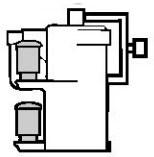
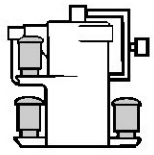
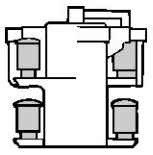
Domestic® Pump Series VCD™ Vacuum Heating Units

Guide Specification Index







PART 1 GENERAL

1.01 SECTION INCLUDES

A. Unit shall be a Domestic® Series VCD2™, vacuum heating and condensate pumping unit as manufactured by Bell & Gossett.
B. Furnish and install extended life pumps with capacities as indicated in the plans.

1.02 RELATED SECTIONS

A. Section 23 22 00 - Steam and Condensate Piping and Pumps
B. Section 23 22 23 – Steam Condensate Pumps
C. Section 23 22 23.13 – Electric Driven Condensate Pumps.

1.03 REFERENCES

A. HI - Hydraulic Institute.
B. ANSI - American National Standards Institute.
C. NEMA - National Electrical Manufacturers Association.
D. UL - Underwriters Laboratories.
E. ETL - Electrical Testing Laboratories.
F. CSA - Canadian Standards Association.
G. NEC - National Electric Codes.
H. ISO - International Standards Organization.
I. IEC - International Electrotechnical Commission.

1.04 SUBMITTALS

A. Submit data cover sheet.
B. Unit description sheet.
C. Dimensional print(s).
D. Sales bulletin.
E. Piping diagram(s).
F. Wiring diagram(s).
G. Installation, operation & maintenance manual.

1.05 QUALITY ASSURANCE

A. The manufacturer shall have a minimum of 30 years experience in the design and construction of condensate return equipment.
B. The pump manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.
C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.
D. The Unit shall be UL Listed or Recognized by Underwriters Laboratories, Inc as a complete condensate pumping package.
E. All control cabinet components shall be U.L. Listed or Recognized.

The control panel assembly shall be Listed by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
   1. Bell & Gossett Domestic Series VCD2 vacuum heating and condensate pumping unit.
   2. Pre-approved equal.

2.02 COMPONENTS

Note: Optional accessories are Underlined

A. Cast iron receiver
   1. The receiver shall be manufactured of close grained cast iron construction (warrantied for 20 years from the date of shipment against failure due to corrosion).
   2. The centerline of inlet shall be no higher than 15 inches (381 mm) above the floor, and shall consist of condensate receiver and independent hurling water separation chamber.
   3. Condensate Receiver shall have a capacity as indicated by the drawings. Condensate receiver accessories shall include: deaerating cascade baffle, water level gauge, vacuum gauge, dial thermometer, float switch for pump control, lifting eye bolts, and reverse acting temperature limit switch to prevent operation of air pump if the condensate temperature exceeds 180°F (82°C).
B. A vacuum unit shall consist of:
   1. (1) Multi-jet vacuum producer(s) and (1) centrifugal pump and motor assembly(s) mounted on the separation chamber and shall deliver the scheduled capacity of saturated air at 5-1/2" Hg vacuum and 160°F, rated and tested according to the latest ASHRAE Standard Code for "Return Line Low Vacuum Heating Pumps."
   2. Hurling or sealing water for the air pump shall be recirculated for an independent reservoir and shall not mix with condensate.
   3 The separation chamber shall be equipped with water level gauge, thermometer, suction swing check valve, air vent and overflow connections and automatic hurling water level controls, temperature limit switch to add cooling water if hurling chamber liquid reaches 160 degrees. Vacuum pumps requiring mufflers or silencers to quiet noise shall not be accepted.
   4. Both pumps shall be flange mounted centrifugal type and designed for vertical operation. Each shall be bronze fitted, and be equipped with bronze impeller, renewable bronze wear ring, and stainless steel shaft.
   5. Carbon/ceramic mechanical seal shall be rated for 250°F (121°C) for maximum life. Condensate return and vacuum capacities, motor HP and rpm, receiver size and electrical characteristics shall be as scheduled on the drawings. Condensate Pumps – each pump GPM shall be sized for 2 times the system return rate.
C. Water pump
   1. Water pump shall be a series C35 or C17 bronze fitted, centrifugal pump, close-coupled to a 3500 RPM or 1750 RPM motor, permanently aligned, and flange mounted for vertical operation.
   2. Each pump shall include:
      a. One cast Iron volute with:
         1) One discharge gauge port tapping.
         2) One drain tapping.
      b. One dynamically balanced enclosed bronze centrifugal impeller.
      c. One renewable bronze wearing ring.
      d. One stainless steel shaft.
      e. Carbon/ceramic/Buna N/stainless steel mechanical seal suitable for 250°F (121°C) operation.
   3. Each pump shall be sized for two times the system return rate.

