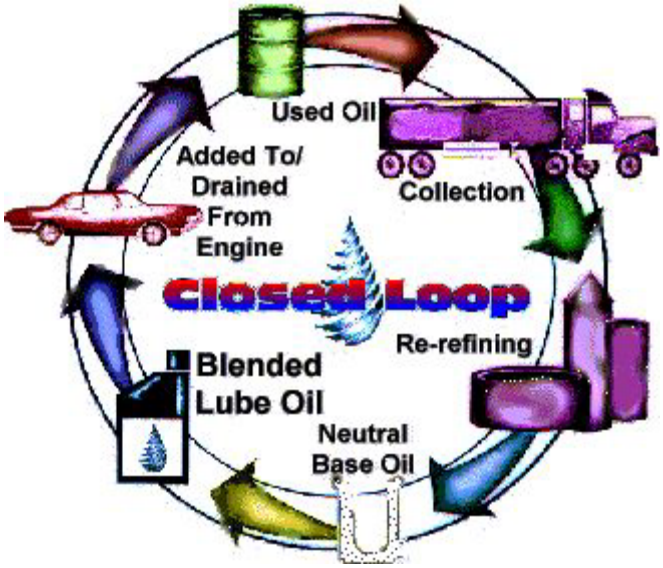

Figure 1: Typical Closed Loop for Re-refining Base Oils

6. Lubricant Demand & Product Types

6.1 Lubricant demand by product type

In Latin America, most lubricant markets showed that gasoline motor oils (GMO) amount to about 25%, diesel oils (both cars and heavy duty commercial) amount to ca. 35%, and industrial/other lubricants make the balance (i.e. 40%). These are benchmarks numbers, which may change depending upon the specific car park and commercial fleets in the country of interest.

The reported data in Table 3 below for Guatemala shows that 65% of lubricants are of the automotive type, that is, engine oils for passenger car motor oils and diesel oils. Transmission oils, marine oils, industrial oils, and greases make up the balance, namely, 35%.

On the other hand, reported data for automotive lubricants in Honduras shows 48% passenger car motor oils (PCMO), and 52% for commercial (trucks, buses), marine oils, and industrial oils. The author believes that the PCMO proportion is on the high side (overestimated number).

Table 3: 2000 Relative lubricant consumption (%) by product type in Guatemala

Type of lubricant	% in Guatemala
Automotive	65
Transmission	7
Marine	14
Industrial	7
Grease	7

Source: Texaco Inc.

Table 4: Relative lubricant consumption (%) by product type in Honduras (Year 2000)

Type of lubricant	% in Honduras
Passenger Car Motor Oils	48
Commercial Lubricants	13
Marine Oils	2
Industrial Lubricants	35

Source: Mobil Corp.

6.2 Lubricant volume sold by importing companies

The main importers of lubricants into El Salvador together with product brand names, source of import, lubricant quality levels, and volume of lubricant imported are described in (Reference 6).

The name of the importing lubricant company, the lubricant volume sold, and the major type of lubricant imported in Honduras are described in Table 5 below. Only those companies that imported more than 500,000 Kg are listed.

Table 5: Honduras - Imported Lubricants & Major Importers in 2000
(Ranked in decreasing volume)

Importer[1]	**Lubricants Imports, Kilograms.**	**Type of Lubricant**
TEXACO CARIBEAN INC	6,980,514	Automotriz, Industrial.
DISTRIBUIDORA DE PRODCT.PETROL	2,233,392	Automotriz, Industrial.
SHELL HONDURAS S.A	1,995,389	Automotriz, Industrial.
ESSO STANDARD OIL S.A.	1,856,254	Automotriz, Industrial.
LUBRICATES MOBIL DE CENTROAMERICA	1,446,820	Automotriz, Industrial.
TECNICA Y MOTORES S A DE C V	907,116	Automotriz.
LLANTEX	785,318	Automotriz.
CONFECCIONES ALKA S.A.	555,356	Industria textil.
TOYOPARTES,S.A.	503,183	Automotriz.
CASA COMERCIAL MATHEWS S A	502,064	Equipo pesado, agrícola.
Other	4,684,580	
TOTAL 2000	**22,449,986**	

Costa Rica reported the data for imported lubricants in the years 1999, 2000, and Jan-April 2001 (Reference 7). For the year 2000, total imported lubricant volume is estimated

at 6.2 MM US Gallons (23.5 MM Liters). A list of the lubricant importers and local distributors was also provided (Reference 8).

