

## SECTION 11528

PAINT SPRAY AND SANDBLAST BOOTHS  
04/98

## PART 1 GENERAL

## 1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

## AMERICAN CONFERENCE OF GOVERNMENTAL INDUSTRIAL HYGENI,TS

ACGIH Industrial Ventilation      22nd Edition    Manual of Recommended  
Practice

## AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI Z21.66                            (1996) Automatic Vent Damper Devices for  
Use with Gas-Fired Appliances

ANSI Z83.4                            (1991; Z83.4a) Direct Gas-Fired Make-Up  
Air Heaters

## INTERNATIONAL APPROVAL SERVICES (IAS)

IAS-01                                (1996) IAS Directory of AGA & CGA  
Certified Appliances and Accessories

## NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 54/ANSI Z223.1                (1996; Errata) National Fuel Gas Code

NFPA 33                                (1996) Spray Application Using Flammable  
or Combustible Materials

NFPA 70                                (1996; Errata 96-4) National Electrical  
Code

NFPA 91                                (1996) Blower and Exhaust Systems for  
Dust, Stock and Vapor Removal or Conveying

Occupational Safety and Health Administration (OSHA) Rules and  
Regulations, 1981:Org

Part 1910.107                        Spray Finishing Using Flammable and  
Combustible Materials

## UNDERWRITERS LABORATORY

UL 263                                (1997) Fire Tests of Building Construction  
and Materials

UL Gas & Oil Dir (1997) Gas and Oil Equipment Directory  
UL Product Directory 199x UL Listing

## 1.2 SUBMITTALS

Government approval is required for submittals with a "GA" designation; submittals having an "FIO" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

### SD-01 Data

Paint Booths and Sandblast Booth; FIO.

Submit manufacturer's descriptive product data, and technical literature, catalog cuts, and installation instructions.

### SD-04 Drawings

Paint Spray Booths and Sandblast Booth; FIO.

Submit drawings showing layout, dimensions and electrical diagram of each system. Diagrams shall indicate each numbered wire, where wire initiates, where wire terminates, and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearances for maintenance and operation.

### SD-06 Instructions

Framed Instructions; FIO.

Diagrams, Instructions and Safety Requirements

### SD-19 Operation and Maintenance Manuals Sectional Overhead

Paint Booths and Sandblast Booth; FIO.

Three complete copies of maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, and troubleshooting guides. The instructions shall include simplified diagrams for the equipment as installed. Also spare parts data for each different item of material and equipment specified, including a complete lists of parts and supplies, with current unit prices and source of supply. Three complete copies of operation instructions outlining the step-by-step procedure required for paint booth operation. The instructions shall include the manufacturer's name, model number, service manual, parts list, and brief description of all equipment and their basic operating features.

## 1.3 DESIGN CRITERIA

### 1.3.1 Paint Spray Booths

Two (2) paint spray booths shall be provided to operate in Bays 6 and 10 in the given spaces and matching the dimensions as shown. Capacities shall be

as indicated in the Mechanical Equipment Schedule. The paint spray booths shall include filtered gas fired make-up air duct furnaces complete with supply fans, filtered exhaust cabinets with exhaust fans, and all other appurtenances required for a fully functional spray booth. Booths shall be designed in accordance with NFPA 20, 33, and 92, and OSHA rules and regulations, part 1910.107. Work shall include the installation, equipment raceways and duct work, field piping, electrical controls, electrical wiring, lighting, field painting and all materials and labor required to provide a complete operating system. The booths shall be designed to withstand normal live loads incurred during initial installation and subsequent maintenance and operation. The booths shall be designed for the deadload of booth components and supported equipment and utilities. The paint booth shall be designed for Seismic Zone III