4. Each motor is ODP type and shall meet NEMA specifications and shall be the size, voltage, insulation class, duty rating and enclosure called for in the plans. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.

D. Manual by-pass valve around the water make-up solenoid consisting of:
   1. Two ball valves to isolate the solenoid valve.
   2. One gate valve for the direct water feed line.

E. Air gap fitting for make-up valve.

F. Lifting eye bolts for unit placement.

G. Cast iron inlet basket strainer with vertical self-cleaning bronze screen and large dirt pocket for sediment collection. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing. This option ships loose for field installation.

H. TEFC motors as required.

I. Consolitrol® NEMA 2, UL electrical panel mounted and wired with drip lip and piano hinged door is available with the following options:
   1. NEMA 4 and NEMA 12 Electrical panels mounted and wired as required.
   2. Two combination magnetic starters with disconnect devices, either fusible or circuit breaker type with cover interlock and adjustable thermal overload protection.
   3. One fused control circuit transformer when the motor voltage exceeds 230V.
   4. Selector switch:
      a. "Auto-Off-Hand" selector switches.
   5. Two pump running pilot lights.
   6. Two "Push to Test" buttons.
   7. One numbered terminal strip.
   8. Two auxiliary contacts on the magnetic starters normally open for remote monitoring of pump operation.
   9. A removable control component mounting plate.
   10. Two elapsed time meters (UL).
   11. An audible alarm to indicate water level conditions.
      a. Audible alarm is available with or without silencing relay.
      b. A separate tank mounted level switch should be provided with audible alarm.
      c. Alarm may be provided with alarm light to provide visual indication of alarm condition.
   12. One single point power connection.
   13. Control power switching relay shall allow the switch over of control power from one pump to the other in the event of a power failure or pump failure.

J. Liquid tight conduit suitable for NEMA 2, NEMA 4 & NEMA 12 applications.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install simplex vacuum heating unit equipment in accordance with manufacturer's instructions.

B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.

D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.

E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection-wiring diagrams and piping diagrams. Installation and operation instructions shall also be provided.

F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.

G. The unit shall be shipped completely assembled.

H. The factory shall provide a certified test report.

I. Unit shall be a Domestic Pump Series VCD2 as manufactured by Bell & Gossett, Morton Grove, IL.

END OF SECTION

Domestic® Series VCD2™ Simplex Vacuum Heating Unit

STANDARD UNIT FEATURES:

- Cast Iron Receiver for years of dependable service
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Multi-jet vacuum producer
- Automatic vacuum hurling water level control
- Vacuum switch, diaphragm type, double pole
- Float switch, double pole and externally adjustable with seamless float and stainless steel rod
- Vacuum gauge, vacuum breaker, gauge glass and thermometer
- Inlet basket strainer
- NEMA 2 Control Panel mounted and wired with liquid tight flexible conduit – U.L. Listed
- Centriflo® centrifugal pumps with open drip proof motors

OPTIONAL EQUIPMENT AS SPECIFIED:

- TEFC motors
- Combination magnetic starters with fused disconnect switch or circuit breakers
- Temperature limit switch for vacuum pump protection in high temperature conditions
- Control circuit transformers
- Lifting eye bolts
- Discharge pressure gauge for the condensate pump

