



# Operating and Maintenance Instructions Manual

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## VE414 Pipe Roll Grooving Tool



### **⚠ WARNING**



Failure to follow Instructions and warnings can result in serious personal injury.

- Before installing, operating, or servicing this tool, read this Manual and all warning labels on the tool.
- Always wear safety glasses and foot protection.

If you need additional copies of the manual or have any questions about the safe operation of this tool, contact Victaulic Tool Company, P.O. Box 31, Easton, PA 18044-0031, Phone: 610-559-3300.

# VE414

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## Read this First – Hazard Identification

Definitions for identifying the various hazard levels shown on warning labels or to indicate proper safety procedures in this Manual are provided below.



This safety alert symbol indicates important safety messages on warning labels and in this manual. When you see this symbol be alert to the possibility of personal injury and carefully read and fully understand the message that follows.

### DANGER

The use of the word "DANGER" always signifies an immediate hazard with a likelihood of serious personal injury or death if instructions, including recommended precautions, are not followed.

### WARNING

The use of the word "WARNING" signifies the presence of hazards or unsafe practices which could result in serious personal injury or death if instructions, including recommended precautions, are not followed.

### CAUTION

The use of the word "CAUTION" signifies possible hazards or unsafe practices which could result in minor personal injury, product or property damage if instructions, including precautions, are not followed.

### NOTICE

The use of the word "NOTICE" signifies special instructions which are important but not related to hazards.

## OPERATOR SAFETY INSTRUCTIONS

This tool is designed only for roll grooving pipe. To accomplish this function requires some dexterity and mechanical skills, as well as sound safety habits. Although this tool is manufactured for safe dependable operation, it is impossible to anticipate those combinations of circumstances which could result in an accident. The following instructions are recommended for safe operation of the tool. The operator is cautioned to always practice "Safety First" during each phase of use, including setup and maintenance of this unit. **It is the responsibility of the owner, lessee or user of this tool to ensure that all operators receive, read and understand this manual and are fully trained to operate this tool.**

### GENERAL

- 1. Read and understand this Manual before operating or performing maintenance on this tool.** Become familiar with the tool's operations, applications and limitations. Be particularly aware of its specific hazards. Store this manual in a clean area and always at a readily available location. Additional copies at no charge are available upon request by writing or phoning the Victaulic Tool Company.
- 2. Use only recommended accessories.** Use of improper accessories may be hazardous. See Accessories on page 29.
- 3. This tool is designed ONLY for roll grooving of pipe sizes, materials and wall thicknesses outlined under Tool Rating and Roll Selection, pages 33 and 34.**

### TOOL SETUP

- 1. Ground the drive motor.** Be sure the drive motor is connected to an internally grounded electrical system.
- 2. Avoid dangerous environments.** Don't use the machine in damp or wet locations. Don't use the tool on sloped or uneven ground or floor. Keep work area well illuminated. Allow sufficient space to operate tool and accessories properly and for others to pass safely.
- 3. Prevent back injury.** During tool setup, a lift must be used to handle and position tool.

### OPERATING TOOL

- 1. Inspect the equipment.** Prior to starting the tool, check the movable parts for any obstructions. Be sure that guards and tool parts are properly installed and adjusted.
- 2. Prevent accidental startings.** Place power switch in the "OFF" position prior to connecting electrical power.
- 3. Operate tool from control station side only.** The tool must be operated with the safety foot switch control located for easy operator access. Never reach across moving parts or material being worked on. Foot switch should always be accessible to operator.
- 4. Keep hands away from grooving rolls and stabilizer wheel during grooving operation.** Grooving rolls can crush or cut fingers and hands.
- 5. Never reach inside pipe ends during operation.**
- 6. Do not over-reach.** Keep your proper footing and balance at all times. Be sure you can reach foot switch safely at all times. Do not reach across tool or pipe. Keep hands and loose tools away from moving parts.
- 7. Wear safety glasses and footwear.**
- 8. Keep work area clean.** Cluttered areas, benches and slippery floors invite accidents.
- 9. Wear ear protection if exposed to long periods of very noisy shop operations.**
- 10. Keep visitors away.** All visitors should be kept a safe distance from the work area.
- 11. Keep alert.** Do not operate tool if ill or drowsy from medication or fatigue. Avoid horseplay around tool and keep bystanders a safe distance from tool and pipe being grooved.
- 12. Wear proper apparel.** Never wear loose clothing (unbuttoned jackets or loose sleeve cuffs) loose gloves or jewelry that can get caught in moving parts.
- 13. Do not force tool.** It will do the job better and safer at the rate for which it was designed.
- 14. Secure work, machine and accessories.** Make sure machine is stable. See "Tool Setup" for securing machine to floor or platform.
- 15. Support work.** Support long pipe with a pipe stand secured to the floor or ground.
- 16. Do not misuse tool.** Perform only the functions for which the tool is designed. Do not overload the tool.

### TOOL MAINTENANCE

- 1. Disconnect electrical power prior to servicing.** Repair should be attempted only by authorized personnel. Always disconnect power before servicing or making adjustments.
- 2. Maintain tool in top condition.** Keep tool clean for best and safest performance. Follow lubricating instructions.
- 3. Use only genuine Victaulic replacement parts to ensure proper and safe function of the tool.**

## VE414

### NOTICE

Drawings and/or pictures in this manual may be exaggerated for clarity.

## INTRODUCTION

The Victaulic® Vic-Easy® Series VE414 is a fully motorized, semi-automatic hydraulic feed tool for roll grooving pipe to prepare it to receive Victaulic grooved pipe couplings. The VE414 is designed to roll groove pipe of various materials and wall thicknesses (see Tool Rating and Roll Selection charts on pages 33 and 34).

This tool and manual contains trademarks, copyrights and/or patented features which are the exclusive property of Victaulic Company of America.

### CAUTION

- This tool should only be used for roll grooving pipe designated in the Tool Rating and Roll Selection charts on pages 33 and 34.

Use of the tool for other purposes or exceeding the pipe thickness maximums will overload the tool, shorten tool life and may cause tool damage.

## POWER REQUIREMENTS

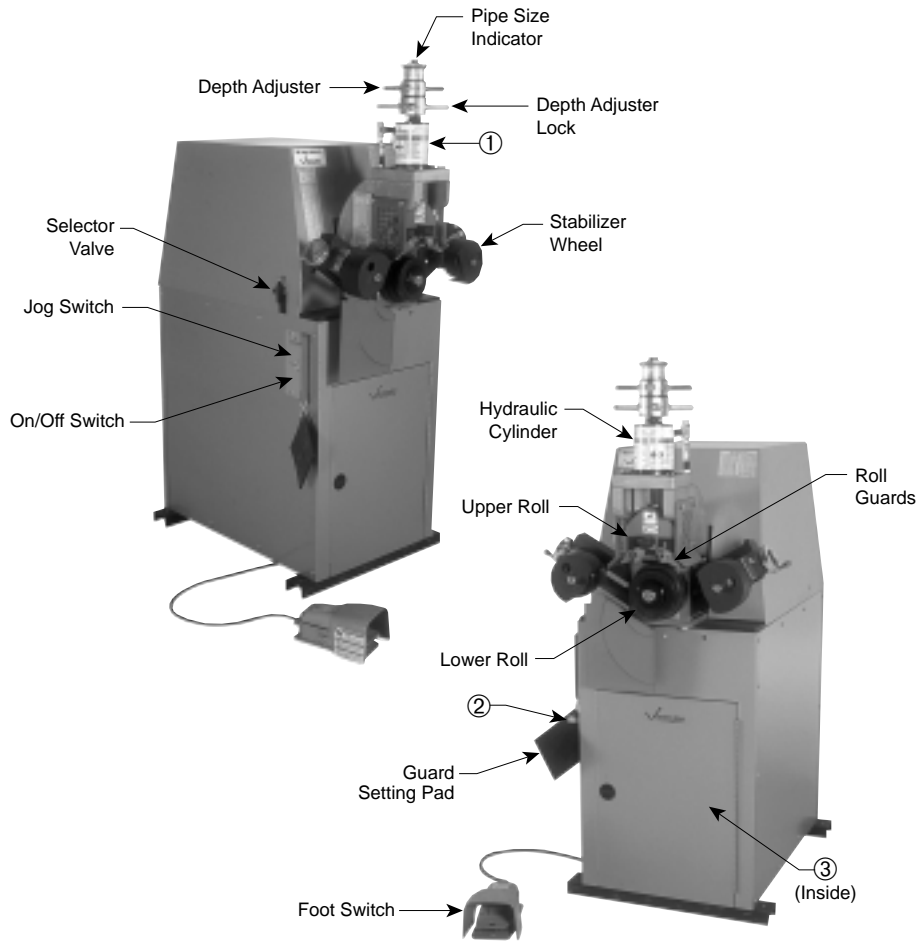
VE414 is designed to operate on 220/440 volt, 3 phase, 60 Hertz power supply. The tool is shipped with wiring set for 220 volt operation unless otherwise specified on the order. To re-wire for 440 volt service refer to the Electrical Schematic on page 32 and the name plate data on the drive motor name plate. The 220 volt service requires a minimum of 20 amp circuit protection. VE414 components are all grounded to the tool frame. Be certain frame is properly grounded. For other voltages and frequencies, contact the Victaulic Tool Company.

### DANGER

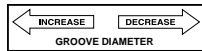


- To reduce the risk of electric shock, check the electrical source for proper grounding.
  - Before performing any repair or maintenance, disconnect the tool from the electrical source.
- Failure to do so could result in serious personal injury or death.

**TOOL NOMENCLATURE**



①



MADE IN U.S.A.

②

**ALWAYS KEEP THIS PAD WITH THE TOOL. USE IT TO SET THE GUARDS IN ACCORDANCE WITH THE TOOL OPERATION AND MAINTENANCE MANUAL.**  
R068272L\_AB

**WARNING**

Grooving rolls can crush or cut fingers and hands.

- Be sure guard is properly adjusted before grooving pipe.
- Keep hands away from grooving rolls and stabilizer wheel.
- Never reach inside pipe end or across the tool or pipe during operation.
- Always groove pipe in a clockwise direction only.
- Never manually groove pipe shorter than what is recommended.
- Never wear loose clothing, loose gloves, or jewelry while operating tool.

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**WARNING**

Failure to follow instructions and warnings can result in serious personal injury.

- Before installing, operating or servicing this tool, read and understand the Operating Instructions and all warning labels on this tool.
- Always wear safety glasses and foot protection.

If you have any questions about the safe operation of this tool, contact Victaulic Tool Company, P.O. Box 31, Eaton, PA 16044-0031. Phone: 610-559-3300.

398 2271 Rev. A

③

**⚠ DANGER**

Only Qualified Persons should open this door.

Hazardous voltage inside will cause serious injury or death. ALWAYS disconnect power before servicing.

0305.1

## VE414

### RECEIVING TOOL

VE414 tools are palletized individually and covered with a cardboard sleeve designed for use in reshipping the tool. The stabilizer assembly and additional roll sets are shipped in a separate container.

**NOTE:** Be sure to save original shipping materials for return shipment of rental tools.

### VE414 CONTAINER CONTENTS

Upon receipt of tool, make sure all necessary parts are included. If any parts are missing, notify your Victaulic distributor or Victaulic representative.



1. Tool assembly
2. Enhanced Tracking Rolls (ETR) for 2 - 16" steel pipe. The 8 - 12" rolls are mounted on the head assembly
3. Two (2) tool operating manuals
4. Guard setting pad
5. Slide spacer
6. Spare Woodruff keys
7. Hydraulic system bleeder hose

Upon receipt of tool, check to be certain all necessary parts are included. Should the appropriate components not be contained, notify the Victaulic Tool Company. The standard series VE414 tools are supplied with grooving rolls for 2 - 16" carbon steel pipe. Rolls are marked with the size and part number and color coded for pipe material, for your convenience. For grooving to other specifications and other materials, see Tool Rating and Roll Selection charts on pages 33 and 34. Grooving rolls for other specifications and other materials must be purchased separately.

