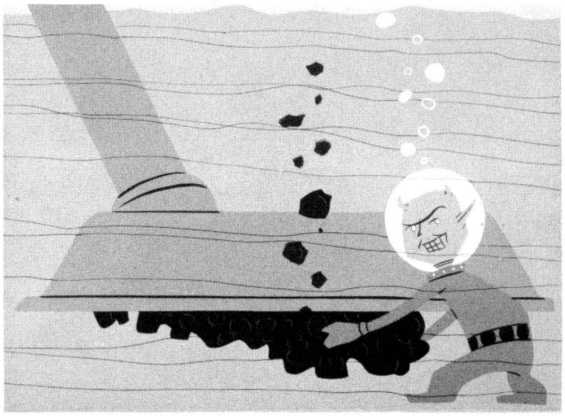
OXIDATION INHIBITORS

The oxidation inhibitors in MS oil react chemically with the sludge and varnish-forming ingredients. This chemical reaction changes the combustion soot and partially burned fuel particles into new chemical compounds. These new compounds are relatively harmless and do not form sludge and varnish.

THE DEPLETION OF OXIDATION INHIBITORS

Sludge-producing ingredients are a normal by-product of combustion. Even under ideal driving conditions, some of the oxidation inhibitor additive is used up in combating sludge and varnish formation. A cold engine, an engine that isn't properly tuned, or fuel that doesn't burn cleanly greatly accelerates the rate at which the oxidation additives are used up. It is extremely important to change oil before the oxidation additives are depleted.

OIL CONTAMINATION IS ALWAYS PRESENT



Even under ideal driving conditions, small amounts of contamination manage to get into the oil. Traces of non-abrasive contaminants aren't particularly harmful as long as they are evenly dispersed. If these contaminants are held in suspension and circulated, the oil filter soon traps and holds the solids.

If contaminants are allowed to accumulate and deposit out in critical areas of the oil flow system, oil flow and lubrication may suffer. Needless to say, reduced oil circulation can cause serious problems and excessive wear.

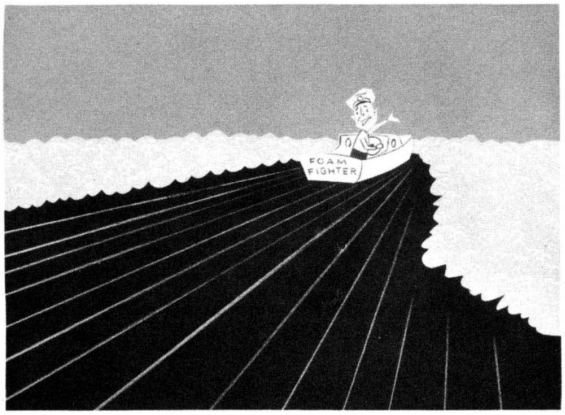
DETERGENT AND DISPERSANT ADDITIVES

The detergent and dispersant additives in MS oil prevent contaminants from accumulating and depositing out in critical areas of the oil flow system. Small oil passages represent critical areas and in extreme cases some plugging of the oil intake screen may occur. The dispersants and detergents help keep the engine clean.

The detergent additives in MS oil are gradually used up in much the same way that greasy pots and pans use up the detergent in a pan of dishwater.

OIL FOAMING AND AIR BUBBLES

Heat and the constant mechanical agitation of the engine oil tends to produce air bubbles and foam. Since it takes a solid stream of oil to maintain oil pressure, foaming of the oil is very undesirable. Air bubbles and foam in the engine oil could literally cause lubrication starvation even though the crankcase level was correct and the oil pump operating perfectly.



ANTI-FOAM ADDITIVES

MS engine oils contain anti-foam additives which minimize the formation of air bubbles and prevent the formation of foam.

