



# COOPERATIVE EXTENSION

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**Fact Sheet-01-25**

## **Freeze Branding Ranch Animals**

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### **Introduction**

Freeze branding is not a new technique. The process of freeze branding, also known as Cryo-Branding, was developed by Dr. R. Keith Farrell in 1966 at Washington State University. Freeze branding is a process of permanently identifying animals with a super cold iron rather than the traditional hot iron. When done properly, the extremely cold iron destroys the pigment-producing hair color follicles. White hair will outline the brand site once hair growth returns. The main advantage to freeze branding is a permanent identification that remains legible year round. Freeze branding is less painful than the traditional hot iron branding system.

This fact sheet outlines the procedure for freeze branding and discusses the pros and cons of utilizing this system on ranch animals.

### **Merits of Freeze -Branding**

Freeze branding offers several advantages.

These include:

1. Freeze Branding causes little or no hide damage as compared to hot iron branding. This is important from a Beef Quality Assurance viewpoint.
2. Animals show little reaction to the super cold iron, indicating that freeze branding is relatively painless. This is important as an animal welfare issue.
3. Brands are legible year round with freeze branding especially on dark animals due to color contrast.

There is no blotching and distortions with freeze branding.

4. Animal theft and/recovery may be superior with freeze branding versus hot iron branding.

There are several disadvantages to freeze branding.

These include:

1. The process of freeze branding is much more time consuming than hot iron branding.
2. Freeze branding requires many steps and much equipment.
3. Freeze branding requires teaching the ranch crew proper procedures for improved success.
4. Freeze brands are not immediately legible for ownership identification.
5. Some states do not recognize freeze branding as a legal ownership branding method.
6. Results may vary from animal to animal and time of year branding is performed.
7. There are several safety considerations with freeze branding.

### **What Kind of Irons Should be Used?**

Research has shown that solid copper irons  $\frac{1}{4}$  inch to  $\frac{5}{6}$  inch thick, one inch to one and a half inch from face to back and four inches high are used very successfully. Brass, steel and aluminum branding irons have been used with less success.

Based on field trials, some people have stated that they would prefer a five-inch brand to a four-inch brand. However, if more than one number is used on a brand, the four-inch size is most often preferred. Freeze branding irons of various sizes are available in equipment and supply catalogs and stores.

### **How are Irons Cooled?**

#### **Dry Ice and Alcohol**

Alcohol will be needed for this branding method. Among refrigerants used are methyl, ethyl, or isopropyl alcohol. It is very important that any alcohol used is 99 percent in strength or it will turn to slush at the extremely low temperature needed (approximately 160 to 180 degrees below zero).

Acetone is another very good refrigerant, because it is clear and the quantity of dry ice in the container is always visible. Some of the suppliers of acetone are drug companies, welding supply firms and animal health supplies.

Twenty pounds of dry ice and three gallons of 99 percent alcohol should be ample to freeze-brand 100 head of cattle within a 3-4 hour period. Dry ice will need to be added to the alcohol from time to time. Under damp atmospheric conditions, alcohol should be changed every two hours since it absorbs moisture from the air. This "watered down" alcohol loses its cooling capacity and will begin to slush up as water accumulates and ice forms.

#### **Liquid Nitrogen**

Liquid nitrogen is a very good coolant and will cool to a temperature of approximately 240 to 250 degrees below zero. Liquid nitrogen is available through artificial insemination organizations and welding supply firms. Care should be taken when handling liquid nitrogen because of its extremely cold temperature.

### **What Type of Coolant Container?**

A small styrofoam box is satisfactory as an insulated container. Do not use plastic lined boxes, as thin plastic will crack. The container should be large enough to house the irons yet small enough so excessive amounts of coolants are not required to cover those irons.

### **Important Safety Notice**

**At all times take care not to splash the super cold solution on your skin or in your eyes. Dry ice-alcohol has a temperature of -90 degrees F. Liquid nitrogen has a temperature of -240 degrees below zero. Ninety-nine percent alcohol is extremely flammable.**

### **Cooling Procedure**

If using dry ice as the coolant, break the dry ice into egg-sized pieces to cover the bottom. Put about two to three inches of 99 percent methyl alcohol over the ice.

If using liquid nitrogen as the coolant, pour enough nitrogen in the container to cover the irons.

Immerse the irons into the liquid. When first immersed, the iron causes the cold liquid to bubble for about five minutes.

### **How Long Should the Irons Cool?**

The first time the irons are cooled 15-20 minutes. Thereafter, the irons should cool until the bubbles rising from them in the liquid are reduced to a minimum. No less than one to two minutes should be allowed between brands with the same iron.

### **Should the Animal's Hair Be Clipped?**

The hair *must* be clipped on the area to be branded, preferably with small animal clippers or surgical clippers; however, regular show animal clippers have been less successful. There is now a clipper head available commercially for clipping before freeze branding. This head attaches to the show clippers. The clipper heads can be obtained through supply catalogs and equipment stores. Time required for branding varies with the amount of short hair remaining. The shorter the hair the less time required.

### **Is Liquid Applied to the Clipped Area?**

Liquid should be applied after the animal has been clipped and the excess loose hair and dirt has been removed. A second application of liquid should take place just before the irons are applied. The liquid is necessary for transferring heat from the animal to the irons and aids in obtaining good brands. Alcohol is the best liquid to use for this purpose.

