SPFA-144

Coating Equipment Guidelines

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ABOUT SPRAY POLYURETHANE FOAM ALLIANCE (SPFA)

Founded in 1987, the Spray Polyurethane Foam Alliance (SPFA) is the voice, and educational and technical resource, for the spray polyurethane foam industry. A 501(c)6 trade association, the alliance is composed of contractors, manufacturers, and distributors of polyurethane foam, related equipment, and protective coatings; and who provide inspections, surface preparations, and other services. The organization supports the best practices and the growth of the industry through a number of core initiatives, which include educational programs and events, the SPFA Professional Installer Certification Program, technical literature and guidelines, legislative advocacy, research, and networking opportunities. For more information, please use the contact information and links provided in this document.

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DOCUMENT HISTORY

Date	Sections Modified	Description of Changes
August 2015	All	Administrative changes
January 2019	All	Major update of structure, content and photos
January 2021	Front Cover and Header	New SPFA Logo

EQUIPMENT COMMITTEE

MISSION STATEMENT

1. Provide a wide range of technical information to the Spray Polyurethane Foam industry to help members select equipment that best suits customers' needs using input data for customers' Spray Foam applications.
2. Maintain current SPFA TechDocs SPFA-137 Spray Polyurethane Equipment Guidelines and SPFA-144 Coating Equipment Guidelines.
3. Develop new TechDocs and TechTips as needed.
4. Develop a new category with non-biased performance facts for low-pressure (under 1K) Spray Foam systems as they enter the market.
5. Identify, explore, develop, and communicate an understanding of technical issues related to Spray Foam processing equipment.
6. Provide a forum for SPF equipment and accessory suppliers and members who perform equipment maintenance services, troubleshooting, rebuilding and complete overhauls.
7. Develop guidelines for best-practices, safe and efficient design and maintenance of SPF equipment, rigs, and accessories.
8. Identify all types of spray guns, categorizing as appropriate into plastic/throw-away, air purge, mechanical purge, manually operated no air, and re-useable low-pressure guns.
9. Identify all types of available Proportioners.
10. Provide better data analysis of ancillary equipment used with and for the backup of Spray Foam equipment.
11. Analyze and evaluate air-respiratory types of Spray Foam equipment into low-pressure, high-pressure, and OGV mask types.

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PREFACE

The purpose of this guide is to assist those entering the SPF (spray polyurethane foam) business in the selection of coating application equipment. This guide discusses the equipment components necessary to apply primers, elastomeric coatings, and fire-protective coatings for insulation applications.

INTRODUCTION

There are several types of coatings and primers that are used with SPF. The choice of equipment is determined by the characteristics of the materials to be applied. In this guide the word “material” may refer to any of the coating types or primers referenced above.

This guide discusses:

- Spray equipment for single-component and plural-component batch-mixed coatings and primers
- Spray equipment for plural-component, fast curing coatings, and elastomers
- Criteria for selecting the proper equipment for coating applications associated with SPF installations

COATING AND PRIMER TYPES

PRIMERS

Primers are coatings applied to enhance the adhesion of subsequent SPF or coating applications and to lessen the likelihood of corrosion. Primers are usually single-component and applied in a relatively thin application.

ELASTOMERIC COATINGS

Elastomeric coatings are applied to SPF to provide protection from UV (ultra-violet) light, mechanical damage, and other environmental influences that could damage or degrade the SPF. Elastomeric coatings can be single-component or plural-component materials and are characterized by their ability to stretch (i.e., the cured coatings tend to be “rubbery” or elastic). These coatings are typically applied in multiple, relatively thick applications. See SPFA-102 “A Guide for Selection of Elastomeric Protective Coatings over Exterior Spray Polyurethane Foam Applications” for more information on elastomeric coatings.

SINGLE COMPONENT

Single-component coatings are applied with single-component equipment. These materials are characterized by relatively slow cure times. Mixing may be required, but it only involves stirring the material to ensure a uniform consistency prior to application.

PLURAL COMPONENT

Plural-component coatings cure by a relatively fast chemical reaction between the coating components. Plural-component materials with a relatively moderate to slow cure time (20–60 minutes) are known as ‘slow-set’ materials and may be batch-mixed and applied with single-component equipment. Batch-mixed materials must be applied within the material’s pot life. Pot life is the period during which the material remains suitable for application after being mixed - refer to manufacturer’s technical data sheet for processing and cure time. Some plural component materials are called ‘quick set’ have intermediate cure times from 30 seconds to 20 minutes. ‘Fast-set’ materials are plural component materials with fast cure times (3–30 seconds). Fast-set systems must be applied with fast set plural-component equipment.

