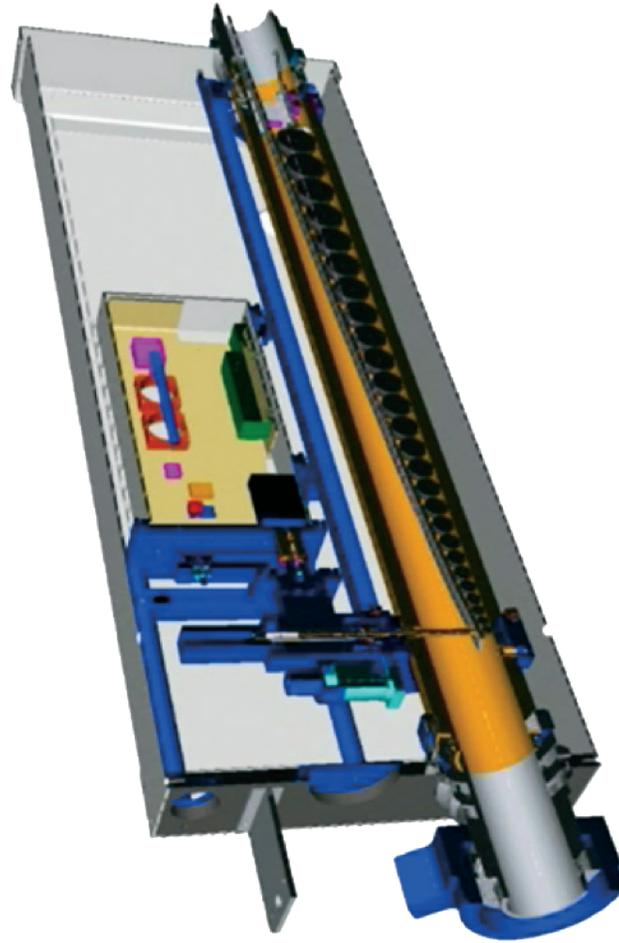


# BALL LAUNCHERS



[stingercanada.com](http://stingercanada.com)

**Grande Prairie**

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**Medicine Hat**

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403-529-5921

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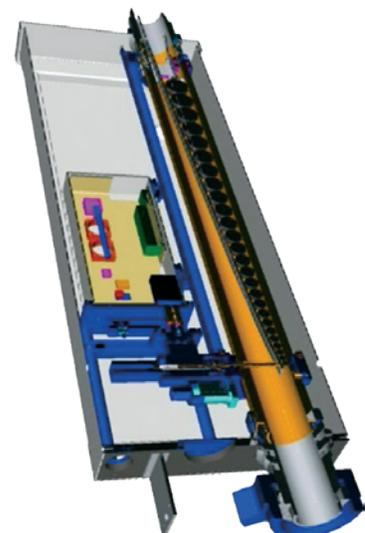
## Ball Launchers

Patented controlled aperture ball drop mechanism for multi-stage well stimulation operations.

- Adaptable to any configuration of the wellhead
- Computer generated, detailed job report, showing ball size and time stamp
- Fully enclosed for low temperature conditions
- Heating blanket provided for extreme sub-zero temperatures

### How does a ball launcher work?

- Used during multi-zone fracturing operations during treatment processes
- Launcher deploys balls upon command into wellbore during fracturing stages
- Single stack tube (standard load stack of up to 27 balls)
- Capable of adapting to various size increments
- **Balls are deployed by actuator**
- Unit is remotely controlled
- Replaces manual process and reduces errors and interruptions in service
- Rated for hazardous conditions
- Heating blanket provided for extreme sub-zero temperatures
- Computer generated, detailed job report shows ball size and time stamp



## Ball Launchers

### How Does a Ball Launcher Work?

Controlled aperture ball drop mechanism for multi-stage well stimulation operations.

- Multiple detection devices for drop confirmation
- Safely operated by field personnel
- Corrosion resistant
- CSA Class 1, Div 2 rating
- 15K pressure rated
- Impossible to drop a ball out of sequence
- Positioned outside of the fluid stream

### Ball Sizes

- Minimum: 0.750"
- Maximum: 4.750"

### Single Launcher Jobs

Capable of handling up to 27 balls (stack specific)

### Dual Launcher Jobs

- For jobs with increments smaller than 1/10"
- For Jobs with Repeater Balls
- Up to 27 balls per launcher (stack specific)
- Specialty configurations upon request.



# Ball Launchers

## Process of a Ball Launch Job

Ball stacks are measured & loaded by the tool hand and company rep.

Launcher is connected to a pump-in-sub on a frac head. The frac is pumped through the multi-port frac head.

Balls are deployed on top of the remote valve in the pump-in sub. This is done by signaling the aperture to open enough to allow one ball to drop at a time.

Once the frac is flushed, the remote valve is opened to allow the ball to enter the frac stream. Positive pressure is applied through the pump-in sub for a few minutes. The remote valve is then shut. Frac of the next zone commences with the launched ball located in the pad fluid.



# Ball Launchers

## Process of a Ball Launch Job

Separate indicators confirm that a ball has been launched.

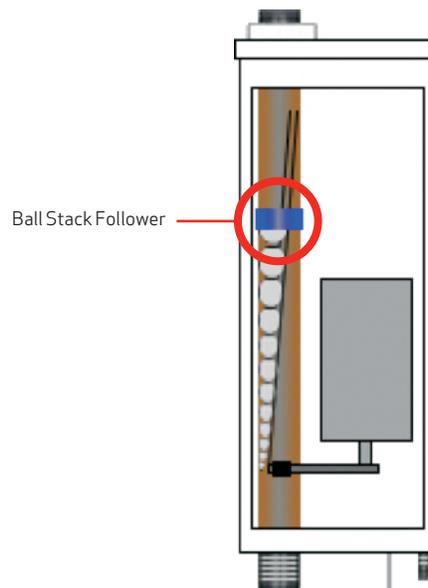
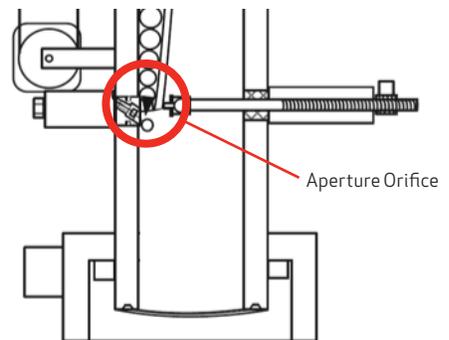
- Aperture orifice size increases
- Ball stack follower descends

Aperture opening is controlled by an on-board processor with memory. Aperture opening is driven by a precision stepper motor (accurate for 51,200 steps per revolution). In the event of a power disturbance, the stepper motor will not change position which maintains the ball stack integrity.

The ball stack follower sits on top of the stack inside the ball cartridge. It has a number of high-powered earth magnets which are attracted to a ball stack tracker collar on the outside of the cartridge.

This tracker is attached to a sensitive potentiometer which measures the downward travel of the stack as each ball is launched.

Each Stinger Ball Launcher is controlled by a laptop, which can be located in the frac van or any area of the customer's choosing. Laptop is connected to the launcher by a heavy duty intrinsically safe umbilical cord.



## Ball Launchers

### Stack Specific – Single or Dual Launchers

Each launcher is designed to handle balls with increments of 1/10" or larger.

For jobs where ball size increments are smaller than 1/10" or the ball stack weight is deemed too heavy for a single launcher, a second launcher and "Y joint" are used.

Specialty configurations upon request.

