

# **CostGard™**

Condensate Drain Seal  
for  
**Draw-Through HVAC Systems**

## **SUBMITTAL**



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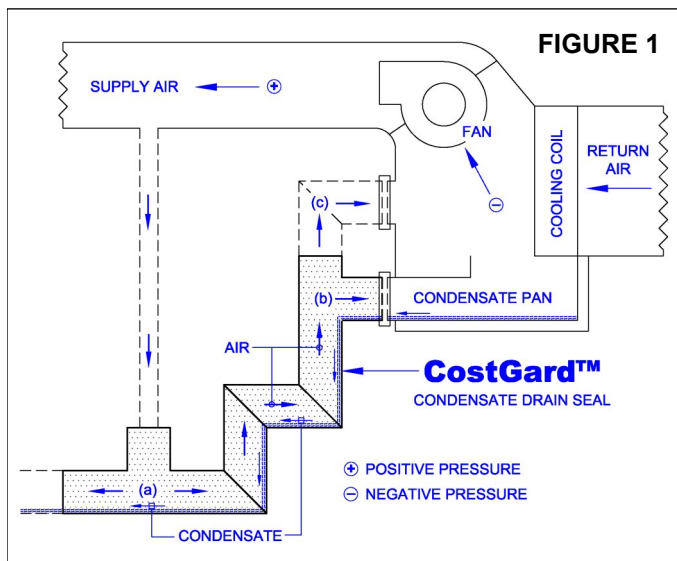
# CostGard™ Condensate Drain Seal for DRAW-THROUGH HVAC SYSTEMS

## GENERAL

The CostGard™ Condensate Drain Seal was developed specifically to replace the condensate trap on draw-through HVAC systems. Unlike a condensate trap, it uses an air seal instead of a water seal and thereby eliminates costly operational and health related problems needlessly tolerated by facility managers for more than half a century. It does this by reducing (1) service calls, (2) maintenance requirements, (3) damage to equipment, (4) damage to surrounding property, and (5) threats to healthy indoor air quality.

## Operation

The CostGard™ Condensate Drain Seal is the result of over four years of engineering research and development. It makes use of the hydraulic and pneumatic forces present in all draw-through air handlers. It is simple, effective and reliable. It has no moving parts. How it operates is illustrated in Figure 1.



During both heating and cooling operations, the air seal is formed as follows:

Fresh air from the fan discharge is supplied to point (a) at a pressure slightly above atmospheric. Some of the air flows away from the HVAC unit; thus, preventing ingestion of outside air. A portion of the air returns to the HVAC unit, passing through points (b) and (c). The quantity of air returning to the unit is minimized by the high-pressure loss in the mitered elbows. This pressure loss plus the air flowing through the bypass connected at point (c) ensures that the air entering the condensate drip pan does not produce blowing and geysering and an aerosol mist. Condensate flows through the device without being trapped. At the same time, the counter-flow of condensate and air creates a pulsing action that ensures free passage of debris. Hence, the potential for freeze-up and flow blockage (common problems with traps) is nil.

## Advantages Over a Trap

When used in place of a condensate trap, the CostGard™ Condensate Drain Seal significantly reduces the cost of owning and operating draw-through HVAC systems. And, it removes a major and serious contributor to poor indoor air quality. The need to replace the condensate trap with an effective and reliable drain seal is well recognized by many in the HVAC industry. Many of the problems caused by condensate traps are clearly stated in ASHRAE Standard 62-89R, paragraph 5.6.4, which reads as follows:

*“Condensate traps exhibit many failure modes that can impact on indoor air quality. Trap failures due to freeze-up, drying out, breakage, blockage, and/or improper installation can compromise the seal against air ingestion through the condensate drain line. Traps with insufficient height between the inlet and outlet [design deficiency] on draw-through systems can cause the drain to back-up when the fan is on, possibly causing drain pan overflow or water droplet carryover into the duct system. The resulting moist surfaces can become sources of biological contamination. Seasonal variations, such as very dry or cold weather, may adversely affect trap operation and condensate removal.”*

The ASHRAE Standard addresses only “building ventilation and indoor air quality”. However, the cost impact of trap failures on system maintenance and property damage is clearly evident.

