ICD
High Performance Coatings

OPACI-COAT-300®

Spray Application Guide

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FOREWORD

While this publication examines the spray operation and its equipment from many viewpoints, there is still much more to be learned by anyone who wants to become truly professional.

By far the best way to become proficient at spray technique is to do it! There is no shortage of information available on this fascinating subject. We hope this publication gives you a start toward acquiring your skills.

INTRODUCTION

This publication is about the use and maintenance of painting equipment, spray guns, air assisted airless sprayers, regulators, respirators and spray booths. ICD has gone to great lengths to publish information on its product and to acquaint users with it.

But even an extensive knowledge of OPACI-COAT-300® is not enough to assure a professional finish. It must still be applied by spray gun, roller coater or curtain coater, and all of the variables of its use must be controlled.

The equipment used to apply OPACI-COAT-300® must be used and maintained properly, with an appreciation of how it works and why it works the way it does.

AIR ASSISTED AIRLESS SPRAYER

Introduction

The Air Assisted Airless sprayer has proven to be the best system available when applying OPACI- COAT-300®. Although there are many manufacturers of Air Assisted systems on the market, ICD and its customers rely heavily on the Graco 10:l Monark sprayer, so for this reason, in this section we will use this system as an example.

An air-powered, air-assisted airless sprayer uses a suction hose and tube which provides siphon feeding of the pump directly from ICD original shipping pails. An accessory drum length siphon kit is available for 200 liter drums (50 gallon drums). The guns versatility (AA2000) means it can easily spray and atomize OPACI-COAT-300®, a light viscosity material. The pump provides continuous delivery and pressure that can be easily regulated. The sprayer supports one gun with a selection of 23 tips for use with OPACI-COAT-300®.

The pump is used to force OPACI-COAT-300® through a small orifice or tip at low hydrostatic pressure. Air assisted airless operates at pressures under 950 psi. OPACI-COAT-300® cannot attain quality atomization at these low airless spray pressures and fan patterns are usually incomplete with “tails” formed at each end. To complete the atomization, and eliminate the “tails”, low pressure (10 to 30 psi) compressed air is added to the airless spray by an air cap.

With the air assisted airless concept, OPACI-COAT-300® can be atomized with full spray patterns at low pressure. This provides a low turbulence of material on the glass and overspray conditions are minimal, in- creasing the transfer efficiency of the material.

1. **New Air Assisted Airless systems.**

   Before using your new system it must be purged, using the following method:

   (a) Circulate isopropyl Alcohol in the pump for 5 minutes, them empty. It will take approximately 8 liters (2 gallons).

   (b) Circulate hot-soapy water in the pump for 5 minutes, and then empty.

   (c) Circulate clean hot water in the pump for 5 minutes and drain the system. Now you are ready to use OPACI-COAT-300®.

2. **Charging the new system.**

   At this point you must refer to your new owner’s manual for step by step instructions on charging the system.

3. **Setting your pressure.**

   All spray systems should have a combination lubricator/filter/ regulator, within 15 meters (50 feet) of your spray system. This will trap accumulated moisture and dirt and should be cleaned at least once a day. Never exceed 180 psi air pressure to the motor, and never exceed the stated maximum working pressure of the pump or of the lowest rated component in your system. The Graco system is a 10:l system which means if you have 50 psi of air into the pump you will create 500 psi available air at the gun tip. Because all systems use different regulators on air motors, use the following settings as a starting reference point to set pressures:

   (a) Fluid Regulator pressure @400 psi

   (b) Pump Air Regulator pressure @40 psi

   (c) Gun Regulator @30 psi

   All pressures will vary with different tip and filter combinations, so you will need to experiment.

