



OPERATION AND MAINTENANCE MANUAL

V160 V200 V250 V315 V355

FOREWORD

Dear Customers and Partners,

Thank you very much for purchasing our products, and we are confident it will create more value to your business.

In this manual book, you will find all the information and suggestions needed to operate our V series butt fusion machine in a safe, professional and proper way. Therefore we strongly request you to read all messages in this book before the operators start using the machines.

As this machine is a professional device, and it must be limited to skilled and certificated personnel.

Now enjoy the welding journey through using Riyang welding machines.

Note: We reserve the rights to change the technical parameters without prior notice.

Sincerely

Jack Chan



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1. Technical Parameter

Riyang V series is on-site hydraulic butt fusion welding machine. It is used to butt weld pipe and fittings such as elbow, tees, wye and flange necks without any additional equipment by simply adjusting the clamps` drag bar. It is suitable for welding plastic pipe and fittings made of HDPE, PP, PVDF and other thermoplastics material.

Each person who operates the machine has to conform to the instructions of this manual.

Technical Parameters	V160	V200	V250	V315	V355
Welding Range O.D. (mm)	50 - 160	63 - 200	(75*)90 - 250	90 - 315	90 - 355
Applicable Materials	HDPE, PP, PVDF and other thermoplastics material				
Power Supply	220V, 50/60Hz				
Rated Power (kW)	2.85	3.35	4.6	5.6	5.6
Overall Machine Weight	96Kg/211lb	110Kg/242lb	137Kg/301lb	189Kg/415lb	208Kg/457lb
Machine Chassis					
Piston Area(cm²)	6.27	6.27	10.99	20.02	20.02 (12.56+)
Chassis Dimension (mm)	800x400x370 31.5x15.7x14.5in	780x430x410 30.7x16.9x16.1in	800x500x480 31.5x19.7x18.9in	900x600x570 35.4x23.6x22.4in	900x650x620 35.4x25.6x24.4in
Weight	42.4Kg/93lb	51.5Kg/113lb	67Kg/147lb	105Kg/231lb	118Kg/259lb
Hydraulic Power Unit					
Rated Power (kW)	1.1				
Working Pressure Range (Bar)	0-80				
Hydraulic Oil	#46, SHELL TELLUS T46 is recommended				
Oil Tank Volume (L)	3				
Chassis Dimension (mm)	640x320x370 25.2x12.6x14.5in				
Weight	38.2Kg/84lb				
Heating Plate					
Rated Power (kW)	1	1.5	2	3	3
Temperature Range	Maximum 320 ℃				
Dimension (mm)	280x60x460 11x2.3x18.1in	300x60x490 11.8x2.3x19.3in	390x60x550 15.3x2.3x21.6in	500x60x670 19.7x2.3x26.4in	550x60x700 21.6x2.3x27.5in
Weight	4.2Kg/9.2lb	4.6Kg/10lb	6.5Kg/14.3lb	10Kg/22lb	11.8Kg/26lb
Trimmer					
Rated Power (kW)	0.75		1.5		
Chassis Dimension (mm)	350x260x340 13.8x10.2x13.4in	390x240x400 15.3x9.4x15.7in	450x370x480 17.7x14.5x18.9in	550x365x570 21.6x14.4x22.4in	570x365x600 22.4x14.4x23.6in
Weight	7.7Kg/16.9lb	10.5Kg/23lb	18.2Kg/40lb	25Kg/55lb	28Kg/61lb
Support					
Overall Dimension (mm)	300x270x230 11.8x10.6x9.0in	310x300x270 12.2x11.8x10.6in	380x360x340 14.9x14.2x13.4in	510x385x400 20.0x15.1x15.7in	550x400x430 21.6x15.7x16.9in
Weight	4Kg/8.8lb	4.9Kg/10.7lb	7Kg/15.4lb	10.8Kg/23.7lb	11.5Kg/25.3lb

* Available as option

+ Change the piston area to 12.56cm² in year 2024

2. Safety Precautions

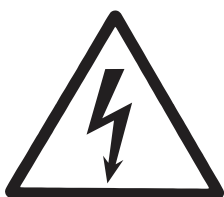
The use of butt welding machine V series is limited to skilled and certified personnel only. Any irregular operation could probably cause any injury. Attention please.

The safety precautions herein indicated must be taken into consideration all the time when operating the machine.

You should promptly replace the worn-out or damaged parts with original Riyang spare parts only.

Any sort of repair and maintenance must be conducted by authorized skilled and qualified personnel only.

2.1 Electrical Hazard



Hazard: Electric Shock

Parts involved: Hydraulic Power Unit
Heating Plate
Trimmer

Make sure that the power supply correspond to the request of the machine. And all connections are done properly.



Earth the machine

Please make sure the earthed system is working properly.

Important:

The panel board plug must accord with the IEC 309 type with IP44 minimum protection degree.

Do not expose the machine to rain or any other liquids.

Do not expose the cables to chemical environment, mechanical strain, and keep it away from some sharp objects.

Make sure the the isolation protection device, such as safety gloves and shoes, are completely dry when machine working in wet environment.

It is forbidden to splash the machine in purpose of cleaning the machine.

Should clean the machine after use. It is forbidden to use solvents, gasoline, abrasive liquids and corrosive liquids, these could probably destroy the isolating parts.

Check insulation condition of machine periodically by qualified personnel, including earthed system, leakage switch, cables insulation.

Unplug the machine from power source immediately after use.

2.2 Cutting Hazard



Hazard: Cutting

Parts involved: Trimmer

Please pay attention to the blade when handle the trimmer by hand.

Keep a safe distance from the trimmer when it is working.



Keep in mind that safety gloves is always needed.

2.3 Splintering Hazard



Hazard: Splintering

Part involved: Trimmer

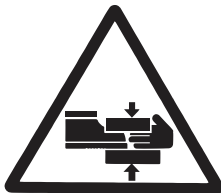
Keep a safe distance from the trimmer when it is working.

Remember to clean the pipe ends before trimming them, nothing remains on the trimming area.



Always wear safety glasses or goggles

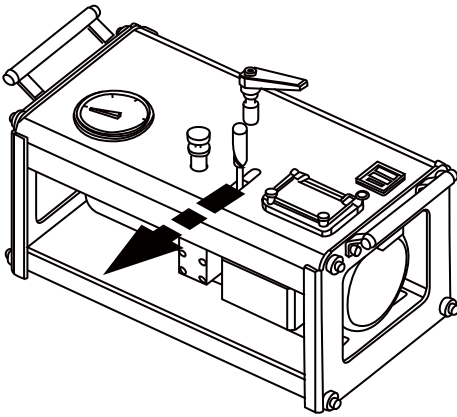
2.4 Crush Hazard



Hazard: Crush

Part involved: Machine Chassis

When crush happened, immediately activate the directional lever to open the carriage. (the lever must go to the direction as show below)



Make sure that you are familiar to operate the machine before welding.

Make sure that the machine is stable at all times during the welding.

Make sure that nothing stays in the welding area before close the carriage.

2.5 Scald Hazard



Hazard: Scald

Part involved: Heating Plate
Support

Keep a safe distance from the heating plate when it is working.

Do not touch the plate when it is working or still hot.

Clean the heating plate with maximum caution.

Do not touch the heating plate support when the plate is heating or just take out.



Please always wear your safety gloves.

2.6 Fire Hazard



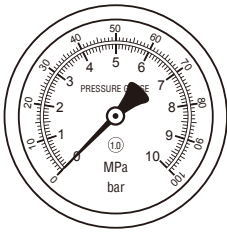
Hazard: Fire

Part Involved: Heating Plate
Support

Be sure that flammable material kept away from the heating plate and support.

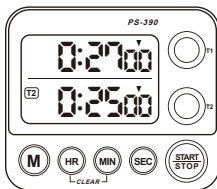
3. General Welding Knowledge

3.1 Parts you should know



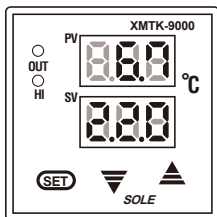
Part name: Pressure Gauge

Functionality: Show the force applied during welding
Verify the functionality before welding



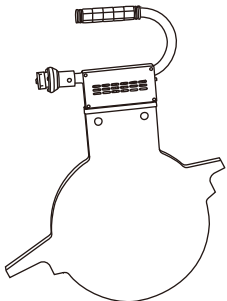
Part Name: Timer

Functionality: Set the time applied to each welding process
Verify the functionality before welding



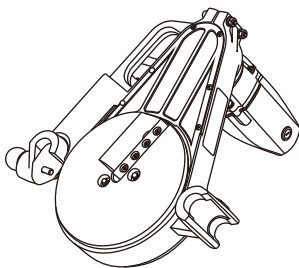
Part Name: Temperature Controller

Functionality: Set and control the temperature applied to the welding
Verify the functionality before welding



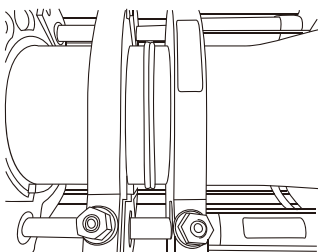
Heating plate

Check the integrity of Teflon coating.
Should verify the heating plate if could reach to the temperature which set by temperature controller.



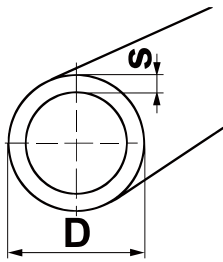
Trimmer

Before welding, be sure the trimmer works well.
Be sure the blades are sharp enough and could face the pipe end properly.

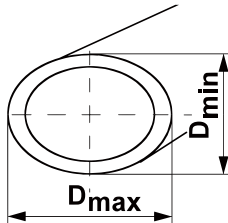


Please make a test welding.

Pipes specifications should respect the tolerance range established by the National Legislation and Regulation:

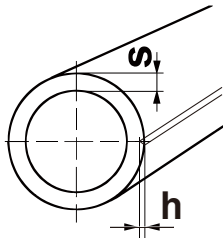


It must have same nominal outside diameter(D) and nominal thickness(S).



The oval-shaped

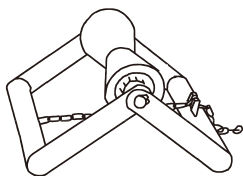
$$\frac{D_{\max} - D_{\min}}{D} \times 100$$



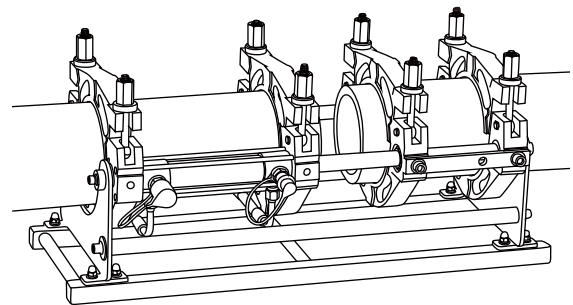
Scratches percentage(h: scratch depth)

$$\frac{h}{s} \times 100$$

3.2 Welding Criteria



Sustain the pipes with rollers to reduce the friction, therefore reduce the dragging pressure.



The dragging pressure must be measured with pipes/fittings clamped.

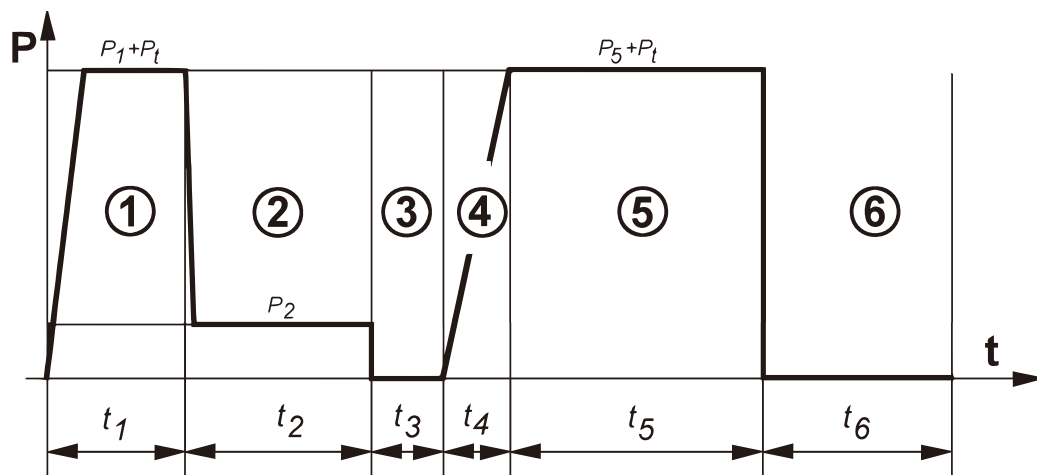


Be sure the internal and external surfaces of the pipe ends be cleaned well.



Please protect the welding in case of rain, sand wind, snow, very low or very high temperatures.

3.3 Welding Procedure



P1: Bead-up pressure

P2: Maximum soaking pressure

P5: Welding pressure

Pt: Dragging pressure (a pressure required to overcome the overall friction when machine carriage start to move with pipes/fittings fastened in the clamp. Operator read it from pressure gauge.)

t1, t2, t3, t4, t5, t6: Time requested for each phase 1, 2, 3, 4, 5, 6.

Phase 1 : Bead-up.

Approach both ends to be welded to the heating plate at the $(P1+Pt)$ pressure, and wait until the bead has reached the expected size from the standard requested.

Phase 2: Soaking

Reduce pressure to $P2$ maximum value, to keep the ends in touch with the heating plate for the entire $t2$ time.

IMPORTANT! The ends to be welded **MUST NOT** detach from the heating plate while the pressure is being reduced. If that happens, the welding must absolutely be repeated.

Phase 3: Removal of heating plate.

Remove the heating plate within the maximum $t3$ time, without damaging the beads.

Phase 4: Reach of welding pressure.

Get both ends together while gradually increasing the pressure up to $(P5+Pt)$ value, within $t4$ time.

Phase 5: Welding.

Keep both ends together at the $(P5+Pt)$ pressure for the entire $t5$ time.

Phase 6: Cooling.

The joint must not be removed or suffer any sort of mechanical strain for the entire t_6 time. Do not use water or compressed air to rush cooling. Protect the joint from very low or very high temperature, rain.

You are requested to follow the welding procedure strictly to make the right joints without any intention to reduce the welding time by mechanical strain.

3.4 Welding joint overview and analysis



Qualified joint by visual checking.



Narrow and fall bead. Too high pressure while welding.



Too small bead. Pressure is not enough while welding.



A ditch in the joint. Temperature is not reached or change-over time is too long before welding.

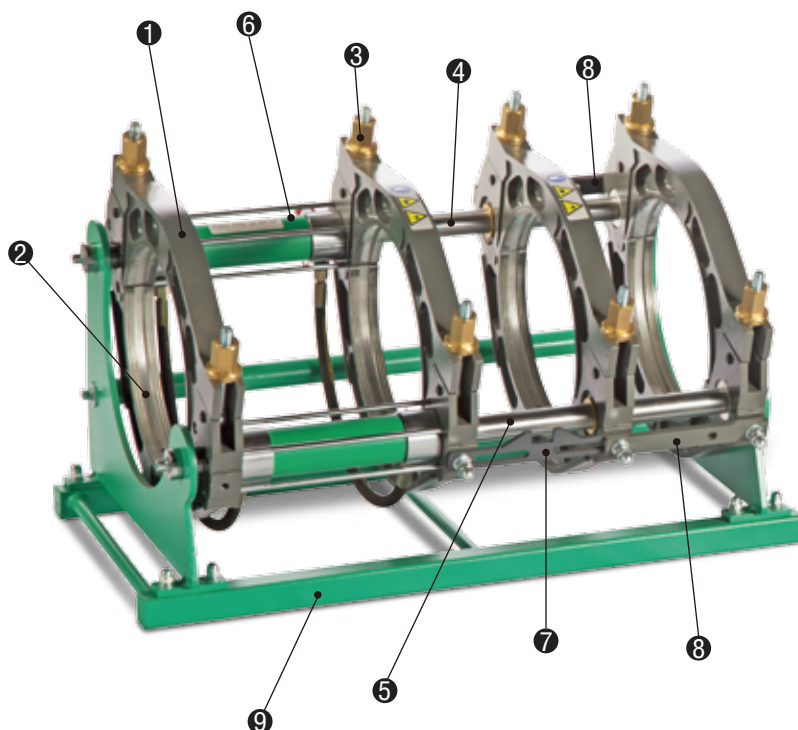


Misalignment. Welding under the condition that the misalignment exceeds 10% of pipe wall thickness while align the two ends.

4. Components Description

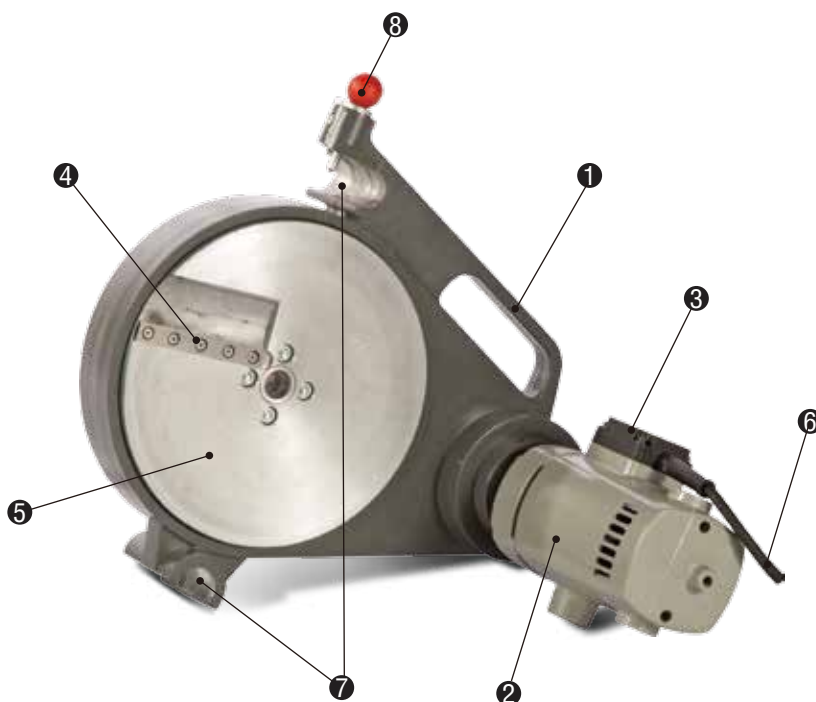
4.1 Machine Carriage

- ❶ Upper jaw
 - ❷ Bottom jaw
 - ❸ Fasten screws
 - ❹ Upper piston rod
 - ❺ Lower piston rod
 - ❻ Quick coupling
 - ❼ Heating plate detach device(*)
 - ❽ Dragging bars
 - ❾ Basic support
- (*) Not featured in the models V160, V200 and V250.



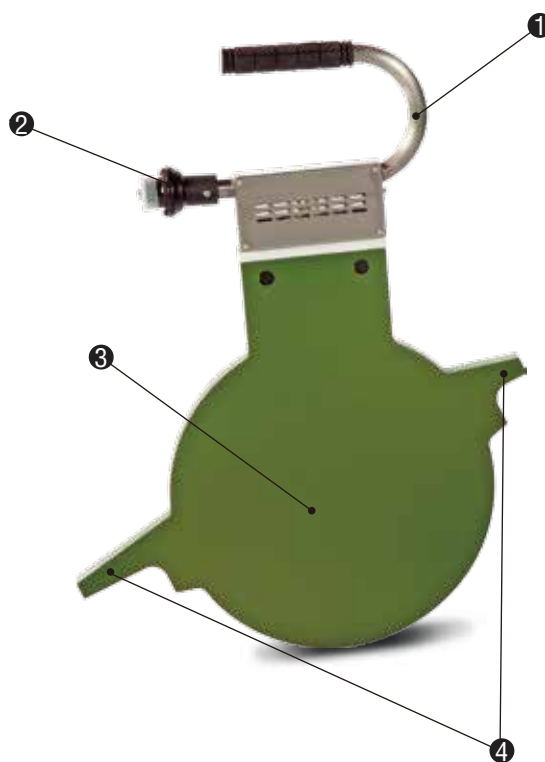
4.2 Trimmer

- ❶ Handgrip
- ❷ Motor
- ❸ Start/Stop button
- ❹ Blade
- ❺ Facer disk
- ❻ Power supply cable
- ❼ Support
- ❽ Blocking ball



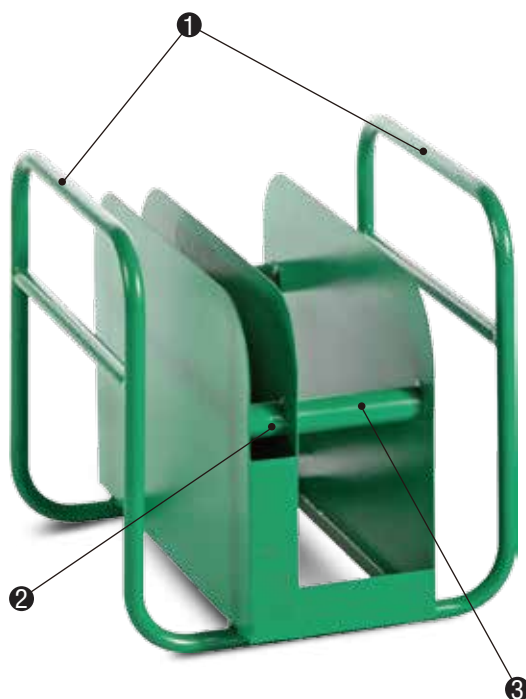
4.3 Heating plate

- ① “C” handle
- ② Power supply connection
- ③ Plate
- ④ Piston rod support



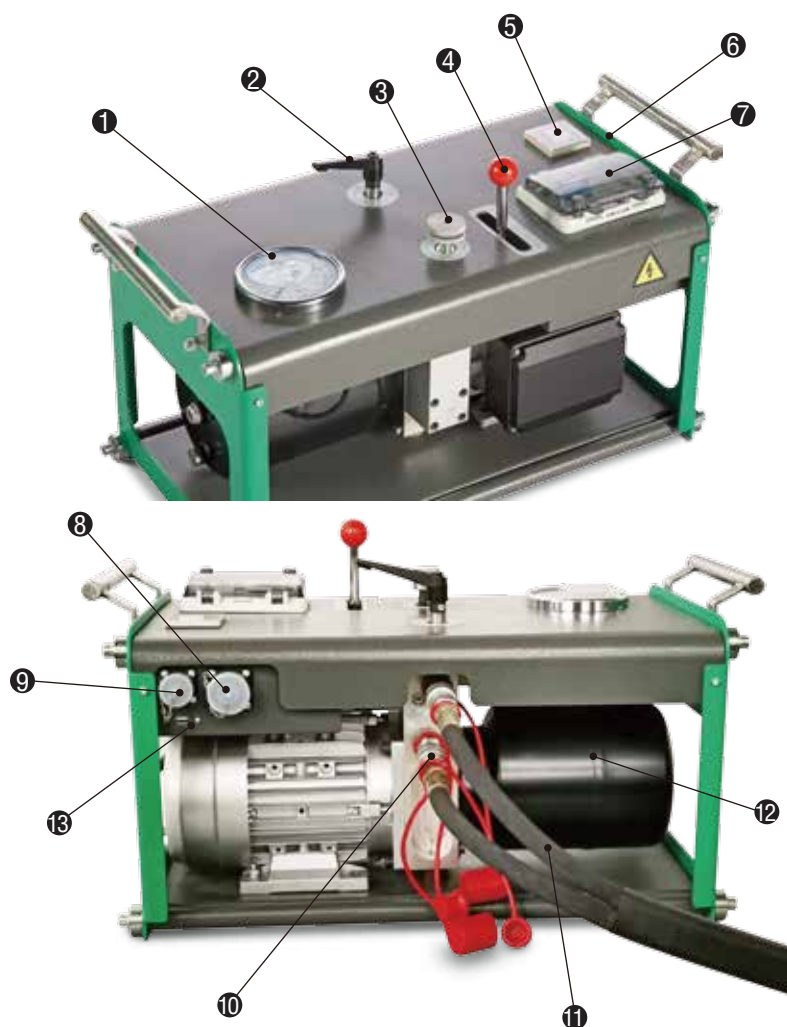
4.4 Support for trimmer and heating plate

- ① Handgrip
- ② Heater support rod
- ③ Trimmer support rod



4.5 Hydraulic Power Unit

- ❶ Pressure gauge
- ❷ Pressure relief valve
- ❸ Pressure regulated valve
- ❹ Direction lever
- ❺ Temperature controller
- ❻ Temperature on/off button
- ❼ Circuit breaker
- ❽ Heating plate connection
- ❾ Trimmer connection
- ❿ Quick coupling
- ⓫ Hydraulic oil hoses
- ⓬ Oil tank filler
- ⓭ USB charger port



4.6 Timer

- ❶ T1 mode key
- ❷ T2 mode key
- ❸ Memory time key
- ❹ Hour adjustment key
- ❺ Minutes adjustment key
- ❻ Second adjustment key
- ❼ Start/stop key



4.7 Standard Tool Box

- ❶ Tool box
- ❷ Inserts fixing screws
- ❸ Ratchet Wrench
- ❹ Screwdriver
- ❺ Timer and batteries
- ❻ Blade (2pcs)
- ❼ Oil suction



5. Operating Instruction

Again, please make sure below things are in position before welding:

Only qualified personnel is allowed to operate the machine.

The whole unit should be placed on the stable ground without water and fire, keep inflammable material out of heating plate reach.

The machine is in good condition, electricity cable and hydraulic hoses are not worn and broken.

The power supply should comply with that the machine requires.

5.1 Hydraulic Connections



Connect the hydraulic hoses to hydraulic power unit.

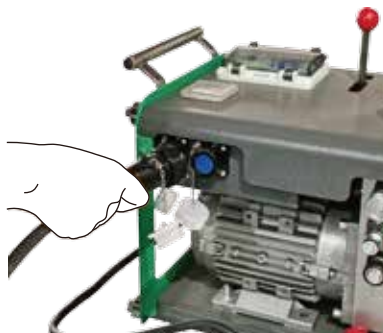


Connect the hydraulic hoses to machine carriage.

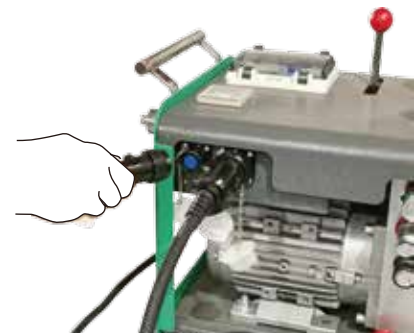
5.2 Electrical Connections



Connect heating plate cable to heating plate. It is connected properly only when sound "Click" made.



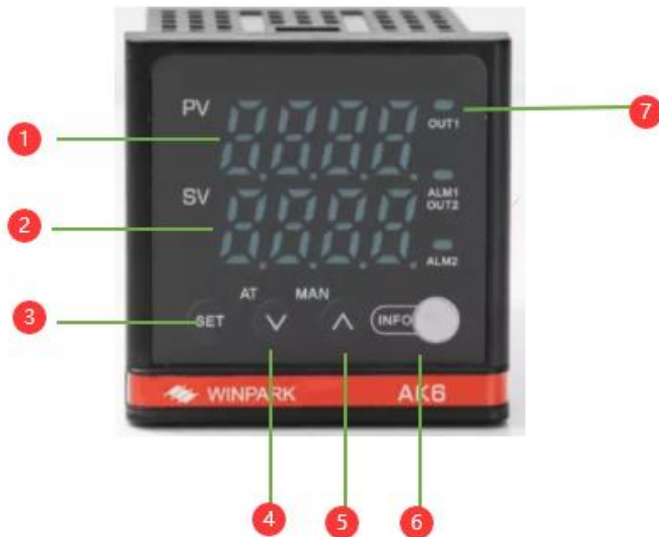
Connect the heating plate cable to hydraulic power unit. It is connected properly only when sound "Click" made.



Connect the trimmer cable to hydraulic power unit. It is connected properly only when sound "Click" made.

At last, please plug the hydraulic power unit to main power.

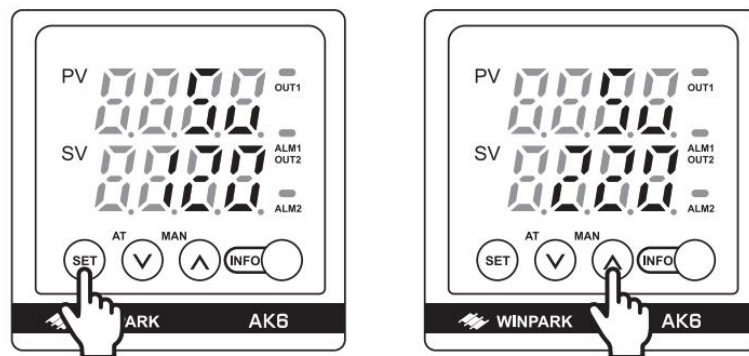
5.3 Temperature Set



- ① (PV) display temperature
- ② (SV) display set temperature
- ③ (SET) function key
- ④ Value minus/parameter sift
- ⑤ Value plus/parameter sift
- ⑥ Enter to confirm information
- ⑦ Heating indicator

Activate the temperature controller by pressing the “On/Off” button. Then the button light will turn to be “blue”, and display shows up the values of current temperature and temperature set. The heater is thermoregulating now.

Press “**SET**” until “**SV**” blinks, increase and decrease the temperature value by pressing button “**V**” or “**^**” accordingly. After setting, please press “**SET**” to confirm the value and it will reflect to the temperature controller.

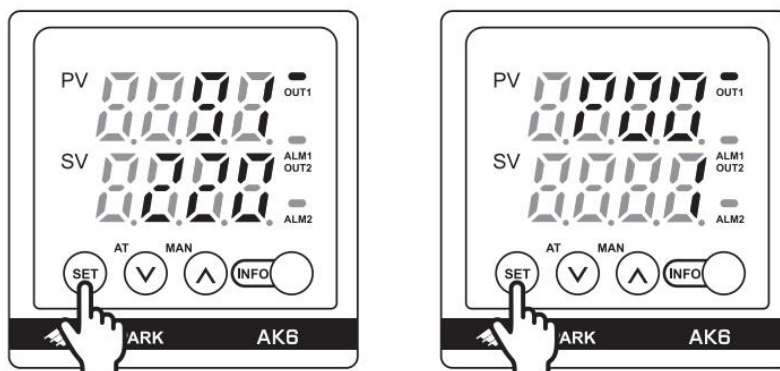


5.5 How To Rectify The Temperature Deviation

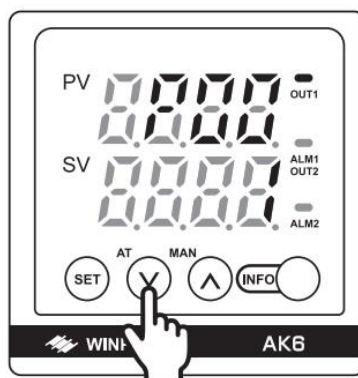
Due to the different environmental temperature, the actual temperature shown and temperature set may need a deviation rectification, please follow below ways:

<Example: after contact thermometer detecting the heater, the actual temperature is less 4°C than temperature set>

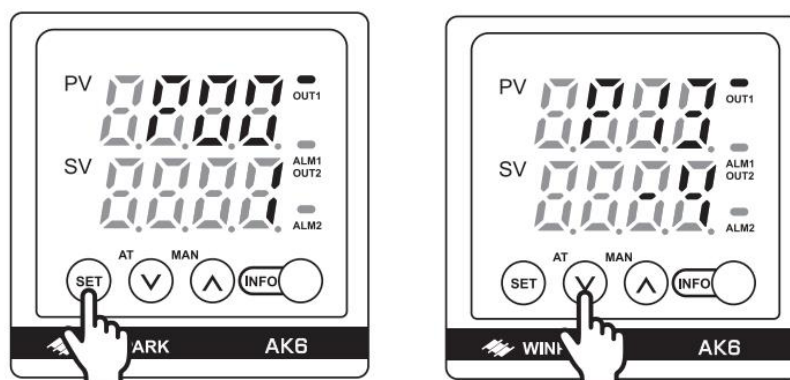
- ① Keep “**SET**” pressed for approximately 3 seconds until the “**PV**” shows “**P00**”, and press “**SET**” again, “**SV**” will blink



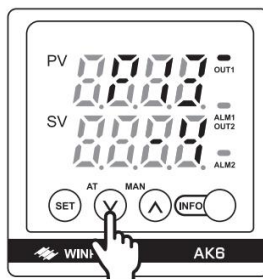
- ② Press “**V**” or “**^**” until the “**SV**” value shows “**1**”



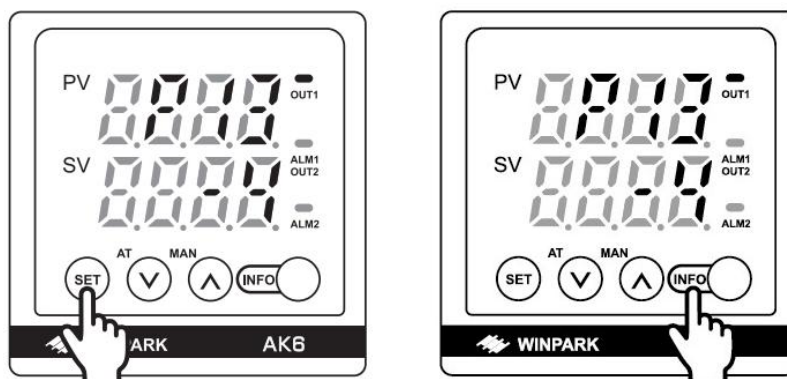
- ③ Press “**SET**” and “**PV**” will blink. Press “**V**” or “**^**” until the “**PV**” value shows “**P13**”



- ④ Press “**SET**” and “**SV**” will blink. Then set the value “**-4**” (if the actual temperature on heater surface is 4°C higher than temperature set, set the value to be “**4**”)



- ⑤ After setting, please press “**SET**” and then “**INFO**” to confirm. The value is memorized and the temperature controller rectifying automatically.

