

# **Proweld™ Equipment**

## **Owner & Maintenance**

### **Manual**

## **FIELD 12 & 20 TRENCH MACHINES**

**(Omicron/Rothenberger)**



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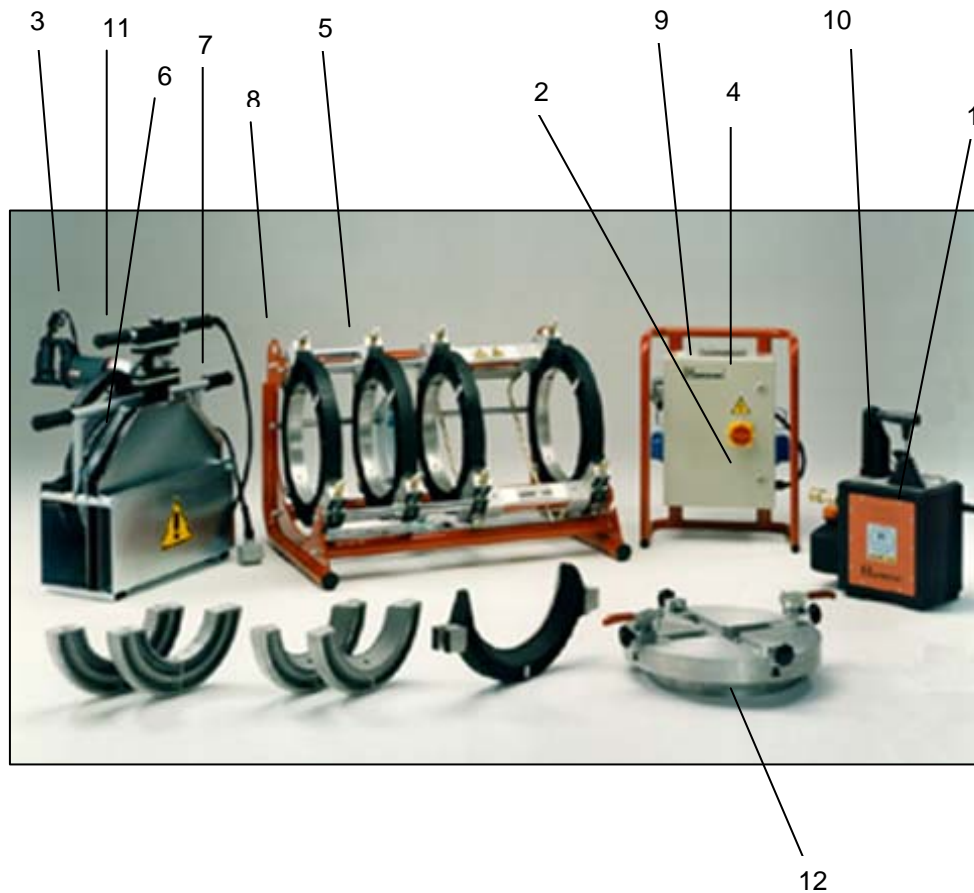
## Section I - Safety Precautions for Trench Machines

1. Keep working area clean and tidy.
2. Keep electrical tools away from moisture. Never use in wet environment or humid conditions. Working area should be well illuminated. Keep tools away from chemicals and other corrosive materials.
3. Keep visitors at a safe distance.
4. Electrical tools not in use should be stored away safely.
5. Do not wear loose clothing or jewelry. They can inadvertently get stuck in the moving parts of the machine, causing injury.
6. Never carry tools by the electric cable. Never unplug by pulling the cable. Keep cables away from oil, heat and sharp edges.
7. Always check that the pipe and fittings are clamped down tightly.
8. The heating element can reach temperatures in excess of 300°C (570°F). Do not touch the surface, and keep non-operating personnel at a safe distance.
9. Do not touch facing unit blades while tool is connected to power supply. Activate facing unit only when it is in the working position.
10. When bringing clamps and pipes together, make sure hands are not between the clamps.
11. Keep tools clean and sharpened. They produce better and safer results. Missing and worn-out parts should be replaced immediately. Always assure that the accessories are properly mounted on the machine. Only use factory parts.
12. Always disconnect the machine when not in use, when performing maintenance or when accessories are being changed.
13. Before connecting to power, check that any accessory tools (e.g. facing unit motor) are turned off.
14. Always use correct extension cable.
15. Do not use tools and machines when housing or handles, specifically plastic ones, are bent or cracked. Dirt and humidity in any fracture can lead to electrical shock should the insulation in the machine be damaged.