4. **How to select a Spray Tip**

   Selection of the proper spray tip is all-important to airless spraying since the tip has ultimate control over application rate and spray fan width. Spray tip is expressed in thousandths of an inch. Determine how many gallons per minute can be atomized through the airless spray tip. The last two digits of standard and fine-finish tip part numbers give this measurement in thousandths of an inch. Example: 163-411 tip has a .011 inch orifice. When first starting

with the airless system, this is a good tip to start with. As you gain experience and develop your technique, increase your tip size for better and faster production. The largest tip you will ever need to apply OPACI-COAT-300® is a 163-617.

5. Fluid Filters.

All Air Assisted Airless systems should be equipped with a canister style filter (if not have one installed). When using OPACI-COAT, a 100 mesh (149 micron) filter will do the job. Check and clean the filter often when you are in production (be sure to relieve the system pressure before opening the canister).

6. Applying OPACI-COAT-300®.

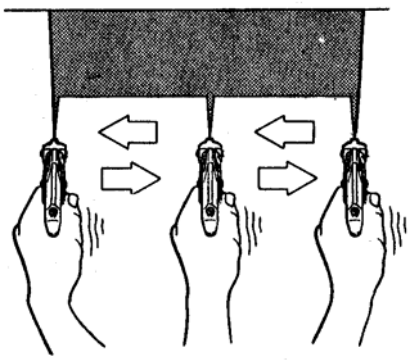
In time you will develop your own spray technique, but always follow these basic rules:

(a) Keep the gun the same distance from the glass 25.4cm (10 to 12 inches).

(b) Always hold the gun at a right angle to the glass.

(c) Do not make an arc; arcing causes an uneven coat and you will lose up to 65% of your material. (see Fig. 1).

(d) Apply OPACI-COAT-300® in three coats. One full wet coat .076mm to .1 mm (3 to 4 mils), the second coat will be applied in the opposite direction as the first .076mm to .1mm (3 to 4 mils wet). Then apply a light fog coat .0243mm to .05mm (1 to 2 mils wet).



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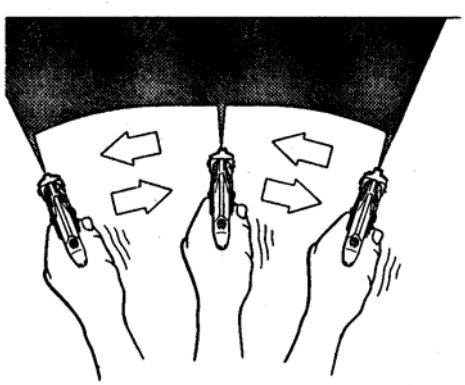

WRONG *Figure 1.*

7. Respirators.

The spraying of OPACI-COAT-300® creates a certain amount of overspray. This is true even under ideal conditions and there is no way to avoid it entirely. Anyone who is in the area should consider some type of respirator. Here are two good types;

(1) *Organic Vapor Respirator:*
This type of respirator, which covers the nose and mouth, is equipped with a replacement cartridge that removes the organic vapors by chemical absorption, as illustrated in figure 2. Some of these are also designed with a prefilter to remove solid particles from the air before the air passes through the chemical cartridge.

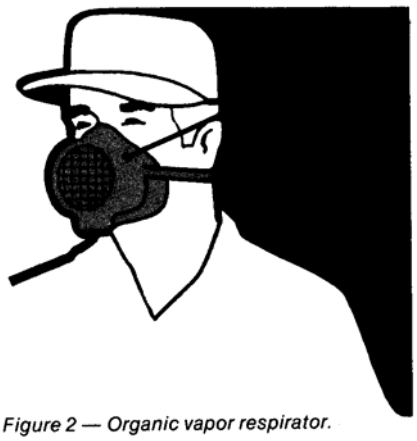

Figure 2 — Organic vapor respirator.

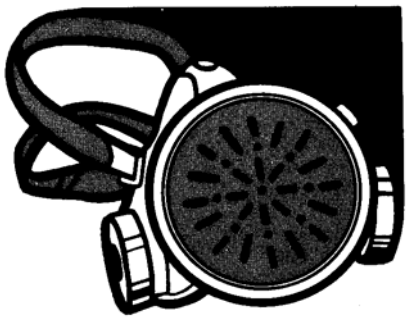

Figure 3 — Dust respirator.

