



# **Victorian Paintball Safety Course**

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## Introduction

In applying for a licence to own a paintball marker – a Paintball Marker Licence - you have taken the first step in joining a large number of people who own and use paintball markers for the recreational purpose of paintball gaming.

It is important to be aware from the outset, however, that firearms ownership is not without its hazards and has attached to it significant obligations.

Whilst proper training can have little effect upon the deliberate criminal misuse of firearms, it greatly reduces risks associated with lawful firearms ownership and use.

This course is designed to ensure that you are made aware of your responsibilities as the holder of a Paintball Marker Licence. The ultimate objective is to improve public safety and reduce accidental injuries associated with the sport of paintball.

To be a safe and lawful paintball marker user you need to both understand how your marker functions and possess a good working knowledge of the legislation regulating the possession, carriage and use of paintball markers in Victoria.

It is important to remember throughout this course, and when using a paintball marker at a later date, that the use of a paintball marker breaches the main safety principle that is applicable to all other types of firearms, namely **“Always point firearms in a safe direction”** which includes not pointing it at a person. Given that paintball gaming involves striving to ‘mark’ others using a paintball marker, extreme care must be taken by persons who play paintball and use conventional firearms to ensure that the transition between the various sports is undertaken in a safe and responsible manner.

## The Firearms Act 1996

The **Firearms Act 1996** ('Act') regulates the possession, carriage and use of firearms in Victoria. Paintball markers are included in the definition of 'firearms' in the Act.

This means that the Act regulates the use, carriage and possession of paintball markers in Victoria.

### Definitions

The Act includes the definitions set out below relevant to paintball.

**"Paintball"** means a projectile that primarily consists of a dye or similar substance designed to mark a person or object.

**"Paintball marker"** means a firearm that is designed to discharge a paintball.

**"Paintball marker licence"** means a licence issued under section 9(6) of the Act.

### The Law

#### Who can play paintball and when is a Paintball Marker Licence required?

- To play paintball in Victoria, you must:
  - be at least 18 years of age; and
  - not be a 'prohibited person'.

You are a **prohibited person** within the meaning of the Act if:

- (1) you are serving a term of imprisonment for an offence under section 321 or 321A of the **Crimes Act 1958**
- (2) less than 15 years has expired since you finished serving a term of imprisonment of five years or more for an indictable offence, an assault or an offence under the **Drugs, Poisons and Controlled Substances Act 1981**, or an offence of a corresponding nature in another State or Territory;
- (3) less than five years has expired since you finished serving a term of imprisonment of less than five years for an indictable offence an assault or an offence under the **Drugs, Poisons and Controlled Substances Act 1981**, or an offence of a corresponding nature in another State or Territory;
- (4) less than 10 years has expired since you finished serving a term of imprisonment for an offence under section 321 or 321A of the **Crimes Act 1958**, or an offence of a corresponding nature in another State or Territory;
- (5) you are subject to an intervention order under section 4 of the **Crimes (Family Violence) Act 1987** or an order of a corresponding nature made in another State or Territory or a supervision order under section 26 of the **Crimes (Mental Impairment and Unfitness to be Tried) Act 1997**;
- (6) less than five years has expired since you were subject to an order of the nature described in paragraph (5) above;

- (7) less than 12 months has expired since you were found guilty by a court, whether in Victoria or in another State or Territory, of:
- (a) an offence against the **Firearms Act 1996** in relation to which it was open to the court to impose a term of imprisonment; or
  - (b) an offence against any other Act involving the possession or use of firearms and in relation to which it was open to the court to impose a term of imprisonment; or
  - (c) an indictable offence.

The Victoria Police Licensing Services Division can assist an individual to determine whether he or she is a prohibited person, should there be any doubt.

- You *do not* need a Paintball Marker Licence to play paintball if you:
  - are at least 18 years of age; and
  - are not a prohibited person; and
  - intend to use or carry a paintball marker for the purpose of, and when engaging in, paintball activities at a location approved by the Chief Commissioner of Police.
- You *do* need a Paintball Marker Licence if you:
  - own your own paintball marker; or
  - otherwise wish to ‘possess’ a paintball marker other than at a location approved by the Chief Commissioner of Police.

‘Possession’ is defined in the Act to include:

- having actual physical possession of a paintball marker; or
- having custody or control of a paintball marker; or
- having and exercising access to a paintball marker (either solely or in combination with others).

## Licence requirement

To obtain a Paintball Marker Licence, you must satisfy the Chief Commissioner that you require the licence for the purpose of engaging in paintball activities at locations approved by the Chief Commissioner of Police.