## Section II - Welding Conditions

1. The welding environment needs to be protected against unfavorable conditions, e.g. excessive humidity or temperature below 5°C (41°F).
2. It needs to be assured that the pipe wall temperature is adequate for welding. If necessary, the pipe has to be warmed up or an environmentally controlled welding tent needs to be erected. If these conditions are met, the welding can be performed at virtually any environmental temperature. It is advisable to verify the weld quality by making some test welds at the given conditions.
3. Should the pipe be irregularly heated by intense sunshine, it may be necessary to cover the pipe ends to be welded so that a balanced temperature is obtained.
4. The pipe ends to be welded must be checked for damage and be free from oil, grease, dirt and other contaminants. Cleaning the pipe ends must be done just prior to welding.
5. The weld must be kept free from external stresses during the weld process until the material has sufficiently cooled.
6. The weld process has to be observed continuously. It is recommended to keep a record of each weld.

## Section III – Parts Identification



### Controls

1. Hydraulic unit control lever
2. Main on-off switch
3. Facer switch
4. Heating element switch (on-off and temperature setting)

### Dangerous parts

5. Squeezing warning
6. Burn warning

### Lifting points

7. Lifting handles for facer and heating element steel case
8. Tubular frame with holes for lifting of the machine
9. Tubular frame with built-in handles
10. Lifting handle for hydraulic unit
11. Lifting handles for heating element
12. Flange Adapter

## Section IV - Machine Set Up and Operation

### 1. General Tool Information

#### A. Field 12

Size Range: 3" – 12" (90 mm – 315 mm)  
Amperage: 20 Amp.  
Voltage: 220 – 230 AC / 1 PH

#### B. Field 20

Size Range: 8" – 20" (200 mm – 500 mm)  
Amperage: 30 Amp.  
Voltage: 230 AC / 3 PH

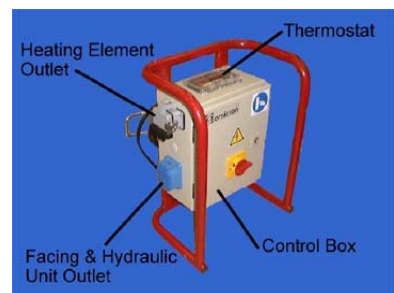
### 2. Hydraulic Hose Connection & Electrical Connection

- A. Use the two hydraulic hoses to connect the base machine to the hydraulic unit. The non-dripping quick couplings need to be kept free of dirt. When not in use, put on the red caps as protection.

⇒ Before disconnecting the hoses, make sure that there is zero pressure in the hoses. If there is pressure in the hoses, it will be difficult to re-connect them.

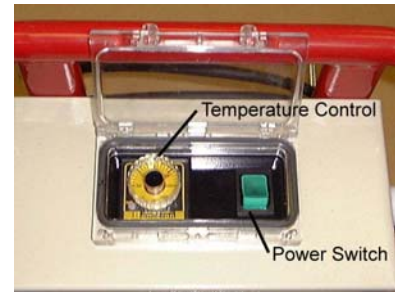
- B. Put heater and facing unit into the storage case.

- C. Connect the heating element power cable to the appropriate outlet on the control box. Also connect the facing unit and the hydraulic unit to the appropriate outlets.