(2) *Dust Respirator:*
These respirators are equipped only with a cartridge to remove solid particles from the air. A typical dust respirator is shown in Figure 3.

AIR ATOMIZING SPRAY GUN

Introduction

The spray gun is a key component in your spray system. It is a precision engineered and manufactured tool, and each type and size available is specifically designed to perform a certain number of tasks. Even though all spray guns have many parts and components in common, each gun type or size is suited for only a certain, defined range of jobs. As in most other areas of painting, having the right tool for the job goes a long way toward getting a professional job done in minimum time.

This chapter will help you pick the right gun by reviewing the two primary spray gun designs commonly used in painting-the suction feed and the pressure feed. The differences and the similarities between these two systems will allow you to select the right gun. ICD and its customers have had the best luck with the suction feed gun in applying OPACI-COAT-300®. Proper use of your gun will give you a high quality finish, and contribute toward a profitable operation.

SPRAY GUN TYPES

1. What is a Spray Gun?

A spray gun is a tool which uses compressed air to atomize paint or other sprayable material and apply it to a surface. Air and the material enter the gun through separate passages and are mixed at the air cap in a controlled pattern.

2. What types of Spray Guns are there?

Spray guns can be classified in various ways. One is by the location of the container. Figure 1 shows a gun with an attached cup. Figure 2 illustrates a gun using material from a container some distance away. The type of material feed system can also be a way of classifying guns, with the material either kept under pressure-a pressure feed gun Fig. 2.-or using the suction feed principle to deliver material to the gun Fig. 1. Guns can also be classified as either external or internal mix, bleeder or non- bleeder types.

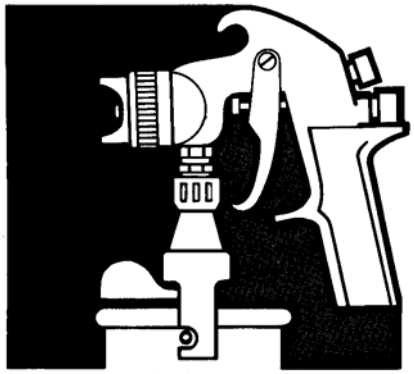

Figure 1 — suction feed gun with attached cup.

3. What is a Suction Feed Gun?

A spray gun design in which a stream of compressed air creates a vacuum at the air cap, thus providing a siphoning action. Atmospheric pressure on the material in

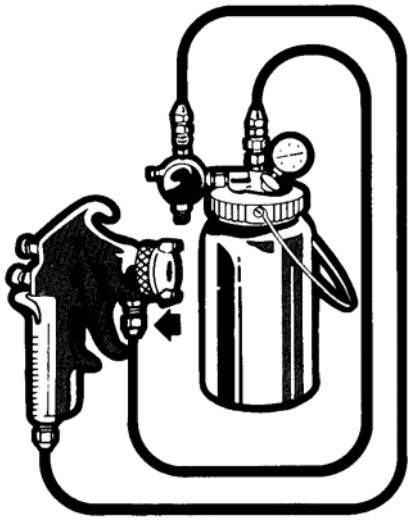

Figure 2 — pressure feed gun with remote 2 qt. cup.

the suction cup forces the material to the air cap of the gun. The vent holes in the cup lid must be open. This type of gun is usually limited to quart- size or smaller containers. It is easily identified by the fluid tip extending slightly beyond the face of the air cap, as shown in Figure 3. Suction feed guns are suited to many color changes and small amounts of material, such as in auto refinishing.

