

A guide to best practice husbandry in beef cattle

Branding, castrating and dehorning – 2nd edition



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Foreword

Best practice in animal health and welfare makes sense.

The MLA publication *A guide to best practice husbandry in beef cattle: Branding, castrating and dehorning* (2012) has proven to be a widely acclaimed and valuable resource for all beef cattle producers in Australia. While there have been no recommended changes to the way these common husbandry procedures are performed, the *Australian Animal Welfare Standards and Guidelines for Cattle* (2016) now replace the *Model Code of Practice for the Welfare of Animals: Cattle, 2nd edition* (2004). The Standards are incorporated in the various animal welfare legislation for each of the states and territories and producers need to be aware of the specific regulations that apply within their state or territory. In addition, over the past decade, several new products have been developed and are now available to producers to improve pain relief at the time of these routine husbandry procedures. These products, along with recommended dose rates and guidelines for use are included in this latest edition. Adoption of best practice and improved pain relief will demonstrate to the wider community that Australian cattle producers care for their animals and recognise that best practice in animal husbandry is paramount to running a successful, sustainable and ethical business.

Cattle Australia (CA) works closely with the industry's research, development and marketing body, Meat & Livestock Australia, to ensure that the welfare of food-producing animals continues to be a priority and that the efforts that Australian beef producers invest in this crucial area are recognised.

The most common beef cattle husbandry techniques are those performed at branding time – branding, castration and dehorning.

The routine husbandry practices of dehorning, castration and identification are essential management procedures that help ensure the docility of our livestock so that they can be reared and delivered to market in the safest way possible for both the animal and the handler and that full traceability from paddock-to-plate can be guaranteed.

While current producers already perform these procedures efficiently and correctly, the industry needs to ensure that new entrants to the industry have access to information outlining the current best practice for branding, castration and dehorning.

The development of the original booklet was the result of extensive consultation with a wide range of interested parties, including welfare organisations, agricultural colleges, veterinary schools, cattle industry bodies, pastoral companies and experienced cattle handlers.

On behalf of the industry, Cattle Australia recommends this 2nd edition best practice guide which provides practical, easy to follow advice that will be useful both in teaching institutions and on cattle properties across Australia.

Cattle Australia



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Introduction

This booklet is a resource to ensure all beef producers can comply with the *Australian Animal Welfare Standards and Guidelines for Cattle* (2016).

The animal welfare standards now underpin all the various animal care and welfare legislation for the various states and territories in Australia. Information on the relationship between Australian standards and legislation is contained in Appendices A and C. Relevant excerpts from the *Australian Animal Welfare Standards and Guidelines for Cattle* are contained in each section of this booklet, and are repeated in Appendix A.

Currently, if the procedures covered in this booklet are performed at the specified ages, there is no legal requirement for the use of anaesthesia or analgesia. If the procedures are carried out on older animals, the use of anaesthetics and analgesics becomes mandatory. Notwithstanding, an expanding number of beef producers are now using pain

relief applications when performing routine animal husbandry procedures on their animals regardless of age. While the long-term productivity gains are difficult to evaluate, the anecdotal evidence certainly points to treated calves and weaners being easier to handle, more contented and returning to normal behaviour more quickly. This anecdotal evidence along with an ever-growing consumer demand to see beef produced in a welfare aware environment implies an increasing uptake of the routine use of anesthesia and analgesia in the beef industry. This 2nd edition of *A guide to best practice husbandry in beef cattle: Branding, castration and dehorning* not only provides all the valuable instructions from the 1st edition on how to perform the procedures in the best possible way, but also includes recommendations on how and when to apply pain relief.



Key messages when branding, castrating and dehorning

General

- Be mindful of the animal's health and welfare at all times.
- Be aware of the requirements of *The Cattle Code* and of your particular state/territory legislation – refer to Appendix C.
- Perform all procedures with cattle as young as possible.
- Provide pain relief in the form of local anaesthesia and pre or post operative analgesia when available.
- Minimise stress to the animal by:
 - » quiet, calm mustering and handling
 - » ensuring access to water before and after the procedures
 - » minimising the time that cows and calves are separated
 - » doing the procedures in the coolest part of the day
 - » ensuring adequate restraint so that the procedures can be performed efficiently and safely for both animal and operator
 - » releasing cattle from yards as soon as possible, into a shaded, grassed holding paddock with access to water
 - » avoiding wet, humid weather, and dusty conditions.
- Use adequate numbers of well-trained and experienced staff, and good planning and process – brand, then castrate, then dehorn.
- Ensure cattle have adequate protection against tetanus.
- Good hygiene is essential. Always wash hands and instruments, keeping separate containers with antiseptic for washing hands and storing instruments, and change antiseptic after every 15–20 calves.
- Inspect animals daily for 10 days after castrating or dehorning to check for complications such as infection and flystrike and provide appropriate treatment if necessary – consult your veterinarian.

Branding

- Good restraint is essential. Use a cradle for calves and a squeeze crush for older cattle.
- Ensure branding irons are well maintained and heating equipment is adequate to reach and hold the required temperature.
- Hot branding irons must be 'blue hot' (refer to page 14).
- Never brand or dehorn wet, weak or emaciated cattle.

Castration

- To minimise pain and stress to the animal and the resultant production loss, always castrate calves as young as possible and before six months of age.
- Good restraint is essential; use a calf cradle.
- Change antiseptic solution and replace scalpel blades after every 10–15 calves.
- Do not castrate an animal unless two normal, freely moving testicles can be palpated in the scrotum. Otherwise, consult your veterinarian.

Dehorning

- Dehorning is a painful procedure and should be completely avoided by breeding polled cattle.
- Always dehorn as young as possible and before six months of age to minimise pain and stress to the animal and the resultant production loss.
- Good restraint is essential – use a calf cradle.
- Whichever dehorning instrument is used, it must be well-maintained, clean and sharp.
- Remove a complete ring of hair 1cm wide around the base of the horn to prevent horn regrowth.

Occupational health & safety

- Get well organised and plan the process well in advance.
- Use well-designed and maintained yards and equipment, especially the calf cradle.
- Handle cattle quietly and calmly and be especially aware of the risk of kicks from calves in a calf cradle.
- Always make castration cuts away from the hand.
- Work in the coolest part of the day, for the welfare of both the operators and cattle.
- Ensure vaccinations of staff for Q Fever and tetanus are up-to-date.
- Keep dust to a minimum, and avoid contact with cattle blood, urine and other fluids to minimise risk of Q Fever and Leptospirosis.
- Wear gloves when handling hot branding irons.

1. Some basic principles of surgery and wound healing

Castration and dehorning, and to a lesser extent branding, produce wounds on cattle, and so are classified as surgical procedures. Thus, some basic understanding of the principles of surgery and wound healing, and how they apply to the procedures covered in this booklet, will help ensure the best outcomes for the animal from both a welfare and production point of view.

More detailed information is provided in relevant chapters later in this book, but there are some important things to consider before, during and after the procedures.

Before surgery

Minimise stress. One of the animal's main responses to stress is to produce the hormone cortisol that circulates in the bloodstream.

Cortisol slows wound healing and reduces resistance to infection.

Minimising stress before surgery by good mustering and cattle handling and reducing the time calves are separated from their mothers assists healing and reduces the risk of infection.

Minimise dehydration. Access to good water speeds healing and recovery:

- Plan mustering well in advance, avoid mustering in hot weather and muster cattle calmly.
- Minimise the time that cattle are off water during mustering.
- Allow cattle to rest in yards and provide enough access to clean fresh water after mustering and before handling.
- Brand, castrate and dehorn during the coolest part of the day.
- Minimise the time that calves are separated from their mothers.

Check the work environment. Moisture and contamination around a wound increase the risk of infection and slow wound healing. Moisture also attracts flies, greatly increasing the risk of fly-strike.

- Avoid performing surgical procedures in wet and humid weather.
- Keep dust down by watering the yards, especially around the working area, before starting work.

Protect with vaccination. Vaccinating the animals for tetanus four weeks before any surgical procedure provides adequate immunity and reduces the risk of disease. Vaccination is best done four weeks before surgery. Ensuring the mother has good tetanus protection to pass on to the calf is an extra method of protection.

During surgery

Minimise stress. As mentioned before, minimising stress is essential for quick recovery.

Make sure particular attention is paid to cleanliness so as to avoid wound contamination. The operator's hands must be kept clean and dirt free. There is a balance between allowing enough time for good surgical procedure and completing the tasks quickly to reduce the stress of prolonged handling.

Ensure efficient job performance with the minimum pain and stress for the animal by:

- ensuring good animal restraint – a well-designed branding cradle provides a safe working environment and enables ease of access and maximum visibility to perform the procedures
- good planning and preparation, and an organised order for the procedures
- having adequate numbers of well-trained staff to do the job
- administering appropriate pain relief
- using well-maintained equipment
- using calm handling practices.

Stress of the procedures will increase with the age of the animal – the younger the animals are, the better (see the relevant sections for more information).

Minimise haemorrhage. Excessive bleeding significantly delays wound healing. Minimise bleeding by good surgical practices (see the relevant sections for more information).

Hot animals bleed more. Always allow cattle to settle and cool down after yarding, handle them calmly and perform the procedures in the coolest part of the day.

Minimise infection. Infection greatly reduces wound healing, is painful, delays recovery, reduces production and can cause death.

The risk of infection can be greatly reduced by:

- minimising dust in the work area
- not performing procedures in wet or humid weather
- minimising stress before, during and after surgery
- administering analgesics to reduce post-surgical inflammation and swelling
- washing hands thoroughly and disinfecting them between each animal. Wash in one bucket, then disinfect in the other bucket to avoid excessive contamination of the antiseptic solution
- cleaning instruments after each use, and keeping them in a solution of an effective antiseptic at the recommended dilution
- ensuring the surgical site is clean and free of any contamination, especially faeces – swab the area with water or an antiseptic if necessary
- minimising haemorrhage during the procedure
- ensuring that open wounds can drain, especially after castration.

Efficient action of wound dressings usually depends on application at least daily, which is impractical in most cattle enterprises as the extra stress involved in daily handling of cattle is detrimental to cattle welfare.

The use of 'home brews' (especially after dehorning) is not condoned because of uncertainty about their usefulness, the unknown chemical residue risk they pose, and important workplace health and safety implications of use of an unregistered preparation.

After surgery

Minimise stress by:

- reuniting calves and mothers as soon as possible
- releasing cattle from yards as soon as possible
- calm and quiet handling always
- releasing cattle into a well-shaded holding paddock with access to fodder and water
- avoiding immediately walking or trucking cattle over large distances to paddocks.

Inspect frequently. Cattle that have been castrated and dehorned should be inspected frequently (preferably daily) for about 10 days so that any complications can be detected and treated early. This may mean cattle are kept in smaller holding paddocks for that time.

Observe the animals' general condition – is one lying down for long periods, slow to rise or move if approached, not grazing with its mother, looking depressed, dehydrated or distressed, looking hollow and empty?

Check for swelling, reddening, discharge or presence of fly activity at the wound sites.

Any animals that are behaving abnormally should be yarded, or caught and restrained in the paddock, for closer inspection and treatment if necessary.



2. Pain relief – anaesthetics and analgesics

The provision of pain relief with routine husbandry practices is now an expectation. Not only do producers need to consider the use of pain relief products in their animals, but also alternative husbandry procedures and management practices.

Anaesthesia and analgesia

Anaesthesia can be defined as the loss of sensation in the entire body (general anaesthesia) or in part of the body (local anaesthesia) by the drug-induced depression of the central or local nervous tissue. An example would be a block of the nerve that supplies the horn area.

Anaesthesia is normally done **before or at** the time of the procedure to make it easier on both the animal and the operator.

Tri-Solfen contains local anaesthetic to deaden the pain, as well as adrenaline to reduce bleeding and an antiseptic to limit infection. It is applied to the wound immediately after the procedure.

Analgesia is the relief or control of pain. An example would be the use of an anti-inflammatory drug such as Meloxicam or Ketoprofen after castration.

Analgesics are normally used **after** the procedure to reduce post-surgical inflammation and provide medium-term pain relief.

Anaesthesia versus analgesia

Anaesthesia refers to loss of physical sensation. It is either general (with loss of consciousness) or local. Effective anaesthesia aims to eliminate pain in that part of the body anaesthetised by numbing it. However, pain may be experienced once the anaesthesia wears off. Analgesia refers to pain relief without total loss of feeling or consciousness.

Local anaesthetics versus non-steroidal anti-inflammatory drugs (NSAIDs)

Local anaesthetics work by blocking nerve cell pulse transmission. All nerves are affected but those concerned with pain and temperature are most sensitive. Onset of action is rapid when given by injection. Local anaesthetics combat immediate pain, making the animal more comfortable while the procedure occurs and shortly after. Local anaesthetics are generally immediate and short-acting. They provide a high degree of analgesia (pain relief) during that period, but no pain relief once they wear off. Local anaesthesia is therefore the appropriate drug to eliminate nociceptive pain or the actual pain associated with the surgical procedure. Tri-Solfen contains two local anaesthetics (being lignocaine which has a rapid onset of action) and bupivacaine (which is longer acting), and so provides longer pain relief (e.g. 2–4 hours, possibly up to six hours) when applied to a wound. The adrenaline in Tri-Solfen helps reduce bleeding and prolongs the activity of the local anaesthetic and the cetrimide is a quaternary ammonium antiseptic. Because Tri-Solfen is applied topically,

it provides no pain relief for internal nerves supplying the testis, spermatic cord (during castration) or the frontal sinuses (during dehorning).

