***Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference. Installation by qualified professional technicain only. Not for residential use.***

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

ENGLISH

## Description

Horizontal hydronic unit heaters are available in both serpentine and header type units. Serpentine units offer outputs from 8,000 to 38,900 BTUH (2.4 to 11.4 kW) and are ideal for hot water (only) installations with limited clearances. Header type units range from 18,000 to 360,000 BTUH (5.3 to 105.5 kW) and can operate with either hot water or steam. The designs are certified by ETL to CAN/CSA-C22.2 and UL1995. **Do not alter these units in any way and do not attach ductwork to them. Units are for use in non-explosive and non-corrosive environments only.** If you have any questions after reading this manual, contact the manufacturer.

**⚠WARNING**

**Improper installation, adjustment, alteration, service or maintenance can cause property damage, injury or death. Read the installation, operating and maintenance instructions thoroughly before installing or servicing this equipment.**

**NOTE:** It is the equipment owners' responsibility to provide any scaffolding or other apparatus required to perform emergency service or annual/periodic maintenance to this equipment.

**Figure 1 – Serpentine Type**
**(5PV19, 5PV22, 5PV26, 5YH18)**

**Figure 2 – Header Type**
**(1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV20, 5PV23, 5PV24, 5PV27-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53, 5YH19, 5YH20)**

## Installer's Responsibility

**Installer Please Note:** This equipment has been tested and inspected. It has been shipped free from defects from our factory. However, during shipment and installation, problems such as loose wires, leaks or loose fasteners may occur. **It is the installer's responsibility to inspect and correct any problems that may be found.**

## Unpacking

Inspect shipment immediately when received to determine if any damage has occurred to the unit during shipment. After the unit has been uncrated, check for any visible damage to the unit. If any damage is found, the consignee should sign the bill of lading indicating such damage and immediately file claim for damage with the transportation company.

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

ENGLISH

## General Safety Information

**⚠WARNING** ***Failure to comply with the general safety information may result in extensive property damage, severe personal injury or death.***

**⚠WARNING** ***Do not alter the unit heater in any way or damage to the unit and/or severe personal injury or death may occur!***

**⚠WARNING** ***Disconnect all power supplies before installing or servicing the heater. If the power disconnect is out of sight, lock it in the open position and tag it to prevent unexpected application of power. Failure to do so could result in fatal electric shock, or severe personal injury.***

**⚠ CAUTION** ***Insure that all power sources conform to the requirements of the unit heater or damage to the unit will result!***

Follow installation instructions CAREFULLY to avoid creating unsafe conditions. All external wiring must conform to applicable current local codes, and to the latest edition of the National Electric Code ANSI/NFPA No. 70. In Canada, all external wiring must conform to the Canadian Electric Code, Part 1 CSA Standard C22.1 All wiring should be done and checked by a qualified electrician using copper wire only. All steam and hot water connections should be made and leak-tested by a suitably qualified individual, per instructions in this manual. Also follow procedures listed on the "Unit Equipment Start-Up Sheet" located in this manual.

Make certain that the power source conforms to the electrical requirements of the heater.

**⚠WARNING** ***Do not depend upon a thermostat or other switch as sole means of disconnecting power when installing or servicing heater. Always disconnect power at main circuit breaker as described above. Failure to do so could result in fatal electric shock.***

Special attention must be given to any grounding information pertaining to this heater. To prevent the risk of electrocution, the heater must be securely and adequately grounded. This should be accomplished by connecting a grounded conductor between the service panel and the heater. To ensure a proper ground, the grounding means must be tested by a qualified electrician.

Do not insert fingers or foreign objects into the heater or its air moving device. Do not block or tamper with the heater in any manner while in operation or just after it has been turned off, as some parts may be hot enough to cause injury.

**To meet ETL, CSA and OSHA requirements, units mounted below 8 feet (2.4m) from the floor must be equipped with an OSHA fan guard.**

It is good practice to have a shutoff switch on the electrical power lines controlling the heater. Whenever a unit is serviced, shut power off to the unit. Since these units are installed in most instances higher than 8 feet (2.4m), proper type of ladders or scaffolding should be used, as set up by OSHA requirements (see Note on cover).

In industrial plants, professional maintenance crews should service this equipment.

All Horizontal Unit Heaters are shipped fully assembled and may be used for steam or hot water applications. Coils are factory tested at 250 psig (1723.5 kg).

Each unit is packaged individually and marked for proper identification. Use normal care in handling and during installation to prevent damage to the coils fins, fan and casing.

Unless otherwise specified, the following conversions may be used for calculating SI unit measurements:
1 foot = 0.305 m
1 inch = 25.4 mm
1 psig = 6.894 kPa
1 pound = 0.453 kg
1 gallon = 3.785 L
1 inch water column = 0.249 kPa
meter/second = FPM ÷ 196.8
liter/second = CFM x 0.472
1000 Btu per hour = 0.293 kW
1000 Btu/Cu. Ft. = 37.5 MJ/$m^3$
1 cubic foot = 0.028 $m^3$

# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## Table 1-Specifications

| Model No. | MBH Output 2 PSI Steam | MBH Output 200° F Water | Pipe Conn., NPT Inches | Max. Mtg. Height Ft.* | Max. Air Throw Ft.* | Fan CFM | Fan Guard** | Motor FPM HP*** | Motor Amps @ 115VAC | Motor Speed RPM |
|---|---|---|---|---|---|---|---|---|---|---|
| *Header Coil Units* | | | | | | | | | | |
| 5PV31 | 18.0 | 13.1 | 1 1/4 | 8 | 20 | 395 | OSHA | 16W | 0.80 | 1550 |
| 3DUF7 | 24.0 | 17.4 | 1 1/4 | 8 | 24 | 450 | OSHA | 16W | 0.80 | 1550 |
| 5PV43 | 36.0 | 26.1 | 1 1/4 | 9 | 28 | 550 | OSHA | 25W | 1.20 | 1550 |
| 5PV46 | 48.0 | 34.8 | 1 1/4 | 9 | 30 | 750 | OSHA | 1/20 | 1.40 | 1000 |
| 5PV48 / 5PV47 | 60.0 | 43.6 | 1 1/4 | 10 | 30 | 900 | OSHA / Non-OSHA | 1/20 | 1.40 | 1000 |
| 5PV50 / 5PV49 | 72.0 | 52.3 | 1 1/4 | 10 | 29 | 1100 | OSHA / Non-OSHA | 1/20 | 1.40 | 1000 |
| 5PV51 / 5YH20 | 84.0 | 61.0 | 1 1/4 | 10 | 30 | 1400 | OSHA / Non-OSHA | 1/12 | 2.20 | 1000 |
| 5PV53 / 5PV52 | 96.0 | 69.7 | 1 1/2 | 11 | 38 | 1400 | OSHA / Non-OSHA | 1/12 | 2.20 | 1000 |
| 5PV16 / 5PV15 | 108.0 | 78.4 | 1 1/2 | 11 | 40 | 1800 | OSHA / Non-OSHA | 1/12 | 2.20 | 1000 |
| 5PV20 / 5YH19 | 120.0 | 87.1 | 1 1/2 | 12 | 40 | 1900 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 5PV24 / 5PV23 | 132.0 | 95.8 | 1 1/2 | 13 | 54 | 2000 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 5PV28 / 5PV27 | 144.0 | 104.0 | 1 1/2 | 13 | 55 | 2200 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 5PV30 / 5PV29 | 156.0 | 113.0 | 1 1/2 | 13 | 55 | 2600 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 5PV33 / 5PV32 | 180.0 | 118.0 | 1 1/2 | 13 | 53 | 2200 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 5PV35 / 5PV34 | 204.0 | 148.0 | 1 1/2 | 13 | 55 | 2900 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 1EBC1 / 5PV38 | 240.0 | 174.0 | 2 | 14 | 57 | 3500 | OSHA / Non-OSHA | 1/3 | 4.50 | 1140 |
| 1EBC2 / 5PV40 | 280.0 | 209.1 | 2 | 14 | 57 | 4200 | OSHA / Non-OSHA | 1/2 | 5.40 | 1100 |
| 1EBC3 / 5PV42 | 300.0 | 230.0 | 2 | 15 | 58 | 5000 | OSHA / Non-OSHA | 1/2 | 5.40 | 1100 |
| 1EBC4 / 5PV45 | 360.0 | 261.3 | 2 | 15 | 60 | 5500 | OSHA / Non-OSHA | 1/2 | 5.40 | 1100 |
| *Serpentine Coil Units* | | | | | | | | | | |
| 5YH18 | — | 8.0 | 3/8 cu. | 8 | 20 | 245 | OSHA | 16W | 0.80 | 1550 |
| 5PV19 | — | 18.4 | 3/8 cu. | 8 | 25 | 500 | OSHA | 16W | 0.80 | 1550 |
| 5PV22 | — | 24.8 | 3/8 cu. | 9 | 29 | 580 | OSHA | 25W | 1.20 | 1550 |
| 5PV26 | — | 38.9 | 3/8 cu. | 9 | 29 | 850 | OSHA | 1/20 | 1.40 | 1000 |

*** See Figure 6 Page10.**

**** Heaters mounted less than 8 feet above floor must have OSHA Compliant fan guards.**

***** All Motors are totally enclosed, thermally protected sleeve bearing type with 3 1/2 cubic inch conduit boxes.**

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



## Dimensional Data

**Figure 3 – Serpentine Type**
**Models 5PV19, 5PV22, 5PV26, 5YH18**

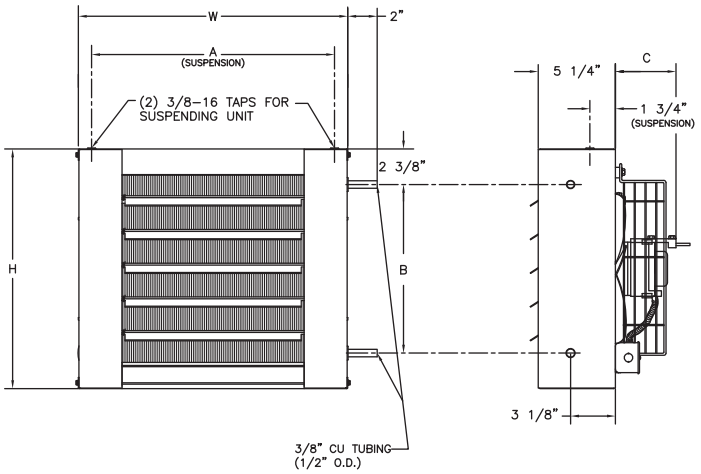
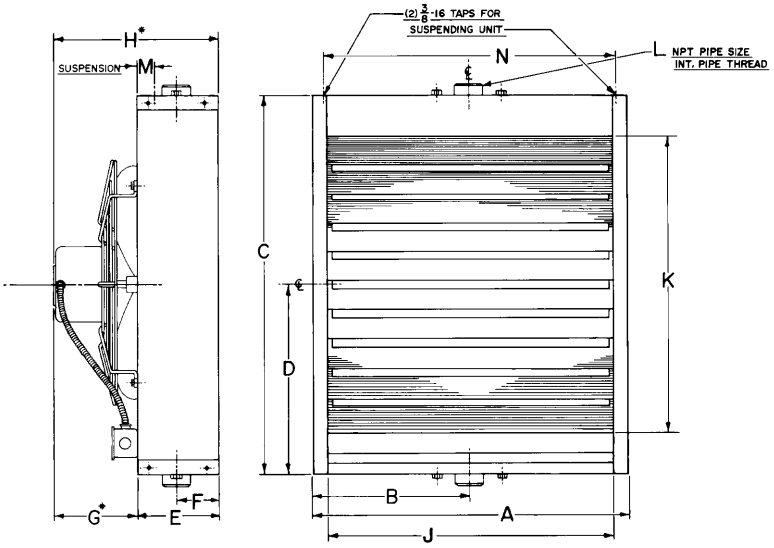



**Figure 4 – Header Type**
**Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV20, 5PV23, 5PV24, 5PV27-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53, 5YH19, 5YH20**




NOTE: Pipe connections for all serpentine type units are right hand as shown. 3/8-16 nutserts are attached to enclosures of all heaters for balanced hanging.

# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## Dimensional Data

**Table 2 – Serpentine Models (See Figure 3 on page 4)**

| MODEL NO. | CAPACITY MBH | H inches (mm) | W inches (mm) | A inches (mm) | B inches (mm) | C inches (mm) | NO. OF LOUVERS | NOM. FAN DIAM. inches (mm) | APPROX. SHIP WT. lbs. (kg) |
|---|---|---|---|---|---|---|---|---|---|
| 5YH18 | 8.0 | 16 (406) | 18 (457) | 16 7/32 (412) | 11 1/4 (286) | 4 1/4 (108) | 5 | 9 (229) | 22 (10.0) |
| 5PV19 | 18.4 | 16 (406) | 18 (457) | 16 7/32 (412) | 11 1/4 (286) | 4 1/4 (108) | 5 | 10 (254) | 24 (10.9) |
| 5PV22 | 24.8 | 16 (406) | 18 (457) | 16 7/32 (412) | 11 1/4 (286) | 4 1/4 (108) | 5 | 10 (254) | 25 (11.3) |
| 5PV26 | 38.9 | 18 1/2 (470) | 20 1/2 (521) | 18 22/32 (475) | 13 3/4 (349) | 5 11/16 (144) | 6 | 12 (305) | 31 (14.0) |

**Table 3 – Header Models (See Figure 4 on page 4)**

| MODEL NO. | CAPACITY MBH | A inches (mm) | B inches (mm) | C inches (mm) | D inches (mm) | E inches (mm) | F inches (mm) | G* inches (mm) | H* inches (mm) | J inches (mm) | K inches (mm) | L inches (mm) | M inches (mm) | N inches (mm) | NO. OF LOUVERS | NOM. FAN DIAM. inches (mm) | APPROX. SHIP WT. lbs. (kg) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5PV31 | 18.0 | 14 5/8 (371) | 7 5/16 (186) | 15 (381) | 7 1/2 (191) | 6 1/8 (156) | 2 15/16 (75) | 3 1/4 (83) | 9 3/8 (238) | 12 1/4 (311) | 9 1/2 (241) | 1 1/4 (32) | 2 1/4 (57) | 12 7/8 (327) | 4 | 9 (229) | 26 (11.8) |
| 3DUF7<br>5PV43 | 24.0<br>36.0 | 14 5/8 (371) | 7 5/16 (186) | 18 (457) | 9 (229) | 6 1/8 (156) | 2 15/16 (75) | 3 1/4 (83) | 9 3/8 (238) | 12 1/4 (311) | 12 1/2 (318) | 1 1/4 (32) | 2 1/4 (57) | 12 7/8 (327) | 5 | 10 (254) | 30 (13.6) |
| 5PV46 | 48.0 | 17 1/8 (435) | 8 9/16 (217) | 20 1/2 (521) | 10 1/4 (260) | 5 7/8 (149) | 2 15/16 (75) | 5 11/16 (144) | 11 7/16 (291) | 14 3/4 (375) | 15 (381) | 1 1/4 (32) | 1 3/4 (44) | 15 3/8 (391) | 6 | 12 (305) | 41 (18.6) |
| 5PV47, 5PV48 | 60.0 | 17 1/8 (435) | 8 9/16 (217) | 20 1/2 (521) | 10 1/4 (260) | 5 7/8 (149) | 2 15/16 (75) | 5 1/16 (129) | 10 15/16 (278) | 14 3/4 (375) | 15 (381) | 1 1/4 (32) | 1 3/4 (44) | 15 3/8 (391) | 6 | 12 (305) | 41 (18.6) |
| 5PV49, 5PV50 | 72.0 | 18 3/8 (467) | 9 3/16 (233) | 21 3/4 (552) | 10 7/8 (276) | 6 (152) | 2 15/16 (75) | 5 1/16 (129) | 11 1/16 (281) | 16 (406) | 16 1/4 (413) | 1 1/4 (32) | 1 3/4 (44) | 16 5/8 (422) | 7 | 14 (356) | 44 (19.9) |
| 5PV51, 5YH20 | 84.0 | 20 7/8 (530) | 10 7/16 (265) | 24 1/4 (616) | 12 1/8 (308) | 6 1/8 (156) | 2 15/16 (75) | 5 11/16 (144) | 11 13/16 (300) | 18 1/2 (470) | 18 3/4 (476) | 1 1/4 (32) | 1 3/4 (44) | 19 1/8 (486) | 8 | 14 (356) | 47 (21.3) |
| 5PV52, 5PV53<br>5PV15, 5PV16 | 96.0<br>108.0 | 19 5/8 (498) | 9 13/16 (249) | 24 (610) | 12 (305) | 6 5/16 (160) | 3 3/16 (81) | 7 1/2 (191) | 13 13/16 (351) | 17 1/4 (438) | 17 1/2 (445) | 1 1/2 (38) | 1 3/4 (44) | 17 7/8 (454) | 8 | 16 (406) | 49 (22.2) |
| 5PV20, 5YH19 | 120.0 | 20 7/8 (530) | 10 7/16 (265) | 25 1/4 (641) | 12 5/8 (321) | 6 5/16 (160) | 3 3/16 (81) | 6 11/16 (170) | 13 (330) | 18 1/2 (470) | 18 3/4 (476) | 1 1/2 (38) | 1 3/4 (44) | 19 1/8 (486) | 8 | 18 (457) | 59 (26.7) |
| 5PV23, 5PV24<br>5PV27, 5PV28 | 132.0<br>144.0 | 23 3/8 (594) | 11 11/16 (297) | 27 3/4 (705) | 13 7/8 (352) | 6 5/16 (160) | 3 3/16 (81) | 7 7/16 (194) | 13 3/4 (349) | 21 (533) | 21 1/4 (540) | 1 1/2 (38) | 1 3/4 (44) | 21 5/8 (549) | 9 | 18 (457) | 74 (33.5) |
| 5PV29, 5PV30 | 156.0 | 23 3/8 (594) | 11 11/16 (297) | 27 3/4 (705) | 13 7/8 (352) | 6 5/16 (160) | 3 3/16 (81) | 7 7/16 (194) | 13 3/4 (349) | 21 (533) | 21 1/4 (540) | 1 1/2 (38) | 1 3/4 (44) | 21 5/8 (549) | 9 | 18 (457) | 74 (33.5) |
| 5PV32, 5PV33<br>5PV34, 5PV35 | 180.0<br>204.0 | 24 5/8 (625) | 12 5/16 (313) | 29 (737) | 14 1/2 (368) | 6 3/8 (162) | 3 3/16 (81) | 7 7/16 (194) | 13 3/4 (349) | 22 1/4 (565) | 22 1/2 (572) | 1 1/2 (38) | 1 3/4 (44) | 22 7/8 (581) | 9 | 18 (457) | 90 (40.8) |
| 1EBC1, 5PV38 | 240.0 | 27 7/8 (708) | 13 15/16 (354) | 30 1/4 (768) | 15 1/8 (384) | 8 1/8 (206) | 3 3/16 (81) | 5 7/8 (149) | 14 (356) | 25 1/2 (648) | 23 3/4 (603) | 2 (51) | 1 3/4 (44) | 26 1/8 (664) | 10 | 20 (508) | 143 (65.0) |
| 1EBC2, 5PV40 | 280.0 | 27 7/8 (708) | 13 15/16 (354) | 30 1/4 (768) | 15 1/8 (384) | 8 1/8 (206) | 3 3/16 (81) | 9 5/8 (244) | 17 3/4 (451) | 25 1/2 (648) | 23 3/4 (603) | 2 (51) | 1 3/4 (44) | 26 1/8 (664) | 10 | 20 (508) | 154 (70.0) |
| 1EBC3, 5PV42<br>1EBC4, 5PV45 | 300.0<br>360.0 | 33 3/8 (848) | 16 11/16 (424) | 37 3/4 (959) | 18 7/8 (479) | 9 (229) | 3 3/16 (81) | 9 5/8 (244) | 18 5/8 (473) | 31 (787) | 31 1/4 (794) | 2 (51) | 1 3/4 (44) | 31 5/8 (803) | 13 | 24 (610) | 203 (92.0) |

*** Applies to standard, non-OSHA fan guard. When optional OSHA fan guards are requested, dimensions will vary according to substitutions made.**

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



Table 4-Steam Performance Data

**Header Type Models Only**

| Model No. | Output BTU/ HR (kW) | Cond. lbs./hr. (kg/hr) | E.D.R. Sq. Ft. (sq. m) | Final Air Deg.°F (Deg. °C) | Motor HP (kW) | RPM | Nominal CFM ($m^3/s$) | Outlet FPM (m/s) | Nom. Amps @ 115VAC† | Nom. Fan Diam. Inches (mm) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5PV31 | 18,000 **(5.3)** | 18.0 **(8.2)** | 75 **(7.0)** | 102 **(39)** | 16 Watts | 1550 | 395 **(.186)** | 395 **(2.007)** | 0.80 | 9 **(228.6)** |
| 3DUF7 | 24,000 **(7.0)** | 24.5 **(11.1)** | 100 **(9.3)** | 109 **(43)** | 16 Watts | 1550 | 450 **(.212)** | 450 **(2.286)** | 0.80 | 10 **(254.0)** |
| 5PV43 | 36,000 **(10.5)** | 37.0 **(16.8)** | 150 **(13.9)** | 119 **(48)** | 25 Watts | 1550 | 550 **(.260)** | 550 **(2.794)** | 1.2 | 10 **(254.0)** |
| 5PV46 | 48,000 **(14.1)** | 49.0 **(22.2)** | 200 **(18.6)** | 119 **(48)** | 1/20 **(.037)** | 1000 | 750 **(.354)** | 550 **(2.794)** | 1.4 | 12 **(304.8)** |
| 5PV47, 5PV48 | 60,000 **(17.6)** | 61.0 **(27.6)** | 250 **(23.2)** | 121 **(49)** | 1/20 **(.037)** | 1000 | 900 **(.425)** | 650 **(3.302)** | 1.4 | 12 **(304.8)** |
| 5PV49, 5PV50 | 72,000 **(21.1)** | 73.0 **(33.1)** | 300 **(27.9)** | 120 **(49)** | 1/20 **(.037)** | 1000 | 1100 **(.519)** | 800 **(4.064)** | 1.4 | 14 **(355.6)** |
| 5PV51, 5YH20 | 84,000 **(24.6)** | 85.0 **(38.5)** | 350 **(32.5)** | 115 **(46)** | 1/12 **(.062)** | 1000 | 1400 **(.661)** | 900 **(4.572)** | 2.2 | 14 **(355.6)** |
| 5PV52, 5PV53 | 96,000 **(28.1)** | 97.0 **(43.9)** | 400 **(37.2)** | 123 **(51)** | 1/12 **(.062)** | 1000 | 1400 **(.661)** | 930 **(4.724)** | 2.2 | 16 **(406.4)** |
| 5PV15, 5PV16 | 108,000 **(31.6)** | 110.0 **(49.8)** | 450 **(41.8)** | 115 **(46)** | 1/12 **(.062)** | 1000 | 1800 **(.850)** | 1000 **(5.080)** | 2.2 | 16 **(406.4)** |
| 5PV20, 5YH19 | 120,000 **(35.2)** | 122.0 **(55.3)** | 500 **(46.5)** | 118 **(48)** | 1/3 **(.249)** | 1140 | 1900 **(.897)** | 900 **(4.572)** | 4.5 | 18 **(457.2)** |
| 5PV23, 5PV24 | 132,000 **(38.7)** | 134.0 **(60.7)** | 550 **(51.1)** | 121 **(49)** | 1/3 **(.249)** | 1140 | 2000 **(.944)** | 950 **(4.826)** | 4.5 | 18 **(457.2)** |
| 5PV27, 5PV28 | 144,000 **(42.2)** | 146.0 **(66.1)** | 600 **(55.7)** | 120 **(49)** | 1/3 **(.249)** | 1140 | 2200 **(1.038)** | 1000 **(5.080)** | 4.5 | 18 **(457.2)** |
| 5PV29, 5PV30 | 156,000 **(45.7)** | 160.0 **(72.5)** | 650 **(60.4)** | 115 **(46)** | 1/3 **(.249)** | 1140 | 2600 **(1.227)** | 1150 **(5.842)** | 4.5 | 18 **(457.2)** |
| 5PV32, 5PV33 | 180,000 **(52.7)** | 190.0 **(86.1)** | 770 **(71.5)** | 135 **(57)** | 1/3 **(.249)** | 1140 | 2200 **(1.038)** | 800 **(4.064)** | 4.5 | 18 **(457.2)** |
| 5PV34, 5PV35 | 204,000 **(59.8)** | 208.0 **(94.2)** | 850 **(79.0)** | 124 **(51)** | 1/3 **(.249)** | 1140 | 2900 **(1.369)** | 1000 **(5.080)** | 4.5 | 18 **(457.2)** |
| 1EBC1, 5PV38 | 240,000 **(70.3)** | 244.0 **(110.5)** | 1000 **(92.9)** | 123 **(51)** | 1/3 **(.249)** | 1140 | 3500 **(1.652)** | 900 **(4.572)** | 4.5 | 20 **(508.0)** |
| 1EBC2, 5PV40 | 280,000 **(82.0)** | 280.0 **(126.8)** | 1100 **(102.2)** | 121 **(49)** | 1/2 **(.373)** | 1100 | 4200 **(1.982)** | 980 **(4.978)** | 5.4 | 20 **(508.0)** |
| 1EBC3, 5PV42 | 300,000 **(87.9)** | 310.0 **(140.4)** | 1250 **(116.1)** | 117 **(47)** | 1/2 **(.373)** | 1100 | 5000 **(2.360)** | 700 **(3.556)** | 5.4 | 24 **(609.6)** |
| 1EBC4, 5PV45 | 360,000 **(105.5)** | 366.0 **(165.8)** | 1500 **(139.4)** | 120 **(49)** | 1/2 **(.373)** | 1100 | 5500 **(2.596)** | 1000 **(5.080)** | 5.4 | 24 **(609.6)** |

