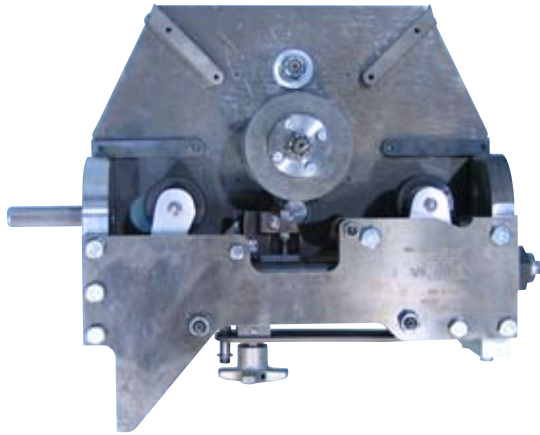


VG824 and VG828

CUT-GROOVING TOOLS



WARNING



WARNING



Failure to follow instructions and warnings could result in serious personal injury, property damage, and/or product damage.

- Before operating or servicing the VG824 or VG828 Cut Grooving Tool, read all instructions in this manual and all warning labels on the tool.
- Wear safety glasses, hardhat, foot protection, and hearing protection while working around this tool.
- Save this operating and maintenance manual.

If you need additional copies of any literature, or if you have questions concerning the safe and proper operation of this tool, contact Victaulic, P.O. Box 31, Easton, PA 18044-0031, Phone: 1-800-PICK VIC, E-Mail: pickvic@victaulic.com.

INDEX

Hazard Identification	1	Tool Bit Removal	18
Operator Safety Instructions	1	Tool Bit Installation	19
Introduction	3	Tool Bit Projection Adjustment	20
Tool Bit Information for VG824 Tools	3	Pipe Stop Removal and Installation	21
Tool Bit Information for VG828 Tools	3	Adjusting the Center Adjustable Pipe Stop	22
Receiving the VG824 and VG828 Tools	4	Top and Bottom Pipe Stop Removal and Installation	23
Container Contents	4	Drive Roll Removal and Installation	23
Factory Settings for the VG824 Tool	4	Drive Roll Removal	23
Factory Settings for the VG828 Tool	4	Drive Roll Installation	23
Additional Tools that may be Required for Tool Setup, Adjustment, or Operation	5	Maintenance	24
Power Requirements for the Victaulic Power Mule II or Power Drive	6	Re-Sharpening Tool Bits	24
Extension Cord Requirements	6	Parts Ordering Information	25
Tool Nomenclature	7	Recommended Accessories	25
Chain-Type Pipe Vise Setup	8	Victaulic Power Mule II	25
Preparing Pipe for Grooving	8	Troubleshooting	26
Pipe Length Requirements	9	Explanation of Critical Cut Groove Dimensions	28
Mounting Pipe in the Chain-Type Pipe Vise	9	Standard Cut Groove Specifications for Steel and Other NPS Pipe Grooved with the VG824 Tool	30
Checking and Adjusting the Tool Prior to Grooving	10	Rigid Radius-Cut Groove Specifications for Ductile Iron Pipe Grooved with the VG824 Tool	32
Mounting the VG824 or VG828 Tool Onto the Pipe	10	Flexible Radius-Cut Groove Specifications for Ductile Iron Pipe Grooved with the VG824 Tool	33
Attaching the Victaulic Power Mule II to the VG824 or VG828 Tool	11	Cut Groove Specifications for Standard or Heavier-Wall Pipe or Plastic-Coated Pipe Grooved with the VG824 Tool and Joined with Style HP-70ES Couplings	34
Attaching a Power Drive to the VG824 or VG828 Tool	12	Advanced Groove System (AGS) Cut Grooving Specifications for Carbon Steel Pipe Grooved with the VG828 Tool	35
Grooving Operation	13	VG824 Tool Bit/Pipe Stop Specifications	36
Preparing to Dismount the VG824 or VG828 Tool	15	VG828 Tool Bit/Pipe Stop Specifications	37
Dismounting the VG824 or VG828 Tool when Used with the Victaulic Power Mule II	16		
Dismounting the VG824 or VG828 Tool when Used with a Power Drive	16		
Groove Diameter Adjustment	17		

HAZARD IDENTIFICATION

Definitions for identifying the various hazard levels are provided below.



This safety alert symbol indicates important safety messages. When you see this symbol, be alert to the possibility of personal injury.

Carefully read and fully understand the message that follows.



DANGER

- The use of the word “DANGER” identifies an immediate hazard with a likelihood of death or serious personal injury if instructions, including recommended precautions, are not followed.



WARNING

- The use of the word “WARNING” identifies the presence of hazards or unsafe practices that could result in death or serious personal injury if instructions, including recommended precautions, are not followed.



CAUTION

- The use of the word “CAUTION” identifies possible hazards or unsafe practices that could result in personal injury and product or property damage if instructions, including recommended precautions, are not followed.

NOTICE

- The use of the word “NOTICE” identifies special instructions that are important but not related to hazards.

OPERATOR SAFETY INSTRUCTIONS

VG824 and VG828 Cut-Grooving Tools are designed only for cut grooving pipe. Use of these tools requires dexterity and mechanical skills, as well as sound safety habits. Although these tools are designed for safe, dependable operation, it is impossible to anticipate all combinations of circumstances that could result in an accident. The following instructions are recommended for safe operation of these tools. The operator is cautioned always to practice “safety first” during each phase of use, including setup and maintenance. It is the responsibility of the owner, lessee, or user to ensure that all operators read this manual and fully understand the operation of these tools.

Read this operating and maintenance instructions manual and the operating and maintenance instructions manual for the Victaulic Power Mule II or power drive before operating or servicing these tools. Become familiar with the tools' operations, applications, and limitations. Be particularly aware of their specific hazards. Store this manual in a clean area where it is always readily available. Additional copies of this manual are available upon request through Victaulic.

1. **These tools are designed ONLY for cut grooving pipe sizes, materials, and wall thicknesses listed in this manual.**
2. **Avoid using tools in dangerous environments.** Do not expose tools to rain, and do not use tools in damp or wet locations. Do not use tools on sloped or uneven surfaces. Keep the work area well lit. Allow sufficient space to operate tools properly.
3. **Prevent back injury.** Use proper lifting techniques when handling heavy tool components.
4. **Inspect the equipment.** Before using any tools, check all moveable parts for any obstructions. Make sure tool components are installed and adjusted properly.

5. **Prevent accidental startups.** Always unplug the Victaulic Power Mule II or power drive from the electrical source. The rotation control switch of the Victaulic Power Mule II **DOES NOT** feature a “neutral” or “off” position. Depressing the safety foot switch will energize the tool immediately if it is not unplugged. **ALWAYS USE THE SAFETY FOOT SWITCH TO OPERATE THE VICTAULIC POWER MULE II OR POWER DRIVE.**
6. **Wear proper apparel.** Do not wear loose clothing, jewelry, or anything that can become entangled in moving parts.
7. **Wear protective items when working with tools.** Always wear safety glasses, hardhat, foot protection, and hearing protection.
8. **Stay alert.** Do not operate the tool if you are drowsy from medication or fatigue. Avoid horseplay around the equipment.
9. **Keep visitors away from the immediate work area.** All visitors should be kept a safe distance from equipment at all times.
10. **Keep work areas clean.** Keep the work area around the tool clear of any obstructions that could limit the movement of the operator. Clean up any metal shavings and oil or other spills.
11. **Secure the work, tool, and accessories.**
12. **Support the work.** Support the pipe in a pipe vise that is mounted to a workbench or a stand. The workbench or stand must be secured to the floor.
13. **OPERATE THE VICTAULIC POWER MULE II ON THE HANDLE SIDE ONLY.** The Victaulic Power Mule II must be operated with a safety foot switch that is located for easy operator access. Never reach across moving parts. If the Victaulic Power Mule II or power drive does not contain a safety foot switch, contact Victaulic.
14. **Align the Victaulic Power Mule II with the cut-groover's drive shaft.** Always position the Victaulic Power Mule II 90° to the cut groover's drive shaft. Make sure there is no binding between the drive head of the Victaulic Power Mule II and the drive shaft of the cut groover.
15. **Keep hands and tools away from the pipe, cut-grooving tool, Victaulic Power Mule II/ power drive during operation.**
16. **Do not reach inside the pipe end during tool operation.**
17. **Do not over-reach.** Maintain proper footing and balance at all times. Make sure the safety foot switch is easily accessible for the operator.
18. **Do not force the tool.** Do not force the tool or accessories to perform any functions beyond their capabilities. Do not overload the tool.
19. **Do not abuse the safety foot switch cord.** Never yank the cord out of the receptacle. Keep the cord away from heat, oil, and sharp objects.
20. **Always unplug the Victaulic Power Mule II or power drive from the electrical source before servicing or adjusting the tool.** Only authorized personnel should attempt to perform maintenance on the tool.
21. **Maintain tools with care.** Keep tools clean at all times to ensure proper and safe performance. Follow all maintenance instructions.
22. **Store tools in a dry, secure place when not in use.**
23. **Use only Victaulic replacement parts and accessories.** Use of any other parts may result in a voided warranty, improper operation, and hazardous situations.
24. **Do not remove any labels from the tool.** Replace any damaged or worn labels.

INTRODUCTION

NOTICE

- Drawings and/or pictures in this manual may be exaggerated for clarity.
- The tool, along with this operating and maintenance instructions manual, contains trademarks, copyrights, and/or patented features that are the exclusive property of Victaulic.

Victaulic VG824 Cut-Grooving Tools are designed for cut grooving 8 – 24-inch IPS carbon steel and AWWA size cast or ductile iron pipe. Wall thickness capacity for the VG824 is 0.238 – 0.750 inch (thicknesses include any linings).

Victaulic VG828 Cut-Grooving Tools for Advanced Groove System **AGS** specifications are designed for cut grooving 14 – 24-inch carbon steel pipe only. The minimum pipe wall thickness requirement for the VG828 is “XS” (Extra Strong, 0.500 inch/12.7 mm). The maximum pipe wall thickness capacity of the VG828 is 0.750 inch/19.1 mm.

During operation, the tool grips the pipe wall between two external support rolls and an internal drive roll. The tool travels around the pipe circumference in a clockwise direction. While being driven in a clockwise direction, the tool pulls itself tightly against the pipe end. The tool bit, which cuts the groove into the pipe, is spring-loaded against the pipe and removes material until the depth stop, mounted directly adjacent to the tool bit, contact the pipe surface. The pipe stop, mounted in the same arm as the tool bit, prevents the tool bit from cutting further into the pipe and ensures uniform groove depth.

CAUTION

- VG824 and VG828 tools are designed **ONLY** for cut grooving pipe sizes, materials, and wall thicknesses listed in this manual.

Failure to follow this instruction could overload the tool, resulting in reduced tool life and/or damage to the tool.

TOOL BIT INFORMATION FOR VG824 TOOLS

Standard, high-speed tool bits for VG824 tools are designed with two cutting edges (with the exception of tool bits for 22 – 24-inch sizes) to provide long tool bit life. These tool bits are re-sharpenable.

VG824 tool bits for grooving iron pipe (gray or ductile) are a single-edge, carbide-tipped design. This design is not suitable for re-sharpening.

Refer to the “VG824 Tool Bit/Pipe Stop Specifications” table for further information.

TOOL BIT INFORMATION FOR VG828 TOOLS

WARNING

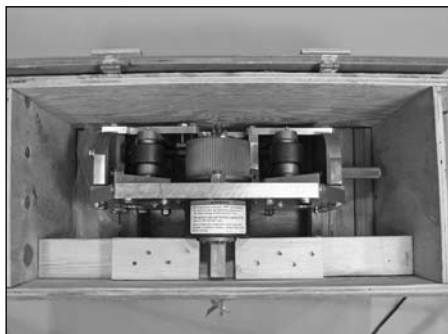
- **DO NOT attempt to re-sharpen VG828 tool bits for cut grooving to Advanced Groove System (AGS) specifications.**
- **Use of re-sharpened tool bits for cut grooving to AGS specifications may produce improper groove profiles.**

Failure to follow these instructions may cause improper product installation and product failure, resulting serious personal injury and/or property damage.

VG828 tool bits for cut grooving to AGS specifications are high-speed steel and **ARE NOT** suitable for re-sharpening. Contact Victaulic for replacement tool bits.