Non-steroidal anti-inflammatory drugs (NSAID)

NSAIDs such as meloxicam of the oximam group act by reducing inflammation, exudation, pain and fever. They also inhibit leucocyte infiltration into inflamed tissues and prevent bone and cartilage destruction. They have been used in people (e.g. Nurofen, Voltaren) and cattle for years, but not routinely in husbandry procedures. NSAIDs take 15–30 minutes to take effect, and generally provide pain relief for at least nine hours, but often longer.

The best analogy of how local anaesthetics and NSAIDs are used can be visualised by a trip to your dentist. A local anaesthetic is used to eliminate pain during the procedure on the tooth and Nurofen or Panadol is used after to reduce inflammation and pain following the visit.

Registered products available for routine animal husbandry use

There are currently three products on the market that have pain relief claims for cattle. There are also a number of additional injectable NSAIDs that can be obtained from a veterinarian and are not covered here. The three products are:

- Tri-Solfen (Bayer Australia) – local anaesthesia, post-op
- Ilium Buccalgesic OTM (Troy Laboratories, meloxicam) – NSAID
- Injectable Meloxicam (Boehringer Ingelheim, meloxicam) – NSAID – prescription only.

Tri-Solfen® is a topically (externally) applied combination agent that includes lignocaine, bupivacaine, adrenaline and cetrimide. It is applied to wounds immediately after the procedure i.e. it is a post-operative product for routine animal husbandry procedures. It is used to control pain and inflammation and is available over the counter from major distributors directly to farmers.

Tri-Solfen dosages and costs as of July 2023:

Tri-Solfen dosages and costs: calves

Weight kg	Dose mL	Cost \$
30–100	6	0.86
>100	9	1.29

Withholding period (WHP) – 90 days (meat cattle).

Buccalgesic® is a meloxicam (NSAID) gel that is administered by oral application in the buccal (cheek) pouch of calves, rather than drenching for the animal to swallow. At present, it is available in a 200ml pack costing approximately \$80–100 or 40¢/20kg for calves. Animals should not be retreated for 21 days after an initial treatment.

WHP is 10 days and Export Slaughter Interval (ESI) 21 days (meat cattle).

Buccalgesic 10mg/mL meloxicam dosage and costs – cattle (0.5mL/10kg)

Weight kg	Dose mL	Cost \$
30	1.5mL	\$0.60
40	2.0 mL	\$0.80
50	2.5 mL	\$1.00
60	3.0 mL	\$1.20
70	3.5 mL	\$1.40

Prices quoted are approximate and may vary from region to region and with supplier and quantity purchased. This product is available over the country from major distributors directly to farmers.

Metacam 20[®] is a meloxicam (NSAID) injection (subcutaneous, under the skin at a rate of 2.5mL/100kg or 1mL/40kg). It is available in 100mL bottles costing approximately \$150–200 or 75¢/20kg for calves. It is an S4 drug so it has to be purchased from a veterinarian.

WHP is eight days (meat cattle).

NB: The prices included here are approximate at the time of publication and will vary according to region and distribution channel.

How to use Tri-Solfen:

Safety directions:

Tri-Solfen may irritate the eyes and skin so avoid contact with the skin. Use PVC gloves, wear safety goggles and wash hands thoroughly after use.

Castration of calves:

- Follow the instructions on castration as outlined in Chapter 3.
- After cutting through the skin and extruding the testis, squirt one third of the dose up the spermatic cord prior to removal of the testis.
- Repeat for the second testis.
- Apply the final one third (1/3) of the total Tri-Solfen dose to the edges of the scrotal skin wound(s).

Disbudding and dehorning in calves:

- Follow the instructions on disbudding and dehorning as outlined in Chapter 4.
- Immediately apply Tri-Solfen using the applicator gun after disbudding or dehorning each horn, completely covering the wound including the surrounding burn wound (if using cautery).
- Always ensure that the applicator is squeezed hard enough to cause the product to froth and cause foaming. This will ensure that the Tri-Solfen sticks to the wound and that run off from the application site is minimised.
- Take care not to spray excess over the wound, therefore preventing Tri-Solfen from getting into the eyes of treated calves.

How to use Meloxicam

Meloxicam can be administered by injection subcutaneously in the neck prior to the procedure or immediately after any of the husbandry procedures outlined in this manual have been completed.

Buccalgesic paste is absorbed through the mucosa of the cheek – **it is not a drench!**



3. Branding

What is branding?

Branding is the placing of permanent identifying marks on the hide of an animal by destroying the hair follicles and altering hair regrowth.

From a welfare perspective, fire branding is not the preferred method of identification, but it is permanent and may be the only practical system in some circumstances and jurisdictions.

Hide damage at the branded area decreases the value of a tanned hide.

Brand position and size

A poorly administered hot brand can significantly reduce the value of the hide, causing financial loss to the producer and beef industry. Use the correct sized brand and position it correctly.

Cheek branding is not good welfare practice, being close to sensitive major facial nerves. It should not be performed and is illegal in most states.

See Appendix C for legal branding positions in your state.

Electronic devices, such as ear tags used in the National Livestock Identification System (NLIS), are another method of identification. These can be removed, are not easily read electronically further than about 60cm from the animal and are not visible from a distance.

Improvements in electronic ID technology may make branding unnecessary in the future, with benefits for the animals.

Why brand?



This three-piece plus symbol hot brand has produced clear identification.

A unique brand provides positive permanent and visible identification and assists in establishing ownership of an animal.

A year brand provides easily visible evidence of the age of an animal to assist with management.

A brand is a legal requirement in some states, which stipulate the type, size and positioning of brands, age of animals at branding, and the lodgment of annual brands returns.

See Appendix C for a summary of the legal requirements for different states or contact your relevant state department.

Branding and *The Australian Standards and Guidelines – Cattle*

S5.10 A person must use the most appropriate and least painful method to identify cattle that is applicable to the jurisdiction and the production system.

S5.11 A person must not place a permanent brand on the head of cattle.

As states/territories may have differing regulatory requirements for cattle identification, these should be checked.

G5.25 Hot-iron branding of wet cattle should be avoided.

G5.26 The correct time period of application and temperature of the iron should be used when hot-iron branding.

G5.27 Hot-iron branding of weak or extremely thin cattle should be avoided.

G5.28 Care should be taken with the concurrent application of volatile pour-on treatments when hot-iron branding or applying the electric prodder.

G5.29 Ear tagging and tattooing should be done in a way that minimises the risk of infection and tearing of the ear.

G5.30 Ear marking and tattooing instruments should be sharp and clean, with relevant hygienic techniques followed.

When to brand

- Branding is best done when the animal is young. It is usually incorporated with other standard husbandry procedures, such as castration and dehorning.
- Young animals are easier to handle and restrain. This reduces stress on the animal and decreases the risk of workplace accidents.
- However, the size of the branding iron relative to the size of the calf means it is difficult to brand calves less than one month of age. Calves two to six months old are easier to restrain and better suited to the size of the brand.
- Older cattle can be effectively branded but adequate restraint (e.g. a squeeze crush) is essential to reduce movement and the chance of a smudged or illegible brand. At present, there is no legal requirement to use anaesthesia or analgesia when branding older cattle.



This brand is smudged because the animal moved.

- When older cattle change ownership, they are often cross-branded with the new owner's brand to reduce confusion. Some states have legal requirements for positions when cross-branding. Check with your department's local office or refer to Appendix C.



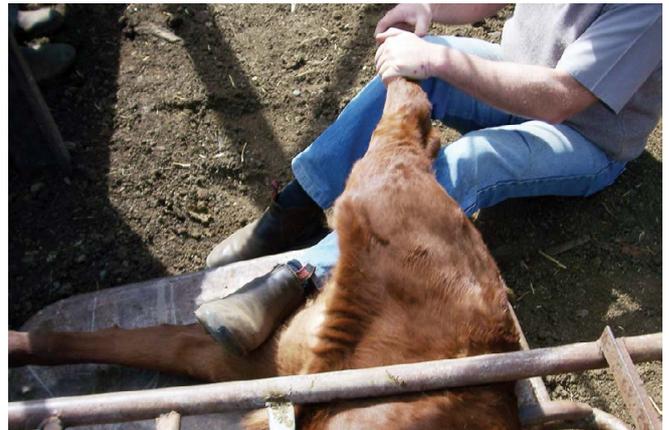
A calf cradle provides the best and safest restraint during branding. Note the soft tyre to reduce jarring when the cradle is dropped and to keep the calf's head off the dirt.

Facilities and equipment

Restraint

The animal must be restrained adequately for fast and efficient branding – with minimum discomfort to the animal and maximum safety for the operator.

- Young calves are best branded in a calf cradle.
- The upper-most rear leg of the calf must be firmly held to prevent movement and resultant smudging of the brand. The leg is held back firmly if branding on the rump or pulled forward if branding on the twist (the upper rear part of the hind leg).



The uppermost rear leg must be held firmly to prevent the calf moving and smudging the brand.

- If a calf cradle is not available and only a few calves are to be branded, small calves can be immobilised while standing by firm pressure against a strong vertical surface (e.g. a yard panel). At least two people are needed to adequately restrain the calf. The calf cradle is easier on the animal and operator.
- Larger cattle can be adequately restrained by using a head bail and a squeeze gate in a sturdy cattle crush.



Small calves can be held against a vertical surface, but a larger animal (as above) will struggle and smudge the brand.

Branding irons

Branding irons can be letters, numbers or symbols. Symbol brands and conjoined three- piece brands are better for the animal's welfare as the brand is smaller and fewer applications are needed.

- Refer to Appendix C or check with your relevant state department for the legal requirement on the type and size of a brand and on the need to register it through an annual brand return.
- Branding irons are obtained from commercial manufacturers – your state department can provide names of suppliers.
- The structure of the branding irons is important. Avoid small, enclosed symbols such as an 'O' which may overheat the skin and cause the centre of the branded area to die and slough out. Such problems are avoided if brands are obtained from a commercial manufacturer rather than being home-made.
- Branding irons must be properly maintained and cleaned before and after use. The edge should be relatively thick and flat and not sharp, rounded or dented. Test the heated brand on a piece of flat wood to check the evenness of the brand's contact surface.
- Hot-iron brands are different to irons used for freeze branding, and the types must not be interchanged. Freeze branding irons may not retain their shape under high temperatures.



A conjoined three-piece brand is quicker to use than three separate brands and causes less distress.



A symbol brand: the face of this one should be filed flat before being used.

Heating equipment

Brands have to be heated to kill the hair follicles. The hot-iron brand can be heated electrically or in a wood- or gas-fired branding furnace.



An example of a gas-fired branding furnace.



A battery-powered electric branding iron.

How to brand

There are two types of branding: hot-iron branding and freeze branding. Freeze branding causes less pain to the animal at the time of application, but equal pain later.

Hot-iron branding

The hot-branding iron destroys the hair follicles and prevents hair regrowth. The iron must be at the correct temperature to produce the required effect in the shortest possible time, thus reducing the pain to the animal.

'Black hot' irons are not hot enough and will not produce a clearly visible brand. 'Red hot' irons are too hot and damage the hide. 'Blue hot' irons are ideal and will produce a clear brand in 2–3 seconds.

1. Make sure the brand site is clean and free from dirt or faeces to allow even contact of the brand with the hair and hide.
2. Check the iron is the correct way up and the animal is properly restrained.
3. Press the iron firmly against the hide for 2–3 seconds, rocking the handle slightly if necessary to distribute the pressure uniformly. Maintain firm pressure to prevent the iron slipping and making an illegible smudged brand. The brand should appear as a light tan colour on the hide.
4. Clean branding iron regularly to stop burnt hair and skin debris accumulating and reducing heat conductivity.

Do not brand wet animals because the correct temperature cannot be reached on the skin.

Water on the hair will boil, scalding the animal and resulting in a large painful burnt area and an indistinct brand. If necessary, thoroughly dry the site before branding.



Fresh brand showing tan colour.

The animal's welfare

To minimise discomfort to the animal:

- Check it is properly restrained.
- Check the irons are at the correct temperature (blue hot, not black or red hot).
- Apply hot irons for 2–3 seconds only.
- Do not brand wet animals.
- Do not brand weak or emaciated animals.
- Brand animals when 2–6 months old.
- Use a symbol brand preferably. Instead of using three separate branding irons, have them conjoined for a single operation.
- Never brand on the cheek – see Appendix C for appropriate branding sites.
- Administer an analgesic if not already provided for other husbandry procedures.



Black hot – too cool.



Blue hot – correct.



Red hot – too hot.

Freeze branding

A freeze brand is super-cooled in liquid nitrogen stored in a large vacuum flask. Dry ice mixed with methylated spirits is sometimes used but is not as cold.

Freeze branding uses ultra-low temperatures to destroy the skin and hair cells that produce pigmentation. A freeze brand appears as white hair growing on the branded area.

- Freeze branding causes little pain at the actual time of branding but appears to cause pain for a period afterwards, similar to hot-branding.
- Irons used for freeze branding are not suitable for hot branding; they are thicker and heavier, and made of specific alloys to maintain the cold temperature.
- The advantages of freeze branding are less pain to the animal at the time of branding and the brand is clearly visible from a distance in dark-coated cattle.

The disadvantages of freeze branding are:

- The iron must be held on the animal for longer, increasing handling time and restraint stress.
- It requires dry ice or liquid nitrogen which are expensive. Liquid nitrogen needs a suitable vacuum storage container for transport and storage, and trained personnel to handle material at -196°C.
- The brand site must be clipped, and preferably sprayed with alcohol, to help uniform contact of the brand's surface.
- The results can vary with the thickness of the skin of the animal, and the colour of the coat.
- The brand will not be visible on white or grey cattle.