There are three possible ways to satisfy this requirement:

1. provide evidence of current membership of an approved paintball club or organisation; or
2. provide a statement as to why you require a Paintball Marker Licence together with a declaration from an approved paintball club or operator supporting your application; or
3. provide a statement as to why you require a Paintball Marker Licence and some other form of evidence supporting your case.

It should be borne in mind, when submitting an application of the nature described in item (3) above, that to obtain a licence you must satisfy the Chief Commissioner of Police that you require the licence for the purpose of engaging in activities that require the use of paintball markers at a location approved by the Chief Commissioner. Any

evidence submitted to support your application should be consistent with this requirement.

It should also be noted by any person acquiring a Paintball Marker Licence on the basis of membership of an approved paintball club or organisation that membership of that club or organisation must be maintained for the period of the licence. If this is not done, the genuine reason for the licence will lapse.

A Paintball Marker Licence is subject to the general conditions applicable to all firearms licences, namely:

- the licence holder must permit a member of the police force to inspect the holder's storage arrangements at any reasonable time;
- the holder of the licence must not transfer, lend or give the licence to another person;
- any firearms held under the licence must not be used for any reason other than the reasons authorised by the licence; and
- any other conditions the Chief Commissioner wishes to impose.

Failure to comply with the conditions attached to a Paintball marker Licence is an offence under section 36(3) of the Act and may result in the loss of the licence and forfeiture of any paintball markers held under that licence.

### **Licence renewal**

Prior to a Paintball Marker Licence expiring, Victoria Police will forward licence renewal documentation to the licence holder. This documentation will need to be completed by the licence holder.

It is the licence holders' responsibility to ensure the relevant documentation is returned to Victoria Police before the licence expires.

### **Registration of paintball markers**

Like all other firearms, paintball markers must be registered. Any person found possessing or using an unregistered marker will be subject to severe penalties including the loss of any firearms licence they may possess.

### **Acquisition of paintball markers**

Persons wanting to own their own paintball marker must:

- possess a current Paintball Marker Licence; (Section 6(5A) and
- obtain a permit to acquire from Victoria Police before acquiring a paintball marker. (Section 102(1A))

The Act requires a person who is purchasing a paintball marker to engage a licensed firearms dealer as his/her agent in the transaction. (Section 95(1A))

## **Disposal of paintball markers**

The Act requires a person who is disposing of a paintball marker to engage a licensed firearms dealer as his/her agent in the transaction. (Section 96(1A))

## **Use of a paintball marker by another person**

The Act recognises that only certain persons can lawfully possess paintball markers. Any person who possesses a paintball marker must ensure that any other person they give a marker to holds a Paintball Marker Licence or is exempted from the need to hold such a licence under the Act. (Section 127)

## **Offence to own a paintball marker without a licence**

If you wish to own or acquire a paintball marker, you must obtain a Paintball Marker Licence. It is an offence under the Act to own or acquire a paintball marker if you do not have a current Paintball Marker Licence. (Section 135(4))

## **Advertising paintball markers for sale**

Only a licensed firearms dealer may publish or cause to be published an advertisement for the sale of a paintball marker (section 101(1)). This restriction does not apply in the case of an advertisement placed in a magazine published by an ‘approved club’ or in a commercially published firearms or shooting sports magazine (section 101(5)). An ‘approved club’, in this context, is a sport or target shooting club that has been approved by the Chief Commissioner under section 10(3) of the Act.

Any advertisement for the sale of a paintball marker must include the serial number of the marker and the licence number of the owner (section 101(3))

## **Storage of paintball markers**

The storage requirements for paintball markers are the same as for category A or B longarms.

These requirements are set out below.

- The paintball marker must be stored in a receptacle—
  - which is constructed of hard wood or steel that is not easily penetrable; and
  - which, if it weighs less than 150 kilograms when it is empty, must be fixed to the frame of the floor or the wall of the premises where the firearm is kept in such a manner that it is not easily removable; and
  - which, when any firearm is stored in it, is locked with a lock of sturdy construction.
- If more than 15 firearms are stored on the premises where the paintball marker is stored, the premises must be fitted with an effective alarm system.

There are no specific storage requirements for paintballs.

## **Transportation of paintball markers**

When carrying a paintball marker to or from an approved paintball location, a person should:

- ensure that the paintball marker is carried in a manner that is secure and not dangerous; and
- take reasonable precautions to ensure that the marker is not lost or stolen.

Failure to do so may be a breach of your licence conditions and may also constitute an offence under the Act.

It should also be noted that laws regarding the transportation of firearms, including paintball markers, vary from state to state. If crossing into another State or Territory it is essential to ascertain the requirements of that jurisdiction in relation to storage and transportation.

