

INSTALLATION INSTRUCTIONS FOR PTS CHIMNEY LINERS: Ventinox®/DuraFlex Pro®/DuraFlex SW®

READ THESE INSTRUCTIONS COMPLETELY BEFORE ATTEMPTING TO INSTALL A PTS CHIMNEY LINING SYSTEM

INTRODUCTION

ProTech Division (PTS) Chimney Liners 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. PTS Liners should not be used to vent unlisted gas or oil appliances, unlisted wood or coal burning appliances, Categories II, III and IV Gas appliances (unless specifically listed to UL 1738) or gas appliances listed for use only with Type BW vent. **PTS Liners must be installed by an experienced professional, familiar with the operation and maintenance of heating appliances and chimneys.**

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.

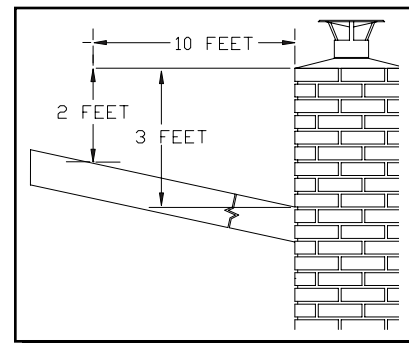
PTS Liners are made from corrosion-resistant stainless steel alloys. It is common, however, for indoor air to contain chlorides given off from carpeting, paints, paint thinners and laundry detergents. When combustion air for the heating appliance is drawn from the house, these contaminants can combine 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 manufacturer's instructions and local codes for methods of providing outside air.

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 **PTS Chimney Liners**:

- 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.

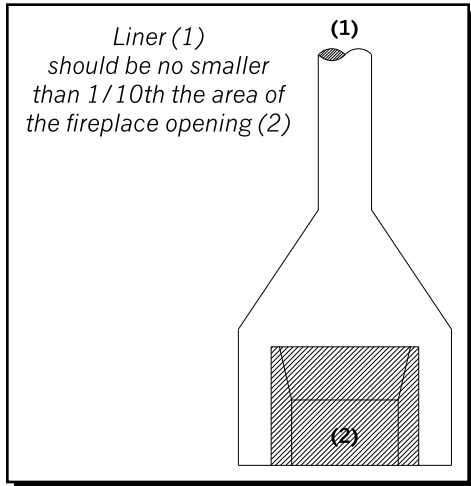
The chimney must be thoroughly cleaned before a liner is installed. Examine the chimney for obstructions, soot or tar, glazed creosote, cracked, loose or missing bricks and eroded mortar joints. Any defects or potential safety problems must be repaired prior to relining the chimney or must be rectified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

FACTORY-BUILT CHIMNEYS

Before installing a **PTS Lining System** 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 chimney's 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 PTS LINERS INTO A MASONRY CHIMNEY

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

PTS 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 **PTS Liners** do not fit a chimney's inside dimensions, they may be ovalized to allow proper fit. When ovalizing a **PTS Liner**, its cross sectional area decreases. Refer to ProTech Technical Bulletin #1009 for details or contact your **PTS Liner** supplier for assistance.

When ovalizing DuraFlex SW®, Please read Addendum B of these installation instructions.

***Please note: While insulation is not required for every installation (refer to UL1777 for 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 improves draft and minimizes condensation, helping flue surfaces warm up more 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.**

PTS 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.

IN ORDER TO MEET THE TERMS OF THE LISTING AND PROTECH SYSTEMS' WARRANTY REQUIREMENTS, THESE INSTALLATION INSTRUCTIONS MUST BE FOLLOWED COMPLETELY.

TOOLS AND SUPPLIES

The following tools and supplies may be required when installing **PTS 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

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

Ventinox® components are made from various stainless steel alloys. When ordering, match liner and component materials. Components are fastened to **PTS Liners** by tightening the built-in draw band. Pre-drilling liners or using pop rivets are not necessary.



For the complete list of Ventinox® Components, please refer to our Product Family Catalog (#2000H) or visit the Literature Library on our website, www.protechinfo.com

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 **PTS Liner** supplier or ProTech Systems Customer Service Technicians at 800.766.3473.

