

TOILET (CLOSET) FLANGE REPAIR TOOL

SMALL ELECTRIC DEBONDER

A Product of Debonding Systems, Inc.
PVC Pipe Debonder

Operating Manual

Warnings

Read and understand this entire manual and your employer's safety procedures before operating or servicing this tool. **CAUTION: The heating element reaches temperatures over 1000 degrees F and can cause severe burns or ignite flammables. After a heating cycle, the element remains above 120 degrees for several minutes and if touched, will burn flesh. Make certain that the hot heating element is not allowed to touch any flammable material or contact the operator until it has cooled. Do not put a hot debonder in the tool box until it has cooled.**

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Record the following information for warranty purposes.

Where purchased _____

Purchase date _____

Serial no. _____

The pipe debonder removes a broken piece of PVC, CPVC, or ABS pipe from any fitting it is glued into without requiring that the fitting be replaced or the manifold it is attached to scrapped or rebuilt. Using a process of tightly controlled heat, the original bond will loosen and the old pipe can be removed without any damage to the fitting allowing a new joint to be made with the integrity of the original glue joint. This saves the fitting and most of the labor to replace it. A broken pipe near a tee can be repaired using one coupling, a short piece of pipe, and three glue joints. The alternative requires 3 couplings (or unions), 3 pieces of pipe, a new tee, and 9 glue joints.

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Section 1: Introduction to Pipe Debonding, a new technology

Debonding Systems, Inc. is the world leader in PVC Debonding Technology. Debonding Systems developed the concept of an automated system that allows solvent cement welded PVC pipe to be removed from PVC fittings without damage to the fitting. Beginning in 1995 and through years of testing and development, The Toilet (Closet) Flange Repair Tool has been developed and brought to market allowing PVC and ABS piping systems to be repaired easily and quickly saving complex manifolds from having to be rebuilt when one pipe breaks. We call it the Toilet (Closet) Flange Repair Tool because some of the greatest savings occur when toilet flanges can be replaced without cutting the floor or the ceiling below to gain access to the wye or sweep below the floor. Even basement drain pipe can be debonded below the concrete allowing only the broken flange to be replaced, not the wye or the sweep. It is a robust, industrial grade tool.

Debonding Systems Toilet Flange Repair Tool can salvage any glued fitting, not just toilet flanges. The Toilet Flange Repair Tool works up to 4 inch pipe, ABS, PVC, and CPVC. To debond $\frac{1}{2}$ and $\frac{3}{4}$ inch pipe, the three screws holding the heater guard need to be removed.

Debonding Systems also manufactures a mid size electric Debonder that debonds 4 and 6 inch schedule 80 pipe with 3 larger heating elements that increase the debonding speed for 4 to 6 inch pipe particularly for schedule 80 PVC and CPVC. Both debonder tools fit in the same tool box.

Plumbing contractors who have a boneyard of expensive fittings such as flanges, valves, sensors, etc. that have been saved, but cannot be used, now have a way to salvage and reuse these otherwise wasted parts and inventory.

Debonding Systems has debonded the same fitting as many as 100 times without damage to the fitting. Schools now have a way to actually build 10 and 12 inch piping systems economically by not only teaching how to build them, but to actually build them in class. Not only is that beneficial, the students can now learn how to take apart glued fittings and reuse expensive fittings, something never before possible! Even high school students are now learning how to build and repair large PVC piping systems with the latest technology. Plumbers of the future will have this new technology when they enter the workforce.

Customers who have had deformed pipe ends from being stacked for years outdoors use the Debonder to re-round the pipe simply by heating it and allowing it to go back to its natural shape.

Section 2: Safety Precautions – Read before use

1-1: Pipe Debonding General Hazards

- Only qualified persons should operate, maintain, and repair this unit.
- Prepare the work area so that you have a safe place to hold the Debonder during the heating cycle and identify a place to put it after heating and during the pipe removal process. Depending on the size of the pipe, cycles can take up to 10 minutes.
- Check Debonder for damage before each use. The Debonder is designed to be robust and needs little maintenance.
- The control unit key pad is not waterproof.
- When the power cord is plugged in, the Debonder automatically is switched on.
- Do not use if Debonder is damaged or not completely functional.

