

4

Proper Procedures for Wire EDM

To gain the greatest benefits from wire EDM, specific procedures should be used to maximize EDM's potential for reducing machining costs. In planning work, the wire EDM machine can be visualized as a super precision band saw which can cut any hard or soft electrical conductive material.

Starting Methods for Edges and Holes

Three Methods to Pick Up Dimensions.

If the outside edges are important, then a finished edge should be indicated when setting up the part to be wire EDMed.

A. Pick Up Two Edges as in Figure 4:1.

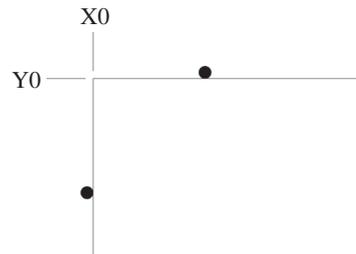


Figure 4:1

Pick Up Two Edges

B. Pick Up a Hole as in Figure 4:2.

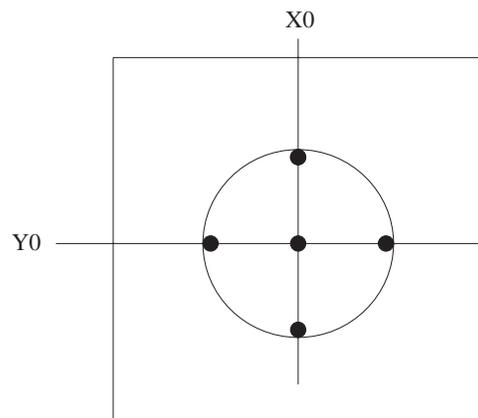


Figure 4:2

Pick Up a Hole

C. Pick Up an Edge and Holes or Two Holes

By using an edge and two holes, a part can be EDMed which is much larger than the capacity of the machine. The part is indicated and a hole that has been either machined or EDMed is picked up. Also, two EDMed edges can be used to locate the part after it has been machined. See Figure 4:3.

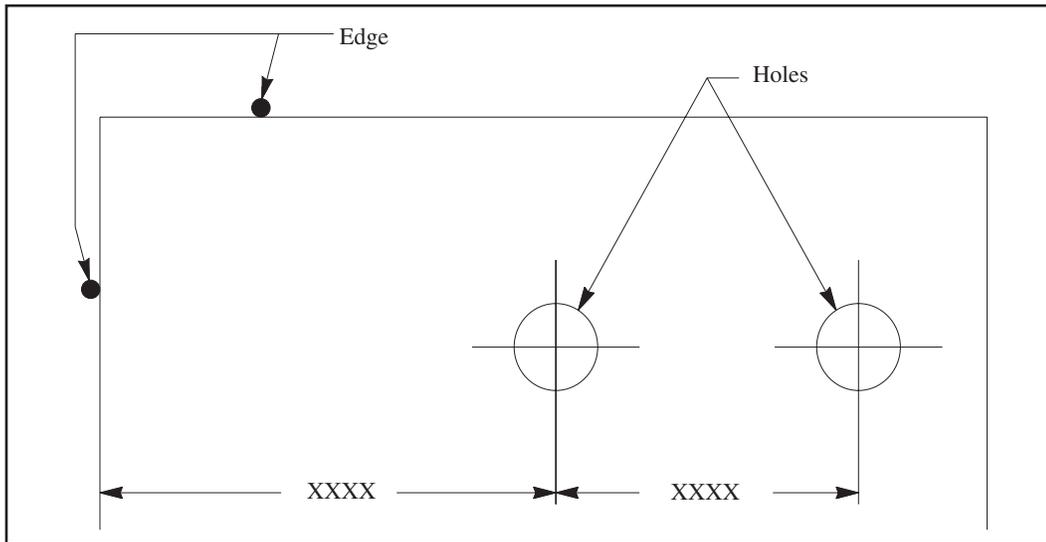


Figure 4:3

Pick-Up from Edges and Holes

Edge Preparation

A. Square Edges

1. Machined or Ground.

To ensure accuracy, the pick up edges must be square, as shown in Figure 4:4.

