



Installation Manual

Rev. 3a, 11/30/2005

COR*Guard LLC – An innovative, cost-effective manufacturer of fluoropolymer coated stainless steel duct, cleanroom furniture and other custom products





INSTALLATION MANUAL TABLE OF CONTENTS

PRE-INSTALLATION INFORMATION	3
Introduction	3
System Design	3
SMACNA	3
Warranty	3
Receiving.....	4
Product Care.....	4
Product Inspection	5
Visual Inspection	5
Electronic Inspections	5
FLANGE SYSTEMS.....	7
Angle Rings	7
Prime*Guard™ Unattached Rings	7
Prime*Guard™ Attached Rings	7
Prime*Guard™ Seal Welded Rings	7
DUCT ASSEMBLY	8
Gasket	8
Hardware	8
Connecting Sections	9
Attaching to Non-Prime*Guard Ductwork.....	10
FIELD MODIFICATIONS.....	11
Shortening Duct in the Field	11
1. Disassembly.....	11
2. Measuring the Modification	11
3. Cutting the Duct.....	11
4. Filing the Edges	11
5. Flange Tool	11
6. Adjusting the Flange Height	11
7. Flanging the Duct End.....	12
8. Inspect the Coating	12
FIELD INSTALLED FLANGE	13
FIELD INSTALLED NIPPLE	14
NPT Nipple	14
INSTALLING A TEST PORT	15
3/8" Test Port	15
FIELD INSTALLED SADDLE TAP.....	16
SPARK TEST PROCEDURE	17
Spark Detector	17
COATING REPAIR.....	18
Precautions	18
Preparing the Repair Area.....	18
Sizing the Patch	18
Applying the Patch.....	18
1. Heating the Area.....	18
2. Place the Patch	18
3. Flowing the Repair Patch:	19
Spark Test Inspection	19
Technical Assistance.....	19



PRE-INSTALLATION INFORMATION

Introduction

The purpose of this Manual is to provide information for the proper handling and assembly of COR*Guard's™ Prime*Guard™ ductwork. By following these tried and proven methods the safety, the reliability, and the longevity of the system will be insured to function as it was originally designed. All Prime*Guard™ products are factory inspected and certified to meet all quality standards before being shipped from the factory. The installer is obligated though, to re-inspect and verify that all products are serviceable before being installed and put into commission. It is the responsibility of the owner to assure that the installer has followed inspection procedures, if the installation is sub-contracted.

System Design: Prime*Guard™ ductwork is manufactured to meet or exceed all SMACNA requirements for Round Industrial Duct. Depending on the duct sizes and the pressure classification of the exhaust system, reinforcing angle rings may be required. Refer to SMACNA "Industrial Duct Construction Standards" for these reinforcing requirements to maintain SMACNA compliance.

SMACNA: All ductwork shall be supported in accordance with the latest version of guidelines established by SMACNA. During the installation process special care must be taken not to damage the coating. The inspection process should insure the reliability of the coating, but if the coating is damaged during the installation process the system will fail to work as designed. Do not penetrate the coating for any reason, except in the case of approved COR*Guard™ modification systems. Do **NOT** use "Tek" screws, rivets, or other related fasteners that penetrate any coated surface on ductwork, unless specifically allowed by SMACNA or specifically stated in COR*Guard™ procedures. Remember, do **NOT** install any ductwork that has failed a visual or electronic inspection until it has been repaired and re-inspected. All fittings, balancing dampers, blast gates, drains, test ports, and other inline accessories must be provided by COR*Guard™ to maintain the proper system design and warranty.

Warranty: COR*Guard™ will warranty products for quality and workmanship for one (1) year from the date of commissioning. Field installations, modifications, repairs, and other post-installation operations shall be performed using factory-authorized procedures. Prior to any field repairs or other modifications, notify COR*Guard™ to receive a Field Modification Authorization (FMA) from an authorized COR*Guard™ representative. Failure to follow these procedures or to notify COR*Guard™ may result in voiding the warranty.



Receiving

Prime*Guard™ components are inspected and packaged at the factory to assure that they arrive in perfectly new condition. Products though, can be damaged while in transit to the delivery site. Any claim for damage, loss, or delay as a result of the freight company, MUST BE identified on the bill of lading and filed with the delivery company by the consignee. If this is not done, the loss will not be recognized as valid by the delivery company, and the cost will be borne by the consignee. The consignee is responsible for inspecting the shipment upon arrival for damages and completeness and noting any issues on the bill of lading before taking receipt of the shipment. It is then also the consignee's responsibility to notify COR*Guard™ within 48 hours of receipt of any unsatisfactory product.

Product Care

Once the product has arrived at the job-site, proper handling and storage of Prime*Guard™ duct is essential to its eventual successful installation. Handle and store Prime*Guard™ ductwork carefully to make sure the coating is not damaged in any way. All COR*Guard™ items are shipped from the factory with packaging designed to protect the coated duct from damage due to handling and other debris, but proper care must still be used to protect the coating.