Refer to the “VG828 Tool Bit/Pipe Stop Specifications” table for further information.

RECEIVING THE VG824 AND VG828 TOOLS



VG824 and VG828 tools are packed in wooden chests that are designed for repeated shipping. Save the original chest for return shipment of rental tools.



Upon receipt of the tool, make sure all necessary parts are included. If any parts are missing, contact Victaulic.

CONTAINER CONTENTS

Qty.	Description
1	Permanent Shipping Chest
1	Cut-Grooving Tool (VG824 or VG828)
1	Tool Bit Removal Kit (Includes $\frac{3}{8}$ x $\frac{7}{16}$ -inch Open-End Wrench, $\frac{1}{4}$ -inch Combination Wrench, and Steel Push Rod)
1	Extra Tool Bit for VG824 Tool (8 – 24-inch Pipe)*
1	Extra Tool Bit for VG828 Tool (14 – 24-inch Pipe Grooved to AGS Specifications)†
2	Operating and Maintenance Manual
2	Repair Parts List
1	AGS 14-24 Pipe Wall No-Go Gauge (Shipped with the VG828 Tool Only)
1	Victaulic Go/No-Go Pipe Tape

* Factory Settings for the VG824 Tool

VG824 tool are set at the factory prior to shipment for trial grooving of 10-inch IPS steel pipe, unless specified otherwise on the order. If the VG824 tool is ordered for other types of pipe, sizes, and styles of groove, the tool will be set at the factory, as ordered. NOTE: Additional lead time is required for For grooving to specifications other than those set "as shipped," follow all sections in this manual to ensure proper tool setup. VG824 tools ordered for cut grooving to other than standard IPS specifications are provided set, as ordered, with the correct tool bit and pipe stops mounted on the tool. In addition, one extra tool bit of the same type is supplied. **EXAMPLE:** A tool ordered for 10 – 12-inch cast iron rigid grooving would be supplied with one 10 – 12-inch CIR bit mounted in the tool and one extra 10 – 12-inch CIR tool bit supplied loose.

A 0.562-inch width groove is required for 22 – 24-inch pipe sizes in order to obtain the maximum allowable pipe end movement. The 0.500-inch groove width will provide half the maximum allowance for 22 – 24-inch pipe sizes. For the 8-inch pipe size, the 0.500 groove width does not change the allowable pipe-end movement.

† Factory Settings for the VG828 Tool

VG828 Tool are shipped from the factory for grooving 14 – 24-inch pipe to AGS specifications. The VG828 is intended **ONLY** for cut grooving pipe to AGS specifications.

ADDITIONAL TOOLS THAT MAY BE REQUIRED FOR TOOL SETUP, ADJUSTMENT, OR OPERATION

The following is a list of items that are not included in the shipment but may be required during tool setup, adjustment, or operation.

SPEED REDUCTION CONTROL



Victaulic recommends a speed reduction control unit (115-volt, 15-amp AC) for various universal power drive sources to provide proper grooving tool rotation speed. The speed reduction control plugs in between the electrical supply and the power drive's electrical plug. **NOTE:** A speed reduction control is not required when the Victaulic Power Mule II is used as the power drive. DO NOT use a speed reduction control with induction-type motors.

CHAIN-TYPE PIPE VISE AND VISE STAND



OILER



MACHINIST'S END RULE



SLOTTED SCREWDRIVER (THIN)



5/16-INCH COMBINATION WRENCH




1 1/16-INCH COMBINATION WRENCH




CRESCENT WRENCH



POWER REQUIREMENTS FOR THE VICTAULIC POWER MULE II OR POWER DRIVE

 **DANGER**



- To reduce the risk of electric shock, check the electrical source for proper grounding.**
- Before performing any maintenance on the Power Mule II or power drive, disconnect the power cord from the electrical source.**

Failure to follow these instructions could result in death or serious personal injury.

The VG824 and VG828 tools are designed for use with the Victaulic Power Mule II and power drives in conjunction with a secure pipe support system. Power, speed, and safety requirements must be verified before attempting to use any power source other than the Victaulic Power Mule II. All power sources must be equipped with a safety foot switch for safe and proper operation. If the power source is shipped without a safety foot switch, contact the manufacturer.

The Victaulic Power Mule II is designed to operate on a 115-volt, 20-Amp, 25 – 60 Hz, single-phase power supply. In addition, a 220-volt, 8-Amp model is available.

Most other power drives are designed to operate on a 115-volt, 15-Amp, 50/60-Hz power supply or 220-volt, 8-Amp, 50/60-Hz power supply.

Always refer to the operating and maintenance instructions for the Victaulic Power Mule II or the applicable power drive for detailed information.

VG824 and VG828 tools must be driven at 32 revolutions per minute (RPM) or less (under load). If the power source runs too fast, tool bit chatter may occur. Use of a speed reduction controller is recommended to reduce the speed of the power source.

Victaulic recommends a speed control reducer that is designed to operate on a 115-volt, 15-Amp, 50/60-Hz power supply. **NOTE:** Speed control reducers work only with AC universal motors that have brushes. DO NOT use speed control reducers with induction-type AC motors.

The speed control reducer and the safety foot switch for the Power Mule II or power drive MUST be plugged into an internally-grounded electrical outlet, in accordance with Article 250 of the National Electrical Code.

EXTENSION CORD REQUIREMENTS

When pre-wired outlets are not available and an extension cord must be used, it is important to use the proper cord size (i.e. Conductor Size American Wire Gauge). Cord size selection is based upon tool rating (amps) and cord length (feet). Use of a cord size (gauge) thinner than required will cause significant voltage drop while the tool is operating. Voltage drops may cause damage to the power source and can result in improper tool operation. **NOTE:** It is acceptable to use a cord size (gauge) that is heavier than required.

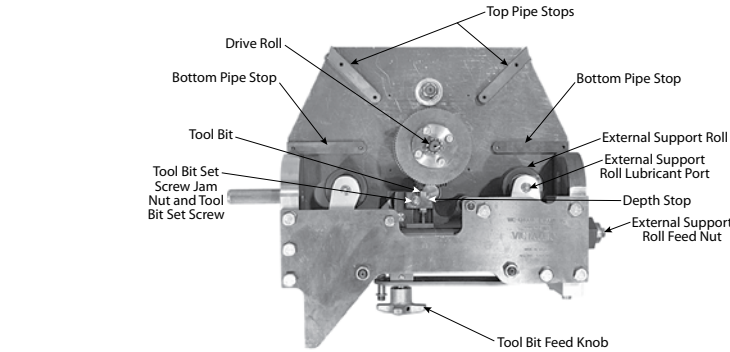
The required cord sizes (gauges) for cord lengths up to and including 100feet/31 m are listed in the table below. Use of extension cords longer than 100feet/31 m must be avoided. Always refer to the operating and maintenance instructions for the Victaulic Power Mule II or the applicable power drive for detailed information.

Power Source Rating		Cord Lengths		
Volts	Amps	25 feet/ 8 m	50 feet/ 15 m	100 feet/ 31 m
115	15	12 gauge	12 gauge	10 gauge
220	8	14 gauge	14 gauge	12 gauge

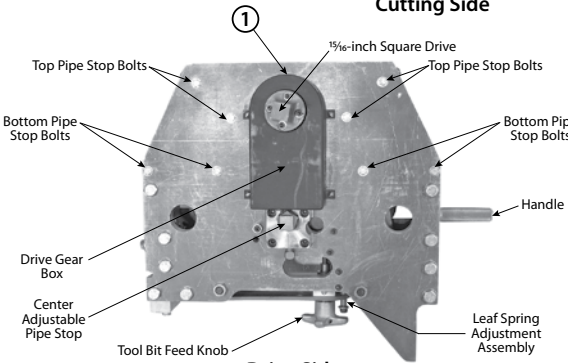
TOOL NOMENCLATURE

NOTICE

- Drawings and/or pictures in this manual may be exaggerated for clarity.
- The tool, along with this operating and maintenance instructions manual, contains trademarks, copyrights, and/or patented features that are the exclusive property of Victaulic.



Cutting Side



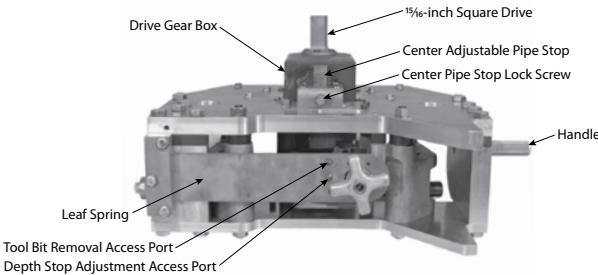
Drive Side

⚠ WARNING

- For cut grooving to Victaulic **AGS** specifications, the minimum pipe wall thickness requirement is "XS" (Extra Strong, 0.500 inch/12.7 mm).
- The maximum pipe wall thickness capacity of this tool is 0.750 inch/19.1 mm.

Failure to follow this instruction could cause joint separation, resulting in serious personal injury and/or property damage.

Label shown above applies only to the VG828 Tool for cut grooving to AGS specifications



Bottom View

CHAIN-TYPE PIPE VISE SETUP



CAUTION

- **The stand or workbench must be secured to the floor, and the chain-type pipe vise must be secured to the stand or workbench.**

Failure to follow this instruction could result in personal injury and product damage.

1. The VG824 and VG828 Cut Grooving Tools are designed for field or shop use. Select a location for the grooving operation by taking into consideration the following factors:
 - 1a. The required power supply (refer to the operating instructions for the Victaulic Power Mule II or the applicable power drive)
 - 1b. Adequate space to handle pipe lengths
 - 1c. A firm and level surface for tool operation
 - 1d. Anchoring requirements for the power drive (if applicable) and pipe vise
2. Fasten a stand or workbench securely to the floor.
3. Mount a chain-type pipe vise to the secured stand or workbench. The chain-type pipe vise must be capable of supporting the weight of the pipe and tool (tool weighs approximately 82 – 85 pounds). The chain-type pipe vise should be flush with or slightly overhang the edge of the stand or workbench to permit the tool to rotate freely without being obstructed.

PREPARING PIPE FOR GROOVING

For proper tool operation and production of grooves that are within Victaulic specifications, the following pipe preparation steps must be followed.

Victaulic recommends square-cut pipe for use with grooved-end pipe products. Square-cut pipe **MUST** be used with Victaulic FlushSeal® and EndSeal® gaskets.

Victaulic VG824 Cut-Grooving Tools are designed for cut grooving 8 – 24-inch IPS and AWWA size case or ductile iron pipe. Wall thickness capacity for the VG824 is 0.238 – 0.750 inch (thicknesses include any linings). For pipe sizes grooved to original specifications with the VG824 tool, raised internal and external weld beads and seams must be ground flush with the pipe surface 3½ inches/89 mm back from the pipe ends.



CAUTION

- **DO NOT attempt to groove standard-wall or lighter-wall pipe with the VG828 tool for AGS specifications.**

Failure to follow this instruction will cause the pipe wall to be too thin at the groove, resulting in improper joint performance.

Victaulic VG828 Cut-Grooving Tools for **AGS** specifications are designed for cut grooving 14 – 24-inch carbon steel pipe only. The minimum pipe wall thickness requirement for the VG828 is “XS” (Extra Strong, 0.500 inch/12.7 mm). The maximum pipe wall thickness capacity of the VG828 is 0.750 inch/19.1 mm. For 14 – 24-inch/355.6 – 610.0-mm pipe grooved to AGS specifications with the VG828 tool, raised internal and external weld beads and seams must be ground flush with the pipe surface 4 inches/100 mm back from the pipe ends.



VG828 tools are shipped with an “AGS 14-24 Pipe Wall No-Go Gauge” that should be used to determine if the pipe wall thickness meets the requirements for cut grooving to AGS specifications. If the pipe wall thickness fits between the two pegs of the gauge, the wall thickness is too thin and the pipe must not be used for cut grooving to AGS specifications. If the pipe wall thickness does not fit between the two pegs of the gauge, the pipe can be used for cut grooving to AGS specifications, up to a maximum wall thickness of 0.750 inch/19.1 mm using the VG828 tool.



CAUTION

- **Foreign material and loose rust must be removed from the interior and exterior surfaces of the pipe ends.**

Foreign material may interfere with or damage the drive roll, resulting in improper tool operation.

