

# HOBART®

WELDING PRODUCTS

## PRODUCT CATALOG



# TABLE OF CONTENTS

# Table Of Contents

## MILD STEEL & LOW ALLOY STICK ELECTRODES

AWS Classifications .....	2
Oven Storage and Reconditioning of Stick Electrodes .....	2
Pipemaster® Pro-60, Pipemaster® 60, Pipemaster® 70 .....	3
Pipemaster® 80, Pipemaster® 90, Hobart® 335A .....	4
Hobart® 335C, Hobart® 447A, Hobart® 447C .....	5
Hobart® 1139, Hobart® 14A, Rocket 7024 .....	6
Hobart® 24, Hobart® 418, Hobart® 718MC .....	7
Hobart® 18AC, Hoballoy™ 7018A1, Boilermaker 18 .....	8
Boilermaker 18A1, Boilermaker B2, Boilermaker B3 .....	9
Hoballoy™ 8018B2, Hoballoy™ 8018B2L, Hoballoy™ 8018B6 .....	10
Hoballoy™ 8018B8, Hoballoy™ 8018C1, Hoballoy™ 8018C2 .....	11
Hoballoy™ 8018C3, Hoballoy™ 9015B9, Hoballoy™ 9018B3 .....	12
Hoballoy™ 9018B3L, Hoballoy™ 9018M, Hoballoy™ 10018D2 .....	13
Hoballoy™ 10018M, Hoballoy™ 11018M, Hoballoy™ 12018M .....	14
Pieces Per Pound Arc Welding Electrodes	
Comparative Index of Mild Steel & Low Hydrogen Electrodes .....	15
Comparative Index of Low Alloy Electrodes	
Approvals, Specifications, Classifications .....	16
Hobart Stick Electrodes Packaging Information .....	17/18

## STEEL SOLID WIRES

AWS Classifications	
GMAW Shielding Gases .....	20
Quantum Arc 3, QCL-3, HB-25 .....	21
Quantum Arc 6, QCL-6, HB-28 .....	22
Quantum Arc D2, QCL-D2, Comparative Index of Solid Wires .....	23
Packaging of Hobart Solid Welding Wires	
Short Circuit and Spray Transfer Parameters .....	24
Packaging Specifications and Illustrations .....	25-29
Recyclable Robopak 300/600/950 .....	29

## TUBULAR WIRES

AWS Classifications .....	30
FabCOR® 86R, FabCO® RXR, FabCO® TR-70 .....	31
FabCO® 85, Excel-Arc™ 71, Formula XL®-525 .....	32
Formula XL®-550, Formula XL®-8Ni1, FabCO® 81K2-C .....	33
FabCO® 91K2-C, FabCO® 110K3M, FabCO® 115 .....	34
FabTuf® 960, FabLoy® Stainless Wires 490, 439, Fabshield® 4 .....	35
Fabshield® 7027, Fabshield® 3Ni1, Fabshield® 81N1 .....	36
Fabshield® XLR-8, Fabshield® 81N2, Fabshield® X80 .....	37
Fabshield® 21B, Fabshield® 23 .....	38
Approvals, Specifications, Classifications	
Comparative Index of Self-Shielded Tubular Wires	
Comparative Index of Gas-Shielded Tubular Wires .....	39
Packaging of Tubular Welding Wires .....	40-43
How to Calculate .....	44
Wire Diameters Conversion Chart .....	45

## HARDSURFACING/STAINLESS STEEL PRODUCTS

FabTuf® 960, FabLoy® Stainless Wires 409, 439 .....	35
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## HOBART DISTRIBUTORS

Find the Hobart Office Nearest You .....	48
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Mild Steel & Low Alloy Electrodes

Steel Solid Wires

Tubular Wires



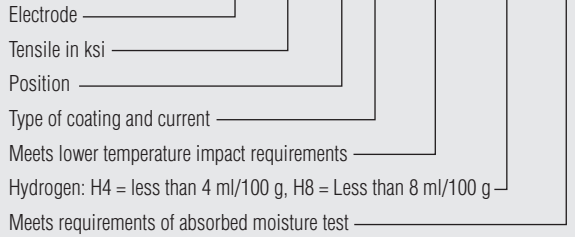
# Mild Steel Electrodes

# Mild Steel Electrodes

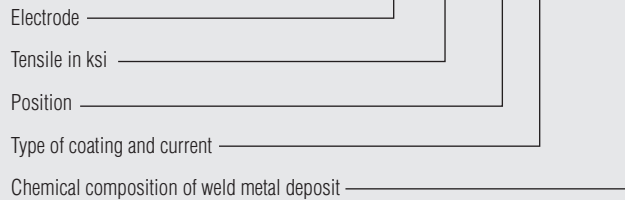
## How AWS Classifies Mild Steel Covered Electrodes, SMAW Process

## How Aws Classifies Low Alloy Covered Electrodes

### E7018-1 H4R



### E8018-B2



#### Position

- 1 Flat, Horizontal, Vertical, Overhead
- 2 Flat and Horizontal only

#### Types of Coating & Current

AWS	DIGIT	TYPE OF COATING	WELDING CURRENT
6010	0	cellulose sodium	DCEP
6011	1	cellulose potassium	AC or DCEP
6022	2	titania sodium	AC or DCEN
6013	3	titania potassium	AC or DCEP or DCEN
7014	4	iron powder titania	AC or DCEP or DCEN
7018	8	iron powder low hydrogen	AC or DCEP

DCEP-Direct Current Electrode Positive  
 DCEN-Direct Current Electrode Negative  
 AC-Alternating Current

#### Chemical composition of weld metal deposit

AWS	Suffix	C	Mn	Si	Ni	Cr	Mo	V	P	S	Cu	Al	Nb	N	Cu
E7018	A1	0.12	0.90*	.80	—	—	.40-.65	—	.03	.03					
E8018	B2L	.05	.90	0.80	—	1.00-1.50	.40-.65	—	.03	.03					
E8018	B2	.05-.12	.90	0.80	—	1.00-1.50	.40-.65	—	.03	.03					
E9018	B3L	.05	.90	0.80*	—	2.00-2.50	.90-1.20	—	.03	.03					
E9018	B3	.05-.12	.90	0.80*	—	2.00-2.50	.90-1.20	—	.03	.03					
E8018	B6	.05-.10	1.0	.90	.40	4.0-6.0	.45-.65	—	.03	.03					
E8018	B8	.05-.10	1.0	.90	.40	8.0-10.5	.85-1.20	—	.03	.03					
E9015	B9	.08-.13	1.20	.30	8.0	8.0-10.5	.85-1.20	15-.30	.01	.01	.25	.04	.02-.10	.02-.07	
E8018	C1	.12	1.25	0.80*	2.00-2.75	—	—	—	.03	.03					
E8018	C2	.12	1.25	0.80*	3.00-3.75	—	—	—	.03	.03					
E8018	C3	.12	40-125	.80	80-110	.15	.35	.05	.03	.03					
E10018	D2	.15	1.65-2.00	0.80*	.90	—	.25-.45	—	.03	.03					
EXXXX	G**	—	1.00 Min	.80 Min	.50 Min	.20 Min	.20 Min	.10 Min	.03	.03	.2				
E9018	M	.10	.60-1.25	.80	1.40-1.80	.15	.35	.05	.030	.030					
E10018M	M	.10	.60-1.25	.80	1.40-1.80	.15	.35	.05	.030	.030					
E11018M	M	.10	1.30-1.80	.60	1.25-2.50	.40	.25-.50	.05	.030	.030					
E12018	M	.10	1.30-2.25	.60	1.75-2.50	.30-1.50	.30-.55	.05	.030	.030					
E7010	P1	.20	1.20	.60	1.00	.30	.50	.10	.030	.030					
E8010	P1	.20	1.20	.60	1.00	.30	.50	.10	.030	.030					

\* Amount depends on electrode classification. Single values indicate maximum  
 \*\* All G classifications have the same chemical minimum requirements

HOBART PERFORMANCE WELDING PRODUCTS

## Oven Storage And Reconditioning Of Stick Electrodes

Welding electrodes may be damaged by atmospheric moisture. The following table recommends proper storage conditions, and time and temperature for reconditioning electrodes that have absorbed excess moisture.

**Notes for table:** Pallets and unopened cartons of electrodes should be stored away from exposure to water in the form of rain, snow, spray, or humidity. Only hermetically sealed cans are safe against these conditions. Damaged cartons permit entry of damp air which may be picked up by the product and lower its quality. Humidity below 50% should be avoided for 6010, 6011, 6012 and 6013 electrodes. At no time should these classes of electrodes be stored in an oven above 130°F.

The instruction, "Dry at Room Temperature" in the table signifies that the humidity should be below 70% and the temperature should be within the limits 40°F to 120°F.

Item Designation	Storage of Contents of Open Cartons*	Reconditioning*
Mild Steel – 6010, 6011	Dry at room temperature	Not recommended
Mild Steel – 6013, 6022, 7014, 7024	100°F – 130°F	250°F – 300°F, 1 hr.
Mild Steel Low Alloy – 7010, 8010, 9010	Dry at room temperature	Not recommended
Mild Steel, Low Alloy, Low Hydrogen – 7018, 8018, 9015, 9018, 10018, 9010 11018, 12018	250°F – 300°F	500°F – 800°F, 1-2 hrs.
Stainless Steel Stick Electrodes DC Lime (AWS-15) Sterling AP & AC/DC (AWS-16) Smootharc Plus (AWS-16) Sterling (AWS-17)	225°F – 260°F	500°F – 600°F, 1 hr.
Hardalloy® Surfacing	225°F – 260°F	450°F – 600°F, 1 hr.
Special Maintenance GP	225°F – 260°F	500°F, 1 hr.
Cast Iron Electrodes	215°F – 230°F	250°F – 300°F, 1 hr.

\* Remove any packaging that may be damaged from oven storage or reconditioning.

# Mild Steel Electrodes

## Pipemaster® Pro-60

### AWS E6010

Pipemaster Pro-60 is a quick-starting, cellulosic mild steel electrode that provides you with outstanding arc stability, penetration and wash-in. It's ideal for welding in all positions and produces an X-ray quality weld with light slag that's easy to remove. Pipemaster Pro-60 can be used to weld the following API 5L steels: Grade A, B, X-42, X-46, X-52, X-56 and for the root pass on material up to X-80. It features enhanced weldability and increased physical properties. Earthtone grey coating.

#### Typical applications:

- construction and shipbuilding
- general-purpose fabrication
- maintenance welding
- out-of-position X-ray welds
- pipe welding
- vertical and overhead plate welding

#### Typical weld metal properties (Chem Pad):

Carbon	0.13
Manganese	0.40
Silicon	0.12
Chromium	0.03
Nickel	0.03
Molybdenum	0.01
Vanadium	<0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	76,000 (527 MPa)
Yield Strength (psi)	64,000 (438 MPa)
Elongation % in 2"	23%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 51 ft.lb. (69J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	40-70 amps
1/8" (3.2 mm)	65-130 amps
5/32" (4.0 mm)	90-175 amps
3/16" (4.8 mm)	140-225 amps

Type of current: DCEP

#### Approvals and conformance:

- AWS A5.1, E6010
- ASME SFA 5.1, E6010
- Lloyd's Grade 3m
- En 499, E383C21
- ABS E6010

For additional information, see Hobart data sheet 612-AE.

## Pipemaster® 60

### AWS E6010

Use Pipemaster 60 for quick starting, excellent arc stability, superior arc drive (penetration), light slag and excellent wash-in. An all-position cellulosic mild steel electrode, it outdoes itself in producing X-ray quality welds. Earthtone grey coating.

#### Typical applications:

- construction and shipbuilding
- general-purpose fabrication
- maintenance welding
- out-of-position X-ray welds
- pipe welding
- vertical and overhead plate welding

#### Typical weld metal properties (Chem Pad):

Carbon	0.08
Manganese	0.40
Silicon	0.23
Chromium	0.08
Nickel	0.08
Molybdenum	0.01
Vanadium	<0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	72,000 (497 MPa)
Yield Strength (psi)	63,000 (435 MPa)
Elongation % in 2"	26%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 58 ft.lb. (78J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	40-70 amps
1/8" (3.2 mm)	65-130 amps
5/32" (4.0 mm)	90-175 amps
3/16" (4.8 mm)	140-225 amps

Type of current: DCEP

#### Approvals and conformance:

- AWS A5.1, E6010
- ASME SFA 5.1, E6010
- Lloyd's Grade 3m
- ABS E6010

For additional information, see Hobart data sheet 612-A.

## Pipemaster® 70

### AWS E7010-P1

The Pipemaster 70, an all-position cellulosic mild steel electrode, is excellent for producing X-ray quality welds. It's quick starting with excellent arc stability, superior penetration, light slag and excellent wash-in. Pipemaster 70 can also help you handle vertical-down welding on all passes on 5L, 5LX and X52 through X65 pipe.

#### Typical applications:

- welding of high-yield pipe steels
- pipeline welding using downhill travel
- shipbuilding
- storage tanks
- drill platforms

#### Typical weld metal properties (Chem Pad):

Carbon	0.13
Manganese	0.58
Silicon	0.16
Nickel	0.69
Molybdenum	0.01
Phosphorus	0.01
Sulphur	0.02
Chromium	0.09
Vanadium	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	84,000 (578 MPa)
Yield Strength (psi)	72,000 (498 MPa)
Elongation % in 2"	22%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 45 ft.lb. (61J)  
Avg. at -40°F (-40°C) 25 ft.lb. (34J)

#### Available diameter and recommended operating ranges:

1/8" (3.2 mm)	70-140 amps
5/32" (4.0 mm)	80-190 amps
3/16" (4.8 mm)	120-230 amps

Type of current: DCEP

#### Approvals and conformance:

- AWS A5.5, E7010-P1
- ASME SFA 5.5, E7010-P1
- Lloyd's Grade 3m, 3Ym
- ABS E7010-P1

For additional information, see Hobart data sheet 612-AB.

# Mild Steel Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## Pipemaster® 80

### AWS E8010-P1

With features like quick starting, excellent arc stability, superior penetration, light slag and excellent wash-in, the Pipemaster 80 is great for a variety of jobs. This all-position cellulosic mild steel electrode gets a handle on vertical-down welding on all passes with X56 through X70 pipe. And with good low-temperature impact properties, it can be used on pipe steels with relatively high silicon (up to .30).

#### Typical applications:

- welding of high-yield pipe steels
- pipe welding using downhill travel
- shipbuilding
- storage tanks
- drill platforms

#### Typical weld metal properties (ChemPad):

Carbon.....	0.13
Manganese.....	0.85
Silicon.....	0.23
Nickel.....	0.78
Molybdenum.....	0.12
Phosphorus.....	0.01
Sulphur.....	0.01
Chromium.....	0.07
Vanadium.....	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	91,000 (628 MPa)
Yield Strength (psi)	77,000 (531 MPa)
Elongation % in 2"	22%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C)	58 ft.lb. (79J)
Avg. at -50°F (-46°C)	25 ft.lb. (34J)

#### Available diameter and recommended operating ranges:

1/8" (3.2 mm).....	70-140 amps
5/32" (4.0 mm).....	80-190 amps
3/16" (4.8 mm).....	130-240 amps

Type of current: DCEP

#### Approvals and conformances:

- AWS A5.5, E8010-P1
- ASME SFA 5.5, E8010-P1
- Lloyd's Grade 3m, 3Ym
- ABS E8010-P1

For additional information, see Hobart data sheet 612-AC.

## Pipemaster® 90

### AWS E9010-G

Pipemaster 90 is designed for welding high-yield strength pipe out-of-position applications for use in harsh arctic and/or desert environments. Pipemaster 90 meets the requirements of AWS 5.5 low alloy electrode specifications and pipeline API Code 1104. It is recommended for welding any 5L material from X65 to X80 steel pipe. Pipemaster 90 has a smooth, yet forceful arc that provides good penetration and fusion with excellent control. Its superior wetting characteristics offer freedom from internal undercutting with practically no slag, which minimizes slag entrapment. Although Pipemaster 90 can be used in any welding position, it is especially outstanding in the vertical-down position for welding pipe joints. As with all Pipemaster electrodes, Pipemaster 90 has excellent operator appeal with low spatter levels and easy slag removal for quick clean-up.

#### Typical applications:

- high-yield X65, X70 and X80 pipe steels
- drill platforms
- storage tanks
- shipbuilding and construction industries

#### Typical weld metal properties (Chem Pad):

Carbon.....	0.25
Manganese.....	1.10
Silicon.....	0.24
Nickel.....	0.78
Phosphorus.....	0.005
Sulphur.....	0.01
Molybdenum.....	0.18
Vanadium.....	0.005

#### Typical mechanical properties (AW):

Tensile Strength (psi)	103,000 (713 MPa)
Yield Strength (psi)	86,000 (590 MPa)
Elongation % in 2"	23%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

1/8" (3.2 mm).....	70-140 amps
5/32" (4.0 mm).....	80-185 amps
3/16" (4.8 mm).....	120-230 amps

Type of current: DCEP

#### Approvals and conformances:

- AWS A5.5, E9010-G
- ASME SFA 5.5, E9010-G

For additional information, see Hobart data sheet 612-AD.

## Hobart® 335A

### AWS E6011

The Hobart 335A offers a fine spray transfer that enhances operator appeal in all positions. Designed for use with AC power sources, this all-position, cellulose-based electrode provides stable arc characteristics and good penetration.

#### Typical applications:

- galvanized steel work
- general fabrication
- railroad cars
- shipbuilding
- structural work

#### Typical weld metal properties (Chem Pad):

Carbon.....	0.11
Manganese.....	0.60
Silicon.....	0.25
Nickel.....	0.07
Chromium.....	0.07
Molybdenum.....	0.01
Vanadium.....	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	82,000 (563 MPa)
Yield Strength (psi)	69,000 (476 MPa)
Elongation % in 2"	25%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 39 ft.lb. (53J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm).....	60-90 amps
1/8" (3.2 mm).....	80-125 amps
5/32" (4.0 mm).....	130-160 amps
3/16" (4.8 mm).....	160-190 amps

Type of current: AC, DCEP or DCEN

#### Approvals and conformances:

- AWS A5.1, E6011
- ASME SFA 5.1
- Lloyd's 2m, 2Ym
- CWB-E4311
- ABS E6011

For additional information, see Hobart data sheet 612-B.

# Mild Steel Electrodes

## Hobart® 335C

### AWS E6011

The versatile soft-arc electrode Hobart 335C is designed for AC power sources, but it can also be used on DCEP or DCEN. With the ability to weld through paint, mill scale or rust, it is an all-position cellulosic electrode with the ultimate in operator appeal.

#### Typical applications:

- general construction
- light sheet metal fabrication
- maintenance and repair welding
- shipyards
- welding on galvanized steels
- welding through paint, mill scale or rust

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.10
Manganese	.....0.84
Silicon	.....0.40
Nickel	.....0.08
Chromium	.....0.08
Molybdenum	.....0.01
Vanadium	.....0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	85,000 (589 MPa)
Yield Strength (psi)	71,000 (489 MPa)
Elongation % in 2"	27%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 42 ft.lb. (57J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	.....60-90 amps
1/8" (3.2 mm)	.....80-125 amps
5/32" (4.0 mm)	.....130-160 amps
3/16" (4.8 mm)	.....160-190 amps

**Type of current:** AC, DCEP or DCEN

#### Approvals and conformances:

- AWS A5.1, E6011
- ASME SFA 5.1
- Lloyd's 2m, 2Ym
- ABS E6011

For additional information, see Hobart data sheet 612-C.

## Hobart® 447A

### AWS E6013

When poor fit-up conditions exist, you'll prefer the fast-freeze characteristics of Hobart 447A. Whether put to use with AC or DC power sources, the 447A has a very stable arc and good bead appearance.

#### Typical applications:

- general-purpose fabrication
- machine parts
- metal buildings and structures
- shaft buildup

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.06
Manganese	.....0.38
Silicon	.....0.30
Nickel	.....0.09
Chromium	.....0.08
Molybdenum	.....0.01
Vanadium	.....0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	74,000 (510 MPa)
Yield Strength (psi)	64,000 (444 MPa)
Elongation % in 2"	24%

#### Typical Charpy V-notch impact values:

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	.....40-80 amps
1/8" (3.2 mm)	.....70-120 amps
5/32" (4.0 mm)	.....130-160 amps
3/16" (4.8 mm)	.....140-220 amps

**Type of current:** AC, DCEN or DCEP

#### Approvals and conformances:

- AWS A5.1, E6013
- ASME SFA 5.1
- ABS E6013

For additional information, see Hobart data sheet 612-E.

## Hobart® 447C

### AWS E6013

A soft arc AWS 6013 electrode, Hobart 447C is the best way to take control of poor fit-up conditions. It has fast-freeze characteristics, giving it preferred operator appeal. Hobart 447C versatility extends its usage with AC or DC power sources and low open-circuit voltage AC machines.

#### Typical applications:

- general-purpose fabrication
- machine parts
- metal buildings and structures
- shaft buildup

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.09
Manganese	.....0.40
Silicon	.....0.31
Nickel	.....0.02
Chromium	.....0.03
Molybdenum	.....0.01
Vanadium	.....0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	73,000 (502 MPa)
Yield Strength (psi)	66,000 (454 MPa)
Elongation % in 2"	24%

#### Typical Charpy V-notch impact values:

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	.....40-80 amps
1/8" (3.2 mm)	.....70-120 amps
5/32" (4.0 mm)	.....130-160 amps

**Type of current:** AC, DCEN or DCEP

#### Approvals and conformances:

- AWS A5.1, E6013
- ASME SFA 5.1
- CWB E4313
- ABS E6013

For additional information, see Hobart data sheet 612-F.