When storage of the duct is required, it should be left in the factory-installed packaging to maintain its cleanliness and to protect the coating. Store the items in a location that protects them from damage by traffic and other debris. If possible, store all the items indoors where dirt and other debris cannot come into contact with the coating. However, if you must store the items outside, then the ductwork should be protected with waterproof materials to protect it from dirt, dust and other damaging elements.

If it is necessary to stack the items, place a barrier, such as plywood, between the layers. The open end of each duct section is the area most susceptible to damage of the coating. Although, the ends are wrapped in packaging care must be taken to avoid an object penetrating the packaging and damaging the coated surface. If the duct sections are stacked horizontally, do not overload the bottom layer and compress the round diameter into an oval. When moving Prime*Guard™ duct and fittings by hand, do not drag them along the ground, which could scrape and damage the coating. Remove the factory-installed packaging ONLY when the item is ready to be inspected and then installed. Although the items are made from a steel substrate, it must be kept in mind that the coating is relatively delicate and damage to it will compromise the entire system.



Product Inspection

A clean work area is imperative for handling and inspecting the Prime*Guard™ ductwork so that it maintains its serviceability once installed. All work areas and employee hands should be cleaned before handling the coated duct. The objective is to clean any dust, dirt, or other contaminants from the duct pieces before proceeding with the inspections and to keep the items in this cleaned condition until they are installed. Proceed with the project ONLY when the conditions are satisfactory for beginning this step. If unsatisfactory conditions exist, make the effort to correct the situation before proceeding.

All COR*Guard™ products are inspected and certified to meet quality standards prior to leaving the factory. The consignee and installer though, are responsible for re-inspecting and verifying, just prior to installation, that all ductwork has been kept in a serviceable condition. Leave all the factory packaging in place until the items are ready to be inspected and then install immediately thereafter. Handle with the utmost care to avoid damaging the coating.

Visual Inspection

Begin the inspection by visually looking for dents in the metal. Check the flanges on each end to assure that they are still in the proper shape. Continue the visual inspection by next checking the coating. Look for areas, especially on the flanges, where the coating may have been scuffed or scraped. Visually check to see if any foreign items have become imbedded in the coating. Tag or identify any areas that are damaged or appear questionable.

Electronic Inspections

Next, electronically inspect the coating using a spark tester. Check that the setting on the tester is correctly set for the given coating thickness. Sweep the entire coated surface with the brushes of the wand to check for areas that no longer have the recommended coating in place. Pay particular attention to the “tagged” areas that may have been damaged, scraped or scuffed. Tag or identify any points that fail the spark test. Any point that “sparks” constitutes a failure of that item for installation until the failure has been corrected and retested.

Follow the spark test with an inspection of the coating thickness. Make sure that the thickness gauge is set for non-ferrous metal. After properly “zeroing” the gauge, pick random points on the coated surface to take readings. The average of all the readings should be within the specified thickness. If one reading is significantly outside the desired thickness, check several points close to that area to verify the actual coating thickness in that region. Identify any specific areas that are not acceptable. If the average thickness is outside the specified thickness identify the item as unacceptable.

An item is acceptable for installation and service only when it has passed both the visual inspection and the electronic inspections. COR*Guard recommends that the approved section of duct be tagged in some visual manner to easily identify that it has pass all the necessary inspections.



Electronic Inspections (continued)

If an item has had the coating damaged enough to expose the stainless steel, or if it fails a spark test, or it does not have the proper coating thickness, the item is unacceptable for installation at that time. Tag or clearly mark any items that fail the inspection tests so that these items do not inadvertently become installed. Segregate these unacceptable items in one area that is clearly identified as such. Contact COR*Guard's Quality Control department with the information regarding each item that has failed and why it has failed the inspection. COR*Guard's personnel will discuss the appropriate measures that need to be taken for each item. However, most "unacceptable" items can be repaired in the field without necessitating a replacement part. Instructions for field repairs and a repair kit from COR*Guard will be necessary though. Any damaged duct that cannot be field repaired must be replaced or returned to COR*Guard for factory repair. Take tremendous care to protect the coating throughout the entire process of inspection to insure excellent performance from the system.

(installation manual continued on following page)

FLANGE SYSTEMS

Angle Rings

Prime*Guard™ ductwork is manufactured and should be installed according to SMACNA procedures for round industrial duct. This is accomplished by bolting angle ring joint systems together in a specific and systematic process. Please refer to the latest edition of SMACNA to review the standards for this process. The diameter of the angle rings can range in size from 4" to 120". The specific design for the angle ring connection system varies depending on the diameter of the duct, the gage of the material, and the pressure requirements of the system.

