

# aquatherm welding- and labour times

pipe OD-Ø	welding depth	heating time		welding time	cooling time	labour time total *
		sec.DVS	sec.AQE			
mm	mm			sec.	min.	min.AQE
16	13,0	5	8	4	2	4
20	14,0	5	8	4	2	4
25	15,0	7	11	4	2	4
32	16,5	8	12	6	4	6
40	18,0	12	18	6	4	6
50	20,0	18	27	6	4	8
63	24,0	24	36	8	6	10
75	26,0	30	45	8	8	12
90	29,0	40	60	8	8	14
110	32,5	50	75	10	8	16
125	40,0	60	90	10	8	18

\* These are the labour times for one welding connection and one person, fittings or other accessories are not included in this calculation and need to be considered separately or project wise.

\* Labour time total = cutting, burring, peeling if needed, marking of the welding depth, fixing and adjusting of the machine, heating time and cooling time.



Heating-up of pipe and fitting



Joining, fixing and...



...aligning



The result: a permanent connection!

For labour time calculation of diameter 160-630mm please consider only the complete cooling time (t4) for one welding connection (in acc. to DVS 2207-11) and one person.

In acc. to DVS 2207-11 2008 the cooling time can be reduced by 50% if:

- the joint is manufactured in workshop conditions
- the removal from the welding machine cause only a slight load
- the pipes have wall thicknesses >= 15mm

**Ritmo Delta Dragon 250B, 315B, 355B, 630V1**  
 Hydraulic butt welding machine 160-630 mm for PP-R -- fusion temperature: 210°C +/- 10°C

DIMENSION		ADJUSTING				min. height of the bead mm	HEATING		WELDING		COOLING
dimension mm	pipe series number SDR	adjustment pressure in bar					in acc. to DVS 2207 sec.	ca.10% of the adjustment pressure bar	max. adaption time sec.	pressure build-up time sec.	Cooling and labour time for one weld min.
		250B	315B	355B	630V1						
		P1 = P3				H	t1	P2	t2	t3	t4
160x9,1	17,6	7	6	3		1	204	1	6	9	15*
160x14,6	11	11	10	5		1	277	1	8	13	24*
160x21,9	7,4	16	14	7		1,5	361	2	10	19	34
200x11,4	17,6	11	10	5		1	237	1	7	11	19*
200x18,2	11	18	16	7		1	320	2	9	16	29
200x27,4	7,4	25	22	11		2	412	2	11	23	42
250x14,2	17,6	18	16	7		1	272	2	8	13	23*
250x22,7	11	28	24	11		1,5	368	3	10	20	35
250x34,2	7,4	39	35	16		2	466	4	13	30	52
315x17,9	17,6		25	12		1	317	3	9	16	28
315x28,6	11		39	18		2	420	4	12	24	44
315x42,6	7,4		55	26		2,5	520	6	15	37	62

determined drag-pressure + adjustment pressure = maschine adjustment (s. Manual)

\* wall thickness < 15mm

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In acc. to DVS 2207-11 2008 the cooling time can be reduced by 50% if:

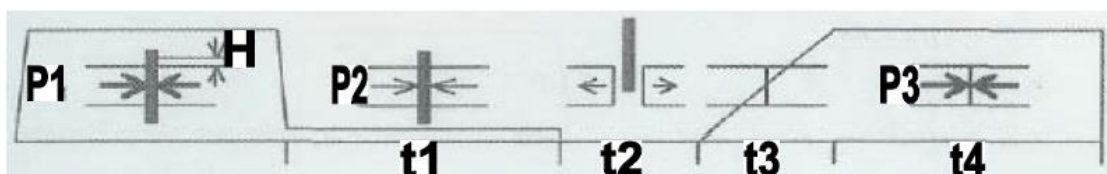
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		250B	315B	355B	630V1						
		P1 = P3				H	t1	P2	t2	t3	t4
355x20,1	17,6			15		1,5	341	3	9	18	32
355x32,2	11			23		2	448	5	13	28	48
355x48,0	7,4			33		2,5	565	7	17	42	70
400x22,7	17,6				13	1,5	367	1	10	20	35
400x36,3	11					2	480	2	14	31	54
450x25,5	17,6				17	1,5	395	2	11	22	39
450x40,9	11					2,5	508	3	15	35	59
500x28,4	17,6				21	2	419	2	12	24	43
560x31,7	17,6				26	2	444	3	12	27	48
630x35,7	17,6				33	2	475	2	14	31	53

determined drag-pressure + adjustment pressure = maschine adjustment (s. Manual)

\* wall thickness < 15mm



## FUSION

### PART H: BUTT-WELDING OF PIPE DIMENSION 160 - 630 MM

The following aquatherm - pipes series are available:

aquatherm blue pipe SDR 11 MF faser-composite pipe

aquatherm blue pipe SDR 11 MF OT faser-composite pipe

aquatherm blue pipe SDR 17,6 MF faser-composite pipe

Pipes and fittings are fused, as explained below, by butt welding:

1. Protect your place of work from weather influences
2. Check, if welding machine works properly and heat it up
3. Cut pipes into required length
4. Plastic pipes are aligned and fixed by means of the clamping elements
5. Use the milling machine for planing the pipe end to be plane-parallel
6. Remove the debris and clean the pipe ends with methylated spirit
7. Check if pipes match (tolerance: max. 0.1 x wall thickness)
8. Check width of gap between the two pipes to be welded (tolerance: max. 0.5 mm)
9. Check the temperature of the heating element ( $210^{\circ}\text{C} \pm 10^{\circ}\text{C}$ )
10. Clean the heating element