## **Possession of a paintball marker whilst intoxicated**

Persons under the influence of intoxicating liquor or drugs must not carry or use a paintball marker. (Section 132(1))

The word ‘drug’, when used in this context, may include prescribed medications that have the potential to adversely affect a person’s ability to function normally. These medications are often dispensed with a warning indicating that certain activities, such as operating heavy machinery or driving, should not be undertaken whilst the medication is being taken.

If you have any doubts as to whether you may lawfully use a paintball marker whilst taking a certain medication you should seek medical advice.

## **Notification of change of address**

The Act requires the holder of a Paintball Marker Licence to notify the Chief Commissioner in writing of any change of address within 7 days of the change of address occurring. (Section 139)

## **Lost, theft, or destruction of a paintball marker**

The Act requires the holder of a Paintball Marker Licence to notify the Chief Commissioner of any loss, theft or destruction of a paintball marker held under that licence within 24 hours of the licence holder becoming aware of that loss, theft or destruction. (Section 140)

## **Where can paintball be played?**

The sport of paintball must **only** be conducted on a paintball activity location approved by the Chief Commissioner of Police under Section 179(1) of the Act.



It is illegal for any person, regardless of whether or not he or she holds a Paintball Marker Licence, to engage in paintball activities at any other place.

If you are in any doubt about whether or not a particular location has been approved by the Chief Commissioner, you should ask the operator to show you his or her written approval documentation. This documentation should, in any case, be on public display at every approved paintball activity location.

### **Who can operate a paintball activity location?**

The sport of paintball must only be conducted by a licensed firearms dealer and his or her registered employees at an approved paintball activity location.

### **Importation of paintball markers, ammunition and hoppers**

The importation of paintball markers into Victoria is restricted under the **Customs (Prohibited Imports) Regulations 1956** (Cth).

The importation into Victoria of single shot, repeating action and semi-automatic paintball markers requires the written approval of the Victoria Police before the goods arrive in Australia. The written police authorisation is known as a B709A import permit.

Paintball markers that have a fully automatic firing capability or that resemble a sub-machinegun, an assault rifle, a machine gun, machine pistol or automatic handgun cannot be imported, even with a police authorisation.

The importation of hoppers and paintballs also requires the written authorisation (B709A) of Victoria Police.

## Paintball Equipment Standards

All paintball safety equipment and paintball markers used on a paintball activity location must:

- be made specifically for the sport of paintball; and
- comply with the paintball industry standards produced by ASTM International for use in paintball games.

The Victorian Paintball Code of Practice prevents the use of the following specific types of paintball marker in any paintball game:

- paintball markers that have a rate of fire that may be altered; and
- paintball markers that allow “ramping”, “multiple fire”, “burst fire” or “full auto” modes of operation (“ramping” is a mode which increases the fire rate of the marker during rapid trigger pulls to more than one shot per trigger pull. Typically it cuts in after 3 shots and lifts the fire rate to around 15 balls per second whilst the trigger is being pulled rapidly. This mode is often found on aftermarket ‘cheat’ boards); and
- paintball markers that, in the view of the Chief Commissioner, resemble a sub-machine gun, an assault rifle, a machine gun, machine pistol or fully automatic handgun for recreational use such that approval for their importation could not be obtained under the provisions of the Customs (Prohibited Imports) Regulations 1956 (Cth).

The Code of Practice also requires the paintball activity location operator to:

- inspect any privately owned paintball equipment that is proposed to be used in a paintball game conducted by that operator to ensure that it meets all relevant regulatory and safety requirements. In particular, paintball operators must ensure that any privately owned paintball marker being used in a paintball game conducted by that operator is inspected by the paintball operator to ensure it complies with the relevant restrictions set out in the Code of Practice in relation to appearance, modification and rate of fire etc.;
- ensure that any paintball player involved in a paintball game conducted by that operator who possesses a paintball marker that is not owned by the paintball operator is appropriately licensed to possess the marker and that the marker is registered; and
- ensure that no paintball marker has a maximum velocity exceeding 300 feet per second.

## Paintball Marker Safety

There are many different types of paintball markers. Similarly, there is a wide range of paintball safety equipment available and a number of well established safety rules designed to ensure the safe conduct of paintball games.

As with all areas where potentially hazardous equipment is used, the most important factor is human behaviour. The safety rules applicable to paintball are simple yet of great importance. Compliance with these rules requires an understanding of the reasons behind the rules, a commitment to observing the rules and an understanding of the equipment involved.

