



**STANDARD MODEL**

# Contents

Disclaimer.....	1
About Blackline.....	2
Components and Working of the Blackline Standard Model.....	3
When to Burn your Blacklines .....	5
Preparing the Water System .....	6
Preparing the Burning System.....	7
Burning your Blacklines.....	8
Precautions.....	10
Emergency Procedure.....	11
Using the Blackline Afterburner.....	12
Specifications.....	13

**Important: Before using the Blackline Standard Model, read this instruction manual in its entirety.**

## **Disclaimer**

Firebreak Equipment CC will not be held responsible or liable for any incidental or consequential damages or for any loss or injury arising in connection with the use or inability to use this product. Correct use of the Blackline Burner and Blackline Afterburner is the sole responsibility of the user. Follow all the safety precautions normally taken when burning a firebreak.

If in doubt, contact us for assistance via our website at [www.firebreak.co.za](http://www.firebreak.co.za)

## About Blackline

Blackline is a range of equipment that allows you to create burned firebreaks faster than conventional methods and with less risk of runaway fires. The range includes the Standard Model and the Hand Model.

This instruction manual concerns the Standard Model and its components.

Pulled behind a low-gear vehicle such as a tractor, the Standard Model burns a 53-inch wide blackline. Generally, firebreaks need to be at least twice as wide as the adjacent vegetation is tall, though some guides suggest that they be at least twice as wide as the expected flame length. A single blackline is therefore not sufficient to act as a firebreak. To create an effective firebreak, you need to burn a second blackline, more or less parallel to the first, and then do a controlled burn between these two blacklines. By burning a blackline alongside an existing natural or built control line, you can eliminate the need to burn a second blackline.

Depending on the height, density, and volatility of the fuel, the second blackline should be 3 to 16 feet away from the first blackline. Burning between the two blacklines allows you to create a firebreak of 12 feet or wider.

The Standard Model can handle reasonably rocky terrain. It accommodates rocks about 10 inches high.

For more information and photographs visit our website at [www.firebreak.co.za](http://www.firebreak.co.za)

# Components and Working of the Blackline Standard Model

## Components

The Blackline Standard Model has two components:

- The *Blackline Burner* is the primary component that ignites the vegetation and provides an enclosed burning area.
- The *Blackline Afterburner* is an optional component that extends the enclosed burning area, affording additional safety and increasing operating speed.

The *Blackline Burner* consists of:

- A burning chamber on skids
- A *burning system*
- A *water system*

The *Blackline Afterburner* consists of:

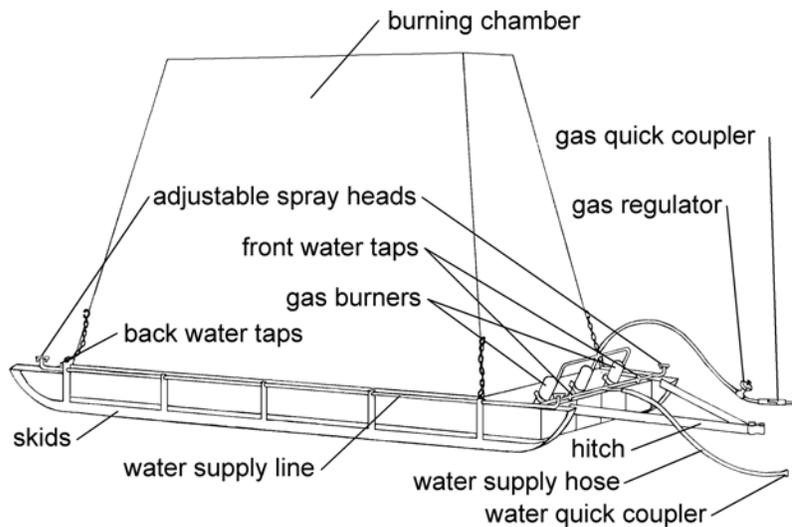
- A burning chamber on skids
- A *water system*

**Important:** To protect the inside of the burning chamber during transport, a reusable cover is fitted over the top of the chamber. This cover is for transportation purposes only. You must remove the cover before using the Burner or Afterburner.

