



Portable Toilet Maintenance: How To Keep Toilets From Freezing

METHANOL SAFETY

METHANOL SOLUTION GUIDE

We recommend any of the following products or combination of products listed below to protect your toilets from freezing.

NOTE: We also recommend using Satellite deodorizers, as they are compatible with any of antifreeze products listed below.

- A. Rock Salt (sodium chloride) NaCl
- B. Salt (Magnesium chloride) MgCl₂
- C. Methanol
- D. Rock salt and methanol combination
- E. 30% Magnesium chloride solution (liquid)

CHART A

Amount of Salt (NaCl) in Water	Freezing Point
0 lb./gal.	32° F
0.5 lb./gal.	26° F
1 lb./gal.	19° F
1.5 lbs./gal.	11° F
*2 lbs./gal.	0° F

*2.00 lbs./gallon (NaCl) is the eutectic point, the freezing or protection point will rise with the addition of more than 2.00 lbs./gallon (NaCl).

CHART B

Amount of Salt (MgCl ₂) in Water	Freezing Point
0.5 lb./gal.	26° F
1 lb./gal.	18° F
1.5 lbs./gal.	0° F
2 lbs./gal.	- 20° F
*2.25 lbs./gal.	- 26° F

*2.25 lbs./gallon is the eutectic point, the freezing or protection point will rise with the addition of more than 2.25 lbs./gallons (MgCl₂).

CHART C

Volume of methanol in water	Percent of methanol by weight	Freezing Point
6.4 oz/gal	5%	28° F
12.8 oz/gal	10%	23° F
19.2 oz/gal	15%	17° F
25.6 oz/gal	20%	11° F
32 oz/gal	25%	4° F
38.4 oz/gal	30%	-4° F
42.2 oz/gal	*33%	-9° F

*Methanol solution becomes flammable when it exceeds 33% methanol by volume, so be very careful not to exceed this percentage.

CHART D

Amount of Salt NaCl in Water	Volume of methanol in water	Percent methanol by volume	Freezing Point
2 lbs./gal	0 oz/gal	0%	0° F
2 lbs./gal	6.4 oz	5%	-6° F
2 lbs./gal	12.8 oz/gal	10%	-11° F
2 lbs./gal	16.6 oz/gal	13%	-15° F
2 lbs./gal	21.8 oz/gal	17%	-19° F
2 lbs./gal	28.2 oz/gal	22%	-25° F
2 lbs./gal	32 oz/gal	25%	-30° F
2 lbs./gal	38.4 oz/gal	30%	-40° F

CHART E		
Volume of MgCl ₂ solution in water	Percent MgCl ₂ solution by weight	Freezing Point
38.4 oz/gal	30%	20° F
55 oz/gal	43%	10° F
69.1 oz/gal	54%	0° F
79.4 oz/gal	62%	-10° F
87 oz/gal	68%	-20° F
93.4 oz/gal	73%	-26° F

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I. STORAGE

Local fire departments or fire marshals in each community will have regulations concerning flammable liquid storage such as methanol. Many communities pattern their regulations after the requirements set forth in the National Fire Protection Association's Flammable and Combustible Liquids Code #30. Information gathered from NFPA #30 includes the following:

A. Methanol can safely be stored in 55 gallon (208 liter) barrels if those barrels are isolated in an outdoor storage yard. The following requirements are listed:

1. No more than 40 barrels can be stored in a group.
2. A five-foot (1.5 meters) distance must be maintained as an aisle between each group of 40 barrels.
3. Barrels should be at least 50 feet (15 meters) from adjoining property and at least 10 feet (3 meters) away from the nearest street, alley, or public way.
4. The storage area cannot be more than 200 feet (60 meters) away from a 12 foot-wide (3.6 meter-wide) access into the yard for fire equipment.
5. A maximum of 20 barrels can be stored adjacent to a building located on the same premises and under management provided that the building is limited to one story of fire resistive or non-combustible construction.
6. Storage yards should be constructed such that possible spills cannot drain onto neighboring building or property. Also, keep in mind that from a safety standpoint the empty drums need to be handled just as carefully as the full one due to the presence of vapors in the drums. Tossing the drums about may cause sparks and result in fire and/or explosion.

