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Viron® International Corporation

SSTeelcoat® Installation Guide



*Viron® International's Duct System
"Product of Choice" for Highly
Corrosive Environments.*

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SSTeelcoat® Installation Guide

*Viron® International's Duct System
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I. Specifications and Precautions

The intent of this guide is to provide the information necessary for effective and correct installation of Viron® manufactured SSteelcoat®. This manual will cover installer necessary information pertaining to duct connections and proper duct handling. Viron®'s SSteelcoat® duct is Factory Mutual System Approved for fume and smoke evacuation without the use of sprinkler heads in the duct system.

The manufacture of SSteelcoat® is an accurate and carefully undertaken process. Viron®'s SSteelcoat® systems are constructed of 300 Series stainless steel coated with Halar®, a corrosion resistant coating. Duct interconnections are Van Stone style flanges, which are separated and sealed by PTFE® encapsulated gaskets. The SSteelcoat® Halar® coating is manufactured in accordance with restrictive tolerances that allow for accurate thickness and evenly distributed application.

As manufacturing is an extreme process, extreme care must be taken in the handling and installation of SSteelcoat® ductwork. It is Viron®'s responsibility to produce SSteelcoat® material, which is acceptable to the customer. SSteelcoat® is deemed acceptable if the Halar® coating is not penetrated to allow the stainless steel to become visible or if the duct passes a spark test. The coating may be scuffed during transportation or installation and still be considered acceptable. Unacceptable or damaged pieces can sometimes be repaired in the field (Please contact Viron® International for repair kits and instructions). Damaged pieces beyond field repair must be either factory repaired or replaced

Viron®'s responsibility for damages to, loss of or delay of duct shipments ends upon acceptance of shipment by the party responsible for shipping. Any claims for the above mentioned must be filed with the freight line by the consignee. The consignee must inspect the shipment upon delivery and note any and all damages or discrepancies. The consignee then has ten days after receipt to notify the freight line of damage. The consignee then has six months to file claim.

II. Installation

All SSteelcoat® shall be hung in accordance with SMACNA regulations. Hanger strap or rod hanger will be the method used. Ductwork shall be hung such to provide a continuous incline terminating at the effluent gas source. Depending on the diameter of the ducting, reinforcing rings may be required. These requirements are to be referenced to the SMACNA “Industrial Duct Construction Standards.”

Installation of Viron®’s SSteelcoat® is to be inspected for coating deficiencies. At no time is the Halar® coating to be punctured or penetrated. SSteelcoat® may be cut to length in the field (Please consult Viron® International for instructions).

SSteelcoat® is manufactured as a flanged system using Van Stone style flanges. Viron® uses Gore-Tex® joint sealant and complies with the following installation procedures suggested by the manufacturer:

1. Clean the flange on the duct with a soft cloth.
2. Place the joint sealant toward the outside of the flange.
3. Firmly press the joint sealant in place as you go. *Note: The placement of the joint sealant is important because it makes a very thin gasket, which spreads wider as the bolts are torqued.*
4. Complete the seal by crossing the ends at a bolt hole. Cross one end over the other about one (1) inch and cut.
5. Make a final pass around the flange firmly pressing the joint sealant as you go.
6. Assemble the flanged joint and torque the bolts. Run all nuts finger tight. Develop the required bolt stress in a minimum of three equal steps following the suggested pictured bolt stress.

As the SSteelcoat® system is repaired and/or added to; duct replacement requires new gasket material.

All SSteelcoat® is shipped with wood covered ends to maintain the integrity of the coated surface. Special considerations should be made for duct storage as to provide a safe, debris free limited traffic atmosphere with ample under-support.

SSteelcoat®

“Product of Choice “for Highly Corrosive Environments.

End of Section



VIRON® INTERNATIONAL CORPORATION

THE FOLLOWING ARE STANDARDS FOR VIRON® INTERNATIONAL'S SSTEELCOAT DUCTWORK.

STRAIGHT

1. SSteelcoat ductwork with a gauge thickness of 22ga through 14ga will have field connections utilizing a VanStone type flange/304 stainless steel angle ring.
2. All straight stainless steel duct lengths utilizing 22ga through 14ga will be 47" ± .125 in overall length.
3. Stitch welding to the VanStone flange is required on all straight stainless steel duct lengths over 30"Ø.
4. All straight stainless steel duct lengths utilizing 12ga through 10ga will not have a VanStone connection. These pieces will be furnished as continuous welded for rigid mount. The overall lengths will be 49" or 97" in length.
5. SSteelcoat ductwork is constructed of 300 Series stainless steel material.
6. Angle rings are constructed of 304 stainless steel material and sandblasted.
7. SSteelcoat ductwork fittings are to be Tig weld only.
8. Fusion welds on all longitudinal seams.