FIRE PROTECTIVE COATINGS

Fire protective coatings are applied to SPF insulation to meet building code requirements for fire safety. Building codes prescriptively require coverings, such as gypsum board or other materials, to separate foam plastics from occupied spaces (thermal barriers) or limited access attics and crawlspaces (ignition barriers). Single component intumescent coatings, with proper fire testing, may be used in place of these prescriptive coverings. See SPFA-126 “Thermal Barriers and Ignition Barriers for the Spray Polyurethane Foam Industry” for more information.

EQUPMENT TYPES

There are two categories of coating equipment that depend on the type of coating being applied.

SINGLE-COMPONENT EQUIPMENT

Single-component equipment utilizes one pressure pump (and possibly a transfer pump), single-component hoses, and an airless spray gun. An airless spray gun atomizes (aerosolizes) the material without the use of air pressure at the tip. Single-component equipment can be used to apply single-component coatings and primers as well as batch-mixed, plural-component coatings.

FAST-SET PLURAL COMPONENT EQUIPMENT

Fast-set plural-component equipment utilizes dual pressure pumps (which also control the ratio of the components), dual material hoses, and a mixing spray gun, which mixes the material components and atomizes the resultant mixture. With fast-set plural-component equipment, the component coating materials are kept separate until they are mixed at the gun.

SECTION 1: SINGLE COMPONENT SPRAY EQUIPMENT

Single-component spray equipment may be used for single-component materials or for batch-mixed, plural-component materials. A typical equipment setup employs a high-pressure coatings pump mounted on the drum of coating material with its suction apparatus immersed in the coating material. Alternatively, the pressure pump can be independently mounted with a flexible suction tube or transfer pump inserted into the coating material drum. The high-pressure pump discharges material through a high-pressure hose to an airless spray gun. Single-component equipment may be further subdivided into the material supply system, the high-pressure pump, the fluid hose and the spray gun. Each of these items is discussed below.

Figure 1: Suction tube feed from material drum
(photo courtesy of Gaco)

FACTORS FOR SELECTING A MATERIAL SUPPLY SYSTEM

In order to select the most suitable material supply system, including feed hose diameter, pressure rating, type of lining or jacket, the following factors must be considered:

- Material container (size and type)
- Material viscosity
- Moisture protection
- Chemical resistance
- Maximum pressure
- Distance from supply to pump

FACTORS FOR SELECTING A HIGH-PRESSURE COATING PUMP

- Viscosity and pot life of the materials at the application temperature

- Pump fluid pressure limits
- The distance of the pump from the point of application
- Output required to yield consistent application
- Type of pump drive: hydraulic, electric, or pneumatic
- Chemical resistance of the equipment to the materials
- Moisture sensitivity of the materials
- Abrasiveness of the materials
- Number of guns per pump
- Durability and serviceability

FACTORS FOR SELECTING FLUID HOSES

- Internal and external chemical resistance
- Distance from the pump to the application site
- Protection of the coating from moisture
- Viscosity of materials
- Required flow rate of materials
- Hose heat and insulation requirements
- Pressure rating (working and burst)
- Flexibility of the hose

FACTORS FOR SELECTING SINGLE-COMPONENT SPRAY GUNS

- Output pressure rating
- Maintenance
- Ergonomics
- Type of spray guns
- Pressure rating
- Type of tips
- Swivels
- Compatibility with your existing equipment
- Wear factors (See "Getting the Most from Your Spray Tips")

UNDERSTANDING SINGLE-COMPONENT PUMPS

Examples of high-pressure single-component pumps are shown in Figure 2. These pumps may be air driven or gasoline/hydraulic driven. The mode of powering single-component pumps will be dependent on available power sources.

Figure 2: Air-driven, single-component, high-pressure pump
(photo courtesy of Binks–Carlisle Fluid Technologies)

Dual Action: Transfer and high-pressure pumps are typically dual-acting. They are designed to pump materials during both up and down strokes. Suction only occurs during the upstroke. The effect of dual action is a more uniform flow rate of material to the spray gun.

SIZING A FLUID PUMP

To properly size a single-component, high-pressure pump, an understanding of the pump ratio and stroke characteristics is necessary.