**Performance based on 2# steam pressure (13.8 kpa) at heater with air entering @ 60°F (16°C).**
**Use conversion Table on page 2 for all metric conversions.**

**†Stated amp is full load for the standard motor. Amp draw varies by motor manufacturer ± 0.2 amps. Please see your unit's motor data plate for exact full load amp rating.**

## Steam Calculations and Correction Factors (Header Type Models Only)

| | | **EXAMPLE: –**<br>UNIT SIZE: _3DUF7 (24 MBTUH)<br>Steam Pressure ____ 10 PSI<br>Entering Air Temp. ___40°F |
|---|---|---|
| **I. CAPACITY** | | |
| A. For 2 lbs. steam, 60° entering air | Read output directly from Table 4, 24,000 BTU/HR. | |
| B. For higher steam pressures and/or E.A.T.'s above or below 60°F | Multiply output from Table 4 by appropriate correction factor from Table 5 (below). | 24,000 x 1.29 = 30,960 BTU/HR. |
| **II. FINAL AIR TEMPERATURE** | | |
| A. For 2 lbs. steam, 60° entering air | Read temperature directly from Table 4, 109°F. | |
| B. For capacities calculated in I.B. (above) | $\frac{\text{Output from I.B.}}{1.085 \times \text{CFM from Table 4}}$ + E.A.T. = Final Air Temp. | $\frac{30{,}960}{1.085 \times 450}$ + 40 = 103.4°F. |
| **III. FINAL AIR VOLUME** | | |
| A. For 2 lbs. steam, 60° entering air | $\frac{460 + \text{Final Air Temp from Table 4}}{530}$ x Nom. CFM from Table 4 = Final Air Volume | $\frac{460+109}{530}$ x 450 = 483 CFM |
| B. For final air temperatures calculated In II. B. (above) | $\frac{460 + \text{Final Air Temp from II.B.}}{530}$ x Nom. CFM from Table 4 = Final Air Volume | $\frac{460+103.4}{530}$ x 450 = 478 CFM |
| **IV. CONDENSATE PER HOUR** | | |
| A. For 2 lbs. steam, 60° entering air | Read lbs. per hour from Table 4, 24.5 LBS./HR. | |
| B. For capacities calculated in I.B. (above) | $\frac{\text{Output from I.B.}}{\text{Latent Heat From Table 6}}$ = lbs. per hour of condensate | $\frac{30{,}960}{953}$ = 32.5 LBS./HR. |

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**Table 5 - Steam Correction Factors based on 2 PSI (13.8 kPa) Steam and 60°F (16°C) E.A.T.**

| ENTERING AIR TEMPERATURE °F (°C) | STEAM PRESSURE (SATURATED) — LBS. PER SQ. IN. (kPa) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 (.0) | 2 (13.8) | 5 (34.5) | 10 (68.9) | 15 (103.4) | 20 (137.9) | 30 (206.8) | 40 (275.8) | 50 (344.7) | 75 (517.1) | 100 (689.4) | 125 (861.8) | 150 (1,034.1) |
| 30 -(1) | 1.19 | 1.24 | 1.29 | 1.38 | 1.44 | 1.50 | 1.60 | 1.68 | 1.70 | 1.90 | 2.02 | 2.11 | 2.20 |
| 40 (4) | 1.11 | 1.16 | 1.21 | 1.29 | 1.34 | 1.42 | 1.51 | 1.60 | 1.60 | 1.81 | 1.93 | 2.02 | 2.11 |
| 50 (10) | 1.03 | 1.08 | 1.13 | 1.21 | 1.28 | 1.33 | 1.43 | 1.51 | 1.58 | 1.72 | 1.84 | 1.93 | 2.02 |
| 60 (16) | 0.96 | 1.00 | 1.05 | 1.13 | 1.19 | 1.25 | 1.35 | 1.43 | 1.50 | 1.64 | 1.75 | 1.84 | 1.93 |
| 70 (21) | 0.88 | 0.93 | 0.97 | 1.06 | 1.12 | 1.17 | 1.27 | 1.35 | 1.42 | 1.55 | 1.66 | 1.76 | 1.84 |
| 80 (27) | 0.81 | 0.85 | 0.90 | 0.98 | 1.04 | 1.10 | 1.19 | 1.27 | 1.34 | 1.47 | 1.58 | 1.68 | 1.76 |
| 90 (32) | 0.74 | 0.78 | 0.83 | 0.91 | 0.97 | 1.02 | 1.12 | 1.19 | 1.26 | 1.39 | 1.50 | 1.59 | 1.67 |
| 100 (38) | 0.67 | 0.71 | 0.76 | 0.84 | 0.89 | 0.95 | 1.04 | 1.12 | 1.19 | 1.32 | 1.42 | 1.51 | 1.59 |

**Table 6 - Properties of Saturated Steam**

| | STEAM PRESSURE IN LBS. PER SQUARE INCH GAUGE (PSIG) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Steam Pressure psi (kPa) | 0 (.0) | 2 (13.8) | 5 (34.5) | 10 (68.9) | 15 (103.4) | 20 (137.9) | 30 (206.8) | 40 (275.8) | 50 (344.7) | 75 (517.1) | 100 (689.4) | 125 (861.8) | 150 (1,034.1) |
| Steam Temperature-°F (°C) | 212.0 (100.0) | 218.5 (103.6) | 227.1 (108.4) | 239.4 (115.2) | 249.8 (121.0) | 258.8 (126.0) | 274.0 (134.4) | 286.7 (141.5) | 297.7 (147.6) | 319.9 (159.9) | 337.9 (169.9) | 352.9 (178.3) | 365.9 (185.5) |
| Latent Heat of Steam Btu/lbm (KJ/Kg) | 970 (2256) | 966 (2247) | 961 (2235) | 953 (2217) | 946 (2200) | 940 (2186) | 929 (2161) | 920 (2140) | 912 (2121) | 891 (2072) | 881 (2049) | 868 (2019) | 857 (1993) |

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



## Table 7-Hot Water Performance Data

**Serpentine and Header Type Models**

| Model No. | Output BTU/ HR (kW) | Flow Rate GPM (L/s) | Final Air Temp. °F (°C) | Press. Drop FT./$H_2O$ (m/water) | Motor HP (kW) | RPM | Nominal CFM ($m^3$/s) | Outlet Air Velocity FPM (m/s) | Nom. Amps @ 115VAC† | Sound Rating |
|---|---|---|---|---|---|---|---|---|---|---|
| 5YH18 | 8,030 **(2.4)** | 0.8 **(.050)** | 91 **(33)** | 0.80 **(.244)** | 16 Watts | 1550 | 245 **(.116)** | 250 **(1.270)** | 0.80 | II |
| 5PV19 | 18,400 **(5.4)** | 1.9 **(.120)** | 94 **(34)** | 2.20 **(.671)** | 16 Watts | 1550 | 500 **(.236)** | 500 **(2.540)** | 0.80 | II |
| 5PV22 | 24,800 **(7.3)** | 2.5 **(.158)** | 102 **(39)** | 2.20 **(.671)** | 25 Watts | 1550 | 580 **(.274)** | 590 **(2.997)** | 1.2 | II |
| 5PV26 | 38,900 **(10.5)** | 3.6 **(.227)** | 99 **(37)** | 3.00 **(.914)** | 1/20 **(.037)** | 1000 | 850 **(.401)** | 550 **(2.794)** | 1.4 | II |
| 5PV31 | 13,050 **(3.8)** | 1.3 **(.082)** | 95 **(35)** | 0.005 **(.002)** | 16 Watts | 1550 | 395 **(.186)** | 395 **(2.007)** | 0.80 | II |
| 3DUF7 | 17,400 **(5.1)** | 1.8 **(.114)** | 96 **(36)** | 0.014 **(.004)** | 16 Watts | 1550 | 450 **(.212)** | 450 **(2.286)** | 0.80 | II |
| 5PV43 | 26,100 **(7.6)** | 2.7 **(.170)** | 103 **(39)** | 0.09 **(.027)** | 25 Watts | 1550 | 550 **(.260)** | 550 **(2.794)** | 1.2 | II |
| 5PV46 | 34,800 **(10.2)** | 3.5 **(.221)** | 103 **(39)** | 0.12 **(.037)** | 1/20 **(.037)** | 1000 | 750 **(.354)** | 550 **(2.794)** | 1.4 | II |
| 5PV47, 5PV48 | 43,600 **(12.8)** | 4.4 **(.278)** | 105 **(41)** | 0.17 **(.052)** | 1/20 **(.037)** | 1000 | 900 **(.425)** | 650 **(3.302)** | 1.4 | II |
| 5PV49, 5PV50 | 52,300 **(15.3)** | 5.3 **(.334)** | 104 **(40)** | 0.23 **(.070)** | 1/20 **(.037)** | 1000 | 1100 **(.519)** | 800 **(4.064)** | 1.4 | II |
| 5PV51, 5YH20 | 61,000 **(17.9)** | 6.1 **(.385)** | 100 **(38)** | 0.24 **(.073)** | 1/12 **(.062)** | 1000 | 1400 **(.661)** | 900 **(4.572)** | 2.2 | III |
| 5PV52, 5PV53 | 69,700 (20.4) | 7.0 **(.442)** | 106 **(41)** | 0.29 **(.088)** | 1/12 **(.062)** | 1000 | 1400 **(.661)** | 930 **(4.724)** | 2.2 | III |
| 5PV15, 5PV16 | 78,400 **(23.0)** | 7.9 **(.498)** | 100 **(38)** | 0.36 **(.110)** | 1/12 **(.062)** | 1000 | 1800 **(.850)** | 1000 **(5.080)** | 2.2 | III |
| 5PV20, 5YH19 | 87,100 **(25.5)** | 8.8 **(.555)** | 102 **(39)** | 0.39 **(.119)** | 1/3 **(.249)** | 1140 | 1900 **(.897)** | 900 **(4.572)** | 4.5 | III |
| 5PV23, 5PV24 | 95,800 **(28.1)** | 9.6 **(.606)** | 104 **(40)** | 0.41 **(.125)** | 1/3 **(.249)** | 1140 | 2000 **(.944)** | 950 **(4.826)** | 4.5 | IV |
| 5PV27, 5PV28 | 104,000 **(30.5)** | 10.4 **(.656)** | 104 **(40)** | 0.43 **(.131)** | 1/3 (.249) | 1140 | 2200 **(1.038)** | 1000 **(5.080)** | 4.5 | IV |
| 5PV29, 5PV30 | 113,000 **(33.1)** | 11.3 **(.713)** | 100 **(38)** | 0.53 **(.162)** | 1/3 **(.249)** | 1140 | 2600 **(1.227)** | 1150 **(5.842)** | 4.5 | IV |
| 5PV32, 5PV33 | 118,000 **(34.6)** | 11.8 **(.744)** | 110 **(43)** | 0.6 **(.183)** | 1/3 **(.249)** | 1140 | 2200 **(1.038)** | 800 **(4.064)** | 4.5 | III |
| 5PV34, 5PV35 | 148,000 **(43.4)** | 14.9 **(.940)** | 107 **(42)** | 0.79 **(.241)** | 1/3 **(.249)** | 1140 | 2900 **(1.369)** | 1000 **(5.080)** | 4.5 | IV |
| 1EBC1, 5PV38 | 174,000 **(51.0)** | 17.4 **(1.098)** | 106 **(41)** | 1.06 **(.323)** | 1/3 **(.249)** | 1140 | 3500 **(1.652)** | 900 **(4.572)** | 4.5 | IV |
| 1EBC2, 5PV40 | 209,100 **(61.3)** | 21.0 **(1.325)** | 106 **(41)** | 1.33 **(.405)** | 1/2 **(.373)** | 1100 | 4200 **(1.982)** | 980 **(4.978)** | 5.4 | IV |
| 1EBC3, 5PV42 | 230,000 **(67.4)** | 23.0 **(1.451)** | 102 **(39)** | 2.1 **(.640)** | 1/2 **(.373)** | 1100 | 5000 **(2.360)** | 700 **(3.556)** | 5.4 | IV |
| 1EBC4, 5PV45 | 261,300 **(76.6)** | 26.2 **(1.653)** | 103 **(39)** | 2.1 **(.640)** | 1/2 **(.373)** | 1100 | 5500 **(2.596)** | 1000 **(5.080)** | 5.4 | IV |

