



Investigation Guideline

Product: Paintball Marker(s) (Paintball Gun(s))

Appendix #: 134

Date amended: July 2005

I. Introduction

A. Background Information

From 1994 to 2003, participation in paintball games has doubled. Estimated injuries associated with paintballs and paintball markers¹ appear to have increased from approximately 930 emergency room-treated injuries in 1997 to approximately 3,800 emergency room-treated injuries in 2004. While the estimated number of emergency room-treated injuries have remained stable from 2001 – 2004, staff will continue to monitor the injuries.

A common hazard pattern is intentional or accidental firing of a paintball into a body part (usually face or eye). Paintball markers are activated by a trigger much like BB-guns. A paintball marker consists of the marker body (which looks like a gun), a cylinder (which contains compressed gas for propelling the paintball pellets), and a hopper (which acts as a magazine for holding the paintball pellets) (see Figure 1).

Figure 1: Paintball Marker



¹ Paintball guns are typically called markers as defined by ASTM voluntary paintball standards.

Paintball markers are capable of firing up to 15 pellets per second at speeds of up to 280 feet per second. Approximately three quarters of those who participate in paintball-related activities are between the ages of 12 and 34 and the majority of these participants are male. The paintball markers are used during warfare simulation games at established paintball facilities or by individuals playing with friends in backyards. While paintball fields require users to wear protective gear, such as helmets, face shields and body armor, CPSC incident investigations (IDIs) have shown that the use of markers outside of these facilities, is often unsupervised and users may refrain from wearing protective gear.

Paintball marker users must use caution whenever handling paintball markers. Intentional or accidental firing of paintball pellets can result in severe damage to eyes or other parts of the head, if protective gear is not being worn or is inadequately designed. CPSC Investigations include incidents where a marker has unintentionally fired when the user was looking down the barrel to see if it was loaded or where a marker has accidentally fired when the user was taking the marker apart after play.

ASTM International maintains several standards for paintball marker and protective gear performance and paintball playing field design. CPSC staff is monitoring injuries and deaths to find any new hazard patterns that need to be addressed by the voluntary standards. While minor bruises are considered to be an acceptable part of play, CPSC staff is working with ASTM paintball marker subcommittees to ensure that paintball markers and protective gear help prevent more serious injuries.

B. Product Descriptions

The basic components of paintball markers are the paintball marker body, the propellant, the paintball hopper, and the paintballs. There are a wide variety of options available with paintball markers for a wide variety of prices ranging from less than one hundred dollars to a few thousand.

The most common types of paintball markers are:

STOCK CLASS - These are pump action pistols holding between 10-15 paintballs at a time, which need to be tilted in order to feed in the next paintball. They use small CO₂ cylinders, rather than the large gas bottles.

PUMP ACTION - Similar to the Stock Class, these paintball markers still need to be manually cocked with the pump, but will generally be larger, and will have a vertical 'gravity fed' hopper that holds a greater number of paintballs. These can be found on many paintball fields as rental equipment.

SEMI-AUTOMATIC - The most common type of paintball marker currently in use. Semi-Automatic paintball markers require only a trigger pull to fire a paintball. The next paintball drops down from the hopper and is automatically readied to be fired by the next trigger pull. They run on either CO₂ or Compressed Air, depending on the

make and style of the marker.

ELECTRO-PNEUMATIC - These are almost identical to the standard Semi-Automatic, except they use electronics rather than mechanical parts in the trigger mechanism

FULL AUTO - Fully Automatic paintball markers will continue to fire paintballs for as long as the trigger is held down. Fully Automatic paintball markers are illegal in some places.

Paintball marker propellant – propellant consists of CO₂ cylinder, air cylinder, long barrel pump-action, and high pressure or nitro bottles. Propellant cylinders are either vertically or horizontally attached to the paintball marker. A horizontally attached cylinder is also called a bottom line bottle attachment.

Figure 2: Paintball Marker with a Vertical Bottle Attachment



Figure 3: Paintball Marker with a Bottom Line Bottle Attachment



Paintball hopper – a plastic container mounted on the gun and holds paintball pellets (attached to top of paintball markers in Figures 2 and 3). The hopper normally holds 140 to 200 balls. Electronic hoppers are available on higher-end guns to feed balls faster.

Paintball pellets – colored paint encased in a thin casing that breaks on contact with the target.