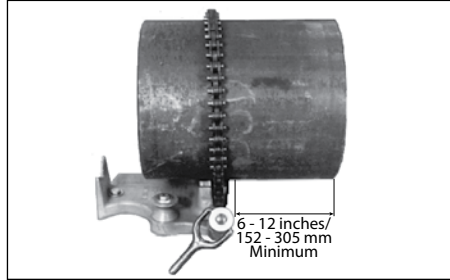
All coarse scale, dirt, and other foreign material must be removed from the interior and exterior surfaces of the pipe ends.

PIPE LENGTH REQUIREMENTS

The minimum pipe length that can be grooved with VG824 or VG828 tools is 18 inches/457 mm.

MOUNTING PIPE IN THE CHAIN-TYPE PIPE VISE

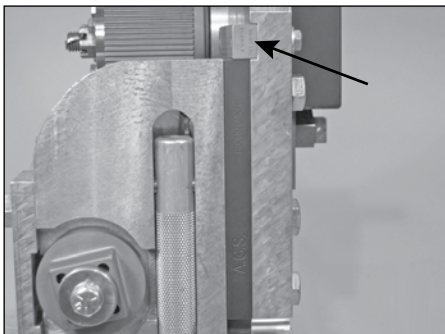
1. Make sure all instructions in the “Chain-Type Pipe Vise Setup” section have been followed.



2. Position the pipe to overhang the pipe vise approximately 6 – 12 inches/152 – 305 mm so that the tool can groove the pipe without being obstructed by the pipe vise, pipe vise stand, or workbench.

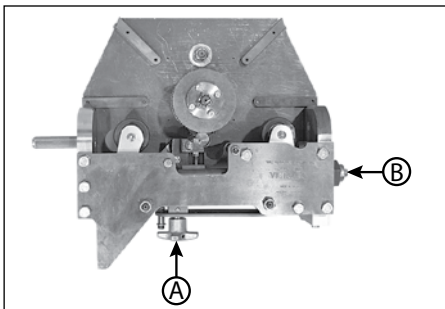
CHECKING AND ADJUSTING THE TOOL PRIOR TO GROOVING

1. Make sure the proper tool bit is installed for the pipe size and type of grooving required. Refer to the applicable “Tool Bit/Pipe Stop Specifications” table. If the incorrect tool bit is installed, refer to the “Tool Bit Removal” and “Tool Bit Installation” sections.



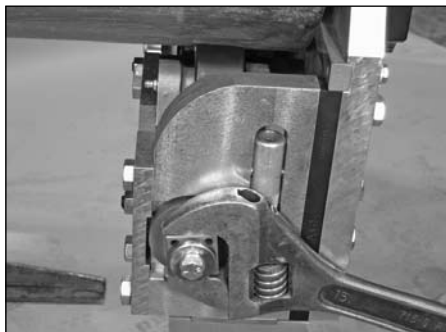
2. Make sure the proper pipe stops are installed for the pipe size and type of grooving required. Refer to the applicable “Tool Bit/Pipe Stop Specifications” table. If the incorrect pipe stops are installed, refer to the “Pipe Stop Removal and Installation” section.

MOUNTING THE VG824 OR VG828 TOOL ONTO THE PIPE



1. Before mounting the tool onto the pipe, retract the tool bit feed knob (A) fully by turning counterclockwise. Retract the

external support rolls fully by turning the external support roll feed nut (B) counterclockwise.



2. Lift the tool and mount it onto the pipe end. The tool bit feed knob should be facing downward, and the drive roll should be inside the pipe. Use caution to prevent the tool bit from hitting the pipe during mounting.
3. Hold the tool firmly against the pipe end, making sure the pipe stops are in complete contact with the pipe end. Tighten the external support roll feed nut by turning clockwise to bring the external support rolls into contact with the outside pipe surface. Load the external support rolls against the pipe by turning the external support roll feed nut with a 15-inch crescent wrench, as shown. Tighten the external support roll feed nut to approximately 75 – 85 ft-lbs.

NOTICE

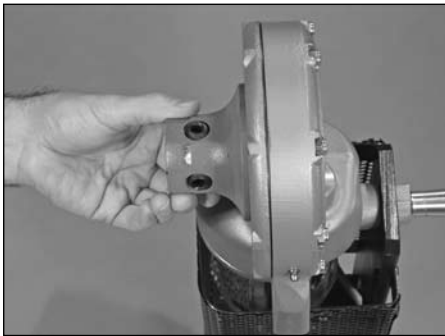
- **DO NOT over-tighten the external support rolls, since damage to the pipe and/or the tool may result. This is extremely important when the VG824 tool is used on gray cast iron pipe or glass-lined pipe, since these materials are brittle and may crack under too much compression.**
- **If the external support rolls are not tightened sufficiently, the tool may not “track” properly, resulting in improper grooves.**

ATTACHING THE VICTAULIC POWER MULE II TO THE VG824 OR VG828 TOOL

WARNING

- Make sure the Power Mule II is disconnected from the electrical source before attempting to attach the VG824 or VG828 tool.
- DO NOT connect the Power Mule II to the electrical source until instructed otherwise.

Failure to follow this instruction could result in serious personal injury.

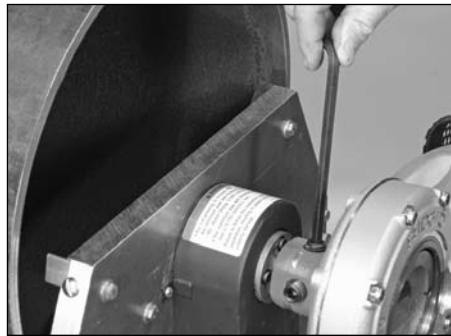
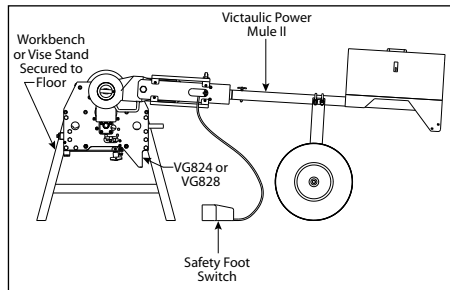
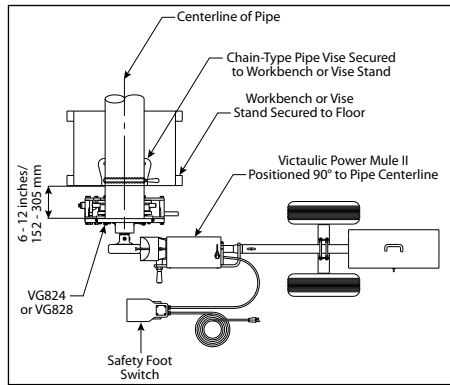


1. Insert the square drive adapter into the power head of the Victaulic Power Mule II.

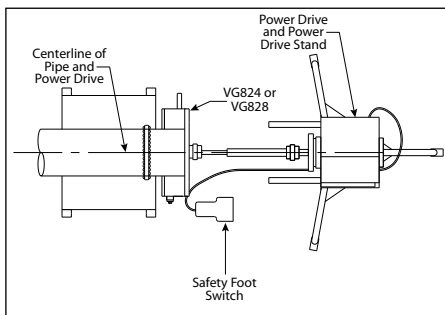


2. Align the square drive adapter with the 1 5/16-inch square drive on the tool. Slide the

power head of the Power Mule II onto the square drive of the tool, as shown. Make sure the Power Mule II is positioned 90° to the pipe centerline. Refer to the drawings below.



3. Tighten the two set screws on the square drive adapter of the Power Mule II.



4. The tool is set up and ready for grooving.
Refer to the "Grooving Operation" section.

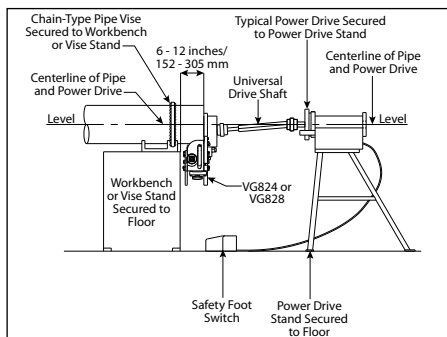
ATTACHING A POWER DRIVE TO THE VG824 OR VG828 TOOL

WARNING

- **Make sure the power drive is disconnected from the electrical source before attempting to attach the VG824 or VG828 tool.**
- **DO NOT connect the power drive to the electrical source until instructed otherwise.**

Failure to follow this instruction could result in serious personal injury.

This procedure applies to a power drive that utilizes a universal drive shaft to attach to the VG824 or VG828 tools.



1. Mount the power drive securely to a power drive stand.
2. Position the power drive/stand so that the centerline of the power drive chuck aligns with the pipe centerline both horizontally and vertically. Refer to the drawings on this page. The power drive/stand must be located far enough away from the pipe so that the universal drive shaft will fit properly between the power drive/stand and VG824 or VG828.
3. Mount the chuck end of the universal drive shaft into the power drive chuck. Tighten the chuck securely.
4. Collapse the universal drive shaft far enough to fit the square hole end (tool end) of the shaft onto the $\frac{1}{16}$ -inch square drive of the VG824 or VG828 tool. Slide the end of the universal drive shaft over the $\frac{1}{16}$ -inch square drive of the VG824 or VG828 tool. Tighten the set screw of the universal drive shaft securely. Make sure the universal drive shaft is not extended further than the power drive manufacturer's recommendations. Always refer to the power drive manufacturer's operating and maintenance manual for detailed information and lubrication requirements.
5. Fasten the power drive stand securely to the floor before attempting to perform the grooving operation.
6. The tool is set up and ready for grooving. Refer to the "Grooving Operation" section.

GROOVING OPERATION

Always refer to the operating and maintenance instructions for the Victaulic Power Mule II or the applicable power drive for detailed operating information.

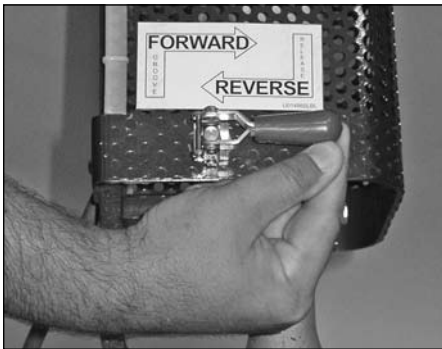
1. Plug the safety foot switch cord of the Power Mule II or power drive into an internally-grounded electrical outlet. Refer to the “Power Requirements for the Victaulic Power Mule II or Power Drive” section. If an extension cord is used, refer to the “Extension Cord Requirements” section. If a speed control reducer is being utilized, plug the speed control reducer into an internally-grounded electrical outlet, and plug the safety foot switch for the Power Mule II or power drive into the speed control reducer.



WARNING

- **Never attempt to operate the tool in the counterclockwise direction.**

Failure to follow this instruction may cause the tool to come off the pipe end, resulting in serious personal injury and/or product damage.



For grooving operations utilizing a Victaulic Power Mule II: Set the rotation control switch to the **FORWARD** position. VG824 and VG828 tools are designed to operate in a **CLOCKWISE** direction when viewed from the 1 $\frac{1}{4}$ -inch square drive shaft side of the tool.

For grooving operations utilizing a power drive:

Set the control switch on the power drive to produce **CLOCKWISE** rotation of the tool when viewed from the 1 $\frac{1}{4}$ -inch square drive shaft side of the tool (**FORWARD** setting on most power drives).

2. Check tool rotation by depressing the safety foot switch momentarily. Proper rotation direction of the tool must be **CLOCKWISE** when viewed from the 1 $\frac{1}{4}$ -inch square drive shaft side of the tool.
3. If tool rotation direction is clockwise, proceed to step 4.
- 3a. If tool rotation direction is counterclockwise, flip the control switch on the Power Mule II or power drive to the opposite direction. Re-test tool rotation direction, and make sure the tool rotates **CLOCKWISE**. If problems persist, contact Victaulic.
4. Depress the safety foot switch to drive the tool in the **CLOCKWISE** direction for several revolutions. Observe the stability of the tool. The tool should rotate around the pipe smoothly without slipping when approaching the top of the pipe or dropping when approaching the bottom of the pipe. If the tool does not rotate smoothly, remove foot from the safety foot switch, and tighten the external support roll feed nut an additional $\frac{1}{8}$ turn. Re-test tool for stability, and tighten the external support roll feed nut in $\frac{1}{8}$ -turn increments, as needed.

