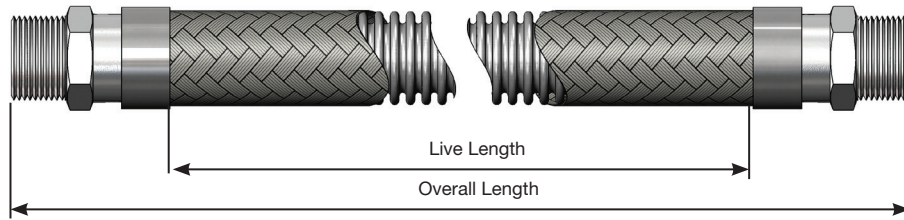




Hose Assembly Live Length Calculation Guide

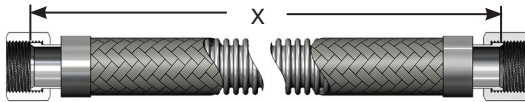


Length Calculations

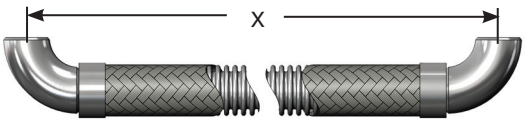


To calculate the proper length of a hose assembly, you need to:

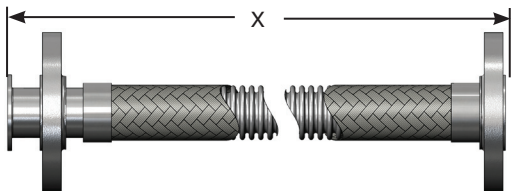
1. **Verify that the installation is properly designed** (refer to Do's & Don'ts page in our corrugated metal hose catalog)
 - Do not torque the hose
 - Do not overbend the hose
 - Do not compress the hose
2. **Calculate the live length of the assembly** - The live length of the assembly is the amount of active (flexible) hose in an assembly; that is, the hose between the braid collars (refer to length formulas in our corrugated metal hose catalog to help calculate live length for a variety of common hose installations).
3. **Calculate the overall length of the assembly** - Overall length is equal to the live length plus the lengths of the braid collars and fittings. When adding fitting lengths, be aware that the points from which measurements should be taken vary for different fitting types. When calculating overall length for assemblies with threaded fittings, remember to account for the length of thread that is lost by threading into the mating connection (refer to Thread Allowance chart in our corrugated metal hose catalog).



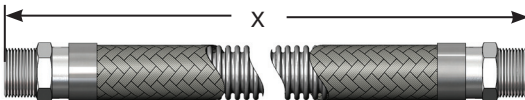
JIC/SAE-type fittings are measured from the seat of the fitting



Elbows and other fittings with a radius are measured from the centerline of the fitting



Flanges are measured from the flange face or from the face of the stub end if one is used



Threaded fittings are measured to the end of the fitting

For assistance in making any calculation or for dimensional information on fittings, please contact Hose Master's Inside Sales Department.

Example : Constant Radius Traveling Loop (A-Loop)

For a hose installed in a constant radius traveling loop (A-Loop), calculate the minimum live length required for 1/2" Annuflex AF4750 traveling 6" (3" above center and 3" below center).

- Formula - See *Corrugated Catalog (A-Loop)* → $L = 4R + 1/2T$
- Dynamic Minimum Bend Radius (See *Corrugated Catalog Annuflex Product Page*) → 5.5"
- Minimum Live Hose Length → $L = 25$ "

$$L = 4R + 1/2T \rightarrow L = 4(5.5) + 1/2(6) \rightarrow L = 22 + 3 \rightarrow L = 25"$$

*Remember to add fitting lengths and braid collars to get your overall length (OAL). The installed radius (R) of the loop should be used in the formula, and should never be smaller than the Minimum Dynamic Bend Radius of the hose as shown in the catalog (5.5" for 1/2" AF4750). If movement on one side of the center-line exceeds the movement on the other side of the center-line, use the larger movement in the formula.

ANNUFLEX is the foundation of Hose Master's extensive line of annular products. Proprietary manufacturing processes produce a hose with minimal residual stress, uniform wall thickness throughout the corrugations, and minimal work hardening. These processes create a very flexible, long-lasting corrugated metal hose.



