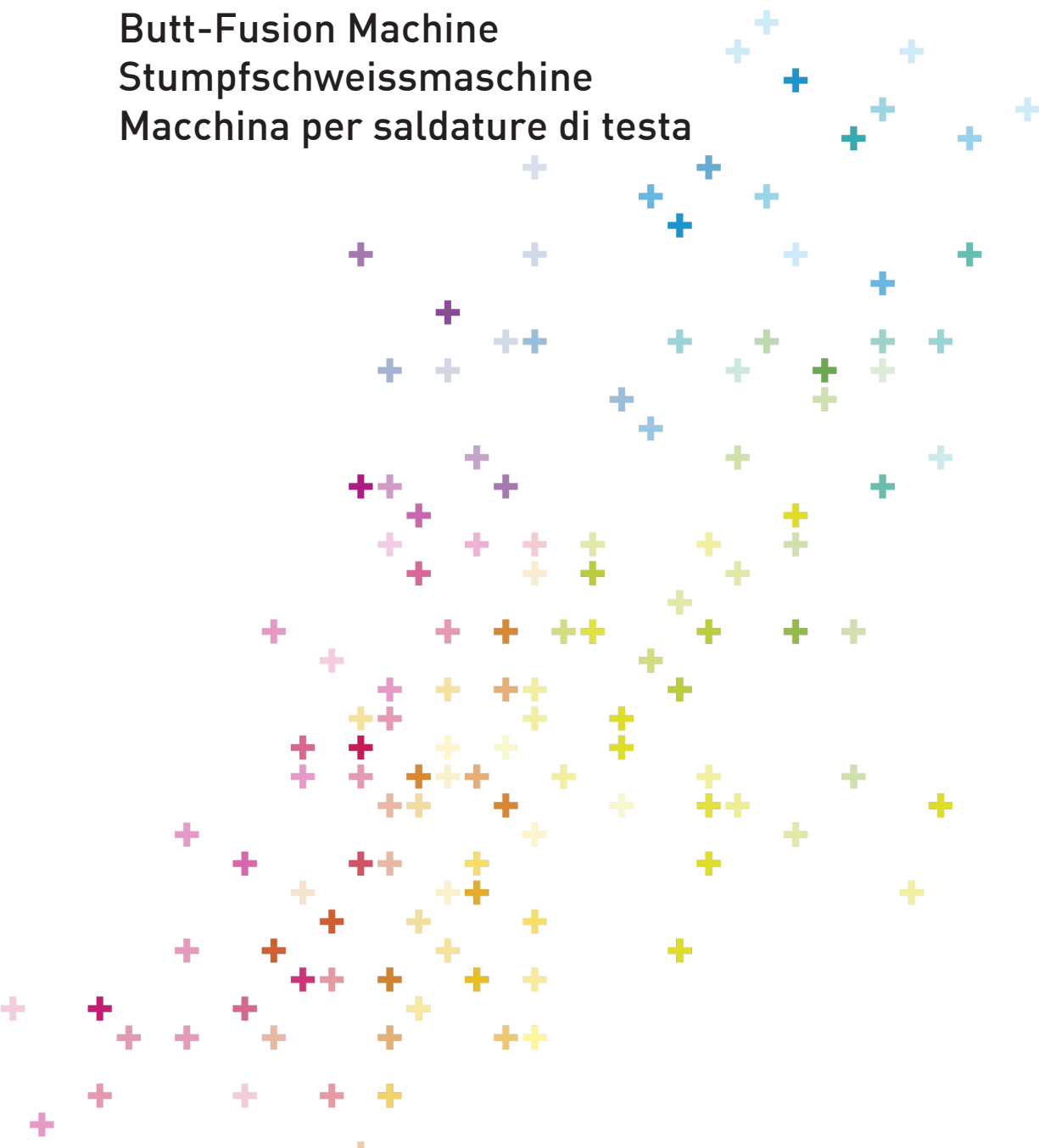


# Welding Table

Schweiss-Tabelle  
Tabella di Saldatura

TM250

Butt-Fusion Machine  
Stumpfschweissmaschine  
Macchina per saldature di testa





# 1. Fusion data / Schweissdaten / Dati di saldatura

## 1.1 Heating element butt-fusion of PE

### Heizelement-Stumpfschweissen von PE

### Saldatura di testa con termoelemento per PE

Fusion chart according to DVS 2207-1

Schweisstabelle entsprechend DVS 2207-1

Tabella di saldatura in conformità di DVS 2207-1

Heating element temperature: 220°C ± 10°C

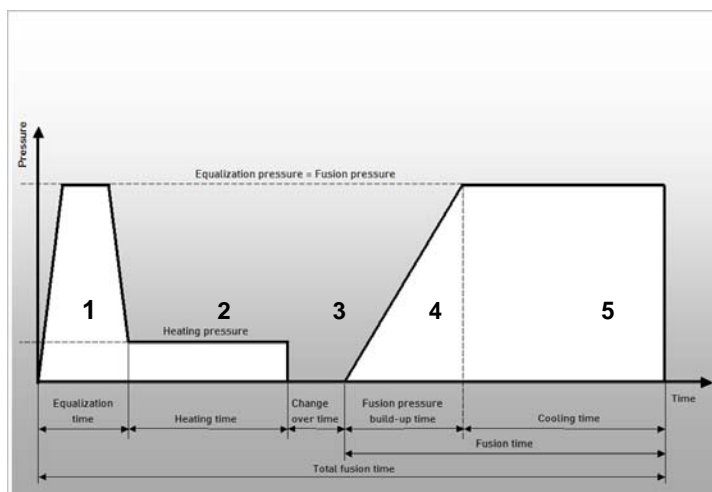
Heizelementtemperatur : 220°C ± 10°C

Temperatura termoelemento: 220°C ± 10°C

	1	2	3	4	5
<b>Nominal wall thickness</b>	<b>Equalization</b> Bead height on heating element after equalization	<b>Heat soak</b> Heat soak time = 10 x wall thickness	<b>Change-over</b>	<b>Join</b> Time until max pressure reached	<b>Cooling</b> Cooling time at fusion pressure
<b>Nennwanddicke</b>	<b>Angleichen</b> Wulsthöhe am Heizelement am Ende der Angleichzeit	<b>Anwärmen</b> Anwärmzeit = 10 x Wanddicke	<b>Umstellen</b>	<b>Fügen</b> Zeit bis zur vollen Druckaufbringung	<b>Abkühlen</b> Abkühlzeit unter Fügedruck
<b>Spessore parete nominale</b>	<b>Preriscaldamento</b> Altezza bordino sul termoelemento alla fine del preriscaldamento	<b>Riscaldamento</b> Tempo di riscaldamento = 10 x spessore parete	<b>Rimozione termoelemento</b>	<b>Salita in pressione</b> Tempo di raggiungimento della pressione di saldatura	<b>Raffreddamento</b> Tempo di raffreddamento alla pressione di saldatura
	P1=0.15N/mm <sup>2</sup>	P2=0.01N/mm <sup>2</sup>			P5=0.15N/mm <sup>2</sup>
