PROJECT MANUAL GUIDE SPECIFICATIONS FOR:
PFANNENBERG SERIES PWS AIR-TO-WATER HEAT EXCHANGERS



PART 1 – GENERAL

1.1 SUMMARY

A. Air-to-water heat exchangers provide an effective and energy efficient method for cooling control panels containing sensitive electronic devices, or cooling variable frequency drives that are enclosed inside an enclosure, box, or console. The air-to-water heat exchanger utilizes a source of chilled coolant such as water, or a water/glycol mixture, to cool expelled warm air from an enclosure and circulate cold air into it. The source of chilled coolant can be from a variety of open or closed-loop sources, including industrial process water, cooling towers, treated water, municipal potable water, and packaged chillers. Another benefit to the approach of using air-to-water heat exchangers for cooling electrical enclosures is the isolation of the ambient air from being transferred to the inside of the enclosure. This is particularly beneficial in environments where the ambient air has high levels of dust, dirt, oil, flour, corrosive agents, etc. Keeping sensitive electronics clean and cool within an enclosure is vital to their satisfactory performance and longevity.

1.2 SECTION INCLUDES

A. Heat Exchangers, Cold Plates, Chillers, Packaged Chillers, and Cooling Devices as scheduled in this section and as indicated on the drawings.

1.3 SUBMITTALS

A. Product Data: Submit the following manufacturer's documentation for each product specified.

1. Catalog specifications and outline drawings.
2. Installation and operating instructions.
3. Certifications to substantiate necessary agency approvals.

B. Manufacturer Warranty

1. Manufacturer's warranty for Air-to-Water Heat Exchangers and Packaged Chillers.

Manufacturer's standard 1-year warranty for Air-to-Water Heat Exchangers and Packaged Chillers.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design and Support: The air-to-water heat exchanger is ideal for applications with cooling requirements of 650 to 10,000 Watts (2218 to 34,121 BTU). It is a self-contained heat exchanger package with fin and tube heat exchanger, axial air circulating fan, solenoid control valve, electronic thermostat, and condensate management system, which ensures that no liquid will enter into the control panel enclosure onto which it is mounted. To ensure uniformity of operation, quality of construction, standard 1-year warranty term, and worldwide localized support, specifications are solely based, wherever practical, on the products of Pfannenberg Inc. www.pfannenbergusa.com.

B. Substitution: Products of a similar nature from other manufacturers may be considered only when performance capabilities, component capabilities, installation capabilities, and warranty terms are fully met or exceeded.

2.2 PERFORMANCE / DESIGN CRITERIA

A. Air-To-Water Heat Exchanger Description. Series PWS – Pfannenberg Air-To-Water Heat Exchanger. Available in a variety of frame sizes to support a wide range of capacities from 650 to 10,000 Watts (2218 to 34,121 BTU), the air-to-water heat exchanger features an aluminum-fin/copper-tube heat exchanger, axial fan, electronic thermostat, solenoid valve for coolant flow control, color-coded coolant lines, bulkhead fitting for condensate collection, one-piece cover with sloped top, terminal block for alarm contact connection, and (pick one) an indoor/outdoor NEMA 12/3R/4 rated housing with polyester powder-coated galvanized steel panel construction or NEMA 4X rated housing with 304 stainless steel construction.

B. Air-To-Water Heat Exchanger Specifications. Pfannenberg Series PWS Air-To-Water Heat Exchangers.

Model: PWS 3062

- Cooling Capacity: 2218 BTU/h (650 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 100 cfm (170 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 30 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 10.1 x 24.1 x 5.6 inch (257 x 613 x 143 mm).
- Dry Weight: 22 lb (10 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <51 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3082

- Cooling Capacity: 2900 BTU/h (900 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 125 cfm (213 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 20 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 10.1 x 24.1 x 5.6 inch (257 x 613 x 143 mm).
- Dry Weight: 22 lb (10 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <51 dB(A).

- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3102

- Cooling Capacity: 3753 BTU/h (1100 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 175 cfm (297 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 55 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 15.8 x 32.1 x 6.3 inch (401 x 814 x 159 mm).
- Dry Weight: 33 lb (15 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <59 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3152

- Cooling Capacity: 5800 BTU/h (1700 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 175 cfm (297 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 57 watts.
- Power Connections: external plug.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 11.8 x 36.7 x 8.2 inch (299 x 930 x 207 mm).
- Dry Weight: 34 lb (15.5 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.

- Noise Level (@ 1 m): <60 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3202

- Cooling Capacity: 7165 BTU/h (2100 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 300 cfm (510 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 71 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 15.8 x 51.9 x 9.1 inch (400 x 1318 x 230 mm).
- Dry Weight: 62 lb (28 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <62 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3302

- Cooling Capacity: 12,283 BTU/h (3600 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 315 cfm (535 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 68 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 15.8 x 51.9 x 9.1 inch (400 x 1318 x 230 mm).
- Dry Weight: 66 lb (30 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.

- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <62 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 3502

- Cooling Capacity: 21,496 BTU/h (6300 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 690 cfm (1172 m^3/hr).
- Power Required (pick one): 115 VAC 60 Hz single phase or 230 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 204 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 2 gpm (450 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 15.8 x 57.1 x 8.6 inch (400 x 1450 x 218 mm).
- Dry Weight: 73 lb (33 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).
- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <64 dB(A).
- Duty Cycle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

Model: PWS 31002

- Cooling Capacity: 34,121 BTU/h (10,000 watts).
- Control Temperature Range: +50 to +104 °F (+10 to +40 °C).
- Internal Airflow: 1180 cfm (2005 m^3/hr).
- Power Required: 460 VAC 50-60 Hz single phase.
- Nominal Power Consumption: 916 watts.
- Power Connections: internal spring terminals.
- Coolant Connections: 1/2 inch Quick-Connect (accepts flexible tubing with O.D. specified and provides a leak-proof, o-ring seal).
- Rated Coolant Flow Rate: 5 gpm (1130 l/hr).
- Maximum Coolant Pressure: 150 psi.
- Dimensions (w x h x d): 19.7 x 65.5 x 12.1 inch (501 x 1664 x 307 mm).
- Dry Weight: 126 lb (57 kg).
- Enclosure Rating: (pick one): NEMA Type 12/3R/4 or NEMA Type 4X (stainless steel units only).

- Housing Construction: (pick one): powder-coated galvanized steel or 304 stainless steel.
- Heat Exchanger Type: copper pipe / aluminum fin.
- Noise Level (@ 1 m): <66 dB(A).
- Duty Cyle: 100%.
- Certifications: UL (meets requirements for UL 484), CUL, CE

C. Air-To-Water Heat Exchanger Component Details.

1. Cabinet and frame construction: The cabinet shall be constructed of (pick one) galvanized-steel panels with light grey (RAL 7035) polyester powder coat finish or 304 stainless steel panels with #3 polished finished. The cabinet shall have a sloped cabinet top for shedding water in wash-down or outdoor situations. The cabinet shall contain a segmented inner compartment to isolate the coolant supply and return lines from the airflow cavity. The airflow path shall be designed to prevent condensate from entering the enclosure to which the air-to-water heat exchanger is attached. A bulkhead fitting is included at the bottom of the cabinet for condensate draining.
2. Heat exchanger: copper pipe with aluminum fins.
3. Fan: axial fan with protective cage.
4. Thermostat: digital electronic thermostat with solenoid valve override control for winterization/system purge.
5. Temperature alarm relay contact.
6. Coolant lines: PEX type piping color coded with red for hot and blue for cold.

D. Air-To-Water Heat Exchanger Options.

1. External condensate evaporation system.
2. Condensate collection bottle.
3. Fan(s) for installation into enclosure to aid in circulating cool air.

A.3 PACKAGED CHILLER SCHEDULE

A. Pfannenberg **Model PWS 3062 Air-to-Water Heat Exchanger:** 2218 BTU/h (650 watts).
B. Pfannenberg **Model PWS 3082 Air-to-Water Heat Exchanger:** 2900 BTU/h (900 watts).
C. Pfannenberg **Model PWS 3102 Air-to-Water Heat Exchanger:** 3753 BTU/h (1100 watts).
D. Pfannenberg **Model PWS 3152 Air-to-Water Heat Exchanger:** 5800 BTU/h (1700 watts).
E. Pfannenberg **Model PWS 3202 Air-to-Water Heat Exchanger:** 7165 BTU/h (2100 watts).
F. Pfannenberg **Model PWS 3302 Air-to-Water Heat Exchanger:** 12,283 BTU/h (3600 watts).
G. Pfannenberg **Model PWS 3502 Air-to-Water Heat Exchanger:** 21,496 BTU/h (6300 watts).
H. Pfannenberg **Model PWS 31002 Air-to-Water Heat Exchanger:** 34,121 BTU/h (10,000 watts).

PART 3 – EXECUTION

3.1 INSTALLATION

A. Install products in strict compliance with manufacturer's written instructions and recommendations.

END OF SECTION

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CSI Master Format Sections for which this product may be applicable include the following:

23 06 60 Schedules for HVAC
- 23 06 60.16 Packaged Water Chiller Schedule

23 64 00 Packaged Water Chillers
- 23 64 19 Reciprocating Water Chillers
- 23 64 23 Scroll Water Chillers

26 06 00 Schedules for Electrical
- 26 06 20.13 Electrical Switchboard Schedule
- 26 06 20.16 Electrical Panelboard Schedule
- 26 06 20.19 Electrical Motor-Control Center Schedule

26 24 00 Switchboards and Panelboards
- 26 24 13 Switchboards
- 26 24 16 Panelboards
- 26 24 19 Motor-Control Centers

26 27 00 Low-Voltage Distribution Equipment
- 26 27 16 Electrical Cabinets and Enclosures

26 29 00 Low-Voltage Controllers
- 26 29 13 Enclosed Controllers
- 26 29 13.13 Across-the-Line Motor Controllers
- 26 29 13.16 Reduced-Voltage Motor Controllers
- 26 29 23 Variable-Frequency Motor Controllers
- 26 29 33 Controllers for Fire Pump Drivers
- 26 29 33.13 Full-Service Controllers for Fire Pump Electric-Motor Drivers
- 26 29 33.16 Limited-Service Controllers for Fire Pump Electric-Motor Drivers
- 26 29 33.19 Controllers for Fire Pump Diesel Engine Drivers

42 22 00 Process Chillers and Coolers
- 42 22 16 Reciprocating Process Chillers and Coolers
- 42 22 23 Rotary Process Chillers and Coolers

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