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.

PREPARING THE THIMBLE AREA

A 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. **When cutting DuraFlex SW® to length, it is important to use a RotoZip®- 90° Angle Grinder or similar angle grinder. Please see Addendum A of these installation instructions.**

PTS CHIMNEY LINING SYSTEMS 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.

Note: DuraFlex SW® must be installed with the arrow imprinted on the liner pointing AWAY from the appliance! If arrows are hard to see, run your fingers on the inside of the liner. The rough side should face towards the appliance.

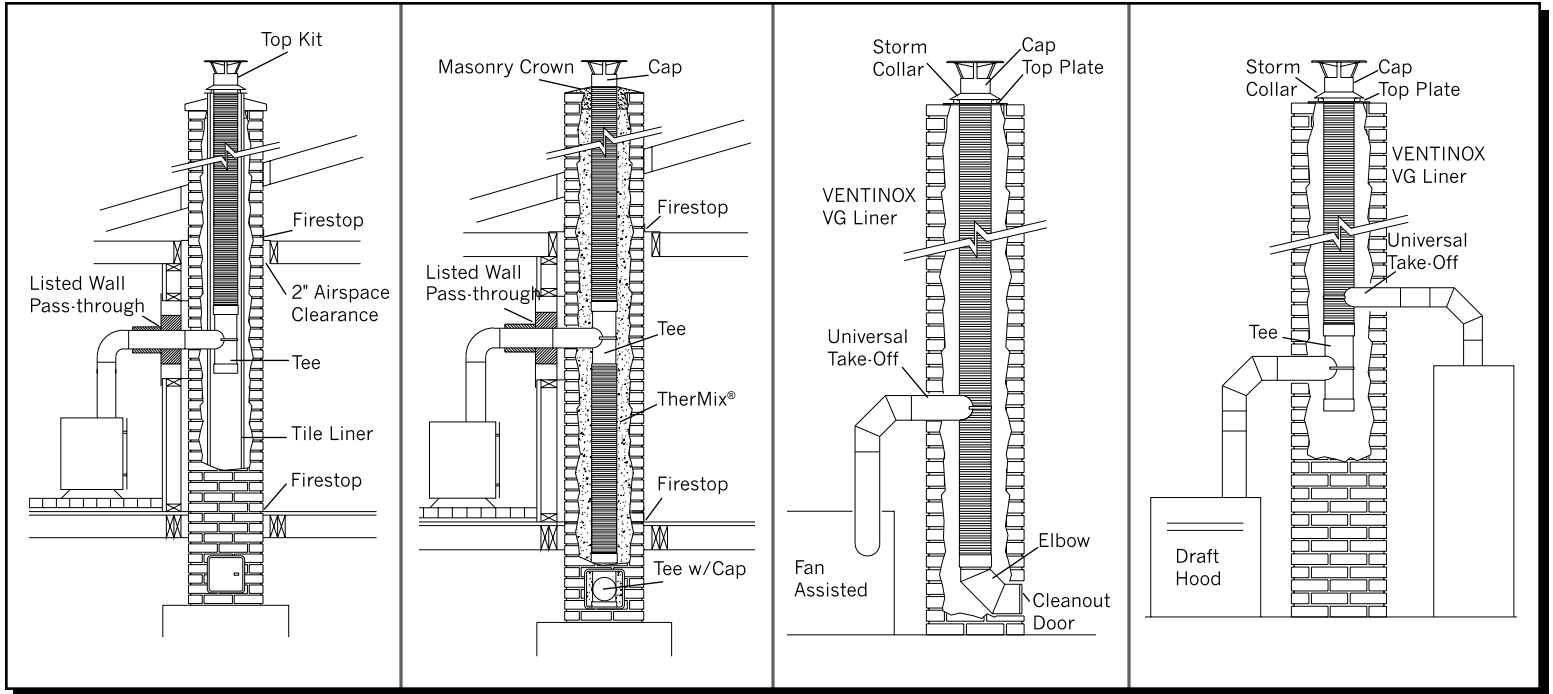
Lower the liner into the chimney from the top until the Tee reaches the thimble area. With the draw band of the Tee Snout fully extended, push the Snout through the thimble into the chimney. Lower the liner and feed it through the draw band of the Snout. Rotate the liner until the Snout and Tee are aligned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

VENTINOX® ONLY

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

EDGE OF LINER IS SHARP! ALWAYS WEAR GLOVES AND EYE PROTECTION!