[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	

<b>Nominal wall thickness</b>	<b>Cooling time at fusion pressure <math>p = 0.15 \text{ N/mm}^2 \pm 0.01</math> depending on the ambient temperature (<math>T_a</math>)</b>		
<b>Nennwanddicke</b>	<b>Abkühlzeit unter Fügedruck <math>p = 0,15 \pm 0,01 \text{ N/mm}^2</math> in Abhängigkeit von der Umgebungstemperatur (<math>T_a</math>)</b>		
<b>Spessore parete nominale</b>	<b>Tempo di raffreddamento alla pressione <math>p = 0,15 \pm 0,01 \text{ N/mm}^2</math> in funzione della temperatura ambiente (<math>T_a</math>)</b>		
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  
 Diagramma tempi – pressioni per saldatura di testa



t1 Equalization time / Angleichzeit / Tempo di adattamento

t2 Heating time / Anwärmzeit / Tempo di riscaldamento

t3 Change over time / Umstellzeit / Tempo di rimozione

t4 Fusion pressure build-up time / Fügedruck Aufbauzeit / Salita in pressione

t5 Cooling time / Abkühlzeit / Tempo di raffreddamento

Heating element butt fusion of **PE** according to DVS 2207-1  
 Heizelement-Stumpfschweissen von **PE** nach DVS 2207-1 /  
 Saldatura di testa con termoelemento per **PE** in conformità alle DVS 2207-1

Ø	Outside pipe diameter	Rohr - Aussendurchmesser	Diametro esterno del tubo
e	Wall thickness	Wanddicke	Spessore nominale parete
A	Fusion surface	Schweissfläche	Superficie di saldatura
P1	Equalization pressure	Angleich Druck	Pressione Preriscaldamento
P2	Heating pressure	Anwärmdruck	Pressione di riscaldamento
P5	Fusion pressure	Fügedruck	Pressione di saldatura
Ta	Ambient Temperature	Umgebungstemperatur	Temperatura ambiente

