



Machine Works

GLASS MASTER SG-420
DUCT BOARD GROOVING MACHINE
SETUP & OPERATING INSTRUCTIONS

INTRODUCTION

Thank you for your recent purchase of the Glass Master Model SG-420 fiberglass duct board grooving machine. This revolutionary machine has been manufactured with the high level of quality synonymous with Glass Master and CertainTeed Machine Works.

MACHINE CAPABILITIES

The Glass Master SG-420 accurately grooves multiple brands, densities and thickness of fiberglass duct board manufactured throughout the world. U.S. manufacturers include CertainTeed, Knauf Fiberglass, Johns Manville, and Owens-Corning. The SG-420 will groove a 4' long section of fiberglass duct board in only eight seconds, or an 8' long section of fiberglass duct board in only sixteen seconds.

Tool holders and blades are available to groove duct board thickness of 1.0", 1.5" and 2.0". In all cases, the "A", "B", "C", "D" and "E" tools are the only ones needed for fabricating standard 1-Piece and 2-Piece "L-Style" construction. The "F" and "G" tools are normally used to make the "U-style" filler caps and end caps. Proper tool settings for various duct configurations are shown on a decal adhered to the center of the machine's top cover (see the N.A.I.M.A. manual for complete fabrication instructions). Other tool holders and blades are available at additional cost, as are other useful accessories such as duct board support arms and hand grooving tools.

Each tool holder is equipped with a three-position lettered tab to allow for measurement of inside duct height and width settings for 1", 1½" or 2" thick materials. Tooling and cutting blades have been installed at the factory for whichever thickness the customer requested. In order to utilize the remaining two tab positions, additional blade assemblies and/or tool holders must be purchased separately, and the drive roller gap must be adjusted (see section entitled "CHANGING BOARD THICKNESS").

ELECTRICAL REQUIREMENTS:

The SG-420 requires a grounded power source of 120 volts - 60/50 Hz - 15 amps. Avoid extension cords if at all possible. ***ANY EXTENSION CORD USED MUST BE NO MORE THAN 25' IN LENGTH, AND INCLUDE MINIMUM 12 GAUGE WIRE TO AVOID DAMAGE TO THE MOTOR OR ELECTRICAL SYSTEM.***

VISUAL INSPECTION:

Inspect the machine immediately upon removal of the crating material. If it appears that damage to the machine has occurred, contact the freight carrier and file a written claim for any damage noted.

FILE ALL FREIGHT CLAIMS IMMEDIATELY!

MACHINE SET-UP

1. Place a forklift capable of safely lifting 2,000 pounds near the front and center of the machine. ***Be aware that the left side of the SG-420 is heavier than the right side due to the weight of the drive motor, foot switch, chains and sprockets.*** Align the forklift approximately 7" to the left of machine center with the forks spread to maximum width. Place forks under the bottom of the tubular frame and raise the machine vertically from the floor approximately 10". Safely remove all remaining pallet materials.
2. With the SG-420 elevated, attach two casters to the bottom of the leg at each end of the machine using the fasteners provided. It is recommended to install the caster with the brake toward the front of the machine.
3. Provide as much clear space as possible in both the front and back of the machine. Grooving of 4', 8' or 10' board lengths requires a minimum front and back clearance of 6', 10' or 12', respectively.
4. Locate the foot switch, mounted at the left end of the machine within the tubular steel frame area. Place the foot switch in a convenient location on floor in front of the machine.
5. Locate the SG-420 near a 120 Volt, 15 amp power outlet and connect the power cord to the outlet.
6. The drive roller "REVERSE-OFF-FORWARD" switch is located inside the left end of the machine above the board bed and behind the board guide plate. This switch is shipped in the middle (or "OFF") position, and should always remain in this position whenever the machine is not being used. The "REVERSE" position is used for removing damaged or mis-fed board sections from the machine. The "FORWARD" position is used for the normal fabrication of duct sections. Push the switch to the "FORWARD" position.
7. Remove all cutting tools from the protective packaging – **CAUTION: BLADES ARE EXTREMELY SHARP.** The blades will require final adjustment before the machine is ready for use.

