

# **POLAR BEAR PERIMETER FENCE RECOMMENDATIONS**

(companion to Polar Bear Safety Recommendations)

## **For guided polar expeditions and trips**

---

The purpose of these recommendations is to emphasise the necessity for all polar guides to prepare thoroughly for trips into polar bear territories and to assume that an encounter will happen.

The recommended equipment and systems are designed for expedition-style portability, functionality on a snow or ice surface, ease of use in severe cold and availability of ammunition.

IPGA recognises that alternative techniques, strategies and equipment exist and that it is the choice of the guide to adopt those that apply best to their experience, knowledge and circumstances. However in some instances a perimeter fence may be the preferred option (groups too small for sustained camp watch, dogs not available/permitted etc.) therefore a fence should be a familiar and accessible tool in a guide's arsenal of polar bear defence and deterrence.

These recommendations have been compiled from multiple resources including regional authorities, IPGA Polar Expedition Guide experiences in the use of perimeter fences and incident reports.

These recommendations are the result of an ongoing IPGA charter to document advances and improvements in skills and practices.

<b>INTRODUCTION.....</b>	<b>3</b>
<b>1. HAZARDS .....</b>	<b>3</b>
a. Impact .....	3
b. Sound.....	3
c. Complacency .....	3
<b>2. PERIMETER FENCE COMPONENTS .....</b>	<b>4</b>
a. Spring-activated firing mechanism .....	4
b. Mounting .....	4
c. Signal cartridges .....	5
d. Sear release .....	6
e. Pin release.....	7
f. Trip line.....	7
g. Spool/reel.....	7
h. Support Posts .....	8
i. Assembly on ice.....	9
j. Summary of components.....	9
<b>3. PERIMETER FENCE CONFIGURATIONS .....</b>	<b>10</b>
<b>4. ORDER OF ASSEMBLY / DISASSEMBLY.....</b>	<b>11</b>
<b>5. WARNING INDICATORS .....</b>	<b>11</b>
<b>6. STORAGE AND MAINTENANCE.....</b>	<b>11</b>
<b>7. AVAILABILITY .....</b>	<b>12</b>
<b>8. SOURCES .....</b>	<b>12</b>

# INTRODUCTION

The use of polar bear deterrents is mandatory in Svalbard (and other jurisdictions) with the use of perimeter fences around campsites being highly recommended by authorities. A minimum of two lines at varying height is recommended as bears have been observed crawling under and stepping over a single line.

International standards in perimeter fence construction, usage or law do not exist.

Once in polar bear territory it must be assumed that a polar bear encounter can occur at any place and at any time.

These recommendations are based on the use of the *Ice Bear Alarm* mechanism (which has been tested extensively and is sold in stores in Longyearbyen, Svalbard), and twin-level trip lines. Rounds for this mechanism are also commonly available. See Chapter 7 for availability. Other mechanisms and brands are available.

## 1. HAZARDS

Polar bear deterrents such as firearms, flares, dogs, perimeter fences, camp watches etc, are not standalone methods of protection against encounters. Often a combination of methods is preferable, determined by a range of factors including, but not limited to, bear density, sightings, terrain, group size, availability of ammunition/cartridges, local regulations etc.

The firing mechanisms recommended in this document use signal cartridges (rounds) that emit a projectile and loud audio (bang) and team members must be fully briefed on these hazards and associated procedures prior to departure on a trip.

### a. Impact

Detonated signal rounds can inflict serious injury and death and must be treated with extreme caution. Clients must be instructed on the potential hazards and should not take part in the arming or de-arming of a mechanism. An exclusion zone for each mechanism post should be enforced. Periodically remind team members to avoid the fence, particularly in the first few days of your trip.

Operators should never place themselves in the line of fire of a round, always work from the side, never above, and keep the mechanism on safety until fence assembly is complete and team members are in their tents.

### b. Sound

A detonated round can contribute to noise-induced hearing loss.

### c. Complacency

A perimeter fence should never be regarded as a standalone solution to polar bear intrusion. Likewise, a single detonation of a dual line fence should not be regarded as an environmental triggering. Every detonation must be investigated and mechanism re-armed.

## 2. PERIMETER FENCE COMPONENTS

A perimeter fence is comprised of a minimum number of components, designed to create a secure, sturdy and functional structure that does not inflict injury to a bear.