<b>SDR 41</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
	e: wall thickness	mm	-	-	-	3,1	3,5	4,0	4,4	4,9	5,5	6,2	
	A: Fusion surface	mm <sup>2</sup>	-	-	-	1187	1501	1960	2427	3003	3793	4749	
	P1&P5 : fusion pressure	bar	-	-	-	3	4	6	7	9	11	14	
	Bead / Wulst / Bordino	mm	-	-	-	0,5	0,5	0,5	0,5	1,0	1,0	1,0	
	P2: heating pressure	bar	-	-	-	1	1	1	1	1	1	1	
	t2: heating time	sec	-	-	-	31	35	40	44	49	55	62	
	t3: change over time	sec	-	-	-	5	5	5	5	5	5	6	
	t4: Pressure buildup time	sec	-	-	-	5	5	5	5	5	5	6	
	t5: Cooling time	Ta <= 40°C	min	-	-	-	7	7	7	7	7	8	9
		15°C < Ta <= 25°C	min	-	-	-	5	5	5	5	5	6	7
Ta <= 15°C		min	-	-	-	4	4	4	4	4	5	5	

<b>SDR 33</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
	e: wall thickness	mm	-	-	3,4	3,9	4,3	4,9	5,5	6,2	6,9	7,7	
	A: Fusion surface	mm <sup>2</sup>	-	-	1139	1484	1833	2388	3015	3775	4728	5861	
	P1&P5 : fusion pressure	bar	-	-	3	4	5	7	9	11	14	17	
	Bead / Wulst / Bordino	mm	-	-	0,5	0,5	0,5	1,0	1,0	1,0	1,0	1,5	
	P2: heating pressure	bar	-	-	1	1	1	1	1	1	1	1	
	t2: heating time	sec	-	-	34	39	43	49	55	62	69	77	
	t3: change over time	sec	-	-	5	5	5	5	5	6	6	6	
	t4: Pressure buildup time	sec	-	-	5	5	5	5	5	6	6	6	
	t5: Cooling time	Ta <= 40°C	min	-	-	7	7	7	7	8	9	9	10
		15°C < Ta <= 25°C	min	-	-	5	5	5	5	6	7	7	8
Ta <= 15°C		min	-	-	4	4	4	4	5	5	6	6	

**PE (DVS 2207-1)**

SDR 26	Ø	mm	75	90	110	125	140	160	180	200	225	250
	e: wall thickness	mm	-	-	4,2	4,8	5,4	6,2	6,9	7,7	8,6	9,6
	A: Fusion surface	mm <sup>2</sup>	-	-	1396	1813	2283	2996	3752	4652	5847	7250
	P1&P5 : fusion pressure	bar	-	-	4	5	7	9	11	14	17	21
	Bead / Wulst / Bordino	mm	-	-	0,5	1,0	1,0	1,0	1,0	1,5	1,5	1,5
	P2: heating pressure	bar	-	-	1	1	1	1	1	1	1	1
	t2: heating time	sec	-	-	42	48	54	62	69	77	86	96
	t3: change over time	sec	-	-	5	5	5	6	6	6	7	7
	t4: Pressure buildup time	sec	-	-	5	5	5	6	6	6	7	7
	t5: Cooling time	Ta <= 40°C	min	-	-	7	7	8	9	9	10	11
15°C < Ta <= 25°C		min	-	-	5	5	6	7	7	8	9	10
Ta <= 15°C		min	-	-	4	4	5	5	6	6	7	8

SDR 22	Ø	mm	75	90	110	125	140	160	180	200	225	250
	e: wall thickness	mm	-	4,1	5,0	5,7	6,4	7,3	8,2	9,1	10,3	11,4
	A: Fusion surface	mm <sup>2</sup>	-	1106	1649	2136	2686	3502	4426	5458	6947	8545
	P1&P5 : fusion pressure	bar	-	3	5	6	8	10	13	16	20	25
	Bead / Wulst / Bordino	mm	-	0,5	1,0	1,0	1,0	1,5	1,5	1,5	1,5	1,5
	P2: heating pressure	bar	-	1	1	1	1	1	1	1	1	2
	t2: heating time	sec	-	41	50	57	64	73	82	91	103	114
	t3: change over time	sec	-	5	5	5	6	6	6	7	7	8
	t4: Pressure buildup time	sec	-	5	5	5	6	6	6	7	7	8
	t5: Cooling time	Ta <= 40°C	min	-	7	7	8	9	10	11	12	13
15°C < Ta <= 25°C		min	-	5	6	6	7	8	9	9	10	11
Ta <= 15°C		min	-	4	4	5	6	6	7	7	8	9