1-2: Fire Hazards

- Hot parts can cause severe burns. **Do not touch hot parts!** Allow 10 minutes cooling period before servicing heater head.
- Never touch heating element to see if it is hot. The heater reaches temperatures that cause severe burns within 5 seconds of cycle start. The heating element can cause combustibles to catch fire – liquids or solids.
- The Debonder body and metal parts get hot after long cycles or after several cycles.
- Be sure there is no combustible or flammable material in the work area. Any material that cannot be removed must be protected.
- Use in a well ventilated area. Heating PVC to its softening point may cause limited scorching to the inside of the pipe being removed. If this happens, some smoke may be evident. Do not breathe this smoke. Use a fan to remove vapors or wear respirator approved for smoke and organic vapors if needed.
- Keep a fire extinguisher nearby.

1-3: Protective Clothing and Gear

- Wear safety glasses with side shields when using unit.
- Avoid breathing smoke or vapors produced by the Debonder during use.

1-4: Work Area

This is an electrical device and using it in wet areas require precaution to avoid an electrical shock. Do not use the Debonder while standing in water without electrical insulation protection between the operator and the tool. Do not use in explosive atmospheres, such as flammable liquids, gases, or dust. Replace damaged power cord. Damaged cords could create a fire or electrical short. **USE OF A 3rd PARTY GFCI (GROUND FAULT CIRCUIT INTERRUPTER) DEVICE IS HIGHLY RECOMMENDED AND MAY BE REQUIRED BY LOCAL CODE.**

Section 3 Care of Unit – Read before use

2-1: Maintenance

Other than replacement of the power cord and straightening bent extraction tool prongs, all repairs should be performed at the factory. Do not store unit when it is wet. If damp, dry it with a soft cloth when unit is cool enough to touch without burns. Store unit only in a dry condition.

2-2: Cleaning

- To remove soil, use only a damp cloth to wipe unit down. Unit will not rust as it is made of anodized aluminum.
- Discoloration of the heating element is normal. Scrape off any melted PVC that sticks to the element to prevent smoke during next heating cycle.
- The use of any abrasive material will damage the finish on the parts.
- Do not use any organic solvents to clean as they may damage the unit, particularly the key pad. Remove oil and grease with a dry cloth.
- Do not flood or immerse control unit or key pad. They are not waterproof.

2-3: Repairs

- If the Debonder unit needs repairs, contact the factory to see if the problem can be solved by phone. If it can't, an RMA will be issued for returning it, freight paid, to the factory for service. The Debonder unit cannot be repaired in the field. Contact information is found in section 6 at the back of this manual.

Section 4: Statement of Warranty

Limited warranty: Debonding Systems, Inc. (hereinafter "Debonding") warrants that its products will be free of defects in workmanship or material. Should any defect in workmanship or materials occur within 24 months of purchase (excluding battery packs and heating elements), the defective item should be returned to Debonding for evaluation and repair, prepaid by Customer. Should Debonding determine that defective material or workmanship is valid, Debonding will replace or repair the defects at no charge to Customer. Return freight to Customer will be paid by Debonding. Should Debonding, in its sole discretion, determine that the defects were caused by abuse, neglect, or misuse of the item not in accordance with this manual, Debonding will alert Customer of cost to repair or replace damaged unit and require Customer approval to do the repairs before proceeding. If Customer does not approve the repairs or does not respond within 30 days, Debonding will return the unit without repairs to Customer. This warranty is exclusive and is in lieu of any warranty of merchantability or fitness for a particular purpose.

Limitation of liability: Debonding shall not under any circumstances be liable for special or consequential damages, such as, but not limited to, damage or loss of purchased or replacement goods, or claims of customers or distributor (hereinafter "Customer") for service interruption. The remedies of the Customer set forth herein are exclusive and the liability of Debonding with respect to any contract, or anything done in connection therewith such as the performance or breach thereof, or from the manufacture, sale, delivery, resale, or use of any

goods covered by or furnished by Debonding whether arising out of contract, negligence, or under any warranty, or otherwise, shall not, except as expressly provided herein, exceed the price of the goods upon which such liability is based.

