

# Sportport Porting Manual

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*Like Rand McNally provides a map-but doesn't "teach you how to build the road," - Sport Port provides guidelines like a map-It's like following the road with your car.*

Kit Contents: Sport Port Manual, Templates

**What you need:**

Safety goggles, Mask  
Grinder, Cutter,90 degree scribe  
Vise (optional)  
Grease (optional) & straight edge

This manual provides comprehensive, step by step, instructions for the use of Sport Port from **Race Logic**. Failure to follow each procedure as instructed may result in personal injury or damage to your cylinder. It is important that you read and understand this manual before using Sport Port.

## **Use of NOTES, CAUTIONS, AND WARNINGS**

Inserted within the text of this manual are NOTES, CAUTIONS. And WARNINGS, provided to emphasize important and helpful instructions and/or safety measures. The meaning of each is defined below. It is essential that these NOTES, CAUTIONS, and WARNINGS be read and understood before performing the procedures described in this manual.

### **NOTE:**

A helpful suggestion which is highlighted.

### **CAUTION:**

A procedure, which if not followed correctly, could result in damage or destruction of the cylinder and/or the template.

### **WARNING:**

A procedure which, if not followed correctly, could result in personal injury.

## **GLOSSARY**

### **Port Window:**

The area in the cylinder, at the opening of the port tunnel.

### **Port Tunnel:**

The tunnel between the port window and the outside of the cylinder.

### **Step:**

The rise you feel within the port tunnel, after grinding the port window.

### **Grind:**

The slow, sweeping strokes used to port the cylinder.

### **Blend:**

Grinding the contour of the port tunnel to match the contour of the port window.

### **Chamfer:**

The slight bevel on the port window that prevents the ring from snagging.

## CHAPTER 1

This chapter will demonstrate the proper procedures for preparation of the cylinder and installation of the template system.

*NOTE: ALL INSTRUCTIONS AND ILLUSTRATIONS SHOWN REFER TO THE EXHAUST PORT AND CYLINDER TOP. ALL INSTRUCTIONS AND ILLUSTRATIONS ALSO APPLY WHEN WORKING ON THE INTAKE PORT, (i.e.: THE "CYLINDER TOP" WILL BE THE CYLINDER BOTTOM WHEN THE INTAKE PORT IS BEING DONE).*

Wipe the inner surface and the ends of the cylinder clean with alcohol, carb cleaner, contact...etc. It is important that all dirt and oil is removed from the cylinder.

### TEMPLATE APPLICATIONS

- 1) Remove all oil and dirt from the cylinder.
- 2) Apply layout die to area around the port to be modified and allow to dry. (You can use a magic marker, spray paint...etc. but layout die is preferred).
- 3) (optional)Apply a thin layer of grease to a back of template.

*NOTE: The Templates are much easier to work with when stored for one warm, cool heat cycle in the inside a round steel container. The cylinder to be ported is good if it's steel. NiCaSil coated are not magnetic enough to help much. We use 3" diameter heat duct from Home Depot. (works Great) or old steel cylinder.*

4) Install template in the cylinder (It will stick to the grease-if used-) and carefully align over the port so that there is an even area on both sides of the template.

5) Place a straight edge on the top or bottom (depending on which port you are working on) of the cylinder. Gently move the template so it just comes in contact with the straight edge. Check for alignment on both sides of the template again (adjust if necessary).(see **fig. 1-1**)

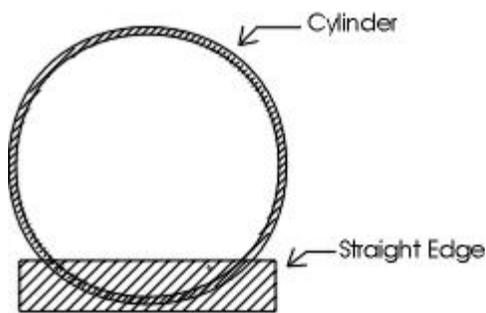


Fig 1-1

**CAUTION: THE STRAIGHT EDGE IS NECESSARY FOR THE PROPER ALIGNMENT OF THE TEMPLATE AT THE TOP OF THE CYLINDER. AFTER THE TEMPLATE HAS BEEN TRACED (see instruction #6) THE SQUARE MUST BE REMOVED BEFORE PORTING THE CYLINDER.**

