

AWS ER70S-3

QCL-3**DESCRIPTION:**

QCL-3 is a *premium* copperless, mild steel solid wire, with silicon and manganese levels suitable for general purpose welding over clean to light levels of rust and mill scale. QCL-3 has the flexibility to provide trouble-free performance in heavy-duty, high-speed spray or pulse applications to lighter duty, lower speed short-arc applications. QCL-3 is designed for use with 100% CO₂ or argon/rich CO₂ shielding gases and argon/oxygen mixtures. A smooth, stable arc with lower spatter levels can be expected even in the most difficult applications.

APPLICATIONS:

General fabrication, farm, construction, mining, railcar, and other industrial general purpose type applications. Outstanding performance through a wide range of wire feed speeds in robotic, automatic and semi-automatic applications.

FEATURES:

- Smooth, stable arc throughout a wide range of wire feed speeds
- Excellent arc starts in all applications
- Low spatter levels
- Dependable feedability in all processes
- Bead ties in smoothly to the weld joint

BENEFITS:

- Increased productivity, consistent feeding
- Less down time, more productivity
- Reduced clean-up time
- Increased flexibility
- Appealing weld appearance

SHIELDING GAS:

100% CO₂, 75% Ar/25% CO₂, 90% Ar/10% CO₂, 92% Ar/8% CO₂ and other commercially available shielding gases.

TYPICAL CHEMISTRIES*:

	Wire		Weld Deposit		
	AWS Wire Spec	Wire (Melt Button)	100% CO ₂	75% Ar/25% CO ₂	90% Ar/10% CO ₂
Carbon (C)	.06 -.15	0.089	0.088	0.083	0.084
Manganese (Mn)	0.90—1.40	1.20	0.91	0.93	0.98
Phosphorus (P)	0.025 max	0.013	0.012	0.012	0.012
Silicon (Si)	0.45—0.70	0.56	0.34	0.36	0.41
Sulphur (S)	0.035 max	0.013	0.011	0.011	0.011
Copper (Cu)	0.50 [†] max	0.04	0.06	0.05	0.05

[†] Copper content of wire and copper coating shall not exceed .5% max.

TYPICAL MECHANICAL PROPERTIES* (AW):

	AWS Spec (CO ₂)	100% CO ₂	75% Ar/25% CO ₂	90% Ar/10% CO ₂
Tensile Strength	70,000 psi (min)	75,000 (psi)	77,500 (psi)	80,000 (psi)
Yield Strength	58,000 psi (min)	62,000 (psi)	64,500 (psi)	69,000 (psi)
Elongation % in 2"	22.0%	27.0%	28.5%	29.5%
Reduction in Area	Not specified	68.0%	70.0%	72.0%

TYPICAL CHARPY V-NOTCH IMPACT*:

	AWS Spec (CO ₂)	100% CO ₂	75% Ar/25% CO ₂	90% Ar/10% CO ₂
Avg. at room temperature		100 ft-lbs	125 ft-lbs	160 ft-lbs
Avg. at 0°F	20 ft/lbs (min)	74 ft-lbs	110 ft-lbs	145 ft-lbs
Avg. at -20°F		63 ft-lbs	92 ft-lb	132 ft-lbs
Avg. at -40°F		48 ft-lbs	83 ft-lbs	115 ft-lbs
Avg. at -60°F		42 ft-lbs	70 ft-lbs	95 ft-lbs

CONFORMANCES AND APPROVALS:

• AWS A5.18, ER70S-3 • ASME SFA 5.18, F-6, A-1 • CWB W48-01 ER495-3

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SHORT-CIRCUIT TRANSFER WELDING PARAMETERS*:

Material Thickness ¹ size in. (decimal) mm			Electrode Diameter in. mm		Welding Current (DC) amps	Arc Voltage (electrode positive)	Wire Feed Speed ipm	Travel Speed ipm	Deposition Rate lbs/hr
20 ga.	0.037	0.9	.035	0.9	55-85	16-18	70-120	15-25	1.0-1.6
18 ga.	0.050	1.3	.035	0.9	70-100	17-20	100-160	20-35	1.3-2.1
1/16"	0.063	1.6	.035	0.9	80-120	17-20	120-180	20-35	1.6-2.4
5/64"	0.078	2.0	.035	0.9	100-130	18-21	160-220	20-35	2.1-2.9
1/8"	0.125	3.2	.035	0.9	120-175	19-22	210-290	20-30	2.7-3.8
1/8"	0.125	3.2	.045	1.1	140-160	18-21	120-160	15-25	3.1-4.2
3/16"	0.187	4.7	.035	0.9	140-175	19-22	240-290	14-19	3.1-3.8
3/16"	0.187	4.7	.045	1.1	160-200	19-22	150-225	15-22	3.9-5.9
1/4"	0.250	6.4	.035	0.9	140-160	19.22	240-290	9-13	3.1-3.8
1/4"	0.250	6.4	.045	1.1	180-225	20-23	190-240	12-18	5.0-6.3

* Shielding gas is 100% CO₂ or 75% Ar/25% CO₂; 20-35 cfh.

¹ For fillet and groove welds—for fillet welds, size equals metal thickness; for square groove welds, the root opening should equal 1/2 the metal thickness.

NOTE: Single-pass flat and horizontal fillet positions. Reduce current 10 to 15% for vertical and overhead welding.

SPRAY TRANSFER WELDING PARAMETERS*:

Material Thickness ¹ size in. (decimal) mm			Electrode Diameter in. mm		Welding Current (DC) amps	Arc Voltage (electrode positive)	Wire Feed Speed ipm	Travel Speed ipm	Deposition Rate lbs/hr
1/8"	0.125	3.2	.035	0.9	160-170	23-24	320-340	17-22	5.1-5.4
1/8"	0.125	3.2	.045	1.1	170-180	23-24	170-185	16-21	4.5-4.8
3/16"	0.187	4.7	.035	0.9	180-190	24-25	360-380	15-20	5.7-6.0
3/16"	0.187	4.7	.045	1.1	190-200	24-25	195-210	14-19	5.1-5.5
1/4"	0.250	6.4	.035	0.9	200-210	24-25	400-420	12-18	6.3-6.6
1/4"	0.250	6.4	.045	1.1	210-220	25-26	220-240	11-17	5.8-6.3
1/4"	0.250	6.4	.052	1.3	250-275	26-27	235-275	11-18	8.2-9.6
5/16"	0.313	7.9	.035	0.9	200-250	25-26	420-510	11-16	6.6-8.0
5/16"	0.313	7.9	.045	1.1	220-300	26-28	240-375	11-18	6.3-9.8
5/16"	0.313	7.9	.052	1.3	250-325	26-28	235-325	11-17	8.2-11.4
5/16"	0.313	7.9	1/16	1.6	275-350	26-28	185-250	11-19	9.4-12.8
3/8"	0.375	9.5	.045	1.1	300-350	26-28	375-475	11-19	9.8-12.4
3/8"	0.375	9.5	.052	1.3	300-350	26-28	300-360	11-19	10.5-12.6
3/8"	0.375	9.5	1/16	1.6	325-375	26-28	240-280	10-18	12.2-14.3
1/2"	0.500	12.7	.045	1.1	325-375	27-29	400-550	12-18	10.5-14.4
1/2"	0.500	12.7	.052	1.3	350-425	28-30	360-485	10-15	12.6-17.0
1/2"	0.500	12.7	1/16	1.6	350-450	28-30	250-350	9-15	12.8-17.9

Diameter In mm		45-lb Spool
0.035	0.9	S303308-085
0.045	1.2	S303312-085

*Shielding gas: 90% Ar/10% CO₂ at 35-50 cfh with electrode stick-out, 3/4" ± 1/8". (Voltage adjustments likely if other spray arc gases are used—85% Ar min.)

¹Fillet and groove welds (backing may be required on groove welds).

Material Safety Data Sheets on any Hobart Brothers Company product may be obtained from Hobart Customer Service.

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