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# BEND GUIDELINE

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**VERSION : 2016-08-08**

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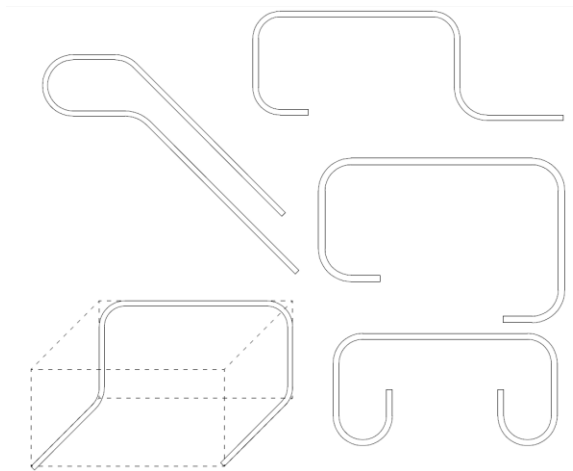
## About this guideline

This document has been prepared to serve as a general reference guide when detailing/designing a concrete structure reinforced with V-ROD. The following pages show some examples of simple and complex shapes (and their dimensions limitations) that can be fabricated in piece.

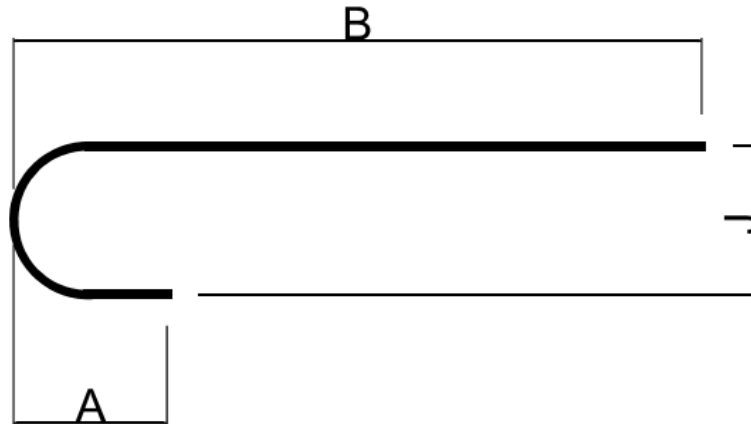
Some general limitations inherent to the technology itself are applicable to the fabrication of bent bars and these are:

- Parts must always keep the same direction (clockwise to counter-clockwise is impossible).
- 3D parts are impossible to fabricate.

To illustrate these limitations, here are a few images of shapes that can't be made in a single piece.



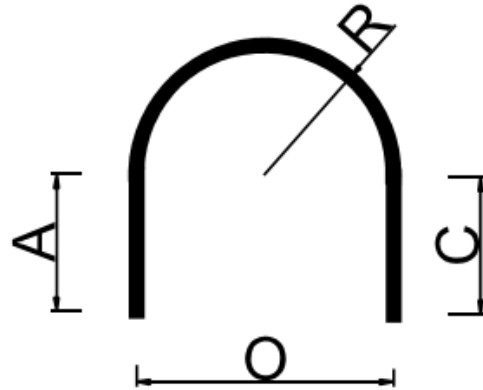
However, these shapes could be obtained by lapping different pieces together. Therefore, even if your shape cannot be made in one piece, do not hesitate to send a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com). Our engineering team will be able to recommend you an assembly that will meet the requirements of the ACI 440.1R-15 or the AASHTO LRFD as well as your own requirements.



**Type 01**

#	DIA (in)	A & B MAX	J (in)
#2	1/4	8'-3"	3½
#3	3/8	8'-3"	3¾
#4	1/2	8'-3"	5
#5	5/8	8'-3"	6¼
#6	3/4	8'-3"	7½
#7	7/8	8'-3"	9¾
#8	1	8'-3"	10