SDR 21	Ø	mm	75	90	110	125	140	160	180	200	225	250
	e: wall thickness	mm	-	4,3	5,3	6,0	6,7	7,7	8,6	9,6	10,8	11,9
	A: Fusion surface	mm <sup>2</sup>	-	1158	1743	2243	2806	3684	4631	5742	7268	8901
	P1&P5 : fusion pressure	bar	-	3	5	7	8	11	14	17	21	26
	Bead / Wulst / Bordino	mm	-	0,5	1,0	1,0	1,0	1,5	1,5	1,5	1,5	1,5
	P2: heating pressure	bar	-	1	1	1	1	1	1	1	1	2
	t2: heating time	sec	-	43	53	60	67	77	86	96	108	119
	t3: change over time	sec	-	5	5	6	6	6	7	7	8	8
	t4: Pressure buildup time	sec	-	5	5	6	6	6	7	7	8	8
	t5: Cooling time	Ta <= 40°C	min	-	7	7	8	9	10	11	13	14
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	9

**PE (DVS 2207-1)**

<b>SDR 17.6</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
	e: wall thickness	mm	4,3	5,1	6,3	7,1	8,0	9,1	10,2	11,4	12,8	14,2	
	A: Fusion surface	mm <sup>2</sup>	947	1364	2037	2631	3300	4310	5455	6734	8523	10522	
	P1&P5 : fusion pressure	bar	3	4	6	8	10	13	16	20	25	31	
	Bead / Wulst / Bordino	mm	0,5	1,0	1,0	1,5	1,5	1,5	1,5	1,5	2,0	2,0	
	P2: heating pressure	bar	1	1	1	1	1	1	1	1	2	2	
	t2: heating time	sec	43	51	63	71	80	91	102	114	128	142	
	t3: change over time	sec	5	5	6	6	6	7	7	8	8	9	
	t4: Pressure buildup time	sec	5	5	6	6	6	7	7	8	8	9	
	t5: Cooling time	Ta <= 40°C	min	7	7	9	10	11	12	13	15	16	18
		15°C < Ta <= 25°C	min	5	6	7	8	8	9	10	11	13	14
Ta <= 15°C		min	4	4	5	6	7	7	8	9	10	11	

<b>SDR 17</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
	e: wall thickness	mm	4,4	5,3	6,5	7,4	8,2	9,4	10,6	11,8	13,2	14,7	
	A: Fusion surface	mm <sup>2</sup>	978	1409	2105	2718	3409	4453	5635	6957	8805	10871	
	P1&P5 : fusion pressure	bar	3	4	6	8	10	13	17	20	26	32	
	Bead / Wulst / Bordino	mm	0,5	1,0	1,0	1,5	1,5	1,5	1,5	1,5	2,0	2,0	
	P2: heating pressure	bar	1	1	1	1	1	1	1	1	2	2	
	t2: heating time	sec	44	53	65	74	82	94	106	118	132	147	
	t3: change over time	sec	5	5	6	6	6	7	7	8	8	9	
	t4: Pressure buildup time	sec	5	5	6	6	6	7	7	8	9	9	
	t5: Cooling time	Ta <= 40°C	min	7	7	9	10	11	12	14	15	17	19
		15°C < Ta <= 25°C	min	5	6	7	8	9	10	11	12	13	14
Ta <= 15°C		min	4	5	6	6	7	8	9	9	10	11	

<b>SDR 13.6</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
	e: wall thickness	mm	5,5	6,6	8,1	9,2	10,3	11,8	13,2	14,7	16,5	18,4	
	A: Fusion surface	mm <sup>2</sup>	1204	1734	2590	3344	4195	5479	6934	8561	10834	13376	
	P1&P5 : fusion pressure	bar	4	5	8	10	12	16	20	25	32	39	
	Bead / Wulst / Bordino	mm	1,0	1,0	1,5	1,5	1,5	1,5	2,0	2,0	2,0	2,0	
	P2: heating pressure	bar	1	1	1	1	1	1	1	2	2	3	
	t2: heating time	sec	55	66	81	92	103	118	132	147	165	184	
	t3: change over time	sec	5	6	6	7	7	8	8	9	9	10	
	t4: Pressure buildup time	sec	5	6	6	7	7	8	9	9	10	11	
	t5: Cooling time	Ta <= 40°C	min	8	9	11	12	13	15	17	19	21	23
		15°C < Ta <= 25°C	min	6	7	8	9	10	12	13	14	16	17
Ta <= 15°C		min	5	6	7	8	8	9	10	11	12	14	

