



# **AL-Mahaba Oil Services**



## **OIL & GREASES**



Since lubricating oils and greases (with a few minor exceptions) are based on petroleum or related hydrocarbons, they have certain inherent characteristics of which the user should be aware. There are, of course, no unusual hazards associated with most lubricating oils and greases, provided reasonable care is taken with their storage, handling and usage.

## **STORING AND HANDLING**

**AOSCO** should have a definite place for the storage of oils and greases. Even if the place designated is only a corner in the plant, it is better than having drums in indiscriminately scattered locations with no means of control.

Cleanliness and orderliness in the oil house will pay dividends in trouble free operation.

There should be a place for everything, racks for oil drums, space for greases drums, shelves for smaller containers, and an especially clean area or cupboard for oil cans, greases guns, etc. The absolute necessity for clean storage facilities cannot be over emphasized. This is important not only from the standpoint of preventing contamination of lubricants, but from the standpoint of oily or greasy floors, which may result from improper handling or inadequate facilities and the resultant accidents to plant personnel which may result.

Lubricant containers should be kept clean on the outside and lubricant pumps, measuring cans, grease guns, etc. should be stored away from open doors or windows in order to preclude the possibility of contamination from dirt, dust, etc.

A mineral spirit solvent is a valuable aid to housekeeping in the oil room. However, kerosene should never be used as it does not evaporate and it may therefore, thin out any lubricant with which it comes into contact. Mineral spirit, which evaporates entirely, will help to keep equipment clean without the danger of product dilution. Suitable clean containers should also be providing to catch oil drip. Drip oil which has been gathered in clean cans or traps may be used for lubrication in once through applications without being filtered.

Drum bungs and drum heads should always be kept tight and should always be replaced immediately after use. A proper non sparking bung wrench should always be used so that bungs are not damaged by frequent opening and closing with improper tools.

Great care should be taken with regard to what is allowed in the oil house avoid the ever-present danger of product contamination. Only lubricants and lubricating devices should be allowed in the oil house storage area so that personnel who are not directly involved in lubrication will not come in contact with the lubricants. Only lint-free rags should be used for clean up since lint can accumulate in circulation piping or oil grooves on equipment and then stop or limit lubricant flow.



## **HANDLING LUBRICANTS**

The equipment which is necessary for handling lubricants in the oil house may include pumps, grease guns, meters, hoists and racks for handling drums storage tanks, etc. when oils are to be handled out of any sort of storage tank, sealed pumps with drip return should be used. Measuring devices are advisable to ensure proper consumption and cost record. If a rack and hoisting equipment is available; oil drums may be stored on their sides and taps used to withdraw oil. Here provision of drip trays will take care of any oil overflow. However, oil may be efficiently stored in the drum in which it is shipping and dispensed by a hand pump fitted in the drum.

When oil drums are stored on end it is most important to ensure there is no possibility of water getting inside. Moisture does not affect most straight mineral oils adversely but can cause havoc with many additive type oils. Extra precautions must therefore be taken to ensure that water never accumulates on drum heads. Drums should always be stored on their sides until they are used. When they are set on end and equipped with pumps or pouring valves, the fittings should be routinely checked to see that they are leak proof.

Many types of grease are also affected by water which can cause separation and in some cases lump formation. Drums and packages are seldom tight enough to completely exclude water if it is allowed to stand on the top of drums or to drip onto packages; consequently, they should always be stored under cover.

To protect the contents of grease packages which have been opened and to prevent the content from drying out and from becoming contaminated with dirt, dust, etc... removable covers should always be replaced at once.

## **DISPENSING LUBRICANTS**

The best designed machines and the highest quality lubricants will not provide satisfactory operation unless proper maintenance procedures are followed. One of the greatest losses to productive capacity is caused by poor lubrication maintenance and practices. The best maintenance procedures consist of common-sense and good housekeeping. If equipment and its lubricants are kept clean, service life will be extended indefinitely. This means clean oil or greases should be placed in a clean system and then kept clean. When this procedure is not followed, various problems arise and considerable time and effort has to be expended to prove that the lubricant was not at fault, but that contamination created a situation which led to the ensuing problem

## **HEALTH HAZARD WITH LUBRICATING OILS AND GREASES**

There are no unusual hazards in using most lubricating oils and greases provided ordinary and reasonable care is taken to keep them off the skin, away from the eyes and to avoid breathing their vapors or mists. In view of the general and increasing concern about the use and handling of all materials, the following information has been compiled to point out potential hazards and precautionary practices that should be followed to prevent any impairment to health.