NOTICE

- **DO NOT over-tighten the external support rolls, since damage to the pipe and/or the tool may result. This is extremely important when the VG824 tool is used on gray cast iron pipe or glass-lined pipe, since these materials are brittle and may crack under too much compression.**

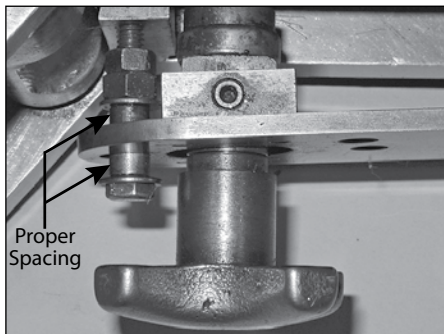
5. Prepare a trial groove by depressing the safety foot switch to drive the tool in the **CLOCKWISE** direction.



6. As the tool rotates, generously oil the area where the groove will be cut, as shown above. Use a good-grade cutting oil (i.e. Ridgid® dark thread cutting oil or equivalent) on steel pipe only. For aluminum or stainless steel pipe, use a thread cutting oil that is formulated specifically for these materials. **DO NOT apply oil on cast iron (gray or ductile) pipe.**



7. Turn the tool bit feed knob gradually in the **CLOCKWISE** direction to advance the tool bit against the pipe while the tool is rotating.



- 7a. The tool bit is advanced properly when the leaf spring is approximately $\frac{3}{8}$ inch open from the stop nut on the leaf spring adjustment post. Using the hand knob, continue advancing the tool bit in $\frac{1}{4}$ -turn increments every three or four rotations of the pipe to maintain the proper spacing, as shown above.

CAUTION

- An opening **MUST** be maintained between the stop nut on the leaf spring adjustment post and the leaf spring.

If the hand knob is turned enough to eliminate this opening, the tool bit will cut a chip that is too large, which may jam the tool, overload the power drive, and/or shear the serrated drive roll key.

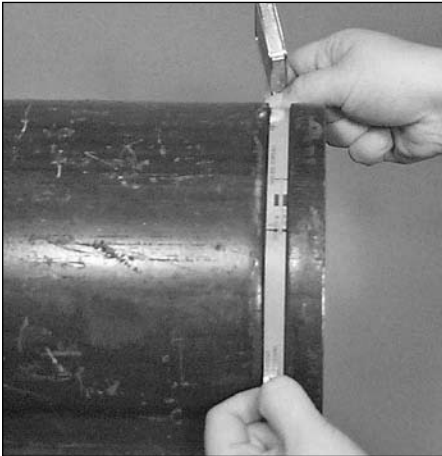
8. Continue grooving and oiling the pipe until the groove is complete. The groove is complete when the tool bit stops removing material around the entire circumference of the pipe. Indications of a complete groove or a nearly complete groove are:
- Oil remaining in the bottom of the groove after the tool bit passes
 - The Power Mule II or power drive picks up speed
 - Chips stop falling to the floor
 - The groove depth stop lightly contacts the pipe directly behind the groove

* Ridgid is a registered trademark of the Ridge Tool Company.

NOTICE

- Some portions of the groove will be complete before others. Make sure the entire groove is complete before dismantling the tool.

9. Follow the instructions in the “Preparing to Dismount the VG824 or VG828 Tool” section on this page and the applicable “Dismounting” section on the following page.



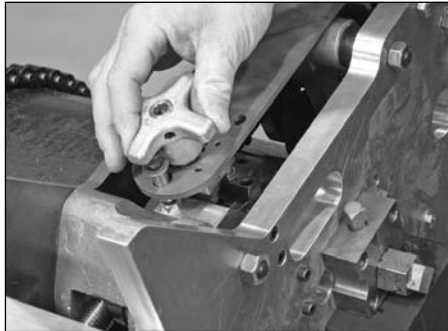
10. After a trial groove is prepared and the pipe is removed from the tool, check the groove diameter (“C” dimension) carefully with a pipe tape. Refer to the applicable “Cut Groove Specifications” table in this manual. In addition, a vernier caliper or narrow-land micrometer can be used to check the “C” dimension at two locations (90° apart) within the groove. The average reading must be within the required groove diameter specification.

**CAUTION**

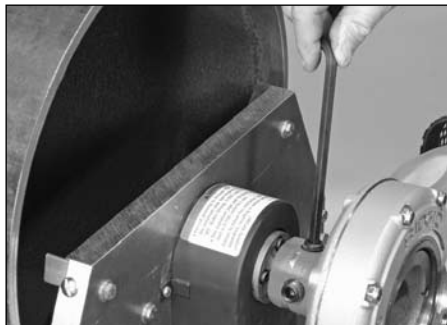
- The “C” dimension (groove diameter) must conform to Victaulic specifications to ensure proper joint performance.

Failure to follow this instruction could cause joint failure, resulting in personal injury and/or property damage.

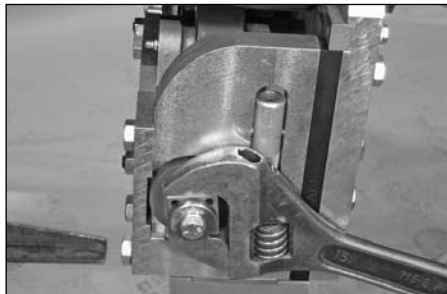
- 10a. If the groove diameter (“C” dimension) is not within Victaulic specifications, the diameter stop must be adjusted. Refer to the “Groove Diameter Adjustment” section.
11. Prepare another trial groove, and check the groove diameter (“C” dimension), as described in step 10 on this page. Repeat these steps, as necessary, until the groove diameter is within specification.

PREPARING TO DISMOUNT THE VG824 OR VG828 TOOL

1. Stop the tool at the top side of the pipe with the tool bit feed knob facing upward.
2. Retract the tool bit completely by turning the tool bit feed knob counterclockwise.
3. Drive the tool clockwise. Stop the tool at the bottom of the pipe with the tool bit feed knob facing downward.

**DISMOUNTING THE VG824 OR VG828 TOOL
WHEN USED WITH THE VICTAULIC POWER
MULE II**

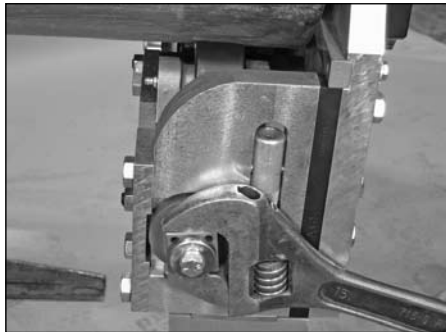
1. Loosen the two set screws that are located at the square drive adapter.
2. Flip the rotation control switch on the Victaulic Power Mule II to the opposite position.
3. Momentarily depress the safety foot switch.
4. Gently pull on the handle of the power head.
5. Disengage the Victaulic Power Mule II from the VG824 or VG828 tool.
6. Roll the Victaulic Power Mule II to the **RIGHT** and out of the way.



7. Loosen the external support roll feed nut so that the external support rolls are not contacting the pipe.
8. Slide the tool off the pipe. Set the tool on a workbench or the floor.
9. Using a rag, wipe any oil and chips off the pipe end.

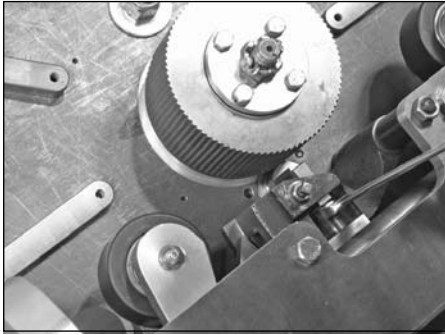
**DISMOUNTING THE VG824 OR VG828 TOOL
WHEN USED WITH A POWER DRIVE**

1. Loosen the universal drive shaft set screw. Slide the tool end of the universal drive shaft off the tool. Move the universal drive shaft out of the way.



2. Loosen the external support roll feed nut so that the external support rolls are not contacting the pipe.
3. Slide the tool off the pipe. Set the tool on a workbench or the floor.
4. Using a rag, wipe any oil and chips off the pipe end.

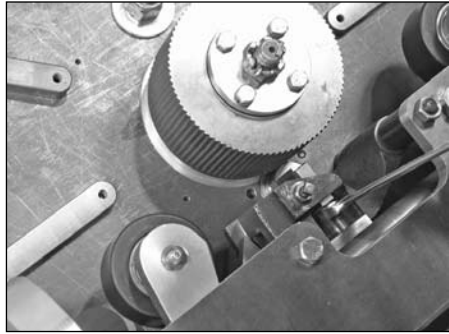
GROOVE DIAMETER ADJUSTMENT



1. With the $\frac{7}{16}$ -inch open-end wrench (supplied with the tool), loosen the groove diameter stop lock nut, as shown above.

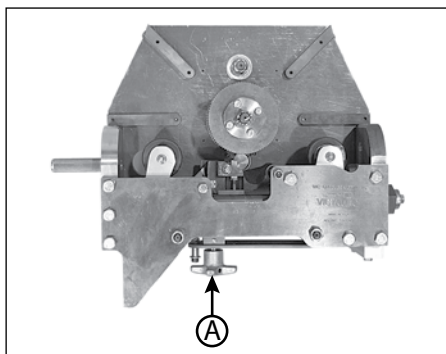


2. With a regular-head screwdriver, adjust the groove diameter stop adjustment screw, as shown above. When viewed from the bottom of the tool, turn the groove diameter stop adjustment screw clockwise to increase the groove diameter (decrease groove depth). Turn the groove diameter stop adjustment screw counterclockwise to decrease the groove diameter (increase groove depth). One full turn of the groove diameter stop adjustment screw changes the groove diameter by 0.040 inch.

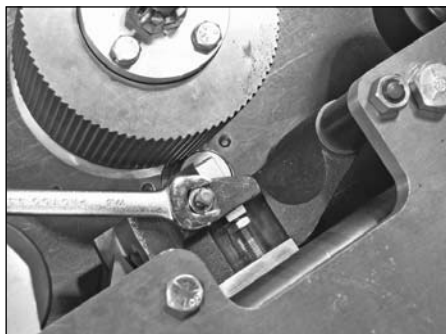


3. Tighten the groove diameter stop lock nut.
4. If the original groove diameter was oversized, complete the groove and re-check the groove diameter. If the original groove diameter was undersized, prepare another trial groove and check the groove diameter.
5. Repeat the steps in this section until the groove diameter is within specification.

TOOL BIT REMOVAL



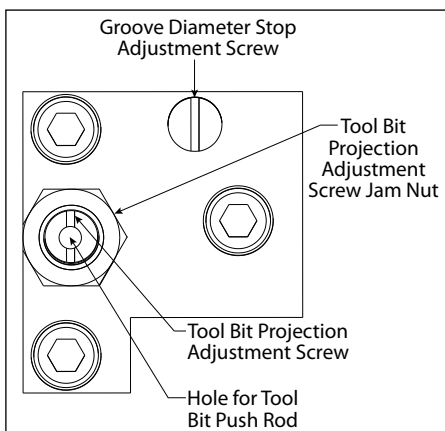
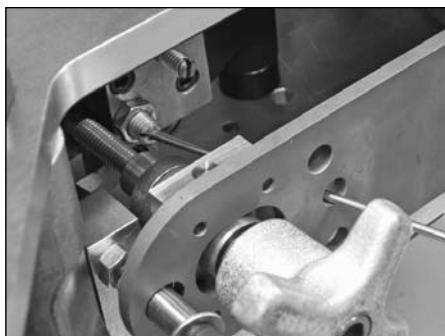
1. Fully retract the tool bit by turning the tool bit feed knob (A) counterclockwise.