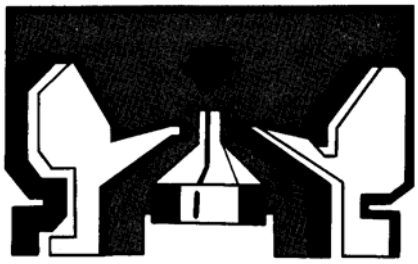

Figure 3 — suction feed air cap.

4. What is a Pressure Feed Gun?

In this design the fluid tip is flush with the face of the air cap Figure 4, and no vacuum is created. The fluid is forced to the air cap by pressure kept on the material in the system: a separate cup, tank or pump. This system is normally used when large amounts of material are being used, when the material is too heavy to be siphoned from a container, or when fast application is required.

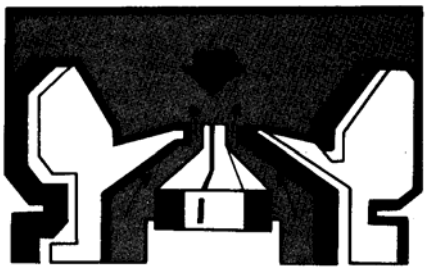

Figure 4 — pressure feed air cap.

5. What is a Bleeder type gun?

A bleeder type spray gun is designed without an air valve. Air passes through the gun at all times. It is usually used with small compressors of limited capacity and pressure which have no pressure-controlling device such as an unloader or pressure switch. In this type of gun, Figure 5, the trigger only controls the flow of fluid.

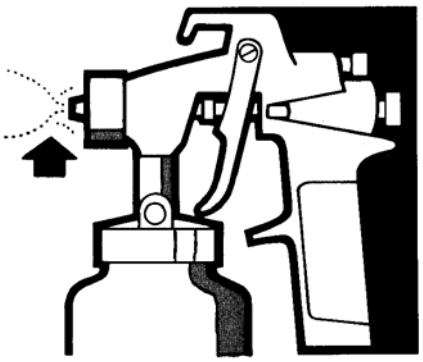

Figure 5 — bleeder type gun.

6. What is a Non-bleeder type gun?

This type of gun is equipped with an air valve to shut off the flow of air when the trigger is released. The trigger controls both air and fluid flow. It is used with compressors having some type of pressure control device.

7. What is an External Mix Gun?

This type, shown in Figure 7, mixes and atomizes air and fluid outside the air cap. It can be used for applying virtually all types of materials, and is desirable for spraying fast drying paints such as lacquer. It is also used when a high quality finish is desired.

8. What is an internal Mix gun?

This gun type mixes air and material inside the air cap before expelling them,

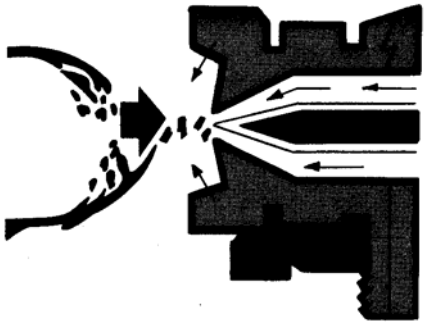

Figure 7 — external mix gun.

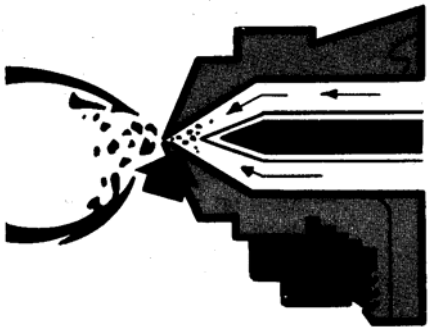

Figure 8 — internal mix gun.

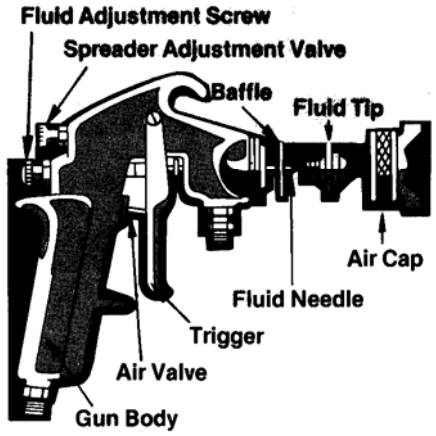

Figure 10.