Medical problems arising from contact with petroleum based lubricants are relatively infrequent and occur chiefly in circumstances where there is an excessive degree of bodily contact, e.g. where oil soaked clothing is not regularly changed. Oil soaked clothing should be changed daily. In respect of occasional short-term contact, mineral oils and mineral oil based greases are relatively harmless, being only slight or mild skin irritants and are well tolerated by intact and normal skin. No unusual hazards should be involved in their use provided good



Hygiene is practiced. However, because lubricants and cutting oils can, especially during service, become contaminated with bacteria, particular care should be taken to prevent those contacting cuts or abrasions.

Frequent and prolonged contact with mineral oils way, however, given rise to various forms of skin irritations, and even in rare instances, to more serious conditions such as skin cancer. We wish to stress however that cancer of the skin from oil is as an uncommon disease and that, while we feel right to draw attention to it, it should not be interpreted in any alarmist way.

Inhalation of oil mists is always to be avoided.

The chances of prolonged exposure and contact, and the consequent effects, can normally be eliminated or minimized by the observance of good working practices and work are housekeeping coupled with reasonable standards of personal hygiene. This once again highlights the need to observe simple precautions which provide a very effective safeguard.

These precautions, which are summarized below, are desirable irrespective of the types of lubricating oil or grease being used or the industrial application concerned.

### **COMPOSITION OF LUBRICATING OILS**

The lubricating oil fractions from crude oils are widely varying mixtures of straight and branched chain paraffin, naphthenic (cyclo-paraffinic), and aromatic hydro-carbons, with fall in the approximate molecular size range C17 and higher. They have boiling points ranging from about 302 °C – 593 °C. Oils derived from residual stocks may have components boiling as high as 815 °C, while very light distillate fractions used in some specialty lubricants may extend down to about 177 °C.

The various base stocks which all lubricant suppliers use to make today's oils and greases differ widely in their properties to cover uses ranging from rough open gear lubricants to highly refined pharmaceutical and medicinal grade white oils. This variety is achieved by appropriate choice of crude source, viscosity grade and method of refining. In many cases, additives are also included to give properties which would be otherwise unattainable in a finished lubricant.

### **ADDITIVES**

The many additives which are used in lubricant formulations vary in their toxicity, though they are generally low. The presence of an additive in lubricating oil does not in any way change the handling precautions required for base stocks alone. There are some exceptions, such as some lead compound, and certain other materials that can be toxic if ingested, inhaled, or absorbed through the skin, or that are irritating to the skin and/or eyes. Some extreme pressure gear lubricants and greases to contain low concentrations of lead naphthenate. As this toxic material could be absorbed through the skin, it is necessary to have more stringent precautions about avoiding skin contact and the contamination of Tenarisuffs, cosmetics, cigarettes, etc. Although exposure to the mist from such lubricants is most unlikely from the majority of applications, where a mist is produced the breathing zone concentration should be controlled to well below the currently recommended 5 mg/m<sup>3</sup> limit for oil mist or vapor.



## **BIOCIDES AND BACTERIAL CONTAMINATION**

Cutting oils supplied to customers are normally, relatively free of bacterial and straight oil can be regarded as sterile as far as harmful bacteria are concerned. Although bacterial contamination of soluble oils is not uncommon, the types of bacteria involved are almost invariably unlikely to have harmful effects other than on the technical qualities of the product. Many soluble oils contain small quantities of biocides in an attempt to minimize problems of this type. Where bacterial contamination repeatedly occurs, the oil sump, etc... must be cleaned as completely as possible, and the cause must be identified and removed.

Most bacterial contamination results from pollution of the oil by floor sweepings, refuse or human waste. This kind of contamination should be suspected when problems of this type arise and must therefore be effectively discouraged.

Use of additional biocide should be a last resort, not a palliative for bad work practice. If a biocide must be introduced, the minimum quantities recommended for the product should be used – too much could lead to skin trouble. Excessive amounts of phenolic type biocides can cause, and have caused, wide spread outbreaks of dermatitis. As a general rule keep oil circulating at a low rate over weekends or other shutdown periods to prevent the phase separation in soluble oils which permits bacteria to proliferate.

## **OIL MIST**

If inhaled in high enough concentrations, oil mist or vapors can cause irritation of the lungs, which may lead to pneumonia: even medicinal grade liquid paraffin may cause such a reaction.

However, this is not unique to petroleum oils, since the excessive inhalation of many other compounds may also cause the development of a chemical pneumonia there has been some indication from recent research that workers exposed to oil mist may have a slightly increased risk of developing cancers of the respiratory and digestive systems. Although the situation is by no means well substantiated, it is prudent to recommend that exposure of workers to oil mist from either single phase or soluble oils be prevented, or at least controlled to below the currently recommended 5 milligrams per cubic meters of air level for an 8 hour daily workday. A number of equipment manufacturer now offer specially designed local exhaust systems for controlling any oil mist which is generated during a variety of operations including those utilizing metal-working fluids.

