Tube caron

PRECISION IS EVERYTHING WE KNOW

tubecaron.com

Tube Caron Inc. is a precision bending company specializing in thin-walled tubing with diameters of 3/8” to 6”, innovating since 1987. The following materials are available to clients for a variety of applications: aluminized steel, stainless steel (304 and 409), aluminum and copper.

Our dynamic engineering team is dedicated to optimizing our manufacturing process and methods in order to maintain high quality standards and affordable pricing for our privileged clients.

The specifications in this present document are general in nature and represent Tube Caron’s manufacturing standards.

However, special tool manufacturing is available for the production of tubing with different specifications.

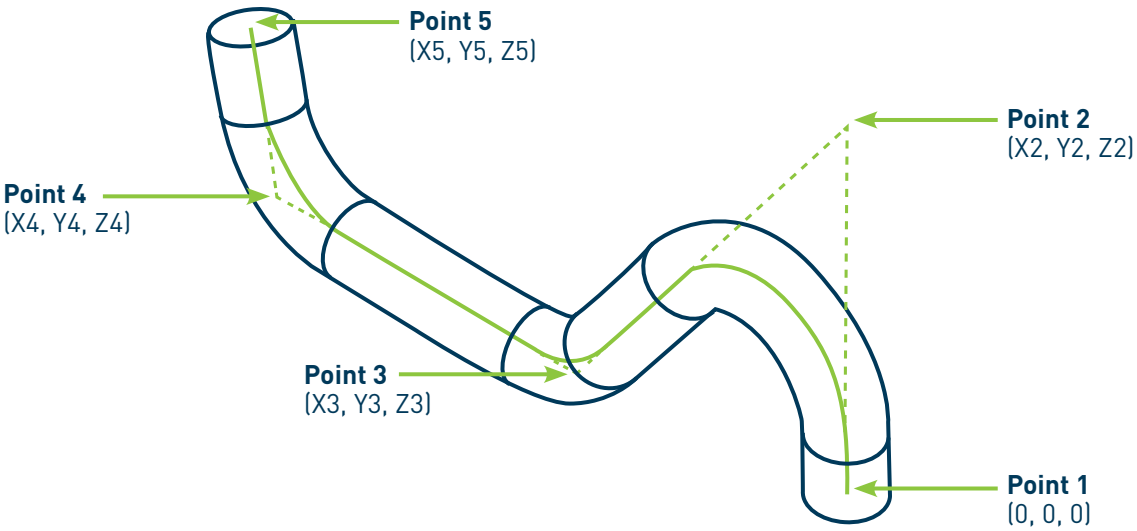
TUBE DESIGN

How to design a tube?

The dimensions of a tube must be determined using the coordinates of junction points along the central line of the tube. This system simplifies the manufacturing of tubing.

The system of coordinates must be a positive orthonormal system.