### 3. Heating Element Temperature Setting

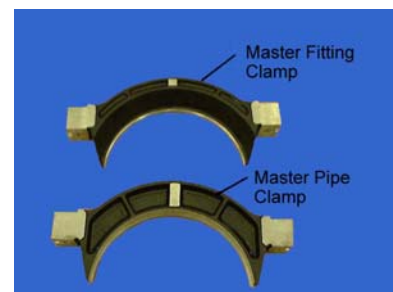
- A. The thermostat is located at the top of the control box beneath a transparent protective cover. Slight pressure on the front locking devices allows the cover to be opened and access to the thermostat.
- B. Set the thermostat to the appropriate temperature.
  - I. HDPE 215°C-230°C/ 420°F-446°F
  - II. PP 200°C-210°C/ 393°F-410°F
  - III. PVDF 225°C-235°C/ 436°F-456°F



### 4. Installation of Reducer Inserts

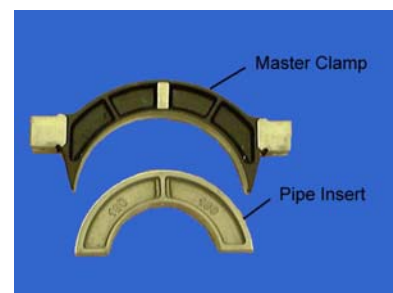
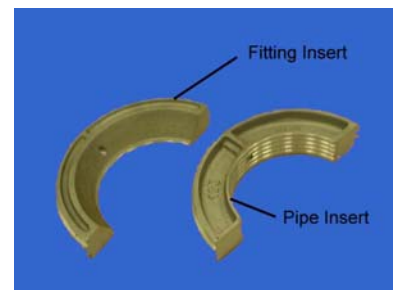
#### A. 20" Trench Machine

- I. For 500 mm pipe and fittings, no inserts are needed.
- II. For 450 mm pipe and fittings, the reducer inserts are mounted directly into the master clamps and secured with the shorter allen head screws.
- III. For pipe and fittings smaller than 450 mm, the insert clamps must be placed into the 450 mm master clamps, and then secured with the longer allen head screws.



#### B. 12" Trench Machine

- I. For 315 mm pipe and fittings, no inserts are needed.
- II. For 250 mm pipe and fittings, the reducer inserts are mounted directly into the master clamps and secured with the shorter allen head screws.
- III. For pipe and fittings smaller than 250 mm, the insert clamps must be placed into the 250 mm master clamps, and then secured with the longer allen head screws.

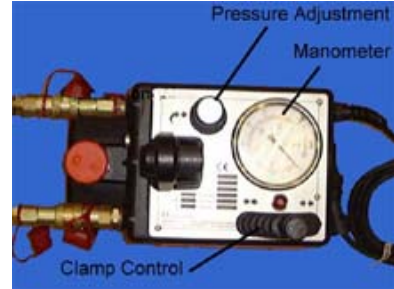


Note: The ability to weld with the versatile master clamps (connection of one inner master clamp to the two clamps on the opposite side with the use of the multiple slot connection shaft) allows the combination of almost any pipe configuration i.e. pipe/pipe, pipe/fitting, fitting/fitting.

For the welding of flanges and eccentric reducers to pipe or fitting, the flange adapter should be placed in the pipe master clamp and the flange or eccentric reducer centered on the flange adapter.

## 5. **Preparation For Welding**

- A. Place the hydraulic unit so that the manometer is easily visible. Pull the lever to (< >) and hold until the welding carrier has moved back all the way.



- B. Open the clamps and insert the pipe or fittings that are to be welded, allowing enough space between the pipe ends for placing the facing unit. Mount the upper clamps and tighten them with the brass nuts. Small adjustments for high low can be made by tightening and loosening the brass nuts. AWS/DVS standards allow a maximum tolerance of 10% of the wall thickness.



- C. Check whether both worked pieces are clamped tight by applying the weld pressure to ensure that they do not slide back in the clamps.

## 6. **Facing**

- A. Place the facing unit onto the machine shafts between the two pipe ends and lock into place with the safety lever.
- B. With the hydraulic unit, carefully move the welding carrier into the rotating facing unit. Use the hydraulic control to adjust the proper pressure for facing. Do not use too much pressure during the facing process, as this can burn out the facing unit.



