USDA United States Department of Agriculture

Forest Service National Technology & Development Program

NTDP Tech Tips

Spark-ignited Utility-terrain Vehicle Torch Developed by the Forest Service

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The U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP) developed a 20-gallon utility-terrain vehicle (UTV) torch (figure 1). NTDP designed the UTV torch to mount in the rear cargo area of a UTV. The torch provided favorable results during prescribed fire operations.

The UTV torch works well in open timber stands where trails or roads border burn units. It also is useful for burning open areas and grasslands with few obstacles where the operator can drive the UTV off-road and light the interior of the burn unit. The UTV torch uses a diesel and gasoline mixture similar to drip-torch fuel, though the UTV torch may require a higher concentration of gasoline to ignite the mixture.

Highlights

- The U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP) developed a 20-gallon utility-terrain vehicle (UTV) torch for use during prescribed fire operations.
- The UTV torch works well in open timber stands where trails or roads border burn units and in open areas and grasslands with few obstacles.
- Units can have a local fabrication shop build the torch using fabrication drawings available from NTDP.
- An operations manual also is available from NTDP.

Figure 1—A utility-terrain vehicle (UTV) operator using a UTV torch to ignite grass along the side of a road.

UTV Torch Description

The UTV torch ignites torch fuel using an electric spark generated at the end of an igniter arm. The torch pumps fuel from the tank through a fuel filter and fuel pump (figure 2) plumbed with stainless steel tubing. Polytetrafluoroethylene (PTFE)-lined, braided, stainless steel hose carries the fuel to the igniter arm. Examples of PTFE include Teflon and Hostaflon. The fuel exits the hose and flows through a spark between two electrodes. The ignited fuel has a range of about 6 feet.

You can power the torch by:

- Connecting it directly to the UTV battery.
- Using the 12-volt auxiliary port.
- Wiring a separate plug to the UTV power supply.

Switches on the control box power the pump and spark. You must depress an operator's push-button switch (figure 3) to engage the pump and spark; this is a safety feature in case you lose control of the vehicle—you simply release the button and the torch stops firing. To test without ignition, you can leave one switch off to engage the pump or spark separately. Because the torch uses a spark for ignition, no residual flame remains on the torch.

NTDP constructed the fuel tank of $^{1}/_{8}$-inch stainless steel, but a fabricator can build a lighter torch by constructing an aluminum tank. A lighter fuel tank could be beneficial, particularly if you want to install a water pump unit on the same UTV. NTDP also extended a protective rail over the top of the tank to protect the torch components in case of a rollover. The torch has a two-way vent with a flame arrester to prevent the accumulation of pressure or the creation of a vacuum inside the tank. The fill cap is fusible, so a seal on the cap will melt at 250 °F. This feature helps to prevent an explosion if the tank reaches extreme temperatures and the vent cannot disperse enough gas.

The igniter arm pivots 180 degrees (figure 4) so that you can direct fire to either side of the vehicle or to the rear. Depending on the configuration of the UTV, you can either strap the torch in place or mount it to a frame.