Typical system layouts for chimneys serving one or more Category I appliances:

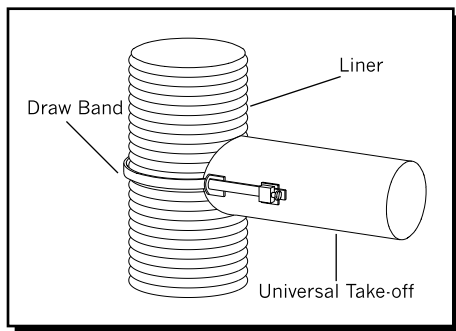


while a second person at the top of the chimney pushes downward and turns the liner clockwise. When the liner reaches the thimble, remove the installation Cone and install the fully assembled Tee onto the liner.

UNIVERSAL TAKE-OFF (TO) INSTALLATION

Use TOs when additional gas or oil appliances need to be vented into the **PTS liner** (common vent), or when a TO is used with an ovalized liner instead of a round Tee section. When a TO is installed into a round **PTS liner**, the liner must be at least one inch larger in diameter than the diameter of the TO.

Cut an access hole into the masonry chimney at the point where the TO 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.



When cutting a TO into a DuraFlex SW® Liner, please read Addendum B of these installation instructions.

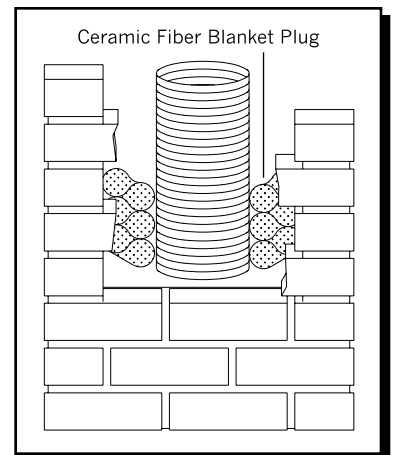
Feed the TO's draw band around the liner and into the turnbuckle. Tighten the draw band. Apply a bead of High Temp RTV Silicone between the TO and liner.

CLOSING UP THE THIMBLE AREA

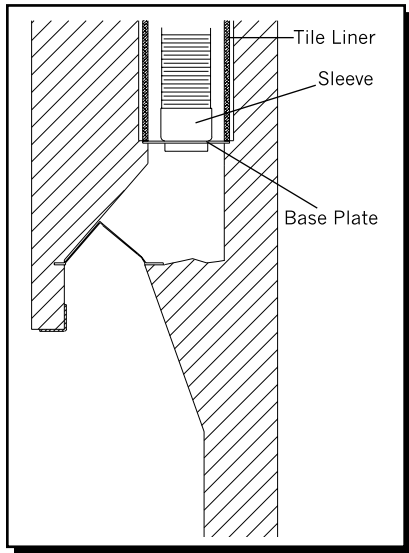
Use the Tee Snout or TO to center the liner within the chimney. Fill the space between the Tee Snout or TO and the chimney structure with masonry and mortar to form an airtight seal. Silicone caulking may also be used for this purpose.

INSTALLING A PTS LINER 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 **PTS Liners** from here to the top.



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



flue. Attach the SL to the **PTS Liner**, then lower it until the male end of the SL is seated in the Base Plate.