BLADE ADJUSTMENT FOR STANDARD TOOLS

Cutting blade adjustment is necessary prior to use to accommodate variations in board thickness. Set the blades according to the following techniques:

1. The 9 degree flap tool is used to remove all fiberglass material from the foil surface and create a staple flap on the left-hand edge of the duct section. This flap will be used in conjunction with an approved UL181A-P or UL181A-H duct board tape to ensure proper closure of the duct section (see the N.A.I.M.A. manual or duct board manufacturer's installation instructions for more information). Using the two screws located on the blade-mounting skid, adjust the blade on tool holder "A" so that *light* contact is made against the top surface of the bottom drive roller. Groove a minimum 12" wide piece of scrap material at least 24" long to test the setting of this blade. When the blade is properly adjusted, a staple flap will be produced with very little (if any) fiberglass remaining on the foil scrim surface. If the "A" blade is adjusted too far upward, fiberglass material will be left on the staple flap making the taping process very difficult. If the "A" blade is adjusted too far downward, the foil flap will either be cut or torn as the duct board passes through the machine, and the added pressure on the blade may cause breakage.
2. Tools "B", "C", and "D" are used to make "modified shiplap" cuts in order to form the three "non-taped" corners of the duct section. All three tools are comprised of a two-blade set. Locate the first blade in each set – the one that has only one bend. Adjust this blade so that it rests *lightly* on the top surface of the bottom drive roller. The second blade in the set has three bends. Adjust this blade until the tip is even with or slightly lower than the tip of the first blade. Groove a piece of scrap material to test the new blade settings. When properly adjusted, the first blade should cut straight down to, but not through the foil surface. The horizontal portion of the second blade should cut exactly halfway through the thickness of the duct board - matching the depth of the female factory shiplap.
3. Tool "E" is used to make the final female shiplap cut along the right-hand edge of the duct section. This is the easiest blade combination to adjust because the "L" shaped blade must simply cut to a depth of $\frac{1}{2}$ the thickness of the duct board while the "straight cutoff" blade must cut all the way through the fiberglass and aluminum foil scrim. Groove a piece of scrap material to test these settings, and adjust the "L" shaped blade upward or downward as required to match the depth of the female factory shiplap.
4. The final test to confirm correct blade and tool settings is to set the tools for a known duct size and groove a trial duct section. Inspect all grooves and panel dimensions to determine which blades are set correctly and which need further adjustment (see the N.A.I.M.A. manual for more information).

BLADE ADJUSTMENT FOR V-GROOVE TOOLS

Cutting blade adjustment is necessary prior to use to accommodate variations in board thickness. Set the blades according to the following techniques:

1. The 9 degree flap tool is used to remove all fiberglass material from the foil surface and create a staple flap on the left-hand edge of the duct section. This flap will be used in conjunction with an approved UL181A-P or UL181A-H duct board tape to ensure proper closure of the duct section (see the N.A.I.M.A. manual or duct board manufacturer's installation instructions for more information). Using the two screws located on the blade-mounting skid, adjust the blade on tool holder for the 9 degree flap tool so that *light* contact is made against the top surface of the bottom drive roller. Groove a minimum 12" wide piece of scrap material at least 24" long to test the setting of this blade. When the blade is properly adjusted, a staple flap will be produced with very little (if any) fiberglass remaining on the foil scrim surface. If the 9 degree flap tool is adjusted too far upward, fiberglass material will be left on the staple flap making the taping process very difficult. If the 9 degree flap tool blade is adjusted too far downward, the foil flap will either be cut or torn as the duct board passes through the machine, and the added pressure on the blade may cause breakage.
2. The 18 degree tools are used to make V-grooves cuts in order to allow a flat duct board to be tightly roll into a round duct. All 18 degree tool sets have two blades (each 9 degrees) which will be adjusted similarly. To properly adjust the blade heights, make sure that the blades rest *lightly* on the top surface of the bottom drive roller. Groove a minimum 12" wide piece of scrap material at least 24" long to test the setting of the blades. When the blade is properly adjusted, a cut will be produced with very little (if any) fiberglass remaining on the foil scrim surface.
3. The final test to confirm correct blade and tool settings is to set the tools for a known duct size and groove a trial duct section. Inspect all grooves and panel dimensions to determine which blades are set correctly and which need further adjustment (see the N.A.I.M.A. manual for more information).