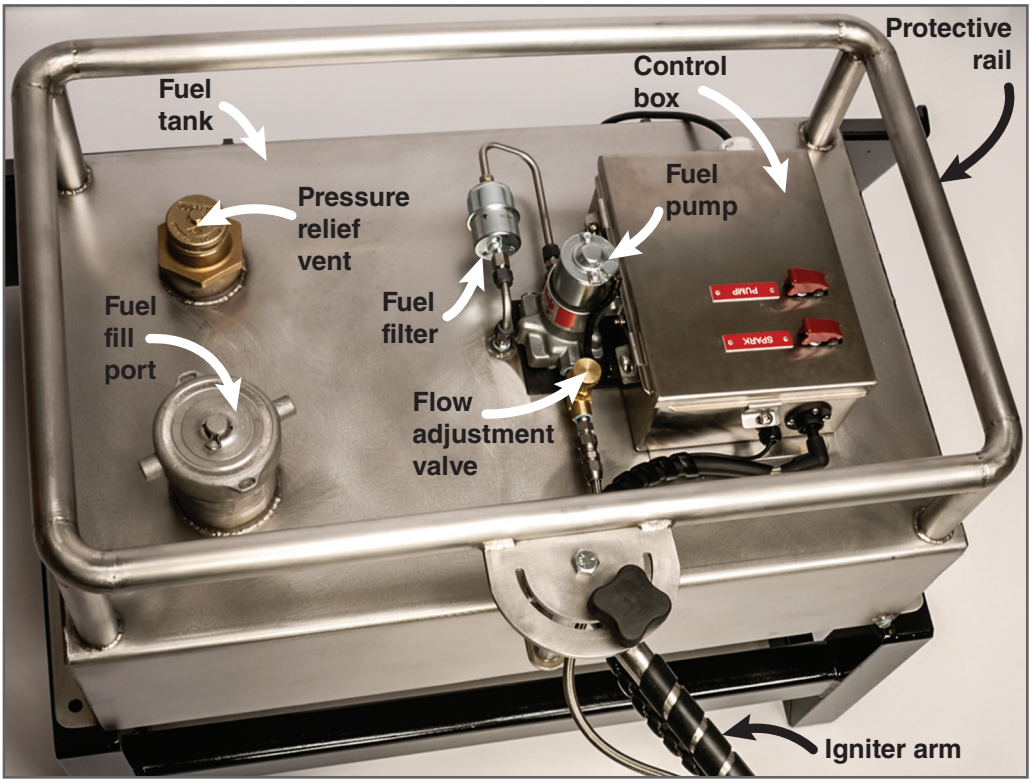

Figure 2—A top view of the utility-terrain vehicle torch fuel tank and its components.

Figure 3—The operator controls the torch with a push-button switch. The switch cable is long enough to reach from the rear of the utility-terrain vehicle to the front seat where the operator sits.

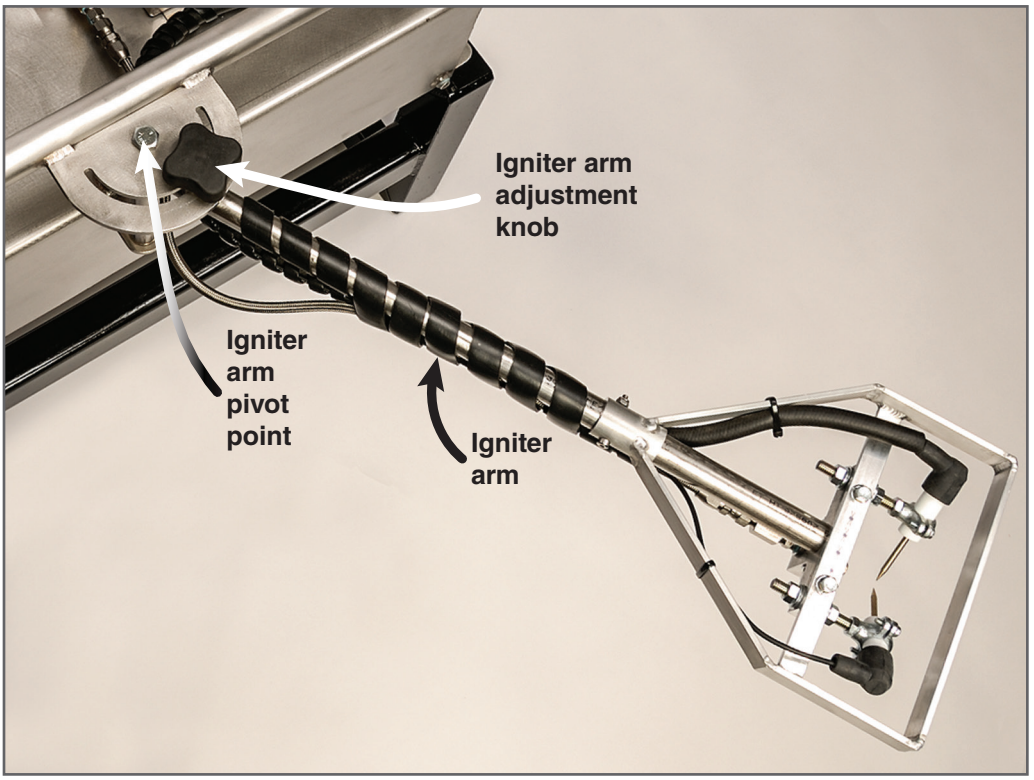

Figure 4—The igniter arm pivots so that the operator can fire the torch from either side of the utility-terrain vehicle.

Power Torch Capability

You can attach a longer PTFE-lined, braided, stainless steel hose and handheld wand to convert the torch into a power torch (figure 5). This configuration enables the torch to have greater range and accuracy. Contact the NTDP ignition specialist at 406–329–3900 for specific details about the power torch conversion.

