

Estimating Robot Welding Cycle Times

Welding Speeds

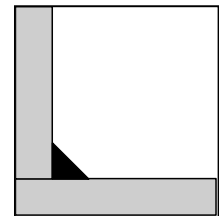
Contents

Typical welding speeds for:

- Fillet welds
- Overlap welds
- Outside corners

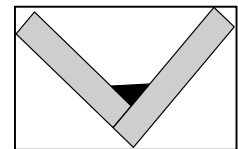
Fillet Welds - Mild Steel

0.8 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	14	15		12
	max	25	26		16
3 mm leg	typ	13	14		9
	max	18.5	19.5		15
4 mm leg	typ	10	11		5
	max	14	14.5		8
5 mm leg	typ	8	9		
	max	10.5	11		
6 mm leg	typ	6.5	7		
	max	8	8.5		



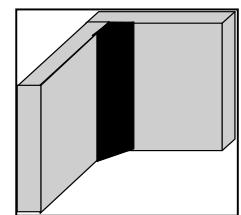
HV

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	13	14		13
	max	23	25		18
3 mm leg	typ	12.5	13		10
	max	20	21		15
4 mm leg	typ	11	11.5		6
	max	15	16		9
5 mm leg	typ	9	9.5	4	
	max	12	13	6	
6 mm leg	typ	7	8	2.5	
	max	9.5	10	3	



Gravity

1.2 mm Wire		HV	Gravity	Vert Up	Vert Down
3 mm leg	typ	11	12		6
	max	16	17		10
4 mm leg	typ	10	11		5
	max	14	15		8
5 mm leg	typ	8.5	9	2.2	
	max	11	12	4	
6 mm leg	typ	7	7.5	1.8	
	max	8.5	10	3	
8 mm leg	typ	4	4.5	1.5	
	max	5	6	2	
10 mm leg	typ	2.7	3	1	
	max	3.5	4	1.5	

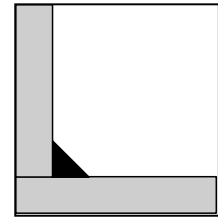


Vertical

1.6 mm Wire		HV	Gravity	Vert Up	Vert Down
6 mm leg	typ	6	7		3.5
	max	9	10		4
8 mm leg	typ	4	4.5	2	
	max	5.5	6.5	2.5	
10 mm leg	typ	3	3.3	1.5	
	max	3.8	4.5	2	
12 mm leg	typ	2	2.5	1	
	max	2.8	3.3	1.5	

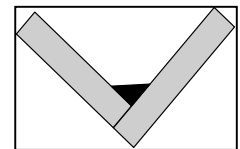
Fillet Welds - Stainless Steel

0.8 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	12	13		10
	max	21	22		14
3 mm leg	typ	11	12		8
	max	16	17		13
4 mm leg	typ	8.5	9		4
	max	12	12.5		7
5 mm leg	typ	7	8		
	max	9	9.5		
6 mm leg	typ	5.5	6		
	max	7	7		



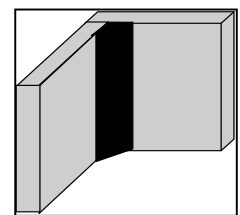
HV

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	11	12		11
	max	20	21		15
3 mm leg	typ	10.5	11		9
	max	17	18		13
4 mm leg	typ	9.5	10		5
	max	13	14		8
5 mm leg	typ	7.5	8	3	
	max	10	11	5	
6 mm leg	typ	6	7	2	
	max	8	9	3	



Gravity

1.2 mm Wire		HV	Gravity	Vert Up	Vert Down
3 mm leg	typ	9	10		5
	max	14	14		9
4 mm leg	typ	8.5	9		4
	max	12	13		7
5 mm leg	typ	7	8	2	
	max	9.5	10	3	
6 mm leg	typ	6	6	2	
	max	7	9	3	
8 mm leg	typ	3.5	4	1	
	max	4	5	2	
10 mm leg	typ	2.5	3	1	
	max	3	3	1	

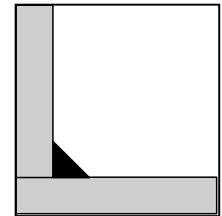


Vertical

1.6 mm Wire		HV	Gravity	Vert Up	Vert Down
6 mm leg	typ	5	6		3
	max	8	9		3
8 mm leg	typ	3.5	4	1.7	
	max	5	6	2	
10 mm leg	typ	2.5	2.5	1.3	
	max	3.5	4	1.7	
12 mm leg	typ	1.7	1.7	1	
	max	2.5	2.8	1.5	

