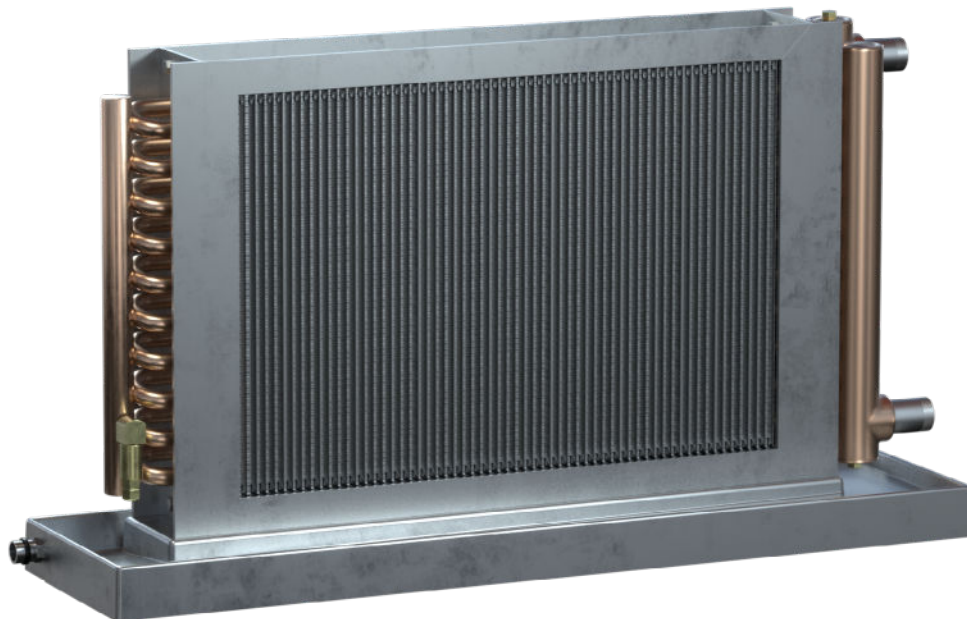


# COONEY FREEZE BLOCK™

## Installation and Operation Guide



This document details the installation and operation of Cooney Freeze Block™ Coils.

The scope of this document is to provide sufficient details for successful installation of the unit in new installation and to offer operational understanding of the main systems and features of the unit.

**Version 1.7**



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# RECEIVING A SHIPMENT

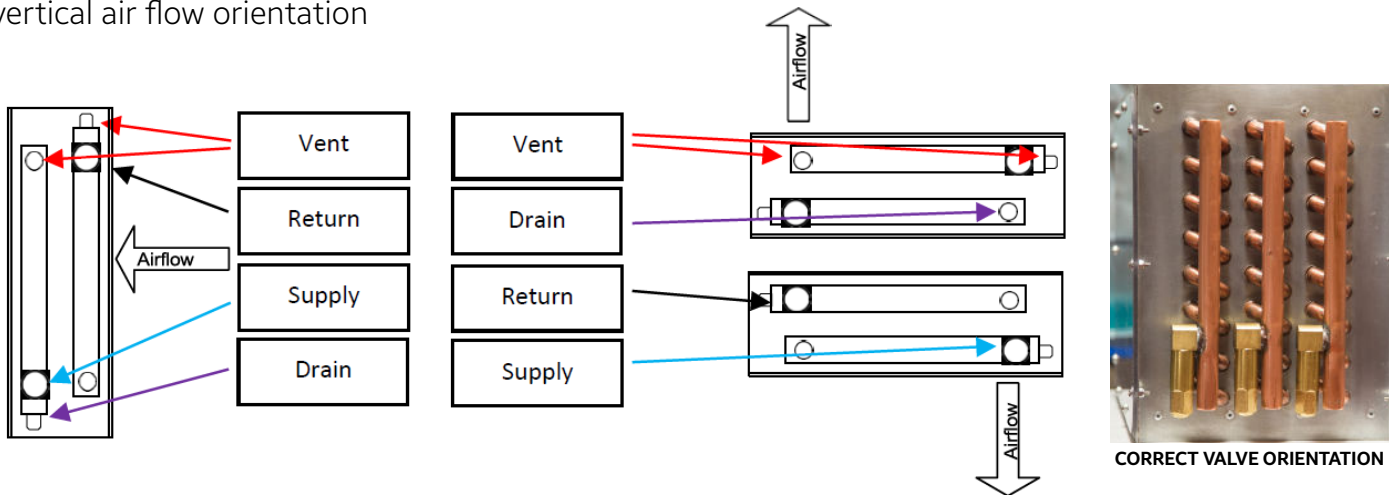


All coils, unless otherwise pre-arranged with CES, are shipped FOB factory requiring all received crates and coils be inspected for any signs of possible freight damage prior to offloading from truck and while the carrier is still present. CES makes every effort to protect the coils from shipping damage but if suspect upon arrival, check the coil while the carrier is still present. If there is damage file a claim with the carrier.

