

PPG PITT-THERM® 909

Spray-on insulation coating application guide

INTRODUCTION

This guide provides contractors and applicators with the information required to successfully apply PPG PITT-THERM® 909 spray-on insulation (SOI) coating. The guide covers various questions and scenarios that may arise during application, with further information available within the technical data sheet or from your PPG representative. Please read this document carefully prior to commencing application.

SURFACE PREPARATION

This product is suitable for applying directly to metal or over recommended primers. If applying over a primer, all surface preparation and product application should be conducted in accordance with the product technical datasheet for that product. **However, it is recommended to only apply a total of 100-150 microns (4-6 mils) of primer, even if typically applied at higher film builds in other corrosion-under-insulation (CUI) situations.**

For application directly to steel, the following substrate conditions and temperatures are recommended:

- Steel surfaces should be abrasive blasted to Sa2.5 or minimum SSPC SP-6, blasting profile 50-150 microns (2-6 mils).
- Substrate temperature during application and curing should be above 5°C (41°F).
- Substrate temperature during application and curing should be 3°C (5°F) above dew point.
- Surface must be free of visible moisture.
- Product can be applied to hot surfaces at temperatures up to 149°C (300°F). See section on hot application below for further details.

RECOMMENDED PRIMERS

Various primers are suitable for use with this product.

PPG HI-TEMP 900 can be used in all applications where PPG PITT-THERM® 909 is suitable (at temperatures of up to 260°C/500°F). Other options include SIGMATHERM® 230 for temperatures up to 230°C (446°F), and AMERLOCK 2 GF/SIGMASHIELD 2 and AMERLOCK 400 GF/SIGMASHIELD 400 for temperatures up to 200°C (392°F).

STORAGE

Once product is received, store in a cool dry area. Temperatures below 32°C (90°F) are optimal for long-term stability. It is not recommended to open the part A container until ready to use as this can introduce moisture and cause the curing process to begin. If nitrogen (or other inert gas such as argon) is available, this can be used to fill the headspace of an opened part A container before resealing for later use.



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COATING THICKNESS AND SPREAD RATE

Coating thickness

The coating thickness required will depend on the application conditions and purpose for use. Where personal protection is the main goal and no primer or topcoat is applied, 2.54 mm (100 mils) will provide safe-to-touch measured with a thermesthesiometer (ASTM C1055) up to 260°C (500°F) in most circumstances.

As use of topcoat and varying operating and environmental factors can affect thermal efficiency, please consult your PPG representative for exact film thicknesses required for both safe-to-touch and energy retention. The table below shows approximate coating surface temperature with various dry film thicknesses (DFT) and operating temperatures. These values assume standard laboratory conditions and will vary based on actual conditions in the field.

Operating Temp (°C)	38 (100°F)	93 (200°F)	149 (300°F)	204 (400°F)	260 (500°F)
system					
DFT (mm)	Coated Surface Temperatures (°C)				
2.54 (100 mils)	28 (82°F)	58 (136°F)	88 (191°F)	118 (245°F)	148 (299°F)
6.35 (250 mils)	26 (79°F)	51 (124°F)	76 (169°F)	101 (213°F)	126 (258°F)
12.7 (500 mils)	23 (74°F)	39 (103°F)	56 (132°F)	72 (161°F)	88 (190°F)

Table 1: Coating surface temperature (not primed or topcoated) at different film thickness and operating temperatures

Spread rate

Once the required film thickness is known, spread rate can be calculated by the formula below:

Spread Rate (m²/liter) = (% Volume Solids x 10) / DFT (in microns)

Multiply by 40.75 to get ft²/US gal

PPG PITT-THERM® 909 approximate spread rate = 0.10 m²/l for 6.35 mm DFT (4.04 ft²/US gal for 250 mils)

PPG PITT-THERM® 909 Volume Solids = 63 ± 2%

Please note that despite a volume solids of 63 ± 2%, the DFT to WFT ratio is 0.85-0.9 as a significant portion of the solvent evaporates from the coating while being sprayed before it even hits the substrate.

PERSONAL PROTECTIVE EQUIPMENT

This product is for use only by professional applicators in accordance with information in this application guide, the product or technical data sheet, and the applicable material safety data sheet (MSDS). Applicators should use proper PPE including chemical-resistant clothing, gloves, safety goggles, and respirator. Refer to the appropriate MSDS before using this material. All use and application of this product should be performed in compliance with all relative federal, state, and local, health, safety, and environmental regulations or in compliance with all pertinent local, regional, and national regulations as well as good safety practices for painting, and in conformance with recommendations in SSPC PA 1, "Shop, Field and Maintenance Painting of Steel."