## 7. **Adjustment of Carrier Movement Pressure (Drag Pressure)**

- A. Turn the pressure control valve counter clockwise to release the hydraulic pressure.
- B. Move the lever on the hydraulic unit in the direction (> <) and slowly turn the pressure control valve in a clockwise direction until the carrier moves. Read off the pressure at the manometer (pressure gage on the hydraulic unit). This pressure (referred to as Drag pressure) must be added to the calculated weld pressure.
- C. Bring the pipe ends together and turn the pressure control valve to set the weld pressure (carrier movement pressure + calculated weld pressure).

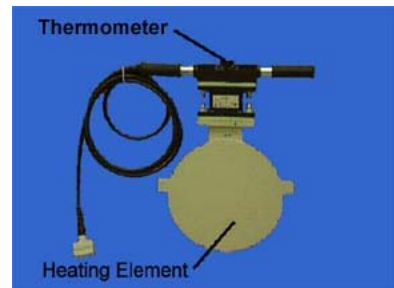
⇒ For welding pressures and times, please refer to the welding data charts located at the end of this instruction manual.

## 8. **Alignment**

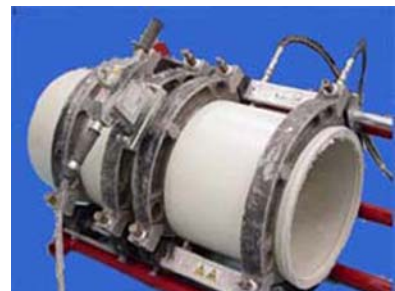
- A. With the pipe ends together, check for any offset (as described under “Preparation for welding”). Move the pipe ends apart.

## 9. **Initial Heating**

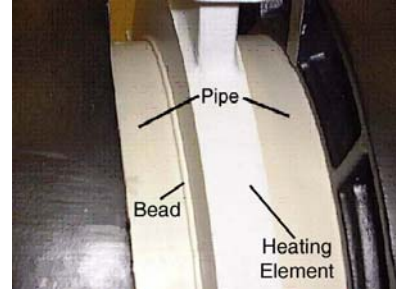
- A. Check the temperature setting of the heating element (see the charts at the end of this manual for welding temperatures). Once the heater is at the proper temperature, place the heating element between the pipe ends, so that it rests by the heater plate ears on the shafts.



- B. Using the control lever on the hydraulic unit, bring the pipe ends against the heater while applying the proper weld pressure.



- C. Watch for a continuous bead to form around both pipe ends (see pipe manufacturer or AWS/DVS standards for size).
- D. Lower hydraulic pressure by either carefully moving lever or by turning pressure control valve in a counter clockwise motion.



⇒ **Note:** If the control lever is moved too far in this direction, the hydraulic motor will activate and the carrier will open, moving the pipe away from the heater.

### 10. **Heat Soak**

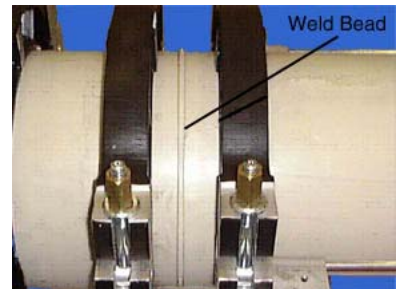
- A. With the pressure almost at zero, begin to time the heat soak process (see welding parameters). It is important to assure that the pipe ends remain in full contact with the heating element.

### 11. **Change Over Time**

- A. With the hydraulic unit, move the pipe ends apart. Remove the heating element and then bring the pipe ends back together.
- B. Bring the hydraulic pressure back to the original weld pressure. Do not over pressurize, as this will cause a bad weld. These steps must be performed within the allowable change over time.
- C. In the event that there is hydraulic pressure loss during the welding process, activate the hydraulic unit to bring the pressure back to the weld parameter as noted in the chart.