**Performance based on 200°F (93°C) EWT, 60°F (16°C) E.A.T., 20°F (11°C)TD.**

**† Stated amp is full load for the standard motor. Amp draw varies by motor manufacturer ± 0.2 amps. Please see your unit's motor data plate for exact full load amp rating.**

## Hot Water Calculations and Correction Factors (Serpentine and Header Type Models)

| | | **EXAMPLE: –**<br>UNIT SIZE: _____ 3DUF7 (24 MBTUH)<br>Entering Water Temp. _____ 160°F<br>Entering Air Temp. _____ 40°F<br>Water Temperature Drop _____ 10°F |
|---|---|---|
| **I. CAPACITY @ 20° TD:**<br>A. For 200° EWT, 60° EAT | Read output directly from Table 7, 17,400 BTU/HR. | |
| B. For EWT and/or EAT above or below Standard | Multiply output from Table 7 by factor from Table 8 (below). | 17,400 x .878 = 15,277 BTU/HR. |
| **II. CAPACITY AT OTHER TD's**<br>A. For TD's from 5 to 60°F | Multiply output obtained in IA. or IB. (above) by appropriate factor from Table 9 (below) | IA - 17,400 x 1.15 = 20,010 BTU/HR.<br>– OR –<br>IB - 15,277 x 1.15 = 17,569 BTU/HR. |
| **III. GPM AT OTHER TD's**<br>A. For TD's from 5 to 60°F | Multiply GPM of unit for 20° TD, from Table 7 by appropriate factor from Table 9 (below). | 1.8 x 2.30 = 4.14 GPM (Applies only to units with Std. 200° EWT, 60° EAT.) For all others calculate using formula – $GPM = \frac{BTU}{500 \times TD}$ |
| **IV. CAPACITY AT OTHER RATES** OF WATER FLOW | Multiply output from Table 7 by factor from Table 11 (below). | |
| **V. PRESSURE LOSS AT OTHER TD's**<br>A. For TD's from 5 to 60°F | Multiply P.D. of unit for 20° TD, from Table 7 by appropriate factor from Table 9 (below). | .014 x 5.00 = .07 Ft. $H_2O$ |

**Table 8 - Hot Water Conversion Factors based on 200° (93°C) Entering Water, 60° (16°C) Entering Air and 20° (11°C) Temperature Drop**

| ENTERING AIR TEMPERATURE °F (°C) | ENTERING WATER TEMPERATURE — °F (°C) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 100° (38) | 120° (49) | 140° (60) | 160° (71) | 180° (82) | 200° (93) | 220° (104) | 240° (116) | 260° (127) | 280° (138) | 300° (149) |
| 30 -(1) | 0.518 | 0.666 | 0.814 | 0.963 | 1.120 | 1.268 | 1.408 | 1.555 | 1.702 | 1.850 | 1.997 |
| 40 (4) | 0.439 | 0.585 | 0.731 | 0.878 | 1.025 | 1.172 | 1.317 | 1.464 | 1.609 | 1.755 | 1.908 |
| 50 (10) | 0.361 | 0.506 | 0.651 | 0.796 | 0.941 | 1.085 | 1.231 | 1.375 | 1.518 | 1.663 | 1.824 |
| 60 (16) | 0.286 | 0.429 | 0.571 | 0.715 | 0.857 | 1.000 | 1.143 | 1.286 | 1.429 | 1.571 | 1.717 |
| 70 (21) | 0.212 | 0.353 | 0.494 | 0.636 | 0.777 | 0.918 | 1.060 | 1.201 | 1.342 | 1.483 | 1.630 |
| 80 (27) | 0.140 | 0.279 | 0.419 | 0.558 | 0.698 | 0.837 | 0.977 | 1.117 | 1.257 | 1.397 | 1.545 |
| 90 (32) | 0.069 | 0.207 | 0.345 | 0.483 | 0.621 | 0.759 | 0.897 | 1.035 | 1.173 | 1.311 | 1.462 |
| 100 (38) | 0.000 | 0.137 | 0.273 | 0.409 | 0.546 | 0.682 | 0.818 | 0.955 | 1.094 | 1.230 | 1.371 |

**Table 9 — Hot Water Output, Flow Rate and Pressure Loss Factors based on Standard Conditions of 200°F (93°C) Entering Water, 60°F (16°C) Entering Air & 20°F (11°C) Water Drop**

| USE FACTORS FROM THIS TABLE TO OBTAIN APPROXIMATE RESULTS | TEMPERATURE DROP °F (°C) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 5 (3) | 10 (6) | 15 (8) | 20 (11) | 25 (14) | 30 (17) | 40 (22) | 50 (28) | 60 (33) |
| To obtain output for other Water Temperature Drops, multiply basic output rating by applicable Factor. | 1.25 | 1.15 | 1.08 | 1.00 | .94 | .90 | .83 | .76 | .72 |
| To obtain flow for other Water Temperature Drops, multiply basic rate rating by applicable Factor.* | 5.00 | 2.30 | 1.44 | 1.00 | .74 | .59 | .40 | .30 | .24 |
| To obtain Pressure Loss Feet (Meters) of Water for other temperature Drops, multiply Basic loss at 20°F (11°C) drop by Factor. | 10.00 | 5.00 | 2.00 | 1.00 | .60 | .40 | .20 | .13 | .07 |

***Table 10 — Minimum Water Flow**

| MODEL MBH | 8.03 | 18.4 | 24.8 | 38.9 | 13.05 | 17.4 | 26.1 | 34.8 | 43.6 | 52.3 | 61.0 | 69.7 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MINIMUM GPM (L/s) | 0.125 (.008) | 0.125 (.008) | 0.125 (.008) | 0.125 (.008) | 0.750 (.047) | 1.240 (.078) | 1.240 (.078) | 1.490 (.094) | 1.490 (.094) | 1.620 (.102) | 1.860 (.117) | 3.350 (.211) |
| MODEL MBH | 78.4 | 87.1 | 95.8 | 104.0 | 113.0 | 118.0 | 148.0 | 174.0 | 209.1 | 230.0 | 261.3 | |
| MINIMUM GPM (L/s) | 3.35 (.211) | 3.60 (.227) | 4.09 (.258) | 4.09 (.258) | 4.09 (.258) | 4.34 (.274) | 4.34 (.274) | 4.59 (.290) | 4.59 (.290) | 6.08 (.384) | 6.08 (.384) | |

***Table 11 - Heating Capacity Factors for Various Rates of Water Flow**

| % of Rated Water Flow | 25% | 50% | 75% | 100% | 125% | 150% | 175% |
|---|---|---|---|---|---|---|---|
| Heating Capacity Factor | .80 | .89 | .96 | 1.00 | 1.04 | 1.07 | 1.10 |

ENGLISH

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water

ENGLISH

## Technical Data

The performance data listed in Table 7 includes sound ratings. The ratings provide a guide in determining the acceptable degree of loudness in particular occupancy situations.

Certain general rules apply to specific selection of unit heaters with regard to degree of quietness (or loudness);

- The greater the fan diameter, the higher the sound level.
- The higher the motor RPM, the higher the sound level. Note that on most units the lower the speed mode results in lowering the sound rating one increment.
- Selecting a larger number of smaller units generally results in lower overall noise levels than fewer large units.

All hoizontal steam and hot water unit heater motors, whether fan guard or shelf-mounted, are isolated from the mechanical mount by resilient isolators. This mounting along with balanced fan blades and excellent overall construction integrity, assures you the utmost in quiet operation.

The following table outlines sound ratings for various applications. The lower the number, the quieter the unit and the lower the sound requirement.

Table 8-Sound Ratings

| CATEGORY OF AREA | SOUND RATING |
|---|---|
| Apartment, assembly hall, classrooms churches, courtrooms, executive offices, hospitals, libraries, museums, theatres. | I |
| Dining rooms, general offices, recreation areas, small retail stores. | II |
| Restaurants, banks, cafeterias, department stores, public buildings, service stations. | III |
| Gymnasiums, health clubs, laundromats, supermarkets. | IV |
| Garages, small machine shops, light manufacturing. | V |
| Factories, foundries, steel mills. | III-VII* |

*(*) Depending on specific use in these facilities, size of operation, etc.*

**CORRECTIONS WHEN USING GLYCOL SOLUTION IN SYSTEM**

| | Propylene Glycol |
|---|---|
| 1. Heat transfer @180°F (82°C) with no increase inflow rate solution | |
| 20% solution | .97* |
| 50% solution | .90* |
| 2. G.P.M. Req'd. @180°F (82°C), 20°F (11°C) Δ t (no correction to pump curve) | 1.10%* |
| 3. Pump Head Req'd. @180°F (82°C) w/increase in G.P.M. | 1.23%* |
| 4. Specify gravity (water = 1.0) | 1.045-1.055* |
| 5. Pounds/Gallons @60°F (16°C) (water = 8.3453 Pound/Gallon) | 8.77 |
| 6. pH @ 50% by volume | 9.5 |
| 7. Freezing Point | |
| 55% by volume | - |
| 50% | -28°F (-33°C) |
| 40% | -13°F (-25°C) |
| 30% | + 4°F (-16°C) |
| 20% | +17°F (- 8°C) |

*(*) Compared to water.*

| Approximate factors at varying altitudes | |
|---|---|
| **Altitude** | **Factor** |
| Sea level - 1000 ft. (305m) | 1.00 |
| 1000 ft. - 3000 ft. (915m) | .958 |
| 3000 ft. - 5000 ft. (1524m) | .929 |
| 5000 ft. - 7000 ft. (2134m) | .900 |
| 7000 ft. - 10000 ft. (3048m) | .871 |

# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## Location

It is assumed that the design engineer has selected, sized, and located the units in the area to be heated. However, the information given here may be of additional help to the installer. These sketches indicate suggested basic locations for different types of unit heaters.

