



WELDING BASICS SERIES

MAKE SOMETHING BETTER



PLASMA WELDING INFORMATION



Plasma Welding Information

PLASMA WELDING

PROCEDURES, PARAMETERS, & TECHNIQUES

PULSED ARC WELDING

GAS FLOW VERSUS SPEED

BEAD WIDTH VERSUS CURRENT

BEAD WIDTH VERSUS SPEED

BEAD WIDTH VERSUS PLASMA GAS FLOW

Plasma Welding Information

WELDING PROCEDURES, PARAMETERS AND TECHNIQUES

Plasma arc welding has been applied successfully to carbon steel pipes at greatly increased production rates. Some experimental work resulted in an increased productivity of four times that of MIG welding. When the square edge butt welded joint is plasma arc welded, significant savings are realized over the prepared edges necessary for MIG welding.

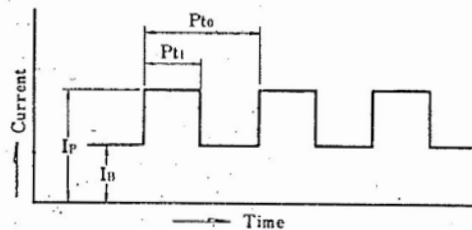
The higher efficiency and reduced production cost associated with plasma arc welding of pipelines, insures, also a continuous penetration bead.

The following data show the relationship between the more important process variables such as current, plasma gas flow rate and current. It was found that bead width increases both at the surface side and at the penetration side as the welding current is increased. As the welding speed is increased, the bead width is decreased on both sides. When the plasma gas flow rate is increased, the surface bead width decreases and the penetration bead with increases. This is due to the fact that the increase of the plasma gas flow rate results in a simultaneous increase in the plasma intensity and a constriction of the plasma arc.

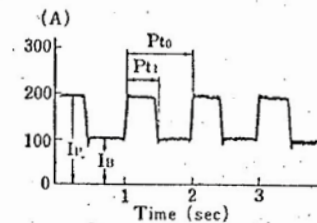
	Variable elements	Abbreviation	Unit
0	Welding position Flat, Vertical, Overhead		
1	Welding current 150, 180, 200, 240	I	Amp.
	Welding speed	V_T	cm/min
	Plasma gas flow rate	Q_P	l/min
2	Pulse current		
	Peak current	I_P	Amp.
	Base current	I_B	Amp.
	Frequency	I_{P-F}	Hz
	Pulse duration	I_{P-D}	%
	Average current	I_{AVE}	Amp.
3	Backing method		
	Back shield gas (argon)	Q_B	l/min
	Atmospheric pressure		mm Aq
	Reduced pressure -40, -20		
	Increased pressure +40, +20		
	Backing plate jig		
4	Spacing between backing plate and test piece	t_S	mm
	Gap between backing plates	G_c	mm
	Filler wire feed rate	V_W	cm/min
	0.9 mm diameter filler wire		

