Clean Air Products 90-Degree Low Profile Left Hand Air Shower Purchase Specification

1. Purpose

This specification describes a single person air shower (aka decontamination shower) used to remove particulates from people and/or equipment before entering or leaving a controlled environment.

2. Construction:

The air shower shall be constructed of a pressure wall section, a return wall section, a side-mounted blower cabinet, a ceiling duct, and two doors. The nominal outer dimensions of the air shower shall be approximately _____ wide x _____ deep x 95 inches tall.

2.1 Wall Sections

2.1.1 The wall sections shall be made of cold rolled steel with a white powder coated finish.
2.1.2 Only low outgassing epoxy or urethane sealant shall be used – no silicone.
2.1.3 The blower cabinet shall contain a removable high pressure interior nozzle wall panel for convenient cleaning and servicing.
2.1.4 There shall be 16 adjustable anodized aluminum nozzles on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 adjustable anodized aluminum nozzles, resulting in 27 total nozzles in the air shower.
2.1.5 There shall be two white powder coated steel wall return air grills in each blower cabinet and one in each return wall section (three wall return air grills total).

2.2 Blower Cabinet

2.2.1 The blower cabinet shall be made of cold rolled steel with a white powder coated finish.
2.2.2 Only low outgassing epoxy or urethane sealant shall be used – no silicone.
2.2.3 There shall be a single white powder coated steel single inlet blower, with a superior efficiency direct drive aluminum airfoil wheel and a 5hp 3600RPM sealed ball bearing continuous duty motor.
2.2.4 The HEPA filter plenum shall be of galvanized steel construction.
2.2.5 There shall be a wall-switched LED surface mounted light fixture located on the blower cabinet side of the interior of the air shower.

2.2.6 Service access shall be from the outside of the air shower via hinged access doors.

2.3 Doors

2.3.1 Doors shall have anodized aluminum frames and full-view safety glass windows.
2.3.2 Each door shall be equipped with a hydraulic door closer.

2.4 Ceiling Duct

2.4.1 The ceiling duct shall be made of cold rolled steel with a white powder coated finish.
2.4.2 There shall be a 2-1/2 inch diameter steel sprinkler sleeve welded into the ceiling duct.

3. Filters

3.1 The HEPA filter shall be a high-capacity, 24x24x11/2, 99.97% efficient filter.
3.2 There shall be a 10x20x1 MERV 8 filter in each return air grill.
3.3 There shall be a 20x20x4 MERV 8 filter installed at the blower inlet.

4. Electrical

4.1 The air shower shall be furnished with all the electrical controls required to operate the system. These will include the starter with thermal overload, a PLC, a non-fusible disconnect, and transformers. All that is required is to connect the appropriate power to a single connection point.
4.2 The supply power shall be 208 Volt, 60 Hz, 3 Phase, 4 Wire.
4.3 The painted steel control box and wiring shall be NEMA 1 rated with a UL508A panel sticker. The control box shall be mounted inside the blower cabinet.
4.4 All wiring shall be in compliance with NEC code.

5. Performance

5.1 The average air velocity at the face of each nozzle shall be 7800 FPM.
5.2 Total air flow of the air shower shall be 1900 CFM.

6. Operation

6.1 The cleaning cycle shall be initiated from a button on the wall in the interior of the air shower.
6.2 The cleaning cycle time shall be controlled via a Programmable Logic Control (PLC) mounted in the control box. The PLC will allow for a 0-30 second adjustable run time and 0-10 second adjustable wait time.

7. Shipping

7.1 The air shower shall be shipped "knocked-down" as components to be assembled at the destination.
7.2 All components shall be able to fit through a standard 3 foot by 7 foot door.
7.3 The air shower shall be shipped via common-carrier truck.

Modify the Purchase Specification as described below for each desired option:

Air Shower General Options

Raised Floor Return (44)

A. Change line 2: "Construction: The air shower shall be constructed of a pressure wall section, a return wall section, a side-mounted blower cabinet, a ceiling duct, two doors, and one raised floor return. The nominal outer dimensions of the air shower shall be approximately _____ wide x _____ deep x 101 inches tall."
B. Remove line 2.1.5
C. Add line 2.5: "Raised Floor Return"
D. Add line 2.5.1: "There shall be a welded white powder coated steel raised floor return."
E. Add line 2.5.2: "The raised floor return shall have a removable zinc plated steel floor grate."
F. Change line 3.2: "There shall be two 20x24x2 MERV 8 filters in the raised floor return."

