



## INSTALLATION INSTRUCTIONS FOR VENTINOX® CHIMNEY LINERS

**VENTINOX®** Chimney Liners are manufactured by American BOA, Inc. and are intended to service residential Category I heating appliances burning wood, wood pellets, natural gas, propane gas (LP) or oil fuel, including naturally drafted appliances with draft hoods, fan assisted naturally drafted appliances and other appliances listed for use with Type B gas vents. **VENTINOX®** liners should not be used to vent unlisted gas or oil appliances, unlisted wood or coal burning appliances, Category II, III and IV Gas appliances or gas appliances listed for use only with Type BW vent. **VENTINOX® liners must be installed by an experienced professional, familiar with the operation and maintenance of heating appliances and chimneys.**

American BOA, Inc. manufactures **VENTINOX® HiFlex (VFL)**, which is UL listed for venting wood, wood pellet, gas and oil fired heaters, **VENTINOX®VFT**, which is listed for venting wood, wood pellets, non-condensing gas and oil fired heaters and, **VENTINOX®VG**, which is listed for venting gas and oil fired heaters.

Every venting system must be properly planned and installed for optimum performance and safety. Refer to the appliance manufacturer's instructions to determine venting requirements and limitations with respect to installation and use of the appliance. **It is the responsibility of the installer to contact local building and fire officials concerning any installation restrictions and/or inspection requirements that may apply.** Permits may be required before commencement of the installation. This product must be installed in accordance with local building code requirements.

**VENTINOX®** liners are made from 321ss (VFL), 316Ti ss (VFT), or AL29-4C (VG) These three types of stainless steel have proven to be resistant to corrosion. It is common, however, for indoor air to contain chlorides given off from carpeting, paints, paint thinners and laundry detergents. When combustion air for the gas appliance is drawn directly from the house, these contaminants can combine with flue gas condensates to form aggressive chemicals, such as hydrochloric acid that can attack and degrade connector pipes and chimney liners. Since it is difficult to determine if contaminants are present, the venting system should be designed to minimize the potential for condensation (i.e. insulate the liner and use B vent type double wall connectors) and to supply outside combustion air directly to the appliance. Refer to the appliance manufactures instructions and local codes for methods of providing outside air.



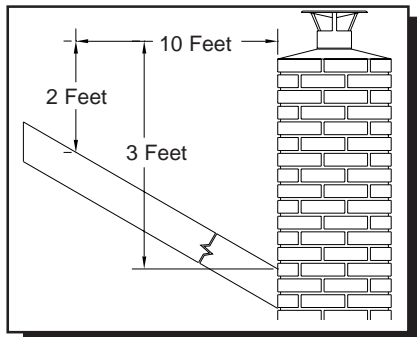
**READ THESE INSTRUCTIONS  
BEFORE INSTALLING A  
VENTINOX® CHIMNEY  
LINING SYSTEM.**



## INSPECTING AND PREPARING THE CHIMNEY

Inspect the masonry chimney for proper construction and compliance with applicable building codes. The chimney must meet the following minimum requirements before lining or relining it with **VENTINOX®**:

- The masonry chimney must have a wall thickness of at least 3.5 inches (4 in. nominal), a minimum height of 10 feet and maximum height of 100 feet.



- In wood burning applications the chimney must extend at least 3 feet above the highest point where it passes through the roof and at least 2 feet higher than any portion of the building within 10 feet.
- Only one solid fuel heater may be connected into a flue and may not be combined to vent gas or oil burning appliances
- If the flue's capacity is sufficient multiple gas and/or oil burning appliances may be vented into one flue. Gas appliances must connect into the flue ABOVE any oil fired heater.
- Oil fired appliances require a base Tee.
- Connector pipes between a heater and chimney must be installed with proper clearance to combustibles as specified by the appliance manufacturer and by any applicable building codes and standards. In the US, refer to the National Fire Protection Association's NFPA 211. In Canada, refer to CSA B365M91 Installation Code for Solid Fuel Burning Appliances and Equipment.

The chimney must be thoroughly cleaned before a liner is installed. Examine the chimney for obstructions, soot or tar, glazed creosote, cracked, loose or missing bricks and eroded mortar joints. Any defects or potential safety problems must be repaired prior to relining the chimney or must be rectified by the installation of a **VENTINOX®** system.