### TOOL SETUP

#### **⚠ WARNING**

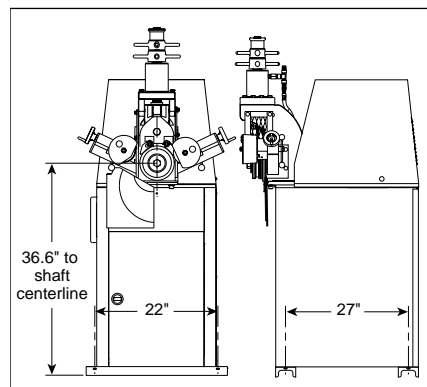
- Do not connect power until instructed otherwise. Accidental start up of tool may result in serious personal injury.

1. Remove all components from the containers and check to be certain all necessary items are included. See "Receiving Tool."



2. The VE414 is designed to be used in a permanent location. It should be located on a level concrete floor or base. Once located, it should be leveled and securely anchored (see Figure 1) in a level position, as a non-level can severely affect proper grooving operation. When checking tool levelness, place level directly on tool frame as shown. The choice of tool location and position should take into account the following factors:

- a. Pipe handling and support requirements
- b. Power supply requirements
- c. Ambient temperature requirements:  
20°F to 104°F
- d. Clearance requirements around pipe stabilizer for easy adjustment



**Figure 1**  
**MOUNTING HOLE LOCATIONS**  
(Four 3/16"/14 mm diameter through holes)

**POWER HOOK-UP**

The tool is supplied with a #12/4 line cord (3 power, 1 ground). The tool is supplied set up for 220 volt, 3 phase, 60 Hz power unless specified otherwise. If 440 volt is to be used, be sure proper conversions are made. Conversions include: 1) motor connections; 2) fuse changes; 3) thermal overload unit changes; 4) and transformer connections.

Consult electrical wiring diagram on page 32 for information.

Once power is properly connected, the tool must be checked for proper rotational direction. Proceed as follows:



**1.** Turn main power switch “On” and flip toggle switch to “Jog”. It is located on the left-hand side of the enclosure.

**2.** Depress foot switch and observe the tool’s lower roll rotation direction and then release foot switch.

Proper roll rotation is clockwise. If clockwise, power hook-up is complete; proceed to Pipe Preparation. If counterclockwise, turn main power switch off and proceed as follows:

**⚠ DANGER**



- **ONLY QUALIFIED ELECTRICIANS SHOULD CONNECT OR DISCONNECT INCOMING POWER TO TOOL.**

**Failure to do so could result in death or serious personal injury.**

- 1.** Disconnect power.
- 2.** Reverse any two (2) of three (3) power leads at the power source.

- 3.** Turn main power switch “On” and flip toggle switch to “Jog” and retest rotational direction. It should now be clockwise. If not, consult the Victaulic Tool Company.

**PRE-OPERATION ADJUSTMENTS**

Every Vic-Easy tool is checked, adjusted and tested at the factory prior to shipment. Before grooving, however, the following adjustments must be made in sequence to make sure of proper tool operation.

**⚠ WARNING**

- **Always turn off power before making any tool adjustments unless instructed otherwise.**

**Accidental start up of tool may result in serious personal injury.**

**GROOVING ROLLS**

Make sure the proper roll set is on the tool for the pipe size and material to be grooved. They are marked with the pipe size, part number and color coded for the pipe material to be grooved. See Tool Rating and Roll Selection chart on pages 33 and 34. If proper rolls are not on tool, refer to Roll Changing on page 20.

**⚠ CAUTION**

- **Make sure roll retaining bolts and set screws are tight.**

**Loose retaining bolts or set screws could seriously damage both the tool and rolls.**

**PIPE PREPARATION**

For proper tool operation, and production of proper pipe grooves, carefully observe the following pipe preparation tips.

- 1.** Pipe ends should be cut squarely in accordance with Column 2 note in the appropriate Roll Groove Specification chart, pages 35 - 38.
- 2.** Internal or external weld bead or seams must be ground flush with the pipe surface extending 2" back from the pipe end.

## VE414

- The end of the pipe, both inside and out, must be cleaned of loose rust, coarse scale, dirt and other foreign material.

### CAUTION

For maximum grooving roll life, remove foreign material and loose rust.

- Foreign material such as coarse scale or dirt might interfere with or damage the grooving rolls or distort the groove. Rust is an abrasive material and will tend to wear out the surface of the grooving rolls.

- Victaulic recommends that pipe shall be square ended. When using beveled pipe, standard wall or less, the bevel should not exceed 37½°. Square ended pipe must be used with FlushSeal® and EndSeal® gaskets. For heavier pipe walls, square ended pipe is required.

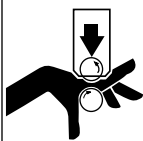
### GROOVABLE PIPE LENGTHS

The VE414 is capable of grooving short pipe lengths without the use of a pipe stand (See Table 1, page 9), or long pipe lengths up to double randoms (approximately 40 ft.) with the use of appropriate pipe stands.

### SHORT PIPE LENGTHS

Table 1 shows minimum and maximum pipe lengths that can be grooved without the need for a pipe stand. Refer to Grooving Operation on page 16 for instructions on how to groove short pipe lengths. For pipe longer than shown in Table 1, refer to Long Pipe Lengths on page 9.

### WARNING



Grooving rolls can crush or cut fingers and hands.

- Loading and unloading pipe will place your hands close to the rollers.
- Never groove pipe shorter than what is recommended in Table 1 on page 9.

### NOTICE

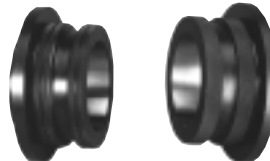
#### ALL VICTAULIC ROLL GROOVING TOOL OWNERS AND USERS

New Enhanced Tracking Rolls (ETR) for Victaulic Roll Grooving Tools

#### Enhanced Tracking Rolls (ETR)

In late 1993, Victaulic introduced an improved type of grooving roll called Enhanced Tracking Roll. The patented ETR allows hands-free grooving for short lengths of pipe as shown in Table 1. The photo below shows you the difference in appearance between the new ETR and the old type of roll. The new ETRs have two narrow grooves in the knurled surfaces; the older rolls do not.

ETRs are for the lower roll only. Your upper roll is compatible with the new ETR.



ETR Roll

Old Type Roll

**NOTE:** Roll grooving short length pipe will place your hands close to the rollers. Using the old type of lower roll requires you to manually guide the pipe while grooving short lengths. Using the new ETR allows hand-free grooving.

#### Who has ETRs?

You may have ETRs if you:

- Purchased or rented a Victaulic roll grooving tool after December 1993
- Purchased replacement grooving rolls after December 1993

**NOTE:** It is important to figure out what type of grooving rolls you have. If you bought replacement rolls recently, you may have both types. If you do not have ETRs and would like to order them, contact Victaulic for details.



**TABLE 1 – GROOVABLE PIPE LENGTHS**

2201-1B

Nom. Size Inches	Length Inches		Nom. Size Inches	Length Inches	
	Min.	Max.		Min.	Max.
2	8	36	6	10	28
2½	8	36	8 O.D.	10	24
3	8	36	8	10	24
3½	8	36	10	10	20/15*
4	8	36	12	12	18/14 †
4½	8	32	14	12	16/13 §
5	8	32	16	12	16^
6 O.D.	10	30			

\*20" long for aluminum, PVC and lightwall steel and stainless steel. 15" long for Sch. 30 and standard wall steel and stainless steel.

† 18" long for aluminum, PVC and lightwall steel and stainless steel. 14" long for Sch. 30 and standard wall steel and stainless steel.

§ 16" long for aluminum, PVC and lightwall steel and stainless steel. 13" long for Sch. 30 and standard wall steel and stainless steel.

^16" long for aluminum, PVC and lightwall steel and stainless steel. Always use a pipe stand only for Sch. 30 and standard wall steel and stainless steel.

If a pipe shorter than the minimum shown in Table 1 is needed, if possible, shorten the next to last piece of pipe enough so that the last piece of pipe is as long or longer than the minimum length specified in Table 1. See example below.

**NOTICE**

Pipe nipples shorter than those shown in Table 1 are available from Victaulic.

**Example:** A 20 ft. 4 in. length of 10 in. diameter pipe is needed to finish a section and you only have 20 ft. lengths available. Instead of roll grooving a 20 ft. piece of pipe and a 4 in. piece of pipe, follow these steps:

1. Refer to Table 1 and note that for 10 in. diameter pipe, the minimum length that should be grooved is 10 in.
2. Roll groove a 19 ft. 6 in. piece of pipe and a 10 in. piece of pipe. Refer to Long Pipe Lengths below.

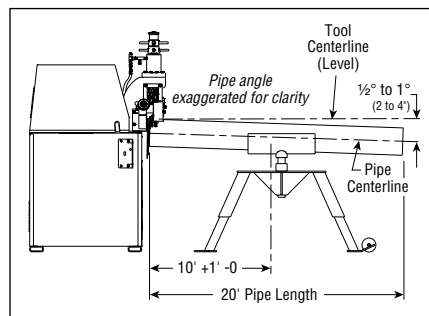
**LONG PIPE LENGTHS**

With pipe in excess of the maximum length shown in Table 1, a roller type pipe stand must be used.

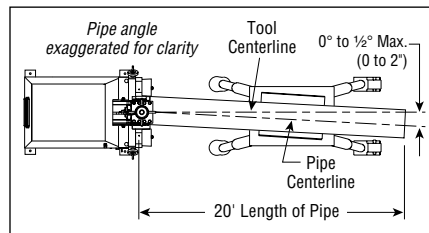
**NOTICE**

Figure 2 shows the Victaulic adjustable pipe stand (VAPS 112). VAPS 112 is suitable for ¾ - 12" pipe. Also available is Victaulic model VAPS 224 suitable for sizes 2 - 24". See Accessories on page 29.

1. Position pipe and pipe stand in accordance with Figures 2 and 3.



**SUPPORT OF PIPE**  
Figure 2



**TRACKING ANGLE**  
Figure 3

**CAUTION**

Pipe position will affect pipe flare.

- When pipe end flare is excessive, right-to-left tracking must be kept to a minimum. It may be necessary to use less than ½ degree.
- Assembly of couplings on pipe exceeding Maximum Allowable Flare, Column 8 in the Roll Groove Specifications charts, pages 35 - 38, may prevent closure of couplings pad-to-pad, allowing possible pipe separation, and result in property damage.
- Also, joint leakage may result due to excessive gasket distortion/damage.

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### CAUTION

Make sure tool is level (see Tool Setup).

- If pipe is grooved with back end of pipe (end of pipe which is not in tool) higher than the end being grooved, pipe may not track and excessive pipe end flare may result.
- Assembly of couplings on pipe exceeding Maximum Allowable Flare, Column 8 in the Roll Groove Specifications charts, pages 35 - 38, may prevent closure of couplings pad-to-pad, allowing possible pipe separation, and result in property damage.
- Also, joint leakage may result due to excessive gasket distortion/damage.

### NOTICE

For additional information about pipe stands, refer to the Operating Instructions included with your pipe stand.

### ROLL GUARD ADJUSTMENT

The VE414 guards must be adjusted every time rolls are changed or pipe size or wall thickness is different from pipe previously grooved.



**1.** Make sure the proper roll set is on the tool for the pipe size and material to be grooved. Rolls are marked with the pipe size, part number and are color coded for pipe material for your convenience. See Tool Rating and Roll Selection on pages 33 and 34. If the proper rolls are not on the tool, refer to Roll Changing on page 20.



