

WARNING !

*You must read these safety guidelines
before using Cryonite equipment.*

CRYONITE[®] Safety Guidelines

Please read the chapter about safety in the user manual and label before using the system.

- Follow local safety guidelines issued by your local CO₂ supplier about transporting and handling the CO₂ cylinder.
- Electrical receptacles and other electrical equipment:

Caution should always be used when working in these areas. Electricity must be shut off when working on, in or around electrical apparatus. Cryonite is in itself dry, but as the surface temperature drops, condensation may form. Only the immediate surface is cooled, the cooling effect doesn't penetrate into the objects treated. The surfaces will regain ambient temperatures quickly, and any moisture will rapidly evaporate. However, caution should be shown in areas of higher humidity. Do not use directly on sensitive equipment, screens or digital displays.

Getting Started with Cryonite

Thank you for choosing Cryonite. This introduction shows you how to get started using and getting the most value out of the Cryonite system. Please note that Cryonite is used in a very different way compared to chemicals, so please forget your current practices and pay detailed attention to the enclosed documentation including the user manual and label.

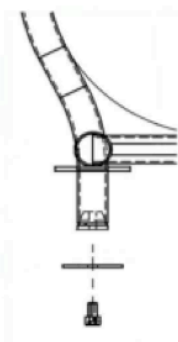
To get started, please follow these simple steps:

1. ASSEMBLE TROLLEY

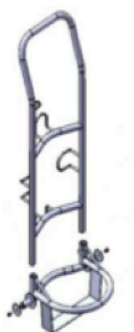
For transport cost reasons, the trolley is shipped ready to assemble and comes in 9 pieces:

1. The upper part
2. The wheel base
3. Two wheels
4. Two washers
5. Two screws
6. Strap

To assemble the trolley, please follow these three simple steps:



1. Mount the wheels using the included M6 x 10 mm screws and washers. Use a 6 mm hex key to tighten the screws firmly.



2. Attach the upper part to the wheel base. Pull the small knobs at the end of the upper part. Attach the upper part to the wheel base and press until you hear a click and the knobs have hooked on to the wheel base.



3. Load the CO₂ cylinder onto the trolley and firmly tighten it with the strap.

2. GET CO₂ CYLINDER(S) FROM LOCAL SUPPLIER

Requirements on the CO₂ cylinder

Gas: You can use any pure CO₂ gas in cylinders with room temperature (sub-zero cryo-gas gives a poor effect). A technical grade of 99.5% purity or better is very good. If you can find gas only of lower purity - check with us.

Cylinder: The cylinder *must have* a "dip-tube". For explanation see below "Why don't I get any snow". That is the only must. But of course size matters. Usually cylinders with dip-tube don't come in many sizes. Our own trolley is made for a size we find to have a good ratio of weight / usage time. It is a 13.5 liter, 10 kg net CO₂, diameter 20.5 cm (the trolley can handle max 23 cm), and height to shoulder (below the valve) 52-62 cm. The valve adds about 15 cm. Available sizes vary between countries.

Coupling: The gun is connected to the cylinder with a hose, which we also supply. The connection on the cylinder needs to be the right one, for the hose to fit. Our standard hose fits the European DIN 477 nr 6 / SN 219505 Type 7, as well as the British variant thereof British Standard 341 Part 1 (.860 in x 1/14 in W) / BS341 No. 8. This standard is the most common throughout the world. We can alternatively supply a hose for the US standard, i.e. CGA 320.

CRYONITE

POISON FREE PEST CONTROL

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CTS Technologies AG

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The CRYONITE® equipment

The equipment consists of a trolley, a lance with trigger mechanism, a pressure hose, and a gas cylinder, typically containing 10 kg CO₂.

Trolley

The trolley has straps for the gas cylinder, one CO₂ hose, one earth cable for static electricity reduction and a jet nozzle. It also has clips to hold the lance, jet nozzle (picture) and spanner, and hooks for winding the hose and earth cable.

The hose

The hose is four metres long, has connections for the gun on one end, and connections for the cylinder on the other. The hose is temperature and pressure resistant.