Safety equipment –

Protective Gear - protective equipment a user wears to minimize injury to body, face and eyes. This includes any padding or armor, face mask, helmet, and goggles. See Figure 3 for an example of a face mask pictured to the right of the paintball marker.

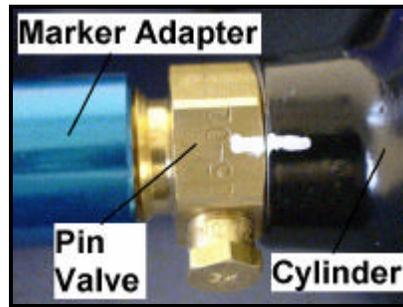
Barrel Plugs – a plastic or hard rubber device inserted into end of barrel to keep balls from leaving the barrel and potentially injuring someone, pictured in Figure 1.

C. Specific Items of Interest

Incidents involving paintball markers require information on paintball marker brand, paintball marker type, propellant source and size, model, serial number, as well as detailed information on the use of the paintball marker at the time of the accident. Of particular interest is whether the marker was being used at an organized paintball facility or in an unorganized fashion on private property, including whether the paintball was fired intentionally or accidentally.

Also of interest is if the paintball marker failed in any manner. The paintball marker propellant source is typically a steel, aluminum or composite cylinder containing CO₂ or compressed air. The pressure inside the cylinder can be 1800 psi or more. Under certain conditions, the cylinder can detach from the pin valve instead of the marker adapter when the cylinder is being unscrewed. Figure 4 shows the connection between the pin valve and cylinder. The line from the pin valve to the cylinder helps the user see if the cylinder is unscrewing in the wrong place. At this time, there are two known cases of the cylinder becoming a projectile in this situation, resulting in death to two individuals. CPSC staff has been working with the ASTM subcommittee on paintball markers and safety equipment to eliminate this type of scenario.

Figure 4. Paintball Marker Pin Valve to Cylinder Connection



D. Headquarters Contacts

Natalie Marcy, EHHA (301) 504-7329

Vince Amodeo, ESME (301) 504-7570

II. Instructions for Collecting Specific Information

WARNING: Always treat the paintball marker as a loaded gun that can fire at any time. When handling a paintball marker, be sure to have a barrel plug in place and do not aim the marker at anyone. Keep your fingers away from the trigger. If a cylinder is attached, the investigator should not attempt to unscrew the cylinder from the gun. The cylinder could unscrew incorrectly, which could cause the cylinder to forcefully expel from the gun.

A. Synopsis

It is important to describe clearly the sequence of events. Describe what happened immediately before, during, and after the incident. Include location of the victim, and a detailed description of how the paintball marker was being used. Describe whether the victim is the operator, helper, or bystander. Where the incident occurred (home, playing field, back yard, etc.). What the injury was and how severe was the injury. Include the following important information:

- Explain in a step by step manner the tasks required to set up and use the paintball marker (i.e. attach propellant cylinder, verify air pressure in the cylinder, load the paintballs, unlock the safety etc.).
- Describe in detail the exact task being performed by the paintball marker user such as whether they were in the act of shooting or deactivating the marker.
- Did the marker fire more than one paintball? Was this expected?
- Provide details of the victim in relation to the paintball marker. Was the victim using the paintball marker? Was the victim a bystander or participant in paintball marker play? Did the victim know they were being fired upon?

- Use **ATTACHED DATA RECORD SHEET** to obtain specific information associated with paintball maker related incidents.

B. Description of Incident Environment

Describe all relevant information on environmental factors such as time of day, lighting conditions, supervised or unsupervised play. Diagram the scene of the incident labeling the victim's location, the operator's location (if the victim wasn't the operator), location of any other players (if applicable), and any other important aspects of the incident environment. Note if the area was wooded, hilly, or an open field. Note areas that were/were not a part of the paintball playing field. **Visually** examine the paintball marker for signs for abuse, modified safety devices, or other problems with it.

Inspect the paintball marker, owner's manual, or other available material. Photograph and copy down information on them. If anything unusual is found, include a statement indicating this in the investigation report.