Figure 12 — cross section of external and internal mix air caps

as shown in Figure 8. It is usually used where low air pressures and air volumes are employed or where slow drying materials are being sprayed. A typical example would be spraying flat wall paint or out- side house paint with a 114 HP compressor. Internal mix guns are rarely used for refinishing when very fast drying materials are being sprayed.

PART INDENTIFICATION FUNCTION

9. What are the principal parts of a spray gun?

The principal components are illustrated in Fig. 10. Some guns are equipped with a removable spray head unit containing the air cap, fluid tip and fluid needle.

10. What happens when the trigger is pulled?

As the trigger is pulled back, it first makes contact with the air valve stem, which turns on the air. It then moves to the fluid needle, pulling it out of the fluid tip" so paint can flow. When the trigger is released, this process is reversed. There is always atomization air at the air cap whenever paint is turned on or off.

11. What is the function of the Air Cap? (Fig. 10)

The air cap directs compressed air into the material stream to atomize it and form the spray pattern. There are various style caps producing different sizes and shapes of patterns for all types of applications. (Fig. 11)

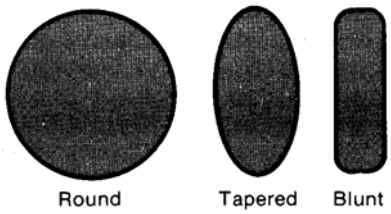

Figure 11.

12. What Air Cap classifications are there?

All air caps can be divided into External or internal mix classifications. External mix caps are used with either suction or pressure feed and eject air through one or more holes to atomize the fluid (Fig. 12). External mix can range from single orifice types to multiple jet caps. External mix caps

are normally used in refinishing work where a high quality finish is required.

Internal mix air caps mix air and material inside the gun cap before ejecting them through a single slot or round orifice and are used only with pressure feed. Atomization air and material pressure must be approximately equal at the gun.

13. What are the advantages of the Multiple Jet Cap?

(a) Better atomization for the more viscous Material.

(b) Higher atomization pressures can be used on more viscous materials with less danger of split spray pattern.

(c) Greater uniformity in pattern due to better equalization of air volume and pressure from cap.

(d) For materials that can be sprayed with lower pressures, multiple jet caps provide better atomization.

14. How should an Air cap be selected?

On the following Factors:

(a) Volume of air (in cubic feet per minute-CFM) and pressure (in pounds per square inch-PSI) available.

(b) Material Feed system to be used-pressure of suction.

(c) Type and volume of material to be sprayed.

(d) Size of fluid tip to be used. Most air caps work best with certain fluid tip and needle combinations.

(e) Size and nature of object or surface to be sprayed. Many or large orifices increase ability to atomize more material for painting large object with greater speed. Fewer or smaller orifices usually require less air, pro- duce smaller spray patterns and deliver less material to conveniently paint smaller objects or apply coatings at lower speeds.

15. What is the function of the fluid tip and needle? (Fig. 10)

They meter and direct the flow of material from the gun into the air stream. The fluid tip forms an internal seat for the fluid needle which shuts off the flow of material. The amount of material which actually leaves the front of the gun depends on the size of the fluid tip. Fluid tips are available in a variety of sizes to properly handle materials of various types and viscosities. Fluid tips pass the required volume of material to the cap for different speeds of application.

16. What Is the Nozzle Combination?

In actual practice, the air cap, fluid tip and needle are all selected together, which affect the quality of the spray pattern and finish. These three items as a unit are referred to as the nozzle combination.