## **PRINCIPAL HARMFUL EFFECTS**

The principal problem associated with the handling of lubricating oils is dermatitis resulting from prolonged or repeated contact with the skin. This is characterized by acne-type lesions mainly on the back of the hands, and on the forearms and thighs where the hair follicles and sweat pores can become infected with the formation of small boils or pimples. For the occasional person who develops an individual sensitivity to lubricating oils, very severe skin reactions may develop requiring special medical attention. In general, however, dermatitis is not a problem if unnecessary contact with the oils is avoided and good personal hygiene and cleanliness are always observed.

Most petroleum products with final boiling points below 343 °C. Naphtha's, solvents and diesel or fuel oil, tend to be direct skin irritants. Prolonged exposure of the skin to these should be avoided since like other fat solvents they may cause dry skin or dermatitis. The higher boiling point fractions may cause oil folliculate by superficial irritation of the hair follicle or oil acne from their effect on the sebaceous glands of the skin.



Either of these two conditions indicates gross skin contact or poor personal hygiene. Prolonged and repeated skin contact with higher boiling point fractions may cause warty growths over a period of years and these growths may become malignant. However, by adopting simple precautionary measures designed to minimize skin contact and contamination, the risk of developing long-term disorders can be reduced to a very low level.

But it is worth repeating that product differences are minor factors compared to the much more important one of good industrial and personal hygiene. It is easier to say that, than to achieve uniformly high standards, but, once they are achieved, health and other associated problems will be at a minimum.

### **RECOMMENDED PRACTICES**

- Avoid all unnecessary contact with mineral or synthetic oils. Minimize contact by using splash guards, protective gloves, and protective aprons, etc. use goggles or face visors when handling soluble oil concentrates. Have protective clothing that becomes contaminated with oil, regularly dry-cleaned. The golden rule is: don't wear oil-soaked clothing and never put oily rags into pockets.
- Avoid prolonged and repeated contact with used oils. Although used crankcase oils, hydraulic oils, quench oils, etc... are not expected to have a dramatically increased risk of producing skin disorders, slight changes in composition of the oils do occur, and it is prudent to exercise care and avoid skin contact as much as possible.
- It is essential that workers should be encouraged to wear clean work clothes; since oil-soaked clothing may hold the oil in contact with the skin longer than would otherwise occur. This applies particularly to underclothes, which should be changed daily and washed thoroughly before re-use. Consider the provision of one locker for work clothes and a separate one for street clothes.
- Consider the use of short-sleeved coveralls rather than long-sleeved garments for workers handling metalworking fluids where friction on the skin from cuffs saturated in oil can promote skin problems.
- Remove oil from the skin as soon as possible if contact does occur. This usually means the installation of easily accessible wash basins and the provision of mild soap or waterless hand cleaner and clean towels in adequate supply. Avoid strong soaps, detergents, and abrasive type skin cleansers.
- Encourage workers to take showers at the end of a day's work, in order to remove all traces of oil from the skin.
- Do not allow kerosene, gasoline, chlorinated hydrocarbons or hydrocarbon solvents to be used for cleaning the skin. Use only warm water, mild soap and a soft brush or in combination with a mild waterless skin cleanser.
- Avoid unnecessary exposure of workers to oil mist or vapors. In any event, ensure that breathing zone levels of oil mist are well below the currently recommended permissible concentration of 5 milligrams/cubic meters of air.



- See that all cuts and scratches receive prompt medical attention. Medical supervision should be available so that prompt advice can be given on dermatitis, etc... at an early stage in its development. Once dermatitis appears in an individual, it may be possible to prevent it from becoming more severe by the appropriate treatment and by transferring the person to another job until the dermatitis subsides.
- Prevent the contamination of all oils, particularly soluble oils, and minimize the use of biocides. Ensure that soluble oils are used only at the recommended dilution ratio. Check the ration frequently with a refract meter. Make appropriate use of sterilization and filtration systems. See there is an adequate supply of clean waste rags to wipe oil from the skin, machinery, etc...
- Program the regular of machines that use oil. Where it is temporarily impossible to prevent oil accumulating on the floor, use buckboards, floorboards, absorbents, etc... to prevent machine operator's shoes from becoming soaked with oil. Leather footwear which has become oil soaked should be discarded.
- Obey any special instruction on the product labels. In common with most other industries, the petroleum industry is increasing its use of precautionary labeling.
- Use correct work technique-particularly for soluble oil concentrates which may irritate skin and eyes. Handling concentrates and preparing dilutions requires careful precautionary measure: the use of goggles or a face visor, impervious gloves, etc... Also, there must be reasonable accuracy in dispensing soluble oil concentrates for dilution, since strong solution or emulsions made up in error could cause excessive skin irritation.
- Use warning notices, placards, etc... in prominent locations to draw attention to the need for wood personal hygiene and good work practices.