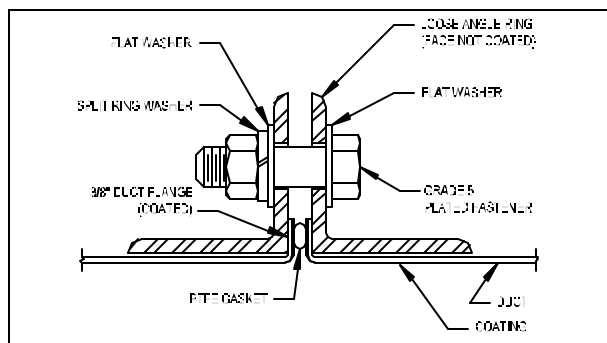


Figure #1: Unattached angle rings

Prime*Guard™ Unattached Rings: The standard joint design is an unattached angle ring and a retaining flange on the end of the duct. The diameter of the duct, the gage of the metal, and the negative pressure rating will determine the range in which this design is appropriate. Refer to the SMACNA manual or contact a COR*Guard representative for details. Angle rings can be manufactured from material that is either black iron or 300 series stainless steel. As shown in Figure #1, a gasket and fasteners complete the system.

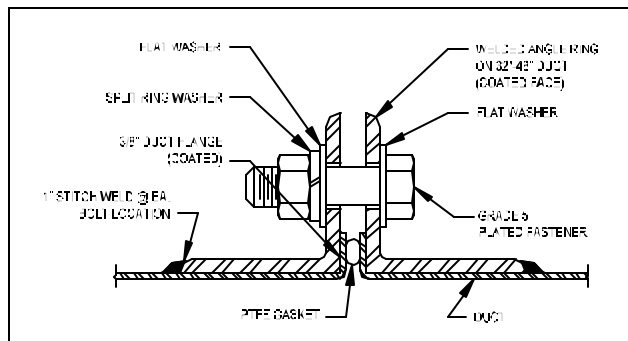


Figure #2: Attached angle rings

Prime*Guard™ Attached Rings: Duct pieces can be manufactured with angle rings that are stitch welded directly to the duct sidewall. The duct itself though, still has flanges on each end. The angle rings are manufactured from 300 series stainless steel. The diameter of the duct, the gage of the metal, and the negative pressure rating will determine the range in which this design should function. Figure #2 illustrates this system. The fastener hole locations in the attached angle rings are designed to straddle the vertical centerline of the duct when installed, unless otherwise specified.

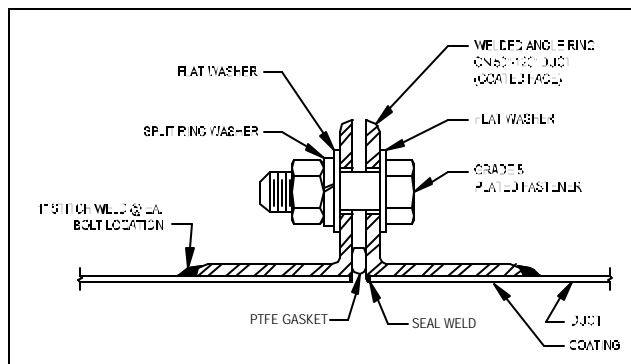


Figure #3: Seal welded angle rings

Prime*Guard™ Seal Welded Rings: Ducts that are large in diameter are manufactured without duct flanges at all. The angle rings are seal welded directly to the end(s) of the duct and form the end flange in this manner. The angle rings are made from 300 series stainless steel. The diameter of the duct, the gage of the metal, and the negative pressure rating will determine the range in which this design can function. The standard fastener hole locations straddle the vertical centerline unless otherwise specified. Again, note the location of the gasket in Figure #3.



DUCT ASSEMBLY

Unless otherwise specified, Prime*Guard™ ductwork will include all necessary gasket material and hardware required to assemble all the connection joints.

Gasket: The gasket material shall be a Gore-Tex® form-in-place, fully expanded 100% PTFE joint sealant. Use of other gasket material will void the warranty and could adversely affect the performance of the system. Depending on the diameter of the duct section, a specific size of joint sealant is required. It is vital that the appropriate size seal is used so that a watertight seal can be formed. Refer to Table #4 to size the joint seal to the appropriate duct diameter. If a duct joint has been disassembled for any reason after having the bolts tightened, a new gasket must be installed during reassembly to ensure a secure watertight seal.

Note that specific gasket sizes are used for particular size ducts.

Duct Diameter	Gasket Size
4" to 10"	3/16"
12" to 48"	1/4"
50" to 120"	3/8"