#### IMPORTANT:

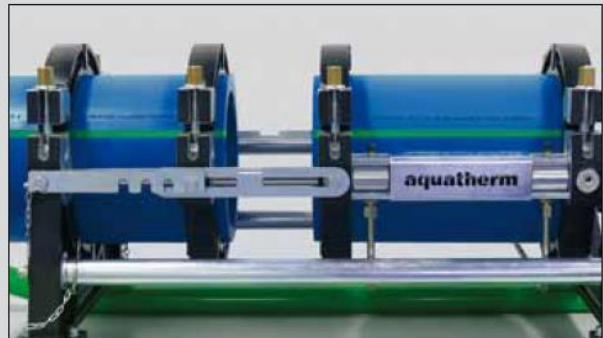
Before welding, aquatherm blue pipe OT pipes have to be burred at the front. To ensure an optimal weld joint, the heating plates' surfaces have to be cleaned before each welding process and be free of visible and invisible residues.



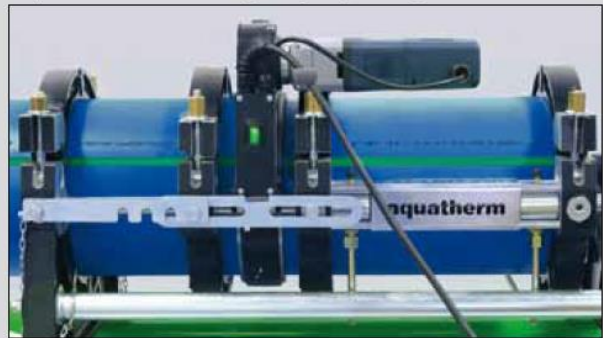
Before welding, pipes are cut into the required lengths



Check performance of the welding machine and heat it up



The parts to be welded are fixed and aligned respectively, the milling machine is used



## PART H: BUTT-WELDING OF PIPE DIMENSION 160 - 630 MM

11. After the heating element has been positioned, the pipes are pushed onto the heating plate with a defined adjusting pressure.
12. After reaching the specified bead height (see tablet) the pressure is reduced. This process marks the beginning of the heating time. This time is for heating up the pipe ends up to the right welding temperature.

Specified bead height in mm:

	SDR 11	SDR 17,6
160 mm	1,0	1,0
200 mm	1,0	1,0
250 mm	1,5	1,0
315 mm	2,0	1,0
355 mm	2,0	1,5
400 mm	2,0	1,5
450 mm	2,5	1,5
500 mm		2,0
560 mm		2,0
630 mm		2,0

13. When heating time has expired, divide the machine slide, remove heating element quickly and join the pipes (by putting both parts of the slide together).
14. The pipes are fused with the required welding pressure and cooled down under pressure.
15. The welded connection can be unclamped - the welding process is finished.

Additionally please follow the instructions given in the operating manual of the welding machine and observe guideline DVS 2207, part 11.

### Important Note

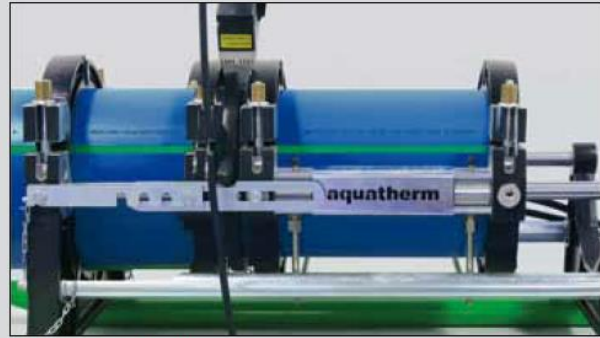
1. The welding machines have to be suitable for the welding of pipes with a diameter/wall thickness ratio of up to SDR 7.4

aquatherm recommends the following manufacturers of welding machines for butt welding:

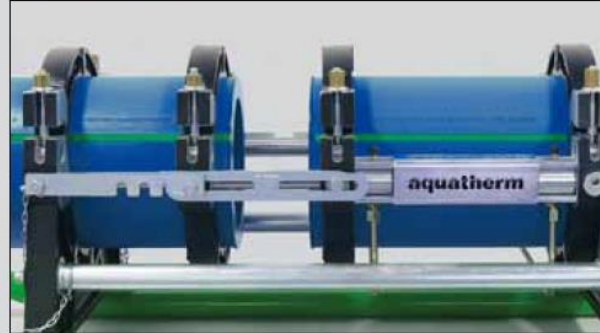
Company Ritmo  
Company Rothenberger  
Company Widos

2. For hydraulically operated welding machines, the real manometer pressure has to be calculated in consideration of the hydraulic piston area.

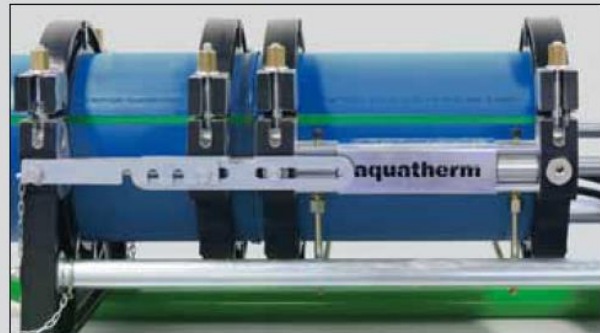
This value can be taken from the respective operating manuals.



Positioning of heating element



Divide the machine slide, remove heating element



Unclamp and work on...