SOFTWARE & TECH

How To Make A Moonshine Still

PUBLISHED
November 25, 2026

REFERENCE
#1795582653214481

Understanding the Art and Science of Home Distillation

Building your own distilling equipment is a project that combines craftsmanship with an understanding of basic chemistry. For generations, people have crafted their own setups to produce spirits, and while the practice carries a certain mystique, it is important to begin any discussion of **how to make a moonshine still**with a clear understanding of the law. In the United States and many other countries, distilling spirits at home without the proper federal and state permits is illegal. This guide is provided for educational purposes only, focusing on the mechanical and scientific aspects of still construction. Always research and comply with your local regulations before proceeding.

What Is a Moonshine Still and How Does It Work?

Before gathering materials, it is essential to understand the core principles. A still is a device designed to separate alcohol from a fermented liquid, known as mash, through the process of evaporation and condensation. Alcohol has a lower boiling point (173 degrees Fahrenheit) than water (212 degrees Fahrenheit). By carefully heating the mash, the alcohol turns into vapor first. This vapor is then captured, cooled, and returned to a liquid state, resulting in a higher concentration of ethanol.

The fundamental components of any still include a boiling vessel (the pot), a condenser (to cool the vapor), and a collection vessel. The path between the pot and the condenser, often called the lyne arm or vapor tube, guides the alcohol vapor to its destination. When exploring **how to make a moonshine still**, you are essentially learning how to assemble these three elements into a sealed, efficient system.

The Two Main Types of Stills for Beginners

There are two primary designs that most hobbyists consider when learning **how to make a moonshine still**: the pot still and the reflux still.

- Pot Still: This is the simplest and most traditional design. It consists of a large pot or kettle with a domed lid, from which a copper tube or pipe exits and leads into a condenser. Pot stills are excellent for making full-flavored spirits like whiskey and rum because they do not strip away the congeners, which are the compounds responsible for taste and aroma.
- Reflux Still: This design includes a vertical column packed with copper mesh or ceramic saddles. As the vapor rises through the column, it condenses and re-evaporates multiple times. This process, called reflux, produces a much purer, higher-proof alcohol, similar to vodka or neutral grain spirit. Reflux stills are more complex to build but are highly efficient.

For a first project, a simple pot still is often recommended. It is easier to build, requires fewer specialized parts, and is more forgiving for a beginner learning **how to make a moonshine still** that actually works.

Essential Materials and Tools for Building a Still

When researching **how to make a moonshine still**, one of the first challenges is selecting the right materials. The golden rule of distilling equipment is that all parts that come into contact with the alcohol or vapor must be non-reactive. This means no plastic, no aluminum, and no solders containing lead.

Selecting the Boiling Vessel

The boiling vessel, or pot, can be made of stainless steel or copper. Stainless steel is durable, easy to clean, and widely available. Many beginners repurpose a 5-gallon or 8-gallon stainless steel stockpot or a beer brewing kettle. Copper is the traditional material and is highly valued because it helps remove sulfur compounds from the alcohol, resulting in a smoother spirit. However, copper is more expensive and harder to work with.

Materials for the Lid and Seals

Creating a tight seal between the pot and the lid is critical. If vapor escapes, you lose efficiency and potentially create a fire hazard. The lid itself should be made of the same material as the pot. To seal the gap, use a flour paste (a simple mix of flour and water) applied around the rim before clamping the lid down. This is safer and more effective than rubber or silicone, which can degrade or impart off-flavors. Rope made of natural fibers, soaked in water and pushed into the rim gap, can also work well.

Constructing the Vapor Path

Copper is the best material for the lyne arm and the condenser coil. You can purchase soft copper tubing from most hardware stores. For a pot still, a length of 3/8-inch or 1/2-inch copper tubing is typical. You will also need a copper fitting, such as a compression fitting or a soldered adapter, to attach the tube to the lid. When learning **how to make a moonshine still**, many builders choose to solder a copper ferrule into the lid for a clean, permanent connection.

Building the Condenser

The condenser is where the magic happens. The simplest design is a worm, which is a coil of copper tubing submerged in a bucket of cold, constantly circulating water. The vapor travels through the coil and cools until it drips out as liquid. For a worm condenser, you will need 10 to 20 feet of copper tubing and a 5-gallon bucket. Alternatively, a Liebig condenser is a straight tube within a larger tube, with cold water flowing through the outer jacket. Both designs are effective, but the worm is easier to fabricate by hand.

Step-by-Step Guide on How to Make a Moonshine Still

Now that you have your materials, it is time to look at the assembly process. This guide assumes you are building a basic 5-gallon pot still with a worm condenser. Remember, this information on **how to make a moonshine still** is for educational purposes only.

Step 1: Prepare the Lid

Take your stainless steel pot lid and drill a hole in the center. The hole should be slightly smaller than the diameter of your copper tubing or fitting. If you are using a compression fitting, drill the appropriate size. Insert the fitting and secure it tightly. If you are soldering, clean the area thoroughly, apply flux, and heat the joint until the solder flows evenly. Safety glasses and gloves are mandatory during this step.