### Paintball marker types

A paintball marker, also commonly called a paintball gun, is the primary device used in the game of paintball to mark an opposing player. An expanding gas (usually carbon dioxide, nitrogen or air) forces a paintball through a barrel at a muzzle velocity of up to 300ft/s (100m/s). This velocity is sufficient for most paintballs to break upon impact, but not fast enough to cause tissue damage to a person (beyond mild bruising). Under the Code of Practice applying to all Victorian paintball operators, the maximum velocity of any paintball marker is 300ft/s.



#### *Semi-automatic paintball markers*

The majority of modern paintball markers are semi-automatic in nature, utilising either an "open" or "closed" bolt firing position. There are three main designs.

- The first is a gas blowback design, whereby the trigger releases a hammer which sends the bolt forward and simultaneously knocks open a valve releasing gas to fire the paintball as well as cock the marker.
- The second is an aut cocking design, which uses a complicated gas pneumatic system to drive a cocking knob back after firing. This system allows the marker to fire in a "closed-bolt" format and is generally more accurate, although not under higher rates of fire because there is much more mass in motion.
- The third and most advanced design is the electropneumatic. Here, the trigger trips an electronic microswitch and information is passed to a computer controlled solenoid which releases the propellant to drive the bolt forward and fire the paintball, again simultaneously, most often from the "open-bolt" position. This microswitch operation makes the trigger pull very light and allows for extreme rates of fire. These markers are usually the most expensive and advanced of the three types and are generally used for tournament play where rates of fire can reach and exceed 25 balls per second.

Semi-automatic paintball markers discharge a paintball once each time the trigger is pulled until the hopper is empty.

#### *Pump action paintball markers*

A pump action paintball marker operates on the principle that the player has to chamber a new paintball after each shot by manually pumping or sliding the marker's cocking mechanism back, allowing a new paintball to enter the chamber, then pushing the cocking mechanism forward with the aid of the pump handle, to close the chamber. In this way, two separate movements are required to "load" the marker. After loading, the paintball marker is ready to expel the loaded paintball.

Pump action markers purposefully have lower rate of fire than semi-automatic paintball markers.

## **Basic trouble shooting**

The main reasons for the failure of a paintball marker to fire are:

- the safety is on;
- the marker needs to be cocked;
- the marker has run out of gas/air; or
- the marker needs maintenance.

### **Remember -**

- **Full auto paintball markers or paintball markers that allow a full auto mode are not permitted to be possessed or used in Victoria.**
- **Treat every paintball marker as if it were loaded and ready to fire.**
- **Never look down the barrel of a paintball marker.**
- **Always measure your marker's velocity before playing paintball.**
- **Never shoot at velocities in excess of 300 feet per second.**
- **Keep your hands and face away from any moving parts on the marker. Usually, this is not a problem because the moving parts are inside the paintball marker, but some models have moving parts on the outside.**

## **Marker maintenance**

A well-maintained paintball marker will last longer, be more reliable and safer.

A paintball marker should be disassembled and checked for problems regularly. For example, it is not uncommon for the O-Ring to break, or for paintballs to break inside the barrel. The latter problem can be solved temporarily when the player is "in the field" by using a pipe-cleaner-like tool referred to as a squeegee.

It is important to disassemble the marker after each game and properly clean out any affected parts with water. After cleaning the marker, it should be lubricated with commercially available paintball marker lubricant. Do *not* use firearm oils or lubes; these are petroleum-based and will dissolve the internal O-rings and fittings. The player should then ensure that the marker is unloaded before firing several shots to blow out any remaining paint and dry out the interior.

Occasionally, more serious problems such as broken parts will occur. In such cases, the player should not attempt to provide his/her own replacement part, but should contact the manufacturer of the marker for an official new part.

### **Remember -**

- **Never attempt to repair a paintball marker that has an air source attached.**
- **If a serious malfunction occurs it should only be repaired by the manufacturer or an authorised dealer.**

## Other Equipment

### Facemasks



Facemasks are the main item of safety or protective equipment used in paintball. The use of these masks is essential at all times to protect the eyes, face and ears of players from accidental injury. Only facemask systems specifically made for paintball should be used. All other forms of goggles or facemasks may not provide suitable protection.

The lenses are designed to stop paintballs traveling at or under 300ft/s (~100m/s). It should be noted, however, that the lenses are not designed to withstand impacts of paintballs traveling at vastly greater speeds.

Double-layered or "thermal" lenses are also available. These lenses are much less prone to fogging. These work by separating an inside and an outside lens with an air chamber that allows for the difference in temperature between the inside and the outside of the mask without the formation of condensation.