Pump Ratio: The pump ratio is equal to the ratio of the motor piston area to the fluid piston area.

$$Pump\ \ Ratio = \frac{Motor\ Piston\ Area}{Fluid\ Piston\ Area}$$

Example: A pump with a pump ratio of 10:1 and an inlet air pressure of 100 psi (690 kPa), would have a material outlet pressure of 1,000 psi (6,900 kPa).

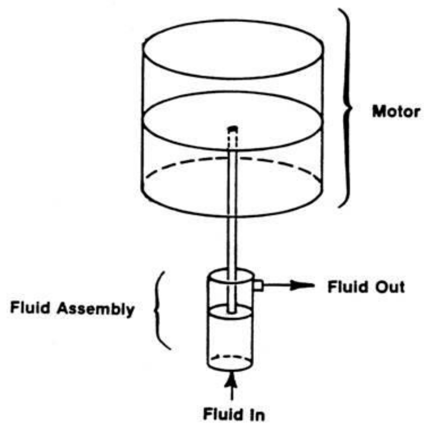


Figure 4: Comparison of motor piston area and fluid piston area (diagram courtesy of Graco)

Material delivery rate is not always proportional to the air requirements for the pump. Air requirements (CFM) for a fluid pump depend upon pump lower size, number of guns, tip size/wear, spray pressure and material viscosity, among other factors.

Stroke Length is the distance the piston travels in one direction. Fluid output is proportional to stroke length.

A **Cycle** is one upstroke and one downstroke of the piston.

Cycles per Minute (CPM) refers to the number of upstrokes and downstrokes per minute. It is a measure of the speed of the pump.

Cubic Feet per Minute (CFM) is a measure of pump capacity, and refers to the pump's air consumption for a given flow (output) rate of a pump operated continuously.

AIRLESS MIXING GUNS

Slow-set or quick-set plural-component coating and primer materials (with cure times of greater than 2 minutes) may use an airless type spray gun with a mixing manifold. Also available are plural-component guns employing an airless reversible tip; some utilize static mixers just before the reversible tip. These airless mixing gun arrangements are often used with primers and slower curing coatings. Examples of airless mixing guns are shown in Figures 5 and 6. All single-component and some pre-mixed slow-set plural component materials are sprayed through an airless sprayer.

Figure 5: Plural component airless spray guns. Right image shows gun with mixing manifold with solvent-purge (left photo courtesy of Carlisle Fluid Technologies, right phot courtesy of Graco)

Figure 6: Solvent-purge, airless spray guns with static mixer (photos courtesy of Graco and Carlisle Fluid Technologies)

SELECTION, SIZING AND WEAR OF SPRAY TIPS

MATCHING SPRAY TIP TO SPRAYER OUTPUT

Choosing the right tip assures maximum productivity. The wrong tip can increase overspray and provide less control, resulting in more time on the job and higher coating usage.

Factors to consider when matching spray tip to output are:

- Correct spray pattern to shape and size
- Material and application rate

It is important that the applicator check with the coating manufacturer to select the proper equipment package (pump, hose, gun and tip) for the application. Elastomeric coatings used in the SPF industry typically require larger tip sizes (29–36) than common paints, due to their greater viscosities and application rates.

SPRAY TIP WEAR

- Tip wear occurs with normal use.
- The greatest wear occurs within the first 30 gallons of material sprayed.
- Most tips show obvious wear after 100–150 gallons.
- Tip wear will vary because it depends on the abrasiveness and viscosity of the material

being sprayed.

- Tip wear will affect spray pattern and output. Examples are shown in Figure 7.
- Spray tips may wear prematurely with:
    - Abrasive solids and fillers
    - Higher fluid pressure
    - Unstrained or unfiltered coating materials

				
	Original Tip	30 gal (113 L)	100 gal (279 L)	After 150 gal (568 L)
Orifice size	0.015 in (0.381 mm)	0.017 in (0.431 mm)	0.019 in (0.483 mm)	0.021 in (0.533 mm)
Fan width	12 in (305 mm)	11 in (279 mm)	9 in (229 mm)	5.5 in (140 mm)
Gallons per minute	0.87 Lpm (.23 gpm)	1.14 Lpm (.30 gpm)	1.36 Lpm (.36 gpm)	1.74 Lpm (.46 gpm)
Flow Rate Increase	N/A	+30%	+61%	+100%

Tip Size (In.)	**Gal/min**	**Liters/min**
.029	*0.88*	*3.33*
.031	*1.02*	*3.86*
.035	*1.31*	*4.96*
.037	*1.47*	*5.56*
.039	*1.63*	*6.18*
.041	*1.80*	*6.83*
.043	*1.98*	*7.51*
.045	*2.70*	*8.23*

Figure 7: Example of airless spray tip size and output.