Step 2: Shape the Lyne Arm

The lyne arm is the pipe that carries the vapor from the lid to the condenser. Using your copper tubing, create a 90-degree bend that goes up from the pot and then angles downward toward the condenser bucket. You can use a pipe bender to avoid kinking the tube, which would restrict vapor flow. A gentle curve is better than a sharp corner. The length of the lyne arm should be enough to allow the vapor to cool slightly before entering the condenser.

Step 3: Coil the Worm Condenser

This is often the most challenging part of learning **how to make a moonshine still**. Fill your copper tubing with sand or salt and plug both ends. This prevents the tube from collapsing when you bend it. Wrap the tubing tightly around a cylindrical object, such as a gallon paint can or a piece of PVC pipe. Aim for a coil that fits easily inside your 5-gallon bucket, with space around it for water to circulate. Once coiled, flush out the sand thoroughly with water.

Step 4: Assemble the Condenser System

Place the copper worm inside the 5-gallon bucket. Drill two small holes near the top of the bucket: one for the incoming vapor tube to enter and one for the distilled spirit to exit. Alternatively, you can feed the top end of the worm through a hole in the side of the bucket and let the bottom end exit through a separate hole. Seal these holes with silicone caulk (non-toxic, food-grade) to prevent water from leaking. Attach a hose to a water source and feed it into the bottom of the bucket. Add a drain hose near the top so that warm water overflows and is replaced by cold water.

Step 5: Connect and Seal the System

Attach the lyne arm from the lid to the top of the worm condenser. This connection must be airtight. If you are using copper, you can solder the joint or use a high-temperature food-grade sealant. Before running your first batch, perform a water test. Fill the pot with water, heat it to a boil, and check for any steam leaks. Seal any leaks with additional flour paste or solder. A properly sealed system is the hallmark of a good build.

Safety Considerations When Operating a Still

Understanding **how to make a moonshine still**is only half the battle. Operating it safely is far more important. Distilling involves high heat, flammable vapors, and pressurized vessels. Carelessness can lead to serious injury or property damage.

- Never use a gas burner indoors: Alcohol vapors are heavier than air and can pool around the base of the still. An open flame from a gas stove or propane burner can ignite these vapors. Use an electric hot plate or induction burner instead, and ensure your workspace is well-ventilated.
- Maintain proper pressure: A still should always be open to the atmosphere through the condenser output. Never seal the collection vessel airtight, as pressure can build up and cause an explosion. The system must be able to breathe freely.
- Avoid plastic components: Hot alcohol vapor will degrade most plastics, leaching harmful chemicals into your spirit. Stick with copper, stainless steel, and glass for all parts that contact the vapor or finished product.
- Separate the foreshots: The first liquid to come out of the still contains methanol and other volatile compounds that are toxic. As a rule of thumb, discard the first 50 to 100 milliliters for every 5 gallons of mash. This is not a step to skip.
- Never leave the still unattended: The heating process requires constant attention. A sudden boil-over can clog the vapor path and cause a dangerous pressure spike. Always monitor the temperature and the drip rate.

Distilling Basics for Your First Run

Once your still is built and safety measures are in place, you will want to understand the distillation process itself. Even the best build will produce poor results without proper technique. Here is what you need to know to make effective use of your new equipment.

Preparing the Mash

Your still cannot create alcohol; it only concentrates what is already there. You need a fermented mash with a reasonable alcohol content, typically 8 to 12 percent. A simple sugar wash, made with sugar, water, and yeast,

is a good starting point for beginners. Allow the mash to ferment completely until the bubbling stops and the liquid clears. Racking the mash off the sediment before distilling will prevent scorching, which ruins the flavor.

Heating and Managing the Run

Pour the fermented mash into your pot, filling it no more than three-quarters full to prevent foaming and boil-over. Attach the lid, seal it with flour paste, and connect the lyne arm to the condenser. Turn on the cooling water and then apply heat. Heat the mash rapidly to around 160 degrees Fahrenheit, then reduce the heat so that the temperature rises slowly. The goal is to produce a steady, thin stream of distillate. A pencil-lead-thick stream is ideal. If the output is too fast, the alcohol will be contaminated with water. If it is too slow, the process will take all day.

Making the Cuts

Distillation yields three phases: the heads, the hearts, and the tails. The heads contain harsh volatile compounds and have an acrid smell. The hearts are the clean, drinkable spirit. The tails contain heavy oils and water, which taste muddy. Collect the output in small jars and learn to identify each phase by smell and taste. The hearts are what you keep; the heads and tails can be saved and redistilled later. Mastering the cuts is the difference between mediocre and exceptional spirits.

Maintenance and Improving Your Design

After you have successfully completed a run, you will want to clean and maintain your still. Copper will oxidize and develop a patina over time. This is normal and even beneficial, as a thin layer of copper oxide can help catalyze the removal of sulfides. However, heavy green or black deposits should be cleaned with a mild acid, such as a vinegar and salt solution, followed by a thorough water rinse.

As you gain experience with how to make a moonsh

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