TECHNICAL ASSISTANCE

Please contact Viron® International Corporation with any questions or comments.

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SSTEELCOAT® FABRICATION INSTRUCTIONS (STANDARDS GUIDE)



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THE FOLLOWING ARE STANDARDS FOR VIRON® INTERNATIONAL'S SSTEELCOAT DUCTWORK.

ELBOWS

1. SSteelcoat ductwork with a gauge thickness of 22ga through 14ga will have field connections utilizing a VanStone type flange.
2. Standard centerline radius is 1.5 times the diameter. Custom centerlines are available upon request. Please consult with Viron International.
3. Standard number of gores are as follows:
 - 90° Elbow 5 gore
 - 60° Elbow 4 gore
 - 45° Elbow 3 gore
 - 30° Elbow 2 gore
4. All elbow end gores must be long enough to house an angle ring plus 1" minimum to allow enough room for the elbow gores to be welded together. This is accomplished by adding throat extensions.
5. Standard elbows utilizing 12ga and 10ga stainless steel material will require the angle ring to be continuously welded without a VanStone flange.
6. All 90° elbows larger than 54" diameter will be supplied as two (2) 45° elbows and are to be field assembled to complete a 90° elbow.
7. Angle rings are constructed of 304 stainless steel material and sandblasted.

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THE FOLLOWING ARE STANDARDS FOR VIRON® INTERNATIONAL'S SSTEELCOAT DUCTWORK.

TEES

1. SSteelcoat tees with a gauge thickness of 22ga through 14ga will be supplied on 47" and 97" straight lengths of SSteelcoat duct when possible.
2. Tees can be supplied as a straight, conical, or a 45°/30° branch.
3. The minimum length of a straight tap is 6".
4. The minimum length of a conical tap is 7".
5. The minimum length of the short side of the 45°/30° branch is 6".
6. Viron requires a 4" minimum between the tap and the end of the VanStone flange on the straight duct in order to weld the tap onto the straight duct piece.
7. Viron can supply tees as the following:
 1. Single Tap.
 2. Double Taps.
 3. Triple Taps.
 4. Quadrupal Taps.
 5. 90° Boot Taps.
 6. 90° Reducing Tees.
 7. 45° Double Tees.

Note: As long as the tees can fit on the host duct.

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THE FOLLOWING ARE STANDARDS FOR VIRON® INTERNATIONAL'S SSTEELCOAT DUCTWORK.

REDUCERS

1. SSteelcoat ductwork with a gauge thickness of 22ga through 14ga will have field connections utilizing a VanStone type flange.

2. Standard length of concentric reducers are as follows:

D1	-	D2	=	Length
8"	& Under	=		12"L
10"	to 14"	=		14"L
16"	to 18"	=		24"L
20"	to 24"	=		30"L

3. All reducers must be long enough to house an angle ring plus 1" minimum to allow enough room for the reducer to be welded together. Viron requires a 3" minimum length of straight duct to be welded to each end of the reducer.

4. Viron can supply concentric and eccentric reducers.

5. Viron can manufacture any custom length and diameter required.

6. Standard length of eccentric reducers are as follows:

D1	-	D2	=	Length
6"	& Under	=		12"L
8"	to 10"	=		18"L
12"	to 14"	=		24"L
16"	to 24"	=		30"L

7. Angle rings are constructed of 304 stainless steel material and sandblasted.

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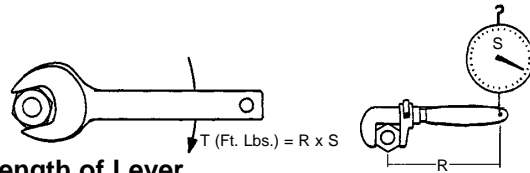
THE FOLLOWING IS THE APPROVED TORQUING REQUIREMENTS NECESSARY FOR THE JOINING OF VIRON® INTERNATIONAL'S VAN STONE FLANGE DUCT AND FITTINGS.

WHAT IS TORQUE?

Torque is a twisting force. Torque is applied to your watch stem when you wind your watch. You apply torque to unscrew the top of a mason jar. Torque causes rotation of a shaft, or it will set up a twist in a stationary shaft. It is generally expressed in foot pounds or inches pounds.

HOW TORQUE IS DETERMINED?

If a shaft connected to a 2 ft. lever or arm requires 2 lbs. of force to cause it to rotate, the torque would be 4 ft. lbs.