#### 1.3.2 Sandblast Booth

One (1) sandblast booth shall be provided to operate in Bay 6 in the given space and matching the dimensions as shown. Capacities shall be as indicated in the Mechanical Equipment Schedule. The sandblast booth shall include a dust collection system, and all other appurtenances required for a fully functional spray booth. This contract does not include the blast equipment package (pressure vessel, blast nozzle and hoses, control handle, moisture separator, and blast hood) which will be provided and installed by others. Booth shall be designed in accordance with OSHA rules and regulations, part 1910.104. Work shall include the installation, equipment raceways and duct work, field piping, electrical controls, electrical wiring, lighting, field painting and all materials and labor required to provide a complete booth. The booth shall be designed to withstand normal live loads incurred during initial installation and subsequent maintenance and operation. The booth shall be designed for the deadload of booth components and supported equipment and utilities. The sand blast booth shall be designed for Seismic Zone III

#### 1.4 DELIVERY AND STORAGE

Components shall be delivered to the job site wrapped in a protective covering with the brands and names clearly marked thereon. Store in a dry location that is adequately ventilated and free from dust or water, and in a manner that permits easy access for inspection and handling. Components shall be handled carefully to prevent damage. Damaged items that cannot be restored to like-new condition shall be replaced.

### PART 2 PRODUCTS

#### 2.1 MATERIALS AND EQUIPMENT

General: Materials and equipment shall be the products of manufacturers regularly engaged in the manufacture of such products and installation of both shop-fabricated and factory-fabricated paint spray booths and equipment. Evidence shall be furnished that installations of approximately the same type and design as that proposed has been in successful commercial operation for a minimum of 2 years, and shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site.

## 2.2 PAINT SPRAY BOOTH

The paint booth shall have vertical walls and leveled roof which adjoins the side walls in a angled configuration. Spray booth shall be a single span structure. Overall dimensions of the booth shall be generally as shown on the drawings, although exact dimensions shall be as standard with the manufacturer. The paint booth frame and panels may be matched and pre-punched to receive fasteners, or the drilling of holes for fasteners may be performed in the field.

### 2.2.1 Walls

Walls shall constructed of a minimum of eighteen (18) gage galvanized steel panels with two inch (2") rolled edge flanges.

### 2.2.2 Entry Doors

Doors: A personnel door shall be provided on the accessible side of the paint spray booth. A bi-fold vehicle entrance door shall be provided at the front of the paint spray booth.

Doors shall consist of the following:

- a. Sandwich slabs with Internal frame constructed of galvanized steel and external construction in galvanized, pre-coated and PVC film protected steel plate.
- b. Door glazing with laminated safety glass, supported by fire resistant frames.
- c. Steel hinges, adjustable vertically and horizontally.
- d. large door closing handles in galvanized and painted steel date. Door closing rods In galvanized steel with fiberglass reinforced nylon supports; Internal handle in fiberglass reinforced nylon.
- e. Snap locks for the anti-panic closing and opening of the personnel and safety door.

### 2.2.3 Filtration

Filtration shall be provided for both make-up and exhaust air by means of paint arrestor filters conforming to Underwriter's Laboratories Class 2.

#### 2.2.3.1 Characteristics of the Filter Media

- a. Material: Non-woven acrylic fiber.
- b. Binding material: Acrylic.
- c. Classification: Fire retardant/UL Class II.
- d. Maximum operating temperature: 230 degrees F.
- e. Average gravimetric filtering efficiency 80%.
- f. Accumulation at cycle end: .102 Ib./ft 2.

### 2.2.4 Exhaust Fan

Air Exhaust: Air Exhaust system shall include double mounting ring exhaust fan, exhaust stack with automatic damper, cleanout door, and connector ring. Explosion-proof motor shall be provided. Fan to provide exhaust for

a minimum face velocity of 100 FPM inside the paint booth. Fan to have aluminum hub and blades. Exhaust system shall meet the requirements of NFPA 33 and NFPA 91.

The fan shall be a single side exhaust centrifugal fan, with galvanized steel plate shell, steel blades tuned backwards and sparkproof air intake collars; the fan supply a high air dynamics efficiency.

The booth shall include an explosion-proof switch to control the start/stop function for the exhaust fan.

#### 2.2.5 Fan Motors

Motors shall be 4-pole a synchronous electrical type with internal ventilation, of the cage cage type (1,480 rpm);3-phase/60 Hz Insulation class "F", as per contract drawings. They shall be CSA listed and ETL approved.