Explanation of **Annuflex** Part Numbers
 AF _____ 7 _____
 Material Code Braid Code

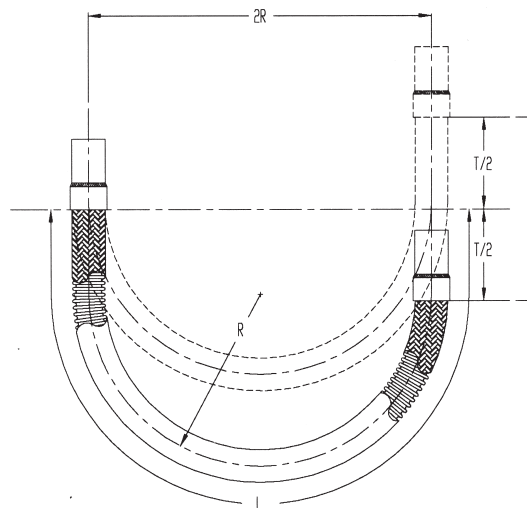
Material Codes
 4 - T321 Stainless Steel
 5 - T316L Stainless Steel
 7 - T304L Stainless Steel

Braid Codes
 00 - Unbraided
 50 - T304 Single Braid
 55 - T304 Double Braid
 T316 Braid available upon request

Example: AF4750 = T321 stainless steel, annular corrugated metal hose with a single T304 stainless steel braid

Inside Diameter (in.)	Number of Braids (#)	Outside Diameter (in.)	Static Minimum Bend Radius (in.)	Dynamic Minimum Bend Radius (in.)	Maximum Working Pressure (psi)	Burst Pressure (psi)	Weight Per Foot (lbs.)
1/2	0	0.77	1.5	5.5	70	n/a	0.11
	1	0.83			1186	4743	0.22
	2	0.89			1779	7115	0.33

Constant Radius Traveling Loop (A-Loop)



Formula $L = 4R + 1/2T$
 R = Installation radius in this formula

Example: Variable Radius Traveling Loop (B-Loop)

For a hose installed in a variable radius traveling loop (B-Loop), calculate the minimum live length required for 2" Annuflex AF5750 traveling 2".

- Formula - See *Corrugated Catalog (B-Loop)* → $L = 4R + 1.57T$
- Dynamic Minimum Bend Radius (See *Corrugated Catalog Annuflex Product Page*) → 13"
- Minimum Live Hose Length → $L = 55.14"$

$$L = 4R + 1.57T \rightarrow L = 4(13) + 1.57(2) \rightarrow L = 52 + 3.14 \rightarrow L = 55.14"$$

*Remember to add fitting lengths and braid collars to get your overall length (OAL). The installed radius (R) of the loop should be used in the formula, and should never be smaller than the Minimum Dynamic Bend Radius of the hose as shown in the catalog (13" for 2" AF5750).

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Explanation of **Annuflex** Part Numbers

AF _____ 7 _____
 Material Code Braid Code

Material Codes

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 5 - T316L Stainless Steel
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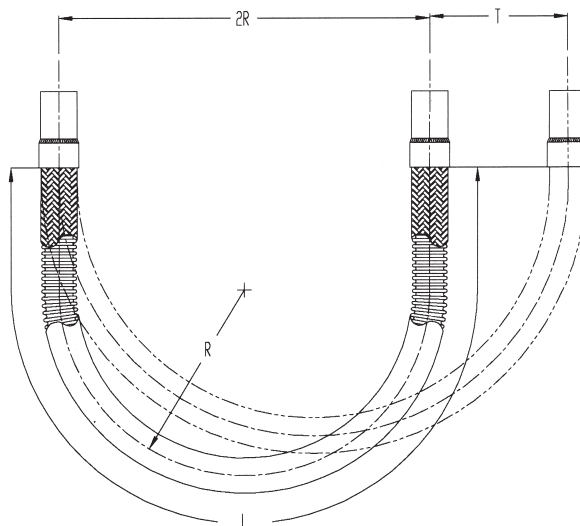
Braid Codes

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 50 - T304 Single Braid
 55 - T304 Double Braid
 T316 Braid available upon request

Example: AF4750 = T321 stainless steel, annular corrugated metal hose with a single T304 stainless steel braid

Inside Diameter (in.)	Number of Braids (#)	Outside Diameter (in.)	Static Minimum Bend Radius (in.)	Dynamic Minimum Bend Radius (in.)	Maximum Working Pressure (psi)	Burst Pressure (psi)	Weight Per Foot (lbs.)
2	0	2.61	5.1	13.0	14	n/a	0.59
	1	2.69			449	1797	1.11
	2	2.77			674	2696	1.63

Variable Radius Traveling Loop (B-Loop)



$$\text{Formula } L = 4R + 1.57T$$

R = Installation radius in this formula

Example: Angular Deflection

Calculate the minimum live length required for 6" Annuflex AF4700 to handle a 20 degree angular bend.