This warranty is invalid if replacement parts or accessories are used which may impair the safety or performance of any Debonding product.

All parts are warranted for 24 months from the date of purchase except heating elements and batteries which are warranted for 12 months.

Section 5: Detailed Step-by-Step Operating Instructions

Important: Cycle times programmed into the control unit are based on starting with a cold heater. If the heater is hot from a previous cycle, the programmed cycle will be about one minute longer than required.

1. Gain access to fitting with the broken pipe. Leave enough room around fitting so heating unit can be aligned with broken pipe. Heating head must be able to fit inside the broken pipe so that it is centered by orange centering arms.
2. Obtain a short section of the size pipe you are going to debond. Have it available at the debonding site for possible use after the cycle is completed if the roundness of the debonded fitting is in question. Instructions for how to do this are found in step 19 below.
3. Cut off broken pipe so that it sticks out from the fitting 1/4 to 1/2 inch. Do not cut flush to fitting end or extraction is difficult.
4. Drain or remove liquid (wires, if conduit) from fitting. Once pipe is dry you may proceed with removal.
5. Make certain there are no flammable liquids or gasses in the pipe system. If so, block the legs of the pipe system with appropriate means. Remember to remove these blocks after the pipe is debonded and before the repair is completed. Damp towels work well. **CUSTOMER IS RESPONSIBLE TO DETERMINE THE CORRECT AND SAFE SOLUTIONS FOR ANY POTENTIALLY HAZARDOUS SITUATION.**
6. Plug the power cord in to a power source and to the Debonder. The tool automatically starts when power is applied. The display will scroll "PIPE dEbondEr".
7. Select the schedule (wall thickness) of the broken pipe (not the fitting) by pressing the curved line between arrow heads key repeatedly until the proper schedule is displayed on the screen. The letter in front of the number indicates the pipe type: P for PVC, C for CPVC, and A for ABS. The first entry is P20 for schedule 20, PVC pipe, the thinnest wall pipe. Pressing the key again advances to schedule 40, then to schedule 80 (the thickest wall pipe), then to ABS, and then to C80. The schedule on the display is the one selected.
8. Select the diameter (pipe size) of the broken pipe by pressing the circle with radial arrows key repeatedly until the proper diameter is displayed. The first selection is .75" for 3/4" pipe. Pressing the size key advances to 1" and up to 6" and then back to .75". The diameter on the display is the one selected. If there is no size indicated for the pipe you want to unglue, the DEBONDER doesn't have a cycle programmed for that size and thickness. Use the next higher schedule for the cycle you need and terminate the heating

when the pipe is ready to remove as described below. Note that if you use a tape measure or ruler to measure the pipe diameter, you could select the wrong debonding cycle because the measured pipe diameter is always larger than the pipe size.

9. Place the Debonder head fully into the pipe until the centering guides touch the pipe. For small pipe sizes, the heater flange stays far from the end of the pipe allowing more ventilation than desired. Faster cycles will occur if a non-flammable barrier is used to reduce heat escape around the top of the pipe during the cycle. A damp towel works well for this purpose.

10. Get in a position that you can maintain for the duration of the cycle and when ready, press green key to start the debonding cycle.

11. The display shows the number of seconds remaining in the debonding cycle. It counts down to zero at which time the heating part of the cycle is complete. When this happens, the Debonder beeps.

12. Remove the Debonder from the pipe and place it in a safe place to cool down where it won't burn or melt anything. The heater will stay hot enough to burn skin for about 10 minutes. A good way to cool the heating head is with a damp towel where you turn the towel to keep good cooling. Do not run water on the debonder head or heater for risk of getting water in the electric circuits inside the unit.