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

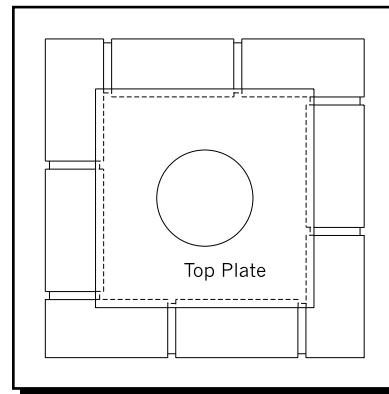
Ovalize the bottom 4 or 5 feet of the **PTS Liner** so that the ovalized portion

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 adaptors. Seal chimney with a Damper Sealing Kit (see instructions for 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 **PTS 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 Stove and Fireplace Insert Installation Kits) or a sealing plug at the damper level or at the top of the smoke chamber. Insulate a **PTS Liner** from here to the top.

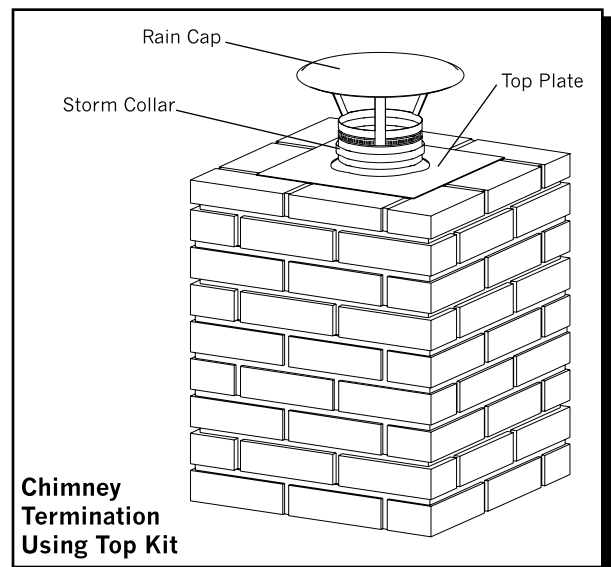
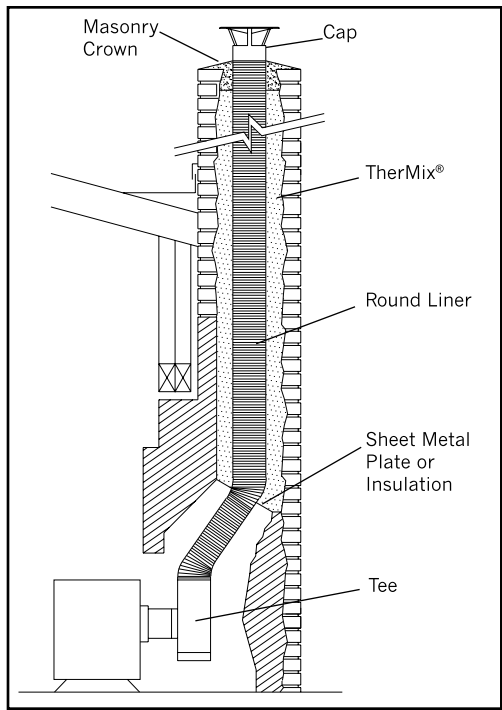
FINISHING THE TOP OF A PTS LINED CHIMNEY

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



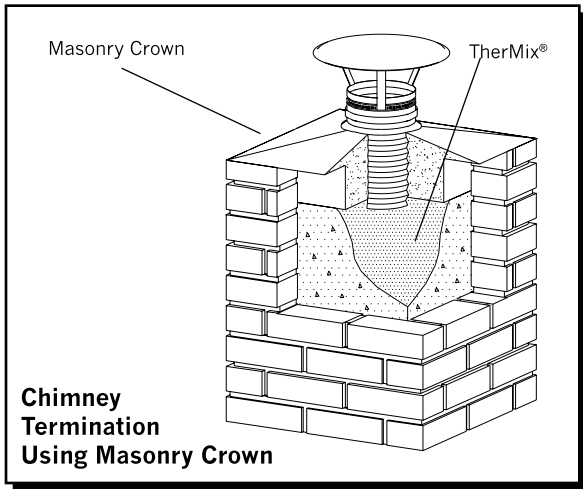
Slip the Top Plate over the liner and position it on the chimney with the liner centered. Trim as necessary or fold edges over the outside of the chimney. Apply a generous bead of High Temp RTV Silicone under the Top Plate and press it into position. Slip the Storm Collar portion of the Rain Cap over

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.