**PE (DVS 2207-1)**

<b>SDR 11</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>
	e: wall thickness	mm	6,8	8,2	10,0	11,4	12,7	14,5	16,4	18,2	20,5	22,7
	A: Fusion surface	mm <sup>2</sup>	1460	2103	3142	4057	5089	6647	8412	10385	13144	16227
	P1&P5 : fusion pressure	bar	4	6	9	12	15	20	25	31	39	48
	Bead / Wulst / Bordino	mm	1,0	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	3	3
	t2: heating time	sec	68	82	100	114	127	145	164	182	205	227
	t3: change over time	sec	6	6	7	8	8	9	9	10	10	11
	t4: Pressure buildup time	sec	6	6	7	8	8	9	10	11	12	13
	t5: Cooling time											
	Ta <= 40°C	min	9	11	13	15	16	19	21	23	26	28
	15°C < Ta <= 25°C	min	7	9	10	11	13	14	16	17	19	21
	Ta <= 15°C	min	6	7	8	9	10	11	12	13	15	17

<b>SDR 9</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>
	e: wall thickness	mm	8,3	10,0	12,2	13,9	15,6	17,8	20,0	22,2	25,0	27,8
	A: Fusion surface	mm <sup>2</sup>	1745	2513	3754	4848	6082	7943	10053	12411	15708	19393
	P1&P5 : fusion pressure	bar	5	7	11	14	18	23	30	37	46	57
	Bead / Wulst / Bordino	mm	1,5	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	2	2	2	3	4
	t2: heating time	sec	83	100	122	139	156	178	200	222	250	278
	t3: change over time	sec	7	7	8	9	9	10	10	11	12	13
	t4: Pressure buildup time	sec	7	7	8	9	10	10	11	12	14	15
	t5: Cooling time											
	Ta <= 40°C	min	11	13	16	18	20	23	25	28	31	34
	15°C < Ta <= 25°C	min	9	10	12	14	15	17	19	21	23	26
	Ta <= 15°C	min	7	8	10	11	12	13	15	16	18	20

<b>SDR 7.4</b>	Ø	mm	<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>
	e: wall thickness	mm	10,1	12,2	14,9	16,9	18,9	21,6	24,3	27,0	30,4	33,8
	A: Fusion surface	mm <sup>2</sup>	2065	2974	4443	5737	7197	9400	11896	14687	18588	22948
	P1&P5 : fusion pressure	bar	6	9	13	17	21	28	35	43	55	67
	Bead / Wulst / Bordino	mm	1,5	2,0	2,0	2,0	2,0	2,5	2,5	3,0	3,0	3,0
	P2: heating pressure	bar	1	1	1	1	1	2	2	3	4	4
	t2: heating time	sec	101	122	149	169	189	216	243	270	304	338
	t3: change over time	sec	7	8	9	9	10	11	12	12	14	15
	t4: Pressure buildup time	sec	7	8	9	10	11	12	13	14	16	18
	t5: Cooling time											
	Ta <= 40°C	min	13	16	19	21	24	27	30	33	37	41
	15°C < Ta <= 25°C	min	10	12	14	16	18	20	23	25	28	31
	Ta <= 15°C	min	8	10	11	13	14	16	18	20	22	25