## FACTORY-BUILT CHIMNEYS

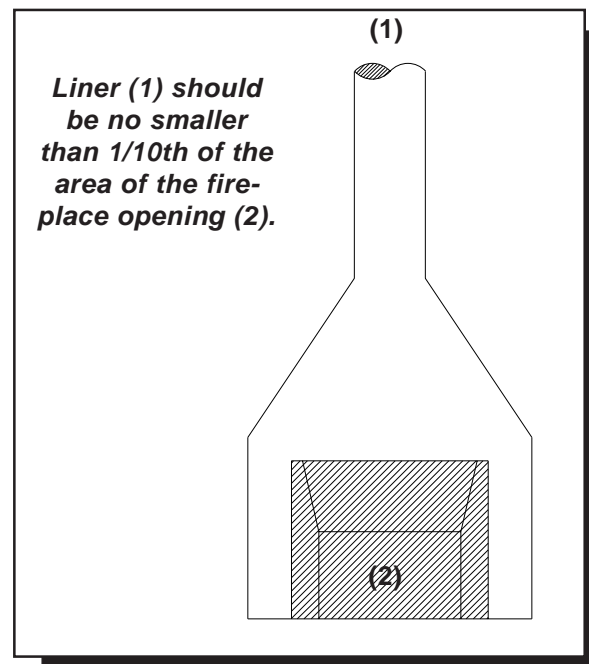
Before installing **VENTINOX®** into a factory-built chimney, the chimney must be thoroughly cleaned and checked for structural defects. All parts of the chimney system, such as supports, radiation shields, and fire stops specified by the chimney manufacturer must be installed correctly and, in addition, there must be proper clearances between the chimney and surrounding combustible materials, as specified by the chimneys installation instructions.

## DETERMINING THE REQUIRED LINER SIZE

To determine the correct diameter of a liner, refer to the appliance manufacturer's installation instructions, or to local building codes: model code NFPA 211(wood), model code NFPA 54(gas), model code NFPA 31(oil), the GAMA Venting Tables For Category I Central Furnaces (gas) or in Canada, the Installation Code for Natural Gas and Propane Burning Appliances and Equipment, CAN1-B149.1 and .2 and Installation Code for Oil burning equipment, CSA B139.

**It is very important that high efficiency appliances with low flue gas temperatures have correctly sized flue liners.**

**Condensation within the flue system and improper venting/appliance performance can result, if flue liners are sized incorrectly.**



## FITTING VENTINOX® INTO A MASONRY CHIMNEY

**Note:** VENTINOX® liners are tested and listed as alternative lining materials to standard clay tiles. VENTINOX® can be installed into existing clay tiles, or clay tiles may be removed and replaced with VENTINOX® liners.

VENTINOX® liners venting gas or oil appliances do not require a minimum clearance or insulation between the outside of the liner and inside of the masonry shell\*. Leave enough clearance for the liner to slide into place without difficulty. If round VENTINOX® liners do not fit a chimney's inside dimensions, they may be ovalized to allow proper fit. When ovalizing VENTINOX®, its cross sectional area decreases. Refer to ProTech Technical Bulletin #1009 for details or contact your VENTINOX® supplier for assistance.

**\*Please note: While insulation is not required for every installation (refer to UL1777 or appropriate listings or standards), the performance of the entire heating system is greatly enhanced when installing insulating materials. The venting system acts and reacts in step with the heating unit's operation. Insulation helps improve draft, minimize condensation and flue surfaces warm up quickly to achieve a heater's rated efficiency. Insulation is particularly important for exterior chimneys. Read the sections outlining insulating procedures before beginning the installation.**

**VENTINOX® liners venting solid fuel heaters must be installed with a minimum of one inch of TherMix® or with a double layer of ProFoil or Flexwrap insulating blanket between the outside of the liner and the inside of the masonry shell to meet the requirements of UL1777 at zero clearance to combustibles.**

## TOOLS AND SUPPLIES

The following tools and supplies may be required when installing VENTINOX® Chimney Liners:

Hammer	Key Hole Saw(s)
Screwdriver w/Hex head	Reversible Electric Drill
Cold Chisel	Mortar Mixing Trough
Tin Snips	Silicone Caulk
Trowel	Refractory Mortar
Measuring Tape	Ladder
Eye Protection	Pliers
Work Gloves	Rope
Dust Respirator	Hack Saw
Masonry Drill Bit(s)	Ovalizing Machine

VENTINOX® Liners are available in 3, 4, 5, 5.5, 6, 7, 8, 9, 10, 11, and 12 inch diameters. VENTINOX® liners can also be ovalized to assume many different cross sectional shapes and areas.