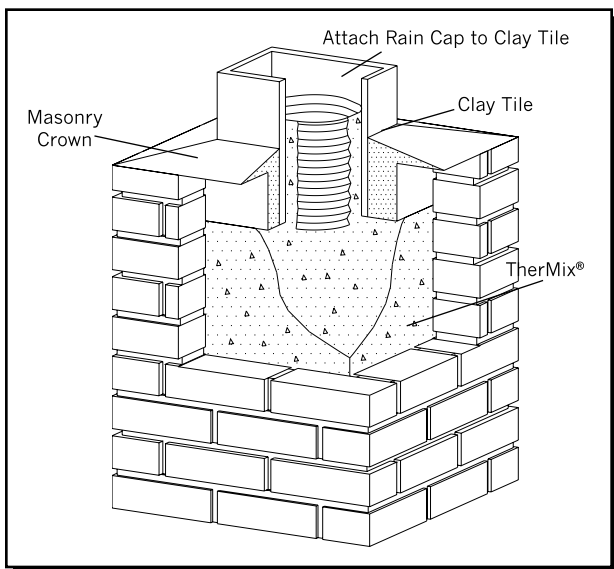


Chimney Termination Using Top Kit

2) Masonry crowns with a Rain Cap (RC) are commonly used to finish TherMix® insulated **PTS 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 Rain Cap (RC) 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 **PTS 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 the **PTS Liner** and the tile with TherMix® and seal the last inch with mortar or crown mix. A **PTS Liner** 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 PTS LINERS

General Guidelines:

PTS Liners have been tested and are listed by Underwriters Laboratories, Inc (UL) to 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.

All temperature tests were performed on chimneys featuring a 4" nominal masonry shell and a PTS 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 **PTS Liners** 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.

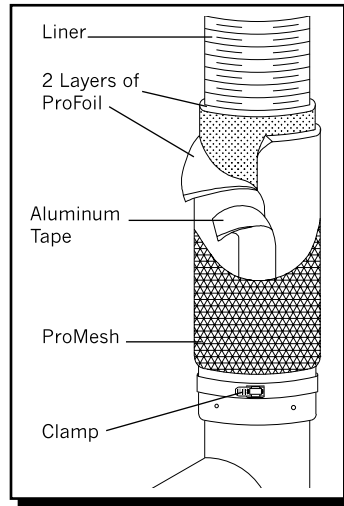
For blanket sizing, consult the “Sizing Guide for ProFoil Ceramic Blanket” (ProTech Bulletin #1025) or the “ProFoil Chimney Insulation Parts Description” (sheet #1111).

Attaching ceramic blankets to a PTS Liner:

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.



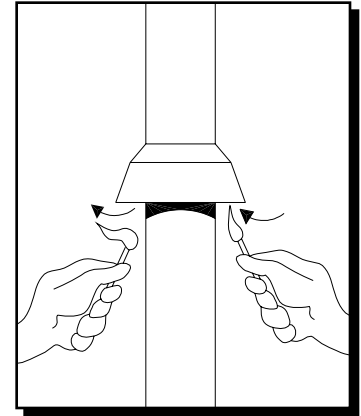
CONNECTING THE APPLIANCE AND CHECKING DRAFT

When installing gas or oil appliances, use connector pipes specifically designed for connecting such appliances. Attach the connector pipe directly and securely to the 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 Tee Snout or wall penetration assembly. The label provides the **PTS Liner** brand name, liner manufacturer, the date of installation and states the intended use of the particular **PTS 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.**

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.

Creosote or soot buildup can occur in all venting systems and should be removed to reduce the risk of a chimney fire. Therefore, Ventinox®/DuraFlex SW®/DuraFlex Pro® Lining Systems should be inspected at least once every two months during the heating season to determine if a creosote or soot buildup has occurred.

Annual inspection is required to comply with the terms of the warranty. If creosote or debris have accumulated, they 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.

Should a fire occur within a **PTS 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.

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.

