



INSTALLATION & INSPECTION PROCEDURE FOR PPS120 SHRINK SLEEVE ON POLYPROPYLENE COATED PIPES

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**INSTALLATION INSTRUCTIONS FOR PPS120 ON 3-LAYER
POLYPROPYLENE COATED PIPE**

1. GENERAL:

This installation procedure describes the application of PPS120 heat-shrinkable sleeves on Polypropylene coated pipe operating up to 120°C (148°F). The system described herein comprises a wraparound heat shrink sleeve type PPS120 sleeve installed on the bare steel area, S-1113 adhesive strips on the PP line coating and S1401 with reinforcement over the sleeve edges.

Only Berry Plastics CPG approved and equipped installers should perform the installation of PPS120.

Note : Contact the Berry Plastics CPG Technical Services Department prior beginning installation.

2. MATERIAL AND EQUIPMENT

Materials

Appropriate size of PPS120 UNI-sleeve or PPS120 sleeve with separate WPCP IV closure.

S-1113 mastic strips in roll form.

S1401 epoxy kit + applicator pad.

PP protection layer and heat shields, this in order to protect the PP line coating from direct flame during preheating.

Fiberglass cloth.

Paper or PE tape in roll form.

Equipment

Power sanding discs of P24 or P36 grade and scotch brite.

Drilling machine and impeller.

Two BN XX torches.

	Pipe size / DN
BN 25	Smaller than DN 100
BN 40	DN 100 to DN 250
BN 60	DN 300 to DN 950
BN 80	DN 1000 to DN 1500

Propane tanks with appropriate regulators of 4 bars and propane hoses.

Calibrated surface pyrometers.

Berry Plastics CPG flat silicone rollers.

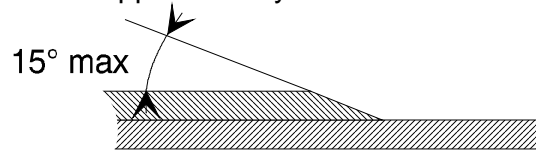
Note: For pipe diameters above 10 inch two equipped installers are required.

3. SAFETY

The contractor is responsible to ensure that the installers are well equipped for safety in accordance with local regulations such as heat resisting gloves, goggles, etc.

4. POLYPROPYLENE LINE COATING EDGES

If not factory beveled, bevel the line coating edges on both sides of the weld bead to approximately 15°.



The ends of existing mill coating shall be inspected. Unbounded portions of the coating shall be removed and then suitably trimmed.

Portions where parent coating is removed shall be thoroughly beveled, and cleaned as specified.

5. SURFACE PREPARATION

Clean exposed steel area and adjacent pipe coating that will be covered by the PPS120 sleeve from all dust, dirt, moisture, grease or other contaminations; if required use a non contaminating solvent - eg Xylene.

Grit blast only the bare steel part of the girth weld area to SA 2½.

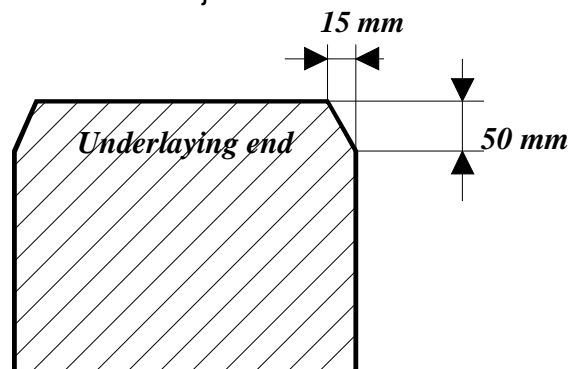
Adjacent line coating is to be abraded by a rotating sanding disc or similar, which will score the surface of the polypropylene without melting the surface or leaving loosely adhered polypropylene deposits on the surface which will interfere with the final bond of the mastic.

Line coating to be prepared each side of the bare steel area for a width about 25mm wider than the area to be covered by the mastic strips.