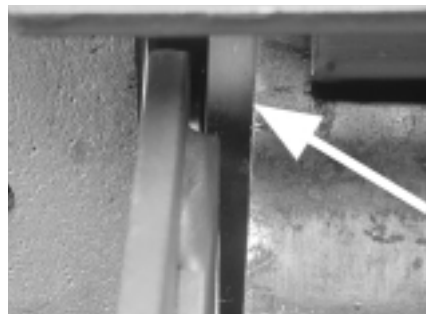
**2.** Loosen wing nuts and move the adjustable guards to the full up position. Tighten wing nuts.



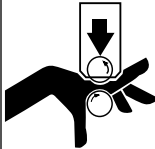
**3.** Set groove diameter stop to pipe size and schedule/thickness to be grooved. To do this, back off the depth adjuster lock, align the depth adjuster with the proper diameter and thickness. Lock the depth adjuster in position with the depth adjuster lock. See Groovable Pipe Lengths and cautionary information on pages 8 and 9.



**4.** Retract stabilizer, if necessary, to insert pipe. To do this, loosen the right hand stabilizer locking handle and retract stabilizer as shown to clear pipe when inserted onto lower roll. Fully retract the left hand stabilizer if it's not required. See Figure 4a of Pipe Stabilizer Adjustment section for guidelines concerning the use of the left hand stabilizer.



**5.** Insert a piece of pipe of the correct size and schedule/thickness to be grooved over the lower roll with the pipe end against the lower roll backstop flange. See Pipe Preparation on page 7.

<b>⚠ WARNING</b>	
	<p>Grooving rolls can crush or cut fingers and hands.</p> <ul style="list-style-type: none"> <li>• Loading and unloading pipe will place your hands close to the rollers.</li> <li>• Never groove pipe shorter than what is recommended in Table 1 on page 9.</li> </ul>



**6.** Set the main power switch to the “ON” position and flip toggle switch to “Jog”. It is located on the left-hand side of the enclosure.



**7.** With operator on the switch side of the machine, use the safety foot switch to energize the tool motor, bringing the upper roll down into firm contact with pipe. Withdraw foot from safety foot switch.

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**8.** Remove the guard setting pad from its storage hook. Hold the guard setting pad firmly down against the pipe and push it under the adjustable guards flush against the red plate.



**9.** Loosen the wing nuts and adjust each guard to conform to and lightly pinch the pad against the pipe. Tighten wing nuts to secure guards in position.

**10.** Remove the guard setting pad. Store the pad back on the hook provided.

**11.** Prepare to support pipe and flip toggle switch to “Normal Operation”. Arm/upper roll assembly will return to its upper position and pipe will release.



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### CAUTION

- Use the “Jog” mode only for pre-operation adjustments of the tool.
- Always return switch to “Normal Operation” at the completion of the pre-operation adjustments.
- When tool is left in “Jog” mode with power on, pipe is gradually released. This may result in pipe falling out of tool.

Failure to follow this instruction may cause personal injury, product or property damage.

The Series 414 pipe stabilizers are designed to prevent sway of 6 - 16" pipe. The length and size of pipe to be grooved will determine whether both stabilizers are required.

### PIPE STABILIZER ADJUSTMENT

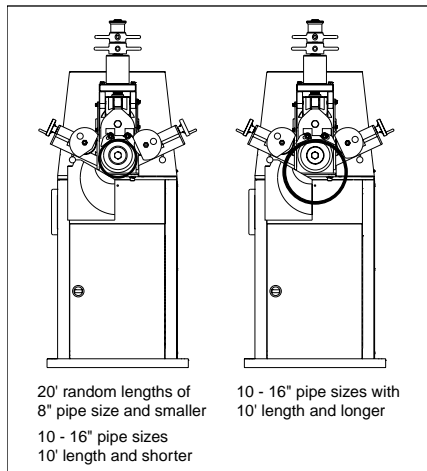


Figure 4a

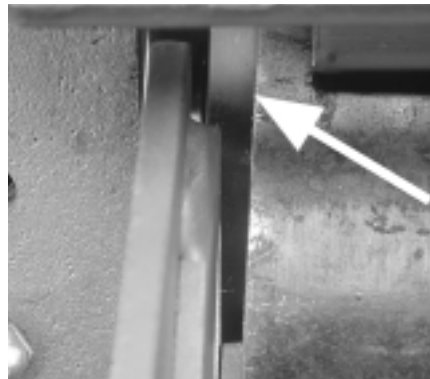
When roll grooving pipe sizes 8" and smaller, the left side stabilizer is not required. (It's the stabilizer on the switch side of the machine.)

When roll grooving pipe sizes 10 - 16", with a length less than 6 feet, the left side stabilizer should not be required.

**1.** Make sure proper roll set is on the tool for the pipe size and material to be grooved. Rolls are marked with pipe size, part number and are color coded for pipe material for your convenience. See Tool Rating and Roll Selection pages 33 and 34.



**2.** Loosen the stabilizer locking handles. Fully retract the left hand stabilizer



**3.** Insert a piece of pipe of the correct size and schedule to be grooved over the lower roll with the pipe end against the lower roll backstop flange.



**4.** Set the main power switch to the “ON” position and flip toggle switch to “Jog”. It is located on the left-hand side of the enclosure.

**5.** With operator on the switch side of the machine, jog (momentarily depress) the safety foot switch to energize the tool motor, producing lower roll rotation and bringing the upper roll down into firm contact with pipe. Withdraw foot from safety foot switch.

**6a.** When the roll grooving application requires only use of the right hand stabilizer, advance its roller inward with the handwheel to the position shown in Figure 4b, then tighten its locking handle. The right hand stabilizer will not require further adjustment on a given pipe size and thickness. Pipe of the same size and wall may be moved in and out of the tool without retracting the right hand stabilizer.

**6b.** When roll grooving short lengths or pipe sizes smaller than 8" NPS, retract and keep the left hand stabilizer out of the way as indicated in Figure 4a. This will make it easier to move pipe in and out of the tool.

**6c.** When the pipe size and length requires the use of the left hand stabilizer (see Figure 4a), advance its roller to within  $\frac{1}{2}$ " of the pipe, but do not tighten the locking handle. When roll grooving over 10' lengths of a 10" or larger pipe, the condition of the pipe seam may induce sway when the seam passes through the grooving rolls. If sway is pronounced while grooving the pipe, the left stabilizer must be utilized by bringing the wheel against the pipe.

**6d.** After completing the groove, if utilized, retract the left hand stabilizer about  $\frac{1}{2}$ " before withdrawing pipe from tool.

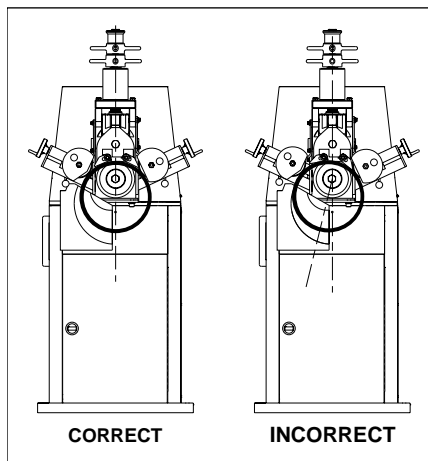


Figure 4b

### ⚠ CAUTION

Do not adjust stabilizers to push pipe to the left and off center from the rolls. Doing so will cause increased pipe end flare and shorten roller life.

- Assembly of couplings on pipe exceeding Maximum Allowable Flare, Column 8 in the Roll Groove Specifications charts, pages 35 - 38, may prevent closure of couplings pad-to-pad, allowing possible pipe separation and result in property damage.
- Also, joint leakage may result due to excessive gasket distortion/damage.

**7.** Prepare to support pipe and flip toggle switch to "Normal Operation". Upper roll assembly will return to its upper position and pipe will release.

### ⚠ CAUTION

- Use the "Jog" mode only for pre-operation adjustments of the tool.
- Always return switch to "Normal Operation" at the completion of the pre-operation adjustments.
- When tool is left in "Jog" mode with power on, pipe gradually releases which may result in pipe falling out of tool.

Failure to follow this instruction may cause personal injury, product or property damage.

### GROOVE DIAMETER STOP ADJUSTMENT/SELECTOR VALVE SETTING

The groove diameter stop must be adjusted for each pipe size or change in wall thickness. Groove diameter, identified as the "C" dimension for each pipe size, is listed under Standard Roll Groove Specifications on pages 35 - 38.

### NOTICE

To perform the following adjustments, use several short scrap sections of pipe (but not shorter than what is recommended in Table 1, page 9) of the proper material, diameter and thickness to be grooved.

**To achieve proper diameter:**

1. Determine the size and thickness of pipe to be grooved. See pipe dimensions on page 39 to determine proper schedule.

## VE414



**2.** Locate the proper size and schedule on the pipe size indicator above the hydraulic power cylinder. It is rotatable for easy viewing.



**3.** Back off the depth adjuster lock. Align the depth adjuster with the proper size and schedule as shown. Lock the depth adjuster in position with the depth adjuster lock.

### NOTICE

The markings provide an approximate groove diameter adjustment and are not "exact" groove diameter settings. Variations in actual pipe O.D.'s and wall thicknesses make it impossible to calibrate the diameter stop exactly.

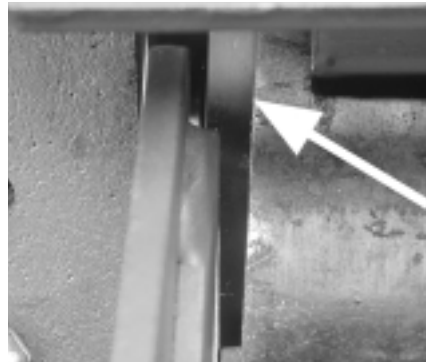


**4.** Set the selector valve on the power switch side of the tool to the color that matched the pipe size and schedule number color (red or black) of the pipe size indicator.

### NOTICE

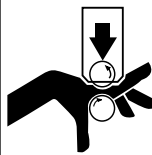
The selector valve only affects the maximum pressure at which the upper roll forms the groove. It does not affect the rate at which the roll retracts from the pipe at the completion of the groove.

Ram pressure during the formation of the groove can have a significant effect on pipe end flaring. The above recommended settings will produce accurate grooves in most situations. When operating in the high ram pressure or "red" setting, if excessive pipe flaring or stalling of drive motor occurs, changing the selector valve setting to low or "black" will usually correct the condition.



**5.** Using a piece of scrap pipe or short piece of pipe (refer to the Groovable Pipe Lengths Table on page 9) of the diameter and wall thickness to be grooved, place the pipe over the lower roll with the pipe end against the lower roll back stop flange.

### WARNING



Grooving rolls can crush or cut fingers and hands.

- Keep hands away from grooving rolls and stabilizer wheel.

- Never reach inside pipe end or across the tool or pipe during operation.

- Always groove pipe in a clockwise direction only.
- Never groove pipe shorter than what is recommended.
- Never wear loose clothing, loose gloves, or jewelry while operating tool.

**6.** Prepare a trial groove. To do so, follow the Grooving Operation procedures outlined on page 16.



**7.** After a trial groove is prepared and pipe removed from the tool, carefully check the groove diameter ("C" dimension), as charted on pages 35 - 38 under Roll Groove Specifications. The "C" dimension is best checked with a pipe tape. It also may be checked with a vernier caliper or narrow-land micrometer at two locations, 90° apart, around the groove. Average reading must equal the required groove diameter specification.

**! CAUTION**

- The "C" dimension (groove diameter) must always conform to specifications under Roll Groove Specifications, pages 35 - 38, to ensure proper joint performance.

Failure to do so could result in personal injury, property damage, improper installation, joint leakage or joint failure.