## INSTALLATION

### Coil Mounting Orientation

A Freeze Block™ coil is designed to be mounted in one particular orientation. Proper coil orientation ensures proper valve deployment given a freeze event, maximum heat transfer, automatic purging of air in the tubes and ability to properly drain coil by gravity. If the coil is improperly installed or has not been built to fit the orientation required at the job site, coil performance may be diminished. The sketch below shows the proper fluid connections and horizontal air flow direction of a coil built for a “Right” or for a “Left” hand installation. Also shown are the proper fluid connections to a coil built for a vertical air flow orientation



### Coil Pipe and Support

Fluid coil tubes must be horizontal and level with the ground for maximum draining, and the sheet metal coil casing firmly attached to the supporting structure or duct work. Any movement or vibration in the coil and / or connected piping during operation must be minimized as this could put excessive bending force on the headers. Piping at the coil should be supported so the weight of the piping and fluid in the piping are not supported by the coil headers. Also see the “Precautions” section.

### Piping Connection

The coil connections are usually copper or brass. They are softer than steel connections and can easily be cross-threaded and damaged by over tightening. Coils connections and headers can be twisted out of shape, especially if a long handled wrench is used.

It is recommended that a second, (hold back) wrench be used and held firmly to prevent the twisting of the coil connection as force is applied by the tightening wrench.

## Freeze Block™ Valve Drainage



All Freeze Block™ relief valves should flow to an open drain. Attaching a hose to direct drain flow is optional. Any hose attachment to direct drainage should flow downward ensuring proper flush. Lifting fluid after valve must be avoided. Any coil installed or operated with a drainage restriction or lift in drain line will not be covered under the Freeze Block™ Warranty.

## Access Doors

All coils equipped with the Cooney Freeze Block™ technology to be installed inside of any air handling unit must be equipped with access doors at all relief valve connections. These access doors must be large enough to perform any and all necessary maintenance to the relief valve sections of the coil. Removable panels are not an acceptable form of access doors. For applications where access doors cannot be properly utilized, a minimum of 4" between the end of the coil and the interior air handler wall must be provided at all valve locations. Any exceptions must be reviewed by Cooney Engineered Solutions.

## Tube / Fin Damage

When cutting or drilling near the coil, observe and check the location of the nearest tubes and header to avoid puncturing them. If the coil fins get bent they can be combed out by utilizing fin comb, (this needs to match the coil's fins per inch) and can be procured from a local HVAC supply house.

## Insulation

All Fluid Cooney Freeze Block™ Coils come with pre-insulated return bends and expansion relief headers on the front and back of the coil. This insulation must be left in place for the life of the coil. Steam coils do not require insulation on the headers. The supply and return piping and fittings to and from the coil connections must be fully insulated and or heat traced to be protected against freezing in the event that the piping is exposed to freezing conditions. Any coil installed or operated without this insulation will not be covered under the Freeze Block™ Warranty.

## INITIAL OPERATION

### Startup

Once coil is in position and piping has been connected, remove the plugs from the vent(s) at the top of the supply and return headers. Slowly open control valve to flow water into the coil until it comes out of the vent. Filling slowly is crucial to getting the air out of the coil. Failure to do so can cause a decrease in performance. Complete the startup by replacing the plugs into the vents and inspect all sides of the coil for leaks

### Leak Check

It is suggested that the coil be checked for leaks several days after initial startup when the system is operating at full fluid flow and temperature levels.

**Note:** Rain water, cleaning, loose connections and condensation dripping off piping, coil surfaces or headers may look like a coil leak. Investigate these thoroughly to avoid downtime and expense prior to leak testing the coil.

# PERFORMANCE

## Thermal



Optimum heat transfer of a coil can be maintained if the fin surface and inside of the tubes are kept clean, along with a tight bond between the fins and tubes. Should a coil not meet thermal expectations the problem may reside elsewhere in the system.

The coil is the final component in a series with other heating and cooling components. It relies on these prior components working properly to supply the correct fluid flow rates at designated temperatures.

The coil is the easiest component to measure how well the entire heating / cooling system is operating and usually the first to be suspect when the root cause may lie elsewhere.

## Durability

Similarly the durability of a coil can be affected by distant issues in the system. Water hammer, pressure and / or temperature spikes, vibration, water treatment incompatibility and other factors may first show up at the coil as a leak. This may be a result of an issue somewhere else in the system. These factors need to be investigated if there is a deficiency in the coil's thermal performance or durability. Once eliminated, a more thorough evaluation can be done. Refer to the "Initial Operation" and "Precautions" sections.

