Winterization Procedures for Your Equipment

A Publication of JOHNTalk

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Have you heard? Cold weather is hot!

It's below freezing, and runners are running a 5K wearing their tackiest Christmas sweaters. Families go on hayrides and do other fun activities before buying a Christmas tree. Young hipsters are fashionably bundled in the trendiest winter gear, tasting the latest craft brews in an open-air market.

Municipalities, Chambers of Commerce, other civic organizations and not-for-profit groups have discovered that fairs, festivals, events and recreation are not just for summer anymore. And winter events are no longer exclusively held indoors. In fact, winter and cold weather are opportunities to give new experiences to people of all ages eager to escape the seasonal doldrums. Offering winter events is a way to improve civic pride, promote tourism, raise donations and get couch potatoes away from the fireplace for a while. You're likely to see more and more outdoor activities like these this winter:

- **Christmas/Holiday parades**
- **Christmas/Holiday lights tours**
- **Christmas/Holiday outdoor markets**
- **Arts festivals**
- **Ski and snowboard events**
- **Winter running events**
- **Beer festivals**
- **Music festivals**
- **Public ice rink**
- **Polar plunges**
- **Snowman building contests**
- **Christmas tree farm events**
- **New Year's Eve events**

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Also, let's not forget that in the cold-weather climates, construction companies are always looking to reduce their winter downtime with projects, and some outdoor work is necessary at any time of year.

Winterizing your business is an excellent opportunity to expand your earning potential without making a large investment to expand your inventory. Portable restrooms and accessories are built rugged and should handle anything Old Man Winter throws at them. So, gear up for winter. For the portable sanitation professional, all this cold-weather activity means cold hard cash!

Northern Exposure

For operators in Alaska, Canada and the northern parts of the continental United States, these guidelines are probably something you've known and experienced for years. For other PROs, these winterization tips are just the basics. It may benefit beginners to get more detail and further advice from your northern colleagues. You can make acquaintances through social media sites or at portable sanitation conferences. The many PROs we know who work in cold weather through much of the year are always willing to share their expertise.

Start Early

Just like stores start stocking up for winter and Christmas early in the year, you should also be an early bird. By the end of summer or beginning of autumn, you should be asking current customers if they are planning winter events. Check the local papers, websites, social media sites and Chamber of Commerce for information on upcoming happenings.

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Construction companies and contractors that have winter work projects scheduled will be preparing early as well, renting the equipment they will need – including portable sanitation – to meet the rigors of cold, snow and ice that add to the complexity of outdoor work. Contact local companies and stay in touch with your current construction customers and ask about their work outlook.

Become Weather-Alert

With phone apps, it's easy to stay on top of the weather precisely targeted to your service area. Be especially aware of projected temperatures because temperature is a critical component of winterization. For example, the amount of salt you are using in a brine solution depends on the temperature. Your decision to use 1 pound or 2 pounds of salt per gallon will significantly affect your costs. Use weather predictions cautiously. Forecasts, especially temperature, are most accurate only for the next day; a week ahead is much less reliable. However, forecasts 1 to 7 days out will serve as a solid baseline for your planning.

Add Extra Time to Your Schedule

Plan on doing everything a little slower when providing services outdoors during winter, and add this time to your schedule. It will take longer to prep your units when cleaning off snow or adding chemicals to prevent freeze-up. It will take longer to dispose of the waste, for example, if you're using a split tank and need to thaw the waste first. You will be driving slower, for conditions. You will be more careful moving while on frozen ground. Take time for your safety, the safety of others, and the protection of your inventory and equipment.

To cover your increased costs for time and additional products needed to prevent freeze-ups, you may consider charging your customers a winterization fee.

Winterization Job #1: Preventing Freeze-ups

The most significant challenge of providing outdoor sanitation in winter is freezing. Freezing temperatures can dramatically affect an unprotected restroom. Plastic can crack, and parts turn brittle in the cold. Frozen water and liquid waste can do lots of damage. Water left in a sink can freeze, resulting in leaks or cracks. And when the water in your fresh water tank could freeze solid before you reach your customers and the waste in your waste tank could freeze before you can drive to your dump site, those are big problems!