# Mild Steel Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## Hobart® 1139

### AWS E6022

When you want to get a handle on roof decking, you can rely on Hobart 1139. It is a very fluid electrode designed for welding roof decking to support beams with burn-through spot welds. You can also rely on the 1139 for rapid downhill welding when joining light-gauge materials.

#### Typical applications:

- rapid downhill welding
- roof decking
- sheet metal

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.18
Manganese .....	0.25
Silicon .....	0.15
Phosphorus .....	0.015
Sulphur .....	0.017

#### Typical mechanical properties:

Transverse tensile strength exceeds  
60,000 psi (414 MPa)

#### Typical Charpy V-notch impact values:

Not required

#### Available diameter and recommended operating ranges:

1/8" (3.2 mm) .....	110-150 amps
5/32" (4.0 mm) .....	150-180 amps

**Type of current:** DCEN, DCEP or AC

#### Approvals and conformances:

- AWS A5.1, E6022

For additional information, see Hobart data sheet 612-G.

## Hobart® 14A

### AWS E7014

When you are tackling jobs where higher deposition and speed of travel is needed, the Hobart 14A is the electrode to choose. An all-position electrode, Hobart 14A is equipped with a rutile base and iron powder addition to increase deposition rates and give operator appeal. This electrode offers outstanding slag removal and bead appearance and can be operated with AC, DCEP or DCEN power.

#### Typical applications:

- frames
- heavy sheet metal
- machine bases

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.06
Manganese .....	0.44
Silicon .....	0.25
Phosphorus .....	0.01
Sulphur .....	0.015
Nickel .....	0.09
Chromium .....	0.07
Molybdenum .....	0.01
Vanadium .....	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	79,000 (543 MPa)
Yield Strength (psi)	69,000 (479 MPa)
Elongation % in 2"	24%

#### Typical Charpy V-notch impact values:

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm) .....	70-90 amps
1/8" (3.2 mm) .....	120-145 amps
5/32" (4.0 mm) .....	140-210 amps
3/16" (4.8 mm) .....	180-280 amps

**Type of current:** AC, DCEP or DCEN

#### Approvals and conformances:

- AWS A5.1, E7014
- ASME SFA 5.1, E7014
- CWB E4914
- ABS E7014

For additional information, see Hobart data sheet 612-H.

## Hobart® Rocket 7024

### AWS E7024

Hobart Rocket 7024 is a newly engineered E7024 electrode designed to provide the user with outstanding "best of class" features in several important areas. Rocket 7024 is engineered with a slag system to provide the easiest slag removal in its class and in most cases is self peeling. In addition the slag releases from the entire joint with no slag left in the toes of the joint. Spatter levels are extremely low, better than any other E7024. Rocket 7024 has a super smooth soft arc and is less harsh than other E7024 products. Rocket 7024 is more forgiving than other E7024 products when the material being welded is moderately rusty or isn't as clean as it should be. Rocket 7024 can be used with a drag welding technique and operates equally well on either AC or DC (electrode negative) power. It is exceptionally fast when used down hand in properly designed weld joints or in horizontal fillet welds and can be used in single or multipass applications.

#### Typical applications:

- plate fabrication
- tank fabrication
- barge construction
- construction and earthmoving equipment

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.04
Manganese .....	0.61
Silicon .....	0.32
Phosphorus .....	0.01
Sulphur .....	0.01
Nickel .....	0.07
Chromium .....	0.06
Molybdenum .....	0.01
Vanadium .....	0.02

#### Typical mechanical properties (AW):

Tensile Strength (psi)	76,000 (527 MPa)
Yield Strength (psi)	68,000 (471 MPa)
Elongation % in 2"	24%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

1/8" (3.2 mm) .....	130-170 amps
5/32" (4.0 mm) .....	180-245 amps
3/16" (4.8 mm) .....	200-300 amps
7/32" (5.6 mm) .....	250-340 amps
1/4" (6.4 mm) .....	300-380 amps

**Type of current:** DCEN, AC or DCEP

#### Approvals and conformances:

- AWS A5.1, E7024
- ASME SFA 5.1, E7024
- ABS E7024

For additional information, see Hobart data sheet 612-I.

# Mild Steel Electrodes

Mild Steel & Low Alloy Electrodes

## Hobart® 24

### AWS E7024, E7024-1

If you want speed, the Hobart 24 high-speed electrode has it. Hobart 24 is exceptionally fast when used down hand in properly designed weld joints or in horizontal fillet welds where equal leg fillets are desired. It has excellent operation on either AC or DCEN power with a drag welding technique. It also meets AWS E7024-1 impact requirements.

#### Typical applications:

- earthmoving equipment
- mining machinery
- plate fabrication
- railroad cars
- structurals
- shipbuilding
- mobile trailers

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.06
Manganese	.....0.81
Silicon	.....0.44
Phosphorus	.....0.008
Sulphur	.....0.014
Nickel	.....0.08
Chromium	.....0.06
Molybdenum	.....0.02
Vanadium	.....0.02

#### Typical mechanical properties (AW):

Tensile Strength (psi)	80,000 (553 MPa)
Yield Strength (psi)	71,000 (492 MPa)
Elongation % in 2"	25%

#### Typical Charpy V-notch impact values (AW) for E7024-1:

Avg. at 0°F (-18°C)	42 ft.lb. (56J)
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#### Available diameter and recommended operating ranges:

1/8" (3.2 mm)	.....130-150 amps
5/32" (4.0 mm)	.....180-225 amps
3/16" (4.8 mm)	.....200-280 amps
7/32" (5.6 mm)	.....250-320 amps
1/4" (6.4 mm)	.....300-360 amps

**Type of current:** DCEN or AC

#### Approvals and conformances:

- AWS A5.1, E7024, E7024-1
- ASME SFA 5.1, E7024
- ABS 3
- CWB E4924-1

For additional information, see Hobart data sheet 612-J.

## Hobart® 418

### AWS E7018 H4R/E7018-1 H4R

Hobart 418 gives you all the flexibility you need in a general-purpose, low-hydrogen, mild steel electrode. It also has good out-of-position welding capabilities and provides an X-ray quality deposit. And this unique electrode is ideal for tacking prior to finish welding with Fabshield self-shielded, tubular wire. That's because the construction of the Hobart 418 allows removal of all the slag from the self-shielded wire.

#### Typical applications:

- field erections, steel structures
- jobs where low-hydrogen weld metal in the tensile strength range of 70,000 psi is required
- low alloy structurals
- low-, medium- and high-carbon steels
- offshore rigs, power plants

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.02
Manganese	.....0.81
Silicon	.....0.46
Phosphorus	.....0.006
Sulphur	.....0.012
Nickel	.....0.05
Chromium	.....0.03
Molybdenum	.....0.01
Vanadium	.....0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	76,000 (527 MPa)
Yield Strength (psi)	64,000 (440 MPa)
Elongation % in 2"	33%

#### Typical Charpy V-notch impact values (AW):

Avg. at -50°F (-46°C)	108 ft.lb. (147J)
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#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	.....80-100 amps
1/8" (3.2 mm)	.....90-150 amps
5/32" (4.0 mm)	.....110-230 amps
3/16" (4.8 mm)	.....150-300 amps
7/32" (5.6 mm)	.....220-350 amps
1/4" (6.4 mm)	.....270-380 amps

**Type of current:** DCEP or AC

#### Approvals and conformances:

- AWS A5.1, E7018 H4R, E7018-1 H4R
- ASME SFA 5.1, E7018
- ABS 3H5, 3Y
- Lloyd's BF3.3YH5
- CWB E4918-1 H4

For additional information, see Hobart data sheet 612-L.

## Hobart® 718MC

### AWS E7018 H4R/E7018(M)-1 H4R

You can take control with the electrode that's formulated and manufactured to give you excellent moisture resistance, good out-of-position welding capabilities and an X-ray quality deposit. The 718MC meets the requirements of military spec. Mil-E-22200/10, including moisture absorption limits of .10% max. as opened and .20% max. after 9 hrs. at 80°F and 80% relative humidity.

#### Typical applications:

- barge offshore rigs, shipbuilding
- boiler code applications
- field erection, steel structures
- petrochemical plants, power plants
- railcar and locomotive construction
- welding of enameling steels; free machining steels; low alloy structurals; and low, medium or high carbon steels
- weldments in low-temperature environments where low-temperature impacts are important

#### Typical weld metal properties (Chem Pad):

Carbon	.....0.04
Manganese	.....0.92
Silicon	.....0.24
Phosphorus	.....0.010
Sulphur	.....0.016
Nickel	.....0.08
Chromium	.....0.08
Molybdenum	.....0.01
Vanadium	.....0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	76,000 (523 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation % in 2"	29%

#### Typical Charpy V-notch impact values (AW):

Avg. at -50°F (-46°C)	198 ft.lb. (268J)
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#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	.....70-110 amps
1/8" (3.2 mm)	.....90-165 amps
5/32" (4.0 mm)	.....125-220 amps
3/16" (4.8 mm)	.....160-300 amps
7/32" (5.6 mm)	.....260-340 amps
1/4" (6.4 mm)	.....270-380 amps

**Type of current:** DCEP or AC

#### Approvals and conformances:

- AWS A5.1, E7018 H4R, E7018 -1H4R
- ABS 3H5, 3Y
- ASME SFA 5.1, E7018
- MIL-E-22200/10

For additional information, see Hobart data sheet 612-N.



## Hobart® 18AC

### AWS E7018 H8

Highly recommended for applications using small 208/230V, single phase AC welders, 18AC has good operator appeal, excellent re-striking characteristics and an extremely stable arc. 18AC is also an excellent choice for skip or tack welds. The slag is self-removing in most applications. 18AC will work well on all AC power sources and performs exceptionally well on utility-type welders.

#### Typical applications:

- low-, medium- and high-carbon steels
- skip or tack welds
- shops, farms, hobbyist
- some high-strength low alloy steels

#### Typical weld metal properties (Chem Pad):

Carbon	0.04
Manganese	0.67
Silicon	0.29
Chromium	0.07
Molybdenum	0.01
Nickel	0.08
Vanadium	0.02
Phosphorus	0.008
Sulphur	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	81,000 (560 MPa)
Yield Strength (psi)	73,000 (504 MPa)
Elongation % in 2"	30%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C) 57 ft.lb. (77J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-165 amps
5/32" (4.0 mm)	125-220 amps

**Type of current:** AC, DCEN or DCEP

#### Approvals and conformance:

- AWS A5.1, E7018 H8
- ASME SFA 5.1, E7018

For additional information, see Hobart data sheet 612-R.

## Hoballoy® 7018A1

### AWS E7018-A1 H4R

For pressure vessel applications, the Hoballoy 7018A1 is an outstanding choice. When welding .50% molybdenum steel and other low alloy steels, the Hoballoy 7018A1 offers resistance to moisture reabsorption. This important feature helps prevent hydrogen cracking and aids in the elimination of starting porosity.

#### Typical applications:

- construction and maintenance of boilers
- piping
- tubing

#### Typical weld metal properties (Chem Pad):

Carbon	0.03
Manganese	0.83
Silicon	0.32
Phosphorus	0.01
Sulphur	0.01
Molybdenum	0.49

#### Typical mechanical properties (stress relieve 1 hour @ 1150°F):

Tensile Strength (psi)	87,000 (599 MPa)
Yield Strength (psi)	72,000 (496 MPa)
Elongation % in 2"	26%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps

**Type of current:** DCEP or AC

#### Approvals and conformance:

- AWS A5.5, E7018-A1 H4R
- ASME SFA 5.5, E7018-A1
- ABS E7018-A1

For additional information, see Hobart data sheet 613-A.

## Boilermaker 18

### E7018 H4R/E7018-1 H4R

Boilermaker electrodes were specifically designed to be used in the repair of water wall tubes in power generation facilities. Their unique chemistry and formulation construction create water clear x-rays. The excellent starts and re-starts, low spatter levels, easy slag removal, and smooth wash and bead tie-ins make this the choice electrode to use for those critical welds in boilers. The four separate chemistries allow these electrodes to be used from the bottom to the top of the boilers depending on the weld area that is being repaired. All four products have a wide amperage operating range allowing any operator to weld at the amperage where they are comfortable and assured of making quality welds with no porosity.

#### Typical weld metal properties (Chem Pad):

Carbon	0.04
Manganese	0.80
Phosphorus	0.011
Sulphur	0.010
Silicon	0.43

#### Typical mechanical properties (as welded):

Tensile Strength (psi)	89,000 (536 MPa)
Yield Strength (psi)	75,000 (428 MPa)
Elongation % in 2"	24.7%

#### Typical Charpy V-notch impact values

Avg. at -20°F (-29°C) 115 ft.lb. (156J)  
Avg. at -50°F (-46°C) 87 ft.lb. (118J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	60-110 amps
1/8" (3.2 mm)	90-165 amps

**Type of current:** DCEP, AC

#### Approvals and conformance:

- AWS A5.1, ASME SFA 5.1

For additional information, see Hobart data sheet.

# Low Alloy Electrodes

Mild Steel & Low Alloy Electrodes

## **Boilermaker 18A1**

### **E7018-A1 H4R**

Boilermaker electrodes were specifically designed to be used in the repair of water wall tubes in power generation facilities. Their unique chemistry and formulation construction create water clear x-rays. The excellent starts and re-starts, low spatter levels, easy slag removal, and smooth wash and bead tie-ins make this the choice electrode to use for those critical welds in boilers. The four separate chemistries allow these electrodes to be used from the bottom to the top of the boilers depending on the weld area that is being repaired. All four products have a wide amperage operating range allowing any operator to weld at the amperage where they are comfortable and assured of making quality welds with no porosity.

#### **Typical weld metal properties (Chem Pad):**

Carbon.....	0.05
Manganese.....	0.60
Phosphorus.....	0.009
Sulphur.....	0.009
Silicon.....	0.46
Molybdenum.....	0.47

#### **Typical mechanical properties (stress relieve 1 hour @ 1150°F):**

Tensile Strength (psi)	99,000 (683 MPa)
Yield Strength (psi)	86,000 (599 MPa)
Elongation % in 2"	26%

#### **Typical Charpy V-notch impact values**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	65-110 amps
1/8" (3.2 mm).....	80-160 amps

**Type of current:** DCEP, AC

#### **Approvals and conformance:**

- AWS A5.5, ASME SFA 5.5

For additional information, see Hobart data sheet.

## **Boilermaker B2**

### **E8018-B2 H4R**

Boilermaker electrodes were specifically designed to be used in the repair of water wall tubes in power generation facilities. Their unique chemistry and formulation construction create water clear x-rays. The excellent starts and re-starts, low spatter levels, easy slag removal, and smooth wash and bead tie-ins make this the choice electrode to use for those critical welds in boilers. The four separate chemistries allow these electrodes to be used from the bottom to the top of the boilers depending on the weld area that is being repaired. All four products have a wide amperage operating range allowing any operator to weld at the amperage where they are comfortable and assured of making quality welds with no porosity.

#### **Typical weld metal properties (Chem Pad):**

Carbon.....	0.058
Manganese.....	0.708
Phosphorus.....	0.011
Sulphur.....	0.013
Silicon.....	0.33
Chromium.....	1.20
Molybdenum.....	0.45

#### **Typical mechanical properties (stress relieve 1 hour @ 1275°F):**

Tensile Strength (psi)	101,200 (698 MPa)
Yield Strength (psi)	88,000 (607 MPa)
Elongation % in 2"	22.8%

#### **Typical Charpy V-notch impact values:**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	60-105 amps
1/8" (3.2 mm).....	90-160 amps

**Type of current:** DCEP, AC

#### **Approvals and conformance:**

- AWS A5.5-81 E8018-B2
- AWS A5.5-06 E7018-B2, ASME SFA 5.5

For additional information, see Hobart data sheet.

## **Boilermaker B3**

### **E9018-B3 H4R**

Boilermaker electrodes were specifically designed to be used in the repair of water wall tubes in power generation facilities. Their unique chemistry and formulation construction create water clear x-rays. The excellent starts and re-starts, low spatter levels, easy slag removal, and smooth wash and bead tie-ins make this the choice electrode to use for those critical welds in boilers. The four separate chemistries allow these electrodes to be used from the bottom to the top of the boilers depending on the weld area that is being repaired. All four products have a wide amperage operating range allowing any operator to weld at the amperage where they are comfortable and assured of making quality welds with no porosity.

#### **Typical Weld metal properties (Chem Pad):**

Carbon.....	0.053
Manganese.....	0.742
Phosphorus.....	0.015
Sulphur.....	0.013
Silicon.....	0.395
Chromium.....	2.37
Molybdenum.....	0.959

#### **Typical mechanical properties (stress relieve 1 hour @ 1275°F):**

Tensile Strength (psi)	108,000 (745 MPa)
Yield Strength (psi)	91,000 (628 MPa)
Elongation % in 2"	20%

#### **Typical Charpy V-notch impact values:**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	60-105 amps
1/8" (3.2 mm).....	90-160 amps

**Type of current:** DCEP, AC

#### **Approvals and conformance:**

- AWS A5.5-81 E9018-B3
- AWS A5.5-06 E018-B3, ASME SFA 5.5

For additional information, see Hobart data sheet.

# Low Alloy Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## Hoballoy® 8018B2

### AWS E8018-B2 H4R

Hoballoy 8018B2 is an outstanding electrode for welding higher strength steels requiring tensile strengths of 80,000 lbs. or more. Ideal for welding in conditions of high heat or humidity, it features a specially formulated coating that's designed to reduce moisture pick-up and thus help keep hydrogen cracking and starting porosity to a minimum.

#### Typical applications:

- fabrication and maintenance of boilers and associated piping
- steels such as 1-1/4 Cr-1/2 Mo and 1/2 Cr-1/2 Mo

#### Typical weld metal properties (Chem Pad):

Carbon.....	0.07
Manganese.....	0.73
Silicon.....	0.61
Phosphorus.....	0.01
Sulphur.....	0.01
Chromium.....	1.33
Molybdenum.....	0.55

#### Typical mechanical properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	103,000 (710 MPa)
Yield Strength (psi)	90,000 (621 MPa)
Elongation % in 2"	22%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

#### Approvals and conformances:

- AWS A5.5, E8018-B2 H4R
- ASME SFA 5.5, E8018-B2
- ABS E8018-B2

## Hoballoy® 8018B2L

### AWS E8018-B2L H4R/E7018-B2L H4R

Hoballoy 8018B2L is an outstanding electrode for welding higher strength steels requiring tensile strengths of 80,000 lbs. or more. Low carbon levels reduce the possibility of cracking in the weldment. It offers good arc characteristics and excellent notch toughness. Plus, Hoballoy 8018B2L features a specially formulated coating that reduces moisture pick-up, making it ideal for welding in conditions of high heat and humidity and helps to minimize hydrogen cracking and starting porosity.

#### Typical applications:

- fabrication and maintenance of boilers and associated piping
- steels such as 1-1/4 Cr-1/2 Mo and 1/2 Cr-1/2 Mo

#### Typical weld metal properties (Chem Pad):

Carbon.....	0.03
Manganese.....	0.58
Silicon.....	0.53
Phosphorus.....	0.012
Sulphur.....	0.010
Chromium.....	1.35
Molybdenum.....	0.59

#### Typical mechanical properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	90,000 (624 MPa)
Yield Strength (psi)	76,000 (521 MPa)
Elongation % in 2"	24%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

#### Approvals and conformances:

- AWS A5.5-81, E8018-B2L H4R
- AWS A5.5, E7018-B2L H4R
- ASME SFA 5.5, E8018-B2L
- ABS E 8018-B2L

## Hoballoy® 8018B6

### AWS E8018-B6 H4R

The Hoballoy 8018B6 is the right choice for 5% Cr, 1/2% Mo steels and other chromium-molybdenum steels in severe service conditions. Its special coating reduces moisture pick-up, minimizing hydrogen cracking and starting porosity. Plus, it offers excellent arc characteristics for a stable, easy-to-control arc and its quick slag removal means faster clean-up time.

#### Typical applications:

- petrochemical and petroleum industries
- tubes and tube sheets
- plate steels
- high pressure hydrogen service

#### Typical weld metal properties (Chem Pad):

Carbon.....	0.06
Manganese.....	0.60
Phosphorus.....	0.01
Sulphur.....	0.01
Silicon.....	0.23
Chromium.....	4.60
Nickel.....	0.10
Molybdenum.....	0.46

#### Typical mechanical properties (stress relieve 1 hour @ 1375°F):

Tensile Strength (psi)	89,000 (614 MPa)
Yield Strength (psi)	73,000 (505 MPa)
Elongation % in 2"	23%

#### Typical Charpy V-notch impact values

Not required

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-210 amps
3/16" (4.8 mm).....	200-290 amps

**Type of current:** DCEP

#### Approvals and conformances:

- AWS A5.5, E8018-B6 H4R
- ABS E8018-B6
- ASME SFA 5.5

For additional information, see Hobart data sheet 613-B.

For additional information, see Hobart data sheet 613-C.

For additional information, see Hobart data sheet 613-CA.