17. What is the best Fluid Tip size?

When applying OPACI-COAT-300® with suction feed system, it is best to use the largest tip available for your gun. This will give you the best wetting and -speed up your production.

18. What is the Spreader Adjustment Valve?

A valve for controlling the air to the horn holes which regulates the size of a spray pattern from maximum width down to a narrow or round pattern. (Fig. 10)

19. What is the Fluid Needle Adjustment?

This adjustment controls the travel of the fluid needle which allows more or less material through the fluid tip.

20. What are the components of a Suction Feed System?

A typical suction feed system consists of a (A) suction feed spray gun with cup, (B) an air compressor, (C) an air control device, and (D) lengths of air hose, (Fig. 16)

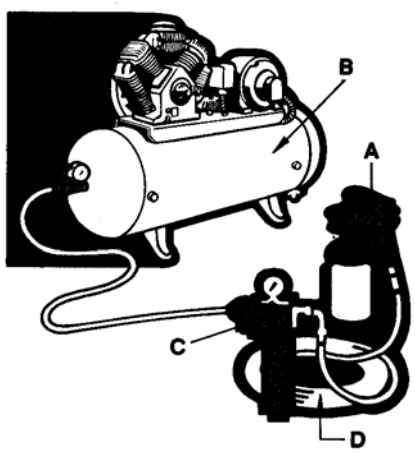

Figure 16 — suction feed system components.

OPERATION

21. How is Suction Feed equipment hooked up for operation?

(a) Connect air line from the compressor outlet to the air control device inlet.

(b) Connect air hose leading from the air outlet, on the air control device to the air inlet on the spray gun.

(c) Mix and strain into the cup, attach the gun to the cup.

22. How is the Suction Feed Spray system initially adjusted for spraying?

(a) Open the air outlet valve on the air regulator and adjust the atomization air to approximately 50 psi at the gun.

(b) For maximum pattern size open wide the spreader adjusting valve on the gun. Turn counter-clockwise until it stops.

(c) For maximum fluid delivery (this is best for OPACI-COAT-300®) back out the fluid adjusting screw to a wide-open position.

23. How is the Suction Feed gun checked for spraying?

(a) Spray a horizontal test pattern; hold the trigger open until the paint begins to run. There should be even distribution of paint across the full width of the pattern. If there is not, there is a problem with either the air cap or the fluid tip which must be corrected. Refer to the Troubleshooting section for examples of faulty patterns to help diagnose your problem.

(b) If the pattern produced by the above test appears normal, rotate the air cap back to a normal spraying position and begin spraying.

(c) With the fluid adjusting screw open and the air pressure set at approximately 50 psi, make a few test passes with the gun on some clean paper. If there is variation in particle sizes (some specks and large globs) the paint is not atomizing properly.

(d) If the paint is not atomized properly, increase the air pressure slightly and make another test pass. Continue this sequence until there is uniform size of paint particles.

(e) If the pattern seems starved and the fluid adjusting screw is open wide (to the first thread), the atomization air pressure may be too high.

24. What causes defective spray patterns?

(a) Top heavy pat tern (Fig. 32)

Figure 32.

(1) Horn holes partially plugged.

(2) Obstruction on bottom of fluid tip.

(3) Dirt on air cap seat or fluid tip seat.

(b) Heavy bottom (b) pattern (Fig. 33)

Figure 33.

(1) Horn holes partially plugged.

(2) Obstruction on top side of fluid tip.

(3) Dirt on air cap seat or fluid tip seat.

(c) Heavy right side pattern (Fig. 34)

Figure 34.

(1) Left side horn holes partially clogged.

(2) Dirt on left side of fluid tip.

(d) Heavy left side pattern (Fig. 35)

Figure 35.

(1) Right side horn holes partially clogged.

(2) Dirt on right side of fluid tip.

(e) Heavy center pattern (Fig. 36)

Figure 36.

(1) Too low a setting of the spreader adjustment valve.

(2) Too low an atomizing pressure or material being too thick.