The exterior of the thermal lenses (or the lenses, in non-thermal masks) is usually made of Polycarbonate or Lexan®. This provides impact resistance. An unfortunate side effect is that these materials are very easily scratched by dirt and debris, so care must be taken to keep any such damage to a minimum. Many vendors recommend the immediate replacement of very scratched lenses or lenses that have been subjected to very strong impacts.

Some masks include electric fans that cool the player's face whilst it is being worn. This is useful for situations that require wearing the mask for extended periods of time, such as wood play, large games, or refereeing.

Generally, more expensive masks tend to be smaller (which in turn makes the player a smaller target), more comfortable, and have more interchangeable parts.

Facemasks should be -

- inspected prior to use;
- transported in a separate container from other paintball equipment to prevent scratching of the lens;
- replaced after being struck by a direct impact on the lens; and
- cleaned regularly by a method that will not leave scratches on the lens.

Facemasks ***must*** be worn when:

- you are on the playing field;
- you are chronographing a paintball marker; and
- you are in the vicinity of a paintball marker that has air attached and no barrel plug fitted.

## **Remember -**

**Do not remove facemasks at any time on the field, even if:**

- **it gets foggy; or**
- **it gets hot; or**
- **you are 'shot' in the goggles.**

**In any of the above situations, you should call a referee for assistance.**

## **Mask maintenance**

As facemasks are vital for the protection of players, care must be taken to ensure that they are properly maintained. A common occurrence in paintball games is players receiving a 'shot' to the facemask. If the lens becomes covered in paint, it is important that the player not simply wipe the paint off because doing so will cause debris to scratch the lens. The player should leave the field and when s/he gets a chance, clean off the lens using water and a towel or a piece of cloth.

If players are using a thermal lens, it is imperative that water or anti-fog treatment be applied only to the outer lens of the marker. Allowing moisture of any kind in between the two lenses will destroy the lens system. The interior portion of a thermal lens is also very delicate and should only be wiped clean with a microfibre lens cloth designed specifically for cleaning glasses or goggles without scratching. It is very important that the player not use products such as Windex or other glass cleaners, including spectacle cleaners. Doing so could potentially damage the anti-fog treatments, or more importantly, the integrity of the lens, thereby putting the user at risk. Use only a clean cloth on the mask. Paper towels will scratch the lens.

Anti-fog spray is also available, which coats the lens in a temporary fog-resistant film. It is suggested that lenses be replaced every 12 months. Another good lens cleaning agent is a 50-50 mixture of rubbing alcohol and water. After it is mixed it should be put into a spray bottle for use. Some new lenses will come "pre-treated" with an anti-fog agent, or the lens will be marked "fog-resistant". Even if this is the case, you should probably still treat your lens with an appropriate anti-fog agent.

Typically, paintball markers purchased new will be accompanied by manufacturer's recommendations regarding maintenance and other important matters concerning the workings of the marker. The manufacturer's directions in this respect should always be noted and followed.

## **Barrel Blockers**

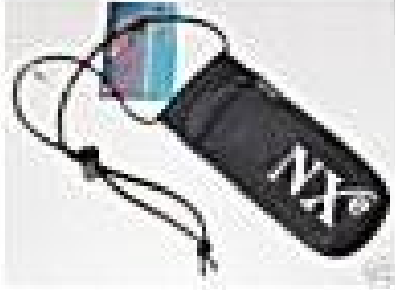
Barrel blockers must be used at all paintball activity locations.

There are two different types of barrel blockers, both of which are used to stop paintballs from leaving the paintball marker during an accidental discharge.

Many paintball activity locations will have areas where barrel blockers must be used. These areas will be identified by staff at the venue. Failure to comply with the requirement to use barrel plugs may result in the expulsion of the player from the venue.



One type of barrel blocker is an actual plug that is inserted into the paintball marker barrel muzzle. These should be both difficult to insert and hard to remove.



A second type of barrel blocker is called a "barrel condom", "sock" or "bag". These are more reliable in terms of stopping accidental discharges. They are simply a bag that covers the muzzle of the barrel. They have adjustable straps to loop over the hopper or tank and can then be pulled tight. If an accidental discharge occurs, the bag stays in place because it is tied to the paintball marker.

Many paintball markers will come from the manufacturer with barrel plugs. Aftermarket plugs come in many shapes sizes and colours but, regardless of appearance, when inserted in the muzzle they must prevent a paintball from leaving the paintball marker.