2. With the 3/16-inch open-end wrench (supplied with the tool), loosen the tool bit set screw jam nut, as shown above.



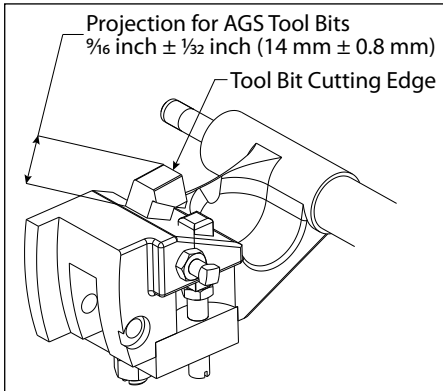
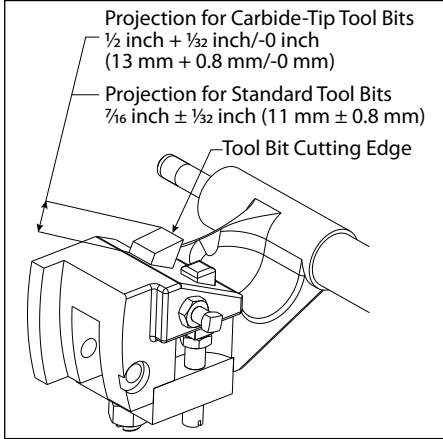
3. With the 1/4-inch combination wrench (supplied with the tool), loosen the tool bit set screw, as shown above.



4. Insert the 1/8-inch diameter steel push rod (supplied with the tool) through the rear hole in the leaf spring and into the hollow tool bit adjustment screw, as shown above. Use the push rod to push the tool bit out. Refer to the drawing above for tool bit adjustment screw location.

TOOL BIT INSTALLATION

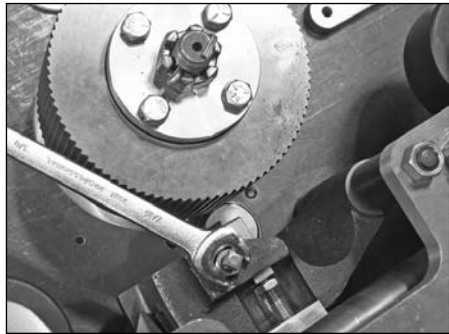
Select the size and type of tool bit required for grooving the pipe. Tool bits are marked with the size and type (Example: 8-24 Std.). Refer to the applicable "Tool Bit/Pipe Stop Specifications" table.



1. Insert the tool bit into the tool bit arm with the cutting edge of the bit toward the external support roll, feed-nut side of the tool. Refer to the drawings above.

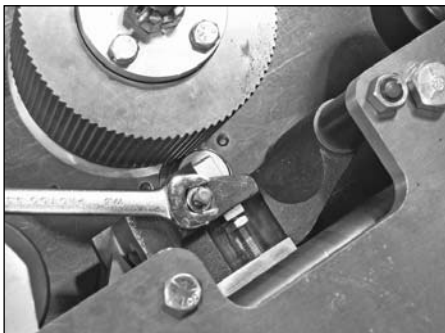


2. Hold the tool bit down against the tool bit adjustment screw. Tighten the tool bit set screw.



3. Tighten the tool bit set screw jam nut.
4. Check tool bit projection with an end rule between the cutting edge of the tool bit and the tool bit arm. If the projection is out of specification, refer to the "Tool Bit Projection Adjustment" section.

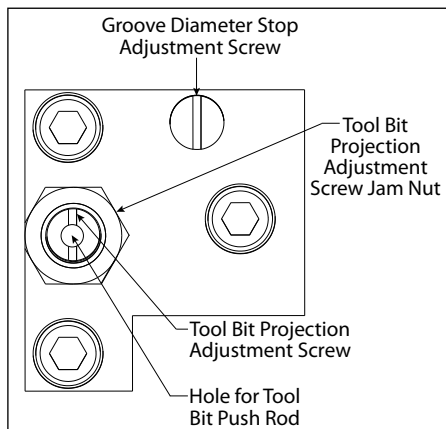
TOOL BIT PROJECTION ADJUSTMENT



1. With the $\frac{7}{16}$ -inch open-end wrench (supplied with the tool), loosen the tool bit set screw jam nut, as shown above.



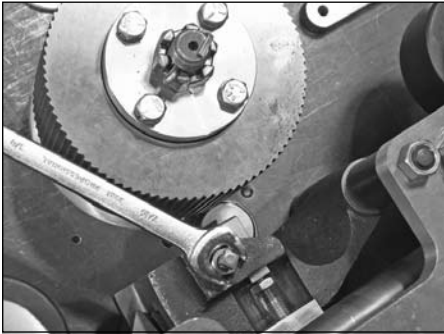
2. With the $\frac{1}{4}$ -inch combination wrench (supplied with the tool), loosen the tool bit set screw, as shown above.



3. With a $\frac{7}{16}$ -inch open-end wrench, loosen the tool bit projection adjustment screw jam nut. Refer to the drawing above.
4. Adjust tool bit projection by turning the tool bit projection adjustment screw with a regular-head screwdriver. Refer to the drawing above **NOTE:** Half a turn of the tool bit projection adjustment screw will change the projection by $\frac{1}{32}$ inch.
 - 4a. Turning the tool bit projection adjustment screw clockwise increases tool bit projection.
 - 4b. Turning the tool bit projection adjustment screw counterclockwise decreases tool bit projection. **NOTE:** It may be necessary to push the tool bit down against the tool bit projection adjustment screw when decreasing the projection.
5. Tighten the tool bit projection adjustment screw jam nut. **NOTE:** Use a screwdriver to prevent the tool bit projection adjustment screw from turning while tightening the tool bit projection adjustment screw jam nut.



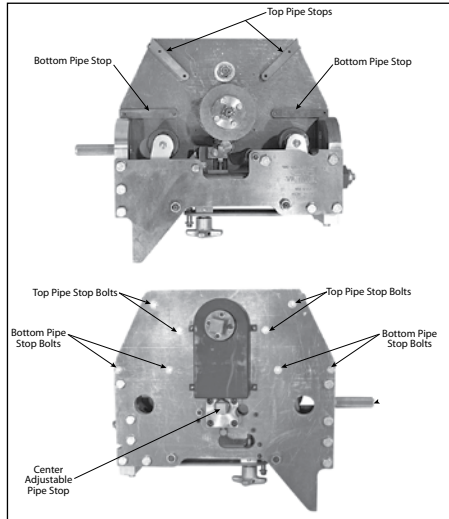
6. Tighten the tool bit set screw.



7. Tighten the tool bit set screw jam nut.

PIPE STOP REMOVAL AND INSTALLATION

VG824 and VG828 tools are designed to “hug” the pipe end when driven in a clockwise direction. The tool tries to pull itself as far as possible onto the pipe end. The pipe stops limit the distance the tool can pull itself onto the pipe end, therefore controlling the “A” dimension (distance from the groove to the pipe end). The pulling action of the tool forces the pipe stops against the pipe end, resulting in a rubbing action between the pipe end and pipe stops. Eventually, this rubbing action wears down the hardened steel pipe stops, resulting in longer “A” dimensions. When the wear results in “A” dimensions that are not within Victaulic specifications, the pipe stops must be replaced.



VG824 and VG828 tools are designed with five pipe stops. All pipe sizes contact the single, center adjustable pipe stop, which is adjustable for all sizes and styles of grooving.

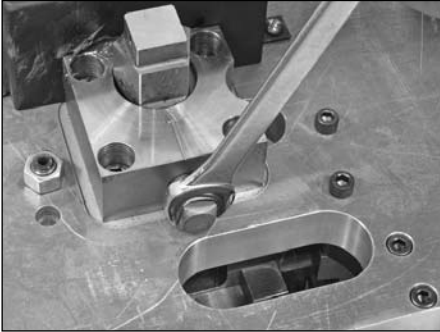
The two top and two bottom pipe stops are not adjustable, but each of these pipe stops cover many sizes.

The top pipe stops contact 8 – 12-inch IPS and 8-inch CI pipe sizes and must be removed for larger CI sizes.

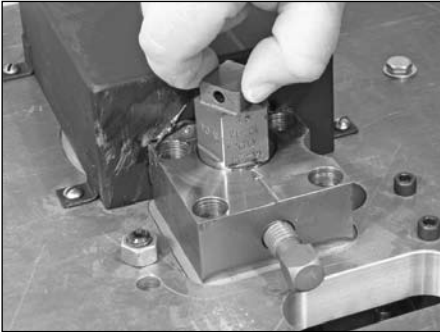
IPS pipe in 14-inch and larger sizes clears the top pipe stops, which do not need to be removed.

The bottom pipe stops contact 14 – 24-inch IPS pipe and 10-inch and larger CI pipe.

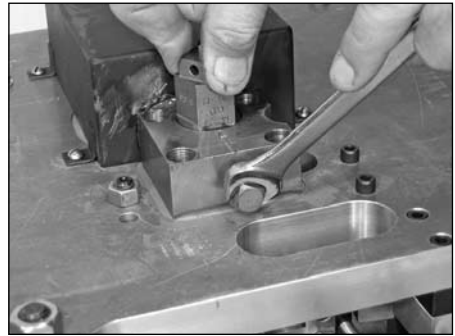
When grooving certain sizes of CI pipe, the top and/or bottom pipe stops must be changed or removed. Refer to the applicable “Tool Bit/Pipe Stop Specifications” table.

ADJUSTING THE CENTER ADJUSTABLE PIPE STOP

1. Loosen the center adjustable pipe stop lock screw, as shown above, and back it out to clear the center adjustable pipe stop (approximately $\frac{3}{8}$ inch).

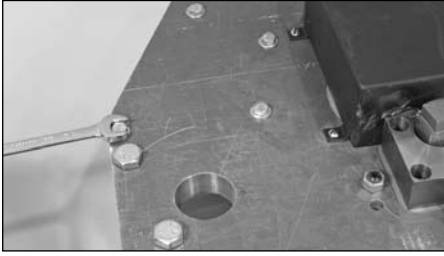


2. Rotate the center adjustable pipe stop so that the arrow on the center adjustable pipe stop block aligns with the correct markings on the center adjustable pipe stop. Refer to the applicable "Tool Bit/Pipe Stop Specifications" table. Push in or pull out the center adjustable pipe stop so that the flat on the pipe stop is flush with the pipe stop block adjacent to the arrow.

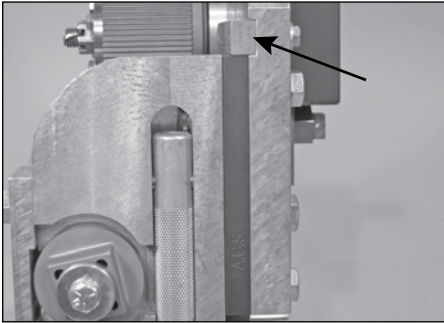


3. Tighten the center adjustable pipe stop lock screw, making sure it engages the hole in the center adjustable pipe stop. When engaged properly, no threads on the center adjustable pipe stop lock screw will be showing.

TOP AND BOTTOM PIPE STOP REMOVAL AND INSTALLATION



1. Remove the two bolts per pipe stop with the $\frac{7}{16}$ -inch open-end wrench (supplied with the tool), as shown above.
2. Remove the pipe stops.



3. Install the pipe stops with the correct markings for the pipe size and type of grooving required. Refer to the applicable "Tool Bit/Pipe Stop Specifications" table. The pipe stops are marked on the end, as shown above. **NOTE:** In this photo, the VG828 tool for grooving pipe to AGS specifications is shown, which is installed with pipe stops that are marked "14-24 STD/10-12 Cl."

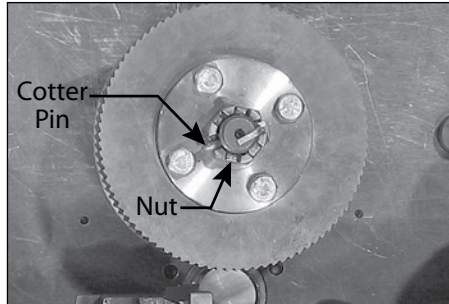
NOTE: Pipe stops are reversible and can be turned over when one side is worn out. The top pipe stops must be switched right-to-left when reversed. The "Tool Bit/Pipe Stop Specifications" tables specify removal of top pipe stops for certain types of grooving. When removed, the pipe stop bolts should be installed loosely into the removed pipe stops to prevent loss.