(3) Too large or too small a tip for the material used.

(f) Split spray pat tern (Fig. 37) due to air and fluid not being properly balanced. Reduce width of spray pattern by means of the spreader adjustment valve or increase fluid pressure. This latter adjustment increases speed and the gun must be handled much faster.

Figure 37.

SPRAY BOOTH

Introduction

Containing the overspray and keeping it out of the air and off other objects is an important consideration in the application of OPACI-COAT-300®. This section looks at the prime method of controlling overspray.

1. What is a Spray Booth?

A compartment, room or enclosure built to confine and exhaust the overspray from the spraying area. There are various models available for different spray applications.

2. What are the benefits of a spray booth?

A well designed and maintained spray booth will provide a number of advantages. It will segregate the spray operations from other activities, making both the spraying and other operations cleaner and safer. It provides an area which is easier to keep clean, which means both the operator and the glass being sprayed are likely to stay cleaner. It is equipped with adequate and approved lighting. It allows better control of the finish.

3. What is the best type of Booth for use of OPACI -COAT?

A dry type booth is the best for small handy spray operations. It draws contaminated air containing overspray and particles through replaceable filters before venting to the outside. Booths of this type are available in leg and bench type. (Fig. 1 and 2).

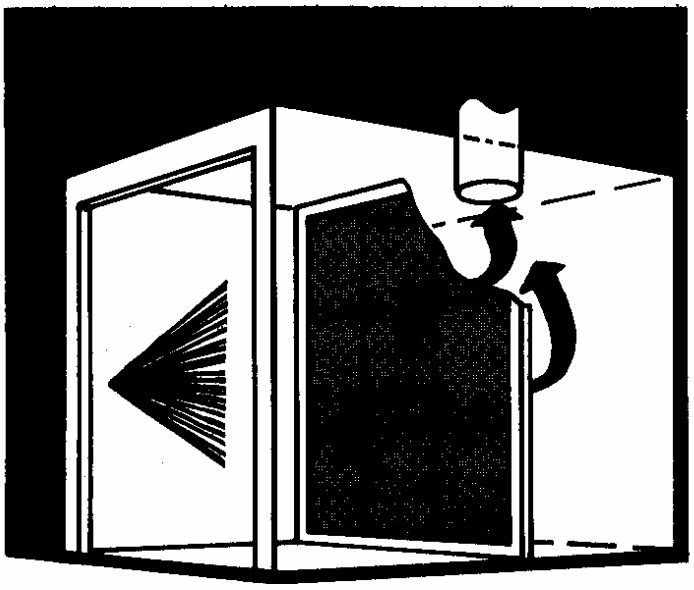

Figure 2—Bench type booth.

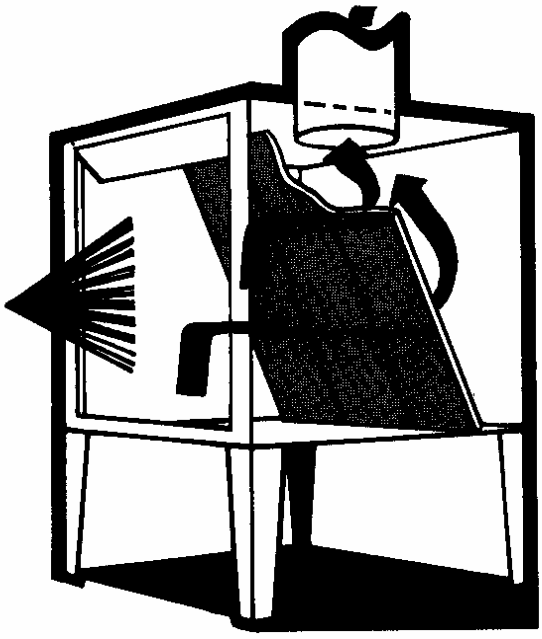

Figure 1—Leg type booth.