- Formula - *Corrugated Catalog (Angular Deflection)* → $L = 2S + (A/57.3)R$, where "S" = hose OD in inches, "A" = the angle of the bend, and "R" = the installed radius of the hose.
- Dynamic Minimum Bend Radius (*See Corrugated Catalog Annuflex Product Page*) → 32"
- Hose OD (*See Corrugated Catalog Annuflex Product Page*) → 7.01"
- Minimum Live Hose Length → $L = 25.188"$

$$L = 2S + \left(\frac{A}{57.3}\right)R \rightarrow L = 2(7.01) + \left(\frac{20}{57.3}\right)32 \rightarrow L = 14.02 + (0.349)32 \rightarrow L = 14.02 + 11.168 \rightarrow L = 25.188"$$

*Remember to add fitting lengths and braid collars to get your overall length (OAL). The installed radius (R) of the loop should be used in the formula, and should never be smaller than the Minimum Dynamic Bend Radius of the hose as shown in the catalog (32" for 6" AF4700).

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Explanation of **Annuflex** Part Numbers
 AF _____ 7 _____
 Material Code Braid Code

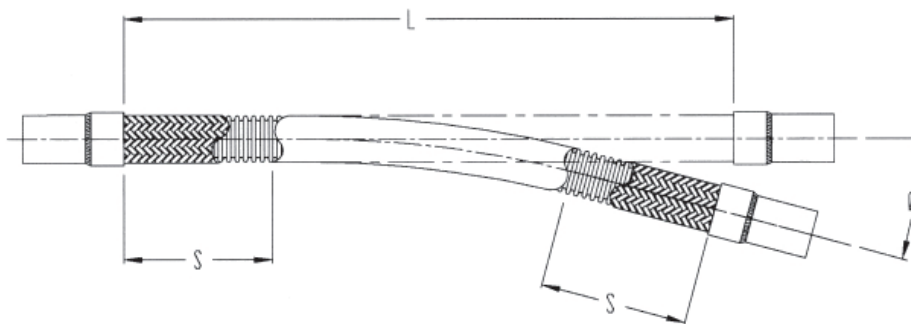
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Braid Codes
 00 - Unbraided
 50 - T304 Single Braid
 55 - T304 Double Braid
 T316 Braid available upon request

Example: AF4750 = T321 stainless steel, annular corrugated metal hose with a single T304 stainless steel braid

Inside Diameter (in.)	Number of Braids (#)	Outside Diameter (in.)	Static Minimum Bend Radius (in.)	Dynamic Minimum Bend Radius (in.)	Maximum Working Pressure (psi)	Burst Pressure (psi)	Weight Per Foot (lbs.)
6	0	7.01	14.8	32.0	11	n/a	2.69
	1	7.13			210	839	4.44
	2	7.25			315	1259	6.19

Angular Deflection



Formula: $L = 2S + (\theta/57.3)R$
 R = Hose minimum bend radius in this formula

Example: Lateral Offset

Calculate the minimum live length required for 2" Masterflex AF5550 to handle a 2" lateral offset.

- Formula - See *Corrugated Catalog (Lateral Offset)* → $L = \sqrt{20R \times T}$
- Dynamic Minimum Bend Radius (See *Corrugated Catalog Masterflex Product Page*) → 10.3"
- Minimum Live Hose Length → $L = 20.29"$

$$L = \sqrt{20(10.3) \times 2} \rightarrow L = \sqrt{206 \times 2} \rightarrow L = \sqrt{412} \rightarrow L = 20.29$$

*Remember to add fitting lengths and braid collars to get your overall length (OAL). The installed radius (R) of the hose loop should be used in the formula, and should never be smaller than the Minimum Dynamic Bend Radius of the hose as shown in the catalog (10.3" for 2" AF5550).

MASTERFLEX is manufactured using the same high quality process used to make Annuflex hose, but the number of corrugations per foot is increased to provide for greater flexibility.