There are six common ways to fight freeze-up:

1. **Brine solutions made with rock salt**
2. **De-icing salt solution or crystal**
3. **Methanol**
4. **Methanol plus rock salt**
5. **De-icing additives**
6. **Switch-out or split tanks**

BRINE SOLUTIONS WITH ROCK SALT

Brine solutions are probably the least expensive way to fight freeze-ups. A half-pound of rock salt per gallon of water will keep tanks from freezing down to 26˚F. By using 2 pounds of salt per gallon, tanks are safe down to 0˚F.

For cost savings, adjust your salt levels to the predicted temperature extreme. You don't need to use 2 pounds per gallon when a

half-pound would do. Mix the brine solution in your shop. It doesn't have to be complicated. One easy method is to set up a mixing tank with an agitator or augur, determine the correct ratio of salt and water, mix thoroughly, then pump the solution into your truck. To avoid salt water buildup in your pump, run fresh water through it after each use.

In colder regions such as the Northeast U.S., operators prefer to add up to 5 pounds of rock salt solution into the urinal. Every time the urinal is used, it drains into the tank and adds a little more salt to the solution. Look for urinals designed to hold at least 5 pounds of salt.

There are two disadvantages to using a brine solution: its temperature limit and its corrosiveness.

If the temperature is colder than 0°F, a brine solution will not prevent freezing. You can't add more salt than about 2.25 pounds per gallon because the salt won't stay in solution – it has reached its saturation point.

The second disadvantage of brine is its corrosiveness to steel. You must use stainless steel or aluminum tanks and corrosion-resistant fittings on your trucks, or the brine will corrode them. When brine dries, it leaves a white chalk stain, so be sure to wipe everything down with fresh water.

Also, don't clean toilets with a brine solution. Use a windshield washer fluid mix.

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DE-ICING SALT SOLUTION OR CRYSTAL

De-icing salt or magnesium chloride ($MgCl_2$) can be purchased as a crystal and used just like rock salt, or in a 30% liquid solution. It provides protection at lower temperatures than the brine solution. Using 2 pounds per gallon will provide protection to -20˚F, and using 2.25 pounds per gallon provides temperature protection to -26˚F. It would be a rare instance in the continental U.S. that the temperature will drop below this point.

A disadvantage is cost. It is more expensive than rock salt.

METHANOL AND METHANOL WITH ROCK SALT

Many portable restroom operators swear by methanol to keep ice out of their tanks. Methanol is easier to mix than crystal salts because you don't have to dissolve it. You just pour it into a tank. Methanol is also non-corrosive, so it is safe for steel-tank trucks. While methanol can be more expensive than salt, you may save on the cost of trucks, and you can avoid buying large brine mixing tanks.

Six and one-half ounces of methanol per gallon of water will protect tanks at 28˚F. You can add more methanol for more protection, up to a mix of 33% methanol to water (approximately 42 oz/gal). At 33% methanol, your tanks are protected from freezing down to -9˚F.

For extra-cold weather, a methanol and rock salt combination can provide maximum freeze protection. A mix of 2 pounds of salt and 40 ounces of methanol per gallon will protect a tank from freezing all the way down to -40˚F!

There are two very significant disadvantages to using methanol — it is flammable and poisonous. It must be used with extreme caution.

Methanol can be extremely dangerous if not used correctly. A mix higher than 33% and your tanks become flammable.

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It's highly toxic when swallowed and harmful if you inhale too many of the vapors. Ingesting methanol can be fatal (although there are antidotes). Methanol can cause blindness; always use eye protection and rubber gloves when handling or mixing. Never use undiluted methanol near electric equipment such as pumps since the slightest spark could lead to a disaster.

Anyone using methanol should understand the National Fire Protection Association's Flammable and Combustible Liquids Code #30. You can get a copy of it online at www.nfpa.org.