There are many causes of trap failures. Such failures are much too familiar to facility managers and HVAC maintenance personnel. The maintenance effort required to deal with these destructive results is extremely demanding. In fact, trap deficiencies are so numerous that successful maintenance is often not feasible. Indeed, in some instances adequate maintenance is not realistically possible.

The CostGard™ Condensate Drain Seal eliminates all the problems caused by the condensate trap, including the following:

- Trap blockage and condensate pan overflow;
- Seal (trap) freeze-damage in outside locations;
- Ingestion of odorous and toxic gases through the condensate drain system;
- Condensate pan overflow due to negative pressure during start-up;
- Condensate blowing which produces an aerosol mist and causes biological contamination; and
- Shortened life of HVAC systems.

Eliminating these problems is an enormous cost savings for the building owner as a result of fewer service calls, reduced maintenance effort, less property damage, increased equipment life, and improved indoor air quality.

## PRODUCTS

The CostGard™ Condensate Drain Seal is produced in two basic model types: Production (1525) and Custom-built models (CXXBV). Each is fabricated from polyvinyl chloride (PVC). As a family, these model types are available for a wide range of draw-through HVAC systems. Specifically, CostGard™ Condensate Drain Seals are available for HVAC systems with widely differing characteristics:

1. Drain diameters up to 2 inches (nominal pipe dimensions);
2. Static pressure in the drain pan = -5 inches wc, or less; and
3. Cooling capacities up to 100+ tons.

### Production Models (1525)

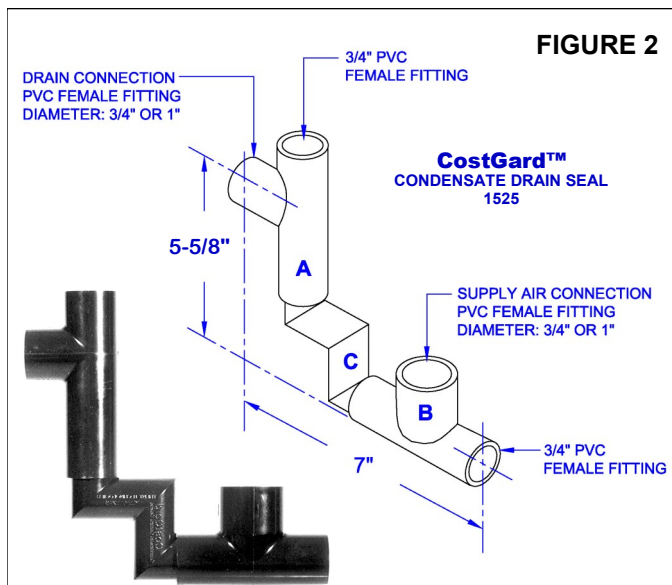
The production model type, designated as 1525, is available in four different models, which can accommodate drain diameters up to 1 inch and can operate with a negative static pressure in the drain pan of 1.5 inches wc or less.

The production models available are identified by the photograph and sketch in Figure 2. These models are produced by injection molding and are in stock.

Table 1 defines the characteristics of the production models. The depth (i.e., the distance between the centerline of the drain connection and the bottom of the unit) is 5.6 inches\* for all models.

The device consists of three parts, identified in Figure 2 as Parts A, B, and C. These parts provide versatility in installation. For example, by rotating Part C in Part A, the discharge port Part B can be pointed in various directions. Part B can also be rotated up to 60 degrees to allow piping alignment.

\*Note: Most building codes require that drain pipes slope at least 1/8 inch per foot toward the floor drain. Thus, for example, if the floor drain is located 16 feet away from the drain outlet, the curb height must be sufficient to accommodate the depth of the CostGard™ Condensate Drain Seal plus 2 inches (16 x 1/8).