C. Description of Interaction between Injured Person(s) and Product

- Determine the incident sequence and the exact position the victim was in when injured.
- Was the victim in the act of shooting the marker, in between play, being shot at, or an observer.
- Describe the position of the paintball marker operator and victim (if victim wasn't the operator) with respect to the paintball marker just before the incident, and right at the time of the incident.
- Indicate whether the victim was wearing safety mask, body armor, or other special clothing at the time of the incident and before the incident occurred.
- Determine age of all individuals involved in the incident.
- Were the individuals aware of proper use and safety of the paintball marker? Who taught the individuals about safety and proper use (paintball field employee, parent/guardian, other adult, other player(s), etc.)?
- In the victim's opinion what caused the accident?

D. Description of Product (Involved in the injury)

Provide the following detailed information on the paintball marker:

- Type of paintball marker, manufacturer, model number, and serial number or any other identification number.
- Paintball hopper type, maximum number of paintballs the hopper will hold.
- Propellant cylinder:
 - Type (CO₂, Air or other)
 - Working pressure of the cylinder.

- Manufacturer
- Capacity
- When was the cylinder last charged and how long had it been used since the last charge?
- Type of trigger system on the paintball marker: single shot or multi-shot.
- Manner in which the paintball marker was acquired: new, used, rented, or borrowed.
- Age of the paintball marker (if acquired used, state number of years owned and total age, if known).
- Condition of the paintball marker, maintenance level, or previous repairs or modifications including any optional equipment installed on the paintball marker. Note who made these repairs/modifications (professional, owner of paintball marker, etc.). (**pay special attention to repairs made shortly before the incident**)

III. Photographs/ Diagrams of Incident Scene

- Photograph the paintball marker front, side, and top views and how the marker was positioned at the time of the incident.
- Provide close-up photos of labels, controls, cylinder.
- Have victim pose for photo that depicts his/her position (**With a barrel plug in place and fingers away from the trigger**), as well as the position of any bystanders, including operator (if the victim wasn't the operator), at the time of the incident.

IV. Obtaining samples and documents related to the investigation

- Photocopy the owners' manual and attach it to the report.
- Collect any official records associated with this incident that may be available. Including any consent forms and rules for the paintball field (if applicable).
- Only collect the paintball marker as a sample if it *malfunctioned* in some way. If there was no product malfunction, photographs and detailed information should be sufficient.

(DATA RECORD SHEET – Attached)



DATA RECORD SHEET Investigation Guideline

PRODUCT: Paintball Marker

TASK NUMBER _____ INCIDENT DATE _____

1. Describe the paintball marker involved in the incident (refer to section I D – Product Description for the kind of information we’re looking for). What type of propellant source does the marker use to shoot the paintball?

2. What type of trigger mechanism is on the paintball marker?

- _____ Single Fire → When you press and hold the trigger, does only one paintball fire?
- _____ Semi-Automatic → When you press and hold the trigger, does more than one paintball fire?
- _____ Fully Automatic → When you press and hold the trigger, does it continue to fire paintballs until it runs out?
- _____ Don't Know

3. About how old is the paintball marker?

4. What is the brand name (manufacturer), model name and number of the paintball marker?

_____ Manufacturer/brand name

_____ Model name/number

5. Propellant cylinder information:

_____ Manufacturer/brand name

_____ Model name/number

_____ Type (CO₂, Air, other)

_____ Material (Steel, Aluminum, composite, other)

_____ Capacity- expressed in ounces

_____ Working pressure- expressed in PSI

6. Had the paintball marker or propellant cylinder been changed, modified, or repaired in anyway since you got it? How was the marker changed or modified? Who did it?

7. Does the paintball marker have a safety lock switch or something similar?

8. How long had the operator been working with the paintball marker that day before the accident occurred? How many propellant cylinders were used that day? Count each refill of a cylinder separately and note how many of them were refills. How many times had the operator previously played paintball? Had the operator used this specific marker previously, or different makers?

9. If the propellant cylinder was refilled, who filled the cylinder and when was it refilled? How old is the propellant cylinder?

10. Where was the paintball marker being used?

11. Did the paintball marker fire more than one paintball?

12. Was the victim the operator, helper, or bystander?
13. Was the shooting accidental or intentional?
14. Where was the operator's index finger at the time of the incident? Did the operator release the trigger after operation?
15. Did the paintball marker malfunction or act strangely in any way prior to the accident?
16. Was the victim wearing a safety mask, body armor or any other special clothing at the time of the accident? Was the safety equipment or protective clothing designed for paintball use?
17. How much experience did the operator have with this paintball marker?
18. In the victim's opinion, what caused the accident?