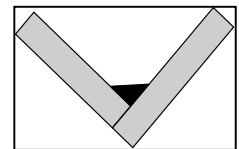
Fillet Welds - Aluminium

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	14	15		14
	max	24	26		19
3 mm leg	typ	13	14		11
	max	21	22		16
4 mm leg	typ	11.5	12		6
	max	16	17		9
5 mm leg	typ	9.5	10	4	
	max	13	14	6	
6 mm leg	typ	7	8	3	
	max	10	11	3	



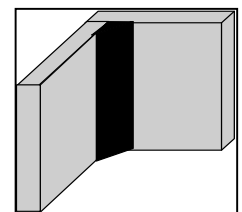
HV

1.2 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	13	14		6
	max	18	20		11
3 mm leg	typ	12	13		7
	max	17	19		11
4 mm leg	typ	11	12		6
	max	16	17		9
5 mm leg	typ	9.5	10	2	
	max	12	13	4	
6 mm leg	typ	7.5	8	2	
	max	9	11	3	



Gravity

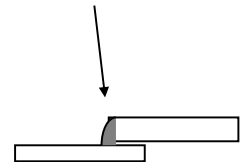
1.6 mm Wire		HV	Gravity	Vert Up	Vert Down
3 mm leg	typ	11	13		5
	max	18	19		8
4 mm leg	typ	11	12		4
	max	15	16.5		6
5 mm leg	typ	9.5	10		
	max	12	13		
6 mm leg	typ	8	9	3.5	
	max	10	11	4.5	
8 mm leg	typ	4.5	5.5	2.2	
	max	5.5	6.5	2.8	
10 mm leg	typ	3	3.3	1.5	
	max	4	4.5	2.2	



Vertical

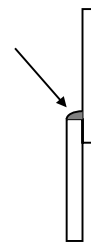
Overlap Welds - Mild Steel

0.8 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	15	14		12
	max	26	25		16
3 mm leg	typ	14	13		9
	max	19.5	18.5		15
4 mm leg	typ	11	10		5
	max	14.5	14		8
5 mm leg	typ	9	8		
	max	11	10.5		
6mm leg	typ	7	6.5		
	max	8.5	8		



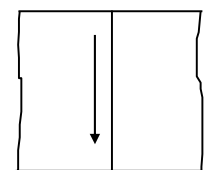
Flat

1.0 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	14	13		13
	max	25	23		18
3 mm leg	typ	13	12.5		10
	max	21	20		15
4 mm leg	typ	11.5	11		6
	max	16	15		9
5 mm leg	typ	9.5	9	4	
	max	13	12	6	
6 mm leg	typ	8	7	2.5	
	max	10	9.5	3	



Side

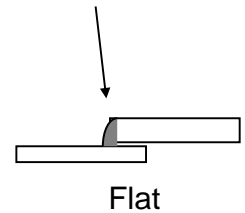
1.2 mm Wire		Flat	Side	Vert Up	Vert Down
3 mm leg	typ	12	11		
	max	17	16		
4 mm leg	typ	11	10		
	max	15	14		
5 mm leg	typ	9	8.5	2.2	
	max	12	11	4	
6 mm leg	typ	7.5	7	1.8	
	max	10	8.5	3	
8 mm leg	typ	4.5	4	1.5	
	max	6	5	2	
10 mm leg	typ	3	2.7	1	
	max	4	3.5	1.5	



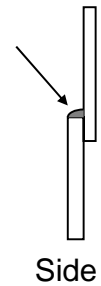
Vertical

Overlap Welds - Stainless Steel

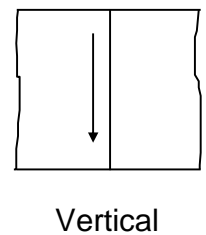
0.8 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	13	12		10
	max	22	21		14
3 mm leg	typ	12	11		7.5
	max	17	16		13
4 mm leg	typ	9	8.5		4.5
	max	12.5	12		7
5 mm leg	typ	8	7		
	max	9.5	9		
6 mm leg	typ	6	5.5		
	max	7	7		