The formula for torque is: **T = R x S**
where **R = Radius or Length of Lever**
S = Pounds Pull of Scale

Properly fastened threaded products achieve their holding power from the tension (or torque) that is derived from the mating of the external and internal threads subject to the elastic limit of the material.

What torque to apply is a generally asked question, but the answer depends on the variables of material, threads' class of fit, methods of thread manufacture, and thread lubrication – if any.

The table below is offered as the suggested maximum torquing values for threaded products made from the metals as listed. The table is only a guide. Actual tests were conducted on dry, or near dry, products. All values shown on the chart represent a safe working torque.

Bolt Size	SAE Grade 2 Plated Finish	SAE Grade 5 Plated Finish	Stainless Steel
1/4" - 20	4 ft-lbs	10 ft-lbs	6 ft-lbs
5/16" - 18	8 ft-lbs	22 ft-lbs	11 ft-lbs
3/8" - 16	15 ft-lbs	36 ft-lbs	19 ft-lbs
7/16" - 14	24 ft-lbs	60 ft-lbs	31 ft-lbs
1/2" - 13	36 ft-lbs	75 ft-lbs	43 ft-lbs

Caution: All torque values included in these charts are advisory only, and their use by anyone is entirely voluntary. Reliance on the contents for any purpose by anyone is the sole risk of that person and Viron® International is not responsible for any loss, claim or damages arising there from. In developing this information, Viron® International has made a determined effort to present its contents accurately. Extreme caution should always be used when using a formula for torque-tension relationships. Torque is only an indirect indication of tension.

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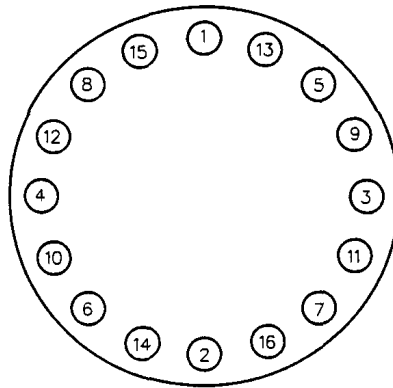
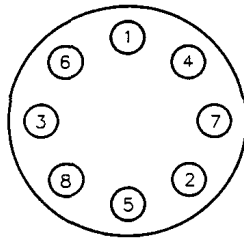
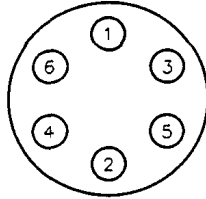




VIRON® INTERNATIONAL CORPORATION

STEELCOAT® INSTALLATION INSTRUCTIONS (TORQUE PATTERN)

THE FOLLOWING IS THE SUGGESTED TORQUE SEQUENCE METHOD FOR THE JOINING OF VIRON® INTERNATIONAL'S VAN STONE FLANGE DUCT AND FITTINGS.



Viron International recommends the following bolt torque sequence to be acceptable:

1. Assemble the flanged joint and introduce the hardware to the system.
2. Run all nuts finger tight.
3. Develop the required bolt stress in a minimum of three equal steps following the suggested bolt patterns as pictured above.

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SSTEELCOAT® DUCTWORK FABRICATION STANDARDS

The Viron® International SSteelcoat® Ductwork Fabrication Standard Manual is designed to assist our customers in becoming acquainted with Viron's fabrication practices. The manual is in strict accordance with the practices in the latest S.M.A.C.N.A. manuals.

GENERAL

Codes and Standards

a. **Ducts** shall be listed for use without the necessity for internal fire protection sprinklers or any devices relied on to cut off airflow in the event of fire by the following:

Factory Mutual Research Approval - Standard 4922

Limitations and Requirements:

1. All SSteelcoat® ducts shall be furnished with an interior Halar® ECTFE thermoplastic resin coating consisting of a prime coat 2 to 3 mil (0.05-0.07 mm) thick and a top coat 7 to 8 mil (0.18-0.20 mm) thick. The total interior coating thickness shall not exceed an average of 12 mil (0.30mm).
2. This duct may be used for smoke removal in special purpose areas when properly designed and sized. Sprinklers are not required.
3. The product shall be manufactured with identical resins as tested, and according to the formulation on file with Factory Mutual Research, and shall meet all physical requirements of S.M.A.C.N.A. manual for Industrial Duct Construction Standards.
4. Vertical height of individual risers within the duct system are not restricted, however, they shall not penetrate other fire areas.
(approval as of 04/09/01)
5. The manufacturer shall determine the suitability of the duct system for specific corrosive environments.
6. If the process served by this duct system produces flammable residue or a combustible fume source exceeding 1 ft² (0.09 m²) in areas per inlet which can build up inside the duct, then internal sprinklers will be required.
7. The ASTM E-84 Standard Test Method for Surface Burning Characteristics. Tested in flat sheet form at a 20 ga. (0.95 mm) Thickness: Flame Spread 10. Smoke Density 35.