Table #4: Duct & Gasket Sizing

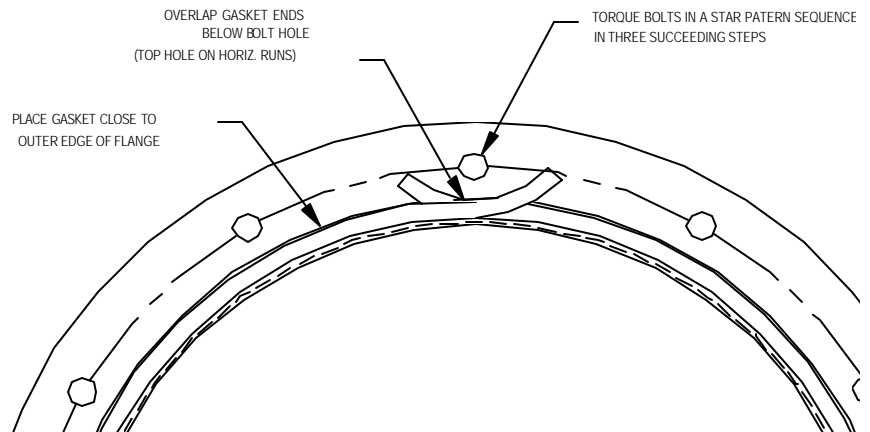


Figure #5: Gasket Placement

Hardware: Prime*Guard™ ductwork is shipped with all the hardware required to assemble the connection joints. Each fastener hole will have an appropriate size bolt, nut, lock washer, and two flat washers. All hardware shall be plated SAE Grade 5 fasteners. Stainless steel fasteners are available upon request, although they are not recommended. Using unapproved hardware will void the product warranty. Bolt sizes and torque specifications vary based upon the size of the duct. Please refer to Table #6 for the specific sizes and torque specifications.



Connecting Sections

1. Verify the Section: Identify the correct duct section to be installed and locate the tag identifying that it has been inspected and approved. If there is any doubt regarding the inspection approval on the item, return it to be inspected and tagged. If the item is identified as having been inspected and approved, proceed by using a clean, lint-free cloth to wipe the coated surface of the duct to remove any dust or foreign particles. Make a last visual inspection of the coated flanges to insure no damage has occurred since the prior inspection. Do NOT install any piece of duct that is visibly damaged. Return any items for re-inspection that are in doubt.

2. Size the Gasket: The gasket material typically is provided in a roll of 50 to 75 feet. Therefore, the gasket must first be cut to the proper length. Being careful to keep the adhesive covering in place, unroll enough gasket material until it can be wrapped around the diameter of the duct section with an overlap of approximately 2 inches. Cut the described length of gasket from the remainder of the roll. Only one (1) gasket is required for each connection joint.

3. Apply Gasket: Peel back the adhesive covering from the first 6 inches of one end of the gasket that has been cut to length. Identify a fastener hole that will be located on the upper half of the duct once it has been installed. Apply 1" of the exposed adhesive to the angle ring near that hole. (refer to Figure #5) Smoothly apply the entire gasket around the edge of the coated flange while stripping the covering from the adhesive. Do not allow the gasket to become wrinkled or allow the adhesive to become stuck to the gasket. If the gasket becomes stuck to the adhesive, or damaged, discard that section and cut a new length. Finish applying the gasket by making sure some overlap (approximately 1") occurs at the angle ring hole from which the gasket started. (See Figure #5) Seat the gasket on to the coated flange by running a finger around the gasket to firmly set the adhesive onto the duct flange.

Note: On duct that is manufactured without a flange and the angle ring is seal welded directly to the duct, install the gasket directly onto the angle ring. As with other designs, identify an angle ring hole that will be located on the upper half of the duct and begin to apply the gasket. Apply the gasket material around the diameter of the duct between the angle ring holes and the inside surface of the duct. Continue to smoothly apply the gasket to the entire face of the angle ring. Finish by overlapping the gasket (approximately 1") at the beginning hole. Run a finger around the gasket to firmly set the adhesive onto the duct. (Figure #5)

4. Bolt Flanges: Align the two duct ends to be joined. Take care not to shift the duct from side-to-side and disturb or wrinkle the gasket. Insert a few "starter" bolts on opposite sides of the angle ring to position and hold the duct ends in place. Each bolt should be installed with a flat washer against the angle ring. A lock washer should also be placed between the flat washer and nut. Once the duct ends are correctly positioned, hold them in place, insert the remaining bolts, and tighten the nuts "finger-tight".



5. Tighten the Bolts: Follow a star pattern when tightening the bolts. Apply a gradual torque to all fasteners with a low-torque air wrench, or by hand, until the appropriate compression is achieved. Tightening one bolt dramatically more than the others can result in damage to the gasket and failure of the system. Once all the bolts have been tightened to approximately the proper torque with the air wrench or by hand, use a calibrated torque wrench to finish the tightening. Be sure to properly set the torque wrench to the COR*Guard™ recommended torque value for each bolt size, before final tightening. (Table #6)

Standard hardware: SAE Grade 5 fasteners					
Duct Diameter	Bolt Size	Torque Specifications			
			Ft. lb.	In. lb.	M kg.
4" to 10"	5/16"	Grade 5	22	264	3.0
		S/S	8	96	1.1
12" to 48"	3/8"	Grade 5	36	432	5.0
		S/S	15	180	2.1
50" to 120"	7/16"	Grade 5	60	720	8.3

Table #6: Hardware size & torque specifications

Attaching to Non-Prime*Guard Ductwork

It may be desirable in some instances to attach Prime*Guard™ duct to an existing duct system. The existing duct may be a Fiberglass Reinforced Plastic (FRP) or a coated metal duct system and still allow a secure connection. COR*Guard will need specific details about the existing flange that is to be connected to. A custom built flange to mate with the existing system is easily manufactured with the correct details. Joining to FRP without a flange can also be accomplished once specific details are communicated and understood regarding diameters and desired design. These circumstances are best handled by contacting a COR*Guard representative directly to discuss the particulars of each situation. This will assure that the highest degree of compatibility is achieved.



