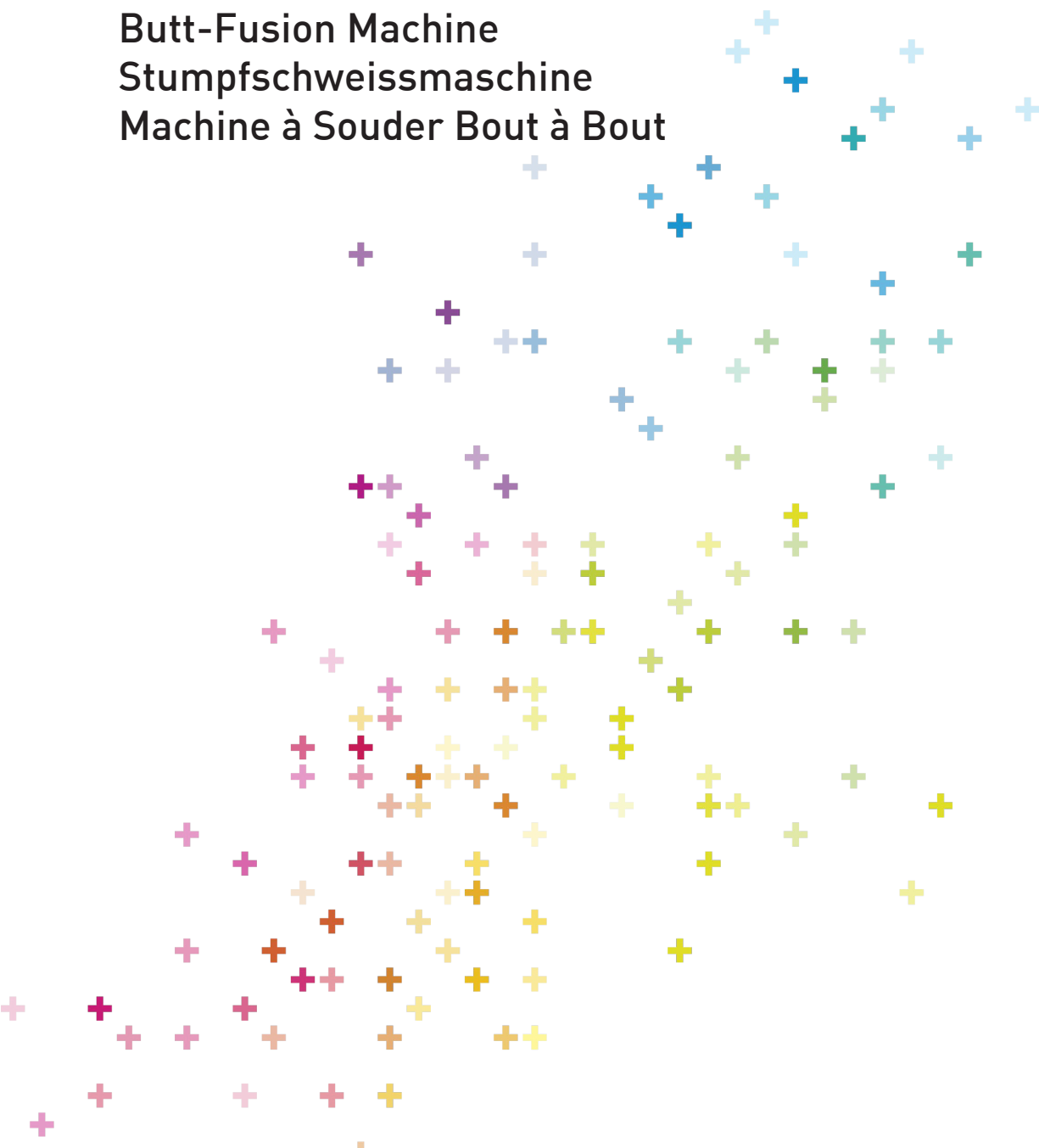


Welding Table

Schweiss-Tabelle
Table de Soudage

TOP - ECOS 500

Butt-Fusion Machine
Stumpfschweissmaschine
Machine à Souder Bout à Bout



1. Fusion data / Schweissdaten / Param. de soudage

1.1 Heating element butt fusion of PE Heizelement-Stumpfschweissen von PE Soudage bout à bout pour PE

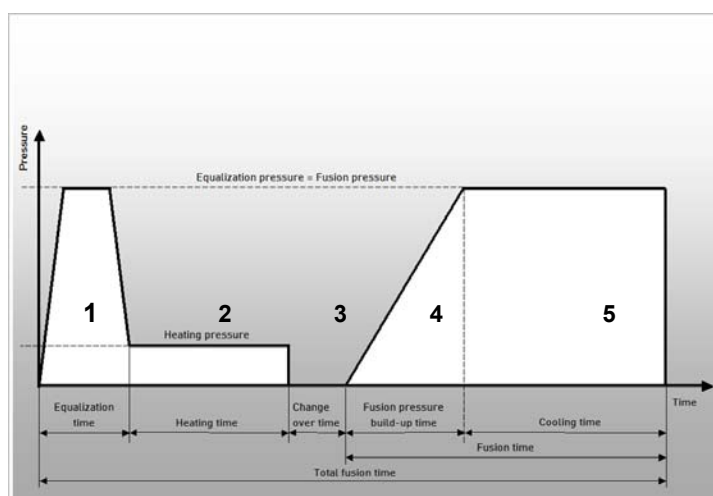
Fusion chart according to DVS 2207-1
Schweisstabelle entsprechend DVS 2207-1
Table de Soudage conformément aux DVS 2207-1

Heating element temperature: $220^{\circ}\text{C} \pm 10^{\circ}\text{C}$
Heizelementtemperatur : $220^{\circ}\text{C} \pm 10^{\circ}\text{C}$
Température de l'élément chauffant: $220^{\circ}\text{C} \pm 10^{\circ}\text{C}$

	1	2	3	4	5
Nominal wall thickness	Equalization Bead height on heating element after equalization	Heat soak Heat soak time = 10 x wall thickness	Change-over	Join Time until max pressure reached	Cooling Cooling time at fusion pressure
Nennwanddicke	Angleichen Wulsthöhe am Heizelement am Ende der Angleichzeit	Anwärmen Anwärmzeit = 10 x Wanddicke	Umstellen	Fügen Zeit bis zur vollen Druckaufbringung	Abkühlen Abkühlzeit unter Fügedruck
Épaisseur nominale du tuyau	Formation du bourrelet Épaisseur du bourrelet sur la plaque chauffante	Chauffage Temps de chauffe = 10 x épaisseur du tuyau	Transition	Augment. de la pression Temps pour atteindre la pression de soudage	Refroidissement Temps de refroidissement à la pression de soudage
	P1=0.15N/m ²	P2=0.01N/mm ²			P5=0.15N/mm ²