13. Select the right size extraction tool for the pipe you want to unglue. Use it to test the softened pipe at 3:00 or 9:00 by pushing the extraction tool into outside wall of the pipe that protrudes from the fitting. Push it towards the center to separate it from the fitting. It should be relatively easy to separate. If it separates, go to the 12:00 position (top) and push the extraction tool into the outside of the pipe making it separate from the fitting. Do not pierce the pipe with the extraction tool. Slide the extraction tool between the pipe and fitting and pry the pipe away from the fitting more. Continue this process until the prongs of the extraction tool are completely through the pipe and the body of the extraction tool touches the pipe. Be careful not to scar the fitting wall. This is done at the top of the joint because heat rises and the top, being the hottest, is where the pipe is the softest and therefore easiest to separate. This makes the insertion of the extraction tool easiest.

14. For debonding ABS pipe, insert the extraction tool fully through the pipe to separate the pipe from the fitting, then insert long needle nose pliers in that location where the pipe is separated. For PVC and CPVC pipe, skip to step 15.

ABS tears when hot. ABS requires gripping the pipe with pliers, then winding up the pipe around the pliers while gripping the pipe. If the pipe tears, continue to wind the pipe around the pliers. You may need to change the location of the grip to keep from tearing more. Continue to extract until the pipe is completely removed. Newer ABS pipe is sometimes made with foam core where the inside and outside surfaces of the pipe are solid, but the center is full of nitrogen bubbles. Foamed pipe is very insulating and therefore difficult to transfer heat through. The pre-programmed ABS cycles are for solid pipe. For foamed ABS pipe, use the cycles for Schedule 80 PVC and regularly test for separation as in step 13 to know when to terminate the Schedule 80 cycle.

15. Rotate the extraction tool to wind up the softened pipe around the extraction tool and remove the broken piece of pipe. While rotating the extraction tool, keep the prongs straight into the pipe so the pipe wraps straight on itself.

16. If the pipe is not soft enough to be pushed away from the fitting, place the Debonder back into the pipe. Usually there is enough heat left in the heating element to adequately soften the pipe after another minute or so.
17. You may stop the cycle at any time by pressing the red key and removing the unit from the pipe. If you press green, the display flashes indicating that the cycle has been interrupted and turns off the heater. You can restart by pressing green again. To clear an aborted cycle, press either the schedule or diameter keys to select a new cycle.
18. You generally have about one minute to extract the pipe after the cycle ends. If you take too long to insert the tool and break the joint, the pipe will cool and you will have to use another cycle or part of one. To do this, simply begin another cycle and use the removal tool to push the tines into the side wall of the pipe to see how it separates from the fitting. When you can easily push the pipe away from the fitting, remove the unit and stop the cycle. If the fitting softens, too much heat has been applied. Usually the pipe can be removed anyway, but the pipe cohesive strength is reduced to where the pipe can tear easily if the extraction tool is twisted too fast. If the pipe tears before it is released from the fitting, reinsert the extraction in the middle of the remaining piece of pipe and break the adhesive bond slow enough that it doesn't tear.
19. If the fitting flexes and warps as the extraction is being done, quickly insert the short piece of cold pipe from step 2 into the fitting as soon as the old pipe is removed to hold the fitting "round" as it cools. Generally insertion of only $\frac{1}{4}$ to $\frac{1}{2}$ inch is sufficient.
20. If the pipe is too hot to remove without damage to the fitting, allow the joint to cool back down past the softening point and start over. Removing the pipe when the fitting is soft may damage the integrity of the fitting and cause it to leak.
21. Allow the fitting to cool slightly before cementing new pipe. Inspect the joint surface of the fitting to see that it is not damaged. Generally the fitting will be in new condition after removal of the broken pipe. The old glue will be rough to touch, but new primer and glue will soften the glue peaks and the new pipe will easily fit into a debonded socket.
22. When the fitting is cool enough to grip, you can prime, apply glue, and recreate the new joint.
23. Let the Debonder cool off before starting the next repair. If you start another cycle without allowing the heater to cool, you need to check the pipe for separation as in step 13 about 1 minute before the end of the cycle to avoid overheating and over softening the joint.
24. If the removal tool gouges the fitting joint surface, there is risk that the repair will leak thru the gouge. It is advised to remove that fitting and replace it. Be careful to insert the removal tool in such a way that the pipe gets scarred, but not the fitting inside surface. If the prongs are parallel to the pipe when inserted, no scarring will occur.
25. If a great deal of scorching or smoke occurs during the heating cycle, cancel the cycle by pressing the red key. Unless the smoke is excessive, leave the heating unit in place. The residual heat is usually enough to break the cement bond. Test the pipe using step 13 after about 1 minute by pushing on the pipe with removal tool to test if pipe is soft enough to separate from the fitting. When the pipe is ready, proceed with the extraction. If not, start cycle again and stop manually when pipe is soft enough to remove.