9 SOLID REASONS TO CHOOSE DOMESTIC®:

- Reliable cast iron receivers
- Bronze-fitted centrifugal pump
- Stainless steel pump shaft
- Renewable bronze pump wearing ring
- 250°F (121°C) Mechanical seal construction
- Quiet ball bearing type motor
- Factory wired and tested before shipment
- Package construction for compact installation
- Engineered Reliability

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Unit shall be a Domestic® Series VCD3™, vacuum heating and condensate pumping unit as manufactured by Bell & Gossett.
B. Furnish and install extended life pumps with capacities as indicated in the plans.

1.02 RELATED SECTIONS
A. Section 23 22 00 - Steam and Condensate Piping and Pumps
B. Section 23 22 23 – Steam Condensate Pumps
C. Section 23 22 23.13 – Electric Driven Condensate Pumps

1.03 REFERENCES
A. HI - Hydraulic Institute.
B. ANSI - American National Standards Institute.
C. NEMA - National Electrical Manufacturers Association.
D. UL - Underwriters Laboratories.
E. ETL - Electrical Testing Laboratories.
F. CSA - Canadian Standards Association.
G. NEC - National Electric Codes.
H. ISO - International Standards Organization.
I. IEC - International Electrotechnical Commission.

1.04 SUBMITTALS
A. Submit data cover sheet.
B. Unit description sheet.
C. Dimensional print(s).
D. Sales bulletin.
E. Piping diagram(s).
F. Wiring diagram(s).
G. Installation, operation & maintenance manual.

1.05 QUALITY ASSURANCE
A. The manufacturer shall have a minimum of 30 years experience in the design and construction of condensate return equipment.
B. The pump manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.
C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.
D. The Unit shall be UL listed or recognized by Underwriters Laboratories, Inc as a complete condensate pumping package.
E. All control cabinet components shall be U.L. Listed or Recognized.

The control panel assembly shall be Listed by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
   1. Bell & Gossett Domestic Pump Series VCD3 vacuum heating and condensate pumping unit.
   2. Pre-approved equal.

2.02 COMPONENTS
Note: Optional accessories are Underlined

A. Cast iron receiver
   1. The receiver shall be manufactured of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
   2. The centerline of inlet shall be no higher than 15 inches (381mm) above the floor, and shall consist of condensate receiver and independent hurling water separation chamber.
   3. Condensate Receiver shall have a capacity as indicated by the drawings. Condensate receiver accessories shall include: deaerating cascade baffle, water level gauge, vacuum gauge, dial thermometer, float switches for pump level control, lifting eye bolts, and reverse acting temperature limit switch to prevent operation of air pump if the condensate temperature exceeds 180°F (82°C).
B. A vacuum unit shall consist of:
   1. (1) Multi-jet vacuum producer(s) and (1) centrifugal pump and motor assembly(s) mounted on the separation chamber and shall deliver the scheduled capacity of saturated air at 5-1/2" Hg vacuum and 160°F , rated and tested according to the latest ASHRAE Standard Code for "Return Line Low Vacuum Heating Pumps."
   2. Hurling or sealing water for the air pump shall be recirculated from an independent reservoir and shall not mix with condensate.
   3. The separation chamber shall be equipped with water level gauge, thermometer, suction swing check valve, air vent and overflow connections and automatic hurling water level controls, temperature limit switch to add cooling water if hurling chamber liquid exceeds 160 degrees. Vacuum pumps requiring mufflers or silencers to quiet noise shall not be accepted.
   4. Both pumps shall be flange mounted centrifugal type and designed for vertical operaton. Each shall be bronze fitted, and be equipped with bronze impeller, renewable bronze wear ring, and stainless steel shaft.
   5. Carbon/ceramic mechanical seal shall be rated for 250°F (121°C) for maximum life. Condensate return and vacuum capacities, motor HP and rpm, receiver size and electrical characteristics shall be as scheduled on the drawings. Condensate Pumps – each pump GPM shall be sized for 2 times the system return rate.
C. Water pump
   1. Two water pumps shall each be a series C35 or C17 bronze fitted, centrifugal pump, close-coupled to a 3500 RPM or 1750 RPM motor, permanently aligned, and flange mounted for vertical operation.
   2. Each pump shall include:
      a. One cast Iron volute with:
         1) One discharge gauge port tapping.
         2) One drain tapping.
      b. One dynamically balanced enclosed bronze centrifugal impeller.
      c. One renewable bronze wearing ring.
      d. One stainless steel shaft.
      e. Carbon/ceramic/Buna N/stainless steel mechanical seal suitable for 250°F (121°C) operation.
   3. Each pump shall be sized for two times the system return rate.