Air Shower Shell Options

Stainless Steel Walls and Cabinet, Type 304 #4 Finish (40)

A. Change line 2.1.1: "The wall sections shall be made of type 304 #4 finish stainless steel."
B. Change line 2.1.5: "There shall be two type 304 #4 finish stainless steel wall return air grills in each blower cabinet and one in each return wall section (three wall return air grills total)."
C. Change line 2.2.1: "The blower cabinet shall be made of type 304 #4 finish stainless steel."
D. Change line 2.4.1: "The ceiling duct shall be made of type 304 #4 finish stainless steel."
E. Change line 2.4.2: "There shall be a 2-1/2 inch diameter stainless steel sprinkler sleeve welded into the ceiling duct."
F. If Raised Floor Return (44) is also ordered, change line 2.5.1: "There shall be a welded type 304 #4 finish stainless steel raised floor return."

Stainless Steel Walls and Cabinet, Type 316L #2b Finish (41)

A. Change line 2.1.1: "The wall section shall be made of type 316L #2b finish stainless steel."
B. Change line 2.1.5: "There shall be two type 316L #2b finish stainless steel wall return air grills in each blower cabinet and one in each return wall section (three wall return air grills total)."
C. Change line 2.2.1: "The blower cabinet shall be made of type 316L #2b finish stainless steel."
D. Change line 2.4.1: "The ceiling duct shall be made of type 316L #2b finish stainless steel."
E. Change line 2.4.2: "There shall be a 2-1/2 inch diameter stainless steel sprinkler sleeve welded into the ceiling duct."
F. If Raised Floor Return (44) is also ordered, change line 2.5.1: "There shall be a welded type 316L #2b finish stainless steel raised floor return."

Stainless Steel Pharmaceutical Applications (42)

A. Change line 2.1.1: "The wall section shall be made of type 304 #4 finish stainless steel."
B. Change line 2.1.4: "There shall be 16 fixed white solid PVC nozzles ("puck-style") on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 fixed white solid PVC nozzles, resulting in 27 total nozzles in the air shower."
C. Change line 2.1.5: "There shall be two type 304 #4 finish stainless steel wall return air grills in each blower cabinet and one in each return wall section (three wall return air grills total)."
D. Add line 2.1.6: "All exposed interior hardware shall be hex head type stainless steel."
E. Change line 2.2.1: "The blower cabinet shall be made of type 304 #4 finish stainless steel."
F. Change line 2.2.5: "There shall be a PLC switched LED surface mounted light fixture located on the blower cabinet side of the interior of the air shower."
G. Add line 2.2.7: "All exposed interior hardware shall be hex head type stainless steel."
H. Changle line 2.3.1: "Doors shall have sealed anodized aluminum door frames with full-view safety glass windows."
I. Add line 2.3.3: "All exposed interior hardware shall be hex head stainless steel."
J. Change line 2.4.1: "The ceiling duct shall be made of type 304 #4 finish stainless steel."
K. Change line 2.4.2: "There shall be a 2-1/2 inch diameter stainless steel sprinkler sleeve welded into the ceiling duct."
L. Add line 4.5: "Only low profile membrane EPO switches shall be used"

M. If Magnetic Interlocks – External Mount option is also ordered, add line 2.3.3: "Each door shall have a type 304 #4 finish stainless steel armature cover with fully welded seams, mounted at the top."
N. If Raised Floor Return (44) option is also ordered, change line 2.5.1: "There shall be a welded type 304 #4 finish stainless steel raised floor return."

Non-Standard Paint – Customer Specified (43)

A. Change line 2.1.1: "The wall sections shall be made of cold rolled steel with a _____ finish." In the space provided, fully describe the paint required.
B. Change line 2.1.5: "There shall be two _____ steel wall return air grills in each blower cabinet and one in each return wall section (three wall return air grills total)." In the space provided, fully describe the paint required.
C. Change line 2.2.1: "The blower cabinet shall be made of cold rolled steel with a _____ finish." In the space provided, fully describe the paint required.
D. Change line 2.4.1: "The ceiling duct shall be made of cold rolled steel with a _____ finish." In the space provided, fully describe the paint required.
E. If Raised Floor Return (44) is also ordered, change line 2.5.1: "There shall be a welded _____ steel raised floor return." In the space provided, fully describe the paint required.

<u>Air Shower Nozzle Options</u>

Fixed Nozzles (47)

A. Change line 2.1.4: "There shall be 16 fixed anodized aluminum nozzles on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 fixed anodized aluminum nozzles, resulting in 27 total nozzles in the air shower."