### 12. **Cooling Time**

- A. Keep the machine under pressure until the cooling time has expired.
- B. For PP and HDPE, Cooling time can be reduced by 50% under the following conditions:
  - I. Prefabrication under workshop conditions
  - II. Low additional pressure when unclamping
  - III. No additional pressure during further cool down
  - IV. System will not see pressure until cool down is complete



## **Section V - Maintenance**

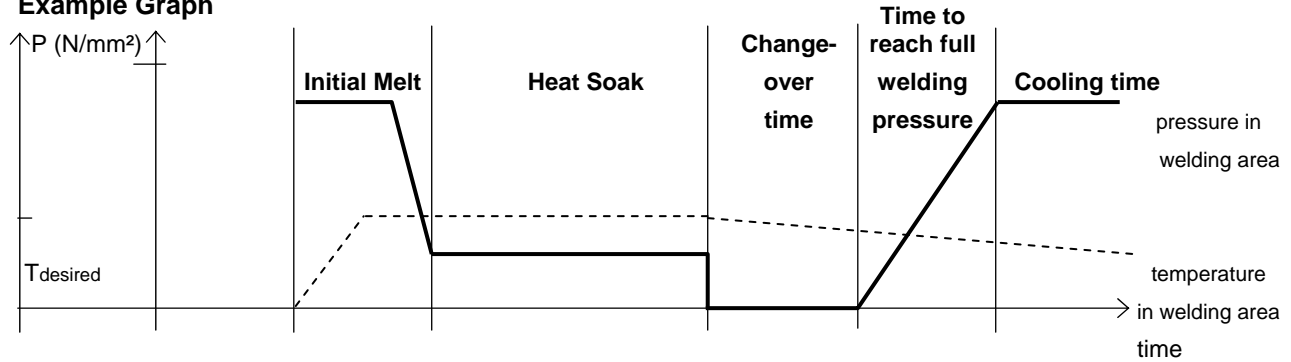
To keep the machine in good working condition, the following should be observed:

1. Keep the hardened chrome guide shafts free of dirt.
2. Assure that the machine is always connected to proper power supply.
3. Keep heating element clean. Whenever necessary, wipe residue off with clean, lint free cloth while the element is at operating temperature.
4. Keep sufficient oil in the hydraulic tank in order not to damage the pump. Always use high quality hydraulic oil, commonly used in tractors and construction equipment.
5. All hydraulic quick couplings need to be kept free of dirt by keeping the protective caps in place at all times.
6. Assure that blades are sharp at all times. The blade design allows for reversal to use both sides. If necessary, replace blades.

## Section VI - Welding Parameters

These parameters are for Omicron & Rothenberger style trench tools only

### Example Graph



## Field 12 Omicron-Rothenberger Welding Parameters

### Single Wall Butt Fusion

PIPE SIZE (INCHES)	INITIAL MELT PRESSURE		MELT PRESSURE	HEATSOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE		COOLING TIME (MIN)
	BAR	(PSI)				BAR	(PSI)	
<b>Pro 150</b>								
3	4.0	(58)		60	8	4.0	(58)	10
4	5.9	(87)	Almost	80	9	5.9	(87)	13
6	12.7	(187)		100	10	12.7	(187)	16
8	19.8	(291)	Zero	160	10	19.8	(291)	23
10	30.9	(454)		200	10	30.9	(454)	29
12	49.0	(720)		260	12	49.0	(720)	37
<b>Pro 45</b>								
4	2.2	(33)		35	5	2.2	(33)	5
6	4.7	(68)	Almost	45	5	4.7	(68)	5
8	7.1	(104)		60	8	7.1	(104)	8
10	11.4	(167)	Zero	80	8	11.4	(167)	10
12	18.0	(265)		100	8	18.0	(265)	12
<b>Air Pro</b>								
4 (230 psi)	6.0	(89)	Almost	100	9	6.0	(89)	13
6 (150 psi)	18.9	(278)	Zero	200	10	18.9	(278)	15
<b>PVDF*</b>								
3 (150 psi)	1.9	(28)		30	4	1.9	(28)	6
4 (150 psi)	2.9	(43)	Almost	40	4	2.9	(43)	7
6 (150 psi)	6.0	(89)		60	4	6.0	(89)	10
8 (150 psi)	9.3	(137)	Zero	80	6	9.3	(137)	12
10 (150 psi)	14.8	(218)		100	8	14.8	(218)	14
12 (150 psi)	23.4	(344)		140	10	23.4	(344)	20

\* For 230 psi parameters, please consult the factory.