The procedure for freeze branding

1. Place the iron in the liquid nitrogen or dry ice/methylated spirits bath and leave it there until the vigorous bubbling stops (generally 3–5 minutes). The iron is ready to use when frosting appears on the handle just above the liquid surface. Check the animal is properly restrained, remove the iron from the liquid, shake off excess liquid and place the iron firmly on the animal. If cooling with dry ice, apply the brand for 30–60 seconds depending on the animal's size and coat colour (adult cattle 40–60 seconds, weaners and calves 30–50 seconds, light-coloured animals 50–60 seconds). The timing will also vary with hide thickness, which depends on the breed of the animal and the branding position. The branding time is slightly shorter with liquid nitrogen as it is colder than dry ice.
- The outline of the brand will quickly disappear, but a raised area will appear after 10–20 minutes. This will also disappear and nothing will be seen until the hair colour changes some weeks later.
 - White hair growth will start to become noticeable after 6–10 weeks.



Freeze brands stand out well on dark-coloured animals.

Pain relief when branding

Tri-Solfen is not recommended prior to branding as it will wet the hair. It is unlikely to provide much pain relief after the procedure as the duration of action will be short lived. Buccalgesic or Meloxicam will be much more effective in providing medium-term pain relief during the 24 hours after branding and will be normally administered in association with the other husbandry procedures that occur concurrently.

4. Castrating

What is castration?

Castration is the removal of the testicles from a male animal. Castration may be either immediate (surgical, using a blade) or delayed (non-surgical, using an Elastrator® ring or Burdizzo® emasculator).

New technology, such as male infertility vaccination, may eventually render present castration practices obsolete, with obvious benefits to animal welfare, but it is not yet practical for on-farm use.

Why castrate?

Compared to entire male cattle, castrated males:

- are less aggressive
- are easier and safer to handle
- are less likely to fight, reducing bruising and injuries to themselves and other cattle and damage to fences and gates
- are easier to keep in paddocks after the time that sexual maturity would be reached
- prevent unwanted mating and allow greater control over genetic gains through selective breeding
- older entire males are less likely to grade under the MSA guidelines.

When to castrate

The younger that bull calves are castrated, the better. Early castration significantly reduces:

- pain and discomfort for the animal
- risk of bleeding and infection
- recovery time after castration
- weight loss after castration
- difficulty of restraining the calves and performing the procedure
- risks to the operator and the amount of labour needed.

Calves as young as two days old, **but no more than two weeks old**, can be effectively castrated with Elastrator rings.

Calves should be castrated preferably under six months of age or at the first muster before weaning (it is acknowledged that in extensive cattle operations the first muster may not occur until calves are more than six months old). In more intensively managed situations, castration may be possible well before six months, and this should be the aim.

Note: Some states have specific legislation regarding age of castration – refer to Appendix C or check with your relevant state department.

Castration and the *Australian Animal Welfare Standards and Guidelines for Cattle* section

S6.1 A person castrating or dehorning cattle must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge, experience and skills.

S6.2 A person in charge must ensure the use of appropriate pain relief when castrating cattle, unless cattle are:
1) less than six months old; or
2) less than 12 months old if at their first yarding and where the later age is approved in the jurisdiction.

S6.3 A person must use appropriate tools and methods to castrate cattle.

G6.12 A person should use the most appropriate tools and least painful method to castrate cattle that is applicable to the production system.

G6.13 Cattle to be castrated or made cryptorchid should be as young as possible (less than 12 weeks old) and the procedure should be done before the cattle are weaned.

G6.14 Calves should be more than 24 hours old when castrated.

G6.15 Calves less than two weeks old should be castrated by the rubber ring method in preference to the cutting method.

G6.16 Calves more than two weeks old should be castrated by the cutting method in preference to the rubber ring and tension band methods.

G6.17 Use of rubber rings or tension bands on calves should ensure that the correct position and tension is achieved to block the arterial blood flow.

G6.18 The incision for surgical castration should be of sufficient size, and extend to the base of the scrotum, to allow effective drainage and reduce the risk of infection.

Facilities and equipment

Effective restraint of the calf

Proper restraint is essential for the welfare of both the animal and the operator.

- Most calves are castrated in a commercially available calf cradle (see page 4). A cradle that secures the calf in an elevated position, and not touching the ground, is easier to use and reduces dirt and dust contamination of castration and dehorning wounds.

If no cradle is available, calves can be:

- held firmly on their side on the ground by one or more competent operators, depending on calf
- restrained standing in a crush by one or more operators holding the calf firmly against the side of the crush. Holding the tail vertically and slightly forward towards the head of the calf helps restraint. However, this standing position is not recommended as it is generally harder to perform the operation and there is greater chance of retraction of the testicle into the scrotum or inguinal canal during surgical castration.



Calf restrained manually on the ground. The body is immobilised by the lock on the head and front leg; the scrotum is exposed by the hold on the back legs.

Equipment needed for surgical castration:

- separate buckets containing an effective antiseptic (such as Hibitane® or Savlon® mixed to the recommended dilution) for hand washing and then antiseptic rinsing
- a suitable pair of artery forceps to clamp blood vessels in case of heavy bleeding. This is unlikely if the correct procedure is followed
- scalpel blades (No.10, 22, 23 or 24) and handle (No. 3 handle for No. 10 blade, No. 4 handle for No. 22, No. 23 and No. 24 blades)
- a shallow container of antiseptic solution for the scalpel between calves
- a secure closable sharps container for used blades.

Equipment needed for non-surgical castration:

- buckets containing effective antiseptic for hand washing and then antiseptic rinsing
- either a Burdizzo® emasculator or an Elastrator® applicator and rubber rings. The size of the Burdizzo® used will depend on the size of the calves.



A Burdizzo® emasculator for non-surgical castration. (Hint – store your Burdizzo® with the jaws open to preserve spring tension.)

Scalpel blades for surgical castration

Scalpel blades should be used in preference to a sharpened pocket knife for surgical castration. Scalpel blades are:

- much sharper
- sterile until opened
- easier to keep sterile in antiseptic solution
- relatively inexpensive (about 80¢ each).

The blade should be replaced after every 15–20 calves so that it is always ultra-sharp.

Shortening the scalpel handle makes it easier and safer to use. Some operators like to use the blade partly wrapped in its foil, as a blade on its own can be difficult to hold securely.

The bull's reproductive anatomy

The important relevant structures in the bull's reproductive anatomy are the scrotum, testicles and spermatic cords – with their associated blood vessels.

Scrotum

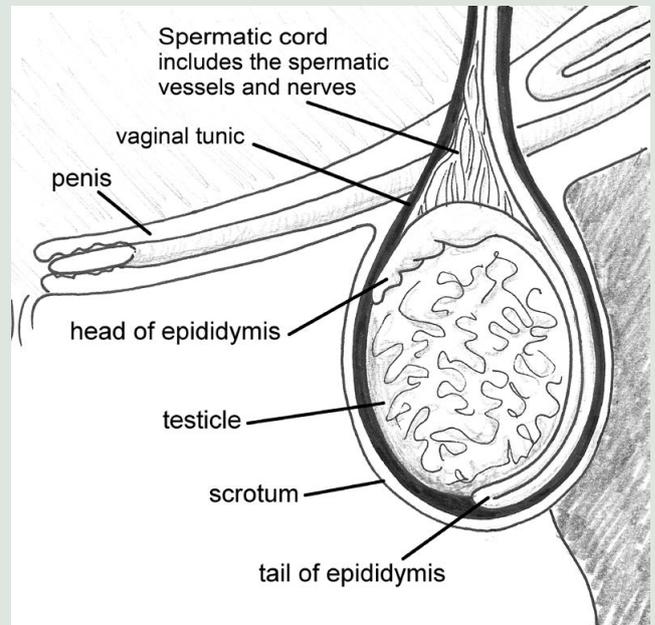
- The scrotum is a bag of skin containing the testicles.
- The scrotum is divided into two sections by a membrane called the scrotal septum; each side contains one testicle.

Testicles

- Each testicle is covered by a tough fibrous membrane called the vaginal tunic. This membrane is separated from the testicles and removed during castration to reduce the risk of swelling and infection.
- The epididymis, with a distinct lump on each end (the head and tail of the epididymis), attaches around the curved outer upper and lower surface of the testicle.

Spermatic cord

- The spermatic cord is attached to the top of the testicle and goes up into the neck of the scrotum. It is enveloped in the fibrous vaginal tunic.
- The spermatic cord contains the duct which carries sperm from the testicle and the major blood vessels supplying the testicle. The sperm duct comes out of the epididymis that is attached to the testicle.

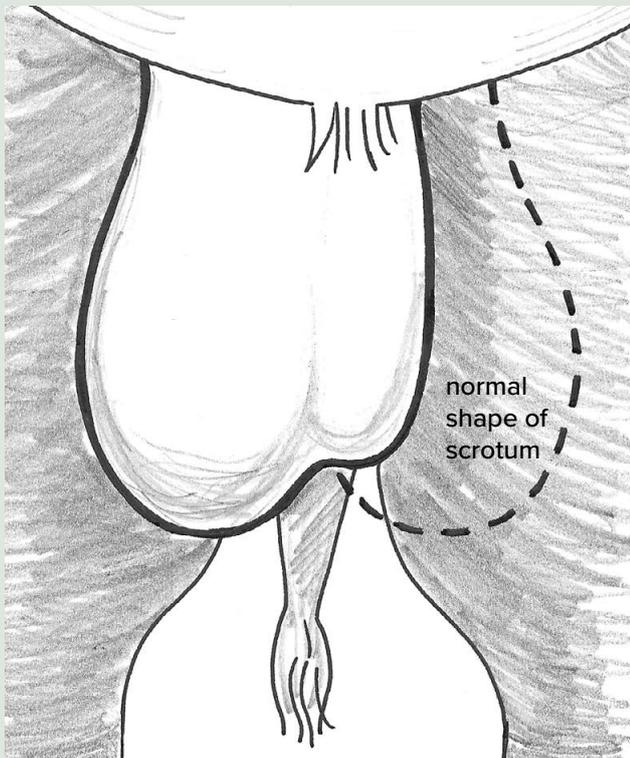


Anatomical abnormalities

Cryptorchidism

Some calves (about five calves in every 1,000) have only one testicle in the scrotum. This is called cryptorchidism (and is heritable).

- The retained testicle does not produce sperm but will produce male sex hormones.
- If a cryptorchid is found, it is advisable not to remove the one testicle present; this would greatly reduce the chances of the other one descending into the scrotum later – when full castration can be performed.
- If the one descended testicle is removed, the animal is known as a 'stag' and, though infertile, will exhibit male sexual characteristics (e.g. mounting and aggression). If this is done, a close watch needs to be kept on the 'stag' in case the other testicle does descend, with the possibility of fertile mating occurring.

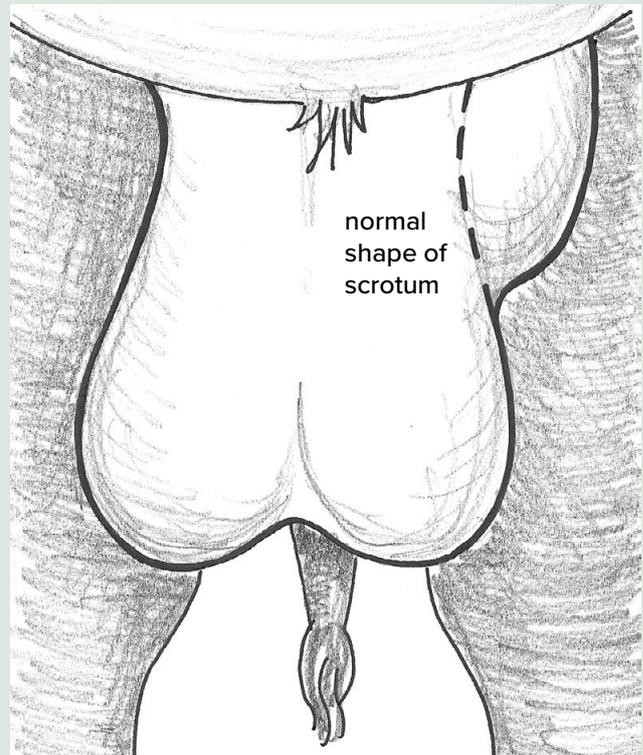


Cryptorchidism with only one testicle descended.

Inguinal hernia

On rare occasions, calves will have a larger than normal opening between the abdominal cavity and the scrotum, allowing intestines and/or fat to descend into the scrotum.

- An inguinal hernia will look like a large swelling on one side of the scrotum, often near the top. This swelling will often feel soft, due to the intestines or abdominal fat descending into the area.
- **Do not** attempt to castrate a calf if an inguinal hernia is suspected. Consult your veterinarian or leave the calf entire.



Inguinal hernia.

Deformed or injured testicles

- Injuries to testicles or previous infections can result in deformed testicles and adhesions developing between the testicle and the scrotal wall.
- If the testicles **do not** move easily inside the scrotum, do not attempt to castrate the animal. Consult your veterinarian or leave entire.