There will be a tendency for users to reduce the weight and bulk of components however this should never hinder its utility under all conditions

### a. Spring-activated firing mechanism

Mechanically-activated audio-signal mechanisms are commercially available though not all are suited to usage against harmful animals in polar environments. Battery-operated mechanisms should be avoided.

The spring-activated mechanism is comprised of an internal spring that, when primed and triggered, fires a detonating point (striker) into a signal round loaded onto the mechanism.

The mechanism will be in one of a number of states:

- deactivated (round is removed)
- disarmed (mechanism is loaded, firing pin is primed, lockable safety pin is activated)
- armed (mechanism is loaded, primed and armed).

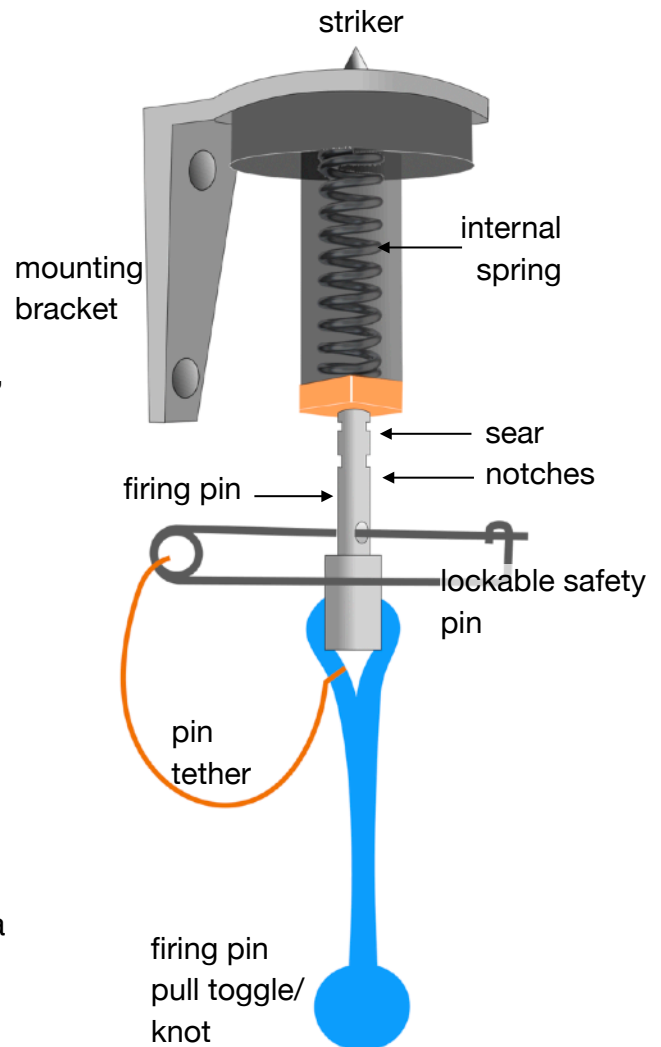
The mechanism is mounted to a support post via a bracket and mounting fixtures (bolts/pins/cam straps/hose clamps) which should match pole diameter.

For ease of use in cold conditions a glove-friendly firing pin pull toggle should be attached to the firing pin.

The displayed mechanism is representative of the Ice Bear Alarm brand and incorporates a sear release (as used in firearms). Other brands and models can be found and may or may not function similarly. It is incumbent on the guide to ensure the mechanism of choice functions as it should under a range of environmental and operational conditions.

### b. Mounting

The mechanism requires mounting to a support post. This can be achieved using fixtures provided with the bracket or by using a cam strap or hose clamp. If the mount is in a fixed position, height adjustability must be incorporated elsewhere in the system eg. use of telescopic poles.