4. Each motor is ODP type and shall meet NEMA specifications and shall be the size, voltage, insulation class, duty rating and enclosure called for in the plans. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.

D. Manual by-pass valve around the water make-up solenoid consisting of:
   1. Two ball valves to isolate the solenoid valve.
   2. One gate valve for the direct water feed line.
E. Air gap fitting for make-up valve.
F. Lifting eye bolts for unit placement.
G. Cast iron inlet basket strainer with vertical self-cleaning bronze screen and large dirt pocket for sediment collection. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing. This option ships loose for field installation.
H. A NEMA 1 automatic mechanical alternator to replace two float switches.
I. TEFC motors as required.
J. Consolitrol® NEMA 2, UL electrical panel mounted and wired with drip lip and piano hinged door is available with the following options:
   1. NEMA 4 and NEMA 12 Electrical panels mounted and wired as required.
   2. Three combination magnetic starters with disconnect devices, either fusible or circuit breaker type with cover interlock and adjustable thermal overload protection.
   3. One fused control circuit transformer when the motor voltage exceeds 230V.
   4. One selector switches per pump:
      a. "Off-Hand-Lead-Lag" selector switches.
      b. "Auto-Off-Hand" selector switches.
   5. Three pump running pilot lights.
   6. Three "Push to Test" buttons.
   7. One numbered terminal strip.
   8. Three auxiliary contacts on the magnetic starters normally open for remote monitoring of pump operation.
   9. A removable control component mounting plate.
   10. Three elapsed time meters (UL).
   11. An audible alarm to indicate water level conditions.
      a. Audible alarm is available with or without silencing relay.
      b. A separate tank mounted level switch should be provided with audible alarm.
      c. Alarm may be provided with alarm light to provide visual indication of alarm condition.
   12. One single point power connection.
   13. One electrical alternator.
   14. Control power switching relay shall allow the switch over of control power from one pump to the other in the event of a power failure or pump failure.
K. Liquid tight conduit suitable for NEMA 2, NEMA 4 & NEMA 12 applications.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install simplex vacuum heating unit equipment in accordance with manufacturer's instructions.
B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.
C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.
D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.
E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection-wiring diagrams and piping diagrams. Installation and operation instructions shall also be provided.
F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.
G. The unit shall be shipped completely assembled.
H. The factory shall provide a certified test report.
I. Unit shall be a Domestic Pump Series VCD3 as manufactured by Bell & Gossett, Morton Grove, IL.

END OF SECTION

Domestic® Series VCD3™ Semi-Duplex Vacuum Heating Unit

STANDARD UNIT FEATURES:

- Cast Iron Receiver for years of dependable service
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Multi-jet vacuum producer
- Automatic vacuum hurling water level control
- Vacuum switch, diaphragm type, double pole
- Float switches, double pole and externally adjustable with seamless float and stainless steel rod
- Vacuum gauge, vacuum breaker, gauge glass and thermometer
- Inlet basket strainer
- NEMA 2 Control Panel mounted and wired with liquid tight flexible conduit – U.L. Listed
- Centriflo® centrifugal pumps with open drip proof motors

OPTIONAL EQUIPMENT AS SPECIFIED:

- TEFC motors
- Combination magnetic starters with fused disconnect switch or circuit breakers
- Temperature limit switch for vacuum pump protection in high temperature conditions
- Control circuit transformers
- Lifting eye bolts
- Discharge pressure gauges for the condensate pumps

9 SOLID REASONS TO CHOOSE DOMESTIC®:

- Reliable cast iron receivers
- Bronze-fitted centrifugal pumps
- Stainless steel pump shafts
- Renewable bronze pump wearing ring
- 250°F (121°C) Mechanical seal construction
- Quiet ball bearing type motors
- Factory wired and tested before shipment
- Package construction for compact installation
- Engineered Reliability

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Unit shall be a Domestic® Pump Series VCD4, vacuum heating and condensate pumping unit as manufactured by Bell & Gossett ®.
B. Furnish and install extended life pumps with capacities as indicated in the plans.

1.02 RELATED SECTIONS

A. Section 23 22 00 - Steam and Condensate Piping and Pumps
B. Section 23 22 23 – Steam Condensate Pumps
C. Section 23 22 23.13 – Electric Driven Condensate Pumps.

1.03 REFERENCES

A. HI - Hydraulic Institute.
B. ANSI - American National Standards Institute.
C. NEMA - National Electrical Manufacturers Association.
D. UL - Underwriters Laboratories.
E. ETL - Electrical Testing Laboratories.
F. CSA - Canadian Standards Association.
G. NEC - National Electric Codes.
H. ISO - International Standards Organization.
I. IEC - International Electrotechnical Commission.

1.04 SUBMITTALS

A. Submit data cover sheet.
B. Unit description sheet.
C. Dimensional print(s).
D. Sales bulletin.
E. Piping diagram(s).
F. Wiring diagram(s).
G. Installation, operation & maintenance manual.

1.05 QUALITY ASSURANCE

A. The manufacturer shall have a minimum of 30 years experience in the design and construction of condensate return equipment.
B. The pump manufacturer shall be fully certified by the International Standards Organization per ISO 9001. Proof of this certification shall be furnished at the time of submittal.
C. The manufacturer shall carry a minimum product liability insurance of $5,000,000.00 per occurrence.
D. The Unit shall be UL listed or recognized by Underwriters Laboratories, Inc as a complete condensate pumping unit.
E. All control cabinet components shall be U.L. Listed or Recognized.

The control panel assembly shall be Listed by Underwriters Laboratories, Inc.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with these specifications, the following manufacturers shall be acceptable:
   1. Bell & Gossett Domestic Pump Series VCD4 vacuum heating and condensate pumping unit.
   2. Pre-approved equal.

2.02 COMPONENTS

Note: Optional accessories are Underlined

A. Cast iron receiver
   1. The receiver shall be manufactured of close grained cast iron construction (warranted for 20 years from the date of shipment against failure due to corrosion).
   2. The centerline of inlet shall be no higher than 15 inches (381mm) above the floor, and shall consist of condensate receiver and independent hurling water separation chamber.
   3. Condensate Receiver shall have a capacity as indicated by the drawings. Condensate receiver accessories shall include: deaerating cascade baffle, water level gauge, vacuum gauge, dial thermometer, float switches for pump level control, <u>lifting eye bolts</u>, and <u>reverse acting temperature limit switch to prevent operation of air pump if the condensate temperature exceeds 180°F (82°C).</u>
B. A vacuum unit shall consist of:
   1. (2) Multi-jet vacuum producer(s) and (2) centrifugal pump and motor assembly(s) mounted on the separation chamber and shall deliver the scheduled capacity of saturated air at 5-1/2" Hg vacuum and 160°F , rated and tested according to the latest ASHRAE Standard Code for "Return Line Low Vacuum Heating Pumps."
   2. Hurling or sealing water for the air pump shall be recirculated from an independent reservoir and shall not mix with condensate.
   3. The separation chamber shall be equipped with water level gauge, thermometer, (2) suction swing check valves, air vent and overflow connections and automatic hurling water level controls, <u>temperature limit switch to add cooling water if hurling chamber liquid reaches 160 degrees F</u>. Vacuum pumps requiring mufflers or silencers to quiet noise shall not be accepted.
   4. Both pumps shall be flange mounted centrifugal type and designed for vertical operaton. Each shall be bronze fitted, and be equipped with bronze impeller, renewable bronze wear ring, and stainless steel shaft.
   5. Carbon/ceramic mechanical seal shall be rated for 250°F (121°C) for maximum life. Condesate return and vacuum capacities, motor HP and rpm, receiver size and electrical characteristics shall be as scheduled on the drawings. Condensate Pumps – each pump GPM shall be sized for 2 times the system return rate.
C. Water pump
   1. Four water pumps shall each be a series C35 or C17 bronze fitted, centrifugal pump, close-coupled to a 3500 RPM or 1750 RPM motor, permanently aligned, and flange mounted for vertical operation.
   2. Each pump shall include:
      a. One cast Iron volute with:
         1) One discharge gauge port tapping.
         2) One drain tapping.
      b. One dynamically balanced enclosed bronze centrifugal impeller.
      c. One renewable bronze wearing ring.
      d. One stainless steel shaft.
      e. Carbon/ceramic/Buna N/stainless steel mechanical seal suitable for 250°F (121°C) operation.