MS ENGINE OIL SUMMARY

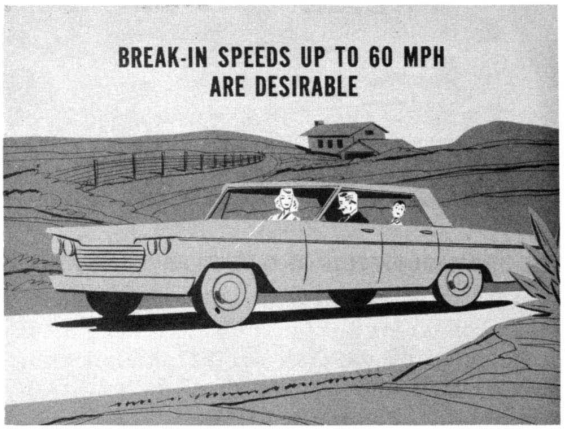
By now the importance of essential engine oil additives should be obvious. The *amount* of each additive contained in a compounded engine oil as well as the *quality* of the base stock is important. To provide today's high-performance, precision-built engines with maximum protection for all types of driving, high-quality MS engine oils should be used.

Many oil suppliers certify that their MS oils meet the MS requirements established by the car builders.

It is mighty important that all dealers use certified MS oil and educate their owners on the importance of using *MS OIL ONLY*.

ENGINE BREAK-IN

The owner should follow the break-in instructions in his owner's manual. Make sure that he understands the importance of these instructions. We won't repeat them here, but these are the important highlights.



The owner should stick to MS oil for maximum engine protection, and should drive his car in the normal way. After the first fifty miles, moderately high speeds up to fifty or even sixty miles an hour are desirable. While cruising at road speeds, brief full-throttle acceleration is also a desirable aid to engine break-in.

BREAK-IN OILS AND STRAIGHT MINERAL OILS

A great deal of misunderstanding still exists on the subject of break-in oils and straight mineral oils. Let's set the record straight.

Original Factory Fill: The engines of Chrysler-built cars and trucks are filled with high-quality MS engine oil at the factory. If it is necessary to add oil before the first regularly scheduled oil change, ADD MS OIL ONLY!

Break-In Oils: Special break-in oils are neither necessary nor desirable. BREAK-IN OILS SHOULD NOT BE USED. It is important to use MS engine oil to insure protection against scuffing during break-in. Don't forget, for example, that the anti-scuff additives actually aid in polishing and properly seating some of the vital engine parts.

Straight Mineral Oils: Everything that has been said about break-in oils applies to straight mineral oils and "non-detergent" oils . . . they must not be used in present-day engines.

ENGINE OIL VISCOSITY

Engine oil viscosity recommendations have undergone a gradual change over the years. Time was when SAE 40 and SAE 50 oils were recommended for hot-weather operation. Engines of that period frequently developed serious pressure loss problems because of excessive flow or "spillage" past bearings and seals. Then, too, the viscosity of oils of that era was not as temperature-stable as today's oils. As a result of engine and oil limitations, it was common practice to recommend an oil for the *highest temperature anticipated* to minimize pressure drop and insure adequate pressure at idle speeds. Slow cranking and hard starting were commonplace!

Today's precision-built engines and the greatly improved MS engine oils have made lower viscosity oils both *practical* and *desirable*. Generally, oil viscosity should be selected on the basis of the *lowest temperature anticipated*. Choosing oil viscosity for the lowest temperature expected will insure easier starting and better cold-engine lubrication.

OIL VISCOSITY CHART

Lowest Temperature Expected	SAE Viscosity Number
Above +32°F.	SAE 30 SAE 20W-40 SAE 10W-30
+32°F. to +10°F.	SAE 20W SAE 10W-30
+10°F. to —10°F.	SAE 10W SAE 10W-30 SAE 5W-20
Below —10°F.	SAE 5W-20

SINGLE AND MULTI-VISCOSITY OILS

In recent years a great deal of progress has been made in the compounding and control of multi-viscosity oil quality and viscosity. Present-day multi-viscosity oils provide good lubrication over a wide range of temperatures. When using the OIL VISCOSITY CHART, the following considerations may help you or the owner make the best possible decision.

Single Viscosity Oils: Single viscosity MS oils of the correct weight for the lowest temperature expected are fine for areas where seasonal temperature changes are not great. Where seasonal temperature changes are both rapid and severe, the owner with a single viscosity oil may get caught between oil changes with oil that is too heavy for easy starting. This is not a condemnation of single-viscosity oils.