### c. Signal cartridges

#### Calibre 4

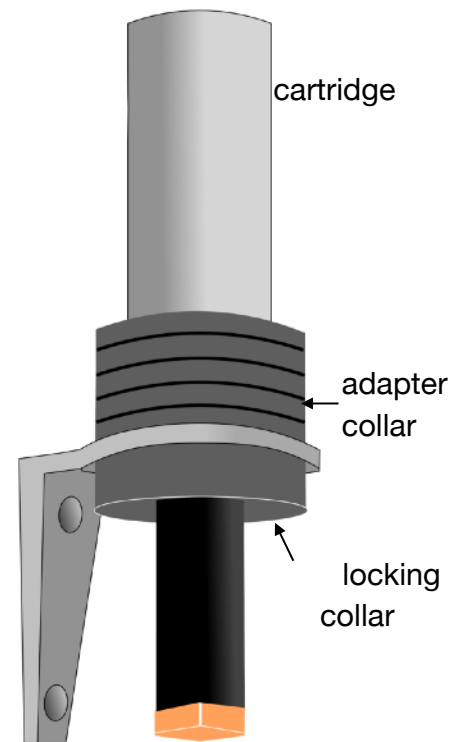
The cartridge (round) most commonly used with the Ice Bear Alarm firing mechanism is the *Comet Maroon silver* Calibre 4 (26.5mm) Flashbang. The round is locked onto the mechanism with a locking collar specific to the 26.5mm cartridge.

- the first signal (bang) sounds on firing, followed by another bang a couple of seconds later
- Cal 4 rounds are projectile and can inflict injury
- expiry dates are stamped on the casing
- Cal. 4 cartridges are compatible with signal guns commonly used as polar bear deterrents

#### 12 gauge

12-gauge cartridge can also be used in this system.

- requires an adapter collar
- 12g blanks require black powder to give the appropriate audio effect
- never use 12g rounds with pellets/shot, this must be removed
- not interchangeable with Cal 4 signal guns without a 12g adapter