Horizontal unit heaters should be located to give a circulatory motion, preferably in the outer perimeter of the building. The units should be spaced to properly blanket the areas with warm air.

The unit should be suspended from connections provided in the unit by means of rods. The rods should then be attached to solid supports of the building.

Add clearances to combustibles.

**Figure 6**

**MOUNTING HEIGHT AND APPROX. HEAT THROW (see Table 1 on page 3)**

**Based on 2 PSI (13.8 kPa) steam pressure and 60°F (16°C) entering air temperature**

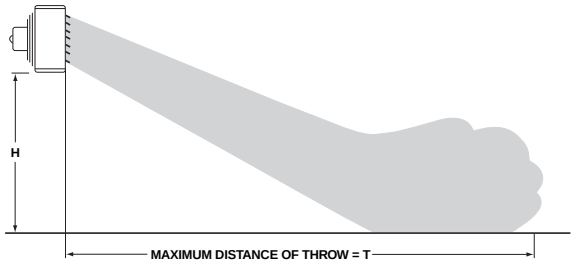
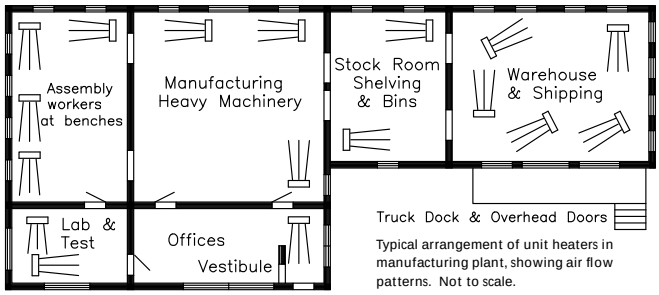
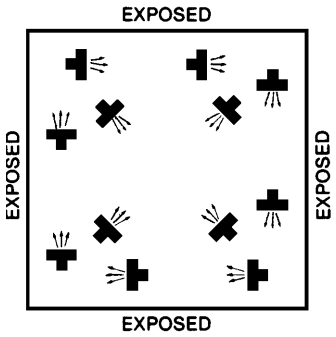



**Figure 5**

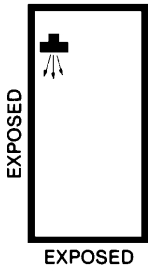



Typical arrangement of unit heaters in manufacturing plant, showing air flow patterns. Not to scale.




**A large square area with exposed walls and roof; units are blanketing all exposed surfaces.**

**A narrow area with two exposed walls either with or without roof exposure.**




**A small area with exposed walls requiring one unit.**

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



## Installation

### UNIT MOUNTING

Install unit heaters to meet Occupational Safety and Health Act (OSHA) and ETL requirements. Unit heaters mounted lower than 8 feet (2.4m) from the floor must be equipped with an OSHA fan guard.

**NOTE:** Units are equipped with the motor mounted to the fan guard and require two point suspension. Refer to Figures 3 and 4 for two point suspension.

**⚠ CAUTION** ***Unit heaters must be hung level from side to side and from front to back. Failure to do so will result in poor performance and/or premature failure of the unit.***

**⚠WARNING** ***Make certain that the lifting methods used to lift the heater and the method of suspension used in the field installation of the heater are capable of uniformly supporting the weight of the heater at all times. Failure to heed this warning may result in property damage or personal injury!***

**⚠WARNING** ***Insure that all hardware used in the suspension of each unit heater is more than adequate for the job. Failure to do so may result in extensive property damage, severe personal injury, or death!***

**⚠WARNING** ***Make sure that the structure to which the unit heater is to be mounted is capable of safely supporting its weight. Under no circumstances must the gas lines, the venting system or the electrical conduit be used to support the heater; or should any other objects (i.e. ladder, person) lean against the heater gas lines, venting system or the electrical conduit for support. Failure to heed these warnings may result in property damage, personal injury, or death.***

Nutserts are provided at the top of all units for suspension purposes. Support rods should support the total unit weight to assure that no strain is placed on supply and return piping. Provisions for removal of the unit from the suspension rods may be desirable for servicing purposes.

Units must hang level vertically and horizontally.

For sufficient air flow, maintain 2 feet (0.61m) clearance from the front and back of the unit, and 7 inches (0.18m) from the top of the unit. Also provide sufficient clearance around units for maintenance purposes.

Isolators are not required but may be desirable for some applications. Refer to "Dimensional Data" in Tables 2 and 3.

### PIPING

To provide proper coil operation, follow all piping recommendations listed in this manual.

See Figures 8 through 12 for proper pipe connections.

Follow standard practices and codes when installing the piping. Provide swing joints for expansion purposes, unions and shut-off valves for servicing purposes and as illustrated in Figures 8 through 12, valves and traps for control purposes. Use 45 degree angle run-offs from all supply and return mains.

Dirt pockets should be the same pipe size as the return tapping of the unit heater. Also, pipe size in the branch-off should be the same size as the tapping in the traps. Beyond the trap, the return lateral pipe should be increased one size up to the return main.

It is assumed that the design engineer has selected the type of system to be used. The sketches shown are for different types of steam systems or hot water systems. For sizing of piping, traps, filter, etc., consult ASHRAE guides of the manufacturer's literature on these products.

It is important that the system be kept clean. Care should be exercised that excessive joint materials or foreign substances be kept out of the system.

On steam systems it is recommended that the unit be installed level for proper condensate drainage. Swing joints should be used in piping, and pipes should be pitched down from units so that condensate can drain freely.

## Installation (Continued)



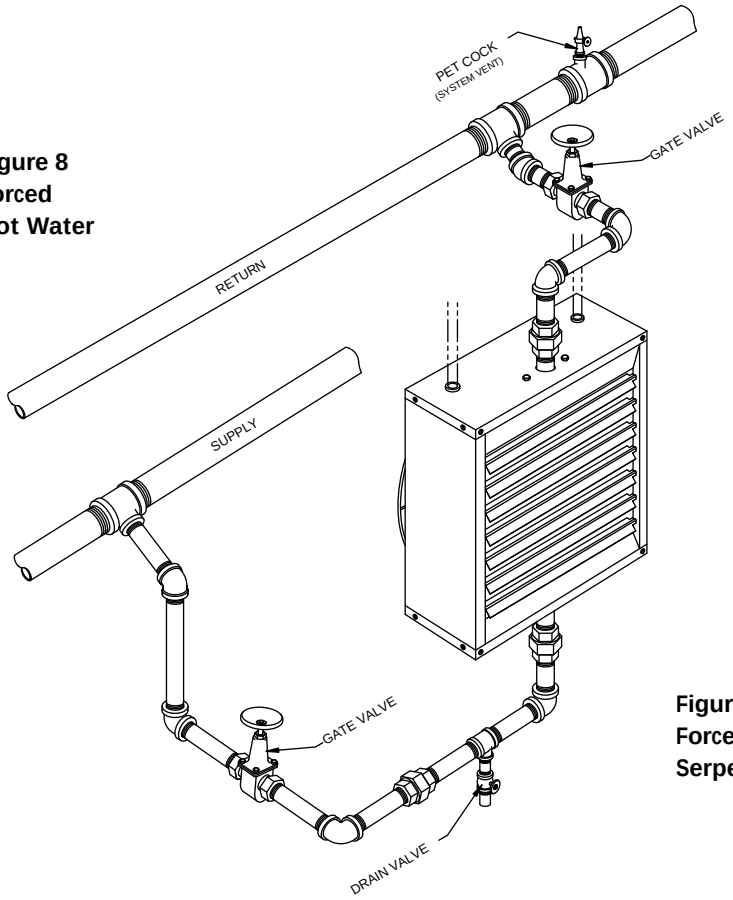



**Figure 8**
**Forced**
**Hot Water**

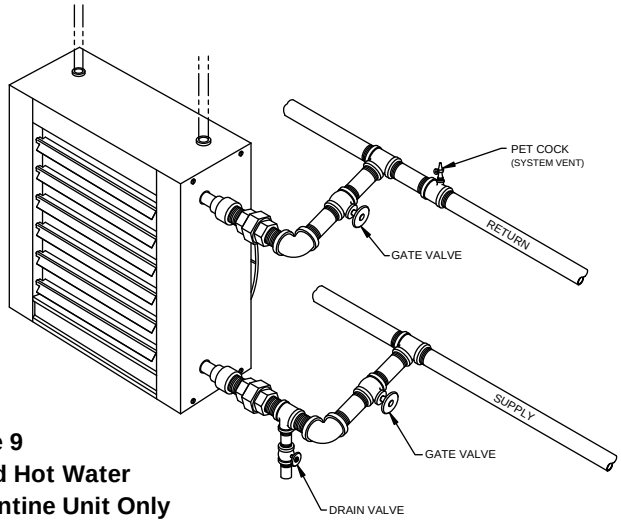
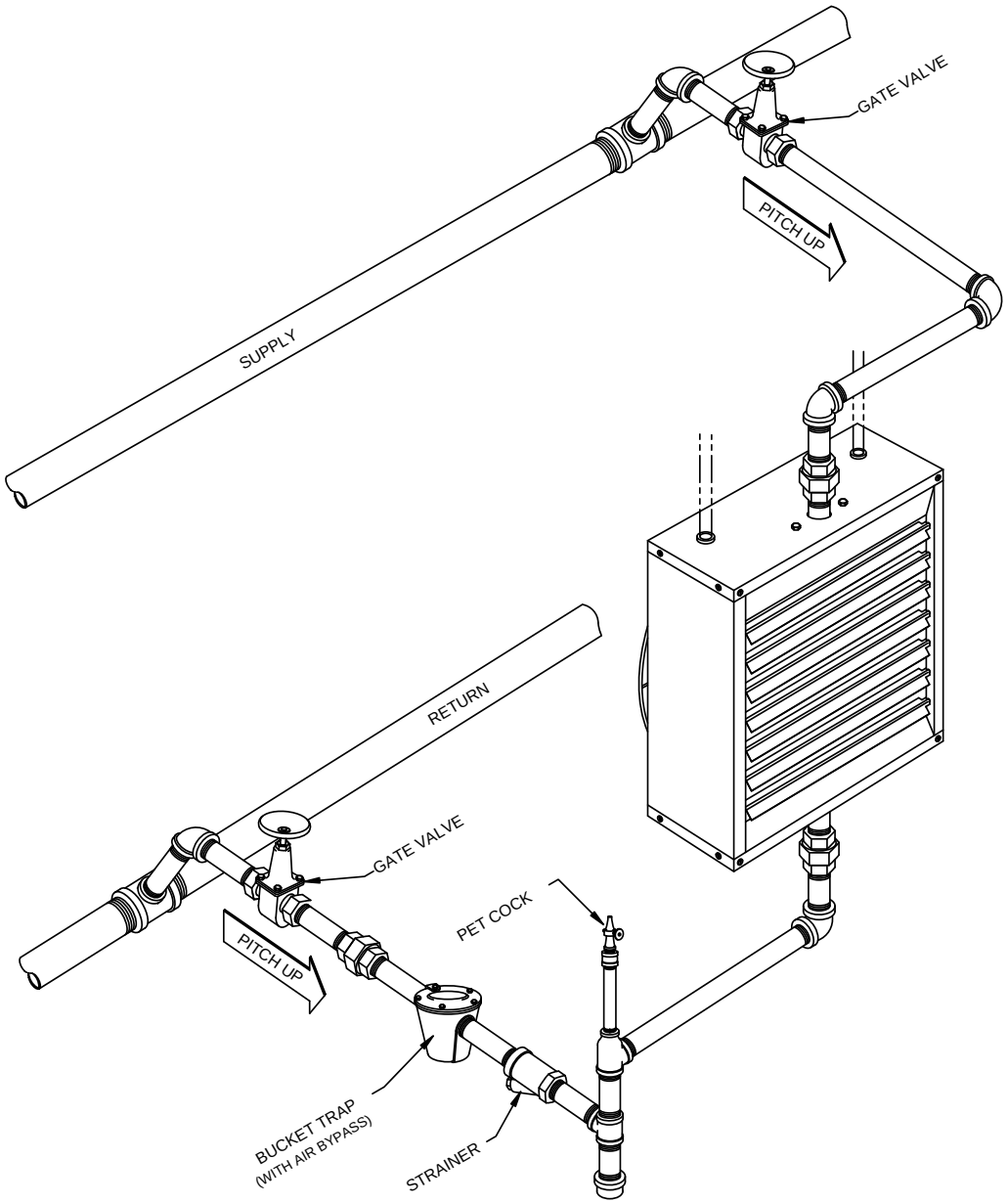