DRIVE ROLL REMOVAL AND INSTALLATION

The standard drive roll supplied on VG824 tools is designed for use with steel, aluminum, stainless steel, and cast iron pipe (with no linings). When lined pipe is required for grooving, the drive roll must be replaced with a urethane-coated drive roll. **THE URETHANE-COATED DRIVE ROLL IS NOT RECOMMENDED WHEN GROOVING CEMENT-LINED DUCTILE IRON PIPE.** **NOTE:** If the tool was special ordered for grooving lined pipe, the tool will be shipped with the urethane-coated drive roll mounted on the tool. Longer lead times are required for special-order tools.

The VG828 tool is designed for grooving steel pipe to AGS specifications; therefore, the drive roll supplied on the VG828 tool is designed for use with steel pipe (with no linings).

DRIVE ROLL REMOVAL



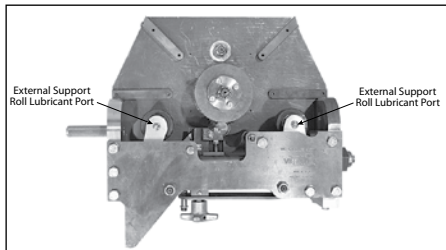
1. Remove the cotter pin and nut that secure the drive roll to the tool. **NOTE:** Victaulic recommends replacement of the cotter pin after it is removed. Use the $\frac{1}{16}$ -inch square drive on the back of the tool to keep the drive roll from turning while loosening the nut. Slide the drive roll off the tool's shaft. Be careful not to lose the key on the tool's shaft.

DRIVE ROLL INSTALLATION

1. Align the keyway of the drive roll with the key on the tool's shaft. Slide the drive roll onto the tool's shaft. Install the nut and cotter pin (provided with the new drive roll).

MAINTENANCE

Always keep the tool free from chips and grindings.



Regular lubrication of the external support rolls is required. Lubrication fittings are located on the front of the external support roll studs. A #2EP general-purpose, extreme-pressure lithium grease should be pumped into the lubrication fittings approximately once per week.

RE-SHARPENING TOOL BITS

CAUTION

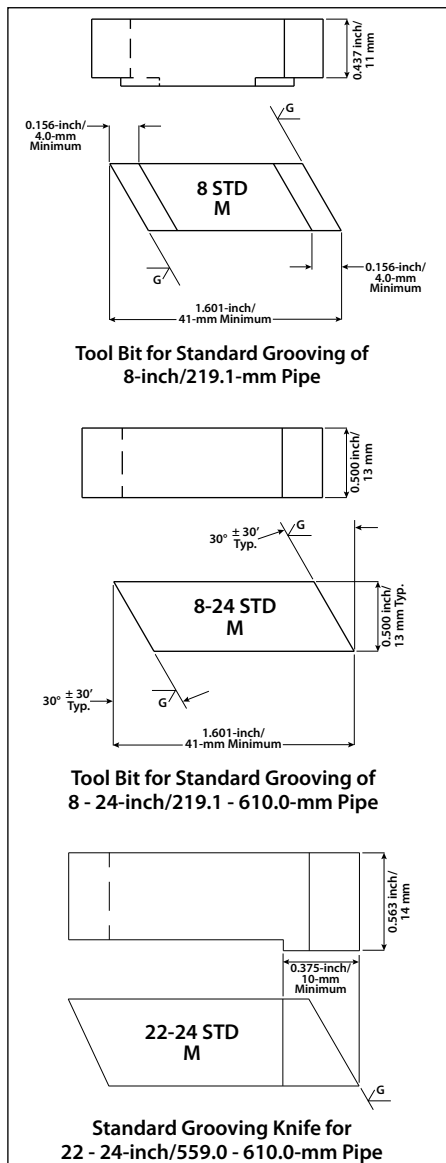
- **DO NOT attempt to re-sharpen tool bits for cast iron pipe and tool bits for AGS specifications.**

Failure to follow this instruction will create a tool bit that will not produce grooves within Victaulic specifications, resulting in improper joint performance, joint failure, and property damage.

Only standard and “ES” tool bits can be re-sharpened. Tool bits for cast iron pipe and tool bits for grooving to AGS specifications **MUST NOT** be re-sharpened.

1. Remove the tool bit from the tool by following the “Tool Bit Removal” section.
2. Sharpen the edge(s) of the tool bit to the specifications listed in the drawing on this page. Re-grind the “G” surfaces to obtain sharp cutting edges that are free of nicks and discoloration. If the minimum length dimension cannot be maintained, the tool bit must be discarded. **DO NOT** attempt to use a tool bit that cannot be re-sharpened to the proper dimensions.

3. Re-install the tool bit into the tool by referring to the “Tool Bit Installation” section.
4. Adjust tool bit projection by referring to the “Tool Bit Projection Adjustment” section.



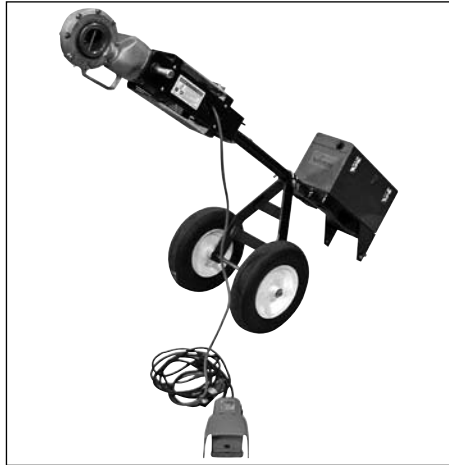
PARTS ORDERING INFORMATION

When ordering parts, the following information is required for Victaulic to process the order and send the correct part(s). Request the Repair Parts List for detailed drawings and parts listings.

1. Tool Model Number – VG824 or VG828
2. Tool Serial Number
3. Quantity, Part Number, and Description of Item
4. Where to Send the Part(s) – Company name and address
5. To Whose Attention to Send the Part(s)
6. Purchase Order Number
7. Billing Address

RECOMMENDED ACCESSORIES

VICTAULIC POWER MULE II



The Victaulic Power Mule II is a high-torque power drive for driving Victaulic Cut Grooving Tools. The power mule operates at 13 amps with a no-load operating speed of 32 rpm. Under load, the power mule runs at slower speeds. This is a very desirable feature, since heavier loads and slower speeds greatly reduce tool-bit chatter.

TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
Tool will not fit onto pipe end.	The external support rolls are not retracted sufficiently.	Turn the external roll feed nut fully counterclockwise.
	The tool bit is not retracted sufficiently.	Turn the tool bit feed knob fully counterclockwise.
	Pipe diameter exceeds the tool's capacity.	Refer to the "Introduction" section.
	Pipe wall thickness exceeds the tool's capacity.	Refer to the "Introduction" section.
Tool will not rotate.	The external support rolls are not tightened sufficiently.	Refer to the "Mounting the VG824 or VG828 Tool Onto the Pipe" section.
	Chips are wedged between the external support rolls and the pipe.	Loosen the external support rolls and remove any chips. Re-tighten the external support rolls.
	The power mule or power drive is not connected to the electrical source.	Plug the power drive into an internally-grounded electrical source.
	The power drive switch is in the OFF position.	Place the power drive switch in the position to produce clockwise rotation of the tool.
	Dirt or rust accumulated on the drive roll.	Remove dirt, grime, and rust accumulation with a stiff wire brush.
	The drive roll is worn out.	Replace the drive roll. Contact Victaulic for replacement parts.
	The drive roll key is missing or sheared.	Replace the key. Contact Victaulic for replacement parts.
Tool will not cut.	The tool is being driven counterclockwise.	Reverse the control switch on the power drive, and drive the tool in a clockwise direction.
	The tool bit is not loaded against the pipe properly.	Refer to the "Grooving Operation" section.
	The tool bit is dull.	Replace or re-sharpen the tool bit. Refer to the "Re-Sharpening Tool Bits" section.
	The tool bit is installed backward.	Refer to the "Tool Bit Installation" section.
	Tool bit projection is not set properly.	Refer to the "Tool Bit Projection Adjustment" section.
	Chips have accumulated between the tool bit arm and pipe.	Retract the tool bit and remove any chips. Re-load the tool bit against the pipe while the tool is rotating.
Tool chatters during the cutting operation.	The tool bit is not loaded properly against the pipe.	Refer to the "Grooving Operation" section.
	The power drive is running at a speed that exceeds the tool's capacity.	Refer to the "Power Requirements for the Victaulic Power Mule II or Power Drive" section.
	Not enough cutting oil is being used during the cutting operation.	Refer to the "Grooving Operation" section.
	Tool bit projection is not set properly.	Refer to the "Tool Bit Projection Adjustment" section.
	Pipe has a hard spot or hard weld seam.	Increase the tool bit load slightly and oil the groove generously.
	The tool bit is starting to dull.	Replace or re-sharpen the tool bit. Refer to the "Re-Sharpening Tool Bits" section.

TROUBLESHOOTING (CONTINUED)

PROBLEM	POSSIBLE CAUSE	SOLUTION
Tool will not "hug" pipe end.	The tool is being driven counterclockwise.	Reverse the control switch on the power drive, and drive the tool in a clockwise direction.
	The power mule is not positioned 90° to the pipe.	Refer to the "Attaching the Victaulic Power Mule II to the VG824 or VG828 Tool" section.
	The power drive is not aligned with the pipe centerline.	Refer to the "Attaching a Power Drive to the VG824 or VG828 Tool" section.
	The pipe is not square cut.	Cut the pipe end square. Refer to the "Preparing Pipe for Grooving" section.
Tool cannot be dismounted from the pipe.	The external support rolls are not retracted.	Turn the external support roll feed nut fully counterclockwise.
	The tool bit is not retracted.	Turn the tool bit feed knob fully counterclockwise.
Groove diameter "C" dimension is incorrect.	The groove diameter is out of adjustment.	Refer to the "Groove Diameter Adjustment" section.
	Tool bit projection is out of adjustment.	Refer to the "Tool Bit Projection Adjustment" section.
	The pipe outside diameter varies widely from piece to piece.	The groove diameter adjustment must be made for each piece to ensure correct groove diameter "C" dimensions.
	Chips have built up between the tool bit arm and the pipe.	Retract the tool bit arm and remove any chips. Re-load the tool bit against the pipe while the tool is rotating.
	The tool bit has been re-sharpened beyond the specified tool bit length.	Replace the tool bit. Contact Victaulic for replacement parts.
	The depth stop has worn to a point where it can't be adjusted.	Replace the worn depth stop. Contact Victaulic for replacement parts.
Gasket seat "A" dimension is incorrect.	The incorrect tool bit and/or pipe stops are installed in the tool.	Refer to the applicable "Tool Bit/Pipe Stop Specifications" table.
	The pipe stops are worn.	Replace the pipe stops. Contact Victaulic for replacement parts.
	The pipe is not square cut.	Cut the pipe end square. Refer to the "Preparing Pipe for Grooving" section.
	The power mule is not positioned 90° to the pipe.	Refer to the "Attaching the Victaulic Power Mule II to the VG824 or VG828 Tool" section.
	The power drive is not aligned with the pipe centerline.	Refer to the "Attaching a Power Drive to the VG824 or VG828 Tool" section.
Groove width "B" dimension is incorrect.	The incorrect tool bit is installed in the tool.	Refer to the applicable "Tool Bit/Pipe Stop Specifications" table.
	The power mule is not positioned 90° to the pipe.	Refer to the "Attaching the Victaulic Power Mule II to the VG824 or VG828 Tool" section.
	The power drive is not aligned with the pipe centerline.	Refer to the "Attaching a Power Drive to the VG824 or VG828 Tool" section.

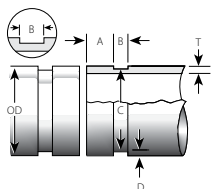
EXPLANATION OF CRITICAL CUT GROOVE DIMENSIONS



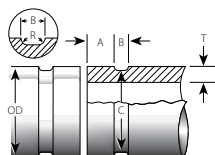
WARNING

- Pipe dimensions and groove dimensions must be within the tolerances specified in the tables on the following pages to ensure proper joint performance.

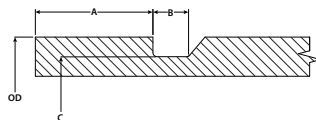
Failure to follow these specifications could result in serious personal injury, property damage, joint leakage, and/or joint failure.