The lance

The secret of Cryonite is in the nozzle, which has been developed to create the optimum quality of CO₂ snow. The ergonomic telescopic lance has a variable trigger mechanism allowing Cryonite delivery at different rates to suit the situation. It also has a security lock for the trigger.



The jet nozzle

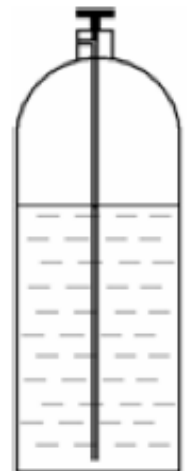
To produce high speed snow. This is useful when it comes to cleaning in hard to reach areas. Do not use for most applications of Cryonite (Refer to the Directions for Use).

The earth cable

While working with Cryonite, you may get some static electricity build-up. The steel cable will lead the static away. You'll only need it when using Cryonite near electronics (integrated circuits). See the [“Safely working”](#) section.

The cylinder

It's important to use the right type of CO₂ cylinder – one that has a dip tube inside! The dip tube is needed because Cryonite uses the CO₂ in liquid form, otherwise it will not produce snow. If there are problems with snow production - always check the cylinder first. Cylinders come in various



shapes and sizes. Check with the supplier.

How does CRYONITE® work?

Making the snow

The CO₂ is in a liquid form in the tube and will come out frozen (snow) from the nozzle. About half of the CO₂ will become cold gas, blowing the snow into the hiding places of the target pest.

The CO₂ snow made by CRYONITE is a mixture of particles with different sizes and speeds. This mix forms a snow with good freezing qualities to kill listed insect pests.

Killing the pests

When the CO₂ snow hits surfaces at normal temperatures it evaporates (sublimates) and becomes CO₂ gas. During this process energy is required and this heat energy is extracted from the immediate surroundings. If insects are part of the immediate surroundings the energy is taken from them and extreme cooling results, the water in their cells crystallizes to ice, killing the insects. Materials will only be chilled on the surface. Most materials have the ability to transport energy from their larger mass, which results in relatively small drops in temperature here.

When the pest is deep frozen, it has to stay frozen for a short while. Cryonite's particles are optimized for reaching the pest, and clinging to it.

Directions for Use (Indoor Use Only).

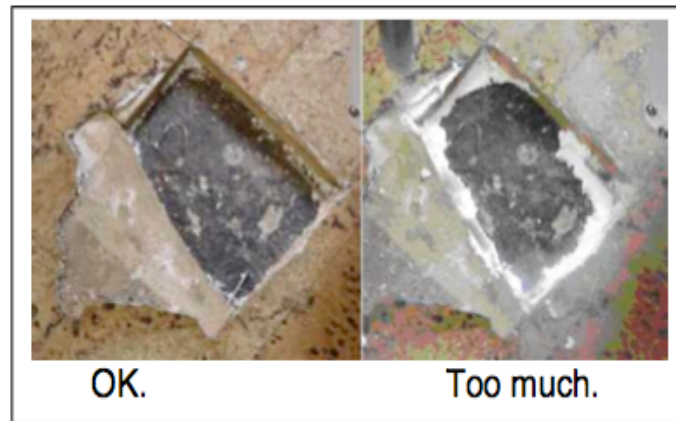
Cryonite kills flour beetles, cockroaches and bed bugs in structures such as food manufacturing facilities, factories, health care facilities (e.g., hospitals), educational institutions (e.g., universities, colleges), transport vehicles (e.g., boats, trucks, trains, airplanes), hospitality facilities (e.g., hotels, motels, inns, bed and breakfasts, hostels), commercial buildings (e.g., restaurants, malls, movie theatres, stores, offices) and residential buildings (e.g., homeless shelters, houses, apartments). Cryonite may also be used on furniture, machinery and electrical equipment.

The Cryonite system consists of a trolley, hose, the lance, the jet nozzle, the grounding cable and a CO₂ cylinder. Listed insect pests are killed by freezing when they come in contact with the CO₂ dry ice particles (snow) delivered by the Cryonite system. Larger insect pests may require more freezing power. Freezing

power can be adjusted by putting more or less pressure on the trigger mechanism of the device. Cryonite should be directly applied to the listed insect pests. It has no residual activity.

