



## How To Prepare For Code Issues

### When You Install New Powder Coating Equipment

In order to make the permitting and inspection process go as smoothly as possible for you or your customer (if you are not the end-user of the equipment), we suggest the following:

1. Have A Realistic Time Line
2. Review All Of The Material You Receive
3. Understand The Equipment And Terminology
4. Locate Licensed Professionals
5. Contact Local Authorities
6. Prepare Your Site
7. Check Up On Installation
8. Prepare For Inspection
9. Work With Inspectors
10. Operate And Maintain The Equipment Only As Advised

#### 1. Have A Realistic Time Line

Customers who have not previously dealt with powder coating equipment often fail to realize how long it takes from the time they receive their equipment until they have the equipment up and running. In theory, this process can take as little as 5-10 days.

**THE ASSEMBLY, START-UP, TESTING, PERMITTING, AND INSPECTION PROCESS  
TYPICALLY TAKES FROM TWO WEEKS TO THREE MONTHS TO COMPLETE.**

Trying to force the situation to go faster usually causes extra problems and puts added pressure on everyone. By planning ahead and working at a reasonable pace, the chance for errors that may slow the approval process is greatly reduced. Start by allowing plenty of time to get the equipment assembled, tested, and inspected.

## 2. Review All Of The Material You Receive

Much of the material you receive from suppliers, and from local government offices involved in code inspection will be boring and technical in nature. A common mistake is to scan the material and then discard it or file it away. Often, critical details such as location restrictions, wiring details and operating requirements are included in the literature you receive. If you fail to read this material in detail, you may plan an installation that simply won't meet code.

## 3. Understand The Equipment And Terminology

During the installation and permitting process, a great deal of communication is done by phone and email. By becoming familiar with how the equipment will operate and what the major components and assemblies are called, you will be able to intelligently interact with professionals who deal with this equipment on a regular basis.

**PRINT OUT AND READ THE ELECTRONIC MANUAL(S) PROVIDED WITH THE EQUIPMENT.**

## 4. Locate Licensed Professionals

The first requirement of almost any regulatory agency is to make sure that you have only licensed professionals performing electrical wiring and gas plumbing tasks. In most areas it is possible for the shop owner to act as his own general contractor and to hire licensed specialists just for gas piping and high voltage wiring.

**NEVER ATTEMPT WIRING THE EQUIPMENT OR CONNECTING THE GAS ON YOUR OWN—IT VOIDS ALL WARRANTIES AND VIOLATES NUMEROUS CODES.**

Many shop owners choose to hire a general or mechanical contractor to act as a project manager. It is our experience that these customers are typically up and running faster than those who choose to handle contracting and permitting issues on their own. Even if you don't want to hire a project manager, it is prudent to select mechanical and electrical contractors well before you have to use them. They can often make suggestions that will save you time and money, and they may have "ins" with the permitting office that a shop owner won't have. By locating and hiring the best people you can afford, you will speed the installation and permitting process.

## 5. Contact Local Authorities

Sometimes permitting problems can be avoided just by taking a proactive approach and talking with local authorities before the equipment arrives. Questions about zoning, approved use of equipment, etc. can be dealt with in advance. In some parts of the U.S., powder coating equipment is fairly “new” to code inspectors. It is possible that you will know more about powder coating than the people who will inspect your equipment. This can be aggravating, but it is not uncommon. Patience and friendliness will go a long way towards getting good results. Many shop owners are not aware of this one fact that doesn't seem fair--but is undeniable:

**AN INSPECTOR CAN PREVENT YOU FROM INSTALLING AND/OR OPERATING YOUR EQUIPMENT FOR JUST ABOUT ANY REASON THAT HE OR SHE SEES FIT.**

This is something that you will need to accept 100% or you will find the permitting process extremely frustrating. By providing the information the inspector needs in a timely and cooperative manner, you are helping your shop get up and running as quickly as possible. Sometimes local authorities will be familiar with your contractors, so the contractor may be able to get better results than you will. Take advantage of the experience of your contractors and listen to their advice.

## 6. Prepare Your Site

Before the equipment arrives, you need to clean the area where it will be installed and roughly map out the installation location. There are some common issues (such as placing an oven too close to a flammable wall) that a licensed professional will be able to help you avoid if you contact them before the equipment arrives. The most common problems shop owners encounter are low ceilings and unlevel floors. A floor that is not smooth and dead level to within plus or minus ¼” needs to be repaired/reworked before the equipment arrives. Make sure your site is ready to go before equipment assembly begins:

- Prior to determining the permanent location of the equipment, check with the authorities having jurisdiction to make sure the location will meet code.
- In many areas a fire suppression system will need to be installed because of local codes or conservative code inspectors. If fire suppression is going to be installed, consider the requirements of the suppression system when mapping the location of the equipment.
- Make sure that the equipment is installed on a smooth, level, non-combustible surface. The installation site MUST have a floor that is smooth and level to within ¼” over the entire oven,

heat unit, and door footprint.