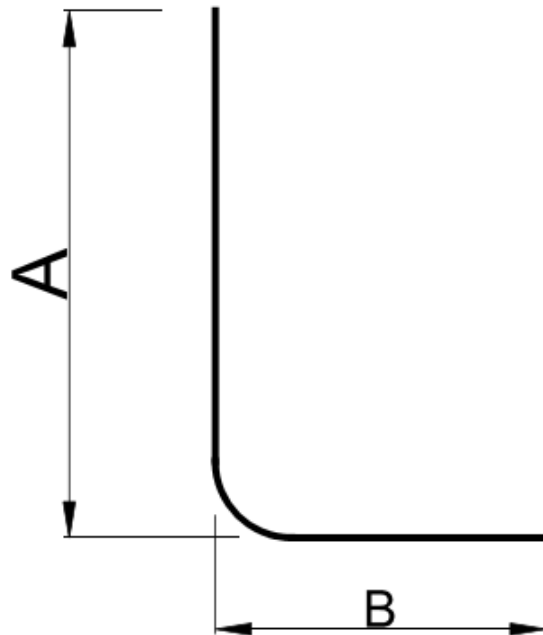
*In case of doubt about the possibility of fabricating the desired bend, please verify with us by sending a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com)*



### Type 10

		A & C	O	R
#	DIA (in)	MAX	(in)	INT (in)
#2	1/4	8'-3"	3½	1½
#3	3/8	8'-3"	3¾	1½
#4	1/2	8'-3"	5	2
#5	5/8	8'-3"	6¼	2½
#6	3/4	8'-3"	7½	3
#7	7/8	8'-3"	9¾	4
#8	1	8'-3"	10	4

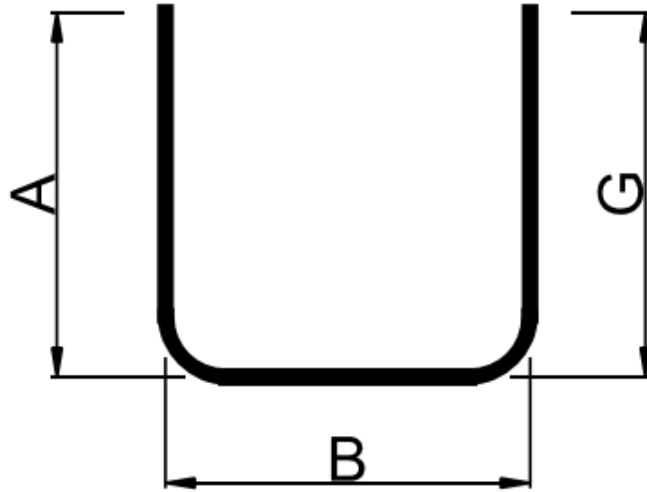
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**Type 02**

		A	B
#	DIA (in)	MAX	MAX
#2	1/4	6'	5'-8"
#3	3/8	6'	5'-8"
#4	1/2	6'-3"	5'-10"
#5	5/8	6'-4"	5'-11"
#6	3/4	6'-5"	6'
#7	7/8	6'-8"	6'-3"
#8	1	6'-8"	6'-3"

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**Type 02**

**Table 1**

#	DIA (in)	A & G		B	
		MAX	MIN	MIN	MAX
#2	1/4	5'-8"	9"	9"	6'
#3	3/8	5'-8"	9"	9"	6'
#4	1/2	5'-10"	11"	11"	6'-3"
#5	5/8	5'-11"	1'	1'	6'-4"
#6	3/4	6'	1'	1'	6'-5"
#7	7/8	6'-3"	1'-4"	1'-4"	6'-8"
#8	1	6'-3"	1'-4"	1'-4"	6'-8"

If the "A" or "G" dimension exceed the maximum dimension shown in **table 1**, maximum and minimum dimensions need to be modified as per **table 2**



Table 2

#	DIA (in)	A & G	B	
		MAX	MIN	MAX
#2	1/4	6'	1'-7"	5'-8"
#3	3/8	6'	1'-7"	5'-8"
#4	1/2	6'-3"	1'-8"	5'-10"
#5	5/8	6'-4"	1'-9"	5'-11"
#6	3/4	6'-5"	1'-11"	6'
#7	7/8	6'-8"	2'-1"	6'-3"
#8	1	6'-8"	2'-1"	6'-3"