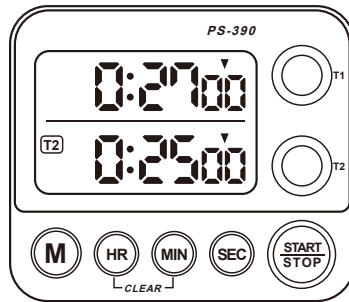


Error Message

If one of the following messages appears, please ask your electrical technician to diagnose it and work out the solution. Please contact local authorized service center or contact Riyang company directly if problem still exist.

Display	Code Define	Trouble Shooting	Remark
Err 0	No error	None	
Err 1	Parameter invalid	Controller malfunction, please contact supplier	
Err 2	RTD is disconnected	Check if RTD is connected well or not	
Err 3	Abnormal cold end temperature	Controller malfunction, please contact supplier	“PV” blinks
Err 4	Exceed upper limit of temperature range	Check if the thermocouple is connected or not	
Err 5	Exceed lower limit of temperature range	Check if the thermocouple is connected or not	

5.5 Set The Time



Countdown

Choose the time mode by pressing “T1” and “T2”, which we could refer to the “T2” and “T5” time applied during the welding procedure.

Press the keys “HR”, “MIN” or “SEC” to set time in terms of hour, minutes or second. Keeping the key pressed to set the time quickly. Press the key “START/STOP” to start countdown. Countdown could be paused and re-started at anytime by press the key “START/STOP”.

Press the keys “HR” and “MIN” to clear the time.

When countdown is over

When the timer counts down to zero, the count-up symbol “▲” blinks, the timer will count up from zero, and it will alarm for a minute (if the alarm is turned on by fluctuation switch), and accordingly the indicating lamp will blink for a minute.

Press the key “START/STOP” to recall the countdown time previously set.

Set the Memory Time

You can apply the memory time to welding cycles. Set as following:

When the time is paused, keep the key “M” pressed until the value blinks. Then you press the keys “HR”, “MIN” or “SEC” to set time in terms of hour, minutes or second.

Press the key “M” to confirm the time setting.

When timer is paused, you could recall the memory time by pressing the key “M”.

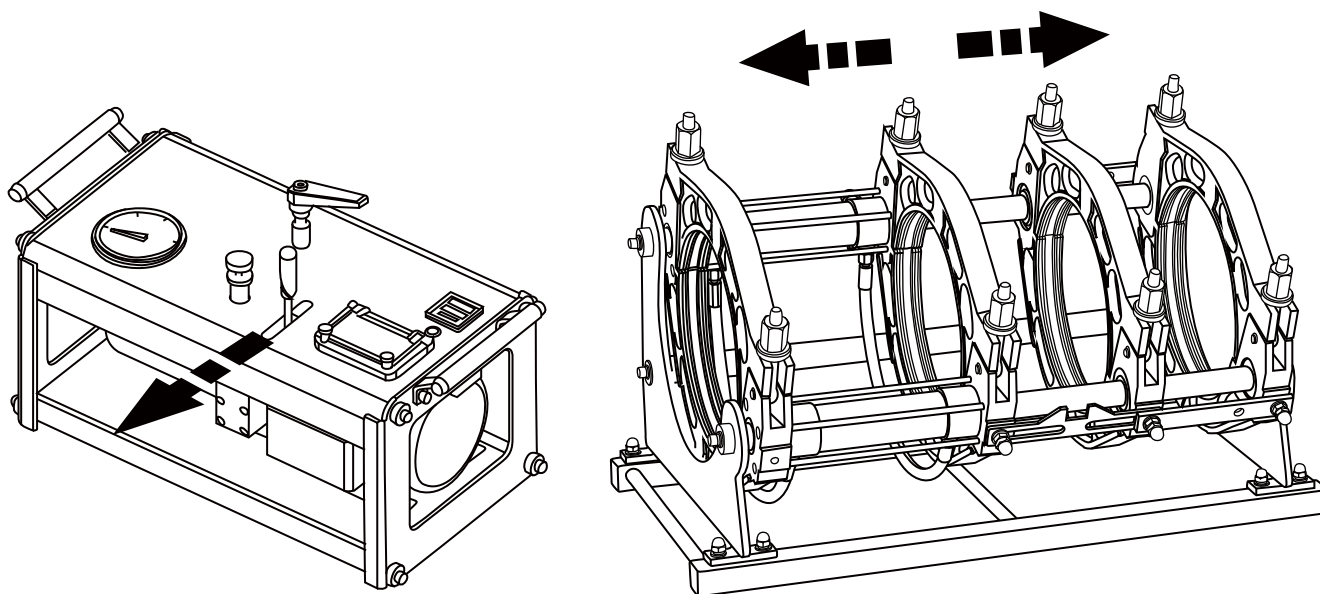
5.6 Hydraulic Oil Checking

You should re-fill the oil tank if you took the machine by air flight. The oil tank is always empty out before delivery to comply with International Air Regulation.

And please check if the hydraulic oil is sufficient or not by oil probe. It should be 2/3 of the tank volume.

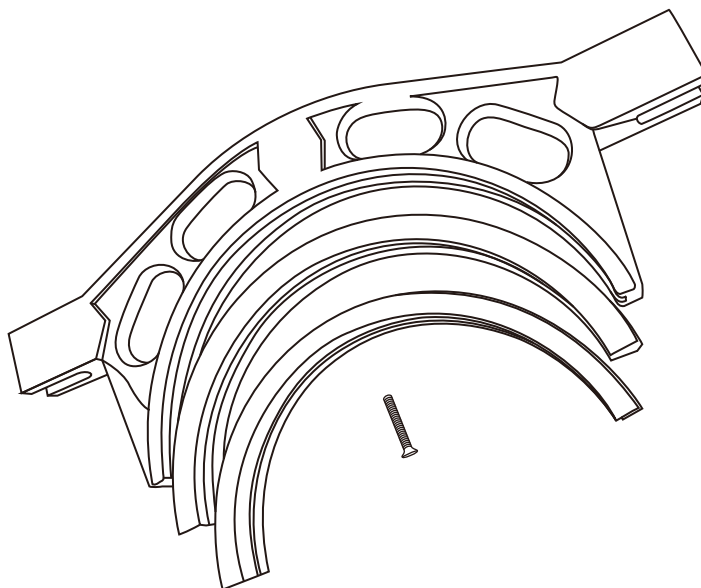
5.7 Prepare The Machine Carriage

Pull the direction lever to the maximum and open the carriage completely.



5.8 According to the pipe diameter, insert the reductions.

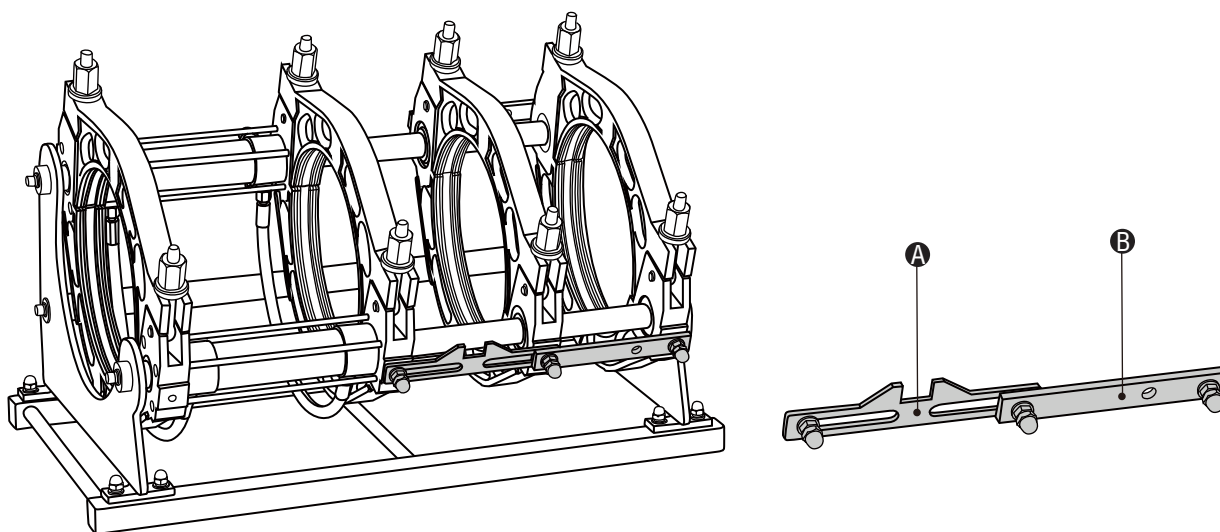
Select the requested reductions, and pick the suitable inserts screws in the plastic box, using the screwdriver to fasten the reductions with upper and bottom jaws. Repeat the operation with other jaws.



5.9 Welding Between Jaws No.2 and No.3

Assemble the dragging bar and heating plate detach device as show in the image below (standard composition after delivery).

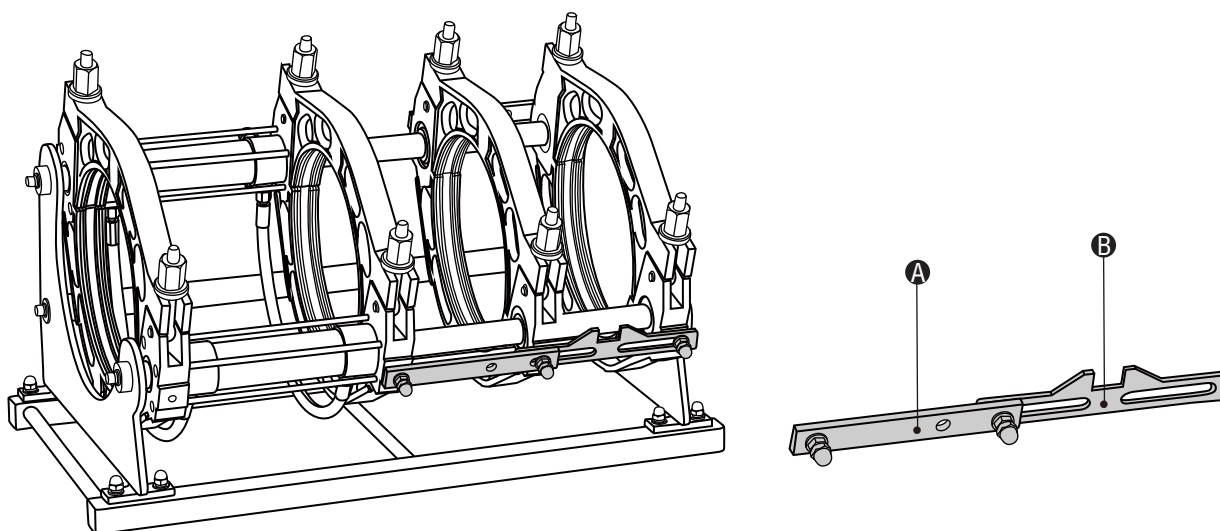
Note: The heating plate detach device is not featured in models V160, V200 and V250.



Welding Between Jaws No.3 and No.4

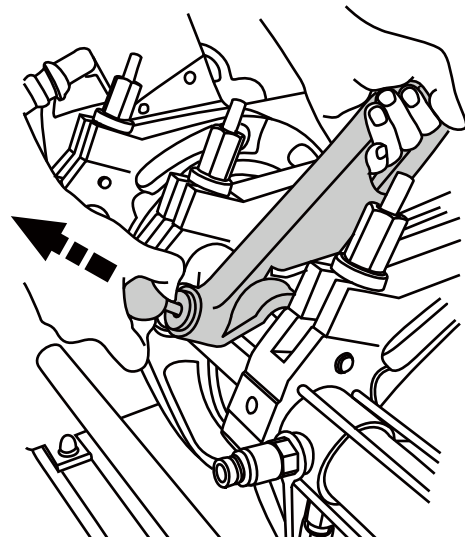
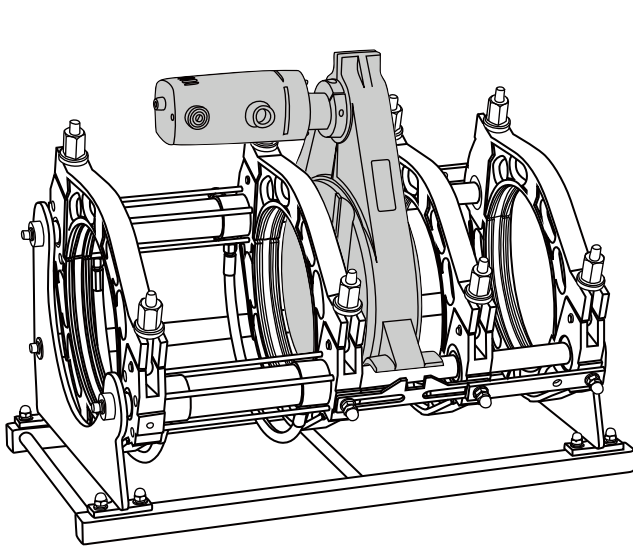
Assemble the dragging bar and heating plate detach device as show in the image below.

Note: The heating plate detach device is not featured in models V160, V200 and V250.



5.10 Trimming

Position the trimmer in between the pipe ends to be welded.

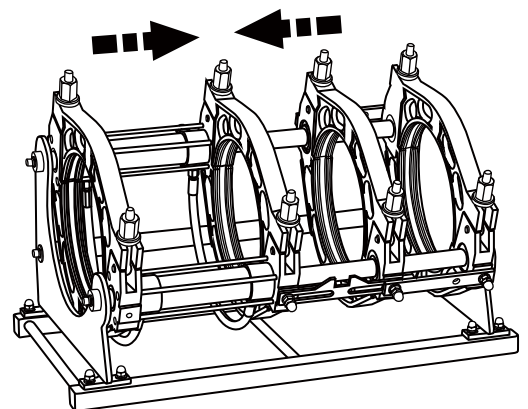
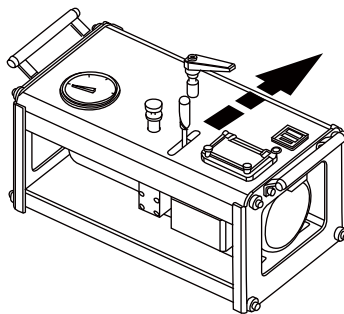
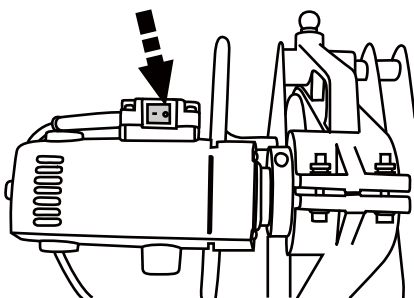


Rest the trimmer on the lower piston rod.

Keep the trimmer stand on the upper piston rod with the help of blocking ball. (Pull the ball and release it after trimmer stand on)

Turn on the trimmer by pressing the start/stop button.

In order to not overstress the trimmer motor, you should increase the milling pressure gradually, to overcome the dragging pressure P_t . And the milling pressure could be up to maximum 10bar.

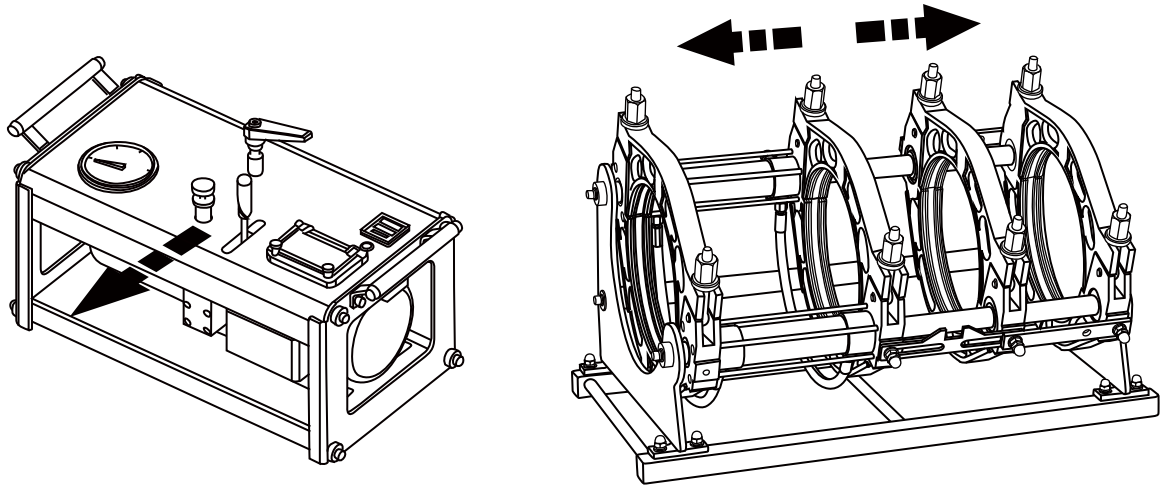


When the continuous and even chip comes out from both pipe ends, stop the motor by pressing the start/stop button.

Open the machine carriage, remove the trimmer, and place it in its support. Please remove the chips without touching the trimmed ends. Please clean the pipe ends if some dust remains.

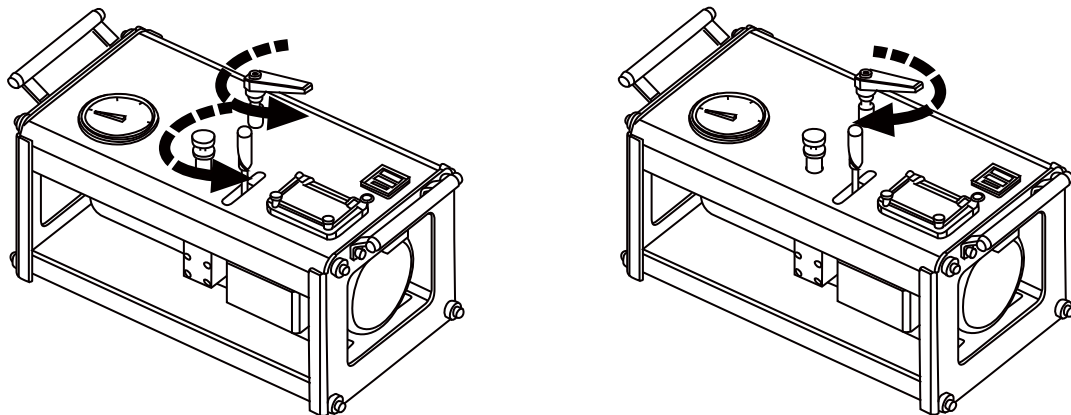
5.11 Measuring The Dragging Pressure P_t

Pull the direction lever maximum and open the machine carriage completely.

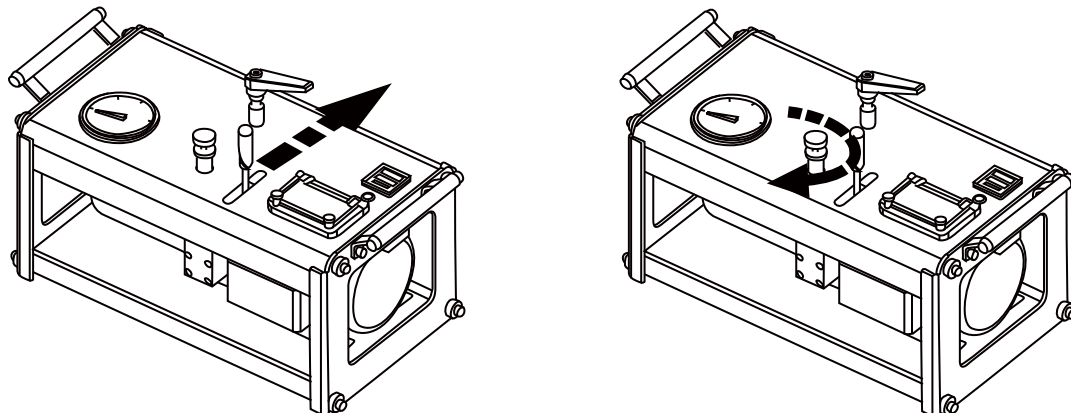


Zero the pressure in the hydraulic system by rotating the pressure relief valve and pressure regulated valve in counterclockwise way.

Then close the pressure relief valve by rotating it in clockwise way.



Then push the direction lever to maximum and gradually rotate the pressure regulated valve in a clockwise way, until the movable carriage gets in motion. Read the current pressure on the gauge and writ it down.

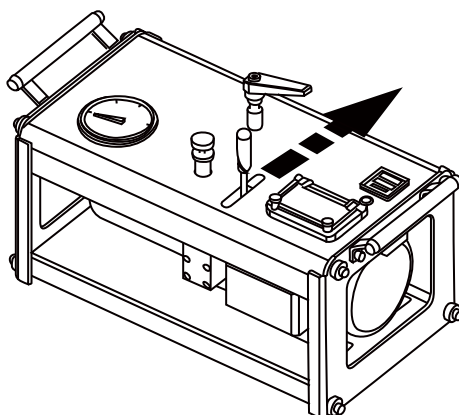


Note: You are requested to measure the dragging pressure before every welding.

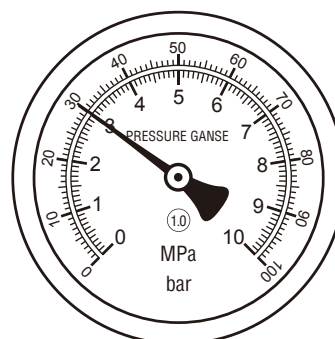
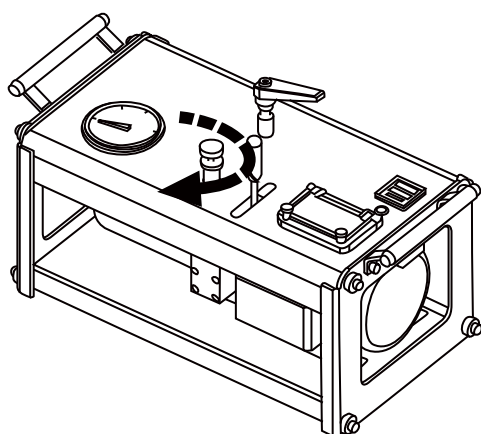
5.12 Single Pressure Welding Cycle

Set the Phase 1 pressure (P_1+P_t) on the hydraulic power unit.

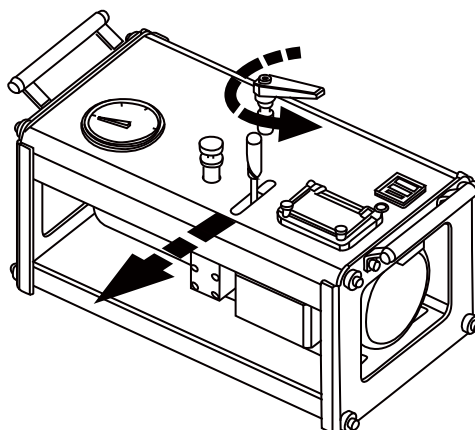
Close the machine carriage and push the direction lever to the maximum.



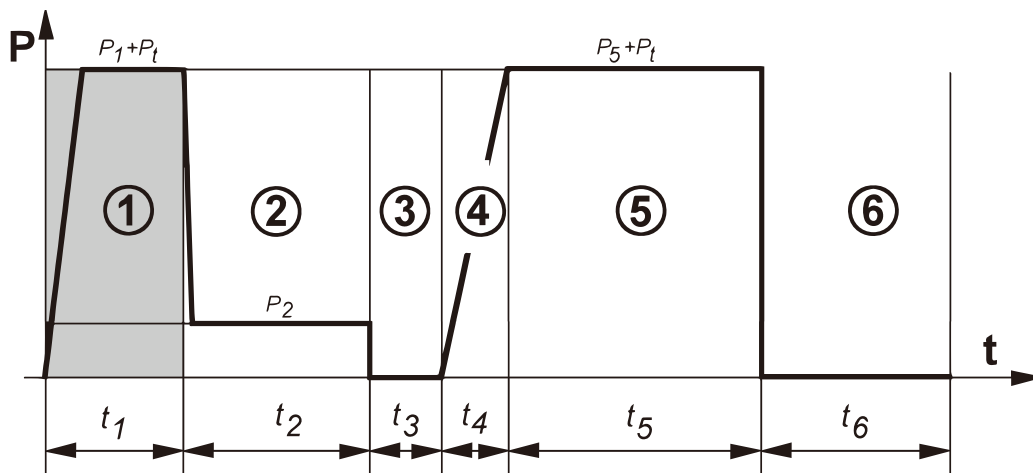
Gradually rotating the pressure regulated valve in a clockwise way until the pressure gauge show the pressure (P_1+P_t).



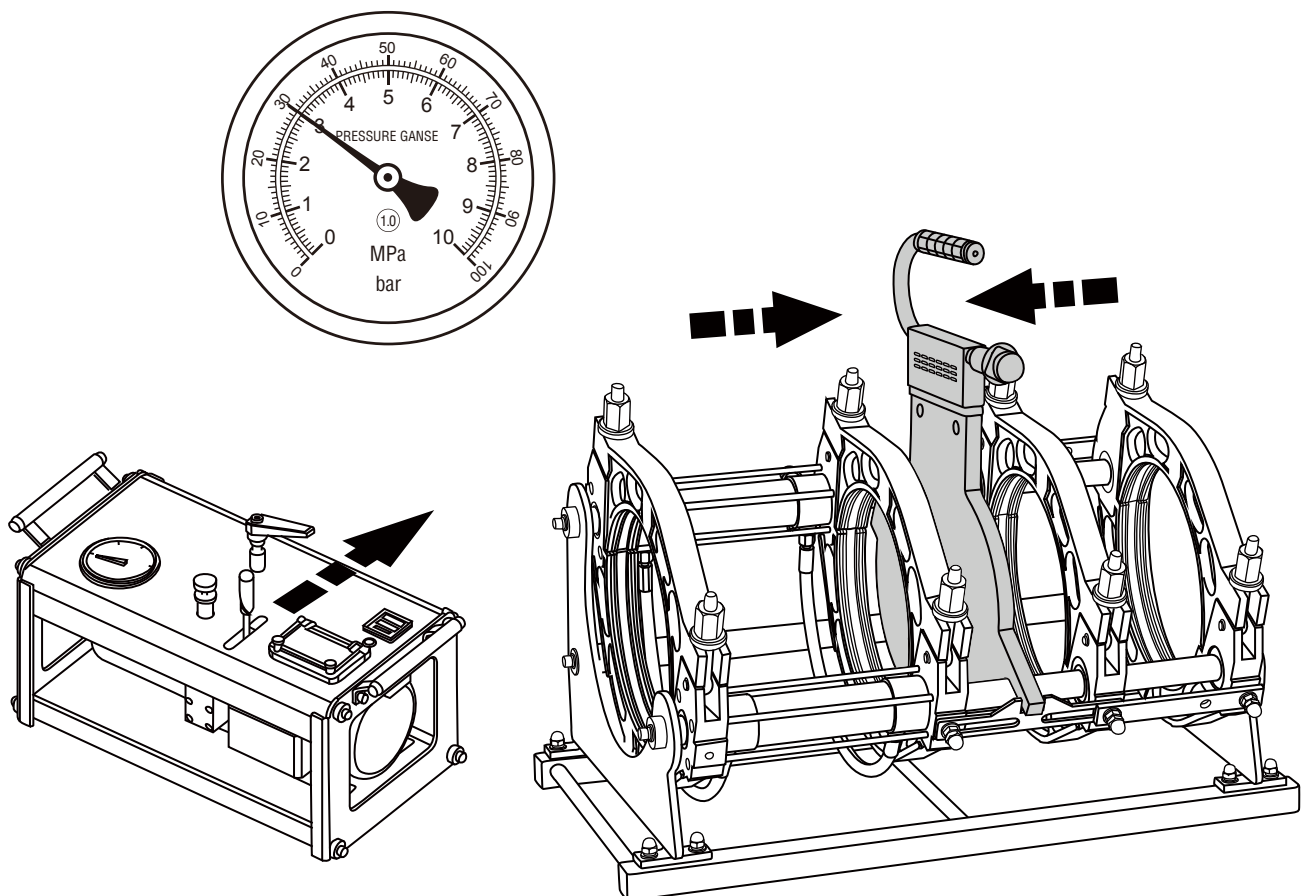
Then open the pressure relief valve by rotating it in a counterclockwise way, and pull the direction lever to open the machine carriage completely.



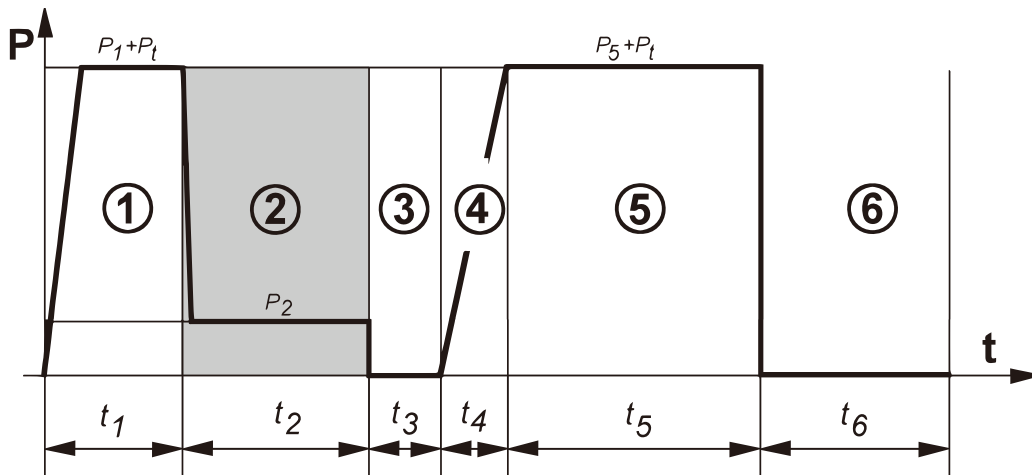
Phase 1: Bead Up



When the heating plate reaches the set temperature, insert it in between the two pipe ends. Close the pressure relief valve by rotating it in a clockwise way. And push the direction lever to close the carriage and keep the bead up pressure (P_1+P_t) until the bead height reaches the requested one. Then release the direction lever slowly.



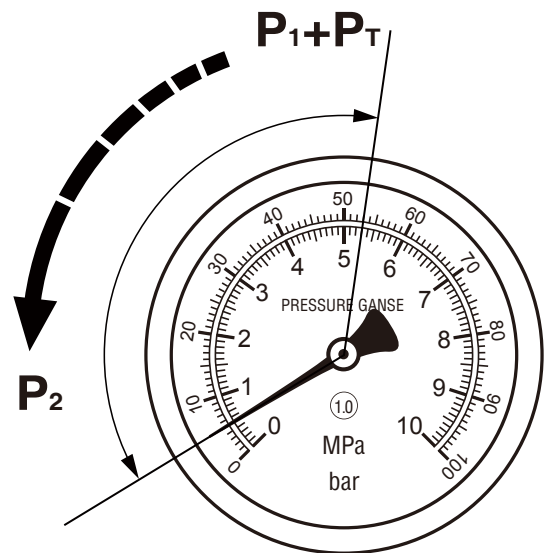
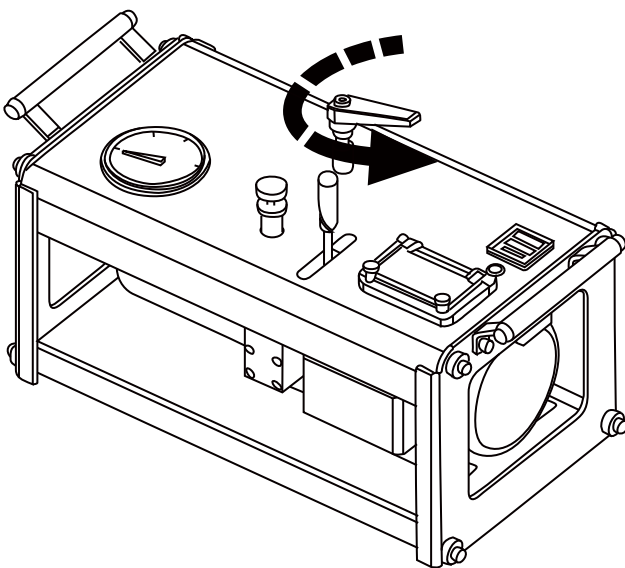
Phase 2: Soaking



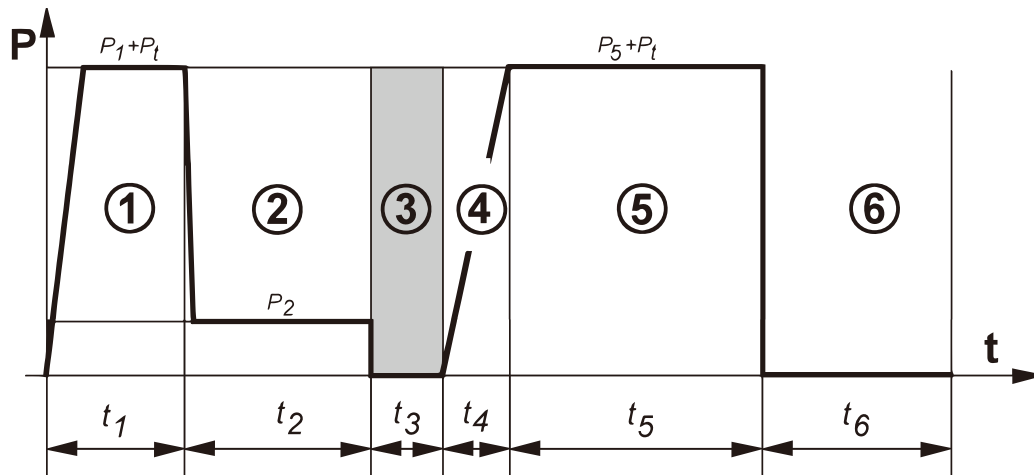
(Soaking pressure is needed to keep the two pipe ends in contact with the heating plate during this period.)

Slowly release the pressure relief valve in a counterclockwise way until the pressure gauge shows up the soaking pressure (P_2), then close the pressure relief valve immediately in a clockwise way.

Wait for T_2 time to end. But please be sure that the pipe ends never detach from the heating plate. If this happen, please repeat the welding.