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MIXING AND POT LIFE

No induction time is required.

Mix ratio by volume: base to hardener 16:1 (plus water addition below).

Mix parts A* and B separately using a Jiffy mixer or paddle type blade. Mix until fully homogenized.

When properly mixed, the consistency of PPG PITT-THERM® 909 should be heavy-bodied (high viscosity) but free flowing, and there should be no lumps.

Once part B is fully mixed, add the following quantity of distilled water to Part B and mix thoroughly before adding to part A. The pre-marked cup that comes with the kit can be used for this purpose:

- 0.81 oz (24 ml) per 4-gal kit (15.1L kit)
- 9 oz (266 ml) per 44-gal kit (166.6L kit)

The addition of water is required to guarantee proper cure times and humidity robustness.

PPG PITT-THERM® 909 should be fully mixed without additional thinning. Any decision to thin the material should be made only after fully mixing and observing the condition of the mixed material. If thinner is required, only add up to 1% PPG Thinner 21-06 (AMERCOAT 65).

Once the material is mixed, the pot life is expected to be 8 hours at 20°C (68°F). The container should be covered during application to prevent skinning of the material and early solvent evaporation.

*Part A may contain a solid layer at the top of the can when first opened. This is normal and should be thoroughly mixed as directed above.

APPLICATION EQUIPMENT

PPG PITT-THERM® 909 is suitable for multiple application methods provided that pressure during fluid transfer does not exceed 3.44 MPa (500 PSI). Below is a list of equipment that has been validated with PPG PITT-THERM 909.

Epoxy Mortar Piston Pump (Graco ToughTek M680a Piston Pump) – PPG preferred and suggested for most general pipe and large surface applications

Use with Graco STX Air Spray Trigger Gun, Model 17Y910 Series J23A:

- 6 mm Fluid Nozzle Part 17Z564 with W6 Disc Part 24S115 or aftermarket TRTS-1635
- Fluid Pressure: 0.41 MPa (4.14 bar; 60 PSI)
- Pressure on the Pump Regulator: 0.14 MPa (1.38 bar; 20 PSI)
- Air Pressure adjusted at the gun: Turn off the air on the gun completely. Slowly turn the air knob open on the gun while spraying into a waste container until the desired atomization is achieved.
- Material hose diameter: 12.7 mm (½") ID fluid hose for hose lengths up to 61 m (200'), it is recommended to use 19.05 mm (¾") ID fluid hose in the first with 30.5 m (100') section
- Air hose diameter: 6.35 - 9.53 mm (¼"-3/8" is acceptable)

It is recommended to use the STX gun in place of the flex hose applicator that comes with the ToughTek M680a pump. To fully utilize the functionality of the STX gun to cycle the pump on/off based on trigger pull, PPG recommends the TORTIS STX GUN CONTROL BOX part number TRTS-2998 manufactured by TORTIS Coatings. Contact your PPG representative. This setup prevents solids build up in the gun and hose for optimal application properties and provides pressure relief control at the gun. The TORTIS STX GUN CONTROL box is easily mounted directly onto the piston pump. Complete hose bundles are available upon request as well, part number TRTS-6249. 30.5 m (100ft) TORTIS hose bundle includes 12.7 mm (½") fluid line, nylon air line, STX Gun control wire wrapped in Velcro, hose scuff guard for maximum hose protection, and connection of the M680 Pump to the STX gun. Instructions for installation are provided with the control box. Alternatively, please reach out to PPG field technical service for assistance with installation or equipment acquisition.

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To improve the ergonomics during horizontal spray applications or hard to reach areas, an STX gun extension wand (part #: TRTS-7755 TORTIS STX GUN EXTENSION MOD) can also be requested from a PPG sales representative.

To transfer materials directly from a drum to the hopper, remove hopper from the pump and attach a suction tube via CAM lock directly to the pump. The other end of the tube can be placed directly in the pail or drum of material. For recommendations or assistance, please reach out to a PPG sales representative.

Pneumatic Piston Pump (Graco President 10:1) – recommended for smaller application areas; not recommended for pipes.