It is just one of the factors you and the owner should take into consideration when choosing the correct oil viscosity.

Multi-viscosity oils: These oils were developed for convenience to the car owner during seasons when temperature changes occur. For example, 5W-20 is a good substitute for 10W and it will insure much easier cranking and better cold starting. This excellent multi-viscosity oil can be used any time you expect the temperature to drop lower than ten above zero. Lubrication will be entirely satisfactory even if the weather should become unseasonably warm for a few days.

ENGINE OIL AND FILTER CHANGES

So far we have explained how the additives in MS engine oil protect the engine against premature wear and possible failure. We have also explained how these additives are gradually used up or depleted. Oils must be changed before the additives are all used up or before it becomes excessively contaminated.

ADDITIVE DEPLETION SUMMARY

Let's review briefly what happens to MS oil additives. Anti-scuff additives are gradually used up due to contact with the hot engine surfaces. Corrosion inhibitors neutralize the acids formed in the engine and are thereby consumed. Oxidation inhibitors react chemically with air and the blow-by products to prevent varnish and sludge formation and are consumed in this process. In addition, the oil itself will form deposits when heated. These inhibitors are consumed while preventing this type of deposit formation. Detergents and dispersant additives hold the contaminants in the oil, preventing the deposits from forming on engine parts. When the additive capacity is exceeded by the accumulated contaminants, deposits form in the engine.

OIL CHANGE FREQUENCY

From the foregoing we can see that the oil becomes dirty and the all-important additives are consumed. Periodic oil changes are the only way to remove contaminants from the engine. How often should the oil be changed? This depends on how fast the contaminants build up in the oil. This buildup is primarily affected by:

1. TEMPERATURE
2. TYPE OF OPERATION
3. ENGINE CONDITION

TEMPERATURE

Operation at low oil temperature allows more contaminants to collect in the oil. As the oil warms up, many of these contaminants are driven off and expelled through the ventilation system. Driving in cold weather is more severe because the oil does not warm up as fast. At extreme high oil temperatures, the oil tends to oxidize and form organic acids and deposits.

TYPE OF OPERATION

Short-trip driving: The necessary rich fuel mixture due to choke operation, allows more contaminants to enter the oil. In addition, the oil temperature is relatively low. These two factors combine to cause a rapid accumulation of contaminants in the oil.

Operation at idle: This does not allow the oil to warm up sufficiently to effectively drive off the contaminants.

Highway driving: The engine operates at normal warm oil and water temperatures. At these temperatures, contaminants are more easily driven off, resulting in less contaminant

in the oil. In addition, operation with the choke on is minimized.

Extreme high speeds: High speeds, especially in hot weather, will cause high oil temperatures and consequent deterioration of the oil as described.

Airborne dust: Driving on dusty roads or in sandy areas causes more dust and dirt to enter the crankcase and frequent oil changes will be required.

ENGINE CONDITION

Engine tune: Contamination of the oil is increased by any condition of the engine which results in misfiring, increased blow-by, slower warm-up or reduced ventilation. Misfiring and poor combustion result from factors usually corrected during tune-up. These include incorrect ignition timing, worn or fouled spark plugs or points, incorrect carburetor operation or adjustment, dirty air cleaners, and faulty operation of the choke or stuck manifold heat control valve.

Engine coolant temperature: A faulty or incorrect thermostat delays the warm-up of the engine coolant and prevents it from reaching the proper temperature. This causes increased corrosion of the cylinder walls and prevents the oil from reaching the desired temperature.

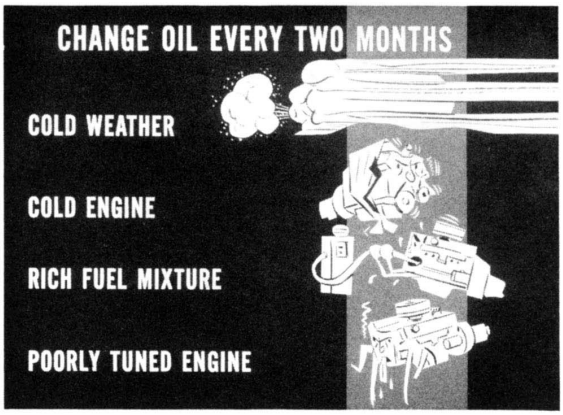
Crankcase ventilation: Inadequate crankcase ventilation prevents removal of the contaminants from the oil. This can be caused by plugging or sticking of the ventilator valve or the breather cap.