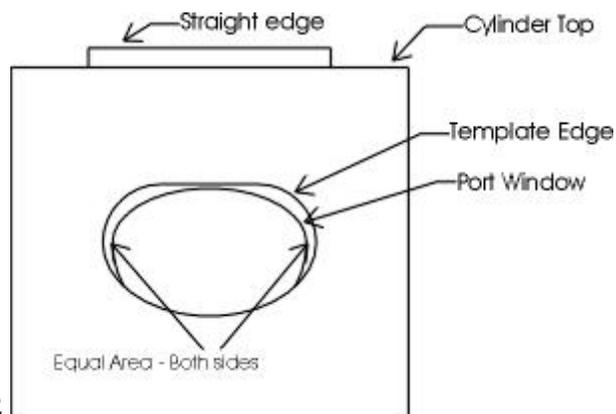
NOTE: TEMPLATE IS DESIGNED FOR STOCK CYLINDERS (TOP AND BOTTOM NOT CUT)

6) After you have made sure the template is correctly in place, use a sharp right angle to trace around the template. (NOTE: BE CAREFUL NOT TO MOVE THE TEMPLATE).

**DO NOT CUT THE CYLINDER WITH THE TEMPLATE IN PLACE.**

7) Remove the template and clean the cylinder and template.

**CAUTION: PROPER PLACEMENT OF THE TEMPLATE IS CRITICAL. IF THE TEMPLATE IS NOT PLACED CORRECTLY, THE PORT MODIFICATION WILL NOT BE ACCURATE.(see fig. 1-2)**



**figure 1-2**

**NOTE: FOR EASE IN HANDLING, CYLINDER MAY BE HELD STATIONARY WITH A VISE.**

To modify intake port, repeat the instructions used for installing the first template.

## CHAPTER 2

This chapter will demonstrate the proper step by step instructions for grinding and shaping the port window(s).

**WARNING: THE USE OF SAFETY GOGGLES AND A MASK WHILE GRINDING IS ESSENTIAL FOR PERSONAL SAFETY.**

**CAUTION: TAKE YOUR TIME.**

**USE SLOW SWEEPING STROKES WHEN GRINDING. \*\*REMEMBER THE ADAGE, "You can always take a little more off, but you can't put it back on."\*\* TAKE YOUR TIME!**

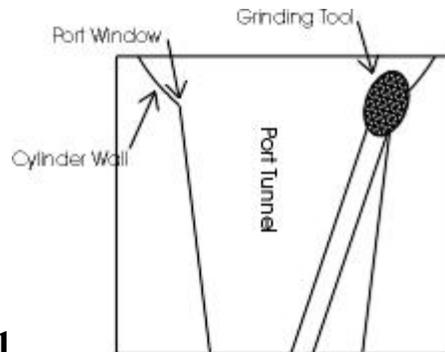
**CAUTION: ADEQUATE LIGHTING**

**BE SURE THERE IS ADEQUATE LIGHTING. POOR LIGHTING MAY CAUSE SHADOWS AND DISTORT THE AREA TO BE GROUND. YOU MUST TAKE YOUR TIME IN GRINDING THE PORTS. ALWAYS USE SLOW, SWEEPING STROKES.**

**NOTE: GRADUAL GRINDING OF THE PORT APPLIES TO ALL PORTS.**

Begin grinding the port window by inserting the grinder up through the port tunnel from the outside of the cylinder. (see **fig. 2-1**)

Using slow sweeping strokes, grind the surface of the port window that is visible on the inner edge of the template line. Use light, even pressure when grinding, to prevent gouging of the cylinder. Continue grinding, using slow, sweeping strokes, until the port window is close to the same size as the template line. (see fig. 2-2) Make sure the contour of the port window is the same as the contour of the template line. (see figs. 2-2 and 2-3)