How to castrate

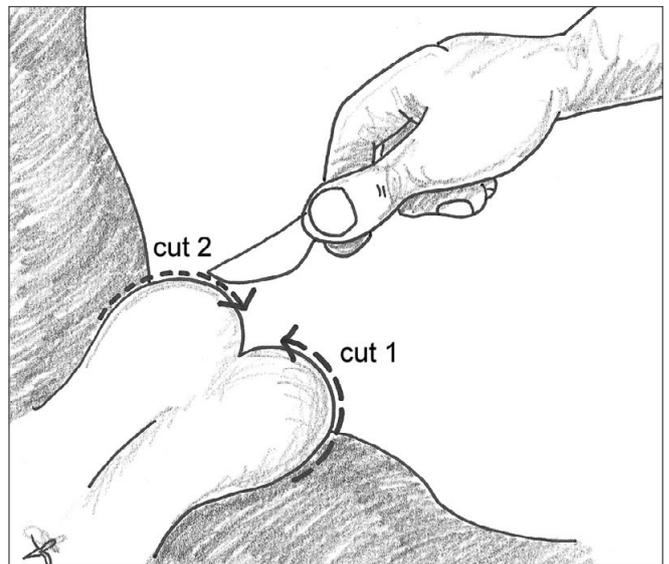
There are four methods of castration:

- surgical – using a blade
- non-surgical – using an Elastrator® ring
- non-surgical – using a Burdizzo®
- non-surgical – using a tension banding technique – this method is not supported by *Australian Animal Welfare Standards and Guidelines for Cattle* and is not advisable.

Surgical castration – using a blade

- Restrain the calf, preferably in a calf cradle, or on the ground or standing in a crush.
- If the calf is on its side, pull back its upper hind leg fully, hold it firmly to expose the scrotal area (see page 17).
- Ensure latex/PVC gloves are worn if using Tri-Solfen.
- Check the scrotum to ensure there are two free-moving testicles present and there is no inguinal hernia or other deformity (see 'Anatomical abnormalities' on page 19).
- If the scrotum is excessively dirty or covered in faeces, clean it with antiseptic before proceeding.
- Always remove the testicle closer to the ground first. This will minimise the contamination of the second incision.
- Squeeze the testicle to trap it against the bottom of the scrotum so the skin of the scrotum is stretched over the testicle.
- Make a firm, decisive incision in the scrotum from about halfway up the scrotum to the midline of the base of the scrotum. The incision size will depend on the size of the testicle. A larger incision is better; a small cut may not allow adequate drainage and could result in a higher incidence of infection. (See figure at right.)
- The incision invariably cuts a little into the tissue of the testicle. This is not a problem, provided the testicle is not squeezed excessively resulting in the testicular tissue being shelled out. This makes the remnant of the testicle almost impossible to hold, and it can be withdrawn into the scrotum to the point of being irretrievable. This may result in a 'stag' (an infertile animal with male sex characteristics).

- Make sure the incision through the scrotal wall and through the vaginal tunic (the thick fibrous capsule or inner bag surrounding the testicle) is long enough to allow the testicle to be easily squeezed through the incision, and to allow good post-operative drainage.
- Pull the testicle from the incision hole by wrapping fingers around the testicle and the spermatic cord. If using Tri-Solfen, squirt $\frac{1}{3}$ of the dose up the spermatic cord.
- Cut through the white fibrous vaginal tunic close to the incision opening, freeing the cut fibrous tissue and testicle with epididymis attached. The blood vessels are then manually separated from the sperm duct and the fibrous tissue. The sperm duct and fibrous tissue are then cut as close to the neck of the scrotum as possible, leaving the testicle attached only by the blood vessels. This fibrous tissue must be removed separately to the blood vessels, so cut through and remove it **before** removing the testicle.



Make the cuts long enough for easy removal of the testicle and to allow good drainage.

Keep it clean – hygiene is all important!

- Before starting, and between animals, immerse instruments constantly in a solution of an effective antiseptic (eg Hibitane® or Savlon® mixed to the correct dilution).
- Wash both hands thoroughly first and then rinse in an effective antiseptic solution before each calf's castration, especially if performing other procedures (such as dehorning). Use separate buckets for initial washing and then antiseptic rinsing to prevent excessive contamination of the antiseptic solution.
- Change all antiseptic solutions (for hands and instrument storage) every 15–20 calves to stop them becoming contaminated.



Scalpel blades, blade wrapped in foil, scalpels with shortened and regular handles – in antiseptic solution.

- Firmly pull the testicle away from the scrotum with the attached blood vessels and remove it with one quick continuous tearing action. This is the **best** way to prevent excessive bleeding as the stretching helps block the blood vessels.
- If the testicle cannot be torn away, it means there is remnant fibrous tissue that has not been completely separated from the blood vessels. This must be separated from the blood vessels before attempting to tear again.

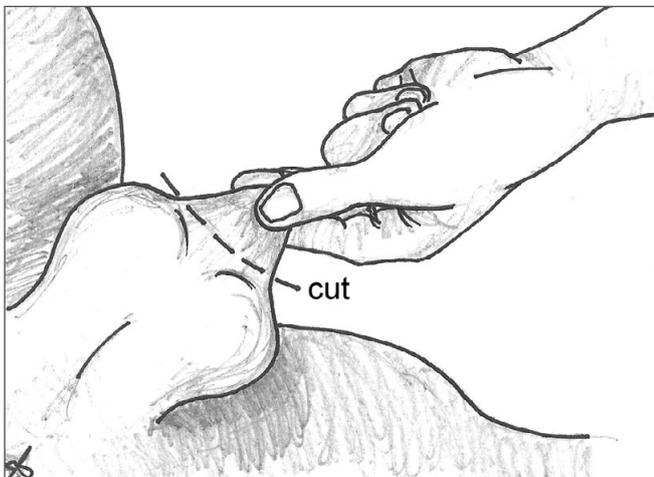
Another, but less preferred, method is to stretch the blood vessels and cut through them by scraping back and forth repeatedly with the scalpel blade close to where they exit from the top of the scrotum.

Do not cut straight through the cord as a clean cut will predispose to excessive bleeding.

- Trim away any obvious loose tissue to minimise infection and promote wound healing.
- Repeat the procedure on the other testicle applying the second dose of Tri-Solfen along the spermatic cord after the testicle is exposed.
- Do not allow any tissue to return back into the scrotum after it has been pulled out as it is potentially contaminated and a source of infection.
- Pull the scrotum away from the body in one single 'stripping' motion to allow the cut ends of the cords to retract high up into the scrotum and to remove any blood clots. This will reduce the chance of post-operative swelling and infection. If using Tri-Solfen, squirt the remainder of the dose along the cut edges of the scrotum.

An alternative procedure is especially useful in young calves with smaller testicles that are difficult to grasp through the scrotum. This method is to remove the bottom quarter of the scrotum by grasping it firmly with thumb and forefinger of one hand, stretching it away from the body of the calf, and removing it with one quick, clean incision.

Each testicle is then easily exposed, freed of the fibrous vaginal tunic and removed as described above.



Amputation of the bottom quarter of the scrotum is especially useful to expose the testicles in younger calves.

Caution! If...

- both testicles are not easily movable within the scrotum, or if an inguinal hernia is suspected, do not castrate the calf – contact your veterinarian or leave it entire
- only one testicle is present, carefully consider the information on cryptorchids in 'Anatomical abnormalities' before deciding to castrate.

Avoid rain and dust

- Do not castrate calves if they are wet or if the yards are muddy as this increases the risk of infection and/or fly strike.
- If possible, water down the yards (but not the calves) before and during the procedure to lay dust.

Surgical castration – using a blade

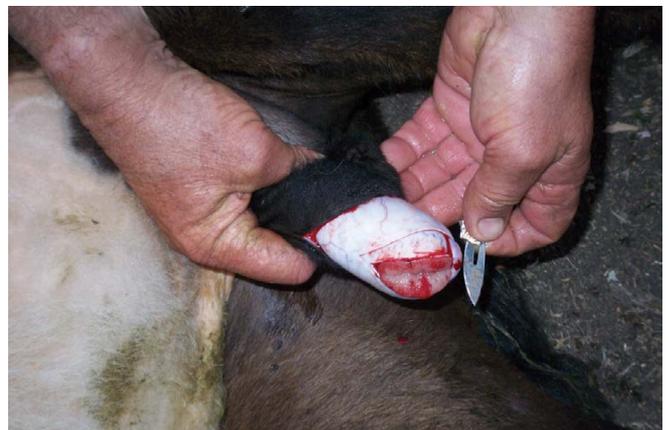
Wear latex gloves if using Tri-Solfen.

Start with testicle closest to the ground:

1. Squeeze the testicle against the bottom of the scrotum to stretch the skin.



2. Cut from about half way up the side of the scrotum to the midline of the base of the scrotum to allow the testicle to be easily squeezed out. If using Tri-Solfen, squirt a third of the dose up the spermatic cord.



3. Pull the testicle from the incision hole by wrapping fingers around the testicle and the spermatic cord.
4. Separate the blood vessels from the sperm duct and the fibrous tissue.



5. Cut through the white fibrous vaginal tunic close to the incision opening, freeing the cut fibrous tissue from the testicle with epididymis attached.



6. Cut the sperm duct and fibrous tissue as close to the neck of the scrotum as possible, leaving the testicle attached only by the blood vessels.
(This fibrous tissue must be removed separately to the blood vessels, so cut through and remove it before removing the testicle.)



7. Firmly pull the testicle away from the scrotum and remove it with one quick continuous tearing action.
(Don't cut straight through the cord or it will bleed excessively; stretching helps block the blood vessels.)
8. Pull the scrotum away from the body in one single 'stripping' motion to allow the cut ends of the cords to retract high up into the scrotum and to remove any blood clots. This reduces any post-operative swelling or infection.



9. Repeat steps 1–8 for the other testicle.
10. Squirt remainder of Tri-Solfen on the cut edges of the scrotum when completed.

Possible complications of surgical castration

The risk of complications and infections is greatly reduced by castrating calves when very young.

Swelling. The risk of swelling and fluid build-up is reduced if a large incision is made initially through the skin and underlying fibrous tunic tissue.

Infection. Infection will show as a swollen reddened area, with or without pus discharge. Infected wounds should be treated by drainage and/or antibiotics, by or under the direction of a veterinarian.

Bleeding. Minimal bleeding occurs if the cord is stretched as described. If there is excessive bleeding, the vessel should be located and clamped with artery forceps; otherwise, apply firm pressure over the scrotum to control the bleeding.

Fly strike. Fly strike may occur, particularly if castration is done in rainy or humid weather. Avoid these conditions and check cattle daily, for 10 days.

Remember – surgical castration is:

- a skilled procedure that should only be attempted for the first time under the supervision of an experienced operator
- a precise task that must be done at a pace which allows a clean, efficient job that will heal quickly and with minimum discomfort to the animal. It is **not** a contest of speed
- an invasive surgical procedure. Failure to thoroughly wash hands and to remove all faecal material and dirt from the surgical area first will greatly increase the risk of infection, post-operative pain and possible mortality.

Non-surgical castration – with Elastrator® ring

A small rubber ring is placed around the neck of the scrotum to cut off the blood supply to the scrotum and testicles. All tissue below the ring will die and fall off.

Castration with Elastrator® rings should be done only to calves **less than two weeks old** – see *Australian Animal Welfare Standards and Guidelines for Cattle*.

Using rings on older calves causes a high incidence of swelling and infection, and severe pain to the calf. This is because there is too much tissue in the neck of the scrotum for the ring to completely block the blood flow both into and out of the scrotum. Some blood can still flow in but none flows out.

Castration of very young calves (less than two weeks old) with Elastrator® rings is very effective and appears to cause little discomfort to the calf compared to other methods of castration. Calves can be castrated with rings when two days old and they can be easily restrained in the paddock. Often only one person is needed for the whole procedure in very young calves, but the operator should be wary of the calf's mother as she may become aggressive when her calf is handled.

Castrating with a rubber ring:

- Restrain the calf on its side.
- Place the rubber ring on the Elastrator® applicator and expand it.
- Position the applicator near the bottom of the scrotum with the prongs pointing towards the calf's body.
- Pull the tip of the scrotum through the expanded ring which is positioned above the testicles close to the calf's body.
- Apply gentle pressure at the neck of the scrotum to force the testicles below the rubber ring into the scrotum. Do not place the ring too high up the neck of the scrotum as this may pinch the adjacent skin on the abdomen.
- Release the pressure on the applicator so that the ring tightens around the neck of the scrotum.
- Carefully remove the rubber ring from the prongs of the applicator.
- Palpate the scrotum gently to make sure both testicles are present below the rubber ring.

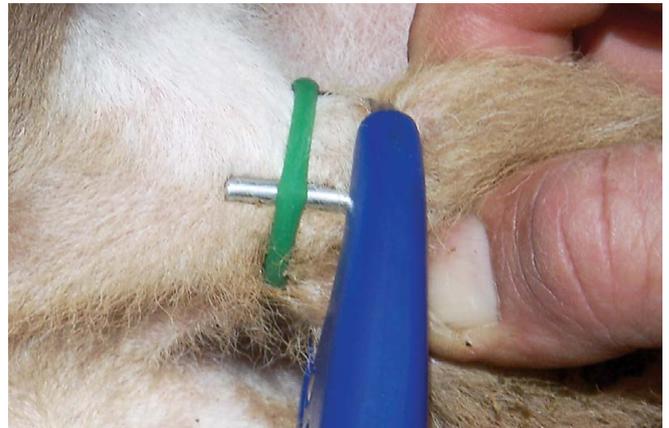
Do not use Elastrator® rings unless both testicles are present in the scrotum; they should not be used on cryptorchids.