### Remember -

- **When moving from the staging areas to the playing field, have the safety on and the muzzle plugged.**
- **Only disengage the safety devices on the specific and direct instructions of a referee.**
- **If the barrel plug is not tightly fitted, only one shot is necessary to displace the plug allowing subsequent shots to exit the barrel. A discharging plug is itself a hazard.**

### Hoppers

'Hoppers' are the means by which paintball are held in reserve before discharge, in much the same way as a clip will hold rounds for a rifle. There are two main types of hopper.



The older and less advanced type of hopper is the commonly used simple black shell. It has a hinged lid on the back so the hopper can be filled, and a necked down area which slides down into the marker's "feedneck" and is just wide enough for one paintball at a time to fall through. Some of these hoppers include some form of battery powered "agitation" to keep the mouth of the hopper's feedneck from becoming clogged with paintballs so that a constant supply of paintballs into the feedneck is maintained. This type of hopper relies solely on gravity to get a paintball into the chamber.



More expensive hoppers use some sort of electronic or mechanical means to force paintballs into the feedneck,



and down into the chamber, resulting in a much faster and steadier supply of ammunition to the marker. These types of hoppers are generally found more often in tournament settings on electropneumatic markers to achieve an extremely high rate of fire.

## Paintballs

Paintballs, also called simply 'paint', are spherical gelatin capsules containing primarily polyethylene glycol and dye. Early paintballs were made of glass filled with indelible oil-based paint. The dye used in modern paintballs, however, should easily wash out of most clothing and causes significantly less pain on impact.



In Australia, the term "loader" is often used to describe the 100 & 120 round "tubes" that players carry their spare paintballs in.

Most common paintballs and paintball markers are described as '.68 inch calibre'. Paintballs described in this way will not, however, necessarily have a diameter of this size. In reality, many factors will impact on a paintball's exact dimensions and the vast majority of paintballs are, in fact, larger than .68 inch calibre and may in fact have a diameter equal to or exceeding .69 inch calibre. In addition, paintballs are very sensitive to heat and moisture. A hot or humid day may result in paint swelling or losing its shape. Care should be taken to keep paintballs out of the sun and away from moisture. For this purpose, an insulated cooler works well on the field.

To ensure the proper functioning of a paintball marker, care must be taken to ensure that the paintballs used in that marker match the size of the marker barrel.

- Having a paintball that is too small for the marker barrel will allow air to get past the paintball, resulting in uneven air pressure which will adversely impact on the range of the marker.
- Having a paintball that is too big for the marker barrel will result in a lot of paintballs breaking in the barrel.

Generally speaking, more expensive paintballs are subjected to more stringent manufacturing processes and quality checks, to ensure that their size is more consistent. This is very important for accuracy. More expensive paintballs also tend to have higher quality 'fills' and more brittle shells for maximum breaks.

Never freeze paintballs. Despite the belief of some people that this preserves them, it does not; it actually weakens the outer shell which means it is more likely to break in the barrel.

Paintballs that have dimples or are malformed should be discarded. This usually occurs as a result of improper storage after manufacture or simply as a result of ageing. It is generally recommended that paintballs not be kept for more than 3-6 months.

Paintballs are round but are not true spheres and, as a result, they will generally curve in flight. The further they travel, the further they will curve. A paintball will curve in flight if:

- it is oblong in shape;
- it is fatter around the seam and the seam catches the air;
- the air has a high humidity level;
- it is effected by prevailing wind direction; or
- there is a foreign object, such as paint or oil, in the barrel.

### Remember -

- **Never use paintballs that are smaller or larger in size than those for which your marker was specifically designed.**
- **Paintballs should be stored in a cool, dry place and discarded after 3-6 months.**

### Air Tanks/Cannisters

**Capacity:** High Pressure (HP) bottles come in different capacities and maximum filling pressures. The capacity of the bottle will be stated in cubic inches (ci) and the maximum filling pressure in pounds per square inch (psi). The higher the capacity, the more shots you will get from a bottle.

**Bottle Construction:** Because of the high pressures the bottle has to contain, they are made of steel. In an effort to make the bottle lighter but just as strong, there are also bottles made of aluminium wrapped by carbon fibre. These wrapped bottles are lighter but more expensive than steel bottles.

**Valving:** Two type of valves are used on HP Bottles.

- The **standard regulator** allows the player to adjust the pressure into the paintball marker. These regulators require a cradle as a means to attach to the paintball marker and a combination of hoses, elbows, and a quick disconnect/slidecheck valve.
- **High Pressure Pin Valves** act in the same way as the pin valve on a CO<sub>2</sub> bottle; therefore, this type attaches to the paintball marker just like a CO<sub>2</sub> bottle. This type of valve doesn't require extra hardware. The pin valve style typically has the output pressure preset by the manufacturer to the range required by most paintball markers. There are some HP pin valves that also have an adjustable feature.

