Paint Booth
Design Review Checklist

- ACGIH Industrial Ventilation Manual, 27th /28th Edition
- UFC 3-410-04N, Industrial Ventilation, 25 October 2004
- ANSI Z9.3-2007, Spray Finishing Operations – Safety Code for Design, Construction, and Ventilation
- 29 CFR 1926.57, Ventilation
- 29 CFR 1910.94, Ventilation
- 29 CFR 1910.107, Spray finishing using flammable and combustible materials
- NFPA 33-2016, Spray Application Using Flammable or Combustible Materials
- National Guard Design Guides, 2011

Means of Egress

1. Emergency Exits provided?

2. Walkway of 6.5 feet high and 3 feet wide provides access to exit(s) (1910.94, ANSI Z9.3)?

3. Personnel doors open outward from the booth (1910.94)?

4. In booths where the open front is the only exit, is the exit not less than 3 feet wide (1910.94)?

5. If there are multiple exits is each exit at least 2 feet wide (1910.94)?

6. Is the maximum distance to an exit less than or equal to 25 feet (1910.94)?

Fire Protection

1. Industrial occupancy in which the painting booth is located is separated from other occupancies (2 hours from business; 3 hours from educational; 2 hours from assembly)? Reduce by 1 hour if sprinkled.
Spray areas separated from other areas of the building by 1 hour fire barrier?
Separated from other operations by 3 feet or a 1 hour fire barrier? (NFPA 33; 1910.94)

2. Is the area sprinkled? (required by NFPA 33)
    a. Exhaust ductwork sprinkled?
    b. Exhaust plenum sprinkled?
    c. Particulate filters sprinkled, if applicable?
    d. Recirculation air supply units, if applicable?
    e. Mixing room sprinkled, if applicable?

3. Are fire extinguishers provided and located for instant use in emergency (NFPA 33, 1910.107)?

4. Fire alarm provided (NFPA 101)?

5. Will sprinklers be protected against overspray residue (NFPA 33)?

6. Ducts do not penetrate fire barriers (NFPA 33)? Penetrations through combustible walls are protected with an appropriate fire resistant assembly (1910.94)?

Construction

1. Noncombustible/Limited combustible construction (NFPA 33)?

2. No aluminum used for structural support (NFPA 33)?

3. Interior surfaces are designed to prevent accumulation of residue (dead air pockets) (NFPA 33)?

4. Acoustical treatment provided if noise levels exceed 85 dB for room where booth is located? Must be noncombustible if provided. (NCB<60 for NGB)

5. Noncombustible fire doors and shutters (1910.94)? Noncombustible supports for air filters, baffles, etc. (NFPA 33, 1910.107)?

6. Observation window of safety glass (heat-treated) (NFPA 33)?

7. No smoking signs for paint area, paint storage, mixing rooms (1910.107)?

8. Is a clear space of 3 feet maintained on all sides and above the booth (NFPA 33, 1910.107)?
If no, is the booth located adjacent to a noncombustible exterior wall or roof or an interior partition with a 1 hour fire rating?

HVAC

1. Space heating appliances located away from spray area (1910.107)?

2. Is makeup air provided if temperature is less than 55^{o}F for an appreciable period of time during booth operation (1910.94)?
Is make-up air is heated to at least 65^{o}F (1910.94)?
No means of heating make-up air inside booth (1910.94)?

3. Air velocity at doors, dampers or louvers into the booth is 200 fpm or less (1910.94)? All are noncombustible?

4. Spray area is provided mechanical ventilation (NFPA 33)?

5. Exhaust system runs continuously while operations are in progress and as long as necessary afterwards (1910.107)?

6. Air exhausted from spray operations is not recirculated and is directed outdoors to the exhaust fan and away from intake openings (NFPA 33, 1910.107)?

7. Ductwork does not connect to any other process (1910.94)?

8. Make up air system provided in same quantity as exhaust air (UFC)? Plenum provided to distribute air evenly across the booth (UFC)?

9. Air intake openings are located to minimize dead air pockets and are adequate for the efficient operation of exhaust fans (1910.107)?
Air intake openings are fully open during spray operations (1910.94)?
Velocity through air intake openings does not exceed 200 fpm unless exhaust system can accommodate higher velocities (1910.94)?

10. Overspray collection filters are Class 1 or 2 in accordance with ANSI/UL 900 (NFPA 33)?
Filters maintain average velocity greater than or equal to 100 fpm over open face of booth (1910.107)?
Filters sized for 100-500 fpm (IV Manual)?
Filters have interlocks with ventilation system or are on effective inspection program (NFPA 33)?

11. Booths equipped with overspray collection filters have visible gauges, audible alarms or inspection program to ensure adequate airflow velocity (1910.107)?
Filters are accessible for cleaning/replacement?

12. Differential pressure gauges across replacement air filters (1910.107)?

13. Multiple booths, if provided, each have a dedicated exhaust system (NFPA 33, 1910.107)?

14. Exhaust ducts are equipped with access panels every 9-12 feet for ducts up to 12 inches diameter, greater distances for larger ducts (NFPA 33, 1910.94)?

