Carbide lamps use a gas hydride (calcium carbide) which means that the gas is locked up in the solid and when water contacts it the gas is released, in this case it is acetylene.

The basic way carbide lamps work is the top holds the water, the bottom the carbide. The top screws into the bottom and is sealed with a rubber gasket. The top has a hole that leads to the tip. The tip has a very small hole that the gas is pushed out of under pressure from the reaction of the water and carbide. Before the gas foes through the hole in the top it goes through a felt that helps to filter out carbide junk. There is a felt spacer, then the felt and then the felt retainer or clip, to hold it all together.

You need to fill the bottom with about 1/3 carbide and no more. This will give you about 2 hrs of light depending on your flame and drip setting. You may need to add water more than once per two hour charge. The water valve on the top of the lamp controls the drip of water that reaches the carbide. You want your flame to be no more than 1-1.5 inches long. Any longer and you risk your lamp building up too much pressure and blowing up. Each lamp is different and no two drippers work the same or turn the same distance, so you have to find the sweet spot for each lamp you use. Most of these lamps are from 60-80 years old and may work fine one day and then the next they are shot from a micro crack or some other issue related to corrosion from carbide or pressure. So just give them some tlc, keep them clean and don't bang them around. The carbide must be removed as soon as you are done using the lamp. If not the carbide can expand and blow out the sides or the bottom of the lamp. It can also set like cement and ruin the bottom. Spent carbide should not be dumped anywhere as it is actually quick lime and very alkaline. Mix it with the dirt in a rose garden or in an outhouse, but never just dump it. Half spent carbide can be dumped in a pale of water and left to bubble away the acetylene gas. Don't smoke around this as it can explode, and again don't dump it anywhere, mix it with plants that like the alkaline (lime).

The rubber gasket is extremely important as without it you won't get a seal and the gas will leak causing a fire or an explosion. Gaskets are one of the first things to go due to the caustic nature of the carbide. These should be replaced on a regular basis.

Felts are the next thing to go bad, getting clogged up with bits of carbide. If this happens your lamp won't burn right and excess pressure can build up, so replace these often.

The tip can get clogged/sooted up so keeping the clean and reamed out is essential. Again if they are left alone and get nasty they won't give you a good flame and the pressure will build up and ruin your lamp.

With a spade mount thin or wide they simply slide into the slot on the hat.

With a hook & cap braces the hook goes into a small hole and the cap braces usually snap over the back part of the lamp mount. But like I mentioned previously, most miners removed the braces to have more control over the light direction.

To start a lamp, first take the top & bottom apart. Fill the top with water and move the dripper to see what is off and what is on and then the drip speeds in between. Some lamps never fully shut off so just keep that in mind. Then turn the dripper off as much as it will go without forcing it. Fill the carbide bottom 1/3 full screw the top to the bottom and tighten snugly, don't over tighten. Then start the dripper to about a drip a second or so. After a few seconds put your nose to the tip and see if you smell the carbide and hear it coming out of the tip. Cup your hand over the entire reflector for a couple of seconds and then run it across the reflector and over the striker wheel in one smooth quick motion. This

should be enough to fire up the lamp. It will give you a small pop at first when it fires up and the flame is usually large. You can shake the lamp a bit to get things going more, then adjust the water dripper to achieve the 1-1.5 inch flame length. It should burn bright and fairly white. A yellow small flame indicates a problem, like spent carbide, a clogged felt or tip.

Clean the lamps after use with water to remove the carbide residue that is left after you have removed the spent carbide. Ream the tip and inspect/replace the filter and gasket regularly. Carry some aluminum foil and a Ziploc baggie to haul out the spent carbide for proper disposal. You should be able to blind fold yourself and tear down/rebuild the lamp by feel. These things are notorious for going out at the worst possible moment, so be prepared for that happening.

The lamps will get warm to hot which is all part of the chemical reaction and burning of the acetylene gas. They can make a great hand warmer. Also pack a couple of large garbage bags with you in case you get wet. You can cut a hole in the top of the garbage bag for your head and then hold the carbide lamp below the opening and the heat will rise and warm the rest of you. I have done that on many a cave trip and was glad to have that little carbide lamp for warmth.

As far as safety goes, it's an open flame so don't burn yourself or anyone else. Keep it away from flammable things and keep it clean and in good working condition.

I hope that helps…