

CERAM CORE® Field Fabrication Tool

Instructions for 6" - 12" Ceram Core Pipe

The Ceram Core field fabrication tool is a portable lathe designed to prepare the pipe for the field bonding of flanges. This tool was designed for 6"-12" Ceram Core pipe only. Normally, piping systems are factory flanged and pressure tested. However, circumstances may exist that necessitate field bonding of the pipe.

These instructions are concerned with the description and operating procedures of the Ceram Core tool. Bonding and installation instructions of piping systems are contained in Ceram Core Installation Manual.

General Description of The Tool

The Field Fabrication Tool is basically a portable lathe incorporating a diamond blade and a grinding drum. The pipe is slowly turned by the mandrel assembly and either cut with the diamond blade or ground by the drum.

The water-cooled diamond blade is used to square cut (+.010"/-.015") through the ceramic bead-lined pipe. This is done after the pipe is rough-cut to within 1" of desired length. The tool allows the diamond blade to be moved away from the cut pipe end making the grinding operation possible without removing the pipe from the tool. The water-cooled grinding drum is then used to produce a straight scarf to the desired outside diameter and length according to the pipe size.

Warning: The use of water-cooled cutting tools presents a possible shock hazard if proper safety precautions are not observed. Failure to follow safety precautions may result in serious or fatal injury.

Safety Precautions: When connecting this tool to its power source, follow all local electrical and safety codes as well as the National Electrical Code (N.E.C.) and O.S.H.A.

The tool must be operated only when all original safety equipment, including guards, etc., are in place. The tool must be disconnected from its power source before any components of the tool are changed or repaired. Consult your local NOV Fiber Glass Systems representative if any safety equipment has become inoperable. Discontinue use of the tool until proper replacement of the safety equipment has been completed.

Equipment Needed

The following equipment must be provided by the contractor or shop using this tool.

1. 3,500 Watt, 125 Volt AC power supply with a twist lock plug receptacle.

Warning: Because this tool requires 30 amps, a three-pronged parallel common slot plug should not be used to operate this equipment.

2. Water supply with a male adapter that allows connection to a 1¹/₈" N.P.T. female threaded coupling. A catch pan and drain system is suggested for disposal of the run-off water.

3. A "diameter tape" capable of measuring 2" through 14" or greater.

4. Adjustable roller stand with plastic or hard rubber wheels. The stand must allow for height changes and wheel adjustments to fit different pipe sizes.

5. Mounting of the tool can be by any of three different methods. (**Note:** With mandrels, the tool can weigh up to 700 lbs.)

The base of the shipping box will serve as the mounting and must be supported under its entire dimensions.

A solid table must be used if the tool is unbolted from the shipping box base. The tool is fastened down with 1/2" bolts on a rectangular base of 16¹/₂" x 15". The long side (16¹/₂") should be parallel to the front of the table but approximately 1¹/₂" back from the edge of the table.

The tool may also be mounted on a stand having two 1³/₈" solid round shafts extending 2' from the stand. The center to center dimension for the parallel shafts must be 16 -¹/₄" to fit the slots of the tool.

6. Circular saw with masonry blade for making initial rough cuts.

7. English Allen wrench set.

8. Two 12" adjustable wrenches.

9. Ear plugs for tool operator as noise can exceed 90 dB.

10. Torque wrench and 1¹/₈" socket. (Torque wrench equipped with a ratchet mechanism will prove convenient.)

Critical Machining Dimensions

1. END-GRIND LENGTH DIMENSIONS

The grind length of a given pipe size varies according to joint style.

2. O.D. DIMENSION

The grind length dimension and the O.D. dimension varies with size. (See chart below)

Pipe Size	Grind Length ⁽²⁾	Flush Joint ⁽¹⁾
6"	3 ⁵ / ₁₆ "	6.680"
8"	4 ⁵ / ₁₆ "	8.680"
10"	5 ¹ / ₁₆ "	10.750"
12"	5 ⁵ / ₁₆ "	12.959"

⁽¹⁾ O.D. dimension tolerance is +/- .007".
⁽²⁾ Tolerance +/- ¹/₄"

Part Identification

The following identification letters refer to the indicated parts in Figures 1 through 4.