Remove carefully all remaining abrasive dust and loose particles.

6. CUTTING OF PPS120 SLEEVE'S CORNERS

The corners of the underlying sleeve's end should be cut by $\pm 15 \times 50$ mm, prior to wrapping sleeve around the joint



7. PREHEATING GIRTH WELD AREA

Make sure that all necessary items are in close proximity before you start. Prior to preheating apply the protective heat shields and thermal blankets around the pipe to avoid direct flame contact to the PP line coating. Wrap the PP protection layer tightly around the PP edges using paper or PE tape (under tension), followed by a triple wrap (under tension) of heat shield overlapping the steel for approximately 25 mm (1 inch). Preheat the steel area with the torch up to 190°C-200°C (374°F-392°F), whilst the PP line coating should be between 80°C to 90°C (176°F-194°F). Check the preheat temperature using a calibrated contact pyrometer, do not use temperature sticks or crayons, as these can result in overheating. In windy or wet conditions, a windshield or ventilated tent shall be used.

8. PPS120 SLEEVE APPLICATION

Immediately following the joint preheat and prior to sleeve application, apply the S1113 adhesive strips. Remove outer layer of release plastic/paper before material is tensioned around the polypropylene coating at both sides on the joint area. Starting at the 12 o'clock position and equal with the PP line coating edge. Start wrapping the PPS120 sleeve centrally around the field joint, the leading edge will be approximately in the 1 to 2 o'clock position. The sleeve should be wrapped around the joint leaving only a small gap between the bottom of the pipe and the sleeve, in order to shrink it as fast as possible and maintain heat in the pipe.

Pipe size	Gap in mm
DN 100 to DN 250	From 10 mm to 30 mm
DN 250 to DN 950	From 30 mm to 60 mm
DN 1000 to DN 1500	From 60 mm to 90 mm

Gently heat the inside of the overlapping edge and press down onto the opposite sleeve end with a gloved hand. Sleeve overlap onto itself should be approximately 50 mm (2 inch). While heating press down and smooth the closure patch with a gloved hand to ensure good bonding and eliminate air entrapment. Wrap the heat shields either side of the PPS120 sleeve over the line coating to avoid the flame damaging the line coating during sleeve installation. Using Berry Plastics CPG propane torches adjust flame length to approximately 500 mm (20 inch). Begin at one side of the sleeve, moving the torch in a paintbrush motion towards the other sleeve end and is fully recovered.

9. **POSTHEATING**

Immediately after sleeve installation, and with the heat shields still wrapped over the adjacent line coating next to the sleeve, heat the entire sleeve to ensure that the adhesive is molten.

After post heating and while the adhesive is still liquid, using a silicon roller or gloved hand, roll or massage the sleeve over the weld bead and over the steel/PP transition starting from the 6 o'clock up to the 12 o'clock position.

In addition roll the sleeve closure area with a silicone hand roller to ensure no air is trapped under the closure area and to ensure a bond of the sleeve to the steel has been achieved under this area.

Start rolling from the weld bead towards the ends, forcing possible air enclosures out of the sleeve.

Special attention should be given to longitudinal and circumferential weld beads. Rolling does not affect the properties of the sleeve, but does help to remove possible entrapped air.

10. **S1401 PRIMER HANDLING**

S1401 is supplied in two pre-measured components.

The base is a thick gray epoxy and the hardener is an amber liquid amine.

The components must be mixed together and in the proper ratio of base to hardener ;

3 parts of base to 1 part of hardener by volume.

4,5 parts of base to 1 part of hardener by weight.

S1401 has a two-year shelf life if stored between 15 and 40°C (59°F-104°F).

11. **S1401 PRIMER MIXING**

Before mixing the primer use a paper or PE tape to indicate the area to be covered with the primer.

The area to be covered should be approximately 150mm or 6 inch, to be divided 50% on the PPS120 sleeve and 50% on the PP line coating.

