MAINTENANCE

OF

CONDENSATE DRAIN SEALS

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Among the myriad of problems facing facilities managers, some of the most insidious and relentless are those caused by use of the condensate p-trap as a drain seal. The p-trap is one of the most deceptive, trouble-prone and costly components in the HVAC system. When installed in a draw-through system (the most common commercial and industrial type), it causes numerous problems, which—during the life of the system—may cost building owners and managers more than the system itself.

Many within the industry are aware of the deplorable conditions of HVAC systems in this country, but few have identified the true cause. For example, ASHRAE, EPA and OSHA attribute these conditions to poor maintenance by the building owners and managers. Moreover, each of the agencies has proposed elaborate and expensive maintenance management programs to be imposed on building owners and managers. These programs are well meant but misguided, and they will be costly for the building owners and managers to implement. The fact is that successful maintenance of draw-through HVAC systems, which use p-traps, is neither realistic nor practical. Indeed, under many common operating conditions, it is virtually impossible to keep the interior of these systems dry and clean regardless of the maintenance.

Table 1 excerpted from the *HVAC Maintenance and Operations Handbook*, McGraw-Hill Companies, New York, 1998, p654, shows why. This table prepared according to the ASHRAE Guidelines 4-1993, outlines the routine and preventive maintenance procedures required for a conventional condensate p-trap. It enumerates the steps necessary in the maintenance procedures and shows why such a program is time consuming, expensive, and under certain conditions impossible to implement.

Clearly, a more effective, reliable and maintenance condensate drain seal is needed. The **CostGard™** Condensate Drain Seal is such a seal. See: Product Overview on our website. The effectiveness and reliability of the **CostGard™** Condensate Drain Seal has been proven in operation. Thousands are in the field. Some have been in operation for more than six (6) years. Not one has failed to perform successfully. See: Product Reliability on our website.

Table 1

Routine and Preventive Maintenance Program for Conventional Condensate P-Traps

(Prepared Per ASHRAE Guidelines 4-1993)

Traps located indoors or outdoors, with outdoor temperatures above freezing

1. **Frequency and Time of Inspection and Service:**
   (a) For Systems That Provide Summer Cooling and Winter Heating
   During Cooling Operation:
   - Annually—at initial system start-up for cooling
   - Semiannually—at initial system start-up and at second system start-up if facility is shut down annually for a week or more, e.g. schools

   During Heating Operation:
   - Biweekly—between cooling system shut-down and the beginning of winter heating

   (b) For Systems That Provide Summer Cooling and Winter Cooling
   - Semiannually—at 6-mo. intervals (one inspection must be made at system start-up, following an annual shut-down of facility for a week or more, e.g., schools)

2. **Maintenance Effort Required:**
   (a) At each annual inspection (and semi-annually if need is indicated)
   - Physically remove flow-blocking algae and/or debris, or replace trap
   - Flush with water
   - Treat with EPA approved biocide and
   - Fill trap with water and add biocide tablets

   (b) At each biweekly inspection
   - Fill with water and add biocide tablets if need is indicated.

3. **Equipment and Material Needed:**
   (a) Internal pipe scraper
   (b) New trap
   (c) Water hose
   (d) Biocide

4. **Estimated Time Required:**
   (a) Annually and Semiannually:
   - 5 min per inspection + (25 min travel time to and from maintenance shop and system site)
   - 0 to 60 min per time serviced + (25 min travel time to and from maintenance shop and system site)

   (b) Biweekly:
   - 5 min, per time serviced + (25 min travel time to and from maintenance shop and system site)

Traps located outdoors, with outdoor temperatures below freezing

1. **Frequency and Time of Inspection and Service:**
   (a) For Systems That Provide Summer and Winter Cooling and Winter Heating
   During Cooling Operation:
   - Not possible to maintain a condensate trap during winter cooling under these conditions—flowing condensate will freeze in trap, block flow, and damage trap

   During Heating Operation:
   - Not possible to maintain a condensate trap during winter heating under these conditions—unless the trap is filled with water, it will not hold a seal and when filled, water will freeze and block condensate flow

Table 2, also excerpted from the *HVAC Maintenance and Operations Handbook*, McGraw-Hill Companies, New York, 1998, p653, enumerates the minimal maintenance required for the **CostGard™** Condensate Drain Seal, and illustrates the reasons for its demonstrated effectiveness and reliability.

Table 2

Routine and Preventive Maintenance Program for the CostGard™ Condensate Drain Seal

(Prepared per ASHRAE Guidelines 4-1993)

CostGard™ Condensate Drain Seals located indoors or outdoors, with outdoor temperatures above or below freezing

1. **Frequency and Time of Inspection and Service:**
   (a) For Systems That Provide Summer Cooling and Winter Heating
   - Annually-during cooling operation, when condensate is flowing
2. **Maintenance Effort Required:**
   (a) If condensate is not flowing freely during cooling operation and/or condensate is standing in the pan:
   - Check for debris inside the device and in the condensate drain line. If present, physically remove and flush inside with water
   - Check operating pressures per HVAC system specifications. If pressures are outside the design limits, find the cause and remedy it.

   (b) Otherwise, no effort is required.
3. **Equipment and Material Needed:**
   (a) Water hose
   (b) Pressure gauge
4. **Estimated Time Required:**
   (a) Less than 5 min per inspection + (25 min travel time to and from maintenance shop and system site)
   (b) 0 to 30 min per time serviced + (25 min travel time to and from maintenance shop and system site)

BIOGRAPHICAL SKETCH OF AUTHORS

Warren C. Trent, M.S. Purdue University, is a Registered Professional Engineer and CEO of Trent Technologies, Inc., Tyler, Texas. He is a member of the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE) and a Fellow in the American Institute of Aeronautics and Astronautics (AIAA).

He is a co-author of chapters on "Condensate Control" for two McGraw-Hill Handbooks: *HVAC Systems and Components Handbook*, and *HVAC Operations and Maintenance Handbook*. He is also the author of *A New Approach to Understand and Selecting Personnel*, Gateway Press.

He has had more than 30 years experience in fluid flow research and development, including pioneering work in the development and application of the geothermal heat pump. He served as Director of Engineering Technology for the McDonnell Douglas Corporation, where among other projects, he directed the design and development of the propulsion system for the F15 fighter aircraft.

As an Evaluator for the Accreditation Board for Engineering and Technology (ABET), from 1983 to 1989, he visited and evaluated 12 university Mechanicals Engineering Programs for academic accreditation.

He is a patentee and is listed in *Who's Who in Science and Engineering* and *Who's Who in America.*

Since 1993 he has been the CEO of Trent Technologies, Inc.

C. Curtis Trent, M.S. Ph.D. University of Wisconsin, is President of Trent Technologies, Inc. of Tyler, Texas. He has held tenured professorships and department head positions at Kansas State University, Washington State University, and North Carolina State University. He has directed the research of 22 Doctoral candidates.

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He is the author or co-author of six books, numerous monographs and the author of 30 refereed journal articles.

He has served as a consultant to the governments of Nigeria, Malawi, Botswana, and Gambia

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