- The equipment should be located with enough clearance to open access panels, remove service covers, and inspect key components. Adequate clearance to service blowers, motors, belts, pulleys, and gas train is critical.
- NOTE – The heat unit is designed to discharge air at elevated temperatures. Avoid directing the heated air upon people or heat-sensitive objects in the immediate area of the oven doors.
- When using a suspended or roof mounted heat unit, make sure that the position of the heat unit relative to the support beams is correct so as to provide adequate support for the equipment.
- For all equipment make sure that the spacing of beams or other structural components will not interfere with ductwork.
- Control panels are factory wired and tested. They must be installed in compliance with all applicable codes. Location of the panel must be within 40' of the heat unit to assure proper signal quality to control equipment.

Heat unit installation must conform to all applicable codes. In the absence of local codes, install in accordance with the “National Fuel Gas Code,” ANSI Z223.1, or the CAN/CGA B149 Installation Codes. When installed in Canada the equipment must be electrically grounded in accordance with CSA C.22.1 (latest edition) Canadian Electrical Code Part 1.

## 7. Check Up On Installation

One of the best ways to avoid last minute surprises is to get a daily report from the installers that assemble your equipment, whether they are independent contractors or your own employees. They can often predict issues before they happen because they are actively involved in erecting the equipment. Encourage the installers to let you know if there is anything that they feel may become an issue in terms of safety, functionality, or quality of installation. This also applies to electrical contractors, gas plumbers, and mechanical contractors.

**IF YOU LEARN THAT THERE IS A PROBLEM WITH THE LOCATION OR INSTALLATION OF**

**THE EQUIPMENT, THE MOST EFFICIENT SOLUTION IS OFTEN TO REMOVE THE EQUIPMENT AND START AGAIN FROM SCRATCH.**

The temptation to ignore or work around a problem can lead to bigger hassles later!

**8. Prepare For Inspection**

If you know you have violations, correct them before the inspection. Hoping an inspector will overlook something is unwise. Similarly, if the shop where the equipment is being installed typically operates in a manner that may be viewed as unsafe or outside of code, take the time to perform housekeeping tasks and let everyone know an inspector will be on-site. Simple things like dirty rags left on a counter can lead to problems.

**WHEN PRACTICAL, ASK A CONTRACTOR OR OTHER OUTSIDE PARTY TO REVIEW THE INSTALLATION SITE BEFORE THE INSPECTOR ARRIVES AND POINT OUT ANYTHING THAT MAY BE A PROBLEM—EVEN IF IT ISN'T DIRECTLY RELATED TO THE EQUIPMENT BEING INSPECTED.**

For example, if there is a wet paint spray booth or prep area that is not being used properly, address the issue before the inspector arrives.

**9. Work With Inspectors**

Avoid situations where the inspector has to admit that he or she doesn't know much about powder coating. Suggest useful websites or pro-powder coating organizations such as the PCI ([www.powdercoating.org](http://www.powdercoating.org)) as resources. Some inspectors are friendly and helpful. Some are passive and don't seem to care much about the details of your equipment. Some can be aggressive and confrontational. Others are extremely technical and thorough. No matter how the inspector(s) behave, you will need to work with them in a cooperative manner. Sometimes if inspectors make suggestions about non-critical issues and you follow their advice, they will be more inclined to "work with you" on more important issues.

**10. Operate And Maintain The Equipment As Advised**

In shops where the equipment is operated by employees and not the owner, it is more likely that maintenance tasks will be overlooked. Simple routines like lubricating bearings, cleaning floors and changing filters will increase the equipment life and improve performance.

Poor maintenance routines and unsafe operation should always be avoided. They are a violation of code and they void the warranty.

If you have never dealt with powder coating equipment before, the following summary may be helpful when you are interacting with local authorities. The technical term most often used for inspectors is “Authorities Having Jurisdiction.” You may see this phrase in literature from organizations in the powder coating field. Pretreatment stations and blasting enclosures are not covered by this document because they tend to be much less problematic in terms of code issues. Here is what you need to know when talking with Authorities Having Jurisdiction:

Unlike conventional solvent-based wet paint, the powder used for powder coating is not dangerous. It is typically categorized as a nuisance dust. This means that it does not emit a significant amount of VOCs (Volatile Organic Compounds) and is not naturally flammable. The powder is applied in a “Powder Containment Enclosure,” “Powder Spray Enclosure” or “Powder Application Enclosure.” Avoid using the term “spray booth” when possible because some inspectors will want to lump in your equipment with wet paint booths—even though they have very different requirements.