1.0 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	12	11		11
	max	21	20		15
3 mm leg	typ	11	10.5		9
	max	18	17		13
4 mm leg	typ	10	9.5		5
	max	14	13		8
5 mm leg	typ	8	7.5	3	
	max	11	10	5	
6 mm leg	typ	7	6	2	
	max	8.5	8	3	

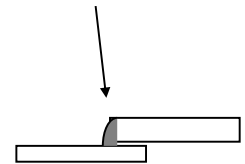


1.2 mm Wire		Flat	Side	Vert Up	Vert Down
3 mm leg	typ	10	9		5
	max	14	14		9
4 mm leg	typ	9	8.5		4
	max	13	12		7
5 mm leg	typ	8	7	2	
	max	10	9.5	3	
6 mm leg	typ	6	6	2	
	max	9	7	3	
8 mm leg	typ	4	3.5	1	
	max	5	4	2	
10 mm leg	typ	3	2.5	1	
	max	3	3	1	



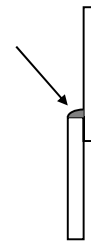
Overlap Welds - Aluminium

1.0 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	15	14		14
	max	26	24		19
3 mm leg	typ	14	13		11
	max	22	21		16
4 mm leg	typ	12	11.5		6
	max	17	16		9
5 mm leg	typ	10	9.5	4	
	max	14	13	6	
6 mm leg	typ	8	7	3	
	max	11	10	3	



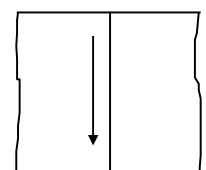
Flat

1.2 mm Wire		Flat	Side	Vert Up	Vert Down
14-18 swg	typ	14	13		6
	max	20	18		11
3 mm leg	typ	13	12		7
	max	19	17		11
4 mm leg	typ	12	11		6
	max	17	16		9
5 mm leg	typ	10	9.5	2	
	max	13	12	4	
6 mm leg	typ	8	7.5	2	
	max	11	9	3	



Side

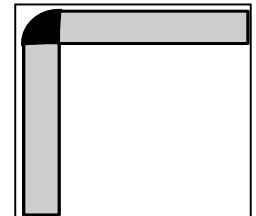
1.6 mm Wire		Flat	Side	Vert Up	Vert Down
3 mm leg	typ	13	11		5
	max	19	18		8
4 mm leg	typ	12	11		4
	max	16.5	15		6
5 mm leg	typ	10	9.5		
	max	13	12		
6 mm leg	typ	9	8	3.5	
	max	11	10	4.5	
8mm leg	typ	5.5	4.5	2.2	
	max	6.5	5.5	2.8	
10 mm leg	typ	3.3	3	1.5	
	max	4.5	4	2.2	



Vertical

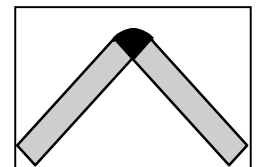
Outside Corners - Mild Steel

0.8 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	12	13		12
	max	22	23		16
3 mm leg	typ	11.5	12.5		9
	max	16	17		15
4 mm leg	typ	9	10		5
	max	12.5	13.5		8
5 mm leg	typ	7	8		
	max	9.5	10		
6 mm leg	typ	5.5	6		
	max	7.5	8		



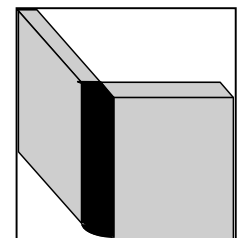
HV

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	11.5	12.5		12
	max	21	22		16
3 mm leg	typ	11	11.5		9
	max	18	19		15
4 mm leg	typ	10	10.5		5
	max	14	15		8
5 mm leg	typ	8	8.5		
	max	11	12		
6 mm leg	typ	6.5	7		
	max	8.5	9		



Gravity

1.2mm Wire		HV	Gravity	Vert Up	Vert Down
3mm leg	typ	10	11		6
	max	14	15		9
4mm leg	typ	9	10		4.5
	max	12.5	13.5		7.5
5mm leg	typ	8	8.5		
	max	10	11		
6mm leg	typ	6.5	7		
	max	8	9		
8mm leg	typ	3.5	4		
	max	4.5	5.5		
10mm leg	typ	2.5	2.7		
	max	3.2	3.6		

