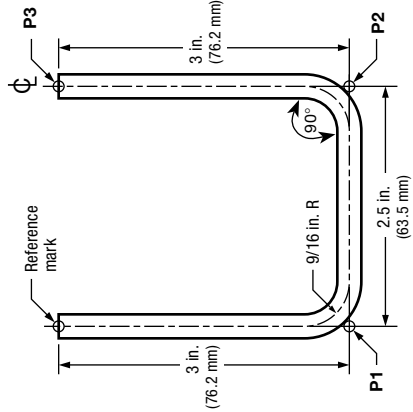


Swagelok

**Bend Adjustment Calculator for the Swagelok Hand Tube Bender**

**Plan a multiple bend using adjustment (gain) calculation.**

Example: 1/4 in. tubing with two 90° bends, using a 1/4 in. bender with a 9/16 in. bend radius.



To achieve the desired bend, mark the tubing as follows:

**P1** = 3 in.

To determine the location of the bend mark for a subsequent bend, add the *new* section leg length to the *previous* bend mark location, then subtract the adjustment (gain) of the *previous* bend.

**P2** = P1 (3.0) + 2.5 in. – 5/16 in. adjustment (gain) = 5 3/16 in.

**P3** = P2 (5 3/16) + 3 in. – 5/16 in. adjustment (gain) = 7 7/8 in.

7 7/8 inches is the total length of tube needed.

**90° adjustment** = 5/16 in.

See the *Hand Tube Bender Manual*, MS-13-43, for more information.

150  
140  
130  
120  
110  
100  
90  
80  
70  
60  
50  
40  
30  
20  
10  
0

1 mm

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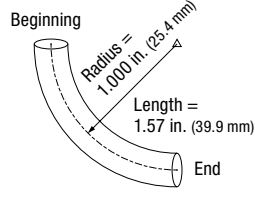
**Bend Adjustment Calculator for the Swagelok Hand Tube Bender**

**How to Use**

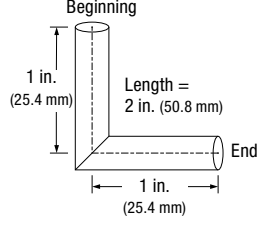
- Slide inner scale until the tube OD and the bend radius are in the window.
- Move down to the desired bend angle and read the adjustment (gain).

Adjustment (gain) is the difference in the length of tubing used in a radiused bend compared to the length of tubing required in a sharp bend, when measured from the beginning to the end of the bend.

**The distance around a radiused bend is always less than a sharp bend.**



Radiused Bend



Sharp Bend

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Slide-Chart by PERRYGRAF, L.A., 91324-3552 Printed in U.S.A. PG940653-35 MS-13-66, R3

**Tube OD**  
**Bend Radius**

- Bend Angle
- 30°
  - 45°
  - 50°
  - 55°
  - 60°
  - 65°
  - 70°
  - 75°
  - 80°
  - 85°
  - 90°

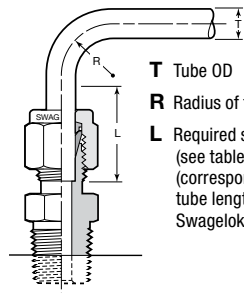
Adjustment (Gain)

Adjustment (gain) on angles of less than 30° is minimal

<b>12 mm</b>	<b>10 mm</b>	<b>8 mm</b>	<b>6 mm</b>	<b>1/2 in.</b>	<b>3/8 in.</b>	<b>5/16 in.</b>	<b>1/4 in.</b>	<b>1/4 in.</b>
<b>38 mm</b>	<b>24 mm</b>	<b>24 mm</b>	<b>15 mm</b>	<b>1 1/2 in.</b>	<b>15/16 in.</b>	<b>15/16 in.</b>	<b>3/4 in.</b>	<b>9/16 in.</b>
1 mm	1 mm	1 mm	1 mm	1/16 in.	0 in.	0 in.	0 in.	0 in.
3 mm	2 mm	2 mm	1 mm	1/16 in.	1/16 in.	1/16 in.	1/16 in.	1/16 in.
3 mm	2 mm	2 mm	2 mm	1/8 in.	1/16 in.	1/16 in.	1/16 in.	1/16 in.
4 mm	3 mm	3 mm	2 mm	1/8 in.	1/8 in.	1/8 in.	1/16 in.	1/16 in.
5 mm	4 mm	3 mm	3 mm	3/16 in.	1/8 in.	1/8 in.	1/16 in.	1/8 in.
7 mm	4 mm	4 mm	3 mm	1/4 in.	1/8 in.	3/16 in.	1/8 in.	1/8 in.
8 mm	5 mm	5 mm	4 mm	5/16 in.	3/16 in.	3/16 in.	1/8 in.	1/8 in.
10 mm	7 mm	6 mm	5 mm	3/8 in.	1/4 in.	1/4 in.	3/16 in.	3/16 in.
12 mm	8 mm	8 mm	6 mm	7/16 in.	5/16 in.	5/16 in.	3/16 in.	3/16 in.
15 mm	10 mm	10 mm	7 mm	9/16 in.	3/8 in.	3/8 in.	1/4 in.	1/4 in.
18 mm	12 mm	12 mm	8 mm	11/16 in.	7/16 in.	7/16 in.	5/16 in.	5/16 in.

www.perrygraf.com PGR940653-35

Properly selected tubing, combined with quality Swagelok tube fittings, can provide leak-tight systems. When installing fittings near tube bends, there must be a sufficient length of straight tubing to allow the tube to be bottomed in the Swagelok tube fitting.



- T** Tube OD
- R** Radius of tubing bend
- L** Required straight tube length (see table) (corresponds to the straight tube length mark on the Swagelok hand bender.)

Fractional, in.		
T	R	L
1/4	9/16	13/16
	3/4	
5/16	15/16	7/8
3/8	15/16	15/16
1/2	1 1/2	1 3/16

Metric, mm		
T	R	L
6	15	21
8	24	23
10	24	25
12	38	31