# Low Alloy Electrodes

## **Hoballoy® 8018B8**

### **AWS E8018-B8 H4R**

Whenever you face severe service conditions, the Hoballoy 8018-B8 is the perfect electrode choice. Designed for joining creep-resistant, high chromium (9% Cr) alloys of similar composition, its iron powder low-hydrogen coating reduces moisture pick-up and helps to minimize hydrogen cracking and starting porosity. It also offers a stable, easy-to-control arc and improved bead appearance.

#### **Typical applications**

- Petrochemical and petroleum industries
- Tubes, tube sheets and plate steels for high pressure hydrogen service
- 9% Cr and 1% Mo steels

#### **Typical weld metal properties (Chem Pad):**

Carbon	0.05
Manganese	0.74
Phosphorus	0.015
Sulphur	0.008
Silicon	0.31
Chromium	8.97
Nickel	0.09
Molybdenum	0.94

#### **Typical mechanical properties (stress relieve 1 hour @ 1375°F):**

Tensile Strength (psi)	100,000 (689 MPa)
Yield Strength (psi)	79,000 (547 MPa)
Elongation % in 2"	23%

#### **Typical Charpy V-notch impact values**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-210 amps

**Type of current:** DCEP

#### **Approvals and conformances:**

- AWS A5.5, E8018-B8 H4R
- ABS E8018-B8
- ASME SFA 5.5

For additional information, see Hobart data sheet 613-CB.

## **Hoballoy® 8018C1**

### **AWS E8018-C1 H4**

Hoballoy 8018C1 is a high-quality electrode that's designed for applications of 2% nickel deposits and the welding of nickel-bearing steels for low temperature applications where toughness of the weld metal is important. It provides good puddle control, excellent wetting action and tie-in and offers good arc characteristics as well as excellent notch toughness (65 ft. lbs. at -75°F) and easy slag removal. Hoballoy 8018C1 is also great for welding in conditions of high heat or humidity as it features a specially-formulated coating that's designed to minimize hydrogen cracking and starting porosity.

#### **Typical applications:**

- shipbuilding
- piping
- tanks used in the storage of gases

#### **Typical weld metal properties (Chem Pad):**

Carbon	0.04
Manganese	1.01
Silicon	0.26
Phosphorus	0.01
Sulphur	0.01
Nickel	2.57

#### **Typical mechanical properties (stress relieve 1 hour @ 1150°F):**

Tensile Strength (psi)	95,000 (656 MPa)
Yield Strength (psi)	84,000 (581 MPa)
Elongation % in 2"	27%

#### **Typical Charpy V-notch impact values (SR):**

Avg. at -75°F (-59°C) 70 ft.lb. (103J)

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
3/16" (4.8 mm)	200-300 amps

**Type of current:** DCEP or AC

#### **Approvals and conformances:**

- AWS A5.5, E8018-C1 H4
- ASME SFA 5.5, E8018-C1 H4
- ABS E8018-C1

For additional information, see Hobart data sheet 613-D.

## **Hoballoy® 8018C2**

### **AWS E8018-C2 H4**

Hoballoy 8018C2 is an outstanding electrode for low temperature applications requiring tensile strengths greater than 80,000 psi and for welding 2% to 4% nickel steels. It features a special formulated coating designed to minimize hydrogen cracking and starting porosity.

#### **Typical applications:**

- shipbuilding
- piping and gas storage tanks
- AR and T-1 steel welding

#### **Typical Weld metal properties (Chem Pad):**

Carbon	0.04
Manganese	0.90
Phosphorus	0.02
Sulphur	0.01
Silicon	0.36
Nickel	3.44

#### **Typical mechanical properties (stress relieve 1 hour @ 1150°F):**

Tensile Strength (psi)	100,000 (693 MPa)
Yield Strength (psi)	86,000 (591 MPa)
Elongation % in 2"	23%

#### **Typical Charpy V-notch impact values (SR):**

Avg. at -100°F (-73°C) 48 ft.lb. (66J)

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
1/4" (6.4 mm)	300-400 amps

**Type of current:** DCEP

#### **Approvals and conformances:**

- AWS A5.5, E8018-C2 H4
- ASME SFA5.5, E8018-C2 H4
- ABS E8018-C2

For additional information, see Hobart data sheet 613-E.



# Low Alloy Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## **Hoballoy® 8018C3**

### **AWS E8018-C3 H4**

Hoballoy 8018-C3 electrodes are designed for high tensile steels requiring 1% nickel weld deposits.

#### **Typical applications:**

- commercial using 80,000 tensile steels
- military using 80,000 tensile steels
- welding of AR and T-1 steels

#### **Typical weld metal properties**

##### **(Chem Pad):**

Carbon.....	0.02
Manganese.....	0.84
Silicon.....	0.16
Phosphorus.....	0.01
Sulphur.....	0.01
Nickel.....	0.84
Chromium.....	0.01
Molybdenum.....	0.09
Vanadium.....	0.01

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	80,000 (554 MPa)
Yield Strength (psi)	68,000 (470 MPa)
Elongation % in 2"	27%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -40°F (-40°C) 128 ft.lb. (174J)

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

#### **Approvals and conformances:**

- AWS A5.5, E8018-C3 H4
- ASME SFA 5.5, E8018-C3 H4
- MIL-E-22200/1 (1/8, 5/32)
- ABS E8018-C3

## **Hoballoy® 9015B9**

### **AWS E9015-B9 H4R**

The improved creep resistance of the Hoballoy 9015B9 make it an outstanding electrode for power generation and high temperature service applications. It features low moisture reabsorption that prevents starting porosity and offers resistance to hydrogen-induced cracking. Plus, its quick and easy slag removal makes clean-up faster than ever.

#### **Typical applications:**

- petrochemical and petroleum industries
- high temperature service applications
- tubes, tube sheets
- pipe and plate steels
- 9% Cr - 1% Mo-V steels

#### **Typical weld metal properties**

##### **(Chem Pad):**

Carbon.....	0.09
Manganese.....	0.41
Phosphorus.....	0.01
Sulphur.....	0.01
Silicon.....	0.20
Copper.....	0.14
Chromium.....	8.50
Vanadium.....	0.18
Nickel.....	0.57
Molybdenum.....	0.91
Aluminum.....	0.01
Niobium.....	0.03
Nitrogen.....	0.04

#### **Typical mechanical properties**

##### **(stress relieve 1 hour @ 1375°F):**

Tensile Strength (psi)	105,000 (724 MPa)
Yield Strength (psi)	90,000 (620 MPa)
Elongation % in 2"	21%

#### **Typical Charpy V-notch impact values**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-100 amps
1/8" (3.2 mm).....	90-140 amps
5/32" (4.0 mm).....	120-210 amps

#### **Approvals and conformances:**

- AWS A5.5, E9015-B9 H4R
- ASME SFA5.5

## **Hoballoy® 9018B3**

### **AWS E9018-B3 H4R**

Hobart's Hoballoy 9018B3 is an outstanding electrode that's designed for welding higher strength steel applications. It offers better corrosion resistance than carbon electrodes and features a special coating that's formulated to reduce moisture pick-up, helping to minimize hydrogen cracking and starting porosity.

#### **Typical applications:**

- chrome-moly pipes
- castings
- forgings
- boiler work

#### **Typical weld metal properties**

##### **(Chem Pad):**

Carbon.....	0.10
Manganese.....	0.69
Silicon.....	0.50
Phosphorus.....	0.01
Sulphur.....	0.01
Chromium.....	2.35
Molybdenum.....	1.06

#### **Typical mechanical properties**

##### **(stress relieve 1 hour @ 1275°F):**

Tensile Strength (psi)	125,000 (865 MPa)
Yield Strength (psi)	111,000 (765 MPa)
Elongation % in 2"	18%

#### **Typical Charpy V-notch impact values**

Not required

#### **Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

#### **Approvals and conformances:**

- AWS A5.5, E9018-B3 H4R
- ASME SFA 5.5, E9018-B3 H4R
- ABS E9018-B3

For additional information, see Hobart data sheet 613-F.

For additional information, see Hobart data sheet 613-FA.

For additional information, see Hobart data sheet 613-G.

# Low Alloy Electrodes

## Hoballoy® 9018B3L

**AWS E9018-B3L H4R/E8018-B3L H4R**  
Hoballoy 9018B3L is an outstanding electrode for welding higher-strength piping where cracking is a problem. It features a coating that's specially formulated to reduce moisture pick-up, which makes it ideal for conditions of high heat and humidity and for minimizing hydrogen cracking and starting porosity.

**Typical applications:**

- chrome-moly pipes
- boiler work

**Typical weld metal properties (Chem Pad):**

Carbon.....	0.04
Manganese.....	0.65
Silicon.....	0.48
Phosphorus.....	0.01
Sulphur.....	0.01
Chromium.....	2.33
Molybdenum.....	1.10

**Typical mechanical properties (stress relieve 1 hour @ 1275°F):**

Tensile Strength (psi)	104,000 (719 MPa)
Yield Strength (psi)	89,000 (616 MPa)
Elongation % in 2"	20%

**Typical Charpy V-notch impact values**

Not required

**Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

**Approvals and conformance:**

- AWS A5.5-81, E9018-B3L H4R
- AWS A5.5-96, E8018-B3L H4R
- ASME SFA 5.5, E9018-B3L
- ABS E9018-B3L

For additional information, see Hobart data sheet 613-H.

## Hoballoy® 9018M

**AWS E9018-M H4R**  
Hoballoy 9018M is an outstanding electrode that's designed for applications requiring tensile strengths of at least 90,000 psi. An ideal choice for conditions of high heat and humidity, Hoballoy 9018M has a specially formulated coating that reduces moisture pick-up, which helps to minimize hydrogen cracking and starting porosity.

**Typical applications:**

- joining HY-90 steel
- joining HY-80 steel
- joining T-1 steel
- joining other high-tensile steels

**Typical weld metal properties (Chem Pad):**

Carbon.....	0.05
Manganese.....	1.06
Silicon.....	0.22
Phosphorus.....	0.011
Sulphur.....	0.010
Nickel.....	1.55
Chromium.....	0.08
Molybdenum.....	0.29
Vanadium.....	0.01

**Typical mechanical properties (AW):**

Tensile Strength (psi)	96,000 (665 MPa)
Yield Strength (psi)	83,000 (575 MPa)
Elongation % in 2"	26%

**Typical Charpy V-notch impact values (AW):**

Avg. at -60°F (-51°C) 65 ft.lb. (88J)

**Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

**Approvals and conformance:**

- AWS A5.5, E9018-M H4R
- ASME SFA 5.5, E9018-M H4R
- ABS E9018-M
- DNV 5 YH5

For additional information, see Hobart data sheet 613-J.

## Hoballoy® 10018D2

**AWS E10018-D2 H4R**  
A high-quality electrode, Hoballoy 10018D2 is designed for the welding of high tensile steels and manganese-molybdenum steels requiring tensile strengths of at least 100,000 psi. It has high operator appeal and offers a wide variety of welding advantages including good arc characteristics, ductility, crack-resistance, easy slag removal, and low spatter and smoke. Plus, Hoballoy 10018D2 is an ideal choice for conditions of high heat and humidity because it features a special coating that's designed to reduce moisture pick-up, which also helps to minimize hydrogen cracking and starting porosity.

**Typical applications:**

- manganese-moly castings
- alloy forgings
- structurals
- pressure vessel applications in either the as welded or stress-relieved condition

**Typical weld metal properties (Chem Pad):**

Carbon.....	0.06
Manganese.....	1.96
Silicon.....	0.25
Phosphorus.....	0.01
Sulphur.....	0.01
Molybdenum.....	0.35
Nickel.....	0.08

**Typical mechanical properties (stress relieve 1 hour @ 1150°F):**

Tensile Strength (psi)	116,000 (797 MPa)
Yield Strength (psi)	100,000 (693 MPa)
Elongation % in 2"	22%

**Typical Charpy V-notch impact values (SR):**

Avg. at -60°F (-51°C) 32 ft.lb. (43J)

**Available diameter and recommended operating ranges:**

3/32" (2.4 mm).....	70-110 amps
1/8" (3.2 mm).....	90-160 amps
5/32" (4.0 mm).....	130-220 amps
3/16" (4.8 mm).....	200-300 amps

**Type of current:** DCEP or AC

**Approvals and conformance:**

- AWS A5.5, E10018-D2 H4R
- ASME SFA 5.5, E10018-D2 H4R

For additional information, see Hobart data sheet 613-K.

# Mild Steel/Low Alloy Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## Hoballoy® 10018M

### AWS E10018-M H4R

Designed for welding low alloy, high-strength steels, the Hoballoy 10018M provides good ductility and excellent notch toughness. Its good arc characteristics, easy slag removal, and low spatter and smoke combine for operator appeal. And it's also ideal in high heat and humidity because of its moisture-resistant coating, which also helps to prevent hydrogen cracking and starting porosity.

#### Typical applications:

- reinforcing steel
- HY-80, HY-90, T-1, AR and other high-tensile steels

#### Typical weld metal properties (Chem Pad):

Carbon	0.07
Manganese	1.44
Phosphorus	0.012
Sulphur	0.007
Silicon	0.40
Chromium	0.04
Nickel	1.89
Molybdenum	0.38
Vanadium	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	108,000 (747 MPa)
Yield Strength (psi)	100,000 (687 MPa)
Elongation % in 2"	23%

#### Typical Charpy V-notch impact values (AW):

Avg. at -60°F (-51°C) 52 ft.lb. (71J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
3/16" (4.8 mm)	200-300 amps

Type of current: DCEP

#### Approvals and conformances:

- AWS A5.5, E10018-M H4R
- ASME SFA5.5

## Hoballoy® 11018M

### AWS E11018-M H4R

Designed for military applications and other projects that require weld joints with tensile strengths of at least 110,000 psi, Hoballoy 11018M offers a wide range of welding advantages that will improve your welding productivity – good arc characteristics, excellent puddle control with good wetting action and tie-in, and easy slag removal. Ideal for conditions of high heat and humidity, it features a special coating that's designed to reduce moisture pick-up, helping to minimize hydrogen cracking and starting porosity. Hoballoy 11018M also offers good ductility, good crack resistance and high notch toughness even at temperatures as low as -60°F.

#### Typical applications:

- low-alloy steels including HY-80, HY-90 and T-1

#### Typical weld metal properties (Chem Pad):

Carbon	0.04
Manganese	1.54
Silicon	0.34
Nickel	1.90
Phosphorus	0.011
Sulphur	0.013
Molybdenum	0.33
Chromium	0.19
Vanadium	0.010

#### Typical mechanical properties (AW):

Tensile Strength (psi)	112,000 (771 MPa)
Yield Strength (psi)	102,000 (703 MPa)
Elongation % in 2"	22%

#### Typical Charpy V-notch impact values (AW):

Avg. at -60°F (-51°C) 54 ft.lb. (74J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	75-115 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
3/16" (4.8 mm)	200-300 amps
1/4" (6.4 mm)	300-400 amps

Type of current: DCEP or AC

#### Approvals and conformances:

- AWS A5.5, E11018-M H4R
- ASME SFA 5.5, E11018-M
- ABS E11018M
- MIL-E-222001, (1/8)
- DNV 5Y69

## Hoballoy® 12018M

### AWS E12018-M H4R

Hoballoy 12018M is designed for welding high tensile steels requiring weld joints with tensile strengths of at least 120,000 psi. It offers a wide variety of welding advantages that include: good arc characteristics, ductility, crack-resistance, easy slag removal, and low spatter and smoke. Hoballoy 12018M also works extremely well under conditions of high heat and humidity because its special coating is designed to reduce moisture pick-up, which also helps to keep hydrogen cracking and starting porosity to a minimum.

#### Typical applications:

- low-alloy steels
- forgings
- castings
- plate and pressure vessels

#### Typical weld metal properties (Chem Pad):

Carbon	0.04
Manganese	1.70
Silicon	0.44
Phosphorus	0.010
Sulphur	0.009
Nickel	1.81
Molybdenum	0.37
Chromium	0.63
Vanadium	0.01

#### Typical mechanical properties (AW):

Tensile Strength (psi)	134,000 (926 MPa)
Yield Strength (psi)	120,000 (825 MPa)
Elongation % in 2"	19%

#### Typical Charpy V-notch impact values (AW):

Avg. at -60°F (-51°C) 36 ft.lb. (49J)

#### Available diameter and recommended operating ranges:

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
3/16" (4.8 mm)	200-300 amps

Type of current: DCEP or AC

#### Approvals and conformances:

- AWS A5.5, E12018-M H4R
- ASME SFA 5.5, E12018-M H4R
- ABS E12018M

For additional information, see Hobart data sheet 613-L.

For additional information, see Hobart data sheet 613-M.

For additional information, see Hobart data sheet 613-N.

# Mild Steel/Low Alloy Electrodes

<b>Pieces Per Pound Arc Welding Electrodes</b>								
Hobart Type	Diameter:	3/32"	3/32"	1/8"	5/32"	3/16"	7/32"	1/4"
	Length:	10"	14"	14"	14"	14"	18"	18"
Pipemaster 60, 70, 80, 90 Pipemaster Pro-60		—	30	17	12	8	—	—
<b>335A, 335C</b>		—	29	16	11	7	—	—
<b>447A, 447C</b>		—	30	15	10	7	—	—
<b>14A</b>		—	23	13	9	6	—	—
<b>24 (-1)</b>		—	—	10	7	—	4	2
<b>XX18 (Iron Powder)</b>		—	21	12	9	7	—	3
<b>Stainless</b>		22	—	13	9	4	—	3

<b>Comparative Index of Mild Steel &amp; Low Hydrogen Electrodes</b>					
AWS Class	HOBART	MUREX	ESAB	LINCOLN	MCKAY
E6010	Pipemaster Pro-60 Pipemaster 60	-	SW-10P; SW-10P Plus	Fleetweld 5P, 5P+; Pipeliner 6P+	6010 PM
E6011	335A; 335C	6011C	SW-14	Fleetweld 35; 35LS; 180	Soft Arc 6011 6011
E6013	447A; 447C	6013D	SW-15; 6013LV	Fleetweld 37	6013
E6022	1139	-	-	Fleetweld 22	-
E7010-P1	Pipemaster 70	-	710P	Shield-Arc HYP+ Pipeliner 7P+	-
E7014	14A	7014	SW-15 IP	Fleetweld 47	7014
E7018 (AC)	18AC	-	Atom Arc 7018-AC	Lincoln 7018AC	
E7018	Boilermaker 18 418; 718MC	7018MR	Atom Arc 7018	Excalibur 7018MR; Jetweld LH-70; Jet-LH-78 MR	7018XLM; Soft-Arc 7018-1
E7018-1	Boilermaker 18 418; 718MC	-	Atom Arc 7018-1	Excalibur 7018-1 MR	7018XLM; Soft-Arc 7018-1
E7024 E7024-1	Rocket 7024, 24	7024 -	Sureweld 7024 Sureweld 7024	Jetweld 1	7024 7024
E8010-P1	Pipemaster 80	-	SW-810P	Pipeliner 8P+ Shield-Arc 80	-
E9010-G	Pipemaster 90	-	-	Shield-Arc 90	-

Mild Steel & Low Alloy Electrodes



**Mild Steel/Low Alloy Electrodes**

HOBART PERFORMANCE WELDING PRODUCTS

**Comparative Index of Low Alloy Electrodes**

AWS Class	HOBART	ESAB	LINCOLN
E7018-A1	<b>Hoballoy 7018A1/Boilermaker A1</b>	Atom Arc 7018-Mo	Excalibur 7018-A1 MR
E8018-B2	<b>Hoballoy 8018-B2/Boilermaker B2</b>	Atom Arc 8018-CM	
E7018-B2L/E8018-B2L	<b>Hoballoy 8018-B2L</b>	Atom Arc 7018-B2L	
E8018-B6	<b>Hoballoy 8018B6</b>	Atom Arc 8018-B6	
E8018-B8	<b>Hoballoy 8018B8</b>	Atom Arc 8018-B8	
E8018-C1	<b>Hoballoy 8018C1</b>	Atom Arc 8018-C1	Excalibur 8018-C1 MR
E8018-C2	<b>Hoballoy 8018C2</b>	Atom Arc 8018-N	
E8018-C3	<b>Hoballoy 8018C3</b>	Atom Arc 8018	Excalibur 8018-C3 MR
E9015-B9	<b>Hoballoy 9015B9</b>	Atom Arc 9015-B9	
E9018-B3	<b>Hoballoy 9018B3/Boilermaker B3</b>	Atom Arc 9018-CM	
E8018-B3L/E9018-B3L	<b>Hoballoy 9018B3L</b>	Atom Arc 8018-B3L	
E9018M	<b>Hoballoy 9018M</b>	Atom Arc 9018	Excalibur 9018M MR
E10018-D2	<b>Hoballoy 10018D2</b>	Atom Arc 10018-MM	
E10018M	<b>Hoballoy 10018M</b>	Atom Arc 10018	
E11018M	<b>Hoballoy 11018M</b>	Atom Arc T	Excalibur 11018M MR
E12018M	<b>Hoballoy 12018M</b>	Atom Arc 12018	

**Approvals, Specifications, Classifications**

All filler metals listed conform to the specifications listed in each section. Because some agencies do not specifically approve particular types, please be careful to note whether or not the heading for each section indicates specific approval.