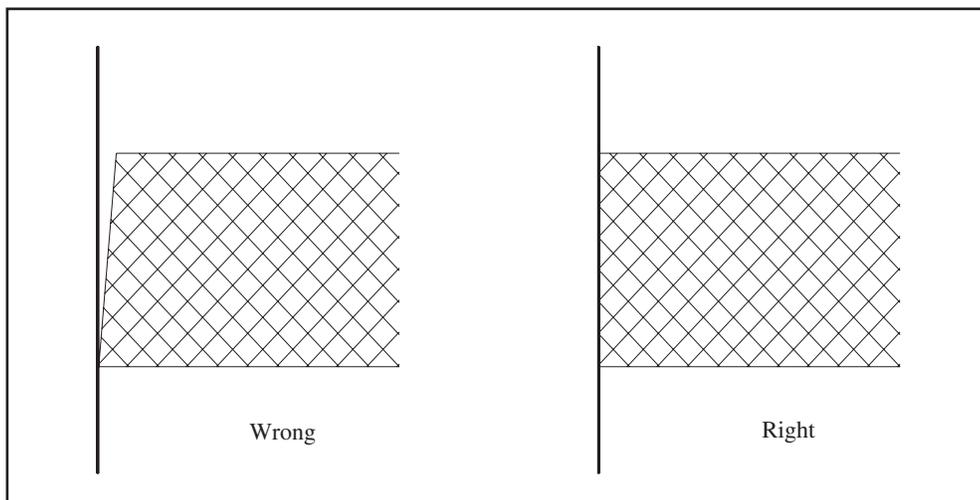


Figure 4:4

Edges must be square for proper pick up.

2. Unfinished Edges.

In case workpieces cannot be placed flat on the table, workpieces can be made square to the top surface with sides unfinished by using a special squaring block, as shown in Figure 4:5.

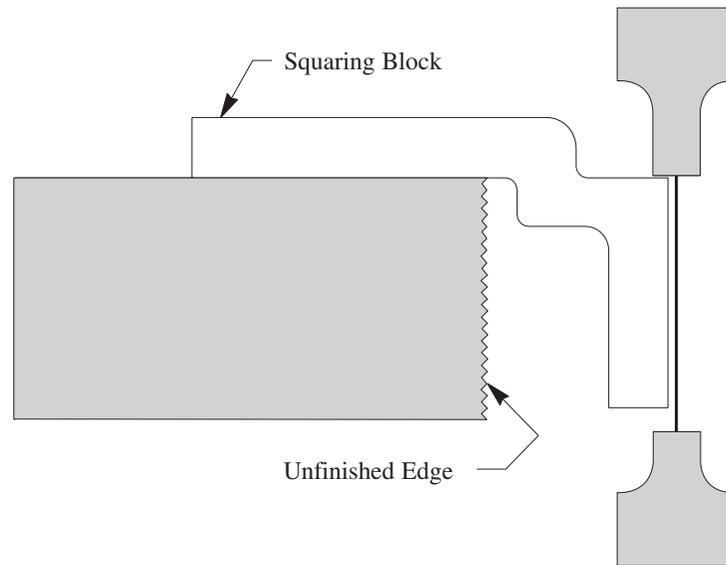


Figure 4:5

Special squaring block can be used to make the wire square to the surface of the material to be cut.

B. Scale

Since wire EDM is an electrical process, any material that is non-conductive must be removed if it is to be EDMed, or if the area is to be used for picking up. Scale from heat treating is non-conductive. See Figure 4:6.

The heat-treated parts, particularly holes, must be either cleaned of scale or have been vacuum heat treated or wrapped before heat treating. Sand or glass blasting can be used to clean the surfaces where the wire will cut in. However, deep holes are difficult to clean with sand or glass blasting.