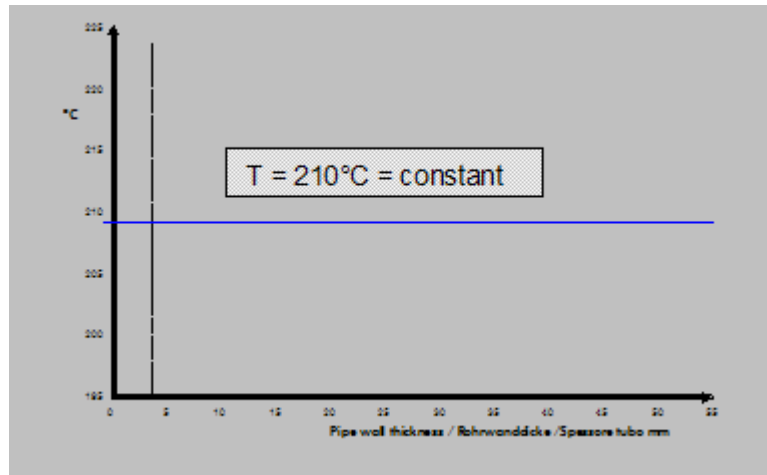


## 1.2 Heating element butt-fusion of PP Heizelement-Stumpfschweissen von PP Saldatura di testa con termoelemento per PP

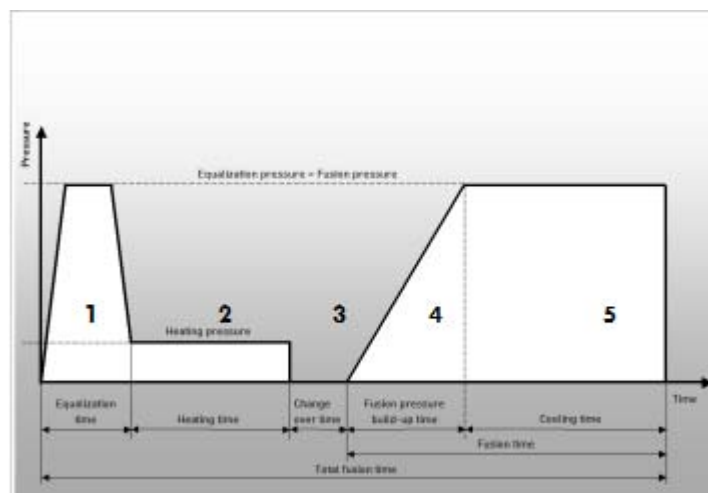
Fusion chart according to DVS 2207-11  
Schweisstabelle entsprechend DVS 2207-11  
Tabella di saldatura in conformità di DVS 2207-11

	1	2	3	4	5
<b>Nominal wall thickness</b>	<b>Equalization</b> Bead height on heating element after equalization	<b>Heat soak</b> Heat soak time = 10 x wall thickness	<b>Change-over</b>	<b>Join</b> Time until max pressure reached	<b>Cooling</b> Cooling time at fusion pressure
<b>Nennwanddicke</b>	<b>Angleichen</b> Wulsthöhe am Heizelement am Ende der Angleichzeit	<b>Anwärmen</b> Anwärmzeit = 10 x Wanddicke	<b>Umstellen</b>	<b>Fügen</b> Zeit bis zur vollen Druckaufbringung	<b>Abkühlen</b> Abkühlzeit unter Fügedruck
<b>Spessore parete nominale</b>	<b>Preriscaldamento</b> Altezza bordino sul termoelemento alla fine del preriscaldamento	<b>Riscaldamento</b> Tempo di riscaldamento = 10 x spessore parete	<b>Rimozione termoelemento</b>	<b>Salita in pressione</b> Tempo di raggiungimento della pressione di saldatura	<b>Raffreddamento</b> Tempo di raffreddamento alla pressione di saldatura
	P1=0.10N/mm <sup>2</sup>	P2=0.01N/mm <sup>2</sup>			P5=0.10N/mm <sup>2</sup>
[mm]	Min. [mm]	[sec]	Max. [sec]	[sec]	Min. [min]
Fino a 4.5	0.5	up to 135	5	6	6
4.5 – 7.0	0.5	135 – 175	5 – 6	6 – 7	6 – 12
7.0 – 12.0	1.0	175 – 245	6 – 7	7 – 11	12 – 20
12.0 – 19.0	1.0	245 – 330	7 – 9	11 – 17	20 – 30
19.0 – 26.0	1.5	330 – 400	9 – 11	17 – 22	30 – 40
26.0 – 37.0	2.0	400 – 485	11 – 14	22 – 32	40 – 55
37.0 – 50.0	2.5	485 – 560	14 – 17	32 – 43	55 – 70

Curve for standard values of heater temperatures in relation on pipe wall thickness  
Richtwertkurve für Heizelement-Temperaturen in Abhängigkeit der Rohrwanddicke  
Curva per determinare la temperatura del termoelemento in relazione della parete del tubo da saldare