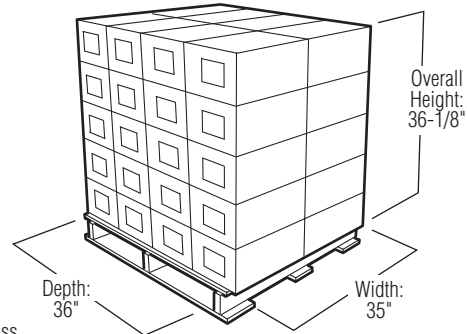
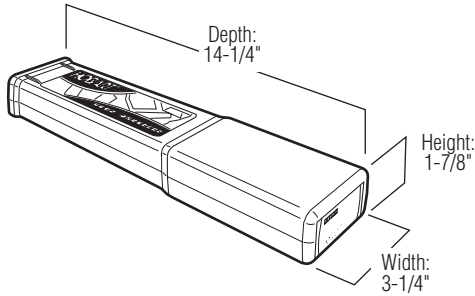
Product	AWS/ASME	ABS	Lloyd's	CWB
<b>PIPEMASTER PRO 60</b>	E6010	E6010	3m	-
<b>PIPEMASTER 60</b>	E6010	E6010	3m	-
<b>HOBART 335A</b>	E6011	E6011	2m, 2Ym	E4311
<b>HOBART 335C</b>	E6011	E6011	2m, 2Ym	-
<b>HOBART 447A</b>	E6013	E6013	-	-
<b>HOBART 447C</b>	E6013	E6013	-	E4313
<b>HOBART 1139</b>	E6022	-	-	-
<b>HOBART 14A</b>	E7014	E7014	-	E4914
<b>BOILERMAKER 18</b>	E7018 H4R/E7018-1 H4R			
<b>HOBART 418</b>	E7018 H4R/E7018-1 H4R	3 H5, 3Y	3m, 3Ym	E4918-1-H4
<b>HOBART 718MC</b>	E7018 H4R/E7018-1 H4R	3 H5, 3Y	-	-
<b>HOBART 18AC</b>	E7018 H8	-	-	-
<b>HOBART 24</b>	E7024/E7024-1	3	-	E4924-1
<b>HOBART ROCKET 7024</b>	E7024	E7024	-	-
<b>PIPEMASTER 70</b>	E7010-P1	E7010-P1	3m, 3Ym	-
<b>PIPEMASTER 80</b>	E8010-P1	E8010-P1	3m, 3Ym	-
<b>PIPEMASTER 90</b>	E9010-G	-	-	-
<b>HOBALLOY 7018A1/BOILERMAKER A1</b>	E7018-A1	E7018-A1	-	-
<b>HOBALLOY 8018B2/BOILERMAKER B2</b>	E8018-B2	E8018-B2	-	-
<b>HOBALLOY 8018B2L</b>	E8018-B2L	E8018-B2L	-	-
<b>HOBALLOY 8018B6</b>	E8018-B6	E8018-B6	-	-
<b>HOBALLOY 8018B8</b>	E8018-B8	E8018-B8	-	-
<b>HOBALLOY 8018C1</b>	E8018-C1	E8018-C1	-	-
<b>HOBALLOY 8018C2</b>	E8018-C2	E8018-C2	-	-
<b>HOBALLOY 8018C3</b>	E8018-C3	E8018-C3	-	-
<b>HOBALLOY 9015B9</b>	E9015-B9	-	-	-
<b>HOBALLOY 9018B3/BOILERMAKER B3</b>	E9018-B3	E9018-B3	-	-
<b>HOBALLOY 9018B3L</b>	E9018-B3L	E9018-B3L	-	-
<b>HOBALLOY 9018M</b>	E9018-M	E9018-M	-	-
<b>HOBALLOY 10018D2</b>	E10018-D2	E10018-D2	-	-
<b>HOBALLOY 10018M</b>	E10018-M	-	-	-
<b>HOBALLOY 11018M</b>	E11018-M	E11018-M	-	-
<b>HOBALLOY 12018M</b>	E12018-M	E12018-M	-	-

## Mild Steel/Low Alloy Electrodes

# Mild Steel/Low Alloy Electrodes

### 5-lb. Plastic-Pak

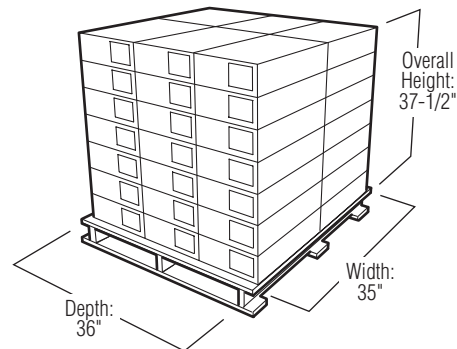
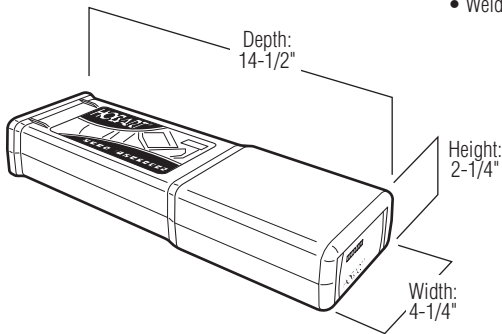
- Color-coded labels for easy product identification
- Packaging designed for display in showroom
- Resealable Plastic-Pak protects and preserves product before and after use
- Welding parameters on label



Weight: 2,000 pounds net, 2,235 gross  
Stacking sequence: 4 wide, 2 deep & 5 high  
Cartons per pallet: 40

### 10-lb. Plastic-Pak

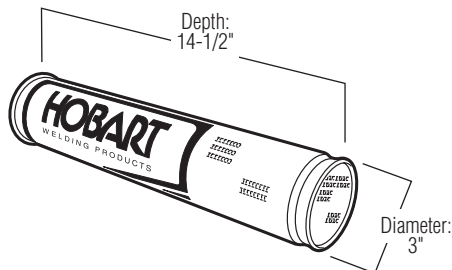
- Color-coded for easy product identification
- Packing designed for display in showroom
- Resealable Plastic-Pak protects and preserves product before and after use
- Welding parameters on label



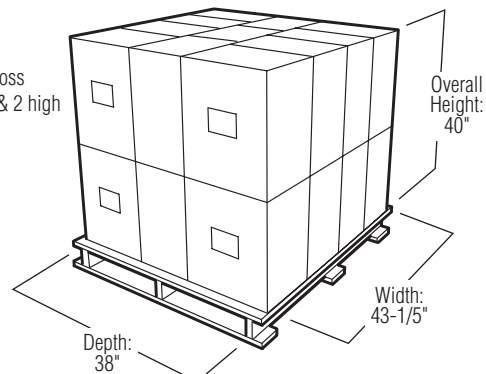
Weight: 2,100 pounds net, 2,235 gross  
Stacking sequence: 3 wide, 2 deep & 7 high  
Cartons per pallet: 42

### 10-lb. Can

- Hermetically-sealed cans keep electrodes protected and ready to use when opened.
- Easy open pull-tab with plastic lid to protect product after opening



Weight: 1,320 pounds net, 1,465 gross  
Stacking sequence: 3 wide, 4 deep & 2 high  
Cartons per pallet: 22



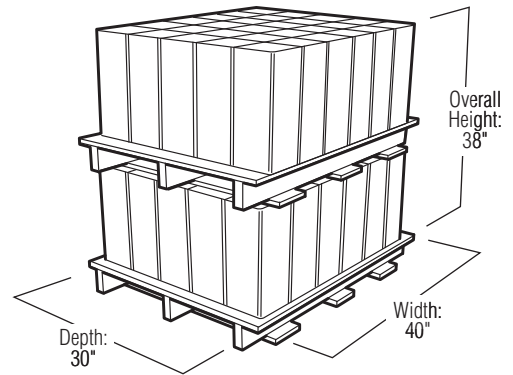
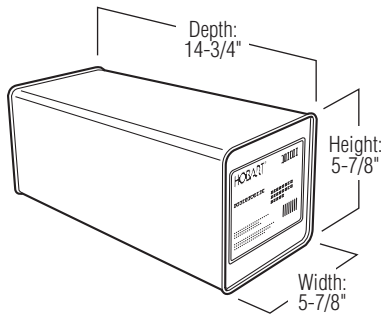
# Mild Steel/Low Alloy Electrodes

# Mild Steel/Low Alloy Electrodes

HOBART PERFORMANCE WELDING PRODUCTS

## 50-lb. Can 14" length

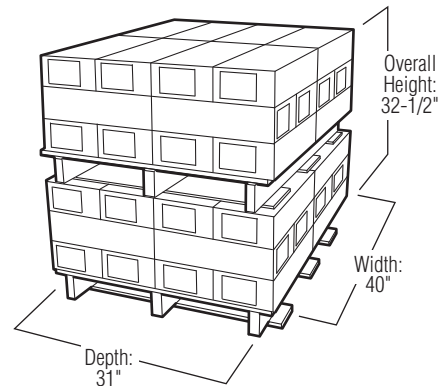
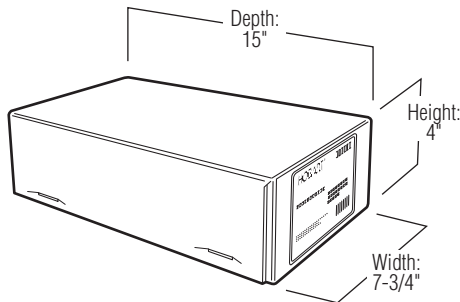
- Hermetically-sealed cans keep electrodes protected and ready for use when opened
- Pull-tab for safe, trouble-free opening
- Two separate pallets for convenient handling



Weight: 3,000 pounds net, 3,150 gross  
Stacking sequence: 5 wide, 6 deep & 2 high  
Cans per pallet: 60 cans

## 50-lb. Carton

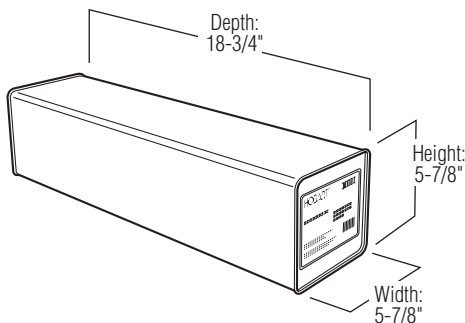
- Two separate pallets for convenient handling



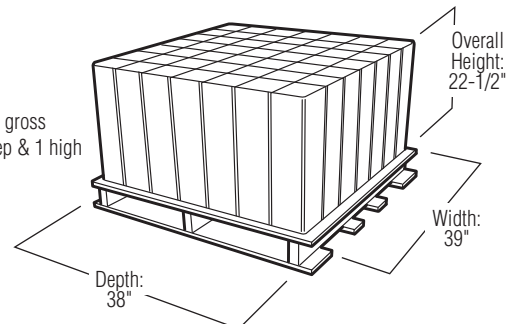
Weight: 3,000 pounds net, 3,090 gross  
Stacking sequence: 4 wide, 4 deep & 2 high  
Cartons per pallet: 48 cartons

## 50-lb. Can 18" length

- Hermetically-sealed cans keep electrodes protected and ready for use when opened
- Pull-tab for safe, trouble-free opening
- Two separate pallets for convenient handling



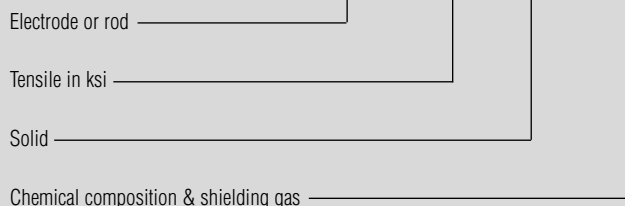
Weight: 2,450 pounds net, 2,540 gross  
Stacking sequence: 7 wide, 7 deep & 1 high  
Cans per pallet: 49 cans



# Steel Solid Wires

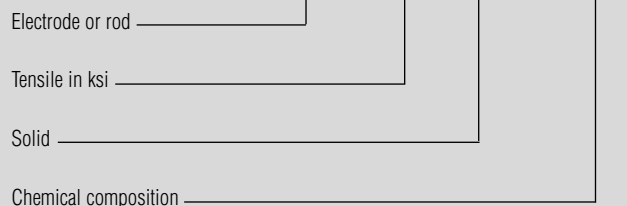
**How AWS classifies mild steel solid electrodes, GMAW, GTAW and PAW**

**ER70S-3**



**How AWS classifies low alloy solid electrodes, GMAW, GTAW and PAW**

**ER80S-D2**



HOBART PERFORMANCE WELDING PRODUCTS

### Chemical Composition of Solid Wires Using CO<sub>2</sub> Shielding Gas

AWS classification	Shielding gas	Tensile Strength ksi (MPa)	Yield Strength ksi (MPa)	% Elongation min. in 2" (50 mm)	Impact strength Min. ft-lbs at °F (J at °C)	CHEMICAL COMPOSITION									
						C	Mn	Si	P	S	Ni	Cr	Mo	Cu	Other
ER70S-2	CO <sub>2</sub>	72 (500)	60 (420)	22	20 at -20 (27 at -29)	.07	.90-1.40	.40-.70	.025	.035	—	—	—	.50	Ti, Zr, Al
ER70S-3	CO <sub>2</sub>	72 (500)	60 (420)	22	20 at 0 (27 at -18)	.06-.15	.90-1.40	.45-.70	.025	.035	—	—	—	.50	—
ER70S-4	CO <sub>2</sub>	72 (500)	60 (420)	22	—	.07-.15	1.00-1.50	.65-.85	.025	.035	—	—	—	.50	—
ER70S-5	CO <sub>2</sub>	72 (500)	60 (420)	22	—	.07-.19	.90-1.40	.30-.60	.025	.035	—	—	—	.50	Al
ER70S-6	CO <sub>2</sub>	72 (500)	60 (420)	22	20 at -20 (27 at -29)	.07-.15	1.40-1.85	.80-1.15	.025	.035	—	—	—	.50	—
ER70S-7	CO <sub>2</sub>	72 (500)	60 (420)	22	20 at -20 (27 at -29)	.07-.15	1.50-2.00	.50-.80	.025	.035	—	—	—	.50	—
ER80S-D2	CO <sub>2</sub>	80 (550)	68 (470)	17	20 at -20 (27 at -29)	.07-.12	1.60-2.10	.50-.80	.025	.025	.15	—	.40-.60	.50	—

### GMAW Shielding Gases

Type	Metal	Shielding Gas/Advantage
Spray Transfer	Carbon steel	<b>95-98% Ar/2-5% O<sub>2</sub></b> — Improves arc stability; produces a more fluid and controllable puddle; good coalescence and bead contour; minimizes undercutting; permits higher speeds than pure argon.
		<b>90-92% Ar/8-10% CO<sub>2</sub></b> — High-speed mechanized welding; low-cost manual welding; pulsed welding.
	Low alloy steel	<b>98% Ar/2% O<sub>2</sub></b> — Minimizes undercutting; provides good toughness.
Short Circuiting Transfer	Carbon steel	<b>CO<sub>2</sub></b> — Broad penetration; reduces chances of porosity.
		<b>75% Ar/25% CO<sub>2</sub></b> — High welding speeds without burn-through; minimum distortion and spatter.
		<b>Ar/5-10% CO<sub>2</sub></b> — Deeper penetration; faster welding speeds.
	Low alloy steel	<b>60-70% He/25-35% Ar/4-5% CO<sub>2</sub></b> — Minimum reactivity; excellent toughness; excellent arc stability, wetting characteristics, and bead contour; little spatter.
		<b>75% Ar/25% CO<sub>2</sub></b> — Fair toughness; excellent arc stability, wetting characteristics and bead contour; little spatter.



# Steel Solid Wires

## **QUANTUM ARC 3**

### **AWS ER70S-3**

When you need a wire versatile enough for general fabrication or a wire that can handle argon-rich mixtures like 75% Ar/25% CO<sub>2</sub> with ease, choose Hobart Quantum Arc 3. It's a precision mix of silicon and manganese in a deoxidized wire that makes short-circuiting and spray-transfer applications go smoothly.

#### **Typical applications:**

- auto frames
- general fabrication
- farm equipment
- ornamental iron fabrication
- railcars
- sheet metal
- storage bins

#### **Typical wire chemistry (as manufactured):**

Carbon	.....0.10
Manganese	.....1.10
Silicon	.....0.50
Phosphorus	.....0.008
Sulphur	.....0.012
Copper	.....0.080

#### **Typical weld metal properties**

<b>(Chem Pad):</b>	100%	75% Ar	90% Ar
	CO <sub>2</sub>	25% CO <sub>2</sub>	10% CO <sub>2</sub>
Carbon	0.09	0.09	0.09
Manganese	0.90	0.93	0.95
Silicon	0.35	0.38	0.40
Phosphorus	0.11	0.011	0.011
Sulphur	0.012	0.012	0.012

#### **Typical mechanical properties (AW):**

	CO <sub>2</sub>
Tensile Strength (psi)	77,000 (531 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation % in 2"	26%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at 0°F (-18°C), CO <sub>2</sub>	72 ft.lb. (98J)
Avg. at -20°F (-29°C), CO <sub>2</sub>	64 ft.lb. (87J)
Avg. at -40°F (-40°C), CO <sub>2</sub>	50 ft.lb. (68J)

#### **Approvals and Conformances:**

- AWS A5.18, ER70S-3
- ASME SFA 5.18, ER70S-3
- ABS ER70S-3
- CWB ER49S-3

For additional information, see Hobart data sheet 632-N.

## **QCL-3**

### **AWS ER70S-3**

A premium copperless, mild steel wire, with silicon and manganese levels suitable for light levels of rust and mill scale, QCL-3 is designed for use with CO<sub>2</sub>, argon-rich, and argon/oxygen mixtures, exhibiting a smooth, stable arc in high-speed spray, pulse and short arc applications.

#### **Typical applications:**

- general fabrication
- farm implement fabrication
- auto and truck assemblies
- storage bins
- railcar assemblies

#### **Typical wire chemistry (as manufactured):**

Carbon	.....0.089
Manganese	.....1.20
Silicon	.....0.56
Phosphorus	.....0.013
Sulphur	.....0.013

#### **Typical weld metal properties**

<b>(Chem Pad):</b>	100%	75% Ar	90% Ar
	CO <sub>2</sub>	25% CO <sub>2</sub>	10% CO <sub>2</sub>
Carbon	0.088	0.083	0.084
Manganese	0.91	0.93	0.98
Silicon	0.34	0.36	0.41
Phosphorus	0.012	0.012	0.012
Sulphur	0.011	0.011	0.011

#### **Typical mechanical properties (AW):**

	CO <sub>2</sub>
Tensile Strength (psi)	75,000 (517 MPa)
Yield Strength (psi)	62,000 (427 MPa)
Elongation % in 2"	27%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at room temp.	100 ft.lb. (136J)
Avg. at 0°F (-18°C)	74 ft.lb. (100J)
Avg. at -20°F (-29°C)	63 ft.lb. (85J)
Avg. at -40°F (-40°C)	48 ft.lb. (65J)
Avg. at -60°F (-51°C)	42 ft.lb. (57J)

#### **Approvals and Conformances:**

- AWS A5.18, ER70S-3
- ASME SFA 5.18, ER70S-3
- CWB ER49S-3

For additional information, see Hobart data sheet 632-H.

## **HB-25**

### **AWS ER70S-3**

Hobart HB-25 is specially formatted to work with CO<sub>2</sub>. It's a silicon and manganese deoxidized wire, so it's also excellent for general fabrication, for short-circuiting and for spray-transfer applications.

#### **Typical applications:**

- auto frames
- farm equipment
- general fabrication
- metal furniture
- ornamental iron fabrication
- sheet metal
- storage bins

#### **Typical wire chemistry (as manufactured):**

Carbon	.....0.09
Manganese	.....1.22
Silicon	.....0.55
Phosphorus	.....0.013
Sulphur	.....0.013

#### **Typical weld metal properties**

<b>(Chem Pad):</b>	100%	75% Ar	90% Ar
	CO <sub>2</sub>	25% CO <sub>2</sub>	10% CO <sub>2</sub>
Carbon	0.09	0.09	0.09
Manganese	0.88	0.92	0.94
Silicon	0.37	0.39	0.41
Phosphorus	0.009	0.009	0.009
Sulphur	0.011	0.011	0.010

#### **Typical mechanical properties (AW):**

	CO <sub>2</sub>
Tensile Strength (psi)	85,000 (586 MPa)
Yield Strength (psi)	70,000 (483 MPa)
Elongation % in 2"	29%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at 0°F (-18°C), CO <sub>2</sub>	68 ft.lb. (92J)
Avg. at -20°F (-29°C), CO <sub>2</sub>	52 ft.lb. (71J)
Avg. at -40°F (-40°C), CO <sub>2</sub>	47 ft.lb. (64J)

#### **Approvals and Conformances:**

- AWS A5.18, ER70S-3
- ASME SFA 5.18, ER70S-3

For additional information, see Hobart data sheet 632-B.

# Steel Solid Wires

HOBART PERFORMANCE WELDING PRODUCTS

## QUANTUM ARC 6

### AWS ER70S-6

When the task demands excellent weldability for CO<sub>2</sub> or Ar/CO<sub>2</sub> mixtures and you have rusty, scaly or oily plates, choose the mild steel electrode with deoxidizers powerful enough to handle the job. Hobart Quantum Arc 6 is formulated to ensure sound, porosity-free welds over a wide range of general shop fabrications.