- A. Lifting handles
- B. Grinding drums—3 different sizes
- C. Grinding drum spacers—2 different sizes
- D. Mandrel expansion plates—6 for each head
- E. Mandrel expansion nut—1-1/8" size head
- F. Chain clamps for mandrel shaft
- G. Grinder clamp knob
- H. Slide feed handle
- I. Spring detent pin
- J. Spring detent plate
- K. Water supply hose
- L. Mandrel drive switch
- M. Grinding drum switch
- N. Diamond blade
- O. Grinding drum guard bolts
- P. Mandrel back-up rings—for 8" and larger esp. plates
- Q. Grinding drum nut

Figure 1

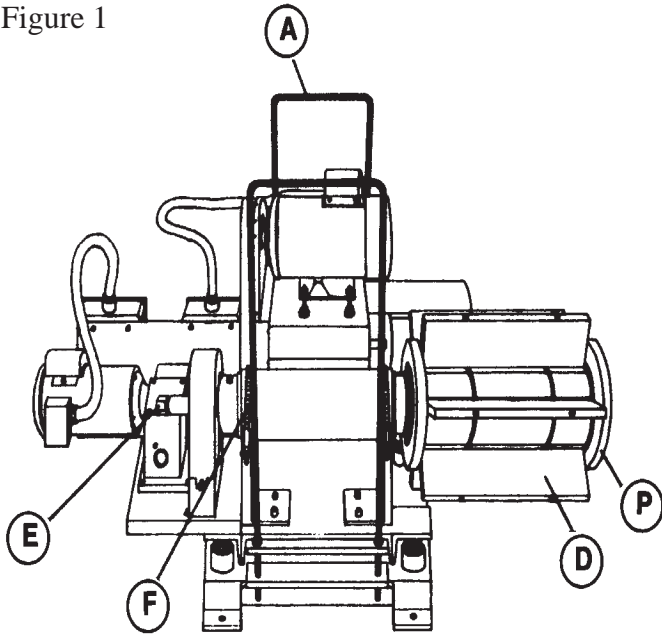


Figure 2

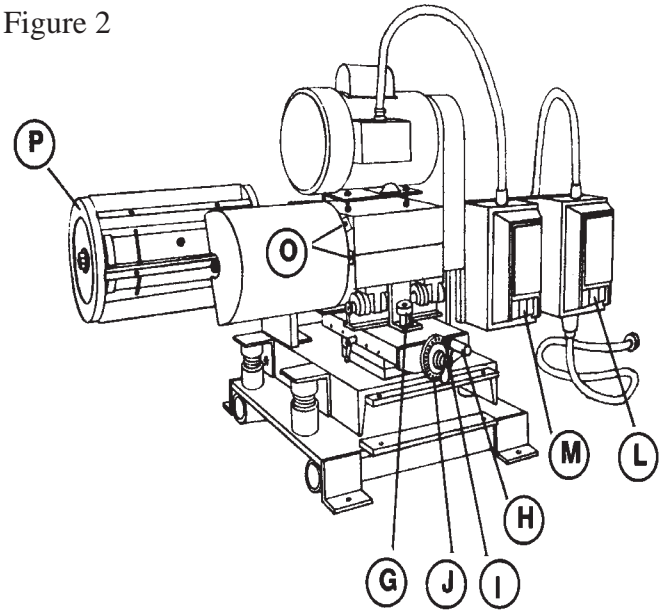


Figure 3

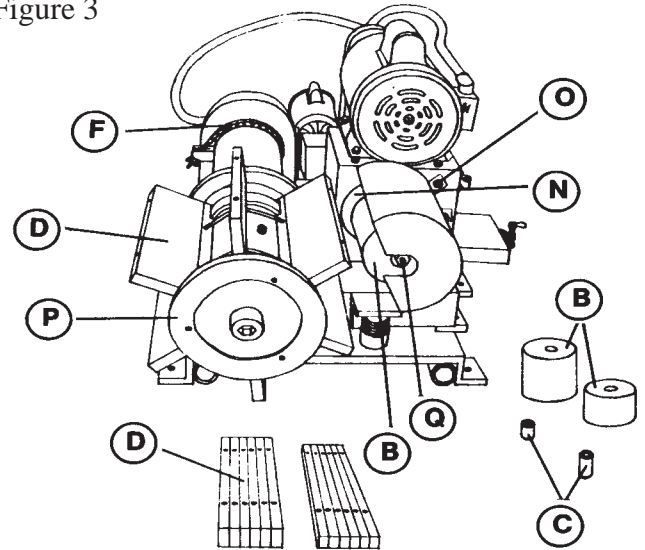
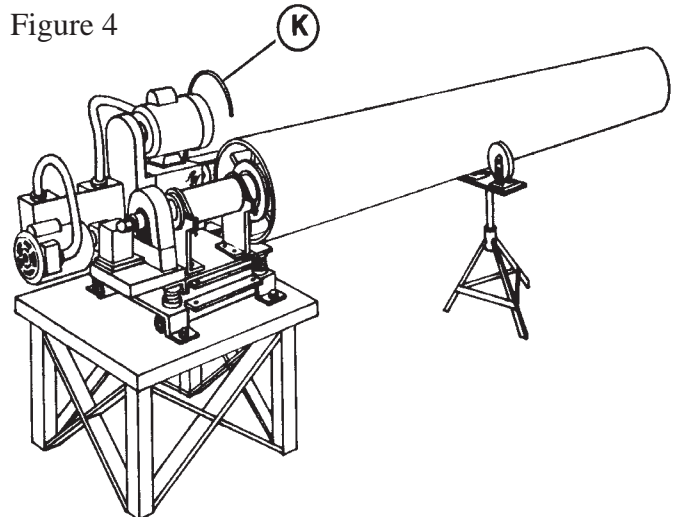


Figure 4



Tool Preparation

Lifting The Ceram Core Tool

Lifting the tool requires four or more men (approximate tool weight 300 lbs.). Lifting handles are shown (Item A, Fig. 1) on the tool drawings. The handles must be removed after the tool is set into the mounting and before the tool is operated. The tool must be free to swivel and float on the four springs with the handles removed.

Tool Mounting

See #5 listed under Equipment Needed in these instructions.

Selecting And Changing The Grinding Drums

1. Selecting the grinding drum:

The following is a listing of the grinding drum length vs. the pipe size.

- 1) 5 $\frac{3}{4}$ " drum—Used on all 10" and 12" ends.
- 2) 4 $\frac{3}{4}$ " drum—Used on all 8" ends.
- 3) 3 $\frac{3}{4}$ " drum—Used on all 6" ends.

2. Changing the grinding drums:

Prior to changing grinding drums disconnect the tool from the power source. Remove the two bolts (Item O, Figures 2 & 3) that hold the grinding drum guard on the tool.

To remove the grinding drum, two 12" adjustable wrenches are required. One wrench is used to hold the shaft at the flat behind the diamond blade. (Item N, Figure 3) and the second wrench is used to loosen and remove the grinding drum nut (Item Q, Figure 3). Replace the grinding drum selected next to the diamond blade. If the 3- $\frac{3}{4}$ " long drum is selected, place the longer spacer (Item