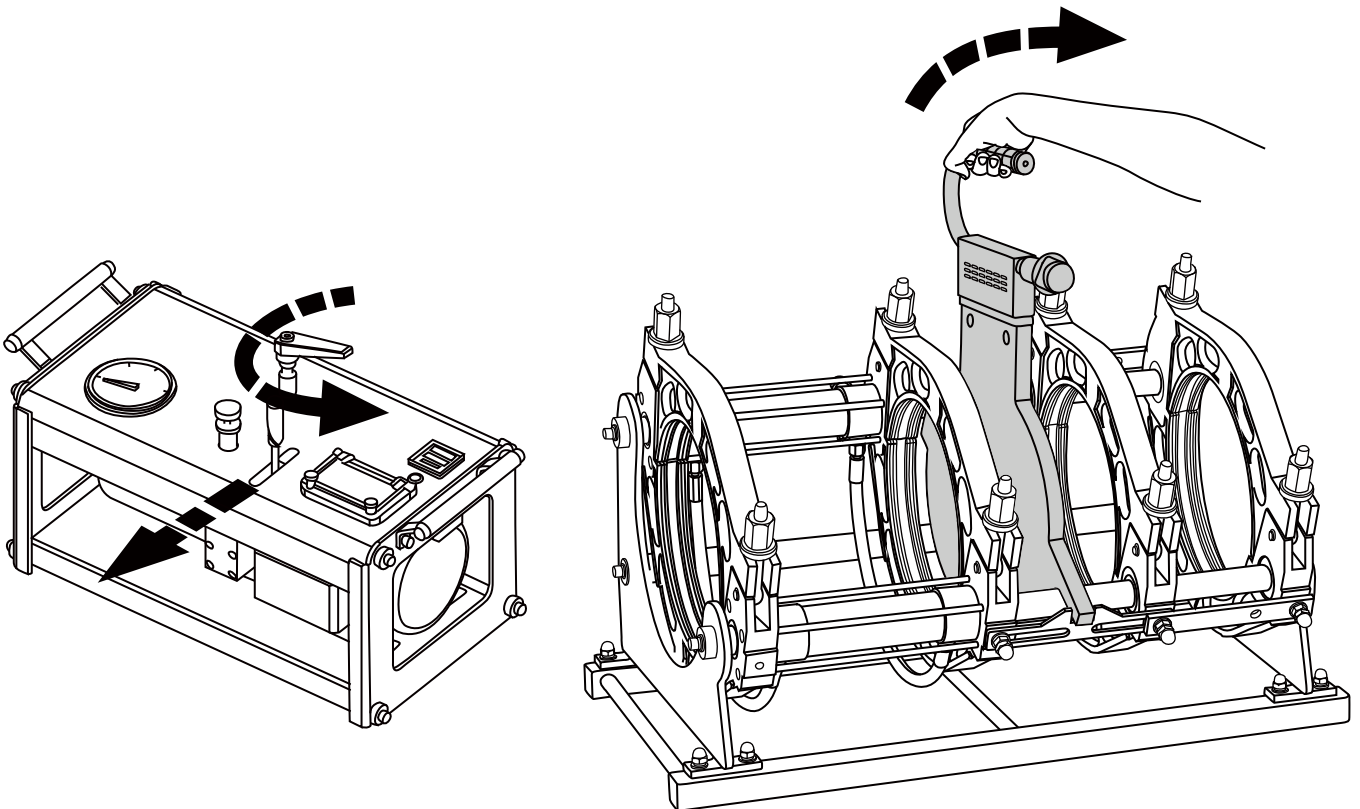


Phase 3: Removal of Heating Plate

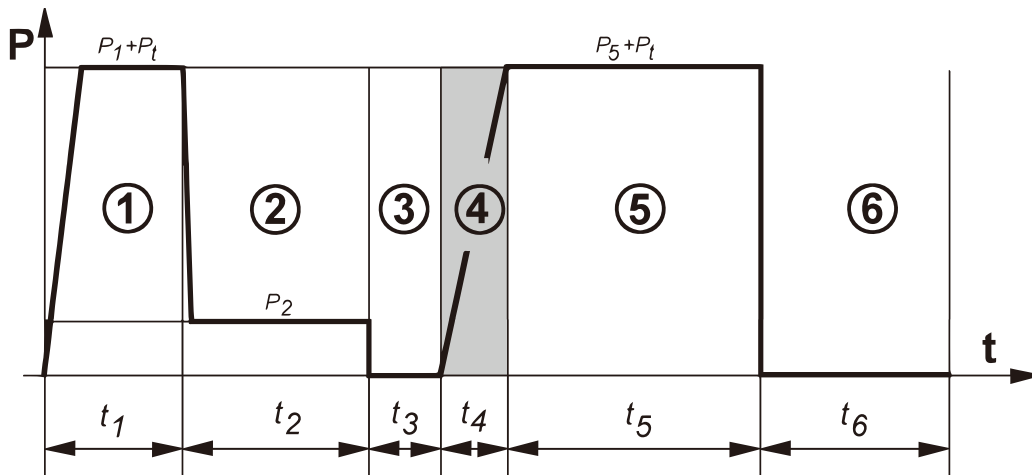


Once the T2 time ended,

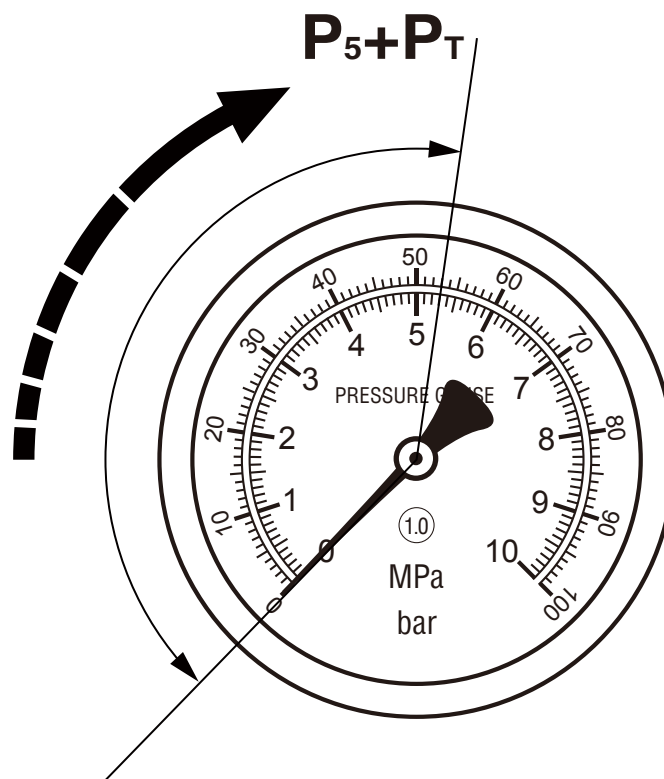
Open the pressure relief valve, and open the machine carriage by pulling the direction lever, And remove the heating plate within T3 time.



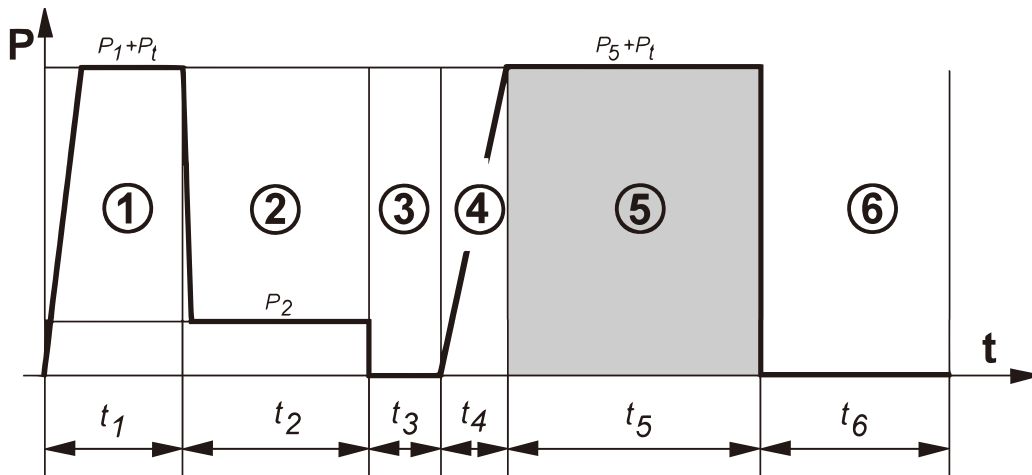
Phase 4: Reach of Welding Pressure



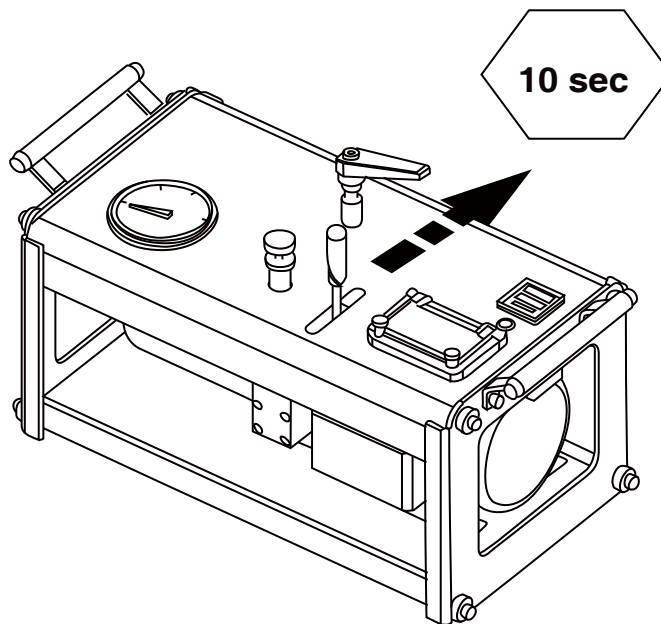
Close the pressure relief valve, and push the direction lever to maximum , meanwhile gradually increasing the pressure until the pressure gauge reaches the welding pressure ($P_5 + P_t$) , within T_4 time.



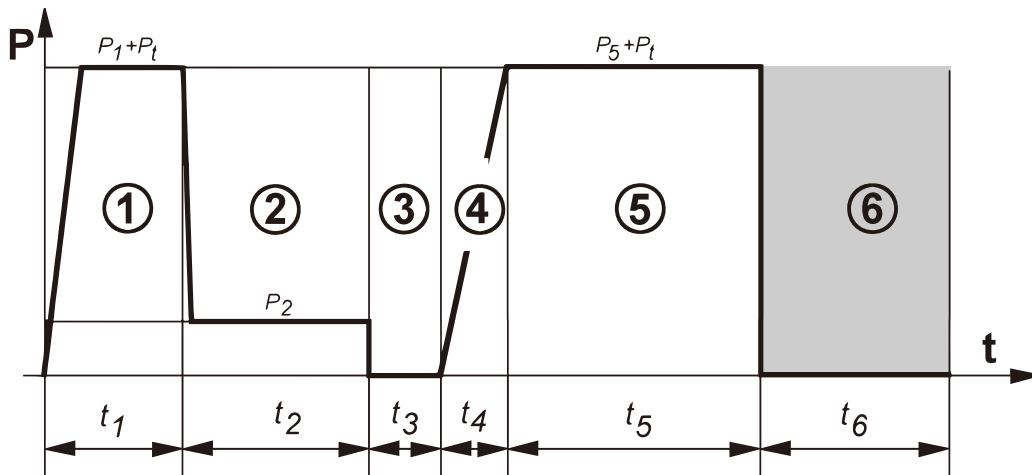
Phase 5: Welding



To stabilize the pressure ($P_5 + P_t$), please keep the direction lever pushed for around 10 seconds. Then release the direction lever slowly. Wait T_5 time to end.



Phase 6: Cooling



After time **T₅**, release the pressure by rotating pressure relief valve in a counterclockwise way and remove the jointed pipe from the machine after time **T₆**.

When you continue next joints:

1. You are suggested to measure the dragging pressure again.
2. You are suggested to measure the bead-up and welding pressure again.
3. You could use the memory time(**T₂** and **T₅**) already set by timer if welding pipe with same specifications.
4. If weld other pipes with different specifications, please repeat above steps with the standard used.

When you complete the welding:

1. Open the jaws and remove the welded pipe.
2. Unplug the machines from the main power and disconnect all cables.
3. Clean the machine accurately.



6. Maintenance

Note: Please use the recommended hydraulic oil to replace used oil (See technical specification chart).

Used oil is very pollutant, take it to the nearest hazardous waste collection site.

Item	Description	Check before use	First month	Every 6 months	Every year
Trimmer	◎ Replace both blades ◎ Replace the cable if it is broken ◎ Tighten mechanical connections	•	•	•	•
Heating plate	◎ Clean the heating plate ◎ Re-coat heating plate with Teflon again if necessary or replace the heating plate ◎ Tighten mechanical connections	•		•	•
Hydraulic system	◎ Check pressure gauge if works in normal or not ◎ Replace seals if the hydraulic unit is leaking ◎ Check the oil level ◎ Completely replace the hydraulic oil ◎ Replace if the oil hose is broken ◎ Keep the quick coupling and connectors clean	•	•	•	•
Basic Frame	◎ Keep piston rod clear ◎ Keep the quick coupling connectors clean ◎ After use, cover the quick coupling connectors with plastic cap ◎ Tighten mechanical connections	•	•	•	
Power Supply	◎ Press the testing button of circuit protector to make sure it works ◎ Replace the cable, plug and sockets if broken	•			

7. Trouble shooting

If the malfunctions happened with your V series machines, please send the machine to Riyang`s authorized dealer or contact directly Riyang in China. We will assist you to resolve the problems. If your machine still under warranty period, Riyang dealer will totally cover the responsibility to fix your machine; if no Riyang dealer in your area, we will send you the replacement parts, and replace it by certified technical personnel.

Note: Please unplug the machine from main power before you working on the electrical problems.

7.1 Hydraulic Power Unit

❶ Problem: The pump motor does not work.	
Possible Cause	Solution
Power source not connected well	Check the power cable connected well with main power or not.
Sockets connection is loosen	Check the sockets connection, please restore it if necessary.
Failure on the electrical parts	Check the micro-switch, solid relay.

❷ Problem: The pump motor rotating slowly with abnormal noise.	
Possible Cause	Solution
The motor is overloaded	Make sure the working pressure is less than 80bar.
The oil filter is blocked	Check the oil filter and clean it.
Failure on the motor	Repair or replace the motor.
The input voltage is unstable	Check the power instability.

③ Problem: Oil leakage.	
Possible Cause	Solution
Quick coupling connectors loosen or worn out	Tighten the loosen connectors, or replace the worn-out connectors.
Hydraulic hoses worn out	Replace the hydraulic hoses.
Oil seal between oil tank and block not fitted well	Restore the oil seal, replace it if necessary.
The hydraulic block is not working well	Replace the hydraulic block.

④ Problem: Lack of pressure.	
Possible Cause	Solution
Hydraulic oil in the tank is not sufficient	Add the oil to requested level.
The pressure relief valve is not closed completely	Completely close the pressure relief valve by rotating in a clockwise way.
Air in the hydraulic system	Directly unite the quick coupling connectors-connections (hydraulic power unit), and activate the hydraulic motor for 30 seconds by pushing the direction lever.
The pressure relief valve is out of operation	Replace the pressure relief valve.
The quick coupling connector is blocked	Replace the quick coupling connectors.

7.2 Machine Carriage

❶ Problem: Oil leakage.	
Possible Cause	Solution
Quick coupling connectors loosen or worn out	Tighten the loosen connectors, or replace the worn-out connectors.
Hydraulic hoses worn out	Replace the hydraulic hoses.
Oil seal kit not fitted well or worn out	Please restore the kit if necessary or replace it.
Cylinder or piston scratched or worn out	Please replace it.

❷ Problem: Carriage is trembling when in motion.	
Possible Cause	Solution
Lack pressure caused by air in the hydraulic cylinders	Move the machine carriage back and forward by activating the direction lever, until the air is eliminated.

7.3 Heating Plate

❶ Problem: The temperature display shows up“HH”.	
Possible Cause	Solution
Circuit open	Check the heating sensor connected well or not. Check the sockets disconnected or not. Check the cable disconnected or not.

❷ Problem: The heating plate can not heat up, display indicated the environment temperature.	
Possible Cause	Solution
Signal interrupted	Replace the solid relay. Replace the temperature controller.

③ Problem: The heating plate can heat up, however the display not show the actual temperature.	
Possible Cause	Solution
Failure on the temperature controller	Replace the temperature controller.

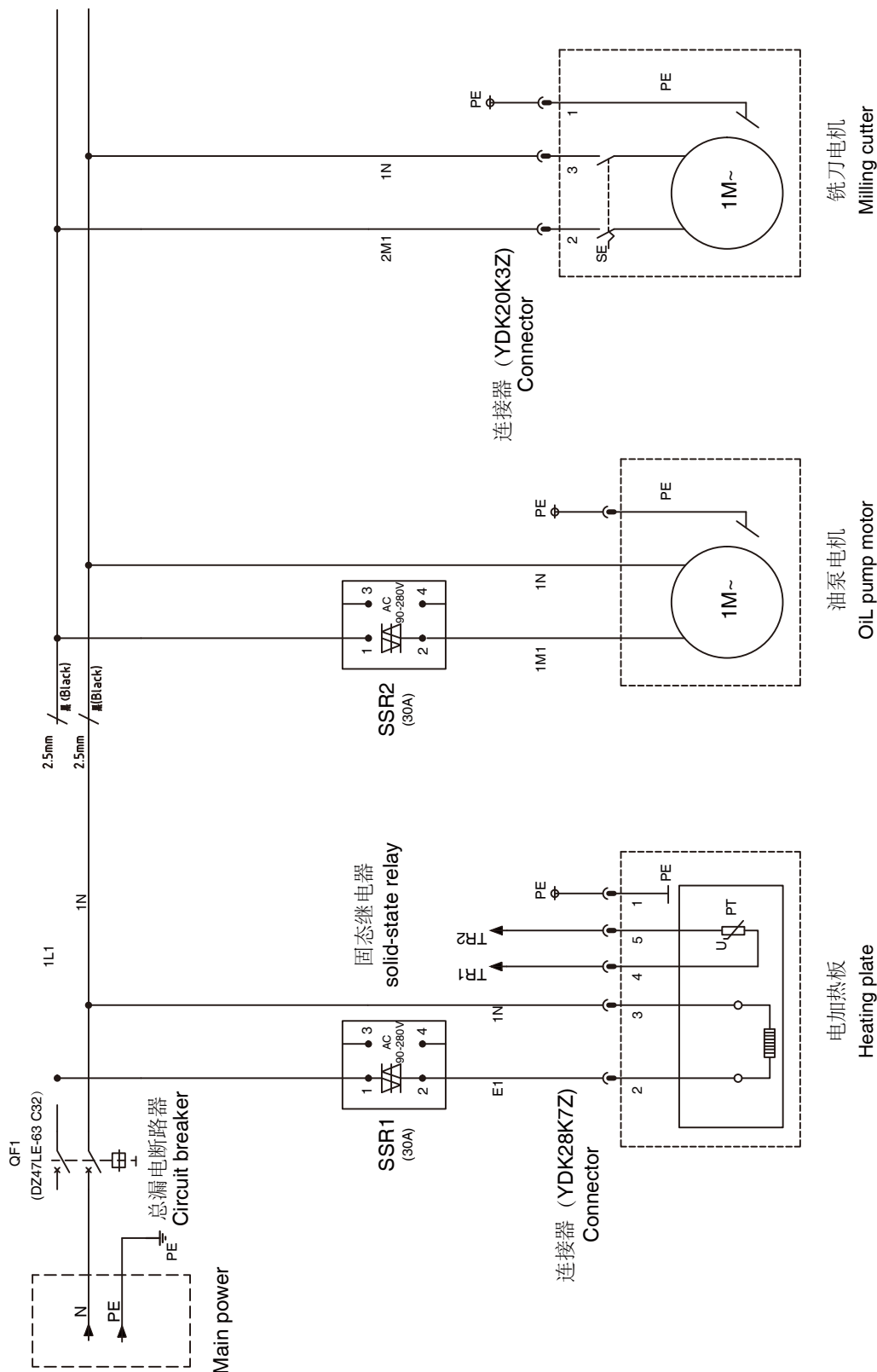
7.4 Trimmer

① Problem: The motor does not work.	
Possible Cause	Solution
Power source not connected well	Check the power cable connected well with main power or not.
Sockets connection is loosen	Check the sockets connection, please restore it if necessary.
Failure on motor	Repair it, if can not, replace it.

② Problem: It could not face the pipe ends with continuous chips.	
Possible Cause	Solution
Blade is blunt	Switch to another side, or replace it.
Blade surface lower than the trimmer plate	Using thin paper or copper to fill in between blade and trimmer plate.

8. Schematic Diagram

Please unplug the machine from main power before you working on the electrical components.
All inspection and intervention on the electrical system should be under process of the certified electrical personnel.



WELDING PARAMETER CHARTS

V160

RAM=6.27 cm²

HDPE

DVS2207-1-2016

ISO21307-2017

PP

DVS2207-11 (2017)

TEMP: 220 ±10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time		Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
50	41	1.2	1	1	1	0.5	0.03	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	1.5	1	1	1	0.5	0.04	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	1.9	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	2.4	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	17	2.9	1	1	1	0.5	0.07	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	13.6	3.7	1	1	1	0.5	0.09	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	11	4.5	2	2	2	1.0	0.11	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	9	5.6	2	2	2	1.0	0.13	0m 58s	5.5s	5.5s	2	2	2	0h 5m	0h 6m	0h 8m
63	7.4	6.8	2	2	2	1.0	0.15	1m 10s	6s	6s	2	2	2	0h 6m	0h 7m	0h 9m
	41	1.5	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	1.9	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.4	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	3.0	1	1	2	0.5	0.10	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	17	3.7	2	2	2	0.5	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	13.6	4.6	2	2	2	1.0	0.14	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	11	5.7	2	3	3	1.0	0.17	0m 58s	5.5s	5.5s	2	3	3	0h 5m	0h 6m	0h 8m
75	9	7.0	3	3	3	1.5	0.20	1m 10s	6s	6s	3	3	3	0h 6m	0h 8m	0h 10m
	7.4	8.5	3	4	4	1.5	0.24	1m 27s	6.7s	6.7s	3	4	4	0h 7m	0h 9m	0h 11m
	41	1.8	1	1	1	0.5	0.07	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.3	1	1	1	0.5	0.09	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.9	2	2	2	0.5	0.11	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	21	3.6	2	2	2	0.5	0.13	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	17	4.4	2	2	3	0.5	0.16	0m 45s	5s	5s	2	2	3	0h 4m	0h 5m	0h 7m
	13.6	5.5	3	3	3	1.0	0.20	0m 58s	5.5s	5.5s	3	3	3	0h 5m	0h 6m	0h 8m
90	11	6.8	3	4	4	1.0	0.24	1m 10s	6s	6s	3	4	4	0h 6m	0h 7m	0h 9m
	9	8.3	4	4	5	1.5	0.28	1m 21s	6.5s	6.5s	4	4	5	0h 7m	0h 8m	0h 11m
	7.4	10.1	5	5	5	1.5	0.33	1m 43s	7.4s	7.4s	5	5	5	0h 8m	0h 10m	0h 13m
	41	2.2	1	2	2	0.5	0.10	0m 45s	5s	5s	1	2	2	0h 4m	0h 5m	0h 7m
	33	2.7	2	2	2	0.5	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	3.5	2	2	3	0.5	0.16	0m 45s	5s	5s	2	2	3	0h 4m	0h 5m	0h 7m
	21	4.3	3	3	3	0.5	0.19	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	17	5.3	3	3	4	1.0	0.23	0m 51s	5.3s	5.3s	3	3	4	0h 4m	0h 6m	0h 7m
110	13.6	6.6	4	4	5	1.0	0.28	1m 10s	6s	6s	4	4	5	0h 6m	0h 7m	0h 9m
	11	8.2	5	5	5	1.5	0.34	1m 21s	6.5s	6.5s	5	5	5	0h 7m	0h 8m	0h 11m
	9	10.0	6	6	7	1.5	0.41	1m 43s	7.4s	7.4s	6	6	7	0h 8m	0h 10m	0h 13m
	7.4	12.2	7	7	8	2.0	0.48	2m 0s	8s	8s	7	7	8	0h 10m	0h 12m	0h 16m
	41	2.7	2	2	2	0.5	0.15	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	3.3	3	3	3	0.5	0.18	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	26	4.2	3	3	4	0.5	0.23	0m 45s	5s	5s	3	3	4	0h 4m	0h 5m	0h 7m
	21	5.2	4	4	4	1.0	0.28	0m 51s	5.3s	5.3s	4	4	4	0h 4m	0h 6m	0h 7m
125	17	6.5	5	5	5	1.0	0.34	1m 4s	5.8s	5.8s	5	5	5	0h 5m	0h 7m	0h 8m
	13.6	8.1	6	6	7	1.5	0.42	1m 21s	6.5s	6.5s	6	6	7	0h 7m	0h 8m	0h 11m
	11	10.0	7	8	8	1.5	0.51	1m 43s	7.4s	7.4s	7	8	8	0h 8m	0h 10m	0h 13m
	9	12.2	8	9	10	2.0	0.60	2m 0s	8s	8s	8	9	10	0h 10m	0h 12m	0h 16m
	7.4	14.9	10	11	11	2.0	0.71	2m 27s	8.8s	9.2s	10	11	11	0h 11m	0h 14m	0h 19m
	41	3.0	3	3	3	0.5	0.19	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	33	3.8	3	4	4	0.5	0.24	0m 45s	5s	5s	3	4	4	0h 4m	0h 5m	0h 7m
	26	4.8	4	4	5	1.0	0.29	0m 45s	5s	5s	4	4	5	0h 4m	0h 5m	0h 7m
140	21	6.0	5	5	6	1.0	0.36	0m 58s	5.5s	5.5s	5	5	6	0h 5m	0h 6m	0h 8m
	17	7.4	6	7	7	1.5	0.44	1m 10s	6s	6s	6	7	7	0h 6m	0h 8m	0h 10m
	13.6	9.2	8	8	9	1.5	0.54	1m 32s	6.9s	6.9s	8	8	9	0h 7m	0h 9m	0h 12m
	11	11.4	9	10	10	1.5	0.65	1m 55s	7.8s	7.8s	9	10	10	0h 9m	0h 11m	0h 14m
	9	13.9	11	12	12	2.0	0.78	2m 16s	8.5s	8.7s	11	12	12	0h 11m	0h 13m	0h 17m
	7.4	16.9	13	14	15	2.0	0.92	2m 49s	9.4s	10.1s	13	14	15	0h 12m	0h 16m	0h 21m
	41	3.4	3	4	4	0.5	0.24	0m 45s	5s	5s	3	4	4	0h 4m	0h 5m	0h 7m
	33	4.2	4	4	5	0.5	0.29	0m 45s	5s	5s	4	4	5	0h 4m	0h 5m	0h 7m
160	26	5.4	5	6	6	1.0	0.37	0m 51s	5.3s	5.3s	5	6	6	0h 4m	0h 6m	0h 7m
	21	6.7	6	7	7	1.0	0.45	1m 10s	6s	6s	6	7	7	0h 6m	0h 7m	0h 9m
	17	8.2	8	8	9	1.5	0.55	1m 21s	6.5s	6.5s	8	8	9	0h 7m	0h 8m	0h 11m
	13.6	10.3	9	10	11	1.5	0.67	1m 43s	7.4s	7.4s	9	10	11	0h 8m	0h 10m	0h 13m
	11	12.7	11	12	13	2.0	0.82	2m 5s	8.2s	8.3s	11	12	13	0h 10m	0h 13m	0h 16m
	9	15.6	14	15	16	2.0	0.97	2m 38s	9.1s	9.7s	14	15	16	0h 12m	0h 15m	0h 20m
	7.4	18.9	16	17	18	2.0	1.15	3m 10s	10s	11s	16	17	18	0h 14m	0h 18m	0h 23m
	41	3.9	4	5	5	0.5	0.31	0m 45s	5s	5s	4	5	5	0h 4m	0h 5m	0h 7m
	33	4.8	5	6	6	1.0	0.38	0m 45s	5s	5s	5	6	6	0h 4m	0h 5m	0h 7m
	26	6.2	7	7	8	1.0	0.48	1m 4s	5.8s	5.8s	7	7	8	0h 5m	0h 7m	0h 8m
	21	7.6	8	9	9	1.5	0.59	1m 16s	6.3s	6.3s	8	9	9	0h 6m	0h 8m	0h 10m
	17	9.4	10	11	11	1.5	0.72	1m 32s	6.9s	6.9s	10	11	11	0h 7m	0h 9m	0h 12m
	13.6	11.8	12	13	14	1.5	0.88	2m 0s	8s	8s	12	13	14	0h 9m	0h 12m	0h 15m
	11	14.5	15	16	17	2.0	1.07	2m 27s	8.8s	9.2s	15	16	17	0h 11m	0h 14m	0h 19m
	9	17.8	18	19	20	2.0	1.27	2m 59s	9.7s	10.6s	18	19	20	0h 13m	0h 17m	0h 22m
	7.4	21.6	21	23	24	2.5	1.50	3m 37s	10.8s	12.2s	21	23	24	0h 16m	0h 20m	0h 27m

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)										Buildup Time
D _n	SDR	e _s	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max	Up to 15°C	15°C to 25°C	
50	41	1.2	0	0	0	0.5	0.03	0m 53s	5s	6s	0	0	0	0h 4m	0h 5m	0h 7m
	33	1.5	0	0	1	0.5	0.04	0m 53s	5s	6s	0	0	1	0h 4m	0h 5m	0h 7m
	26	1.9	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	2.4	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	2.9	1	1	1	0.5	0.07	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	13.6	3.7	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	11	4.5	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	9	5.6	1	1	1	0.5	0.13	1m 4s	5.4s	6.4s	1	1	1	0h 5m	0h 6m	0h 8m
63	7.4	6.8	1	2	2	0.5	0.15	1m 15s	5.8s	6.8s	1	2	2	0h 6m	0h 7m	0h 9m
	41	1.5	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	1.9	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.4	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	3.0	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	3.7	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	13.6	4.6	1	1	2	0.5	0.14	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	11	5.7	2	2	2	0.5	0.17	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
75	9	7.0	2	2	2	1.0	0.20	1m 21s	6s	7s	2	2	2	0h 6m	0h 8m	0h 10m
	7.4	8.5	2	2	3	1.0	0.24	1m 37s	6.3s	8.2s	2	2	3	0h 7m	0h 9m	0h 11m
	41	1.8	1	1	1	0.5	0.07	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.3	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.9	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	3.6	1	1	2	0.5	0.13	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	17	4.4	2	2	2	0.5	0.16	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	13.6	5.5	2	2	2	0.5	0.20	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
90	11	6.8	2	2	3	0.5	0.24	1m 15s	5.8s	6.8s	2	2	3	0h 6m	0h 7m	0h 9m
	9	8.3	3	3	3	1.0	0.28	1m 32s	6.2s	7.8s	3	3	3	0h 7m	0h 8m	0h 11m
	7.4	10.1	3	3	4	1.0	0.33	1m 53s	6.6s	9.4s	3	3	4	0h 8m	0h 10m	0h 13m
	41	2.2	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	2	2	0.5	0.16	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	21	4.3	2	2	2	0.5	0.19	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	17	5.3	2	2	3	0.5	0.23	0m 59s	5.2s	6.2s	2	2	3	0h 4m	0h 6m	0h 7m
110	13.6	6.6	3	3	3	0.5	0.28	1m 15s	5.8s	6.8s	3	3	3	0h 6m	0h 7m	0h 9m
	11	8.2	3	3	4	0.5	0.34	1m 32s	6.2s	7.8s	3	3	4	0h 7m	0h 8m	0h 11m
	9	10.0	4	4	5	0.5	0.41	1m 53s	6.6s	9.4s	4	4	5	0h 8m	0h 10m	0h 13m
	7.4	12.2	4	5	5	0.5	0.48	2m 15s	7s	11s	4	5	5	0h 10m	0h 12m	0h 16m
	41	2.7	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	33	3.3	2	2	2	0.5	0.18	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	26	4.2	2	2	3	0.5	0.23	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	21	5.2	3	3	3	0.5	0.28	0m 59s	5.2s	6.2s	3	3	3	0h 4m	0h 6m	0h 7m
125	17	6.5	3	3	4	0.5	0.34	1m 10s	5.6s	6.6s	3	3	4	0h 5m	0h 7m	0h 8m
	13.6	8.1	4	4	5	1.0	0.42	1m 32s	6.2s	7.8s	4	4	5	0h 7m	0h 8m	0h 11m
	11	10.0	5	5	6	1.0	0.51	1m 53s	6.6s	9.4s	5	5	6	0h 8m	0h 10m	0h 13m
	9	12.2	5	6	7	1.0	0.60	2m 15s	7s	11s	5	6	7	0h 10m	0h 12m	0h 16m
	7.4	14.9	6	7	8	1.0	0.71	2m 40s	7.8s	13.2s	6	7	8	0h 11m	0h 14m	0h 19m
	41	3.0	2	2	2	0.5	0.19	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	33	3.8	2	2	3	0.5	0.24	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	26	4.8	3	3	3	0.5	0.29	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
140	21	6.0	3	4	4	0.5	0.36	1m 4s	5.4s	6.4s	3	4	4	0h 5m	0h 6m	0h 8m
	17	7.4	4	4	5	1.0	0.44	1m 21s	6s	7s	4	4	5	0h 6m	0h 8m	0h 10m
	13.6	9.2	5	5	6	1.0	0.54	1m 43s	6.4s	8.6s	5	5	6	0h 7m	0h 9m	0h 12m
	11	11.4	6	7	7	1.0	0.65	2m 4s	6.8s	10.2s	6	7	7	0h 9m	0h 11m	0h 14m
	9	13.9	7	8	9	1.0	0.78	2m 30s	7.5s	12.3s	7	8	9	0h 11m	0h 13m	0h 17m
	7.4	16.9	8	9	10	1.0	0.92	3m 1s	8.3s	14.9s	8	9	10	0h 12m	0h 16m	0h 21m
	41	3.4	2	2	3	0.5	0.24	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	33	4.2	3	3	3	0.5	0.29	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
160	26	5.4	3	4	4	0.5	0.37	0m 59s	5.2s	6.2s	3	4	4	0h 4m	0h 6m	0h 7m
	21	6.7	4	5	5	0.5	0.45	1m 15s	5.8s	6.8s	4	5	5	0h 6m	0h 7m	0h 9m
	17	8.2	5	6	6	1.0	0.55	1m 32s	6.2s	7.8s	5	6	6	0h 7m	0h 8m	0h 11m
	13.6	10.3	6	7	7	1.0	0.67	1m 53s	6.6s	9.4s	6	7	7	0h 8m	0h 10m	0h 13m
	11	12.7	7	8	9	1.0	0.82	2m 20s	7.2s	11.5s	7	8	9	0h 10m	0h 13m	0h 16m
	9	15.6	9	10	11	1.0	0.97	2m 51s	8s	14s	9	10	11	0h 12m	0h 15m	0h 20m
	7.4	18.9	10	12	13	1.0	1.15	3m 21s	8.9s	16.6s	10	12	13	0h 14m	0h 18m	0h 23m
	41	3.9	3	3	3	0.5	0.31	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
	33	4.8	3	4	4	0.5	0.38	0m 53s	5s	6s	3	4	4	0h 4m	0h 5m	0h 7m
	26	6.2	4	5	5	0.5	0.48	1m 10s	5.6s	6.6s	4	5	5	0h 5m	0h 7m	0h 8m
	21	7.6	5	6	6	1.0	0.59	1m 26s	6.1s	7.4s	5	6	6	0h 6m	0h 8m	0h 10m
	17	9.4	6	7	8	1.0	0.72	1m 43s	6.4s	8.6s	6	7	8	0h 7m	0h 9m	0h 12m
	13.6	11.8	8	9	10	1.0	0.88	2m 10s	6.9s	10.6s	8	9	10	0h 9m	0h 12m	0h 15m
	11	14.5	10	11	12	1.0	1.07	2m 40s	7.8s	13.2s	10	11	12	0h 11m	0h 14m	0h 19m
	9	17.8	12	13	14	1.0	1.27	3m 11s	8.6s	15.8s	12	13	14	0h 13m	0h 17m	0h 22m
	7.4	21.6	14	15	17	1.5	1.50	3m 49s	9.8s	18.8s	14	15	17	0h 16m	0h 20m	0h 27m