#### 2.2.6 Fire Dampers

A fire cut off damper Shall be provided in the connection duct between the make-up air unit and the booth. The fire dampers are made in galvanized steel plate, with counter placed fins and fusible link set to 240 degrees F.; complete with end-stroke switch to cut off the burner in case of the closing of the fire.

#### 2.2.7 HEATERS

Heaters shall be equipped for and adjusted to burn natural gas. Each heater shall be provided with a gas pressure regulator that will satisfactorily limit the main gas burner supply pressure. Heaters shall have an intermittent or interrupted electrically ignited pilot or a direct electric ignition system. Safety controls shall conform to the ANSI standard specified for each heater. Mounting brackets and hardware shall be furnished by the heater manufacturer and shall be factory finished to match the supported equipment.

##### 2.2.7.1 Direct Fired Make-Up Air Heaters

Heaters shall be in accordance with ANSI Z83.4. Direct fired make-up air heaters use outside air directly ducted to the heater. The products of combustion generated by the heater are released into the outside air stream being heated. Heaters shall be equipped with motorized discharge damper, , duct collar, air filters, and bird screen. Gas control valve shall be modulating type with a maximum modulated turn down ratio of 25:1. Maximum air temperature rise during minimum burner fire shall be 4 degrees C (7 degrees F). Fan shall be single speed. Motorized discharge dampers shall be closed when the unit is shut down. Dampers shall be interlocked to prevent burner operation when dampers are closed. Heaters shall be provided with a space discharge air thermostat, a low limit air stream thermostat, and an ambient air thermostat. The space discharge air thermostat shall control the modulating gas control valve. The low limit air stream thermostat shall shut down the entire unit if the discharge air temperature drops below the space discharge thermostat setting. The ambient air thermostat shall shut down the burner if the outside air exceeds the discharge space thermostat setting.

#### 2.2.8 Fire Protection

A fire protection system shall be provided in accordance with all local and

state codes, NFPA 13 and NFPA 33, Chapter 7. Paint spray booth fire protection systems shall be tied to the building fire protection systems as per electrical drawings.

#### 2.2.9 Lighting

Fluorescent lighting shall be provided to attain 100 foot candles at three feet above the floor throughout the booth. Lighting fixtures shall be mounted in an enclosure so as to be separated from the NFPA 70, Class I, Division 1 atmosphere within the paint booth itself. Fixtures shall be rated as suitable for use in a NFPA 70, Class I Division 2 location.

#### 2.2.10 Control Panel

Paint Booth Control: The Make-up Air Units DF-1 and DF-2, exhaust fans PEC-1, PEC-2, and PEC-3, and compressed air supplies shall be interlocked. They shall be controlled by a start/stop push button. During the heating season the room stat, T, shall maintain 80 degrees F. The make up air units DF-1 and DF-2, shall be provided with a safety shut down which includes an emergency disconnect switch and a manual reset freeze stat set for 35 degrees F. The exhaust fans, control circuit shall include a disconnect switch and filter pressure switch. The pressure switch shall be provided to turn off equipment if the pressure drop across the filter bank exceeds a pre-set level. A sail switch inter-connected with the exhaust fan shall be provided to prevent paint booth operation in the event of exhaust fan failure. The make-up Air Units, exhaust fans, and equipment air compressors shall shut-off in the event of activation of building fire pull stations, water flow indicator at riser, or duct smoke detector.

Provide one ETL approved control panel for each generating group so that each section of the booth could be operating independently. Furnish with the following:

- a. Main disconnect switch with door blocking, complete with warning lamp for power on indication.
- b. Key working selector with warning lamp for installation working.
- c. Burner on/off switch with burner cut-off warning lamp.
- d. Lighting switch.
- e. Low limit safety thermostat to control the highest temperature, which Interrupts burner operation when activated.
- f. Low limit safety thermostat to shut down spray booth at end of all cycles, and adjustable for the optimum spray temperature for the entry of next vehicle to be sprayed.
- g. Circuit breakers for each separate function.
- h. Electrovalve to cut off the compressed air at the spray gun during the drying cycle and when doors are open during spraying cycle.
- i. Relays, auxiliary contacts and all other components needed to supply the automation interlockings of the working cycle.
- j. Terminal board with relative electrical wirings.

