



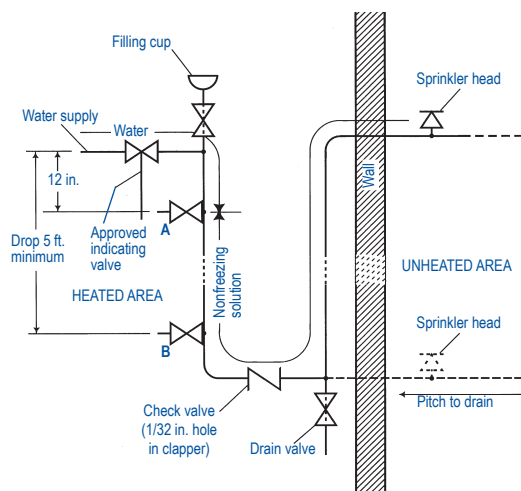
Glycerine-based Non-Toxic Freeze Protection Fluid

- flow protection to below **-25°F**
- burst protection lower than **-50°F**

PRE-MIXED TO NFPA GUIDELINES DO NOT DILUTE

Full-strength antifreeze solution for
wet fire protection sprinkler systems

- ✦ *Non-toxic*
- ✦ *Non-corrosive*
- ✦ *Compatible with all approved types
of pipe including CPVC*



TECHNICAL BULLETIN

FIMGL48716

INSTALLATION INSTRUCTIONS:

Drain the system completely. Add **FIRE & ICE MASTER -GL48-** to the system through a filling cup. Use the end sprinklers to vent air from the piping. Back out all of the sprinklers slightly, until **FIRE & ICE MASTER -GL48-** appears assuring that the piping is completely filled and all the air has been purged from the system.

If the filling cup is NOT above the highest sprinkler, use the following installation procedures:

1. Put a filling cup at the highest sprinkler branch line and fill the system with **FIRE & ICE MASTER -GL48-**. The drop pipe should be completely filled through the filling cup as shown in the diagram. Tighten the sprinkler heads and open the valve marked "A" until the drop pipe and the section of the pipe above valve "A" are empty. Close valve "A". Close the filling connection valve and then slowly open the supply valve wide.
2. Or, a small pump can be used to add **FIRE & ICE MASTER -GL48-** to the system at the valve marked "B" in the diagram below.

TESTING

Systems should be tested to determine the level of freeze protection at the beginning of each freezing season. For systems larger than 40 gallons NFPA 13 requires a drain/test connection be installed at the most remote portion of the system. Use of antifreeze solutions should be in conformity to any state or local health codes. Please contact your local health authorities if you have any questions concerning code.

Use a hydrometer to test the specific gravity of a small sample of the solution. To maintain a -25°F flow protection, the specific gravity should be 1.137 at 77°F. If test indicates that the solution has weakened, replace the solution with fresh **FIRE & ICE MASTER -GL48-**.

FIRE & ICE MASTER -GL48- is a glycerine-based antifreeze, which satisfies the recommendations of NFPA 13. Systems freeze-protected with **FIRE & ICE MASTER -GL48-** are assured flow protection to -25°F, and burst protection to -50°F.

To meet NFPA guidelines, **FIRE & ICE MASTER -GL48-** should not be diluted. This product is considered GRAS (Generally Recognized As Safe) by the Food and Drug Administration.



HOW TO SIZE YOUR SYSTEM

USE THE FOLLOWING CHART TO HELP SIZE THE PIPING IN YOUR SYSTEM.