FIELD MODIFICATIONS

One of the major advantages of Prime*Guard™ duct is that it can be modified in the field. This can reduce “change-out” time and reduce cost by not having to purchase additional custom items. Duct that is constructed of 16 gage material or lighter can be field cut and flanged without damaging the coating if done properly with the correct tools. However, this process has several steps which can easily damage the coating if not done properly according to prescribed methods.

Shortening Duct in the Field

- 1. Disassembly:** Remove the section of duct that is to be modified from its installed position. Remove the seal material and properly discard them. Always use new seals when re-installing any duct section.
- 2. Measuring the Modification:** Measure the distance between the existing sections of duct where the modified duct has been removed. Slide the angle ring away from the flange end of the duct that is to be cut, towards the portion of the duct that is to be saved and reinstalled. Add 3/8” to the length of the measured distance. (This 3/8” is to allow for the distance that will be lost when the flange is turned out.) Scribe a line completely around the circumference of the duct that is to be cut at the desired length.
- 3. Cutting the Duct:** Use a center punch to mark a location on the scrap side of the duct that will result in a drilled hole, tangent to the scribed line. This will be the starter hole where you will begin cutting. Drill the hole using a 1/8” drill bit. Then use a step drill to enlarge the pilot hole up to a 3/8” or a 1/2” hole. Enlarge the hole slowly to minimizing the heat produced. If too much heat is generated the coating may be damaged. Using the hole as a starting point, insert a double-cut power shear and cut along the scrap-side of the scribed line. Inaccurate cutting may result in ruining the item.
- 4. Filing the Edges:** Use a hand file to remove all the burrs from the cut edge. Take care to avoid damaging the coating while filing the edge. Remove all filings and debris produced from either the cutting process or the hand file. Be careful not to imbed or scratch the coating when removing the metal filings.
- 5. Flange Tool:** Use only COR*Guard™ supplied rolls to insure the duct is properly formed while maintaining the coating’s integrity. Before using the tool, make sure the rolls are clean and free of damage. Any debris or foreign material on either the rolls or the duct will be imbedded into the coating if not cleaned prior to this step. If the rolls have been damaged in some manner, this also can cause the coating to be scored, cut or otherwise compromised.
- 6. Adjusting the Flange Height:** Adjust the flange tool stop as required so that a 3/8” flange will be produced on the cut end of the duct when finished.



7. Flanging the Duct End: Check before proceeding that both angle rings are properly positioned on the duct. Use standard procedures for turning the flange on the duct. Remember that over-tightening the rolls can pinch the coating and cause damage.

8. Inspect the Coating: After the flange is completely turned out, inspect the duct to ensure the Prime*Guard™ coating was not damaged during the flanging process. Check visually to see if any foreign items were imbedded into the coating by the rolls. Perform a spark test on the duct, thoroughly inspecting the flanged end. (See “Spark Testing” section of this manual for instructions.) Inspect the other end of the duct to insure that it was not damaged during this process. If the duct passes inspection, it is now ready to re-install.

(installation manual continued on following page)



FIELD INSTALLED FLANGE

In order to make a field installation of the flange, a section of the duct must be removed from the system. The flange must be inserted through a hole from the inside of the duct. Therefore the section of duct to be removed may be the item in which the flange is to be installed or the section directly adjoining if the location can then be accessed.