The *burning system* consists of:

- Three propane burners mounted at the front of the burning chamber.
- A gas supply hose with a gas pressure regulator and quick coupler.

The burning system requires liquefied propane, typically provided by a 100-pound Department of Transportation (DOT) specification propane cylinder with fittings for liquid withdrawal.



**Figure 1: Positions of key components of the Blackline Burner**

The *water system* consists of:

- Eight adjustable spray heads with embedded filters.
- A fixed water supply line with four taps.
- A water supply hose with a quick coupler.

The water system depends on, and extends, a user-supplied water sprayer comprising:

- A tank with filters.
- A pump delivering a minimum of 5.8 gallons per minute at a pressure of 44 to 217 psi.
- A manifold for three hoses (optional, but recommended).
- Two high-pressure handguns (optional, but recommended).

## **Configuration**

The Blackline Burner must be pulled by a vehicle with a low gear range.

Usually the vehicle carries the water sprayer and the propane cylinder. A tractor carrying a sprayer and a cylinder on a three-point hitch is ideal. A low-gear truck carrying a skid sprayer and a cylinder is equally suitable. A trailer can also be used to carry the sprayer and cylinder, in which case the Blackline Burner is hitched to the trailer.

The Blackline Afterburner, if used, is hitched to the Burner.

## **Working**

The vehicle pulls the Blackline Burner along the planned path of the firebreak. The gas burners ignite surface fuels inside the burning chamber. The vegetation burns safely within the confines of the chamber—flames are kept inside by a positive upward draught.

The optional Afterburner extends the contained burning area, thereby allowing the towing vehicle to move faster.

The adjustable spray heads on either side of the burning chamber continuously spray water onto the vegetation alongside the chamber. These wet lines prevent the spread of flames beyond the 53-inch burned strip.

## When to Burn your Blacklines

Under optimal burning conditions, you will achieve the best results with maximum efficiency. Using an Afterburner, you can expect to burn up to 1½ miles of blackline per hour.

For best results, ensure that:

- The grass is dead and burns readily.
- The grass is dry.

**Note:** Since dew on the grass inhibits burning, it is best not to begin burning before 09:30 or 10:00.

- The grass is not too long.

If the grass is longer than 3 feet, we recommend that you mow it before burning. This will reduce the risks associated with wind and the flame length.

**Note:** Do not cut the grass shorter than about 10 inches—sufficient fuel is required to burn an effective firebreak.

- The wind is minimal.

Due to the inherent safety of the Blackline range, a total lack of wind is not a prerequisite. However, wind does increase the risk of embers flaring up in the blackline and sparks or firebrands being carried onto surrounding vegetation. Ember flare-up is most likely to occur up to 200 yards behind the Blackline Burner.

# Preparing the Water System

The water system on the Blackline Burner and Afterburner depends on, and extends, a user-supplied water sprayer.

Before using the Blackline Standard Model

1. Ensure that the water filters are clean.

Water filters are located:

- Inside each of the eight spray heads on both the Burner and the Afterburner.
- On the water sprayer, in the supply line between the water tank and the pump.

2. Fill the tank with water. Use clean water only—dirt collecting in the filters reduces the flow of water, compromising safety.

For safety reasons, do not allow the water tank to run completely empty while burning. You can refill the tank while burning is in progress.

3. Hitch the Burner behind the towing vehicle. If you are using an Afterburner, hitch the Afterburner behind the Burner.
4. Connect the Burner's water supply hose to an outlet on the water sprayer. Connect the Afterburner's water supply hose to the water outlet at the back of the Burner.

**Important:** Be sure to allow slack in the hoses at the hinge points between the units.

## **Important:**

Even under optimal conditions, you should augment the water system with:

- At least one person with a backpack sprayer to extinguish flames or embers that flare up in the blackline.
- At least one person to operate a high-pressure handgun, usually connected to the water sprayer.

If conditions are less favorable, provide:

- A second high-pressure handgun operator.
- Another backpack sprayer.

