

FILARC PZ6138, PZ6138SR and PZ6138S SR

All positional rutile cored wires for applications with low-temperature toughness demands.

The PZ6138 family consists of all positional rutile, low-hydrogen flux-cored wires for applications involving the welding of thick steel components and impact toughness requirements down to -60°C . The family is based on the PZ6138 which has been widely applied in offshore fabrication for decades. They are alloyed with 0.9% Ni and micro-alloyed with TiB. PZ6138 and PZ6138 SR are designed for use in Ar/CO₂ mixed gas, whereas PZ6138S SR is used in pure CO₂. Types with the suffix SR provide good low temperature toughness after stress relieving. All types are successfully CTOD tested – the SR types at temperatures as low as -40°C .

The wires are extremely “welder friendly” wire with a soft, spatter-free arc that always operates in the spray arc mode. It is easy to obtain flat welds with a good penetration and smooth wetting into the plate edges. The brittle slag is easily removed leaving behind a smooth rutile weld appearance. Typical positional welding defects such as lack of fusion and slag inclusions are avoided, due to the spray arc operation. The wires have a good tolerance to poor joint preparation. High quality one-sided root runs are made economically on ceramic backing.

The wire formulation provides a fast freezing slag that supports the weld pool well in positional welding, enabling deposition rates which cannot be equalled by stick electrodes or solid wires. Deposition rates in vertical up welding can reach up to 4 kg/h (100% duty cycle), making it the most productive consumable available for manual welding in this position. Welding parameters are optimised per welding position for maximum productivity, but one single setting can be selected for all-positions (230A), making it ideal for fit-up work.

Diffusible hydrogen satisfies the EN H5 class tested under the conditions prescribed in the classification standard. Weld metal remains low-hydrogen over a wide envelope of welding parameters.



- **High deposition rate:** reduced welding times leading to overall lower welding costs.
- **All positional weldability:** one wire with the ability to weld several applications
- **Welder friendly:** easy to use with a lower risk of weld defects and reduced welder training costs
- **High level of weld metal integrity:** outstanding CTOD performance to -40°C in both the AW and PWHT conditions
- **High level of weld quality:** consistently low hydrogen (H5) provides assurance against the risk of HAZ hydrogen induced cold cracking

Classification

FILARC	EN ISO 17632-A	AWS A5.29
PZ6138	T 50 6 1Ni P M 1 H5	E81T1-Ni1M JH5
PZ6138 SR	T 46 6 1Ni P M 1 H5	E81T1-Ni1M J
PZ6138S SR	T 46 6 1Ni P C 1 H5	E81T1-Ni1CJ

Approvals

	ABS	BV	CE / EN	DB	DNV	GL	LR	PRS	RS	VdTÜV
PZ6138	3SA, 3YSA H5	S3YMHH	EN 13479	42.105.08	V Y42MS (H5)	6YH5S	5Y40S H5	3YS H10	5Y42MSH5	4903
PZ6138SR	4YSA H5				V Y42MS (H5)		5Y42S H5, 5Y42srS H5			

Typical weld metal chemical composition(%)

Chemistry	C	Si	Mn	Ni	P	S
PZ6138	0.051	0.39	1.26	0.86	0.012	0.009
PZ6138SR	0.048	0.37	1.24	0.84	0.010	0.007
PZ6138S SR	0.052	0.32	1.20	0.89	0.011	0.008

Deposition data in Ar/15-25%CO₂

Diameter: 1.2 mm / stick-out: 20 mm / recovery: 85%

I (A)	V wire (m/min)	Dep. Rate (kg/h)
170	6.0	2.5
250	11.6	4.2
300	14.5	5.8

Typical weld metal mechanical properties

FILARC PZ	Condition	Rp (MPa)	Rm(MPa)	A5 (%)	CVN (J)/ -60°C
6138	AW	546	614	24	86
6138 SR	PWHT*	544	613	26	91
6138S SR	PWHT*	480	560	25	83

*2h/600°C

FILARC PZ	Condition	CTOD/-10°C	CTOD/-40°C
6138	AW	>0.93, >0.91, >0.96	
6138 SR	AW	0.95, 0.96, 1.05	0.55, 0.52, 0.60
6138 SR	PWHT*	1.52, 1.40, 1.45	0.73, 0.70, 0.86
6138S SR	PWHT*	1.08, 1.17, 1.12	0.17, 0.66, 0.54

* 2h/600°C

Welding parameters diameter 1.2mm, DC+

Current (A)	V wire (m/min)	Voltage (V)	
1G, 1F / PA			
170-190	6.0-8.0	23-26	root*
180-280	6.0-12.0	25-30	fill
2F / PB			
180-300	6.0-14.0	24-31	
2G / PC			
170-190	6.0-8.5	23-26	root*
180-260	6.0-10.0	25-29	fill
3G-up/3F-up / PF			
180-260	6.0-12.0	23-32	root*
180-280	6.0-12.0	24-30	fill
3F-down / PG			
180-220	6.0-9.0	23-26	
4G / PE			
Not recommended			root
180-260	6.0-10.0	24-28	fill
4F / PD			
180-250	6.0-10.0	23-28	

Parameter settings – diameter 1.2 mm in Ar/CO₂ mixed gas. Increase voltage by 1-2V when using CO₂ * Root pass on ceramic backing with rectangular groove. Limit current to 180A for positions 1G and 2G.



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