A couple of important points about the importance of pressure drop and the relationships between pressure drop, hose length and tip selection and wear for single-component coatings:

- The chart on the left of Figure 7 shows how the fan pattern will change as the spray tip wears. It also shows the increase in flow rate of the coating. This example is for application of thinner low viscosity airless coatings like primers and barrier coatings that use spray tips with smaller orifices, but similar performance will result for tips used with more viscous coatings. The main point here is that over time, the tip orifice will wear, changing the spray pattern and flow rate. It is important to regularly replace spray tips to create smoother coatings and use less material.

- The chart on the right of Figure 7 shows flow rate versus tip size for tips with larger orifices that are used for higher viscosity elastomeric roof coatings such as silicone (0.029-0.031) and acrylic (0.035-0.045). It is important to note that as the viscosity of the coating changes, different pump pressures, as well as hose length and hose diameters may need to be changed to achieve a desired flow rate.

Always refer to the coating manufacturer's installation instructions as well as the operator's manual for the coating equipment to determine proper application rate, pump pressure, hose diameter/length and tip selection.

SECTION 2: PLURAL-COMPONENT SPRAY EQUIPMENT

Plural-component coating materials that have fast cure times (typically 3–20 seconds) cannot be batch-mixed but must be applied using plural-component spray equipment. Polyurethane elastomers and polyurea coatings typically fall into this category. While "plural-component" is a general term that could refer to coating systems that have more than two components, virtually all systems used in the SPF industry are two-component; in essence, "plural-component" is synonymous with "dual-component."

Typical equipment setups consist of the following elements, as noted on Figure 8:

1. Two transfer pumps that pump material from the material containers (Figure 8, Item 1)
2. Two transfer hoses connecting the transfer pumps to the proportioner (Figure 8, Item 2)
3. A proportioner consisting of two high-pressure, positive-displacement pumps that meter the materials in a precise ratio. the proportioner is usually equipped with heaters that warm the materials to reduce viscosity) (Figure 8, Item 3)
4. An insulated hose bundle (Figure 8, Item 4) containing
    a. Two high-pressure hoses
    b. Heating elements to maintain material temperature
    c. An air line to operate the mixing spray gun
5. A spray gun that mixes the components and atomizes the mixture into a spray pattern (Figure 8, Item 5)

The material containers, transfer pumps, and proportioner are usually permanently mounted in a truck or trailer. The hose bundle must be of sufficient length to reach from the proportioner to the point of application on the jobsite. Pressurized air and electrical power must be provided to operate the various equipment elements; the requirements are equipment-specific.

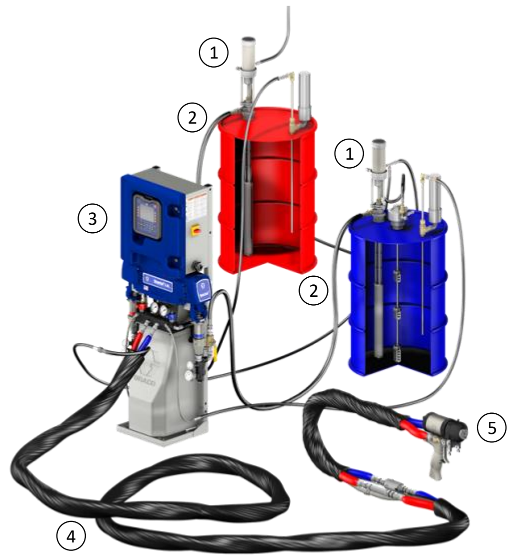


Figure 8: Typical plural-component setup (diagram courtesy of Graco)

Figure 9: Typical field staging and setup

Figure 10: Spraying a fast curing, plural-component coating onto concrete

Figure 11: Spraying a fast curing, plural-component coating onto SPF

MATERIAL SUPPLY SYSTEM

The material supply system consists of material containers (drums or tanks), material conditioning equipment, material supply pumps, filters, and material supply hoses. Material supply pumps, if used (also called transfer or drum pumps) are positive displacement, typically diaphragm or piston types. Material supply pumps must be properly sized for the proportioner, spray gun, and desired output.