Ceiling Nozzles - Single (48)

A. Add line 2.2.8: "There shall be a single adjustable anodized aluminum nozzle in the ceiling duct of the air shower."

Ceiling Nozzles – Dual (48)

A. Add line 2.2.8: "There shall be two adjustable anodized aluminum nozzles in the ceiling duct of the air shower."

Concentrated Wall Nozzle Pattern (49)

A. Change line 2.1.4: "There shall be 17 adjustable anodized aluminum nozzles on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 adjustable anodized aluminum nozzles, resulting in 28 total nozzles in the air shower. The nozzles on the blower cabinet shall be arranged

in a centered, concentrated pattern that fits within a 2 foot by 3 foot nominal area on the removable wall panel."

Air Knife Design (50)

A. Change line 2.1.4: "There shall be a vertical air knife nozzle centered on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 adjustable anodized aluminum nozzles. The air knife nozzle shall be made of type 304 #4 finish stainless steel."
B. Change line 5.1: "The average air velocity at the face of the air knife nozzle shall be 7800 FPM."

Rub Rail Nozzle Protection (45)

A. Change line 2.1.3: "Each wall section and blower cabinet shall contain a removable high pressure interior nozzle wall panel for convenient cleaning and servicing. Each wall section and blower cabinet shall also contain two horizontal stainless steel rub rails to protect the nozzles from damage."

Wall Point Ionization System (51)

A. Change line 2.1.4: "There shall be 16 adjustable anodized aluminum nozzles on each high pressure interior nozzle wall panel. The pressure wall section shall have 11 adjustable anodized aluminum nozzles, resulting in 27 total nozzles in the air shower. Four of the nozzles on each wall shall be equipped with a point ionizer for static control – 8 point ionizers total."

<u>Air Shower Power Options</u>

480Volt, 60Hz, 6.5Amps per Section (11)

A. Change line 4.2: "The supply power shall be 480 Volt, 60 Hz, 3 Phase, 4 Wire."

575Volt, 60Hz, 5.3Amps per Section (12)

A. Change line 4.2: "The supply power shall be 575 Volt, 60 Hz, 3 Phase, 4 Wire."

380Volt, 60Hz, 8.0Amps per Section (14)

A. Change line 4.2: "The supply power shall be 380 Volt, 60 Hz, 3 Phase, 4 Wire."

<u>Air Shower Control Options</u>

NEMA12 Control Box (19)

A. Change line 4.3: "The painted steel control box and wiring shall be NEMA 12 rated with a UL508A panel sticker. The control box shall be mounted inside the blower cabinet."

Stainless Steel Control Box (20)

A. Change line 4.3: "The type 304 #4 finish stainless steel control box and wiring shall be NEMA 1 rated with a UL508A panel sticker. The control box shall be mounted inside the blower cabinet."

Remote Mounted Control Box (17)

A. Change line 4.3: "The painted steel control box and wiring shall be NEMA 1 rated with a UL508A panel sticker. A junction box with connection terminals shall be mounted inside the blower cabinet. The control box with connection terminals shall be shipped loose for the customer to mount in a remote location. The customer is to provide the cabling between the junction box and the control box."

Whip – Prewired Flex Conduit (24) (only available with the Remote Mounted Control Box option)

A. Change line 4.3: "The painted steel control box and wiring shall be NEMA 1 rated with a UL508A panel sticker. A junction box with connection terminals shall be mounted inside the blower cabinet. The control box with connection terminals shall be shipped loose for the customer to mount in a remote location. A set of flexible conduit cables, whose total length is determined by the customer, is provided to connect the junction box and the control box."

Variable Frequency Drive (21)

A. Change line 4.1: "The air shower shall be furnished with all the electrical controls required to operate the system. These will include the starter with thermal overload, a PLC, a non-fusible disconnect, a variable frequency drive, and transformers. All that is required is to connect the appropriate power to a single connection point."

Interior Presence Sensor (75)

A. Add line 6.3: "There shall be an interior presence sensor that prevents the air shower from running when there is no person or object inside the air shower."

Motion Sensor Start (86)

A. Change line 6.1: "The cleaning cycle shall be initiated by a person or object approaching a motion sensor head on. The motion sensor shall be mounted above the front entrance of the air shower."

Fused Disconnect (22)

A. Change line 4.1: "The air shower shall be furnished with all the electrical controls required to operate the system. These will include the starter with thermal overload, a PLC, a fusible disconnect, and transformers. All that is required is to connect the appropriate power to a single connection point."

LCD Display Panel 5.7 inch Color Display (26)

A. Add line 6.3: "There shall be a 5.7 inch touch screen LCD display panel mounted on an interior wall of the air shower. This screen shall display the status of the air shower, including remaining cycle time, door status, and light switch status."

