

# Basics of Paint Spray Booths

The core goal of any paint or spray booth is to provide a clean, well-lit, safe (well-vented) work area for application of automotive paint and other industrial finishings. So, it is important to have a paint or spray booth that is not only properly isolated / contained but also has the appropriate lighting, ventilation, and safety systems built into it.

“It’s a metal box that moves air” – it is / can be much more complicated than that but that is the primary objective of a booth.

Automotive paint booths come in three major types: open-faced, pressurized, and non-pressurized. Here is a brief explanation of these types of booths:

- Open-Faced: This type of booth has three walls with an open front entrance. Air is pulled in through the front opening and is pushed out through an exhaust located at the rear.
- Non-Pressurized: Unlike an open-faced booth, this is fully enclosed. Air is pulled in through an intake filter bank and through the exhaust bank. Because there is no pressure being applied to the incoming air, you have no direct control over the air volume and its pull from the surrounding (ambient) shop air.
- Pressurized (Air Make Up [AMU] or Heating unit): The difference here is that some pressure (and / or heated air) is applied to the incoming air from an external or outside source giving you more control over the air volume and temperature within the booth and negating the pull on your shop’s ambient air. This will almost always be more effective than a non-pressurized booth albeit more equipment and more expense. This particular feature of paint booths becomes more critical in colder climates.

## Types of Airflow

Automotive and industrial paint booths come in a variety of shapes and sizes. Likewise, there are different types of airflow. They all have their advantages, as well as their disadvantages. So, you will want to weigh the

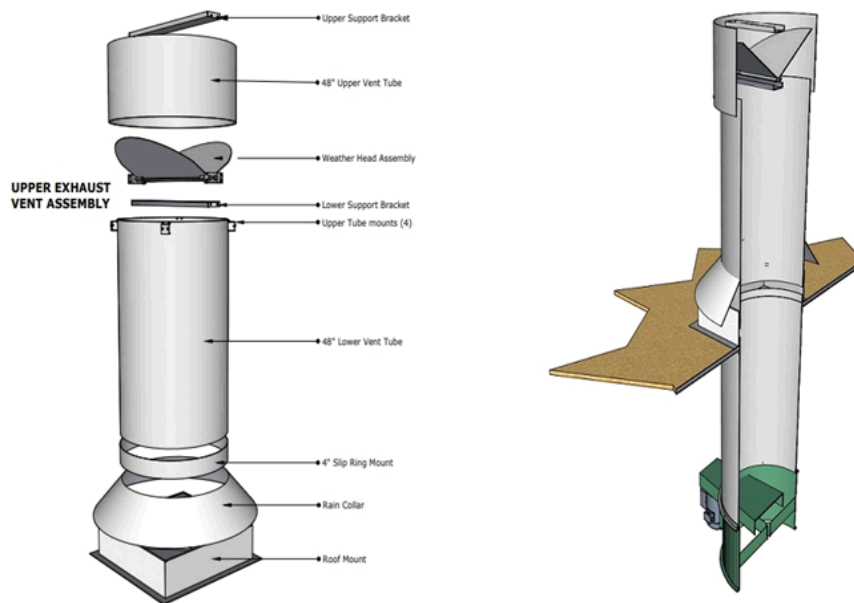
variants and options (and the associated cost) to determine which booth will work best for YOUR operation.