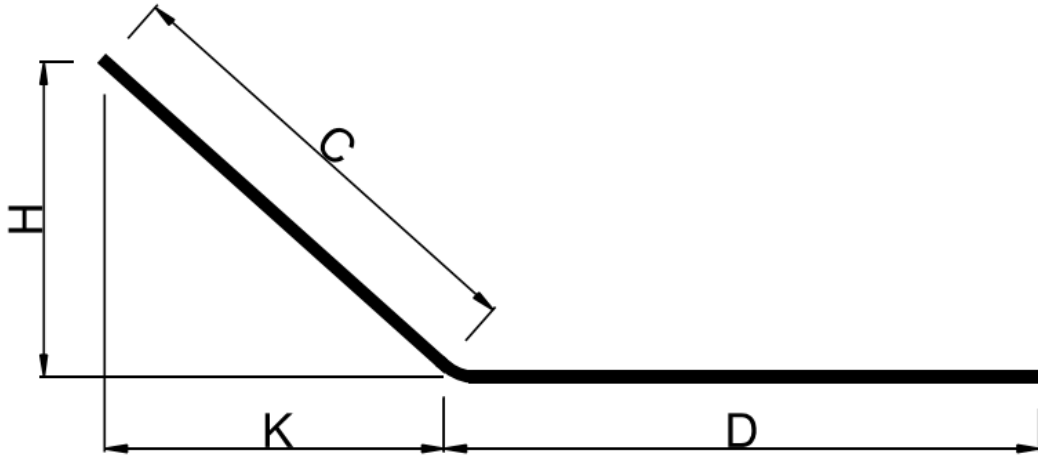
If the “B” dimension is smaller than the minimum dimension shown in **table 1**, maximum dimensions for “A” and “G” need to be modified as per **table 3**

Table 3

#	DIA (in)	A & G	B	
		MAX	MIN	MAX
#2	1/4	3'-5"	5¼"	9"
#3	3/8	3'-5"	5¼"	9"
#4	1/2	3'-7"	6½"	11"
#5	5/8	3'-8"	7¾"	1'
#6	3/4	3'-9"	9¼"	1'
#7	7/8	4'	11½"	1'-4"
#8	1	4'	11½"	1'-4"

*Other combinations of “A”, “B” and “G” may be possible. Bigger shapes may be available upon request.*

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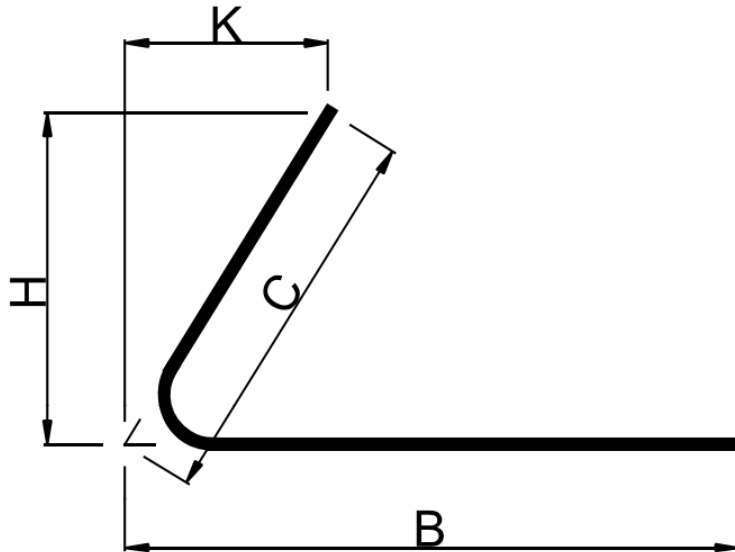
### Type 03

		D + K	H
#	DIA (in)	MAX	MAX
#2	1/4	6'	5'-8"
#3	3/8	6'	5'-8"
#4	1/2	6'-3"	5'-10"
#5	5/8	6'-4"	5'-11"
#6	3/4	6'-5"	6'
#7	7/8	6'-8"	6'-3"
#8	1	6'-8"	6'-3"

*Bigger shapes may be available upon request.*

*In case of doubt about the possibility of fabricating the desired bend, please verify with us by sending a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com)*