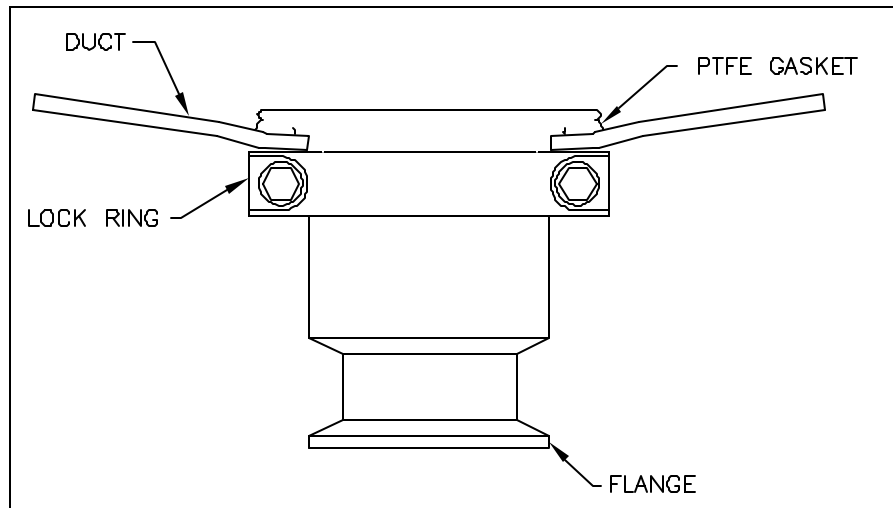


Figure #7: Field Installed Flange

- 1. Punch:** Locate the center of the desired location for the flange. Mark the location using a center punch. Drill a 3/8" pilot hole. Using a hydraulic punch kit, punch the appropriate diameter hole.
- 2. Swage:** Next swage the hole so that the gasket will be allowed to form a proper seal to the duct.
- 3. Install:** Wrap the Gore-Tex® Joint Seal around the flange to determine the length of material needed. Add enough length so that the material can overlap itself once installed and cut it from the roll. Remove the adhesive covering and apply the gasket material to the inside flange of the fitting. Place the fitting into the swaged hole from the inside of the duct so the gasket creates a seal between the flange and the duct. Thread the lock ring onto the fitting until it is hand-tight. Use the correct size wrench on the jam nut and the flats on the test port to tighten the lock ring until the gasket has been compressed and seals against the inside of the duct. The lock ring should be tightened until resistance is encountered to achieve this seal. The fitting is now installed. (Fig #7)



FIELD INSTALLED NIPPLE

To install this fitting the duct section, or the one adjoining it, must be removed from the system.

DESCRIPTION	PUNCH SIZE	MIN. HOST DUCT SIZE
1" NPT Nipple	1-5/16" dia.	6" dia.
1-1/2" NPT Nipple	1-7/8" dia.	8" dia.
2" NPT Nipple	60 mm	10" dia.
Item includes: (1) Nipple, (1) Jam Nut		
MAXIMUM MATERIAL THICKNESS		
Table #8	16 gauge maximum for all Nipple sizes.	

NPT Nipple

The procedure for creating the hole to install the nipple is the same as the flange.

- 1. Punch:** Locate the center of the desired location for the nipple. Mark this location with a center punch. Drill a pilot hole to accommodate insertion of the punch. Punch the desired size hole.
- 2. Swage:** Next swage the hole making sure to use the proper size tool.
- 3. Installing the Nipple:** Measure and cut the proper length of Gore-Tex® Joint Seal to allow for overlap once installed. Apply the gasket to the inside flange of the test port. Insert the test port into the hole from inside the duct. Thread the jam nut onto the nipple and tighten until hand-tight. Tighten jam nut with a wrench while holding nipple on the flats with another wrench. Make sure the gasket is uniform and forms a seal to the duct wall. The installation is now complete. (Fig #9)

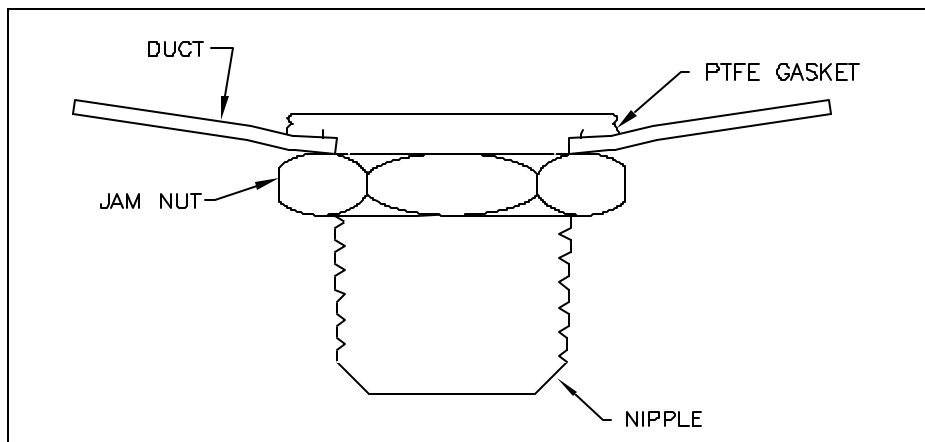


Figure #9: Field Installed Nipple Setup



INSTALLING A TEST PORT

To install the test port, the duct can remain in the system if already installed. The minimum duct size the test port can be installed in is a 6" duct diameter if a 3/4" test port is to be installed. A 3/8" test port can be installed in as small as a 4" diameter pipe.