#### Typical applications:

- construction work
- farm implement fabrication
- general shop work
- steel castings or forging salvage
- shaft buildup
- tanks
- auto and truck assemblies

#### Typical wire chemistry (as manufactured):

Carbon	0.10
Manganese	1.54
Silicon	0.92
Phosphorus	0.013
Sulphur	0.013

#### Typical weld metal properties

(Chem Pad):	100% CO <sub>2</sub>	75% Ar 25% CO <sub>2</sub>	90% Ar 10% CO <sub>2</sub>
	Carbon	0.09	0.09
Manganese	1.13	1.15	1.22
Silicon	0.59	0.65	0.78
Phosphorus	0.011	0.011	0.011
Sulphur	0.012	0.012	0.012

#### Typical mechanical properties (AW):

	CO <sub>2</sub>
Tensile Strength (psi)	86,000 (593 MPa)
Yield Strength (psi)	69,000 (476 MPa)
Elongation % in 2"	28%

#### Typical Charpy V-notch impact values (AW):

Avg. at 0°F (-18°C), CO <sub>2</sub>	65 ft.lb. (88J)
Avg. at -20°F (-29°C), CO <sub>2</sub>	50 ft.lb. (68J)
Avg. at -40°F (-40°C), CO <sub>2</sub>	45 ft.lb. (61J)

#### Approvals and Conformances:

- AWS A5.18, ER70S-6
- ASME SFA A5.18, ER70S-6
- ABS ER70S-6
- CWB ER49S-6

For additional information, see Hobart data sheet 632-M.

## QCL-6

### AWS ER70S-6

A premium copperless, mild steel wire with higher deoxidizer levels for use on light to moderately scaled or lightly rusted plate without pre-cleaning. QCL-6 produces a smooth, stable arc, with low spatter levels, producing a weld bead that ties evenly to the sides. QCL-6 can be used with all common gas mixtures and arc transfer applications (short arc, spray, pulse).

#### Typical applications:

- general fabrication
- pressure vessels
- pipe fabrication
- auto, truck, farm assemblies
- railcar assemblies

#### Typical wire chemistry (as manufactured):

Carbon	0.088
Manganese	1.60
Silicon	0.88
Phosphorus	0.013
Sulphur	0.011

#### Typical weld metal properties

(Chem Pad):	100% CO <sub>2</sub>	75% Ar 25% CO <sub>2</sub>	90% Ar 10% CO <sub>2</sub>
	Carbon	0.09	0.082
Manganese	1.01	1.06	1.22
Silicon	0.56	0.61	0.69
Phosphorus	0.015	0.015	0.018
Sulphur	0.014	0.012	0.013

#### Typical mechanical properties (AW):

	CO <sub>2</sub>
Tensile Strength (psi)	84,000 (579 MPa)
Yield Strength (psi)	67,000 (462 MPa)
Elongation % in 2"	28%

#### Typical Charpy V-notch impact values (AW):

Avg. at room temp.	90 ft.lb. (122J)
Avg. at 0°F (-18°C)	57 ft.lb. (77J)
Avg. at -20°F (-29°C)	56 ft.lb. (76J)
Avg. at -40°F (-40°C)	48 ft.lb. (65J)
Avg. at -60°F (-51°C)	26 ft.lb. (35J)

#### Approvals and Conformances:

- AWS A5.18, ER70S-6
- ASME SFA 5.18, ER70S-6
- CWB ER49S-6

For additional information, see Hobart data sheet 632-G.

## HB-28

### AWS ER70S-6

When your CO<sub>2</sub> welding task won't allow for strict cleaning practices, choose HB-28. It's a mild steel electrode that provides sound, porosity-free welds. You'll get excellent weldability with powerful deoxidizers for your work with CO<sub>2</sub> and other commercially available shielding gas mixtures.

#### Typical applications:

- construction work
- farm implement fabrication
- general shop applications with poor fit-up or rusty, oily plates
- steel castings or forging salvage
- tanks
- home projects
- sheet metal

#### Typical wire chemistry (as manufactured):

Carbon	0.09
Manganese	1.61
Silicon	0.90
Phosphorus	0.010
Sulphur	0.010

#### Typical weld metal properties

(Chem Pad):	100% CO <sub>2</sub>	75% Ar 25% CO <sub>2</sub>
	Carbon	0.09
Manganese	1.18	1.21
Silicon	0.62	0.67
Phosphorus	0.009	0.009
Sulphur	0.010	0.010

#### Typical mechanical properties (AW):

	CO <sub>2</sub>
Tensile Strength (psi)	85,000 (586 MPa)
Yield Strength (psi)	70,000 (483 MPa)
Elongation % in 2"	29%

#### Typical Charpy V-notch impact values (AW):

Avg. at 0°F (-18°C), CO <sub>2</sub>	68 ft.lb. (92J)
Avg. at -20°F (-29°C), CO <sub>2</sub>	52 ft.lb. (71J)
Avg. at -40°F (-40°C), CO <sub>2</sub>	47 ft.lb. (63J)

#### Approvals and Conformances:

- AWS A5.18, ER70S-6
- ASME SFA 5.18, ER70S-6

For additional information, see Hobart data sheet 632-E.

# Steel Solid Wires

## QUANTUM ARC D2

### AWS ER80S-D2, ER90S-G

This exceptional quality, high-strength welding wire gives you an X-ray quality weld deposit. You can use it with CO<sub>2</sub>, Ar/CO<sub>2</sub> and Ar/O<sub>2</sub> mixtures in situations where porosity is a problem or when you must counter high-sulfur or carbon content in your base metal.

#### Typical applications:

- alloy applications
- construction equipment
- high-strength welds
- X-ray quality applications

#### Typical wire chemistry (as manufactured):

Carbon.....	0.09
Manganese.....	1.90
Silicon.....	0.60
Phosphorus.....	0.015
Molybdenum.....	0.51

#### Typical weld metal properties (Chem Pad):

Carbon.....	CO <sub>2</sub>
Carbon.....	0.09
Manganese.....	1.37
Silicon.....	0.22
Phosphorus.....	0.015
Sulphur.....	0.015
Molybdenum.....	0.42

#### Typical mechanical properties (AW):

	CO <sub>2</sub>
Tensile Strength (psi)	93,300 (643 MPa)
Yield Strength (psi)	81,900 (565 MPa)
Elongation % in 2"	19.8%

#### Typical Charpy V-notch impact values (AW):

Avg. at 0°F (-18°C), CO <sub>2</sub>	33 ft.lb. (45J)
Avg. at -20°F (-29°C), CO <sub>2</sub>	27 ft.lb. (37J)

#### Approvals and Conformances:

- AWS A5.28, ER80S-D2, ER90S-G
- ASME SFA 5.28, ER80S-D2, ER90S-G
- CWB

For additional information, see Hobart data sheet 632-A.

## QCL-D2

### AWS ER80S-D2, ER90S-G

QCL-D2 is a premium copperless solid wire with a chemistry that includes the addition of 1/2% molybdenum to provide increased strength in those applications requiring tensile strengths of 80,000 - 90,000. QCL-D2 provides x-ray quality welds, and can be used with CO<sub>2</sub>, 75/25, and 90/10 shielding gases.

#### Typical applications:

- high temperature service piping
- construction equipment
- trailers
- Cranes high tensile applications

#### Typical wire chemistry (as manufactured):

Carbon.....	0.095
Manganese.....	1.95
Silicon.....	0.65
Phosphorus.....	0.012
Sulphur.....	0.010
Molybdenum.....	0.5

#### Typical weld metal properties (Chem Pad):

	100% CO <sub>2</sub>	75% Ar 25% CO <sub>2</sub>	90% Ar 10% CO <sub>2</sub>
Carbon.....	0.095	0.095	0.095
Manganese.....	1.42	1.58	1.63
Silicon.....	0.27	0.51	0.54
Phosphorus.....	0.012	0.012	0.012
Sulphur.....	0.010	0.010	0.010
Molybdenum.....	0.47	0.53	0.54

#### Typical mechanical properties (AW):

	100% CO <sub>2</sub>	75% Ar 25% CO <sub>2</sub>	90% Ar 10% CO <sub>2</sub>
Tensile Strength(psi)	93,500 (645 MPa)	103,500 (714 MPa)	106,500 (734 MPa)
Yield Strength (psi)	82,000 (565 MPa)	89,000 (614 MPa)	90,000 (621 MPa)
Elongation % in 2"	20.0%	22.0%	22.0%

#### Typical Charpy V-notch impact values (AW):

Avg. at -20°F (-29°C), CO <sub>2</sub>	30 ft.lb. (41J)
Avg. at -20°F (-29°C), 75/25	35 ft.lb. (47J)
Avg. at -20°F (-29°C), 90/10	40 ft.lb. (54J)

#### Approvals and Conformances:

- AWS A5.28, ER80S-D2, ER90S-G
- ASME SFA 5.28, ER80S-D2, ER90S-G
- CWB

For additional information, see Hobart data sheet 632-K.

## COMPARATIVE INDEX OF SOLID WIRES

AWS CLASS	HOBART	LINCOLN	ESAB	NATIONAL STANDARD
ER70S-3	HB-25; QCL-3; QUANTUM ARC 3	SuperArc L-50; SuperGlide S3	Spoolarc 29S; Spoolarc 82; ESAB MIG-3	NS-101
ER70S-6	HB-28; QCL-6; QUANTUM ARC 6	SuperArc L-56; SuperGlide S6	Spoolarc 86; ESAB MIG-6	NS-115
ER80S-D2	QCL-D2; QUANTUM ARC D2	SuperArc LA-90	Spoolarc 83	NS-102

## Packaging of Hobart Solid Welding Wires

Package	Pallet Net Weight lbs. (kg)	Flange diameter inches	Hub diameter inches	Width inches	Arbor hole inches	Engaging hole inches	Eng. hole off center inches	Available in the following Brands:
2 lb. spool	20* (18.2)	4"	1-1/2"	1-3/4"	5/8"	n/a	n/a	HB
10 lb. plastic spool	1,920 (871.7)	8"	3-7/8"	2-1/8"	2-1/16"	7/16"	1-3/4"	HB
33 lb. Steel Reel	2,376 (1,078.7)	11-3/4"	6-7/8"	4"	2-1/16"	n/a	n/a	QA
45 lb. Steel Reel	3,240 (1,471)	11-3/4"	6-7/8"	4"	2-1/16"	n/a	n/a	QA
33 lb. plastic spool	2,376 (1078.7)	11-3/4"	8"	4"	2-1/16"	7/16"	1-3/4"	HB
45 lb. plastic spool	3,240 (1471)	11-3/4"	6-1/2"	4"	2-1/16"	7/16"	1-3/4"	HB
30 lb. fiber spool	2,160 (980.6)	11-3/4"	8-1/4"	4"	2-1/16"	7/16"	1-3/4"	QCL
45 lb. fiber spool	3,240 (1471)	11-3/4"	6-1/2"	4"	2-1/16"	7/16"	1-3/4"	QCL
60 lb. fiber spool	1,920 (871.7)	14"	8-1/4"	4"	2-1/16"	7/16"	1-3/4"	QA, QCL
600 lb. ROBOPAK	2,400 (1,089.6)	Height - 32-1/4", Diameter - 20-3/8", Core diameter - 11-1/2"						QA, QCL
300 lb. Recyclable ROBOPAK	2,400 (1,089.6)	Height - 21", Diameter - 23"						QA, QCL
600 lb. Recyclable ROBOPAK	2,400 (1089.6)	Height - 35-1/2", Diameter - 23"						QA, QCL
950 lb. Recyclable ROBOPAK	1,900 (862.6)	Height - 35-1/2", Diameter - 23"						QA, QCL

\*Carton weight.

## Short Circuit Transfer Welding Parameters

size	Material thickness <sup>1</sup>		Electrode diameter		Welding current amps-DC	Arc voltage (electrode positive)	Wire feed speed ipm	Travel speed ipm	Shielding gas flow CFH <sup>2</sup>
	in. (decimal)	mm	in.	mm					
24 ga.	0.025	0.6	0.024	0.6	30-50	13-15	130-160	10-20	15-20
24 ga.	0.025	0.6	0.030	0.8	30-50	15-17	85-100	12-20	15-20
22 ga.	0.031	0.8	0.030	0.8	40-60	15-17	90-130	18-22	15-20
20 ga.	0.037	0.9	0.035	0.9	55-85	15-17	70-120	35-40	15-20
18 ga.	0.050	1.3	0.035	0.9	70-100	16-19	100-160	35-40	15-20
1/16"	0.063	1.6	0.035	0.9	80-110	17-20	120-180	30-35	20-25
5/64"	0.078	2.0	0.035	0.9	100-130	18-20	160-220	25-30	20-25
1/8"	0.125	3.2	0.035	0.9	120-160	19-22	210-290	20-25	20-25
1/8"	0.125	3.2	0.045	1.1	180-200	20-24	210-240	27-32	20-25
3/16"	0.187	4.7	0.035	0.9	140-160	19-22	210-290	14-19	20-25
3/16"	0.187	4.7	0.045	1.1	180-205	20-24	210-245	18-22	20-25
1/4"	0.250	6.4	0.035	0.9	140-160	19-22	240-290	11-15	20-25
1/4"	0.250	6.4	0.045	1.1	180-225	20-24	210-290	12-18	20-25

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 CO<sub>2</sub>, or 75% Ar/25% CO<sub>2</sub>.

## Spray Transfer Welding Parameters

size	Material thickness		Type of weld <sup>1</sup>	Electrode diameter		Welding current amps-DC	Arc voltage (electrode positive)	Wire feed speed ipm	Travel speed ipm	92% Ar/8% CO <sub>2</sub> gas flow CFH
	in. (decimal)	mm		in.	mm					
18 ga.	0.050	1.3	fillet	0.045	1.1	280	26	350	190	25
				0.045	1.1	270	25	340	180	25
16 ga.	0.063	1.6	fillet	0.045	1.1	325	26	360	150	35
				0.045	1.1	300	28	350	140	35
14 ga.	0.078	2.0	fillet	0.045	1.1	325	27	360	130	35
				0.045	1.1	325	29	360	110	35
				0.045	1.1	330	29	350	105	35
11 ga.	0.125	3.2	fillet	1/16	1.6	380	28	210	85	35
				0.045	1.1	350	29	380	100	35
3/16"	0.188	4.8	fillet	1/16	1.6	425	31	260	75	35
				1/16	1.6	425	30	320	76	35
				1/16	1.6	375	31	260	70	35
1/4"	0.250	6.4	square groove	1/16	1.6	475	32	340	55	35

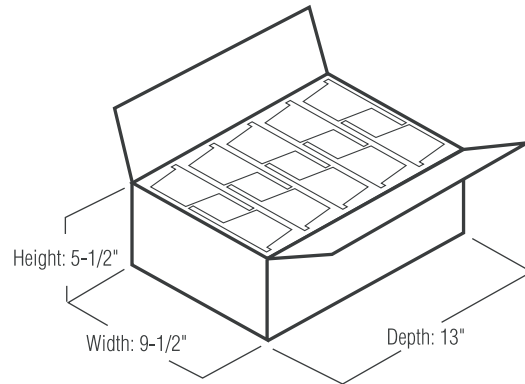
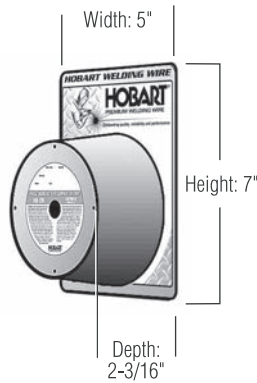
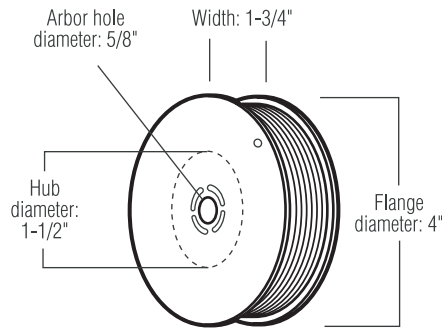
1 For mild carbon and low alloy steels – on square groove welds, backing is required.



# Steel Solid Wires

## 2-lb. Plastic Spool

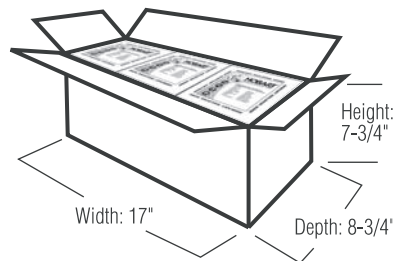
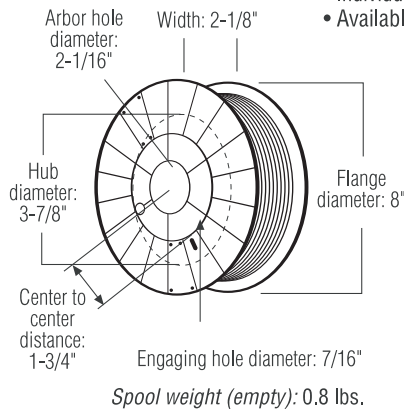
- Color-coded labels for easy wire identification
- Clear, plastic clamshell allows easy viewing of wire product
- Packaging designed for hanging on displays and in showrooms
- Handy application and wire size reference chart on back
- Available in:  HB



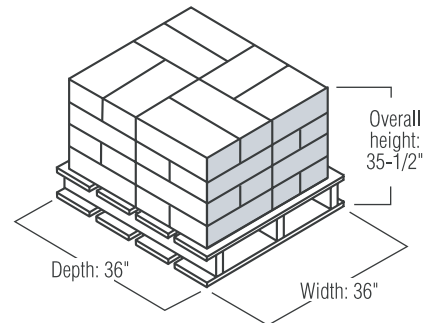
Weight: 20 pounds  
Spoils per carton: 10

## 10-lb. Plastic Spool

- Color-coded labels for easy wire identification
- Colorful packaging—great for P.O.P. displays
- Handy application and wire size reference chart on back
- Individually packed for increased portability and protection
- Available in:  HB



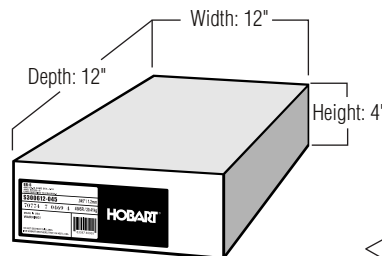
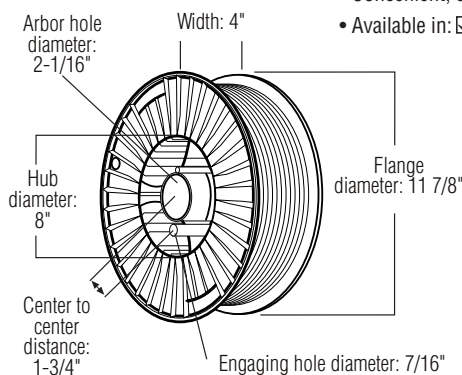
Weight: 60 lbs.  
Spoils per master carton: 6



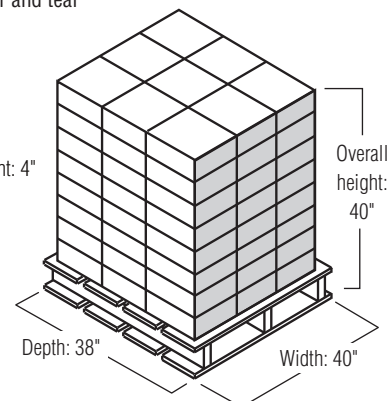
Weight: 1,920 lbs.  
Stacking sequence: 4 wide, 4 deep, 4 high  
Master cartons per pallet: 32  
Spoils per pallet: 192

## 33-lb. Plastic Spool

- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Convenient, easy to change over
- Available in:  HB



Weight: 33-lb. Plastic Spool – 2,376 lbs.  
Stacking sequence: 3 wide, 3 deep, 8 high  
Spoils per pallet: 72

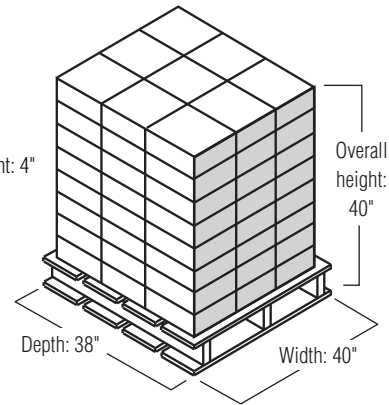
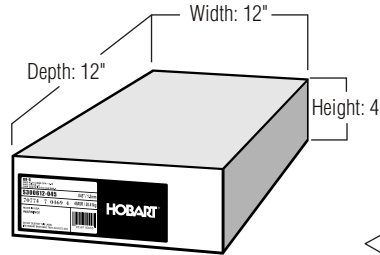
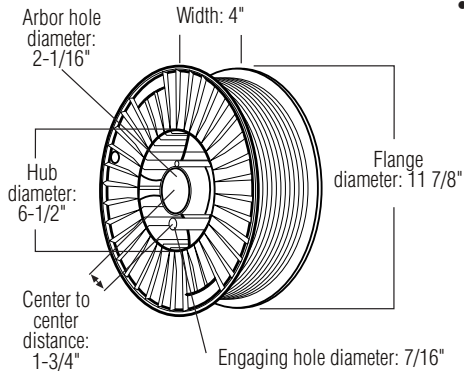


# Steel Solid Wires Packaging Information

# Steel Solid Wires

## 45-lb. Plastic Spool

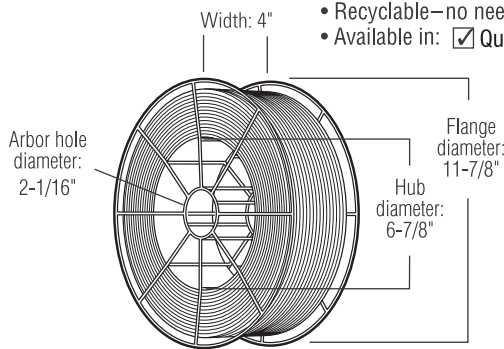
- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Convenient, easy to change over
- Available in:  HB



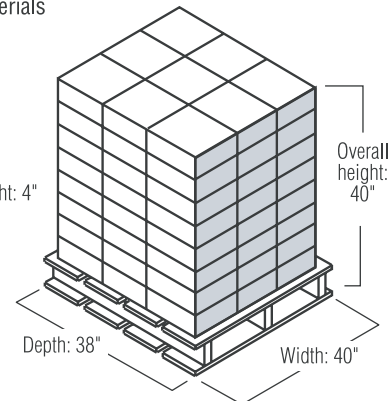
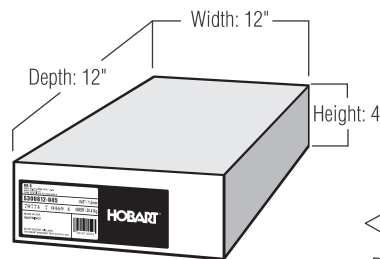
Weight: 45-lb. Plastic Spool – 3,240 lbs.  
Stacking sequence: 3 wide, 3 deep, 8 high  
Spools per pallet: 72

## 33-lb. & 45-lb. Steel Reels™

- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Recyclable – no need to separate from other steel scrap materials
- Available in:  Quantum Arc



Steel Reel weight (empty): 1.1 lbs.