TABLE OF COORDINATES			
Points	**X**	**Y**	**Z**
1	0	0	0
2	X2	Y2	Z2
3	X3	Y3	Z3
4	X4	Y4	Z4
5	X5	Y5	Z5

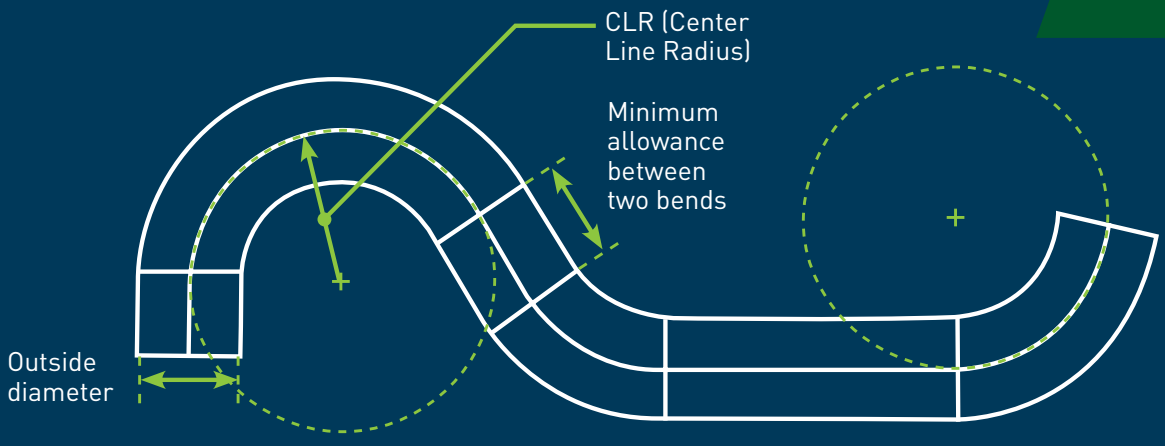


Using 3D design

In addition to a 2D drawing, some clients also send us a 3D file (*.IGS, *.STEP, *.x_t [Parasolid]) of the piece to be manufactured. The 3D file serves as a reference for tubing measurements, while the 2D drawing basically indicates tolerances that must be respected.

The advantage of having a 3D rendering is that Tube Caron can refer to the document when manufacturing and inspecting pieces.

TUBE BENDING



We can manufacture tubing with a bending radius as tight as 1D.*

*1 time tube diameter. Ex: 4" tube diameter with 4" CLR.

TUBE BENDING

ALUMINUM			
Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
6063-T4			
16 GA (0.065")	0,875	2	2
	0,875	2,5	2
1 1/4" PIPE SCH 40 (0.140")	1,66	3	4
6063-T0			
16 GA (0.065")	1,25	3,75	2
15 GA (0.072")	2,25	2,5	5
	2,25	3	4
	4	4	4,5
	5	5,5	6
	5,5	6	6,25

COLD ROLL/HOT ROLL STEEL, ASTM A-513, TYPE 1 OR 2			
Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
18 GA (0.049")	1	2	1
	1	4,5	1
16 GA (0.065")	0,75	1,5	1,5
	0,75	2,25	1,5
	0,75	2,5	1,5
	0,875	1,5	2
	1,25	2	2
	1,25	2,5	2
	1,625	2,5	1,625
	2	3	3

TUBE BENDING

ALUMINIZED STEEL T125			
Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
16 GA (0.065")	1	2	1
	1	2,375	1
	1,375	1,5	2
	1,5	1,5	1,5
	1,5	2	1,5
	1,5	3	1,5
	1,75	2,5	3
	2	2,5	3
	2	3	3
	2,25	2,5	4
	2,25	3	4
	2,5	3	4
	2,5	5	5
	2,75	3	4
	3	3	4,5
	3	3,5	5
	3	4,5	5
	3	6	6
	3,5	3,5	5
	3,5	5	7
	3,5	6	7
	3,5	8	7
	4	4	6
	4	5	4,5
	4	6	5
	4	8	8
	4,5	6	8
	4,5	8	8
	5	5,5	6
	5	8	10
	6	6	10
	6	10	10
14 GA (0.083")	0,625	1,5	1
	0,875	2,5	2
	4	6	6

HYDRAULIC STEEL			
Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
SAE J524			
20 GA (0.035")	0,375	0,75	0,5
	0,375	1	0,5
18 GA (0.049")	0,375	0,75	0,5
	0,375	1	0,5
	0,5	1	1
	0,5	1,25	1
	0,75	1,5	1,5
	0,875	1,5	2
16 GA (0.065")	0,375	1	0,5
	0,5	1	1
	0,625	1	1
	0,625	1,25	1
	0,75	1,5	1,5
	1	1,5	1
	1	2,375	1
	1	3	1
	1	4,5	1
	1	6	1
	1,25	2	2
	1,25	2,5	2
	1,25	3	2
	1,25	4,25	2
	1,375	1,5	2
14 GA (0.083")	0,625	1,5	1
	0,875	2,5	2
13 GA (0.095")	1	2,375	1
	1	3	1
11 GA (0.120")	1	2	1
	1,05	2,5	3
	1,25	3	2

TUBE BENDING

HYDRAULIC STEEL

Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
	ASTM A106		
1" PIPE SCH 40 (0.133")	1,315	3	3
3/4" PIPE SCH 40 (0.113")	1,050	2,5	2