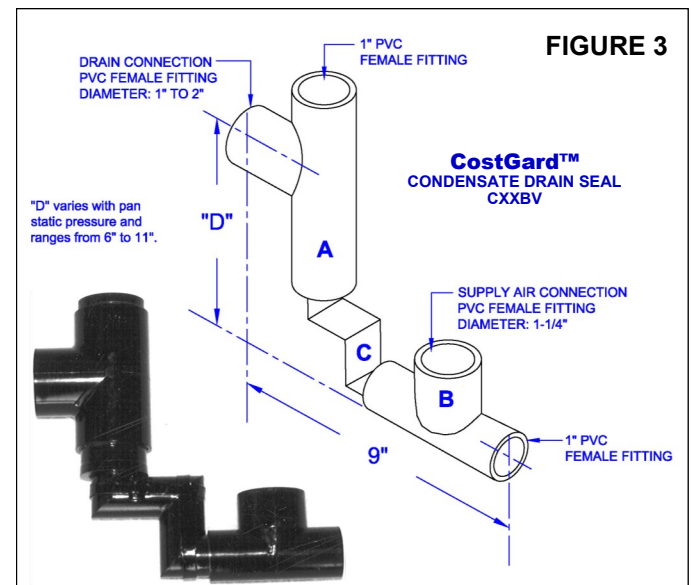
### Custom-built Models (CXXBV)

The custom-built model type, designated CXXBV, is designed to match customer requirements. It is available for any nominal drain diameters up to 2 inches, and it can accommodate systems with cooling capacities up to 100 tons.

Figure 3 shows a photograph of a custom-built model, along with a sketch, which defines the required geometry for a wide range of applications. Units are fabricated to match the specific requirements of each air handler.

Table 2 defines the characteristics of the custom-built models. The depth of these models, identified in Figure 3 as "D", depends on the pressure in the drain pan. As shown, a unit 11 inches deep will accommodate a negative pressure of 5 inches wc or less. Note that the minimum depth of the custom-built unit is 6 inches, which is applicable to all systems with negative drain pan pressure of 2-1/2 inches wc and less. (If the unit depth and pan pressures listed in Table 2 are outside the design limits of the system, contact Trent Technologies, Inc. for possible variations.)

Like the 1525 models, the device consists of three parts, identified in Figure 3 as Parts A, B, and C. This arrangement of parts provides versatility in installation. For example, by rotating Part C in Part A, the discharge port Part B can be pointed in various directions. Part B can also be rotated up to 60 degrees to allow piping alignment.



**Available Models and Characteristics shown in Table 1 & 2 on Page 4**

**TABLE 1. PRODUCTION CostGard™ CONDENSATE DRAIN SEAL  
1525 MODELS FOR UNITS WITH COOLING CAPACITIES UP TO 30 TONS**

MAXIMUM NEGATIVE DRAIN PAN PRESSURE (INCHES WC)	MODEL NUMBER	DEPTH OF DRAIN SEAL (INCHES)	LENGTH (INCHES)	DRAIN DIAMETER (INCHES)
1-1/2	P1525-77-56	5-5/8	7-1/2	3/4
1-1/2	P1525-71-56	5-5/8	7-1/2	3/4
1-1/2	P1525-11-56	5-5/8	7-1/2	1
1-1/2	P1525-17-56	5-5/8	7-1/2	1

**TABLE 2. CUSTOM-BUILT CostGard™ CONDENSATE DRAIN SEAL  
CXXBV MODELS FOR UNITS WITH COOLING CAPACITIES UP TO 100+ TONS**

MAXIMUM NEGATIVE DRAIN PAN PRESSURE (INCHES WC)	MODEL NUMBER	DEPTH OF DRAIN SEAL (INCHES)	LENGTH (INCHES)	DRAIN DIAMETERS AVAILABLE (INCHES)			
1-1/2	C15BV	6	9	1	1-1/4	1-1/2	2
2	C20BV	6	9	1	1-1/4	1-1/2	2
2-1/2	C25BV	6	9	1	1-1/4	1-1/2	2
3	C30BV	7	9	1	1-1/4	1-1/2	2
3-1/2	C35BV	8	9	1	1-1/4	1-1/2	2
4	C40BV	9	9	1	1-1/4	1-1/2	2
4-1/2	C45BV	10	9	1	1-1/4	1-1/2	2
5	C50BV	11	9	1	1-1/4	1-1/2	2