**8.** If groove diameter ("C" dimension) is not within tolerance, the diameter stop must be adjusted to obtain the proper dimension. To adjust for a **smaller groove diameter**, turn the depth adjuster **counterclockwise**. To adjust for a **bigger groove diameter**, turn adjuster **clockwise**. A quarter turn either way will change the groove diameter adjustment by **0.031"** (0.125" per full turn).

**9.** Prepare another trial groove and check the groove diameter again. Repeat Steps 7 and 8 until the groove diameter is within specification. If excessive pipe flaring or stalling of the drive motor occurs, even when roll grooving with the reduced ram pressure ("black" selector valve setting), adjustment of the Ram Speed Control Valve is required.

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**ADJUSTING THE RAM SPEED CONTROL VALVE**



The Ram Speed Control Valve adjustment is set at the maximum speed when the tool leaves the factory, which is satisfactory for the roll grooving of most pipes within the tool's rating. When excessive pipe flare or tool "stalling" exists, proceed as follows:



**1.** Set power switch to the "OFF" position.



**2.** Make sure the selector valve on the power switch side of the tool is adjusted to the "black" setting.

## VE414



**3.** Turn the Ram Speed Control Valve knob clockwise two to three revolutions to reduce flow.

**NOTE:** The Ram Speed Control Valve features both color coding and numerical readout for convenience.



**4.** Set the power switch to the "ON" position and make sure the toggle switch is on the "Normal Operation."

**5.** Follow the Grooving Operation procedures outlined in the manual and prepare another trial groove.

**6.** If the pipe flare is still found to be excessive or the tool still stalls, repeat Steps 1 through 5.

**NOTE:** The Ram Speed Control Valve affects both the rate at which the upper roll forms the groove and the rate at which the upper roll advances to contact the pipe. The rate at which the upper roll retracts from the pipe is not affected. The use of the slide spacer on 2 - 3½" pipe (see page 20 of this manual) will limit how far the upper roll retracts which minimizes the time and distance it must move down to groove the pipe.

### CAUTION

To prevent damage to the tool's hydraulics:

- Never operate the tool with the flow control valve completely closed.
- Never attempt to roll groove pipe while making an adjustment to the flow control valve.
- Never make adjustments to the flow control valve while the tool is under pressure.

Failure to follow these instructions may cause property damage.

## GROOVING OPERATION

### CAUTION

- Vic-Easy Series VE414 tools are designed **ONLY** for roll grooving pipe of the sizes, materials and wall thicknesses outlined under Tool Rating and Roll Selection on pages 33 and 34.

Grooving pipe other than that recommended will result in improper pipe end configuration or improper groove dimensions for applying Victaulic products.

Before grooving, make sure you have followed all instructions in:

- "Tool Setup" on page 6
- "Grooving Rolls" on page 7
- "Pipe Preparation" on page 7
- "Groovable Pipe Lengths" on page 8
- "Roll Guard Adjustment" on page 10
- "Pipe Stabilizer Adjustment" on page 12
- "Groove Diameter Stop Adjustment/ Valve Selector Setting" on page 13
- "Adjusting the Ram Speed Control Valve" on page 15

### WARNING



- Before operating tool, review all safety precautions on page 3.

Failure to do so may result in serious personal injury.

### DANGER



- To reduce the risk of electric shock, check the electrical source for proper grounding.

Failure to do so could result in death or serious personal injury.



**FOR GROOVING WITH PIPE IN ROLLER-TYPE PIPE SUPPORT**



**1.** Set power switch to the "ON" position.

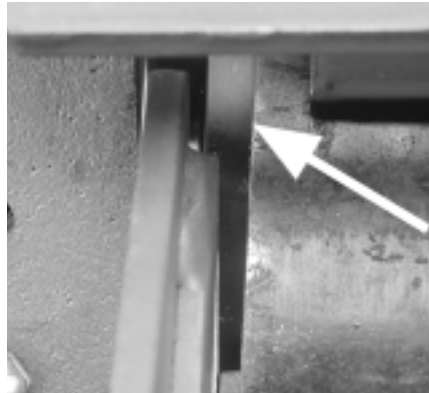
**2.** Momentarily depress safety foot switch to be certain tool is operational.



**3.** If the upper roll is not in the full open position, flip toggle switch on the left side of the tool to the "Normal Operation" position.

<b>! WARNING</b>	
	<ul style="list-style-type: none"> <li>• Grooving rolls can crush or cut fingers and hands.</li> <li>• Keep hands away from grooving rolls and stabilizer wheel.</li> <li>• Never reach inside pipe end or across the tool or pipe during operation.</li> </ul>
<ul style="list-style-type: none"> <li>• Always groove pipe in a clockwise direction only.</li> <li>• Never groove pipe shorter than what is recommended.</li> <li>• Never wear loose clothing, loose gloves, or jewelry while operating tool.</li> </ul>	

**VE414**



**4.** Insert pipe onto lower roll up against back top flange of lower roll as shown.

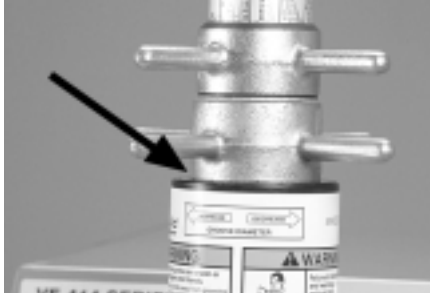


**5.** Operator should be positioned as shown.



**6.** To initiate grooving, depress and hold down the safety foot switch to start tool. This will produce rotation of the lower roll. The upper roll will move down to contact the pipe, starting the pipe rotation and grooving process.

## VE414

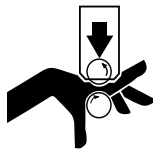


7. Let the grooving continue until the depth adjuster lock comes into full, firm contact with the top of the power cylinder. Continue pipe rotation for several revolutions to ensure groove completion.



8. Withdraw foot from safety foot switch and remove pipe from tool.

### ! WARNING



Grooving rolls can crush or cut fingers and hands.

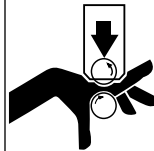
- Do not place hand(s) inside end of pipe to pull pipe out of tool or place hand(s) in area of grooving rolls or stabilizer roller.

### NOTICE

Groove diameter should be correct for the diameter and wall thickness of pipe for which it was set under Groove Diameter Stop Adjustment. Groove diameter should be checked and adjusted as necessary to ensure grooves are within specification

## GROOVING SHORT PIPE LENGTHS

### ! WARNING



Grooving rolls can crush or cut fingers and hands.

- Loading and unloading pipe will place your hands close to the rollers.
- Never groove pipe shorter than what is recommended in Table 1 on page 9.



1. Set power switch to the "ON" position.

2. Momentarily depress safety foot switch to be certain tool is operational.



3. If the upper roll is not in the full open position, flip toggle switch on the left side of the tool to the normal operation position.

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**4.** Operator should be positioned as shown.



**5.** Insert pipe onto lower roll up against back-stop flange of lower roll as shown. Depress and hold down the safety foot switch, while supporting the pipe. This will produce rotation of the lower roller. The upper roll will move down to contact the pipe, starting the pipe rotation and grooving process.

**6a.** If using ETR rolls (see Notice on page 8), remove hands from pipe.

**6b.** When grooving a short piece of pipe (8" minimum length) with old type rolls (see Notice on page 8), pull the pipe to the left and downward with your right hand. Do not lift up on the pipe or push it to the right, as the pipe will not track and may spin (walk) out of the rolls. To initiate power depress and hold down the safety foot pedal switch. This will produce rotation of the lower roll which serves to rotate the pipe, which in turn rotates the upper roll. Check the tracking of the pipe as it rotates to be certain it remains snug against the lower roll back stop flange. If it does not, stop the tool rotation by releasing the safety pedal switch and check to be certain pipe is level and properly positioned.

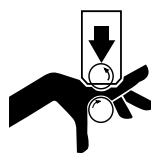


**7.** Let the grooving continue until the depth adjuster lock moves into full, firm contact with the top of the power cylinder. Continue pipe rotation for several revolutions to ensure groove completion.



**8.** Prepare to support pipe and withdraw foot from safety foot switch. Remove pipe from tool.

### ! WARNING



**Grooving rolls can crush or cut fingers and hands.**

- Do not place hand(s) inside end of pipe to pull pipe out of tool or place hand(s) in area of grooving rolls or stabilizer roller.

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### NOTICE

Groove diameter should be correct for the diameter and wall thickness of pipe for which it was set under Groove Diameter Stop Adjustment. Groove diameter should be checked and adjusted as necessary to ensure grooves are within specification.

## ROLL CHANGING

### NOTICE

Vic-Easy Series 414 roll grooving tools are designed for fast, easy grooving. Rolls accommodate several pipe sizes (refer to Tool Rating and Roll Selection on pages 33 and 34) eliminating the need for frequent roll changes. When a different size range is encountered or special grooving styles are required, the grooving rolls must be changed and Pre-Operation Adjustments performed again. Also, different pipe materials may require that the rolls be changed. Refer to Tool Rating and Roll Selection, pages 33 and 34, for proper roll selection.

## INSTALLATION AND REMOVAL OF SLIDE SPACER (2 - 3/2")

Slide/Upper Roll must return to its maximum upper position prior to changing rolls. The Slide Spacer will limit the travel of the Slide.



1. Set power switch to the "ON" position.



2. Flip toggle switch to the "Jog" position.



3. With operator on the switch side of the tool, use the safety foot switch to bring the upper roll down into firm contact with the pipe.



4. Withdraw foot from safety foot switch. Slide/Upper Roll will remain in the down position.

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**5.** Make sure guards are properly adjusted per the Roll Guard Adjustment procedure on page 10.



**6.** Place the slide spacer on top of the slide.



**7.** Flip toggle switch to the "Normal Operation" position. Slide/Upper Roll will return until the slide spacer contacts the cylinder mounting block.



**8.** Set power switch to the "OFF" position.

### ROLL REMOVAL

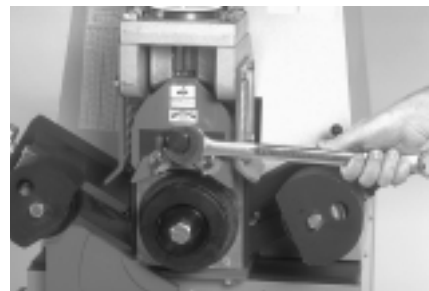


**1.** Set power switch to the "OFF" position.

### **⚠** WARNING

- Always turn off power before making roll change. Accidental start up of tool may result in serious personal injury.

### UPPER ROLL (4 - 16")



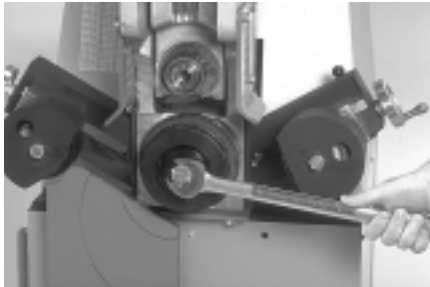
**1.** With a wrench, loosen and remove upper roll bolt as shown. Place on a clean surface.

## VE414



**2.** Slide the upper roll and retaining plate off the upper shaft as shown and store in the cabinet.

### LOWER ROLL



**1.** Loosen and remove the bolt and retaining plate as shown. Place on a clean surface.



**2.** Slide the lower roll off the main shaft as shown and store in the roll tote box supplied.



### NOTICE

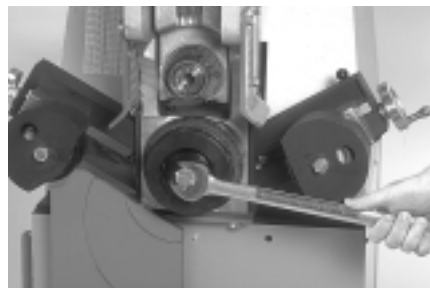
Be careful not to lose the Woodruff key. It should remain in the lower shaft. Inspect the Woodruff key and replace if damaged. Spare Woodruff keys are supplied with instruction manual.