It is important that the snow layer is not too thin or too thick. If the snow is too thin, the temperature is not cold enough to kill. If the snow is too thick, the snow will work as an insulator trapping a layer of gas under the snow. The temperature will not be reduced enough and insects will not be killed. Thick layers also cause unnecessarily deep chilling of materials, possibly causing a moisture or material problem. When applying to cracks and crevices, avoid applying a thick layer because the entrance to the crack or crevice will be filled with snow and it will not allow a second application to be applied. Insects trapped behind the snow will not be killed.

As a guideline the layer of snow should be gone in 20-30 seconds. It's better to apply two or three times immediately one after another than apply once in one thick layer. Apply by moving the nozzle back and forth motion, rather than just once slowly. When using the standard nozzle, the ideal spraying distance is usually 10-20 cm from the target site but this can be varied depending on the individual characteristics of the environment being treated.



Target insects located in areas inaccessible to Cryonite will not be killed. Cryonite cannot penetrate through thick layers of dust or previously applied layers of Cryonite snow. It is essential that the area be cleaned prior to treatment. As a result of the high pressure, Cryonite may also contribute to cleaning by blowing dirt out of inaccessible areas. Cleaning helps against re-infestation by listed pests.

The jet nozzle can be used in confined and hard-to-reach spaces. The jet nozzle can also be used to clean and remove breeding places that are difficult to reach. Don't use the jet nozzle if you don't have to. The snow quality of the standard nozzle is better and the penetration in cracks and crevices is still very good.

Cryonite should be used in conjunction with other



pest control practices (e.g., vacuuming, sanitation). It is important to be thorough and systematic. Remember to use good pest control practices including:

1. Inspect - look for all possible hiding places, or traces of activity.
2. Clean those areas. Use a vacuum cleaner if appropriate.
3. Treat insect harborages with Cryonite, for example, cracks, crevices, pallets, under bags, etc.
4. Evaluate the findings and review the frequency of cleaning procedures.
5. Monitor on a regular basis.
6. Repeat if pests continue to be a problem.

Insects may be moved by the gas pressure produced by Cryonite. Releasing the amount of pressure being applied to the trigger of the device by half may reduce this problem.

To determine whether it is safe to treat an object, apply Cryonite in a small, inconspicuous area prior to treating the entire surface.

Bed bugs: Bed bugs are difficult to control. Treat the infested area with Cryonite. Wait 20 minutes and re-treat for any additional bed bugs that come out of hiding. A registered pest control product to provide additional control may be necessary.

Cockroaches: German cockroaches are killed at all stages. It may be more difficult to kill the adults of larger cockroach species.

Safely working with CRYONITE®

This chapter and the label explain how to work safely with CO₂, transporting CO₂ and the Cryonite system.

Safely using CRYONITE

Along with the safe use of CO₂ there are other issues, which are important when using Cryonite.

a. The gun and nozzle

The end of the gun, near the nozzle, can get very cold when using the equipment. This can be seen as frost on the nozzle. For unscrewing the nozzle and switching to the jet nozzle, wait until the frost has evaporated, or use insulating gloves when changing the nozzle.

b. The cylinder

Depending on the type of cylinder to be used, always keep in mind the weight of the cylinder.

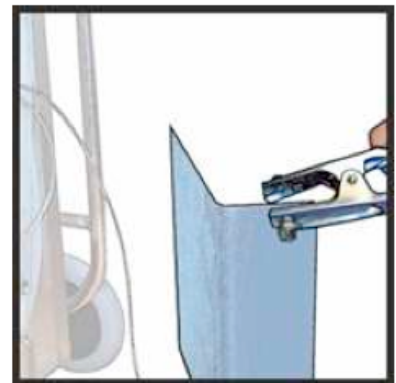
c. The snow

The snow has a temperature of -78.5oC (-110 oF). The snow comes out of the gun at different speeds. The speed depends on the pressure put on the trigger and if the high speed nozzle is being used. The snow can bounce back from surfaces and hit eyes, nose or mouth.