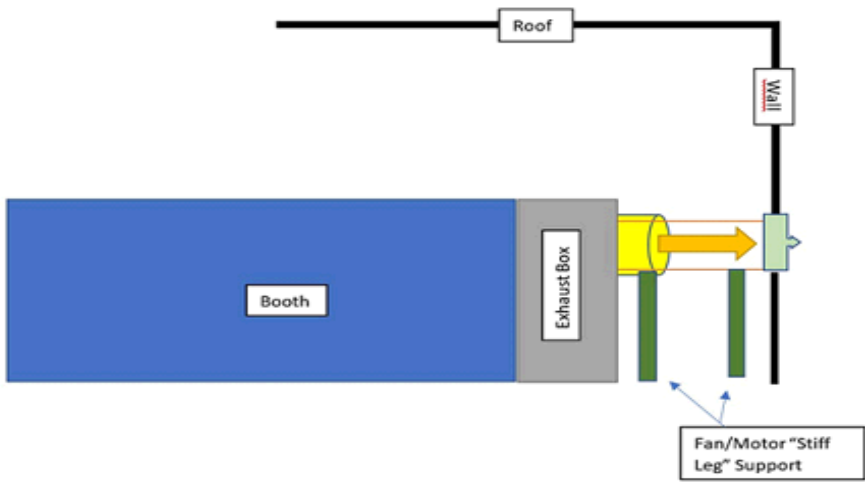
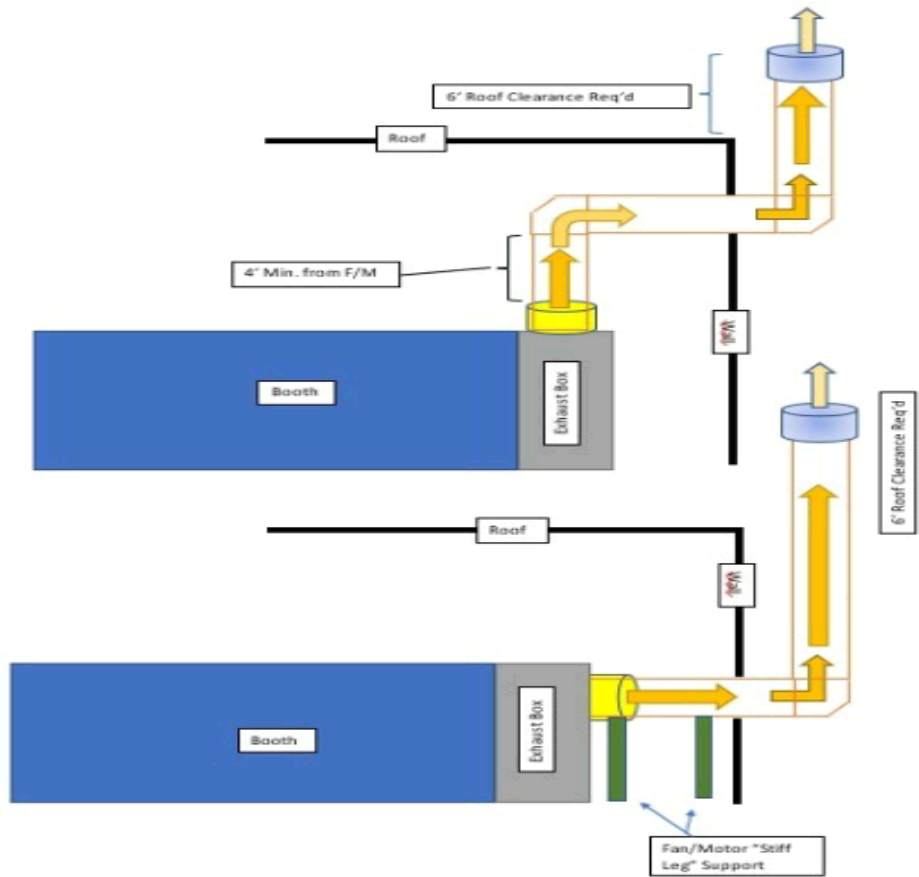
Three (3) primary types of booths and airflow:

- **Cross flow:** This booth type provides a fully enclosed, non-pressurized, **horizontal** flow of air from one end (front/intake) to the other (rear/exhaust) for clean air flow through and within the spray booth. In short, air in these types of booths move from one end to the other in a horizontal direction.
  - Pros: Most common and economical
  - Pros: Easily accessible filters - maintenance
  - Cons: Spraying is best when 'up-wind' of air flow
  - Cons: Spraying should be perpendicular to surface
  - Cons: Not adaptable to a pressurized booth (AMU)
- **Side-Down-Draft:** This booth type provides a fully enclosed, pressurized or non-pressurized, **vertical** flow of air from the top intake box to the bottom (side) exhaust boxes for clean air flow through and within the spray booth. In short, air in these types of booths move from one top to bottom in a vertical direction.
  - Pros: Limits dry overspray
  - Pros: Optimal air flow/direction to minimize contaminate
  - Pros: Adaptable to AMU with addition of in-take box
  - Cons: Most expensive; Larger 'footprint'
- **Semi-Downdraft:** This booth provides a fully enclosed, pressurized or non-pressurized booth that is **hybrid** of the previous two, in that, the air comes in from the ceiling intake and is pulled out through the filtered rear wall. Creating a partial vertical and horizontal air flow.
  - Pros: Same price as Cross Flow (CF)
  - Pros: Adaptable to AMU with addition of in-take box
  - Cons: Spraying is best when 'up-wind' of air flow
  - Cons: Spraying should be perpendicular to surface
  - Cons: Ceiling intake filters more difficult to reach

## Construction / Installation Considerations

The most notable consideration is that optimally booths should have a 3' clearance or halo around the booth when feasible (may be req'd in some codes/regulations). The purpose for this is to ensure access to all sides of the booth for maintenance (cleaning) as well as to eliminate (unreachable) pockets that could become fire hazards. Another critical factor in placement is the projected exit point for the ductwork. This most often is the ceiling but could be a wall. In either case you need to ensure there is a clear path for the full diameter of the ductwork with consideration for rafters, studs, etc. that could impede installation.





Additionally, most municipal codes require that ductwork be at least 6' above the ceiling exit point as shown above. This requirement will also apply to wall-exhausted systems as well unless otherwise approved.

If a side or wall exhaust is planned there are two points of note. One is that if a 90-degree elbow is employed it must be 4' above the motor to minimize air flow constriction. Second when the fan/motor is horizontally installed a stiff-leg support should be employed to mitigate excessive weight and vibration on the exhaust panel.

Booth construction in most cases should begin with the exhaust plenum in order to provide a stable starting point from which to add wall and ceiling panels. Our booths are erected using tek screws as opposed to nut and bolt. Tek screws are substantially easier, and more flexible with little to no notable strength difference from nut-bolt construction. Furthermore, should you desire, a nut can be applied to the tek screws.

