Facilities Standards & Guidelines

C.39 Paint Booth Requirements

Revision 1

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BAE SYSTEMS

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Section 1 – Summary

1.1 The objective for providing a Paint Booth Standard is to achieve coherence for all buildings managed by BAE Systems. The design standards set forth here are intended to assist designers and contractors in providing a design that is conducive to supporting BAE's operational, maintenance, and life cycle needs.

1.2 All paint booths shall comply with the current building, architectural, mechanical, electrical, plumbing, and fire codes.

Section 2 – Specific Design Requirements

2.1 General

2.1.1 All downdraft paint booths shall be based on GFS (Global Finishing Solutions) or similar as selected by the program users and acceptable through ISN.

2.1.2 All paint booths shall be Class 1, Division 2, unless specified otherwise by the users, with all components rated accordingly. BAE Systems defers to the local codes and AHJ.

2.1.3 With the selection of the paint booth, an adequately sized, dedicated makeup air unit shall be interlocked with an exhaust fan.

2.1.4 The paint booth will include the following items:

1.1.4.1 C1D2 limit switches

1.1.4.2 ¾" solenoid valve powered by 120V

1.1.4.3 Filter monitoring frame

2.1.5 The booths shall be fabricated from 18 gage white pre-coat sheet steel with pre-punched and companion flanged for bolt together assembly.

2.1.6 The booth support structure will be fabricated from W8x10 I-Beam, pre-drilled, and factory painted white.

2.1.7 The pit, ductwork, and duct support shall be coordinated by the design team and contractors.

2.1.8 Coordinate the Paint Booth submittal as a pre-purchase package before 100% Construction Documents to prevent long lead delivery.

2.1.9 All paint booths shall also have 3rd party commissioning such as Iconergy or similarly certified commissioning group.

2.2 Specialties & Utilities

2.2.2 Intake Filtration

2.2.2.1 The paint booth shall have intake filters with Part Number: 217-012 from GFS, if using a GFS model

2.2.2.2 Typical Quantity is 24

2.2.3 Three Stage Filtration

2.2.3.1 First Stage

2.2.3.2 Roll Media, QTY: 1 Lot

2.2.4 Second Stage

2.2.4.1 20x20 MEPT Panel, QTY: 24

2.2.5 Third Stage

2.2.5.1 20X20 Bag, QTY: 24

2.2.6 The utilities shall be included, but are not limited to the list below:

UTILITY:	ITEM:
Domestic Water	Evaporative Fill
Compressed Air	Tool air and Breathing Air
Heating Hot Water	MAU Pre-heat, Re-heat, and Regen
Chilled Water	MAU Pre-cool and Re-cool
Electrical	Control Panel for Booth, MAU, and EF
Drainage	Condensate and Evaporative Drains

2.3 Mechanical

PAINT BOOTH DESIGN CRITERIA		
Room Temperature Setpoint (Occupied)	Room Temperature Setpoint (Unoccupied)	Humidity Setpoint
68°F ± 3°F	70°F ± 10°F	40% ± 10%

2.3.1 MAU (Makeup Air Unit)

2.3.2 Ensure that the makeup air unit sizing considers any future growth for additional paint booths or occupancy in the space.

2.3.3 Chilled Water

2.3.3.1 The MAU shall preferably utilize chilled water for cooling. If chilled water capacity is limited, coordinate with the Facilities Team for alternate options with DX cooling.

2.3.3.2 The following campuses have the following supply and return temperatures from the chiller plant. All chillers do not have glycol unless specified.

2.3.3.2.1 AMC – 45 degrees Fahrenheit, 55 degrees Fahrenheit

2.3.3.2.2 FM/FT – 45 degrees Fahrenheit, 55 degrees Fahrenheit

2.3.3.2.3 FA – 42 degrees Fahrenheit, 52 degrees Fahrenheit

2.3.3.2.4 FI – 35 degrees Fahrenheit, 45 degrees Fahrenheit (These chillers contain 30% glycol)

2.3.3.2.5 PDF – 45 degrees Fahrenheit, 54 degrees Fahrenheit

2.3.3.2.6 AHQ – 45 degrees Fahrenheit, 55 degrees Fahrenheit

2.3.3.4 Heating Hot Water

2.3.3.4.1 The MAU shall primarily use heating hot water for the pre-heat and reheat coils.

2.3.3.4.2 The heating hot water coils shall be sized with 160-degree Fahrenheit entering water temperatures and 140-degree Fahrenheit leaving water temperatures.

2.3.3.4.3 Coordinate piping and boiler capacities with the Facilities Engineer and Maintenance personnel.

2.3.3.4.4 If there is limited boiler capacity, coordinate with Facilities Engineering and Maintenance for gas heating options.

2.3.3.5 Ensure that the makeup air unit sizing considers any future growth for additional paint booths or occupancy in the space.

2.3.4 Exhaust Fan

2.3.4.1 The operation of the exhaust fan shall be interlocked with the MAU. The total CFM exhausted shall be 10% more than the MAU to ensure negative pressure in the paint booth.

2.3.4.2 The exhaust fan shall be roof mounted. In the case that the exhaust fan must be wall mounted, please coordinate the routing and penetrations with the BAE Facilities and Maintenance Team.

2.3.5 Dehumidification

2.3.5.1 Chilled water coils – Chilled Water would be the preferred route for dehumidification, if required. However, this will only be applicable on chiller systems providing 35-degree supply, 45-degree return temperatures.

2.3.5.2 Desiccant Wheel – If chilled water is unavailable for dehumidification, the design team shall coordinate a desiccant wheel design for dehumidification.

