

# XIOM 1000

the gun that protects your world

[www.xiompr.com](http://www.xiompr.com)

## What is the Xiom 1000 system?

In a nutshell, the Xiom 1000 is a portable plastic powder coating system. It's small, weighing only 70lbs, meaning that it can be mounted on a cart, in a van, or on a trailer and taken on location to apply the special Xiom plastic coatings - when and where you need it.

It operates on cool, dry compressed air, oxygen (supplied by any oxygen cylinder), and propane - a regular barbeque tank will do.



The system is very simple. The console is used to control the flow of powder and gases, and may be set differently for different material that you are applying the coatings to.

### WHY IS THE XIOM 1000 SYSTEM SO UNIQUE?

Ask a person who has been in the powder coating business for any amount of time and they will tell you how much effort is necessary to run a powder coating operation - from setting up an oven system which can cost a small fortune, to preparing materials for coating using chemical baths, to hanging parts.



The Xiom 1000 can be up and running in a matter of hours and costs a fraction of the price of an oven based system. Minimal training is required to operate the Xiom 1000 nor do you need to be a rocket scientist to set it up.

On top of that, since the Xiom 1000 doesn't use ovens or electrostatic charging, a plastic coating can now be applied to wood, concrete, metals (including steel, aluminum, and galvanized metals), and even cardboard if you so desire!

The flexibility of this new system allows you to coat almost any surface or any material that you can think of.

To change from one color to another is a matter of simply dumping any powder in the canister out, blowing it out with air, and filling it with a different color. Two minutes and you're on to your next color!

Unlike paint, the coatings cure within seconds after they have been applied. No sticky parts that need to cure for a week- the coatings are set and ready to go as soon as they've been coated!

## The Xiom Advantage

30 May 2006 -

### On-Site Plastic Powder Spraying

By Thomas Gardega, Executive Vice President, and Linda Comac, Director of Marketing, Xiom Corp., Babylon, N.Y. Written for Metal Finishing - [www.metalfinishing.com](http://www.metalfinishing.com).



The coatings industry, like so many others, has become increasingly concerned with environmental problems and continually seeks methods and materials that are less hazardous and wasteful. Among the concerns are the environmental problems associated with VOCs, which led the U.S. Environmental Protection Agency (EPA) to embark on a program to remove VOC-bearing coating materials from the market as alternatives became available. This effort continues today with increased urgency. Painting contractors facing increasing regulatory pressure in the use and handling of all paints are looking for viable alternatives.

Beginning in the 1960s, electrostatic powder spray process (EPS) became the standard for applying organic polymer coatings. This process is commonly referred to as "powder coating," which means EPS is applied to plastic powder coatings followed by oven curing at approximately 400°F, where melting and film formation take place. In the early to mid 1980s, having little or no VOCs was one of the recognized benefits of factory powder coating.

Other benefits included reduced waste, easier clean-up, good barrier protection, and reclaimable and reusable overspray. However, the materials, methods, equipment, and knowledge of applications still had a long way to go. Even in the early days, job shop powder coaters and field paint contractors were expressing both the desire and the need to apply powder paint on site. The thermal spray industry attempted to address this need beginning with the flame spraying of thermoplastic powders. But 20 years ago, the results were not too promising.

Two main problems were behind this disappointing beginning. First, the materials available then were limited and not as advanced as now. Second, the thermal spray equipment available was not suitable for low melting point polymers.



The plastic powders being sprayed were the same as those used in the EPS process. No effort was made to modify powder particle size distribution to meet the requirements of thermal spraying. In addition, no effort was made to design new polymer coating formulations for on-site thermal spraying. Coating adhesion, function, and decorative value suffered as a result.

The thermal spray equipment was not suitable for low-melting-point polymers. It had been designed primarily for spraying high-melting-point-metal powders and then adjusted to handle polymer powders. These modifications didn't adequately prevent polymer powders from overheating and burning; therefore, coatings didn't always achieve their intended physical and chemical function.

Flame temperatures designed to melt metals were far too high for powder paint polymer feed stock materials. Propane is a given for the heat source required for these materials because it has a lower flame temperature but higher BTU content than acetylene. In addition, propane hoses can safely be run at longer distances, and historically propane is more economical. Simple propane/air and propane/oxygen mixtures have been tried, but both produced too high a temperature to successfully deposit low melting-point materials.

In addition, existing powder feeders couldn't provide simple, inexpensive, consistent, and reliable feed rates. A consistent feed rate is particularly important for low-melting-point polymer materials because there is a small window between the melting point and ignition. Also, if the feed rate load is too high or is pulsing, polymer materials can act as a fuel source. This was the main problem with previous technology.

Besides having too high a temperature and material feed pulsing, previous technology consumed up to 50% of the coating material and in many cases, even damaged the substrate. The flame measured up to 12 inches long, and the temperature was increased by the ignition of the feedstock material. The increased flame temperature was a further detriment to the coating once it was deposited.