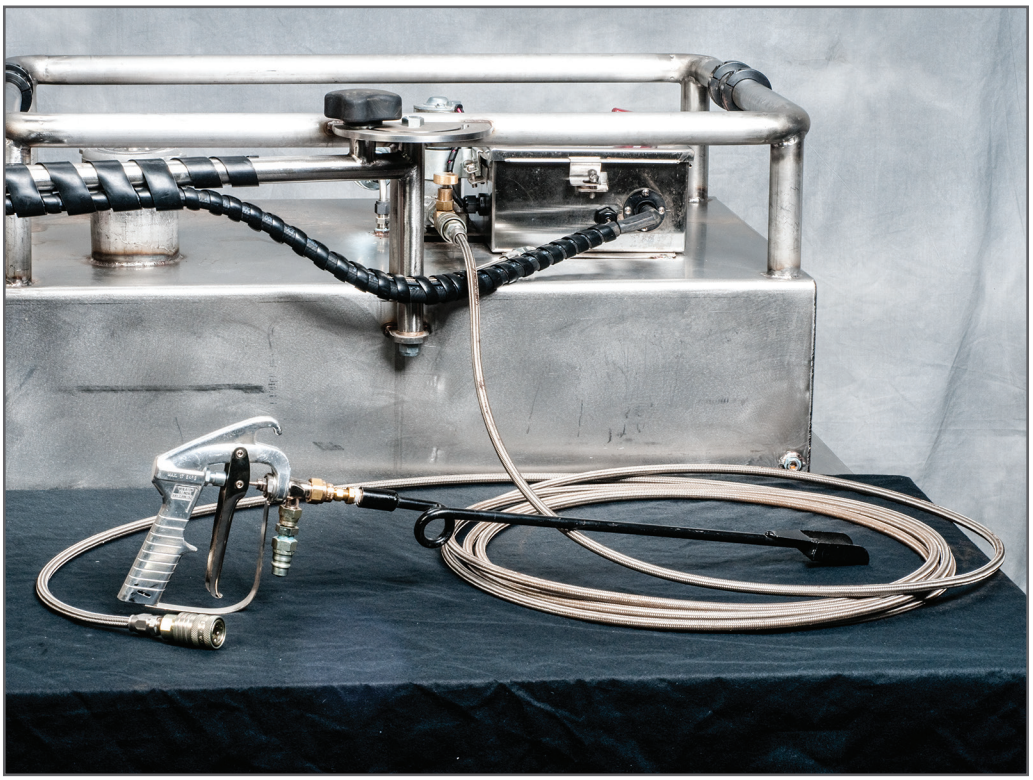

Figure 5—An optional configuration for the torch includes a longer length of polytetrafluoroethylene-lined, stainless steel hose and a handheld wand.

Transportation

The tank does not meet U.S. Department of Transportation requirements for transporting flammable liquids on public highways. You must transport the torch empty of fuel and fill it at the burn site. If fuel remains in the tank after you complete ignition, drain as much fuel from the tank as you can before you transport the torch.

Fabrication

Units may have a local fabricator build the UTV torch using fabrication drawings available from NTDP. The following stipulations apply:

- A welder certified for the materials and welds specified must complete all welds on the UTV torch.
- The unit must obtain the "Spark-Ignited UTV Torch Operations Manual" (1951–2808–NTDP) and the fabrication drawings (MTDC-1108) from NTDP. Contact the NTDP ignition specialist at 406–329–3900 to obtain the fabrication drawings.
- The unit must complete a technical review of the completed UTV torch before accepting it from the fabricator. The reviewer must inspect the torch for quality craftsmanship and to ensure that the torch meets all technical specifications.
- NTDP will assign a serial number to each UTV torch, and the unit will attach the serial number to the torch. NTDP will keep a record of the unit and the serial number.

Conclusion

The UTV torch is now available for ground ignition operations. Some agencies may restrict the use of UTVs for firing operations. Refer to your agency UTV-use policy for more information. The publication "NWCG Standards for Ground Ignition Equipment" (PMS 443) contains additional information about the use of UTV torches.

Contact the NTDP ignition specialist at 406–329–3900 for more information.

Table 1—Utility-terrain vehicle torch specifications

Component	Weight (pounds)
Empty torch	120
Full torch (20 gallons)	280

Component	Dimension (inches)
Torch width	20¼
Torch length	32¼
Tank height (tank only)	8¼
Torch height (including the protective rail)	14¾
Igniter arm length	35¾

About the Author

Shawn Steber is a project leader at the U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP). In 2006, he received his bachelor's degree from Montana Tech in general engineering with a mechanical engineering option. Before coming to NTDP in 2010, he worked for the U.S. Department of the Navy as a civilian nuclear engineer. Steber also has worked for the State of Montana as an engine boss and wildland firefighter.

About NTDP

The U.S. Department of Agriculture, Forest Service, National Technology and Development Program provides Forest Service employees and partners with practical, science-based solutions to resource management challenges. We evaluate, design, and develop new technologies, products, and systems to solve problems and deliver solutions.

Library Card

Steber, S. 2019. Spark-ignited utility-terrain vehicle torch developed by the Forest Service. 1951–2307P–NTDP. Tech. Tip. Missoula, MT: U.S. Department of Agriculture, Forest Service, National Technology and Development Program. 6 p.

The U.S. Department of Agriculture, Forest Service, National Technology and Development Program (NTDP) developed the utility-terrain vehicle (UTV) torch for use as a ground ignition system. The torch mounts on the rear cargo platform of a UTV. The torch's basic components consist of a fuel tank, electric fuel pump, electronic control box, igniter arm assembly, and control cable. The ignition source is an electric spark. The torch operator activates the igniter system and fuel pump using a control button.

This tech tip provides an overview of the UTV torch. NTDP also has a torch operations manual and fabrication drawings available.

Keywords: fuel transportation, gelled fuel, ground ignition, prescribed burns, safety at work, U.S. Department of Transportation, DOT

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