Air Shower Door Options

Steel Construction – Painted (77)

A. Change line 2.3.1: "Doors shall be painted steel with 24 x 30 safety glass windows."

Stainless Steel Construction (76)

A. Change line 2.3.1: "Doors shall be stainless steel with safety glass windows."

Acrylic Panel – Full (82)

A. Change line 2.3.1: "Doors shall have anodized aluminum frames and full-view clear acrylic windows."

Split Panel Design – Safety Glass/Stainless Steel (83)

A. Change line 2.3.1: "Doors shall have anodized aluminum frames with type 304 #4 finish stainless steel panels in the lower half and safety glass windows in the upper half."

Split Panel Design – Acrylic/Stainless Steel (84)

A. Change line 2.3.1: "Doors shall have anodized aluminum frames with type 304 #4 finish stainless steel panels in the lower half and clear acrylic windows in the upper half."

Door Rub Rails

A. Change line 2.3.2: "Each door shall be equipped with a hydraulic door closer and two interior anodized aluminum rub rails."

Magnetic Interlocks – External Mount (72)

A. Change line 4.1: "The air shower shall be furnished with all the electrical controls required to operate the system. These will include the starter with thermal overload, a PLC, a non-fusible disconnect, external mount magnetic interlocks, and transformers. All that is required is to connect the appropriate power to a single connection point."
B. Change line 6.1: "The cleaning cycle shall be initiated from the opening and closing of the entrance door on the air shower. Both doors will lock and the cycle will run to completion unless one of the EPO buttons is pressed. At the completion of the cycle, the exit door will unlock while the entrance door remains locked. Once the exit door is opened and closed, both doors will unlock."
C. Add line 2.3.3: "Each door shall have a type 304 #4 finish stainless steel armature cover mounted at the top."

Magnetic Interlocks – Internal Mount (73)

A. Change line 4.1: "The air shower shall be furnished with all the electrical controls required to operate the system. These will include the starter with thermal overload, a PLC, a non-fusible disconnect, internal mount magnetic interlocks, and transformers. All that is required is to connect the appropriate power to a single connection point."
B. Change line 6.1: "The cleaning cycle shall be initiated from the opening and closing of the entrance door on the air shower. Both doors will lock and the cycle will run to completion unless one of the EPO buttons is pressed. At the completion of the cycle, the exit door will unlock while the entrance door remains locked. Once the exit door is opened and closed, both doors will unlock."

Power Door Openers (74)

A. Change line 2.3.2: "Each door shall be equipped with a power door opener. When activated, the door shall open, pause for an adjustable length of time, and then close. The power door opener shall be activated from the outside of the air shower via a stainless steel switch installed next to the door. A set of stainless steel activation switches shall also be installed inside the air shower to open each door independently."

Stainless Steel Threshold (80)

A. Change line 2.3.2: "Each door shall be equipped with a hydraulic door closer, a fixed door sweep, and a type 304 #4 finish stainless steel threshold."

Door Sweeps – Fixed (78)

A. Change line 2.3.2: "Each door shall be equipped with a hydraulic door closer and a fixed aluminum door sweep with a vinyl seal insert."

Automatic Door Sweeps (79)

A. Change line 2.3.2: "Each door shall be equipped with a hydraulic door closer and an automatic door sweep. The door sweep shall rise when the door is opened and drop down when the door is closed. The amount of downward pressure applied by the door sweep shall be adjustable."

Air Shower Filter Options

HEPA Upgrade to 99.99% on 0.3 Micron Particles (2)

A. Change line 3.1: "The HEPA filter shall be a high-capacity, 24x24x11/2, 99.99% efficient filter."

ULPA Upgrade to 99.999% on 0.12 Micron Particles (3)

A. Change line 3.1: "The ULPA filter shall be a high-capacity, 24x24x11/2, 99.999% efficient filter."

Magnehelic Gage – Single (4)

A. Add line 2.2.8: "There shall be a 0.0 – 10.0 WC range magnehelic gage installed on the blower cabinet that measures the differential pressure between the final filter and the ambient air."

Magnehelic Gage – Dual (5)

A. Add line 2.2.8: "There shall be a pair of magnehelic gages installed on the blower cabinet. One shall measure the differential pressure between the upstream and downstream side of the final filter. The other shall measure the differential pressure between the prefilter and the ambient air."

Minihelic Gage – Single (6)

A. Add line 2.2.8: "There shall be a 0.0 – 10.0 WC range minihelic gage installed on the blower cabinet that measures the differential pressure between the final filter and the ambient air."