DUCTWORK

- a. **Base Metal** shall be a 316L Stainless Steel. Longitudinal seams shall be fusion welded. Traverse seams shall be continuous weld. All seams shall be smooth on the interior of duct.
- b. **Coating** shall be a Halar® ECTFE fluoropolymer resin and shall be applied per Factory Mutual Research Corporation's limitations and requirements.
- c. **Duct Assembly** shall be accomplished utilizing 304 stainless steel sandblasted angle ring/VanStone flange connections:
 1. 304 stainless steel sandblasted angle rings are available in sizes 4" thru 120". The minimum number of holes for angle ring connections is one hole for each 6" of duct circumference to the next higher number.
- d. **Gasket Technology:**
 1. Companion flange gasket material shall be a form in place, fully expanded 100% PTFE joint sealant.
- e. **Delivery, Storage, and Handling:**
 1. **Protection:** Protection is factory applied to ends of ductwork to prevent end damage and prevent dirt and moisture from entering ducts and fittings.
 2. **Delivery:** Consignee must inspect shipment upon delivery and note any and all damages and discrepancies on Bill of Lading and notify manufacturer within 24 hours.
 3. **Storage:** Coated ductwork should not be stored in an area where it will have a chance to be damaged from traffic or debris. All coated ductwork should be stored on cardboard, Styrofoam or similar materials. Where possible, store inside and protect from dirt and debris. Where necessary to store outside, store above ground and enclose with waterproof wrapping to protect from dirt and debris.
 4. **Handling:** If coating is scratched use appropriate protocol to "spark test" and if spark is detected, contact manufacturer for repair instruction.
- f. **Testing** shall be performed over the entire coated surface and edges. The testing shall be performed with a DC spark tester with minimum voltage settings per ASTM-D5162-00 or per specification, whichever is greater.

SSTEELCOAT® FIELD TAP INSTALLATION PROCEDURE

THE FOLLOWING IS A LIST OF PROTOCOL FOR THE INSTALLATION OF VIRON® INTERNATIONAL CORPORATION'S SSTEELCOAT® FIELD TAP FITTING.

OBSERVE CURRENT SITUATION

In situations when it is necessary to add a field tap in an existing system, Viron® International Corporation has developed the SSteelcoat® Field Tap. The Field Tap is available up to 24" diameter and can be installed readily easy. This is a convenient method when shutting down the exhaust system is not a requirement. If there are questions, please consult with qualified Viron® International personnel for further instructions. Viron® International Corporation – Phone: 989-723-8255 / Fax: 989-723-8417.

NECESSARY MATERIALS & EQUIPMENT

- » One (1) Flexible Metal Ruler and Tape Measure *
- » One (1) Metal Pilot Punch *
- » One (1) Electric Drill with Drill Bit set with step drill to 1/2" (13mm) minimum diameter *
- » One (1) Hard Rubber or Leather mallet *
- » One (1) Electric Hand Held Shear *
- » One (1) Hack Saw with Blade (40 teeth per inch) *
- » One (1) Half Round and Flat File (fine) *
- » One (1) Field Tap with Template (available from Viron International Corp.)
- » One (1) pair of Safety Glasses *
- » One (1) pair of heavy sheet metal Gloves *
- » One (1) pair of Scissors or Utility Knife *
- » One (1) Torque Wrench (0-90 ft-lbs) *
- » One (1) Socket Set *
- » One (1) large Adjustable Wrench *
- » One (1) pack of Alcohol Pads *
- » One (1) Lint Free Cloth for cleaning *

SAFETY FIRST

All necessary safety protocol must be observed when making repairs to the SSteelcoat® product. Proper ventilation is necessary when the repair takes place. A respirator is required if proper ventilation is not available. Proper outer clothing protection will be required if the application is taking place on a live system. The work area must be well lit and safety glasses must be worn at all times.

INSTALLATION PROCEDURE

PREPARING THE HOST DUCT. A center point must be established by finding the horizontal and vertical points of connection on the host duct. Once this is established, horizontal and vertical lines must be scribed into the host duct. Place the template onto the host duct and match the center points with the location guidelines as shown on the template. Scribe the host duct using the template as your straight edge. The template also shows the drill locations in four positions. Indicate the drill locations by placing the Metal Pilot Punch over the cross hairs and tap with a hammer. Remove the template.