WELDING PARAMETER CHARTS

V200

RAM=6.27 cm²

HDPE

**DVS2207-1-2016
ISO21307-2017**

PP

DVS2207-11 (2017)

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimum Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR			Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
200	41	4.9	7	7	8	1.0	0.48	0m 45s	5s	5s	7	7	8	0h 4m	0h 5m	0h 7m
	33	6.1	8	9	10	1.0	0.59	1m 4s	5.8s	5.8s	8	9	10	0h 5m	0h 7m	0h 8m
	26	7.7	10	11	12	1.5	0.75	1m 16s	6.3s	6.3s	10	11	12	0h 6m	0h 8m	0h 10m
	21	9.5	13	14	15	1.5	0.91	1m 38s	7.2s	7.2s	13	14	15	0h 8m	0h 10m	0h 13m
	17	11.8	16	17	18	1.5	1.11	2m 0s	8s	8s	16	17	18	0h 9m	0h 12m	0h 15m
	13.6	14.7	19	21	22	2.0	1.37	2m 27s	8.8s	9.2s	19	21	22	0h 11m	0h 14m	0h 19m
	11	18.2	23	25	27	2.0	1.66	3m 5s	9.9s	10.8s	23	25	27	0h 13m	0h 17m	0h 23m
	9	22.2	28	30	32	2.5	1.98	3m 42s	11s	12.4s	28	30	32	0h 16m	0h 21m	0h 28m
	7.4	27.0	33	35	38	3.0	2.35	4m 31s	12.4s	14.5s	33	35	38	0h 20m	0h 25m	0h 33m

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimum Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time		Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _s	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
63	41	1.5	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	1.9	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.4	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	3.0	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	3.7	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	13.6	4.6	1	1	2	0.5	0.14	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	11	5.7	2	2	2	0.5	0.17	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
	9	7.0	2	2	2	1.0	0.20	1m 21s	6s	7s	2	2	2	0h 6m	0h 8m	0h 10m
75	7.4	8.5	2	2	3	1.0	0.24	1m 37s	6.3s	8.2s	2	2	3	0h 7m	0h 9m	0h 11m
	41	1.8	1	1	1	0.5	0.07	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.3	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	2.9	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	3.6	1	1	2	0.5	0.13	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	17	4.4	2	2	2	0.5	0.16	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	13.6	5.5	2	2	2	0.5	0.20	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
	11	6.8	2	2	3	0.5	0.24	1m 15s	5.8s	6.8s	2	2	3	0h 6m	0h 7m	0h 9m
90	9	8.3	3	3	3	1.0	0.28	1m 32s	6.2s	7.8s	3	3	3	0h 7m	0h 8m	0h 11m
	7.4	10.1	3	3	4	1.0	0.33	1m 53s	6.6s	9.4s	3	3	4	0h 8m	0h 10m	0h 13m
	41	2.2	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	2	2	0.5	0.16	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	21	4.3	2	2	2	0.5	0.19	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	17	5.3	2	2	3	0.5	0.23	0m 59s	5.2s	6.2s	2	2	3	0h 4m	0h 6m	0h 7m
	13.6	6.6	3	3	3	0.5	0.28	1m 15s	5.8s	6.8s	3	3	3	0h 6m	0h 7m	0h 9m
110	11	8.2	3	3	4	1.0	0.34	1m 32s	6.2s	7.8s	3	3	4	0h 7m	0h 8m	0h 11m
	9	10.0	4	4	5	1.0	0.41	1m 53s	6.6s	9.4s	4	4	5	0h 8m	0h 10m	0h 13m
	7.4	12.2	4	5	5	1.0	0.48	2m 15s	7s	11s	4	5	5	0h 10m	0h 12m	0h 16m
	41	2.7	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	33	3.3	2	2	2	0.5	0.18	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	26	4.2	2	2	3	0.5	0.23	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	21	5.2	3	3	3	0.5	0.28	0m 59s	5.2s	6.2s	3	3	3	0h 4m	0h 6m	0h 7m
	17	6.5	3	3	4	0.5	0.34	1m 10s	5.6s	6.6s	3	3	4	0h 5m	0h 7m	0h 8m
125	13.6	8.1	4	4	5	1.0	0.42	1m 32s	6.2s	7.8s	4	4	5	0h 7m	0h 8m	0h 11m
	11	10.0	5	5	6	1.0	0.51	1m 53s	6.6s	9.4s	5	5	6	0h 8m	0h 10m	0h 13m
	9	12.2	5	6	7	1.0	0.60	2m 15s	7s	11s	5	6	7	0h 10m	0h 12m	0h 16m
	7.4	14.9	6	7	8	1.0	0.71	2m 40s	7.8s	13.2s	6	7	8	0h 11m	0h 14m	0h 19m
	41	3.0	2	2	2	0.5	0.19	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	33	3.8	2	2	3	0.5	0.24	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	26	4.8	3	3	3	0.5	0.29	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
	21	6.0	3	4	4	0.5	0.36	1m 4s	5.4s	6.4s	3	4	4	0h 5m	0h 6m	0h 8m
140	17	7.4	4	4	5	1.0	0.44	1m 21s	6s	7s	4	4	5	0h 6m	0h 8m	0h 10m
	13.6	9.2	5	5	6	1.0	0.54	1m 43s	6.4s	8.6s	5	5	6	0h 7m	0h 9m	0h 12m
	11	11.4	6	7	7	1.0	0.65	2m 4s	6.8s	10.2s	6	7	7	0h 9m	0h 11m	0h 14m
	9	13.9	7	8	9	1.0	0.78	2m 30s	7.5s	12.3s	7	8	9	0h 11m	0h 13m	0h 17m
	7.4	16.9	8	9	10	1.0	0.92	3m 1s	8.3s	14.9s	8	9	10	0h 12m	0h 16m	0h 21m
	41	3.4	2	2	3	0.5	0.24	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	33	4.2	3	3	3	0.5	0.29	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
	26	5.4	3	4	4	0.5	0.37	0m 59s	5.2s	6.2s	3	4	4	0h 4m	0h 6m	0h 7m
160	21	6.7	4	5	5	0.5	0.45	1m 15s	5.8s	6.8s	4	5	5	0h 6m	0h 7m	0h 9m
	17	8.2	5	6	6	1.0	0.55	1m 32s	6.2s	7.8s	5	6	6	0h 7m	0h 8m	0h 11m
	13.6	10.3	6	7	7	1.0	0.67	1m 53s	6.6s	9.4s	6	7	7	0h 8m	0h 10m	0h 13m
	11	12.7	7	8	9	1.0	0.82	2m 20s	7.2s	11.5s	7	8	9	0h 10m	0h 13m	0h 16m
	9	15.6	9	10	11	1.0	0.97	2m 51s	8s	14s	9	10	11	0h 12m	0h 15m	0h 20m
	7.4	18.9	10	12	13	1.0	1.15	3m 21s	8.9s	16.6s	10	12	13	0h 14m	0h 18m	0h 23m
	41	3.9	3	3	3	0.5	0.31	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
	33	4.8	3	4	4	0.5	0.38	0m 53s	5s	6s	3	4	4	0h 4m	0h 5m	0h 7m
180	26	6.2	4	5	5	0.5	0.48	1m 10s	5.6s	6.6s	4	5	5	0h 5m	0h 7m	0h 8m
	21	7.6	5	6	6	1.0	0.59	1m 26s	6.1s	7.4s	5	6	6	0h 6m	0h 8m	0h 10m
	17	9.4	6	7	8	1.0	0.72	1m 43s	6.4s	8.6s	6	7	8	0h 7m	0h 9m	0h 12m
	13.6	11.8	8	9	10	1.0	0.88	2m 10s	6.9s	10.6s	8	9	10	0h 9m	0h 12m	0h 15m
	11	14.5	10	11	12	1.0	1.07	2m 40s	7.8s	13.2s	10	11	12	0h 11m	0h 14m	0h 19m
	9	17.8	12	13	14	1.0	1.27	3m 11s	8.6s	15.8s	12	13	14	0h 13m	0h 17m	0h 22m
	7.4	21.6	14	15	17	1.5	1.50	3m 49s	9.8s	18.8s	14	15	17	0h 16m	0h 20m	0h 27m
	41	4.4	4	4	4	0.5	0.39	0m 53s	5s	6s	4	4	4	0h 4m	0h 5m	0h 7m
180	33	5.5	4	5	5	0.5	0.48	0m 59s	5.2s	6.2s	4	5	5	0h 4m	0h 6m	0h 7m
	26	6.9	6	6	7	0.5	0.61	1m 15s	5.8s	6.8s	6	6	7	0h 6m	0h 7m	0h 9m
	21	8.6	7	7	8	1.0	0.74	1m 37s	6.3s	8.2s	7	7	8	0h 7m	0h 9m	0h 11m
	17	10.6	8	9	10	1.0	0.90	1m 59s	6.7s	9.8s	8	9	10	0h 9m	0h 11m	0h 14m
	13.6	13.2	10	11	12	1.0	1.11	2m 25s	7.3s	11.9s	10	11	12	0h 10m	0h 13m	0h 17m
	11	16.4	12	14	15	1.0	1.35	2m 56s	8.2s	14.5s	12	14	15	0h 12m	0h 16m	0h 20m
	9	20.0	15	16	18	1.5	1.61	3m 35s	9.3s	17.8s	15	16	18	0h 15m	0h 19m	0h 25m
	7.4	24.3	17	19	21	1.5	1.90	4m 13s	10.5s	20.6s	17	19	21	0h 18m	0h 22m	0h 30m

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR			Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
200	41	4.9	4	5	5	0.5	0.48	0m 53s	5s	6s	4	5	5	0h 4m	0h 5m	0h 7m
	33	6.1	5	6	7	0.5	0.59	1m 10s	5.6s	6.6s	5	6	7	0h 5m	0h 7m	0h 8m
	26	7.7	7	8	8	1.0	0.75	1m 26s	6.1s	7.4s	7	8	8	0h 6m	0h 8m	0h 10m
	21	9.5	8	9	10	1.0	0.91	1m 48s	6.5s	9s	8	9	10	0h 8m	0h 10m	0h 13m
	17	11.8	10	11	12	1.0	1.11	2m 10s	6.9s	10.6s	10	11	12	0h 9m	0h 12m	0h 15m
	13.6	14.7	12	14	15	1.0	1.37	2m 40s	7.8s	13.2s	12	14	15	0h 11m	0h 14m	0h 19m
	11	18.2	15	17	18	1.0	1.66	3m 16s	8.8s	16.2s	15	17	18	0h 13m	0h 17m	0h 23m
	9	22.2	18	20	22	1.5	1.98	3m 54s	9.9s	19.2s	18	20	22	0h 16m	0h 21m	0h 28m
	7.4	27.0	21	24	26	2.0	2.35	4m 39s	11.3s	23s	21	24	26	0h 20m	0h 25m	0h 33m

WELDING PARAMETER CHARTS

V250

RAM=10.99 cm²

HDPE

DVS2207-1-2016

ISO21307-2017

PP

DVS2207-11 (2017)

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum) mm				Buildup Time Max	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max		BAR	Time	Max		Max	Min				Tgt
90	41	2.2	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.07	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.09	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	2	2	2	0.5	0.11	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	17	5.3	2	2	2	1.0	0.13	0m 51s	5.3s	5.3s	2	2	2	0h 4m	0h 6m	0h 7m
	13.6	6.6	2	2	3	1.0	0.16	1m 10s	6s	6s	2	2	3	0h 6m	0h 7m	0h 9m
	11	8.2	3	3	3	1.5	0.20	1m 21s	6.5s	6.5s	3	3	3	0h 7m	0h 8m	0h 11m
	9	10.0	3	4	4	1.5	0.23	1m 43s	7.4s	7.4s	3	4	4	0h 8m	0h 10m	0h 13m
7.4	12.2	4	4	4	2.0	0.28	2m 0s	8s	8s	4	4	4	0h 10m	0h 12m	0h 16m	
110	41	2.7	1	1	1	0.5	0.09	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	2	2	2	0.5	0.11	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	4.2	2	2	2	0.5	0.13	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	21	5.2	2	2	3	1.0	0.16	0m 51s	5.3s	5.3s	2	2	3	0h 4m	0h 6m	0h 7m
	17	6.5	3	3	3	1.0	0.20	1m 4s	5.8s	5.8s	3	3	3	0h 5m	0h 7m	0h 8m
	13.6	8.1	3	4	4	1.5	0.24	1m 21s	6.5s	6.5s	3	4	4	0h 7m	0h 8m	0h 11m
	11	10.0	4	4	5	1.5	0.29	1m 43s	7.4s	7.4s	4	4	5	0h 8m	0h 10m	0h 13m
	9	12.2	5	5	6	2.0	0.35	2m 0s	8s	8s	5	5	6	0h 10m	0h 12m	0h 16m
7.4	14.9	6	6	7	2.0	0.41	2m 27s	8.8s	9.2s	6	6	7	0h 11m	0h 14m	0h 19m	
125	41	3.0	2	2	2	0.5	0.11	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	3.8	2	2	2	0.5	0.14	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	4.8	2	3	3	1.0	0.17	0m 45s	5s	5s	2	3	3	0h 4m	0h 5m	0h 7m
	21	6.0	3	3	3	1.0	0.21	0m 58s	5.5s	5.5s	3	3	3	0h 5m	0h 6m	0h 8m
	17	7.4	4	4	4	1.5	0.25	1m 10s	6s	6s	4	4	4	0h 6m	0h 8m	0h 10m
	13.6	9.2	4	5	5	1.5	0.31	1m 32s	6.9s	6.9s	4	5	5	0h 7m	0h 9m	0h 12m
	11	11.4	5	6	6	1.5	0.37	1m 55s	7.8s	7.8s	5	6	6	0h 9m	0h 11m	0h 14m
	9	13.9	6	7	7	2.0	0.45	2m 16s	8.5s	8.7s	6	7	7	0h 11m	0h 13m	0h 17m
7.4	16.9	7	8	8	2.0	0.53	2m 49s	9.4s	10.1s	7	8	8	0h 12m	0h 16m	0h 21m	
140	41	3.4	2	2	2	0.5	0.14	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	4.2	2	3	3	0.5	0.17	0m 45s	5s	5s	2	3	3	0h 4m	0h 5m	0h 7m
	26	5.4	3	3	3	1.0	0.21	0m 51s	5.3s	5.3s	3	3	3	0h 4m	0h 6m	0h 7m
	21	6.7	4	4	4	1.0	0.26	1m 10s	6s	6s	4	4	4	0h 6m	0h 7m	0h 9m
	17	8.2	4	5	5	1.5	0.32	1m 21s	6.5s	6.5s	4	5	5	0h 7m	0h 8m	0h 11m
	13.6	10.3	5	6	6	1.5	0.39	1m 43s	7.4s	7.4s	5	6	6	0h 8m	0h 10m	0h 13m
	11	12.7	7	7	8	2.0	0.47	2m 5s	8.2s	8.3s	7	7	8	0h 10m	0h 13m	0h 16m
	9	15.6	8	8	9	2.0	0.56	2m 38s	9.1s	9.7s	8	8	9	0h 12m	0h 15m	0h 20m
7.4	18.9	9	10	11	2.0	0.66	3m 10s	10s	11s	9	10	11	0h 14m	0h 18m	0h 23m	
160	41	3.9	3	3	3	0.5	0.18	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	33	4.8	3	3	4	1.0	0.22	0m 45s	5s	5s	3	3	4	0h 4m	0h 5m	0h 7m
	26	6.2	4	4	4	1.0	0.28	1m 4s	5.8s	5.8s	4	4	4	0h 5m	0h 7m	0h 8m
	21	7.6	5	5	5	1.5	0.34	1m 16s	6.3s	6.3s	5	5	5	0h 6m	0h 8m	0h 10m
	17	9.4	6	6	7	1.5	0.41	1m 32s	6.9s	6.9s	6	6	7	0h 7m	0h 9m	0h 12m
	13.6	11.8	7	8	8	1.5	0.50	2m 0s	8s	8s	7	8	8	0h 9m	0h 12m	0h 15m
	11	14.5	9	9	10	2.0	0.61	2m 27s	8.8s	9.2s	9	9	10	0h 11m	0h 14m	0h 19m
	9	17.8	10	11	12	2.0	0.73	2m 59s	9.7s	10.6s	10	11	12	0h 13m	0h 17m	0h 22m
7.4	21.6	12	13	14	2.5	0.86	3m 37s	10.8s	12.2s	12	13	14	0h 16m	0h 20m	0h 27m	
180	41	4.4	3	3	4	0.5	0.23	0m 45s	5s	5s	3	3	4	0h 4m	0h 5m	0h 7m
	33	5.5	4	4	4	1.0	0.28	0m 51s	5.3s	5.3s	4	4	4	0h 4m	0h 6m	0h 7m
	26	6.9	5	5	6	1.0	0.35	1m 10s	6s	6s	5	5	6	0h 6m	0h 7m	0h 9m
	21	8.6	6	6	7	1.5	0.43	1m 27s	6.7s	6.7s	6	6	7	0h 7m	0h 9m	0h 11m
	17	10.6	7	8	8	1.5	0.52	1m 49s	7.6s	7.6s	7	8	8	0h 9m	0h 11m	0h 14m
	13.6	13.2	9	10	10	2.0	0.64	2m 11s	8.4s	8.5s	9	10	10	0h 10m	0h 13m	0h 17m
	11	16.4	11	12	12	2.0	0.77	2m 43s	9.3s	9.9s	11	12	12	0h 12m	0h 16m	0h 20m
	9	20.0	13	14	15	2.5	0.92	3m 21s	10.4s	11.5s	13	14	15	0h 15m	0h 19m	0h 25m
7.4	24.3	15	16	17	2.5	1.09	4m 4s	11.6s	13.4s	15	16	17	0h 18m	0h 22m	0h 30m	
200	41	4.9	4	4	4	1.0	0.28	0m 45s	5s	5s	4	4	4	0h 4m	0h 5m	0h 7m
	33	6.1	5	5	5	1.0	0.34	1m 4s	5.8s	5.8s	5	5	5	0h 5m	0h 7m	0h 8m
	26	7.7	6	6	7	1.5	0.43	1m 16s	6.3s	6.3s	6	6	7	0h 6m	0h 8m	0h 10m
	21	9.5	7	8	8	1.5	0.52	1m 38s	7.2s	7.2s	7	8	8	0h 8m	0h 10m	0h 13m
	17	11.8	9	10	10	1.5	0.64	2m 0s	8s	8s	9	10	10	0h 9m	0h 12m	0h 15m
	13.6	14.7	11	12	13	2.0	0.78	2m 27s	8.8s	9.2s	11	12	13	0h 11m	0h 14m	0h 19m
	11	18.2	13	14	15	2.0	0.95	3m 5s	9.9s	10.8s	13	14	15	0h 13m	0h 17m	0h 23m
	9	22.2	16	17	18	2.5	1.13	3m 42s	11s	12.4s	16	17	18	0h 16m	0h 21m	0h 28m
7.4	27.0	19	20	21	3.0	1.34	4m 31s	12.4s	14.5s	19	20	21	0h 20m	0h 25m	0h 33m	
225	41	5.5	5	5	6	1.0	0.35	0m 51s	5.3s	5.3s	5	5	6	0h 4m	0h 6m	0h 7m
	33	6.8	6	6	7	1.0	0.43	1m 10s	6s	6s	6	6	7	0h 6m	0h 7m	0h 9m
	26	8.7	8	8	9	1.5	0.54	1m 27s	6.7s	6.7s	8	8	9	0h 7m	0h 9m	0h 11m
	21	10.7	9	10	11	1.5	0.66	1m 49s	7.6s	7.6s	9	10	11	0h 9m	0h 11m	0h 14m
	17	13.2	11	12	13	2.0	0.81	2m 11s	8.4s	8.5s	11	12	13	0h 10m	0h 13m	0h 17m
	13.6	16.5	14	15	16	2.0	0.99	2m 49s	9.4s	10.1s	14	15	16	0h 12m	0h 16m	0h 21m
	11	20.5	17	18	19	2.5	1.20	3m 21s	10.4s	11.5s	17	18	19	0h 15m	0h 19m	0h 25m
	9	25.0	20	22	23	2.5	1.43	4m 15s	11.9s	13.8s	20	22	23	0h 18m	0h 23m	0h 31m
7.4	30.4	24	25	27	3.0	1.70	5m 2s	13.6s	16s	24	25	27	0h 22m	0h 28m	0h 37m	

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimum Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
250	41	6.1	6	6	7	1.0	0.43	1m 4s	5.8s	5.8s	6	6	7	0h 5m	0h 7m	0h 8m
	33	7.6	7	8	8	1.5	0.53	1m 16s	6.3s	6.3s	7	8	8	0h 6m	0h 8m	0h 10m
	26	9.6	9	10	11	1.5	0.67	1m 38s	7.2s	7.2s	9	10	11	0h 8m	0h 10m	0h 13m
	21	11.9	11	12	13	1.5	0.82	2m 0s	8s	8s	11	12	13	0h 9m	0h 12m	0h 15m
	17	14.7	14	15	16	2.0	0.99	2m 27s	8.8s	9.2s	14	15	16	0h 11m	0h 14m	0h 19m
	13.6	18.4	17	18	20	2.0	1.22	3m 5s	9.9s	10.8s	17	18	20	0h 13m	0h 17m	0h 23m
	11	22.7	21	22	24	2.5	1.48	3m 48s	11.1s	12.7s	21	22	24	0h 17m	0h 21m	0h 28m
	9	27.8	25	27	28	3.0	1.77	4m 36s	12.6s	14.8s	25	27	28	0h 20m	0h 25m	0h 34m
7.4	33.8	29	31	34	3.0	2.09	5m 39s	14.9s	17.6s	29	31	34	0h 25m	0h 31m	0h 41m	

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (en = Wall Thickness) Max en = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
Dn	SDR	en	Min	Tgt	Max	mm	BAR	Time	Max		Max	Min				Tgt
90	41	2.2	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.07	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	5.3	1	1	2	0.5	0.13	0m 59s	5.2s	6.2s	1	1	2	0h 4m	0h 6m	0h 7m
	13.6	6.6	2	2	2	0.5	0.16	1m 15s	5.8s	6.8s	2	2	2	0h 6m	0h 7m	0h 9m
	11	8.2	2	2	2	1.0	0.20	1m 32s	6.2s	7.8s	2	2	2	0h 7m	0h 8m	0h 11m
	9	10.0	2	2	3	1.0	0.23	1m 53s	6.6s	9.4s	2	2	3	0h 8m	0h 10m	0h 13m
110	7.4	12.2	3	3	3	1.0	0.28	2m 15s	7s	11s	3	3	3	0h 10m	0h 12m	0h 16m
	41	2.7	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.2	1	1	2	0.5	0.13	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	21	5.2	2	2	2	0.5	0.16	0m 59s	5.2s	6.2s	2	2	2	0h 4m	0h 6m	0h 7m
	17	6.5	2	2	2	0.5	0.20	1m 10s	5.6s	6.6s	2	2	2	0h 5m	0h 7m	0h 8m
	13.6	8.1	2	2	3	1.0	0.24	1m 32s	6.2s	7.8s	2	2	3	0h 7m	0h 8m	0h 11m
	11	10.0	3	3	3	1.0	0.29	1m 53s	6.6s	9.4s	3	3	3	0h 8m	0h 10m	0h 13m
125	9	12.2	3	4	4	1.0	0.35	2m 15s	7s	11s	3	4	4	0h 10m	0h 12m	0h 16m
	7.4	14.9	4	4	5	1.0	0.41	2m 40s	7.8s	13.2s	4	4	5	0h 11m	0h 14m	0h 19m
	41	3.0	1	1	1	0.5	0.11	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.8	1	1	2	0.5	0.14	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	26	4.8	2	2	2	0.5	0.17	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	21	6.0	2	2	2	0.5	0.21	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
	17	7.4	2	3	3	1.0	0.25	1m 21s	6s	7s	2	3	3	0h 6m	0h 8m	0h 10m
	13.6	9.2	3	3	3	1.0	0.31	1m 43s	6.4s	8.6s	3	3	3	0h 7m	0h 9m	0h 12m
140	11	11.4	3	4	4	1.0	0.37	2m 4s	6.8s	10.2s	3	4	4	0h 9m	0h 11m	0h 14m
	9	13.9	4	5	5	1.0	0.45	2m 30s	7.5s	12.3s	4	5	5	0h 11m	0h 13m	0h 17m
	7.4	16.9	5	5	6	1.0	0.53	3m 1s	8.3s	14.9s	5	5	6	0h 12m	0h 16m	0h 21m
	41	3.4	1	1	2	0.5	0.14	0m 53s	5s	6s	1	1	2	0h 4m	0h 5m	0h 7m
	33	4.2	2	2	2	0.5	0.17	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	26	5.4	2	2	2	0.5	0.21	0m 59s	5.2s	6.2s	2	2	2	0h 4m	0h 6m	0h 7m
	21	6.7	2	3	3	0.5	0.26	1m 15s	5.8s	6.8s	2	3	3	0h 6m	0h 7m	0h 9m
	17	8.2	3	3	4	1.0	0.32	1m 32s	6.2s	7.8s	3	3	4	0h 7m	0h 8m	0h 11m
160	13.6	10.3	4	4	4	1.0	0.39	1m 53s	6.6s	9.4s	4	4	4	0h 8m	0h 10m	0h 13m
	11	12.7	4	5	5	1.0	0.47	2m 20s	7.2s	11.5s	4	5	5	0h 10m	0h 13m	0h 16m
	9	15.6	5	6	6	1.0	0.56	2m 51s	8s	14s	5	6	6	0h 12m	0h 15m	0h 20m
	7.4	18.9	6	7	7	1.0	0.66	3m 21s	8.9s	16.6s	6	7	7	0h 14m	0h 18m	0h 23m
	41	3.9	2	2	2	0.5	0.18	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	33	4.8	2	2	2	0.5	0.22	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	26	6.2	3	3	3	0.5	0.28	1m 10s	5.6s	6.6s	3	3	3	0h 5m	0h 7m	0h 8m
	21	7.6	3	3	4	1.0	0.34	1m 26s	6.1s	7.4s	3	3	4	0h 6m	0h 8m	0h 10m
180	17	9.4	4	4	5	1.0	0.41	1m 43s	6.4s	8.6s	4	4	5	0h 7m	0h 9m	0h 12m
	13.6	11.8	5	5	6	1.0	0.50	2m 10s	6.9s	10.6s	5	5	6	0h 9m	0h 12m	0h 15m
	11	14.5	6	6	7	1.0	0.61	2m 40s	7.8s	13.2s	6	6	7	0h 11m	0h 14m	0h 19m
	9	17.8	7	7	8	1.0	0.73	3m 11s	8.6s	15.8s	7	7	8	0h 13m	0h 17m	0h 22m
	7.4	21.6	8	9	10	1.5	0.86	3m 49s	9.8s	18.8s	8	9	10	0h 16m	0h 20m	0h 27m
	41	4.4	2	2	3	0.5	0.23	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	33	5.5	3	3	3	0.5	0.28	0m 59s	5.2s	6.2s	3	3	3	0h 4m	0h 6m	0h 7m
	26	6.9	3	4	4	0.5	0.35	1m 15s	5.8s	6.8s	3	4	4	0h 6m	0h 7m	0h 9m
200	21	8.6	4	4	5	1.0	0.43	1m 37s	6.3s	8.2s	4	4	5	0h 7m	0h 9m	0h 11m
	17	10.6	5	5	6	1.0	0.52	1m 59s	6.7s	9.8s	5	5	6	0h 9m	0h 11m	0h 14m
	13.6	13.2	6	6	7	1.0	0.64	2m 25s	7.3s	11.9s	6	6	7	0h 10m	0h 13m	0h 17m
	11	16.4	7	8	9	1.0	0.77	2m 56s	8.2s	14.5s	7	8	9	0h 12m	0h 16m	0h 20m
	9	20.0	8	9	10	1.5	0.92	3m 35s	9.3s	17.8s	8	9	10	0h 15m	0h 19m	0h 25m
	7.4	24.3	10	11	12	1.5	1.09	4m 13s	10.5s	20.6s	10	11	12	0h 18m	0h 22m	0h 30m
	41	4.9	3	3	3	0.5	0.28	0m 53s	5s	6s	3	3	3	0h 4m	0h 5m	0h 7m
	33	6.1	3	3	4	0.5	0.34	1m 10s	5.6s	6.6s	3	3	4	0h 5m	0h 7m	0h 8m
225	26	7.7	4	4	5	1.0	0.43	1m 26s	6.1s	7.4s	4	4	5	0h 6m	0h 8m	0h 10m
	21	9.5	5	5	6	1.0	0.52	1m 48s	6.5s	9s	5	5	6	0h 8m	0h 10m	0h 13m
	17	11.8	6	6	7	1.0	0.64	2m 10s	6.9s	10.6s	6	6	7	0h 9m	0h 12m	0h 15m
	13.6	14.7	7	8	9	1.0	0.78	2m 40s	7.8s	13.2s	7	8	9	0h 11m	0h 14m	0h 19m
	11	18.2	9	10	10	1.0	0.95	3m 16s	8.8s	16.2s	9	10	10	0h 13m	0h 17m	0h 23m
	9	22.2	10	11	13	1.5	1.13	3m 54s	9.9s	19.2s	10	11	13	0h 16m	0h 21m	0h 28m
	7.4	27.0	12	13	15	2.0	1.34	4m 39s	11.3s	23s	12	13	15	0h 20m	0h 25m	0h 33m
	41	5.5	3	4	4	0.5	0.35	0m 59s	5.2s	6.2s	3	4	4	0h 4m	0h 6m	0h 7m
	33	6.8	4	4	5	0.5	0.43	1m 15s	5.8s	6.8s	4	4	5	0h 6m	0h 7m	0h 9m
	26	8.7	5	5	6	1.0	0.54	1m 37s	6.3s	8.2s	5	5	6	0h 7m	0h 9m	0h 11m
	21	10.7	6	7	7	1.0	0.66	1m 59s	6.7s	9.8s	6	7	7	0h 9m	0h 11m	0h 14m
	17	13.2	7	8	9	1.0	0.81	2m 25s	7.3s	11.9s	7	8	9	0h 10m	0h 13m	0h 17m
	13.6	16.5	9	10	11	1.0	0.99	3m 1s	8.3s	14.9s	9	10	11	0h 12m	0h 16m	0h 21m
	11	20.5	11	12	13	1.5	1.20	3m 35s	9.3s	17.8s	11	12	13	0h 15m	0h 19m	0h 25m
	9	25.0	13	14	16	1.5	1.43	4m 22s	10.8s	21.3s	13	14	16	0h 18m	0h 23m	0h 31m
	7.4	30.4	15	17	19	2.0	1.70	5m 4s	12.1s	25.7s	15	17	19	0h 22m	0h 28m	0h 37m

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR			Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
250	41	6.1	4	4	5	0.5	0.43	1m 10s	5.6s	6.6s	4	4	5	0h 5m	0h 7m	0h 8m
	33	7.6	5	5	6	1.0	0.53	1m 26s	6.1s	7.4s	5	5	6	0h 6m	0h 8m	0h 10m
	26	9.6	6	7	7	1.0	0.67	1m 48s	6.5s	9s	6	7	7	0h 8m	0h 10m	0h 13m
	21	11.9	7	8	9	1.0	0.82	2m 10s	6.9s	10.6s	7	8	9	0h 9m	0h 12m	0h 15m
	17	14.7	9	10	11	1.0	0.99	2m 40s	7.8s	13.2s	9	10	11	0h 11m	0h 14m	0h 19m
	13.6	18.4	11	12	13	1.0	1.22	3m 16s	8.8s	16.2s	11	12	13	0h 13m	0h 17m	0h 23m
	11	22.7	13	15	16	1.5	1.48	3m 59s	10s	19.5s	13	15	16	0h 17m	0h 21m	0h 28m
	9	27.8	16	18	20	2.0	1.77	4m 44s	11.5s	23.4s	16	18	20	0h 20m	0h 25m	0h 34m
	7.4	33.8	19	21	23	2.0	2.09	5m 33s	13.1s	28.9s	19	21	23	0h 25m	0h 31m	0h 41m

WELDING PARAMETER CHARTS

V315

RAM=20.02 cm²

HDPE

**DVS2207-1-2016
ISO21307-2017**

PP

DVS2207-11 (2017)