Today, as job shop powder coaters face increased competition, many see the on-site market as untouched potential. Recent attempts by the thermal spray industry to provide equipment for field-applied powder coats have had more success than the earlier efforts, but this is mostly due to improved materials. Efforts in equipment development failed for one major reason: plastic powders often act as a fuel source and a short three-inch flame becomes a two- to three-foot flame if the heat source's temperature is too high for the powder material being applied.

## The System

In the system, oxygen and propane gas are mixed by means of a chambered double reversing vortex, eliminating the complicated siphon plug of previous systems. This is a simple device that is easy to machine with few parts. Also, the nozzle of the gun provides for a shroud of air between the flame and the feed stock polymer material, which clips and reduces the flame temperature. Additionally, an air distributor cap creates a compression wave, which allows for the rapid transfer of heated air to the material to be melted.



The compression wave is analogous to a pressure cooker; however, it is an open rather than closed system. The gun has a visible one- to three-inch flame and polymer feed stock material is visible as a stream beyond this point. The system does not consume the material and can achieve deposit efficiencies of up to 99%.

## Powder Feeder

The other breakthrough of this system is a unique patented powder feeder. This simple and inexpensive feeder provides stable material feed due to its open coupled double venturi. This approach eliminates all pocketing of material in the feed hose. Back pressure surging is virtually non-existent and has no effect on the feed rate.



The flaw of all prior powder feeders is that they have one venturi, which siphons up the material from either a fluid bed or feed screw and then conveys it to the nozzle discharge. However, the material feed rate and material delivery rate are two separate functions and therefore require two separate venturis. The material feed rate must be matched to the available BTUs and system geometry for each separate material. In addition, the material delivery rate must be matched to the dwell time and/or particle velocity required to melt the material.

In existing powder feeders, material builds up in the feed hose, creating a back pressure, which reduces the vacuum of the single venture. The material rate is constantly changing and the delivery of material is constantly pulsing and surging. This problem increases with hose delivery length. The Xiom powder feeder is designed to work with thermal spray equipment and in factory powder paint systems. The total system consists of the powder feeder, console and hoses and weighs just 70 pounds.

### Other Developments

Xiom Corp. has also designed a unique line of mixed polymers that are completely free of VOCs. Little or no preheat is required to easily apply the materials to metals, paper, cardboard, plastics, glass, concrete, asphalt roof tiles, fiberglass, duct-board, wood, and canvas as well as other surfaces.

Powder innovation is particularly evident in coating adhesion to various substrates without the need for liquid primers. Surface preparation for most substrates now requires only cleaning and roughing to achieve reliable and reproducible bonding. For instance, Xiom is the first to produce thermal sprayed epoxy/zinc primer/bond coatings delivering very high quantities of zinc to the substrate for corrosion control. These epoxy/zinc primer coatings were designed for secure bonding to steel substrates and to enhance bonding of sprayed plastic coatings by leaving a suitable rough surface for proper adhesion.

Xiom also produces grip and release coatings, coatings for tank linings, concrete and steel structures and anti-microbial coatings for surfaces that come in contact with food and water.

Powder coating—long known for reduction of waste, good barrier protection, ease of cleanup and lack of VOCs—has moved squarely into the new century, both in factories and on site.

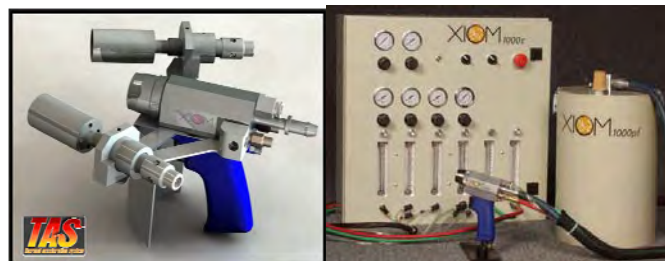




## COMPARE THE XIOM 1000 SYSTEM TO OTHER COATING METHODS



The Systems				
	WET PAINTING	POWDER COATING	PLURAL COMPONENT	Xiom 1000
VOC's	Yes	No	No	No
Energy use	Low	High	Medium	Low
Capital investment	Low	High	Medium	Low
Functionality	Low	High	High	High
Factory-bound	No	Yes	No	No
Speed to apply	High	Medium/high	High	Medium/high
Disposing of materials	Difficult	Easy	Easy	Easy
Aesthetics	Good	Excellent	Poor	Excellent
Thickness	3 mils	5 mils	16 mils to unlimited	6 mils to 1 inch
Chemical protection	Limited	Excellent	Limited	Excellent
Material cost	Low/medium	Low/medium	High	Low/medium
Equipment learning curve	Low/medium	High	Medium/high	Low/medium
Changeover time	Low/medium	High	High	Low
Re-use of coating	No	Yes	No	Yes
Bond strength	Low	High	Medium	High



## BEFORE YOU BEGIN...

What do I need to have before I get started with the Xiom 1000?