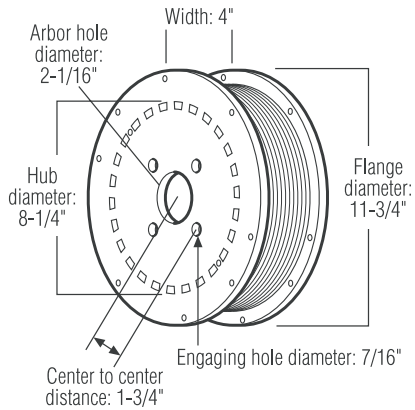
Weight: 33-lb. Steel Reel – 2,376 lbs.  
45-lb. Steel Reel – 3,240 lbs.  
Stacking sequence: 3 wide, 3 deep, 8 high  
Spools per pallet: 72

# Steel Solid Wires Packaging Information

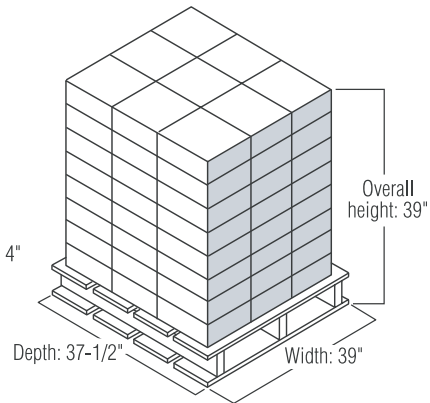
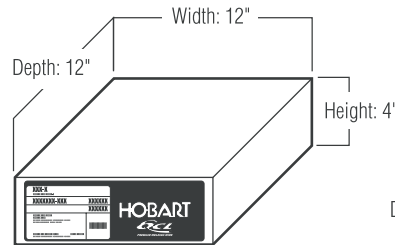
# Steel Solid Wires

## 30-lb. Fiber Spool

- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Convenient, easy to change over
- Available in:  QCL



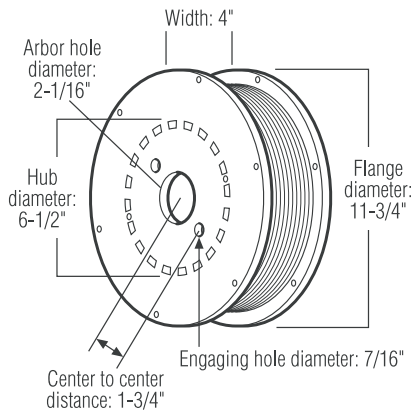
Spool weight (empty): 2.4 lbs.



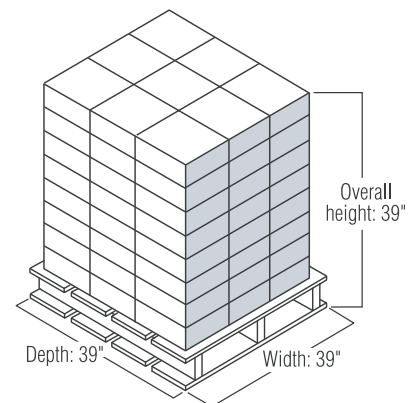
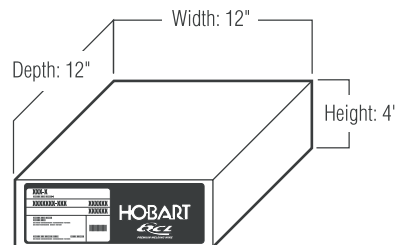
Weight: 2,160 lbs. net; 2,390 lbs., gross (est.)  
Stacking sequence: 3 wide, 3 deep, 8 high  
Spools per pallet: 72

## 45-lb. Fiber Spool

- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Convenient, easy to change over
- Available in:  QCL



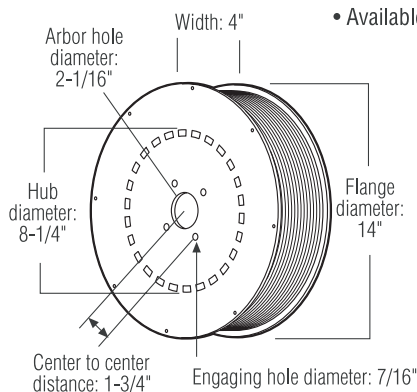
Spool weight (empty): 2.6 lbs.



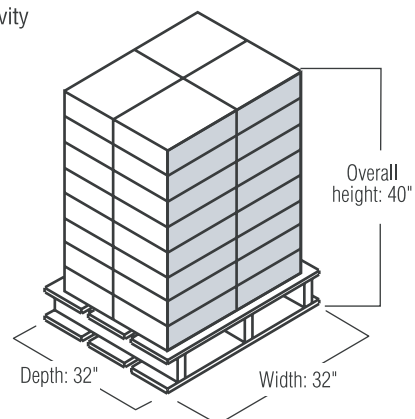
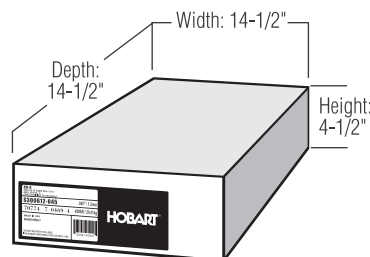
Weight: 45-lb. Fiber Spool – 3,240 lbs. net; 3,470 lbs. gross (est.)  
Stacking sequence: 3 wide, 3 deep, 8 high  
Spools per pallet: 72

## 60-lb. Fiber Spool

- Convenient, easy to changeover
- Simplicity reduces changeover time, increases productivity
- More wire on spool means fewer changeovers
- Available in:  Quantum Arc  QCL



Spool weight (empty): 3 lbs.

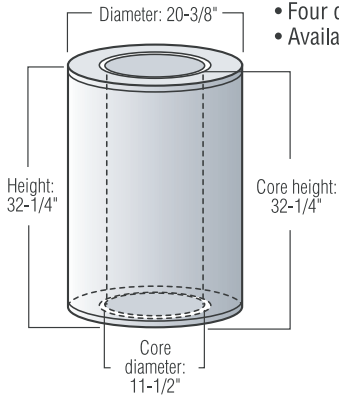


Weight: 1,920 lbs. net; 2,115 lbs., gross (est.)  
Stacking sequence: 2 wide, 2 deep, 8 high  
Spools per pallet: 32

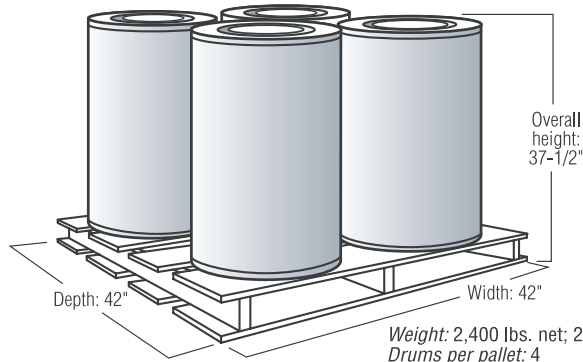
# Steel Solid Wires

## 600-lb. ROBOPAK®

- Tangle-free feeding, no wire flip
- Compact drum to reduce floor-space requirements
- ROBOPAK protects wire from manufacturing environment (dust, spatter, oil, etc.)
- Can be located away from the weld station for convenient change over
- Four drums per pallet reduces excess handling
- Available in:  Quantum Arc  QCL



Drum weight (empty): 19 lbs.





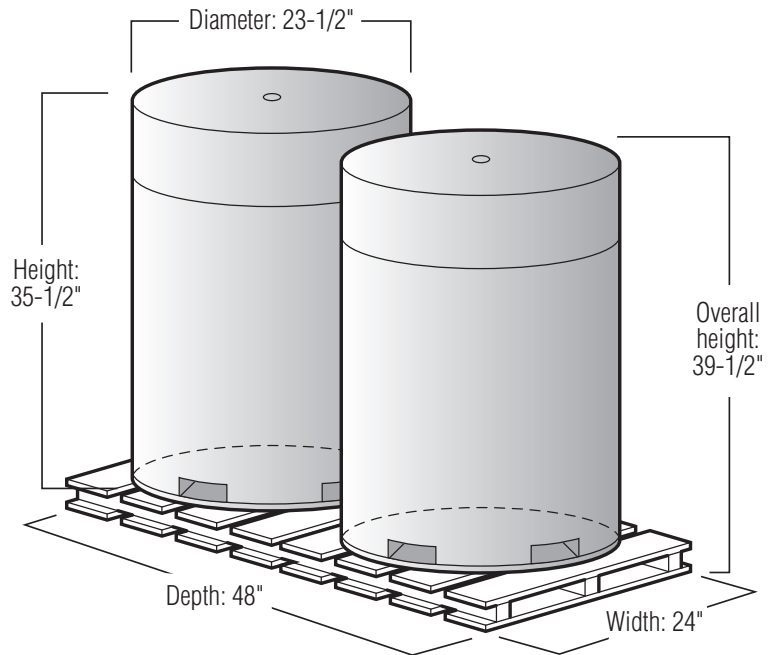
Weight: 2,400 lbs. net; 2,519 lbs., gross (est.)  
Drums per pallet: 4

# Steel Solid Wires Packaging Information

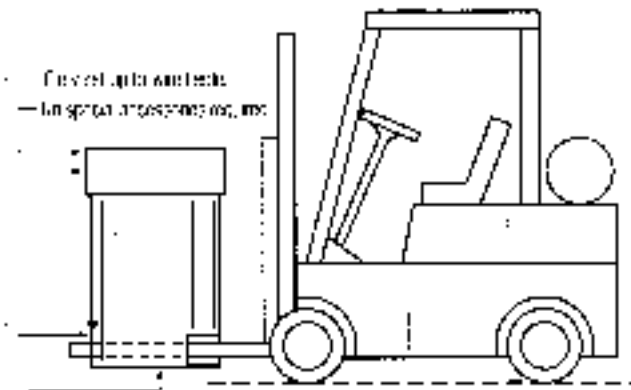
# Steel Solid Wires

## Recyclable Robopak 300/600/950

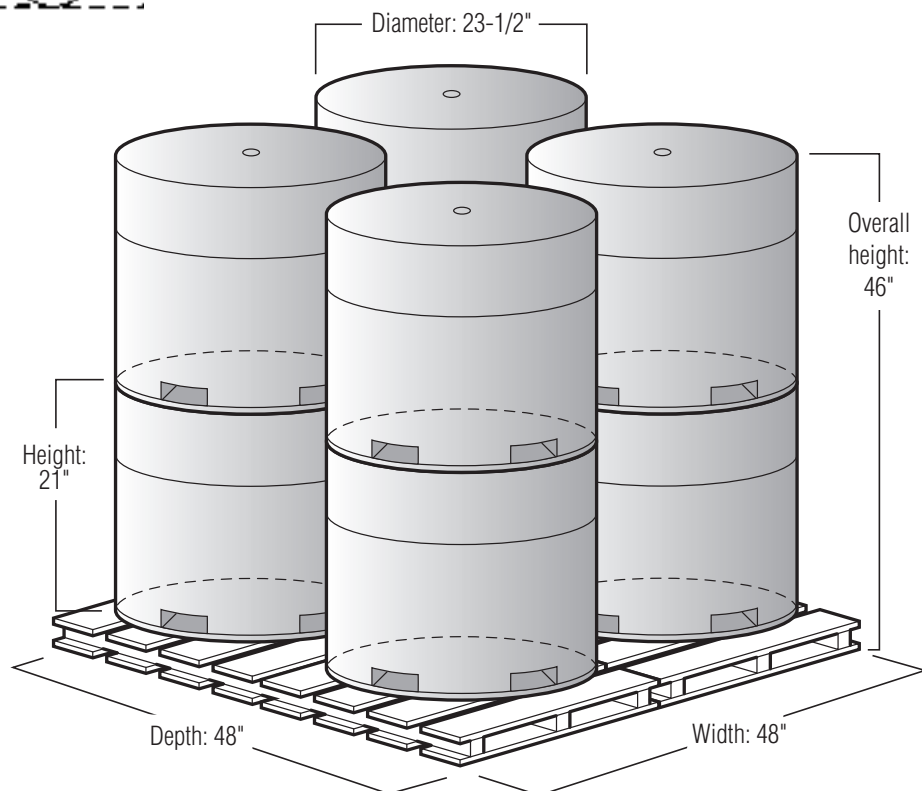
- Tangle-free feeding, no flip wire
- Compact drum to reduce floor-space requirements
- ROBOPAK protects wire from manufacturing environment (dust, spatter, oil, etc.)
- Can be located away from the weld station for convenient change over
- No payoff cone required, connectors and conduit attach directly to lid
- Available in:  Quantum Arc  QCL



950 Weight: 1900 lbs.  
600 Weight: 2400 lbs.



- Convenient self-contained lid & skirt
- 100% wire shielded container
- Straight lip & tangle-free wire feeding

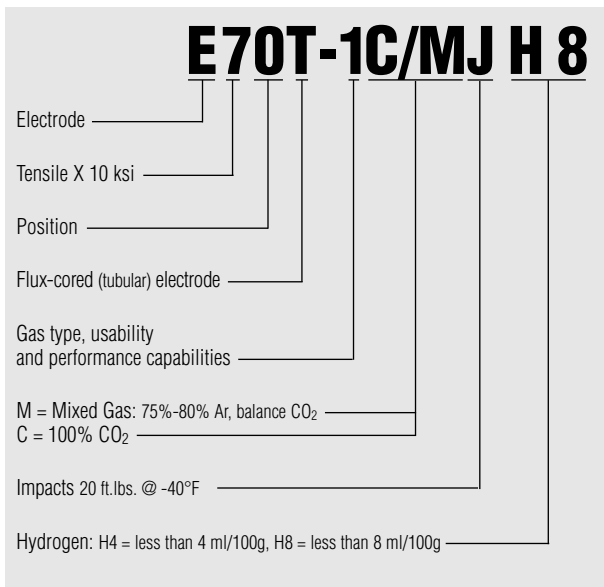


300 Weight: 2400

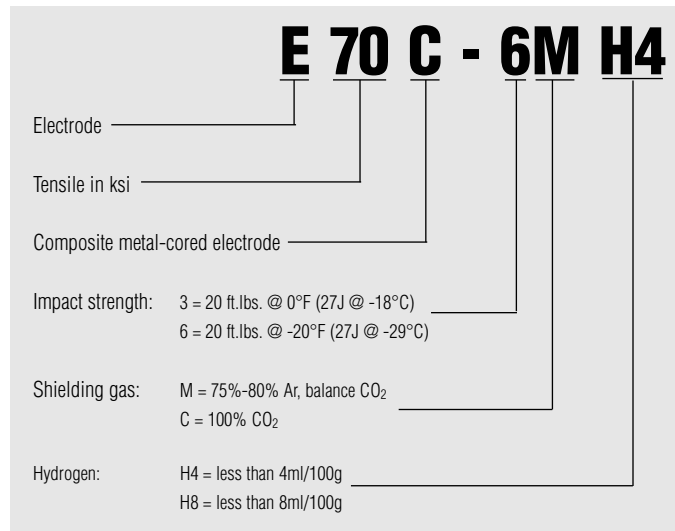


# Tubular Wires

## How AWS classifies mild steel flux-cored (tubular) wires, FCAW process (AWS A5.20)



## How AWS classifies metal-cored wires, GMAW process (AWS A5.18)



c. The term "DCEP" refers to direct current electrode positive (dc, reverse polarity).  
The term "DCEN" refers to direct current electrode negative (dc, straight polarity).

HOBART PERFORMANCE WELDING PRODUCTS

### Position of Welding, Shielding, Polarity, and Application Requirements

AWS Classification	Welding Position <sup>a</sup>	Shielding <sup>b</sup>	Current <sup>c</sup>	Application <sup>d</sup>	AWS Classification	Welding Position <sup>a</sup>	Shielding <sup>b</sup>	Current <sup>c</sup>	Application <sup>d</sup>
E70T-1C	H and F	CO <sub>2</sub>	DCEP	M	E70T-9C	H and F	CO <sub>2</sub>	DCEP	M
E70T-1M	H and F	75-80% Ar/bal CO <sub>2</sub>	DCEP	M	E70T-9M	H and F	75-80% Ar/bal CO <sub>2</sub>	DCEP	M
E71T-1C	H, F, VU, OH	CO <sub>2</sub>	DCEP	M	E71T-9C	H, F, VU, OH	CO <sub>2</sub>	DCEP	M
E71T-1M	H, F, VU, OH	75-80% Ar/bal CO <sub>2</sub>	DCEP	M	E71T-9M	H, F, VU, OH	75-80% Ar/bal CO <sub>2</sub>	DCEP	M
E70T-2C	H and F	CO <sub>2</sub>	DCEP	S	E70T-10	H and F	None	DCEN	S
E70T-2M	H and F	75-80% Ar/bal CO <sub>2</sub>	DCEP	S	E70T-11	H and F	None	DCEN	M
E71T-2C	H, F, VU, OH	CO <sub>2</sub>	DCEP	S	E71T-11	H, F, VD, OH	None	DCEN	M
E71T-2M	H, F, VU, OH	75-80% Ar/bal CO <sub>2</sub>	DCEP	S	E70T-12C	H and F	CO <sub>2</sub>	DCEP	M
E70T-3	H and F	None	DCEP	S	E70T-12M	H and F	75-80% Ar/bal CO <sub>2</sub>	DCEP	M
E70T-4	H and F	None	DCEP	M	E71T-12C	H, F, VU, OH	CO <sub>2</sub>	DCEP	M
E70T-5C	H and F	CO <sub>2</sub>	DCEP	M	E71T-12M	H, F, VU, OH	75-80% Ar/bal CO <sub>2</sub>	DCEP	M
E70T-5M	H and F	75-80% Ar/bal CO <sub>2</sub>	DCEP	M	E61T-13	H, F, VD, OH	None	DCEN	S
E71T-5C	H, F, VU, OH	CO <sub>2</sub>	DCEP or DCEN <sup>e</sup>	M	E71T-13	H, F, VD, OH	None	DCEN	S
E71T-5M	H, F, VU, OH	75-80% Ar/bal CO <sub>2</sub>	DCEP or DCEN <sup>e</sup>	M	E71T-14	H, F, VD, OH	None	DCEN	S
E70T-6	H and F	None	DCEP	M	EX0T-G	H and F	Not Specified	Not Specified	M
E70T-7	H and F	None	DCEN	M	EX1T-G	H, F, VD or VU, OH	Not Specified	Not Specified	M
E71T-7	H, F, VU, OH	None	DCEN	M	EX0T-GS	H and F	Not Specified	Not Specified	S
E70T-8	H and F	None	DCEN	M	EX1T-GS	H, F, VD or VU, OH	Not Specified	Not Specified	S
E71T-8	H, F, VU, OH	None	DCEN	M					

a. H = horizontal position; F = flat position; OH = overhead position; VD = vertical position with downward progression; VU = vertical position with upward progression  
b. Properties of weld metal from electrodes that are used with external gas shielding (EXXT-1C, EXXT-1M, EXXT-2C, EXXT-2M, EXXT-5C, EXXT-5M, EXXT-9C, EXXT-9M, EXXT-12C, and EXXT-12M) vary according to the shielding gas employed. Electrodes classified with the specified shielding gas should not be used with other shielding gases without first consulting the manufacturer of the electrode.

c. The term "DCEP" refers to direct current electrode positive (dc, reverse polarity).  
The term "DCEN" refers to direct current electrode negative (dc, straight polarity).  
d. M = single- or multiple-pass; S = single-pass only  
e. Some E71T-5C and E71T-5M electrodes may be recommended for use on DCEN for improved out-of-position welding.