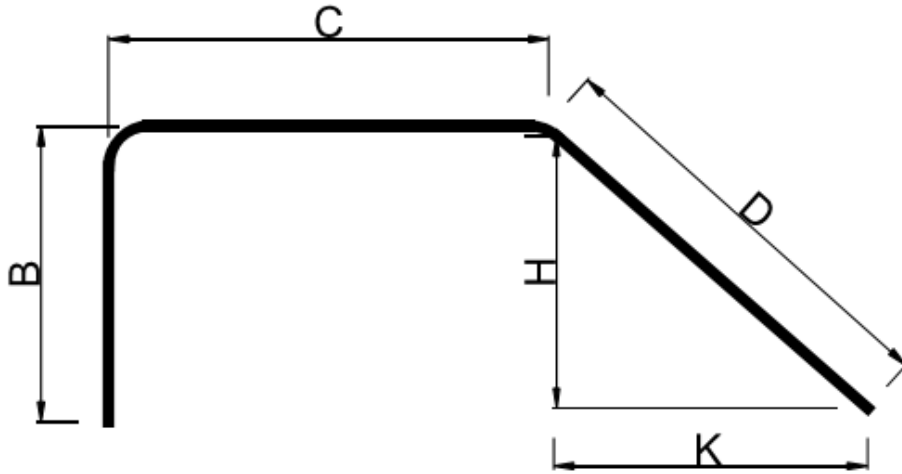




### Type 35

		K & B	H
#	DIA (in)	MAX	MAX
#2	1/4	6'	5'-8"
#3	3/8	6'	5'-8"
#4	1/2	6'-3"	5'-10"
#5	5/8	6'-4"	5'-11"
#6	3/4	6'-5"	6'
#7	7/8	6'-8"	6'-3"
#8	1	6'-8"	6'-3"

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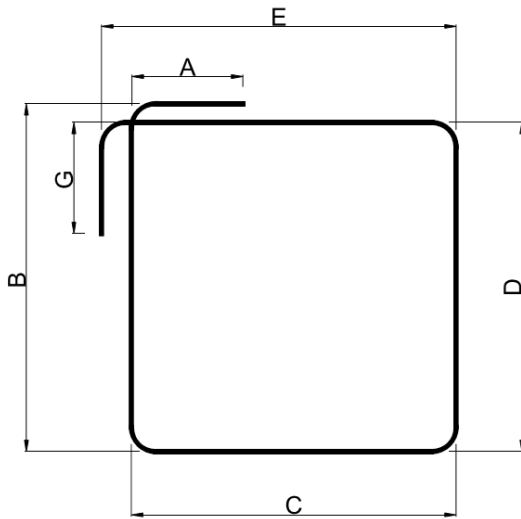


**Type 12**

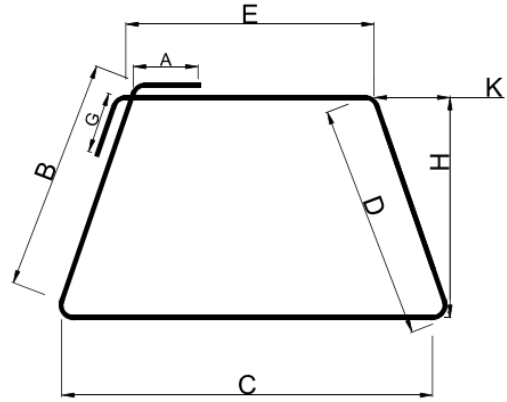
#	DIA (in)	C + K		C	K	B	H
		MIN	MAX	MAX	MAX	MAX	MAX
#2	1/4	1'-7"	6'-5"	6'	3'	5'-8"	2'-10"
#3	3/8	1'-7"	6'-5"	6'	3'	5'-8"	2'-10"
#4	1/2	1'-9"	6'-7"	6'-3"	3'	5'-10"	2'-11"
#5	5/8	1'-10"	6'-8"	6'-4"	3'	5'-11"	2'-11"
#6	3/4	1'-11"	6'-9"	6'-5"	3'	6'	3'
#7	7/8	2'	7'	6'-8"	3'	6'-3"	3'-1"
#8	1	2'	7'	6'-8"	3'	6'-3"	3'-1"

*Other combinations may be possible. Bigger shapes may be available upon request.*

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**Type T02**



**Type T14**

**Table 1**

#	DIA (in)	B & D		C&E	
		MIN	MAX	MIN	MAX
#2	1/4	9"	6'	1'-7"	5'-8"
#3	3/8	9"	6'	1'-7"	5'-8"
#4	1/2	11"	6'-3"	1'-8"	5'-10"
#5	5/8	1'	6'-4"	1'-9"	5'-11"
#6	3/4	1'	6'-5"	1'-11"	6'
#7	7/8	1'-4"	6'-8"	2'-1"	6'-3"
#8	1	1'-4"	6'-8"	2'-1"	6'-3"

If the "D" or "B" dimension is smaller than the minimum dimension shown in **table 1**, maximum dimensions need to be modified as per **table 2**