[mm]	Min. [mm]	[sec]	Max. [sec]	[sec]	Min. [min]
up to 4.5	0.5	45	5	5	See next table
4.5 – 7.0	1.0	45 – 70	5 – 6	5 – 6	
7.0 – 12.0	1.5	70 – 120	6 – 8	6 – 8	
12.0 – 19.0	2.0	120 – 190	8 – 10	8 – 11	
19.0 – 26.0	2.5	190 – 260	10 – 12	11 – 14	
26.0 – 37.0	3.0	260 – 370	12 – 16	14 – 19	
37.0 – 50.0	3.5	370 – 500	16 – 20	19 – 25	
50.0 – 70.0	4.0	500 – 700	20 – 25	25 – 35	
70.0 – 90.0	4.5	700 – 900	25 – 30	35	
90.0 – 110.0	5.0	900 – 1100	30 – 35	35	
110.0 – 130.0	5.5	1100 – 1300	35	35	

Nominal wall thickness	Cooling time at fusion pressure $p = 0.15 \text{ N/mm}^2 \pm 0.01$ depending on the ambient temperature (T_a)		
Nennwanddicke	Abkühlzeit unter Fügedruck $p = 0,15 \pm 0,01 \text{ N/mm}^2$ in Abhängigkeit von der Umgebungstemperatur (T_a)		
Épaisseur nominale du tuyau	Temps de refroidissement à la pression $p = 0,15 \pm 0,01 \text{ N/mm}^2$ en fonction de la température ambiante (T_a)		
mm	$T_a \leq 15^\circ\text{C}$ Min. [min]	$15^\circ\text{C} < T_a \leq 25^\circ\text{C}$ Min. [min]	$25^\circ\text{C} < T_a \leq 40^\circ\text{C}$ Min. [min]
up to 4.5	4.0	5.0	6.5
4.5 – 7.0	4.0 – 6.0	5.0 – 7.5	6.5 – 9.5
7.0 – 12.0	6.0 – 9.5	7.5 – 12	9.5 – 15.5
12.0 – 19.0	9.5 – 14	12 – 18	15.5 – 24
19.0 – 26.0	14 – 19	18 – 24	24 – 32
26.0 – 37.0	19 – 27	24 – 34	32 – 45
37.0 – 50.0	27 – 36	34 – 46	45 – 61
50.0 – 70.0	36 – 50	46 – 64	61 – 85
70.0 – 90.0	50 – 64	64 – 82	85 – 109
90.0 – 110.0	64 – 78	82 – 100	109 – 133
110.0 – 130.0	78 – 92	100 – 118	133 – 157