### ROLL INSTALLATION (2 - 3½")

**1.** Remove existing rolls if necessary. Refer to Roll Removal on page 21.



**2.** Lightly lubricate lower shaft with a thin film of oil or grease before installing the lower roll. Slide lower roll (Part No. R-902-416-L03) onto main shaft. Properly align roll with Woodruff key on main shaft.



**3.** Place ¾" flat washer (Part No. N-W01-120-000) onto ¾" X 3¼" bolt (Part No. N-S02-120-304). Install bolt and washer as shown. Securely tighten bolt with a wrench.

**ROLL INSTALLATION (4 - 16")**

Clean upper shaft, main shaft and lower roll bore of any dirt and/or scale before installation of rolls. Inspect the roller bearing inside upper roll for proper lubrication and condition. Make repairs as necessary.

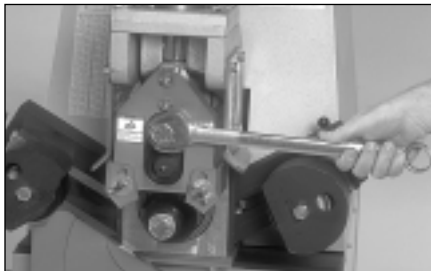
**LOWER ROLL**

**NOTICE**

**Clean main shaft and lower roll bore of any dirt and/or scale before installation. Make repairs as necessary.**



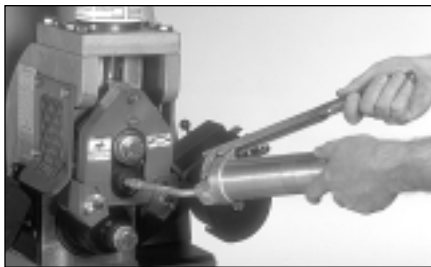
**4.** Carefully slide upper roll assembly onto upper shaft. Properly align the upper support block with the recess in the slide as shown.



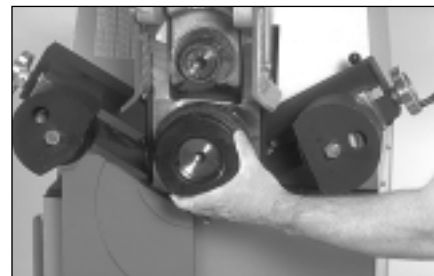
**5.** Thread the upper support block bolt (Part No. R-902-414-M03) into the upper shaft as shown. Tighten securely.

**NOTICE**

**As the upper support block bolt is tightened, it will draw the upper roll assembly into proper alignment with the lower roll.**

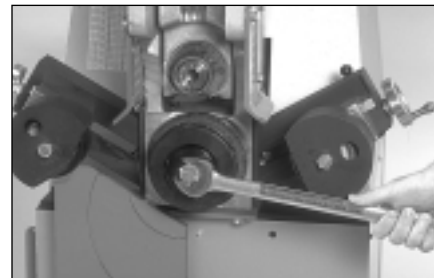


**6.** Lubricate the upper roll with No. 2EP Lithium base grease as shown. Refer to maintenance section for additional information.



**1.** Slide desired size lower roll fully onto main shaft with the marked side facing forward as shown. Properly align roll with the Woodruff key on main shaft.

**NOTE:** To aid in removing roll at a later time, you may apply a thin film of oil or grease (anti-seize lubricant) to the main shaft before installing the lower roll.



**2.** Install lower roll retaining plate (marked R-106-414-VEO) and bolt as shown. Securely tighten bolt with a wrench.

**UPPER ROLL**

**NOTICE**

**Clean upper shaft of any dirt and/or scale before installation of upper roll.**

**Inspect the roller bearing inside upper roll for proper lubrication and condition. Make repairs as necessary.**

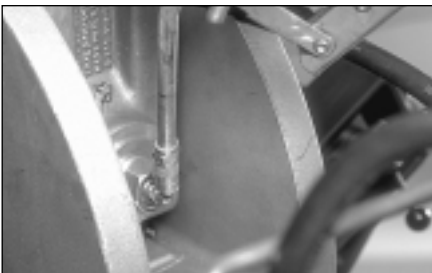
## VE414



**1.** Carefully slide desired size upper roll onto upper shaft as shown with markings facing forward.



**2.** Install upper roll retaining plate and bolt. Align tab on plate with recess in the slide as shown. Securely tighten bolt with a wrench.



**3.** Lubricate upper roll bearing with a No. 2EP Lithium base grease as shown. Refer to maintenance section for additional information.

**4.** Roll installation is complete.

### COPPER ROLL INSTALLATION

Removal and installation of 2 - 6" roll set for copper tubing is identical to removal and installation of standard roll set for 2 - 3½" steel pipe. See pages 22 - 23.

Removal and installation of 8" roll set for copper tubing is identical to removal and installation of standard roll sets for 4 - 16" steel pipe. See pages 20 - 23.

## MAINTENANCE

### GENERAL

This manual provides information to permit the operator of Series 414 tools to keep his equipment in top operating condition and to guide him in making repairs when it becomes necessary.

Replacement parts, applicable only to these tools, should be ordered from Victaulic to ensure proper operation of the tool. All parts are FOB Easton, Pennsylvania, at the price in effect at the time of ordering.

### NOTICE

Remember that preventative maintenance during operation will pay for itself in repair and operating savings.

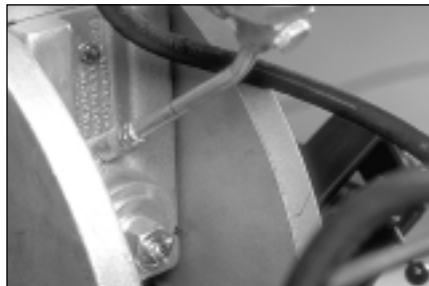
### ⚠ DANGER



- Before performing any repair or maintenance, disconnect the tool from the electrical source to prevent accidental start up of tool, unless otherwise instructed in this manual.

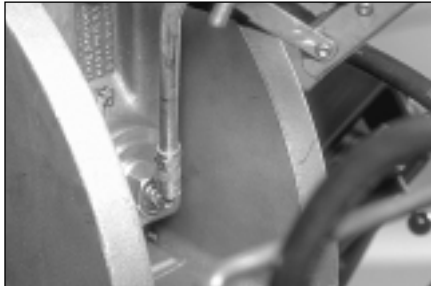
Failure to do so could result in death or serious personal injury.

After every eight hours of operation lubricate the tool. Always lubricate upper roll bearings when rolls are changed.

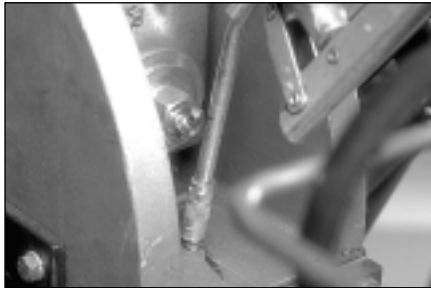


**1.** Grease slide gibs. Two grease fittings are provided as shown.





**2.** Grease upper roll bearing at fitting provided as shown.



**3.** Grease main shaft bearings at fittings provided as shown.



**4.** Grease the hub of both stabilizer wheels. The clearance hole in the wheel guard will provide access to the fitting in the wheel hub.

### HYDRAULIC SYSTEMS

Check the hydraulic oil level at least every 50 hours of operation, preferably before start up. The oil level should be no lower than 3/4" from the top of the tank. Fill with recommended hydraulic oil (refer to page 28) to no higher than 1/2" from the top of the tank. The 1/2" clearance is needed for the expansion of the hydraulic fluid when higher temperatures are reached.

### NOTICE

**Be sure to use a recommended hydraulic oil.**

Change the hydraulic oil and filter every 4000 hours of operation.

#### TO DRAIN THE OIL



**1.** Remove the hydraulic breather cap atop the hydraulic tank.



**2.** Remove the drain plug in the hydraulic line next to the tank. Permit the oil to drain into a 1 1/2 gallon or larger container.

#### TO REMOVE THE FILTER

- 1.** With an oil filter wrench, loosen the filter.
- 2.** By hand, remove the filter.

#### TO INSTALL THE FILTER

- 1.** With hydraulic oil, lightly lubricate the filter gasket.
- 2.** Fill the new filter with oil and install it hand tight. (Replacement filter part number: Victaulic # NH08000002)

#### TO REFILL THE OIL

- 1.** Replace the drain plug.
- 2.** Fill the hydraulic tank with a recommended hydraulic oil (refer to page 28) to a level 1/2" below the top of the tank.

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### HYDRAULIC FLUID BLEEDING PROCEDURE

**1.** Fill the hydraulic tank with a recommended hydraulic oil (refer to page 28) to a level  $\frac{1}{2}$ " below the top of the tank.



**2.** Remove the plug from the tee fitting near the hydraulic cylinder.



**3.** Install the bleeder tube (supplied with tool), hand tight, into the tee fitting.



**4.** Remove breather cap. Insert the end of the bleeder tube (clear hose) into the tank so the tube end is submerged in the hydraulic fluid.

**5.** Connect the tool to its proper power supply.

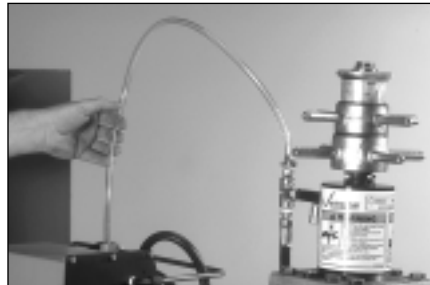
**6.** Set power switch to the "ON" position.

**7.** Flip toggle switch to the "Jog" position.

### **⚠** WARNING

- Lower roll will rotate during Step 8. Avoid contact with lower roll.

Failure to do so may result in serious personal injury.



**8.** Depress the safety foot switch and observe the hydraulic fluid start flowing through the bleeder tube. The fluid should have air bubbles in it. Continue running the fluid through the bleeder tube for at least five minutes. While doing this, lightly tap on all of the steel hydraulic tubes to free air trapped on tubing inside walls. Also, manually depress and release the hydraulic cylinder ram several times to free trapped air inside cylinder. Do this while the fluid is flowing through the bleeder tube. Once the fluid is flowing through the bleeder tube without any air bubbles, continue running for at least two to three minutes. Release foot switch.

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**9.** Remove the bleeder tube from the tee fitting and tank. Install the plug back into the tee fitting. Be certain air is not allowed back into the tee fitting while doing this.



**10.** Fill the hydraulic fluid level to  $\frac{1}{2}$ " from the top of the tank and install breather.



**11.** Set the depth stop on the tool to obtain a  $\frac{1}{4}$ " gap between the depth stop and cylinder.



**12.** Set the valve on the power switch side of the tool to the "black" position.

**13.** Flip toggle switch to "Normal Operation" position.



**14.** Depress the foot switch and observe the hydraulic ram motion. It should move down  $\frac{1}{4}$ " fairly rapidly. Release the foot switch and the hydraulic ram should return to its full up position. Repeat this several times.

### **! WARNING**

- Lower roll will rotate during Step 14. Avoid contact with lower roll.
- Failure to do so may result in serious personal injury.

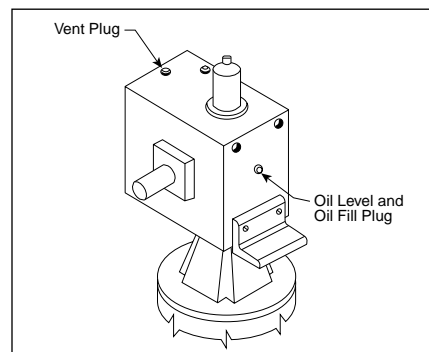
**15.** Set the valve on the front of the tool to the "red" position and repeat Step 14.