Castrating with an elastrator ring

1. Place the rubber ring on the Elastrator® applicator and expand it. Position the applicator near the bottom of the scrotum with the prongs pointing towards the calf's body.
2. Pull the tip of the scrotum through the expanded ring which is positioned above the testicles close to the calf's body.



3. Apply gentle pressure at the neck of the scrotum to force the testicles below the rubber ring into the scrotum. Do not place the ring too high up the neck of the scrotum as this may pinch the adjacent skin on the abdomen.
4. Release the pressure on the applicator so that the ring tightens around the neck of the scrotum.



5. Carefully remove the rubber ring from the prongs of the applicator.
6. Palpate the scrotum gently to make sure both testicles are present below the rubber ring.



Non-surgical castration – with a Burdizzo®

The Burdizzo® is a precision instrument that is used to clamp and crush the spermatic cord and associated blood vessels – without cutting the skin of the scrotum. Without a blood supply, the testicles wither inside the scrotum and disappear over 4–6 weeks, leaving the scrotum intact.

Skill and experience are needed to ensure the spermatic cords are properly crushed. The Burdizzo® must be in good condition to work effectively as it can become 'sprung' (a properly working Burdizzo® should completely sever a match stick placed between two sheets of paper without cutting the paper).

- The procedure is best done from behind with the calf standing.
- The calf must be well restrained and the handler protected from being kicked.
- Palpate the left spermatic cord at the neck of the scrotum and move it to the outer edge of the scrotum.
- Clamp the Burdizzo® tightly over the cord, ensuring only that part of the scrotal skin covering the cord is included. Be careful in case the calf kicks.

Note: The skin down the midline of the scrotum must not be crushed so that blood flow to the scrotum is not interfered with – reduction of blood flow may cause infection and deformity of the scrotum.

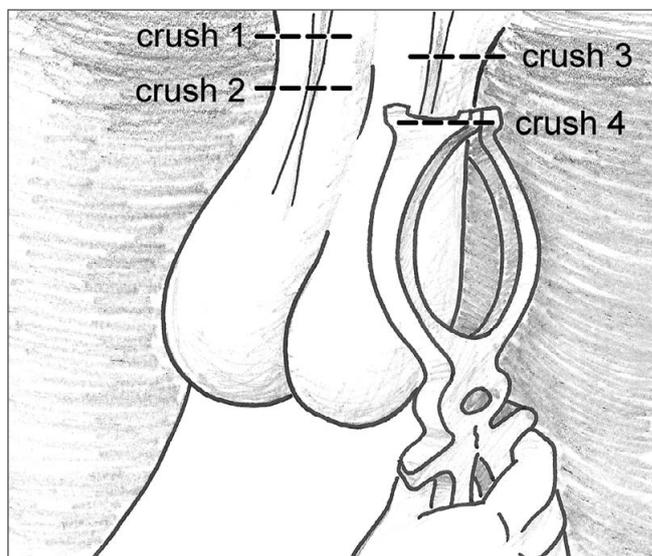
- Leave the clamp in place for 10–20 seconds.
- Open the clamp and reapply about 1cm below the original application point. Clamping twice ensures the blood vessels are effectively crushed and completely removes the nerve supply, reducing pain.
- Repeat the procedure on the right spermatic cord, again clamping it twice. Always ensure that the clamping marks of the left and right sides are not joined so as to be certain that the blood supply to the scrotum remains intact.

Using the Burdizzo®

1. Restrain calf (standing position is best).
2. Feel for left spermatic cord at neck of scrotum and move it to the outer edge.



3. Clamp the Burdizzo® tightly over the left cord for 10–20 seconds. Do not crush the midline of the scrotum with its blood flow.
4. Reapply clamp about 1cm below first point – again for 10–20 seconds.
5. Repeat double clamping on the right cord (again avoiding the midline blood supply).



Order of clamping using the Burdizzo®.

The advantages of castrating with the Burdizzo® are that it appears to cause less pain and stress than other methods. There is also little risk of infection because there is no open wound.

The disadvantages are that it is a specialist instrument and it needs a skilled experienced operator to ensure that the cords are completely severed – failures are common if the Burdizzo® is not applied correctly. This can result in partial castration with resultant uncontrolled mating, and often causes scrotal deformity with decreased market value of the steer/stag.

Non-surgical castration – by tension banding

Castration by tension banding is a technique that is not endorsed in *Australian Animal Welfare Standards and Guidelines for Cattle* as the animal welfare implications of the procedure have not yet been properly evaluated.

Like Elastrator® rings, it relies on completely cutting the blood flow in and out of the scrotum, resulting in all tissue below the band dying and eventually falling off. This is done by placing a tension band well up the neck of the scrotum.

Use of tension banding is a complicated and difficult procedure; failure to **completely** block the blood flow will result in an extremely painful and potentially fatal swelling of the scrotum. For this reason, it is not advocated here.

What after-care is required?

- Castrating younger animals greatly reduces the chance of complications.
- Administer Meloxicam prior to releasing.
- If animals are unvaccinated, give a 5/1 shot at the time of the procedure. This is far better than leaving the animal unvaccinated as the incubation period for tetanus on average is around 7–10 days and antibodies will be forming by this time.
- Inspect animals regularly, preferably daily, for up to 10 days after castration to quickly detect any complications.
- If the scrotum is swollen and reddened, consult your veterinarian. Treatment usually involves draining the scrotum by incising the lower part of the scrotum, flushing the wound and administration of antibiotics, especially if there is any sign of pus.

After surgical castration:

- Do not apply a dressing powder after castration as it will retain moisture and make the wound attractive to flies.
- The main risk with surgical castration is retention of too much fluid in the scrotum causing a reddened swollen area. Though some swelling is normal, too much swelling causes discomfort, and the inflamed tissue and fluid accumulation increases the risk of infection.
- Excess swelling nearly always results from not making the surgical incision long enough, and not near the bottom of the scrotum. This allows fluid to accumulate in the scrotum rather than draining out of the wound.
- Good drainage and exercise the day after the procedure helps reduce swelling.

Method	Advantages	Disadvantages
Surgical castration	<ul style="list-style-type: none"> • visual certainty that task is complete • scalpel blades are sharp, disposable and inexpensive • development of 'cod' (fat-filled scrotal sac) enhances appearance and market price. 	<ul style="list-style-type: none"> • blood loss • risk of swelling and infection from open wound • higher workplace safety risk because of sharp blades • needs experienced operator.
Elastrator® rings	<ul style="list-style-type: none"> • calves can be done very young (less than two weeks), reducing stress • bloodless and no open wound • rings and applicator are inexpensive 	<ul style="list-style-type: none"> • highest tetanus risk • cannot be used on calves older than two weeks • no 'cod' forms.
Burdizzo®	<ul style="list-style-type: none"> • older calves (up to six months) can be done with reduced stress • bloodless and no open wound • appears to cause less pain than surgical castration. 	<ul style="list-style-type: none"> • needs experienced operator and good equipment • Burdizzo® emasculator is expensive • cannot visually confirm if procedure has been successful • higher risk of tetanus.

5. Dehorning

What is dehorning?

Dehorning is the removal of the horns from cattle. It is a labour-intensive, skilled operation with important animal welfare implications, and is **totally avoidable** by breeding polled (hornless) cattle. Breeding for polls is relatively simple with British breeds, but a little more complicated with some *Bos indicus* breeds. Consult your local beef cattle advisor about breeding for polls.



Horned cattle are more dangerous to stock-handlers and other animals.



Breeding polled cattle or dehorning improves ease of handling, production and safety.

Cattle can have horns of different length, shape and size, but all horns are detrimental to cattle from a welfare and production perspective and pose a potential safety risk to cattle handlers.

Tipping (removal of the insensitive sharp end of the horn) is not dehorning. It does little to reduce the disadvantages of having horned cattle, for example it does not reduce bruising, and tipped cattle can still be a danger to other cattle and handlers. It is mainly utilised in horned cattle >12 months of age where there is a need to meet specifications for live export.

Why dehorn?

Horned cattle:

- hurt and damage other cattle, either deliberately or accidentally, especially when they are close to each other – at feeders, in yards and during transport
- get more injuries, bruising and hide damage than dehorned/polled cattle and are more aggressive towards other cattle
- pre-dispose animals to developing potentially deadly disease like Blackleg
- are generally more difficult to handle in yards, and pose a greater risk to themselves and stock-handlers
- cause more damage to gates, yards, fences and troughs
- require more space per beast during road or rail transport, increasing transport costs
- require more trough space in feedlots, and are generally not accepted into feedlots or for live export
- are harder to catch in a head bail and harder to apply ear tags, e.g. NLIS tags.

Dehorned/polled cattle attract better prices, especially from lot-feeders and exporters.

When to dehorn

The younger cattle are dehorned, the better, both for the calf and for the operator. Young calves suffer less pain and stress, have less risk of infection and have better growth rates. They are also much easier to handle and to restrain.

- The best time to dehorn is before the horn bud attaches to the skull. This generally occurs at about two months old but can be quite variable. Dehorning is often possible earlier than this – it can be carried out as soon as the horn bud is visible. (Horn buds emerge more slowly in *Bos indicus* cattle, and they may need to be inspected later.) At this young age, the procedure is simpler, and there is relatively little bleeding. Dehorning at this young age is possible on more intensively managed farms.
- If dehorning cannot be done before the horn bud attaches, the procedure will cause more bleeding and leave a larger wound. However, it can be done successfully up to six months old, with extra care and good procedures.
- Dehorning of older animals is painful to the animal, significantly increases the risk of excessive bleeding and death due to blood loss, and greatly reduces growth rate.
- Cool and dry conditions are best for dehorning. Hot, dry and dusty weather increases bleeding and risk of infection. Wet weather increases the risk of infection and fly strike.

Facilities and equipment

Dehorning is best done in a calf cradle that allows good access to each horn site. Good restraint minimises the duration of the procedure and pain to the calf, reduces the risk of wound contamination and makes it easier for the operator.

- A head bail can be used as long as movement of the head is restricted with a halter, nose grips or a chin bar.
- Holding the calf down on the ground is not recommended because the wound can become contaminated and infected.
- Haemorrhage control equipment including artery forceps and clean pressure pads should be available.
- All equipment must be clean, sharp and operating correctly before use. It must also be disinfected before each animal.



Dehorning in a cradle provides for good restraint. A tyre or flap keeps the head away from the dirt.



Dehorning tools for calves under six months of age. Left to right: dehorning knife; scoop dehorner; cup dehorner.

Which dehorning instrument?

The dehorning instrument used will depend on the age of the calf:

- hot iron – under two months old
- dehorning knife – 2–3 months old
- scoop dehorner – 2–6 months old
- cup dehorner – 2–6 months old

Animals over six months old*

- guillotine dehorner – horn tipping only
- surgical wire – horn tipping only
- tippers – horn tipping only
- horn saw – horn tipping only

*Horn tipping only unless under the direction of a veterinarian.

Caustic dehorning chemicals must not be used. They can spread into the eyes if the skin gets wet.

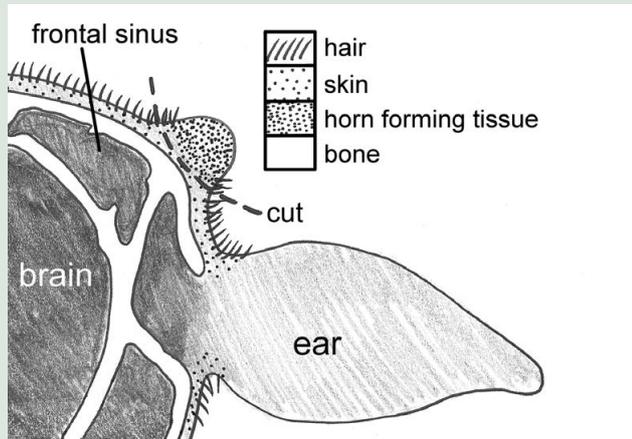
Removing horns with tools such as axes and hammers is inhumane and illegal.

Dehorning and the Australian Animal Welfare Standards and Guidelines for Cattle

- S6.1 A person castrating or dehorning cattle must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge, experience and skills
- S6.4 A person in charge must ensure the use of appropriate pain relief when dehorning cattle, unless cattle are:
- 1) less than six months old; or
 - 2) less than 12 months old if at their first yarding and where the later age is approved in the jurisdiction.
- G6.19 Preference should be given for breeding of naturally polled cattle.
- G6.20 Disbudding should be done in preference to dehorning.

- G6.21 Hot-iron cautery should be used in preference to excision methods for disbudding calves.
- G6.22 Calves should be disbudded or dehorned as young as possible.
- G6.23 The hair around horn buds should be clipped before using caustic chemicals for disbudding.
- G6.24 Tipping should only remove a solid, nonvascular portion of the horn, and result in a blunt horn end.
- G6.25 Horn regrowth or a scur that has a blunt horn end should not be dehorned or tipped.

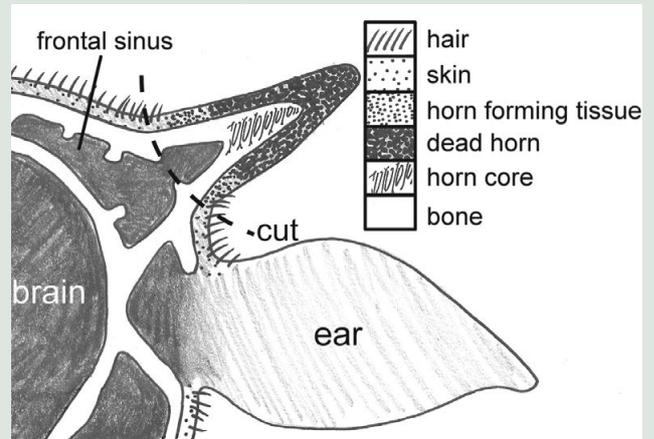
Anatomy of a growing horn



Young calf

The horn grows from the skin around its base – at different rates with different breeds. The horn bud is usually free-floating in the skin over the skull base in calves less than about two months old.