**Preset vs. adjustable:** Preset HP bottles are less expensive than the adjustable models. Typically, most paintball markers have a "preset" input pressure that maximizes the marker's performance. For paintball markers which have an operating pressure that matches the preset output of the HP bottle, preset bottle are perfectly satisfactory. In certain paintball markers, the Autococker being one, the operating pressure can be adjusted if desired. For those types of paintball markers, adjustable bottles (although not necessary) may improve the performance of the paintball marker. You should check with your paintball marker manufacturer to determine the operating pressure of your paintball marker.

The bottle can be attached to a paintball marker in various locations, depending on the specifications of the marker.

### Remember -

- **Don't leave air tanks in direct sunlight.**
- **Don't drop air tanks.**
- **Don't knock the valve.**
- **Be careful when handling freshly filled CO<sub>2</sub> tanks as they can be very cold.**
- **Tanks with on/off valves should be in the fully off position when attaching or removing an air tank.**
- **Follow warnings listed on gas sources for handling and storage.**
- **Do not modify your marker's pressurised air system or cylinder in any way.**

## Propellants

### Carbon dioxide



Because CO<sub>2</sub> becomes a liquid when compressed, it must expand to a gas in order to be used by the paintball marker. This expansion requires energy, causing the tank to cool as heat is used to expand the liquid CO<sub>2</sub> into gas. Eventually, under sustained fire and especially in cold weather, the tank can become so cold that ice crystals form on it. If the

CO<sub>2</sub> bottle does not have an anti-siphon tube fitted, or is shaken while firing, the liquid CO<sub>2</sub> may enter the paintball marker. The liquid CO<sub>2</sub> then passes through the paintball marker instead of the tank, evaporating and causing the marker to freeze. This results in large clouds of CO<sub>2</sub> vapor being ejected from the paintball marker upon firing, caused by the liquid CO<sub>2</sub> evaporating in/around the barrel. This occurrence is known as "drawing liquid" and will damage internal seals and O-Rings, which will put the paintball marker out of commission for some time while it warms back up.

With normal back-bottle setups (or air systems utilising a horizontal air source adapter, more commonly called an ASA), the less dense gaseous CO<sub>2</sub> will rise to the top half of the tank. Normally, ASA's are very slightly angled so that the gaseous CO<sub>2</sub> is always available at the valve of the tank. Special devices known as anti-siphon tubes extend the mouth of the valve and provide only CO<sub>2</sub> from the top part of the tank.

During rapid successions of shots, gaseous CO<sub>2</sub> is used up. Liquid CO<sub>2</sub> will take some time to evaporate and rebuild the internal pressure. This process causes potentially large changes in velocity and, therefore, in marker accuracy and range.

CO<sub>2</sub> tanks are made of aluminium or high tensile steel and are fitted with a pin valve that allows the tank to be screwed to, or removed from, a paintball marker. They are filled by weight with liquid CO<sub>2</sub>. A 7oz tank holds 7 oz of CO<sub>2</sub>, a 20oz tank 20 oz and so on. It's important to weigh these tanks during and after filling to prevent overfilling. Overfilling can lead to large pressure increases as the bottle warms up and, in extreme cases, can cause the over pressure disc to blow or the bottle to fail.

Apart from anti-siphon tubes, the most popular way to avoid getting liquid CO<sub>2</sub> into a marker is to use an expansion chamber. This chamber has a series of baffles in it and is fitted to the marker or a remote hose line.

Of course, there are exceptions to avoiding liquid CO<sub>2</sub>. Some markers were actually designed to use liquid CO<sub>2</sub> and use a siphon tank to supply the liquid to the marker. This technology was originally developed to combat the drop off in velocity in very cold weather but with the increase in popularity of HPA, it is rarely used today.

## High Pressure Air or N<sub>2</sub>



In the sport of paintball, Nitro, High Pressure, and Compressed Air all refer to the same thing – a paintball propellant that is not CO<sub>2</sub>.

When HPA (High Pressure Air) is compressed, it remains a gas. When it expands, it also cools the tank, but at a far lower rate than liquid CO<sub>2</sub> because it does not have to transition from liquid form to gaseous form. This reduces the variation in pressure associated with rapid successions of firing cycles, improving accuracy. Therefore, it is

viewed as a superior source of propulsion.

However, because these propellants are stored at higher pressures (up to 5000 lb/in<sup>2</sup> or 34.47 MPa), while liquid CO<sub>2</sub> is stored at around 1200 lb/in<sup>2</sup> (eight MPa), tanks for nitrogen and HPA are more expensive and heavier.