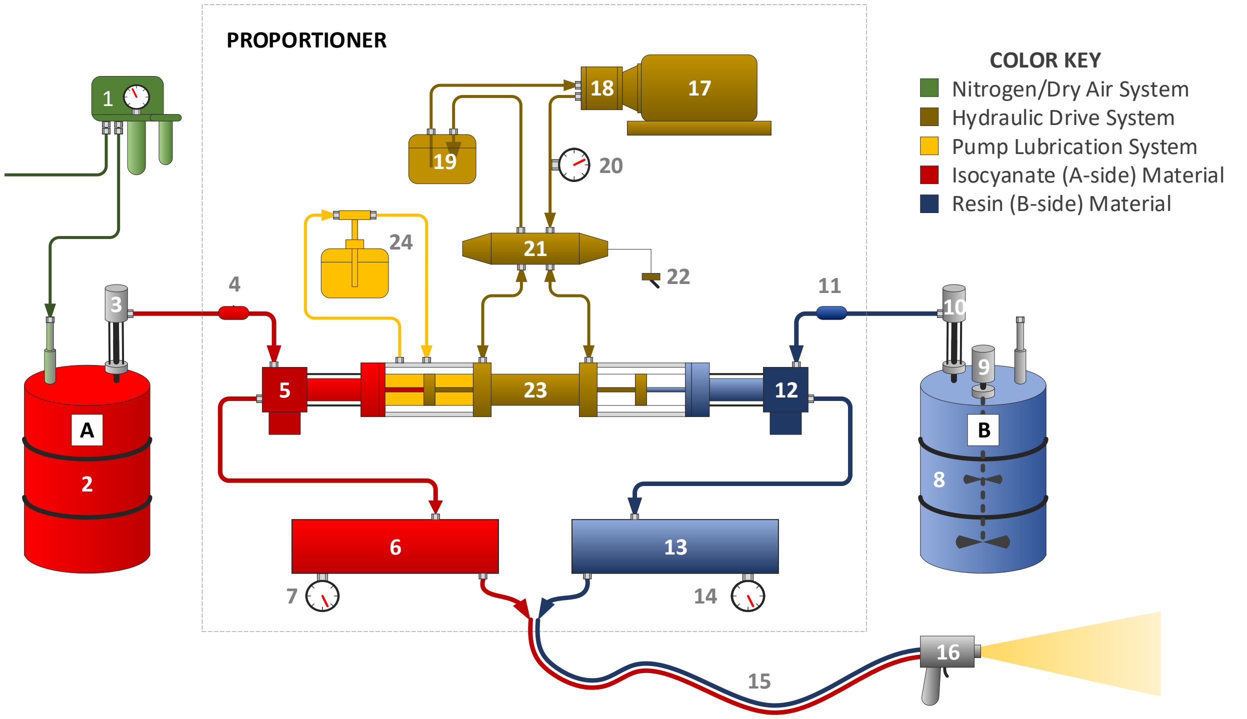
Piston-type pumps typically have the pumping element immersed in the coating material; diaphragm pumps are typically mounted independent of the material container. With diaphragm pumps, a foot valve must be provided on the bottom of the dip tube to prevent drainage of material from the dip tube when switching material containers (i.e., drums). Material conditioning equipment (heating and cooling) should be provided by low heat rate equipment. Heating materials to the correct supply temperatures takes time. Trying to heat supply chemicals too fast can damage the material. Heating system temperature limits are generally provided by the chemical manufacturer. Material temperature verification in the supply tanks or drums should be performed using immersion thermometers with the sensors near the transfer pump inlets.

Material supply hoses for each material component should have the same ID (internal diameter);typical ID for these hoses is 0.75 inches (19 mm) or larger.

⚠ **SAFETY NOTE**
Material supply systems should be comprised of components that will meet the minimum pressure rating and fluid flow requirements.

PROPORTIONERS

The proportioner is the heart of a plural-component setup. It typically consists of dual positive-displacement pumps that are designed to precisely meter and pressurize the coating material for delivery to the spray gun. Proportioners are usually equipped with heaters that control the temperature (and, therefore, viscosity) of the material components. A schematic of a typical proportioner system is shown in Figure 12. See SPFA-137 “SPF High Pressure Equipment Guideline” for more information on proportioners.