**Figure 9**
**Forced Hot Water**
**Serpentine Unit Only**

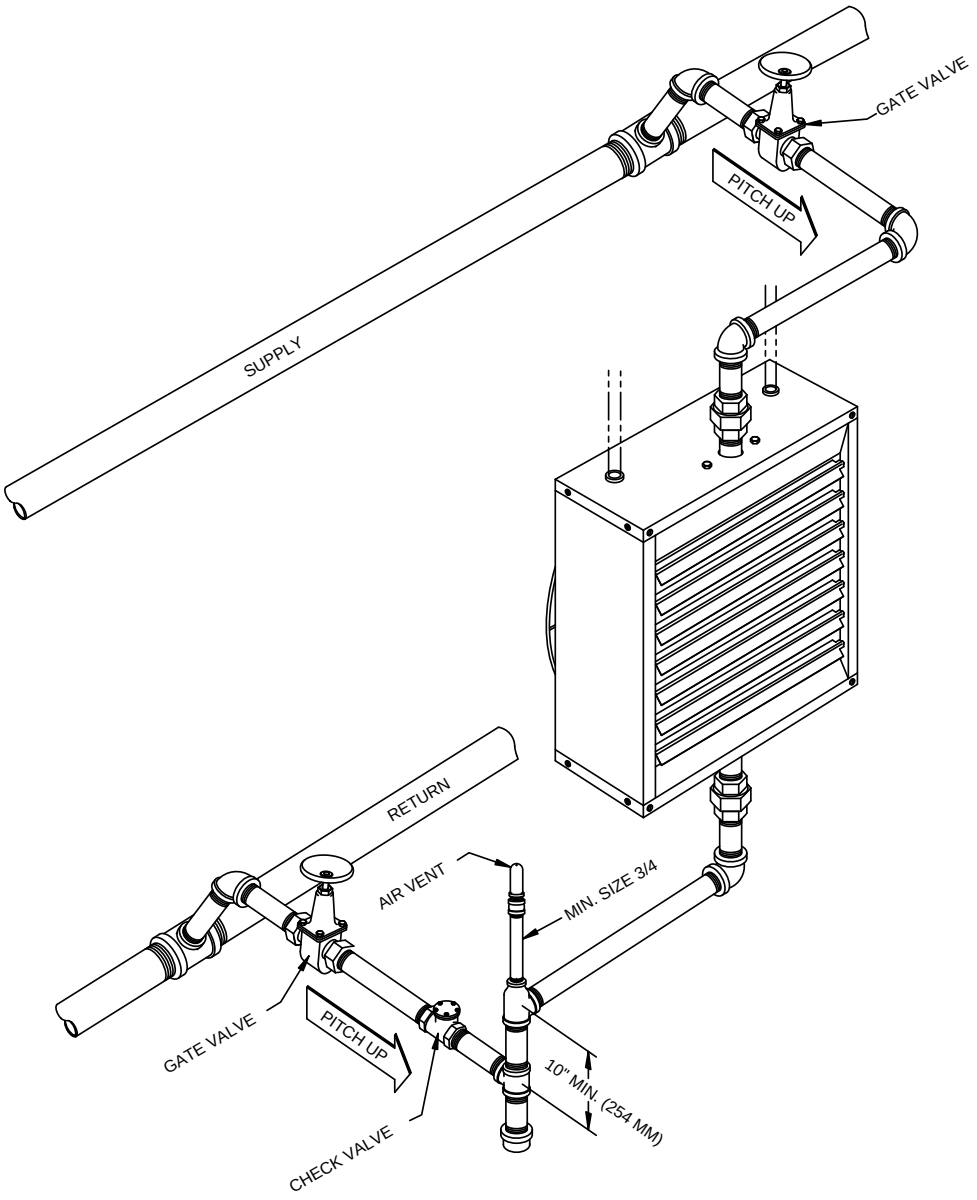
## Installation (Continued)

**Figure 10**
**High Pressure Steam**



## Installation (Continued)

**Figure 11**
**Low Pressure**
**Steam Gravity**

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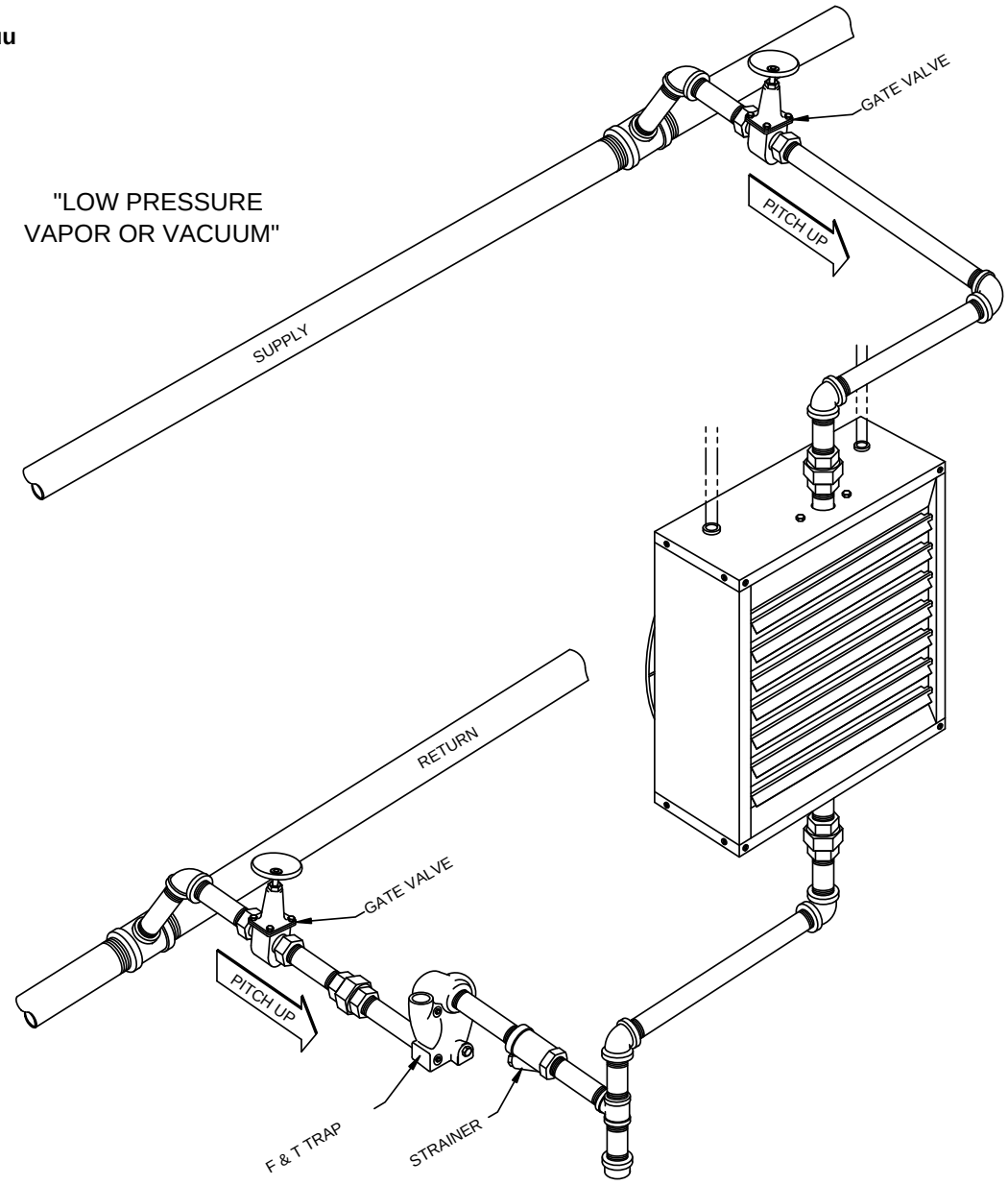
## Installation (Continued)

**Figure 12**
**Low Pressure**
**Vapor Or Vacuu**



# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## Electrical Connections

**⚠WARNING**

**HAZARDOUS VOLTAGE! DISCONNECT ALL ELECTRIC POWER INCLUDING REMOTE DISCONNECTS BEFORE SERVICING. Failure to disconnect power before servicing can cause severe personal injury or death.**

Units are shipped for use on 115 volt, 60 hertz single phase electric power. The motor nameplate and electrical rating on the transformer should be checked before energizing the unit heater electrical system. All external wiring must conform to ANSI/NFPA No. 70, National Electrical Code (or the latest edition) and applicable current local codes; in Canada, to the Canadian Electrical Code, Part 1 CSA Standard C22.1.

**⚠ CAUTION** ***Do not use any tools (i.e. screwdriver, pliers, etc.) across the terminals to check for power. Use a voltmeter.***

It is recommended that the electrical power supply to each unit heater be provided by a separate, fused and permanently live electrical circuit. A disconnect switch of suitable electrical rating for each unit heater should be located as close to the controls as possible. Each unit heater must be electrically grounded in accordance with National Electric Code, ANSI/NFPA No. 70 (or the latest edition of) or CSA Standard C22.1. Sample wiring connections are depicted in Figures 13 through 18.

**OPERATION**

Most basic unit heater systems are controlled by a room thermostat. Locate thermostat on inner wall or column so that optimum control can be obtained for that area. Set thermostat for desired temperature.

On steam systems a low limit may be used to prevent fan from blowing cold air unless the heater has steam passing through the coil.

Small hot water systems may have the circulating pump controlled directly by the room thermostat. On large systems, zone valves could be used to control the individual unit heater where constant water circulation is used on the main system.

**THERMOSTAT WIRING AND LOCATION**

**NOTE:** The thermostat must be mounted on a vertical vibration-free surface free from air currents and in accordance with the furnished instructions.

Mount the thermostat approximately 5 feet (1.5 m) above the floor in an area where it will be exposed to a free circulation of average temperature air. Always refer to the thermostat instructions as well as our unit wiring diagram and wire accordingly. Avoid mounting the thermostat in the following locations:

1. Cold areas - Outside walls or areas where drafts may affect the operation of the control.
2. Hot areas - Areas where the sun's rays, radiation, or warm air currents may affect control operation.
3. Dead areas - Areas where air cannot circulate freely, such as behind doors or in corners.