409 STAINLESS STEEL

Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
16 GA (0.065")	2	3	3
	2,25	3	4
	2,5	3	4
	2,5	5	5
	2,75	3	4
	3	3,5	5
	3	6	6
	3,5	3,5	5
	4	4	8
	4	6	6
	4	8	8
	5	5,5	7,5

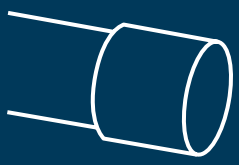
COPPER

Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
(0.050")	0,875	1,5	2
	1,125	2	2

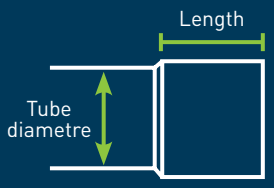
304 STAINLESS STEEL

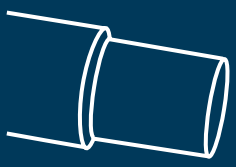
Wall thickness	Outside diameter	CLR	Minimum allowance between two bends
18 GA (0.049")	0,375	0,75	0,5
	0,375	1	0,5
	0,5	1	1
	0,5	2,5	1
	0,875	1,5	2
	0,875	2	2
16 GA (0.065")	1	1,5	1
	1,25	1,5	2
	1,25	2	2
	1,25	2,5	2
	1,25	3	2
	1,375	1,5	2
	1,75	2,5	3
	2	3	3
	2,25	3	4
	2,5	3	4
	2,5	5	5
	2,75	3	4
	3	3,5	5
	3,5	3,5	5
	4	4	7
	4	6	6
	4	8	8
	4,5	6	8
	5	5,5	8,75
14 GA (0.083")	4	4	7
	4	6	6
3" PIPE SCH 10 (0.120")	3,5	3,5	6

END FINISHING

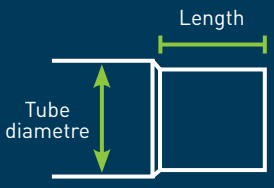


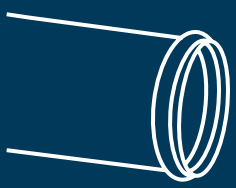
EXPANSION	
Tube diameter	**Maximum length**
2" to 2,75"	2,25"
3" to 6"	3"



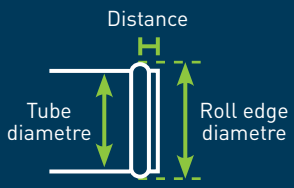


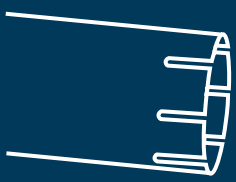
SWAGE	
Tube diameter	**Maximum length**
2" to 3,5"	3"
4" to 6"	4"



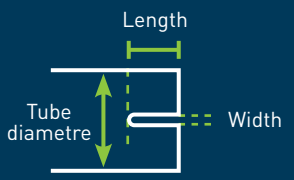


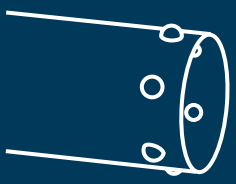
BEAD		
Tube diameter	**Roll edge diameter**	**Distance**
Less than 2"	D_{tube} +0,100"	0,125"
2" to 6"	D_{tube} +0,150"	0,25"



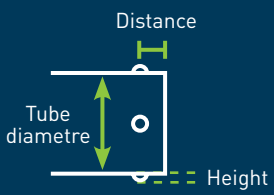


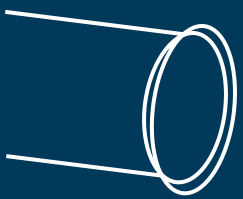
SLOT		
Tube diameter	**Width**	**Length**
2" to 6"	0,125"	0,5" 0,75"
		1" 1,25"



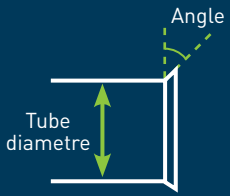


BUTTON		
Tube diameter	**Height**	**Maximum distance**
2" to 6"	0,125"	4"





FLARE	
Tube diameter	**Angle**
2" to 6"	20° or 45°
less than 2"	37° (JIC)