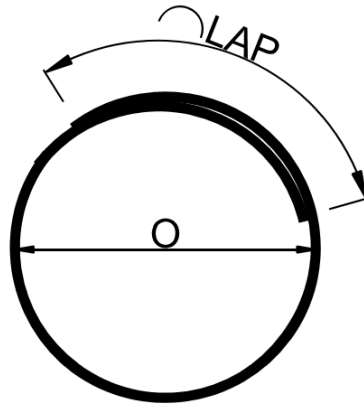
Table 2

		B & D		C&E	
#	DIA (in)	MIN	MAX	MIN	MAX
#2	1/4	5''	9''	5¼''	3'-7''
#3	3/8	5''	9''	5¼''	3'-7''
#4	1/2	6¼''	11''	6½''	3'-9''
#5	5/8	7½''	1'	7¾''	3'-10''
#6	3/4	8¾''	1'	9¼''	3'-11''
#7	7/8	11¼''	1'-4''	11½''	4'-2''
#8	1	11¼''	1'-4''	11½''	4'-2''

*In order to minimize the cost of per piece of stirrups, we recommend, if possible, that "A" be half of the "E" dimension and "G" be half of the "B" dimension*

*Other combinations may be possible. Bigger shapes may be available upon request.*

*In case of doubt about the possibility of fabricating the desired bend, please verify with us by sending a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com)*

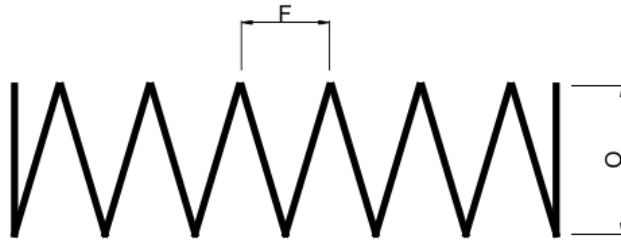


**Type T03**

O (in)		
5.9	6.3	7.3
8.1	8.9	9.1
9.7	9.8	11.2
11.4	12	16.5
18.1	22.1	26.8
38	42.1	48.2
52		

***It is possible to fabricate circular stirrups with other “O” dimensions than the one shown in the previous table. However, a surcharge will be applicable.***

*In case of doubt about the possibility of fabricating the desired bend, please please verify with us by sending a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com)*



**Type SP1**

O (in)		
5.9	6.3	7.3
8.1	8.9	9.1
9.7	9.8	11.2
11.4	12	16.5
18.1	22.1	26.8
38	42.1	48.2
52		

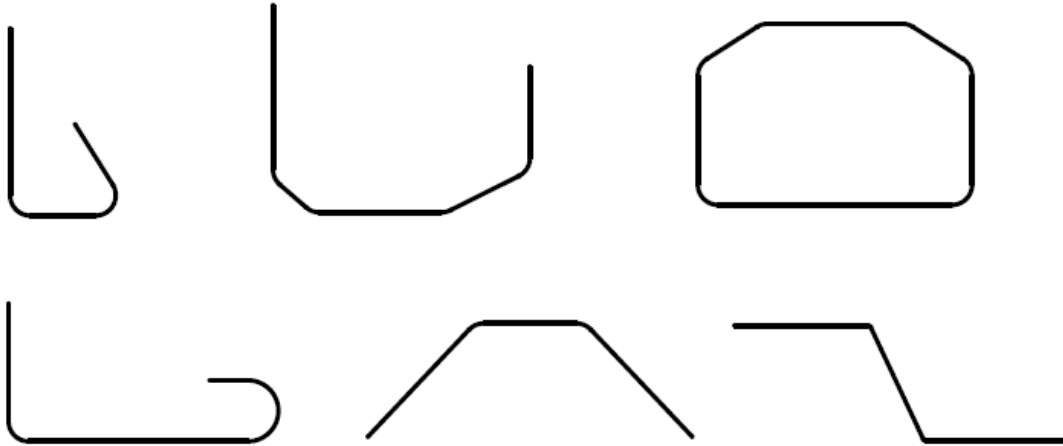
***It is possible to fabricate spirals with other “O” dimensions than the one shown in the previous table. However, a surcharge will be applicable.***

*All our spirals are produced as a “slinky” and need to be stretched to the required pitch “F”. Maximum pitch “F” depends on the spiral dimensions and diameter.*

*Tapered spirals are also available upon request. The “shape” of the spiral can also “squared” instead “circular”.*

*Please, ALWAYS send a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com) for any spirals request.*

**OTHER SHAPES ARE AVAILABLE UPON REQUEST:**



*Please check with Pultrall by sending a sketch along with dimensions and required quantities at [service@pultrall.com](mailto:service@pultrall.com).*