VENTINOX® Components are made from 321ss, 316ss or AL29-4C stainless steel. When ordering, match liner and component materials.

VENTINOX® Components are fastened to VENTINOX® liners by tightening the built-in draw band. Pre-drilling liners or the use of pop rivets is not necessary.



VTE	- Tee
VIC	- Installation Cone
VTC	- Tee Cap
VSL	- Sleeve
VTO	- Universal Take-off
VRC	- Rain Cap
VEL45	- Elbow, 45 degree
VBP	- Base Plate
VEL90	- Elbow, 90 degree
VCP	- Coupler
VTK	- Top Kit

Liner and component arrangements depend on the size and configuration of the chimney structure and the type, number and location of the appliances that are to be vented into the chimney. For assistance, review the manufacturer's instructions for appropriate codes and standards, or contact your VENTINOX® supplier or ProTech Systems, Inc.

**NOTE:** The safe operation of a venting system depends on the proper installation and use of all materials and parts supplied by the manufacturer and proper use and operation of the connected heating equipment.

**IN ORDER TO MEET THE TERMS OF THE LISTING AND AMERICAN BOA'S/PROTECH SYSTEMS' WARRANTY REQUIREMENTS, THESE INSTALLATION INSTRUCTIONS MUST BE FOLLOWED.**

## PREPARING THE THIMBLE AREA

A VENTINOX® Tee with Tee Cap is the most common way to terminate a lining system at the bottom. Elbows or Universal Take-offs may be used as well. If necessary, enlarge the thimble area(s) to accommodate the fittings. Make sure that proper clearances between connector pipes, heating appliances and combustibles are maintained after the liner and heating appliances are installed. If penetrating a combustible wall, be sure to install an **approved wall penetration device**.

## DETERMINING THE REQUIRED LINER LENGTH

Measure the distance from the thimble to the top of the chimney. Add 6 inches to allow for the installation of the chimney crown and Rain Cap. Subtract the length of the bottom Tee and any other system components. In a chimney with offsets, add one foot for each offset. Mark the liner, then cut with a hacksaw or reciprocating saw with a metal cutting blade.