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimum Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max		mm	BAR	Time		Max	Max				Min
90	41	2.2	1	1	1	0.5	0.04	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.04	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	17	5.3	1	1	1	1.0	0.08	0m 51s	5.3s	5.3s	1	1	1	0h 4m	0h 6m	0h 7m
	13.6	6.6	1	1	1	1.0	0.09	1m 10s	6s	6s	1	1	1	0h 6m	0h 7m	0h 9m
	11	8.2	2	2	2	1.5	0.11	1m 21s	6.5s	6.5s	2	2	2	0h 7m	0h 8m	0h 11m
	9	10.0	2	2	2	1.5	0.13	1m 43s	7.4s	7.4s	2	2	2	0h 8m	0h 10m	0h 13m
7.4	12.2	2	2	2	2.0	0.15	2m 0s	8s	8s	2	2	2	0h 10m	0h 12m	0h 16m	
110	41	2.7	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.2	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	5.2	1	1	1	1.0	0.09	0m 51s	5.3s	5.3s	1	1	1	0h 4m	0h 6m	0h 7m
	17	6.5	2	2	2	1.0	0.11	1m 4s	5.8s	5.8s	2	2	2	0h 5m	0h 7m	0h 8m
	13.6	8.1	2	2	2	1.5	0.13	1m 21s	6.5s	6.5s	2	2	2	0h 7m	0h 8m	0h 11m
	11	10.0	2	2	3	1.5	0.16	1m 43s	7.4s	7.4s	2	2	3	0h 8m	0h 10m	0h 13m
	9	12.2	3	3	3	2.0	0.19	2m 0s	8s	8s	3	3	3	0h 10m	0h 12m	0h 16m
7.4	14.9	3	3	4	2.0	0.23	2m 27s	8.8s	9.2s	3	3	4	0h 11m	0h 14m	0h 19m	
125	41	3.0	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.8	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.8	1	1	2	1.0	0.10	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	21	6.0	2	2	2	1.0	0.12	0m 58s	5.5s	5.5s	2	2	2	0h 5m	0h 6m	0h 8m
	17	7.4	2	2	2	1.5	0.14	1m 10s	6s	6s	2	2	2	0h 6m	0h 8m	0h 10m
	13.6	9.2	2	3	3	1.5	0.17	1m 32s	6.9s	6.9s	2	3	3	0h 7m	0h 9m	0h 12m
	11	11.4	3	3	3	1.5	0.21	1m 55s	7.8s	7.8s	3	3	3	0h 9m	0h 11m	0h 14m
	9	13.9	3	4	4	2.0	0.25	2m 16s	8.5s	8.7s	3	4	4	0h 11m	0h 13m	0h 17m
7.4	16.9	4	4	5	2.0	0.29	2m 49s	9.4s	10.1s	4	4	5	0h 12m	0h 16m	0h 21m	
140	41	3.4	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.2	1	1	2	0.5	0.10	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	26	5.4	2	2	2	1.0	0.12	0m 51s	5.3s	5.3s	2	2	2	0h 4m	0h 6m	0h 7m
	21	6.7	2	2	2	1.0	0.14	1m 10s	6s	6s	2	2	2	0h 6m	0h 7m	0h 9m
	17	8.2	2	3	3	1.5	0.18	1m 21s	6.5s	6.5s	2	3	3	0h 7m	0h 8m	0h 11m
	13.6	10.3	3	3	3	1.5	0.21	1m 43s	7.4s	7.4s	3	3	3	0h 8m	0h 10m	0h 13m
	11	12.7	4	4	4	2.0	0.26	2m 5s	8.2s	8.3s	4	4	4	0h 10m	0h 13m	0h 16m
	9	15.6	4	5	5	2.0	0.31	2m 38s	9.1s	9.7s	4	5	5	0h 12m	0h 15m	0h 20m
7.4	18.9	5	5	6	2.0	0.36	3m 10s	10s	11s	5	5	6	0h 14m	0h 18m	0h 23m	
160	41	3.9	1	2	2	0.5	0.10	0m 45s	5s	5s	1	2	2	0h 4m	0h 5m	0h 7m
	33	4.8	2	2	2	1.0	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	6.2	2	2	2	1.0	0.15	1m 4s	5.8s	5.8s	2	2	2	0h 5m	0h 7m	0h 8m
	21	7.6	3	3	3	1.5	0.19	1m 16s	6.3s	6.3s	3	3	3	0h 6m	0h 8m	0h 10m
	17	9.4	3	3	4	1.5	0.23	1m 32s	6.9s	6.9s	3	3	4	0h 7m	0h 9m	0h 12m
	13.6	11.8	4	4	4	1.5	0.28	2m 0s	8s	8s	4	4	4	0h 9m	0h 12m	0h 15m
	11	14.5	5	5	5	2.0	0.34	2m 27s	8.8s	9.2s	5	5	5	0h 11m	0h 14m	0h 19m
	9	17.8	6	6	6	2.0	0.40	2m 59s	9.7s	10.6s	6	6	6	0h 13m	0h 17m	0h 22m
7.4	21.6	7	7	8	2.5	0.47	3m 37s	10.8s	12.2s	7	7	8	0h 16m	0h 20m	0h 27m	
180	41	4.4	2	2	2	0.5	0.13	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	5.5	2	2	2	1.0	0.15	0m 51s	5.3s	5.3s	2	2	2	0h 4m	0h 6m	0h 7m
	26	6.9	3	3	3	1.0	0.19	1m 10s	6s	6s	3	3	3	0h 6m	0h 7m	0h 9m
	21	8.6	3	4	4	1.5	0.24	1m 27s	6.7s	6.7s	3	4	4	0h 7m	0h 9m	0h 11m
	17	10.6	4	4	5	1.5	0.29	1m 49s	7.6s	7.6s	4	4	5	0h 9m	0h 11m	0h 14m
	13.6	13.2	5	5	6	2.0	0.35	2m 11s	8.4s	8.5s	5	5	6	0h 10m	0h 13m	0h 17m
	11	16.4	6	6	7	2.0	0.43	2m 43s	9.3s	9.9s	6	6	7	0h 12m	0h 16m	0h 20m
	9	20.0	7	8	8	2.5	0.51	3m 21s	10.4s	11.5s	7	8	8	0h 15m	0h 19m	0h 25m
7.4	24.3	8	9	10	2.5	0.60	4m 4s	11.6s	13.4s	8	9	10	0h 18m	0h 22m	0h 30m	
200	41	4.9	2	2	2	1.0	0.15	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	6.1	3	3	3	1.0	0.19	1m 4s	5.8s	5.8s	3	3	3	0h 5m	0h 7m	0h 8m
	26	7.7	3	4	4	1.5	0.24	1m 16s	6.3s	6.3s	3	4	4	0h 6m	0h 8m	0h 10m
	21	9.5	4	4	5	1.5	0.29	1m 38s	7.2s	7.2s	4	4	5	0h 8m	0h 10m	0h 13m
	17	11.8	5	5	6	1.5	0.35	2m 0s	8s	8s	5	5	6	0h 9m	0h 12m	0h 15m
	13.6	14.7	6	7	7	2.0	0.43	2m 27s	8.8s	9.2s	6	7	7	0h 11m	0h 14m	0h 19m
	11	18.2	7	8	8	2.0	0.52	3m 5s	9.9s	10.8s	7	8	8	0h 13m	0h 17m	0h 23m
	9	22.2	9	9	10	2.5	0.62	3m 42s	11s	12.4s	9	9	10	0h 16m	0h 21m	0h 28m
7.4	27.0	10	11	12	3.0	0.74	4m 31s	12.4s	14.5s	10	11	12	0h 20m	0h 25m	0h 33m	
225	41	5.5	3	3	3	1.0	0.19	0m 51s	5.3s	5.3s	3	3	3	0h 4m	0h 6m	0h 7m
	33	6.8	3	4	4	1.0	0.24	1m 10s	6s	6s	3	4	4	0h 6m	0h 7m	0h 9m
	26	8.7	4	5	5	1.5	0.30	1m 27s	6.7s	6.7s	4	5	5	0h 7m	0h 9m	0h 11m
	21	10.7	5	6	6	1.5	0.37	1m 49s	7.6s	7.6s	5	6	6	0h 9m	0h 11m	0h 14m
	17	13.2	6	7	7	2.0	0.44	2m 11s	8.4s	8.5s	6	7	7	0h 10m	0h 13m	0h 17m
	13.6	16.5	8	8	9	2.0	0.55	2m 49s	9.4s	10.1s	8	8	9	0h 12m	0h 16m	0h 21m
	11	20.5	9	10	11	2.5	0.66	3m 21s	10.4s	11.5s	9	10	11	0h 15m	0h 19m	0h 25m
	9	25.0	11	12	13	2.5	0.79	4m 15s	11.9s	13.8s	11	12	13	0h 18m	0h 23m	0h 31m
7.4	30.4	13	14	15	3.0	0.93	5m 2s	13.6s	16s	13	14	15	0h 22m	0h 28m	0h 37m	

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
250	41	6.1	3	4	4	1.0	0.24	1m 4s	5.8s	5.8s	3	4	4	0h 5m	0h 7m	0h 8m
	33	7.6	4	4	5	1.5	0.29	1m 16s	6.3s	6.3s	4	4	5	0h 6m	0h 8m	0h 10m
	26	9.6	5	6	6	1.5	0.37	1m 38s	7.2s	7.2s	5	6	6	0h 8m	0h 10m	0h 13m
	21	11.9	6	7	7	1.5	0.45	2m 0s	8s	8s	6	7	7	0h 9m	0h 12m	0h 15m
	17	14.7	8	8	9	2.0	0.55	2m 27s	8.8s	9.2s	8	8	9	0h 11m	0h 14m	0h 19m
	13.6	18.4	9	10	11	2.0	0.67	3m 5s	9.9s	10.8s	9	10	11	0h 13m	0h 17m	0h 23m
	11	22.7	11	12	13	2.5	0.82	3m 48s	11.1s	12.7s	11	12	13	0h 17m	0h 21m	0h 28m
	9	27.8	14	15	16	3.0	0.97	4m 36s	12.6s	14.8s	14	15	16	0h 20m	0h 25m	0h 34m
7.4	33.8	16	17	18	3.0	1.15	5m 39s	14.9s	17.6s	16	17	18	0h 25m	0h 31m	0h 41m	
280	41	6.8	4	4	5	1.0	0.30	1m 10s	6s	6s	4	4	5	0h 6m	0h 7m	0h 9m
	33	8.5	5	6	6	1.5	0.37	1m 21s	6.5s	6.5s	5	6	6	0h 7m	0h 8m	0h 11m
	26	10.8	6	7	7	1.5	0.46	1m 49s	7.6s	7.6s	6	7	7	0h 9m	0h 11m	0h 14m
	21	13.3	8	8	9	2.0	0.56	2m 11s	8.4s	8.5s	8	8	9	0h 10m	0h 13m	0h 17m
	17	16.5	10	10	11	2.0	0.69	2m 43s	9.3s	9.9s	10	10	11	0h 12m	0h 16m	0h 20m
	13.6	20.6	12	13	14	2.5	0.84	3m 26s	10.5s	11.7s	12	13	14	0h 15m	0h 19m	0h 26m
	11	25.5	14	15	16	2.5	1.02	4m 15s	11.9s	13.8s	14	15	16	0h 18m	0h 23m	0h 31m
	9	31.1	17	18	20	3.0	1.22	5m 12s	14s	16.4s	17	18	20	0h 23m	0h 29m	0h 38m
7.4	37.8	20	22	23	3.5	1.44	6m 15s	16.2s	19.3s	20	22	23	0h 27m	0h 35m	0h 46m	
315	41	7.7	5	6	6	1.5	0.38	1m 16s	6.3s	6.3s	5	6	6	0h 6m	0h 8m	0h 10m
	33	9.5	7	7	7	1.5	0.46	1m 38s	7.2s	7.2s	7	7	7	0h 8m	0h 10m	0h 13m
	26	12.1	8	9	9	2.0	0.58	2m 0s	8s	8s	8	9	9	0h 10m	0h 12m	0h 16m
	21	15.0	10	11	11	2.0	0.71	2m 32s	9s	9.4s	10	11	11	0h 12m	0h 15m	0h 19m
	17	18.5	12	13	14	2.0	0.87	3m 10s	10s	11s	12	13	14	0h 14m	0h 18m	0h 23m
	13.6	23.2	15	16	17	2.5	1.07	3m 53s	11.3s	12.9s	15	16	17	0h 17m	0h 22m	0h 29m
	11	28.6	18	19	21	3.0	1.29	4m 46s	13s	15.2s	18	19	21	0h 21m	0h 26m	0h 35m
	9	35.0	22	23	25	3.0	1.54	5m 54s	15.5s	18.3s	22	23	25	0h 26m	0h 32m	0h 43m
7.4	42.6	26	27	29	3.5	1.82	7m 7s	17.8s	21.7s	26	27	29	0h 31m	0h 39m	0h 52m	

TEMP: 215 ± 15C				PHASE 1			PHASE 2				PHASE 3	PHASE 4			PHASE 5	PHASE 6		
Pipe Details (e _n = Wall Thickness)				Bead Up Pressure (see note a) BAR			Heat Soak (See Note c)			Min Bead Size	Maximum Heater Removal Time	Maximum Pressure Up is Not Specified	Weld Pressure BAR			Minimim Cool Time Under Pressure	Additional Cool Time out of Machine (See Note d)	
				ADD DRAG (see note b)			0 - DRAG ONLY						ADD DRAG					
				P1 / t1			P2	t2				t3	t4	P3			t5	t6
D _n	OD	SDR	e _n	Min	Tgt	Max	BAR	Min	Tgt	Max	mm			Min	Tgt	Max		
250	250	41	6.1	10	12	14	0 - DRAG ONLY	1m 1s	1m 7s	1m 13s	1.9	6s	-	10	12	14	0h 3m	d
	250	33	7.6	12	15	18		1m 16s	1m 23s	1m 31s	2.1	8s	-	12	15	18	0h 3m	d
	250	26	9.6	15	19	22		1m 36s	1m 46s	1m 55s	2.4	8s	-	15	19	22	0h 4m	d
	250	21	11.9	19	23	28		1m 59s	2m 11s	2m 23s	2.8	8s	-	19	23	28	0h 5m	d
	250	17	14.7	23	28	34		2m 27s	2m 42s	2m 56s	3.2	10s	-	23	28	34	0h 6m	d
	250	13.6	18.4	28	35	41		3m 4s	3m 22s	3m 41s	3.8	10s	-	28	35	41	0h 8m	d
	250	11	22.7	34	42	50		3m 47s	4m 10s	4m 33s	4.4	12s	-	34	42	50	0h 10m	d
	250	9	27.8	41	50	60		4m 38s	5m 6s	5m 33s	5.2	16s	-	41	50	60	0h 12m	d
	250	7.4	33.8	48	60	71		5m 38s	6m 12s	6m 45s	6.1	16s	-	48	60	71	0h 15m	d
280	280	41	6.8	12	15	18	0 - DRAG ONLY	1m 8s	1m 15s	1m 22s	2.0	6s	-	12	15	18	0h 3m	d
	280	33	8.5	15	19	22		1m 25s	1m 33s	1m 42s	2.3	8s	-	15	19	22	0h 4m	d
	280	26	10.8	19	24	28		1m 48s	1m 58s	2m 9s	2.6	8s	-	19	24	28	0h 5m	d
	280	21	13.3	23	29	35		2m 13s	2m 27s	2m 40s	3.0	10s	-	23	29	35	0h 6m	d
	280	17	16.5	29	35	42		2m 45s	3m 1s	3m 18s	3.5	10s	-	29	35	42	0h 7m	d
	280	13.6	20.6	35	44	52		3m 26s	3m 46s	4m 7s	4.1	12s	-	35	44	52	0h 9m	d
	280	11	25.5	43	53	63		4m 15s	4m 40s	5m 5s	4.8	12s	-	43	53	63	0h 11m	d
	280	9	31.1	51	63	75		5m 11s	5m 42s	6m 13s	5.7	16s	-	51	63	75	0h 13m	d
	280	7.4	37.8	60	75	89		6m 18s	6m 56s	7m 34s	6.7	20s	-	60	75	89	0h 16m	d
315	315	41	7.7	16	19	23	0 - DRAG ONLY	1m 17s	1m 25s	1m 32s	2.2	8s	-	16	19	23	0h 3m	d
	315	33	9.5	19	24	28		1m 35s	1m 45s	1m 55s	2.4	8s	-	19	24	28	0h 4m	d
	315	26	12.1	24	30	36		2m 1s	2m 13s	2m 25s	2.8	10s	-	24	30	36	0h 5m	d
	315	21	15.0	30	37	44		2m 30s	2m 45s	3m 0s	3.3	10s	-	30	37	44	0h 6m	d
	315	17	18.5	36	45	53		3m 5s	3m 24s	3m 42s	3.8	10s	-	36	45	53	0h 8m	d
	315	13.6	23.2	45	55	66		3m 52s	4m 15s	4m 38s	4.5	12s	-	45	55	66	0h 10m	d
	315	11	28.6	54	67	80		4m 46s	5m 15s	5m 44s	5.3	16s	-	54	67	80	0h 12m	d
	315	9	35.0	65	80	95		5m 50s	6m 25s	7m 0s	6.3	16s	-	65	80	95	0h 15m	d
	315	7.4	42.6	76	95	113		7m 6s	7m 48s	8m 31s	7.4	20s	-	76	95	113	0h 18m	d

WELDING PARAMETER CHARTS

V315

RAM=12.56 cm²

HDPE

**DVS2207-1-2016
ISO21307-2017**

PP

DVS2207-11 (2017)

TEMP: 220 ±10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max		Max	Min				Tgt
90	41	2.2	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1		0h 4m	0h 7m
	33	2.7	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	2	0.5	0.10	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	17	5.3	2	2	2	1.0	0.12	0m 51s	5.3s	5.3s	2	2	2	0h 4m	0h 6m	0h 7m
	13.6	6.6	2	2	2	1.0	0.14	1m 10s	6s	6s	2	2	2	0h 6m	0h 7m	0h 9m
	11	8.2	2	3	3	1.5	0.17	1m 21s	6.5s	6.5s	2	3	3	0h 7m	0h 8m	0h 11m
	9	10.0	3	3	3	1.5	0.21	1m 43s	7.4s	7.4s	3	3	3	0h 8m	0h 10m	0h 13m
110	7.4	12.2	3	4	4	2.0	0.24	2m 0s	8s	8s	3	4	4	0h 10m	0h 12m	0h 16m
	41	2.7	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	2	0.5	0.09	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	26	4.2	2	2	2	0.5	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	21	5.2	2	2	2	1.0	0.14	0m 51s	5.3s	5.3s	2	2	2	0h 4m	0h 6m	0h 7m
	17	6.5	2	3	3	1.0	0.17	1m 4s	5.8s	5.8s	2	3	3	0h 5m	0h 7m	0h 8m
	13.6	8.1	3	3	3	1.5	0.21	1m 21s	6.5s	6.5s	3	3	3	0h 7m	0h 8m	0h 11m
	11	10.0	4	4	4	1.5	0.26	1m 43s	7.4s	7.4s	4	4	4	0h 8m	0h 10m	0h 13m
125	9	12.2	4	5	5	2.0	0.30	2m 0s	8s	8s	4	5	5	0h 10m	0h 12m	0h 16m
	7.4	14.9	5	5	6	2.0	0.36	2m 27s	8.8s	9.2s	5	5	6	0h 11m	0h 14m	0h 19m
	41	3.0	1	1	2	0.5	0.10	0m 45s	5s	5s	1	1	2	0h 4m	0h 5m	0h 7m
	33	3.8	2	2	2	0.5	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	4.8	2	2	2	1.0	0.15	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	21	6.0	3	3	3	1.0	0.18	0m 58s	5.5s	5.5s	3	3	3	0h 5m	0h 6m	0h 8m
	17	7.4	3	3	4	1.5	0.22	1m 10s	6s	6s	3	3	4	0h 6m	0h 8m	0h 10m
	13.6	9.2	4	4	4	1.5	0.27	1m 32s	6.9s	6.9s	4	4	4	0h 7m	0h 9m	0h 12m
140	11	11.4	5	5	5	1.5	0.33	1m 55s	7.8s	7.8s	5	5	5	0h 9m	0h 11m	0h 14m
	9	13.9	6	6	6	2.0	0.39	2m 16s	8.5s	8.7s	6	6	6	0h 11m	0h 13m	0h 17m
	7.4	16.9	6	7	7	2.0	0.46	2m 49s	9.4s	10.1s	6	7	7	0h 12m	0h 16m	0h 21m
	41	3.4	2	2	2	0.5	0.12	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	33	4.2	2	2	2	0.5	0.15	0m 45s	5s	5s	2	2	2	0h 4m	0h 5m	0h 7m
	26	5.4	3	3	3	1.0	0.19	0m 51s	5.3s	5.3s	3	3	3	0h 4m	0h 6m	0h 7m
	21	6.7	3	3	4	1.0	0.23	1m 10s	6s	6s	3	3	4	0h 6m	0h 7m	0h 9m
	17	8.2	4	4	4	1.5	0.28	1m 21s	6.5s	6.5s	4	4	4	0h 7m	0h 8m	0h 11m
160	13.6	10.3	5	5	5	1.5	0.34	1m 43s	7.4s	7.4s	5	5	5	0h 8m	0h 10m	0h 13m
	11	12.7	6	6	7	2.0	0.41	2m 5s	8.2s	8.3s	6	6	7	0h 10m	0h 13m	0h 16m
	9	15.6	7	7	8	2.0	0.49	2m 38s	9.1s	9.7s	7	7	8	0h 12m	0h 15m	0h 20m
	7.4	18.9	8	9	9	2.0	0.58	3m 10s	10s	11s	8	9	9	0h 14m	0h 18m	0h 23m
	41	3.9	2	2	3	0.5	0.16	0m 45s	5s	5s	2	2	3	0h 4m	0h 5m	0h 7m
	33	4.8	3	3	3	1.0	0.19	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	26	6.2	3	4	4	1.0	0.24	1m 4s	5.8s	5.8s	3	4	4	0h 5m	0h 7m	0h 8m
	21	7.6	4	4	5	1.5	0.30	1m 16s	6.3s	6.3s	4	4	5	0h 6m	0h 8m	0h 10m
180	17	9.4	5	5	6	1.5	0.36	1m 32s	6.9s	6.9s	5	5	6	0h 7m	0h 9m	0h 12m
	13.6	11.8	6	7	7	1.5	0.44	2m 0s	8s	8s	6	7	7	0h 9m	0h 12m	0h 15m
	11	14.5	8	8	9	2.0	0.53	2m 27s	8.8s	9.2s	8	8	9	0h 11m	0h 14m	0h 19m
	9	17.8	9	10	10	2.0	0.64	2m 59s	9.7s	10.6s	9	10	10	0h 13m	0h 17m	0h 22m
	7.4	21.6	11	11	12	2.5	0.75	3m 37s	10.8s	12.2s	11	11	12	0h 16m	0h 20m	0h 27m
	41	4.4	3	3	3	0.5	0.20	0m 45s	5s	5s	3	3	3	0h 4m	0h 5m	0h 7m
	33	5.5	3	4	4	1.0	0.24	0m 51s	5.3s	5.3s	3	4	4	0h 4m	0h 6m	0h 7m
	26	6.9	4	5	5	1.0	0.30	1m 10s	6s	6s	4	5	5	0h 6m	0h 7m	0h 9m
200	21	8.6	5	6	6	1.5	0.37	1m 27s	6.7s	6.7s	5	6	6	0h 7m	0h 9m	0h 11m
	17	10.6	6	7	7	1.5	0.45	1m 49s	7.6s	7.6s	6	7	7	0h 9m	0h 11m	0h 14m
	13.6	13.2	8	8	9	2.0	0.56	2m 11s	8.4s	8.5s	8	8	9	0h 10m	0h 13m	0h 17m
	11	16.4	9	10	11	2.0	0.67	2m 43s	9.3s	9.9s	9	10	11	0h 12m	0h 16m	0h 20m
	9	20.0	11	12	13	2.5	0.81	3m 21s	10.4s	11.5s	11	12	13	0h 15m	0h 19m	0h 25m
	7.4	24.3	13	14	15	2.5	0.95	4m 4s	11.6s	13.4s	13	14	15	0h 18m	0h 22m	0h 30m
	41	4.9	3	4	4	1.0	0.24	0m 45s	5s	5s	3	4	4	0h 4m	0h 5m	0h 7m
	33	6.1	4	5	5	1.0	0.30	1m 4s	5.8s	5.8s	4	5	5	0h 5m	0h 7m	0h 8m
225	26	7.7	5	6	6	1.5	0.38	1m 16s	6.3s	6.3s	5	6	6	0h 6m	0h 8m	0h 10m
	21	9.5	6	7	7	1.5	0.46	1m 38s	7.2s	7.2s	6	7	7	0h 8m	0h 10m	0h 13m
	17	11.8	8	8	9	1.5	0.56	2m 0s	8s	8s	8	8	9	0h 9m	0h 12m	0h 15m
	13.6	14.7	10	10	11	2.0	0.69	2m 27s	8.8s	9.2s	10	10	11	0h 11m	0h 14m	0h 19m
	11	18.2	12	13	13	2.0	0.83	3m 5s	9.9s	10.8s	12	13	13	0h 13m	0h 17m	0h 23m
	9	22.2	14	15	16	2.5	0.99	3m 42s	11s	12.4s	14	15	16	0h 16m	0h 21m	0h 28m
	7.4	27.0	16	18	19	3.0	1.17	4m 31s	12.4s	14.5s	16	18	19	0h 20m	0h 25m	0h 33m
	41	5.5	4	5	5	1.0	0.31	0m 51s	5.3s	5.3s	4	5	5	0h 4m	0h 6m	0h 7m

TEMP: 220 ±10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimum Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max		mm	BAR	Time		Max	Max				Min
250	41	6.1	5	6	6	1.0	0.38	1m 4s	5.8s	5.8s	5	6	6	0h 5m	0h 7m	0h 8m
	33	7.6	7	7	7	1.5	0.46	1m 16s	6.3s	6.3s	7	7	7	0h 6m	0h 8m	0h 10m
	26	9.6	8	9	9	1.5	0.58	1m 38s	7.2s	7.2s	8	9	9	0h 8m	0h 10m	0h 13m
	21	11.9	10	11	11	1.5	0.71	2m 0s	8s	8s	10	11	11	0h 9m	0h 12m	0h 15m
	17	14.7	12	13	14	2.0	0.87	2m 27s	8.8s	9.2s	12	13	14	0h 11m	0h 14m	0h 19m
	13.6	18.4	15	16	17	2.0	1.07	3m 5s	9.9s	10.8s	15	16	17	0h 13m	0h 17m	0h 23m
	11	22.7	18	19	21	2.5	1.30	3m 48s	11.1s	12.7s	18	19	21	0h 17m	0h 21m	0h 28m
	9	27.8	22	23	25	3.0	1.55	4m 36s	12.6s	14.8s	22	23	25	0h 20m	0h 25m	0h 34m
7.4	33.8	26	28	29	3.0	1.83	5m 39s	14.9s	17.6s	26	28	29	0h 25m	0h 31m	0h 41m	
280	41	6.8	7	7	8	1.0	0.47	1m 10s	6s	6s	7	7	8	0h 6m	0h 7m	0h 9m
	33	8.5	8	9	9	1.5	0.58	1m 21s	6.5s	6.5s	8	9	9	0h 7m	0h 8m	0h 11m
	26	10.8	10	11	12	1.5	0.73	1m 49s	7.6s	7.6s	10	11	12	0h 9m	0h 11m	0h 14m
	21	13.3	13	13	14	2.0	0.89	2m 11s	8.4s	8.5s	13	13	14	0h 10m	0h 13m	0h 17m
	17	16.5	15	16	17	2.0	1.09	2m 43s	9.3s	9.9s	15	16	17	0h 12m	0h 16m	0h 20m
	13.6	20.6	19	20	21	2.5	1.34	3m 26s	10.5s	11.7s	19	20	21	0h 15m	0h 19m	0h 26m
	11	25.5	23	24	26	2.5	1.63	4m 15s	11.9s	13.8s	23	24	26	0h 18m	0h 23m	0h 31m
	9	31.1	27	29	31	3.0	1.94	5m 12s	14s	16.4s	27	29	31	0h 23m	0h 29m	0h 38m
7.4	37.8	32	34	37	3.5	2.30	6m 15s	16.2s	19.3s	32	34	37	0h 27m	0h 35m	0h 46m	
315	41	7.7	8	9	10	1.5	0.60	1m 16s	6.3s	6.3s	8	9	10	0h 6m	0h 8m	0h 10m
	33	9.5	10	11	12	1.5	0.73	1m 38s	7.2s	7.2s	10	11	12	0h 8m	0h 10m	0h 13m
	26	12.1	13	14	15	2.0	0.92	2m 0s	8s	8s	13	14	15	0h 10m	0h 12m	0h 16m
	21	15.0	16	17	18	2.0	1.13	2m 32s	9s	9.4s	16	17	18	0h 12m	0h 15m	0h 19m
	17	18.5	19	21	22	2.0	1.38	3m 10s	10s	11s	19	21	22	0h 14m	0h 18m	0h 23m
	13.6	23.2	24	25	27	2.5	1.70	3m 53s	11.3s	12.9s	24	25	27	0h 17m	0h 22m	0h 29m
	11	28.6	29	31	33	3.0	2.06	4m 46s	13s	15.2s	29	31	33	0h 21m	0h 26m	0h 35m
	9	35.0	34	37	39	3.0	2.46	5m 54s	15.5s	18.3s	34	37	39	0h 26m	0h 32m	0h 43m
	7.4	42.6	41	44	47	3.5	2.91	7m 7s	17.8s	21.7s	41	44	47	0h 31m	0h 39m	0h 52m