Use with Graco STX Air Spray Trigger Gun, Model 17Y910 Series J23A:

- 4 mm Fluid Nozzle with W4H WideTex Disc
- Fluid Pressure: 0.172-0.241 MPa (1.72-2.41 bar; 25-35 PSI)
- Pump Pressure: 1-1.38 MPa (1-13.7 bar; 145-200 PSI)
- Air Pressure: 0.38-0.45 MPa (3.8 - 4.5 bar; 55-65 PSI)
- Material hose diameter: 12.7-19.1 mm (½”-¾”)
- Air hose diameter: 9.5-19 mm (3/8-3/4 in)
- To improve the ergonomics during horizontal spray applications or hard to reach areas, the STX gun extension (TRTS-7755 TORTIS STX GUN EXTENSION MOD) can also be requested from a PPG sales representative as stated above.
- Set-up shall contain the Graco Evenflo Control (Graco Part# 202844) to shut the pump off when de-triggering the gun, lessening pack-out at the gun.
- Mount onto drum lid by placing the pump's fluid intake rod through the drum cover's open bung or clamp to inside wall of drum. If removing lid from open-head drum to mount the pump, keep the coating material covered as best as possible to avoid premature curing and solvent evaporation of the material in the drum.
- Other low ratio piston pumps may work depending on the size and length of hose needed for the job.
- Pre-condition the pump and lines with PPG thinner 21-06 (Amercoat 65) prior to application to confirm pump and hose lines are completely clean.

HVLP with pressure pot – recommended for small or complicated application areas, pipes of diameter <6 inches, or repairs

- Nozzle orifice: approx. 3mm (0.11 in).
- Nozzle pressure: approx. 0.207-0.241 MPa (2.06-2.40 bar; 30-35 PSI)
- Pot pressure: 0.241-0.275 MPa (2.40-2.75 bar; 35-40 PSI)

Image 1-5: From left to Right: Graco President 10:1 pump, Graco ToughTek M680a Pump STX Trigger Gun, Tortis STX gun control box, and STX gun with extension rod (bottom)



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APPLICATION TIPS & TECHNIQUES

PPG PITT-THERM 909 can be applied from 2.54 - 6.35 mm (100-250 mils) DFT per coat up to 12.7 mm (500 mils) total.

The application parameters given in the previous section are recommended starting points. Depending on environmental conditions, it may be required to further adjust the air or material pressures or nozzle orifice size to achieve optimal appearance and reduce overspray.

Image 5 shows the appearance of the coating with too much air pressure and overspray. Image 6 shows the optimal finish. Provided that no loose material is on the surface, the coating in both images will still perform as intended. However, for the best appearance and uniformity in thermal properties, it is best to adjust equipment as necessary.



Image 5 and 6: Rougher texture on the left (still functional) versus optimal texture on the right

If a smoother texture is desired (for appearance only) after application of the coating, there are two options available:

1. As soon as the coating is tack-free, a roller soaked in the recommended thinner can be lightly rolled over the surface of the coating to smooth out any roughness. Alternatively, a dry PVC pipe placed over a roller cage in place of the fabric roller can also be used.
2. Before applying the next layer or topcoat, the surface of the coating can be lightly sanded using a fine grit sandpaper.

Any overspray or dust created from sanding should be brushed or blown off completely before applying subsequent coats. In addition to equipment parameters, other important guidelines include:

- Keep a max distance of at least 30-46 cm (12-18 in) from the surface being sprayed to avoid excessive dry spray.
- The coating fan should remain perpendicular to the surface to minimize overspray.
- When building DFT, apply approximately 760 - 1270 microns (30 - 50 mil) per pass wet-on-wet, allowing a flash time of least 1-2 minutes after each 2540 microns (100 mil) wet film thickness (WFT). Do not allow the coating to reach dry-to-touch between passes. Once the coating is dry-to-touch, the minimum overcoat windows below will need to be followed to prevent delamination between coats. If applying the coating to a large surface area such as a tank roof, the area can be subdivided into smaller sections to prevent passes reaching dry-to-touch before additional passes can be applied. When connecting one section to another, make sure to follow recoat windows. Feathering the edges can help create a smooth transition between sections.

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HOT APPLICATION

PPG PITT-THERM® 909 can be applied on hot substrates up to 149°C (300°F). When applying to surfaces above 66°C (150°F), use the following techniques:

- Build the first 1270-2540 microns (50-100 mil) WFT with quick 250 - 380 microns (10-15 mil) passes. Allow flash time of 1-2 minutes between passes to avoid blisters from solvent popping.
- The remaining WFT can be build up as normal.
- Please note that the maximum overcoat window of the primers will be significantly reduced when applied to a hot substrate. Follow the recoat windows for elevated temperatures in the technical datasheet for your chosen primer.