**EDGES OF THE LINERS ARE SHARP!  
WEAR GLOVES AND  
USE EYE PROTECTION.**

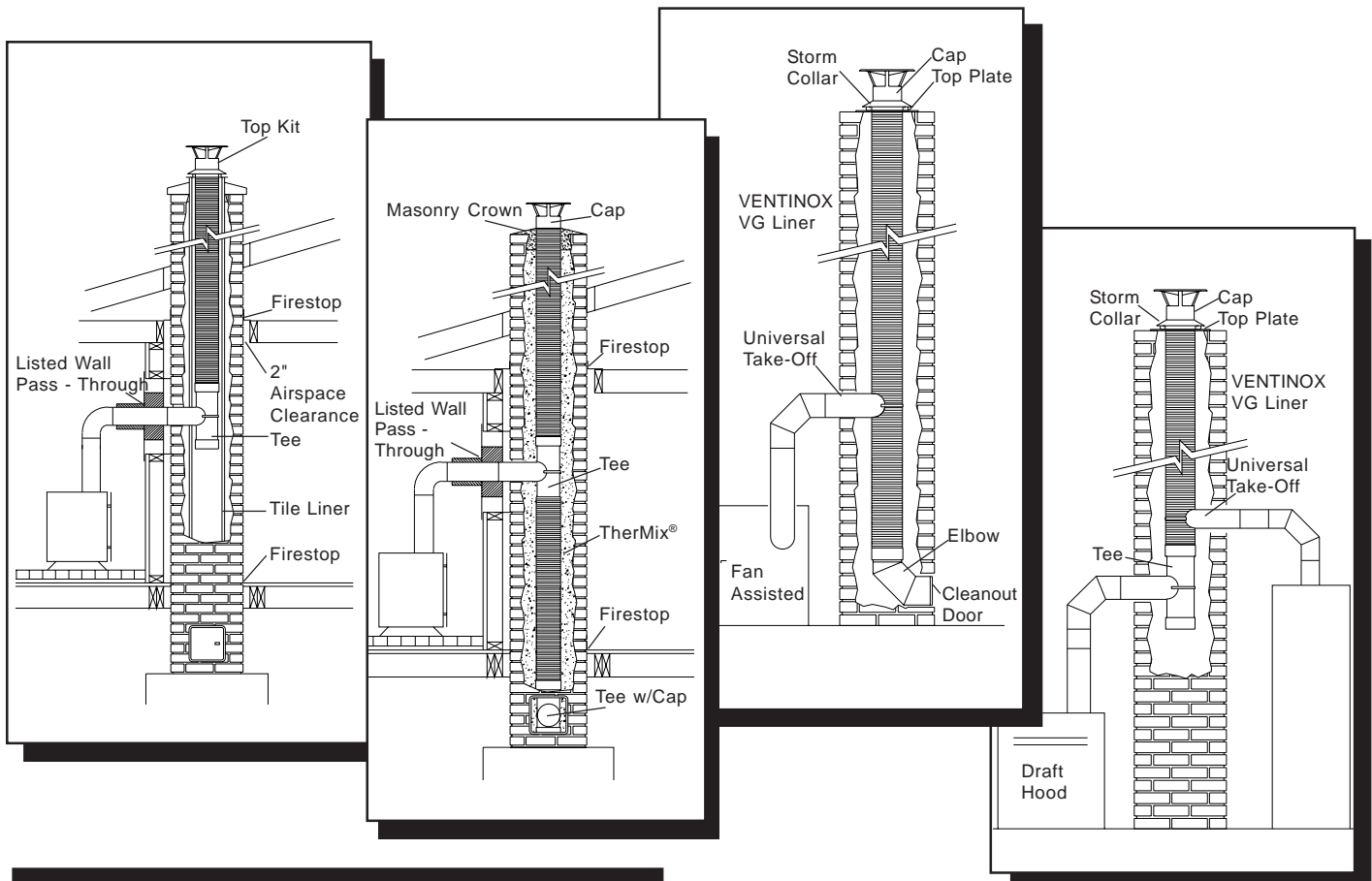
## VENTINOX® WITH A TEE AT THE THIMBLE

Prepare the liner assembly. Slide the expanded end of the Tee body onto the liner and tighten the draw band. Attach the Tee Cap to the Tee Body in the same fashion. Do not attach the Tee Snout at this time.

Lower the liner into the chimney from the top until the Tee reaches the thimble area. With the draw band of the Tee Snout fully extended, push the Snout through the thimble into the chimney. Lower the liner and feed it through the draw band of the Snout. Rotate the liner until the Snout and Tee are aligned and tighten the draw band securely.

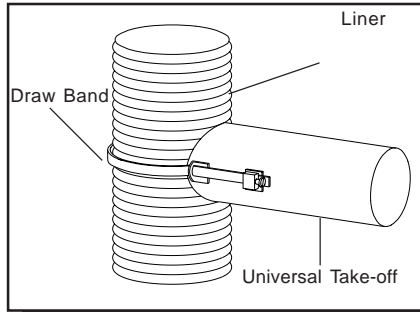
In tight chimneys or chimneys with offsets, it may be difficult to insert the liner with the Tee attached. In such cases, feed a rope through the hole of an appropriately sized VIC Installation Cone, tie a knot in the end of the rope and thread the Cone into the liner. Slide the liner down the chimney until it reaches the offset and the rope extends through the thimble. Pull on the rope while a second person at the top of the chimney pushes downward and turns the liner clockwise. When the liner reaches the thimble, remove the installation Cone and install the fully assembled Tee onto the liner.

Typical systems layout for chimneys serving one or more Category I appliances.



## VENTINOX® UNIVERSAL TAKE-OFF (VTO) INSTALLATION

Use VTOs when additional gas or oil appliances need to be vented into the **VENTINOX®** liner (common vent), or when a VTO is used with an ovalized liner instead of a round Tee section.



When a VTO is installed into a round **VENTINOX®** liner, the liner must be at least one inch larger in diameter than the diameter of the VTO.

Cut an access hole into the masonry chimney at the point where the VTO is to be joined into the liner. Use an appropriate diameter hole saw (with pilot drill bit) and a reversible drill, to make a pilot hole through the liner. Before the main hole is cut, switch the drill into reverse and press lightly but firmly against the liner to cut the main hole. Remove the cutout portion of the liner.

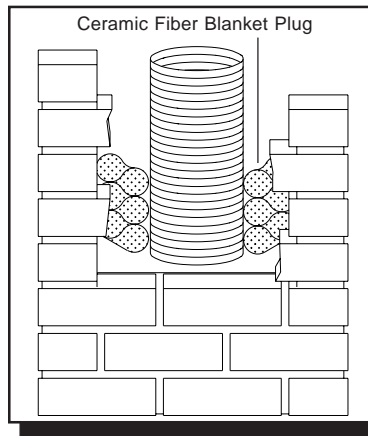
Feed the VTO's draw band around the liner and into the turnbuckle. Tighten the draw band. Apply a bead of High Temp RTV Silicone between the VTO and liner.