**16.** If the slide does not move fairly rapidly in the downward direction, repeat Steps 2 - 15.

**17.** Set power switch to the "OFF" position.

### **GEAR REDUCER OIL LEVEL CHECK**

**1.** Remove oil level plug from gear reducer (see Figure 5). Oil level should be even with bottom of hole.



**Figure 5**

**2.** To add oil, remove oil fill/level plug from side of gear reducer and fill to proper level (see Figure 5).

**3.** Install plug(s).

**GEAR REDUCERS OIL CAPACITY: 75 OZ.**

# VE414

## RECOMMENDED LUBRICANTS

### BEARING AND SLIDE GREASE

General Purpose E.P. Lithium Base Grease

MANUFACTURER	PRODUCT
• Amoco Oil . . . . .	Amolith Grease #2EP
• Arco Petroleum Prod. Co. . . . .	Litholine HEP 2
• Ashland Oil, Inc./Valvoline Oil Co. . . . .	Multi-Lube Lith. EP Grease
• Exxon Co., USA . . . . .	Lidok EP 2
• Gulf Oil Corp. . . . .	Gulfcrown Grease EP#2
• Kendall Refining Co. . . . .	L-426
• Lubriplate . . . . .	No. 630-2
• Mobil Oil Corp. . . . .	Mobilux EP2
• Pennzoil Prod. Co. . . . .	Pennlith EP 712 Lube
• Shell Oil Co. . . . .	Alvania EP2
• Sun Refining . . . . .	Sun Prestige 742 EP
• Texaco Inc. . . . .	Multifak EP2

### GEAR OIL

See tag on Gear Reducer.

### HYDRAULIC OIL

High Pressure Anti-Wear  
Hydraulic Oil ISO Grade 32

MANUFACTURER	PRODUCT
• Amoco Oil . . . . .	Rykon Oil #32
• Arco Petroleum Products Co. . . . .	Duro AW 32
• Ashland Oil, Inc./Valvoline Oil Co. . . . .	AW Oil #15
• Exxon Co., USA . . . . .	Nuto H 32
• Gulf Oil Corp. . . . .	Harmony 32 AW
• Kendall Refining Co. . . . .	Kenoil R&O AW-32
• Lubriplate . . . . .	HO-O
• Mobil Oil Corp. . . . .	Mobil DTE 24
• Pennzoil Products Co. . . . .	AW 32 Hyd. Oil/Penreco Oil 32
• Shell Oil Co. . . . .	Tellus 32
• Sun Refining . . . . .	Survis 706, 816 WR
• Texaco Inc. . . . .	Rando Oil HD 32

## PARTS ORDERING INFORMATION

When ordering parts, the following information is necessary for the Victaulic Tool Company to process the order promptly and send the correct part(s):

- (1)** Tool Model Number. VE414.
- (2)** Tool Serial Number. The serial number can be found on the side of the tool name plate.
- (3)** (Quantity), Item Number, Part Number and Description. Example: (1) #R-001-414-MCH, Main Shaft.
- (4)** Where to send the part (s):  
Company name  
Address
- (5)** To whose attention to send the part(s).  
Person's name
- (6)** Purchase Order Number
- (7)** Billing Address

Order parts from the nearest Victaulic sales office. Consult the back page of this Instruction Manual for the nearest Victaulic sales office.

**ACCESSORIES****VICTAULIC ADJUSTABLE  
PIPE STANDS****VAPS 112**

Victaulic Model 112, a portable, adjustable, roller type, four-leg pipe stand for use with Series VE414 and other Victaulic roll grooving tools, is available from Victaulic. Ball transfer rollers, adjustable for pipe from  $\frac{3}{4}$  - 12", will accommodate linear and rotational movement. Turnstile design permits easy swivel for grooving both pipe ends. Contact Victaulic for details.

**VAPS 224**

Also available is Victaulic Model 224. It has features similar to Model 112. It is suitable for pipe sizes from 2 - 24". Consult Victaulic for details.

**OPTIONAL ROLLS**

See Tool Rating and Roll Selection charts on pages 33 and 34 for rolls for different materials and groove specifications.

## VE414

### TROUBLESHOOTING

Problem	Possible Cause	Solution
Pipe will not stay in grooving rolls.	Incorrect pipe positioning. Improper manual grooving technique.	See Pipe Support section. See Grooving Operation - Grooving Short Pipe Lengths section.
Pipe stops rotating during grooving.	Rust or dirt has built up on lower roll. Excessive ram pressure. Ram Speed Control Valve requires adjustment. Worn grooving rolls.	Remove accumulation from lower roll with stiff wire brush. Reduce ram pressure by turning valve to the "black" position. Turn the Ram Speed Control Valve knob <b>clockwise</b> two to three revolutions to reduce flow. Inspect lower roll for worn knurls, replace if worn.
Pipe flare is excessive.	Excessive ram pressure. Ram Speed Control Valve requires adjustment. Pipe support adjusted too high. Tool is tilted forward. Incorrect pipe support positioning, pipe is "overtracking". Stabilizer(s) is pushing pipe to the left and off center from the rolls.	Reduce ram pressure by turning valve to the "black" position. Turn the Ram Speed Control Valve knob <b>clockwise</b> two to three revolutions to reduce flow. Check pipe levelness. See Pipe Support section. Check tool levelness. See Tool Setup section. Move pipe support to right. See Pipe Support section. Back off stabilizer(s) to the furthest point where it still stabilizes pipe effectively. See Stabilizer Adjustment section.
Pipe sways or vibrates from side to side.	Incorrect stabilizer adjustment. Use of left hand stabilizer may be required, if not already utilized.	Move stabilizer in or out until pipe rotates smoothly. See Stabilizer Adjustment section for pipe sizes and length that require the use of the left hand stabilizer.
While grooving, loud squeaks echo through the pipe.	Incorrect pipe support positioning, pipe is "overtracking". Pipe not square cut.	Move pipe support to the right. See Pipe Support section. Cut pipe end squarely.

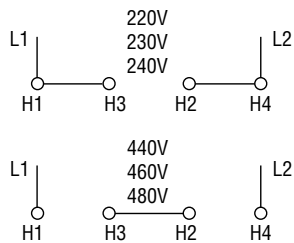
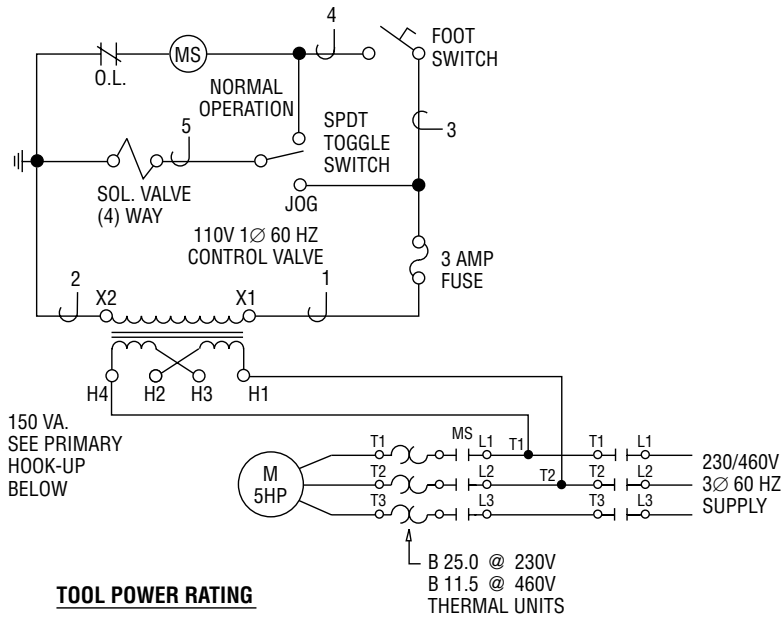
Continued on page 31.

## TROUBLESHOOTING

Problem	Possible Cause	Solution
During grooving, loud thumps or bangs occur about once every revolution of the pipe.	Pipe has a pronounced weld seam.	Grind welds flush with pipe surface inside and out 2" back from pipe end.
Pump won't start or lower roll won't rotate.	Main power is off. Thermal units tripped. Fuses blown.	Turn on main power. Reset thermal units. Check fuses and replace as necessary.
Tool comes up to operating pressure excessively slow.	Air in hydraulic system.	Bleed air from hydraulic system.
Upper roll won't rotate	Dirt trapped between roll and slide or retaining plate.	Remove upper roll and clean off dirt. Re-install upper roll.

# VE414

## ELECTRICAL SCHEMATIC



### TRANSFORMER CONNECTIONS



**TOOL RATING AND ROLL SELECTION**

**STANDARD AND “ES” ROLLS – COLOR CODED BLACK**

0135-2A

SIZE Nominal Inches Actual mm	1		2		3		4		Standard Roll Nos.	“ES” Roll Nos.
	Nominal Wall Thickness Dimensions – Inches/mm									
	Steel Pipe		Stainless Steel Pipe		Aluminum Pipe		PVC Plastic Pipe			
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.		
2 60.3	0.065 1.65	0.154 3.91	0.154 3.91	0.154 3.91	0.065 1.7	0.154 3.91	0.154 3.91	0.154 3.91	Lower Roll R902416L03	Lower Roll RZ02416L03
2½ 73.0	0.083 2.11	0.203 5.16	0.203 5.16	0.203 5.16	0.083 2.11	0.203 5.16	0.203 5.16	0.276 7.01		
3 88.9	0.083 2.11	0.216 5.49	0.216 5.49	0.216 5.49	0.083 2.11	0.216 5.49	0.216 5.49	0.300 7.62	Upper Roll R9A2416U03	Upper Roll RZA2416U03
3½ 101.6	0.083 2.11	0.226 5.74	0.226 5.74	0.226 5.74	0.083 2.11	0.226 5.74	0.226 5.74	0.318 8.07		
4 114.3	0.083 2.11	0.375 9.53	0.237 6.02	0.237 6.02	0.083 2.11	0.237 6.02	0.237 6.02	0.337 8.55	Lower Roll R904416L06	Lower Roll RZ04416L06
4½ 127.0	0.095 2.41	0.375 9.53	0.237 6.02	0.237 6.02	0.095 2.41	0.237 6.02	– –	– –		
5 141.3	0.109 2.77	0.375 9.53	0.258 6.55	0.258 6.55	0.109 2.77	0.258 6.55	0.258 6.55	0.375 9.53	Upper Roll R9A4416U06	Upper Roll RZA4416U06
6 O.D. 152.4	0.109 2.77	0.375 9.53	0.258 6.55	0.258 6.55	0.109 2.77	0.258 6.55	– –	– –		
6 168.3	0.109 2.77	0.375 9.53	0.280 7.11	0.280 7.11	0.109 2.77	0.280 7.11	0.280 7.11	0.432 10.97	Lower Roll R908416L12	Lower Roll RZ08416L12
8 O.D. 203.2	0.109 2.77	0.375 9.53	0.250 6.35	0.322 8.22	0.109 2.77	0.322 8.22	– –	– –		
8 219.1	0.109 2.77	0.375 9.53	0.250 6.35	0.322 8.22	0.109 2.77	0.322 8.22	0.322 8.22	0.500 12.70	Upper Roll R9A8416U16	Upper Roll RZA8416U12
10 273.0	0.134 3.4	0.375 9.53	0.250 6.35	0.365 9.27	0.134 3.40	0.250 6.35	0.365 9.27	0.593 15.06		
12 323.9	0.156 4.0	0.375 9.53	0.250 6.35	0.375 9.53	0.156 3.96	0.250 6.35	0.406 10.3	0.687 17.45	Lower Roll R914416L16	–
14 355.6	0.156 3.96	0.375 9.53	0.312 7.92	0.375 9.53	– –	– –	0.438 11.13	0.438 11.13		
15 O.D. 381.0	0.165 4.19	0.375 9.53	0.312 7.92	0.375 9.53	– –	– –	– –	– –	Upper Roll R9A8416U16	–
16 406.4	0.165 4.19	0.375 9.53	0.312 7.92	0.375 9.53	– –	– –	0.500 12.70	0.500 12.70		

Notes for Standard and “ES” Rolls:

COLUMN 1: **Steel Pipe** – Maximum ratings on steel are limited to pipe of 180 BHN (Brinell Hardness Number) and less.