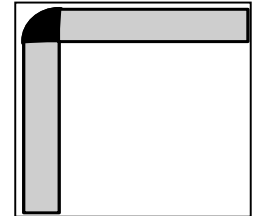


Vertical

1.6 mm Wire		HV	Gravity	Vert Up	Vert Down
6 mm leg	typ	5.5	6		
	max	8	8		
8 mm leg	typ	3.5	4		
	max	5	6		
10 mm leg	typ	2.7	3		
	max	3.5	4		
12 mm leg	typ	1.8	2.3		
	max	2.5	3		

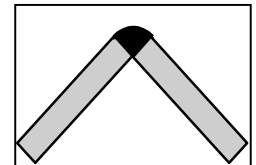
Outside Corners - Stainless Steel

0.8 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	11	11.5		9
	max	19	20		12
3 mm leg	typ	10	10.5		7
	max	14	15		12
4 mm leg	typ	7.5	8		4
	max	11	11.5		6
5 mm leg	typ	6	6.5		
	max	8	8.5		
6 mm leg	typ	5	5.5		
	max	6	6.5		



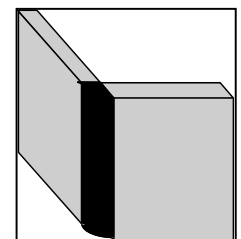
HV

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	10	11		10
	max	17.5	19		14
3 mm leg	typ	9.5	10		7.5
	max	14	15		12
4 mm leg	typ	8.5	9		4.5
	max	11.5	12		7
5 mm leg	typ	7	7.5	3	
	max	9	10	4.5	
6 mm leg	typ	5.5	6	2	
	max	7.5	8	2.5	



Gravity

1.2 mm Wire		HV	Gravity	Vert Up	Vert Down
3 mm leg	typ	8.5	9		5
	max	12	13		8
4 mm leg	typ	8	8.5		4
	max	11	11.5		6
5 mm leg	typ	6.5	7	1.7	
	max	8.5	9	3	
6 mm leg	typ	5.5	6	1.5	
	max	6.5	7.5	2.3	
8 mm leg	typ	3.2	3.5	1.1	
	max	3.8	4.6	1.5	
10mm leg	typ	2.3	2.5	0.8	
	max	2.7	3	1	

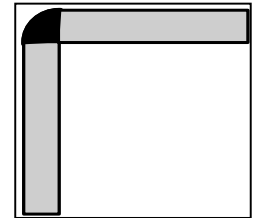


Vertical

1.6mm Wire		HV	Gravity	Vert Up	Vert Down
6 mm leg	typ	4.5	5.5	2.5	
	max	7	8	3	
8 mm leg	typ	3.2	3.5	1.5	
	max	4.5	5	1.8	
10 mm leg	typ	2.3	2.5	1.2	
	max	3.2	3.5	1.5	
12 mm leg	typ	1.5	1.5	1	
	max	2.3	2.5	1.4	

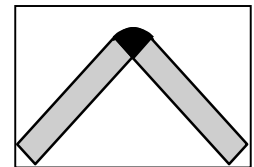
Outside Corners - Aluminium

1.0 mm Wire		HV	Gravity	Vert Up	Vert Down
14-18 swg	typ	12	13		12
	max	22	23		17
3 mm leg	typ	11.5	12		9
	max	19	20		14
4 mm leg	typ	10	11		6
	max	14	15		9
5 mm leg	typ	8.5	9	4	
	max	11	12	6	
6 mm leg	typ	6.5	7.5	2	
	max	9	9.5	3	



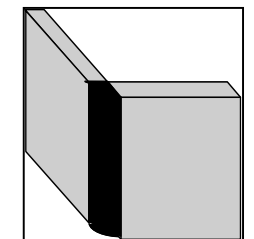
HV

1.2 mm Wire		HV	Gravity	Vert Up	Vert Down
3 mm leg	typ	11	12		6
	max	15	16.5		10
4 mm leg	typ	10	11		5
	max	14	15		8
5 mm leg	typ	8.5	9	2.2	
	max	11	12	4	
6 mm leg	typ	6.5	7	1.8	
	max	8	9.5	3	
8 mm leg	typ				
	max				
10 mm leg	typ				
	max				



Gravity

1.6 mm Wire		HV	Gravity	Vert Up	Vert Down
6 mm leg	typ	6.5	7.5	3	
	max	8.5	9.5	4	
8 mm leg	typ	3.5	4.5	2	
	max	5	5.5	2.5	
10 mm leg	typ	2.5	2.8	1.3	
	max	3.5	4	2	
12 mm leg	typ				
	max				



Vertical