High-mileage engines: Normal engine wear causes increased blow-by past the piston rings, thereby increasing the oil contamination. Stuck piston rings or engines that are badly worn will promote rapid sludge buildup.

OIL CHANGE PERIOD

The short-trip driver needs to change the oil in his engine at relatively low-mileage intervals. The favorable engine temperature condition and the low contamination buildup rate encountered during highway driving permits the owner to drive farther between oil changes.

Thus, it is difficult to judge the proper oil change interval on a car-mileage basis only. However, an oil change interval based on time takes into consideration the type of driving (short trip or highway) as well as the mileage.



EVERY TWO MONTHS BUT NOT MORE THAN 4,000 MILES

For almost all types of operation, the oil should be changed every two months. Frequent driving on dusty roads or in sandy areas or unusually short-trip driving in cold weather will require more frequent service. Four thousand miles is a safe interval for highway driving.

OIL FILTERS

Full-flow, throwaway oil filters are used in all 1963 Chrysler-built engines. The purpose of the filter is to remove abrasive materials from the oil. In a full-flow oiling system, the oil is filtered before it circulates through the system. In an engine with a six-quart capacity, all of the oil will be filtered about every 30 seconds.

As the filter becomes coated with foreign matter, the amount of oil that can pass through the filter is reduced. To eliminate the possibility of oil pressure buildup and ultimate reduction in oil supply to the working parts of the engine, a relief valve is incorporated in the system, which permits the oil to bypass the filter. When this occurs, unfiltered oil is allowed to circulate through the engine and result in abnormal wear conditions.

The full-flow filter uses a special filtering paper. When the filtering area becomes clogged with sediment, the filter loses its effectiveness and must be replaced to protect the engine parts.

FREQUENCY OF FILTER CHANGE

In the frequency with which filters should be changed, here again, there are conditions which dictate the actual length of time a filter should remain in service. Ordinarily, when the engine oil is changed on a regular schedule of every 4,000 miles or two months, whichever comes first, the filter should be replaced twice a year, to coincide with an oil change. This will assure a plentiful supply of clean, filtered oil circulating through the engine.

When the car is operated in unusually dusty areas, the filter should be replaced more frequently.

TYPE OF REPLACEMENT FILTER

MoPar or Chryco replacement oil filters should be used exclusively in all Chrysler-built engines. These filters are engineered to provide the maximum in dependable service. They are superior in respect to capacity and ability to remove small particles of foreign matter from the oil.

CLOSED-CRANKCASE VENTILATION SYSTEM

All engines in 1963 Chrysler Corporation-built cars are equipped with a closed-crankcase ventilating system. In addition to helping to control air pollution, this system, if properly maintained, can be helpful in reducing oil contamination.

Because of the oily nature of the vapors that pass through the passages in the control valve, the hose, the ventilating tube and the carburetor valve body, these passages can become heavily coated and restrict the operation of the system. This can contribute to engine oil sludging and cause erratic engine operation, as well, by upsetting the air-to-fuel ratio.

To keep the system functioning and performing in the manner it was intended to, the components of the system should be thoroughly cleaned at least twice a year. One of the servicing operations should coincide with the annual engine tune-up.

On cars used in taxicab, police and fleet work, where there is considerable idling, the system should be cleaned more often. In some cases, it may be advisable to clean the system at every oil change.