### CLOSING UP THE THIMBLE AREA

Use the Tee Snout or VTO to center the liner within the chimney. Fill the space between the Tee Snout or VTO and the chimney structure with masonry and mortar to form an airtight seal. Silicone caulking may also be used for this purpose.

### INSTALLING VENTINOX® IN FIREPLACE APPLICATIONS

Seal the area at the top of the smoke chamber by lacing strips of ceramic blanket insulation with refractory cement and packing them tightly between the bottom of the liner and masonry (sealing plug). Keep the liner centered. Insulate **VENTINOX®** from here to the top.



Alternatively, the **VENTINOX®** Base Plate (VBP) and the **VENTINOX®** Sleeve (VSL) can anchor the liner at the top of the smoke chamber and seal the gap between the liner and masonry. The VBP can be supported by wedging it into mortar joints or by supporting it with steel rods. When trimming the VBP, make sure that the hole in the

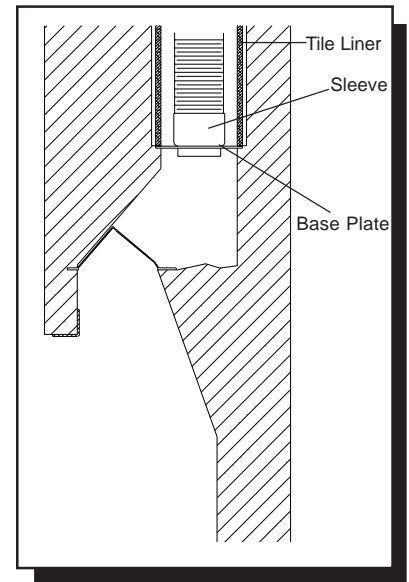
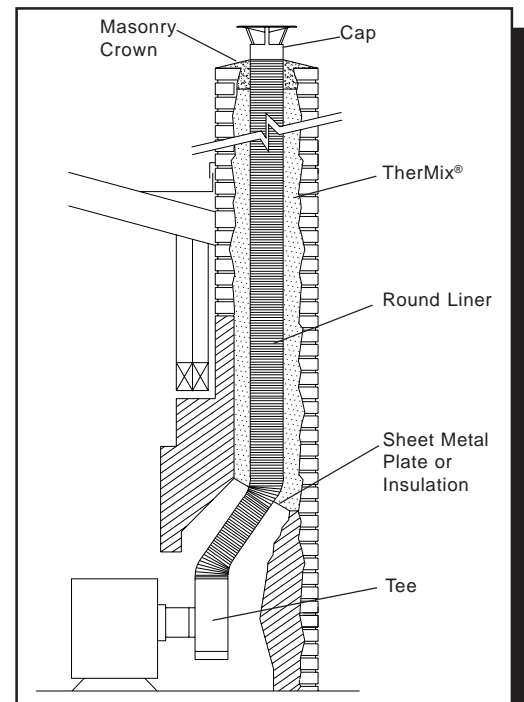


plate is centered in the flue. Attach the VSL to the **VENTINOX®** liner, then lower it until the male end of the VSL is seated in the Base Plate.

When venting a stove or insert through a fireplace and into a chimney, **VENTINOX®** can provide a continuous flue from the heater to the top:

Ovalize the bottom 4 or 5 feet of **VENTINOX®** so that the ovalized portion of the liner fits through the damper and into the firebox (refer to PTS Tech Bulletin #1009 for cross sections!). Connect the heater with an oval Tee or other **VENTINOX®** adaptors. Seal chimney with a Damper Sealing Kit (see instructions for **VENTINOX®** Stove and Fireplace Insert Installation Kits) or a sealing plug at the damper level or at the top of the smoke chamber.