## Electrical Considerations

Our booths components are all UL-certified and lighting is usually standard LED 2' x 4' fixtures. Our fixtures provide outside access in order to meet code requirements and facilitate maintenance. Explosion-proof lighting is not required unless fixture is less than 36" from an opening on the booth or requires an inside access light.

The overall electrical configuration can be as simple as two switches or as complex as an integrated panel configured with relay, breaker, or limit switches. We offer and recommend a control box with a variable frequency drive (VFD). This option provides a 'soft' start and stop for the motor, speed control of fan, and ability to step-up (1PH > 3PH) or step-down (3PH > 1PH) based on the building power supply. Therefore, your building's power source (1PH or 3PH) is a key variable in your planning.

Our booths. By default, we use a 3PH motor— thus if you are operating in a single-phase environment there are two options to accommodate. First being the purchase of a single-phase motor at an additional charge **or** the purchase of a control panel w/VFD which can be configured to step-up from single to three phase.

## Permitting Considerations

County and municipal codes requirements vary but State, City, and County so you need to be sure and do some research and/or ask what the general requirements are for a paint booth installation. For example, fire suppression may or may not be a requirement for installation and some regions require an ETL-certified booth (ours are not). However, our booths are designed with (common) codes and regulations in mind– to include use of outside access fixtures and placement of motor, door, and lighting. However, there is a potential for many unique requirements to be levied– many of which we can accommodate if known prior to purchase. See compliance certificate on next page for sub-component details and applicable standards.

## Purchase Process

We accept cash, checks, bank wires, and credit cards as payment. The normal purchase and payment process is as follows: 50% down-payment which moves your project to the production schedule with the 50% balance due once the booth is completed and ready for shipment. You will be called upon completion for final payment and provided a tracking number and projected delivery date 1-2 days after pick up.

Although we do not offer financing thru our company, we do have an agency we can refer you to that can provide financing (payment plan and terms) for your booth or equipment.

# Certificate of Compliance

Merchant 1 Manufacturing

1203 Freeway Drive, Reidsville, NC 27320



Merchant 1 Manufacturing booths are made in USA, in Reidsville, NC and are compliant with the standards of:

*National Fire Protection Association (NFPA-33) and OSHA 1910*

## Paint Booth Components

Sub-Component	Vendor(s)	Standard -1	Standard -2	Standard -3
Steel	Majestic / NB Handy	18-Gauge	Class 1 Fire Rating	3-HR Fire Ratng
Motor	Grainger (Dayton)	UL Recognized (E47479)	CE/CSA Certified	NEMA Premium
Motor	Cook (TECO-Westinghouse)	UL Listed	CE/CSA Certified	NEMA Premium
Tube Axial Fan	Grainger / Cook	AMCA Type B	Spark-Resistant Props	---- N/A ----
Light Fixtures (LED)	Lithonia	UL Listed	IESNA Certified	DLC & IC rated
Fixture Tempered Glass	Lithonia	16 CFR 1201	ANSI Z 97.1	NFPA 33 (1/4" Thick)
Filters (Intake)	Air Filtration Technology	UL Class 2	MERV 7 - 8	83-97% Efficiency
Filters (Exhaust)	Air Filtration Technology	EPA	MERV 8	98-99% Efficiency
Manometer/Draft Gauge	Grainger	RoHS Compliant		
Sealant / Caulk	Grainger	---- N/A ----		
Control Panel	OPA Consulting	Built w/only UL-Listed Components		

## M1M Compliance Statement

Merchant 1 Manufacturing, LLC, designs and builds the paint booths, powder coating booths, and welding booths. We design and manufacture in compliance with the standards and guidelines set forth by NFPA 33. Our US-made booths are designed with UL approved components and consideration for OSHA 1910 and common permitting codes and regulations. However, since local regulations may vary, we provide configuration support to meet those requirements based on individual needs. M1M does not install or finance booths but we can provide remote installation support through our staff and financing through a third-party agency.

## Production Lead Time

We provide two options regarding production times. **One**, which is the basis of this document is through Merchant 1 Manufacturing ([m1mequipment.com](http://m1mequipment.com)) which builds the booths here in Reidsville, NC. Our process is basically 'first come – first serve', that is to say we prioritize production based on the date we receive the down payment (or full payment). This production schedule will only be adjusted to optimize labor resources or to fill potential gaps in the workflow (i.e. allocation of one 'idle' person to build a ductwork package between booths). If you have/need an expedited order let us know – however, we **can not** push other (multiple) production jobs out to expedite for a single customer.

The **second** option is the purchase of a pre-fabricated booth thru [Paint-Booths-Now.com](http://Paint-Booths-Now.com). These booths are more expensive but can be shipped within 2-3 days of payment. Furthermore, these booths come powder-coated and include a control panel as part of the package (these items are optional on our booths).

Two other factors for consideration with the iDEAL booths are that:

- (1) Customization is limited to only extension panels (length).
- (2) You will need to purchase ductwork from either us (M1M) **or** it can be obtained locally if you have a (HVAC) resource for ductwork.