

## Safety with Liquid Oils

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Proper maintenance of your roads, streets, and highways involves applying hot oils at one time or another. While methods of application vary, the procedures all have one thing in common: the oil products must be heated to a prescribed temperature to perform well. Transferring, heating, and applying these products can be hazardous and dangerous if caution and awareness of safety aren't foremost in mind.

Most applications of hot oils involve either distributor trucks or crack-seal machines. Reminders about safety around each type of equipment are presented later in this article, but your greatest allies are a deliberate approach to operation of the equipment and an awareness of what those around you are doing.

### GENERAL REMINDERS

The high application temperatures of the various oil products demand that equipment operators wear protective clothing, gloves, and other gear. Obviously, the driver of a distributor truck is not likely to come in contact with hot oil during the application process, but when refilling the truck or unclogging plugged nozzles, the driver is at great risk to be burned. In cracksealing operations, the operator of the wand and hoses is in close proximity to hot oils.

Operators must observe all "Caution" and "Warning" signs and placards on the equipment. The warnings are there for a reason, and the reason is to keep you from getting burned. Know both the application and safe heating temperatures for all the products your agency uses. Overheating oil products not only destroys their desirable properties but also can be extremely hazardous.

Avoid allowing any water to enter the machines and equipment. Water will expand rapidly in contact with hot oil products and can cause the products to overflow their tanks and spill on workers. Spills present not only a burn hazard to workers but also a potential for fire or explosion.

Identify the "flash point" of the materials you use. This is found on the Material Safety Data Sheet (MSDS) that should be available with the materials. The flash point is determined by performing a test, called the Cleveland Open Cup method, where the material is heated to the temperature at which it will produce a flash when a small flame is passed over its surface.

Read and fully understand the operator's manuals before operating equipment that carries, heats, or dispenses liquid oils. It is also beneficial to keep copies on the jobsite for reference. The operator's manual provides valuable information for the safe operation of equipment, as well as for its proper startup, shutdown, and routine maintenance. It is advisable never to substitute "after market" parts for "OEM" (original-equipment-manufactured) parts without first consulting the manufacturer. Going to the local NAPA Auto Parts to get rubber hoses for the crack-seal machine could be a costly and dangerous practice. Not all rubber hoses are compatible with the unique ingredients or high application temperatures of some oils. A rupture of a hose under pressure of hot oil is hazardous not only to the operator but to anyone near the equipment.

Know the proper procedure for adding new material to the equipment. Identify whether circulation pumps should be on or off, whether burners and engines should be shut down, and whether auger systems should be shut down before opening access lids. All of these and more are important to safe operation.



**A crack-sealing operation.**



*Liquid asphalt distributor truck.*

## SAFETY AROUND DISTRIBUTOR TRUCKS

Keep these safety practices in mind:

- Always verify the type of material in the truck and the type of material that is being put into the truck. Mixing a cationic (positively charged) emulsion, with an anionic (negatively charged) emulsion, will not result in an explosion or fire initially. But what will happen is the two oils will congeal (glob together) into one large, sticky mess and will not spray out the nozzles. If the operator then heats the material to get it to spray, a fire or explosion may result from overheating. Adding an emulsion to a distributor truck that contains residual cutback or asphalt cement will cause the water in the emulsion to boil and material to spew out the lid like a spout from a surfacing whale, burning any workers in the vicinity.
- Know the proper temperature range of the oil products you plan to apply prior to heating them. Proper heating is determined by having a thermometer that works on the distributor truck. Overheating the oil not only endangers the workers, it also destroys the good properties of the oil, and the product will not perform satisfactorily.
- Never try to unplug a nozzle with the system pressurized. Even if you're successful, you'll be unsuccessful, because the plugged material will come out the nozzle under pressure at somewhere between 30 and 70 pounds per square inch. You can be sure that one or more workers will be burned.
- Always wear eye, ear, and face protection and protective clothing for the body when doing any maintenance on the plumbing system of the equipment. Ideally, the material it contains will be cold and not at operating temperature, but in real life this will not always be the case. The personal protective equipment (PPE) should be designed to protect the wearer from getting burned.

## SAFETY WITH CRACK-SEAL MACHINES

The other piece of equipment commonly used in the application of hot oils is the crack-seal machine. There are a number of manufacturers of this equipment, but most machines fall into

one of two basic design types: direct-heat and double-wall with heat-transfer oil. Direct-heat units use a flame to heat a metal plate at the bottom of the tank. A double-wall unit consists of an inner tank surrounded by heat-transferring oil. The oil in the heat-transfer container is heated and in turn heats the oil to be used as the crack sealant that is in the inner tank. The following are some safety practices while working with crack-seal machines:

- Make sure the operator is familiar with the equipment and fully trained in its operation.
- Keep hands, feet, and clothing away from all moving parts.
- Follow the instructions for startup and shutdown of burners and pilot lights.
- Replace any hoses that show excessive wear, are fraying, or feel as if they may split. Be sure all fittings and joints are tight.
- Make sure all auger and agitator systems have stopped completely before opening the lid to the material compartment when adding new material.
- In the event of material overflow or spillage, immediately shut off burners and other flame sources to prevent a fire.
- Do not mix different ISO grades of heat-transfer oil. Different heat-transfer oils expand at different temperatures.
- Do not mix different crack-sealing materials without first checking with the supplier.
- Do not add kerosene or diesel fuel to crack-sealing materials. If manufacturers wanted them in their products they would put them in there.
- Never exceed the manufacturer's heating and application temperatures for the crack-sealing material.
- Follow the equipment manufacturer's recommendation for cleaning and flushing of equipment, hoses, etc.
- Do not apply heat (for example, from a torch) directly to any wand, hose, or other part except where authorized by the manufacturer.
- Operators of the sealant wand should wear a heavy-duty face shield such as a Nomex fireproof hood or equivalent.
- A clogged hose or wand should be removed from service until cleared by boiling or other manufacturer-approved method.
- A qualified mechanic should check all equipment prior to its going into service.

## FIRST AID

If a worker is burned with hot oil, seek medical attention immediately. The National Asphalt Pavement Association suggests applying cold water, not ice, to the burned area. **Do not remove** the oil from the burn victim; let medical personnel do it.

This information is intended to increase your awareness of the hazards of working with hot oils and the precautions that you can take to reduce or eliminate the chances that you or one of your coworkers will become a burn victim.