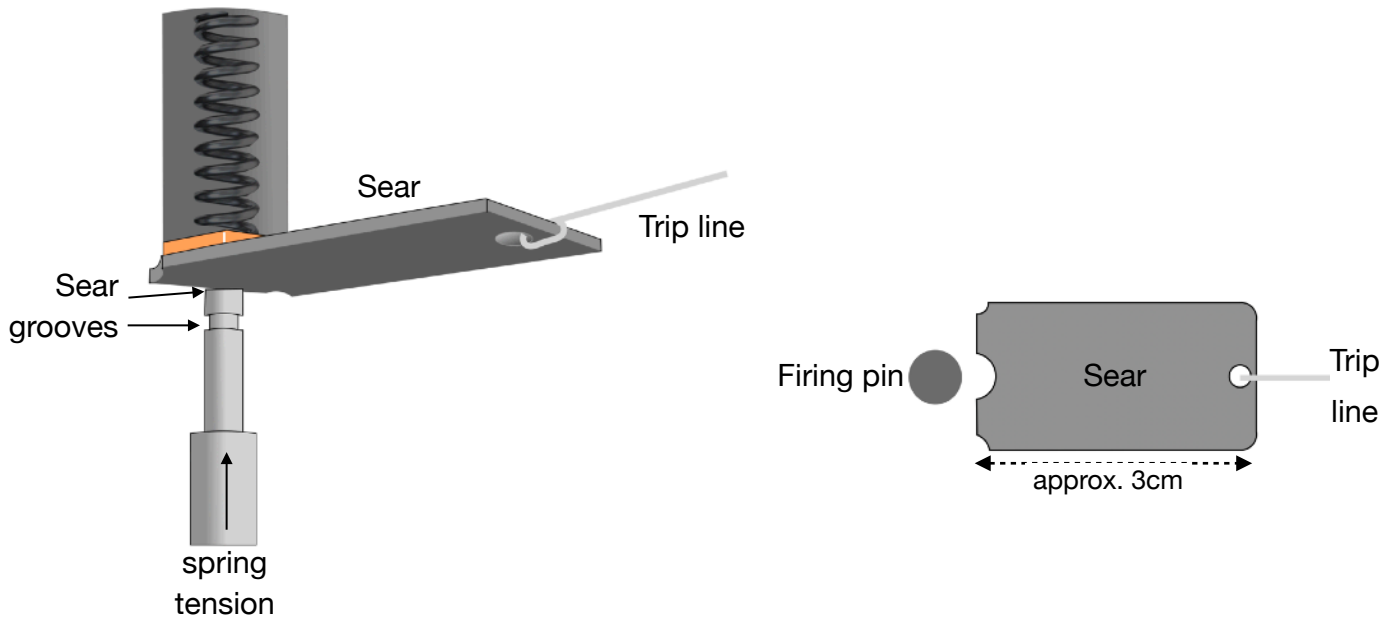
Cal 4



12g

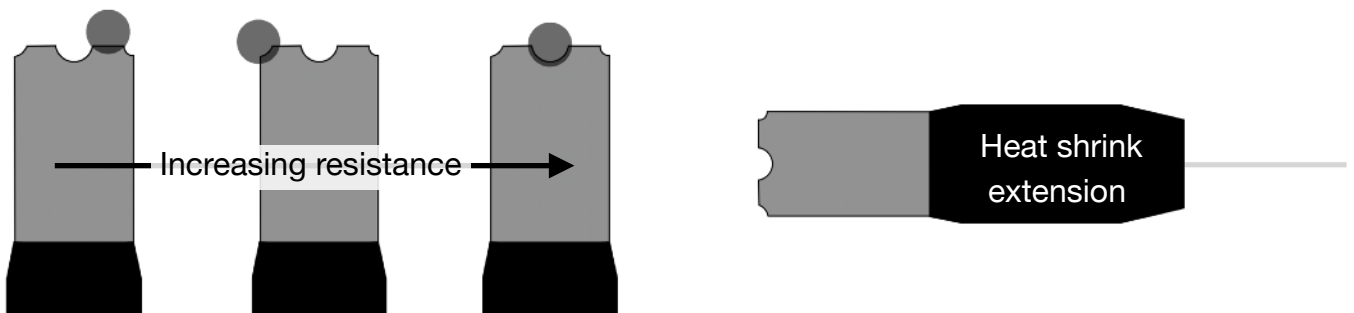
#### d. Sear release

Commonly used in firearms, a sear is a small steel plate that forms part of the trigger mechanism. It inserts into the uppermost notch on the firing pin and is held in place by spring tension. The sear is connected to the trip line and, once critically tensioned (eg. by a bear walking through the fence), releases from the firing pin and detonates the round.



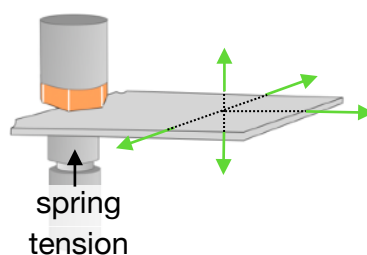
Release sensitivity can be adjusted by connecting the sear to the firing pin at 3 different points. This is useful when setting up for different wind strengths, frost build-up on lines, line stretch and preferred release pressure etc.

The sear is small and difficult to handle in polar conditions, an extension is recommended to facilitate handling



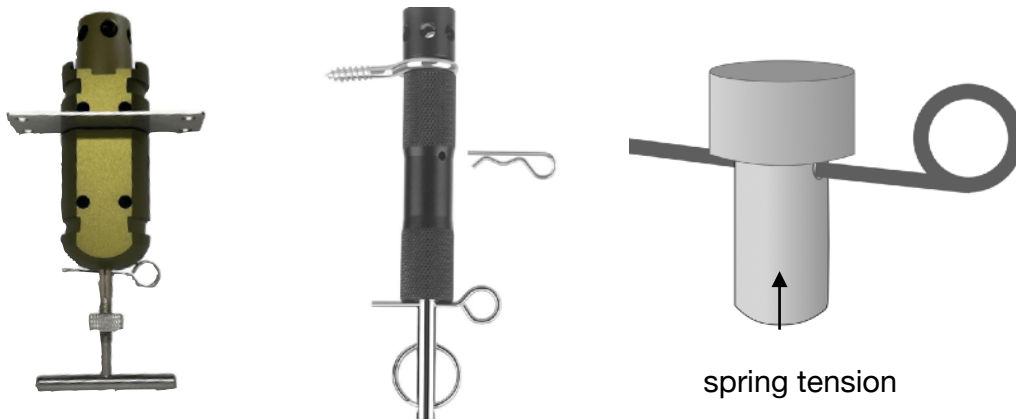
#### Trigger release action

A sear will release under all directions of pull irrespective of which sensitivity is used.



### e. Pin release

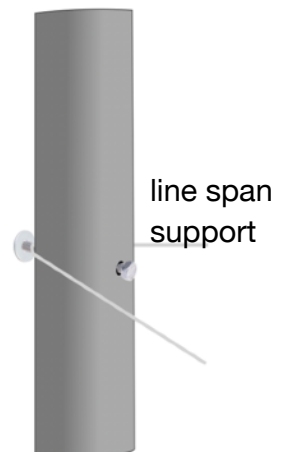
Some mechanisms use a pin release, located in a hole in the firing pin. Release sensitivity can be adjusted by altering the % of pin captured in the hole. This system may require more fidelity in the pin placement and should be tested thoroughly before use.