**GIVE THE HOMEOWNER
THE PTS CHIMNEY LINING SYSTEM WARRANTY CARD
AND A COPY OF THESE INSTRUCTIONS**

Contact ProTech Division at the address below for additional free copies of these instructions

The information presented in this material has been carefully collected and researched by the staff at ProTech. Resources and references include: National Fire Protection Assoc., National Fuel Gas Code, Underwriters Laboratories Inc., Allegheny Ludlum, Battelle Laboratories, & others. We continue our research into venting systems for heating equipment and will issue updates periodically. If you wish to be included in our mailings, give us a call or contact us via our website. We'd like to hear from you.



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DuraFlex SW Cutting & Ovalizing Instructions

Because its smooth inner layer is not mechanically fastened on the downward side, traditional cutting methods are not usually successful.



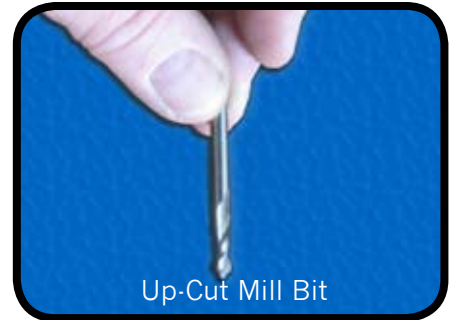
PTS purchased the variable speed **RotoZip®** by **Bosch** for around \$150.00. We first tried the fixed speed model and it works fine. However, the mill bits last much longer when used at 20,000 RPM as compared with the 30,000 RPM fixed speed version. The kit we purchased comes in a carrying case, includes various Bits, a 90° Angle Grinder and three cutting blades: a Dry Diamond Wheel, Metal Wheel and **Masonry Wheel**. We also purchased the CRCT1 **Circle Cutting Guide** for \$18 and an **Up-Cut Mill Bit** for \$12.



90° Angle Grinder



CRCT1 Circle Cutting Guide



Up-Cut Mill Bit

WEAR GLOVES AND EYE PROTECTION WHEN HANDLING/CUTTING ANY LINERS!



Straight Cut -

We tried all three cutting blades and achieved excellent results with the masonry wheel. Therefore, set up the 90° Angle Grinder with the masonry wheel. Make a cut across the liner's corrugations first, then follow the corrugations all the way around the liner. While cutting, **rotate the liner away from you and with the direction of the wheel's rotation**. This method produces a nice, clean cut across

Cutting a Hole for the Universal Take-Off -

Set up the RotoZip® with the Up-Cut Mill bit (none of the bits supplied with the standard kit work well) and the Circle Cutting Guide. Set the guide for the desired hole diameter. **NOTE: The use of the Up-Cut Mill Bit is essential, as it pulls the inner layer of steel against the corrugated layer of DuraFlex SW®, producing a clean cut across both layers.**



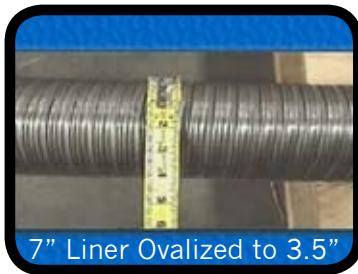
- Drill a 1/4" where the center of the Universal Take-off will be located in the liner
- Position the rubber guard of the Circle cutting guide into the 1/4" hole
- Turn on the RotoZip® and begin cutting the liner in a clockwise direction. Keep the RotoZip® perpendicular to the liner at all times. You do not need to apply much pressure - let the drill bit do the cutting for you

Ovalizing DuraFlex SW liners -

As with any other liner, use our Ovalizing Machine for this purpose. When the outside diameter of any thin walled liner is reduced beyond a certain point, it tends to develop "crinkles" on the major OD. The same is true when ovalizing DuraFlex SW®, it only looks different: the inner layer may begin to "pucker". While this does not reduce the structural stability of the liner, you should be aware of this possibility.



Ovalizing Machine



7" Liner Ovalized to 3.5"



"Pucker"



Side Walls

Please Visit www.protechinfo.com for a Demo Video of these Instructions



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