Process steps for heating element butt fusion
 Verfahrensschritte beim Heizelement-Stumpfschweissen
 Graphique temps/pression pour le soudage bout à bout



- t1 Equalization time / Angleichzeit / Temps de formation du bourrelet
- t2 Heating time / Anwärzeit / Temps de chauffe
- t3 Change over time / Umstellzeit / Temps de retrait de l'élément chauffant
- t4 Fusion pressure build-up time / Fügedruck Aufbauzeit / Temps de augmentation de la pression
- t5 Cooling time / Abkühlzeit / Temps de refroidissement

Heating element butt fusion of **PE** according to DVS 2207-1
 Heizelement-Stumpfschweissen von **PE** nach DVS 2207-1
 Soudage bout à bout par élément chauffant pour PE conformément aux DVS 2207-1

Ø	Outside pipe diameter	Rohr - Aussendurchmesser	Diamètre extérieur du tuyau
e	Wall thickness	Wanddicke	Épaisseur nominale du tuyau
	Fusion surface	Schweisfläche	Surface de soudage
P1	Equalization pressure	Angleich Druck	Pression de formation du bourrelet
P2	Heating pressure	Anwärmdruck	Pression de chauffe
P5	Fusion pressure	Fügedruck	Pression de soudage
Ta	Ambient Temperature	Umgebungstemperatur	Température ambiante

Ø: Pipe outer diameter		mm	200	225	250	280	315	355	400	450	500	
SDR 41	e: Wall thickness	mm	4,9	5,5	6,2	6,9	7,7	8,7	9,8	11,0	12,3	
	A: Fusion surface	mm ²	2990	3784	4749	5920	7418	9421	11961	15138	18846	
	p1/p5: Equalization/fusion pressure	bar	3	4	5	6	8	10	13	16	20	
	Bead size	mm	1,0	1,0	1,0	1,0	1,5	1,5	1,5	1,5	2,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	1	1	
	t2: Heating time	sec	49	55	62	69	77	87	98	110	123	
	t3: Change over time	sec	5	5	6	6	6	7	7	8	8	
	t4: Pressure build-up time	sec	5	5	6	6	6	7	7	8	8	
	t5: Cooling time	Ta <= 40°C	min	7	8	9	9	10	11	13	14	16
		15°C < Ta <= 25°C	min	5	6	7	7	8	9	10	11	12
Ta <= 15°C		min	4	5	5	6	6	7	8	9	10	

PE (DVS 2207-1)

		mm	200	225	250	280	315	355	400	450	500	
SDR 33	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	6,2	6,9	7,7	8,6	9,7	10,9	12,3	13,8	15,3	
	A: Fusion surface	mm ²	3775	4728	5861	7333	9304	11783	14981	18911	23298	
	p1/p5: Equalization/fusion pressure	bar	4	5	6	8	10	13	16	20	25	
	Bead size	mm	1,0	1,0	1,5	1,5	1,5	1,5	2,0	2,0	2,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	1	2	
	t2: Heating time	sec	62	69	77	86	97	109	123	138	153	
	t3: Change over time	sec	6	6	6	7	7	8	8	9	9	
	t4: Pressure build-up time	sec	6	6	6	7	7	8	8	9	9	
	t5: Cooling time	Ta <= 40°C	min	9	9	10	11	13	14	16	18	20
		15°C < Ta <= 25°C	min	7	7	8	9	10	11	12	14	15
Ta <= 15°C		min	5	6	6	7	8	9	10	11	12	

		mm	200	225	250	280	315	355	400	450	500	
SDR 26	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	7,7	8,6	9,6	10,7	12,1	13,6	15,3	17,2	19,1	
	A: Fusion surface	mm ²	4647	5847	7261	9053	11528	14587	18491	23387	28856	
	p1/p5: Equalization/fusion pressure	bar	5	6	8	10	12	15	20	25	31	
	Bead size	mm	1,5	1,5	1,5	1,5	2,0	2,0	2,0	2,0	2,5	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	2	2	
	t2: Heating time	sec	77	86	96	107	121	136	153	172	191	
	t3: Change over time	sec	6	7	7	7	8	8	9	9	10	
	t4: Pressure build-up time	sec	6	7	7	7	8	9	9	10	11	
	t5: Cooling time	Ta <= 40°C	min	10	11	13	14	16	17	20	22	24
		15°C < Ta <= 25°C	min	8	9	10	11	12	13	15	16	18
Ta <= 15°C		min	6	7	8	9	10	11	12	13	14	

