

# Freeze Branding Beef Cattle

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Freeze branding can be a relatively painless and very effective form of permanent animal and herd identification. While hot iron branding is used to make a neat, legible scar on the surface of the hide, the goal with freeze branding is to convert hair pigmentation to white in a legible manner. Freeze branding destroys the natural pigments in hair, producing white hair growth (see Images 3 and 4 for freeze brand examples).

Freeze brands typically become legible about six to eight weeks after branding. As a new hair coat is starting (fall or spring) is a good time to freeze brand. Freeze branding can be successful during any time of the year, but brands applied after a new hair coat is already on an animal may take up to four months to appear as white hair.

There are two effective methods for cooling freeze branding irons. Either liquid nitrogen or a combination of denatured alcohol and dry ice can be used. Both methods have been used on University of Tennessee beef herds, but the current method of choice is alcohol and dry ice because it reduces the risk of scarring. However, one downside to using alcohol and dry ice is that the iron must be placed on the hide for a longer period of time than with the liquid nitrogen method.

Liquid nitrogen (-344 F) cools freeze branding irons to a colder temperature than alcohol and dry ice (-112 F). When liquid nitrogen is used to cool branding irons, the irons should be pressed against the hide for approximately 20 to 45 seconds depending upon the age of the animal and outside temperature (Table 1). Hot summer temperatures and thicker hides may necessitate longer branding durations.

When denatured alcohol and dry ice are used to cool branding irons, the irons should be pressed against the hide for approximately 45 to 60 seconds (Table 1). White cattle can be freeze branded to achieve a bald or bare brand by holding the branding irons in place against the hide for a total of approximately 75 to 90 seconds when using dry ice and alcohol (Table 1). The extra time needed for freeze branding may reduce the number of head that can be branded over a given period of time, but the end results can be very effective.

*Table 1: Time irons should be in contact with the hide for an effective brand.*

	Hair Coat Color	
	Dark	Light (Bald Brand)
<b>Dry Ice &amp; Alcohol</b>	45-50 sec.	75-90 sec.
<b>Liquid Nitrogen</b>	20-45 sec.	45-50 sec.

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### Supplies needed for freeze branding with dry ice and alcohol include:

- Cattle working facility with an area to restrain individual animals (squeeze chute).
- Freeze branding irons.
- Ice chest (plastic or Styrofoam, not metal).
- Dry ice.
- Denatured alcohol.
- Clippers and a source of electricity to run them.
- Spray bottle.
- Rag or brush to clean the clipped area.
- Timer or clock with a second hand.
- Protective gloves.

Irons suitable for freeze branding are often made of copper alloy (Image 1). Brass, stainless steel, and aluminum irons may also be used, but copper irons tend to be the most successful because they more effectively transfer temperature. Freeze branding irons are recognizably different from hot irons because they do not have breaks in the metal at key joints to release excess heat. They typically have shorter handles and generally have a thicker branding surface area.

There are many different sizes of irons available so a decision needs to be made on what size is needed to be legible at a distance and is appropriate for the brand location and age of animal. Yearlings can be branded directly below the hip with 3-inch irons. Four-inch irons can be used, but smaller irons improve the appearance of brands and reduce the extent of hide damage.

When using dry ice and alcohol, make a mixture that allows the irons to be submerged but is not watery; a 50:50 mixture often works well. One gallon of alcohol and 20 pounds of dry ice will brand approximately 20 head of cattle in most

situations. If planning to work a full day, then 50 to 75 pounds of dry ice will be needed.

*Image 1: Typical freeze branding irons. Note that the "6" also doubles as the "9".*



Using a minimum of 95 percent purity denatured isopropyl, methyl or ethyl alcohol with is critical to prevent freezing and slush buildup. Ninety-nine percent pure denatured alcohol works best. When the humidity is high, the solution will eventually become diluted with moisture taken up from the atmosphere. Draining used alcohol and replacing it with fresh alcohol after several hours may be advisable on humid days. Keep in mind that these items are flammable, so open flames and sparks should be kept away from the area.

Place irons in an ice chest with enough dry ice and alcohol to completely submerge the branding surface of the irons and at least a couple of inches up the handle (Image 2). About 2 inches of crushed dry ice covering the bottom of the cooler is needed. The alcohol/dry ice mixture will slowly evaporate, so additional alcohol and dry ice should be added throughout the cattle working session to keep the iron surfaces submerged.

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Irons are ready to use when the mixture stops boiling and frost builds up around the handle above the solution. Waiting 15 to 20 minutes from the time the irons are placed in the cooler until first use is a good rule of thumb. The more irons to be cooled, the longer this generally takes. When irons are reused, make sure that they are cooled for at least 1 to 2 minutes between applications.

*Image 2: Freeze branding irons submerged in dry ice and alcohol.*



Before applying branding irons to the hide surface, make sure that the animal is properly restrained (preferably in a squeeze chute) and that the branding area is clipped, cleaned, and sprayed with a layer of denatured alcohol. Clipping serves two purposes. It prepares the hide to receive the brand by removing the layers of insulating hair and it provides a visual guide for brand placement. The shorter the hair is clipped, the shorter the duration of branding iron application needed to create a good brand.

Clipping in a block pattern, with level and square edges, makes proper brand placement much easier and results in a more attractive brand. A cloth rag or brush should be used to remove clipped hair, manure, and other debris that may interfere with iron to hide contact. The layer of denatured alcohol sprayed onto the hide helps transfer the cold temperature of the iron to the hide. A very generous amount of denatured alcohol should be applied to saturate the hide.

Always check your iron and animal information before branding to make sure the correct iron is applied. Begin timing when the iron first contacts the hide. Use significant pressure to make sure that there is good contact over the entire surface of the iron. The animal may jump within the first 10 seconds of brand contact. The extreme cold usually freezes the nerve endings after 10 seconds, and the animal will stop moving in most cases. As an animal moves around, maintain contact in the same location.

Put significant force behind the iron by leaning into it. This ensures good contact and prevents the iron from sliding around. If the iron loses contact with the branding location on the hide, then reapply the iron to the same location and add 5 seconds to the application time. An outline of the brand number, letter, or symbol should be visible and can be used to indicate where to reapply the iron. Keep up with the amount of time the iron contacts the hide to get the full 45- to 60-second application. A watch or timer displaying seconds is an important piece of equipment to have on hand when freeze branding.

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### Step-by-step instructions:

1. Let the irons cool for 20 minutes before the first use.
2. Properly restrain the animal.
3. Clip the area to be branded.
4. Brush or wipe the area clean.
5. Spray a liberal coat of alcohol on the clipped surface.
6. Apply the branding iron for the predetermined amount of time. (If the iron moves, reapply it to the depressed area and add 5 seconds to the application period).
7. If an iron needs to be used twice (ex. 22 or 33), let it re-cool for at least 2 minutes between applications.

Thin cattle can be difficult to brand effectively, and the end result may not be satisfactory. Cattle should be in good flesh or condition when branding.

Beef Quality Assurance should be considered when branding cattle. Hides are an important byproduct of beef production. Both excessive hide damage and poor placement of brands can be avoided by practicing responsible branding. Responsible branding includes reducing the size of the branding area through branding iron size selection and branding iron placement and selecting a branding location that minimizes hide value losses. Freeze

branding can be a good alternative to hot iron branding for reducing hide damage.

*Image 3: Ideal freeze brand after regrowth of the hair coat.*



*Image 4: Example where the freeze branding iron was left on long enough to create a scar. This would be ideal for light-hided cattle.*



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