15. Exhaust ducts constructed of steel (no aluminum) (NFPA 33)?
Exhaust ducts have at least 18 inches clearance from combustible construction (1910.107)?
Exhaust ducts protected from damage (1910.107)?
Exhaust ducts correctly supported (SMACNA) (NFPA 33)?

16. Exhaust does not discharge within 25 feet of combustible construction or unprotected opening and within 6 feet of an exterior wall or roof (NFPA 33, 1910.107)?

17. Exhaust fan is non-ferrous with explosion proof motor and electrical fixtures (NFPA 33, 1910.107)?
Is the fan belt sealed and not inside the spray area?
Exhaust fan static pressure accommodates “dirty” filter conditions (1910.94)?

18. Static pressure sensor at exhaust fan inlet (UFC)?

19. Exhaust remains functional during fire alarm condition or fire protection system is designed to shut off ventilation (NFPA 33)?

20. Equipment used to monitor exhaust streams, if required, are listed for this purpose, trigger and alarm, shut down spray operations if vapor concentrations in exhaust stream exceed 25% LFL (NFPA 33)?

21. Ductwork has a transport velocity of 2000 fpm (IV Manual)?

22. Booth is downdraft type (UFC, 1910.94)?
    a. Exhaust plenums no wider than 8 feet?
    b. Exhaust plenum velocity does not exceed 1000 fpm?
    c. Supply air provided by a plenum which evenly distributes air across the cross-section of the booth above the object being sprayed?
    d. Supply air plenum velocity does not exceed 500 fpm?
    e. Supply air plenum has openings designed for 1000 fpm?
    f. Exhaust air removed via plenum which runs evenly across the cross-section of the booth?

23. Booth is crossdraft type (UFC, 1910.94)?
    a. Exhaust plenums no wider than 8 feet?
    b. Exhaust plenum velocity does not exceed 1000 fpm?
    c. Supply air provided by a plenum which evenly distributes air across the cross-section of the booth upstream of object being sprayed?
    d. Supply air plenum velocity does not exceed 500 fpm?
    e. Supply air plenum has openings designed for 2000 fpm
    f. Exhaust air removed via plenum which runs evenly across the cross-section of the booth?

24. Air volumes are designed to meet the following (IV Manual)?
    a. Q = 200 cfm per sq. ft. of booth open cross section for small booth with face area up to 4 square feet
    b. Q = 150 cfm per sq. ft. of booth open cross section for small booth with face area over 4 square feet
    c. Q = 100 cfm per square foot booth c-s area for large walk-in booths
    d. Q = 75 cfm per square foot booth c-s area for large deep walk-in booths
    e. Q = 50 cfm per square foot booth c-s area for booths where W x H > 150 sq. ft.
    f. Q = 60 cfm per square foot booth c-s area for HVLP or airless electrostatic spraying in large walk-in or drive-in booths

25. Air velocities meet the requirements below (1910.94)?

Operating Conditions for Objects inside Booth	Crossdrafts (feet per minute, fpm)	Airflow Velocities, fpm	
		Design	Range
Electrostatic and Automatic Airless operation contained in booth without operator	Negligible	50, large booth	50-75
Air-operated guns, manual or automatic	Up to 50	100 small booth, 100 large booth	75-125
Air-operated guns, manual or automatic	Up to 100	150 small booth, 150 large booth	125-175
		200 small booth	150-250

Plumbing

1. Compressed air provided for painting tools? Breathing air provided for respirators (UFC)?

2. Shut-off valve on hose or flexible connections from containers or piping (1910.107)?

3. Pumping system, if used for delivery, is sufficient to accommodate system pressures (1910.107)?

4. Piping is steel or heat/damage resistant (1910.107)?

5. Piping systems are bonded/grounded (1910.107, NFPA 33)?

6. Spray nozzles from positive displacement pumps have relief valve in the pump discharge line or a device to stop it if safe operating pressure is exceeded (1910.107)?

Electrical

1. Explosion-proof lighting/wiring or lighting/wiring listed for use in spray area (1910.107, NFPA 33)?

2. Light fixture panels of safety glass (heat treated) and listed for use in spray area (NFPA 33)?

3. No open flame or spark producing equipment within 20 feet of spray area (1910.107)?
No electrical equipment in spraying area unless approved for that location (1910.107)?

4. Electrically conductive parts, ducts or equipment are electrically bonded and grounded to prevent sparks and static electricity (NFPA 33)?

5. Supply and exhaust systems are electrically interlocked (NFPA 33)?

6. Spray guns and electrical equipment are interlocked with ventilation system (NFPA 33)?

7. Drying apparatus interlocked with spraying apparatus so spraying cannot occur when drying is in process (NFPA 33)?
Drying system interlocked to shut off in the event of ventilation system failure (NFPA 33)?