# CLEANING

## Valves

It is extremely rare that a Freeze Block™ Valve would clog but it can occur if a system experiences repeat freeze and thaw cycles along with an excessive amount of sludge or deposits moving through the valves. It is recommended that strainers and / or filters be installed according to industry standards throughout the chilled water and hot water systems to prevent such situations.

In the event that multiple freeze and thaw conditions occur all valves should be inspected and cleaned if necessary to prevent clogging.

## Fins

The fin surface can be cleaned in several ways. For light dust or dirt that does not aggressively adhere to the fins, blowing low pressure, (oil free) compressed air across the fins or use of a mild soapy detergent that is "free" rinsing, (leaving no residue behind) should be sufficient. Any such cleaning solution needs to be compatible with the coil material and must not be applied to a hot coil so as to allow time for the cleaning solution to work and not burn solvents into the airstream and / or coil materials. Be sure to rinse the seams and crevices thoroughly, especially brazed and welded joints along with where the coil tubes come through the coil casing. After rinsing, the coil needs to be dried as quickly as possible.

Ideally use low pressure, (oil free) compressed air to minimize any corrosion. For more aggressive contaminants a stronger solution or solvent and / or cleaning procedure may be required. Contact CES for more in-depth details.

## Steam Cleaning



The coil can be steam cleaned but the steam pressure needs to be low and the steam parallel to the fins, otherwise the force of the steam could bend the fins over. Also if the fins are severely corroded at the point of contact with the tube, steam cleaning could further deteriorate this critical fin-to-tube bond.

## Cleaning Position

The ideal cleaning position for a coil is with it flat because contaminants travel the shortest distance before being forced out. Cleaning the finned surface in the upright position allows contaminants to collect at the bottom of the coil making it difficult to get debris out.

## COATED COILS

### Installation

Installation and operation of coated coils is identical to standard coils. The only difference is realized in the maintenance / cleaning.

### Cleaning + Maintenance

1. Remove as much dirt and debris as possible with a brush or vacuum as possible before introducing water.
2. Rinse with water to remove the dirt and debris remaining
3. The face of the coil may be washed with a pressure washer with a maximum pressure of 900 PSI at the spray tip. This should be done at a distance of 8 inches to 16 inches and in the direction of the fin stock.

## SEASONAL SHUTDOWN

### Short Term

Short term shutdowns do not require draining the coil if the temperature surrounding the coil is above the freeze point and below the boiling point of the fluid and the fluid is relatively free of oxidizing dissolved air.

### Winterization

For winterization of chilled water Freeze Block™ coils, draining is required for all coils designed to be exposed to freezing conditions. Constant exposure to freezing and thawing may cause tube damage and premature failure.

## Winterization (cont.)



If chilled water Freeze Block™ coils are installed downstream of preheat coils where freezing conditions happen only with system failure, chilled water Freeze Block™ coils may be left undrained if equipped with a Smart Coil System tied into the Building Maintenance System, (BMS). The following actions are the minimum requirements:

1. Notification, (via alarm) to maintenance / operations team of valve deployment
2. Fan to be shut down automatically immediately upon notification of a valve activation
3. Air intake louvers to be shut automatically after fan has stopped rotating
4. Circulation pump to be turned on automatically where available.

If a Smart Coil System is not installed on Chilled Water Coil, Coil must be drained.

All Cooney Freeze Block™ coils are manufactured with threaded drain connections at the bottom of the supply header along with each of the expansion relief headers. A threaded vent connection is located at the high point of the outlet header. Each of these connections require a ball valve, (not included) to be installed prior to the coil installation and operational for use during draining and winterization. When draining, the coil should be isolated from the fluid system. Open the vent ball valve at the top of the coil along with all ball valves at the bottom. If the coil has been installed properly, (see “Installation”) the fluid will drain out by gravity. All vent and drain ball valves should be left open throughout the entire heating season to properly winterize the coil. Coil failures related to lack of proper winterization by customer shall not be covered under the Freeze Block™ warranty.

## Precautions

System issues, or a coil not designed for the rigors of the particular application, as mentioned in the “Performance” sections could cause premature coil failure. The possibility of replacing the coil should be considered in the initial site design or at the time of installation especially if it is a crucial component in the process. Another consideration should be what affect any leaking fluid would have on the surroundings.

## Repairs

Do not attempt to repair a Freeze Block™ coil without Cooney Engineered Solutions factory authorization. Doing so voids the warranty and destroys any evidence of what caused the leak so it is not possible to be evaluated. If the coil is damaged beyond repair it must be replaced. Also refer to the “Performance” and the “Precautions” sections.

## CONTACT US

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