3. Each pump shall be sized for two times the system return rate.
4. Each motor is ODP type and shall meet NEMA specifications and shall be the size, voltage, insulation class, duty rating and enclosure called for in the plans.
5. Capacities and electrical characteristics for the pump shall be scheduled on the drawings.

D. Manual by-pass valve around the water make-up solenoid consisting of:
   1. Two ball valves to isolate the solenoid valve.
   2. One gate valve for the direct water feed line.

E. Air gap fitting for make-up valve.

F. Lifting eye bolts for unit placement.

G. Cast iron inlet basket strainer with vertical self-cleaning bronze screen and large dirt pocket for sediment collection. The screen shall be easily removable for cleaning, requiring no additional floor space for servicing. This option ships loose for field installation.

H. A NEMA 1 automatic mechanical alternator to replace two float switches.

I. TEFC motors as required.

J. Consolitrol® NEMA 2, UL electrical panel(s) mounted and wired with drip lip and piano hinged door is available with the following options: NEMA 4 and NEMA 12 Electrical panels mounted and wired as required.
   1. Four combination magnetic starters with disconnect devices, either fusible or circuit breaker type with cover interlock and adjustable thermal overload protection.
   2. Two fused control circuit transformer when the motor voltage exceeds 230V.
   3. Four selector switches:
      a. "Off-Hand-Lead-Lag" selector switches or Off-Lead-Lag-Continuous.
      b. "Auto-Off-Hand" selector switches.
   4. Four pump running pilot lights.
   5. Four "Push to Test" buttons.
   6. Two numbered terminal strip.
   7. Four auxiliary contacts on the magnetic starters normally open for remote monitoring of pump operation.
   8. Two removable control component mounting plate.
   9. Four elapsed time meters (UL).
   10. An audible alarm to indicate water level conditions.
      a. Audible alarm is available with or without silencing relay.
      b. A separate tank mounted level switch should be provided with audible alarm.
      c. Alarm may be provided with alarm light to provide visual indication of alarm condition.
   11. Two single point power connection.
   12. Two electrical alternator.
   13. Two Control power switching relay shall allow the switch over of control power from one pump to the other in the event of a power failure or pump failure.

K. Liquid tight conduit suitable for NEMA 2, NEMA 4 & NEMA 12 applications.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install duplex vacuum heating unit equipment in accordance with manufacturer's instructions.

B. Power wiring, as required, shall be the responsibility of the electrical contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

C. All factory wiring shall be numbered for easy identification and the numbers shall coincide with those shown on the wiring diagram.

D. All interconnecting wiring between the pump controls and control panel shall be enclosed in liquid tight flexible conduit.

E. The unit shall be factory tested as a complete unit and the unit manufacturer shall furnish elementary and connection-wiring diagrams and piping diagrams. Installation and operation instructions shall also be provided.