**figure 2-1**

**Use extreme caution when the port window is close to the same size as the template(s) line.**

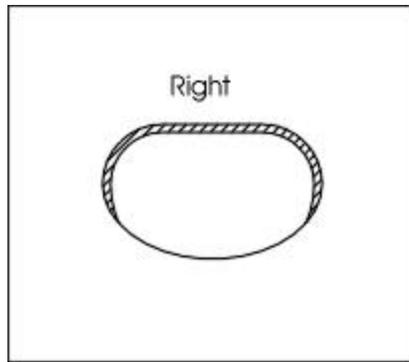


figure 2-2

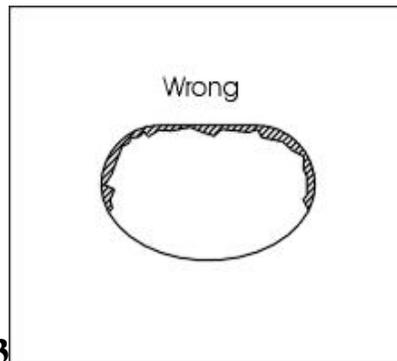


figure 2-3

**CAUTION: USE SLOW, LIGHT SWEEPING STROKES AS YOU APPROACH THE PROPER SIZE - USE CAUTION WHEN CUTTING NEAR THE TEMPLATE LINE. GRINDING CLOSE TO, BUT NOT TOUCHING, THE TEMPLATE LINE (see fig. 2-2).**

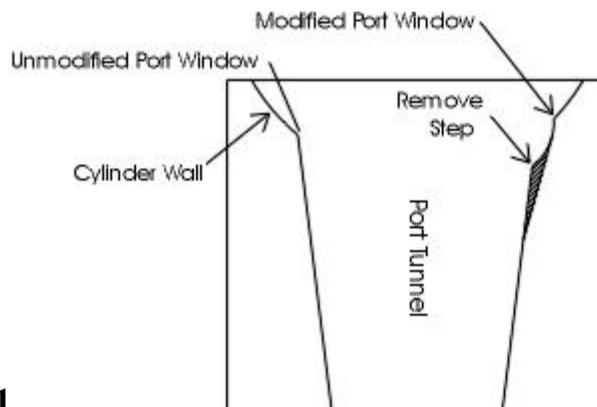
**NOTE: YOU WILL FINISH GRINDING EXACTLY TO THE TEMPLATE(S) AFTER BLENDING THE CONTOUR OF THE PORT TUNNEL. INSTRUCTIONS FOR THIS PROCEDURE ARE IN CHAPTER 4.**

## CHAPTER 3

This chapter will demonstrate the proper procedures for blending the port tunnel to the contour of the port window.

With light, sweeping strokes, blend the port tunnel to the same contour of the port window. Extend the port window straight back, 5 to 10 mm, and progressing into the port tunnel. (see **fig. 3-1**)

Continue grinding, until the contour of the port window matches the original port tunnel. Stop frequently and check the contour, either by sight or feel, to prevent gouging or over grinding.



**figure 3-1**

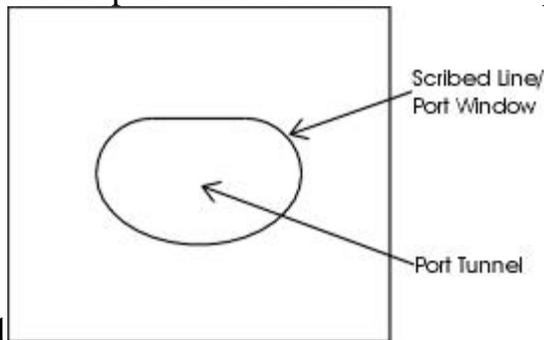
Repeat the instructions used for contouring the first port tunnel (if applicable).

## CHAPTER 4

This chapter provides the proper steps for the finishing of the port window and the clean-up of the cylinder.