TOOL POSITIONING FOR SHIPLAP TOOLS

1. Tool setting begins at the left end of the machine. Tools should be arranged in accordance with the configurations shown on the tool setting decal centered on the top of the front roller guard. Slide the “A” tool as far to the left as possible until it rests against the permanent tool stop provided at the left end of the tool bar. Secure it using the hand clamp provided.
2. All other tools may then be set by measuring the desired “inside” duct dimension (inches, mm’s, cm’s, etc.) with a yardstick, steel ruler (recommended), or a measuring tape between the lettered tabs located on top of each tool holder. Use the tab location for the appropriate thickness of material being grooved (1”, 1½”, 2”), and make sure that the corresponding blade assembly is properly mounted on each tool.
3. **THE INSIDE “THROAT” DIMENSION SHOULD BE MEASURED FIRST** (this is usually, but not always the duct height – see N.A.I.M.A. manual for complete fabrication instructions) between the appropriate tabs on the “A” and “B” tools. Secure the “B” tool to the toolbar using the hand clamp provided.
4. The “**HEEL**” dimension may now be measured between the appropriate tabs on the “B” and “C” tools (this is usually, but not always the duct width – see N.A.I.M.A. manual for complete fabrication instructions). Secure the “C” tool to the toolbar using the hand clamp provided.
5. The “**THROAT**” dimension is now repeated between appropriate tabs on the “C” and “D” tools. Secure the “D” tool to the toolbar using the hand clamp provided.
6. The “**HEEL**” dimension is now repeated between appropriate tabs on the “D” and “E” tools. Secure the “E” tool to the toolbar using the hand clamp provided.

TOOL POSITIONING FOR V-GROOVE TOOLS

1. Tool setting begins at the left end of the machine. Place the 9 degree flap snug up against the tool-stop and lock into place by depressing on the clamp lever. V-groove tools are to be positioned using a gage block per Table 1, and clamped to machine by depressing the clamp lever.
2. Finding the correct distance between tools can be accomplished in two ways: Calculating the distance using the ID, or using Table 1 on page 7 of this manual.

Calculating distance between tools(S, Spacing between tools):

Step 1: C (Total Circumference) = $3.14 \times ID$ (ID of duct you want to create)

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Step 2: Divide C by the Number of Sides: $C / \#sides = A$

Step 3: Subtract 2" from Step 2 total to find S: $S = A - 2"$

3. Table 1: Tool Spacing for Circular Duct

Pipe Diameter(in.)	Number of sides	Correct tool spacing(in)
10	14*	7/32
11	16*	1/8
12	16*	5/16
13	18*	1/4
14	20	3/16
15	20	5/16
16	20	1/2
17	20	21/32
18	20	13/16
19	20	31/32
20	20	1-1/8
21	20	1-9/32
22	20	1-7/16
23	20	1-19/32
24	20	1-3/4
25	20	1-29/32
26	20	2-1/16
27	20	2-7/32
28	20	2-3/8
29	20	2-17/32
30	20	2-11/16
31	20	2-27/32
32	20	3
33	20	3-5/32
34	20	3-5/16
35	20	3-15/32
36	20	3-5/8
37	20	3-25/32
38	20	3-15/16
39	20	4-3/32
40	20	4-1/4
41	20	4-7/16
42	20	4-9/16
43	20	4-3/4
44	20	4-7/8
45	20	5-1/16

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46	20	5-3/16
47	20	5-3/8
48	20	5-1/2

*Recommended for only 1" thick liner board

GROOVING PROCEDURE

1. Be sure that the "REVERSE-OFF-FORWARD" toggle switch located at the left end of the machine is in "FORWARD" position. Fiberglass duct board is normally purchased in 4' x 10' sheets with factory molded "shiplap" edges along the 10' sides. Begin by standing near the center of a duct board sheet with the fiberglass side facing upward (foil side facing downward). **DO NOT DEPRESS THE FOOT SWITCH AT THIS TIME!** Insert the female shiplap (the edge *without* the loose foil flap) into the roller guard opening. With the board pushed slightly against the duct board guide at the left end of the machine, push the material squarely and firmly into the drive rollers. Maintain even pressure across the full width of the sheet to ensure a straight, square cut. Note: Do not attempt to mount any other type of squaring device to the machine. The best possible squaring procedure is to use the rollers themselves as the only squaring device.

2. Depress the foot switch. The duct board sheet will be driven straight through the machine while being grooved by each cutting tool. If the material turns, stops or tears, release the foot switch immediately. Set the toggle switch in the "REVERSE" position and step on the foot switch to back the material out of the machine. See the section entitled "TROUBLE-SHOOTING" if the problem persists. **WARNING – PROPER SAFETY PROCEDURES REQUIRE THAT THE "REVERSE-OFF-FORWARD" TOGGLE SWITCH REMAIN IN THE "OFF" POSITION AT ALL TIMES WHEN THE MACHINE IS NOT IN USE!**

MACHINE MAINTENANCE:

1. Glass Master duct board cutting blades are constructed of high quality spring steel, and factory hardened during heat treating processes. All blades feature excellent long-term wear characteristics, but they will eventually become dull and must be replaced. Because they are made from hardened spring steel, it is extremely difficult to sharpen Glass Master blades. **SHARPENING OF BLADES IS NOT RECOMMENDED. BELT SANDING WILL ADD HEAT TO THE BLADE AND TEMPER THE EXPENSIVE HEAT-TREATING PROCESS, SOFTENING THE METAL AND SIGNIFICANTLY REDUCING THE LIFE OF THE BLADE.**

2. When changing blades, be certain to refer to the blade set-up and adjustment procedures until you are familiar with the process. Always leave the old blades in place as a reference until you are ready to install the new blades.