		mm	200	225	250	280	315	355	400	450	500	
SDR 22	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	9,1	10,3	11,4	12,8	14,4	16,2	18,2	20,5	22,8	
	A: Fusion surface	mm ²	5452	6947	8519	10745	13599	17243	21809	27603	34181	
	p1/p5: Equalization/fusion pressure	bar	6	7	9	11	14	18	23	29	36	
	Bead size	mm	1,5	1,5	1,5	2,0	2,0	2,0	2,0	2,5	2,5	
	p2: Heating pressure	bar	1	1	1	1	1	1	2	2	2	
	t2: Heating time	sec	91	103	114	128	144	162	182	205	228	
	t3: Change over time	sec	7	7	8	8	9	9	10	10	11	
	t4: Pressure build-up time	sec	7	7	8	8	9	10	11	12	13	
	t5: Cooling time	Ta <= 40°C	min	12	13	15	16	18	21	23	26	28
		15°C < Ta <= 25°C	min	9	10	11	13	14	16	17	19	21
Ta <= 15°C		min	7	8	9	10	11	12	13	15	17	

		mm	200	225	250	280	315	355	400	450	500	
SDR 21	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	9,6	10,8	11,9	13,4	15,0	16,9	19,1	21,5	23,9	
	A: Fusion surface	mm ²	5742	7268	8905	11223	14137	17956	22856	28943	35748	
	p1/p5: Equalization/fusion pressure	bar	6	8	9	12	15	19	24	31	38	
	Bead size	mm	1,5	1,5	1,5	2,0	2,0	2,0	2,5	2,5	2,5	
	p2: Heating pressure	bar	1	1	1	1	1	1	2	2	3	
	t2: Heating time	sec	96	108	119	134	150	169	191	215	239	
	t3: Change over time	sec	7	8	8	8	9	9	10	11	11	
	t4: Pressure build-up time	sec	7	8	8	9	9	10	11	12	13	
	t5: Cooling time	Ta <= 40°C	min	13	14	15	17	19	21	24	27	30
		15°C < Ta <= 25°C	min	10	11	12	13	15	16	18	20	22
Ta <= 15°C		min	8	9	9	10	11	13	14	16	18	

PE (DVS 2207-1)

		mm	200	225	250	280	315	355	400	450	500	
SDR 17,6	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	11,4	12,8	14,2	15,9	17,9	20,1	22,7	25,5	28,4	
	A: Fusion surface	mm ²	6734	8523	10522	13199	16705	21148	26937	34007	42089	
	p1/p5: Equalization/fusion pressure	bar	7	9	11	14	18	22	29	36	45	
	Bead size	mm	1,5	2,0	2,0	2,0	2,0	2,5	2,5	2,5	3,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	2	2	3	
	t2: Heating time	sec	114	128	142	159	179	201	227	255	284	
	t3: Change over time	sec	8	8	9	9	10	10	11	12	13	
	t4: Pressure build-up time	sec	8	8	9	10	11	11	13	14	15	
	t5: Cooling time	Ta <= 40°C	min	15	16	18	20	23	25	28	31	35
		15°C < Ta <= 25°C	min	11	13	14	15	17	19	21	24	26
Ta <= 15°C		min	9	10	11	12	13	15	17	19	21	

		mm	200	225	250	280	315	355	400	450	500	
SDR 17	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	11,9	13,4	14,8	16,6	18,7	21,1	23,7	26,7	29,7	
	A: Fusion surface	mm ²	7032	8908	10936	13736	17407	22133	28018	35507	43881	
	p1/p5: Equalization/fusion pressure	bar	7	9	12	15	18	23	30	38	47	
	Bead size	mm	1,5	2,0	2,0	2,0	2,0	2,5	2,5	3,0	3,0	
	p2: Heating pressure	bar	1	1	1	1	1	2	2	3	3	
	t2: Heating time	sec	119	134	148	166	187	211	237	267	297	
	t3: Change over time	sec	8	8	9	9	10	11	11	12	13	
	t4: Pressure build-up time	sec	8	9	9	10	11	12	13	14	16	
	t5: Cooling time	Ta <= 40°C	min	15	17	19	21	24	26	29	33	36
		15°C < Ta <= 25°C	min	12	13	14	16	18	20	22	25	27
Ta <= 15°C		min	9	10	11	12	14	16	17	20	22	