# Tubular Wires

## **FabCOR® 86R**

### **AWS E70C-6M H4**

Smooth and consistent, this metal-cored gas-shielded wire gives you the high deposition rates of a flux-cored wire along with the high efficiency of a solid wire. With its metal powdered core and spray transfer, deposition rates in excess of 20 pounds per hour and deposition efficiencies of 95 percent and greater can be obtained. And you get the minimized spatter, fume and slag that high production environments demand.

#### **Typical applications:**

- automated or robotic welding
- earthmoving equipment
- railcars
- steel structures
- storage vessels

#### **Typical diffusible hydrogen (gas chromatography):**

Less than 4.0ml/100g

#### **Typical weld metal properties (Chem Pad):**

	75% Ar 25% CO <sub>2</sub>	90% Ar 10% CO <sub>2</sub>
Carbon	0.057	0.042
Manganese	1.58	1.64
Silicon	0.75	0.79
Phosphorus	0.010	0.012
Sulphur	0.018	0.019

#### **Typical mechanical properties (AW):**

Tensile Strength(ksi)	87,500 (603 MPa)	90,600 (625 MPa)
Yield Strength(ksi)	75,300 (519 MPa)	77,100 (532 MPa)
Elongation % in 2"	29%	28%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -20°F (-29°C) 72 ft.lb.(98J) 62 ft.lb.(84J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	75-325	15-35	1/2"-3/4"
.052" (1.4 mm)	100-380	16-35	1/2"-1"
1/16" (1.6 mm)	150-450	17-35	1/2"-1"
3/32" (2.4 mm)	350-550	26-37	3/4"-1-1/4"

#### **Shielding gas:**

75% Ar/25% CO<sub>2</sub> or higher argon gas mixtures

#### **Type of current:** DCEP

#### **Approvals and conformance:**

- AWS A5.18, E70C-6M H4
- ASME SFA 5.18, E70C-6M H4
- ABS 80% Ar/20% CO<sub>2</sub> 3SA, 3YSA
- Bureau Veritas 80% Ar/20% CO<sub>2</sub> SA3YM
- CWB E491C-6M H4
- DNV I1Y40 MS
- Lloyd's Register 3S, 3Y40S H15

For additional information, see Hobart data sheet 637-A.

## **FabCO® RXR**

### **AWS E70T-1C, E70T-9C**

When you're faced with welding through rust, mill scale or light oil, choose the wire specifically designed for the task: FabCO RXR. It's an E70T-1 gas-shielded flux-cored wire that performs beautifully when more deoxidizers are required. It can handle both mild and low alloy steels requiring single- or multi-pass welds. FabCO RXR has a spray-type transfer, low spatter and an easily removed moderate volume slag, which completely covers the weld bead. You'll get a weld with deep penetration, a low hydrogen deposit and excellent operator appeal! RXR is designed for use with CO<sub>2</sub> shielding gas only.

#### **Typical applications:**

- mild and low alloy steels
- single- and multi-pass applications
- steel structures
- storage vessels
- earthmoving equipment
- heavy fabrications
- railroad cars including center sills, strikers, bolsters, side sheets, and more

#### **Typical weld metal properties (Chem Pad):**

Carbon	0.06
Manganese	1.58
Silicon	0.69
Phosphorus	0.015
Sulphur	0.02

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	92,000 (634 MPa)
Yield Strength (psi)	77,700 (536 MPa)
Elongation % in 2"	26.5%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at 0°F (-18°C) 35 ft.lb.(47J)  
Avg. at -20°F (-29°C) 22 ft.lb.(30J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	150-250	21-27	1/2"-1"
1/16" (1.6 mm)	200-375	25-29	5/8"-1"
5/64" (2.0 mm)	250-400	26-33	3/4"-1-1/4"
3/32" (2.4 mm)	350-550	26-36	3/4"-1-1/4"
7/64" (2.8 mm)	500-700	30-36	3/4"-1-1/4"
1/8" (3.2 mm)	600-800	32-38	3/4"-1-1/4"

#### **Shielding gas:** 100% CO<sub>2</sub>

#### **Type of current:** DCEP

#### **Approvals and conformance:**

- AWS A5.20, E70T-1C
- ASME SFA 5.20, E701T-1C, E70T-9C
- ABS 100% CO<sub>2</sub> 2SA, 2YSA H10
- CWB E492T-9 H8
- MIL-E-24403/1

For additional information, see Hobart data sheet 636-C.

## **FabCO® TR-70**

### **AWS E70T-1C H8, E70T-9C H8**

For a gas-shielded tubular wire with low smoke, low spatter and extremely smooth operator appeal, choose FabCO TR-70. Its deep-penetration, low hydrogen weld deposit is tolerant to rust, mill scale and light oil. Its low-smoke properties make it ideal for light to heavy gauge mild steel and low alloy steels.

#### **Typical applications:**

- earthmoving equipment
- heavy fabrications
- railroad cars
- steel structures
- storage vessels

#### **Typical diffusible hydrogen (gas chromatography):**

6.1ml/100g

#### **Typical weld metal properties (Chem Pad):**

Carbon	0.024
Manganese	1.34
Silicon	0.49
Phosphorus	0.013
Sulphur	0.010

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	85,800 (592 MPa)
Yield Strength (psi)	74,700 (515 MPa)
Elongation % in 2"	27%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at 0°F (-18°C) 36 ft.lb.(49J)  
Avg. at -20°F (-29°C) 26 ft.lb.(35J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	150-250	23-29	1/4"-3/4"
.052" (1.4 mm)	150-350	24-32	1/2"-1"
1/16" (1.6 mm)	170-350	25-34	3/4"-1-1/4"
5/64" (2.0 mm)	250-550	26-34	3/4"-1-1/4"
3/32" (2.4 mm)	300-650	26-40	3/4"-1-1/4"

#### **Shielding gas:** 100% CO<sub>2</sub>

#### **Type of current:** DCEP

#### **Approvals and conformance:**

- AWS A5.20, E70T-1C H8, E70T-9C H8
- ASME SFA 5.20 E70T-1C H8, E70T-9C H8
- ABS 100% CO<sub>2</sub> E70T-1
- CWB 100% CO<sub>2</sub> E492T-9 H8

For additional information, see Hobart data sheet 636-X.

# Tubular Wires

HOBART PERFORMANCE WELDING PRODUCTS

## FabCO® 85

### AWS E70T-5CJ H4, E70T-5MJ H4

You're outside on a construction site. Your arc is exposed to low temperatures and drafts. You need FabCO 85. It's a flux-cored wire with basic type slag and globular type metal transfer.

#### Typical applications:

- outdoor construction welding
- welding medium carbon steel
- welding low alloy high-strength steel
- welding matching steels
- heavy equipment

#### Typical diffusible hydrogen (gas chromatography):

100% CO <sub>2</sub>	80% Ar/20% CO <sub>2</sub>
1.10ml/100g	1.61ml/100g

#### Typical weld metal properties (Chem Pad):

	100% CO <sub>2</sub>	80% Ar/20% CO <sub>2</sub>
Carbon	0.06	0.07
Manganese	1.18	1.47
Silicon	0.60	0.75
Phosphorus	0.009	0.010
Sulphur	0.013	0.014

#### Typical mechanical properties (AW):

Tensile Strength(ksi)	79,000	90,000
	(545 MPa)	(621 MPa)
Yield Strength (ksi)	63,000	76,000
	(434 MPa)	(524 MPa)
Elongation % in 2"	29%	24%

#### Typical Charpy V-notch impact values (AW):

Avg. at -40°F (-40°C) 45 ft.lb.(61J) 41 ft.lb.(56J)

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	240-400	26-30	5/8"-1-1/4"
3/32" (2.4 mm)	300-500	26-32	3/4"-1-1/2"

**Shielding gas:** 100% CO<sub>2</sub>, 80%Ar/20%CO<sub>2</sub>

**Type of current:** DCEP

#### Approvals and conformances:

- AWS A5.20, E70T-5CJ H4, E70T-5MJ H4,
- ASME SFA 5.20, E70T-5CJ H4, E70T-5MJ H4
- ABS 100% CO<sub>2</sub> E70T-5, 80% Ar/20% CO<sub>2</sub> E70T-5
- CWB 100% CO<sub>2</sub> E492T-5J H4, 80%Ar/20% CO<sub>2</sub> E492T-5MJ H4

## Excel-Arc 71

### AWS E71T-1C, E71T-1M, E71T-9C, E71T-9M H8

A versatile, high-penetrating tubular wire, Excel-Arc 71 is designed to be used with a 100% CO<sub>2</sub> or a 75% Ar/25% CO<sub>2</sub> gas mixture to make fabrication easier in any position. You'll see a low-hydrogen weld deposit in a spray-type transfer of weld metal, with less smoke, deep penetration and a high-deposition rate. With low spatter, clean-up is a snap and it's great for single- or multi-pass jobs. This wire exceeds the AWS impact strength requirement of 20 ft. lb. at both 0°F and -20°F.

#### Typical applications:

- low-alloy steels
- mild steels
- multi-pass applications
- single-pass applications

#### Typical diffusible hydrogen (gas chromatography):

Less than 7.0ml/100g

#### Typical weld metal properties (Chem Pad):

	100% CO <sub>2</sub>	80% Ar/20% CO <sub>2</sub>
Carbon	0.021	0.022
Manganese	1.30	1.60
Silicon	0.69	0.82
Phosphorus	0.015	0.015
Sulphur	0.011	0.010

#### Typical mechanical properties (AW):

Tensile Strength (ksi)	87,400	96,000
	(603 MPa)	(662 MPa)
Yield Strength (ksi)	79,100	85,800
	(545 MPa)	(592 MPa)
Elongation % in 2"	27.6%	25.8%

#### Typical Charpy V-notch impact values (AW):

Avg. at 0°F (-18°C) 70 ft.lb.(95J) 59 ft.lb.(80J)  
Avg. at -20°F (-29°C) 51 ft.lb.(69J) 50 ft.lb.(68J)

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
.035" (0.9 mm)	140-250	20-25	3/8"-5/8"
.045" (1.2 mm)	180-280	22-28	1/2"-3/4"
.052" (1.4 mm)	190-310	22-29	5/8"-3/4"
1/16" (1.6 mm)	180-360	22-30	5/8"-1"

**Shielding gas:** 100% CO<sub>2</sub>, 75%Ar/25%CO<sub>2</sub>

**Type of current:** DCEP

#### Approvals and conformances:

- AWS A5.20, E71T-1C, E71T-1M, E71T-9C, E71T-9M H8
- ASME SFA 5.20, E71T-1C, E71T-1M, E71T-9C, E71T-9M H8
- ABS 75% Ar/25% CO<sub>2</sub>-3SA, 3YSA H10, 100% CO<sub>2</sub> 3SA, 3YSA H10
- Bureau Veritas SA3YM HH
- CWB 100% CO<sub>2</sub> E491T-9 H8, 80%Ar/20% CO<sub>2</sub> E491T-9M H8
- DNV III Y40M H10
- Lloyd's Register 100%CO<sub>2</sub> 3S, 3YS H10

## Formula XL®-525

### AWS E71T-1M, E71T-12MJ H8

Formula XL-525 is a tubular, all-position wire that is designed for the welding of mild and carbon steels, especially when good impact toughness at subzero temperatures is required. Ideal for single- and multi-pass applications, it delivers outstanding welding performance and produces a high quality, X-ray clear weld deposit. Formula XL-525 has outstanding mechanical properties that resemble those of E7018 SMAW electrodes, plus high-operator appeal with low fume levels, low spatter and easy slag removal.

#### Typical applications:

- shipbuilding
- storage vessels
- offshore structures
- earthmoving equipment
- piping

#### Typical diffusible hydrogen (gas chromatography):

3.38ml/100g

#### Typical weld metal properties (Chem Pad):

	80% Ar/20% CO <sub>2</sub>
Carbon	0.04
Manganese	1.24
Silicon	0.29
Nickel	0.37
Phosphorus	0.010
Sulphur	0.015

#### Typical mechanical properties (AW):

Tensile Strength (ksi)	82,000	(565 MPa)
Yield Strength (ksi)	73,000	(503 MPa)
Elongation % in 2"	29%	

#### Typical Charpy V-notch impact values (AW):

Avg. at 0°F (-18°C) 100 ft.lb.(136J)  
Avg. at -40°F (-40°C) 66 ft.lb.(90J)

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	150-300	24-31	1/2"-1"
1/16" (1.6 mm)	225-450	24-34	1/2"-1"

**Shielding gas:** 75-80% Ar/20-25% CO<sub>2</sub>

**Type of current:** DCEP

#### Approvals and conformances:

- AWS A5.20 E71T-1M, E71T-12MJ H8,
- ASME SFA 5.20, Class E71T-1M, E71T-12MJ H8
- ABS 80% Ar/20% CO<sub>2</sub> 3SA, 3YSA 75% Ar/25% CO<sub>2</sub> 3SA, 3YSA
- Bureau Veritas 80% Ar/20% CO<sub>2</sub> SA3YM
- CWB 80%Ar/20% CO<sub>2</sub> E491T-12M H8
- DNV Grade III Y40 MS
- Lloyd's Register 80%Ar/20%CO<sub>2</sub> 3S 3YS H15

For additional information, see Hobart data sheet 636-F.

For additional information, see Hobart data sheet 636-Y.

For additional information, see Hobart data sheet 636-R.

# Tubular Wires

## Formula XL®-550

**AWS E71T-1, E71T-12J H4 .045", .052": AWS E71T-1C, E71T-12CJ H4 1/16": AWS E71T-1C, E71T-12CJ H8**  
 Formula XL-550 is formulated with added deoxidizers to allow you to weld through rust, mill scale and some primers with little or no pre-cleaning. Outstanding, all-position Formula XL-550 is designed to weld mild steels, producing a high-quality, X-ray clear weld deposit that delivers high impact values at low temperatures. Good wet-in action produces a bead contour that's flat to slightly convex with light slag that keeps clean-up time to a minimum.

**Typical applications:**

- ships
- storage vessels
- structures
- earthmoving equipment
- piping

**Typical diffusible hydrogen (gas chromatography):**

Less than 4ml/100g

**Typical weld metal properties (Chem Pad):** 100% CO<sub>2</sub>

Carbon .....	0.04
Manganese.....	0.67
Silicon.....	0.16
Phosphorus.....	0.008
Sulphur .....	0.013
Nickel .....	0.44

**Typical mechanical properties (AW):**

	100% CO <sub>2</sub>
Tensile Strength (psi)	74,000 (510 MPa)
Yield Strength (psi)	66,000 (455 MPa)
Elongation % in 2"	28%

**Typical Charpy V-notch impact values (AW):**

Avg. at -0°F (-18°C)	83 ft.lb. (113J)
Avg. at -40°F (-40°C)	30 ft.lb. (41J)

**Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	195-230	23-26	1/2"-1"
.052" (1.4 mm)	210-260	23-28	1/2"-1"

**Shielding gas:** 100% CO<sub>2</sub>

**Type of current:** DCEP

**Approvals and conformance:**

- AWS A5.20, E71T-1C, E71T-12CJ H4
- ASME SFA 5.20, E71T-1
- .045"-.052" AWS E71T-1C, E71T-12CJ H4
- 1/16" AWS E71T-1C H8, AWS E71T-12CJ H8
- ABS 3SA, 3YSA
- MIL-E-24403/1

## Formula XL®-8Ni1

**AWS E81T1-Ni1 MJ H8**  
 Formula XL-8Ni1 is an all-position tubular wire that's designed for welding medium carbon and low alloy steels. Specifically formulated to produce a high quality, X-ray clear weld deposit that's flat to slightly convex in contour. Formula XL-8Ni1 provides you with good wet-in capabilities along with high impact values at low temperatures, and it allows you to weld over rust, mill scale and some primers without the need for pre-cleaning. Plus, with low spatter levels and easy slag removal, clean-up is kept to a minimum.

**Typical applications:**

- ships
- storage vessels
- structures
- earthmoving equipment
- piping

**Typical diffusible hydrogen (gas chromatography):**

5.9ml/100g

**Typical weld metal properties (Chem Pad):** 75% Ar/25% CO<sub>2</sub>

Carbon .....	0.068
Manganese.....	1.35
Silicon.....	0.40
Phosphorus.....	0.014
Sulphur .....	0.011
Nickel .....	1.06

**Typical mechanical properties (AW):**

	75% Ar/25% CO <sub>2</sub>
Tensile Strength (psi)	96,300 (664 MPa)
Yield Strength (psi)	86,500 (596 MPa)
Elongation % in 2"	24.5%

**Typical Charpy V-notch impact values (AW):**

Avg. at -20°F (-29°C)	93 ft.lb. (126J)
Avg. at -40°F (-40°C)	85 ft.lb. (115J)
Avg. at -60°F (-51°C)	63 ft.lb. (85J)

**Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	175-340	21-32	1/2"-1"
1/16" (1.6 mm)	220-320	24-29	1/2"-1"

**Shielding gas:** 75% Ar/25% CO<sub>2</sub>

**Type of current:** DCEP

**Approvals and conformance:**

- AWS A5.29, E81T1-Ni1MJ H8
- ASME SFA 5.29, E81T1-Ni1 MJ H8
- ABS 75% Ar/25% CO<sub>2</sub> 3SA, 3YSA H10

## FabCO® 81K2-C

**AWS 81T1-K2CJ H8**  
 FabCO 81K2-C is an all-position low alloy flux-cored wire. This high performance 100% CO<sub>2</sub> electrode is characterized by a flat bead profile, smooth stable arc and low spatter even when welded out of position. The exceptional mechanical properties and low diffusible hydrogen makes this product well suited for the shipbuilding and offshore oil construction market.

**Typical applications:**

- offshore
- shipyard

**Typical diffusible hydrogen:**

3.9ml/100g

**Typical weld metal properties (Chem Pad):** 100% CO<sub>2</sub>

Carbon .....	0.07
Manganese.....	1.13
Silicon.....	0.27
Phosphorus.....	0.015
Sulphur .....	0.014
Nickel .....	1.67

**Typical mechanical properties (AW):**

	100% CO <sub>2</sub>
Tensile Strength (psi)	82,900 (572 MPa)
Yield Strength (psi)	74,800 (516 MPa)
Elongation % in 2"	26.5%

**Typical Charpy V-notch impact values (AW):**

Avg. at -40°F (-40°C) 91 ft.lb. (123J)

**Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.045" (1.2 mm)	150-300	23-30	1/2"-3/4"
1/16" (1.6 mm)	175-400	23-31	1/2"-3/4"

**Shielding gas:** 100% CO<sub>2</sub>

**Type of current:** DCEP

**Approvals and conformance:**

- AWS A5.29, E81T1-K2CJ H8
- ASME SFA 5.29, E81T1-K2CJ
- ABS 100%CO<sub>2</sub> 3SA, 3YSA

# Tubular Wires

HOBART PERFORMANCE WELDING PRODUCTS

## **FabCO® 91K2-C**

### **AWS 91T1-K2CJ**

FabCO 91K2-C offers an exceptional combination of properties for an all-position wire, with good low temperature toughness combined with tensile strength in the 90,000-110,000 psi range. FabCO 91K2-C is characterized by a smooth stable arc, low smoke and low spatter levels. The quick-freezing slag is easily removed and bead geometry in all positions is excellent. It is recommended for single- and multiple-pass welding in all positions with 100% CO<sub>2</sub>.

#### **Typical applications:**

- offshore
- shipyard
- railcar

#### **Typical diffusible hydrogen:**

3.8ml/100g

#### **Typical weld metal properties**

##### **(Chem Pad): 100% CO<sub>2</sub>**

Carbon .....	0.05
Manganese .....	1.04
Silicon .....	0.19
Phosphorus .....	0.009
Sulphur .....	0.014
Molybdenum .....	0.01
Nickel .....	1.92

#### **Typical mechanical properties (AW):**

100% CO<sub>2</sub>

Tensile Strength (psi)	97,000 (670 MPa)
Yield Strength (psi)	89,500 (618 MPa)
Elongation % in 2"	22%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -0°F (-18°C)	85 ft.lb. (115J)
Avg. at -76°F (-60°C)	81 ft.lb. (110J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical
			Stickout
.045" (1.2 mm)	150-300	23-30	1/2"-3/4"
.052" (1.4 mm)	175-375	23-30	1/2"-3/4"
1/16" (1.6 mm)	175-400	23-31	3/4"-1"

**Shielding gas:** 100% CO<sub>2</sub>

**Type of current:** DCEP

#### **Approvals and conformances:**

- AWS A5.29, E91T1-K2CJ
- ASME SFA 5.29, E91T1-K2CJ

## **FabCO® 110K3M**

### **AWS E111T1-K3MJ H4**

FabCO 110K3M is gas-shielded tubular wire, which is specially designed for welding of high strength low alloy steels in offshore structure fabrication. Quenched and tempered steels, such as Grade N25 or Dillimax 690, meet those requirements in all welding positions. FabCO 110K3M uses 75%Ar/25% CO<sub>2</sub> mixed gas and offers high productivity along with good welder appeal. Maintaining a proper welding process, such as preheat and interpass temperature is critical in welding these types of steels.