F. The unit manufacturer shall furnish, mount on the unit and wire a NEMA 2 control cabinet with drip lip and piano hinged door.

G. The unit shall be shipped completely assembled.

H. The factory shall provide a certified test report.

I. Unit shall be a Domestic series VCD4 as manufactured by Bell & Gossett, Morton Grove, IL.

END OF SECTION

Domestic® Series VCD4™ Simplex Vacuum Heating Unit

STANDARD UNIT FEATURES

- Cast Iron Receiver for years of dependable service
- Cast Iron Receiver warranted for 20 years from date of shipment against failure due to corrosion.
- Multi-jet vacuum producers
- Automatic vacuum hurling water level control
- Vacuum switches, diaphragm type, double pole
- Float switches, double pole and externally adjustable with seamless float and stainless steel rod
- Vacuum gauge, vacuum breaker, gauge glass and thermometer
- Inlet basket strainer
- NEMA 2 Control Panel mounted and wired with liquid tight flexible conduit – U.L. Listed
- Centriflo® centrifugal pumps with open drip proof motors

OPTIONAL EQUIPMENT AS SPECIFIED

- TEFC motors
- Combination magnetic starters with fused disconnect switch or circuit breakers
- Temperature limit switch for vacuum pump protection in high temperature conditions
- Control circuit transformers
- Automatic alternation – mechanical or electrical
- Discharge pressure gauges for the condensate pumps

9 SOLID REASONS TO CHOOSE DOMESTIC®

- Reliable cast iron receivers
- Bronze-fitted centrifugal pumps
- Stainless steel pump shafts
- Renewable bronze pump wearing ring
- 250°F (121°C) Mechanical seal construction
- Quiet ball bearing type motors
- Factory wired and tested before shipment
- Package construction for compact installation
- Engineered Reliability

Domestic® Series VCD™ Vacuum Heating Units
Description of Standard and Optional Equipment and Controls

Cast Iron Receiver - close grained, gives extended service in hot condensate. Receiver Nos. 25 and 50 are of one piece construction with condensate storage compartments and independent vacuum pump separation chamber. Receiver Nos. 100 and 150 feature factory assembled 2-piece construction consisting of condensate receiver and separate cast iron vacuum pump separation chamber.

Cast Iron Receiver Warranty - The Cast Iron Receiver is warranted for 20 years from date of shipment against failure due to corrosion. In the event of receiver failure due to corrosion, the receiver will be replaced free of charge with transportation charges prepaid to any location within the continental U.S.A. Labor charges for replacement are not allowed nor shall Bell & Gossett, be liable for any special indirect or consequential damages. All implied warranties of merchantability and fitness for a particular purpose are hereby disclaimed.

Magnetic Starters - automatic across-the-line type are furnished. Manual reset over-loads are standard equipment ... for the protection of all windings of 3 phase motors against open circuit and/or unbalanced conditions.

"Lead-Lag" Manual Sequence Control - furnished as standard for water and vacuum pumps on full duplex units and for water pumps only on semi-duplex units. For water pumps, this control consists of 2 selector switches with "Off-Hand-Lead-Lag" positions in conjunction with 2 magnetic starters and 2 float switches. For vacuum pumps, this control consists of 2 selector switches with "Off-Lead-Lag-Continuous" positions used in conjunction with 2 magnetic starters and 2 vacuum switches. "Lead-Lag" control provides for (1) manual selection of the active pump, (2) simultaneous operation of both pumps to provide double capacity under abnormal conditions, and (3) automatic operation of the inactive or lag pump if the lead pump or its control fails.

Combination Magnetic Starters - are available with fusible disconnect switches or circuit breakers. Safety cover interlocking switches are furnished with combination starters Enclosures are available to comply with JIC specifications. NEMA 2 enclosures are standard.

