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discussion in this chapter pertains to combustion engine lubricants the chemistry and technology of these lubricants are presented along with united states and european performance specifications and the process of establishing them in order to facilitate understanding various types of internal combustion engines and their operation are described the chapter also addresses the current topics of fuel economy emissions control and extended service intervals the chapter is concluded by citing examples of several engine oil formulations engine lubricants or engine oils are designed for use in internal combustion engines modern engines operate on a wide variety of fuels and in environments that involve temperature extremes hence their lubrication is quite complex a combustion engine lubricant must possess attributes to help it perform the following functions effectively 1 permit easy starting it must have low viscosity at low temperatures and be pumpable so as to instantaneously reach the engine parts that need lubrication this is an important attribute since most of the engine wear occurs during the start up primarily due to lubricant starvation 2 maintain adequate viscosity at high temperatures this is

important because most oils experience a decrease in viscosity at high temperatures such as those in and around the combustion engine if the viscosity of the oil drops too far the lubricant loses its ability to form the lubricating film of the appropriate thickness which will permit metal to metal contact and wear will ensue 3 lubricate and prevent wear this translates into the oil forming a lubricating film of appropriate thickness to prevent metal surfaces from contacting each other and experiencing wear for most engine parts the surfaces are well separated which makes lubrication easier however there are parts such as the piston rings and cam lobes which are designed to have metal to metal contact and the function of the lubricant is to minimize wear by making chemical surface films 4 reduce friction the formation of the lubricant film of proper thickness on surfaces and its maintenance will reduce friction and the accompanied wear this is especially true during the start up and idle when the lubrication is inadequate and the frictional losses occur therefore controlling friction will improve the fuel economy 5 protect against rust and corrosion water resulting from the fuel combustion while meant to escape through the exhaust can condense on the cylinder walls or travel past piston rings as part of the blow by and enter the crankcase this typically occurs in cold weather or short distance driving because the engine and the lubricant are not hot enough for water to be removed via evaporation water can initiate rust and in the presence of the acidic materials resulting from the lubricant oxidation and

additive decomposition can cause corrosion 6 keep engine parts clean partial fuel combustion products such as free radicals soot sulfur and nitrogen oxides enter the crankcase as the blow by and react interact with the lubricant to form highly polar deposit precursors and corrosive materials these species have the tendency to separate on the hot surfaces to form deposits and to lead to corrosion engine lubricants are designed to prevent the formation of these species or keep them from separating on the surfaces by suspending them in the bulk lubricant or both 7 cool engine parts cooling of the engine parts is crucial to its trouble free operation parts that must be cooled include cylinder heads cylinder walls valves crankshaft main and connecting rod bearings timing gears pistons and others certain parts of the engine can be cooled by the use of a coolant which is typically a mixture of water and ethylene glycol other parts cannot be effectively cooled by the coolant either because of their vicinity or the part temperature is extremely high which leads to the rapid evaporation of water in such situations the lubricant acts as a coolant 8 seal combustion pressures surfaces of piston rings ring grooves and cylinder walls do not have an ideal fit primarily because of the machining limitations it is important that these parts act as a good seal to prevent the loss of the high combustion and compression pressures which are needed for the efficient engine operation a loss into the low pressure area of the crankcase would result in a reduction of the engine power and efficiency engine oils therefore improve the

seal by filling spaces in the above listed parts typically the oil film that acts as a seal is only 0 025 mm thick hence it is ineffective in filling spaces that are larger because of the intensive wear incidentally the oil consumption in a new engine is high until the surfaces in these parts become smoother due to wear for the oil to form a better seal 9 control foam foaming of the engine oil due to air entrainment occurs because of the rapidly moving engine parts which create turbulence the result is the formation of the air bubbles which normally rise to the surface of the oil and break however the presence of water and additives many of which have surfactant properties slows down this process foam in the engine oil is undesired because of its poor cooling ability and noncontinuous film formation which will result in excessive engine wear while a good quality engine oil can perform these functions adequately the continuing efforts of the oems to improve emissions quality by recycling partial combustion products from the exhaust and venting the volatiles from the fuel system and the bulk lubricant positive crankcase ventilation into the combustion chamber place additional demands on the lubricant this strategy is effective in lowering the partial combustion products such as the unburned or partially burned hydrocarbons and carbon monoxide but at the expense of enriching the combustion mixture in nox nitrogen oxides a potent oxidant this will be discussed further in chapter 6 dealing with emissions in an internal combustion engine vols for 1904 1926 include also decisions of the united

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# Parts Catalog, Jacobs L-5 Series Aircraft Engines *1943*

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## *Engine Parts Price List for Engine Model XAH-3 5/8" X 4 1/2." 1934*

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## **Waukesha Engine Parts Price List for Engine Model EU - 5 X 6 1/4** *1932*

issues for include annual air transport progress issue

## *Kinner K-5, B-5 Engines 1931*

## *Parts Catalog, Ranger Aircraft Engine Models*

***6-440C-2-3-4-5 1943***

**Parts Catalog** ***1944***

***Engine Parts 19??***

**Chapter 5 : Combustion Engine Lubricants** ***2009***

**Parts Catalog for Ranger Aircraft Engine Models 6-440C-2-3-4-5** ***1940***

**U.S. Foreign Trade *1971***

**Producer Price Indexes *1987***

**Replies to Questionnaires on Aircraft Engine Production Costs and Profits *1957***

**The Foreign Commerce and Navigation of the United States for the Year Ending ... *1940***

**Occupational Injuries and Illnesses--counts,**

**Rates, and Characteristics** ***1997***

**County Business Patterns** ***1983***

**County Business Patterns, Indiana** ***1979***

***County Business Patterns 1982***

**JT8D-1, D-5, D-7 and D-9 Turbofan Engines** ***1963***

**Business Establishments, Employment, and**

**Taxable Pay Rolls Under Old Age and Survivors Insurance Program** ***1968***

**Treasury Decisions Under Customs and Other Laws** ***1921***

***Impact of Environmental, Energy, and Safety Regulations and of Emerging Market Factors Upon the United States Sector of the North American Automotive Industry 1977***

***County Business Patterns, Colorado 1989***

**County Business Patterns, Florida *1978***

**Organizational, Intermediate (field), Direct Support and General Support, Maintenance Repair Parts and Special Tools List (including Depot Maintenance Repair Parts and Special Tools) *1987***

**U.S. Commodity Exports and Imports as Related**

**to Output** ***1966***

***Employment and Earnings 1982***

**Highlights of U.S. Export and Import Trade** ***1967***

**Parliamentary Debates (Hansard).** ***1992***

**American Aviation** ***1951***

***Instruction Manual and Parts Price List 1938****

**PPI Detailed Report** ***2000-12***

***County Business Patterns, Oklahoma 1985***

**Engine Parts List and Repair Instructions IV** ***1975***

***Survey of Occupational Injuries and Illnesses 2002***

**Current Industrial Reports** ***1967***

**Western Aerospace** ***1949***

**County Business Patterns, Missouri** ***1975***

**Direct Support and General Support Maintenance Repair Parts and Special Tools Lists** ***1984***

***County Business Patterns, Wisconsin 1983***

***United States Exports of Domestic and Foreign Merchandise 1959***

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