

# INSTRUCTIONS FOR CUTTING OUTAGE TUBES TO LENGTH

MS-INS-OT  
Revision C  
December, 2011

## Outage Tube Lengths

Tube OD, in.	Cylinder Ordering Number	Minimum Outage, %				
		10	20	30	40	50
		Tube Length, in.				
1/4	304L-HDF2-40	0.87	1.11	1.35	1.59	1.84
5/16	304L-HDF4-50	0.85	1.07	1.28	1.50	1.71
	304L-HDF4-75	1.02	1.34	1.66	1.98	2.31
	304L-HDF4-150	1.12	1.45	1.79	2.13	2.46
	304L-HDF4-300	1.65	2.32	2.99	3.67	4.34
	304L-HDF4-400	2.00	2.90	3.79	4.69	5.59
	304L-HDF4-500	2.26	3.38	4.50	5.62	6.74
	304L-HDF4-1000	2.31	3.06	3.81	4.56	5.31
	304L-HDF4-2250	3.30	4.59	5.88	7.17	8.46
1/2	304L-HDF4-1GAL	4.62	6.79	8.96	11.14	13.31
	304L-HDF8-1000	2.21	2.96	3.71	4.46	5.21
	304L-HDF8-2250	3.20	4.49	5.78	7.07	8.36
5/16	304L-HDF8-1GAL	4.52	6.69	8.86	11.04	13.21
	316L-HDF4-150	1.12	1.45	1.79	2.13	2.46
	316L-HDF4-300	1.65	2.32	2.99	3.67	4.34
	316L-HDF4-500	2.26	3.38	4.50	5.62	6.74
	M-HDF4-150	1.12	1.45	1.79	2.13	2.46
	M-HDF4-300	1.65	2.32	2.99	3.67	4.34
	M-HDF4-500	2.26	3.38	4.50	5.62	6.74
	304L-05SF4-150	1.09	1.43	1.77	2.12	2.46
	304L-05SF4-300	1.59	2.27	2.96	3.65	4.34
	304L-05SF4-500	2.16	3.30	4.45	5.60	6.74
	316L-50DF4-150	1.62	2.17	2.71	3.26	3.81
316L-50DF4-300	2.74	3.84	4.93	6.03	7.12	
316L-50DF4-500	4.39	6.21	8.04	9.86	11.68	

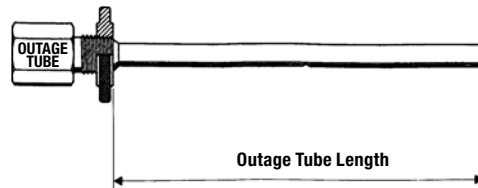


Figure 1

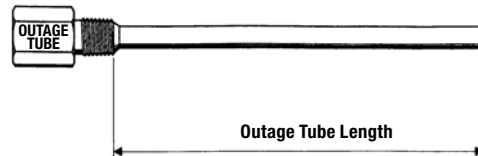


Figure 2

Swagelok

Translations available on  
[www.swagelok.com](http://www.swagelok.com)

Outage tube adapters and valves with outage tubes have a standard tube length of 10.4 inches. To achieve the correct percent outage, follow the example:

### EXAMPLE:

Instructions for Cutting Outage Tubes to Length:

1.) Refer to the Outage Tube Length chart.

a.) Determine and find the cylinder ordering number. Example: 304L-HDF4-500.

b.) Determine and find the percentage of outage required. Example: 20 %

c.) Note the outage tube length, 3.38 inches

**CAUTION:** Tolerances on cylinder volume, dimensions, and thread fit can change the actual outage obtained for an outage tube with a given length by as much as 20 %. The outage tube lengths listed in the chart are the longest lengths required to accommodate these tolerances. To obtain an exact outage, each outage tube and cylinder assembly should be calibrated by weight or volume.

### HOW TO CUT TUBING: (Refer to drawings)

Use of a NPT L1 thread ring gauge in measuring outage tube length is preferred (see figure 1). If a ring gauge is not available, length may be measured from the crest of the first thread on the fitting (see figure 2).

1. With your measuring instrument, measure the length determined from the chart.
2. Scribe a mark on the tubing at that length.
3. With the proper cutting tools, cut the tubing on the scribe mark.
4. Deburr the end of cut tubing and remove any loose particles.

For additional information on outage tube adapters and valves with outage tubes, refer to *Sample Cylinders, Accessories, and Outage Tubes*, MS-01-177.