STEP #1 – Place drill bit onto pilot punch indents and proceed with drilling the four holes. Place the nibbler to the first hole and proceed to nibble from one hole to the other, following the scribed lines. Remove the unwanted host duct and properly dispose of the material. If the installation is taking place on a live system, a blank off plate will be necessary to temporarily cover the opening of the host duct.

STEP #2 – Apply the GOR-TEX® Joint Sealant to the outer edge of the field tap as illustrated on the detail. Please be sure the joint sealant overlaps each end to guarantee an air tight seal stopping any bare metal from being introduced to the corrosive air stream.

STEP #3 – Slide the field tap into the opening, using complete caution not to disturb the joint sealant. Finger tighten the nuts, starting with the slotted holes in order to temporarily position the field tap. Once this is established, lightly tighten the nuts located at the slotted holes. At this time, any adjustment to the position of the field tap to the host duct must be made. Lightly tighten the top and bottom center nuts. Proceed down the line in a criss-cross pattern.

STEP #4 – With the 3/8" socket wrench, begin to tighten the nuts in the same order as before. This may be repeated until the desired torque is reached. At this point the installation should be complete and all raw edges should be sealed from the corrosives in the air stream.

TECHNICAL ASSISTANCE

Please contact Viron® International Corporation with any questions or comments.

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SSTEELCOAT® FIELD REPAIR INSTRUCTIONS – Halar® Sheet Material

THE FOLLOWING IS A LIST OF PROTOCOL FOR REPAIRING VIRON® INTERNATIONAL CORPORATION'S SSTEELCOAT® DUCT PRODUCT.

OBSERVE CURRENT SITUATION

In situations where, scratches or abrasions may occur in the field with the ECTFE Halar® coating. This can easily be repaired in certain situations. This is a simple task of first observing the size of the damaged area. A scratch or abrasion no larger than 3/4" diameter can be field repaired. If there are questions regarding the repair, please consult with qualified Viron® International personnel for further instruction. Viron® International Corporation – Phone: 989-723-8255 / Fax: 989-723-8417.

NECESSARY MATERIALS & EQUIPMENT

- » One (1) Electric Heat Gun *
- » One (1) pair of Scissors *
- » One (1) pair of Tweezers *
- » One (1) Pin Punch *
- » One (1) pair of Safety Glasses *
- » Four (4) 4"x4" pieces of lint free cloth *
- » One (1) pack of Alcohol Pads *
- » One (1) piece of #220 grit Aluminum Oxide Sandpaper *
- » One (1) sheet of ECTFE Halar® coating (available from Viron® International Corp.)

SAFETY FIRST

All necessary safety protocol must be observed when making repairs to the SSteelcoat® product. Proper ventilation is necessary when the repair takes place. A respirator is required if proper ventilation is not available. The work area must be well lit and safety glasses must be worn at all times.

REPAIR PROCEDURE

PREPARING THE SURFACE. The abrasion or scratched area must be lightly sanded using the #220 grit Aluminum Oxide Sandpaper to insure a properly prepared area and to remove any foreign material. Once this is complete, wipe the damaged area with an alcohol pad, wipe again with a dry cloth, and then repeat with a new alcohol pad to insure a clean surface. Do not use the same alcohol pad twice.

CUTTING THE PATCH. The Halar® patch must be cut oversized with a minimum 1/4" overlap to insure the damaged area is completely covered. The patch must not have any sharp corners. All corners are to be rounded.

TO PROCEED WITH THE REPAIR

STEP #1 – With the electric heat gun, the prepared area must be heated until a shiny surface effect occurs. Observe to make sure the area becomes smooth. Gently keep the electric heat gun moving back and forth to avoid overheating one area too long, which burning may occur.

STEP #2 – Using the tweezers, center the precut patch over the prepared area and lower to the surface of the duct. The pin punch must be used to carefully immerse the patch into the softened Halar® coating to create a bond between the existing duct coating and the patch. Please observe to see that no area of damage is exposed at this time.

STEP #3 – Using the electric heat gun, gently move back and forth over the patch and on the outer perimeter. This will allow the bonding process to continue. Once puddling occurs at the outer edges of the patch, the bonding process is finished.

TESTING THE PATCH

To insure there is a pinhole-free environment, spark testing is recommended. This method will require a Elco 236 Tester. Please consult Viron® International Corporation for complete spark testing procedures and recommendations.

TECHNICAL ASSISTANCE

Please contact Viron® International Corporation with any questions or comments. MSDS sheets are readily made available.

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