Standard Cut Groove



Radius Cut Groove



AGS Cut Groove

Illustrations are Exaggerated for Clarity

Pipe Outside Diameter – Nominal NPS Pipe Size (ANSI B36.10) and Basic Metric Pipe Size (ISO 4200)

– The average pipe outside diameter must not vary from the specifications listed in the tables on the following pages. Maximum allowable pipe ovality should not vary by more than 1%. Greater variations between the major and minor diameters will result in difficult coupling assembly. For IPS pipe, the maximum allowable tolerance from square-cut pipe ends is 0.060-inch/1.5-mm for 8-inch/200-mm and larger sizes. This is measured from the true square line. Any internal and external weld beads or seams must be ground flush to the pipe surface. The inside diameter of the pipe end must be cleaned to remove coarse scale, dirt, and other foreign material that might interfere with or damage the drive roll.

For pipe being grooved to Advanced Groove System (AGS) specifications, the outside diameter must not vary from the specifications listed in this manual (API 5L end tolerance). The maximum allowable tolerance from square-cut ends is 0.063 inch/1.5 mm. This is measured from the true square line.

“A” Dimension – The “A” dimension, or the distance from the pipe end to the groove, identifies the gasket seating area. This area must be free from indentations, projections (including weld seams), deep pits, swells, and roll marks from the pipe end to the groove to ensure a leak-tight seal. All foreign material, such as loose paint, scale, oil, grease, chips, rust, and dirt must be removed. For cast pipe, peened surfaces may require corrective action to ensure a leak-tight seal.

“B” Dimension – The “B” dimension, or groove width, controls expansion, contraction, and angular deflection of flexible couplings by the distance it is located from the pipe and its width in relation to the coupling housings’ “key” width. The bottom of the groove must be free of all foreign material, such as dirt, chips, rust, and scale that may interfere with proper coupling assembly.

For pipe being grooved to AGS specifications, the corners at the bottom of the groove must be radiused. The Groove Width “B” dimension will be achieved with properly maintained Victaulic VG828 tools that are equipped with a Victaulic-supplied AGS tool bit.

“C” Dimension – The “C” dimension is the proper diameter at the base of the groove. This dimension must be within the diameter’s tolerance and concentric with the OD for proper coupling fit. The groove must be of uniform depth for the entire pipe circumference. For pipe being grooved to AGS specifications, the VG828 tool must be equipped with a Victaulic-supplied AGS tool bit.

“D” Dimension – The “D” dimension is the normal depth of the groove and is a reference for a “trial groove” only. Variations in pipe OD affect this dimension and must be altered, if necessary, to keep the “C” dimension within tolerance. This groove must conform to the “C” dimension described above.

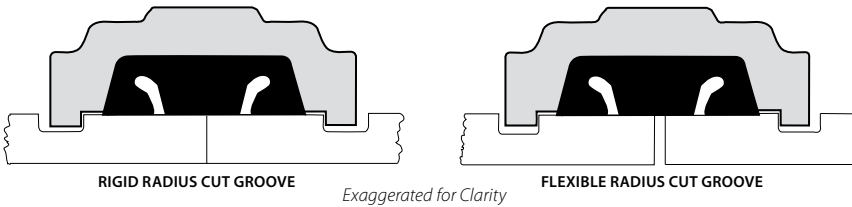
“T” Dimension – The “T” dimension is the lightest grade (minimum, nominal wall thickness) of pipe that is suitable for cut grooving. Pipe that is less than the minimum, nominal wall thickness for cut grooving may be roll grooved.

For AWWA pipe, the tolerances must conform to Class 53 ANSI/AWWA C151/A21.51.

For pipe being grooved to AGS specifications, the absolute minimum wall thickness is 0.500 inch/12.7 mm. The maximum allowable wall thickness is 0.750 inch/19.1 mm.

“R” Dimension – The “R” dimension is the radius necessary at the bottom of the groove to eliminate a point of stress concentration for cast pipe (gray and ductile) and PVC plastic pipe.

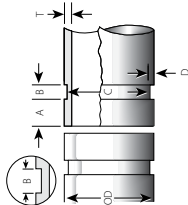
RIGID AND FLEXIBLE RADIUS CUT GROOVES



Victaulic groove specifications for cast pipe (gray and ductile) conform to the requirements of ANSI/AWWA Standard C-606 and CSA B242.

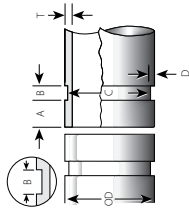
For cast pipe, the groove is cut with a radius (“R” dimension) at the corners of the groove base to reduce stress concentration. Grooving dimensions are the same for any pipe OD, regardless of pipe class and pressure.

Standard preparation is with a rigid radius cut groove. Flexible radius cut groove dimensions may be used to provide expansion/contraction or angular movement allowance at the joint.



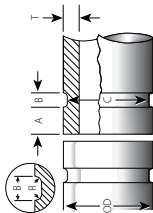
STANDARD CUT GROOVE SPECIFICATIONS FOR STEEL AND OTHER NPS PIPE GROOVED WITH THE VG824 TOOL †

Size		Dimensions – inches/millimeters											
Nom. Size inches/mm	Act. OD inches/mm	Pipe Outside Diameter		Gasket Seat "A"			Groove Width "B"			Groove Diameter "C"		Groove Depth "D" (ref.)	Min. Allow. Wall Thick. "T"
		Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Max.	Min.		
8 OD	8.000	8.063	7.969	0.750	0.781	0.719	0.438	0.469	0.407	7.791	7.791	0.092	0.238
	203.2	204.8	202.4	19.1	19.8	18.3	11.1	11.9	10.3	198.5	197.9	2.4	6.1
216.3 mm	8.515	8.578	8.484	0.750	0.781	0.719	0.438	0.469	0.407	8.331	8.306	0.092	0.238
	216.3	217.9	215.5	19.1	19.8	18.3	11.1	11.9	10.3	211.6	211.0	2.4	6.1
8 200	8.625	8.688	8.594	0.750	0.781	0.719	0.438	0.469	0.407	8.441	8.416	0.092	0.238
	219.1	220.7	218.3	19.1	19.8	18.3	11.1	11.9	10.3	214.4	213.8	2.4	6.1
10 OD	10.000	10.063	9.969	0.750	0.781	0.719	0.500	0.531	0.469	9.812	9.785	0.094	0.250
	254.0	255.6	253.2	19.1	19.8	18.3	12.7	13.5	11.9	249.2	248.5	2.4	6.4
267.4 mm	10.528	10.591	10.497	0.750	0.781	0.719	0.500	0.531	0.469	10.340	10.313	0.094	0.250
	267.4	269.0	266.6	19.1	19.8	18.3	12.7	13.5	11.9	262.6	262.0	2.4	6.4
10 250	10.750	10.813	10.719	0.750	0.781	0.719	0.500	0.531	0.469	10.562	10.535	0.094	0.250
	273.0	274.7	272.3	19.1	19.8	18.3	12.7	13.5	11.9	268.3	267.6	2.4	6.4
304.8 mm	12.000	12.063	11.969	0.750	0.781	0.719	0.500	0.531	0.469	11.781	11.751	0.109	0.279
	304.8	306.4	304.0	19.1	19.8	18.3	12.7	13.5	11.9	299.2	298.5	2.8	7.1
318.5 mm	12.539	12.602	12.508	0.750	0.781	0.719	0.500	0.531	0.469	12.321	12.291	0.109	0.279
	318.5	320.1	317.7	19.1	19.8	18.3	12.7	13.5	11.9	313.0	312.2	2.8	7.1
12 300	12.750	12.813	12.719	0.750	0.781	0.719	0.500	0.531	0.469	12.531	12.501	0.109	0.279
	323.9	325.5	323.1	19.1	19.8	18.3	12.7	13.5	11.9	318.3	317.5	2.8	7.1



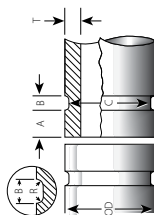
STANDARD CUT GROOVE SPECIFICATIONS FOR STEEL AND OTHER NPS PIPE GROOVED WITH THE VG824 TOOL †

Size		Dimensions – inches/millimeters											
Nom. Size inches/mm	Act. OD inches/mm	Pipe Outside Diameter		Gasket Seat "A"		Groove Width "B"			Groove Diameter "C"		Groove Depth "D" (ref.)	Min. Allow. Wall Thick. "T"	
		Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.				
14 OD	14.000	14.063	13.969	0.938	0.969	0.907	0.500	0.531	0.469	13.781	13.751	0.109	0.281
	355.6	357.2	354.8	23.8	24.6	23.0	12.7	13.5	11.9	350.0	349.3	2.8	7.1
377.0 mm	14.843	14.937	14.811	0.938	0.969	0.907	0.500	0.531	0.469	14.611	14.581	0.116	0.315
	377.0	379.4	376.2	23.8	24.6	23.0	12.7	13.5	11.9	371.1	370.4	2.9	8.0
15 OD	15.000	15.063	14.969	0.938	0.969	0.907	0.500	0.531	0.469	14.781	14.751	0.109	0.312
	381.0	382.6	380.2	23.8	24.6	23.0	12.7	13.5	11.9	375.4	374.7	2.8	7.9
16 OD	16.000	16.063	15.969	0.938	0.969	0.907	0.500	0.531	0.469	15.781	15.751	0.109	0.312
	406.4	408.0	405.6	23.8	24.6	23.0	12.7	13.5	11.9	400.8	400.1	2.8	7.9
426.0 mm	16.772	16.866	16.740	0.938	0.969	0.907	0.500	0.531	0.469	16.514	16.479	0.129	0.335
	426.0	428.4	425.2	23.8	24.6	23.0	12.7	13.5	11.9	419.5	418.6	3.3	8.5
18 OD	18.000	18.063	17.969	1.000	1.031	0.969	0.500	0.531	0.469	17.781	17.751	0.109	0.312
	457.0	458.8	456.4	25.4	26.2	24.6	12.7	13.5	11.9	451.6	450.9	2.8	7.9
20 OD	20.000	20.063	19.969	1.000	1.031	0.969	0.500	0.531	0.469	19.781	19.751	0.109	0.312
	508.0	509.6	507.2	25.4	26.2	24.6	12.7	13.5	11.9	502.4	501.7	2.8	7.9
22 OD	22.000	22.063	21.969	1.000	1.031	0.969	0.563	0.594	0.532	21.656	21.626	0.172	0.375
	559.0	560.4	558.0	25.4	26.2	24.6	14.3	15.1	13.5	550.1	549.3	4.4	9.5
24 OD	24.000	24.063	23.969	1.000	1.031	0.969	0.563	0.594	0.532	23.656	23.626	0.172	0.375
	610.0	611.2	608.8	25.4	26.2	24.6	14.3	15.1	13.5	600.9	600.1	4.4	9.5



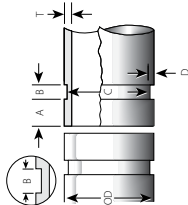
RIGID RADIUS-CUT GROOVE SPECIFICATIONS FOR DUCTILE IRON PIPE GROOVED WITH THE VG824 TOOL

Nom. Dia. Inches/mm		Actual Outside Dia. Inches/mm		Dimensions – Inches/mm												Minimum Allowable Wall Thickness "T"	
				Pipe Outside Diameter		Gasket Seat "A"		Groove Width "B"				Groove Diameter "C"		Radius "R"	Cast Iron	Ductile Iron	
				Max.	Min.	Max.	Min.	Basic	Max.	Min.	Max.	Max.	Min.				
8	200	9.050 229.9	9.110 231.4	8.990 228.3	0.950 24.1	0.930 23.6	0.500 12.7	0.531 13.5	0.484 12.3	8.756 222.4	8.781 223.0	0.145 3.7	0.410 10.4	0.360 9.1			
10	250	11.100 281.9	11.160 283.5	11.040 280.4	1.015 25.8	0.995 25.3	0.500 12.7	0.531 13.5	0.484 12.3	10.788 274.0	10.813 274.7	0.145 3.7	0.440 11.2	0.380 9.7			
12	300	13.200 335.3	13.260 336.8	13.140 333.8	1.015 25.8	0.995 25.3	0.500 12.7	0.531 13.5	0.484 12.3	12.906 327.1	12.906 327.8	0.145 3.7	0.480 12.2	0.400 10.2			
14	350	15.300 388.6	15.350 389.9	15.220 386.6	1.015 25.8	0.995 25.3	0.625 15.9	0.656 16.7	0.609 15.5	14.939 379.5	14.969 380.2	0.165 4.2	0.550 14.0	0.470 10.7			
16	400	17.400 442.0	17.450 443.2	17.320 439.9	1.340 34.0	1.320 33.5	0.625 15.9	0.656 16.7	0.609 15.5	17.033 432.6	17.063 433.4	0.165 4.2	0.580 14.7	0.430 10.9			
18	450	19.500 495.3	19.550 496.6	19.420 493.3	1.340 34.0	1.320 33.5	0.625 15.9	0.656 16.7	0.609 15.5	19.095 485.0	19.125 485.8	0.185 4.7	0.630 16.0	0.440 11.2			
20	500	21.600 548.6	21.650 549.9	21.520 546.6	1.340 34.0	1.320 33.5	0.625 15.9	0.656 16.7	0.609 15.5	21.189 538.2	21.219 539.0	0.185 4.7	0.670 17.0	0.450 11.4			
24	600	25.800 655.3	25.850 656.6	25.720 653.3	1.340 34.0	1.320 33.5	0.625 15.9	0.656 16.7	0.609 15.5	25.376 644.6	25.406 645.3	0.185 4.7	0.730 18.5	0.470 11.9			