TEMP: 225 ±10C			PHASE 1				PHASE 2						PHASE 3		PHASE 4			PHASE 5	PHASE 6
Pipe Details (e _n = Wall Thickness)			Bead Up Pressure (BAR)			Minimum Bead up Size	Heat Soak See Note b			Maximum Heater Removal Time	Maximum Pressure Up Time	Weld Pressure (BAR)			Minimim Cool Time Under Pressure (See Note c)	Additional Cool Time out of Machine (See Note d)			
			ADD DRAG (see note a)				0 - DRAG ONLY					ADD DRAG							
			P1			t1	P2	t2			t3	t4	P3			t5 / P3			
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	M in	Tgt	Max			M in	Tgt	Max				
90	41	2.2	1	1	1	1	0 - DRAG ONLY	0m 26s	0m 30s	0m 33s	5s	5.7s	1	1	1	0h 5m	d		
	33	2.7	1	1	1	1		0m 33s	0m 37s	0m 41s	5s	5.7s	1	1	1	0h 6m	d		
	26	3.5	1	1	1	1		0m 42s	0m 47s	0m 52s	5s	5.7s	1	1	1	0h 6m	d		
	21	4.3	1	2	2	1		0m 51s	0m 58s	1m 4s	5s	5.7s	1	2	2	0h 7m	d		
	17	5.3	2	2	2	2		1m 4s	1m 11s	1m 19s	6s	5.7s	2	2	2	0h 8m	d		
	13.6	6.6	2	2	3	2		1m 19s	1m 29s	1m 39s	6s	5.7s	2	2	3	0h 10m	d		
	11	8.2	3	3	3	2		1m 38s	1m 50s	2m 3s	8s	5.7s	3	3	3	0h 11m	d		
	9	10.0	3	3	4	2		2m 0s	2m 15s	2m 30s	8s	5.7s	3	3	4	0h 13m	d		
	7.4	12.2	4	4	4	2		2m 26s	2m 44s	3m 2s	10s	5.7s	4	4	4	0h 15m	d		
110	41	2.7	1	1	1	1	0 - DRAG ONLY	0m 32s	0m 36s	0m 40s	5s	6.3s	1	1	1	0h 6m	d		
	33	3.3	1	2	2	1		0m 40s	0m 45s	0m 50s	5s	6.3s	1	2	2	0h 6m	d		
	26	4.2	2	2	2	1		0m 51s	0m 57s	1m 3s	5s	6.3s	2	2	2	0h 7m	d		
	21	5.2	2	2	3	2		1m 3s	1m 11s	1m 19s	6s	6.3s	2	2	3	0h 8m	d		
	17	6.5	3	3	3	2		1m 18s	1m 27s	1m 37s	6s	6.3s	3	3	3	0h 9m	d		
	13.6	8.1	3	4	4	2		1m 37s	1m 49s	2m 1s	8s	6.3s	3	4	4	0h 11m	d		
	11	10.0	4	4	5	2		2m 0s	2m 15s	2m 30s	8s	6.3s	4	4	5	0h 13m	d		
	9	12.2	4	5	6	2		2m 27s	2m 45s	3m 3s	10s	6.3s	4	5	6	0h 15m	d		
	7.4	14.9	5	6	7	2		2m 58s	3m 21s	3m 43s	10s	6.3s	5	6	7	0h 18m	d		
125	41	3.0	1	2	2	1	0 - DRAG ONLY	0m 37s	0m 41s	0m 46s	5s	6.8s	1	2	2	0h 6m	d		
	33	3.8	2	2	2	1		0m 45s	0m 51s	0m 57s	5s	6.8s	2	2	2	0h 7m	d		
	26	4.8	2	2	3	1		0m 58s	1m 5s	1m 12s	6s	6.8s	2	2	3	0h 8m	d		
	21	6.0	3	3	3	2		1m 11s	1m 20s	1m 29s	6s	6.8s	3	3	3	0h 9m	d		
	17	7.4	3	4	4	2		1m 28s	1m 39s	1m 50s	8s	6.8s	3	4	4	0h 10m	d		
	13.6	9.2	4	5	5	2		1m 50s	2m 4s	2m 18s	8s	6.8s	4	5	5	0h 12m	d		
	11	11.4	5	5	6	2		2m 16s	2m 33s	2m 50s	8s	6.8s	5	5	6	0h 14m	d		
	9	13.9	6	7	7	2		2m 47s	3m 8s	3m 28s	10s	6.8s	6	7	7	0h 17m	d		
	7.4	16.9	7	8	9	3		3m 23s	3m 48s	4m 13s	10s	6.8s	7	8	9	0h 20m	d		
140	41	3.4	2	2	2	1	0 - DRAG ONLY	0m 41s	0m 46s	0m 51s	5s	7.2s	2	2	2	0h 6m	d		
	33	4.2	2	2	3	1		0m 51s	0m 57s	1m 4s	5s	7.2s	2	2	3	0h 7m	d		
	26	5.4	3	3	3	2		1m 5s	1m 13s	1m 21s	6s	7.2s	3	3	3	0h 8m	d		
	21	6.7	3	4	4	2		1m 20s	1m 30s	1m 40s	6s	7.2s	3	4	4	0h 10m	d		
	17	8.2	4	5	5	2		1m 39s	1m 51s	2m 4s	8s	7.2s	4	5	5	0h 11m	d		
	13.6	10.3	5	6	6	2		2m 4s	2m 19s	2m 34s	8s	7.2s	5	6	6	0h 13m	d		
	11	12.7	6	7	8	2		2m 33s	2m 52s	3m 11s	10s	7.2s	6	7	8	0h 16m	d		
	9	15.6	7	8	9	3		3m 7s	3m 30s	3m 53s	10s	7.2s	7	8	9	0h 19m	d		
	7.4	18.9	9	10	11	3		3m 47s	4m 15s	4m 44s	10s	7.2s	9	10	11	0h 16m	d		
160	41	3.9	2	3	3	1	0 - DRAG ONLY	0m 47s	0m 53s	0m 59s	5s	7.8s	2	3	3	0h 7m	d		
	33	4.8	3	3	4	1		0m 58s	1m 5s	1m 13s	6s	7.8s	3	3	4	0h 8m	d		
	26	6.2	4	4	4	2		1m 14s	1m 23s	1m 32s	6s	7.8s	4	4	4	0h 9m	d		
	21	7.6	4	5	6	2		1m 31s	1m 43s	1m 54s	8s	7.8s	4	5	6	0h 11m	d		
	17	9.4	5	6	7	2		1m 53s	2m 7s	2m 21s	8s	7.8s	5	6	7	0h 12m	d		
	13.6	11.8	7	7	8	2		2m 21s	2m 39s	2m 56s	8s	7.8s	7	7	8	0h 15m	d		
	11	14.5	8	9	10	2		2m 55s	3m 16s	3m 38s	10s	7.8s	8	9	10	0h 18m	d		
	9	17.8	9	11	12	3		3m 33s	4m 0s	4m 27s	10s	7.8s	9	11	12	0h 21m	d		
	7.4	21.6	11	13	14	3		4m 19s	4m 52s	5m 24s	12s	7.8s	11	13	14	0h 17m	d		
180	41	4.4	3	3	4	1	0 - DRAG ONLY	0m 53s	0m 59s	1m 6s	5s	8.4s	3	3	4	0h 7m	d		
	33	5.5	4	4	5	2		1m 5s	1m 14s	1m 22s	6s	8.4s	4	4	5	0h 8m	d		
	26	6.9	4	5	6	2		1m 23s	1m 33s	1m 44s	6s	8.4s	4	5	6	0h 10m	d		
	21	8.6	6	6	7	2		1m 43s	1m 56s	2m 9s	8s	8.4s	6	6	7	0h 12m	d		
	17	10.6	7	8	9	2		2m 7s	2m 23s	2m 39s	8s	8.4s	7	8	9	0h 14m	d		
	13.6	13.2	8	9	10	2		2m 39s	2m 59s	3m 19s	10s	8.4s	8	9	10	0h 16m	d		
	11	16.4	10	11	13	3		3m 16s	3m 41s	4m 5s	10s	8.4s	10	11	13	0h 19m	d		
	9	20.0	12	14	15	3		4m 0s	4m 30s	5m 0s	12s	8.4s	12	14	15	0h 17m	d		
	7.4	24.3	14	16	18	3		4m 52s	5m 28s	6m 5s	12s	8.4s	14	16	18	0h 17m	d		
200	41	4.9	4	4	5	1	0 - DRAG ONLY	0m 59s	1m 6s	1m 13s	6s	9s	4	4	5	0h 8m	d		
	33	6.1	4	5	6	2		1m 13s	1m 22s	1m 31s	6s	9s	4	5	6	0h 9m	d		
	26	7.7	6	6	7	2		1m 32s	1m 44s	1m 55s	8s	9s	6	6	7	0h 11m	d		
	21	9.5	7	8	9	2		1m 54s	2m 9s	2m 23s	8s	9s	7	8	9	0h 13m	d		
	17	11.8	8	9	11	2		2m 21s	2m 39s	2m 56s	8s	9s	8	9	11	0h 15m	d		
	13.6	14.7	10	12	13	2		2m 56s	3m 19s	3m 41s	10s	9s	10	12	13	0h 18m	d		
	11	18.2	12	14	16	3		3m 38s	4m 5s	4m 33s	10s	9s	12	14	16	0h 16m	d		
	9	22.2	15	17	19	3		4m 27s	5m 0s	5m 33s	12s	9s	15	17	19	0h 17m	d		
	7.4	27.0	18	20	22	4		5m 24s	6m 5s	6m 45s	16s	9s	18	20	22	0h 18m	d		
225	41	5.5	5	5	6	2	0 - DRAG ONLY	1m 6s	1m 14s	1m 22s	6s	9.8s	5	5	6	0h 8m	d		
	33	6.8	6	6	7	2		1m 22s	1m 32s	1m 42s	6s	9.8s	6	6	7	0h 10m	d		
	26	8.7	7	8	9	2		1m 44s	1m 57s	2m 10s	8s	9.8s	7	8	9	0h 12m	d		
	21	10.7	9	10	11	2		2m 9s	2m 25s	2m 41s	8s	9.8s	9	10	11	0h 14m	d		
	17	13.2	11	12	13	2		2m 39s	2m 59s	3m 19s	10s	9.8s	11	12	13	0h 16m	d		
	13.6	16.5	13	15	16	3		3m 19s	3m 43s	4m 8s	10s	9.8s	13	15	16	0h 20m	d		
	11	20.5	16	18	20	3		4m 5s	4m 36s	5m 7s	12s	9.8s	16	18	20	0h 17m	d		
	9	25.0	19	21	24	3		5m 0s	5m 38s	6m 15s	12s	9.8s	19	21	24	0h 18m	d		
	7.4	30.4	22	25	28	4		6m 5s	6m 50s	7m 36s	16s	9.8s	22	25	28	0h 20m	d		

TEMP: 225 ±10C			PHASE 1				PHASE 2				PHASE 3	PHASE 4			PHASE 5	PHASE 6	
Pipe Details (e _n = Wall Thickness)			Bead Up Pressure (BAR)			Minimum Bead up Size	Heat Soak See Note b			Maximum Heater Removal Time	Maximum Pressure Up Time	Weld Pressure (BAR)			Minimim Cool Time Under Pressure (See Note c)	Additional Cool Time out of Machine (See Note d)	
			ADD DRAG (see note a)				0 - DRAG ONLY					ADD DRAG					
			P1			t1	P2	t2			t3	t4	P3			t5 / P3	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	M in	Tgt	M ax			M in	Tgt	M ax		
250	41	6.1	6	6	7	2	0 - DRAG ONLY	1m 13s	1m 22s	1m 31s	6s	10.5s	6	6	7	0h 9m	d
	33	7.6	7	8	9	2		1m 31s	1m 42s	1m 54s	8s	10.5s	7	8	9	0h 11m	d
	26	9.6	9	10	11	2		1m 55s	2m 10s	2m 24s	8s	10.5s	9	10	11	0h 13m	d
	21	11.9	11	12	13	2		2m 23s	2m 41s	2m 59s	8s	10.5s	11	12	13	0h 15m	d
	17	14.7	13	15	16	2		2m 56s	3m 19s	3m 41s	10s	10.5s	13	15	16	0h 18m	d
	13.6	18.4	16	18	20	3		3m 41s	4m 8s	4m 36s	10s	10.5s	16	18	20	0h 16m	d
	11	22.7	19	22	25	3		4m 33s	5m 7s	5m 41s	12s	10.5s	19	22	25	0h 17m	d
	9	27.8	23	26	29	4		5m 33s	6m 15s	6m 57s	16s	10.5s	23	26	29	0h 19m	d
	7.4	33.8	27	31	35	4		6m 45s	7m 36s	8m 27s	16s	10.5s	27	31	35	0h 21m	d
280	41	6.8	7	8	9	2	0 - DRAG ONLY	1m 22s	1m 32s	1m 42s	6s	11.4s	7	8	9	0h 10m	d
	33	8.5	9	10	11	2		1m 42s	1m 55s	2m 7s	8s	11.4s	9	10	11	0h 11m	d
	26	10.8	11	12	14	2		2m 9s	2m 25s	2m 42s	8s	11.4s	11	12	14	0h 14m	d
	21	13.3	13	15	17	2		2m 40s	3m 0s	3m 20s	10s	11.4s	13	15	17	0h 16m	d
	17	16.5	16	18	21	3		3m 18s	3m 42s	4m 7s	10s	11.4s	16	18	21	0h 19m	d
	13.6	20.6	20	23	25	3		4m 7s	4m 38s	5m 9s	12s	11.4s	20	23	25	0h 17m	d
	11	25.5	24	28	31	4		5m 5s	5m 44s	6m 22s	12s	11.4s	24	28	31	0h 18m	d
	9	31.1	29	33	37	4		6m 13s	7m 0s	7m 47s	16s	11.4s	29	33	37	0h 20m	d
	7.4	37.8	34	39	44	5		7m 34s	8m 31s	9m 28s	20s	11.4s	34	39	44	0h 24m	d
315	41	7.7	9	10	11	2	0 - DRAG ONLY	1m 32s	1m 44s	1m 55s	8s	12.5s	9	10	11	0h 11m	d
	33	9.5	11	12	14	2		1m 55s	2m 9s	2m 23s	8s	12.5s	11	12	14	0h 13m	d
	26	12.1	14	16	17	2		2m 25s	2m 44s	3m 2s	10s	12.5s	14	16	17	0h 15m	d
	21	15.0	17	19	21	2		3m 0s	3m 23s	3m 45s	10s	12.5s	17	19	21	0h 18m	d
	17	18.5	21	23	26	3		3m 42s	4m 10s	4m 38s	10s	12.5s	21	23	26	0h 16m	d
	13.6	23.2	25	29	32	3		4m 38s	5m 13s	5m 47s	12s	12.5s	25	29	32	0h 17m	d
	11	28.6	31	35	39	4		5m 44s	6m 27s	7m 10s	16s	12.5s	31	35	39	0h 19m	d
	9	35.0	37	42	47	4		7m 0s	7m 53s	8m 45s	16s	12.5s	37	42	47	0h 22m	d
	7.4	42.6	44	49	55	5		8m 31s	9m 35s	10m 39s	20s	12.5s	44	49	55	0h 27m	d

TEMP: 210 ±10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max		Max	Min				Tgt
90	41	2.2	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	5.3	1	1	1	0.5	0.12	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	13.6	6.6	1	1	2	0.5	0.14	1m 15s	5.8s	6.8s	1	1	2	0h 6m	0h 7m	0h 9m
	11	8.2	2	2	2	1.0	0.17	1m 32s	6.2s	7.8s	2	2	2	0h 7m	0h 8m	0h 11m
	9	10.0	2	2	2	1.0	0.21	1m 53s	6.6s	9.4s	2	2	2	0h 8m	0h 10m	0h 13m
110	7.4	12.2	2	2	3	1.0	0.24	2m 15s	7s	11s	2	2	3	0h 10m	0h 12m	0h 16m
	41	2.7	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.09	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.2	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	5.2	1	1	2	0.5	0.14	0m 59s	5.2s	6.2s	1	1	2	0h 4m	0h 6m	0h 7m
	17	6.5	2	2	2	0.5	0.17	1m 10s	5.6s	6.6s	2	2	2	0h 5m	0h 7m	0h 8m
	13.6	8.1	2	2	2	1.0	0.21	1m 32s	6.2s	7.8s	2	2	2	0h 7m	0h 8m	0h 11m
	11	10.0	2	3	3	1.0	0.26	1m 53s	6.6s	9.4s	2	3	3	0h 8m	0h 10m	0h 13m
125	9	12.2	3	3	3	1.0	0.30	2m 15s	7s	11s	3	3	3	0h 10m	0h 12m	0h 16m
	7.4	14.9	3	4	4	1.0	0.36	2m 40s	7.8s	13.2s	3	4	4	0h 11m	0h 14m	0h 19m
	41	3.0	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.8	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.8	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	21	6.0	2	2	2	0.5	0.18	1m 4s	5.4s	6.4s	2	2	2	0h 5m	0h 6m	0h 8m
	17	7.4	2	2	2	1.0	0.22	1m 21s	6s	7s	2	2	2	0h 6m	0h 8m	0h 10m
	13.6	9.2	2	3	3	1.0	0.27	1m 43s	6.4s	8.6s	2	3	3	0h 7m	0h 9m	0h 12m
140	11	11.4	3	3	4	1.0	0.33	2m 4s	6.8s	10.2s	3	3	4	0h 9m	0h 11m	0h 14m
	9	13.9	4	4	4	1.0	0.39	2m 30s	7.5s	12.3s	4	4	4	0h 11m	0h 13m	0h 17m
	7.4	16.9	4	5	5	1.0	0.46	3m 1s	8.3s	14.9s	4	5	5	0h 12m	0h 16m	0h 21m
	41	3.4	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.2	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	26	5.4	2	2	2	0.5	0.19	0m 59s	5.2s	6.2s	2	2	2	0h 4m	0h 6m	0h 7m
	21	6.7	2	2	3	0.5	0.23	1m 15s	5.8s	6.8s	2	2	3	0h 6m	0h 7m	0h 9m
	17	8.2	3	3	3	1.0	0.28	1m 32s	6.2s	7.8s	3	3	3	0h 7m	0h 8m	0h 11m
160	13.6	10.3	3	3	4	1.0	0.34	1m 53s	6.6s	9.4s	3	3	4	0h 8m	0h 10m	0h 13m
	11	12.7	4	4	5	1.0	0.41	2m 20s	7.2s	11.5s	4	4	5	0h 10m	0h 13m	0h 16m
	9	15.6	4	5	5	1.0	0.49	2m 51s	8s	14s	4	5	5	0h 12m	0h 15m	0h 20m
	7.4	18.9	5	6	6	1.0	0.58	3m 21s	8.9s	16.6s	5	6	6	0h 14m	0h 18m	0h 23m
	41	3.9	1	2	2	0.5	0.16	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	33	4.8	2	2	2	0.5	0.19	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	26	6.2	2	2	3	0.5	0.24	1m 10s	5.6s	6.6s	2	2	3	0h 5m	0h 7m	0h 8m
	21	7.6	3	3	3	1.0	0.30	1m 26s	6.1s	7.4s	3	3	3	0h 6m	0h 8m	0h 10m
180	17	9.4	3	4	4	1.0	0.36	1m 43s	6.4s	8.6s	3	4	4	0h 7m	0h 9m	0h 12m
	13.6	11.8	4	4	5	1.0	0.44	2m 10s	6.9s	10.6s	4	4	5	0h 9m	0h 12m	0h 15m
	11	14.5	5	5	6	1.0	0.53	2m 40s	7.8s	13.2s	5	5	6	0h 11m	0h 14m	0h 19m
	9	17.8	6	6	7	1.0	0.64	3m 11s	8.6s	15.8s	6	6	7	0h 13m	0h 17m	0h 22m
	7.4	21.6	7	8	8	1.5	0.75	3m 49s	9.8s	18.8s	7	8	8	0h 16m	0h 20m	0h 27m
	41	4.4	2	2	2	0.5	0.20	0m 53s	5s	6s	2	2	2	0h 4m	0h 5m	0h 7m
	33	5.5	2	2	3	0.5	0.24	0m 59s	5.2s	6.2s	2	2	3	0h 4m	0h 6m	0h 7m
	26	6.9	3	3	3	0.5	0.30	1m 15s	5.8s	6.8s	3	3	3	0h 6m	0h 7m	0h 9m
200	21	8.6	3	4	4	1.0	0.37	1m 37s	6.3s	8.2s	3	4	4	0h 7m	0h 9m	0h 11m
	17	10.6	4	5	5	1.0	0.45	1m 59s	6.7s	9.8s	4	5	5	0h 9m	0h 11m	0h 14m
	13.6	13.2	5	6	6	1.0	0.56	2m 25s	7.3s	11.9s	5	6	6	0h 10m	0h 13m	0h 17m
	11	16.4	6	7	7	1.0	0.67	2m 56s	8.2s	14.5s	6	7	7	0h 12m	0h 16m	0h 20m
	9	20.0	7	8	9	1.5	0.81	3m 35s	9.3s	17.8s	7	8	9	0h 15m	0h 19m	0h 25m
	7.4	24.3	9	10	11	1.5	0.95	4m 13s	10.5s	20.6s	9	10	11	0h 18m	0h 22m	0h 30m
	41	4.9	2	2	3	0.5	0.24	0m 53s	5s	6s	2	2	3	0h 4m	0h 5m	0h 7m
	33	6.1	3	3	3	0.5	0.30	1m 10s	5.6s	6.6s	3	3	3	0h 5m	0h 7m	0h 8m
225	26	7.7	3	4	4	1.0	0.38	1m 26s	6.1s	7.4s	3	4	4	0h 6m	0h 8m	0h 10m
	21	9.5	4	5	5	1.0	0.46	1m 48s	6.5s	9s	4	5	5	0h 8m	0h 10m	0h 13m
	17	11.8	5	6	6	1.0	0.56	2m 10s	6.9s	10.6s	5	6	6	0h 9m	0h 12m	0h 15m
	13.6	14.7	6	7	8	1.0	0.69	2m 40s	7.8s	13.2s	6	7	8	0h 11m	0h 14m	0h 19m
	11	18.2	8	8	9	1.0	0.83	3m 16s	8.8s	16.2s	8	8	9	0h 13m	0h 17m	0h 23m
	9	22.2	9	10	11	1.5	0.99	3m 54s	9.9s	19.2s	9	10	11	0h 16m	0h 21m	0h 28m
	7.4	27.0	11	12	13	2.0	1.17	4m 39s	11.3s	23s	11	12	13	0h 20m	0h 25m	0h 33m
	41	5.5	3	3	3	0.5	0.31	0m 59s	5.2s	6.2s	3	3	3	0h 4m	0h 6m	0h 7m

TEMP: 210 ±10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR			Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max		mm	BAR	Time		Max	Max	Min			
250	41	6.1	3	4	4	0.5	0.38	1m 10s	5.6s	6.6s	3	4	4	0h 5m	0h 7m	0h 8m
	33	7.6	4	5	5	1.0	0.46	1m 26s	6.1s	7.4s	4	5	5	0h 6m	0h 8m	0h 10m
	26	9.6	5	6	6	1.0	0.58	1m 48s	6.5s	9s	5	6	6	0h 8m	0h 10m	0h 13m
	21	11.9	6	7	8	1.0	0.71	2m 10s	6.9s	10.6s	6	7	8	0h 9m	0h 12m	0h 15m
	17	14.7	8	9	10	1.0	0.87	2m 40s	7.8s	13.2s	8	9	10	0h 11m	0h 14m	0h 19m
	13.6	18.4	10	11	12	1.0	1.07	3m 16s	8.8s	16.2s	10	11	12	0h 13m	0h 17m	0h 23m
	11	22.7	12	13	14	1.5	1.30	3m 59s	10s	19.5s	12	13	14	0h 17m	0h 21m	0h 28m
	9	27.8	14	16	17	2.0	1.55	4m 44s	11.5s	23.4s	14	16	17	0h 20m	0h 25m	0h 34m
	7.4	33.8	17	18	20	2.0	1.83	5m 33s	13.1s	28.9s	17	18	20	0h 25m	0h 31m	0h 41m
280	41	6.8	4	5	5	0.5	0.47	1m 15s	5.8s	6.8s	4	5	5	0h 6m	0h 7m	0h 9m
	33	8.5	5	6	6	1.0	0.58	1m 32s	6.2s	7.8s	5	6	6	0h 7m	0h 8m	0h 11m
	26	10.8	7	7	8	1.0	0.73	1m 59s	6.7s	9.8s	7	7	8	0h 9m	0h 11m	0h 14m
	21	13.3	8	9	10	1.0	0.89	2m 25s	7.3s	11.9s	8	9	10	0h 10m	0h 13m	0h 17m
	17	16.5	10	11	12	1.0	1.09	2m 56s	8.2s	14.5s	10	11	12	0h 12m	0h 16m	0h 20m
	13.6	20.6	12	13	15	1.5	1.34	3m 40s	9.5s	18.1s	12	13	15	0h 15m	0h 19m	0h 26m
	11	25.5	15	16	18	1.5	1.63	4m 22s	10.8s	21.3s	15	16	18	0h 18m	0h 23m	0h 31m
	9	31.1	18	19	21	2.0	1.94	5m 12s	12.4s	26.6s	18	19	21	0h 23m	0h 29m	0h 38m
	7.4	37.8	21	23	25	2.5	2.30	6m 5s	14.2s	32.5s	21	23	25	0h 27m	0h 35m	0h 46m
315	41	7.7	5	6	7	1.0	0.60	1m 26s	6.1s	7.4s	5	6	7	0h 6m	0h 8m	0h 10m
	33	9.5	7	7	8	1.0	0.73	1m 48s	6.5s	9s	7	7	8	0h 8m	0h 10m	0h 13m
	26	12.1	8	9	10	1.0	0.92	2m 15s	7s	11s	8	9	10	0h 10m	0h 12m	0h 16m
	21	15.0	10	11	12	1.0	1.13	2m 46s	7.9s	13.6s	10	11	12	0h 12m	0h 15m	0h 19m
	17	18.5	12	14	15	1.0	1.38	3m 21s	8.9s	16.6s	12	14	15	0h 14m	0h 18m	0h 23m
	13.6	23.2	15	17	19	1.5	1.70	4m 3s	10.2s	19.9s	15	17	19	0h 17m	0h 22m	0h 29m
	11	28.6	19	21	23	2.0	2.06	4m 52s	11.7s	24.3s	19	21	23	0h 21m	0h 26m	0h 35m
	9	35.0	22	25	27	2.0	2.46	5m 46s	13.5s	30.2s	22	25	27	0h 26m	0h 32m	0h 43m
	7.4	42.6	26	29	32	2.5	2.91	6m 39s	15.3s	36.7s	26	29	32	0h 31m	0h 39m	0h 52m

TEMP: 225 ± 10C			PHASE 1				PHASE 2			PHASE 3	PHASE 4			PHASE 5	PHASE 6		
Pipe Details (e _n = Wall Thickness)			Bead Up Pressure (BAR)			Minimum Bead up Size	Heat Soak See Note b			Maximum Heater Removal Time	Maximum Pressure Up Time	Weld Pressure (BAR)			Minimim Cool Time Under Pressure (See Note c)	Additional Cool Time out of Machine (See Note d)	
			ADD DRAG (see note a)				0 - DRAG ONLY					ADD DRAG					
			P1			t1	P2	t2				t3	t4	P3			t5 / P3
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Min	Tgt	Max			Min	Tgt	Max		
250	41	6.1	4	4	4	2	0 - DRAG ONLY	1m 13s	1m 22s	1m 31s	6s	10.5s	4	4	4	0h 9m	d
	33	7.6	4	5	5	2		1m 31s	1m 42s	1m 54s	8s	10.5s	4	5	5	0h 11m	d
	26	9.6	5	6	7	2		1m 55s	2m 10s	2m 24s	8s	10.5s	5	6	7	0h 13m	d
	21	11.9	7	8	8	2		2m 23s	2m 41s	2m 59s	8s	10.5s	7	8	8	0h 15m	d
	17	14.7	8	9	10	2		2m 56s	3m 19s	3m 41s	10s	10.5s	8	9	10	0h 18m	d
	13.6	18.4	10	11	13	3		3m 41s	4m 8s	4m 36s	10s	10.5s	10	11	13	0h 16m	d
	11	22.7	12	14	15	3		4m 33s	5m 7s	5m 41s	12s	10.5s	12	14	15	0h 17m	d
	9	27.8	15	16	18	4		5m 33s	6m 15s	6m 57s	16s	10.5s	15	16	18	0h 19m	d
	7.4	33.8	17	19	22	4		6m 45s	7m 36s	8m 27s	16s	10.5s	17	19	22	0h 21m	d
280	41	6.8	4	5	6	2	0 - DRAG ONLY	1m 22s	1m 32s	1m 42s	6s	11.4s	4	5	6	0h 10m	d
	33	8.5	5	6	7	2		1m 42s	1m 55s	2m 7s	8s	11.4s	5	6	7	0h 11m	d
	26	10.8	7	8	9	2		2m 9s	2m 25s	2m 42s	8s	11.4s	7	8	9	0h 14m	d
	21	13.3	8	9	11	2		2m 40s	3m 0s	3m 20s	10s	11.4s	8	9	11	0h 16m	d
	17	16.5	10	12	13	3		3m 18s	3m 42s	4m 7s	10s	11.4s	10	12	13	0h 19m	d
	13.6	20.6	13	14	16	3		4m 7s	4m 38s	5m 9s	12s	11.4s	13	14	16	0h 17m	d
	11	25.5	15	17	19	4		5m 5s	5m 44s	6m 22s	12s	11.4s	15	17	19	0h 18m	d
	9	31.1	18	21	23	4		6m 13s	7m 0s	7m 47s	16s	11.4s	18	21	23	0h 20m	d
	7.4	37.8	22	24	27	5		7m 34s	8m 31s	9m 28s	20s	11.4s	22	24	27	0h 24m	d
315	41	7.7	6	6	7	2	0 - DRAG ONLY	1m 32s	1m 44s	1m 55s	8s	12.5s	6	6	7	0h 11m	d
	33	9.5	7	8	9	2		1m 55s	2m 9s	2m 23s	8s	12.5s	7	8	9	0h 13m	d
	26	12.1	9	10	11	2		2m 25s	2m 44s	3m 2s	10s	12.5s	9	10	11	0h 15m	d
	21	15.0	11	12	13	2		3m 0s	3m 23s	3m 45s	10s	12.5s	11	12	13	0h 18m	d
	17	18.5	13	15	16	3		3m 42s	4m 10s	4m 38s	10s	12.5s	13	15	16	0h 16m	d
	13.6	23.2	16	18	20	3		4m 38s	5m 13s	5m 47s	12s	12.5s	16	18	20	0h 17m	d
	11	28.6	19	22	24	4		5m 44s	6m 27s	7m 10s	16s	12.5s	19	22	24	0h 19m	d
	9	35.0	23	26	29	4		7m 0s	7m 53s	8m 45s	16s	12.5s	23	26	29	0h 22m	d
	7.4	42.6	27	31	35	5		8m 31s	9m 35s	10m 39s	20s	12.5s	27	31	35	0h 27m	d

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time		Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max		mm	BAR	Time	Max	Max	Min	Tgt	Max		
0 9	41	2.2	0	0	0	0.5	0.04	0m 53s	5s	6s	0	0	0	0h 4m	0h 5m	0h 7m
	33	2.7	0	0	1	0.5	0.04	0m 53s	5s	6s	0	0	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	5.3	1	1	1	0.5	0.08	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	13.6	6.6	1	1	1	0.5	0.09	1m 15s	5.8s	6.8s	1	1	1	0h 6m	0h 7m	0h 9m
	11	8.2	1	1	1	1.0	0.11	1m 32s	6.2s	7.8s	1	1	1	0h 7m	0h 8m	0h 11m
	9	10.0	1	1	1	1.0	0.13	1m 53s	6.6s	9.4s	1	1	1	0h 8m	0h 10m	0h 13m
7.4	12.2	1	2	2	1.0	0.15	2m 15s	7s	11s	1	2	2	0h 10m	0h 12m	0h 16m	
0 1 1	41	2.7	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.2	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	5.2	1	1	1	0.5	0.09	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	17	6.5	1	1	1	0.5	0.11	1m 10s	5.6s	6.6s	1	1	1	0h 5m	0h 7m	0h 8m
	13.6	8.1	1	1	2	1.0	0.13	1m 32s	6.2s	7.8s	1	1	2	0h 7m	0h 8m	0h 11m
	11	10.0	2	2	2	1.0	0.16	1m 53s	6.6s	9.4s	2	2	2	0h 8m	0h 10m	0h 13m
	9	12.2	2	2	2	1.0	0.19	2m 15s	7s	11s	2	2	2	0h 10m	0h 12m	0h 16m
7.4	14.9	2	2	3	1.0	0.23	2m 40s	7.8s	13.2s	2	2	3	0h 11m	0h 14m	0h 19m	
5 2 1	41	3.0	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.8	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.8	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	6.0	1	1	1	0.5	0.12	1m 4s	5.4s	6.4s	1	1	1	0h 5m	0h 6m	0h 8m
	17	7.4	1	1	2	1.0	0.14	1m 21s	6s	7s	1	1	2	0h 6m	0h 8m	0h 10m
	13.6	9.2	2	2	2	1.0	0.17	1m 43s	6.4s	8.6s	2	2	2	0h 7m	0h 9m	0h 12m
	11	11.4	2	2	2	1.0	0.21	2m 4s	6.8s	10.2s	2	2	2	0h 9m	0h 11m	0h 14m
	9	13.9	2	3	3	1.0	0.25	2m 30s	7.5s	12.3s	2	3	3	0h 11m	0h 13m	0h 17m
7.4	16.9	3	3	3	1.0	0.29	3m 1s	8.3s	14.9s	3	3	3	0h 12m	0h 16m	0h 21m	
0 4 1	41	3.4	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.2	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	5.4	1	1	1	0.5	0.12	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	21	6.7	1	1	2	0.5	0.14	1m 15s	5.8s	6.8s	1	1	2	0h 6m	0h 7m	0h 9m
	17	8.2	2	2	2	1.0	0.18	1m 32s	6.2s	7.8s	2	2	2	0h 7m	0h 8m	0h 11m
	13.6	10.3	2	2	2	1.0	0.21	1m 53s	6.6s	9.4s	2	2	2	0h 8m	0h 10m	0h 13m
	11	12.7	2	3	3	1.0	0.26	2m 20s	7.2s	11.5s	2	3	3	0h 10m	0h 13m	0h 16m
	9	15.6	3	3	3	1.0	0.31	2m 51s	8s	14s	3	3	3	0h 12m	0h 15m	0h 20m
7.4	18.9	3	4	4	1.0	0.36	3m 21s	8.9s	16.6s	3	4	4	0h 14m	0h 18m	0h 23m	
0 6 1	41	3.9	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.8	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	6.2	1	2	2	0.5	0.15	1m 10s	5.6s	6.6s	1	2	2	0h 5m	0h 7m	0h 8m
	21	7.6	2	2	2	1.0	0.19	1m 26s	6.1s	7.4s	2	2	2	0h 6m	0h 8m	0h 10m
	17	9.4	2	2	3	1.0	0.23	1m 43s	6.4s	8.6s	2	2	3	0h 7m	0h 9m	0h 12m
	13.6	11.8	3	3	3	1.0	0.28	2m 10s	6.9s	10.6s	3	3	3	0h 9m	0h 12m	0h 15m
	11	14.5	3	3	4	1.0	0.34	2m 40s	7.8s	13.2s	3	3	4	0h 11m	0h 14m	0h 19m
	9	17.8	4	4	4	1.0	0.40	3m 11s	8.6s	15.8s	4	4	4	0h 13m	0h 17m	0h 22m
7.4	21.6	4	5	5	1.5	0.47	3m 49s	9.8s	18.8s	4	5	5	0h 16m	0h 20m	0h 27m	
0 8 1	41	4.4	1	1	1	0.5	0.13	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	5.5	1	2	2	0.5	0.15	0m 59s	5.2s	6.2s	1	2	2	0h 4m	0h 6m	0h 7m
	26	6.9	2	2	2	0.5	0.19	1m 15s	5.8s	6.8s	2	2	2	0h 6m	0h 7m	0h 9m
	21	8.6	2	2	3	1.0	0.24	1m 37s	6.3s	8.2s	2	2	3	0h 7m	0h 9m	0h 11m
	17	10.6	3	3	3	1.0	0.29	1m 59s	6.7s	9.8s	3	3	3	0h 9m	0h 11m	0h 14m
	13.6	13.2	3	4	4	1.0	0.35	2m 25s	7.3s	11.9s	3	4	4	0h 10m	0h 13m	0h 17m
	11	16.4	4	4	5	1.0	0.43	2m 56s	8.2s	14.5s	4	4	5	0h 12m	0h 16m	0h 20m
	9	20.0	5	5	6	1.5	0.51	3m 35s	9.3s	17.8s	5	5	6	0h 15m	0h 19m	0h 25m
7.4	24.3	5	6	7	1.5	0.60	4m 13s	10.5s	20.6s	5	6	7	0h 18m	0h 22m	0h 30m	
0 0 2	41	4.9	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	33	6.1	2	2	2	0.5	0.19	1m 10s	5.6s	6.6s	2	2	2	0h 5m	0h 7m	0h 8m
	26	7.7	2	2	3	1.0	0.24	1m 26s	6.1s	7.4s	2	2	3	0h 6m	0h 8m	0h 10m
	21	9.5	3	3	3	1.0	0.29	1m 48s	6.5s	9s	3	3	3	0h 8m	0h 10m	0h 13m
	17	11.8	3	4	4	1.0	0.35	2m 10s	6.9s	10.6s	3	4	4	0h 9m	0h 12m	0h 15m
	13.6	14.7	4	4	5	1.0	0.43	2m 40s	7.8s	13.2s	4	4	5	0h 11m	0h 14m	0h 19m
	11	18.2	5	5	6	1.0	0.52	3m 16s	8.8s	16.2s	5	5	6	0h 13m	0h 17m	0h 23m
	9	22.2	6	6	7	1.5	0.62	3m 54s	9.9s	19.2s	6	6	7	0h 16m	0h 21m	0h 28m
7.4	27.0	7	7	8	2.0	0.74	4m 39s	11.3s	23s	7	7	8	0h 20m	0h 25m	0h 33m	
5 2 2	41	5.5	2	2	2	0.5	0.19	0m 59s	5.2s	6.2s	2	2	2	0h 4m	0h 6m	0h 7m
	33	6.8	2	2	3	0.5	0.24	1m 15s	5.8s	6.8s	2	2	3	0h 6m	0h 7m	0h 9m
	26	8.7	3	3	3	1.0	0.30	1m 37s	6.3s	8.2s	3	3	3	0h 7m	0h 9m	0h 11m
	21	10.7	3	4	4	1.0	0.37	1m 59s	6.7s	9.8s	3	4	4	0h 9m	0h 11m	0h 14m
	17	13.2	4	4	5	1.0	0.44	2m 25s	7.3s	11.9s	4	4	5	0h 10m	0h 13m	0h 17m
	13.6	16.5	5	6	6	1.0	0.55	3m 1s	8.3s	14.9s	5	6	6	0h 12m	0h 16m	0h 21m
	11	20.5	6	7	7	1.5	0.66	3m 35s	9.3s	17.8s	6	7	7	0h 15m	0h 19m	0h 25m
	9	25.0	7	8	9	1.5	0.79	4m 22s	10.8s	21.3s	7	8	9	0h 18m	0h 23m	0h 31m
7.4	30.4	8	9	10	2.0	0.93	5m 4s	12.1s	25.7s	8	9	10	0h 22m	0h 28m	0h 37m	