Nominal size		Gallons Per 100 ft. of Length	Length in Feet Per Gallon
3/4"	Blazemaster® Pipe	3.1	32.3
1"	Blazemaster® Pipe	4.9	20.4
1 1/4"	Blazemaster® Pipe	7.9	12.7
1 1/2"	Blazemaster® Pipe	10.4	9.6
2"	Blazemaster® Pipe	16.4	6.1
2 1/2"	Blazemaster® Pipe	24.0	4.2
3"	Blazemaster® Pipe	35.6	2.8
3/8"	Standard Steel Pipe	1.0	100.0
1/2"	Standard Steel Pipe	1.6	63.3
3/4"	Standard Steel Pipe	2.8	36.0
1"	Standard Steel Pipe	4.5	22.2
1 1/4"	Standard Steel Pipe	7.8	12.8
1 1/2"	Standard Steel Pipe	10.5	9.5
2"	Standard Steel Pipe	17.5	5.7
2 1/2"	Standard Steel Pipe	25.0	4.0
3"	Standard Steel Pipe	39.0	2.6
3 1/2"	Standard Steel Pipe	53.0	1.9
4"	Standard Steel Pipe	66.7	1.5
1/2"	Polybutylene Tube	1.02	98.0
3/4"	Polybutylene Tube	2.06	48.5
1"	Polybutylene Tube	3.46	28.9
1 1/4"	Polybutylene Tube	5.16	19.4
1 1/2"	Polybutylene Tube	7.00	14.3
2"	Polybutylene Tube	12.34	8.1
3/8"	Type "L" Copper Tubing	0.753	132.6
1/2"	Type "L" Copper Tubing	1.21	82.6
5/8"	Type "L" Copper Tubing	1.81	55.2
3/4"	Type "L" Copper Tubing	2.51	39.8
1"	Type "L" Copper Tubing	4.29	23.4
1 1/4"	Type "L" Copper Tubing	6.55	15.3
1 1/2"	Type "L" Copper Tubing	9.25	10.8
2"	Type "L" Copper Tubing	16.05	6.2
2 1/2"	Type "L" Copper Tubing	24.78	4.0
3"	Type "L" Copper Tubing	35.38	2.8
3 1/2"	Type "L" Copper Tubing	47.84	2.1
4"	Type "L" Copper Tubing	62.0	1.6
5"	Type "L" Copper Tubing	97.1	1.0
6"	Type "L" Copper Tubing	139.2	0.7

EXPANSION DAMAGE PROTECTION POINT	-50°F.
FLOW POINT	-25°F.
REFRACTIVE INDEX n_D	1.137
THERMAL CONDUCTIVITY	10°C. 0.00095
Gram Calories, Second, $^{-1}$ cm, $^{-2}$ °C, $^{-1}$ cm	20°C. 0.00096
	30°C. 0.00098
	40°C. 0.00099
	50°C. 0.00100
	60°C. 0.00102
	70°C. 0.00104
	80°C. 0.00105
SPECIFIC GRAVITY	15/15°C. 1.12440
	15.5/15.5°C. 1.12425
	20/20°C. 1.12300
	25/25°C. 1.12185
SPECIFIC HEAT	35°F. 0.80
BTU / LB. / DEGREE FAHRENHEIT	30°F. 0.79
	25°F. 0.78
	20°F. 0.77
	15°F. 0.76
	10°F. 0.75
	5°F. 0.74
	0°F. 0.73
	-5°F. 0.72
VISCOSITY	0°C. 14.6
CENTIPOISE/mPa s	10°C. 9.01
	20°C. 6.00
	30°C. 4.21
	40°C. 3.10
	50°C. 2.37
	60°C. 1.86
	70°C. 1.53
	80°C. 1.25
	90°C. 1.05
	100°C. .91

THE SPECIFICATIONS LISTED ARE FOR TYPICAL IDEAL SITUATIONS. CONTAMINANTS IN THE SYSTEM MAY ALTER THE CHARACTERISTICS OF THIS PRODUCT.

Stock Number	Size & Description	Pack	Lbs./ case
18-406	5 GALLON FIRE & ICE MASTER -GL-	1	50
18-409	55 GALLON FIRE & ICE MASTER -GL-	1	573
18-465	REFRACTOMETER	1	1

THE INFORMATION IN THIS BULLETIN IS BELIEVED TO BE ACCURATE. ALL RECOMMENDATIONS ARE MADE WITHOUT WARRANTY SINCE THE CONDITIONS OF USE ARE BEYOND OUR CONTROL. THE LISTED PROPERTIES ARE ILLUSTRATIVE AND ARE NOT PRODUCT SPECIFICATIONS. WE DISCLAIM ANY LIABILITY IN CONNECTION WITH THE USE OF THIS INFORMATION.



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