Pre-mix the base material slowly with a variable speed drill gun, fitted with an appropriate mixing impeller.

Pour pre-measured part B into part A.

Mix at a speed that just creates a vortex in the primer, and once both parts have created one solid color its ready to apply.

The material should be mixed above 15°C (59°F).

The workable pot life after mixing is 15 minutes at 25°C (77°F).

Pot life will be extended at lower temperatures and shortened at higher temperatures.

12. S1401 PRIMER AND FIBERGLASS APPLICATION

Use paper tape to indicate the area of 150mm (6 inch) to be covered with the S1401 epoxy (50% on PPS120 sleeve / 50% on the PP line coating).

To optimize application in the field the S1401 epoxy can be applied at any time after cool down below 80°C (176°F), using a different application crew if desired.

Apply a first layer of epoxy on the interface of PPS120 and the PP line coating.

Wrap the fiberglass cloth tightly over the wet primer.

Apply a second layer of primer embedding the fiberglass complete in the primer.

To finish the installation remove the tape.

13. VISUAL INSPECTION

The sleeve shall be visually inspected for the following points;

The inspection of the joint shall only be done after the cool down of the sleeve and the substrate to ambient temperature.

The weld bead profile contour shall be visible through the sleeve.

The sleeve will be smooth, there will not be any dimples, cold spots, bubbles, punctures, burn holes or any signs of holidays.

There will be no signs of entrapment of foreign materials in the underlying adhesive.

S1401 primer shall cover the sleeve ends and the glasfibre cloth fully embedded.

The sleeve will overlap the adjacent mill coating for at least 50 mm each side.

14. HOLIDAY INSPECTION

After complete cool down, holiday inspection can be done.

Holiday inspection can be done using a voltage setting of 5 KV + 5 KV per mm of coating thickness (ref. DIN 30672) with a full circumferential contact electrode or brush for every joint.

15. ADHESIVE PEEL STRENGTH

Peel tests should be done prior to S1401 epoxy application.

One out of every 50 sleeves or alternatively one out of a day production shall be subjected to a manual peel test.

After a few days this frequency can be lowered.

Peel strength inspection shall be done at a sleeve temperature of 23°C (73°F) or at 50°C (122°F) early morning in hot climate countries.

Both the substrate and the sleeve shall be at this temperature.

Strips of 25 mm x 200 mm (1 inch-8 inch) shall be cut perpendicular to the pipe axis either at 9 or 3 o'clock positions as per DIN 30672 on both the steel and PP surface.

Manually remove the first 30-40 mm of the leading edge of the strip by using a screwdriver, make sure that the initial adhesive bond line cut is essentially centered within the adhesive layer.

Attach the peel strength test gauge to the leading edge of the test strip and fasten clamp.

Holding the test gauge with both hands exert a steady force a slow pulling speed of 100 mm/min (4 inch), and under 90° to the circumference of the pipe.

The peel strength should be greater as given in the table below.

	At 23°C (73°F)	At 50°C (122°F)
PPS120 on Steel	62N/25mm or 35Pli	37N/25mm or 21Pli
PPS120 on PP	42N/25mm or 23Pli	25N/25mm or 14Pli

16. **AIR VOIDS**

Sleeves should be inspected for possible air entrapments.

Air entrapments should be minimal and shall meet the following criteria;

Air entrapments that extend to bare steel shall be limited to maximum 1sq.cm and maximum 3 per sleeve.

Air entrapments not showing bare steel shall be limited to 10sq.cm maximum.

The total area of entrapment shall not be larger than 3% of the total sleeve area.

Larger entrapments should be corrected in accordance with the Berry Plastics CPG procedure.

17. **REPAIR PROCEDURE FOR PPS120 SLEEVE**

See AG-PPS120-REPAIR.

Note: This installation instruction and inspection procedure is a guideline.

Local circumstances at site may require specific conditional changes.

Authorized Berry Plastics CPG Technical Service personnel must approve these changes.