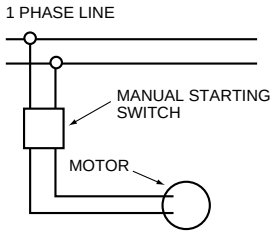
**NOTICE: For all wiring connections, refer to the wiring diagram on the motor nameplate. Should any original wire supplied with the heater have to be replaced, it must be replaced with wiring material having a temperature rating of at least 105°C.**

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



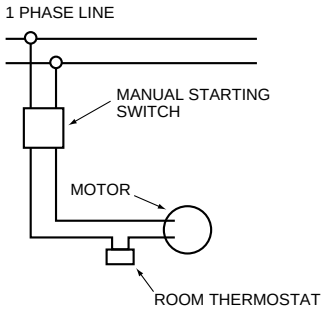
## Wiring Installation

**Figure 13**



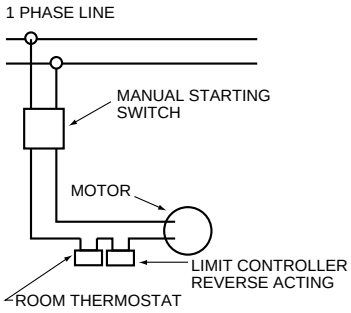

**MANUAL CONTROL WITH SINGLE PHASE MOTOR**

**Figure 14**



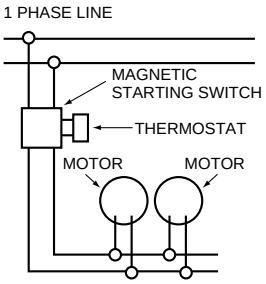

**THERMOSTATIC CONTROL WITH MANUAL STARTER**

**Figure 15**



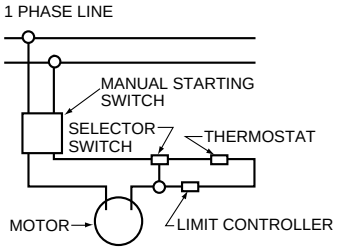

**THERMOSTATIC CONTROL WITH REVERSE ACTING CONTROLLER AND MANUAL STARTER**

**Figure 16**



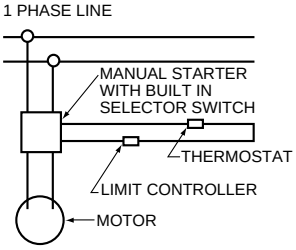

**THERMOSTATIC CONTROL USING MAGNETIC STARTER OPERATING SEVERAL UNITS**

**Figure 17**




**THREE POSITION SELECTOR SWITCH USED FOR EITHER MANUAL OR THERMOSTATIC CONTROL**

**Figure 18**




**THREE POSITION SELECTOR SWITCH BUILT INTO MAGNETIC STARTER FOR MANUAL OR THERMOSTATIC CONTROL**

**NOTICE:** When using electrical accessories, always refer to the accessory manufacturer's installation manual for proper use, location and wiring instructions.

# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## Maintenance

### PERIODIC SERVICE

**⚠WARNING** ***Open all disconnect switches and secure in that position before servicing unit. Failure to do so may result in personal injury or death from electrical shock***

Because of the simple design of the steam and hot water unit heaters, they are nearly maintenance free. However, depending on the environment, simple maintenance practices should be adopted.

Periodically check the finned surfaces and vacuum these as often as necessary to remove any accumulation of lint and dirt. Check fan blades and remove dirt accumulation. If fan blades are not cleaned they tend to become unbalanced.

Check motors for dirt and dust accumulation, and remove any accumulation as often as necessary. Open type motors may overheat if the dirt or dust is not removed from ventilation openings.

**⚠ CAUTION** ***Allow rotating fans to stop before servicing to avoid serious injury to fingers and hands.***

### MOTOR LUBRICATION

Motors with oilers or oil holes are lubricated before shipment with a good grade of electric motor oil. Refill when necessary, with the motor at a standstill, until oil reaches the proper level.

Use SAE 20W non-detergent oil for motors operating in ambient temperatures of 32°F to 100°F (0°C to 38°C). Below 32°F (0°C), SAE 10W non-detergent oil will be required.

The frequency of oiling will depend upon operating conditions and length of running time. Inspect the oilers or oil holes when cleaning the unit. If the unit has a fractional horse-power motor, lubricate at least once a year. Under high ambient conditions or constant fan operation, fractional horse-power motors should be lubricated every 90 days. On those motors without oilers or oil holes, follow the instructions given on the motor nameplate.

**NOTE: The heater system should be checked once a year by a qualified technician. All maintenance/service information should be recorded accordingly on the inspection sheet provided in this manual.**

Should maintenance be required, perform the following inspection and service routine:

Inspect the area near the unit to be sure that there is no combustible material located within the minimum clearance requirements listed in this manual.

### CLEANING THE UNIT

The unit casing, fan, diffuser and coil should be cleaned thoroughly once a year. Coil heat transfer efficiency depends on cleanliness. The following recommended procedures may be performed when lubricating the motor and cleaning the coil.

1. Wipe all excess lubricant from the motor, fan and casing. Clean the motor thoroughly. A dirty motor will run hot and eventually cause internal damage.
2. Clean the coil:
   a) Loosen the dirt with a brush on the fan side of the coil. Operate the motor allowing the fan to blow the loosened dirt through the unit.
   b) Use high pressure air or steam on the side of the coil away from the fan.

**NOTE: A piece of cheesecloth or a burlap bag may be used to collect the large particles during the cleaning process.**

3. Clean the casing, fan blades, fan guard and diffuser using a damp cloth. Any rust spots on the casing should be cleaned and repainted.
4. Tighten the fan guard, motor frame and fan bolts. Check the fan for clearance in the panel orifice and free rotation.

# *For Repair Parts, call 1-800-323-0620*

## *24 hours a day – 365 days a year*

*Please provide following information:*
-Model number
-Serial number (if any)
-Part description and number shown in parts list



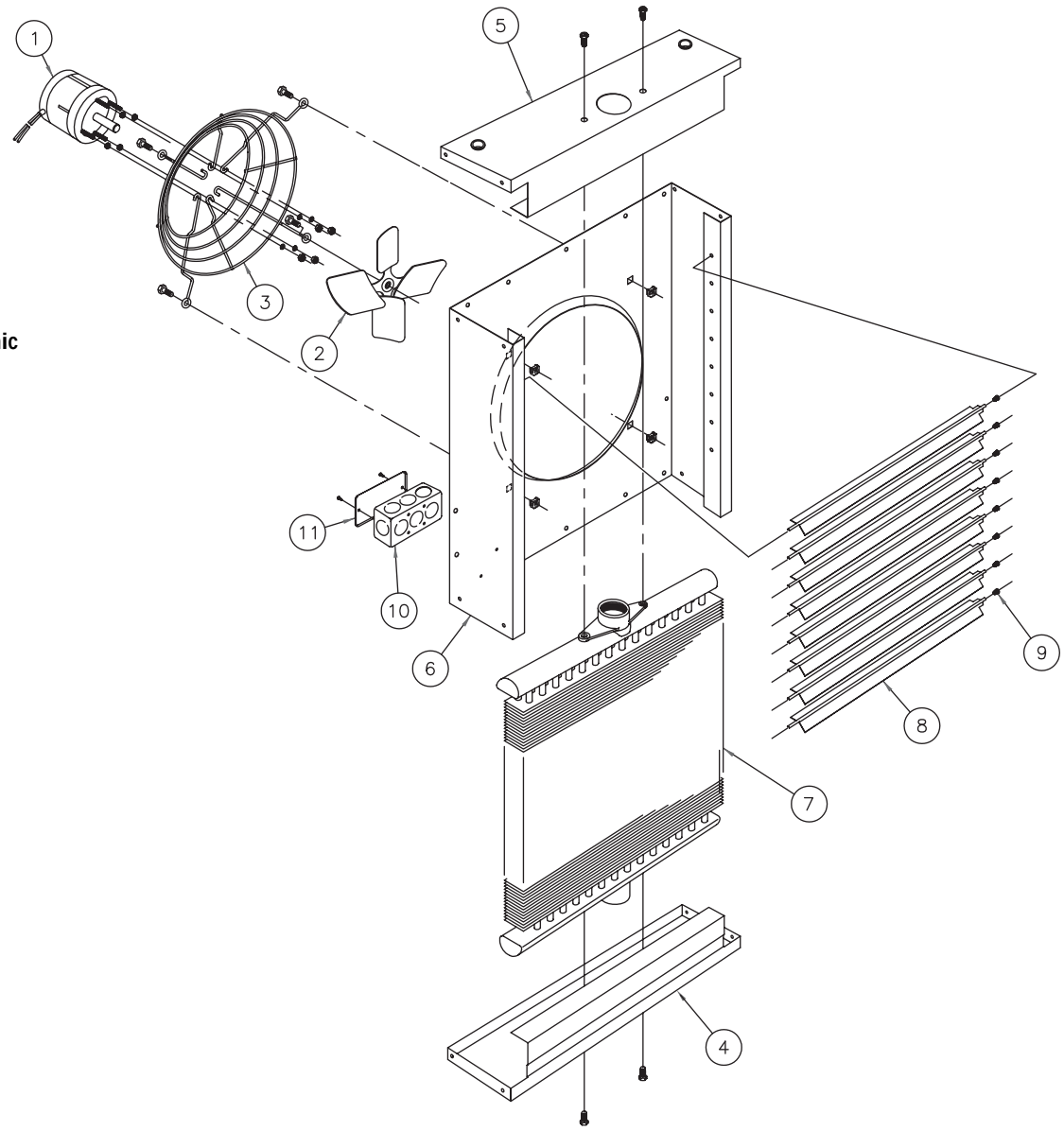



**Figure 19**
**Horizontal Hydronic Unit Heaters**

# Repair Parts List

| Ref. No. | Description | NON-OSHA / OSHA | Part Numbers for Model 5YH18 | 5PV19 | 5PV22 | 5PV26 | 5PV31 | 3DUF7 | 5PV43 | 5PV46 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Motor 115V | | 11J31R08361-001 | 11J31R08361-001 | 11J31R08361-003 | 11J31R01871 | 11J31R08361-001 | 11J31R08361-001 | 11J31R08361-003 | 11J31R01871 |
| 2 | Fan Blade | | 11J34R06999-004 | 11J34R06999-009 | 11J34R06999-015 | 11J34R06999-003 | 11J34R06999-005 | 11J34R06999-009 | 11J34R06999-015 | 11J34R06999-003 |
| 3 | Non-OSHA Fan Guard | | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| 3 | OSHA Fan Guard | | 11J32R08362-004 | 11J32R08362-004 | 11J32R08362-004 | 11J32R04837 | 11J32R08362-002 | 11J32R08362-002 | 11J32R08362-002 | 11J32R04837 |
| 4 | Bottom Jacket Panel | | 11251R02709-001 | 11251R02709-001 | 11251R02709-001 | 11251R02709-002 | 11251R02700-001 | 11251R02700-001 | 11251R02700-001 | 11251R02700-002 |
| 5 | Top Jacket Panel Assembly | | 11251R08539-001 | 11251R08539-001 | 11251R08539-001 | 11251R08539-002 | 11251R08540-001 | 11251R08540-001 | 11251R08540-001 | 11251R08540-002 |
| 6 | Venturi Jacket Panel | | 11251R01012-001 | 11251R01012-001 | 11251R01012-001 | 11251R01012-002 | 11251R02856 | 11251R00803 | 11251R00803 | 11251R02701 |
| 7 | Coil Assembly | | 11257R01006-003 | 11257R01006-001 | 11257R01006-001 | 11257R01006-002 | 11257R01020-001 | 11257R01020-002 | 11257R01020-002 | 11257R01020-004 |
| 8 | Horizontal Louvers (Qty) | | 11257R00272-117 (5) | 11257R00272-117 (5) | 11257R00272-117 (5) | 11257R00272-117 (6) | 11257R00272-117 (4) | 11257R00272-117 (5) | 11257R00272-117 (5) | 11257R00272-118 (6) |
| 9 | Louver Cone Spring (Qty) | | 11J26R01960 (5) | 11J26R01960 (5) | 11J26R01960 (5) | 11J26R01960 (6) | 11J26R01960 (4) | 11J26R01960 (5) | 11J26R01960 (5) | 11J26R01960 (6) |
| 10 | Junction Box | | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 |
| 11 | Junction Box Cover | | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 |