**Note:** It is good practice to ensure that the water tank and the backpack canisters are always more than half full.

## Preparing the Burning System

The burning system uses liquefied propane only. Always use a gas cylinder with fittings for liquid withdrawal.

Before using the Blackline Standard Model

1. Ensure that the cover on the top of the burning chamber (used to protect the inside insulation during transport) has been removed.
2. Securely fasten the gas cylinder to the vehicle carrying it.
3. With the Burner hitched behind the vehicle, connect the Burner's gas supply hose to the gas cylinder.

**Important:** Be sure to allow slack in the hose at the hinge point between the units.

4. Check the entire supply line for gas leaks using leak detection solution or soapsuds. Bubbles forming indicate a leak.

## Burning your Blacklines

With the Blackline Burner hitched behind the vehicle and the burning and water systems ready for use, you can start burning your blacklines.

**Important:** Before using the Blackline Burner, read the entire section, *Precautions*, on page 10.

Pull the Burner to where you want burning to begin, with the towing vehicle facing in the direction in which you want to proceed.

To start and adjust the water system

1. Start the water pump and flush the water system by opening all the taps on the water supply line. (The Burner and the Afterburner have four taps each.)
2. Close the two rearmost water taps.
3. Adjust the spray heads for optimal water distribution.

**Important:** You must adjust *one* of the back spray heads *on each side* of the rearmost component (either the Burner or the Afterburner) to spray on the dividing line between the burned and the unburned vegetation, directly under the back spray heads.

You can adjust the other two spray heads at the back of the rearmost component to extinguish residual flames left in the blackline. Should you notice that vegetation in the blackline is not burning away completely, turn these spray heads to spray outwards, away from the blackline. Alternatively, turn them off to reduce water consumption.

To start and adjust the burning system

1. Completely open the liquid withdrawal valve on top of the gas cylinder.
2. Light all the gas burners at the front of the burning chamber. We recommend that you use a long-handled lighter.
3. Adjust the flame length by turning the knob on the gas regulator (on the gas supply hose, near the gas cylinder). To increase the flame length, turn the knob clockwise. To decrease the flame length, turn the knob anti-clockwise.

**Note:** For the best results, the flames should extend about 10 inches from the burner nozzles. This ensures consistent burning even when the terrain is uneven.

## To burn the blackline

1. Put the vehicle in a low gear and allow it to crawl in the direction of the desired blackline.

The speed at which the Burner moves, determines the extent of the exposed flames left in its path. The faster the Burner moves, the less time the flames have to burn out in the confines of the burning chamber. Adjust the crawl speed to minimize the flames exposed in the burned strip.

2. Station at least one person with a backpack sprayer approximately 30 yards behind the Burner to monitor for and extinguish embers that flare up in the blackline.

An additional backpack sprayer can take up position directly behind the Burner (or Afterburner) to contain and extinguish residual flames as required.

3. Provide at least one high-pressure handgun operator to provide support when required. The handgun operator is best stationed behind the Burner (or Afterburner).
4. When the towing vehicle stops, flames from the gas burners will be inclined to move forward towards the vehicle—the only place where dry, unburned fuels remain. Immediately extinguish any such flames and manually create a wet line in front of the Burner.

## Precautions

Although using products in the Blackline range significantly reduces the risk of starting runaway fires, caution is always advised.

Take note of the following:

- The burning chamber gets **extremely** hot during use. Do not touch the chamber while it is in use and for a time afterwards.
- The gas and water supply hoses require slack for turning.
- Ensure that the spray heads are creating an effective wet line.
- Be vigilant for embers that could flare up in the blackline 200 to 300 yards behind the Blackline Burner.
- Be on the lookout for sparks or firebrands escaping from the burning chamber. They could ignite spot fires in the vicinity.
- It is good practice to keep all the water tanks more than half full. This reduces the likelihood of running out of water in the event of an emergency.
- Stop burning if the wind becomes sufficiently erratic or strong to cause apprehension. The fire should always be controllable.
- When the Burner comes to a standstill, flames tend to creep forward; on stopping, immediately create a wet line in front of the Burner.
- When burning the second blackline, do not be tempted to allow the flames to burn freely towards the first blackline. A change in wind direction could cause the fire to run ahead of the Burner where it will no longer be contained by blacklines.
- When overnight temperatures are expected to drop below freezing, open all the water taps on the Burner (and the Afterburner, if connected) and run the water pump until the water tank is empty. This will prevent the pump and the water line from bursting as the water freezes.