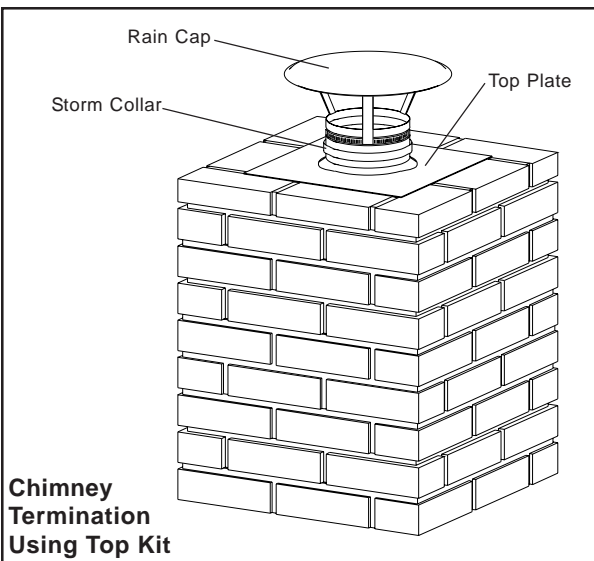
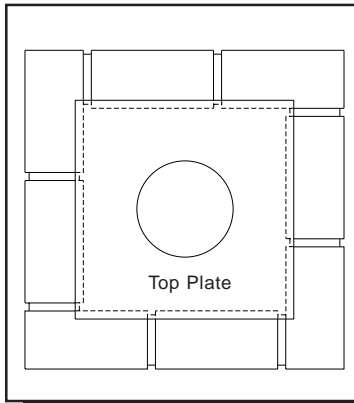


Alternatively, remove portions of the damper frame and smoke shelf so that a round **VENTINOX®** liner can be connected to the heater with a standard Tee, Sleeve, Boot or Adapter. Again, seal chimney with a Damper Sealing Kit (see instructions for **VENTINOX®** Stove and Fireplace Insert Installation Kits) or a sealing plug at the damper level or at the top of the smoke chamber. Insulate **VENTINOX®** from here to the top.

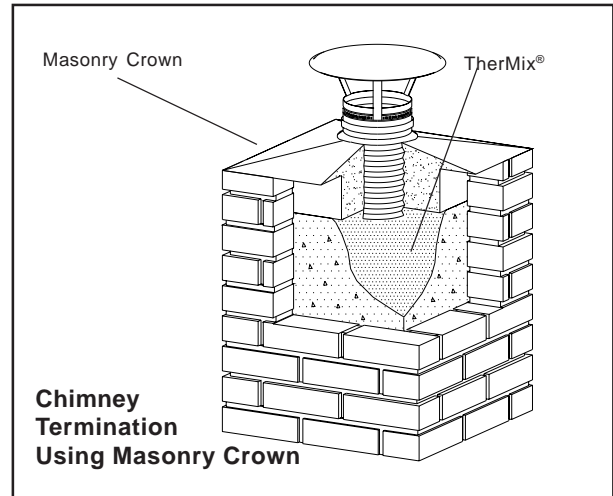
## FINISHING THE TOP OF A VENTINOX® LINED CHIMNEY

**1) VENTINOX® Top Kits (VTK)** include a Top Plate and Storm Collar and provide one method for terminating **VENTINOX®** at the top. When using a **VENTINOX®** Rain Cap (VRC), the Storm Collar is already part of it and only a Top Plate is needed to close the chimney. VTK's can be used to finish TherMix®, ProFoil or Flexwrap insulated chimneys. When ceramic blankets are used, the VTK seals the system **and** supports the liner.

Slip the Top Plate over the liner and position it on the chimney with the liner centered. Trim as necessary or fold edges over the outside of the chimney. Apply a generous bead of High Temp RTV Silicone under the Top Plate and press it into position. Slip the Storm Collar portion of the Rain Cap over the liner, position it over the Top Plate and tighten draw band. Trim off excess liner flush with the Storm Collar. Re-assemble Rain Cap.

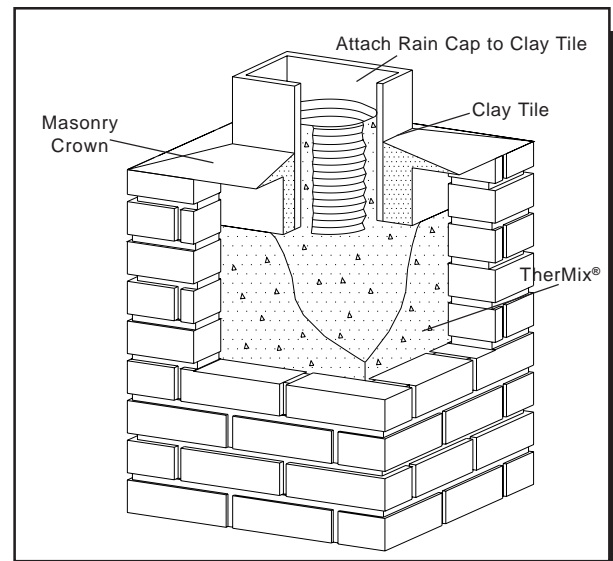


**2) Masonry crowns with a VENTINOX® Rain Cap (VRC)** are commonly used to finish TherMix insulated **VENTINOX®** liners. Fill TherMix to within four inches from the chimney top. Fill the remaining four inches with mortar or crown mix and form a slope from the liner to the outside of the top course of bricks. Attach a **VENTINOX®** Rain Cap (VRC) to the liner.