Before you begin, there are a few things you will need to have so that you can get started quickly once your machine arrives.



**Air compressor**, 20 CFM @90 PSI (minimum recommended), but as a rule of thumb, the more air flow that is available the better.



**Air dryer and filter** - Safechem strongly recommends having an air drying system in place between your air compressor and your Xiom 1000 system. To achieve optimal performance, the Xiom 1000 must have clean dry compressed air. A single coalescing filter will get rid of all oil particles in the air.



**Gases** - you will need a filled 20lb barbecue propane tank and oxygen cylinder in order to provide the gases that cause the coatings to melt. A propane tank is available at most hardware stores and can be filled at many service stations. The oxygen cylinder can be purchased and filled at most welding shops, and there are many shapes and sizes that you can use. More oxygen is used than propane and you will go through this quicker

**Personal protective equipment** - such as goggles/face mask, respirators, gloves, aprons, etc. are recommended.

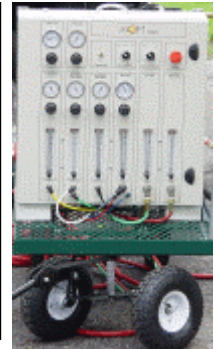
**Ventilation** - There are little to no VOC's produced when spraying with the Xiom 1000 system. However, depending on the materials that you are coating, and the plastics that you are applying, various fumes will be generated when heated. Depending on your environment, proper ventilation must be taken into consideration.



**Tools** - a lighter that you can buy at almost any hardware store is necessary to ignite the gases and start the system. Having a few crescent wrenches nearby is required to couple the air lines to the system. A fine sieve is a great idea - your powders may have settled in transport and running them through the sieve before putting them into the hopper will help break up any little clumps in the powders.



**Stand or Cart** - You will need to attach the Xiom 1000 to a portable stand, cart, or a bench, but however you'd like to do that is up to you. You can mount it on a wall very easily with a drill and some screws, but a portable cart is the best. Feel free to visit our Xiom owner's forum to share ideas for setting up the system.





## FAQ's

### **Q. How difficult is it to use the Xiom 1000 system?**

The gun sets up and is ready to spray within minutes. The gun, the control console and the powder feeder are “plug and play.” All that’s required are a tank of propane, oxygen and an air compressor providing 20 CFM @ 90 PSI of air.

### **Q. Is it time-consuming to change the color of the material**

Changing spray color is a two-minute process: blow the hopper out with air and you’re ready to go.

### **Q. Equipment needed**

The Xiom provided equipment: spray gun, control console, powder feeder and hoses. A customer supplied air compressor fitted with air cooling and drying equipment as well as oxygen and propane is also required. Breathing protection is recommended. For spraying in enclosed tanks, a forced air respirator is required.

### **Q. How much propane and oxygen does the system use?**

One 20-pound propane tank should last 20 hours. A 200 CFM “T” bottle of oxygen should last 8 hours. The oxygen consumption by stochiometric ratio is three units of oxygen to one unit of propane.

### **Q. What’s the average flow rate?**

25 ScFh - Oxygen  
8 ScFh – Propane

### **Q. In addition to the nozzle that comes with the gun, are different nozzles available?**

There is a 1” to 3” oval nozzle and a 4” fan spray nozzle.

### **Q. How much area can be sprayed?**

Not including surface preparation time, under optimal conditions, the Xiom 1000 system can cover 800 to 1,000 square feet a day. The coverage rate may vary based upon the type of substrate and ambient environmental conditions.

**Q. How often do parts need to be replaced?**

The nozzle must be replaced every four to six months. Everything else in the front end of the gun needs replacement once a year. For all other parts, normal wear and tear in deployment would be more likely than damaged parts in the actual spray process. In other words—maintenance costs are very low.

**Q. Does Xiom offer any warranties?**

One-year warranty on all parts and equipment.

**Q. How much does it cost to purchase a system and materials?**

Please give us a call (787-263-9233) for current prices.

**Q. How does Xiom's plastic coating compare to traditional powder coating?**

Our cost is about one third that of powder coating on a per square foot basis. However, powder coaters can do many more square feet at the same time by utilizing their large oven facilities. One good comparison can be seen with electrical conduit. Xiom is automating the spraying of electrical conduit for powder coaters who now do this with their oven set process. Xiom's process can put down 40 mils instantly. The oven process is a three-cycle in-and-out-of-the-oven process. For spray applications, the Xiom 1000 is the best. For coat hangers, for example, powder coating would be advantageous.

**Q. Is it difficult to learn how to use the system?**

A good man after three days of training class can develop a basic level of proficiency. Further practice and experimentation to develop the appropriate skill for more complex applications may be required.

**Q. Is there any instruction or training available?**

Every Xiom 1000 system comes complete with an equipment and coatings manual. In addition, a three day training class, is included in the price of the Xiom system purchase. In the future, Xiom intends to make available a training institute to provide instruction in advance application techniques as well.