II. SAFETY

Knowledge of the potential hazards of methanol is important for safety instruction.

Section 3.1 states that methanol is highly toxic when ingested. It is harmful when prolonged inhalation of vapor or repeated skin contact occurs. Section 5.2 outlines personal protective measures, which lessen these dangers. Eye protection with goggles and hand protection with gloves should be used for those persons directly responsible for mixing the antifreeze solutions. Methanol should be handled in well-ventilated areas to reduce the build-up of flammable and toxic vapors as outlined in Section 4.3. In addition, NO SMOKING signs should be clearly posted where methanol is handled. All other sources of ignition such as sparks from electrical equipment should be eliminated. Carbon dioxide or dry chemical fire extinguisher should be within reach.

III. HANDLING AND TRANSFERRING

Do not use equipment to handle methanol that has not been approved. **ESPECIALLY** electric pumps.

When transferring methanol from drums to the mixing tank, it is important that the operation be properly bonded and grounded (Section 4.5.1 and 7.5.2). Flammable liquids such as gasoline and methanol can build up dangerous static electrical charges on the surface of the liquid.

If a flammable vapor-air mixture is present and a static spark discharges, an explosion or fire could result. Connecting the drum to the mixing tank by means of conductive wire clamped firmly to each will minimize the static difference between the two. This is called bonding. Connecting a conductive wire from the mixing tank to the ground will ground the system of drum, tank and ground. The connections between all containers should be inspected such that paint and other non-conductors will not interrupt the grounding.

IV. FIRST AID AND SPILL PROCEDURES

The Chemical Safety Data sheet outlines the steps for First Aid in Section II. Preventive measures as outlined above and the knowledge of the hazards of methanol will greatly reduce the need for using First Aid. Nevertheless, prompt attention in the case of eye contamination or oral ingestion must be followed. Spills should be quickly taken care of with large amounts of water to dilute the flammable spill. Rags or mops used to clean the spill should be thoroughly rinsed with water before disposing.

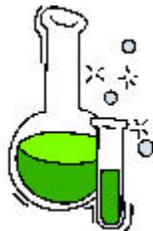
METHANOL MIXING

% of Methanol is for gallons of water used in mixing tank: i.e. 400 gallons of water x 30% Methanol - use 120 gallons methanol + 280 gallons water

i.e. (metric) 1512 liters of water x 30% Methanol - use 450 l methanol + 1050l water.

Example: 500 gallon mixing tank at 30% would need 150 gallons of Methanol plus 350 gallons of water. Also, a higher mix rate, above 30% Methanol and 70% water, can be flammable.

Example: (Metric) 1900 liter mixing tank at 30% would need 570l of Methanol plus 1330 l of water.



Hydrometer Available at:

Curtin Matheson
612-934-1793
800-328-4523

Baume Hydrometer
Scale 0 - 20
.5 increments

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Latitude	Bismarck N. Minn	Minneapolis Rochester Eau Claire	Denver Bloomington Cedar Rapids Chicago	Louisville Cincinnati Dayton Columbus	Atlanta
	48° N	42° N	40° N	37° N	30° N
Oct. 18	10%	5%	Optional	--	--
25	15%	10%	5%	--	--
Nov. 01	20%	15%	10%	--	--
08	25%	20%	15%	--	--
15	25%	20%	15%	--	--
22	30%	25%	20%	--	--
29	30%	25%	20%	5%	--
Dec. 06	30%	25%	20%	5%	--
13	30%	25%	25%	10%	--
20	30%	25%	25%	10%	5%
27	30%	25%	25%	15%	10%
Jan. 03	30%	25%	25%	15%	10%
10	30%	25%	25%	15%	10%
17	30%	25%	25%	15%	10%
24	30%	25%	25%	10%	10%
31	30%	25%	25%	10%	5%
Feb. 07	30%	25%	25%	5%	--
14	30%	25%	20%	5%	--
21	30%	25%	20%	--	--
28	25%	20%	15%	--	--
Mar. 06	20%	15%	10%	--	--
13	15%	10%	5%	--	--
20	10%	5%	5%	--	--
27	5%	Optional	Optional	--	--

All percentages are per 5-gallon charge (19 liters)