**CAUTION: WHEN GRINDING CLOSE TO THE EDGES OF THE TEMPLATE LINE, EXTRA CARE MUST BE TAKEN NOT TO TOUCH THE EDGES. TAKE YOUR TIME!**

Lightly grind the port window to match the template "EXACTLY." (see **fig. 4-1**)



**figure 4-1**

With light, sweeping strokes, blend the contour of the port tunnel to the same contour of the port window. (Again, extending the port window straight back, 5 to 10 mm, and progressing into the port tunnel) (see **fig. 3-1 on page 11**)

Don't be concerned with surface roughness. It doesn't affect the performance of the machine. It "IS" important to remove the bumps and jogs in the port tunnel - far more important than a sanded finish on the port walls. Carefully done grinding doesn't need to be sanded.

**NOTE: SPRAY OIL CAN BE USED INSIDE THE CYLINDER TO PREVENT THE CUTTER FROM LOADING UP.**

When the port window is ground to match the template size EXACTLY, take a few minutes to look over the cylinder and ports. Looking at it in adequate light and from all angles, make sure the port window is EXACTLY even with the template(s) line and the contour in the port tunnel is contoured properly.

**CAUTION: PRECISION IS ESSENTIAL**

**CHAMFERING THE PORTS**

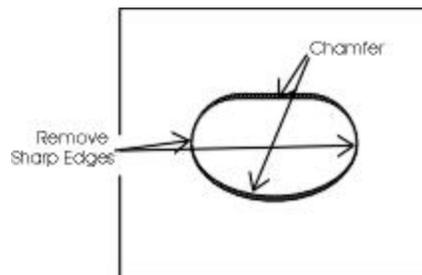
Using a hand file or fine rotary stone, file INTO the port window (**NOT away from it**). Lightly remove the sharpness from the edges of the sides of the port window. (see **fig. 4-2**)

The purpose of chamfering the ports is to prevent ring snagging by easing the ring back into its groove, by surrounding the port window with a VERY SLIGHT BEVEL, (see **figs. 4-2 and 4-3**) tapering IN toward the port tunnel. Chamfer the top and bottom of the port, beginning at the sides and progressing toward the center. The same sort of bevel is recommended at all port windows.

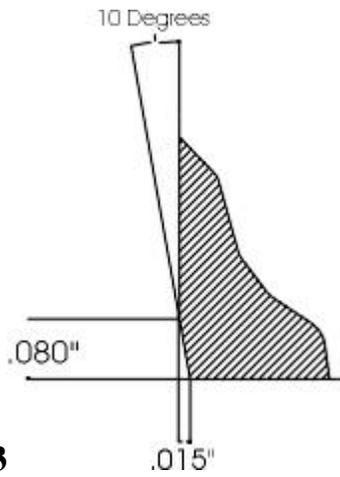
**NOTE: THE TOP OF THE EXHAUST PORT SHOULD BE CHAMFERED SO THAT THE SIDES ARE CHAMFERED SLIGHTLY AND PROGRESSIVELY GET HIGHER TOWARD THE CENTER. (see fig. 4-2)**

Using a hand file or fine rotary stone, file INTO the port window (**NOT away from it**). Lightly remove the sharpness from the edges of the sides of the port window, (see **fig. 4-2**) then chamfer the top and bottom of the port, beginning at the sides and progressing towards the center. (see **figs. 4-2 and 4-3**)

**CAUTION: CHAMFERING MUST BE DONE PROPERLY TO PREVENT THE RING FROM SNAGGING; CAUSING DAMAGE TO THE MOTOR.**



**Figure 4-2**



**figure 4-3**

NOTE: IT IS RECOMMENDED THAT YOU CHECK PISTON TO CYLINDER CLEARANCES.

Hone cylinder and install new rings or bore and install new piston and rings if needed.  
(Whichever is applicable)

**NOTE: IF CYLINDERS ARE BORED, BE SURE ALL CHAMFERING IS RE-DONE CORRECTLY AFTER BORING.**