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimum Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
0 5 2	41	6.1	2	2	3	0.5	0.24	1m 10s	5.6s	6.6s	2	2	3	0h 5m	0h 7m	0h 8m
	33	7.6	3	3	3	1.0	0.29	1m 26s	6.1s	7.4s	3	3	3	0h 6m	0h 8m	0h 10m
	26	9.6	3	4	4	1.0	0.37	1m 48s	6.5s	9s	3	4	4	0h 8m	0h 10m	0h 13m
	21	11.9	4	5	5	1.0	0.45	2m 10s	6.9s	10.6s	4	5	5	0h 9m	0h 12m	0h 15m
	17	14.7	5	6	6	1.0	0.55	2m 40s	7.8s	13.2s	5	6	6	0h 11m	0h 14m	0h 19m
	13.6	18.4	6	7	7	1.0	0.67	3m 16s	8.8s	16.2s	6	7	7	0h 13m	0h 17m	0h 23m
	11	22.7	7	8	9	1.5	0.82	3m 59s	10s	19.5s	7	8	9	0h 17m	0h 21m	0h 28m
	9	27.8	9	10	11	2.0	0.97	4m 44s	11.5s	23.4s	9	10	11	0h 20m	0h 25m	0h 34m
	7.4	33.8	10	12	13	2.0	1.15	5m 33s	13.1s	28.9s	10	12	13	0h 25m	0h 31m	0h 41m
0 8 2	41	6.8	3	3	3	0.5	0.30	1m 15s	5.8s	6.8s	3	3	3	0h 6m	0h 7m	0h 9m
	33	8.5	3	4	4	1.0	0.37	1m 32s	6.2s	7.8s	3	4	4	0h 7m	0h 8m	0h 11m
	26	10.8	4	5	5	1.0	0.46	1m 59s	6.7s	9.8s	4	5	5	0h 9m	0h 11m	0h 14m
	21	13.3	5	6	6	1.0	0.56	2m 25s	7.3s	11.9s	5	6	6	0h 10m	0h 13m	0h 17m
	17	16.5	6	7	8	1.0	0.69	2m 56s	8.2s	14.5s	6	7	8	0h 12m	0h 16m	0h 20m
	13.6	20.6	8	8	9	1.5	0.84	3m 40s	9.5s	18.1s	8	8	9	0h 15m	0h 19m	0h 26m
	11	25.5	9	10	11	1.5	1.02	4m 22s	10.8s	21.3s	9	10	11	0h 18m	0h 23m	0h 31m
	9	31.1	11	12	13	2.0	1.22	5m 12s	12.4s	26.6s	11	12	13	0h 23m	0h 29m	0h 38m
	7.4	37.8	13	14	16	2.5	1.44	6m 5s	14.2s	32.5s	13	14	16	0h 27m	0h 35m	0h 46m
315	41	7.7	3	4	4	1.0	0.38	1m 26s	6.1s	7.4s	3	4	4	0h 6m	0h 8m	0h 10m
	33	9.5	4	5	5	1.0	0.46	1m 48s	6.5s	9s	4	5	5	0h 8m	0h 10m	0h 13m
	26	12.1	5	6	6	1.0	0.58	2m 15s	7s	11s	5	6	6	0h 10m	0h 12m	0h 16m
	21	15.0	6	7	8	1.0	0.71	2m 46s	7.9s	13.6s	6	7	8	0h 12m	0h 15m	0h 19m
	17	18.5	8	9	10	1.0	0.87	3m 21s	8.9s	16.6s	8	9	10	0h 14m	0h 18m	0h 23m
	13.6	23.2	10	11	12	1.5	1.07	4m 3s	10.2s	19.9s	10	11	12	0h 17m	0h 22m	0h 29m
	11	28.6	12	13	14	2.0	1.29	4m 52s	11.7s	24.3s	12	13	14	0h 21m	0h 26m	0h 35m
	9	35.0	14	15	17	2.0	1.54	5m 46s	13.5s	30.2s	14	15	17	0h 26m	0h 32m	0h 43m
	7.4	42.6	16	18	20	2.5	1.82	6m 39s	15.3s	36.7s	16	18	20	0h 31m	0h 39m	0h 52m

WELDING PARAMETER CHARTS

V355

RAM=20.02 cm²

HDPE

DVS2207-1-2016

ISO21307-2017

PP

DVS2207-11 (2017)

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5			
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)				
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C		
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max		Max	Min				Tgt	Max
90	41	2.2	1	1	1	0.5	0.04	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	33	2.7	1	1	1	0.5	0.04	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	17	5.3	1	1	1	1.0	0.08	0m 51s	5.3s	5.3s	1	1	1		0h 4m	0h 6m	0h 7m
	13.6	6.6	1	1	1	1.0	0.09	1m 10s	6s	6s	1	1	1		0h 6m	0h 7m	0h 9m
	11	8.2	2	2	2	1.5	0.11	1m 21s	6.5s	6.5s	2	2	2		0h 7m	0h 8m	0h 11m
	9	10.0	2	2	2	1.5	0.13	1m 43s	7.4s	7.4s	2	2	2		0h 8m	0h 10m	0h 13m
7.4	12.2	2	2	2	2.0	0.15	2m 0s	8s	8s	2	2	2		0h 10m	0h 12m	0h 16m	
110	41	2.7	1	1	1	0.5	0.05	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	26	4.2	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	21	5.2	1	1	1	1.0	0.09	0m 51s	5.3s	5.3s	1	1	1		0h 4m	0h 6m	0h 7m
	17	6.5	2	2	2	1.0	0.11	1m 4s	5.8s	5.8s	2	2	2		0h 5m	0h 7m	0h 8m
	13.6	8.1	2	2	2	1.5	0.13	1m 21s	6.5s	6.5s	2	2	2		0h 7m	0h 8m	0h 11m
	11	10.0	2	2	3	1.5	0.16	1m 43s	7.4s	7.4s	2	2	3		0h 8m	0h 10m	0h 13m
	9	12.2	3	3	3	2.0	0.19	2m 0s	8s	8s	3	3	3		0h 10m	0h 12m	0h 16m
7.4	14.9	3	3	4	2.0	0.23	2m 27s	8.8s	9.2s	3	3	4		0h 11m	0h 14m	0h 19m	
125	41	3.0	1	1	1	0.5	0.06	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	33	3.8	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	26	4.8	1	1	2	1.0	0.10	0m 45s	5s	5s	1	1	2		0h 4m	0h 5m	0h 7m
	21	6.0	2	2	2	1.0	0.12	0m 58s	5.5s	5.5s	2	2	2		0h 5m	0h 6m	0h 8m
	17	7.4	2	2	2	1.5	0.14	1m 10s	6s	6s	2	2	2		0h 6m	0h 8m	0h 10m
	13.6	9.2	2	3	3	1.5	0.17	1m 32s	6.9s	6.9s	2	3	3		0h 7m	0h 9m	0h 12m
	11	11.4	3	3	3	1.5	0.21	1m 55s	7.8s	7.8s	3	3	3		0h 9m	0h 11m	0h 14m
	9	13.9	3	4	4	2.0	0.25	2m 16s	8.5s	8.7s	3	4	4		0h 11m	0h 13m	0h 17m
7.4	16.9	4	4	5	2.0	0.29	2m 49s	9.4s	10.1s	4	4	5		0h 12m	0h 16m	0h 21m	
140	41	3.4	1	1	1	0.5	0.08	0m 45s	5s	5s	1	1	1		0h 4m	0h 5m	0h 7m
	33	4.2	1	1	2	0.5	0.10	0m 45s	5s	5s	1	1	2		0h 4m	0h 5m	0h 7m
	26	5.4	2	2	2	1.0	0.12	0m 51s	5.3s	5.3s	2	2	2		0h 4m	0h 6m	0h 7m
	21	6.7	2	2	2	1.0	0.14	1m 10s	6s	6s	2	2	2		0h 6m	0h 7m	0h 9m
	17	8.2	2	3	3	1.5	0.18	1m 21s	6.5s	6.5s	2	3	3		0h 7m	0h 8m	0h 11m
	13.6	10.3	3	3	3	1.5	0.21	1m 43s	7.4s	7.4s	3	3	3		0h 8m	0h 10m	0h 13m
	11	12.7	4	4	4	2.0	0.26	2m 5s	8.2s	8.3s	4	4	4		0h 10m	0h 13m	0h 16m
	9	15.6	4	5	5	2.0	0.31	2m 38s	9.1s	9.7s	4	5	5		0h 12m	0h 15m	0h 20m
7.4	18.9	5	5	6	2.0	0.36	3m 10s	10s	11s	5	5	6		0h 14m	0h 18m	0h 23m	
160	41	3.9	1	2	2	0.5	0.10	0m 45s	5s	5s	1	2	2		0h 4m	0h 5m	0h 7m
	33	4.8	2	2	2	1.0	0.12	0m 45s	5s	5s	2	2	2		0h 4m	0h 5m	0h 7m
	26	6.2	2	2	2	1.0	0.15	1m 4s	5.8s	5.8s	2	2	2		0h 5m	0h 7m	0h 8m
	21	7.6	3	3	3	1.5	0.19	1m 16s	6.3s	6.3s	3	3	3		0h 6m	0h 8m	0h 10m
	17	9.4	3	3	4	1.5	0.23	1m 32s	6.9s	6.9s	3	3	4		0h 7m	0h 9m	0h 12m
	13.6	11.8	4	4	4	1.5	0.28	2m 0s	8s	8s	4	4	4		0h 9m	0h 12m	0h 15m
	11	14.5	5	5	5	2.0	0.34	2m 27s	8.8s	9.2s	5	5	5		0h 11m	0h 14m	0h 19m
	9	17.8	6	6	6	2.0	0.40	2m 59s	9.7s	10.6s	6	6	6		0h 13m	0h 17m	0h 22m
7.4	21.6	7	7	8	2.5	0.47	3m 37s	10.8s	12.2s	7	7	8		0h 16m	0h 20m	0h 27m	
180	41	4.4	2	2	2	0.5	0.13	0m 45s	5s	5s	2	2	2		0h 4m	0h 5m	0h 7m
	33	5.5	2	2	2	1.0	0.15	0m 51s	5.3s	5.3s	2	2	2		0h 4m	0h 6m	0h 7m
	26	6.9	3	3	3	1.0	0.19	1m 10s	6s	6s	3	3	3		0h 6m	0h 7m	0h 9m
	21	8.6	3	4	4	1.5	0.24	1m 27s	6.7s	6.7s	3	4	4		0h 7m	0h 9m	0h 11m
	17	10.6	4	4	5	1.5	0.29	1m 49s	7.6s	7.6s	4	4	5		0h 9m	0h 11m	0h 14m
	13.6	13.2	5	5	6	2.0	0.35	2m 11s	8.4s	8.5s	5	5	6		0h 10m	0h 13m	0h 17m
	11	16.4	6	6	7	2.0	0.43	2m 43s	9.3s	9.9s	6	6	7		0h 12m	0h 16m	0h 20m
	9	20.0	7	8	8	2.5	0.51	3m 21s	10.4s	11.5s	7	8	8		0h 15m	0h 19m	0h 25m
7.4	24.3	8	9	10	2.5	0.60	4m 4s	11.6s	13.4s	8	9	10		0h 18m	0h 22m	0h 30m	
200	41	4.9	2	2	2	1.0	0.15	0m 45s	5s	5s	2	2	2		0h 4m	0h 5m	0h 7m
	33	6.1	3	3	3	1.0	0.19	1m 4s	5.8s	5.8s	3	3	3		0h 5m	0h 7m	0h 8m
	26	7.7	3	4	4	1.5	0.24	1m 16s	6.3s	6.3s	3	4	4		0h 6m	0h 8m	0h 10m
	21	9.5	4	4	5	1.5	0.29	1m 38s	7.2s	7.2s	4	4	5		0h 8m	0h 10m	0h 13m
	17	11.8	5	5	6	1.5	0.35	2m 0s	8s	8s	5	5	6		0h 9m	0h 12m	0h 15m
	13.6	14.7	6	7	7	2.0	0.43	2m 27s	8.8s	9.2s	6	7	7		0h 11m	0h 14m	0h 19m
	11	18.2	7	8	8	2.0	0.52	3m 5s	9.9s	10.8s	7	8	8		0h 13m	0h 17m	0h 23m
	9	22.2	9	9	10	2.5	0.62	3m 42s	11s	12.4s	9	9	10		0h 16m	0h 21m	0h 28m
7.4	27.0	10	11	12	3.0	0.74	4m 31s	12.4s	14.5s	10	11	12		0h 20m	0h 25m	0h 33m	
225	41	5.5	3	3	3	1.0	0.19	0m 51s	5.3s	5.3s	3	3	3		0h 4m	0h 6m	0h 7m
	33	6.8	3	4	4	1.0	0.24	1m 10s	6s	6s	3	4	4		0h 6m	0h 7m	0h 9m
	26	8.7	4	5	5	1.5	0.30	1m 27s	6.7s	6.7s	4	5	5		0h 7m	0h 9m	0h 11m
	21	10.7	5	6	6	1.5	0.37	1m 49s	7.6s	7.6s	5	6	6		0h 9m	0h 11m	0h 14m
	17	13.2	6	7	7	2.0	0.44	2m 11s	8.4s	8.5s	6	7	7		0h 10m	0h 13m	0h 17m
	13.6	16.5	8	8	9	2.0	0.55	2m 49s	9.4s	10.1s	8	8	9		0h 12m	0h 16m	0h 21m
	11	20.5	9	10	11	2.5	0.66	3m 21s	10.4s	11.5s	9	10	11		0h 15m	0h 19m	0h 25m
	9	25.0	11	12	13	2.5	0.79	4m 15s	11.9s	13.8s	11	12	13		0h 18m	0h 23m	0h 31m
7.4	30.4	13	14	15	3.0	0.93	5m 2s	13.6s	16s	13	14	15		0h 22m	0h 28m	0h 37m	

TEMP: 220 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 130mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimim Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time		Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
250	41	6.1	3	4	4	1.0	0.24	1m 4s	5.8s	5.8s	3	4	4	0h 5m	0h 7m	0h 8m
	33	7.6	4	4	5	1.5	0.29	1m 16s	6.3s	6.3s	4	4	5	0h 6m	0h 8m	0h 10m
	26	9.6	5	6	6	1.5	0.37	1m 38s	7.2s	7.2s	5	6	6	0h 8m	0h 10m	0h 13m
	21	11.9	6	7	7	1.5	0.45	2m 0s	8s	8s	6	7	7	0h 9m	0h 12m	0h 15m
	17	14.7	8	8	9	2.0	0.55	2m 27s	8.8s	9.2s	8	8	9	0h 11m	0h 14m	0h 19m
	13.6	18.4	9	10	11	2.0	0.67	3m 5s	9.9s	10.8s	9	10	11	0h 13m	0h 17m	0h 23m
	11	22.7	11	12	13	2.5	0.82	3m 48s	11.1s	12.7s	11	12	13	0h 17m	0h 21m	0h 28m
	9	27.8	14	15	16	3.0	0.97	4m 36s	12.6s	14.8s	14	15	16	0h 20m	0h 25m	0h 34m
7.4	33.8	16	17	18	3.0	1.15	5m 39s	14.9s	17.6s	16	17	18	0h 25m	0h 31m	0h 41m	
280	41	6.8	4	4	5	1.0	0.30	1m 10s	6s	6s	4	4	5	0h 6m	0h 7m	0h 9m
	33	8.5	5	6	6	1.5	0.37	1m 21s	6.5s	6.5s	5	6	6	0h 7m	0h 8m	0h 11m
	26	10.8	6	7	7	1.5	0.46	1m 49s	7.6s	7.6s	6	7	7	0h 9m	0h 11m	0h 14m
	21	13.3	8	8	9	2.0	0.56	2m 11s	8.4s	8.5s	8	8	9	0h 10m	0h 13m	0h 17m
	17	16.5	10	10	11	2.0	0.69	2m 43s	9.3s	9.9s	10	10	11	0h 12m	0h 16m	0h 20m
	13.6	20.6	12	13	14	2.5	0.84	3m 26s	10.5s	11.7s	12	13	14	0h 15m	0h 19m	0h 26m
	11	25.5	14	15	16	2.5	1.02	4m 15s	11.9s	13.8s	14	15	16	0h 18m	0h 23m	0h 31m
	9	31.1	17	18	20	3.0	1.22	5m 12s	14s	16.4s	17	18	20	0h 23m	0h 29m	0h 38m
7.4	37.8	20	22	23	3.5	1.44	6m 15s	16.2s	19.3s	20	22	23	0h 27m	0h 35m	0h 46m	
315	41	7.7	5	6	6	1.5	0.38	1m 16s	6.3s	6.3s	5	6	6	0h 6m	0h 8m	0h 10m
	33	9.5	7	7	7	1.5	0.46	1m 38s	7.2s	7.2s	7	7	7	0h 8m	0h 10m	0h 13m
	26	12.1	8	9	9	2.0	0.58	2m 0s	8s	8s	8	9	9	0h 10m	0h 12m	0h 16m
	21	15.0	10	11	11	2.0	0.71	2m 32s	9s	9.4s	10	11	11	0h 12m	0h 15m	0h 19m
	17	18.5	12	13	14	2.0	0.87	3m 10s	10s	11s	12	13	14	0h 14m	0h 18m	0h 23m
	13.6	23.2	15	16	17	2.5	1.07	3m 53s	11.3s	12.9s	15	16	17	0h 17m	0h 22m	0h 29m
	11	28.6	18	19	21	3.0	1.29	4m 46s	13s	15.2s	18	19	21	0h 21m	0h 26m	0h 35m
	9	35.0	22	23	25	3.0	1.54	5m 54s	15.5s	18.3s	22	23	25	0h 26m	0h 32m	0h 43m
7.4	42.6	26	27	29	3.5	1.82	7m 7s	17.8s	21.7s	26	27	29	0h 31m	0h 39m	0h 52m	
355	41	8.7	7	7	8	1.5	0.48	1m 27s	6.7s	6.7s	7	7	8	0h 7m	0h 9m	0h 11m
	33	10.8	8	9	9	1.5	0.59	1m 49s	7.6s	7.6s	8	9	9	0h 9m	0h 11m	0h 14m
	26	13.7	10	11	12	2.0	0.74	2m 16s	8.5s	8.7s	10	11	12	0h 11m	0h 13m	0h 17m
	21	16.9	13	14	14	2.0	0.90	2m 49s	9.4s	10.1s	13	14	14	0h 12m	0h 16m	0h 21m
	17	20.9	15	17	18	2.5	1.10	3m 26s	10.5s	11.7s	15	17	18	0h 15m	0h 19m	0h 26m
	13.6	26.1	19	20	22	3.0	1.35	4m 20s	12s	14s	19	20	22	0h 19m	0h 24m	0h 32m
	11	32.3	23	25	26	3.0	1.64	5m 23s	14.3s	16.9s	23	25	26	0h 23m	0h 30m	0h 39m
	9	39.4	27	29	31	3.5	1.96	6m 31s	16.7s	20s	27	29	31	0h 28m	0h 36m	0h 48m
7.4	48.0	32	35	37	3.5	2.32	7m 59s	19.4s	24.1s	32	35	37	0h 34m	0h 44m	0h 58m	

TEMP: 215 ± 15C				PHASE 1			PHASE 2				PHASE 3	PHASE 4			PHASE 5	PHASE 6		
Pipe Details (e _n = Wall Thickness)				Bead Up Pressure (see note a) BAR			Heat Soak (See Note c)			Min Bead Size	Maximum Heater Removal Time	Maximum Pressure Up is Not Specified	Weld Pressure BAR			Minimim Cool Time Under Pressure	Additional Cool Time out of Machine (See Note d)	
				ADD DRAG (see note b)			0 - DRAG ONLY						ADD DRAG					
D _n	OD	SDR	e _n	P1 / t1			P2	t2			t3	t4	P3			t5	t6	
				Min	Tgt	Max	BAR	Min	Tgt	Max	mm		Min	Tgt	Max			
90	90	41	2.2	1	2	2	0 - DRAG ONLY	0m 22s	0m 24s	0m 26s	1.3	5s	-	1	2	2	0h 1m	d
	90	33	2.7	2	2	2		0m 27s	0m 30s	0m 33s	1.4	5s	-	2	2	2	0h 1m	d
	90	26	3.5	2	2	3		0m 35s	0m 38s	0m 42s	1.5	5s	-	2	2	3	0h 1m	d
	90	21	4.3	2	3	4		0m 43s	0m 47s	0m 51s	1.6	5s	-	2	3	4	0h 2m	d
	90	17	5.3	3	4	4		0m 53s	0m 58s	1m 4s	1.8	6s	-	3	4	4	0h 2m	d
	90	13.6	6.6	4	5	5		1m 6s	1m 13s	1m 19s	2.0	6s	-	4	5	5	0h 3m	d
	90	11	8.2	4	5	7		1m 22s	1m 30s	1m 38s	2.2	8s	-	4	5	7	0h 4m	d
	90	9	10.0	5	7	8		1m 40s	1m 50s	2m 0s	2.5	8s	-	5	7	8	0h 4m	d
	90	7.4	12.2	6	8	9		2m 2s	2m 14s	2m 26s	2.8	10s	-	6	8	9	0h 5m	d
110	110	41	2.7	2	2	3	0 - DRAG ONLY	0m 27s	0m 30s	0m 32s	1.4	5s	-	2	2	3	0h 1m	d
	110	33	3.3	2	3	3		0m 33s	0m 37s	0m 40s	1.5	5s	-	2	3	3	0h 1m	d
	110	26	4.2	3	4	4		0m 42s	0m 47s	0m 51s	1.6	5s	-	3	4	4	0h 2m	d
	110	21	5.2	4	4	5		0m 52s	0m 58s	1m 3s	1.8	6s	-	4	4	5	0h 2m	d
	110	17	6.5	4	5	7		1m 5s	1m 11s	1m 18s	2.0	6s	-	4	5	7	0h 3m	d
	110	13.6	8.1	5	7	8		1m 21s	1m 29s	1m 37s	2.2	8s	-	5	7	8	0h 3m	d
	110	11	10.0	7	8	10		1m 40s	1m 50s	2m 0s	2.5	8s	-	7	8	10	0h 4m	d
	110	9	12.2	8	10	12		2m 2s	2m 14s	2m 27s	2.8	10s	-	8	10	12	0h 5m	d
	110	7.4	14.9	9	12	14		2m 29s	2m 44s	2m 58s	3.2	10s	-	9	12	14	0h 6m	d
125	125	41	3.0	2	3	4	0 - DRAG ONLY	0m 30s	0m 34s	0m 37s	1.5	5s	-	2	3	4	0h 1m	d
	125	33	3.8	3	4	4		0m 38s	0m 42s	0m 45s	1.6	5s	-	3	4	4	0h 2m	d
	125	26	4.8	4	5	6		0m 48s	0m 53s	0m 58s	1.7	6s	-	4	5	6	0h 2m	d
	125	21	6.0	5	6	7		0m 60s	1m 5s	1m 11s	1.9	6s	-	5	6	7	0h 3m	d
	125	17	7.4	6	7	8		1m 14s	1m 21s	1m 28s	2.1	8s	-	6	7	8	0h 3m	d
	125	13.6	9.2	7	9	10		1m 32s	1m 41s	1m 50s	2.4	8s	-	7	9	10	0h 4m	d
	125	11	11.4	9	11	13		1m 54s	2m 5s	2m 16s	2.7	8s	-	9	11	13	0h 5m	d
	125	9	13.9	10	13	15		2m 19s	2m 33s	2m 47s	3.1	10s	-	10	13	15	0h 6m	d
	125	7.4	16.9	12	15	18		2m 49s	3m 6s	3m 23s	3.5	10s	-	12	15	18	0h 7m	d
140	140	41	3.4	3	4	5	0 - DRAG ONLY	0m 34s	0m 38s	0m 41s	1.5	5s	-	3	4	5	0h 1m	d
	140	33	4.2	4	5	6		0m 42s	0m 47s	0m 51s	1.6	5s	-	4	5	6	0h 2m	d
	140	26	5.4	5	6	7		0m 54s	0m 59s	1m 5s	1.8	6s	-	5	6	7	0h 2m	d
	140	21	6.7	6	7	9		1m 7s	1m 13s	1m 20s	2.0	6s	-	6	7	9	0h 3m	d
	140	17	8.2	7	9	11		1m 22s	1m 31s	1m 39s	2.2	8s	-	7	9	11	0h 4m	d
	140	13.6	10.3	9	11	13		1m 43s	1m 53s	2m 4s	2.5	8s	-	9	11	13	0h 4m	d
	140	11	12.7	11	13	16		2m 7s	2m 20s	2m 33s	2.9	10s	-	11	13	16	0h 5m	d
	140	9	15.6	13	16	19		2m 36s	2m 51s	3m 7s	3.3	10s	-	13	16	19	0h 7m	d
	140	7.4	18.9	15	19	22		3m 9s	3m 28s	3m 47s	3.8	10s	-	15	19	22	0h 8m	d
160	160	41	3.9	4	5	6	0 - DRAG ONLY	0m 39s	0m 43s	0m 47s	1.6	5s	-	4	5	6	0h 2m	d
	160	33	4.8	5	6	7		0m 48s	0m 53s	0m 58s	1.7	6s	-	5	6	7	0h 2m	d
	160	26	6.2	6	8	9		1m 2s	1m 8s	1m 14s	1.9	6s	-	6	8	9	0h 3m	d
	160	21	7.6	8	9	11		1m 16s	1m 24s	1m 31s	2.1	8s	-	8	9	11	0h 3m	d
	160	17	9.4	9	12	14		1m 34s	1m 44s	1m 53s	2.4	8s	-	9	12	14	0h 4m	d
	160	13.6	11.8	11	14	17		1m 58s	2m 9s	2m 21s	2.8	8s	-	11	14	17	0h 5m	d
	160	11	14.5	14	17	21		2m 25s	2m 40s	2m 55s	3.2	10s	-	14	17	21	0h 6m	d
	160	9	17.8	17	21	25		2m 58s	3m 16s	3m 33s	3.7	10s	-	17	21	25	0h 8m	d
	160	7.4	21.6	20	24	29		3m 36s	3m 58s	4m 19s	4.2	12s	-	20	24	29	0h 9m	d
180	180	41	4.4	5	6	8	0 - DRAG ONLY	0m 44s	0m 48s	0m 53s	1.7	5s	-	5	6	8	0h 2m	d
	180	33	5.5	6	8	9		0m 55s	1m 0s	1m 5s	1.8	6s	-	6	8	9	0h 2m	d
	180	26	6.9	8	10	12		1m 9s	1m 16s	1m 23s	2.0	6s	-	8	10	12	0h 3m	d
	180	21	8.6	10	12	14		1m 26s	1m 34s	1m 43s	2.3	8s	-	10	12	14	0h 4m	d
	180	17	10.6	12	15	17		1m 46s	1m 56s	2m 7s	2.6	8s	-	12	15	17	0h 5m	d
	180	13.6	13.2	15	18	21		2m 12s	2m 26s	2m 39s	3.0	10s	-	15	18	21	0h 6m	d
	180	11	16.4	18	22	26		2m 44s	3m 0s	3m 16s	3.5	10s	-	18	22	26	0h 7m	d
	180	9	20.0	21	26	31		3m 20s	3m 40s	4m 0s	4.0	12s	-	21	26	31	0h 9m	d
	180	7.4	24.3	25	31	37		4m 3s	4m 28s	4m 52s	4.6	12s	-	25	31	37	0h 10m	d
200	200	41	4.9	6	8	9	0 - DRAG ONLY	0m 49s	0m 54s	0m 59s	1.7	6s	-	6	8	9	0h 2m	d
	200	33	6.1	8	10	11		1m 1s	1m 7s	1m 13s	1.9	6s	-	8	10	11	0h 3m	d
	200	26	7.7	10	12	14		1m 17s	1m 25s	1m 32s	2.2	8s	-	10	12	14	0h 3m	d
	200	21	9.5	12	15	18		1m 35s	1m 45s	1m 54s	2.4	8s	-	12	15	18	0h 4m	d
	200	17	11.8	15	18	22		1m 58s	2m 9s	2m 21s	2.8	8s	-	15	18	22	0h 5m	d
	200	13.6	14.7	18	22	27		2m 27s	2m 42s	2m 56s	3.2	10s	-	18	22	27	0h 6m	d
	200	11	18.2	22	27	32		3m 2s	3m 20s	3m 38s	3.7	10s	-	22	27	32	0h 8m	d
	200	9	22.2	26	32	38		3m 42s	4m 4s	4m 27s	4.3	12s	-	26	32	38	0h 10m	d
	200	7.4	27.0	31	38	45		4m 30s	4m 57s	5m 24s	5.1	16s	-	31	38	45	0h 12m	d
225	225	41	5.5	8	10	12	0 - DRAG ONLY	0m 55s	1m 0s	1m 6s	1.8	6s	-	8	10	12	0h 2m	d
	225	33	6.8	10	12	14		1m 8s	1m 15s	1m 22s	2.0	6s	-	10	12	14	0h 3m	d
	225	26	8.7	12	15	18		1m 27s	1m 35s	1m 44s	2.3	8s	-	12	15	18	0h 4m	d
	225	21	10.7	15	19	22		1m 47s	1m 58s	2m 9s	2.6	8s	-	15	19	22	0h 5m	d
	225	17	13.2	18	23	27		2m 12s	2m 26s	2m 39s	3.0	10s	-	18	23	27	0h 6m	d
	225	13.6	16.5	23	28	34		2m 45s	3m 2s	3m 19s	3.5	10s	-	23	28	34	0h 7m	d
	225	11	20.5	28	34	41		3m 25s	3m 45s	4m 5s	4.1	12s	-	28	34	41	0h 9m	d
	225	9	25.0	33	41	49		4m 10s	4m 35s	5m 0s	4.8	12s	-	33	41	49	0h 11m	d
	225	7.4	30.4	39	48	58		5m 4s	5m 34s	6m 5s	5.6	16s	-	39	48	58	0h 13m	d

TEMP: 215 ± 15C				PHASE 1			PHASE 2				PHASE 3	PHASE 4			PHASE 5	PHASE 6		
Pipe Details (e _n = Wall Thickness)				Bead Up Pressure (see note a) BAR			Heat Soak (See Note c)			Min Bead Size	Maximum Heater Removal Time	Maximum Pressure Up is Not Specified	Weld Pressure BAR			Minimim Cool Time Under Pressure	Additional Cool Time out of Machine (See Note d)	
				ADD DRAG (see note b)			0 - DRAG ONLY						ADD DRAG					
				P1 / t1			P2	t2				t3	t4	P3			t5	t6
D _n	OD	SDR	e _n	Min	Tgt	Max	BAR	Min	Tgt	Max	mm			Min	Tgt	Max		
250	250	41	6.1	10	12	14	0 - DRAG ONLY	1m 1s	1m 7s	1m 13s	1.9	6s	-	10	12	14	0h 3m	d
	250	33	7.6	12	15	18		1m 16s	1m 23s	1m 31s	2.1	8s	-	12	15	18	0h 3m	d
	250	26	9.6	15	19	22		1m 36s	1m 46s	1m 55s	2.4	8s	-	15	19	22	0h 4m	d
	250	21	11.9	19	23	28		1m 59s	2m 11s	2m 23s	2.8	8s	-	19	23	28	0h 5m	d
	250	17	14.7	23	28	34		2m 27s	2m 42s	2m 56s	3.2	10s	-	23	28	34	0h 6m	d
	250	13.6	18.4	28	35	41		3m 4s	3m 22s	3m 41s	3.8	10s	-	28	35	41	0h 8m	d
	250	11	22.7	34	42	50		3m 47s	4m 10s	4m 33s	4.4	12s	-	34	42	50	0h 10m	d
	250	9	27.8	41	50	60		4m 38s	5m 6s	5m 33s	5.2	16s	-	41	50	60	0h 12m	d
	250	7.4	33.8	48	60	71		5m 38s	6m 12s	6m 45s	6.1	16s	-	48	60	71	0h 15m	d
280	280	41	6.8	12	15	18	0 - DRAG ONLY	1m 8s	1m 15s	1m 22s	2.0	6s	-	12	15	18	0h 3m	d
	280	33	8.5	15	19	22		1m 25s	1m 33s	1m 42s	2.3	8s	-	15	19	22	0h 4m	d
	280	26	10.8	19	24	28		1m 48s	1m 58s	2m 9s	2.6	8s	-	19	24	28	0h 5m	d
	280	21	13.3	23	29	35		2m 13s	2m 27s	2m 40s	3.0	10s	-	23	29	35	0h 6m	d
	280	17	16.5	29	35	42		2m 45s	3m 1s	3m 18s	3.5	10s	-	29	35	42	0h 7m	d
	280	13.6	20.6	35	44	52		3m 26s	3m 46s	4m 7s	4.1	12s	-	35	44	52	0h 9m	d
	280	11	25.5	43	53	63		4m 15s	4m 40s	5m 5s	4.8	12s	-	43	53	63	0h 11m	d
	280	9	31.1	51	63	75		5m 11s	5m 42s	6m 13s	5.7	16s	-	51	63	75	0h 13m	d
	280	7.4	37.8	60	75	89		6m 18s	6m 56s	7m 34s	6.7	20s	-	60	75	89	0h 16m	d
315	315	41	7.7	16	19	23	0 - DRAG ONLY	1m 17s	1m 25s	1m 32s	2.2	8s	-	16	19	23	0h 3m	d
	315	33	9.5	19	24	28		1m 35s	1m 45s	1m 55s	2.4	8s	-	19	24	28	0h 4m	d
	315	26	12.1	24	30	36		2m 1s	2m 13s	2m 25s	2.8	10s	-	24	30	36	0h 5m	d
	315	21	15.0	30	37	44		2m 30s	2m 45s	3m 0s	3.3	10s	-	30	37	44	0h 6m	d
	315	17	18.5	36	45	53		3m 5s	3m 24s	3m 42s	3.8	10s	-	36	45	53	0h 8m	d
	315	13.6	23.2	45	55	66		3m 52s	4m 15s	4m 38s	4.5	12s	-	45	55	66	0h 10m	d
	315	11	28.6	54	67	80		4m 46s	5m 15s	5m 44s	5.3	16s	-	54	67	80	0h 12m	d
	315	9	35.0	65	80	95		5m 50s	6m 25s	7m 0s	6.3	16s	-	65	80	95	0h 15m	d
	315	7.4	42.6	76	95	113		7m 6s	7m 48s	8m 31s	7.4	20s	-	76	95	113	0h 18m	d
355	355	41	8.7	20	24	29	0 - DRAG ONLY	1m 27s	1m 35s	1m 44s	2.3	8s	-	20	24	29	0h 4m	d
	355	33	10.8	24	30	36		1m 48s	1m 58s	2m 9s	2.6	8s	-	24	30	36	0h 5m	d
	355	26	13.7	31	38	45		2m 17s	2m 30s	2m 44s	3.0	10s	-	31	38	45	0h 6m	d
	355	21	16.9	38	47	56		2m 49s	3m 6s	3m 23s	3.5	10s	-	38	47	56	0h 7m	d
	355	17	20.9	46	57	68		3m 29s	3m 50s	4m 11s	4.1	12s	-	46	57	68	0h 9m	d
	355	13.6	26.1	57	70	84		4m 21s	4m 47s	5m 13s	4.9	16s	-	57	70	84	0h 11m	d
	355	11	32.3	69	85	101		5m 23s	5m 55s	6m 27s	5.8	16s	-	69	85	101	0h 14m	d
	355	9	39.4	82	102	121		6m 34s	7m 14s	7m 53s	6.9	20s	-	82	102	121	0h 17m	d
	355	7.4	48.0	97	120	143		7m 60s	8m 48s	9m 36s	8.2	20s	-	97	120	143	0h 21m	d