## EXECUTION

### Fundamentals

The CostGard™ Condensate Drain Seal is connected to the drain connection of the HVAC unit, the same as the condensate trap. However, in order to form an air seal, in place of a water seal, two other pipe connections are required. For most applications these connections are quite simple; however, some can be more challenging. The basic criteria for a successful installation are stated below:

#### 1. Pipe Connections

The CostGard™ Condensate Drain Seal must be connected, with piping, to the HVAC system at the following three points:

- (a) The condensate drain pan connection where condensate traps are usually connected;
- (b)\* A hole cut into the fan/drain pan compartment; and
- (c)\* A hole cut into the air supply duct, or air supply plenum, downstream of the fan.

\* NOTE: Some manufacturers provide units “CostGard™ Ready” with pre-cut holes.

#### 2. Pipe Routing

All pipes must be routed in such a way that they do not interfere with service access doors.

#### 3. Pipe Supports

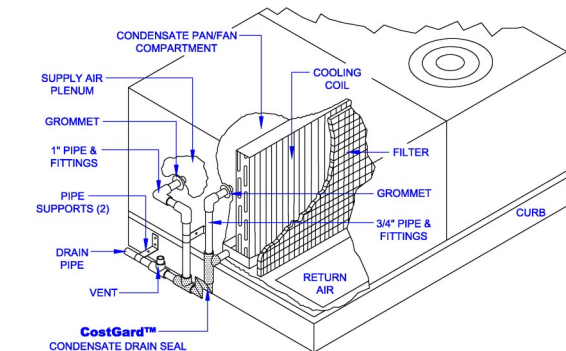
The pipe must be supported and fixed in place in order to minimize potential damage to the piping and to the CostGard™ Condensate Drain Seal.

## INSTALLATION

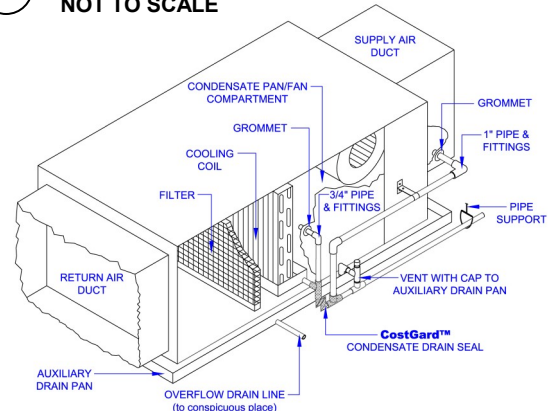
Examples of some possible installation arrangements, which meet the above criteria, are shown to the right. Similar sketches for applicable HVAC units are included with each CostGard™ Condensate Drain Seal.

## MAINTENANCE

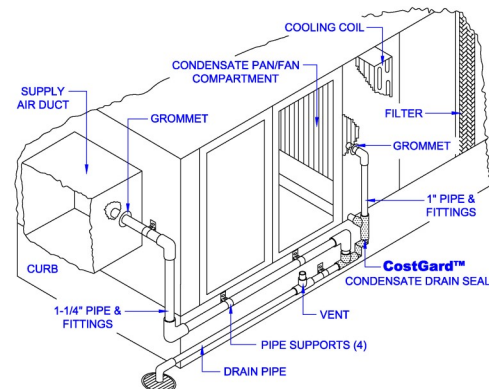
CostGard™ Condensate Drain Seal maintenance is virtually nil when compared to that of p-traps.



**RTU CONDENSATE REMOVAL SYSTEM  
NOT TO SCALE**



**FAN COIL CONDENSATE REMOVAL SYSTEM  
NOT TO SCALE**



**LARGE AHU CONDENSATE REMOVAL SYSTEM  
NOT TO SCALE**

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