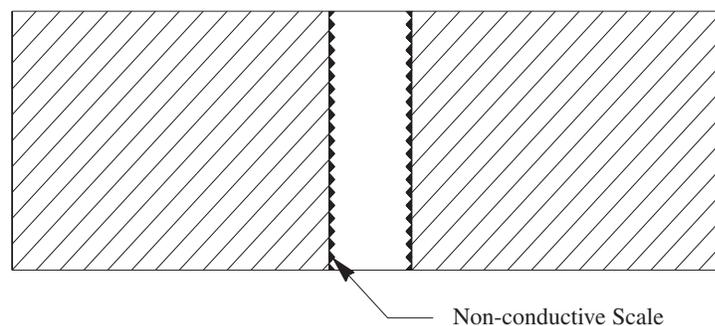


Figure 4:6

To pick up from holes, the holes must be free of scale.

C. Pick-Ups

It is preferred to pick up surfaces without obstructions. If obstructions occur, pick-ups can sometimes be made from a step by means of a gauge block or gauge pin. See Figures 4:7 and 4:8.

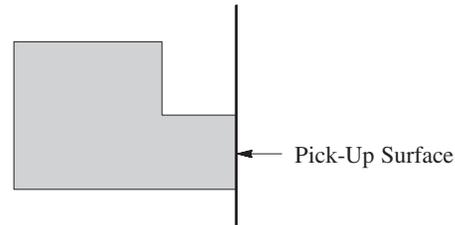


Figure 4:7

Non-Obstructive Pick-Up

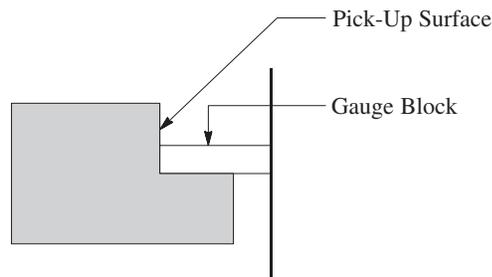


Figure 4:8

Obstruction Pick-Up—A Gauge Block Is Used for Pick-Up.

Starter Holes

A. Automatic Pick-Up

When locating parts with starter holes, the machine will automatically pick up the center of the hole, as shown in Figure 4:9. Such holes should be free from burrs or scale.

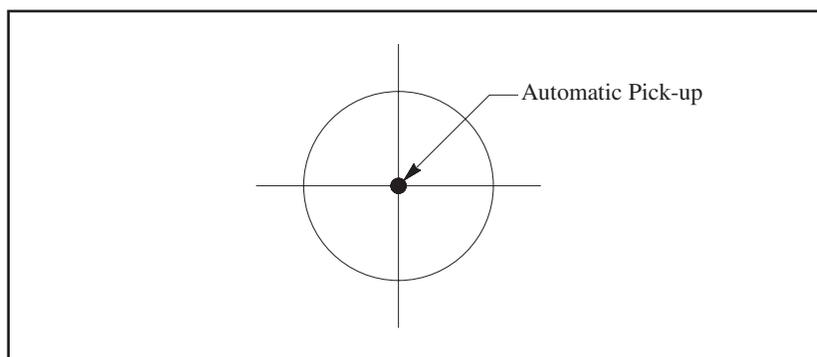


Figure 4:9

Wire EDM Machines Automatically Pick Up Hole Center

B. Unsquare Holes

If a hole is unsquare, as illustrated in Figure 4:10, the wire will pick up the high points and not the center of the hole.

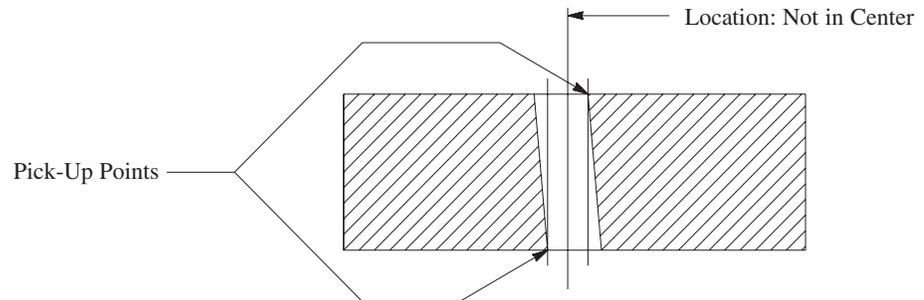


Figure 4:10

Unsquare Hole Will Produce an Inaccurate Pick-Up

C. Relieved Holes

A relieved hole, as pictured in Figure 4:11, is the most accurate method to pick up from a hole. Approximately 1/8" (3 mm) to 1/4" (6 mm) of land should be left.