DE-ICING ADDITIVES

De-icing additives are the most convenient and easy-to-use freeze-up prevention. They are a chemical component blend of chlorides that the operator drops directly into a fresh toilet tank. Keep a bucket on your truck, and just scoop pellets into the toilet and urinal of a freshly serviced unit. They dissolve in the solution and can protect the tank from freezing down to -25˚F, which makes them even more effective than methanol or brine. De-icing additives are a convenient solution that saves the operator the hassles of mixing corrosive salt solutions, the danger of methanol and the extra workload and cost of switching out.

SWITCH-OUT OR SPLIT TANKS

In the really cold places such as Northern Canada and Alaska, many operators use a simple switch-out method. They bring a clean toilet to the site and remove the frozen one back to the shop to thaw until it can be pumped and cleaned. A better solution than switching the whole unit is to use split tanks. Split tanks replace the normal collection tank in a unit with a half-size tank. Rather than driving a service route with a fresh toilet for each site, the operator just needs to bring a new tank. The used tank is collected and returned to the shop for cleaning.

Deodorizers are generally compatible with any combination of brine, de-icing salt, methanol, or de-icing additives.

Additional Winterization Tips

Wind chill can lower the temperature of liquids, making them freeze sooner. Recommendations to prevent freezing include protecting units from wind:

- **Place units against the wall of a building**
- **Cover the vent stack to prevent wind from blowing inside the tank**
- **Tape vents on the windward side**
- **Pack snow or straw around the base**

The weight of heavy snowfall has the potential to collapse the roof of a portable restroom, particularly the larger, wheelchair-accessible units. Propping a 2x4 inside will help support the roof.

Some suppliers, such as PolyJohn Canada, have developed an insulated jacket for portable restrooms to add a layer of warmth and protection against freezing temperatures. These covers fit most popular brands of toilets. They are lightweight and easy to install and remove.

Restroom Trailers

A large-scale or extended winter construction project may require a contractor to rent a restroom trailer. With a durable, climate-controlled interior and interior and exterior lighting, a trailer is a 24-hour-a-day solution to outdoor winter sanitation needs. Of course, a trailer is a substantial investment for the

Photo Credit: coloradoportablerestrooms.com

restroom operator. However, a trailer serves as an upscale option for a variety of customers at any time of year, so your earning potential isn't limited to winter.

Winter Workplace Safety

The most important winterization step you must take is personal. Consider your knowledge of winter workplace safety as a key part of the winterization process.

The Occupational Safety and Health Administration (OSHA), a public health agency of the U.S. Department of Labor, offers a guide at https://www.osha.gov/SLTC/emergencypreparedness/guides/cold.html. Here is a brief review.

Learn and practice winter safety skills for yourself just as you would any other aspect of workplace safety. If you have employees, although OSHA doesn't cover working in cold environments, it is your responsibility to provide workers with a safe workplace free from recognized hazards. Cold weather can be one such hazard.

COLD STRESS

The key to winter workplace safety is avoiding "cold stress." Cold stress refers to the medical conditions or injuries that can result when working in cold conditions. In a cold environment, heat can leave your body more quickly, so the body must work harder to maintain its temperature. The body shifts blood flow from the hands, feet, arms, legs and outer skin to the core (chest and abdomen). Cold stress occurs when the skin temperature, and then the internal body temperature, drops.

Cold stress can be caused by four factors:

1. **Cold temperatures**

2. **High or cold winds**
3. **Dampness**
4. **Cold water**

A person may also have certain risk factors that may contribute to cold stress, including:

- **Dressing improperly**
- **Exhaustion**
- **Health conditions such as hypertension, hypothyroidism and diabetes**
- **Poor physical conditioning**

The most common conditions caused by cold stress are:

- **Hypothermia**
- **Frostbite**
- **Trench Foot**

HYPOTHERMIA

Hypothermia is a potentially life-threatening condition in which the body temperature drops to an abnormally low level – less than 95˚F.