## **Emergency Procedure**

In the event of a runaway fire, immediately stop the blackline-burning process and concentrate all the resources at your disposal on containing the fire.

Decouple the Blackline Burner, allowing independent use of the water sprayer to control the fire.

To decouple the Blackline Burner

1. Disconnect the gas quick coupler.
2. Disconnect the water quick coupler.
3. Remove the pin that secures the Burner to the towing vehicle or trailer.

## Using the Blackline Afterburner

The Afterburner is identical to the Burner, except that it lacks the ignition devices. Hitched behind the Burner, the Afterburner serves to extend the enclosed burning area, thereby improving the operating speed.

The main advantage of using the Afterburner is that you can cover more ground per day. The additional enclosed area provides the time needed for flames to burn out in safety. Using the Afterburner, you can expect to burn 1 to 1.5 miles of blackline per hour.

We recommend using an Afterburner when burning blacklines in dense fuel or fuels that are consumed more slowly.

**Note:** We do not recommend using the Afterburner in rocky terrain.

To extend the Blackline Burner with the Afterburner

1. Ensure that the cover on the top of the burning chamber (used to protect the inside insulation during transport) has been removed.
2. Hitch the Afterburner behind the Burner.
3. Connect the Afterburner's water supply hose to the water outlet at the back of the Burner.
4. Follow the instructions in *Preparing the Water System*.
5. Flush the water system and adjust the spray heads as described in *Burning your Blacklines*.

# Specifications

<b>Width of single blackline</b>		53 in.	
<b>Width of firebreak</b>		You can make a firebreak of any width by successively burning parallel blacklines and then doing a controlled burn between these blacklines	
<b>Blackline burned per hour</b>	<b>With Burner</b>	± 0.5–1 miles per hour	Using a second high-pressure handgun behind the last burning chamber achieves operational speeds at the top of the range
	<b>With Burner and Afterburner</b>	± 1–1.5 miles per hour	
<b>Propane gas consumption</b>		± 10 lb. per hour	A Department of Transportation (DOT) propane cylinder with fittings for liquid withdrawal is required. A 100-lb. cylinder is typically used.
<b>Water consumption</b>		± 280 gal. per mile under optimal conditions	Less with the addition of chemical fire retardant. Dependent on the wind.
<b>Water supply (sprayer)</b>	<b>Tank size</b>	Typically 150 gal.	An inline filter is recommended
	<b>Pump pressure</b>	44–217 psi	A Power Take-Off (PTO) pump is often used
	<b>Pump delivery rate</b>	Minimum of 5.8 gal. per minute	
	<b>Fittings</b>	A manifold for 3 hoses is recommended	Two high-pressure handguns are recommended
<b>Power of towing vehicle</b>		A minimum of 80 hp to carry a 150-gal. water tank on the back of the vehicle	Less if the water is carried on the front of the vehicle. A tractor is often used.
<b>Materials</b>	<b>Burning chamber</b>	Stainless steel, lined with ceramic insulation wool	
	<b>Skids</b>	Tempered steel	
<b>Size of Burner</b>	<b>Weight</b>	± 1100 lb.	Same for Afterburner. Length excludes hitch.
	<b>Dimensions</b>	Length: 136 in. Width: 61 in. Height: 84 in.	
<b>Terrain</b>		Rocks up to 9.75 in. high can pass beneath the burning chamber.	Rocks higher than 9.75 in. should be cleared away. The towing vehicle should circumvent large rocks that cannot be moved. Using an Afterburner in rocky terrain is not recommended.
<b>Grass length</b>	<b>With Burner</b>	If longer than 3 ft., the grass should be mowed	Do not cut the grass shorter than about 10 in.
	<b>With Burner and Afterburner</b>	Grass can exceed 3 ft. in length	