As the calf gets older, this horn bud attaches to the skull bone and a small horn forms.



Older calf

After the horn bud attaches to the skull, the horn grows out from under the skin.

It becomes a bony extension of the skull with the hollow center of the horn opening into the frontal sinus. The brain lies directly under the frontal sinus covered by a thin layer of bone.

Dehorning after the horn attaches increases the risk of entering the frontal sinus and subsequent infection.

Dehorning recommendations

The recommended methods for dehorning calves are by scoop dehorner, gouging knife or heat cautery, as soon as the horn buds are detectable. The method of choice must be able to remove all horn-growing tissue in one action with minimal damage to the adjacent tissues.

Inward growing horns likely to penetrate or contact facial features should be trimmed appropriately.

How to dehorn

Plan your order of operations so that the most invasive procedures are done last. This helps reduce stress on the animal and the risk of infection from wound contamination. Vaccinate first, then ear-tag or earmark, then brand, then castrate, then dehorn.

Before dehorning

Pick a cool dry day. Hot weather increases bleeding; wet weather increases risk of infection. Water the yards to reduce dust (but do not wet calves).

Cleanliness

- Keep surgical instruments in a bucket with a suitable disinfectant solution (e.g. Savlon® or Hibitane®). Change the solution every 15–20 calves.
- Have separate buckets with antiseptic for instruments, and for washing and disinfecting hands.

Hot iron

Best for calves less than two months old as bigger horn buds will not fit in the 'O'-shaped opening of the iron – which must be approximately 1cm larger than the bud all around.

Irons can be heated by gas, fire or battery (12 or 24V).

1. Heat iron until 'dull red' hot.
2. Firmly restrain the calf's head and apply the hot iron over the horn bud.
3. Roll the iron around and apply with sufficient pressure for just long enough to burn through the full thickness of skin. The skin should look copper/bronze colour when finished.

The hot iron method is practically bloodless so risk of infection is minimal.

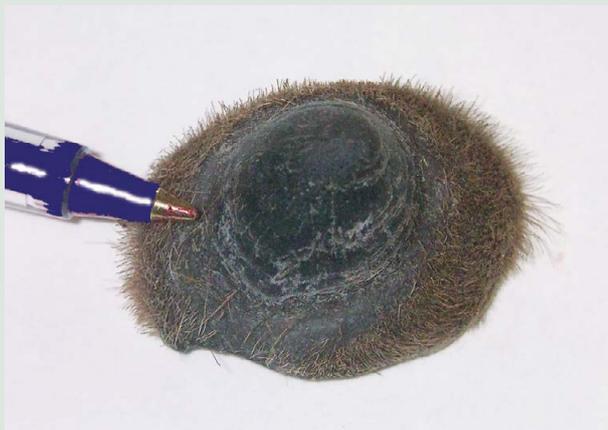
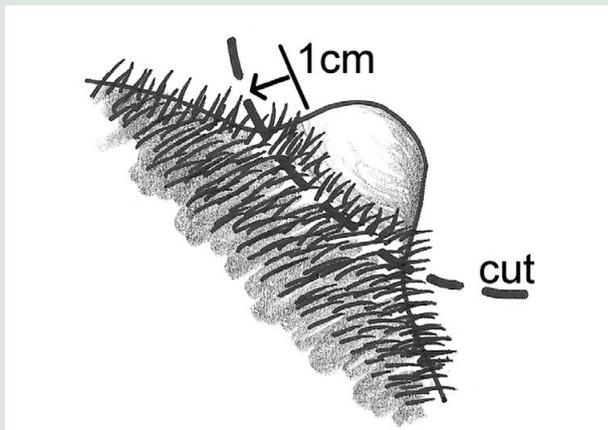
The key to successful dehorning

Applies to all methods

Because the horn grows from the skin around its base, you must remove or destroy a complete ring of hair (1cm wide) around the horn base.

Check that the excised ring is wide enough because some horn will grow if the ring is not complete.

A 1cm wide ring of hair is enough – any more will make a larger wound, cause avoidable pain, and delay healing.



Remove a complete ring of hair 1cm around the horn base, and check that it is wide enough.

Dehorning knife



The dehorning knife must be kept very sharp.

The knife has a sharp curved blade to ensure 1cm of skin around the horn bud is removed. It is suitable for calves up to 2–3 months old but only if the horn bud is mobile and not attached to the skull.



Always cut away from the hand when using a dehorning knife.

1. Remove the knife from the antiseptic solution and ensure it is sharp and clean.
2. Start the cut about 2cm from the base of the horn bud, apply firm pressure directed away from the operator's hand, and firmly and quickly cut through the skin around the horn bud in one decisive action. This will slice off the horn bud level with the skull because of the curve in the blade.
3. Inspect the removed horn bud to ensure there is a 1cm ring of skin/hair around it. If not complete, make a second small cut to remove any remaining skin.
4. Squirt Tri-Solfen onto the wound area immediately after the horn has been removed. Ensuring it foams on application will help the product to stick to the wound. Do not allow run-off as this may irritate the eyes.
5. Repeat on the second horn, clean off any tissue or hair from the cutting edge and replace knife in antiseptic solution.

Scoop dehorers:



- suitable for calves 2–6 months old
 - used preferably before the horn bud attaches but can also be used after attachment provided the horn tissue is not too hard.
1. Remove dehorers from antiseptic solution and ensure cutting edges are sharp and clean.
 2. Firmly restrain the calf's head, hold the handles together, push the open scoop firmly down over the horn bud and then quickly open the handles outwards while maintaining firm downward pressure on the skin. This will scoop out the horn bud and surrounding 1cm of skin around the bud.
 3. Inspect the removed horn bud to ensure there is a 1cm ring of skin/hair around it. If not complete, make a second small cut to remove any remaining skin.
 4. Squirt Tri-Solfen onto the wound area immediately after the horn has been removed. Ensuring it foams on application will help the product stick to the wound. Do not allow run-off as this may irritate the eyes.
 5. Repeat on second horn, clean off any tissue or hair from the cutting edge and replace dehorer in antiseptic solution.



Scoop dehorning is quick for young calves 2–6 months old.

Cup dehorner



Use cup dehorers only when the horn is too big or solid for scoop dehorers. Cup dehorers are best for calves up to six months old where the horn bud is already firmly attached.

1. Remove the cup dehorers from the antiseptic solution and ensure the cups are sharp.
2. Place the open half cups over the horn, ensuring a 1cm skin margin, then close the handles quickly together so the sharp-edged cups cut through the skin and horn.
3. Downward pressure on the cup may need to be applied by a second person to prevent the dehorner 'riding up' the horn, otherwise some of the skin around the base of the horn may be missed.
4. Cup dehorers can cause an unnecessarily large wound, and sometimes exposure of the frontal sinus, if used on too small a calf or if excessive downward pressure is applied.
5. Inspect the removed horn to ensure there is a 1cm ring of skin/hair around its base.
6. Squirt Tri-Solfen onto the wound area immediately after the horn has been removed. Ensuring it foams on application will help the product to stick to the wound. Do not allow run-off as this may irritate the eyes.



Cup dehorers are used on older calves where the horn is attached.

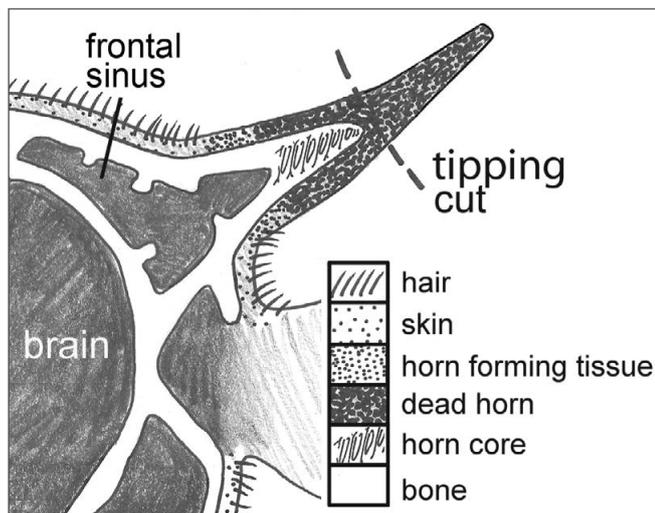
Guillotine dehorners, surgical wire, horn saw and tippers

Guillotine dehorners, surgical wire, horn saws and tippers can be used to dehorn older cattle if done using local anaesthetic by or under the direction of a veterinarian. Dehorning of cattle over 12 months old is not recommended and is illegal under some state/territory laws unless undertaken by a veterinarian. See Appendix C for different state requirements.



Instruments for dehorning older cattle can be used only under direction of a veterinarian. From top: horn saw, surgical wire, tippers and guillotine dehorner.

These instruments can also be used to ‘tip’ the horns of adult cattle, i.e. to remove only the insensitive part of the horn.



Horn tipping must not enter the sensitive horn core.

Horn tipping may be necessary for welfare reasons (for example, a horn is growing towards an animal's head) or to reduce injury caused by aggressive horned cattle.

This would not be necessary if cattle are bred without horns or are dehorned at an early age.

Controlling bleeding

Animals dehorned at an early age before the horn attaches to the skull generally will not bleed excessively.

Any excessive bleeding should be controlled immediately as it will delay healing and can even be fatal.

Bleeding can be controlled by:

- using artery forceps to grab and twist off any individual blood vessels that are leaking blood excessively
- applying firm pressure over the wound using a clean pad/gauze bandage and maintaining the pressure until the bleeding has stopped – generally after about two minutes
- applying a bandage wrapped firmly around the wound and skull if the above methods do not stop the bleeding. Pads or bandages must be carefully removed from the animal after 1–2 days. Do not leave them in place as they will attract flies
- cautery using a hot iron to seal off blood vessels.

No second chance...

If the treated horn bud continues to grow because the job was not done properly the first time, do not attempt to dehorn the animal again, even after a few months – it will bleed excessively.



Dehorn cattle as calves – tipping adult cattle does little to reduce the bruising and damage caused by horns.

Pain relief

Tri-Solfen applied to the open wound created from the dehorning procedure will provide pain relief as well as assist with haemorrhage control. Apply 4mls per horn immediately after disbudding or dehorning to each horn, using the recommended applicator to completely cover the wound including the surrounding burn wound (if using cautery) or the surrounding cut skin edge (if using excision). Always ensure that the applicator is squeezed hard enough to cause the product to foam. This will ensure that the Tri-Solfen sticks to the wound and that run-off from the application site is minimised.

Do not spray excess as product may run off and irritate the eyes.

What after-care is required?

- There is usually no need to apply a dressing or powder at the time of dehorning if cattle are dehorned at the correct age (less than six months) and not in wet or humid weather.
- Dressings and powders tend to retain moisture making the wound attractive to flies. They are not usually needed if the equipment and environment are clean, and the procedure is efficiently carried out on young calves.
- Control any excessive bleeding before the animal is released from the cradle/head bail.
- Reunite calves with their mothers as soon as possible after dehorning. They should be released from the cattle yards as soon as possible into a grassed, shaded holding paddock. There will be less bleeding if the animals are handled calmly and slowly before and after dehorning.
- Inspect the calves regularly, preferably daily, for about 10 days after dehorning for early detection of infection or fly strike. The symptoms usually seen are constant tossing of the head and/or a discharge from the wound. Be extra vigilant if the frontal sinus is exposed as this increases the risk of poor drainage and infection. This will not be a problem if the calves are dehorned at a young age before the horn growth involves the frontal sinus.
- Consult your veterinarian if wounds get infected. Generally, removing any matted hair and flushing the wound daily with a non-irritant antiseptic solution or salt water will suffice.

If necessary, apply a fly strike powder to the edges of the wound. More severe cases may require administration of antibiotics.