C, Figure 3) between the drum and the grinding drum nut. If the 4- $\frac{3}{4}$ " long drum is selected, use the shorter spacer in the same manner. The 5- $\frac{3}{4}$ " long drum requires no spacer. The grinding drum nut should be pulled up tight. Finally, replace the grinding drum guard before connecting the tool to the power source.

Mandrel Setup

The mandrel extension plates (Item D, Figures 1 & 3) and the mandrel backup rings (Item P, Figures 1, 2 & 3) are required for pipe sizes greater than 6".

For 6" pipe, all the mandrel extension plates and the two backup rings must be removed. The extension plates are held in place by three Allen head bolts in each plate which can be removed with a $\frac{3}{16}$ " Allen wrench. The outer backup plate is attached with Allen head screws and will fit the mandrel in only one position. The inner backup ring is removed by taking out the entire mandrel assembly. The mandrel assembly is held in place by two chain clamps (Item F, Figures 1 & 3) which are tightened down by wing nuts. Loosen the wing nuts to remove the chains from around the mandrel shaft. With the mandrel assembly off the tool, the Allen head screws which attach the inner backup ring can be removed and the ring can be slid down the shaft and off the mandrel assembly. Replace the mandrel assembly on the tool and tighten down the chain clamps.

For 8", 10" or 12" pipe, reverse the procedure just described to install the backup rings and mount the appropriate size expansion plates. (NOTE: Be sure the mounting contact surfaces for the expansion plates are clean.)

Tool Alignment

The expanding mandrel must be fully collapsed by turning the mandrel expansion nut (Item E, Figure 1) counterclockwise until it stops. This allows a pipe to be slid over the end of the mandrel. While holding up the free end of the pipe, adjust the roller stand into position under the pipe to an "eyeball" level condition. The stand should be situated near the center of the pipe length to keep most of the weight off the tool. (Figure 4 shows the tool mounted with the roller stand in the correct location.)