The powder is applied by using a compressed air line to blend powder with air and then blow it onto the object being coated. By using a grounding strap to ground the object being coated, an electric charge generated by the spray gun causes the powder to adhere to the object being coated (a process known as electrostatic coating application). This type of coating is very efficient. Most agencies recognize that more than 55% of the powder sprayed will adhere to the object being coated (this is known as a minimum transfer efficiency of 0.55 or greater). The Powder Spray Enclosure is designed so that air is drawn from the shop environment into the enclosure and past the object being coated. As the air moves through the enclosure, overspray is carried with it. This causes the overspray to be contained inside the enclosure. The majority of the overspray settles onto the floor of the enclosure. The remainder is drawn into a set of filters at the rear or side of the unit. The powder is caught in an initial “blanket” type pre-filter. Behind this filter, a “bag” type air filter catches any particles that have blown through the blanket filter. The air is then routed through a tubeaxial fan and either discharged back into the shop or exhausted to the outside atmosphere. In units where the exhaust is returned to the shop, there is a third set of filters. Before the exhaust air enters the shop atmosphere, it is filtered again by a 99.97% efficient HEPA-type filtration system that traps particles that are too small for the other filters to contain. The air is safe and breathable once it exits the enclosure. Powder Spray Enclosures must not be used for wet paint spraying!

- Tempered safety glass is used for all lights
- Glass is sealed closed during installation and lights are outside-access only
- Filter system is typically a 3-stage ASHRAE/NESHAP arrangement
- Filters and fan can all be easily inspected—typically no exhaust ductwork is used
- Controls are housed in a NEMA enclosure and provide stop/start and lighting control
- A separate manual electrical disconnect is required but not provided

Once the powder is applied, the object is moved into a curing oven. The oven is heated to temperatures of 300· F to 450· F and the material is cured for several minutes. After curing, the object is removed from the oven and allowed to cool.

The oven is designed to draw a small amount of air from the shop environment (unless otherwise ducted to the outside atmosphere) to compensate for the air that is removed from the oven by a powered exhaust. The exhausted air from the oven must be ducted to the outside atmosphere via Class B double-wall ductwork. The oven is equipped with a range of safety devices. These devices include:

- High and low pressure gas safety valves
- Manual gas shut-off
- Pilot sensor with auto shut-down
- Combustion safeguard
- Flame safety switch
- Powered air circulation fan
- Powered air exhaust fan
- Intake air proving switch
- Exhaust air proving switch
- High temperature safety switch
- Oven temperature sensor
- Purge timer for combustion
- Purge timer for oven operation
- Motor overload protection—manual disconnect not supplied but required

For all installations, the following issues will need to be considered:

- The spray enclosure does not have to be vented to the outside atmosphere if HEPA filtration is used, but the filters must be in place at all times. The primary filters must be changed frequently—typically two or more times per month.

- The control panel for the spray enclosure must be protected by a manual electrical disconnect.
- The wiring of the control panel, motor and lighting circuit must be performed by a licensed professional. A minimum of 3' of clearance is required around the control panel.
- Remember to allow enough room for carts and other loading aids to enter the enclosure. It is critical to know the turning radius of carts or similar equipment so you don't have to make multi-point turns once the enclosure is installed.
- The oven doors must have an unobstructed swing radius. Remember to take them into account when measuring. As with the spray enclosure, take into account the turning radius of loading equipment before installing the oven.
- The oven may not be installed against a wall. Typically allow 3' to enable assembly and meet codes.
- For best operation in dusty conditions, the oven's burner should have fresh air ducted to it. This is typically done via a small 4"-8" duct routed to the heat unit combustion fan. The duct runs to the outside atmosphere and must have a protective rain cap.
- The oven's gas train may require venting. Most ovens feature gas valves that must be vented to the outside atmosphere to meet code. This is done using small diameter tubing.
- The oven must have an appropriate exhaust duct system connected to it. The exhaust gases may reach temperatures of up to 450· F and the exhaust duct must be a multi-wall type rated for at least this temperature. It is typically a Class B double wall duct 8" in diameter.
- The control panel for the oven must be protected with a manual electric disconnect.
- The wiring of the control panel, motors and high voltage controls must be performed by a licensed professional.

- The connection of the gas supply must be performed by a licensed professional.
- The oven control panel must have a clearance of 3' around it, measured from the face. The panel should be mounted so that the wiring to the heat unit/temperature probe is no more than 40' in length.

We hope this information is helpful and informative. Generally speaking, the inspection process is time consuming but predictable and easy to understand.