1. Nitrogen/Dry Air System
2. Isocyanate Drum/Tote
3. Isocyanate Transfer Pump
4. Isocyanate Filter
5. Isocyanate Proportioning Pump
6. Isocyanate Primary Heater
7. Isocyanate Output Pressure Gauge
8. Resin Drum/Tote
9. Resin Drum Mixer
10. Resin Transfer Pump
11. Resin Filter
12. Resin Proportioning Pump
13. Resin Primary Heater
14. Resin Output Pressure Gauge
15. Dual Heated Hose
16. Spray Gun
17. Electric Motor
18. Hydraulic Pump
19. Hydraulic Fluid Reservoir
20. Hydraulic Pressure Gauge
21. Hydraulic Directional Valve
22. hydraulic Directional Switch
23. Hydraulic Cylinder
24. Pump Lube System

Figure 12: Typical schematic of a plural-component system, including proportioner.

For proper mixing and pattern control at the spray gun, the material component ratio, temperature (viscosity), and pressure must be within recommended ranges at the gun. It is the proportioner's job to control these variables for a successful application.

When specifying and selecting a proportioner, consider the following factors:

- Minimum hose length needed (rig to farthest spray location for the longest reach project) and maximum hose length supported by proportioner.
- Maximum/minimum output determines the application rates of coating materials.
- Viscosity and other physical properties of the coating materials will determine how much pressure is required.
- Electrical requirements (voltage, current and phase);
- Compressed air requirements (pressure and volume) .
- Chemical resistance as determined by the characteristics of the coating materials.
- Required mobility (fixed, truck/trailer mounted, portable) as determined by the types of projects undertaken.

- Durability and serviceability are related to the proportioner's mobility and use environment, as well as the skill and experience of the operators.

MATCHING SPRAY EQUIPMENT TO THE PROJECT ENVIRONMENT

- How will I get the equipment on the job site?
- What power and air requirements are needed? Are they available on site? Do I need self-contained generators and compressors?
- What is the job site access? How can I locate my equipment appropriately?
- What proportioner driving force (hydraulic, electric, or pneumatic) would best suit my needs?

PROPORTIONER BASICS

There are two types of proportioning pumps—vertical and opposed horizontal. These can be air operated, electric, or hydraulically driven.

Most systems are processed at a 1:1 volume ratio. For proper application of fast cure spray elastomeric coating systems, the following operating variables must be controlled:

- Pressure: to get good mixing
- Temperature: to reduce the viscosity and get better mix and atomization
- Volume material flow: to fill the mixing chamber for a full pattern
- Ratio: to achieve correct reaction and cure

Regardless of the type of proportioner used, it should have the capability of heating the coating material components, if heating is needed. Heat is required to lower the viscosity of the components, which allows for proper mixing, atomization, and spray-ability of the coating system. Heating capacity must be designed and sized to achieve the required increase in temperature ("delta T" or ΔT) at the application flowrate.

If using the same equipment to apply SPF and plural-component coatings, consider the following:

- Plural-component coating systems typically require higher application temperatures and pressures than do SPF applications.
- Materials may cross-contaminate during switchovers, resulting in off-specification coating or SPF. Correct switchover will typically require system flushing.
- Filter screen mesh sizes will vary.
- Cross contamination during switchover may make crystallization of the A-side more likely.
- Material will be wasted during line and equipment flushing.

When specifying proportioner material heaters, consider the following factors:

- ΔT Required: The required temperature increase from the material storage temperature to the material application temperature at the specific material application rate

- Chemical Resistance: Determined by the characteristics of the coating material components
- Maximum temperature capability: Typically 180°F (82°C)
- Power/wattage output and requirements: Typically up to 9,000 watts per heater side.

MATERIAL DELIVERY HOSES

Plural-component spray hoses are heated and rated for high pressure. Typically, coating systems require much higher pressures than SPF formulations. If using a rig for both coatings and SPF, be sure all components are rated for the highest required pressure.

See the chart below for sizing and length of hoses to get optimum pressure at the gun. A larger ID hose at the proportioning pump with a smaller ID section near the spray gun gives an "accumulator" effect, which smooths out the consistency of the spray pattern and makes it easier for the installer to move around during the work.

Consider the two hose arrangements pictured in Figure 13. The comparative pressure drops of these two arrangements are show in the following table. (Values in the table are based on a flow rate of 1.4 GPM, spray pressure setting of 1600 psi, viscosity of 60 centipoise, and 300 feet of hose length plus 10' whip.)