### f. Trip line

Trip lines are strung around the camp, preferably in a double configuration, at 30 and 70cm heights above the surface. Lines are connected to the sear and usually stored on a spool or reel for easy management.

- lines should be made from non-stretch fishing line
- white line is preferable in snow conditions, dark line in non-snow conditions
- each spool should carry a minimum of 40m of line
- lines should be tautly tensioned to minimise a bear's ingress before triggering
- line span should be supported on interim posts
- lines can be tied to the mechanism bracket connector pins
- to avoid tangling, place tension on the line when winding onto the spool/reel



### g. Spool/reel

A small hand spool or fly-fishing reel is an optimal method for managing lines.

- one reel/spool per firing mechanism / sear
- add a winding handle extension and carry handle for ease of use in cold conditions
- to avoid tangles place a wrap of line around leg or body while winding back onto the spool/reel

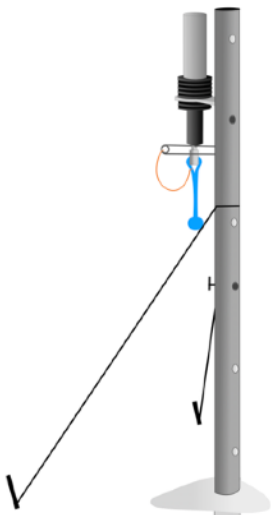


## h. Support Posts

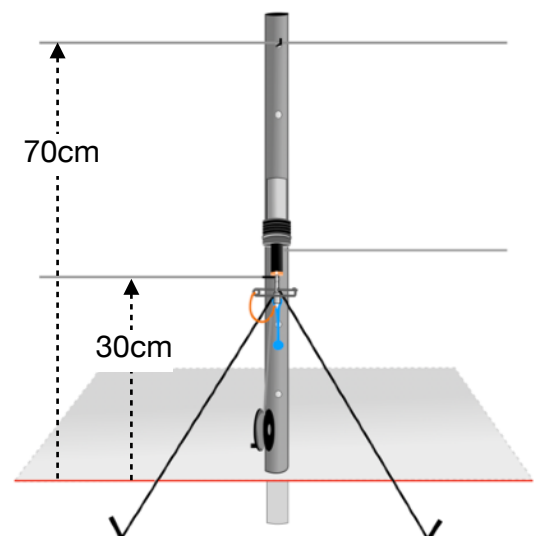
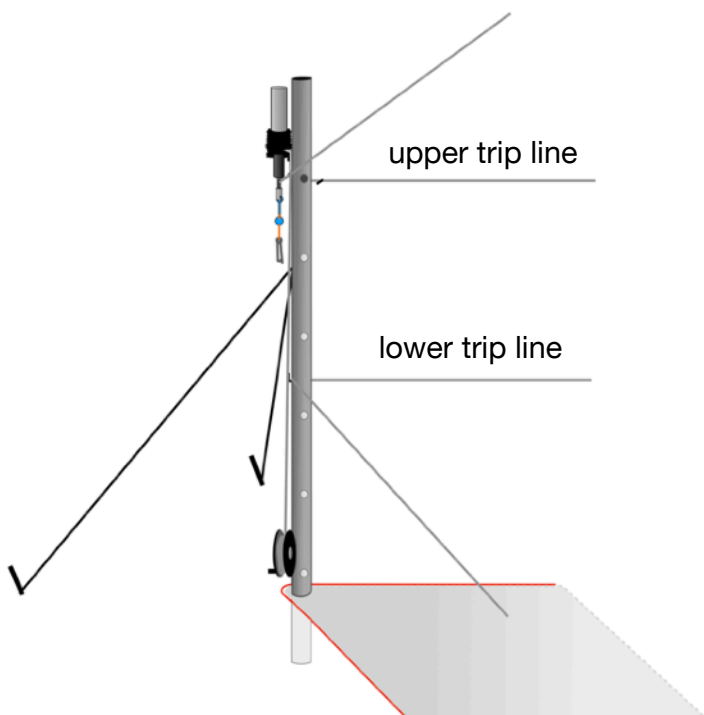
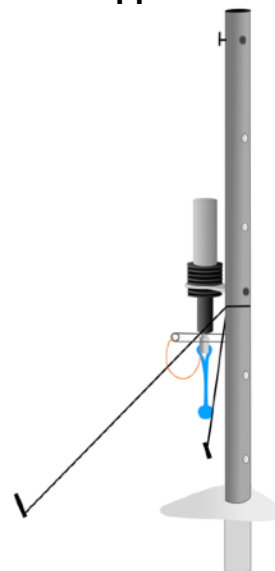
The firing mechanisms must be mounted to rigid support posts typically made from steel, aluminium or carbon fibre.