These air sources have traditionally been used primarily by people who play often and have tournament-grade markers. However, they are becoming more popular amongst casual players. HPA is also preferred because it is easy for more frequent players to fill the air system from a conventional scuba tank.

HPA tanks can also be found in aluminium but are more often fibre wrapped aluminium or high tensile steel. They come in various sizes and two pressure ratings. 3000psi and 4500psi. It's important to check your bottle's rating before filling it to avoid over pressuring.

## Comparison

Nitrogen is generally preferred over carbon dioxide for several reasons:

- Nitrogen will not liquefy and leak into the marker, while if the CO<sub>2</sub> tank doesn't have an anti-siphon installed, liquid CO<sub>2</sub> will leak into the marker, causing damage to O-rings. The solenoids on electronic markers are particularly sensitive to this and many manufacturers of these markers specify that nitrogen or HPA only be used with their electronic markers.
- Nitrogen generally has a more consistent shot than CO<sub>2</sub>. This is because when the playing environment is warm, the CO<sub>2</sub> will expand more rapidly from the liquid form, causing the marker to fire at a higher velocity. But when the temperature is lower, the expansion occurs more slowly, causing a decrease in the velocity of the shot. This is especially apparent during rapid firing while using CO<sub>2</sub>. The rapid discharge of CO<sub>2</sub> causes the temperature of the liquid CO<sub>2</sub>

to drop dramatically, resulting in a significant loss in pressure. The effect of temperature on HPA or nitrogen, on the other hand, is negligible.

CO<sub>2</sub> tanks, however, have the benefit of being significantly cheaper than nitrogen tanks; and being slightly less expensive to fill.

## **Ethics**

Paintball is a sport and, like all sports, it has certain rules that must be followed by all participants. These rules exist not only for legal reasons, but to ensure the continuity of the sport by protecting its image and the safety and enjoyment of all participants.

**Players should immediately report any unlawful or dangerous conduct by another player to a referee.**

## **Unsafe behaviour**

Unsafe behaviour can include, but is not limited to, the matters listed below.

- Failure to obey:
  - the rules of the venue where the game is taking place; or
  - the referee's instructions.
- Removing protective equipment whilst the game is in progress.
- Shooting at a person who is not wearing proper protective equipment.
- Accessing restricted areas.
- Deliberately or negligently shooting in a manner that will cause a paintball to leave the playing field or penetrate a safety zone location.
- Physical contact with staff, referees or fellow players.
- Removing of barrel plugs or bags in unauthorised areas.
- Shooting at another player at close range (less than 5 metres).
- Deliberately shooting at the head of another player.
- Interference with venue or personal equipment safety features.

## **Unacceptable behaviour**

Unacceptable behaviour can include, but is not limited to, the matters listed below.

- Shooting at players who have been eliminated or surrendered.
- Verbal abuse of staff, referees or fellow players.
- Wilful destruction of flora and fauna on outdoor paintball venues.
- Wilful destruction of venue fixtures at indoor paintball venues.
- Cheating.
- Horseplay.
- Smoking in non-designated areas and during games.

## **Additional Safety Tips**

- Always listen to pre-game instruction briefings.
- Never point your paintball marker at anything you don't wish to shoot.
- Keep your paintball marker in 'safe mode' until you are ready to shoot.
- Wear suitable footwear that provides ankle support when playing on uneven terrain.
- Consider using additional protective equipment such as:

- throat protection;
  - a chest protector;
  - a groin protectors;
  - knee and elbow pads; and
  - gloves.
- Do not shoot at fragile objects, such as windows.
  - Be aware that paintballs may stain some porous surfaces, such as brick, stucco and wood.
  - Never place a finger or any object into the chamber of your paintball marker while the CO<sub>2</sub>/compressed air tank is connected.
  - Move to the field staging area, common staging area or safety zone quickly after being eliminated.
  - Always know the location of:
    - the first aid officer; and.
    - the emergency rally point.
  - After completion of the game:
    - remove any remaining paintballs from the hopper;
    - remove the hopper from the paintball marker;
    - ensure the breech is empty; and
    - ‘de-gas’ the paintball marker.
  - Always store your paintball marker unloaded, with the trigger safety switch on, with a barrel plug/sleeve in, and with the CO<sub>2</sub>/compressed air tank detached.
  - Always transport your paintball marker unloaded, with the trigger safety switch on, with a barrel plug/sleeve in, and with the CO<sub>2</sub>/compressed air tank detached.
  - Ensure that you drink a sufficient amount of water to avoid becoming dehydrated whilst playing paintball.
  - Undertake warm up exercises before you play.