QUICK TEST OF CRANKCASE CONTROL VALVE

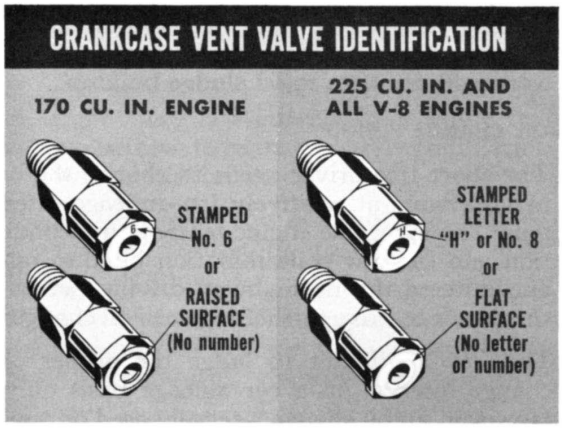
You can check the condition of the system without disassembling it. Lift the valve from the rocker arm cover and shake it. The valve is operating properly if it clicks when the assembly is shaken and a vacuum will be felt at the valve when the engine is run at idle.

SERVICING THE CLOSED-CRANKCASE VENT SYSTEM

To clean the control valve, soak it in MoPar or Chryco Carburetor Cleaner to loosen all oily residue. Blow out with compressed air. If the valve assembly cannot be properly cleaned out, or if the spring is damaged, the valve assembly should be replaced.

USE THE CORRECT VALVE

Some dealers keep several cleaned valve assemblies in stock to minimize servicing time. One size valve is used for the 170-cubic-inch



six-cylinder engine. A different size valve is used for the 225-cubic-inch six-cylinder engine and all V-8 engines. These valves must not be interchanged.

The accompanying illustration will enable you to identify these valves.

The rubber hose and the ventilator tube should be thoroughly cleaned out to remove all residue. The carburetor does not need to be disassembled to clean the passages. Dip the lower part of the carburetor in carburetor cleaner and use a pipe cleaner to remove residue.

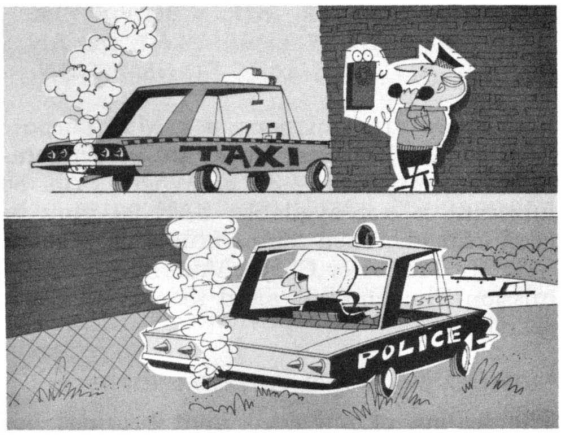
TRANSMISSION AND DRIVE LINE

The durability and dependability of the entire power train has been greatly improved. Inspection and lubrication intervals on some of these units have been greatly extended. In some cases, it is no longer necessary to change the lubricant periodically.

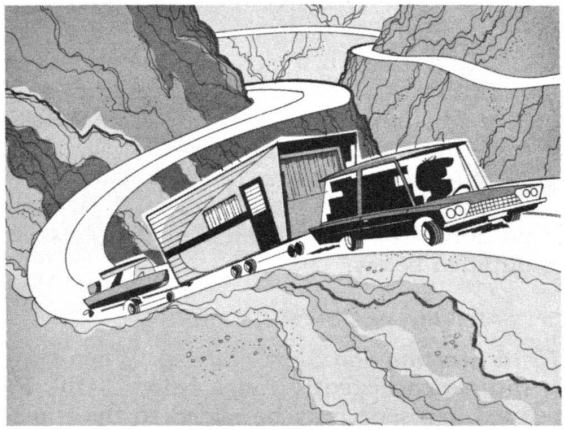
TORQUEFLITE TRANSMISSIONS

Average service: When a car is operated under average driving conditions, it is no longer necessary to replace the transmission fluid. The fluid installed at the factory will provide satisfactory lubrication and protection for the life of the car.

Severe service: Some types of operation can hardly be considered average or normal. For example, most police cars and taxicabs are operated under relatively severe conditions. Fleet cars are sometimes operated under equally severe conditions. Frequent operation under higher than normal loading is also considered to be a severe operation. Overloaded station wagons, a luggage compartment loaded with heavy sample cases or frequent towing of moderately heavy trailers fit into this category. Under these "Severe Service" conditions, the bands should be adjusted and the transmission fluid and filter should be changed every 32,000 miles.