6. Summary of best animal welfare practices

- Always handle cattle correctly. Muster and yard cows and calves calmly and allow them to settle down before the start of drafting. Bleeding from both castration and dehorning will be greatly reduced by calm handling before and after the procedure.
- Firm effective restraint of the animal makes the job easier on both the animal and the operator. The restraint must be the minimum necessary to perform the tasks efficiently and safely. Good facilities and enough trained or experienced people to efficiently perform the tasks are essential. At least two, preferably three people, are needed to brand, castrate and dehorn calves.
- If using a calf-branding cradle, make sure that it is well maintained and lubricated to make catching and restraining the calf easier. Place a soft walled tyre on the ground to cushion the fall and minimise jarring of the calf.
- A calf cradle with a flap under the head of the calf reduces potential injury to the calf's head when lowered to the ground and reduces dirt contamination of dehorning wounds.
- Do not castrate or dehorn in very hot weather – this increases the risk of bleeding.
- Brand, castrate and dehorn early in the morning.
- To prevent wound infections, do not castrate and dehorn cattle in muddy yards or wet, humid weather.
- To prevent dust contamination, wet down yards before and during the procedures. Keep the area around the cradle watered to prevent dust contamination of dehorning and castration wounds. Do not wet the calves.
- The younger that calves are branded, castrated and dehorned, the better.
- Pain relief should be used even when it is not mandatory. Bleeding will be reduced and calves will settle back to normal behaviour much more quickly.
- Experienced, competent operators are needed to perform the tasks of branding, castration and dehorning. Do not attempt to perform these tasks without adequate knowledge and training. Get on-the-job instruction from an experienced operator before attempting the procedures for the first time. Ask an experienced person to help.
- Normally, calf husbandry tasks (branding, dehorning, castration, ear-tagging and vaccinating) are all done at the same time. The sequence in which they are done is important. Always vaccinate, ear-tag and brand first, then castrate and dehorn last. This will minimise wound contamination and reduce stress on the calf.
- After every 15–20 calves, change antiseptic solution for hand washing and instrument storage, and replace the blade if using a scalpel.
- Ensure dehorning instruments are kept sharp and clean. After use, thoroughly clean, sharpen and lubricate before storage.
- Make sure that fire brands are the correct temperature – blue hot is best, not red or black hot – this ensures a good clear brand with minimum contact time reducing excessive hide damage and pain to the calf.
- After branding, castrating and dehorning, re-unite calves with mothers as soon as possible to allow mothering in the yards, and then release cattle from yards into a grassed holding yard/small paddock with good shade and water. Freshly castrated and dehorned cattle kept in yards after the operations are more likely to contract infections, including tetanus.
- Delaying branding, castration and dehorning until weaning time means the stress of these operations comes on top of the stress of weaning, increasing the risk of complications and seriously affecting the calf's growth rate. They should be done well before weaning whenever possible.
- Regular inspection, preferably daily, of calves for up to 10 days is recommended after castration and dehorning. Check for any swelling and reddening of the scrotum, or discharge from the dehorning wound. Refer to the heading 'What after-care is required' in the branding and dehorning sections for details on treating any complications.
- Ensure the calf has protection against tetanus.

Tetanus

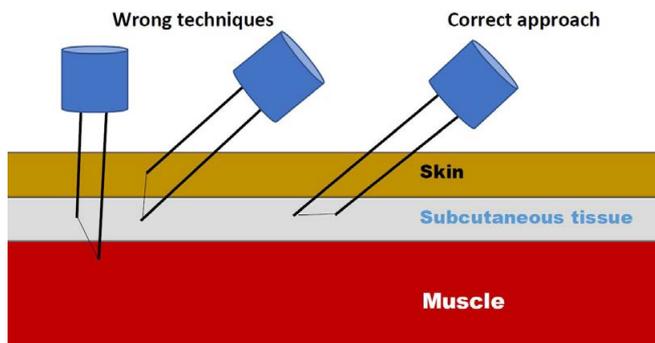
Calves that are castrated and dehorned are susceptible to tetanus and should have immunity before the procedures are carried out.

As the time taken for any immunity to develop may be less than the time taken for the tetanus organism to begin toxin production, initial vaccination only at the time of castration should be undertaken in situations where a muster to vaccinate calves is impractical or not possible.

Tetanus vaccination is usually given with the other Clostridial vaccines (tetanus is one of the 5-in-1 combination vaccine). Good immunity is achieved by two injections at least four weeks apart.



Need more information? The MLA e-learning module 'Vaccination technique' can help.



Injection administration technique



Ideally, calves should be vaccinated about one month before castration and dehorning to give time for immunity to develop.

A second vaccination or booster 4–6 weeks after the initial shot will produce long-term immunity. 5-in-1 vaccination also protects against Black Leg, Pulpy Kidney (seen mainly in feedlots) and Gas Gangrene.

In high tetanus risk situations (e.g. if using Elastrator® rings or Burdizzos®, or operating in yards with a history of tetanus cases), the most effective options are:

- Give the pregnant cows an annual tetanus booster (usually as 5-in-1 vaccine) in the last trimester of pregnancy to ensure maximum protection is passed onto the calf in the colostrum.

or

- Give calves the first tetanus vaccination (e.g. 5-in-1) about four weeks before castrating and dehorning, and the booster at the time of castrating and dehorning. This will ensure the calf has a high level of protection at the most crucial time.

or

- Give calves an injection of tetanus antitoxin at the time of castrating/dehorning. This will provide immediate protection against tetanus, but it is quite expensive (\$5–10 per calf).



The calf on the left was dehorned well at a young age, the calf on the right is naturally polled.

7. Workplace health and safety

The health and safety of operators are always important considerations when handling cattle, but especially when branding, castrating and dehorning as there is close contact with the animals.

A risk assessment should be part of initial planning, and measures taken to reduce risks. All staff should be adequately trained in their respective tasks.

The general principles of workplace safety in the yards are:

- Yards should be well designed, with the head bail, calf cradle and gate latches all working properly.
- Check that there are no protruding bolts, wire or other objects that may injure either stock or handlers.
- Have adequate numbers of well-trained handlers to do the tasks – at least two people, and preferably three, are needed for branding, castrating and dehorning.
- Wear appropriate personal protective equipment – footwear, leather gloves, sun-protection, eye protection and latex gloves if using Tri-Solfen.
- Take a short break preferably every hour to maintain concentration.
- Drink plenty of fluids if working in hot conditions.
- Do not eat food while working in cattle yards, and always wash hands before meal breaks.
- Do not overcrowd stock in yards and handle cattle calmly and quietly.
- Be especially wary of handling horned cows.
- Ensure tetanus and Q Fever vaccinations are current for all handlers.

There are special risks when branding, castrating and dehorning:

- Cows and heifers with calves often become very protective and aggressive. Treat them with caution when drafting and especially if handling their calves (this is important if applying Elastrator® rings to very young calves in the paddock). Ensure the cow cannot charge the handler.
- The calf must be effectively restrained, preferably using a calf cradle, for both calf and operator safety.

- The person holding the calf's upper-most hind leg when branding and/or castrating a calf on its side must be strong enough to restrain the leg whether the calf is in a cradle or being held on the ground.
- If calves are castrated while they are standing in a crush, make sure a properly located, strong kick rail is in place, and the vertical 'tail hold' is used to minimise risk of a kicking injury.
- When dehorning, ensure the animal's head is firmly and effectively restrained to prevent injury to both the operator and the animal. This is especially important when the animal is in a head bail. A strong halter, nose grips or a nose clamp bar may be needed – but not if calves are dehorned young before the horn bud attaches.
- When castrating with a blade, make the cut away from the hand holding the testicle, not towards it.
- Always wash hands before handling food to minimise the risk of ingesting infectious agents.
- Ensure all fittings on gas equipment are tight and in good working order.
- Handles of branding irons can get very hot. Wear thick leather gloves.



Cattle with horns are a danger to both stock handlers and other cattle.

Human diseases

Cattle can carry several animal diseases that can affect people, in particular Leptospirosis and Q Fever. There is an effective vaccination against Q Fever for at-risk people, but not against Leptospirosis. Contact your medical practitioner for advice.

Leptospirosis

Leptospirosis is transmitted mainly by contact with urine of carrier animals, but the organism may also be present in the blood of acutely affected calves.

Symptoms in humans are similar to those of flu, and include fever, headaches and joint pain.

If such symptoms occur and Leptospirosis is suspected, contact a medical practitioner immediately.

To minimise the risk of infection, wash hands frequently with an effective antiseptic (e.g. Savlon® or Hibitane®) to remove any urine or blood. Avoid getting urine or blood into the eyes and mouth.

Q Fever

Q Fever is transmitted in urine, faeces and birth-related fluids of carrier animals. The organism survives for a long time in the environment including in dust. Humans are most commonly infected by inhaling or ingesting the organism.

Symptoms in humans include fever, headaches and joint pain. If suspected, contact a medical practitioner immediately.

Minimise the risk of infection at branding time by controlling dust and by frequent hand washing, especially before eating.



Dust can carry Q Fever – stock handlers should be vaccinated against this debilitating disease.

Appendix A. Australian Animal Welfare Standards and Guidelines for Cattle

The *Australian Animal Welfare Standards and Guidelines for Cattle* are an important component of the pre-existing *Australian Animal Welfare Strategy* (AAWS) — a previous Australian Government initiative that guided the development of new, nationally consistent policies to enhance animal welfare arrangements in all Australian states and territories. The development process was supported and funded by all Governments, Australian Dairy Farmers, Australian Lot Feeders Association and Cattle Council of Australia. The Standards provide a basis for developing and implementing consistent legislation and enforcement across Australia and provide guidance for all people responsible for cattle. They are based on current scientific knowledge, recommended industry practice and community expectations. The development of these standards was an important project in a comprehensive program under the AAWS to develop standards and guidelines for all commercial livestock species and at all points along the production supply chain. The Standards were developed in consultation with state and territory governments, livestock industry organisations, animal welfare groups and the general public under the auspices of the Animal Welfare Committee. The Standards were drafted by a small writing group comprising researchers, government and industry representatives, supported by a widely representative reference group and managed by Animal Health Australia. An important part of the process was the preparation of a regulation impact statement to assess the proposed Standards and evaluate the costs resulting from changes to existing requirements. An extensive consultation process was undertaken, with the final public consultation highlighting ethical and practical issues, which led to the development of more robust Standards. The reference group carefully considered the views and comments of all stakeholders in developing the final Standards and Guidelines for recommendation to the Animal Welfare Committee. These Standards and Guidelines replace the *Model Codes of Practice for the Welfare of Animals: Cattle, 2nd edition*, PISC Report 85, CSIRO Publishing, 2004.

The preparation of these Standards represents a significant investment by all parties, especially members of the writing and reference groups. Their efforts are gratefully acknowledged by Animal Health Australia.

The Standards provide the basis for developing and implementing consistent legislation and enforcement across Australia, and direction for people responsible for cattle.

The cattle standards and guidelines may be reflected in the industry-based quality-assurance programs that may include cattle welfare provisions.

Cruelty and unacceptable animal welfare practices can be prosecuted under cruelty and aggravated cruelty offence clauses in animal welfare legislation.

Standards — the animal welfare requirements designated in this document (i.e. the requirements that must be met under law for livestock welfare purposes). The Standards are intended to be clear, essential and verifiable statements. However, not all issues are able to be well defined by scientific research or are able to be quantified. Science cannot always provide an objective or precise assessment of an animal's welfare and, consequently, where appropriate science is not available, the Standards reflect a value judgement that has to be made for some circumstances. Standards use the word 'must'. They are presented in a box and are numbered with the prefix 'S'. The use of hyperlinks in the Standards indicate a defined term.

Guidelines — the recommended practices to achieve desirable animal welfare outcomes. Guidelines use the word 'should' and complement the standards. Noncompliance with one or more guidelines will not constitute an offence under law.

Cattle in Australia are managed in environments that vary from extensive rangelands to intensively managed systems. In all cases, the people in charge of cattle are responsible for the welfare of the animals under their control. In achieving improved welfare outcomes envisaged by the standards, it is important that people responsible for animals have the necessary knowledge, experience and skills to undertake the various procedures and meet the requirements of the standards, in a manner that minimises the risk to cattle welfare.

Adherence to good animal husbandry principles is essential to meet the welfare requirements of animals.

The term pain relief is used throughout this document to mean the reduction of behavioural and physiological responses by an animal to a painful stimulus to a level judged to be reasonable. Drugs are the common means by which pain relief is achieved; they act in various ways on the peripheral and central nervous systems and may be applied topically or by injection. The range of drugs available for use in cattle, and the effectiveness and duration of pain relief provided is often limited. The assessment of pain is an inexact science. The types of pain and their perception are often not understood and are known to vary at different ages and between individuals. In considering the use of pain relief, cattle should be given the benefit of the doubt.

The Standards that relate to the husbandry procedures outlined in this manual are as follows.

Castration, dehorning and spaying are done only when necessary and in a manner that minimises the risk to the welfare of cattle, particularly pain and distress.

Standards

S6.1 A person castrating or dehorning cattle must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge experience and skills.

Castration

S6.2 A person in charge must ensure the use of appropriate pain relief when castrating cattle, unless cattle are:

- 1) less than six months old; or
- 2) less than 12 months old if at their first yarding and where the later age is approved in the jurisdiction.

S6.3 A person must use appropriate tools and methods to castrate cattle.

Disbudding and dehorning

S6.4 A person in charge must ensure the use of appropriate pain relief when dehorning cattle, unless cattle are:

- 1) less than six months old; or
- 2) less than 12 months old if at their first yarding and where the later age is approved in the jurisdiction.

S6.5 A person must consider the welfare of the calf when using caustic chemicals for disbudding the calf, and must only use it if the calf:

- 1) is less than fourteen days old; and
- 2) can be segregated from its mother for four hours after treatment; and
- 3) can be kept dry for 12 hours after treatment; and
- 4) is not wet.

S6.6 A person must use appropriate tools and methods to dehorn cattle and disbud calves.

Identification

S5.10 A person must use the most appropriate and least painful method to identify cattle that is applicable to the jurisdiction and the production system.

S5.11 A person must not place a permanent brand on the head of cattle.

Guidelines

G6.1 Surgical procedures should only be done if there are no alternatives and the procedure results in either:

- life-time benefits to cattle welfare, or
- better herd management, or
- a reduced work health and safety risk.

G6.2 Surgical procedures should be done with pain relief. Operators should seek advice on current pain minimisation strategies.

G6.3 Surgical procedures should be planned with consideration of the health and age of cattle, weather, staff availability and facilities, including the use of temporary or permanent yards.

G6.4 Good hygiene practices should be implemented in relation to facilities, hands, handling and instruments. Disinfectant should be used and changed frequently.

G6.5 Effective but not excessive restraint should be used to minimise movement, and to enable the procedure to be done quickly and efficiently.