$$I_{P-D} = \frac{P_{t1}}{P_{t0}} \times 100$$

$$I_{AVE} = I_B + I_{P-D}(I_P - I_B)$$



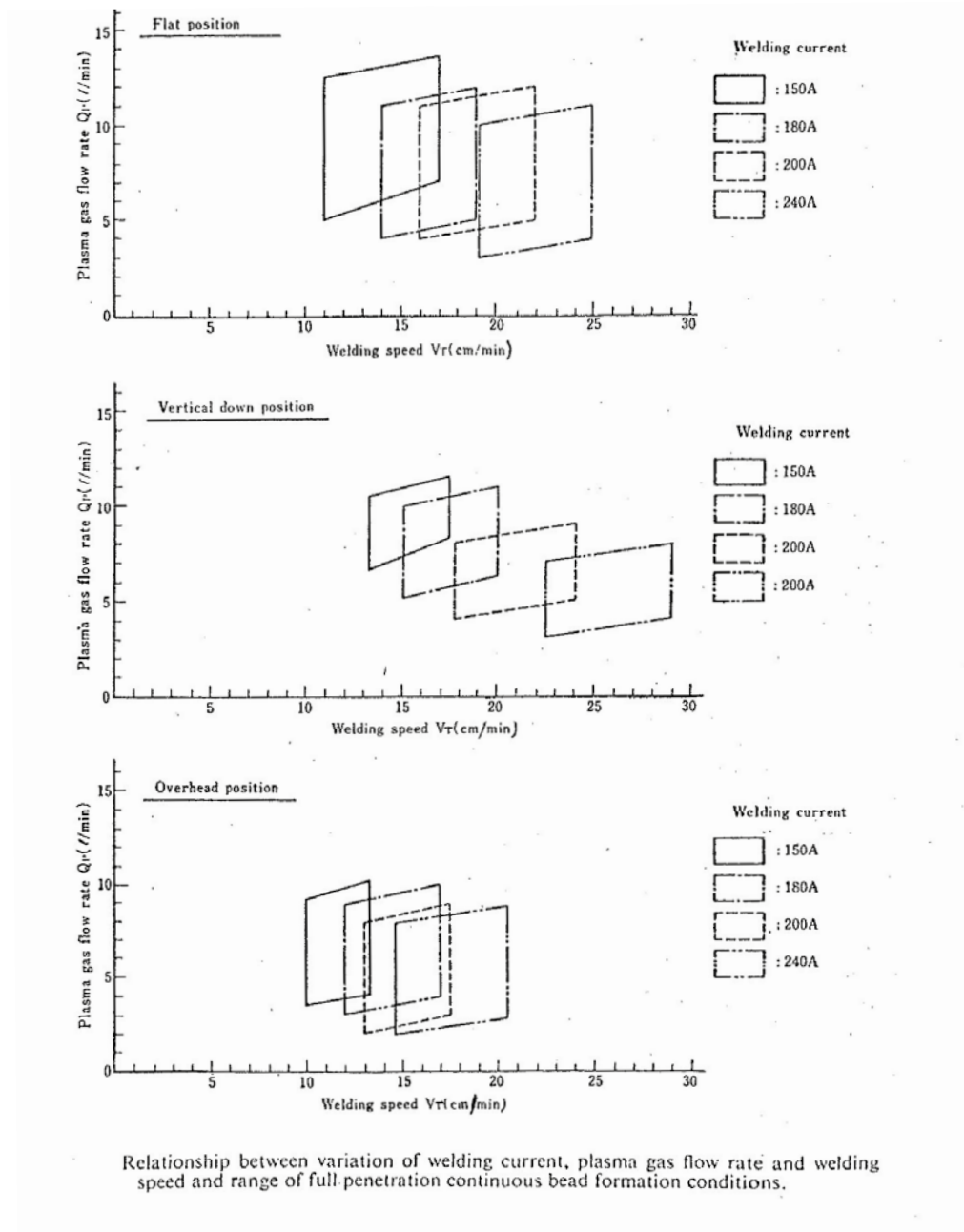
(a) Schematized pulse current wave shape.



(b) Actual pulse current wave shape

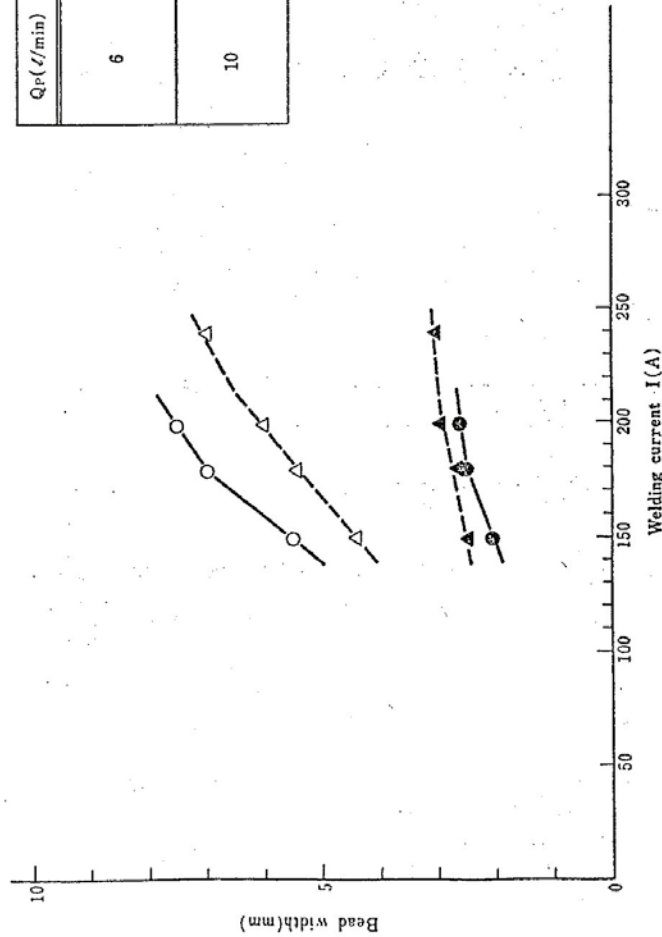
An example of pulse current waveshape.