		mm	200	225	250	280	315	355	400	450	500	
SDR 13,6	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	14,7	16,6	18,4	20,6	23,2	26,1	29,4	33,1	36,8	
	A: Fusion surface	mm ²	8561	10868	13376	16779	21236	26971	34242	43338	53504	
	p1/p5: Equalization/fusion pressure	bar	9	12	14	18	23	29	36	46	57	
	Bead size	mm	2,0	2,0	2,0	2,5	2,5	3,0	3,0	3,0	3,0	
	p2: Heating pressure	bar	1	1	1	1	2	2	2	3	4	
	t2: Heating time	sec	147	166	184	206	232	261	294	331	368	
	t3: Change over time	sec	9	9	10	10	11	12	13	15	16	
	t4: Pressure build-up time	sec	9	10	11	12	13	14	16	17	19	
	t5: Cooling time	Ta <= 40°C	min	19	21	23	26	29	32	36	40	45
		15°C < Ta <= 25°C	min	14	16	17	19	22	24	27	30	34
Ta <= 15°C		min	11	12	14	15	17	19	21	24	27	

		mm	200	225	250	280	315	355	400	450	500	
SDR 11	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	18,2	20,5	22,7	25,4	28,6	32,2	36,3	40,9	45,4	
	A: Fusion surface	mm ²	10385	13144	16227	20316	25762	32654	41476	52576	64839	
	p1/p5: Equalization/fusion pressure	bar	11	14	17	22	27	35	44	56	69	
	Bead size	mm	2,0	2,5	2,5	2,5	3,0	3,0	3,0	3,5	3,5	
	p2: Heating pressure	bar	1	1	1	1	2	2	3	4	5	
	t2: Heating time	sec	182	205	227	254	286	322	363	409	454	
	t3: Change over time	sec	10	10	11	12	13	14	16	17	19	
	t4: Pressure build-up time	sec	11	12	13	14	15	17	19	21	23	
	t5: Cooling time	Ta <= 40°C	min	23	26	28	31	35	39	44	50	55
		15°C < Ta <= 25°C	min	17	19	21	23	26	30	33	38	42
Ta <= 15°C		min	13	15	17	19	21	24	26	30	33	

PE (DVS 2207-1)

		mm	200	225	250	280	315	355	400	450	500	
SDR 9	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	22,4	25,2	27,9	31,3	35,2	39,7	44,7	50,3	55,8	
	A: Fusion surface	mm ²	12498	15818	19467	24455	30941	39325	49894	63161	77869	
	p1/p5: Equalization/fusion pressure	bar	13	17	21	26	33	42	53	67	83	
	Bead size	mm	2,5	2,5	3,0	3,0	3,0	3,5	3,5	4,0	4,0	
	p2: Heating pressure	bar	1	1	1	2	2	3	4	4	6	
	t2: Heating time	sec	224	252	279	313	352	397	447	503	558	
	t3: Change over time	sec	11	12	13	14	15	17	18	20	21	
	t4: Pressure build-up time	sec	12	14	15	16	18	20	23	25	28	
	t5: Cooling time	Ta <= 40°C	min	28	31	34	38	43	48	54	61	68
		15°C < Ta <= 25°C	min	21	23	26	29	32	36	41	46	51
		Ta <= 15°C	min	16	18	20	23	26	29	32	36	40

		mm	200	225	250	280	315	355	400	450	500	
SDR 7,4	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	27,4	30,8	34,2	38,3	43,1	48,5	54,7	61,5	68,3	
	A: Fusion surface	mm ²	14857	18791	23186	29082	36816	46701	59338	75061	92630	
	p1/p5: Equalization/fusion pressure	bar	16	20	25	31	39	50	63	80	98	
	Bead size	mm	3,0	3,0	3,0	3,5	3,5	3,5	4,0	4,0	4,0	
	p2: Heating pressure	bar	1	1	2	2	3	3	4	5	7	
	t2: Heating time	sec	274	308	342	383	431	485	547	615	683	
	t3: Change over time	sec	13	14	15	16	18	20	21	23	25	
	t4: Pressure build-up time	sec	15	16	18	20	22	24	27	31	34	
	t5: Cooling time	Ta <= 40°C	min	34	38	42	47	53	59	67	75	83
		15°C < Ta <= 25°C	min	25	28	31	35	40	45	50	56	62
		Ta <= 15°C	min	20	22	25	28	31	35	39	44	49

