



**TO :**

**FROM :** National Wildfire Coordinating Group

**REPLY TO :** NWCG@nifc.gov

**DATE :** 12/06/2002

**SUBJECT :** SAFETY BULLETIN : Drip Torch Safety

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The incident relayed in the attached report could have been much worse. As with many accidents and injuries, this one could have been prevented by adhering to established safety practices.

MTDC is planning to develop and proffer a Tech Tip on proper maintenance and use of drip torches in the near future.

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## **Drip Torch Incident**

### **Background:**

An employee received minor burns when a drip torch erupted into flame while the spout assembly was being removed from the tank during refueling of the torch. According to an interview conducted by the unit safety coordinator and a telephone interview conducted by Wesley Throop of Missoula Technology and Development Center (MTDC), the employee extinguished the wick with a glove and while holding the tank in one hand and the spout assembly in the other, opened the torch. The wick was still smoking when the torch was opened. When the spout assembly was removed, flame suddenly appeared from the tank. The estimated fuel mixture used that day was 65% diesel to 35% gasoline. The drip torch had been refueled twice without problems prior to the incident.

A copy of the report produced by Unit Safety Coordinator was faxed to MTDC for review. After reviewing the report it was requested that the torch be sent to MTDC for examination.

### **Examination of Drip Torch:**

The drip torch was examined by Wesley Throop at MTDC and is a KCR tank fitted with a Forestry Suppliers spout and wick assembly. The outlet screen and check valve ball and seat were disassembled and examined. With the exception of one small hole in the outlet screen these parts were present and appeared to be in working order. The tank and bleeder assembly also appeared to be complete and in good working order. The wick assembly had a heavy deposit of carbon built up on it. In addition, flakes of carbon approximately 1/16" wide and 1/8" long were found on the top of the tank gasket and on top of the tank cover that is exposed when the drip torch is in use.

### **Discussion:**

**The fuel mixture being used at the time of the incident was reported to be approximately 35% gasoline and 65% diesel or 1 gallon of gasoline for every 1.9 gallons of diesel. The most volatile mixture authorized by the agency is 1 gallon of gasoline to 3 gallons of diesel. Use of this mixture carries the following warning the agency's health and safety handbook: "Caution: 1 gallon of gasoline to 3 gallons of diesel fuel produces a very volatile mixture. This mix should be used only in appropriate fuel types and during periods of high humidity." Since the mixture being used at the time of the incident contained an even greater amount of gasoline than the most volatile authorized mixture, the mixture being used would be extremely easy to ignite.**

Prior to removal of the spout assembly, the flame in the wick was extinguished by wrapping a gloved hand around the wick. The wick was still smoking when the spout

assembly was removed indicating that the wick still retained heat. In addition the wick had a heavy buildup of carbon. Wrapping a gloved hand around the wick could have dislodged some of this carbon. The location of the carbon flakes found during examination of the torch, especially the one found on the tank gasket, indicates that these carbon flakes could come in contact with gasoline vapors once the tank was opened. Hot carbon particles combined with the extremely volatile fuel mixture used could have resulted in the ignition of the remaining fuel in the drip torch tank.

**Recommendations:**

The following recommendations were made by the Unit Safety Coordinator, to prevent a reoccurrence:

Extinguish the torch by setting it upright and letting the wick burn dry.

Place the torch on the ground to open, without bending over the torch or holding in proximity of the body

Insure the fuel mixture is the proper mixture for the environmental conditions and shake the container of fuel prior to refilling the torches to insure the gasoline and diesel are mixed

Visually insure that there are no flames on or near the torch when opening or refilling the torch.

I would also add the recommendation that drip torch wicks be kept free of carbon build up either by periodic cleaning or by replacing dirty wicks with new ones. New wicks are available as spare parts from the drip torch manufacturers.

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