- posts should be a minimum of 1 meter in length and have multiple mounting points for the firing mechanism (also achieved by the use of cam straps)
- telescopic poles are useful for uneven ground/varying snow depth
- guy lines provide rigidity to the system and are useful in soft snow, particularly on corner posts
- to prevent sagging, lines spanning interim posts should be supported by a hook
- each post serves as both a mechanism mount and a line support
- open-ended posts may fill with snow and require periodic cleaning
- for post diameter - see i. Assembly on Ice .

### Example of Corner Post with high-mounted mechanism and low line support



### Example of Interim-Post with low-mounted mechanism and high line support

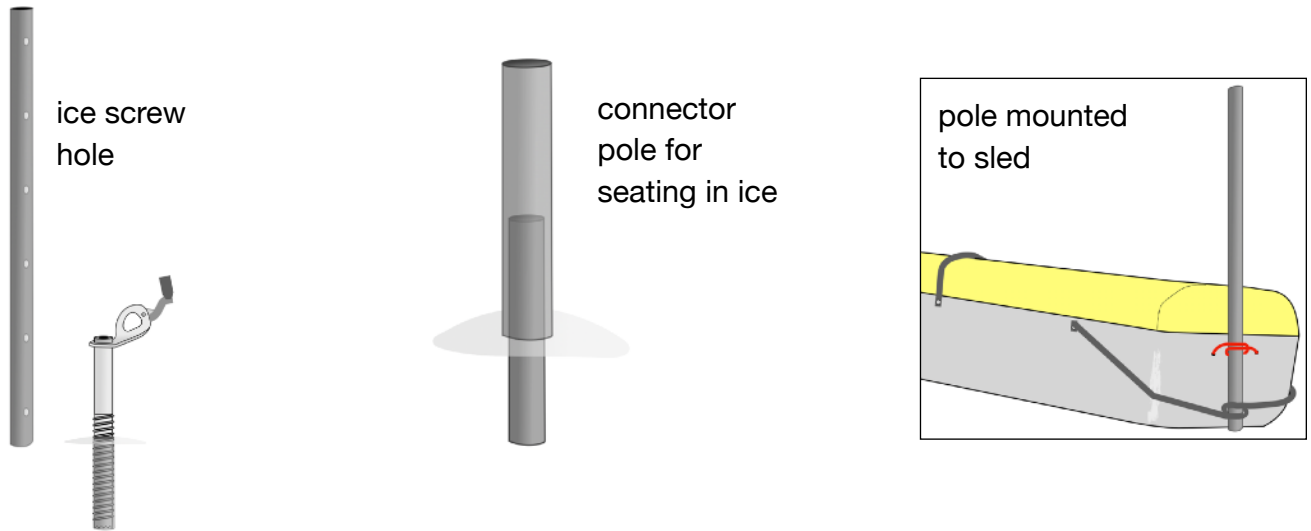




### i. Assembly on ice

The system must be usable on hardened snow and ice. An ice screw hole is ideal for seating the post into ice (guy lines may not be required).

- 22mm diameter may be the widest ice screw available, a 20mm diameter capped post is a compatible fit
- for wider poles use a connector pole seated in the hole
- alternatively, use sled handles and straps to brace posts



### j. Summary of components

The quantity of components carried is dependent on team size. A single set of 4 units is suitable for 1-2 expedition tents, 2 sets for anything bigger.