COLUMN 2: **Stainless Steel Pipe** – Types 304/304L and 316/316L

COLUMN 3: **Aluminum Pipe** – Alloys 6061-T4 and 6063-T4

COLUMN 4: **PVC Plastic Pipe** – PVC Type I Grade I - PVC1120; PVC Type I Grade II - PVC1220; PVC Type II Grade I - PVC2116

The following O.D. sized pipe may also be grooved: 3" O.D., 4¼" O.D., 5¼" O.D., 5½" O.D., 6" O.D., 6¼" O.D., 6½" O.D., 8" O.D., 10" O.D. and 12" O.D. Contact Victaulic for details.

# VE414

## ROLLS FOR SCHEDULE 5S AND 10S STAINLESS STEEL PIPE (RX ROLLS) – COLOR CODED SILVER

0135-3A

SIZE Nominal Inches Actual mm	Nominal Stainless Steel Pipe Wall Thickness Inches/mm			RX Roll Nos.	
	Sch. 5S	Sch. 10S	Sch. 10		
2 60.3	0.065 1.7	0.109 2.8	–	Lower Roll RX02416L03	Upper Roll RXA2416U03
2½ 73.0	0.083 2.1	0.120 3.0	–		
3 88.9	0.083 2.1	0.120 3.0	–		
3½ 101.6	0.083 2.1	0.120 3.0	–		
4 114.3	0.083 2.1	0.120 3.0	–	Lower Roll RX04416L06	Upper Roll RXA4416U06
5 141.3	0.109 2.8	0.134 3.4	–		
6 168.3	0.109 2.8	0.134 3.4	–		
8 219.1	0.109 2.8	0.148 3.8	–	Lower Roll RX08416L12	Upper Roll RXA8416U16
10 273.0	0.134 3.4	0.165 4.2	–		
12 323.9	0.156 4.0	0.180 4.6	–		
14 355.6	0.156 3.96	0.188 4.77	0.250 6.35		
16 406.4	0.165 4.19	0.188 4.77	0.250 6.35	Lower Roll RX14416L16	Upper Roll RXA8416U16

† Types 304/304L and 316/316L.

## ROLLS FOR COPPER TUBING – COLOR CODED COPPER †

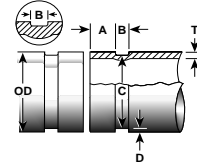
0135-4A

SIZE Nominal Inches Actual mm	Nominal Copper Tubing Wall Thickness Inches/mm		Copper Roll Nos.	
	Min.	Max.		
2 60.3	0.042 1.1	0.083 2.1	Lower Roll RR02416L06	Upper Roll RRA2416U06
2½ 73.0	0.065 1.7	0.095 2.4		
3 88.9	0.045 1.1	0.109 2.8		
4 114.3	0.058 1.5	0.134 3.4		
5 141.3	0.072 1.8	0.160 4.1		
6 168.3	0.083 2.1	0.192 4.9		
8 219.1	0.109 2.8	0.271 6.9	Lower Roll RR08416L08	Upper Roll RRA8416U08

† Drawn copper tubing – DWV, ASTM B306 - Type "M", ASTM B88 – Type "L", ASTM B88 – Type "K", ASTM B88.  
Rolls are available for grooving British Standard, Australian Standard and DIN Standard copper tube, contact Victaulic for details.

**ROLL GROOVE SPECIFICATIONS**

**STEEL PIPE AND ALL MATERIALS  
GROOVED WITH STANDARD AND RX ROLLS**



0135-6A

1  SIZE Nominal Inches Actual mm	2		3		4		5		6	7	8
	Dimensions – Inches/millimeters										
	Pipe Outside Dia.		Gasket Seat A ±0.03 ±0.76		Groove Width B ±0.03 ±0.76		Groove Dia. C		Grv. Depth D (ref.)	Nom. Min. Allow. Wall Thk. T	Max. Allow. Flare Dia.
	Basic	Tolerance + –	Basic	Tol. +0.000 +0.00	Basic	Tol. +0.000 +0.00					
2 60.3	2.375 60.3	0.024 0.61	0.024 0.61	0.625 15.88	0.344 8.74	2.250 57.15	-0.015 -0.38	0.063 1.60	0.065 1.65	2.48 63.0	
2½ 73.0	2.875 73.0	0.029 0.74	0.029 0.74	0.625 15.88	0.344 8.74	2.720 69.09	-0.018 -0.46	0.078 1.98	0.083 2.11	2.98 75.7	
3 O.D. 76.1	3.000 76.1	0.030 0.76	0.030 0.76	0.625 15.88	0.344 8.74	2.845 72.26	-0.018 -0.46	0.078 1.98	0.083 2.11	3.10 78.7	
3 88.9	3.500 88.9	0.035 0.89	0.031 0.79	0.625 15.88	0.344 8.74	3.344 84.94	-0.018 -0.46	0.078 1.98	0.083 2.11	3.60 91.4	
3½ 101.6	4.000 101.6	0.040 1.02	0.031 0.79	0.625 15.88	0.344 8.74	3.834 97.38	-0.020 -0.51	0.083 2.11	0.083 2.11	4.10 104.1	
4¼ O.D. 108.0	4.250 108.0	0.043 1.04	0.031 0.79	0.625 15.88	0.344 8.74	4.084 103.73	-0.020 -0.51	0.083 2.11	0.083 2.11	4.35 110.5	
4 114.3	4.500 114.3	0.045 1.14	0.031 0.79	0.625 15.88	0.344 8.74	4.334 110.08	-0.020 -0.51	0.083 2.11	0.083 2.11	4.60 116.8	
4½ 127.0	5.000 127.0	0.050 1.27	0.031 0.79	0.625 15.88	0.344 8.74	4.834 122.78	-0.020 -0.51	0.083 2.11	0.095 2.41	5.10 129.5	
5¼ O.D. 133.0	5.250 133.0	0.053 1.70	0.031 0.79	0.625 15.88	0.344 8.74	5.084 129.13	-0.020 -0.51	0.083 2.11	0.109 2.77	5.35 135.9	
5½ O.D. 139.7	5.500 139.7	0.056 1.42	0.031 0.79	0.625 15.88	0.344 8.74	5.334 135.48	-0.020 -0.51	0.083 2.11	0.109 2.77	5.60 142.2	
5 141.3	5.563 141.3	0.056 1.42	0.031 0.79	0.625 15.88	0.344 8.74	5.395 137.03	-0.022 -0.56	0.084 2.13	0.109 2.77	5.66 143.8	
6 O.D. 152.4	6.000 152.4	0.056 1.42	0.031 0.79	0.625 15.88	0.344 8.74	5.830 148.08	-0.022 -0.56	0.085 2.16	0.109 2.77	6.10 154.9	
6¼ O.D. 159.0	6.250 159.0	0.063 1.60	0.031 0.79	0.625 15.88	0.344 8.74	6.032 153.21	-0.030 -0.56	0.085 2.16	0.109 2.77	6.35 161.3	
6½ O.D. 165.1	6.500 165.1	0.063 1.60	0.031 0.79	0.625 15.88	0.344 8.74	6.330 160.78	-0.022 -0.56	0.085 2.16	0.109 2.77	6.60 167.6	
6 168.3	6.625 168.3	0.063 1.60	0.031 0.79	0.625 15.88	0.344 8.74	6.455 163.96	-0.022 -0.56	0.085 2.16	0.109 2.77	6.73 170.9	
8 O.D. 203.2	8.000 203.2	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	7.816 198.53	-0.025 -0.64	0.092 2.34	0.109 2.77	8.17 207.5	
8 219.1	8.625 219.1	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	8.441 214.40	-0.025 -0.64	0.092 2.34	0.109 2.77	8.80 223.5	
10 O.D. 254.0	10.000 254.0	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	9.812 249.23	-0.027 -0.69	0.094 2.39	0.134 3.40	10.17 258.3	

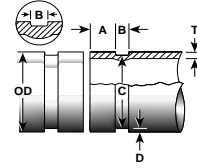
Table continued on page 36.

See column notes on page 36.

# VE414

## ROLL GROOVE SPECIFICATIONS

### STEEL PIPE AND ALL MATERIALS GROOVED WITH STANDARD AND RX ROLLS



0135-6A

1 SIZE Nominal Inches Actual mm	2		3		4		5		6	7	8
	Dimensions – Inches/millimeters										
	Pipe Outside Dia.			Gasket Seat A ±0.03 ±0.76	Groove Width B ±0.03 ±0.76	Groove Dia. C		Grv. Depth D (ref.)	Nom. Min. Allow. Wall Thk. T	Max. Allow. Flare Dia.	
	Basic	Tolerance +      -				Basic	Tol. +0.000 +0.00				
10 273.0	10.750 273.0	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	10.562 268.28	-0.027 -0.69	0.094 2.39	0.134 3.40	10.92 277.4	
12 O.D. 304.8	12.000 304.8	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	11.781 299.24	-0.030 -0.76	0.109 2.77	0.156 3.96	12.17 309.1	
12 323.9	12.750 323.9	0.063 1.60	0.031 0.79	0.750 19.05	0.469 11.91	12.531 318.29	-0.030 -0.76	0.109 2.77	0.156 3.96	12.92 328.2	
14 O.D. 355.6	14.000 355.6	0.063 1.60	0.031 0.79	0.938 23.83	0.469 11.91	13.781 350.04	-0.030 -0.76	0.109 2.77	0.156 3.96	14.10 358.1	
15 O.D. 381.0	15.000 381.0	0.063 1.60	0.031 0.79	0.938 23.83	0.469 11.91	14.781 375.44	-0.030 -0.76	0.109 2.77	0.165 4.19	15.10 383.5	
16 O.D. 406.4	16.000 406.4	0.063 1.60	0.031 0.79	0.938 23.83	0.469 11.91	15.781 400.84	-0.030 -0.76	0.109 2.77	0.165 4.19	16.10 408.9	

#### STANDARD ROLL GROOVE SPECIFICATION NOTES:

COLUMN 1: **Nominal IPS Pipe size.**

COLUMN 2: **IPS outside diameter** – The outside diameter of roll grooved pipe shall not vary more than the tolerance listed. For IPS pipe the maximum allowable tolerance from square cut ends is 0.030" for ¾ - 3½"; 0.045" for 4 - 6"; and 0.060" for sizes 8" O.D. and above measured from true square line.

COLUMN 3: **Gasket seat** – The pipe surface shall be free from indentations, roll marks, and projections from the end of the pipe to the groove, to provide a leak-tight seal for the gasket. All loose paint, scale, dirt, chips, grease and rust must be removed. It continues to be Victaulic's first recommendation that pipe be square cut. When using beveled pipe contact Victaulic for details. Square cut pipe **must** be used with FlushSeal® and EndSeal® gaskets. Gasket seat "A" is measured from the end of the pipe. **IMPORTANT:** Roll grooving of beveled end pipe may result in unacceptable pipe end flare. See column 8.

COLUMN 4: **Groove width** – Bottom of groove to be free of loose dirt, chips, rust and scale that may interfere with proper coupling assembly. Corners at bottom of groove must have a radius of the following dimensions. For IPS steel pipe, .06R on ¾ - 1½", .08R on 2 - 6", .05R on 8" and up.