FLEXIBLE RADIUS-CUT GROOVE SPECIFICATIONS FOR DUCTILE IRON PIPE GROOVED WITH THE VG824 TOOL

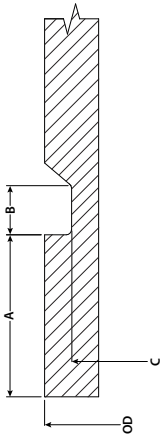
Dimensions – Inches/millimeters												
Nom. Dia. Inches/ mm	Actual Outside Dia. Inches/mm		Pipe Outside Diameter		Gasket Seat "A"		Groove Width "B"			Groove Diameter "C"		Minimum Allowable Wall Thickness "T"
			Max.	Min.	Max.	Min.	Basic	Max	Min	Max	Min	Cast Iron
8	9.050	8.990	9.110	8.990	0.875	0.855	0.500	0.531	0.484	8.781	8.756	0.410
200	229.9	228.3	231.4	228.3	22.2	21.7	12.7	13.5	12.3	223.0	222.4	10.4
10	11.100	11.040	11.160	11.040	0.938	0.918	0.500	0.531	0.484	10.813	10.788	0.440
250	281.9	280.4	283.5	280.4	23.8	23.3	12.7	13.5	12.3	274.7	274.0	11.2
12	13.200	13.140	13.260	13.140	0.938	0.918	0.500	0.531	0.484	12.906	12.876	0.480
300	335.3	333.8	336.8	333.8	23.8	23.3	12.7	13.5	12.3	327.8	327.1	12.2
14	15.300	15.220	15.350	15.220	0.938	0.918	0.625	0.656	0.609	14.969	14.939	0.550
350	388.6	386.6	389.9	386.6	23.8	23.3	15.9	16.7	15.5	380.2	379.5	14.0
16	17.400	17.320	17.450	17.320	1.188	1.168	0.625	0.656	0.609	17.063	17.033	0.580
400	442.0	443.2	439.9	439.9	30.2	29.7	15.9	16.7	15.5	433.4	432.6	14.7
18	19.500	19.420	19.550	19.420	1.188	1.168	0.625	0.656	0.609	19.125	19.095	0.630
450	495.3	496.6	496.6	493.3	30.2	29.7	15.9	16.7	15.5	485.8	485.0	16.0
20	21.600	21.520	21.650	21.520	1.188	1.168	0.625	0.656	0.609	21.219	21.189	0.670
500	548.6	549.9	546.6	546.6	30.2	29.7	15.9	16.7	15.5	539.0	538.2	17.0
24	25.800	25.720	25.850	25.720	1.188	1.168	0.625	0.656	0.609	25.406	25.376	0.730
600	655.3	653.3	656.6	653.3	30.2	29.7	15.9	16.7	15.5	645.3	644.6	18.5



CUT GROOVE SPECIFICATIONS FOR STANDARD OR HEAVIER-WALL PIPE OR PLASTIC-COATED PIPE GROOVED WITH THE VG824 TOOL AND JOINED WITH STYLE HP-70ES ENDSEAL COUPLINGS

Size		Dimensions – inches/millimeters												
Nom. Size Inches/mm	Actual Out. Dia. Inches/mm	Pipe Outside Diameter		Gasket Seat "A"			Groove Width "B"			Groove Diameter "C"			Groove Depth "D" (ref.)	Min. Allow. Wall Thick. "T"
		Max.	Min.	Basic	Max.	Min.	Basic	Max.	Min.	Max.	Min.			
8	8.625	8.688	8.594	0.714	0.729	0.699	0.400	0.410	0.390	8.441	8.416	0.092	0.322	
200	219.1	220.7	218.3	18.1	18.5	17.8	10.2	10.4	9.9	214.4	213.8	2.3	8.2	
10	10.750	10.813	10.719	0.714	0.729	0.699	0.400	0.410	0.390	10.562	10.535	0.094	0.365	
250	273.0	274.7	272.3	18.1	18.5	17.8	10.2	10.4	9.9	268.3	267.6	2.4	9.3	
12	12.750	12.813	12.719	0.714	0.729	0.699	0.400	0.410	0.390	12.531	12.501	0.109	0.375	
300	323.9	325.5	323.1	18.1	18.5	17.8	10.2	10.4	9.9	318.3	317.5	2.8	9.5	

ADVANCED GROOVE SYSTEM (AGS) CUT GROOVING SPECIFICATIONS FOR CARBON STEEL PIPE GROOVED WITH THE VG828 TOOL



Dimensions – inches/millimeters									
Pipe Size		Outside Diameter “OD”		Gasket Seat “A”		Groove Width “B”†		Groove Diameter “C”	
Nominal Size inches	Actual Outside Diameter inches/mm	Max.	Min.	Basic	Max.	Min.	Max.	Basic	Min.
14	14.000	14.063	13.969	1.500	1.531	1.437	0.455	0.455	13.455
	355.6	357.2	354.8	38.1	38.9	36.5	11.6	11.6	341.8
16	16.000	16.063	15.969	1.500	1.531	1.437	0.455	0.455	15.455
	406.4	408.0	405.6	38.1	38.9	36.5	11.6	11.6	392.6
18	18.000	18.063	17.969	1.500	1.531	1.437	0.455	0.455	17.455
	457.0	458.8	456.4	38.1	38.9	36.5	11.6	11.6	443.4
20	20.000	20.063	19.969	1.500	1.531	1.437	0.455	0.455	19.455
	508.0	509.6	507.2	38.1	38.9	36.5	11.6	11.6	494.2
24	24.000	24.063	23.969	1.500	1.531	1.437	0.455	0.455	23.455
	610.0	611.2	608.8	38.1	38.9	36.5	11.6	11.6	595.8

† The Groove Width “B” dimension is listed for information only. The Groove Width “B” dimension will be achieved with a properly maintained Victaulic VG828 tool that is equipped with a Victaulic-supplied AGS tool bit.

VG824 TOOL BIT/PIPE STOP SPECIFICATIONS

Pipe Size		Groove Dimensions inches/millimeters		Pipe Stops Used (Marked As Shown)			Tool Bits		Part Number
Nominal Diameter inches/mm	Actual Outside Diameter inches/ mm	"A"	"B"	Central (Adj.)	Rect. (Top)	Rect. (Bottom)	Width inches/ mm	Marking	

STEEL – STANDARD GROOVE

8 200	8.625 219.1	0.750 19.1	0.438 11.1	8.625 OD 12.750 OD	8-12	14-24	0.438 11.1	8 STD	R-K08-824-008
8 – 12 200 – 300	8.625 – 12.750 219.1 – 323.9	0.750 19.1	0.500 ± 12.7	8.625 OD 12.750 OD	8-12	14-24	0.500 12.7	8-24 STD	R-K08-824-024
14 – 24 OD	14.000 – 24.000 355.6 – 610.0	0.968 24.6	0.500 12.7	14-24 OD 10-12 CI	8-12	14-24	0.500 12.7	8-24 STD	R-K08-824-024
22 – 24 OD	22.000 – 24.000 559.0 – 610.0	0.968 24.6	0.562 ± 14.3	14-24 OD 10-12 CI	8-12	14-24	0.562 14.3	22-24 STD	R-K22-824-024

± A 0.562-inch width groove is required for 22 – 24-inch pipe sizes in order to obtain the maximum allowable pipe end movement. The 0.500-inch groove width will provide half the maximum allowance for 22 – 24-inch pipe sizes. For the 8-inch pipe size, the 0.500 groove width does not change the allowable pipe-end movement.

STEEL – “ES” GROOVE

8 – 12 200 – 300	8.625 – 12.750 219.1 – 323.9	0.714 18.1	0.400 10.2	8.625 OD 12.750 OD	8-12	14-24	0.400 10.2	8-12 ES	R-K08-824-212
---------------------	---------------------------------	---------------	---------------	-----------------------	------	-------	---------------	---------	---------------

CAST IRON – RIGID GROOVE (STANDARD)

8 200	9.050 229.9	0.950 24.1	0.500 * 12.7 *	8 CI	8 CI	14-24	0.500 12.7	8 CIR	R-K08-824-G08
10 – 12 250 – 300	11.100 – 13.200 281.9 – 335.3	1.015 25.8	0.500 * 12.7 *	14-24 OD 10-12 CI	REMOVE	14-24	0.500 12.7	10-12 CIR	R-K10-824-G12
14 350	15.300 388.6	1.015 25.8	0.625 * 15.9 *	14 CI	REMOVE	14 CI	0.625 15.9	14 CIR	R-K14-824-G14
16 – 24 400 – 600	17.400 – 25.800 442.0 – 655.3	1.340 34.0	0.625 * 15.9 *	16-24 CI	REMOVE	16-24 CI	0.625 15.9	14-24 CIR	R-K16-824-G24

* Measurement of groove width at top of groove only – bottom of groove is radiused

CAST IRON – FLEXIBLE GROOVE

8 200	9.050 229.9	0.8750 22.2	0.500 * 12.7 *	8 CI	8 CI	14-24	0.500 12.7	8 CIF	R-K08-824-E12
10 – 12 250 – 300	11.100 – 13.200 281.9 – 335.3	0.9375 23.8	0.500 * 12.7 *	14-24 OD 10-12 CI	REMOVE	14-24	0.500 12.7	8-12 CIF	R-K08-824-E12
14 350	15.300 388.6	0.9375 23.8	0.625 * 15.9 *	14 CI	REMOVE	14 CI	0.625 15.9	14-24 CIF	R-K14-824-E24
16 – 24 400 – 600	17.400 – 25.800 442.0 – 655.3	1.1875 30.2	0.625 * 15.9 *	16-24 CI	REMOVE	16-24 CI	0.625 15.9	14-24 CIF	R-K14-824-E24

* Measurement of groove width at top of groove only – bottom of groove is radiused

VG828 TOOL BIT/PIPE STOP SPECIFICATIONS

Pipe Size		Groove Dimensions inches/millimeters		Pipe Stops Used (Marked As Shown)			Tool Bits		Part Number
Nominal Diameter inches/mm	Actual Outside Diameter inches/ mm	"A"	"B"	Central (Adj.)	Rect. (Top)	Rect. (Bottom)	Width inches/ mm	Marking	

STEEL – AGS GROOVE

14 – 24 OD	14.000 – 24.000 355.6 – 610.0	1.500 38.1	0.450 # 11.4	14-24 OD 10-12 CI	N/A	14-24	0.450 § 11.4	14-24 AGS	R-K14-828-W24
------------	----------------------------------	---------------	-----------------	----------------------	-----	-------	-----------------	-----------	---------------

Measurement of groove width at bottom of groove only

§ Width of tool bit at the tip

VG824 and VG828

CUT-GROOVING TOOLS

For complete contact information, visit www.victaulic.com

TM-VG824/VG828 5218 REV A UPDATED 04/2008 RM00824828

VICTAULIC IS A REGISTERED TRADEMARK OF VICTAULIC COMPANY. © 2008 VICTAULIC COMPANY.
ALL RIGHTS RESERVED. PRINTED IN THE USA.



WCAS-7E8MHM