Recommended components for a double set (8 mechanisms, camp of 3 or more tents):

#### Primary components

- 8 x firing mechanisms
- 8 x brackets & connector pins
- 8 x sears
- 8 x poles
- 8 x cartridges
- 8 x lines/reels
- 1 x ice screw min. 22mm diameter

#### Spares

- minimum 4 x cartridges
- 1 x protective bag/box

#### Optional

- pole connectors for ice
- pole cleaning spike
- mechanism cam straps

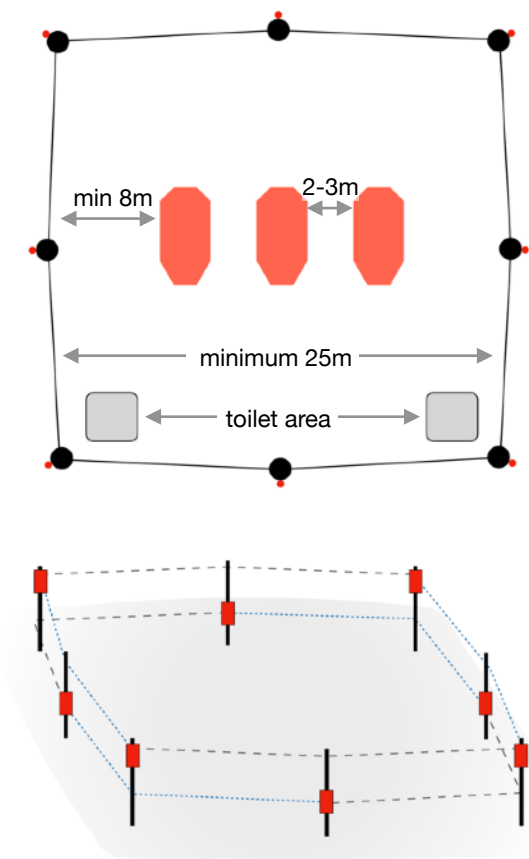
### 3. PERIMETER FENCE CONFIGURATIONS

The geometry of a perimeter fence is dependent on camp size, prevailing wind, quality/depth/consistency of snow, obstacles and surface unevenness, and available fence resources.

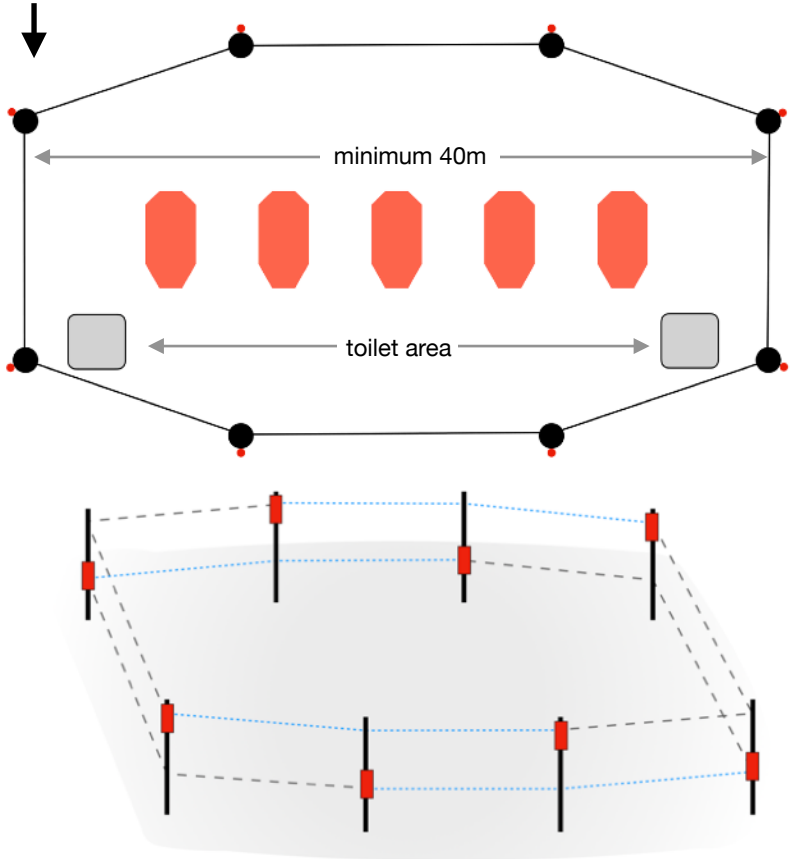
Assuming a camp will be set up for severe wind (see Severe Wind Management Recommendations), tents will be pitched side-by-side with 2-3m spacing. A camp of 2-3 tents may produce a square fence, more than 2-3 may produce a rectangle fence.