3/8" Test Port

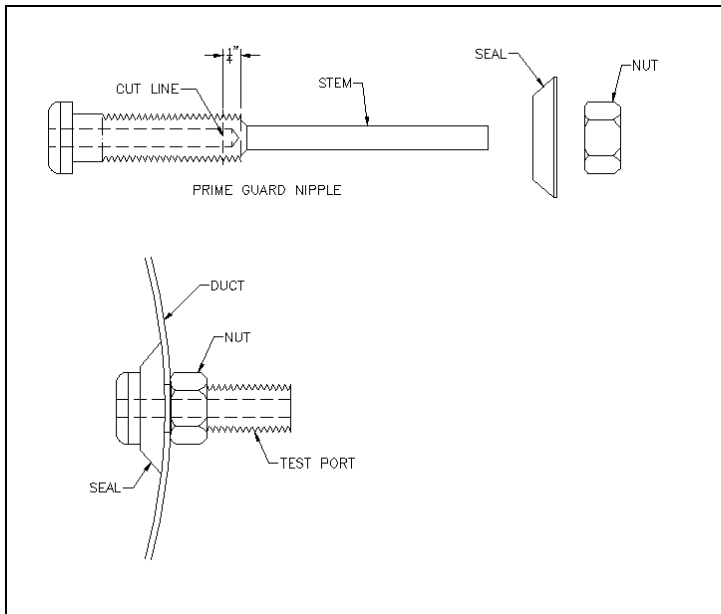


Figure #10: 3/8" Test Port

- 1. Create the Hole:** Locate, center punch, and drill a 1/8" pilot hole in the desired location. Next enlarge the hole to the appropriate diameter through use of a step drill bit. Drill slowly to minimize the amount of heat that is produced. Deburr the edge of the hole and remove any metal or coating fragments.
- 2. Install the Fitting:** Place the seal on the stem of the nipple with the small side of the seal towards the threads of the nipple. Holding the nipple by the stem, put the threaded end into the hole until all the threads are inside the duct. Carefully push the seal through the hole. Once the seal is inside the duct, pull the stem back out of the hole until the threads are exposed. Secure the test port with the nut and torque it to 15 inch pounds. (Fig #10)
- 3. Cutting the Stem:** Measure approximately 1/4" from the end of the threads towards the duct and cut through the stem. This will open the hole in the test port. The test port is now ready to accept fittings with female threads.
- 4. Drilling and Tapping the Test Port:** The original inside diameter for the 3/8" test port is 1/4", but it can be drilled out up to a maximum 3/8" ID, or drilled and tapped to a maximum 7/16" diameter to accept a male fitting if desired. The original inside diameter for the 3/4" test port is 1/2", but it can be drilled out up to a maximum 3/4" ID, or drilled and tapped to a maximum 9/16" diameter to accept a male fitting.



FIELD INSTALLED SADDLE TAP

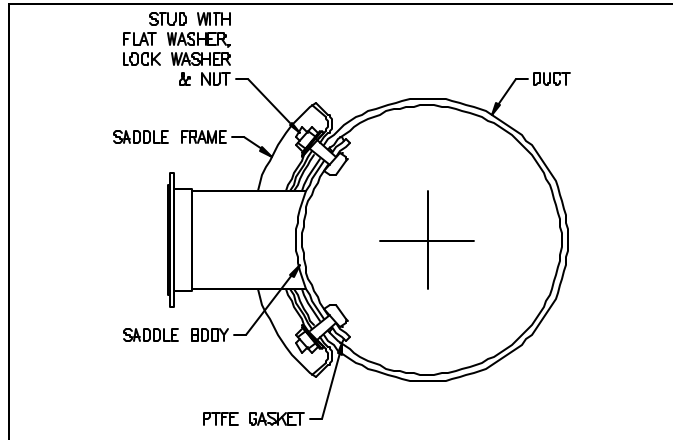


Figure #11: Field Installed Saddle Tap

1. Cutting the Opening: Use the template provided with the saddle tap to trace the outline on the duct where the new opening is to be located. Use a center punch and the template to mark where holes need to be drilled. In addition to bolt holes, holes need to be drilled at each corner of the opening to accommodate cutting with the power shears. Cut along the traced outline to create the opening for the tap. Carefully file the cut edges to remove any burrs and rough edges. Remove any filings or debris from the duct section before proceeding. Be careful not to damage the coating by rubbing the filings into the coating when cleaning is performed.

2. Applying the Gasket: The gasket material needs to be “sandwiched” between the duct sidewall and the interior saddle piece. Measure the distance around the opening where the gasket will be located. Add an additional 2” to the measured distance. Cut this length of gasket from the roll of Gore-Tex® Joint Seal. Contact a COR*Guard representative for the correct diameter of gasket material that is appropriate for the tap being installed. Apply the gasket to the interior saddle piece beginning near one of the middle bolts. Continue around the entire outside and finish by overlapping approximately 1” of the ends of the gasket around this bolt. Refer to Figure #5.

3. Installing the Saddle: Carefully position the interior saddle inside of the new opening taking care not to scratch or damage the coating. Once the interior saddle is in place, slip the exterior frame over the stud bolts. The interior saddle must be kept in place during this process or the gasket may be moved out of place causing the tap to leak and fail. Install in order, a flat washer, lock washer, and a nut onto the studs and tighten “finger-tight”.

4. Torque the Nuts: Use a low-torque air tool or a hand tool to tighten the fasteners. Tighten the bolts in at least three successive sequences until close to the final torque. Alternate the fastener that is being tightened in an opposing pattern. Tighten the fasteners near the center first. Tighten the corner fasteners last to avoid deforming the tap and not forming the proper seal. Do not tighten one stud all the way before moving to the next fastener. Use a calibrated torque wrench, set to the proper torque, to tighten the nuts. See Table #6 for specifications regarding torque values.