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C

PVDF

436°F-446°F

225°C-230°C

## Field 12 Omicron-Rothenberger Welding Parameters

### Single Wall Butt Fusion

PIPE SIZE (INCHES)	INITIAL MELT PRESSURE		MELT PRESSURE	HEATSOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE		COOLING TIME (MIN)
	BAR	(PSI)				BAR	(PSI)	
<b>HDPE SDR 11</b> (IPS PE 80)								
3	6	(90)		81	5	6	(90)	16
4	10	(150)	Almost	104	6	10	(150)	16
6	22	(325)		153	8	22	(325)	24
8	38	(560)	Zero	204	10	38	(560)	24
10	57	(845)		248	10	57	(845)	32
<b>HDPE SDR 17</b> (IPS PE 80)								
3	4	(60)		52	5	4	(60)	7
4	7	(105)	Almost	67	5	7	(105)	10
6	14	(205)		99	6	14	(205)	16
8	26	(385)	Zero	132	8	26	(385)	17
10	38	(560)		161	8	38	(560)	24
<b>HDPE SDR 26</b> (IPS PE 80)								
3	3	(45)		34	3	3	(45)	6
4	4	(60)	Almost	44	4	4	(60)	6
6	10	(150)		65	5	10	(150)	10
8	17	(250)	Zero	86	6	17	(250)	12
10	25	(370)		105	6	25	(370)	14
<b>HDPE SDR 32.5</b> (IPS PE 80)								
3	2	(30)		27	3	2	(30)	5
4	4	(60)	Almost	35	3	4	(60)	5
6	8	(120)		52	5	8	(120)	6
8	14	(205)	Zero	69	5	14	(205)	10
10	21	(310)		84	6	21	(310)	13

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

## Field 12 Omicron-Rothenberger Welding Parameters

### Double Containment Butt Fusion

PIPE SIZE (INCHES)	INITIAL MELT PRESSURE BAR (PSI)	MELT PRESSURE	HEATSOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE BAR (PSI)	COOLING TIME (MIN)
<b>Pro 45 x Pro 45</b>						
4 x 8	9.3 (137)	Almost	60	5	9.3 (137)	8
6 x 10	16.0 (235)		80	5	16.0 (235)	10
8 x 12	25.1 (370)	Zero	100	8	25.1 (370)	12
<b>Pro 150 x Pro 45</b>						
3 x 6	8.6 (127)		80	5	8.6 (127)	10
4 x 8	13.0 (191)	Almost	100	8	13.0 (191)	13
6 x 10	24.1 (354)		130	8	24.1 (354)	16
8 x 12	37.8 (556)	Zero	180	8	37.8 (556)	23
<b>Pro 150 x Pro 150</b>						
3 x 6	16.7 (246)		130	8	16.7 (246)	16
4 x 8	25.8 (378)	Almost	180	9	25.8 (378)	23
6 x 10	43.7 (642)		230	10	43.7 (642)	29
8 x 12	68.8 (1011)	Zero	290	10	68.8 (1011)	37
<b>PVDF x PVDF</b>						
3 x 6	7.9 (116)		70	4	7.9 (116)	10
4 x 8	12.2 (180)	Almost	90	4	12.2 (180)	12
6 x 10	20.8 (306)		120	4	20.8 (306)	14
8 x 12	32.7 (481)	Zero	150	6	32.7 (481)	20
<b>Poly-Flo Polypropylene</b>						
4 x 6	8.3 (120)	Almost Zero	80	8	8.3 (120)	10
<b>Poly-Flo HDPE</b>						
4 x 6	12.2 (177)	Almost Zero	50	8	12.2 (177)	15