Process steps for heating element butt fusion  
Verfahrensschritte beim Heizelement-Stumpfschweissen  
Diagramma tempi - pressioni per saldatura di testa



t1 Equalization time / Angleichzeit / Tempo di adattamento

t2 Heating time / Anwärmzeit / Tempo di riscaldamento

t3 Change over time / Umstellzeit / Tempo di rimozione

t4 Fusion pressure build-up time / Fügedruck Aufbauzeit / Salita in pressione

t5 Cooling time / Abkühlzeit / Tempo di raffreddamento

Heating element butt fusion of **PP** according to DVS 2207-11  
 Heizelement-Stumpfschweissen von **PP** nach DVS 2207-11  
 Saldatura di testa con termoelemento per **PP** in conformità alle DVS 2207-11

Ø	Outside pipe diameter	Rohr - Aussendurchmesser	Diametro esterno del tubo
e	Wall thickness	Wanddicke	Spessore nominale parete
A	Fusion surface	Schweissfläche	Superficie di saldatura
P1	Equalization pressure	Angleich Druck	Pressione Preriscaldamento
P2	Heating pressure	Anwärmdruck	Pressione di riscaldamento
P5	Fusion pressure	Fügedruck	Pressione di saldatura

		Ø	75	90	110	125	140	160	180	200	225	250
<b>S20</b> <b>SDR 41</b> <b>PN 2.5</b>	e: wall thickness	mm	-	-	-	-	-	4.0	4.4	4.9	5.5	6.2
	A: Fusion surface	mm <sup>2</sup>	-	-	-	-	-	1960	2427	3003	3792	4748
	P1&P5 : fusion pressure	bar	-	-	-	-	-	4	5	6	7	9
	Bead / Wulst / Bordino	mm	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5
	P2: heating pressure	bar	-	-	-	-	-	1	1	1	1	1
	t2: heating time	sec	-	-	-	-	-	120	132	141	151	162
	t3: change over time	sec	-	-	-	-	-	5	5	5	5	6
	t4: Pressure buildup time	sec	-	-	-	-	-	6	6	6	6	7
	t5: Cooling time	min	-	-	-	-	-	6	6	7	8	10

		Ø	75	90	110	125	140	160	180	200	225	250
<b>S 16</b> <b>SDR 33</b> <b>PN 3.2</b>	e: wall thickness	mm	-	-	-	-	4.3	4.9	5.5	6.2	6.9	7.7
	A: Fusion surface	mm <sup>2</sup>	-	-	-	-	1833	2387	3015	3775	4727	5861
	P1&P5 : fusion pressure	bar	-	-	-	-	4	5	6	7	9	11
	Bead / Wulst / Bordino	mm	-	-	-	-	0.5	0.5	0.5	0.5	0.5	1.0
	P2: heating pressure	bar	-	-	-	-	1	1	1	1	1	1
	t2: heating time	sec	-	-	-	-	129	143	151	162	174	185
	t3: change over time	sec	-	-	-	-	5	5	5	6	6	6
	t4: Pressure buildup time	sec	-	-	-	-	6	6	7	7	7	8
	t5: Cooling time	min	-	-	-	-	6	7	8	10	12	13

		Ø	75	90	110	125	140	160	180	200	225	250
<b>S 12.5</b> <b>SDR 26</b> <b>PN 4</b>	e: wall thickness	mm	-	-	-	4.8	5.4	6.2	6.9	7.7	8.6	9.6
	A: Fusion surface	mm <sup>2</sup>	-	-	-	1812	2283	2996	3752	4652	5846	7250
	P1&P5 : fusion pressure	bar	-	-	-	4	5	6	7	9	11	14
	Bead / Wulst / Bordino	mm	-	-	-	0.5	0.5	0.5	0.5	1.0	1.0	1.0
	P2: heating pressure	bar	-	-	-	1	1	1	1	1	1	1
	t2: heating time	sec	-	-	-	140	149	162	173	185	197	211
	t3: change over time	sec	-	-	-	5	5	6	6	6	6	7
	t4: Pressure buildup time	sec	-	-	-	6	6	7	7	8	8	9
	t5: Cooling time	min	-	-	-	7	8	10	12	13	15	16

**PP (DVS 2207-11)**

		<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
<b>S 8.3</b> <b>SDR 17.6</b> <b>PN 6</b>	Ø											
	e: wall thickness	mm	–	–	6.3	7.1	8.0	9.1	10.2	11.4	12.8	14.2
	A: Fusion surface	mm <sup>2</sup>	–	–	2052	2629	3317	4314	5441	6754	8533	10519
	P1&P5 : fusion pressure	bar	–	–	4	5	7	9	11	13	17	21
	Bead / Wulst / Bordino	mm	–	–	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	2	2
	t2: heating time	sec	–	–	164	176	189	204	220	237	255	272
	t3: change over time	sec	–	–	6	6	6	6	7	7	7	8
	t4: Pressure buildup time	sec	–	–	7	7	8	9	10	11	12	13
t5: Cooling time	min	–	–	11	13	14	15	17	19	21	23	