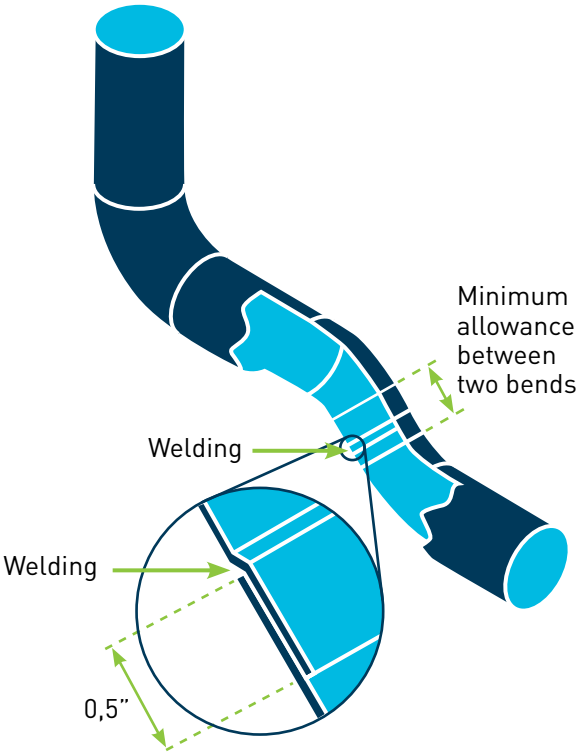
STANDARD WELD SEAMS

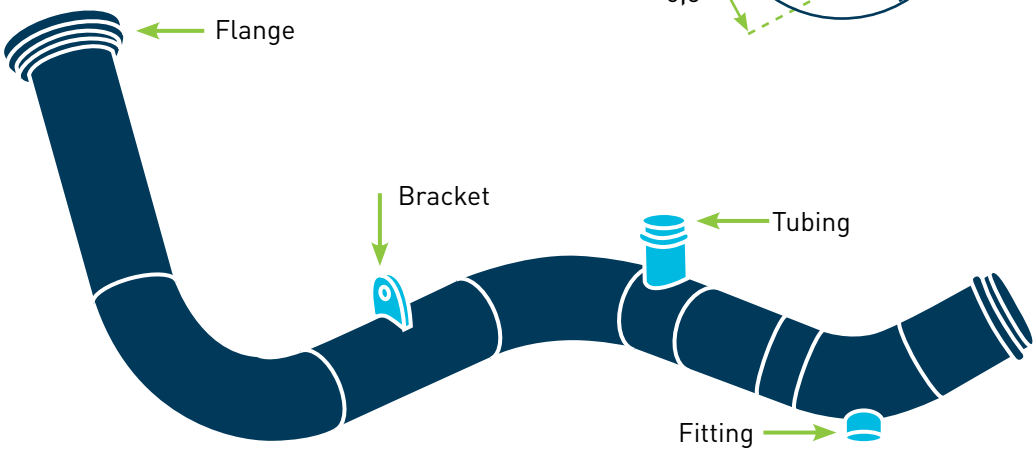
When the distance between two bends is less than the average allowance, the tube must have welded seams.

The end of the tube is reduced so that it will fit on the end of the other tube. This process fully respects the tube's direction of flow.

Welding processes: MIG, TIG, silver brazing

Accessories can be added to tubing. Here are some examples on an actual tube (below).



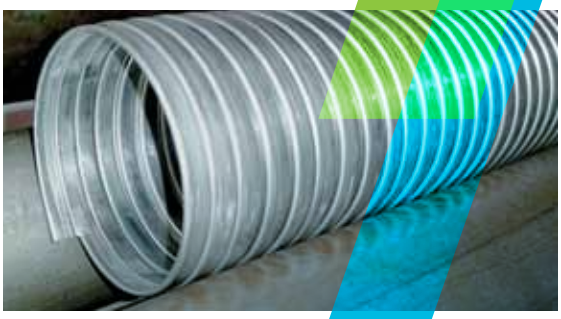


FLEXIBLE TUBING

We also manufacture flexible 304 stainless steel tubing in the following diameters:

2”	**2.25”**	**2.5”**	**2.75”**
3”	**3.5”**	**4”**	**4.5”**
5”	**6”**	**8”**	

These diameters are available in lengths of 10’ and 25’.