G6.6 Equipment for restraining cattle should only be used:

- for the minimum time necessary, and
- with the minimum restraint necessary, and
- if it is in good working order.

G6.7 Calves should be separated from their mothers for the shortest possible time unless they are to be hand-reared or weaned onto a solid diet.

G6.8 Bleeding from surgical wounds should be minimised by selecting an appropriate method, preventing overheating of calves and allowing them to settle after mustering.

G6.9 Infection should be minimised by avoiding muddy or dusty yards, and wet weather.

G6.10 Surgical procedures should not be undertaken during extreme weather.

G6.11 Cattle should be inspected regularly and with minimal disturbance for signs of post-operative complications during the healing process, and appropriate action taken.

Castration

G6.12 A person should use the most appropriate tools and least painful method to castrate cattle that is applicable to the production system.

G6.13 Cattle to be castrated or made cryptorchid should be as young as possible (less than 12 weeks old) and the procedure should be done before the cattle are weaned.

G6.14 Calves should be more than 24 hours old when castrated.

G6.15 Calves less than two weeks old should be castrated by the rubber-ring method in preference to the cutting method.

G6.16 Calves more than two weeks old should be castrated by the cutting method in preference to the rubber-ring and tension-band methods.

G6.17 Use of rubber rings or tension bands on calves should ensure that the correct position and tension is achieved to block the arterial blood flow.

G6.18 The incision for surgical castration should be of sufficient size, and extend to the base of the scrotum, to allow effective drainage and reduce the risk of infection.

Disbudding and dehorning

- G6.19 Preference should be given for breeding of naturally polled cattle.
- G6.20 Disbudding should be done in preference to dehorning.
- G6.21 Hot-iron cautery should be used in preference to excision methods for disbudding calves.
- G6.22 Calves should be disbudded or dehorned as young as possible.
- G6.23 The hair around horn buds should be clipped before using caustic chemicals for disbudding.
- G6.24 Tipping should only remove a solid, nonvascular portion of the horn, and result in a blunt horn end.
- G6.25 Horn regrowth or a scur that has a blunt horn end should not be dehorned or tipped.

Identification

- G5.25 Hot-iron branding of wet cattle should be avoided.
- G5.26 The correct time period of application and temperature of the iron should be used when hot-iron branding.
- G5.27 Hot-iron branding of weak or extremely thin cattle should be avoided.
- G5.28 Care should be taken with the concurrent application of volatile pour-on treatments when hot-iron branding or applying the electric prodder.
- G5.29 Ear tagging and tattooing should be done in a way that minimises the risk of infection and tearing of the ear.
- G5.30 Ear marking and tattooing instruments should be sharp and clean, with relevant hygienic techniques followed.

Appendix B. Relevant state and territory departments

State/territory	Department	Head office	Postal address	Phone	Web address
Australian Capital Territory	Transport ACT	Macarthur House 12 Wattle Street Lyneham ACT 2602	GPO Box 158 Civic ACT 2601	13 22 81 NSW/ACT only (02) 6207 0562 all other states	cityservices.act.gov.au
New South Wales	Primary Industries	161 Kite Street Orange NSW 2800	Locked Bag 21 Orange NSW 2800	(02) 6391 3100	dpi.nsw.gov.au
Northern Territory	Industry, Tourism and Trade Industry	Berrimah Research Farm Makagon Road Berrimah NT 0828	GPO Box 3000 Darwin NT 0801	(08) 8999 2255	industry.nt.gov.au
Queensland	Department of Agriculture and Fisheries		GPO Box 46 Brisbane QLD 4001	13 25 23	daf.qld.gov.au
South Australia	Primary Industries and Resources	Grenfell Centre 25 Grenfell Street Adelaide SA 5000	GPO Box 1671 Adelaide SA 5001	1800 255 556	pir.sa.gov.au
Tasmania	Natural Resources and Environment	1 Franklin Wharf Hobart TAS 7000	GPO Box 44 Hobart TAS 7001	1300 368 550 (03) 61699021	nre.tas.gov.au
Western Australia	Agriculture and Food	3 Baron-Hay Court South Perth WA 6151	Locked Bag 4 Bentley Delivery Centre Perth WA 6983	1300 374 731 (08) 9368 3333	agric.wa.gov.au
Victoria	Agriculture Victoria			13 61 86	agriculture.vic.gov.au

Appendix C. Summary of legal requirements of different states and territories

Check your legal responsibilities

Appendix C contains details about the various legal requirements of your state or territory.

Most states/territories have specific requirements relating to the branding of cattle.

For branding, castration and dehorning, all states/territories, except Victoria, have adopted the requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, into their animal welfare legislation. This Code provides a set of guidelines listing minimum standards to help people understand the standard of care required to meet obligations under the laws that operate in each state/territory. The specific requirements for Victoria are detailed in the relevant sections.

Some states/territories also have specific mention of castration and dehorning in their legislation, and these are summarised.

For more detailed information, contact the relevant state/territory department (Appendix B).

Branding

Australian Capital Territory

- Branding is not compulsory, but any brand used must be registered.
- Brands registered before 1 August 1991 can be symbol brands.
- For brands registered after 1 August 1991, the characters of the brand must be arranged in a horizontal, straight line so that the first character identifies the ACT and the second and third characters identify the brand's registered proprietor.
- The character 'C' identifies the ACT.
- Brand characters must be no less than 35mm high, no more than 75mm high, and no less than 10mm apart.
- A branding instrument must not be constructed with more than two pieces.
- The brand can be placed on the left rump, right rump, left thigh or right thigh but the first brand must be placed on the left rump, and subsequent brands may be applied to any of the other designated positions.

New South Wales

- Branding is not compulsory but if it is done, it must conform to the Rural Lands Protection Act 1998.
- Brands must be registered with the local Rural Lands Protection Board and can be a symbol brand or a Board brand.
- For a symbol brand, any character/s must be no less than 35mm high, no more than 75mm high and no less than 10mm apart.

- A Board brand must be three letters and numbers, each being no less than 35mm high, no more than 75mm high and no less than 10mm apart.
- A Board brand can be made in no more than two pieces.
- A hot-brand must not be placed around the face.
- The brand can be placed on the left rump, right rump, left thigh or right thigh, but
- the first brand must be placed on the left rump; subsequent brands may be applied to any of the other designated places.

Northern Territory

- It is compulsory to brand cattle before they are sold or moved off a property unless the cattle are less than eight months of age.
- The Northern Territory Brands Act and Regulations uses a three-letter brand system where one letter must be the letter 'T'.
- A person must hold a registered three-letter brand before they can apply for a distinctive (symbol) brand.
- Each letter of a three-letter brand shall be not less than 4cm high and wide, nor more than 8cm high and wide. The imprint surface of the irons is to be no more than 4mm wide and no less than 3mm wide. It is recommended that a 6mm by 45mm steel plate be used in the construction of the brand and that it is worked down to 3mm on the working edge. The letters must also be 'clean joined' print and not 'fancy' or 'broken' print.
- Distinctive (symbol) brands must be no less than 4cm wide or high and no more than 12cm wide or high. The imprint surface of the branding iron should be no more than 4mm thick and no less than 3mm thick. It is recommended that any adjacent lines of a distinctive brand be at least 20mm apart to avoid blotching.
- A brand is registered to a person or company for use on a nominated property. This means the branding iron can only be used by the registered owner (or their representative) on the registered property.
- Owners must notify the Registrar of Brands of the position in which they decide to place any brand and shall not vary the position of the brands without permission of the Registrar.
- Registered positions of brands on cattle are the off shoulder (OS) or off rump, hip or thigh (ORHT), or the near shoulder (NS) or near rump, hip or thigh (NRHT).

Queensland

- All cattle of 100kg or more liveweight must bear a brand before being sold.
- All brands must be registered with the Department of Primary Industries and Fisheries.
- A brand's return must be furnished each year before 31 January.
- A brand can either be a three-piece brand or a symbol brand. A symbol brand must be registered in conjunction with a three-piece brand.
- All characters in a three-piece brand must have a face depth of not less than 30mm or more than 65mm, and the space between the characters must not be more than 25mm.
- All three-piece brands with a sideways letter must have the sideways letter permanently affixed to another character in the brand.
- The face depth of a symbol brand must be not less than 30mm or more than 80mm, and the symbol brand must include a dot to the right of and in line with the lower part of the symbol and directly beneath the previous brand at a distance not less than 35mm or more than 65mm.
- The first brander may imprint the registered three-piece or symbol brand in any of the following positions on either side of the animal – neck, rump, shoulder thigh or twist (the twist means the upper rear portion of the animal's hind leg between the pin bone and the hock).
- A cross-brand may be imprinted in any of the prescribed positions or imprinted in the same position. If it is imprinted at the same position, it must be imprinted at the same angle.
- A three-piece brand may be imprinted either vertically or horizontally in any of the prescribed positions.

South Australia

- Branding is not compulsory, but any brand used must be registered.
- The brand must be not less than 30mm or more than 80mm in height.
- The brand must consist of two numbers and one letter.
- The first brand impressed on cattle may be placed on any one of the positions mentioned below. Every subsequent brand must be placed on the position next in order of rotation, the first position regarded as following the fourth position.
- Position and order of rotation on cattle:

1st position	off rump and hip
2nd position	near rump and hip
3rd position	near shoulder
4th position	off shoulder

Tasmania

- Branding is not compulsory but any brands used must be registered.
- A registered brand consists of one, two or three letters of the alphabet.
- The letters must be not less than 50mm and not more than 110mm in height and no part of the brand face should exceed 7mm in width.

Western Australia

- All owners of cattle must register a brand with the Department of Agriculture.
- Cattle must be branded or earmarked.
- Cattle in the South West Land Division (i.e. agricultural area) must be branded or earmarked before six months of age or before being removed from the property, whichever comes first.
- Cattle in the pastoral areas must be branded or earmarked before 18 months old or before being removed from the property, whichever comes first.
- Exemptions apply to calves less than two weeks of age or calves less than six months of age still with their mothers, provided the movement waybill meets certain conditions.
- A brand must measure at least 150mm long and 50mm high.
- A brand can be applied on the left rump or left shoulder.
- If owners are re-branding newly acquired stock, the registered brand must be applied immediately below the existing brand. If an age mark is present, the registered brand must be placed immediately below that.

Victoria

- Branding of cattle is not encouraged and no formal brands registration system is maintained. Identification under the NLIS is the recommended form of identifying cattle.
- The Victorian 'Code of Accepted Farming Practice for the Welfare of Cattle' states "Procedures and practices that cause pain should not be carried out if painless and practical methods of husbandry can be adopted to achieve the same result".
- Thus, anyone who hot-brands cattle would be leaving themselves open to prosecution under the Victorian Prevention of Cruelty to Animals Act.

Castration and dehorning

Australian Capital Territory

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are gazetted under the Animal Welfare Act 1992.
- Actions in line with the gazetted requirements of the Code of Practice are a defence against a prosecution under the Animal Welfare Act 1992.

New South Wales

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.
- Cattle must not be castrated if more than six months of age.
- Cattle must not be dehorned if more than 12 months of age.

Northern Territory

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.
- Cattle must be castrated before 12 months of age unless performed by a veterinarian.
- Cattle must be dehorned before 12 months of age unless performed by a veterinarian.
- Appropriate pain relief must be used when castrating cattle, unless cattle are:
 - 1) less than six months old; or
 - 2) less than 12 months old if at their first yarding.

Queensland

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.
- Use appropriate pain relief when castrating or dehorning cattle. Pain relief is not mandatory if cattle are less than six months old, or less than 12 months old and castrated or dehorned at their first yarding.

South Australia

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.

Tasmania

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.
- Castration is not permitted over six months of age without local or general anaesthesia.
- Use of Elastrator® rings is not recommended over three months of age.
- Dehorning without analgesia is permitted up to 12 months of age.

Western Australia

- The requirements of the *Model Code of Practice for the Welfare of Animals: Cattle*, 2nd edition, are adopted into state legislation.

Victoria

- Victoria has its own cattle welfare code – ‘*The Code of Accepted Farming Practice for the Welfare of Cattle*’ – which is created under Victorian legislation, the Prevention of Cruelty to Animals Act.
- This Code is not mandatory, but provides a defence to prosecution under the Act – provided painful procedures such as castration and dehorning are carried out in accordance with the provisions of the Code, operators are exempted from the provisions of the Act. But a person who carries out these procedures outside the provisions of the Code is liable to prosecution.

- Following are the relevant sections of the Victorian Code.

10.4 Castration

- Castration with Burdizzo® should be performed as young as possible.
- Castration with rubber rings should be ideally performed on calves up to six weeks of age and where operations and management make this difficult not beyond 12 weeks.
- Castration by knife without local or general anaesthetic should be confined to calves under 6–8 months of age. Bulls over 6–8 months should be castrated using appropriate anaesthetic. Castration of mature bulls should preferably be performed by a veterinarian using anaesthesia.

10.6 Dehorning

- To minimise injury to other cattle all horned cattle should be dehorned as young as possible and at a suitable time to reduce fly worry. After dehorning, cattle should be inspected until healing has taken place, and any infected wounds treated.
- Inward growing horns likely to penetrate or contact facial features should be trimmed appropriately.
- Dehorning cattle without local anaesthetic or analgesics should preferably be confined to animals under six months of age. Older animals may be ‘tipped’ (ends of horns removed without cutting into sensitive horn tissue) without anaesthetic in order to reduce their potential to cause injury.
- Dehorning by means of chemicals is not accepted for any class of cattle. The recommended methods for dehorning of calves are by heat cautery, scoop dehorning or gouging.



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