(N/A) Not Applicable.

| Ref. No. | Description | NON-OSHA / OSHA | Part Numbers for Model 5PV47 5PV48 | 5PV49 5PV50 | 5YH20 5PV51 | 5PV52 5PV53 | 5PV15 5PV16 | 5YH19 5PV20 | 5PV23 5PV24 | 5PV27 5PV28 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Motor 115V | | 11J31R01871 | 11J31R01871 | 11J31R01872 | 11J31R01872 | 11J31R01872 | 11J31R01694 | 11J31R01694 | 11J31R01694 |
| 2 | Fan Blade | | 11J34R06999-008 | 11J34R06999-006 | 11J34R06999-007 | 11J34R06999-101 | 11J34R06999-113 | 11253R08419-003 | 11J34R06999-107 | 11J34R06999-108 |
| 3 | Non-OSHA Fan Guard | | 11253R00250-001 | 11253R01873-001 | 11253R01873-001 | 11253R01873-001 | 11253R01873-001 | 11253R01874-001 | 11253R01874-001 | 11253R01874-001 |
| 3 | OSHA Fan Guard | | 11J32R04837 | 11M32R06163 | 11M32R06163 | 11M32R06163 | 11M32R06163 | 11M32R06164 | 11M32R06164 | 11M32R06164 |
| 4 | Bottom Jacket Panel | | 11251R02700-002 | 11251R02700-003 | 11251R02700-004 | 11251R02700-005 | 11251R02700-005 | 11251R02700-006 | 11251R02700-007 | 11251R02700-007 |
| 5 | Top Jacket Panel Assembly | | 11251R08540-002 | 11251R08540-003 | 11251R08540-004 | 11251R08540-005 | 11251R08540-005 | 11251R08540-006 | 11251R08540-007 | 11251R08540-007 |
| 6 | Venturi Jacket Panel | | 11251R02701 | 11251R02702 | 11251R02703 | 11251R02704 | 11251R02704 | 11251R02705 | 11251R02706 | 11251R02706 |
| 7 | Coil Assembly | | 11257R01020-004 | 11257R01020-006 | 11257R01020-007 | 11257R01025-001 | 11257R01025-001 | 11257R01025-003 | 11257R01025-004 | 11257R01025-004 |
| 8 | Horizontal Louvers (Qty) | | 11257R00272-118 (6) | 11257R00272-119 (7) | 11257R00272-120 (8) | 11257R00272-121 (8) | 11257R00272-121 (8) | 11257R00272-120 (8) | 11257R00272-122 (9) | 11257R00272-122 (9) |
| 9 | Louver Cone Spring (Qty) | | 11J26R01960 (6) | 11J26R01960 (7) | 11J26R01960 (8) | 11J26R01960 (8) | 11J26R01960 (8) | 11J26R01960 (8) | 11J26R01960 (9) | 11J26R01960 (9) |
| 10 | Junction Box | | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 |
| 11 | Junction Box Cover | | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 |

| Ref. No. | Description | NON-OSHA / OSHA | Part Numbers for Model 5PV29 5PV30 | 5PV32 5PV33 | 5PV34 5PV35 | 5PV38 1EBC1 | 5PV40 1EBC2 | 5PV42 1EBC3 | 5PV45 1EBC4 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Motor 115V | | 11J31R01694 | 11J31R01694 | 11J31R01694 | 11J31R01694 | 11R70310112010 | 11R70310112010 | 11R70310112010 |
| 2 | Fan Blade | | 11J34R06999-105 | 11J34R06999-107 | 11J34R06999-105 | 11J34R06999-109 | 11J34R06999-109 | 11J34R06999-111 | 11J34R06999-106 |
| 3 | Non-OSHA Fan Guard* | | 11J32R08288 | 11253R01874-001 | 11J32R08288 | 11253R08423-001 | 11253R08423-001 | 11253R08423-002 | 11253R08423-002 |
| 3 | OSHA Fan Guard** | | 11M32R08291 | 11M32R06164 | 11M32R08291 | 11253R08424-001 | 11253R08424-001 | 11253R08424-002 | 11253R08424-002 |
| 4 | Bottom Jacket Panel | | 11251R02700-007 | 11251R02700-008 | 11251R02700-008 | 11251R02700-009 | 11251R02700-009 | 11251R02700-010 | 11251R02700-010 |
| 5 | Top Jacket Panel Assembly | | 11251R08540-007 | 11251R08540-008 | 11251R08540-008 | 11251R08540-009 | 11251R08540-009 | 11251R08540-010 | 11251R08540-010 |
| 6 | Venturi Jacket Panel | | 11251R02706 | 11251R02707 | 11251R02707 | 11251R00804 | 11251R00804 | 11251R02708 | 11251R02708 |
| 7 | Coil Assembly | | 11257R01025-004 | 11257R01025-007 | 11257R01025-007 | 11257R01025-009 | 11257R01025-009 | 11257R01025-011 | 11257R01025-011 |
| 8 | Horizontal Louvers (Qty) | | 11257R00272-122 (9) | 11257R00272-123 (9) | 11257R00272-123 (9) | 11257R00272-124 (10) | 11257R00272-124 (10) | 11257R00272-125 (13) | 11257R00272-125 (13) |
| 9 | Louver Cone Spring (Qty) | | 11J26R01960 (9) | 11J26R01960 (9) | 11J26R01960 (9) | 11J26R01960 (10) | 11J26R01960 (10) | 11J26R01960 (13) | 11J26R01960 (13) |
| 10 | Junction Box | | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 | 11J09R00796-001 |
| 11 | Junction Box Cover | | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 | 11J09R00797-001 |

* Part numbers 11253R08423-001 and 11253R08423-002 are a “Kit” and include a non-OSHA guard and hardware.

** Part numbers 11253R08424-001 and 11253R08424-002 are a “Kit” and include an OSHA guard and hardware.

# Dayton® Horizontal Hydronic Unit Heaters for Steam and Hot Water



Table 9 Troubleshooting Chart

| Symptom | Possible Cause(s) | Corrective Action |
|---|---|---|
| A. Leaking coil | 1. Frozen coil | 1. Replace |
| | 2. Defective coil | 2. Replace |
| | 3. Corrosion | 3. Replace |
| | 4. Leak in joint | 4. Braze joint if joint is exposed where leak has occurred |
| B. Poor Output on steam | 1. Check for air in coil | 1. Repair or replace thermostatic air vent |
| | 2. Lint on coil fins | 2. Clean coil and fins. |
| C. Poor output on steam or hot water | 1. No circulation of water through coil | 1. Check circulation pump. Check for blocked tubes |
| | 2. Short cycling of motor | 2. Check voltage and correct. Check for linted coil and clean. Check for defective overload and repair or replace motor. |
| | 3. Backward rotating motor | 3. On single phase motor replace motor. On three phase motor, reverse two leads to change rotation. |
| D. Noisy or vibrating unit | 1. Damaged fan blade | 1. Change fan blade |
| | 2. Dirty fan blade | 2. Clean fan blade |

## EQUIPMENT START-UP

**Customer** _____ **Job Name & Number** _____

**PRE-INSPECTION INFORMATION**
**With power and water/steam off.**

Type of Equipment: Unit Heater

Serial Number _____ Model Number _____

Name Plate Voltage: _____ Name Plate Amperage:_____

Steam Hot Water Rating: _____ BTU @ ____ °F
_____ kw @ ____ °C

- ❒ Are all panels in place?
- ❒ Has the unit suffered any external damage? Damage _____
- ❒ Does the piping and electric wiring appear to be installed in a professional manner?
- ❒ Has the piping and electric been inspected by the local authority having jurisdiction?
- ❒ Is the supply properly sized for the equipment?
- ❒ Were the installation instructions followed when the equipment was installed?
- ❒ Have all field installed controls been installed?
- ❒ Do you understand all the controls on this equipment? **If not, contact your wholesaler or rep.**

**(DO NOT START this equipment unless you fully understand the controls.)**

# Models 1EBC1-1EBC4, 3DUF7, 5PV15, 5PV16, 5PV19, 5PV20, 5PV22-5PV24, 5PV26-5PV35, 5PV38, 5PV40, 5PV42, 5PV43, 5PV45-5PV53 & 5YH18-5YH20



## *LIMITED WARRANTY*

***DAYTON ONE-YEAR LIMITED WARRANTY.*** *DAYTON® HORIZONTAL HYDRONIC UNIT HEATERS, MODELS COVERED IN THIS MANUAL, ARE WARRANTED BY DAYTON ELECTRIC MFG. CO. (DAYTON) TO THE ORIGINAL USER AGAINST DEFECTS IN WORKMANSHIP OR MATERIALS UNDER NORMAL USE FOR ONE YEAR AFTER DATE OF PURCHASE. ANY PART WHICH IS DETERMINED TO BE DEFECTIVE IN MATERIAL OR WORKMANSHIP AND RETURNED TO AN AUTHORIZED SERVICE LOCATION, AS DAYTON DESIGNATES, SHIPPING COSTS PREPAID, WILL BE, AS THE EXCLUSIVE REMEDY, REPAIRED OR REPLACED AT DAYTON'S OPTION. FOR LIMITED WARRANTY CLAIM PROCEDURES, SEE "PROMPT DISPOSITION" BELOW. THIS LIMITED WARRANTY GIVES PURCHASERS SPECIFIC LEGAL RIGHTS WHICH VARY FROM JURISDICTION TO JURISDICTION.*

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***Product Suitability.*** *Many jurisdictions have codes and regulations governing sales, construction, installation, and/or use of products for certain purposes, which may vary from those in neighboring areas. While attempts are made to assure that Dayton products comply with such codes, Dayton cannot guarantee compliance, and cannot be responsible for how the product is installed or used. Before purchase and use of a product, review the product applications, and all applicable national and local codes and regulations, and be sure that the product, installation, and use will comply with them.*

*Certain aspects of disclaimers are not applicable to consumer products; e.g., (a) some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you; (b) also, some jurisdictions do not allow a limitation on how long an implied warranty lasts, consequently the above limitation may not apply to you; and (c) by law, during the period of this Limited Warranty, any implied warranties of implied merchantability or fitness for a particular purpose applicable to consumer products purchased by consumers, may not be excluded or otherwise disclaimed.*

***Prompt Disposition.*** *A good faith effort will be made for prompt correction or other adjustment with respect to any product which proves to be defective within limited warranty. For any product believed to be defective within limited warranty, first write or call dealer from whom the product was purchased. Dealer will give additional directions. If unable to resolve satisfactorily, write to Dayton at address below, giving dealer's name, address, date, and number of dealer's invoice, and describing the nature of the defect. Title and risk of loss pass to buyer on delivery to common carrier. If product was damaged in transit to you, file claim with carrier.*

***Manufactured for Dayton Electric Mfg. Co., 100 Grainger Parkway, Lake Forest, Illinois 60045-5201 U.S.A.***

Manufactured for Dayton Electric Mfg. Co.
Lake Forest, Illinois 60045 U.S.A.