Both snow and dust are especially annoying when working above shoulder height.

d. Static electricity

While working with Cryonite, the flow of CO₂ can cause a build up of static electricity. A static discharge could knock out unprotected electronics (integrated circuits). Therefore, a steel cable on the trolley is connected to the hose and the equipment to lead the static away (earth). When using Cryonite near electronics (integrated circuits) connect the clamp at the end of the steel cable to the machine or surface you are working on. You won't need it when you apply CRYONITE on drains, carpet floors, walls etc.



Safely transporting CRYONITE[®] and CO₂

The transport of CO₂ should always comply with local regulations; federal as well as national. If you still are uncertain, please contact the local Linde Gas company. For safe transport it is always best to secure the equipment and bottles in an area separated from the driver.

The transport of CO₂ is described in the material safety data sheet under section 14. Before transporting the equipment always make sure that the trolley is secured and that the fragile parts don't get damaged. Especially the gun should be secured to prevent damage. The hose should be disconnected to avoid transport damage - as it operates under very high pressure.

Frequently Asked Questions

Question: [Why don't I get any snow?](#)

Answer: You probably have the wrong cylinder. The cylinder is filled with liquid CO₂, but above the liquid surface, at the top, there is gas. Without dip tube, gas will reach the gun instead of liquid CO₂. Cryonite only works with liquid CO₂. Check with your local gas supplier that you are supplied with the right cylinder.



Question: [Why do I have a gas leak at the bottle?](#)

Answer: Check if the washer ring is in place and in good condition. The washer ring stops the hose-bottle connection leaking. If not; replace with a new ring.

Question: [Why does the connection get cold?](#)

Answer: In the hose, there is a little turbulence, making the connection slightly cold, but this has no effect on the snow or the working quality of the snow.

Question: [I can not connect the gun to the hose!](#)

Answer: You have probably connected the hose to the cylinder and opened the valve already. The pressure in the hose stops you from connecting it to the gun. Action: close the valve of the cylinder, release the pressure in the hose by unscrewing the hose-nut by the cylinder about half a turn. When the pressure is gone, tighten again. Connect the hose to the gun, and open the valve again.

Question: [When should I use the jet nozzle?](#)

Answer: Use the jet nozzle only when it is warranted. The standard nozzle has a better killing effect and still has good penetration in cracks. The high speed nozzle should be used for extremely deep cracks. It will also blow out filth in cracks while treating for pests.

Question: [When using the high speed nozzle, it sometimes freezes?](#)

Answer: The high-speed nozzle is not meant for continuous use. Action: when this occurs, wait for 20-30 seconds, or until the snow/ice has evaporated and try again.



Too much snow

Question: [Why does the snow stay so long on the surface?](#)

Answer: This can have several causes:

- The snow layer is too thick.
- The surface is insulating; with insulating materials the snow stays longer on the surface. For example, in carpets and light materials (flour) there is a lot of air. Air is a good insulator / poor energy provider and the snow will remain longer.

Question: [Can I spray on any surface / material?](#)

Answer: Yes, you can use Cryonite on almost every material. To determine whether it is safe to treat an object, apply Cryonite in a small, inconspicuous area prior to treating the entire surface. Do not apply to plants, non-target animals, pets or people.

Question: [Does the surface get wet when applying Cryonite?](#)

Answer: No, not from the CO₂. The snow converts directly from a solid to gas, there is no liquid phase. However, when the surface gets cold, it will attract moisture out of the air. As the materials are only cold on the surface, they will regain their usual temperature, and any moisture will evaporate quickly. Be careful in very moist surroundings. See "[Safely working](#)".

Question: [Can I use it on electric installations?](#)

Answer: Yes. CO₂ is safe to use with electric equipment. But when too much is used, moisture can be created and a bridge can form for transporting electricity. For maximum safety: switch the electricity off first. See "[Safely working](#)".

Question: [Do I always have to use the earth connector?](#)

Answer: No, not always, in fact, mostly not. The earth connector will reduce static charge build-up. Use it when applying on targets containing electronics (integrated circuits) as these can be damaged by a static discharge. See also "[Safely working](#)".