7. Lubricant Quality, Performance Specifications, and Certification

7.1 Lubricant quality and performance

There are two most widely used engine oil quality levels and performance specifications:

a) American Petroleum Institute (API), which is applicable for North American and

b) ACEA (Association des Constructeurs Europeens des Automobiles), which is applicable for European applications

However, most oil marketers do utilize both types to better promote their products as meetings all quality and performance standards. This is especially the case in Europe, where lubricants companies utilize API and ACEA as well as car manufacturers' approvals. In North America and Japan, API is by far the most prevalent.

In CAM, the most prevalent quality specifications used are those of API. However, most lubricants are of lower quality than the latest API licensed quality level. Only about 30% of passenger car motor oils are of the highest quality levels, currently API SJ (soon to be superseded by API SL). For lower quality levels than API SJ, the indicated quality on the packaging label is based on the oil marketer's recommendation and "read-across" assessment based on historical data. Likewise for diesel engine oils, less than 25% of diesel engine oils are of API CH-4 quality level, highest for API standards. Those products lower than API CH-4 quality levels are also based on the oil marketer's historical data.

7.2 API Service Symbol and Certification Mark

There are two types of marks (Reference 9):

a) The API service symbol, also known as Donut

The top half describes the oil's performance level. The center identifies the oil's viscosity. The bottom half tells whether the oil has demonstrated energy-conserving properties in a standard test in comparison to reference oil.

b) The API Certification Mark, also known as the “starburst”

The API Certification Mark "starburst" is designed and recommended for a specific engine oil application (such as gasoline service). Oil may be licensed to display the starburst only if the oil satisfies the most current requirements of the International Lubricant Standardization and Approval Committee (ILSAC) minimum performance standard for this application (currently GF-2 for passenger cars).

7.3 API Service Categories

The current and previous API Service Categories are shown below in Table 6 and 7 (Reference 10). Vehicle owners should consult their owner’s manuals before referring to these charts. Engine oils are categorized based on their performance characteristics and the type of service for which they are intended: **S** category oils are suitable for gasoline engines and **C** category oils are suitable for diesel engines. Oils may have more than one performance level.

Table 6; API Service Categories for Gasoline Engines

Category	Status	Service
SJ	**Current**	For all automotive engines presently in use. Introduced in the API Service Symbol in 1996.
SH	Obsolete	For model year 1996 and older engines. Valid when preceded by certain C categories.
SG	Obsolete	For model year 1993 and older engines.
SF	Obsolete	For 1988 and older engines.
SE	Obsolete	For 1979 and older engines.
SD	Obsolete	For 1971 and older engines.
SC	Obsolete	For 1967 and older engines.
SB	Obsolete	For older engines. Use only when specifically recommended by the manufacturer.
SA	Obsolete	For older engines; no performance requirement. Use only when specifically recommended by the manufacturer.

Table 7; API Service Categories for Diesel Engines

Category	Status	Service
CH-4	**Current**	Introduced December 1, 1998. For high-speed, four-stroke engines designed to meet 1998 exhaust emission standards. CH-4 oils are specifically compounded for use with diesel fuels ranging in sulfur content up to 0.5% weight. Can be used in place of CD, CE, CF-4, and CG-4 oils.
CG-4	**Current**	Introduced in 1995. For severe duty, high-speed, four-stroke engines using fuel with less than 0.5% weight sulfur. CG-4 oils are required for engines meeting 1994 emission standards. Can be used in place of CD, CE, and CF-4 oils.
CF-4	**Current**	Introduced in 1990. For high-speed, four-stroke, naturally aspirated and turbocharged engines. Can be used in place of CE oils.
CF-2	**Current**	Introduced in 1994. For severe duty, two-stroke-cycle engines. Can be used in place of CD-II oils.
CF	**Current**	Introduced in 1994. For off-road, indirect-injected and other diesel engines including those using fuel with over 0.5% weight sulfur. Can be used in place of CD oils.
CE	Obsolete	Introduced in 1987. For high-speed, four-stroke, naturally aspirated and turbocharged engines. Can be used in place of CC and CD oils.
CD-II	Obsolete	Introduced in 1987. For two-stroke-cycle engines.
CD	Obsolete	Introduced in 1955. For certain naturally aspirated and turbocharged engines.
CC	Obsolete	For engines introduced in 1961.
CB	Obsolete	For moderate duty engines from 1949 to 1960.
CA	Obsolete	For light duty engines (1940's and 1950's).

For automotive gasoline engines, the latest engine oil service category includes the performance properties of each earlier category. If an automotive owner's manual calls for an API SG or SH oil, API SJ oil will provide full protection. For diesel engines, the latest performance category usually - but not always - includes the performance properties of an earlier performance category.

El Salvador reported the current lubricant specifications and definition of quality levels used (Reference 11). This document, adapted from the Mexican specifications (which were adapted from the US API/SAE/ASTM Specifications and Standards), is a very adequate document that