2.3.6 Humidification

2.3.6.1 The design consultants shall coordinate utilizing existing steam piping to provide.

humidity to the paint booth at the MAU.

2.3.6.1.1 The secondary choice would be inline steam grids if steam piping is not in proximity.

2.3.6.1.2 The tertiary option would be wall-mounted humidifiers with domestic water connections.

2.3.7 Drainage

2.3.7.1 Coordinate all condensate and sanitary drainage with the Environmental, Health, and Safety (EHS) Team before indicating locations on drawings.

2.4 Controls

2.4.1 All controls shall be coordinated with the existing Siemens Building Automation Systems.

2.4.2 The design team shall provide controls sequences of operation, controls schematics, and

Matrices for all HVAC equipment serving the Paint Booth on the Mechanical Schedules and Drawings

2.4.3 The design team shall provide a list of controls points, which include but are not limited to below:

TEMPERATURE CONTROL MATRIX															
POINTS LIST:	POINT TYPE				ANALOG ID				STATUS	ALARM				TREND	GRAPHICS
	DI	DO	AI	AO	TEMP	RELATIVE HUMIDITY	POS/ SPEED	PRESS.		HI	LOW	MAINT.	CRIT.		
BOOTH SPACE TEMP			X		X					X	X		X	X	X
EXHAUST FAN STATUS, ON/OFF	X	X							X	X			X	X	X
BOOTH WARNING	X								X	X		X	X		X
BOOTH FAULT	X								X	X		X	X		X
POINTS LIST:	POINT TYPE				ANALOG ID				STATUS	ALARM				TREND	GRAPHICS
	DI	DO	AI	AO	TEMP	RELATIVE HUMIDITY	POS/ SPEED	PRESS.		HI	LOW	MAINT.	CRIT.		
SUPPLY FAN START/STOP		X							X				X	X	X
SUPPLY FAN VFD STATUS	X								X				X	X	X
SUPPLY FAN VFD SPEED				X			X		X					X	X

SUPPLY FAN VFD FAULT	X														X
SUPPLY FAN VFD AMPS/VOLTS	X													X	
SUPPLY AIRFLOW			X											X	X
SUPPLY DUCT STATIC PRESSURE			X					X						X	X
HIGH STATIC SUPPLY SAFETY	X								X						
SUPPLY SMOKE DETECTOR	X														X
HEATING COIL LAT			X		X									X	X
COOLING COIL LAT			X		X									X	X
REHEAT COIL LAT			X		X									X	X
FREEZESTAT	X									X					x
DISCHARGE AIR TEMP			X		X									X	X
HW COIL CONTROL VALVE				X										X	X
HEATING COIL EWT			X		X									X	x
HEATING COIL LWT			X		X									X	X
CHILLED WATER CONTROL VALVE				X			X					X		X	X
CHW COIL EWT			X		X					X			X	X	X
CHW COIL LWT			X		X					X			X	X	X
FILTER DIFFERENTIAL PRESSURE								X							X
DIRTY FILTER ALARM		X							X						X
HUMIDIFIER CONTROL VALVE				X		X	X			X			X	X	X

DISCHARGE RELATIVE HUMIDITY			X			X				X				X	X
MAU REGEN FAN START/STOP		X							X						X
MAU REGEN FAN SPEED				X			X								X
MAU REGEN FAN FAULT	X														X
MAU EVAPORATIVE HUMIDIFIER PUMP START/STOP		X													X
MAU DESICCANT WHEEL START/STOP		X													X
MAU DESICCANT WHEEL STATUS	X								X	X			X	X	X
ALL DAMPER POSITIONS (OA, EA, ETC.)				X			X		X	X		X	X	X	X
AIRFLOW SWITCHES			X				X			X		X		X	X

2.5 Plumbing

2.5.1 Compressed Air

2.5.1.1 Provide approximately 260 SCFM, with 30-120 PSI service for the GFS provided solenoid valve.

2.5.1.2 Provide (2) ½" compressed air connections for breathing air for (2) users max, if applicable.

2.5.1.2.1 If breathing air is required, the engineer shall calculate if the existing compressed air pipe size is sufficient for the breathing air required per user.

2.5.1.2.2 When connecting to the existing air compressor, please ensure that the copper pipes tap into the main, followed by routing to the ENMET AFS-100 filtration system, ENMET CO Guard (compressed Air Line Monitor), and the respirators. Installation and testing to be finalized by the Environmental, Health and Safety (EH&S) Team.

2.5.1.3 Additional compressed air connections from available manifolds or nearby connections to be finalized by users for parts, processes, etc.

2.5.2 Piping

2.5.2.1 The design team and contractors shall ensue that for every new piping needed, isolation valves shall also be installed to allow minimal shutdown of utilities.

2.6 Electrical

2.6.1 All electrical installation, components and distribution needs to meet NFPA 70 and NEC 500-503

2.7 Fire Suppression

2.7.1 The Paint Booth shall have an interlock with the building fire alarm system.

2.7.2 When fire or smoke is detected, the interlock shall engage and create visual and audible. Alarms to disable the solenoid valve, the MAU, and exhaust fan.

2.8 Additional Details

2.8.1 Provide an Air Balance Table on the Mechanical Drawings detailing all equipment providing exhaust CFMs and supple CFMs to assist with the air balance analysis in the space where the Paint Lab is located.

Supplemental Document Information

The following resource documents should be referenced for execution of the standards and guidelines described above.

Document Number	Document Title

Revision Log

Revision	Release Date	Description of Changes
0	07/03/2023	Initial Release
1	04/17/2024	Branding update to BAE Systems