

AWS ER80S-D2, ER90S-G

QCL-D2**DESCRIPTION:**

QCL-D2 is a *premium* copperless solid wire, with a wire chemistry that includes the addition of 1/2% molybdenum to provide increased strength for applications requiring tensile strengths of 80,000 to 90,000 psi. QCL-D2 has higher levels of manganese and silicon to control porosity, provide radiographic quality welds and produce a smooth, flat bead. QCL-D2 will provide trouble-free performance in a variety of applications from pulse to high-speed spray to lower speed short-arc applications. QCL-D2 is designed to provide a smooth, stable arc with low spatter levels with 100% CO₂, argon rich/CO₂, argon/oxygen and other commercially available shielding gases.

APPLICATIONS:

High temperature service piping, construction equipment, trailers, cranes, and high tensile strength applications. Root pass on open butt joints.

FEATURES:

- Smooth, stable arc through a wide range wire feed speeds
- Excellent arc starts in all applications
- Low spatter levels
- Higher tensile and yield strengths
- Bead ties in smoothly to the weld joint

BENEFITS:

- Increased productivity, consistent feeding
- Less downtime, increased productivity
- Reduced clean-up time
- High quality welds to match the requirements of the base metal
- Less grinding, attractive bead 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)	.07-.12	0.095	0.095	0.095	0.095
Manganese (Mn)	1.60—2.10	1.95	1.42	1.58	1.63
Silicon (Si)	0.50—.80	0.65	0.27	0.51	0.54
Phosphorus (P)	0.025 max	0.012	0.012	0.012	0.012
Sulphur (S)	0.025 max	0.010	0.010	0.010	0.010
Molybdenum (Mo)	0.40-.60	0.50	0.47	0.53	0.54
Nickel (Ni)	0.15 max	0.02	0.02	0.02	0.02
Copper (Cu)	.50 [†]	0.08	0.07	0.06	0.06

[†] Copper content of wire and copper coating shall not ex-

TYPICAL MECHANICAL PROPERTIES* (AW):

	AWS Spec (CO ₂)	100% CO ₂	75% Ar/25% CO ₂	90% Ar/10% CO ₂
Tensile Strength	80,000 psi (min)	93,500 psi (644 MPa)	103,500 psi (713 MPa)	106,500 psi (734 MPa)
Yield Strength	68,000 psi (min)	82,000 psi (565 MPa)	89,000 psi (613 MPa)	90,000 psi (620 MPa)
Elongation % in 2"	17.0%	20.0%	22.0%	22.0%
Reduction in Area	not specified	60.0%	62.0%	62.0%

TYPICAL CHARPY V-NOTCH IMPACT VALUES(AW):****CONFORMANCES AND APPROVALS:**

	AWS Spec (CO ₂)	100% CO ₂	75% Ar/25% CO ₂	90% Ar/10% CO ₂
Avg. at room temperature	not specified	60 ft.-lbs (82J)	65 ft.-lbs (89J)	80 ft.-lbs (109J)
Avg. at 0°F (-18°C)	not specified	40 ft.-lbs (54J)	45 ft.-lbs (61J)	55 ft.-lbs (75J)
Avg. at -20°F (-29°C)	20 ft.-lbs (min)	30 ft.-lbs (41J)	35 ft.-lbs (48J)	40 ft.-lbs (54J)

AWS A5.28, ER80S-D2 • ASME SFA 5.28, A-2, F-6

*The information contained or otherwise referenced herein is presented only as "typical" without guarantee or warranty, and Hobart Brothers Company expressly disclaims any liability incurred from any reliance thereon. Typical data are obtained when welded and tested in accordance with AWS 5.28 specification. Other tests and procedures may produce different results. No data is to be construed as a recommendation for any welding condition or technique not controlled by Hobart Brothers Company.

SHORT-CIRCUIT TRANSFER WELDING PARAMETERS*:

Material Thickness ¹			Electrode Diameter		Welding Current (DC) amps	Arc Voltage (electrode positive)	Wire Feed Speed ipm	Travel Speed ipm	Deposition Rate lbs/hr
size	in. (decimal)	mm	in.	mm					
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

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

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.

² Shielding gas is 100% CO₂ or 75% Ar/25% CO₂; 20-35 cfh.

SPRAY TRANSFER WELDING PARAMETERS*:

Material Thickness ¹			Electrode Diameter		Welding Current (DC) amps	Arc Voltage (electrode positive)	Wire Feed Speed ipm	Travel Speed ipm	Deposition Rate lbs/hr
size	in. (decimal)	mm	in.	mm					
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
5/16"	0.313	7.9	.035	0.9	220-250	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
3/8"	0.375	9.5	.045	1.1	300-350	26-28	375-475	11-19	9.8-12.4
1/2"	0.500	12.7	.045	1.1	325-375	27-29	400-550	12-18	10.5-14.4

*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).

Diameter		45-lb Spool
In	mm	
0.035	0.9	S301808-085
0.045	1.2	S301812-085

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

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