Plasma Welding Information



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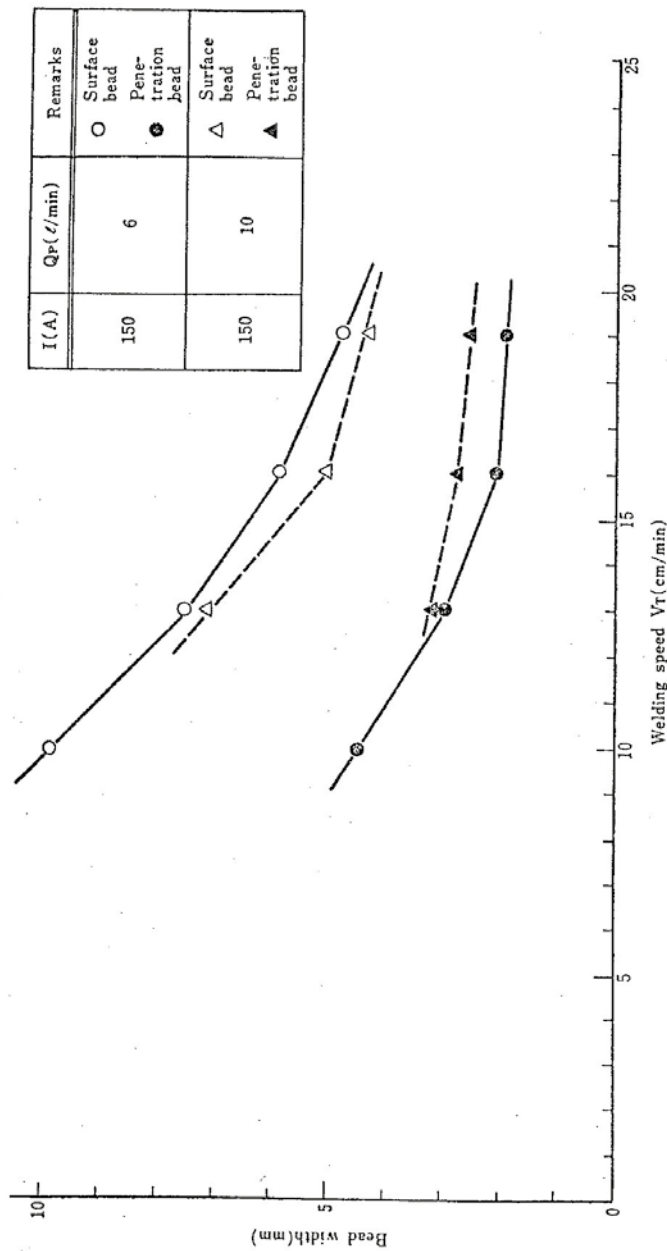
Qp(ℓ/min)	Vr(cm/min)	Remarks
6	16	○ Surface bead ● Penetration bead
10	19	△ Surface bead ▲ Penetration bead



Relationship between variation of welding current and welded bead width—flat position.

Plasma Welding Information

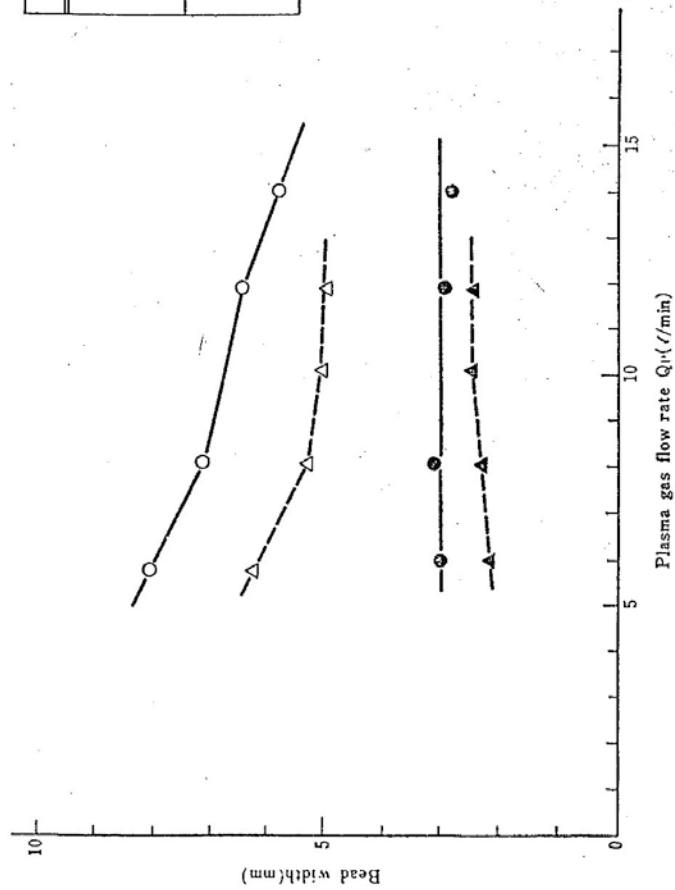
PLASMA ARC WELDING



Relationship between variation of welding speed and welded bead width—flat position.

Plasma Welding Information

I (A)	Vr (cm/min)	Remarks				
150	13	<table border="1"> <tr> <td>○</td> <td>Surface bead</td> </tr> <tr> <td>●</td> <td>Penetration bead</td> </tr> </table>	○	Surface bead	●	Penetration bead
○	Surface bead					
●	Penetration bead					
200	22.5	<table border="1"> <tr> <td>△</td> <td>Surface bead</td> </tr> <tr> <td>▲</td> <td>Penetration bead</td> </tr> </table>	△	Surface bead	▲	Penetration bead
△	Surface bead					
▲	Penetration bead					



Relationship between variation of plasma gas flow rate and welded bead width—flat position.



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**ANY QUESTIONS?
CONTACT US!**

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