**3) Masonry crowns with a clay tile and any UL listed rain cap**

Fill TherMix® to within four inches from the chimney top. Slip a full or partial length of any standard clay tile over the **VENTINOX®** liner. Fill the gap between the outside of the tile with mortar or crown mix and form a slope to the outside of the top course of bricks. Fill the gap between **VENTINOX®** and the tile with TherMix® and seal the last inch with mortar or crown mix. **VENTINOX®** may be terminated anywhere within the tile, as long as it protrudes at least four inches into the tile. Attach a UL Listed rain cap to the clay tile.



## INSULATING VENTINOX® LINERS

### General Guidelines:

VENTINOX®VFL and VFT have been tested and are listed by Underwriters Laboratories, Inc (UL) to the UL 1777 standard at zero clearance to combustibles and for use with all fuels. When venting wood fired heaters or fireplaces, a minimum of one inch TherMix® or two layers of ceramic blankets are needed to conform to the UL1777, zero clearance listing.

VENTINOX®VFL, VFT and VG have been tested and are listed by UL to UL 1777 at zero clearance to combustibles for use with gas and oil heaters. No insulation is needed to conform to the UL1777, zero clearance listing. Here, flue gas temperatures are too low to cause dangerous temperature rises on the outside of a chimney. However, insulating liners is highly recommended for performance reasons (see above).

All temperature tests were performed on chimneys featuring a 4" nominal masonry shell and a VENTINOX® liner with or without the specified insulation between the liner and interior of the chimney (no clay tiles). The outside of the chimney was surrounded with a wood enclosure at zero clearance as specified by the standard.

### Method #1: Insulating with TherMix®

TherMix® is poured into the chimney AFTER the liner is installed. TherMix® is a pre-mixed insulation material and only requires the addition of water at the job site. Review TherMix® literature to determine the volume of TherMix® needed to fill a specific chimney.

Empty a TherMix® bag into a mortar trough or wheelbarrow. Add 7 to 9 gallons of water and mix with a hoe. Proper consistency is achieved when the material feels damp but is still granular. Little or no water should appear between fingers when a handful of TherMix® is squeezed. Correctly prepared TherMix® pours like "loose fill" into the void between the liner and the chimney. **Complete instructions are on each TherMix® bag.**

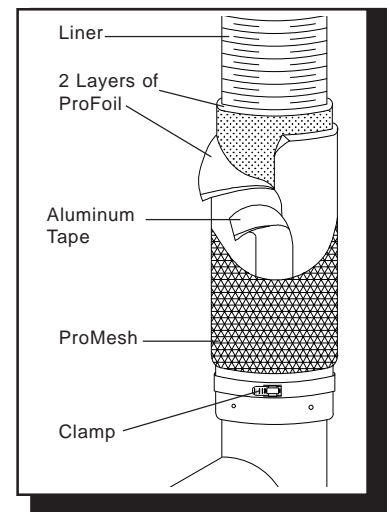


During the pouring process, distribute the insulation evenly into the available space. Spacers may be used every 5 ft. to center the liner. Vibrate the liner by firmly tapping it. Continue to pour TherMix® until the chimney is filled to the top and finish as described previously. Inspect the liner at this time to ensure that no TherMix® has fallen inside the venting system.

All heaters or fireplaces can be fired up right after the installation is complete. Keep flue gas temperatures below 700 degrees F for three weeks. This allows for TherMix® to dry gradually. The operator is responsible for making sure that the heater is not over fired during this initial period.

### Method #2: Insulating with ProFoil or Flexwrap ceramic blankets.

Ceramic blankets are attached to VENTINOX® BEFORE the liner is installed into the chimney. Blankets are 1/4 in. thick, 8 pounds density, and faced with a 2 mil. aluminum foil. Aluminum tape, wire mesh and clamps are needed for proper installation.



For blanket sizing, consult the "Sizing Guide for ProFoil Ceramic Blanket" (ProTech Bulletin #1025) or the "ProFoil Chimney Insulation Parts Description" (sheet #1111).