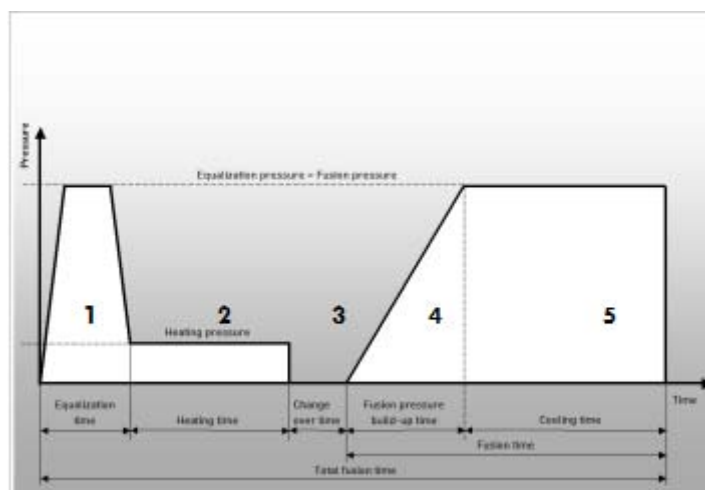
Heating element butt fusion of PP Heizelement-Stumpfschweissen von PP Soudage bout à bout pour PP

Fusion chart according to DVS 2207-11
Schweisstabelle entsprechend DVS 2207-11
Table de Soudage conformément aux DVS 2207-11

	1	2	3	4	5
Nominal wall thickness	Equalization Bead height on heating element after equalization	Heat soak Heat soak time	Change-over	Join Time until max pressure reached	Cooling Cooling time at fusion pressure
Nennwanddicke	Angleichen Wulsthöhe am Heizelement am Ende der Angleichzeit	Anwärmen Anwärmzeit	Umstellen	Fügen Zeit bis zur vollen Druckaufbringung	Abkühlen Abkühlzeit unter Fügedruck
Épaisseur nominale du tuyau	Formation du bourrelet Épaisseur du bourrelet sur la plaque chauffante	Chauffage Temps de chauffe	Transition	Augment. de la pression Temps pour atteindre la pression de soudage	Refroidissement Temps de refroidissement à la pression de soudage
	P1=0.10N/mm ²	P2=0.01N/mm ²			P5=0.10N/mm ²
[mm]	Min. [mm]	[sec]	Max. [sec]	[sec]	Min. [min]
Fino a 4.5	0.5	up to 53	5	6	6
4.5 – 7.0	0.5	53 – 81	5 – 6	6 – 7	See next table
7.0 – 12.0	1.0	81 – 135	6 – 7	7 – 11	
12.0 – 19.0	1.0	135 – 206	7 – 9	11 – 17	
19.0 – 26.0	1.5	206 – 271	9 – 11	17 – 22	
26.0 – 37.0	2.0	271 – 362	11 – 14	22 – 32	
37.0 – 50.0	2.5	362 – 450	14 – 17	32 – 43	
50.0 – 70.0	3.0	450 – 546	17 – 22	43	

Nominal wall thickness	Cooling time at fusion pressure $p = 0.10 \text{ N/mm}^2 \pm 0.01$ depending on the ambient temperature (T_a)		
Nennwanddicke	Abkühlzeit unter Fügedruck $p = 0,10 \pm 0,01 \text{ N/mm}^2$ in Abhängigkeit von der Umgebungstemperatur (T_a)		
Épaisseur nominale du tuyau	Temps de refroidissement à la pression $p = 0,10 \pm 0,01 \text{ N/mm}^2$ en fonction de la température ambiante (T_a)		
mm	$T_a \leq 15^\circ\text{C}$ Min. [min]	$15^\circ\text{C} < T_a \leq 25^\circ\text{C}$ Min. [min]	$25^\circ\text{C} < T_a \leq 40^\circ\text{C}$ Min. [min]
up to 4.5	4.0	5.0	6.5
4.5 – 7.0	4.0 – 6.0	5.0 – 7.5	6.5 – 9.5
7.0 – 12.0	6.0 – 9.5	7.5 – 12	9.5 – 15.5
12.0 – 19.0	9.5 – 14	12 – 18	15.5 – 24
19.0 – 26.0	14 – 19	18 – 24	24 – 32
26.0 – 37.0	19 – 27	24 – 34	32 – 45
37.0 – 50.0	27 – 36	34 – 46	45 – 61
50.0 – 70.0	36 – 50	46 – 64	61 – 85