Figure 13: Two hose configurations:

Top: 200 ft of 1/2 in + 100 ft of 3/8 in + 10 ft 1/4 in whip

Bottom: 300 ft of 3/8 in + 10 ft 1/4 in whip

Arrangement	Proportioner Output pressure setting (psi)	1/2 in Hose ΔP	3/8 in. Hose ΔP	1/4 in Whip ΔP	Total ΔP	Dynamic Pressure (psi)
Top	1600	73	116	59	248	1352
Bottom	1600	NA	348	59	407	1193

As illustrated in Figure 11, a larger ID hose section at the proportioner can substantially reduce the total pressure drop (ΔP) in the hose and increase the pressure at the spray gun. Additionally, the larger ID hose provides an accumulator effect, which dampens proportioner pressure pulsing and provides for a more even flow rate to the spray gun. Using a smaller diameter hose and a whip at the gun end facilitates hose movement and applicator maneuverability. Larger hose diameters require longer purge times if a drum runs out or products are being changed over.

The hose temperature sensor should be placed as close as possible to the gun end of the hose assembly. The temperature setting on the proportioner does not guarantee that the chemicals are at temperature at the gun end, especially in extreme climates and where the hoses run long distances outside. Verify that the hose heat is adequate by checking it at the gun end with a probe thermometer after the test shots have cleared the cold material from the gun end of the hose assembly. Strip test shots will also show when the cold material has been purged.

SPRAY GUNS

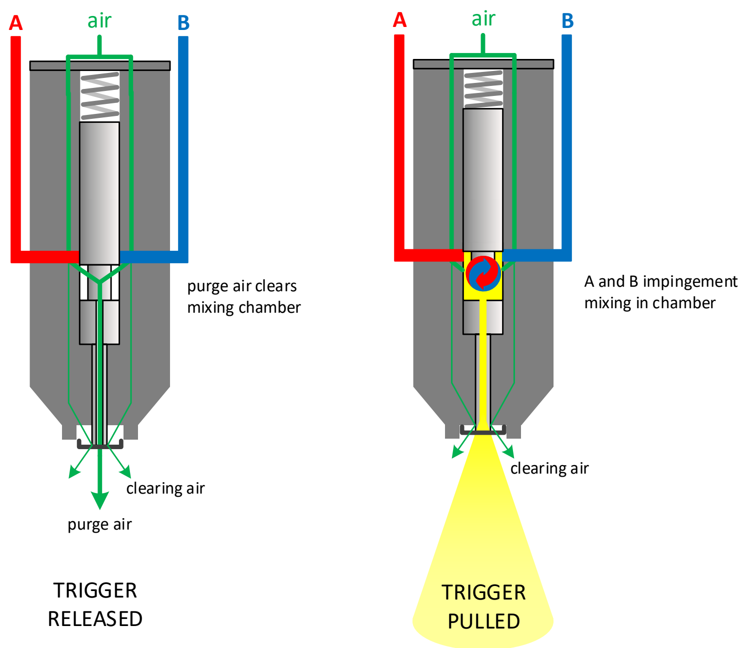
Plural component spray guns impingement mixes the two components. Spray gun selection is dependent on the cure rate of the coating material being applied. Refer to your coating material system supplier for the proper spray gun configuration for the system being used.

IMPINGEMENT MIXING GUNS

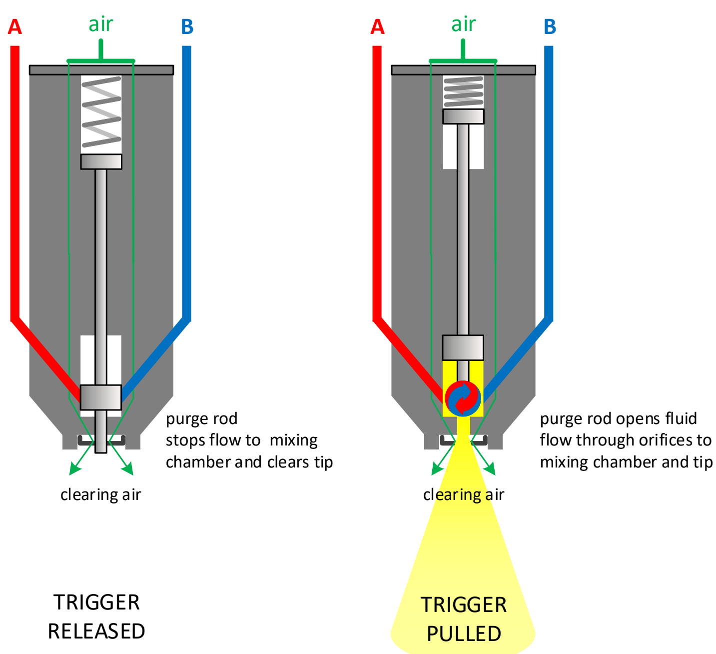
Plural-component spray guns are designed to mix, atomize, and spray plural-component coating materials. Examples are shown in Figures 14 and 15. All fast-set (3–20 seconds), plural-component coating material spray guns use impingement type mixing, wherein the material components are introduced into a mixing chamber via small, offset orifices. There are two types of impingement mix spray guns: (1) those with a fixed mixing chamber with moving valving rod, and (2) those with a moving mix chamber. Figure 16 and 17 show the concept of impingement mixing.