Explanation of **Masterflex** Part Numbers

AF _____ 5 _____
 Material Code Braid Code

Material Codes

4 - T321 Stainless Steel
 5 - T316L Stainless Steel
 7 - T304L Stainless Steel

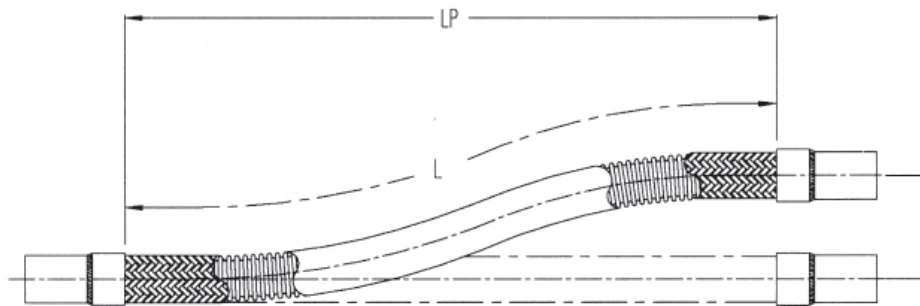
Braid Codes

00 - Unbraided
 50 - T304 Single Braid
 55 - T304 Double Braid
 T316 Braid available upon request

Example: AF4550 = T321 stainless steel, annular corrugated metal hose with a single T304 stainless steel braid

Inside Diameter (in.)	Number of Braids (#)	Outside Diameter (in.)	Static Minimum Bend Radius (in.)	Dynamic Minimum Bend Radius (in.)	Maximum Working Pressure (psi)	Burst Pressure (psi)	Weight Per Foot (lbs.)
2	0	2.61	4.0	10.3	14	n/a	0.88
	1	2.69			449	1797	1.44
	2	2.77			674	2696	1.99

Lateral Offset



Formula: $L = \sqrt{20R \times T}$ $L_p = \sqrt{L^2 - T^2}$
 R = Hose minimum bend radius in this formula

Example: Combination Loop

For a hose installed in a vertical loop with movement in two directions (Combination Loop), calculate the minimum live length required for 3" Masterflex AF5550 traveling 4" in direction 1 (T1) and 1.5" in direction 2 (T2)

- Formula - See *Corrugated Catalog (Combination Loop)* → $L = 4R + 1.57T + \left(\frac{T_2}{2}\right)$
- Dynamic Minimum Bend Radius (See *Corrugated Catalog Masterflex Product Page*) → 14.5"
- Minimum Live Hose Length → $L = 65.03"$

$$L = 4R + 1.57T_1 + \left(\frac{T_2}{2}\right) \rightarrow L = 4(14.5) + 1.57(4) + \left(\frac{1.5}{2}\right) \rightarrow L = 58 + 6.28 + 0.75$$

$$L = 65.03"$$

*Remember to add fitting lengths and braid collars to get your overall length (OAL). The installed radius (R) of the loop should be used in the formula, and should never be smaller than the Minimum Dynamic Bend Radius of the hose as shown in the catalog (14.5" for 3" AF5550).

MASTERFLEX is manufactured using the same high quality process used to make Annuflex hose, but the number of corrugations per foot is increased to provide for greater flexibility.



Explanation of **Masterflex** Part Numbers

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 Material Code Braid Code

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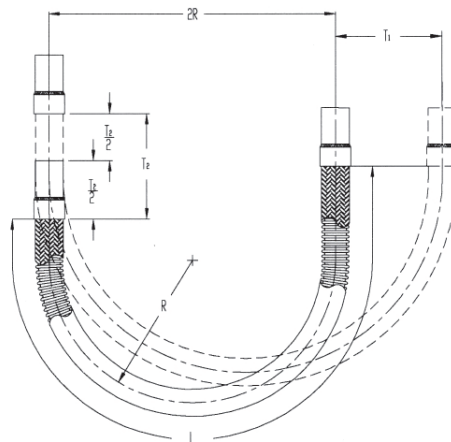
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 55 - T304 Double Braid
 T316 Braid available upon request

Example: AF4550 = T321 stainless steel, annular corrugated metal hose with a single T304 stainless steel braid

Inside Diameter (in.)	Number of Braids (#)	Outside Diameter (in.)	Static Minimum Bend Radius (in.)	Dynamic Minimum Bend Radius (in.)	Maximum Working Pressure (psi)	Burst Pressure (psi)	Weight Per Foot (lbs.)
3	0	3.88			14	n/a	1.63
	1	3.98	6.3	14.5	346	1384	2.50
	2	4.08			519	2076	3.37

Vertical Loop with Movement in Two Directions (Combination Loop)



Formula: $L = 4R + 1.57T_1 + \left(\frac{T_2}{2}\right)$
 R = Hose installation radius in this formula