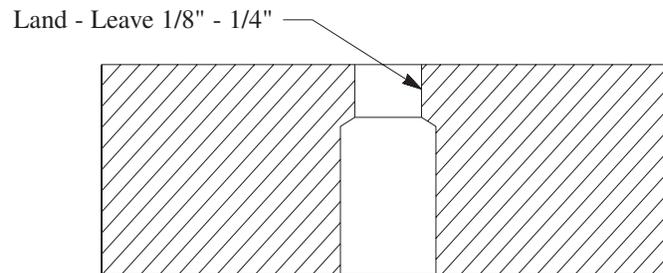


Figure 4:11

The Greatest Accuracy Is Obtained with a Relieved Hole

D. Smooth Holes

A drilled hole may leave ragged edges. The wire will pick up the high points of the ragged edges. To ensure accuracy, a reamed or bored hole is best. See Figure 4:12.

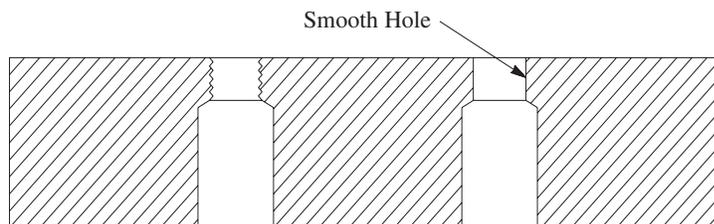


Figure 4:12

Smooth Holes Locate Pick-Ups More Accurately

E. Placement and Location of Starter Holes

1. If the part pick-up is in another location, the starter hole requires no precise location.

2. The starter hole should be placed at a straight surface whenever possible, as shown in Figure 4:13. When parts are not skim cut in order to save machining time and costs, usually a slightly raised area appears where the part ends. In such cases, the tip can be removed with a file or stone.