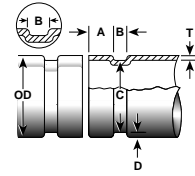
COLUMN 5: **Groove outside diameter** – The groove must be of uniform depth for the entire pipe circumference. Groove must be maintained within the "C" diameter tolerance listed.

COLUMN 6: **Groove depth** – For reference only. Groove must conform to the groove diameter "C" listed.

COLUMN 7: **Minimum allowable wall thickness** – This is the minimum wall thickness which may be roll grooved – except PVC.

COLUMN 8: **Maximum allowable pipe end flare diameter** – Measured at the most extreme pipe end diameter square cut or beveled.

**DRAWN COPPER TUBING**



25.06-1A

1 SIZE Nominal Inches Actual mm	2 Pipe O.D. Inches/mm		3 Dimensions – Inches/millimeters					8 Max. Allow. Flare Dia.
	Basic	Tol.	4 Gasket Seat A ±0.03/±0.76	5 Groove Width B +0.03/-0.00 +0.76/-0.00	6 Groove Diameter C +0.00	7 Groove Depth (ref.) D	Min. Allow. Wall Thick. T	
2 60.3	2.125 54.0	±0.002 ±0.05	0.610 15.5	0.300 7.6	2.029 51.5	0.048 1.2	0.064 1.6	2.220 56.4
2½ 73.0	2.625 66.7	±0.002 ±0.05	0.610 15.5	0.300 7.6	2.525 64.1	0.050 1.2	0.065 1.7	2.720 69.1
3 88.9	3.125 79.4	±0.002 ±0.05	0.610 15.5	0.300 7.6	3.025 76.8	0.050 1.2	DWV	3.220 81.8
4 114.3	4.125 104.8	±0.002 ±0.05	0.610 15.5	0.300 7.6	4.019 102.1	0.053 1.4	DWV	4.220 107.2
5 141.3	5.125 130.2	±0.002 ±0.05	0.610 15.5	0.300 7.6	4.999 127.0	0.053 1.4	DWV	5.220 132.6
6 168.3	6.125 155.6	±0.002 ±0.05	0.610 15.5	0.300 7.6	5.999 152.3	0.063 1.6	DWV	6.220 158.0
8 219.1	8.125 206.4	*	0.610 15.5	0.300 7.6	7.959 202.2	0.083 2.1	DWV	8.220 208.8

\*Tolerances for 8" (219.1 mm) are + 0.002 (0.5 mm) –0.004 (–.10 mm).

**COPPER TUBING ROLL SPECIFICATIONS NOTES**

COLUMN 1: **Nominal ASTM B-88 drawn copper tubing size.**

COLUMN 2: **Outside diameter** – The outside diameter of roll grooved tubing shall not vary more than the tolerance listed. The maximum allowable tolerance from square cut ends is 0.030" (0.8 mm) for 2 - 3" (60.3 - 88.9 mm); 0.045" (1.1 mm) for 4 - 6" (114.3 - 168.3 mm), measured from true square line.

COLUMN 3: **Gasket seat** – The tubing surface shall be free from indentations, roll marks, and projections from the end of the tubing to the groove, to provide a leak-tight seat for the gasket. All loose scale, dirt, chips and grease must be removed.

COLUMN 4: **Groove width** – Bottom of groove to be free of loose dirt, chips and scale that may interfere with proper coupling assembly.

COLUMN 5: **Groove outside diameter** – The groove must be uniform depth for the entire tubing circumference. Groove must be maintained within the "C" diameter tolerance listed.

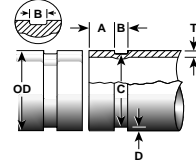
COLUMN 6: **Groove depth** – For reference only. Groove must conform to the groove diameter "C" listed.

COLUMN 7: **ASTM B-306** – Drain waste and vent (DWV) is minimum wall thickness copper tubing which may be roll grooved.

COLUMN 8: **Maximum allowable end flare diameter** – Measured at the most extreme tubing end dia.

# VE414

## STEEL PIPE AND ALL MATERIALS GROOVED WITH "ES" ROLLS



0886-6A

1	2		3		4		5		6	7	8	
	Dimensions – Inches/mm											
	SIZE Nom. In. Actual mm	Pipe Outside Dia. O.D.			Gasket Seat A		Groove Width B		Groove Diameter C		Groove Depth (ref.) D	Min. Allow. Wall Thick. T
Basic		Tolerance + –		Basic	Tol. +0.000 +0.00	Basic	Tol. -0.000 -0.00	Basic	Tol. +0.000 +0.00			
2 60.3	2.375 60.3	+0.024 +0.61	-0.024 -0.61	0.572 14.53	-0.020 -0.51	0.250 6.35	+0.015 +0.38	2.250 57.15	-0.015 -0.38	0.063 1.60	0.065 1.65	2.48 63.0
2½ 73.0	2.875 73.0	+0.029 +0.74	-0.029 -0.74	0.572 14.53	-0.020 -0.51	0.250 6.35	+0.015 +0.38	2.720 69.09	-0.018 -0.46	0.078 1.98	0.083 2.11	2.98 75.7
3 88.9	3.500 88.9	+0.035 +0.89	-0.031 -0.79	0.572 14.53	-0.020 -0.51	0.250 6.35	+0.015 +0.38	3.344 84.94	-0.018 -0.46	0.078 1.98	0.083 2.11	3.60 91.4
4 114.3	4.500 114.3	+0.045 +1.14	-0.031 -0.79	0.610 15.49	-0.020 -0.51	0.300 7.62	+0.020 +0.51	4.334 110.08	-0.020 -0.51	0.083 2.11	0.083 2.11	4.60 116.8
6 168.3	6.625 168.3	+0.063 +1.60	-0.031 -0.79	0.610 15.49	-0.020 -0.51	0.300 7.62	+0.020 +0.51	6.455 163.96	-0.022 -0.56	0.085 2.16	0.109 2.77	6.73 170.9
8 219.1	8.625 219.1	+0.063 +1.60	-0.031 -0.79	0.719 18.26	-0.020 -0.51	0.390 9.91	+0.020 +0.51	8.441 214.40	-0.025 -0.64	0.092 2.34	0.109 2.77	8.80 223.5
10 273.0	10.750 273.0	+0.063 +1.60	-0.031 -0.79	0.719 18.26	-0.020 -0.51	0.390 9.91	+0.020 +0.51	10.562 268.28	-0.027 -0.69	0.094 2.39	0.134 3.40	10.92 277.4
12 323.9	12.750 323.9	+0.063 +1.60	-0.031 -0.79	0.719 18.26	-0.020 -0.51	0.390 9.91	+0.020 +0.51	12.531 318.29	-0.030 -0.76	0.109 2.77	0.156 3.96	12.92 328.2

### "ES" ROLL GROOVE SPECIFICATIONS NOTES

COLUMN 1: Nominal IPS pipe size.

COLUMN 2: **IPS outside diameter/Metric (ISO) outside diameter** – The outside diameter of roll grooved pipe shall not vary more than the tolerance listed. For IPS pipe, the maximum allowable tolerance from square cut ends is 0.030" for ¾ - 3½" (26.7 - 101.6 mm); 0.045" for 4 - 6" (114.3 - 168.3 mm); and 0.060" for sizes 8" O.D. (219.1 mm) and above measured from true square line. For (ISO) metric pipe, the maximum allowable tolerance from square cut ends is 0.76 mm for sizes 26.7 - 88.9 mm; 1.14 mm for sizes 114.3 - 168.3 mm; and 1.52 mm for sizes 219.1 mm and above, measured from the true square line.

COLUMN 3: **Gasket seat** – The pipe surface shall be free from indentations, roll marks, and projections from the end of the pipe to the groove, to provide a leak-tight seal for the gasket. All loose paint, scale, dirt, chips, grease and rust must be removed. Square cut pipe must be used with FlushSeal® and EndSeal® gaskets. Gasket seat "A" is measured from the end of the pipe. IMPORTANT: Roll grooving may result in unacceptable pipe end flare.

COLUMN 4: **Groove width** – Bottom of groove to be free of loose dirt, chips, rust and scale that may interfere with proper coupling assembly. Corners at bottom of roll groove must be radiused. For IPS pipe, 0.04R on 1½ - 12" (48.3 - 323.9 mm). For (ISO) metric pipe, 1.2R mm on 26.7 - 323.9 mm.

COLUMN 5: **Groove outside diameter** – The groove must be uniform depth for the entire pipe circumference. Groove must be maintained within the "C" diameter tolerance listed.

COLUMN 6: **Groove depth** – For reference only. Groove must conform to the groove diameter "C" listed.

COLUMN 7: **Minimum allowable wall thickness** – This is the minimum wall thickness which may be grooved.

**DIMENSIONS**

**SEAMLESS AND WELDED STEEL PIPE\***

2201-2A

SIZE Nominal Inches Actual mm	Nominal Wall Thickness – Inches/mm							
	Sch. 5S	Sch. 10S	Sch. 10	Sch. 20	Sch. 30	Sch. 40	Sch. STD.	Sch. 80
2 60.3	0.065 1.7	0.109 2.8	– –	– –	– –	0.154 3.9	0.154 3.9	0.218 5.5
2½ 73.0	0.083 2.1	0.120 3.0	– –	– –	– –	0.203 5.2	0.203 5.2	0.276 7.0
3 88.9	0.083 2.1	0.120 3.0	– –	– –	– –	0.216 5.5	0.216 5.5	0.300 7.6
3½ 101.6	0.083 2.1	0.120 3.0	– –	– –	– –	0.226 5.7	0.226 5.7	0.318 8.1
4 114.3	0.083 2.1	0.120 3.0	– –	– –	– –	0.237 6.0	0.237 6.0	0.337 8.6
5 141.3	0.109 2.8	0.134 3.4	– –	– –	– –	0.258 6.6	0.258 6.6	0.375 9.5
6 168.3	0.109 2.8	0.134 3.4	– –	– –	– –	0.280 7.1	0.280 7.1	0.432 11.0
8 219.1	0.109 2.8	0.148 3.8	– –	0.250 6.4	0.277 7.0	0.322 8.2	0.322 8.2	0.500 12.7
10 273.0	0.134 3.4	0.165 4.2	– –	0.250 6.4	0.307 7.8	0.365 9.3	0.365 9.3	0.594 15.1
12 323.9	0.156 4.0	0.180 4.6	– –	0.250 6.4	0.330 8.4	0.406 10.3	0.375 9.5	0.688 17.4
14 355.6	0.156 4.0	0.188 4.8	0.250 6.4	0.312 7.9	0.375 9.5	0.437 11.1	0.375 9.5	0.750 19.0
16 406.4	0.165 4.2	0.188 4.8	0.250 6.4	0.312 7.9	0.375 9.5	0.500 12.7	0.375 9.5	0.843 21.4

\*For reference only. The VE414 cannot groove all schedules of steel pipe in table.

**DRAWN COPPER TUBING**

0886-8A

TUBING SIZE Nominal Inches Actual mm	Nominal Wall Thickness – Inches/mm			
	DWV ASTM B-306	Type “M” ASTM B-88	Type “L” ASTM B-88	Type “K” ASTM B-88
2 54.0	0.042 1.1	0.058 1.5	0.070 1.8	0.083 2.1
2½ 66.7	– –	0.065 1.7	0.080 2	0.095 2.4
3 79.4	0.045 1.1	0.072 1.8	0.090 2.3	0.109 2.8
4 104.8	0.058 1.5	0.095 2.4	0.110 2.8	0.134 3.4
5 130.2	0.072 1.8	0.109 2.8	0.125 3.2	0.160 4.1
6 155.6	0.083 2.1	0.122 3.1	0.140 3.6	0.192 4.9
8 206.4	0.109 2.8	0.170 4.3	0.200 5.1	0.271 6.9



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