Process steps for heating element butt fusion
 Verfahrensschritte beim Heizelement-Stumpfschweissen
 Graphique temps/pression pour le soudage bout à bout



t1 Equalization time / Angleichzeit / Temps de formation du bourrelet

t2 Heating time / Anwärzeit / Temps de chauffe

t3 Change over time / Umstellzeit / Temps de retrait de l'élément chauffant

t4 Fusion pressure build-up time / Fügedruck Aufbauzeit / Temps de augmentation de la pression

t5 Cooling time / Abkühlzeit / Temps de refroidissement

Heating element butt fusion of **PP** according to DVS 2207-11

Heizelement-Stumpfschweissen von **PP** nach DVS 2207-11

Soudage bout à bout par élément chauffant pour **PP** conformément aux DVS 2207-11

Ø	Outside pipe diameter	Rohr - Aussendurchmesser	Diamètre extérieur du tuyau
e	Wall thickness	Wanddicke	Épaisseur nominale du tuyau
A	Fusion surface	Schweissfläche	Surface de soudage
P1	Equalization pressure	Angleich Druck	Pression de formation du bourrelet
P2	Heating pressure	Anwärmdruck	Pression de chauffe
P5	Fusion pressure	Fügedruck	Pression de soudage

Ø: Pipe outer diameter		mm	200	225	250	280	315	355	400	450	500	
SDR 41	e: Wall thickness	mm	4,9	5,5	6,2	6,9	7,7	8,7	9,8	11,0	12,3	
	A: Fusion surface	mm ²	2990	3784	4749	5920	7418	9421	11961	15138	18846	
	p1/p5: Equalization/fusion pressure	bar	2	3	3	4	5	7	8	11	13	
	Bead size	mm	0,5	0,5	0,5	0,5	1,0	1,0	1,0	1,0	1,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	1	1	
	t2: Heating time	sec	57	64	72	80	88	99	111	124	138	
	t3: Change over time	sec	5	5	6	6	6	6	7	7	7	
	t4: Pressure build-up time	sec	6	6	7	7	8	8	9	10	11	
	t5: Cooling time	Ta <= 40°C	min	7	8	9	9	10	11	13	14	16
		15°C < Ta <= 25°C	min	5	6	7	7	8	9	10	11	12
		Ta <= 15°C	min	4	5	5	6	6	7	8	9	10

Ø: Pipe outer diameter		mm	200	225	250	280	315	355	400	450	500	
SDR 33	e: Wall thickness	mm	6,2	6,9	7,7	8,6	9,7	10,9	12,3	13,8	15,3	
	A: Fusion surface	mm ²	3775	4728	5861	7333	9304	11783	14981	18911	23298	
	p1/p5: Equalization/fusion pressure	bar	3	3	4	5	7	8	11	13	16	
	Bead size	mm	0,5	0,5	1,0	1,0	1,0	1,0	1,0	1,0	1,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	1	2	
	t2: Heating time	sec	72	80	89	98	110	123	138	153	168	
	t3: Change over time	sec	6	6	6	6	7	7	7	8	8	
	t4: Pressure build-up time	sec	7	7	8	8	9	10	11	13	14	
	t5: Cooling time	Ta <= 40°C	min	9	9	10	11	13	14	16	18	20
		15°C < Ta <= 25°C	min	7	7	8	9	10	11	12	14	15
		Ta <= 15°C	min	5	6	6	7	8	9	10	11	12

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		mm	200	225	250	280	315	355	400	450	500	
SDR 26	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	7,7	8,6	9,6	10,7	12,1	13,6	15,3	17,2	19,1	
	A: Fusion surface	mm ²	4647	5847	7261	9053	11528	14587	18491	23387	28900	
	p1/p5: Equalization/fusion pressure	bar	3	4	5	6	8	10	13	17	20	
	Bead size	mm	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,5	
	p2: Heating pressure	bar	1	1	1	1	1	1	1	2	2	
	t2: Heating time	sec	88	98	109	121	136	151	168	188	207	
	t3: Change over time	sec	6	6	7	7	7	7	8	8	9	
	t4: Pressure build-up time	sec	8	8	9	10	11	12	14	15	17	
	t5: Cooling time	Ta <= 40°C	min	10	11	13	14	16	17	20	22	24
		15°C < Ta <= 25°C	min	8	9	10	11	12	13	15	16	18
		Ta <= 15°C	min	6	7	8	9	10	11	12	13	14