### Attaching ceramic blankets to VENTINOX®

Roll out the insulation blanket on a clean surface, foil face down. Lay the liner on top and trim the blanket so that it is about one foot shorter than the liner.

Wrap the insulation around the liner lengthwise and trim it so that a butt joint is formed. Seal the joint with aluminum foil tape. Spray adhesive may be used to hold the blanket in place until it can be secured with the foil tape. If a double layer of blanket is needed, install it with the butt joint on the opposite side.

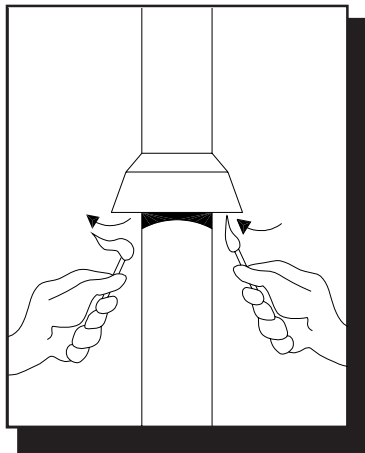
Install ProMesh protective wire mesh over the blanket(s). Slip the ProMesh over the insulated liner and secure one end with a stainless steel band clamp. Pull the ProMesh towards the other end of the liner so that it tightens snugly around the insulation, then trim off the excess. Secure this end with a stainless steel band clamp.

## CONNECTING THE APPLIANCE AND CHECKING DRAFT

When installing gas or oil appliances, use connector pipes specifically designed for connecting such appliances. Attach the connector pipe directly and securely to the **VENTINOX®** Tee Snout or to a listed wall penetration assembly. Secure all sections of the connector pipe with screws or rivets.

Record the date of installation (on the label provided with the liner) and attach it to the **VENTINOX®** Tee Snout or wall penetration assembly. The label provides the **VENTINOX®** brand name, liner manufacturer, the date of installation and states the intended use of the particular **VENTINOX®** liner.

After the installation is complete, make sure the appliances are venting properly. With a gas burning appliance equipped with a draft hood, turn on the unit, let it warm up, then hold a match under the draft hood. If the flame is blown outward or extinguished, the appliance is not drafting properly. Fan



assisted appliances (without draft hoods) have built-in pressure sensing switches. If chimney draft is not adequate, the appliance shuts off. With oil burning appliances, barometric draft dampers should be installed in the connector pipe. Hold a match in front of the partially opened barometric damper to check draft.

If more than one appliance is connected to a common vent, test each appliance with and without the other in operation. **If draft problems exist, corrections must be made before the appliance is used.**



VENTINOX® CHIMNEY LINING SYSTEMS

*Safe, reliable venting for gas, oil and wood*

## INSPECTION AND MAINTENANCE

### Creosote formation and the need for removal

When wood is burned slowly it produces tar and other organic vapors which combine with expelled moisture to form creosote that accumulates inside a chimney flue. When ignited, creosote produces extremely hot fires. Should a fire occur within a **VENTINOX®** liner, notify the fire department immediately. Fires are catastrophic events for any chimney. Before using the chimney after a fire, it must be inspected by a qualified person and cleaned or repaired as necessary.

**Soot build-up and blockages can occur in all venting systems. Therefore, VENTINOX® Lining Systems must be inspected by a Certified Chimney Sweep or qualified professional at least once per year.**

The inspection is required to comply with the terms of the warranty. If creosote or debris has accumulated, it must be removed to eliminate the risk of a chimney fire or the formation of carbon monoxide. Excessive condensation and chimney fires can be prevented through proper appliance use and maintenance.

**To properly inspect the liner, gain access either from the top or bottom of the chimney.**

When examining from the bottom, remove the connector from the thimble or if access is available, inspect through the clean-out cap of the Tee. Use a mirror and flashlight or chimney inspection camera to examine the inside of the liner. When examining from the top, remove the Rain Cap, examine the inside as above and determine if cleaning is necessary.

### CLEANING PROCEDURE

Remove the Rain Cap, or if working from the bottom, remove the appliance connector or clean-out cap. Select appropriately sized polypropylene chimney brushes and flexible fiberglass extension rods. Run the brush up and down inside the liner until any deposits or debris are removed. Reinstall the Rain Cap, connector pipe or Tee Cap.

**LEAVE A COPY OF THESE INSTRUCTIONS AND THE VENTINOX® WARRANTY CARD WITH THE HOMEOWNER**

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