Extremely Severe Service: Some cars may be operated under extremely severe conditions. For example, continuous operation at very high speeds in hot weather is extremely severe service. Pulling a heavy trailer and frequent operation in mountainous regions are also examples of extremely severe service. Under such conditions, play it safe. Recommend that the transmission fluid be changed more often . . . as often as every 10,000 miles. Needless to say, bands should be adjusted and the filter replaced at least every 32,000 miles.



Extended maintenance periods have been made possible by a number of important changes and improvements in manufacturing of TorqueFlite transmission parts and improvements of transmission fluid. Among the improvements are new friction materials for the clutch plates and the bands for greater durability and improvements in the materials used in the seals.

Increased transmission cooler capacity helps

maintain correct fluid viscosity under most all operating conditions, and greatly extends the life of the oil. The new in-line disposable filter removes abrasive particles from the fluid and prevents them from being recirculated through the transmission.

FLUID LEVEL CHECK

Transmission fluid level should be checked at least every six months. It is best to check "warm" level. The engine must be idling, the temperature gauge should indicate normal operating temperature and the transmission fluid should be heated to normal operating temperature. The level should be at the "F" mark, or slightly below, but never above the "F" mark. Foaming may occur if the level is too high and affect the shifting qualities of the transmission. The engine must also be running if the level is checked when the transmission is cold. The level should be at, or slightly below, the "Add One Pint" mark. Before removing the dipstick from the filler tube, wipe the dirt off the top of the filler tube so that dirt will not get into the fluid.

TORQUEFLITE TRANSMISSION FLUID RECOMMENDATIONS

Use only Automatic Transmission Fluid Type "A", Suffix "A". MoPar and Chryco fluids are highly recommended since they are specially designed and compounded for Chrysler Corporation-built automatic transmissions. They will give excellent results under all climatic conditions. The use of additives, if necessary, is outlined below.

SPECIAL TRANSMISSION FLUID ADDITIVES

Hard Starting and Slow Shifting: When temperatures consistently range below —10° F., refined kerosene may be added to the transmission to thin the fluid. Drain one and one-half pints of transmission fluid from the transmission and replace it with a similar amount of refined kerosene. To prevent overdiluting the fluid, this service should be performed only once during the low-temperature season. If replenishment is necessary, thereafter, to maintain the level, use only MoPar or Chryco Automatic Transmission Fluid.

MoPar automatic transmission sealer: Occasionally a very minor external fluid leak may occur at a seal which does not warrant the expense of a complete disassembly job. MoPar Automatic Transmission Sealer, Part No. 2298923, was developed for this purpose. Adding it to the transmission fluid will quickly and safely correct the fluid leak. This special MoPar sealer is the only one which should be used. Other sealers may cause varnish formation or damage the clutches, bands and seals.

MANUAL TRANSMISSION

The lubricant installed in the manual transmissions at the factory will provide satisfactory lubrication for the life of the car. The periodic lubricant change periods, formerly required, are no longer necessary. This has been made possible by the use of improved sealing, better quality control and improved lubricants. Periodic checking of the level is recommended to assure that there is a plentiful supply of lubricant in the transmission at all times.

Fluid Level Checks: The fluid level of manual transmissions should be checked every six months. If the level is below that of the filler hole, fluid should be added.

Lubricant Requirements: Three-speed manual transmissions use MoPar or Chryco Automatic Transmission Fluid. This is recommended for all temperature ranges. However, there may be instances, such as in extremely warm areas, where it is advisable to replenish any lost fluid with Multipurpose Gear Lubricant SAE 90 or SAE 140. Automatic transmission fluid and the multipurpose gear lubricants are compatible and can be safely mixed.