		mm	200	225	250	280	315	355	400	450	500	
SDR 17,6	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	11,4	12,8	14,2	15,9	17,9	20,1	22,7	25,5	28,4	
	A: Fusion surface	mm ²	6734	8523	10522	13199	16705	21148	26937	34007	42089	
	p1/p5: Equalization/fusion pressure	bar	5	6	7	9	12	15	19	24	30	
	Bead size	mm	1,0	1,0	1,0	1,0	1,0	1,5	1,5	1,5	2,0	
	p2: Heating pressure	bar	1	1	1	1	1	1	2	2	3	
	t2: Heating time	sec	128	143	157	175	195	216	241	266	291	
	t3: Change over time	sec	7	7	8	8	9	9	10	11	12	
	t4: Pressure build-up time	sec	10	12	13	14	16	18	20	22	24	
	t5: Cooling time	Ta <= 40°C	min	15	16	18	20	23	25	28	31	35
		15°C < Ta <= 25°C	min	11	13	14	15	17	19	21	24	26
		Ta <= 15°C	min	9	10	11	12	13	15	17	19	21

		mm	200	225	250	280	315	355	400	450	500	
SDR 11	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	18,2	20,5	22,7	25,4	28,6	32,2	36,3	40,9	45,4	
	A: Fusion surface	mm ²	10385	13144	16227	20316	25762	32654	41476	52576	64839	
	p1/p5: Equalization/fusion pressure	bar	7	9	11	14	18	23	29	37	46	
	Bead size	mm	1,0	1,5	1,5	1,5	2,0	2,0	2,0	2,5	2,5	
	p2: Heating pressure	bar	1	1	1	1	2	2	3	4	5	
	t2: Heating time	sec	198	220	241	265	293	322	356	388	419	
	t3: Change over time	sec	9	9	10	11	12	13	14	15	16	
	t4: Pressure build-up time	sec	16	18	20	22	24	28	31	35	39	
	t5: Cooling time	Ta <= 40°C	min	23	26	28	31	35	39	44	50	55
		15°C < Ta <= 25°C	min	17	19	21	23	26	30	33	38	42
		Ta <= 15°C	min	13	15	17	19	21	24	26	30	33

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		mm	200	225	250	280	315	355	400	450	500	
SDR 9	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	22,4	25,2	27,9	31,3	35,2	39,7	44,7	50,3	-	
	A: Fusion surface	mm ²	12498	15818	19467	24455	30941	39325	49894	63161	-	
	p1/p5: Equalization/fusion pressure	bar	9	11	14	17	22	28	35	45	-	
	Bead size	mm	1,5	1,5	2,0	2,0	2,0	2,5	2,5	3,0	-	
	p2: Heating pressure	bar	1	1	1	2	2	3	4	4	-	
	t2: Heating time	sec	238	264	287	315	347	380	414	451	-	
	t3: Change over time	sec	10	11	12	12	14	15	16	17	-	
	t4: Pressure build-up time	sec	19	21	24	27	30	34	39	43	-	
	t5: Cooling time	Ta <= 40°C	min	28	31	34	38	43	48	54	61	-
		15°C < Ta <= 25°C	min	21	23	26	29	32	36	41	46	-
		Ta <= 15°C	min	16	18	20	23	26	29	32	36	-

		mm	200	225	250	280	315	355	400	450	500	
SDR 7,4	Ø: Pipe outer diameter	mm	200	225	250	280	315	355	400	450	500	
	e: Wall thickness	mm	27,4	30,8	34,2	38,3	43,1	48,5	54,7	-	-	
	A: Fusion surface	mm ²	14857	18791	23186	29082	36816	46701	59338	-	-	
	p1/p5: Equalization/fusion pressure	bar	11	13	16	21	26	33	42	-	-	
	Bead size	mm	2,0	2,0	2,0	2,5	2,5	2,5	3,0	-	-	
	p2: Heating pressure	bar	1	1	2	2	3	3	4	-	-	
	t2: Heating time	sec	283	311	339	371	403	440	473	-	-	
	t3: Change over time	sec	11	12	13	14	15	17	18	-	-	
	t4: Pressure build-up time	sec	23	26	29	33	37	42	43	-	-	
	t5: Cooling time	Ta <= 40°C	min	34	38	42	47	53	59	67	-	-
		15°C < Ta <= 25°C	min	25	28	31	35	40	45	50	-	-
		Ta <= 15°C	min	20	22	25	28	31	35	39	-	-

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