Section 6: Extreme cold and when the cycle isn't enough to debond.

Time is a more important factor in determining the proper heating cycle than temperature of the heater. If the set cycle doesn't allow the joint to be debonded, it is better to select a longer cycle (usually the next schedule of the same pipe size) than it is to select a hotter cycle (a larger pipe size). In the case of SCH 80, you don't have any choice but to go to the next larger size, but stay with SCH 80 and test for separation before the cycle is completed.

In extreme cold conditions or where there is significant air flow in the fitting to be debonded, restricting air flow in the pipe system will increase success. Also, wrapping the opening between the debonder and the pipe with non-flammable insulation will improve results.

Section 7: CPVC Debonding

There are pre-programmed cycles for Schedule 80 CPVC. For Schedule 40 CPVC, use the cycle for Schedule 80 and test about 80% through the cycle time. The pipe will be removed very easily if the entire cycle is used with the risk of softening the fitting. To protect the fitting, wrap the fitting with a damp towel to keep it cooler. Check for separation as in step 13 above before the cycle is complete. Terminate the cycle when ready for extraction.

Section 8: Basic Troubleshooting Guide.

1. Heater will not shut off.

Disconnect power cord at once.

Defective control unit.....Return to factory for repair.

Important message:

Do not use the Debonder until this problem is fixed. The factory will test the control unit to determine the cause of the failure and will repair or replace the unit.

2. Blank display

Power cord not connected >.....Verify plug is fully inserted

No power at outlet.....Use another outlet or check breaker

3. Cycle time doesn't count down.....Press red key and restart cycle

4. Pipe doesn't get hot enough to debond.....Try next larger size pipe cycle

5. Heating element fails to glow red.....Burned out heater – return to factory

6. Control unit or heater head gets dropped in water or other liquid

- Remove power cord
- Remove cover to unit with 4 Philips screws.
- Drain out any liquid inside enclosure.

- Blow with compressed air any remaining liquids or dusts from the circuit boards in the enclosure.
- Inspect for any corrosion. Remove any corrosion with dry toothbrush. Allow to air dry for twenty-four hours with cover open.
- Replace enclosure top making sure 3 pin cable is connected on both ends and that no wires get pinched.
- Plug in power cord and start a cycle.
- If unit fails to operate, return to factory for repair.

7. Unit gets dropped in organic liquid or solvent (i.e. gasoline, kerosene, alcohol, diesel fuel, oil etc.)

- Disconnect power immediately.
- Return to repair center for repair or replacement. Do not use until the unit has been checked out and repaired. The unit could burst into flames. Do not reconnect power cord for any reason.

8. Unit gets dropped on hard surface, run over by vehicle, caught in door etc.

Send to factory if not 100% sure of safety. This unit very durable, but it can be damaged and may not work properly if dented or smashed. If unsure of safety, return to factory for repairs.

NOTE: THE HEATER IS 110 VOLTS AND IF DAMAGED, COULD CAUSE ELECTRICAL SHOCK TO THE USER.

Section 9: Contact Information for Debonding Systems, Inc.

- Order units
- Order parts or accessories
- Report trouble with your unit
- Return your unit for repairs
- Offer suggestions
- Ask questions about Toilet (Closet) Flange Repair Tool
- Have interest in becoming a dealer for Debonding tools

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