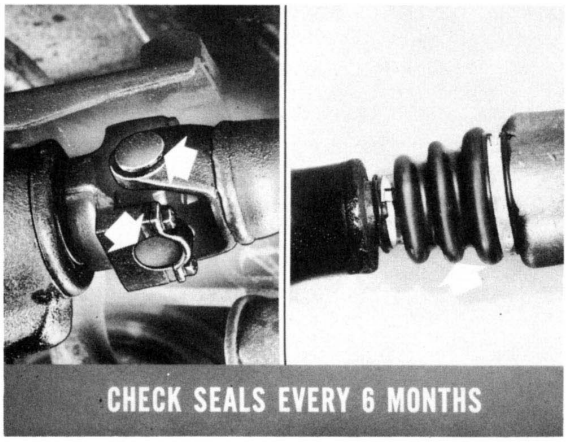
CAUTION: NEVER PUT MULTIPURPOSE GEAR LUBRICANT IN AN AUTOMATIC TRANSMISSION.

Four-speed transmissions use Multipurpose SAE 80 or GL-4 Gear Lubricant in temperature ranges *above* +32°F. Where SAE 80 lubricant is not available, SAE 90 may be used instead. When temperatures drop *below* +32°F., MoPar or Chryco Automatic Transmission Fluid may be used to provide easier gearshifting.

PROPELLER SHAFT AND UNIVERSAL JOINTS

The sealing of universal joint bearings has

been greatly improved. The lubricants used in these joints have also been improved. Relubrication of universal joints on 1963 Chrysler Corporation-built cars is not required, unless they are operated under severe operating conditions—the same types of operation that require periodic transmission fluid service.



Inspection requirements: The universal joint seals should be inspected every six months. The joints should not be disassembled or relubricated unless there is evidence of leakage or seal damage.

Lubrication Requirements: If the seals leak or the universal joints have been operated up to 32,000 miles under severe operating conditions, the joints should be serviced. Disassemble the joint and clean the parts thoroughly. Worn or damaged parts and all seals should be replaced.

Relubricate ball-and-trunnion universal joints with two ounces of Fibrous Universal Joint NLGI Grade 2 lubricant. Care must be taken not to allow the lubricant to get into the rubber dust boot as this may cause the drive line to be out of balance.

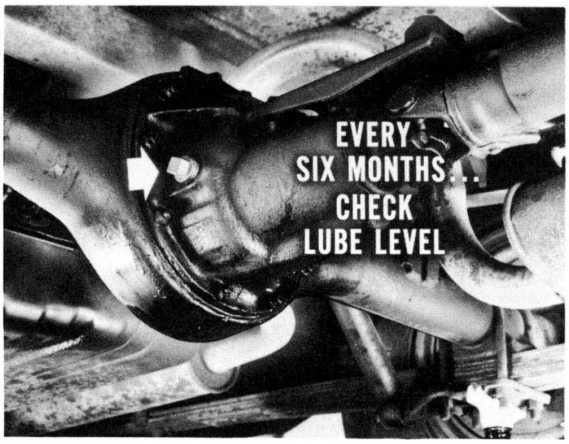
Cross-and-roller joints should be lubricated with NLGI Grade 0 lubricant. The spline on Imperial propeller shafts should be refilled one-half full with Multipurpose Gear Lubricant with 10% molybdenum sulfide powder added.

REAR AXLE

Replacement of the rear axle lubricant is not necessary. The elimination of the lubricant change periods was made possible by improvements in the venting and sealing of the rear axle and the use of improved lubricants.

The spring-loaded axle vent prevents the entrance of dirt and moisture. The use of siliconized leather in the seals also helps eliminate the entrance of dirt and moisture. These seals also reduce lubricant loss due to seepage.

Rear Axle Fluid Level Check: The fluid level should be checked at least every six months. Be sure the car and drive line are in a level position. On all except Valiant and Dart models, the lubricant level should be between the bottom of the filler hole and one-half inch below. On Valiant and Dart models, the level should be at the bottom of the filler hole—never below the filler hole.



Lubricant Recommendations: For conventional axles use Multipurpose Gear Lubricant for Service GL-4, as identified by MIL-L-2105B. Axles with the Sure-Grip differential use MoPar Hypoid Lubricant, Part Number 1879414. If this lubricant is not available, GL-4 lubricants may be used.

REAR AXLE LUBE VISCOSITY

Anticipated Temperature Range	Viscosity
Above —10°F.	SAE 90
As Low As —30°F.	SAE 80
Below —30°F.	SAE 75

SERVICE REFERENCE BOOK

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Litho in U.S.A.