Ceram Core Pipe Preparation (Rough Cutting)

A rough cut of the pipe is required if the pipe is to be cut more than one inch from the end. The rough cut should be approximately one inch longer than the required final dressing cut. A power hand saw with an abrasive blade (masonry blade) is used to cut through the laminate to the bead liner completely around the pipe. The pipe is then snapped apart by placing it on a solid support with the cut slightly overhanging the support. To complete the separation, apply a downward impact load with a 2 x 4 to the end of the pipe while rotating the pipe through one full rotation and until the separation is complete.

Tool Operation

Before the field tool is used to machine the pipe, the operator should review the part identifications and have properly set the tool for the size pipe to be machined.

Mounting The Pipe

1. The expanding mandrel must be fully collapsed by turning the mandrel expansion nut (Item E, Figure 1) counterclockwise until it stops.

2. The diamond blade (Item N, Figure 3) must be moved away from the mandrel assembly to allow clearance for the pipe mounted over the mandrel. This is done by pulling out the slide feed handle (Item H, Figure 2) which disengages the spring detent pin (Item I, Figure 2) from the spring detent plate (Item J, Figure 2). Holding the slide handle out while turning counterclockwise moves the diamond blade and grinding drum away from the mandrel assembly. Continue the retraction until the diamond blade is at least $\frac{1}{2}$ " away from the mandrel assembly.

3. The grinder clamp knob (Item G, Figure 2) is loosened and the grinder assembly is pushed fully toward the roller stand in front of the tool. Tighten the grinder clamp knob back down after adjustment.

4. The pipe is placed over the end of the mandrel while holding the opposite end of the pipe above the roller stand. Continue pushing the pipe over the mandrel until desired cut location of the pipe is in line with the diamond blade.

5. The mandrel is expanded by turning the mandrel expansion nut clockwise. The nut should be torqued to 20-25 ft/lbs. for 6" pipe and 40-45 ft./lbs. for 8" and larger pipe.

6 .Turn on the mandrel drive switch (Item L, Figure 2) and check the roller stand for alignment and free rotation of the pipe.

Final Dress Cutting

1. Open the water supply hose (Item K, Figure 4) valve and adjust the flexible water supply hose to provide a constant stream of water where the diamond blade will contact the pipe. The water is essential to prevent excessive blade wear.

2. Turn on the grinding drum switch (Item M, Figure 2) and allow the motor to develop full speed. Pull out on the slide feed handle to disengage the detent pin. While holding the slide handle out, slowly advance the blade into the pipe. DO NOT FORCE THE CUT. Advance the blade completely through the pipe.

Warning: Do not over-advance the blade as the grinding drum will contact the pipe O.D.

The diamond blade is capable of making a complete cut during one mandrel revolution. Retract cutting blade until edge is ½" away from pipe end after cut.

3 .Turn off both motors and the water supply valve.

Grinding Procedure

The following procedure should be followed to grind the pipe end to the proper outside diameter and length of grind. The procedure for grinding should follow the final dress cut. Do not remove the pipe from the mandrel after the cut; the cut-off piece of pipe can be rested over the chain clamp on the mandrel shaft.

1. Loosen the grinder clamp knob and move the grinder assembly back in the direction away from the roller stand until the distance from the end of the pipe and the end of the grinding drum (end opposite the diamond blade) equals the required length of grind. Tighten down the grinder clamp knob.

2. Turn on the grinding drum switch and the mandrel drive switch. Turn on the water supply valve and direct the stream of water by bending the flexible hose to flow near the center of the area the grinding drum will contact the pipe.

3. Pull out on the slide feed handle and turn the handle clockwise to advance the grinding drum toward the pipe. The grinding drum should make only light contact with the pipe O.D.

Warning: In some cases, one very shallow grind is all that is required. Do not make a deep initial grind.

Always locate the spring detent pin into a hole in the detent plate after adjusting the slide feed handle. Allow two or three revolutions of the pipe after the grinding drum is in position to get a uniform cleanup of the outside diameter of the pipe.

4. Pull out on the slide feed handle and retract the grinding drum from the pipe by turning the handle counterclockwise until the clearance between the two is sufficient to measure the pipe.