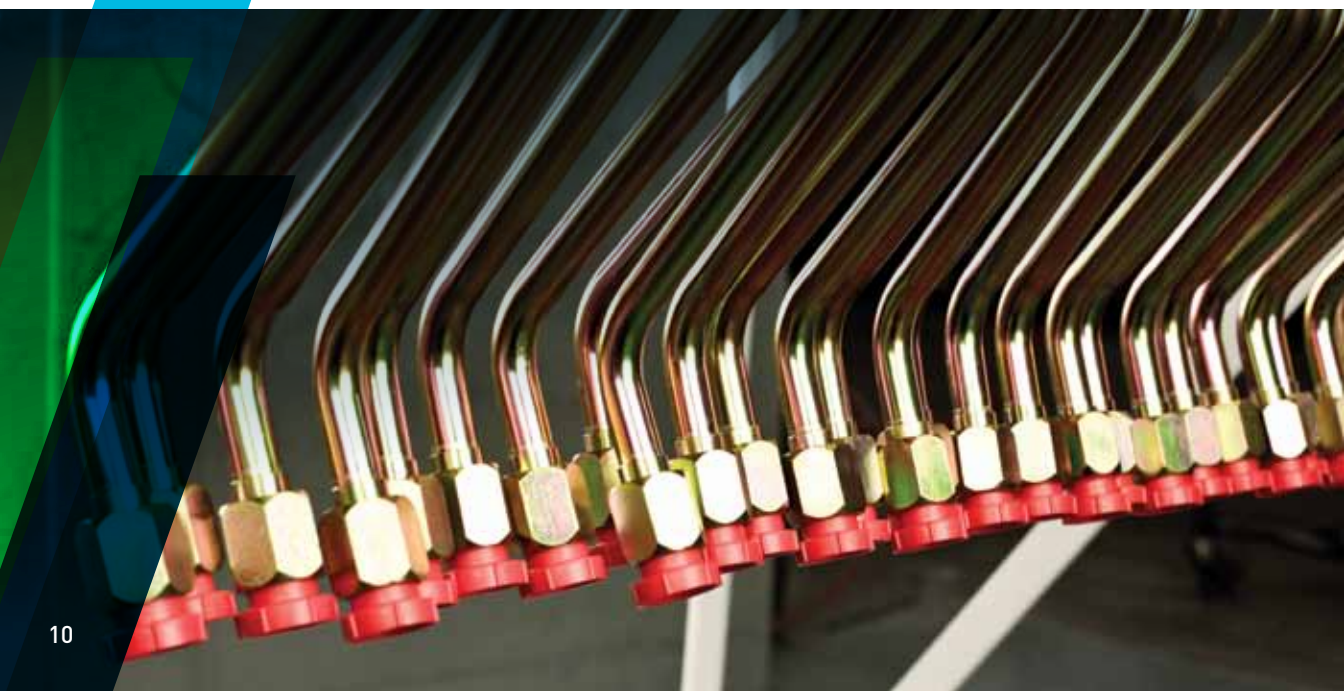
HYDRAULIC TUBING

HYDRAULIC CONNECTIONS	
ORFS	SAE J-1453
JIC	SAE J-514
Code 61	SAE J-518

COATINGS
Powder coating
Zinc plating

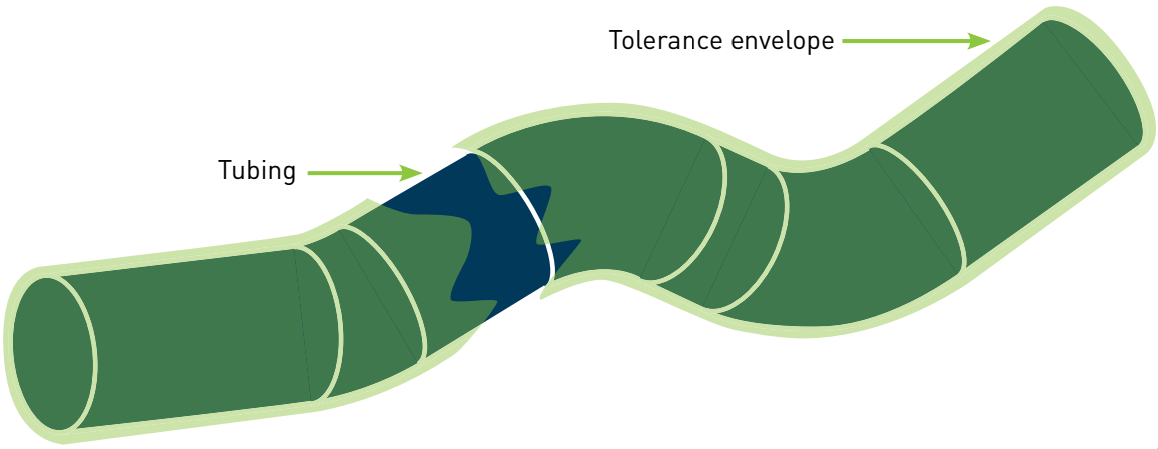
Tube Caron manufactures conduits for low- and high-pressure hydraulic systems. We also have the in-house capacity to test our tubing and welds up to 10,000 psi.

Our reliable manufacturing precision ensures fittings of 1/32” (1mm) at both extremities.

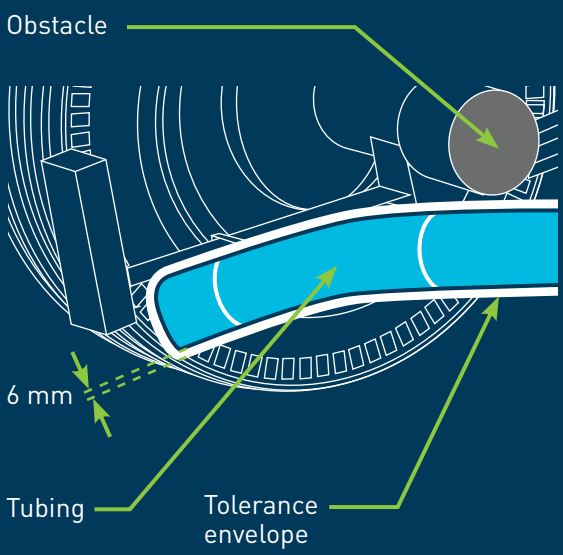


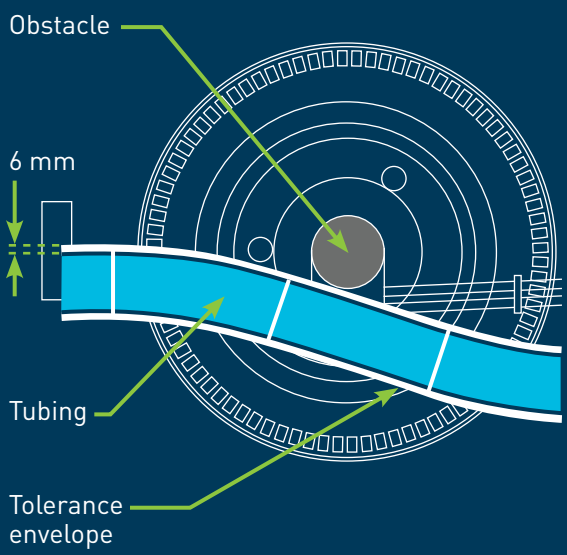
TOLERANCES

Generally, a tolerance envelope around the tube will enable greater quality control. At Tube Caron, the normal tolerance envelope is equal to the tube's diameter, plus approximately 1/2" (12mm). This tolerance can be reduced for manufacturing of pieces requiring greater precision.



The advantage of this type of tolerance is that it facilitates the process of designing the tube, while still taking other assembly components into consideration and thus avoiding interferences. We can therefore define a functional tolerance envelope by looking at the distance between the tube and its nearest components.





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T 450 887-2766
F 450 887-2897
E mail@tubecaron.com

99, rue Louis-Joseph-Doucet
Lanoraie QC Canada J0K 1E0

tubecaron.com