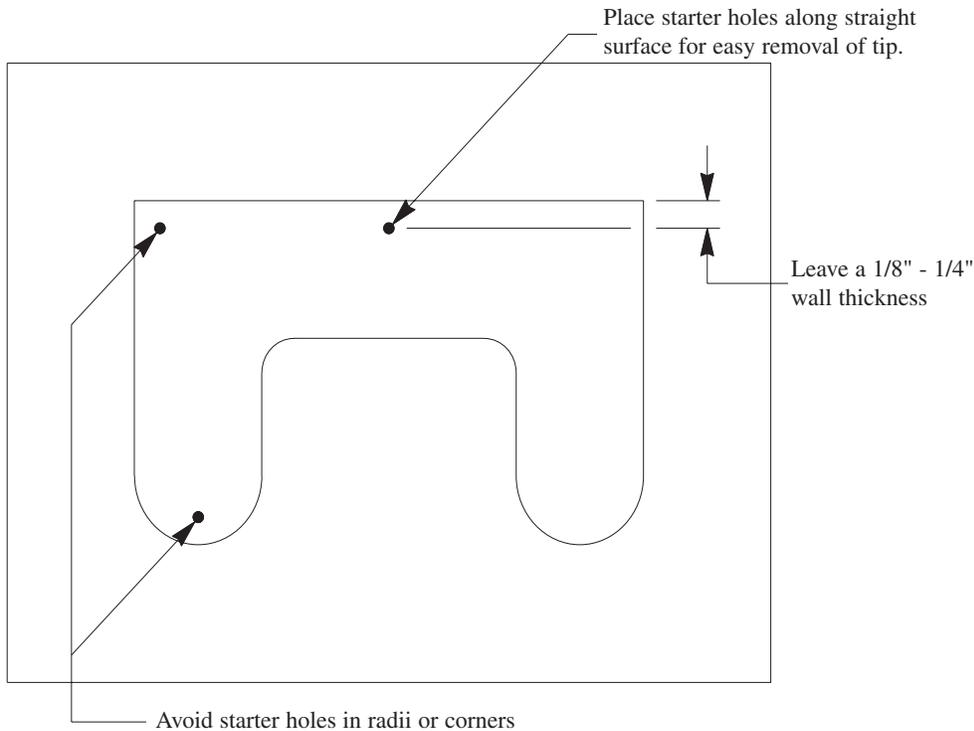


Figure 4:13

Proper Placement of Starter Holes

3. On narrow slots, the starter hole should be placed in a corner, as illustrated in Figure 4:14, so that only one slug will be produced when wire EDMed.

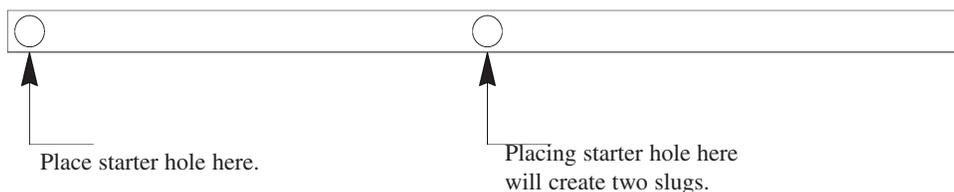


Figure 4:14

Proper Placement of Starter Hole for Narrow Slots

Layout

If multiple wire EDM operations are made in one piece, the best method to put in dimensions is from a reference point of $X = 0$, $Y = 0$. See Figure 4:15 for the ideal layout.

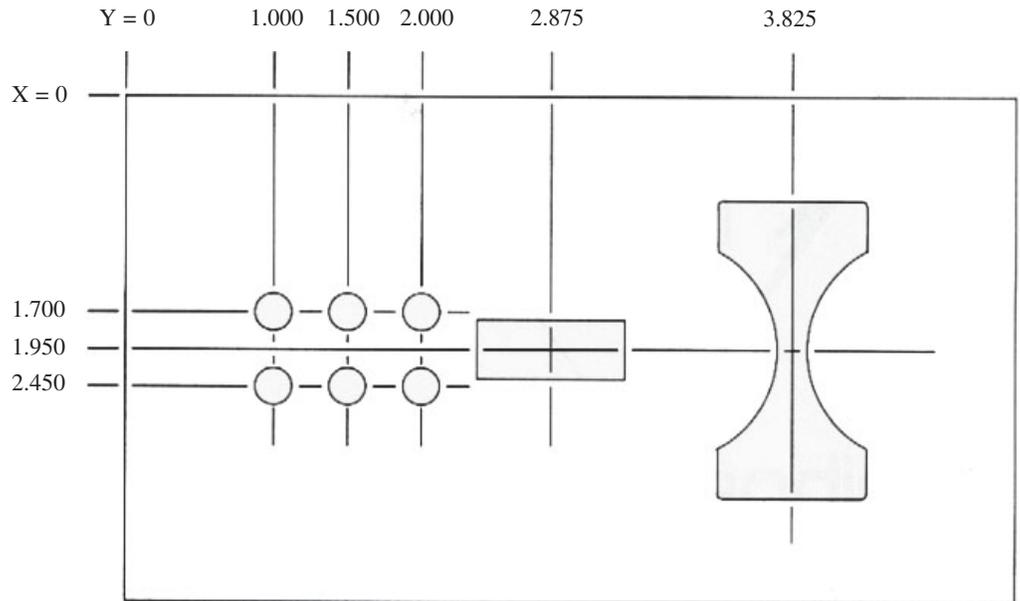


Figure 4:15

Best Layout Dimensions for Wire EDM