INSTRUCTION GUIDE

HERCULES CRYO-TEK

A well-maintained hydronic heating system provides reliable performance even during the harshest winters. Heating maintenance professionals know that top quality materials are critical to achieving superior performance. That is why contractors depend on Hercules Maintenance and Stop-Leak Products. They are formulated for high performance and developed with both the user and the environment in mind.

1 Clean the System

It is recommended that any system, whether new or existing, be thoroughly cleaned prior to being charged with Cryo-Tek products. Any system contaminated with dirt and other materials reduces efficiency and wears the system prematurely. New systems need to be free of flux, solder residue, grease and any foreign particles.

Most boiler manufacturers recommend cleaning new systems with a solution of Tri-Sodium Phosphate (TSP), or Hercules Boiler and Heating System Cleaner (follow instructions on container). Existing systems need to be flushed and cleaned to eliminate any build-up of rust, scale, lime and other non-organic matter.

These systems should be cleaned with an inhibited hydrochloric acid such as Hercules Sizzle (except aluminum systems, check with boiler manufacturer). All systems should be checked for leaks prior to installation of any Cryo-Tek product.

2 Measure the Total Capacity of the System

Direct Method

A. Fill system completely, making sure all components of system are full.
B. Shut system down and let pressure drop to a safe level.
C. Drain out fluid into a suitable container and record the number of gallons removed. This is TOTAL SYSTEM FLUID CAPACITY.

Estimation Method

A. Determine system pipe sizes and amount of linear footage for each size. Using Table I, calculate the volume of the system piping.
B. Add this number to the gallon capacity of the boiler or equipment in the system to determine the TOTAL SYSTEM FLUID CAPACITY.

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TABLE I (NOTE: 1 US GALLON=3.785 LITERS)											
Description	Pipe Diameter Nominal Size	3/8"	1/2"	5/8"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"
Standard Steel Pipe	US Gallons of Fluid per 100 ft. pipe	1.0	1.6	-	2.8	4.5	7.8	10.6	17.5	24.9	38.5
Type "L" US Gallons of	US Gallons of Fluid per 100 ft. pipe	0.76	1.22	1.81	2.52	4.30	6.55	9.27	16.12	24.86	35.48

3 Select Desired Temperature Coverage

Using Table II, determine the desired protection level and match it to the appropriate Cryo-Tek product concentration.

TABLE II	MIXING RATIO		PROTECTIONS		
% Concentration of Cryo-Tek -100	**Parts of Cryo-Tek -100**	**Parts of Water**	**Freeze Protection Down to**	**Pumpable * Down to**	**Burst Protection Down to**
100%	undiluted	-	-70°F/-57°C	-80°F/-62°C	-100°F/-73°C
75%	3	1	-21°F/-30°C	-33°F/-36°C	-60°F/-51°C
60%	3	2	0°F/-18°C	-10°F/-23°C	-40°F/-40°C
50%	1	1	+10°F /-12°C	+5°F/-15°C	-20°F/-29°C

*Pumpable down to protection levels are estimated and are dependent on system and equipment. Attempting to circulate fluid below freeze point may overload and/or cause pump failure

Note: The percentages listed in the chart refer to the amount of Cryo-Tek solution and not the actual percentage of glycol. (For example: 50% of the -100 is 27.5% glycol)

4 Determine Amount of Cryo-Tek Product Required in System

Determine the amount of Cryo-Tek product needed in the system by multiplying total system capacity in gallons by the concentration factor of Cryo-Tek product (first column in each chart above).

Total System Capacity (gal.)× Concentration Factor of Cryo Tek Product (%)=Amount of Cryo Tek Product to be used (gal.)

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5 Charge the System

The system should be completely empty with the burner and pump shut off. All internal valves, including zone valves, should be open. THE ENTIRE SYSTEM SHOULD BE OPEN TO PREVENT ANY AREA OF IT FROM BEING ISOLATED.

First, add the computed amount of Cryo-Tek product. Second, add water if necessary. The system can be filled using one of the following two alternatives. The main objective is to fill the system with little or no air trapped in it.

A. After providing an air exit, pump solution into boiler through the boiler drain valve using a small pump.
B. Pour solution through a removed air vent at the HIGHEST point in the system.

6 Purge the Air in the System

Since air (which includes oxygen) trapped in a system not only results in inefficiencies in the operation of the system (wasted energy and excessive noise), it can also cause corrosion. To prevent this, the system, once filled, needs to be purged of all air.

7 Test the System

Once installed and fully operational, use Hercules Refractometer with Refractometer Reading Adjustment Chart and a pH Meter or Cryo-Tek Test Strips to test the fluid and ensure proper freeze and corrosion protection.

Note: Automotive coolant tester will not work with Cryo-Tek or other propylene glycol anti-freeze mixtures.

8 Maintenance

Systems with Cryo-Tek products installed should be tested annually for product concentration and inhibitor levels using Hercules Refractometer with Refractometer Reading Adjustment Chart and a pH Meter or Cryo-Tek Test Strips. If Cryo-Tek product concentration levels are low, add Cryo-Tek products using the following formula:

$$\textit{Total System Capacity (gal.)} \times \frac{\textit{(\% Cryo Tek - \% Cryo Tek in System)}}{\textit{(\% Cryo Tek Used - \% Cryo Tek in System)}} = \textit{Number of Gallons of Cryo Tek Product to be Added}$$

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If the corrosion inhibitor tests low, add one 8 oz. container of Cryo-Tek inhibitor for every 20 gallons of system fluid capacity. If the total system capacity is less than 20 gallons, add one 8 oz. container of Cryo-Tek Inhibitor. If after inhibitor addition and thorough system mixing, the corrosion inhibitor still tests low, add another 8 oz. container of Cryo-Tek inhibitor for every 20 gallons of system capacity. If, after this addition, the inhibitor still tests low, the system should be drained, cleaned and recharged with fresh Cryo-Tek.

Remember to always check with the boiler manufacturer for correct glycol levels.

Please contact Oatey technical support at technical@oatey.com for any additional information or assistance.