## **Branding Procedure**

Restrain the animal with your desired method making sure the site to be branded is accessible. Horses often need to be sedated, if so consult your veterinarian.

Immediately after the alcohol soak, quickly remove the appropriate iron from the container, align it properly and firmly press the iron squarely on the brand site. As the iron is pressed to the skin the stopwatch should be started. Hold the iron firmly, applying 35 to 45 pounds of steady pressure, with a slight rocking motion. When the appropriate time has elapsed on the stopwatch, the iron should be immediately removed from contact with the skin.

### **How Long Should the Irons Be Applied?**

The time varies with the species and age of the animal, coolant and clippers used.

| Animal | Coolant           | Application Time |
|--------|-------------------|------------------|
| Calf   | Liquid Nitrogen   | 21-24 seconds    |
|        | Dry ice & alcohol | 40-50 seconds    |
| Cow    | Liquid Nitrogen   | 25-30 seconds    |
|        | Dry ice & alcohol | 50-60 seconds    |
| Colt   | Liquid Nitrogen   | 6-12 seconds     |
|        | Dry ice & alcohol | 16-24 seconds    |
| Horse  | Liquid Nitrogen   | 8-12 seconds     |
|        | Dry ice & alcohol | 20-24 seconds    |

Darker colored animals require the minimal amount of time suggested.

### **Post Branding Results**

Immediately after freeze branding you will see a frozen indentation in the animals skin. Within five minutes the indentation will disappear and swelling will begin. The brand will be readable but the swelling will cause the mark to have two or three times the thickness that the actual finished brand will have. The brand will be swollen for 48 to 72 hours. After the swelling dissipates the brand may not be easily seen. About 20 to 30 days the brand will begin to get flaky and scaly. By the third or fourth week the scab will start to turn loose. Once the scab is gone, white, peach fuzz-type hair

should appear in 30 days. Full hair growth will depend upon the time of year the brand is applied.

| Time         | Brand Site                 |
|--------------|----------------------------|
| 15 seconds   | Indented pattern shows     |
| 5-10 minutes | Swelled pattern shows      |
| 5 days       | Swelled pattern disappears |
| 1 month      | Top layer of skin sheds    |
| 2 months     | White hair starts growing  |
| 3 months     | White hair growth complete |

### **What Time of Year is Best for Branding?**

Successful brands have been accomplished at all times of the year; however, those done about the time a new hair coat is starting, appear most rapidly. Those done after the new hair coat is on the animal may take three to four months for white hair to appear.

### **Success Rate and Cost?**

Research has indicated that younger animals were more efficiently branded than were older cows. More of the brands on younger animals were clearly readable due to the white hairs present. Hip, shoulder, and loin brands are more legible than rib brands.

Freeze branding takes about three to ten minutes per head and costs about \$0.05 per head or less when using dry ice. Cost is more than doubled if liquid nitrogen is used.

### **Equipment Needed for Freeze Branding**

1. Cooper freeze branding irons – size depending upon the size of the cattle.
2. Hair clippers – a special head is available for closer clipping.
3. Source of electricity or a generator for power to run clippers.
4. Container with cleaning solution for the clipper head.
5. Container for the liquid coolant, preferably Styrofoam and large enough to contain all the irons. A special cooler is available for liquid nitrogen.
6. Dry ice. Be sure enough is on hand. Approximately 50-75 pounds will be required for an 8-10 hour day of branding operation. Liquid nitrogen is often hard to obtain and arrangements for its purchase should be made in advance. If liquid nitrogen is used, no dry ice is needed.

7. Container for solvent to squirt on the animals' hide. An old soap container from the kitchen will work for this.
8. Sack or cloth to rub off excess dirt.
9. At least two persons.
10. Good working corrals and pens.
11. Watch with second hand or stopwatch.
12. Preferably someone to record brands for production records.

### **Step-wise Procedure**

1. Use copper irons.
2. Reduce the temperature of the liquid coolant to approximately  $-106$  degrees C. or  $-157$  degrees F.
3. Immerse the irons in a liquid coolant and dry ice bath. Make sure the liquid covers the irons completely.
4. Allow at least 20 minutes for the irons to cool the first time.
5. Meanwhile, move cattle up the chute and clip the area to be branded. Avoid branding on the flank or paunch area.
6. Clip the area to be branded. Fine-headed clippers are desired.
7. Soak the clipped area with 99% alcohol.
8. Rub off the liquid.
9. Re-soak the area and apply the cold branding irons.
10. Apply the irons firmly for 40-45 seconds – some less if fine-headed clippers are used.
11. Time with a stopwatch.
12. After each animal is clipped wash the clipper head in a small can of liquid solvent.
13. If a branding iron needs to be used twice, such as 22 or 33, allow at least one minute, preferably more, for the irons to cool between brandings.

### **Precautions**

Dry ice and liquid nitrogen can cause injury to humans, and precautions should be taken so these do not come in contact with your skin. Acetone and alcohol are flammable and should be used in open air or a well-ventilated building. Avoid smoking and keep this material away from open flames or electric cattle prods. Vapor from this liquid is also dangerous to the tissues of your eyes and nose.

Before ordering a freeze brand as proof of ownership or a registered brand, contact your state brand inspection agency. The use of such irons is subject to laws relative to each individual state or county.

### **References**

(Portions of this fact sheet are reprinted with permission from Oklahoma State University Fact Sheet #3250)

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