



# GAS-BLAST REMOTE AVALANCHE CONTROL SYSTEMS

## Fixed system



AVALANCHE



© Ian Jackson (Parks Canada)

Fixed remote avalanche control system (RACS) based on exploding a propane/oxygen gas mixture inside an open metal tube.

This reference solution for preventive control consists of **exploders** (tubes) positioned in avalanche starting areas and connected by pipelines to a **central gas unit** (shelter or mini-shelter).

## Gazex® / Gazflex®

### FUNCTIONAL ADVANTAGES

#### EFFICIENT

« FOR COMPLETE CONTROL »

- Proven over 25 years in 18 countries.
- Available 24 hours a day, regardless of weather conditions and without special preparation.
- Various exploder sizes available to match the type and shape of the area to be controlled.
- Completely self-contained (power and gas) throughout the winter season, with no limit to the number of shots.
- The explosion occurs above the snowpack which is considered the most effective method.
- Rapid implementation: 2 minutes per firing, including its confirmation by seismometer.

#### SAFE

« TO CONTROL THE RISK »

- No explosives to handle, no human intervention in the avalanche area to be made safe.
- No management of unexploded charges (duds).
- No limitation associated with storing or replacing consumables.
- System fully remotely operated, can be installed in very inaccessible sites.

#### SIMPLE

« FOR A PROFITABLE INVESTMENT »

- Readily available consumables (short and long term) at low cost (propane and oxygen).
- Training and approval requirements are minimal due to lack of explosive use.
- Complete range of systems, adaptable to the specific ground condition and morphology of the site.
- No polluting residue produced by the explosion.

*With 24/7 availability and remote control operation, Gazex®/Gazflex® systems will ensure timely, effective avalanche control which reduces the likelihood of destructive avalanche events and allows the work to be conducted in a safe operating environment.*

## TECHNICAL SPECIFICATIONS

### EXPLODERS

3 sizes with volumes and explosion capacities available: 0.8 m<sup>3</sup>, 1.5 m<sup>3</sup> and 3 m<sup>3</sup>

3 models available: Gazflex<sup>®</sup>, Gazex<sup>®</sup> Inertia and Gazex<sup>®</sup> Standard

Comprises a drum and an elbow, consisting of galvanized and painted steel

Supplied in heliportable modules weighing less than 750 kg

### CENTRAL GAS UNIT

2 models available:

Shelter: made of glass-fiber reinforced polyester resin without metal reinforcement, with thermal insulation between two skins

Mini-Shelter: made of laminated panels fastened to a metal-coated and painted steel frame

Self-contained power supply:

Electrically powered by 12 V, 100 Ah gel battery, recharged by regulator and solar panel

Other power supplies possible

Remotely operated by radio, GSM or GPRS link

Operated by Gazex<sup>®</sup> Manager software (manual control possible)

Qualified to -30°C

Integrated weather station (temperature, wind speed and direction)

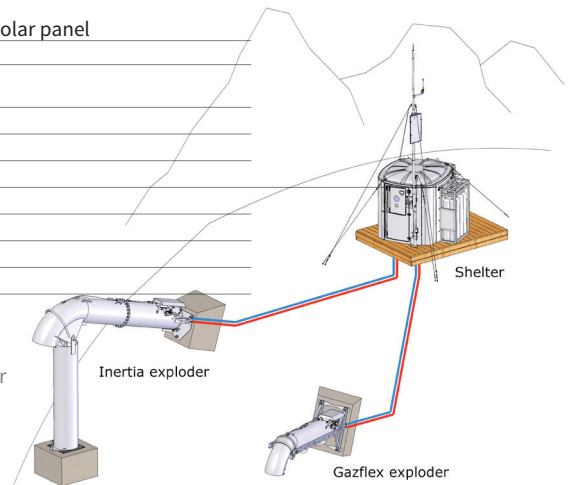
Monitoring of pressure in the gas cylinders and battery voltage

Preventive maintenance integrated in the Gazex<sup>®</sup> Manager software

Seismometer confirmation of firing

Developed to comply with European CE Directive

System diagram for  
Gazex<sup>®</sup> / Gazflex<sup>®</sup>



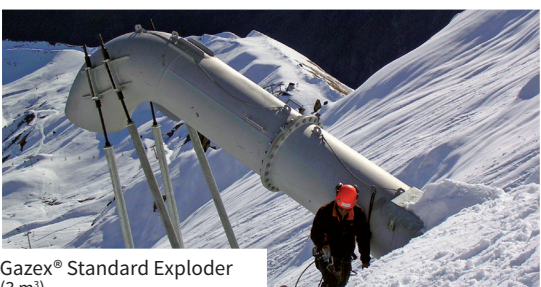
Gazflex<sup>®</sup> Exploder  
(0.8 m<sup>3</sup> ou 1.5 m<sup>3</sup>)

The Gazflex<sup>®</sup> exploder rests on a spring stand (a 'Flex' made of HLE steel, anchored to the ground above) that, during firing, dissipates the forces before they are transmitted to the anchors. This system limits the foundation costs in good quality soils/rock.



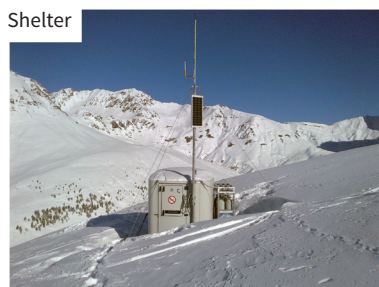
Gazex<sup>®</sup> Inertia Exploder  
(0.8 m<sup>3</sup>, 1.5 m<sup>3</sup> ou 3 m<sup>3</sup>)

The Gazex<sup>®</sup> Inertia Exploder is fully hinged at the base and the front rests on a sliding counterweight that absorbs the forces resulting from firing. This 'shock absorbing' system makes it possible to overcome constraints associated with the quality of the ground.



Gazex<sup>®</sup> Standard Exploder  
(3 m<sup>3</sup>)

The Gazex<sup>®</sup> Standard exploders are the original 'fixed' type with the back anchored solidly in a concrete block and the front supported by 2 or 4 steel bars sealed into the ground.



Shelter

The Shelter is a gas storage and control unit able to supply up to 10 exploder tubes by means of pipelines. This system allows a number of avalanche paths to be controlled using a single gas supply, positioned in a protected area.



Mini-Shelter

The Mini-Shelter is a compact gas storage and control unit connected to one or two exploder tubes positioned relatively nearby. This compact system enables an isolated area to be controlled while minimizing installation costs.