#### Welding Temperatures

PP	393°F-410°F	200°C-210°C
HDPE	420°F-446°F	215°C-230°C
PVDF	436°F-446°F	225°C-230°C

## Field 12 Omicron-Rothenberger Welding Parameters

### Double Containment Butt Fusion

PIPE SIZE  (INCHES)	INITIAL MELT PRESSURE BAR (PSI)	MELT PRESSURE	HEATSOAK TIME  (SEC)	CHANGE OVER TIME  (SEC)	WELDING PRESSURE BAR (PSI)	COOLING TIME  (MIN)
<b>HDPE SDR 11 x SDR 11</b> (IPS PE 80)						
3 x 6	28 (415)	Almost	153	5	28 (415)	24
4 x 8	48 (710)		204	6	48 (710)	24
6 x 10	79 (1170)	Zero	248	8	79 (1170)	32
<b>HDPE SDR 11 x SDR 17</b> (IPS PE 80)						
3 x 6	21 (310)	Almost	99	5	21 (310)	16
4 x 8	36 (530)		132	6	36 (530)	17
6 x 10	60 (890)	Zero	161	8	60 (890)	24
<b>HDPE SDR 17 x SDR 17</b> (IPS PE 80)						
3 x 6	19 (280)	Almost	99	5	19 (280)	16
4 x 8	32 (475)		132	6	32 (475)	17
6 x 10	53 (785)	Zero	161	8	53 (785)	24
<b>HDPE SDR 17 x SDR 26</b> (IPS PE 80)						
3 x 6	14 (205)	Almost	65	5	14 (205)	10
4 x 8	24 (355)		86	6	24 (355)	12
6 x 10	40 (590)	Zero	105	8	40 (590)	14
<b>HDPE SDR 26 x SDR 26</b> (IPS PE 80)						
3 x 6	12 (175)	Almost	65	3	12 (175)	10
4 x 8	22 (325)		86	4	22 (325)	12
6 x 10	35 (520)	Zero	105	5	35 (520)	14
<b>HDPE SDR 26 x SDR 32.5</b> (IPS PE 80)						
3 x 6	10 (150)	Almost	52	5	10 (150)	6
4 x 8	18 (256)		69	5	18 (256)	10
6 x 10	30 (445)	Zero	84	6	30 (445)	13

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

## Field 20 Omicron-Rothenberger Welding Parameters

### Single Wall Butt Fusion

NOMINAL PIPE SIZE (INCHES)	INITIAL MELT PRESSURE		MELT PRESSURE	HEAT SOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE		COOLING TIME (MIN)
	BAR	(PSI)				BAR	(PSI)	
<b>Pro 150</b>								
8	10	(142)		180	10	10	(142)	27
10	14	(199)		200	10	14	(199)	29
12	21	(299)	Almost	260	12	21	(299)	37
14	26	(370)		295	15	26	(370)	42
16	41	(583)	Zero	340	15	41	(583)	47
18	48	(683)		380	15	48	(683)	53
20	52	(740)		420	15	52	(740)	59
<b>Pro 45</b>								
8	3	(45)		70	8	3	(45)	10
10	5	(71)		80	8	5	(71)	10
12	8	(114)	Almost	100	8	8	(114)	12
14	10	(140)		110	8	10	(140)	14
16	12	(171)	Zero	125	8	12	(171)	16
18	16	(228)		140	8	16	(228)	18
20	19	(270)		155	12	19	(270)	20
<b>PVDF</b>								
8	3.5	(49.3)	Almost	90	6	3.5	(49.3)	12
10	5.5	(78.5)		120	8	5.5	(78.5)	14
12	8.7	(124.2)	Zero	150	10	8.7	(124.2)	20

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

## Field 20 Omicron-Rothenberger Welding Parameters

### Single Wall Butt Fusion

PIPE SIZE (INCHES)	INITIAL MELT PRESSURE		MELT PRESSURE	HEATSOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE		COOLING TIME (MIN)
	BAR	(PSI)				BAR	(PSI)	
<b>HDPE SDR 11</b> (IPS PE 80)								
6	8	(117)	Almost Zero	150	8	8	(117)	18
<b>HDPE SDR 17</b> (IPS PE 80)								
6	5.5	(79)	Almost	100	6	5.5	(79)	14
8	9	(133)		130	8	9	(133)	16
10	14	(206)	Zero	160	9	14	(206)	20
12	20	(290)		190	10	20	(290)	24
<b>HDPE SDR 26</b> (IPS PE 80)								
6	3.5	(52)		65	5	3.5	(52)	10
8	6	(88)		85	7	6	(88)	11
10	9.5	(138)	Almost	105	7	9.5	(138)	13
12	13	(195)		125	8	13	(195)	16
14	16	(234)	Zero	140	8	16	(234)	18
16	21	(305)		155	9	21	(305)	20
18	27	(387)		175	9	27	(387)	22
<b>HDPE SDR 32.5</b> (IPS PE 80)								
12	11	(159)	Almost Zero	100	9	11	(159)	14