Control Circuit Transformers - are required for all JIC specifications and when motor voltages exceed 250V. Transformer is required for vacuum unit control circuit when motor voltages exceed 115V. Control Power Switching Relay should be supplied for VCD3 and VCD4 units when individual pump disconnects switches are specified and transformer is provided. This relay is recommended in order to maintain control power in the event of pump #1 disconnect is turned off or pump #1 fails. In this event the control power will automatically be supplied by pump #2.

Mechanical Alternator - for duplex water pumps can be furnished in place of 2 float switches. This control changes the operating sequence automatically after each cycle, provides simultaneous operation of both pumps to provide double capacity under peak load conditions, and automatic operation of the inactive or lag pump if the lead pump or its controls fail.

Vertical Pump Assemblies (vacuum and water pump) - close coupled and permanently aligned, feature bronze fitted construction with enclosed one piece impeller, renewable bronze wearing ring and stainless steel shaft. All pumps use carbon/ceramic mechanical seals rated 250°F (121°C) for maximum life.

Electric Motors - vertically mounted drip proof ball bearing type. Standard voltages are: Three phase - 208-230/460V. Single phase - 115/230 (Single phase motor 2 HP (1 .5KW) and smaller have built-in overload protection).

Selector Switches - for condensate pumps on single units are furnished with "Auto-Off-Hand" positions: for vacuum pumps on single and semi-duplex units selector switches have "Automatic-Off-Continuous" positions. Vacuum and condensate pumps on duplex units and water pumps only on semi-duplex units are equipped with "Lead-Lag" switches.

Inlet Strainer - has vertical self-cleaning screen with large dirt pocket. The screen is vertically removable for cleaning, requiring no additional floor space for servicing.

Special Motors - wound for other than standard voltages are available at extra cost. If drip proof motors are not adequate, totally enclosed, or other special motors can be furnished.

Electric Alternator - for duplex water and/or duplex vacuum pumps. Furnished in place of "Lead-Lag," this control provides for (1) automatic change of operating sequence after each cycle. (2) simultaneous operation of both pumps to provide double capacity under peak load conditions, and (3) automatic operation of the inactive or lag pump if the lead pump or its controls fails.

Pressure Gauges - and other accessories are available on request.

Vacuum Switches - diaphragm type double pole switch, adjustable in differential and vacuum range. with minimum differential of 4" (101 mm) Hg.

Float Switches - heavy duty double pole type, operated by reinforced stainless steel float mounted on stainless steel rod.

Multi-jet Vacuum Producer - consists of a simple, efficient nozzle and venturi assembly. This sound design does not require close clearances or critical adjustments. Its proven ability to retain original efficiencies eliminates any need for oversizing.

Hurling Water Level Control (vacuum pumps) - consisting of probe controller and solenoid valve, maintains hurling water in separation chamber automatically.

Companion Flanges - are furnished as standard for pumps having a 2" (51 mm) or larger discharge. Pumps with 1-1/2" (38 mm) or smaller discharge sizes are normally fitted with screwed connections: however. companion flanges are available.

Low Returns - When the condensate receiver cannot be located so that the inlet is below the lowest return. one of the following devices may be used.

Mechanical Lift - Available for any height lift and any flow rate. See Section 390.

Accumulator Tanks - Practical limit: 5' (1.5M) lift. any flow rate. There is a definite relationship between the size of the system and accumulator tank size. Accumulator tanks based on . 75 gallon (2.8L) net storage capacity per 1000 sq. ft. EDR (113 Kg/hr) are more than ample. See Section 390 for sizes and dimensions of cast iron rectangular or cast iron underground accumulator tanks. Refer to installation manual for piping details.

Lift Fitting - Practical limit: 5' (1.5M) lift, small flow rate only.

Limit Switch for High Temperature Condensate - At the usual cutout point of 8" (203 mm) Hg vacuum, condensate will reevaporate at 197°F (91°C). Therefore. condensate temperatures of 197°F (91°C) or higher will cause the air pump(s) to operate continuously when such a condition exists. A reverse acting temperature limit switch can be installed on the inlet stainer to prevent the air pump(s) from operating, or to add cooling water to the hurling chamber.

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