5. Turn off the water supply valve and both drive switches.

6. Measure the actual grind length and compare the length to the desired grind length dimension. If the grind length is not correct, loosen the grinder clamp knob and readjust to the correct length. Be sure to retighten the grinder clamp knob.

7. Measure the O.D. next to the cut end of the pipe and also 2" away from the cut end. The measurements should agree within .010".

Determine from the measurement of the O.D. and the desired O.D. the amount of material that must be removed.

8. If the initial O.D. measurement indicates that the pipe must be ground further, turn on the water supply valve and both drive switches. Allow grinding drum to achieve full speed.

9. Advance the grinding drum by turning the slide feed handle clockwise until light contact is made with the pipe. Locate the detent pin in the closest detent pinhole counterclockwise from the light contact.

10. Advance the grinding drum into the pipe by relocating the detent pin with the slide handle clockwise to the next detent pinhole. The engagement holes in the spring detent plate are spaced to advance or retract the grinding drum .004" on the O.D. of the pipe. Allow one revolution of the pipe before advancing the slide feed handle to the next hole. Continue the "one hole per revolution" feeding until the O.D. should be approximately to the desired O.D. This is done by figuring the number of times .004" will divide into the difference between the first O.D. measurement and the desired O.D. dimension. This is the number of holes advanced from the first light contact. Allow the grinding to continue at this final setting for three revolutions of the pipe.

11. DO NOT TURN OFF THE GRINDING DRUM SWITCH OR MANDREL DRIVE SWITCH UNLESS THE GRINDING DRUM HAS BEEN RETRACTED AT LEAST ¼" FROM THE PIPE O.D. After the grinding drum is retracted, turn off the motors and the water supply valve.

12. Measure the O.D. of the ground pipe as previously described, checking again that the O.D. variance is within .010" over 2" of length. Check to see that the end dimension is plus or minus .007" of the desired dimension.

13. If the O.D. measurement is larger than the desired O.D. and the tolerance, proceed again as was outlined in steps No. 2 through No. 12.

UNDERSIZED O.D. IS NOT RECOMMENDED. THE ENTIRE GROUND AREA SHOULD BE COMPLETELY REMOVED AND THE ENTIRE CUTTING AND GRINDING REDONE.

14. After the desired O.D. is achieved, release the pipe from the mandrel by loosening the mandrel expansion nut counterclockwise.

If the dimensions are not within this tolerance, consult your NOV Fiber Glass Systems representative.

Tool Maintenance

The following maintenance items should be followed on a daily usage basis.

1. Clean off the water and dust mixture left on the tool. This procedure is especially important for the mandrel assembly.
2. Use oil (WD-40®, etc.) over all exposed metal sliding surfaces.
3. Cover tool with shipping box or waterproof covering if stored in the weather. On a periodic basis (one week's usage), check the following:
 4. Check gear motor gearbox for grease and maintain level with Mobil Gear® #629, or comparable. (Change oil every 1,000 hrs. of usage of tool.)
 5. Check for play in slide assembly. Adjust gib screws to eliminate play but allow free slide advance and retraction. (Grease the zerk fittings on the slide assembly every 1,000 hrs. of tool usage.)

WD-40 is copyrighted by the WD-40 Company/Mobil is copyrighted by Exxon

National Oilwell Varco has produced this brochure for general information only, and it is not intended for design purposes. Although every effort has been made to maintain the accuracy and reliability of its contents, National Oilwell Varco in no way assumes responsibility for liability for any loss, damage or injury resulting from the use of information and data herein nor is any warranty expressed or implied. Always cross-reference the bulletin date with the most current version listed at the web site noted in this literature.

North America

17115 San Pedro Ave. Suite 200
San Antonio, Texas 78232 USA
Phone: 210 477 7500

South America

Avenida Fernando Simoes
Recife, Brazil 51020-390
Phone: 55 31 3501 0023

Europe

P.O. Box 6, 4190 CA
Geldermalsen, The Netherlands
Phone: 31 345 587 587

Asia Pacific

No. 7A, Tuas Avenue 3
Jurong, Singapore 639407
Phone: 65 6861 6118

Middle East

P.O. Box 17324
Dubai, UAE
Phone: 971 4881 3566

www.fgspipe.com • fgspipe@nov.com

NOV Fiber Glass Systems

©2012 National Oilwell Varco. All rights reserved.
TLS 6620 February 2009