Question: [How cold does it get?](#)

Answer: The snow itself is -78.5 °C (-110 °F). However, the actual temperatures at the site of application can be higher, depending on where it is applied (e.g., -20 to -62°C). Factors such as how the spraying is done and the type of surface being treated will impact the temperature at the site of application. As freezing is so rapid, a kill will be accomplished at these temperatures.

Question: [How heavy is the machine?](#)

Answer: The gun itself weighs about 1 kg, the hose and trolley 12 kg. The weight of the cylinder depends on its size. An aluminum cylinder containing 10 kg CO₂ weighs about 25 kg.

Question: [How much gas is left in the bottle?](#)

Answer: The only way to be certain is to weigh the bottle. The empty weight (Tara) is stamped on the bottle. The last kg or so of the CO₂ cannot be used.

Question: [How long does a bottle last?](#)

Answer: A standard bottle of 10 kg / 20 lb CO₂ will last for about 10 minutes of continuous spraying on full throttle. As you will be using it by spraying in bursts, shorter and longer, the actual using time will vary depending on targets. The same goes for area covered.

Question: [How do I store the cylinders?](#)

Answer: Keep the cylinder in storage under 30 °C (85 °F). The recommended temperature is about 15-25 °C (60-75 °F). This temperature is also important when transporting the cylinder. This normally has nothing to do with the safety of the CO₂, but if the temperature in the cylinder exceeds 50 °C (120 °F) the security valve may open, as the pressure in the cylinder gets too high. A hot cylinder can also affect the snow-quality, i.e. its rapid freezing properties. Never leave the cylinder in direct sun exposure (either outside or in the car); the cylinder is heated quicker by sun-rays than by hot surroundings.

Tip: for use in factories, store the cylinders in cool rooms, and leave the transport of the cylinders to the gas company.

Handling CRYONITE®

Before use

Make sure that the cylinder is tightened to the trolley. Ensure that hose to the handle connection is secure and that the locking ring is in the locked position (fig.). Check that the nuts are securely tightened. The nut on the front edge of the nozzle must also be tight; tighten this only by hand. Open the tap on the gas cylinder fully. NB: The equipment is now pressurized. Push the security lock forwards to unlock (fig). Ready!

Jet nozzle

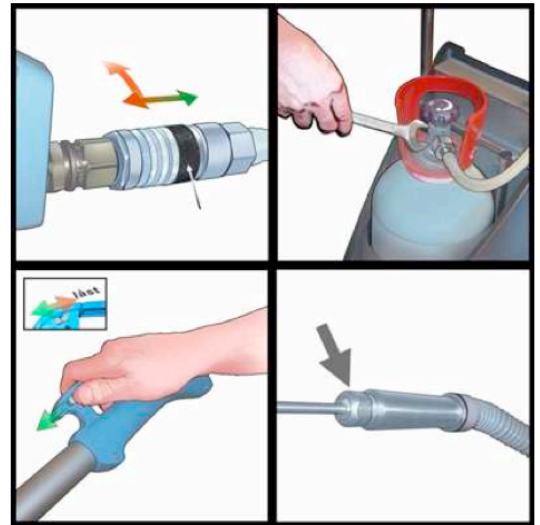
The jet nozzle should be inserted in the standard nozzle. First unscrew the front-end nut. Insert the jet nozzle. Refit the nut (fig.). Only use hand-power. If you insert it and there is still snow in the standard nozzle, the jet nozzle may become plugged. Remove it and let the snow evaporate.

After use

After use, the cylinder tap must always be shut off. Empty hose and lance of gas by pressing the trigger. Relock the security lock. Note that the lance should only be released from the hose once the hose has been emptied of gas.

Change of gas cylinder

Ensure that the tap on the gas cylinder is closed. Empty hose and lance of gas by pressing the trigger. Loosen the connecting nut at the cylinder with a box wrench (fig.). Loosen cylinder straps. Replace cylinder. Tighten straps. Attach connecting nut and tighten. Open tap.



Comments are welcome

If you think something is missing, or too much of, wrong or even right - any comments about this manual are most welcome. Also, if you would like to make a manual to suit your special needs (field use, brush-up, education, supervisor, executive, customer-oriented), we would be happy to assist. Please let us know.

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Safety Data Sheet
(see document named Label_draft_2)