CURE AND RECOAT SCHEDULE

Table 2 below shows cure times for PPG PITT-THERM® 909 at various temperatures and at 50% relative humidity (RH). RH has minimal effect on cure speed and this product is suitable for application at humidity ranging from 10-95%, given that the surface is free from visible moisture.

Curing time for DFT up to 6.35 mm (250 mils) at 50% RH		
Substrate temperature	Dry to touch	Dry to handle
5°C (41°F)	2 hours	2 days
25°C (77°F)	1.5 hours	26 hours
40°C (104°F)	1 hours	23 hours
93°C (200°F)	10 min	15 hours
149°C (300°F)	10 min	14 hours

Table 2: Cure Times

Overcoating Intervals up to 250 mils (6.35 mm) DFT and 50% RH				
Overcoating with...	Interval	5°C (41°F)	25°C (77°F)	40°C (104°F) and above
Itself	Min	24 hours	16 hours	10 hours
	30 days	30 days	30 days	30 days
Topcoat	Min	24 hours	20 hours	16 hours
	14 days	14 days	14 days	14 days

Table 3: Overcoating Intervals

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REPAIR

PPG PITT-THERM® 909 hardens as it cures and is hard and strong enough to walk on the next day. If the coating sustains damage which is caused by a sharp or heavy object (either during application or at a later date), the following two methods are suitable for repair:

1. HVLP with pressure pot as outlined in the section “Application Equipment” can be used to repair damaged areas.
2. Small areas of damage <15 cm (<6 in) wide can be repaired using a trowel. Apply the coating evenly using a clean trowel and follow the same DFT recommendations as with spray application.



Image 7: Trowel repair

CLEANUP

Equipment can be cleaned using PPG Thinner 21-06 (AMERCOAT 65) or any other approved organic solvent. Any unused mixed coating will cure in the can and can be disposed of according to local regulations.

Flush and store the pumps with water to prevent swelling of the packing material.

For information on storing excess coating, please see the section on storage above.

RECOMMENDED TOPCOATS

Topcoat is not required for PPG PITT-THERM® 909 but may be applied to achieve a desired color or high emissivity.

Suitable topcoats include PPG HI-TEMP 1000 and PPG PITT-TECH PLUS EP DTM. Where the surface temperature of PPG PITT-THERM® 909 is likely to exceed 121°C (250°F), PPG HI-TEMP 1000 is recommended. Polyurethanes are not currently recommended.

APPLICATION OF FLANGES AND OTHER COMPLICATED GEOMETRY

For application of flanges, tight to reach areas, and complicated geometry, HVLP with a pressure pot allows for greatest application control. Smaller diameter piping can still be sprayed with other equipment such as the M680a mortar pump, using a 4mm Nozzle Graco part 17Z563 with W4 disc Graco part 24S114. Reduce atomising air at the gun to the minimum to reduce overspray.

Bolts can be coated with PPG PITT-THERM 909 and still be accessed when necessary by removing the coating with hand tools or power tools. If the bolts are to be sprayed with PPG PITT-THERM 909, substrate preparation as described above and in the product data sheet will need to be followed.

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TIE-INS WITH CONVENTIONAL INSULATION SYSTEMS

In some circumstances, it may be desired to apply PPG PITT-THERM 909 on only a portion of the asset, requiring a tie-in with existing insulation. To accomplish this, follow the steps below:

- Apply one of the approved primers to the area PPG PITT-THERM 909 is to be sprayed. If no primer is being used on the bulk of the asset, apply the primer to at least a 0.6 - 0.9m (2-3 ft) wide “tie-in” area.
- Apply PPG PITT-THERM 909 over the area to be insulated. Apply the coating over the primed tie-in area as well, tapering the DFT to a mist coat at the point the conventional insulation starts.

Once PPG PITT-THERM 909 is dry-to handle, overlay the conventional insulation over the 0.6 - 0.9 m (2-3 ft) tie-in area as instructed by the insulation manufacturer, protecting it with a tapered cladding transition piece. The width of the tie-in area can be adjusted depending on the size of the transition piece. Seal the seam between the end of the cladding transition piece and the PPG PITT-THERM 909 surface using a silicone based adhesive or sealant.

LIMITATION OF LIABILITY

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