		<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
<b>S 5</b> <b>SDR 11</b> <b>PN 10</b>	Ø											
	e: wall thickness	mm	–	8.2	10.0	11.4	12.7	14.6	16.4	18.2	20.5	22.7
	A: Fusion surface	mm <sup>2</sup>	–	2107	3141	4068	5079	6669	8429	10394	13170	16209
	P1&P5 : fusion pressure	bar	–	4	6	8	10	13	17	20	26	32
	Bead / Wulst / Bordino	mm	–	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	1.5
	P2: heating pressure	bar	–	1	1	1	1	1	2	2	3	3
	t2: heating time	sec	–	192	217	237	254	277	298	320	345	367
	t3: change over time	sec	–	6	7	7	7	8	8	9	9	10
	t4: Pressure buildup time	sec	–	8	9	11	12	13	15	16	18	20
t5: Cooling time	min	–	14	17	19	21	24	26	29	32	35	

		<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
<b>S 3.2</b> <b>SDR 7.4</b> <b>PN 16</b>	Ø											
	e: wall thickness	mm	10.3	12.3	15.1	17.1	19.2	21.9	24.6	27.4	30.8	34.2
	A: Fusion surface	mm <sup>2</sup>	2093	3002	4502	5796	7286	9501	12009	14856	18790	23185
	P1&P5 : fusion pressure	bar	6	6	9	11	14	19	24	29	37	45
	Bead / Wulst / Bordino	mm	1.0	1.0	1.0	1.0	1.5	1.5	1.5	2.0	2.0	2.0
	P2: heating pressure	bar	1	1	1	1	1	2	2	3	4	5
	t2: heating time	sec	221	249	283	307	332	359	386	411	437	463
	t3: change over time	sec	7	7	8	8	9	10	11	11	12	13
	t4: Pressure buildup time	sec	10	11	14	15	17	19	21	23	26	29
t5: Cooling time	min	17	20	24	27	30	34	38	42	47	51	

		<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
<b>S 2.5</b> <b>SDR 6</b> <b>PN 20</b>	Ø											
	e: wall thickness	mm	12.5	15.0	18.3	20.8	23.3	26.6	29.0	33.2	37.4	–
	A: Fusion surface	mm <sup>2</sup>	2454	3534	5272	6809	8542	11147	13756	17396	22041	–
	P1&P5 : fusion pressure	bar	7	7	10	13	17	22	27	34	43	–
	Bead / Wulst / Bordino	mm	1.0	1.0	1.0	1.5	1.5	2.0	2.0	2.0	2.5	–
	P2: heating pressure	bar	1	1	1	1	2	2	3	3	4	–
	t2: heating time	sec	251	281	322	348	373	405	423	456	487	–
	t3: change over time	sec	7	8	9	10	10	11	12	13	14	–
	t4: Pressure buildup time	sec	11	14	16	18	20	23	25	29	32	–
t5: Cooling time	min	21	24	29	33	37	41	44	50	55	–	

**PP (DVS 2207-11)**

		<b>75</b>	<b>90</b>	<b>110</b>	<b>125</b>	<b>140</b>	<b>160</b>	<b>180</b>	<b>200</b>	<b>225</b>	<b>250</b>	
<b>S 2 SDR 5 PN 25</b>	Ø											
	e: wall thickness	mm	15.1	18.1	22.1	25.1	28.1	32.1	36.1	-	-	-
	A: Fusion surface	mm <sup>2</sup>	2841	4088	6102	7877	9878	12897	16319	-	-	-
	P1&P5 : fusion pressure	bar	8	8	12	15	19	25	32	-	-	-
	Bead / Wulst / Bordino	mm	1.0	1.0	1.5	1.5	2.0	2.0	2.0	-	-	-
	P2: heating pressure	bar	1	1	1	2	2	3	3	-	-	-
	t2: heating time	sec	283	319	361	391	416	447	478	-	-	-
	t3: change over time	sec	8	9	10	11	12	13	14	-	-	-
	t4: Pressure buildup time	sec	14	16	19	21	24	28	31	-	-	-
t5: Cooling time	min	24	29	34	39	43	48	54	-	-	-	





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