## 2.2.11 ELECTRICAL REQUIREMENTS:

### 2.2.11.1 General

Motors, manuals or automatic motor control equipment and protective or signal devices required for the operation specified herein shall be provided under this section in accordance with SECTION: **16415 ELECTRICAL WORK, INTERIOR. All electrical wiring and equipment in paint stray booth shall be rated Class I, Division 1, group D, except those items located within 1.0 meter in all directions from any openings shall be rated Class I, Division 2, Group D.**

### 2.2.12.2 Power Requirements

All electrical power requirements for the paint booth shall be served directly or indirectly through the paint booth control panel. The paint booth lighting and exhaust fan shall be fed directly from this panel, while the make-up-air unit shall be served indirectly from the paint booth control panel by means of a make-up-air unit control panel.

## 2.3 SANDBLAST BOOTH

Overall dimensions of the sandblast booth shall be generally as shown on the drawings, although exact dimensions shall be as standard with the manufacturer. The paint booth frame and panels may be matched and pre-punched to receive fasteners, or the drilling of holes for fasteners may be performed in the field.

### 2.3.1 Walls

.Walls shall constructed of a minimum of eighteen (18) gage galvanized steel panels. All interior walls shall be fitted with wall liners. Wall liners shall be 1/8 inch thick rubber with a durometer hardness of 60.

### 2.3.2 Entry Doors

Doors: The booth shall be provided with a main door as well as full width swing doors at one end. All doors shall be equipped with a 45 cm by 45 cm (18 inch by 18 inch) view window.

### 2.3.3 Dust Collectors

The sandblast booth shall be equipped with two (2) dust collectors. The collectors shall be automatic self cleaning pulse jet cartridge type, including photohelic controls and pressure gage, air valves, filter assembly, tube sheets, and integral blower assembly. Collectors shall have built in silencing complying with OSHA noise limits. Plenum, housing, and hopper shall be constructed of 12 gauge, welded, hot rolled steel complying with ASTM-A570, braced for 16 inch w.g. Capacities shall be as indicated on Mechanical Equipment Schedule.

#### 2.3.3.1 Filtration

Dust collector filtration shall be by means of bag cartridge assemblies consisting of 42 bags each. The filter bags shall approximately 180 cm long and 5.75 cm in diameter and shall be made from 16 oz fine denier

polyester. The filter bags shall be periodically cleaned by bursts of compressed air directed into venturi and then injected down the inside of the bags to reverse the air flow. The cleaning cycle shall be controlled by a solid state timer.

#### 2.3.4 Lighting

Booth shall be equipped with a minimum of six (6) fluorescent light assemblies, containing four (4) tubes each.

### PART 3 EXECUTION

#### 3.1 INSTALLATION

Equipment shall be installed as indicated and in accordance with the recommendations of the equipment manufacturer and the listing agency, except as otherwise specified.

The Contractor shall make provision for the plumbing, heating and electrical connections and for equipment indicated as being furnished and installed by the Government

##### 3.1.1 Heating Equipment

Heaters shall be installed with clearance to combustibles complying with minimum distances as determined by IAS-01, UL Gas&Oil Dir and as indicated on each heater approval and listing plate. Heaters shall be independently supported from the building structure as indicated and shall not rely on support from suspended ceiling systems.

##### 3.1.2 Vents

Vent dampers, piping and structural penetrations shall be located as indicated. Vent damper installation shall conform to ANSI Z21.66. Vent pipes shall extend through the roof or an outside wall and shall terminate, in compliance with NFPA 54/ANSI Z223.1. Vents passing through waterproof membranes shall be provided with the necessary flashings to obtain waterproof installations.

##### 3.1.3 Gas Piping

Gas piping shall be connected as indicated and shall comply with the applicable requirements of Section 15488 GAS PIPING SYSTEMS.

#### 3.2 START-UP AND TESTING

Booth manufacturer's engineer shall provide start-up service. Booth installer shall be present during start-up. Test ventilating and exhaust system for required air delivery. Adjust operating equipment as necessary to obtain required performance. Demonstrate operation of paint booths to designated operating and maintenance staff members.

-- End of Section --