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

## Field 20 Omicron-Rothenberger Welding Parameters

### Double Containment Butt Fusion

NOMINAL PIPE SIZE (INCHES)	INITIAL MELT PRESSURE BAR (PSI)	MELT PRESSURE	HEAT SOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE BAR (PSI)	COOLING TIME (MIN)
<b>Pro 150 x 45</b>						
4 x 8	4.7 (69)		100	8	4.7 (69)	13
6 x 10	8.8 (127)		130	8	8.8 (127)	16
8 x 12	13 (200)	Almost	180	8	13 (200)	23
10 x 14	19 (285)		230	8	19 (285)	29
12 x 16	24 (411)	Zero	290	8	24 (411)	37
14 x 18	35 (521)		325	8	35 (521)	42
16 x 20	45 (654)		370	12	45 (654)	47
<b>Pro 150 x 150</b>						
4 x 8	9.4 (136)		180	9	9.4 (136)	23
6 x 10	15.8 (230)	Almost	230	10	15.8 (230)	29
8 x 12	25.0 (364)		290	10	25.0 (364)	29
10 x 14	34 (493)	Zero	325	12	34 (493)	42
12 x 18	69 (982)		380	15	69 (982)	53
<b>Pro 45 x 45</b>						
4 x 8	3.9 (57)		60	8	3.9 (57)	8
6 x 10	6.1 (89)		80	8	6.1 (89)	10
8 x 12	9.1 (132)	Almost	100	8	9.1 (132)	12
10 x 14	12.4 (186)		110	8	12.4 (186)	14
12 x 16	17.0 (247)	Zero	125	8	17.0 (247)	18
14 x 18	21.5 (313)		140	8	21.5 (313)	20
16 x 20	27 (389)		158	8	27 (389)	20
<b>PVDF x PVDF</b>						
4 x 8	5.8 (84)	Almost	90	6	5.8 (84)	12
6 x 10	10.3 (150)		120	6	10.3 (150)	18
8 x 12	12 (173)	Zero	150	6	12 (173)	20

#### Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

**Field 20 Omicron-Rothenberger Welding Parameters**  
**Double Containment Butt Fusion**

PIPE SIZE (INCHES)	INITIAL MELT PRESSURE BAR (PSI)	MELT PRESSURE	HEATSOAK TIME (SEC)	CHANGE OVER TIME (SEC)	WELDING PRESSURE BAR (PSI)	COOLING TIME (MIN)
<b>HDPE SDR 11 x SDR 17</b> (IPS PE 80)						
6 x 10	22 (323)	Almost Zero	160	9	22 (323)	20
<b>HDPE SDR 17 x SDR 26</b> (IPS PE 80)						
6 x 10	15 (217)		105	7	15 (217)	14
8 x 12	22 (328)	Almost	130	8	22 (328)	16
10 x 14	30 (440)	Zero	160	8	30 (440)	20
12 x 18	47 (677)		190	9	47 (677)	24
<b>HDPE SDR 26 x SDR 26</b> (IPS PE 80)						
6 x 10	13 (190)	Almost	105	5	13 (190)	13
12 x 16	34 (500)	Zero	155	8	34 (500)	20
<b>HDPE SDR 26 x SDR 32.5</b> (IPS PE 80)						
8 x 12	17 (247)	Almost Zero	100	7	17 (247)	14

Welding Temperatures

HDPE	420°F-446°F	215°C-230°C
PP	393°F-410°F	200°C-210°C
PVDF	436°F-446°F	225°C-230°C

**Notes:**

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