SPARK TEST PROCEDURE

Spark Detector

COR*Guard™ recommends the D.E. Stearns 14/20 Voltage Regulated Holiday Detector. It is a portable, all-purpose electrical inspection instrument for identifying non-complying coated surfaces. The detector needs to be set for the proper voltage based upon each coating thickness being tested. Refer to the operating instructions provided with the detector for setting the voltage.

1. Preparing to Test: Make sure the Prime*Guard™ product is clean both externally and internally. Remove any dust or debris from the surface using a soft, lint-free cloth. The cloth may be dampened with water or Isopropyl Alcohol before wiping the surface.

2. Setting the Detector: Determine what the specified thickness of the coating was to be. Set the detector to the proper voltage based on the manufacturer's instructions. Make sure the ground strap is in contact with only the base metal of the duct to be tested. Verify the functionality of the detector by rubbing the electrode brush against the exposed metal duct. If sparks are visible, and you hear an audible tone, the detector is properly functioning. A weak battery will provide inaccurate readings.

Caution: Make sure you do not create a ground path with your body. Though the amperage of the detector is not dangerous, it will generate an uncomfortable shock.

3. Testing the Coating: Rub the brush slowly over the entire coated surface, paying attention to flanges, welds, seams, and geometric changes in the duct. Watch closely for sparks, and listen for the audible tone that indicates a deficient area.

4. Recording the Results: Record the results of the inspection and/or tag the item. If there is no detection of deficiencies in the coating, the piece has "passed," and can be "tagged" as ready for installation. If a deficiency in the coating is detected, the piece has "failed". Mark the location of the deficient area so that it can easily be identified again and segregate the item for either repair or replacement.

5. Processing the "Failed" Part: The "failed" piece should be visually inspected to determine if a field repair is applicable. If the deficient area is larger than 3/4" in diameter the duct should not be field repaired. The duct should be "rejected" altogether. It should immediately be "tagged" to identify it as such, and segregated so that it is not installed in the system. Contact a COR*Guard representative immediately to order a replacement part. If the deficient area is smaller than 3/4" in diameter the piece can be field repaired.



COATING REPAIR

Pinholes, scratches and scuffs up to 3/4" in diameter in the Dyneon fluoropolymer coating can be repaired in the field by following proper methods. You may also contact COR*Guard™ for more information about field repairs.

Precautions

Perform the repairs in a ventilated and well lit area. If you are required to work in a confined area, follow appropriate precautions for working in confined spaces. Respirators designed to filter vapors (e.g. charcoal filters) are strongly recommended and safety glasses are required.

Preparing the Repair Area

Clean the damaged or deficient area with a clean lint-free cloth that has been dampened with alcohol. If the damaged area has been roughed and/or has foreign debris embedded in the coating, sand may be needed. If sanding is required, use #220 grit Aluminum Oxide Sandpaper. Do not expand the damaged area with the sandpaper. Use the sandpaper to smooth the roughened coating and remove any imbedded material. Make sure the repair area is free of all foreign particles before proceeding. After sanding, wipe the coated surface of the duct to remove all sanded material and other debris.

Sizing the Patch

Cut a "patch" from the sheet of Prime*Guard™ repair material using scissors. The patch needs to cover the damaged area of the duct, plus overlap 3/8" onto the surrounding "good" coating. This overlap needs to occur around the entire perimeter of the damaged area.

Applying the Patch

1. Heating the Area: Use an electric heat gun capable of attaining 550 degrees Fahrenheit to slowly preheat the area. The duct should be heated from the bare metal side of the duct directly opposite the repair area. The coating needs to be heated to approximately 550 degrees Fahrenheit, but overheating can damage and ruin the coating. Be extremely careful not to "burn" the coating since dangerous fumes can be produced, besides ruining the coating. Respirators should be worn to protect against this occurrence. If the coating begins to discolor or bubble it has been overheated, and the process should be stopped. Once the coating begins to attain the proper temperature its appearance will change slightly by loosing some of its glossiness. Do not allow the repair area to cool during this process.

2. Place the Patch: While continuing to apply heat so that the coating remains glazed and soft, place the patch material over the area to be repaired. The patch material must overlap onto "good" coating around the entire repair area. Since the coating is "tacky", the patch must be placed in the proper location at first contact. Use of needle-nose pliers or tweezers may assist in positioning the patch material. Begin to apply heat to the patch material directly and gently press the patch into the heated, soft coating using a rounded, blunt object.



3. Flowing the Repair Patch: Use the electric heat gun to continue heating the patch material from both sides of the duct as needed, until a consistent flow is achieved between the coating and the patch material.

Spark Test Inspection

Once the repaired area has cooled, inspect the area visually. Look for coating material that appears to not have been melted or coating that is discolored or bubbled. If it appears visually to be acceptable, perform a “spark” test. (Refer to the **Spark Testing Procedure** in this guide for specifics.) If the patch passes both the visual test and the spark test, the duct should be approved for installation.

Technical Assistance

If you need technical assistance with this process, contact a COR*Guard™ representative at (208) 429-8896.