- a minimum double-line fence at 30 and 70cm intervals is critical as bears have been observed evading a single line by crawling under or stepping over
- interim posts on all sides are offset outward to assist with tensioning
- firing mechanisms on each post, alternating high and low
- 8 lines, each connected to a mechanism, staggered high and low, straight and angled

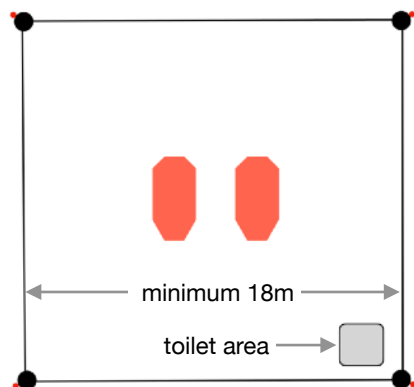
**8-Post Expanded Square Fence**



**8-Post Expanded Oblong Fence**



**4-Post Square Fence**  
1-2 tents



#### Post Configurations

- guyed corner posts provide optimum line rigidity
- dual lines at 30 and 70cm height
- mechanisms can be mounted high or low
- avoid mounting two mechanisms on one post
- line spans should be supported by interim posts

## **4. ORDER OF ASSEMBLY / DISASSEMBLY**

### **Assembly**

1. Ensure snow collecting and toilet areas are allocated
2. Determine perimeter size and position posts, alternating high and low mounted mechanisms
3. Connect sear to corner post (leaving safety pin in place), spool out line past second post, tension and tie on to third post
4. Connect sear to second post, repeat procedure, always working in same direction
5. Arm mechanisms and inform team. Remind team members if you hear them outside of their tents.

### **Disassembly**

1. In the morning, disarm only when at least one team member has permanently exited their tent
2. Reverse the assembly procedure

## **5. WARNING INDICATORS**

### **Detonation of 1 round**

- most likely an environmental cause such as wind or frost build-up on the line
- can also indicate a bear has evaded one of the single lines
- a Cal 4 'Flashbang' round has a double bang, the second bang may be confused as a second detonation
- treat every detonation as a bear intrusion
- re-arm

### **Detonation of 2 rounds**

- two lines have been breached and is most likely a perimeter intrusion
- if an accidental human detonation, inform guide immediately
- treat every detonation as a bear intrusion
- re-arm

## **6. STORAGE AND MAINTENANCE**

- the system can be separated into 2 independent units of 4 x posts, 4 x firing mechanisms and brackets/fixtures, 4 x reels (total 8 of each), and accessories
- each unit is stored in a zippered bag or protective box
- cartridges can remain on firing mechanism during transportation so long as safety pins are activated and locked. Mounted cartridges should not protrude beyond than the height of the post.
- thoroughly dry and inspect your system between trips
- cartridges expire and have expiry dates stamped on them. Cartridges have been known to work effectively many years after expiry but should not be relied on.

## 7. AVAILABILITY

The system is manufactured by [icebearalarm.com](http://icebearalarm.com) in the UK and can be purchased together with:

- firing mechanisms and lockable safety pins
- brackets and connector pins
- adapters for Cal 4 and 12 rounds
- support posts
- lines and sears

Ice Bear Alarm do not provide the following:

- reels
- sear extensions
- connector rods for ice
- firing pin pull toggle
- safety pin tether
- cam straps
- ice clearing poker
- ice screw
- storage bag/box

Alternative mechanisms will require specific rounds, check compatibility before purchasing.

Electric alarms may be an option however power to the system may be compromised in severe cold.

## 8. SOURCES

<http://icebearalarm.com>

[https://www.sysselmesteren.no/contentassets/5f359e34e35d43a7a29f36064eaebc1c/folder\\_sysselmannen\\_svalbard\\_a5\\_engelsk.pdf](https://www.sysselmesteren.no/contentassets/5f359e34e35d43a7a29f36064eaebc1c/folder_sysselmannen_svalbard_a5_engelsk.pdf)

<https://bearwatchsystems.com/bearwatch-wildlife-deterrent-system>

<https://www.udap.com/mm5/bear-shock>