A person shivers when they are cold, but as hypothermia sets in, shivering will stop. Moderate to severe symptoms are a loss of coordination, confusion and disorientation, inability to walk or stand, dilated pupils, slow pulse and breathing, then loss of consciousness. A person could die if help is not received immediately.

Treatment includes:

- **Call 911 immediately in an emergency; otherwise, seek medical assistance as soon as possible**
- **Move the person to a warm, dry area**
- **Remove wet clothes and replace with dry clothes**
- **Cover the body, including head and neck, with layers of blankets and with a vapor barrier (such as a tarp or garbage bag). Do not cover the face.**

If medical help is more than 30 minutes away:

- **Give warm, sweetened drinks if alert (no alcohol). Never try to give a drink to an unconscious person.**
- **Place warm bottles or hot packs in armpits, sides of chest, and groin**
- **Call 911 for additional rewarming instructions**
- **If a person is not breathing or has no pulse, call 911 immediately**

FROSTBITE

Frostbite is injury caused by freezing of the skin and underlying tissues. The lower the temperature, the more quickly frostbite will occur. Frostbite typically affects the feet and hands. Amputation may be required in severe cases.

The symptoms of frostbite are reddened skin that develops gray or white patches, numbness, or the affected body part will feel firm or hard. In severe cases, blisters may occur.

Treatment includes:

- **Follow the recommendations for hypothermia**
- **Do not rub the affected area**
- **Do not apply snow/water**
- **Do not break blisters**
- **Loosely cover and protect the area from contact**
- **Do not try to rewarm the frostbitten area before getting medical help; for example, do not place in warm water**
- **Give warm sweetened drinks, if the person is alert. Avoid drinks with alcohol.**

TRENCH FOOT

Wet feet lose heat 25 times faster than dry feet. Trench foot, also known as immersion foot, is caused by prolonged exposure to wet and cold temperatures. To prevent heat loss, the body constricts the blood vessels to shut down circulation in the feet. The skin tissue begins to die because of a lack of oxygen and nutrients and due to the buildup of toxic products.

Symptoms of trench foot are redness of the skin, swelling, numbness and blisters. If left untreated, trench foot can lead to complications including inability to walk, gangrene, permanent nerve damage and amputation.

Treatment includes:

- **Call 911 immediately in an emergency; otherwise, seek medical assistance as soon as possible**
- **Remove shoes or boots and wet socks**
- **Dry the feet**

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DRESS AND PLAN FOR COLD-WEATHER SAFETY

Layer up! Follow the basics of dressing properly for conditions to prevent cold stress, improve your comfort, and still allow you to do your work in a timely manner. The basics:

- **Wear at least three layers of loose-fitting clothing for better insulation:**
  - An inner layer of wool, silk or synthetic to keep moisture away
  - A middle layer of wool or synthetic to provide insulation
  - An outer wind and rain protection layer that allows ventilation to prevent overheating
- **Wear a hat or hood**
- **Use insulated gloves (water resistant if necessary)**
- **Wear insulated and waterproof boots**

Use safe work practices for yourself and your employees:

- **If possible, schedule heavy work during the warmer part of the day**
- **Take frequent breaks in warm areas, or break in a warm area if uncomfortable**
- **Work together in a buddy system to monitor each other for cold stress**
- **Acclimatize yourself, new workers and those returning to work by gradually increasing the workload and allowing more frequent breaks in warm areas to build up a tolerance for working in the cold environment**

Make the Suggestion

What if you're all set to expand your services, but there isn't a lot of outdoor winter activity in your service area? Lobby for it! If you are a member of your local Chamber of Commerce, a civic organization or not-for-profit group, encourage the organization to look into holding outdoor winter events, festivals and recreational activities.

Keep Busy

Although many more outdoor events are being scheduled in the cold-weather regions of the U.S., you will almost certainly have downtime. Use it to your advantage. Catch up on paperwork and make your business plans for the year. Or, it may be the perfect time to take that warm-weather vacation!