TEMP: 225 ± 10C			PHASE 1				PHASE 2			PHASE 3	PHASE 4			PHASE 5	PHASE 6		
Pipe Details (e _n = Wall Thickness)			Bead Up Pressure (BAR)			Minimum Bead up Size	Heat Soak See Note b			Maximum Heater Removal Time	Maximum Pressure Up Time	Weld Pressure (BAR)			Minimum Cool Time Under Pressure (See Note c)	Additional Cool Time out of Machine (See Note d)	
			ADD DRAG (see note a)			0 - DRAG ONLY					ADD DRAG						
D _n	SDR	e _n	P1			t1	P2	t2			t3	t4	P3			t5 / P3	
			Min	Tgt	Max	mm	BAR	Min	Tgt	Max			Min	Tgt	Max		
90	41	2.2	1	1	1	1	0 - DRAG ONLY	0m 26s	0m 30s	0m 33s	5s	5.7s	1	1	1	0h 5m	d
	33	2.7	1	1	1	1		0m 33s	0m 37s	0m 41s	5s	5.7s	1	1	1	0h 6m	d
	26	3.5	1	1	1	1		0m 42s	0m 47s	0m 52s	5s	5.7s	1	1	1	0h 6m	d
	21	4.3	1	1	1	1		0m 51s	0m 58s	1m 4s	5s	5.7s	1	1	1	0h 7m	d
	17	5.3	1	1	1	2		1m 4s	1m 11s	1m 19s	6s	5.7s	1	1	1	0h 8m	d
	13.6	6.6	1	1	2	2		1m 19s	1m 29s	1m 39s	6s	5.7s	1	1	2	0h 10m	d
	11	8.2	2	2	2	2		1m 38s	1m 50s	2m 3s	8s	5.7s	2	2	2	0h 11m	d
	9	10.0	2	2	2	2		2m 0s	2m 15s	2m 30s	8s	5.7s	2	2	2	0h 13m	d
	7.4	12.2	2	3	3	2		2m 26s	2m 44s	3m 2s	10s	5.7s	2	3	3	0h 15m	d
110	41	2.7	1	1	1	1	0 - DRAG ONLY	0m 32s	0m 36s	0m 40s	5s	6.3s	1	1	1	0h 6m	d
	33	3.3	1	1	1	1		0m 40s	0m 45s	0m 50s	5s	6.3s	1	1	1	0h 6m	d
	26	4.2	1	1	1	1		0m 51s	0m 57s	1m 3s	5s	6.3s	1	1	1	0h 7m	d
	21	5.2	1	1	2	2		1m 3s	1m 11s	1m 19s	6s	6.3s	1	1	2	0h 8m	d
	17	6.5	2	2	2	2		1m 18s	1m 27s	1m 37s	6s	6.3s	2	2	2	0h 9m	d
	13.6	8.1	2	2	2	2		1m 37s	1m 49s	2m 1s	8s	6.3s	2	2	2	0h 11m	d
	11	10.0	2	3	3	2		2m 0s	2m 15s	2m 30s	8s	6.3s	2	3	3	0h 13m	d
	9	12.2	3	3	4	2		2m 27s	2m 45s	3m 3s	10s	6.3s	3	3	4	0h 15m	d
	7.4	14.9	3	4	4	2		2m 58s	3m 21s	3m 43s	10s	6.3s	3	4	4	0h 18m	d
125	41	3.0	1	1	1	1	0 - DRAG ONLY	0m 37s	0m 41s	0m 46s	5s	6.8s	1	1	1	0h 6m	d
	33	3.8	1	1	1	1		0m 45s	0m 51s	0m 57s	5s	6.8s	1	1	1	0h 7m	d
	26	4.8	1	2	2	1		0m 58s	1m 5s	1m 12s	6s	6.8s	1	2	2	0h 8m	d
	21	6.0	2	2	2	2		1m 11s	1m 20s	1m 29s	6s	6.8s	2	2	2	0h 9m	d
	17	7.4	2	2	3	2		1m 28s	1m 39s	1m 50s	8s	6.8s	2	2	3	0h 10m	d
	13.6	9.2	3	3	3	2		1m 50s	2m 4s	2m 18s	8s	6.8s	3	3	3	0h 12m	d
	11	11.4	3	3	4	2		2m 16s	2m 33s	2m 50s	8s	6.8s	3	3	4	0h 14m	d
	9	13.9	4	4	5	2		2m 47s	3m 8s	3m 28s	10s	6.8s	4	4	5	0h 17m	d
	7.4	16.9	4	5	5	3		3m 23s	3m 48s	4m 13s	10s	6.8s	4	5	5	0h 20m	d
140	41	3.4	1	1	1	1	0 - DRAG ONLY	0m 41s	0m 46s	0m 51s	5s	7.2s	1	1	1	0h 6m	d
	33	4.2	1	2	2	1		0m 51s	0m 57s	1m 4s	5s	7.2s	1	2	2	0h 7m	d
	26	5.4	2	2	2	2		1m 5s	1m 13s	1m 21s	6s	7.2s	2	2	2	0h 8m	d
	21	6.7	2	2	3	2		1m 20s	1m 30s	1m 40s	6s	7.2s	2	2	3	0h 10m	d
	17	8.2	3	3	3	2		1m 39s	1m 51s	2m 4s	8s	7.2s	3	3	3	0h 11m	d
	13.6	10.3	3	4	4	2		2m 4s	2m 19s	2m 34s	8s	7.2s	3	4	4	0h 13m	d
	11	12.7	4	4	5	2		2m 33s	2m 52s	3m 11s	10s	7.2s	4	4	5	0h 16m	d
	9	15.6	5	5	6	3		3m 7s	3m 30s	3m 53s	10s	7.2s	5	5	6	0h 19m	d
	7.4	18.9	5	6	7	3		3m 47s	4m 15s	4m 44s	10s	7.2s	5	6	7	0h 16m	d
160	41	3.9	1	2	2	1	0 - DRAG ONLY	0m 47s	0m 53s	0m 59s	5s	7.8s	1	2	2	0h 7m	d
	33	4.8	2	2	2	1		0m 58s	1m 5s	1m 13s	6s	7.8s	2	2	2	0h 8m	d
	26	6.2	2	3	3	2		1m 14s	1m 23s	1m 32s	6s	7.8s	2	3	3	0h 9m	d
	21	7.6	3	3	3	2		1m 31s	1m 43s	1m 54s	8s	7.8s	3	3	3	0h 11m	d
	17	9.4	3	4	4	2		1m 53s	2m 7s	2m 21s	8s	7.8s	3	4	4	0h 12m	d
	13.6	11.8	4	5	5	2		2m 21s	2m 39s	2m 56s	8s	7.8s	4	5	5	0h 15m	d
	11	14.5	5	6	6	2		2m 55s	3m 16s	3m 38s	10s	7.8s	5	6	6	0h 18m	d
	9	17.8	6	7	8	3		3m 33s	4m 0s	4m 27s	10s	7.8s	6	7	8	0h 21m	d
	7.4	21.6	7	8	9	3		4m 19s	4m 52s	5m 24s	12s	7.8s	7	8	9	0h 17m	d
180	41	4.4	2	2	2	1	0 - DRAG ONLY	0m 53s	0m 59s	1m 6s	5s	8.4s	2	2	2	0h 7m	d
	33	5.5	2	3	3	2		1m 5s	1m 14s	1m 22s	6s	8.4s	2	3	3	0h 8m	d
	26	6.9	3	3	4	2		1m 23s	1m 33s	1m 44s	6s	8.4s	3	3	4	0h 10m	d
	21	8.6	3	4	4	2		1m 43s	1m 56s	2m 9s	8s	8.4s	3	4	4	0h 12m	d
	17	10.6	4	5	5	2		2m 7s	2m 23s	2m 39s	8s	8.4s	4	5	5	0h 14m	d
	13.6	13.2	5	6	7	2		2m 39s	2m 59s	3m 19s	10s	8.4s	5	6	7	0h 16m	d
	11	16.4	6	7	8	3		3m 16s	3m 41s	4m 5s	10s	8.4s	6	7	8	0h 19m	d
	9	20.0	8	9	10	3		4m 0s	4m 30s	5m 0s	12s	8.4s	8	9	10	0h 17m	d
	7.4	24.3	9	10	11	3		4m 52s	5m 28s	6m 5s	12s	8.4s	9	10	11	0h 17m	d
200	41	4.9	2	3	3	1	0 - DRAG ONLY	0m 59s	1m 6s	1m 13s	6s	9s	2	3	3	0h 8m	d
	33	6.1	3	3	4	2		1m 13s	1m 22s	1m 31s	6s	9s	3	3	4	0h 9m	d
	26	7.7	3	4	4	2		1m 32s	1m 44s	1m 55s	8s	9s	3	4	4	0h 11m	d
	21	9.5	4	5	5	2		1m 54s	2m 9s	2m 23s	8s	9s	4	5	5	0h 13m	d
	17	11.8	5	6	7	2		2m 21s	2m 39s	2m 56s	8s	9s	5	6	7	0h 15m	d
	13.6	14.7	6	7	8	2		2m 56s	3m 19s	3m 41s	10s	9s	6	7	8	0h 18m	d
	11	18.2	8	9	10	3		3m 38s	4m 5s	4m 33s	10s	9s	8	9	10	0h 16m	d
	9	22.2	9	11	12	3		4m 27s	5m 0s	5m 33s	12s	9s	9	11	12	0h 17m	d
	7.4	27.0	11	12	14	4		5m 24s	6m 5s	6m 45s	16s	9s	11	12	14	0h 18m	d
225	41	5.5	3	3	4	2	0 - DRAG ONLY	1m 6s	1m 14s	1m 22s	6s	9.8s	3	3	4	0h 8m	d
	33	6.8	4	4	4	2		1m 22s	1m 32s	1m 42s	6s	9.8s	4	4	4	0h 10m	d
	26	8.7	4	5	6	2		1m 44s	1m 57s	2m 10s	8s	9.8s	4	5	6	0h 12m	d
	21	10.7	5	6	7	2		2m 9s	2m 25s	2m 41s	8s	9.8s	5	6	7	0h 14m	d
	17	13.2	7	7	8	2		2m 39s	2m 59s	3m 19s	10s	9.8s	7	7	8	0h 16m	d
	13.6	16.5	8	9	10	3		3m 19s	3m 43s	4m 8s	10s	9.8s	8	9	10	0h 20m	d
	11	20.5	10	11	12	3		4m 5s	4m 36s	5m 7s	12s	9.8s	10	11	12	0h 17m	d
	9	25.0	12	13	15	3		5m 0s	5m 38s	6m 15s	12s	9.8s	12	13	15	0h 18m	d
	7.4	30.4	14	16	18	4		6m 5s	6m 50s	7m 36s	16s	9.8s	14	16	18	0h 20m	d

TEMP: 225 ± 10C			PHASE 1				PHASE 2				PHASE 3	PHASE 4				PHASE 5	PHASE 6
Pipe Details (e _n = Wall Thickness)			Bead Up Pressure (BAR)			Minimum Bead up Size	Heat Soak See Note b			Maximum Heater Removal Time	Maximum Pressure Up Time	Weld Pressure (BAR)			Minimum Cool Time Under Pressure (See Note c)	Additional Cool Time out of Machine (See Note d)	
			ADD DRAG (see note a)				0 - DRAG ONLY					ADD DRAG					
			P1			t1	P2	t2			t3	t4	P3			t5 / P3	
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Min	Tgt	Max			Min	Tgt	Max		
250	41	6.1	4	4	4	2	0 - DRAG ONLY	1m 13s	1m 22s	1m 31s	6s	10.5s	4	4	4	0h 9m	d
	33	7.6	4	5	5	2		1m 31s	1m 42s	1m 54s	8s	10.5s	4	5	5	0h 11m	d
	26	9.6	5	6	7	2		1m 55s	2m 10s	2m 24s	8s	10.5s	5	6	7	0h 13m	d
	21	11.9	7	8	8	2		2m 23s	2m 41s	2m 59s	8s	10.5s	7	8	8	0h 15m	d
	17	14.7	8	9	10	2		2m 56s	3m 19s	3m 41s	10s	10.5s	8	9	10	0h 18m	d
	13.6	18.4	10	11	13	3		3m 41s	4m 8s	4m 36s	10s	10.5s	10	11	13	0h 16m	d
	11	22.7	12	14	15	3		4m 33s	5m 7s	5m 41s	12s	10.5s	12	14	15	0h 17m	d
	9	27.8	15	16	18	4		5m 33s	6m 15s	6m 57s	16s	10.5s	15	16	18	0h 19m	d
	7.4	33.8	17	19	22	4		6m 45s	7m 36s	8m 27s	16s	10.5s	17	19	22	0h 21m	d
	41	6.8	4	5	6	2		0 - DRAG ONLY	1m 22s	1m 32s	1m 42s	6s	11.4s	4	5	6	0h 10m
33	8.5	5	6	7	2	1m 42s	1m 55s		2m 7s	8s	11.4s	5	6	7	0h 11m	d	
26	10.8	7	8	9	2	2m 9s	2m 25s		2m 42s	8s	11.4s	7	8	9	0h 14m	d	
21	13.3	8	9	11	2	2m 40s	3m 0s		3m 20s	10s	11.4s	8	9	11	0h 16m	d	
17	16.5	10	12	13	3	3m 18s	3m 42s		4m 7s	10s	11.4s	10	12	13	0h 19m	d	
13.6	20.6	13	14	16	3	4m 7s	4m 38s		5m 9s	12s	11.4s	13	14	16	0h 17m	d	
11	25.5	15	17	19	4	5m 5s	5m 44s		6m 22s	12s	11.4s	15	17	19	0h 18m	d	
9	31.1	18	21	23	4	6m 13s	7m 0s		7m 47s	16s	11.4s	18	21	23	0h 20m	d	
7.4	37.8	22	24	27	5	7m 34s	8m 31s		9m 28s	20s	11.4s	22	24	27	0h 24m	d	
41	7.7	6	6	7	2	0 - DRAG ONLY	1m 32s		1m 44s	1m 55s	8s	12.5s	6	6	7	0h 11m	d
33	9.5	7	8	9	2		1m 55s	2m 9s	2m 23s	8s	12.5s	7	8	9	0h 13m	d	
26	12.1	9	10	11	2		2m 25s	2m 44s	3m 2s	10s	12.5s	9	10	11	0h 15m	d	
21	15.0	11	12	13	2		3m 0s	3m 23s	3m 45s	10s	12.5s	11	12	13	0h 18m	d	
17	18.5	13	15	16	3		3m 42s	4m 10s	4m 38s	10s	12.5s	13	15	16	0h 16m	d	
13.6	23.2	16	18	20	3		4m 38s	5m 13s	5m 47s	12s	12.5s	16	18	20	0h 17m	d	
11	28.6	19	22	24	4		5m 44s	6m 27s	7m 10s	16s	12.5s	19	22	24	0h 19m	d	
9	35.0	23	26	29	4		7m 0s	7m 53s	8m 45s	16s	12.5s	23	26	29	0h 22m	d	
7.4	42.6	27	31	35	5		8m 31s	9m 35s	10m 39s	20s	12.5s	27	31	35	0h 27m	d	
41	8.7	7	8	9	2		0 - DRAG ONLY	1m 44s	1m 57s	2m 10s	8s	13.7s	7	8	9	0h 12m	d
33	10.8	9	10	11	2	2m 9s		2m 25s	2m 41s	8s	13.7s	9	10	11	0h 14m	d	
26	13.7	11	12	14	2	2m 44s		3m 4s	3m 25s	10s	13.7s	11	12	14	0h 17m	d	
21	16.9	13	15	17	3	3m 23s		3m 48s	4m 14s	10s	13.7s	13	15	17	0h 20m	d	
17	20.9	16	19	21	3	4m 11s		4m 42s	5m 13s	12s	13.7s	16	19	21	0h 17m	d	
13.6	26.1	20	23	26	4	5m 13s		5m 52s	6m 32s	16s	13.7s	20	23	26	0h 18m	d	
11	32.3	25	28	31	4	6m 27s		7m 16s	8m 4s	16s	13.7s	25	28	31	0h 20m	d	
9	39.4	29	33	37	5	7m 53s		8m 53s	9m 52s	20s	13.7s	29	33	37	0h 25m	d	
7.4	48.0	35	39	44	6	9m 36s		10m 48s	11m 60s	20s	13.7s	35	39	44	0h 32m	d	

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)				Minimum Cool Time Under Pressure (See Note b)		
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time		Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C
D _n	SDR	e _n	Min	Tgt	Max	mm	BAR	Time	Max	Max	Min	Tgt	Max			
0 9	41	2.2	0	0	0	0.5	0.04	0m 53s	5s	6s	0	0	0	0h 4m	0h 5m	0h 7m
	33	2.7	0	0	1	0.5	0.04	0m 53s	5s	6s	0	0	1	0h 4m	0h 5m	0h 7m
	26	3.5	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	4.3	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	17	5.3	1	1	1	0.5	0.08	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	13.6	6.6	1	1	1	0.5	0.09	1m 15s	5.8s	6.8s	1	1	1	0h 6m	0h 7m	0h 9m
	11	8.2	1	1	1	1.0	0.11	1m 32s	6.2s	7.8s	1	1	1	0h 7m	0h 8m	0h 11m
	9	10.0	1	1	1	1.0	0.13	1m 53s	6.6s	9.4s	1	1	1	0h 8m	0h 10m	0h 13m
0 1 1	7.4	12.2	1	2	2	1.0	0.15	2m 15s	7s	11s	1	2	2	0h 10m	0h 12m	0h 16m
	41	2.7	1	1	1	0.5	0.05	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.3	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.2	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	5.2	1	1	1	0.5	0.09	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	17	6.5	1	1	1	0.5	0.11	1m 10s	5.6s	6.6s	1	1	1	0h 5m	0h 7m	0h 8m
	13.6	8.1	1	1	2	1.0	0.13	1m 32s	6.2s	7.8s	1	1	2	0h 7m	0h 8m	0h 11m
	11	10.0	2	2	2	1.0	0.16	1m 53s	6.6s	9.4s	2	2	2	0h 8m	0h 10m	0h 13m
5 2 1	9	12.2	2	2	2	1.0	0.19	2m 15s	7s	11s	2	2	2	0h 10m	0h 12m	0h 16m
	7.4	14.9	2	2	3	1.0	0.23	2m 40s	7.8s	13.2s	2	2	3	0h 11m	0h 14m	0h 19m
	41	3.0	1	1	1	0.5	0.06	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	3.8	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	4.8	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	21	6.0	1	1	1	0.5	0.12	1m 4s	5.4s	6.4s	1	1	1	0h 5m	0h 6m	0h 8m
	17	7.4	1	1	2	1.0	0.14	1m 21s	6s	7s	1	1	2	0h 6m	0h 8m	0h 10m
	13.6	9.2	2	2	2	1.0	0.17	1m 43s	6.4s	8.6s	2	2	2	0h 7m	0h 9m	0h 12m
0 4 1	11	11.4	2	2	2	1.0	0.21	2m 4s	6.8s	10.2s	2	2	2	0h 9m	0h 11m	0h 14m
	9	13.9	2	3	3	1.0	0.25	2m 30s	7.5s	12.3s	2	3	3	0h 11m	0h 13m	0h 17m
	7.4	16.9	3	3	3	1.0	0.29	3m 1s	8.3s	14.9s	3	3	3	0h 12m	0h 16m	0h 21m
	41	3.4	1	1	1	0.5	0.08	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.2	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	5.4	1	1	1	0.5	0.12	0m 59s	5.2s	6.2s	1	1	1	0h 4m	0h 6m	0h 7m
	21	6.7	1	1	2	0.5	0.14	1m 15s	5.8s	6.8s	1	1	2	0h 6m	0h 7m	0h 9m
	17	8.2	2	2	2	1.0	0.18	1m 32s	6.2s	7.8s	2	2	2	0h 7m	0h 8m	0h 11m
0 6 1	13.6	10.3	2	2	2	1.0	0.21	1m 53s	6.6s	9.4s	2	2	2	0h 8m	0h 10m	0h 13m
	11	12.7	2	3	3	1.0	0.26	2m 20s	7.2s	11.5s	2	3	3	0h 10m	0h 13m	0h 16m
	9	15.6	3	3	3	1.0	0.31	2m 51s	8s	14s	3	3	3	0h 12m	0h 15m	0h 20m
	7.4	18.9	3	4	4	1.0	0.36	3m 21s	8.9s	16.6s	3	4	4	0h 14m	0h 18m	0h 23m
	41	3.9	1	1	1	0.5	0.10	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	4.8	1	1	1	0.5	0.12	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	26	6.2	1	2	2	0.5	0.15	1m 10s	5.6s	6.6s	1	2	2	0h 5m	0h 7m	0h 8m
	21	7.6	2	2	2	1.0	0.19	1m 26s	6.1s	7.4s	2	2	2	0h 6m	0h 8m	0h 10m
0 8 1	17	9.4	2	2	3	1.0	0.23	1m 43s	6.4s	8.6s	2	2	3	0h 7m	0h 9m	0h 12m
	13.6	11.8	3	3	3	1.0	0.28	2m 10s	6.9s	10.6s	3	3	3	0h 9m	0h 12m	0h 15m
	11	14.5	3	3	4	1.0	0.34	2m 40s	7.8s	13.2s	3	3	4	0h 11m	0h 14m	0h 19m
	9	17.8	4	4	4	1.0	0.40	3m 11s	8.6s	15.8s	4	4	4	0h 13m	0h 17m	0h 22m
	7.4	21.6	4	5	5	1.5	0.47	3m 49s	9.8s	18.8s	4	5	5	0h 16m	0h 20m	0h 27m
	41	4.4	1	1	1	0.5	0.13	0m 53s	5s	6s	1	1	1	0h 4m	0h 5m	0h 7m
	33	5.5	1	2	2	0.5	0.15	0m 59s	5.2s	6.2s	1	2	2	0h 4m	0h 6m	0h 7m
	26	6.9	2	2	2	0.5	0.19	1m 15s	5.8s	6.8s	2	2	2	0h 6m	0h 7m	0h 9m
0 0 2	21	8.6	2	2	3	1.0	0.24	1m 37s	6.3s	8.2s	2	2	3	0h 7m	0h 9m	0h 11m
	17	10.6	3	3	3	1.0	0.29	1m 59s	6.7s	9.8s	3	3	3	0h 9m	0h 11m	0h 14m
	13.6	13.2	3	4	4	1.0	0.35	2m 25s	7.3s	11.9s	3	4	4	0h 10m	0h 13m	0h 17m
	11	16.4	4	4	5	1.0	0.43	2m 56s	8.2s	14.5s	4	4	5	0h 12m	0h 16m	0h 20m
	9	20.0	5	5	6	1.5	0.51	3m 35s	9.3s	17.8s	5	5	6	0h 15m	0h 19m	0h 25m
	7.4	24.3	5	6	7	1.5	0.60	4m 13s	10.5s	20.6s	5	6	7	0h 18m	0h 22m	0h 30m
	41	4.9	1	2	2	0.5	0.15	0m 53s	5s	6s	1	2	2	0h 4m	0h 5m	0h 7m
	33	6.1	2	2	2	0.5	0.19	1m 10s	5.6s	6.6s	2	2	2	0h 5m	0h 7m	0h 8m
5 2 2	26	7.7	2	2	3	1.0	0.24	1m 26s	6.1s	7.4s	2	2	3	0h 6m	0h 8m	0h 10m
	21	9.5	3	3	3	1.0	0.29	1m 48s	6.5s	9s	3	3	3	0h 8m	0h 10m	0h 13m
	17	11.8	3	4	4	1.0	0.35	2m 10s	6.9s	10.6s	3	4	4	0h 9m	0h 12m	0h 15m
	13.6	14.7	4	4	5	1.0	0.43	2m 40s	7.8s	13.2s	4	4	5	0h 11m	0h 14m	0h 19m
	11	18.2	5	5	6	1.0	0.52	3m 16s	8.8s	16.2s	5	5	6	0h 13m	0h 17m	0h 23m
	9	22.2	6	6	7	1.5	0.62	3m 54s	9.9s	19.2s	6	6	7	0h 16m	0h 21m	0h 28m
	7.4	27.0	7	7	8	2.0	0.74	4m 39s	11.3s	23s	7	7	8	0h 20m	0h 25m	0h 33m
	41	5.5	2	2	2	0.5	0.19	0m 59s	5.2s	6.2s	2	2	2	0h 4m	0h 6m	0h 7m
	33	6.8	2	2	3	0.5	0.24	1m 15s	5.8s	6.8s	2	2	3	0h 6m	0h 7m	0h 9m
	26	8.7	3	3	3	1.0	0.30	1m 37s	6.3s	8.2s	3	3	3	0h 7m	0h 9m	0h 11m
	21	10.7	3	4	4	1.0	0.37	1m 59s	6.7s	9.8s	3	4	4	0h 9m	0h 11m	0h 14m
	17	13.2	4	4	5	1.0	0.44	2m 25s	7.3s	11.9s	4	4	5	0h 10m	0h 13m	0h 17m
	13.6	16.5	5	6	6	1.0	0.55	3m 1s	8.3s	14.9s	5	6	6	0h 12m	0h 16m	0h 21m
	11	20.5	6	7	7	1.5	0.66	3m 35s	9.3s	17.8s	6	7	7	0h 15m	0h 19m	0h 25m
	9	25.0	7	8	9	1.5	0.79	4m 22s	10.8s	21.3s	7	8	9	0h 18m	0h 23m	0h 31m
	7.4	30.4	8	9	10	2.0	0.93	5m 4s	12.1s	25.7s	8	9	10	0h 22m	0h 28m	0h 37m

TEMP: 210 ± 10C			PHASE 1				PHASE 2		PHASE 3	PHASE 4				PHASE 5		
Pipe Details (e _n = Wall Thickness) Max e _n = 70mm			Equalising				Preheating		Changeover Time	Joining (See Note a)			Minimim Cool Time Under Pressure (See Note b)			
			Equalising Pressure BAR			Bead Height (Minimum)				Buildup Time	Joining Pressure BAR		Up to 15°C	15°C to 25°C	25°C to 40°C	
D _n	SDR	e _n	Min	Tgt	Max		mm	BAR	Time		Max	Max				Min
0 5 2	41	6.1	2	2	3	0.5	0.24	1m 10s	5.6s	6.6s	2	2	3	0h 5m	0h 7m	0h 8m
	33	7.6	3	3	3	1.0	0.29	1m 26s	6.1s	7.4s	3	3	3	0h 6m	0h 8m	0h 10m
	26	9.6	3	4	4	1.0	0.37	1m 48s	6.5s	9s	3	4	4	0h 8m	0h 10m	0h 13m
	21	11.9	4	5	5	1.0	0.45	2m 10s	6.9s	10.6s	4	5	5	0h 9m	0h 12m	0h 15m
	17	14.7	5	6	6	1.0	0.55	2m 40s	7.8s	13.2s	5	6	6	0h 11m	0h 14m	0h 19m
	13.6	18.4	6	7	7	1.0	0.67	3m 16s	8.8s	16.2s	6	7	7	0h 13m	0h 17m	0h 23m
	11	22.7	7	8	9	1.5	0.82	3m 59s	10s	19.5s	7	8	9	0h 17m	0h 21m	0h 28m
	9	27.8	9	10	11	2.0	0.97	4m 44s	11.5s	23.4s	9	10	11	0h 20m	0h 25m	0h 34m
	7.4	33.8	10	12	13	2.0	1.15	5m 33s	13.1s	28.9s	10	12	13	0h 25m	0h 31m	0h 41m
0 8 2	41	6.8	3	3	3	0.5	0.30	1m 15s	5.8s	6.8s	3	3	3	0h 6m	0h 7m	0h 9m
	33	8.5	3	4	4	1.0	0.37	1m 32s	6.2s	7.8s	3	4	4	0h 7m	0h 8m	0h 11m
	26	10.8	4	5	5	1.0	0.46	1m 59s	6.7s	9.8s	4	5	5	0h 9m	0h 11m	0h 14m
	21	13.3	5	6	6	1.0	0.56	2m 25s	7.3s	11.9s	5	6	6	0h 10m	0h 13m	0h 17m
	17	16.5	6	7	8	1.0	0.69	2m 56s	8.2s	14.5s	6	7	8	0h 12m	0h 16m	0h 20m
	13.6	20.6	8	8	9	1.5	0.84	3m 40s	9.5s	18.1s	8	8	9	0h 15m	0h 19m	0h 26m
	11	25.5	9	10	11	1.5	1.02	4m 22s	10.8s	21.3s	9	10	11	0h 18m	0h 23m	0h 31m
	9	31.1	11	12	13	2.0	1.22	5m 12s	12.4s	26.6s	11	12	13	0h 23m	0h 29m	0h 38m
	7.4	37.8	13	14	16	2.5	1.44	6m 5s	14.2s	32.5s	13	14	16	0h 27m	0h 35m	0h 46m
315	41	7.7	3	4	4	1.0	0.38	1m 26s	6.1s	7.4s	3	4	4	0h 6m	0h 8m	0h 10m
	33	9.5	4	5	5	1.0	0.46	1m 48s	6.5s	9s	4	5	5	0h 8m	0h 10m	0h 13m
	26	12.1	5	6	6	1.0	0.58	2m 15s	7s	11s	5	6	6	0h 10m	0h 12m	0h 16m
	21	15.0	6	7	8	1.0	0.71	2m 46s	7.9s	13.6s	6	7	8	0h 12m	0h 15m	0h 19m
	17	18.5	8	9	10	1.0	0.87	3m 21s	8.9s	16.6s	8	9	10	0h 14m	0h 18m	0h 23m
	13.6	23.2	10	11	12	1.5	1.07	4m 3s	10.2s	19.9s	10	11	12	0h 17m	0h 22m	0h 29m
	11	28.6	12	13	14	2.0	1.29	4m 52s	11.7s	24.3s	12	13	14	0h 21m	0h 26m	0h 35m
	9	35.0	14	15	17	2.0	1.54	5m 46s	13.5s	30.2s	14	15	17	0h 26m	0h 32m	0h 43m
	7.4	42.6	16	18	20	2.5	1.82	6m 39s	15.3s	36.7s	16	18	20	0h 31m	0h 39m	0h 52m
5 5 3	41	8.7	4	5	5	1.0	0.48	1m 37s	6.3s	8.2s	4	5	5	0h 7m	0h 9m	0h 11m
	33	10.8	5	6	6	1.0	0.59	1m 59s	6.7s	9.8s	5	6	6	0h 9m	0h 11m	0h 14m
	26	13.7	7	7	8	1.0	0.74	2m 30s	7.5s	12.3s	7	7	8	0h 11m	0h 13m	0h 17m
	21	16.9	8	9	10	1.0	0.90	3m 1s	8.3s	14.9s	8	9	10	0h 12m	0h 16m	0h 21m
	17	20.9	10	11	12	1.5	1.10	3m 40s	9.5s	18.1s	10	11	12	0h 15m	0h 19m	0h 26m
	13.6	26.1	12	14	15	2.0	1.35	4m 31s	11s	22s	12	14	15	0h 19m	0h 24m	0h 32m
	11	32.3	15	16	18	2.0	1.64	5m 21s	12.7s	27.5s	15	16	18	0h 23m	0h 30m	0h 39m
	9	39.4	18	20	22	2.5	1.96	6m 16s	14.5s	33.7s	18	20	22	0h 28m	0h 36m	0h 48m
	7.4	48.0	21	23	26	2.5	2.32	7m 13s	16.5s	40.9s	21	23	26	0h 34m	0h 44m	0h 58m



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