Figure 14: Moving valving rod type spray gun (photo courtesy PMC)

Figure 15: Moving mix chamber type spray gun (photo courtesy of Graco)



Air-purge gun



Mechanical-purge gun

Figure 16: Gun types

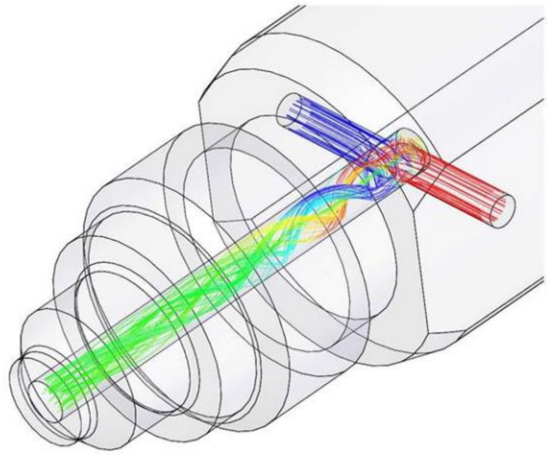


Figure 17: 3D Illustration of impingement mixing in spray gun chamber

PLURAL-COMPONENT ACCESSORIES AND ADJUNCT EQUIPMENT

SCREEN MESH SIZE AT THE GUN

Screens are used to filter particles and coagulated materials that would otherwise clog the close tolerances within a spray gun. The selection of mesh size should be based on the size of the orifices within the mixing chamber of the spray gun being used. Higher numbered mesh sizes have smaller openings. Mesh size is determined by the size of the tip as well as by chemical manufacturer specifications. Some manufacturers require sizes not shown below – always check the manufacturer's installation instructions for screen mesh and mixing chamber orifice sizes. Figure 18 shows typical screen sizes.

U.S. Units: A 40 mesh screen filters a 0.017" particle and will not clog a 0.020" mixing chamber.
SI Units: A 0.42 mm screen filters a 0.43 mm particle and will not clog a 0.51 mm mixing chamber.

0.42 mm / 40 mesh 0.25 mm / 60 mesh 0.18 mm / 80 mesh

Figure 18: Differences in mesh screen sizes

GENERATOR/AIR COMPRESSOR

Unless onsite power and compressed air are available, an electrical generator and/or an air compressor will be necessary. Indeed, most SPF contractors use their own generators and compressors because of the added independence, flexibility, and mobility they provide. Select generators and compressors of enough size to provide service to all the equipment (transfer pumps, proportioners, spray guns, mixers, etc.) employed on the jobsite. It is recommended that there be additional 20% power availability over what is calculated for overall needs with equipment. Provide excess capacity for accessory tools and miscellaneous needs. Electrical and compressed air requirements are available in equipment technical manuals.

MIXING AND MATERIAL CONDITIONING

When materials require pre-mixing, mixing units with collapsible mixer blades, as shown in Figure 19, can be inserted into material drums. Mixing motors can be air-, hydraulic-, or DC-electric-driven. The blades should be one-third the diameter of the drum, or 8 inches (200 mm) (for proper mixing. Auger-type mixers may not provide enough agitation and may leave solids in the bottom of the drum. **Note that some manufacturers prohibit mixing and recirculation. Always check the manufacturer's installation instructions before mixing coating materials, including mixing times and duration.**

⚠ SAFETY NOTE
When using flammable (red labeled) materials, mixers must be rated for use with flammable materials.

Figure 19: Drum mixer and mixing element using folding mixing blades. Mixer shown is electric-driven.

The isocyanate component of plural-component coating materials can react with moisture in the air, forming solids that can clog equipment screens. Containers must be protected with a dry, inert gas purge (such as nitrogen), or withdry air. An example of an an air dryer is shown in Figure 20.

Figure 20: Silica gel air dryer

REFERENCES

- SPFA 102 Coatings Guide
- SPFA 119 Glossary
- SPFA 137 Foam Equipment Guidelines