3. Fiberglass is a highly abrasive material and may eventually, under heavy use, erode the non-skid coating on the top front and rear drive rollers. In the event of this unlikely occurrence, proper glues and "cut-to-length" drive materials may be obtained from CertainTeed Machine Works, along with easy-to-use installation instructions.

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4. Occasionally remove the left end cover to check the drive chain and sprocket alignment for excessive or abnormal wear. If a sprocket becomes loose, re-align and tighten. Remove all excess fiberglass materials from the drive area including deposits on chains and sprockets. **NEVER LUBRICATE CHAINS OR SPROCKETS!** Oily lubricants will only attract highly abrasive fiberglass material and cause excessive wear.

CHANGING BOARD THICKNESS

1. One of the greatest features of the Model SG-420 is that the toolbar is welded in place and requires absolutely no adjustment. This allows every tool holder on the Model SG-420 to be identical to the others except for the measuring tab and blade assembly attached thereto. Each thickness of material (1", 1½", and 2") must have a different blade assembly mounted to the tool holder in a precise location in order to properly groove. It is highly recommended that machine owners obtain extra tool holder sets for each material thickness so that tooling change outs may be done quickly and without time consuming blade assembly adjustments. The user of the machine should never have a need to mount or adjust the blade assemblies unless attempting to use the same tool holders for different material thickness (not recommended).
2. Drive roller spacing has been set at the factory for the proper gap between the upper and lower drive rollers for 1 ½" thick duct board. The gap spacing of 5/8", 15/16" or 1¼" for duct board thickness of 1", 1½" or 2", respectively, provides the proper force and material compression to consistently drive duct board sheets through the machine. If the roller gap must be adjusted due to a change of material type or thickness, use an open end or crescent wrench to turn the roller adjustment screw located on top of either end of the machine. Turning the screw clockwise will increase the gap, counter-clockwise will decrease the gap. An arrow inside each machine end section indicates the proper locations for duct board thickness of 1" (5/8" gap), 1½" (15/16" gap) and 2" (1¼" gap). Repeat this process at the opposite end of the machine. **NOTE – IN ORDER TO AVOID UNNECESSARY STRESS ON THE ROLLER BEARINGS, RAISE EACH END NO MORE THAN ½" AT A TIME BEFORE MOVING TO THE OPPOSITE END AND REPEATING THE PROCESS.**

TROUBLE SHOOTING

1. **If you experience pulling or tearing of glass fibers or board facing:**
 - a. Check for buildup of facing or adhesive on cutting blades.
 - b. Cutting blades may be worn or pitted. Machine owners should replace cutting blades when they first become worn to the point of causing grooving problems.
 - c. Inspect duct board for uniformity of binder distribution, improper binder curing, or foreign material within the fiberglass strata.
 - d. The "A" blade may be set too low.
 - e. The "L" shaped blades on tools "B", "C", and "D" may be set too low.
 - f. The 18 degree "V" blades may be set to low.

TROUBLE SHOOTING (cont'd)

2. **If duct board sheet does not enter the machine squarely, or twists as it passes through the machine:**
 - a. You may be using incorrect board feed procedure (see “Grooving Procedure”).
 - b. Check drive roller gap spacing at both ends of the machine to make sure it is consistent with the desired duct board thickness.
 - c. Check for excessively worn surfaces on top drive rollers.
 - d. Cutting blades may be worn or pitted.
 - e. Cutting blades may be set improperly.

3. **If drive rollers will not turn:**
 - a. The “Forward-Off-Reverse” switch may be in the “Off” position.
 - b. Machine may not be connected to a proper power source.
 - c. Foot switch may not be depressed, or is damaged.

The Glass Master Model SG-420 is a rugged, almost maintenance-free grooving machine that will last for many, many years.

If you encounter any problem with this machine or simply have a question regarding its use, please call our **CUSTOMER SERVICE HOTLINE:**

1-800-874-9135

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