#### **Typical applications:**

- offshore structural fabrication
- quenched steels
- tempered steels

#### **Typical diffusible hydrogen:**

3.35ml/100g

#### **Typical weld metal properties**

##### **(Chem Pad): 75% Ar/25% CO<sub>2</sub>**

Carbon .....	0.08
Manganese .....	1.59
Silicon .....	0.17
Phosphorus .....	0.008
Sulphur .....	0.014
Chromium .....	0.11
Nickel .....	1.76
Molybdenum .....	0.014

#### **Typical mechanical properties**

##### **(Aged 48 hours @ 220°F):**

100% CO<sub>2</sub>

Tensile Strength (psi)	112,600 (776 MPa)
Yield Strength (psi)	119,300 (823 MPa)
Elongation % in 2"	17.3%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -40°F (-40°C) 47 ft.lb. (64J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical
			Stickout
.045" (1.2 mm)	170-250	23.5-28	1/2"-3/4"

**Shielding gas:** 75% Ar/25% CO<sub>2</sub>

**Type of current:** DCEP

#### **Approvals and conformances:**

- AWS A5.29, E111T1-K3JMJ H4, ASME SFA 5.29, E111T1-K3MJ H4
- ABS 75% Ar/25% CO<sub>2</sub> E111T1-K3JMJ H4

## **FabCO® 115**

### **AWS E110T5-K4C**

FabCO 115 is a high strength, flux-cored wire that's comparable to a low alloy E11018M electrode but, with higher deposition rates. It is used primarily for welding A514, A517, HY100 and similar quenched and tempered high-strength, low alloy steels, producing a low hydrogen deposit with basic slag that helps to minimize cracking. FabCO 115 has high impact values at low temperatures and provides you with a modified globular metal transfer. For use with 100% CO<sub>2</sub> shielding gas only.

#### **Typical applications:**

- mining equipment
- earthmoving equipment
- off-the-road vehicles

#### **Typical weld metal properties**

##### **(Chem Pad): 100% CO<sub>2</sub>**

Carbon .....	0.04
Manganese .....	1.50
Silicon .....	0.41
Phosphorus .....	0.012
Sulphur .....	0.014
Chromium .....	0.42
Nickel .....	2.37
Molybdenum .....	0.42

#### **Typical mechanical properties**

##### **(Aged 48 hours @ 220°F):**

100% CO<sub>2</sub>

Tensile Strength (psi)	113,700 (784 MPa)
Yield Strength (psi)	92,700 (639 MPa)
Elongation % in 2"	22%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -60°F (-51°C) 37 ft.lb. (50J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical
			Stickout
.045" (1.2 mm)	120-220	22-27	1/2"-1"
1/16" (1.6 mm)	190-350	22-30	1/2"-1"
3/32" (2.4 mm)	290-525	25-32	3/4"-1-1/4"

**Shielding gas:** 100% CO<sub>2</sub>

**Type of current:** DCEP

#### **Approvals and conformances:**

- AWS A5.29, E110T5-K4C
- ASME SFA 5.29, E110T5-K4C
- ABS 100% CO<sub>2</sub> E110T5-K4
- CWB 100% CO<sub>2</sub> E110T5-K4 H4, 80% CO<sub>2</sub> Ar/20%CO<sub>2</sub> E110T5-K4M H4

For additional information, see Hobart data sheet 636-ZZ.

For additional information, see Hobart data sheet 636-H.

For additional information, see Hobart data sheet 636-H.



# Tubular Wires

## **Hobart FabTuf® 960**

### **Overlay**

With CO<sub>2</sub> shielding, FabTuf 960 is the right filler metal when you need a high quality, uniform deposit that's porosity-free. It's ideal for CO<sub>2</sub> welding in hard surfacing applications where moderate impact strength and moderate abrasion resistance is required. It is also an excellent choice for metal-to-metal wear resistance applications. During welding, the tubular steel sheath and metal powders of the core fuse together to form alloy steel weld metal with almost no slag. You'll get a deposition efficiency equal to that of solid welding wires. FabTuf 960 can be used for out-of-position welding.

### **Typical applications:**

- coal conveyors
- conveyor bucket lips
- dredge parts
- extruder worms

### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.70
Manganese.....	2.00
Chromium .....	8.00
Silicon .....	1.00

**Machinability:** Possible by grinding

**Flame cut:** No

**Hardness:** 55-60 RC

**Wear index:** 35

**Type of current:** DCEP

### **Available diameter and recommended operating ranges:**

Dia.	Amps	Volts
.045" (1.2 mm)	120-210	20-28
1/16" (1.6 mm)	170-310	20-28

## **FabLoy® Stainless Wires 409, 439**

### **AWS A5.9, EC409, EC439**

For stainless 409 and similar alloy welds that resist corrosion, erosion and abrasion at elevated temperatures, choose FabLoy 409. For 439-type chromium alloys, the 18% chromium stainless FabLoy 439 delivers similar temperature and corrosion resistance.

### **Typical applications:**

- automotive manifolds
- exhaust tubing
- heat exchangers and recuperators
- power plant reheater tubes

### **Typical weld metal properties (Chem Pad):**

	409	439
Carbon .....	0.05	0.019
Manganese.....	0.50	0.67
Silicon.....	0.60	0.19
Phosphorus.....	0.02	0.012
Sulphur .....	0.01	0.006
Chromium.....	11.2	18.0
Titanium.....	1.30	0.80

**Type of current:** DCEP

### **Approvals and conformance:**

- AWS A5.9, EC409, EC439

## **Fabshield® 4**

### **AWS E70T-4**

Drafts or moderate wind will not affect your weld when you're using this outstanding high-deposition, self-shielded flux-cored wire. It's designed specifically to desulfurize the weld metal and to resist cracking. You'll use it in both single- and multi-pass applications on mild and medium carbon steels.

### **Typical applications:**

- heavy equipment repair
- industrial equipment repair
- machinery fabrication
- ship equipment

### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.27
Manganese.....	0.73
Silicon.....	0.30
Phosphorus.....	0.011
Sulphur .....	0.005
Aluminum.....	1.42

### **Typical mechanical properties (AW):**

Tensile Strength (psi)	94,600 (652 MPa)
Yield Strength (psi)	62,600 (432 MPa)
Elongation % in 2"	24%

### **Typical Charpy V-notch impact values:**

Not applicable

### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	290-370	29-31	1-3/4"-2-1/4"
3/32" (2.4 mm)	320-450	29-34	2-1/4"-2-3/4"
.120" (3.2 mm)	450-560	28-35	2-1/2"-3"

**Shielding gas:** None required

**Type of current:** DCEP

### **Approvals and conformance:**

- AWS A5.20, E70T-4
- ASME SFA 5.20, E70T-4

For additional information, see Hobart data sheet 657-A.

For additional information, see Hobart data sheet 641-A, 641-B

For additional information, see Hobart data sheet 640-C

# Tubular Wires

HOBART PERFORMANCE WELDING PRODUCTS

## **Fabshield® 7027**

### **AWS E70T-7**

When the properties of the physical weld deposit must match the structural weldment application, you'll like the properties of Fabshield 7027. It's designed to give you peak performance at higher amperage and voltage settings while maintaining excellent arc stability and high deposition efficiency. You'll see fast travel speeds with a barium-free slag system that's fast-freezing. It's great for single- and multi-pass welds in flat and horizontal positions for many of your general fabrication needs.

#### **Typical applications:**

- barges
- general flat weld fabrication
- structural steel fabrication

#### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.33
Manganese.....	0.28
Silicon.....	0.05
Phosphorus.....	0.014
Sulphur.....	0.005
Aluminum.....	1.3

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	92,200 (636 MPa)
Yield Strength (psi)	63,200 (436 MPa)
Elongation % in 2"	23%

#### **Typical Charpy V-notch impact values:**

Not applicable

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	240-460	23-30	1"-2"
3/32" (2.4 mm)	240-560	27-32	1"-2"
7/64" (2.8 mm)	320-600	24-32	1"-2"

**Shielding gas:** None required

**Type of current:** DCEN

#### **Approvals and conformance:**

- AWS A5.20, E70T-7
- ASME SFA 5.20, E70T-7
- ABS E70T-7

## **Fabshield® 3Ni1**

### **AWS E71T8-K6J**

You'll appreciate the smooth handling of Fabshield 3Ni1 whenever you work with high-impact values at low temperatures. An all-position, self-shielded tubular wire, it gives you a globular type of transfer with fast-freezing slag. It's designed for all-position single- and multi-pass applications such as fillets, lap joints and deep groove butt joints.

#### **Typical applications:**

- barges
- construction
- general fabrication
- offshore structures
- ships

#### **Typical diffusible hydrogen (gas chromatography)**

Less than 6.0 ml/100 g

#### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.08
Manganese.....	0.84
Silicon.....	0.06
Phosphorus.....	0.012
Sulphur.....	0.003
Nickel.....	0.67
Aluminum.....	0.62

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	79,700 (550 MPa)
Yield Strength (psi)	64,100 (442 MPa)
Elongation % in 2"	29%

#### **Typical Charpy V-notch impact values:**

Avg. at -20°F (-29°C)	110 ft.lb. (149J)
Avg. at -60°F (-51°C)	60 ft.lb. (81J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	170-350	17-22	1"
3/32" (2.4 mm)	225-500	26-32	1"

**Shielding gas:** None required

**Type of current:** DCEN

#### **Approvals and conformance:**

- AWS A5.29, E71T8-K6J
- ASME SFA 5.29, E71T8-K6J
- ABS 3SA, 3YSA

## **Fabshield® 81N1**

### **AWS E71T8-Ni1 J**

Fabshield 81N1 is great for a variety of structural and general fabrication applications. This all-position wire is designed for single- or multiple-pass applications requiring high impact toughness at low temperatures. Excellent for vertical down welding on pipe.

#### **Typical applications:**

- storage piping
- transportation
- offshore structures
- construction
- general fabrication

#### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.06
Manganese.....	0.76
Silicon.....	0.08
Phosphorus.....	0.01
Sulphur.....	0.005
Nickel.....	0.92
Aluminum.....	0.78

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	76,000 (524 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation % in 2"	29%

#### **Typical Charpy V-notch impact values (AW):**

Avg. at -40°F (-40°C) 180 ft.lb. (244J)

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	200-350	18-22	1"

**Shielding gas:** None required

**Type of current:** DCEN

#### **Approvals and conformance:**

- AWS A5.29, E71T8-Ni1 J
- ASME SFA 5.29, Class 71T8-Ni1 J
- ABS E71T 8-Ni1J
- EN758: T38 41Ni YN2 H10

For additional information, see Hobart data sheet 640-M.

For additional information, see Hobart data sheet 640-B

For additional information, see Hobart data sheet 640-N.

# Tubular Wires

## Fabshield® XLR-8

### AWS E71T-8JD H8

The Fabshield XLR-8 produces flat weld beads across a broad range of parameters and produces welds with excellent mechanical properties under a wide range of heat inputs. The Fabshield XLR-8 is capable of depositing X-Ray quality welds in all positions.

#### Typical applications:

- structural steel erection
- heavy equipment repair
- ship & barge construction

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.19
Manganese .....	0.51
Silicon .....	0.17
Phosphorus .....	0.009
Sulphur .....	0.006
Aluminum .....	0.51

#### Typical Mechanical Properties (Aged 48 hr @ 200° F)

Tensile Strength (psi)	84,100 (580 MPa)
Yield Strength (psi)	67,600 (466 MPa)
Elongation % in 2"	25%

#### Typical Charpy V-Notch Impact Value (AW):

Avg. at -20°F (-29°C)	40 ft.lb. (54J)
Avg. at -40°F (-40°C)	31 ft.lb. (42J)

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
1/16" (1.6 mm)	140-300	19-25	1"
.072" (1.8 mm)	150-350	18-25	1"
5/64" (2.0 mm)	150-350	18-25	1 1/4"

**Shielding gas:** None required

**Type of current:** DCEN

#### Approvals and conformance:

- AWS E71T-8JD H8
- ASME SFA 5.20 E71T-8JD H8
- ABS 3YSA
- CWB E491T-8J H8

## Fabshield® 81N2

### AWS E81T8-Ni2 J

Fabshield 81N2 is an all position wire designed for single- or multiple-pass applications requiring high impact toughness at low temperatures and is excellent for vertical-down welding on pipe.

#### Typical applications:

- storage piping
- transportation
- offshore structures
- construction
- general fabrication

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.04
Manganese .....	0.73
Silicon .....	0.012
Phosphorus .....	0.004
Sulphur .....	0.08
Nickel .....	2.18
Aluminum .....	0.76

#### Typical mechanical properties (AW):

Tensile Strength (psi)	84,700 (584 MPa)
Yield Strength (psi)	71,600 (494 MPa)
Elongation % in 2"	27%

#### Typical Charpy V-notch impact values:

Avg. at -40°F (-40°C)	180 ft.lbs. (244J)
-----------------------	--------------------

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	200-350	18-22	1"

**Shielding gas:** None required

**Type of current:** DCEN

#### Approvals and conformance:

- AWS A5.29, E81T8-Ni2 J
- ASME SFA 5.29
- ABS 81T8-Ni2 J

## Fabshield® X80

### AWS E81T8-Ni2

Fabshield X80 is a self-shielded flux cored wire that is great for a wide variety of applications, including X80 pipeline, structural, and general fabrication. Whether for single- or multi-pass welding, it is great for making fillet, lap or deep groove butt welds, particularly for applications requiring high tensile strength and low temperature CVN impact toughness. You will find that this all-position wire has excellent operator appeal with its fast-freezing, yet self-peeling slag. Advantageous in pipeline welding. This product performs particularly well at all positions.

#### Typical applications:

- pipeline
- storage
- piping
- transportation
- offshore drilling rig
- ships
- barges
- construction
- structural and general fabrication

#### Typical weld metal properties (Chem Pad):

Carbon .....	0.04
Manganese .....	1.37
Silicon .....	0.02
Phosphorus .....	0.011
Sulphur .....	0.001
Nickel .....	2.38
Aluminum .....	0.83

#### Typical mechanical properties (AW):

Tensile Strength (psi)	94,000 (649 MPa)
Yield Strength (psi)	84,000 (578 MPa)
Elongation % in 2"	25%

#### Typical Charpy V-notch impact values:

Avg. at -20°F (-29°C)	107 ft.lbs. (138J)
Avg. at -40°F (-40°C)	96 ft.lbs. (134J)

#### Recommended welding procedures:

Dia.	Amps	Volts	Electrical Stickout
5/64" (2.0 mm)	180-250	18-20	1"

**Shielding gas:** None required

**Type of current:** DCEN

#### Approvals and conformance:

- AWS A5.29, E81T8-Ni2 J
- ASME SFA 5.29
- E81T8-Ni2 J

# Tubular Wires

HOBART PERFORMANCE WELDING PRODUCTS

## **Fabshield® 21B**

### **AWS E71T-11**

You'll find this self-shielded flux-cored wire is easy to use for almost any general purpose application and in any position — flat, horizontal, vertical up and down, and overhead. It's great in single- or multi-pass welds up to 3/4" thick, and particularly well-suited for fillet and lap welds on thin-gauge mild or galvanized steel. Fabshield 21B meets AWS side-bend requirements.

#### **Typical applications:**

- general fabrication
- light structurals
- machinery part fabrication
- prefab construction
- railroad car repair
- short-assembly welds
- tanks

#### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.31
Manganese.....	0.36
Silicon.....	0.18
Phosphorus.....	0.014
Sulphur .....	0.001
Aluminum.....	0.96

#### **Typical mechanical properties (AW):**

Tensile Strength (psi)	91,600 (632 MPa)
Yield Strength (psi)	64,900 (448 MPa)
Elongation % in 2"	22%

#### **Typical Charpy V-notch impact values:**

Not applicable

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.035" (0.9 mm)	55-120	17-20	1/4"-5/8"
.045" (1.2 mm)	80-220	13-20	1/4"-5/8"
1/16" (1.6 mm)	110-270	14-20	1/2"-3/4"
.068" (1.8 mm)	150- 270	18-21	1/2"-3/4"
5/64" (2.0 mm)	125-300	15-22	3/4"-1"
3/32" (2.4 mm)	200-300	18-21	3/4"-1"

**Shielding gas:** None required

**Type of current:** DCEN

#### **Approvals and conformance:**

- AWS A5.20, E71T-11
- ASME SFA 5.20, E71T-11
- ABS E71T-11
- CWB E491T-11 H8

## **Fabshield® 23**

### **AWS E71T-GS**

We're talking versatile: Fabshield 23 is an E71T-GS self-shielded flux-cored wire for general-purpose use and welding in all positions. It's especially suited for single-pass fillet and lap welds on thin-gauge mild or galvanized steel.

#### **Typical applications:**

- excavation equipment
- general fabrication
- prefab building fabrications tanks
- railroad car repair

#### **Typical weld metal properties (Chem Pad):**

Carbon .....	0.18
Manganese.....	0.65
Silicon.....	0.40
Phosphorus.....	0.01
Sulphur .....	0.01
Aluminum.....	1.30

#### **Typical mechanical properties (AW):**

Tensile Strength (psi) 89,600 (618 MPa)

#### **Typical Charpy V-notch impact values:**

Not applicable

#### **Recommended welding procedures:**

Dia.	Amps	Volts	Electrical Stickout
.030" (0.8 mm)	35-140	12-18	1/4"-1/2"
.035" (0.9 mm)	50-150	13-19	1/4"-5/8"
.045" (1.2 mm)	80-220	13-20	1/4"-5/8"
1/16" (1.6 mm)	110-270	15-22	3/4"-1"
3/32" (2.4 mm)	125-300	15-22	3/4"-1"

**Shielding gas:** None required

**Type of current:** DCEN

#### **Approvals and conformance:**

- AWS A5.20, E71T-GS
- ASME SFA 5.20, E71T-GS
- ABS E71T-GS
- CWB E491T-GS

For additional information, see Hobart data sheet 640-D.

For additional information, see Hobart data sheet 640-E.

# Tubular Wires

## Approvals, Specifications, Classifications

All filler metals listed below conform to the specifications listed in each section. Because some agencies do not specifically approve particular types, please be careful to note whether or not the heading for each section indicates specific approval.

Product	AWS/ASME	ABS	CWB	Military	Lloyd's	DNV
<b>FabCOR 86R</b>	E70C-6M H4	80%Ar/20% CO <sub>2</sub> -3SA, 3YSA	E491C-6M H4	—	3S, 3Y40S H15	11Y40 MS
<b>FabCO RXR</b>	E70T-1C, E70T-9C	2SA, 2YSA H10	E492T-9 H8	MIL-E-24403/1		
<b>FabCO TR-70</b>	E70T-1C, E70T-9C H8	E70T-1	E492T-9 H8	—		
<b>FORMULA XL-550</b>	E71T-1C, E71T-12CJ H4/H8	CO <sub>2</sub> -3SA, 3YSA H5	E491T-9 H8	MIL-E-24403/1	CO <sub>2</sub> 3Y40S, H10	
<b>FORMULA XL-525</b>	E71T-1M, E71T-12MJ H8	75% Ar/25% CO <sub>2</sub> 3SA, 3YSA	E491T-12MJ H8	MIL-E-24403/1	3S, 3YS, H15	III Y40 MS
<b>EXCEL-ARC 71</b>	E71T-1C, E71T-1M, E71T-9C, E71T-9M H8	CO <sub>2</sub> ABS 3SA, 3Y SA H10 75Ar/25% CO <sub>2</sub> 3SA, 3YSA H10	E491T-9 H8 E491T-9M H8	MIL-E-24403/1 type 71T-1C	CO <sub>2</sub> 3S, 3YS, H10	III Y40M H10
<b>FabCO 85</b>	E70T-5C, E70T-5MJ H4	CO <sub>2</sub> E70T-5, 80% Ar/20% CO <sub>2</sub> E70T-5	E492T-5J H4, E492T-5MJ H4	—		
<b>FORMULA XL-8Ni1</b>	E81T1-Ni1 MJ H8	75% Ar/25% CO <sub>2</sub> 3SA, 3YSA H10		—		
<b>FabCO 81K2-C</b>	E81T1-K2CJ H8	CO <sub>2</sub> 3SA, 3YSA		—		
<b>FabCO 115</b>	E110T5-K4C	E110T5-K4	E110T5-K4 H4	—		
<b>FABSHIELD 7027</b>	E70T-7	E70T-7		—		
<b>FABSHIELD 3Ni1</b>	E71T8-K6J	3SA, 3YSA		—		
<b>FABSHIELD 21B</b>	E71T-11	E71T-11	E491T-11 H8	—		
<b>FABSHIELD 23</b>	E71T-GS	E71T-GS	E491T GS	—		
<b>FABSHIELD 81N1</b>	E71T8-Ni1 J	E71T-8 Ni1 J		—		
<b>FABSHIELD 81N2</b>	E81T8-Ni2 J	E81T8-Ni2 J		—		
<b>FABSHIELD XLR-8</b>	E71T-8JD H8	3YSA	E491T-8J H8			

## Comparative Index of Self-Shielded Tubular Wires

AWS CLASS	HOBART	COREX	ESAB	LINCOLN	SELECT ARC
E70T-4	<b>FABSHIELD 4</b>	Self-Shield 4	Coreshield 40	Innershield NS-3M	Select 74
E70T-7	<b>FABSHIELD 7027</b>	Self-Shield 7	Coreshield 7	Innershield NR-311	—
E71T-11	<b>FABSHIELD 21B</b>	Self-Shield 11	Coreshield 11	Innershield NR-211-MP	Select 701
E71T-GS	<b>FABSHIELD 23</b>	Self-Shield 11 GS	Coreshield 15	Innershield NR-151, NR-152, NR-157, NR-204-H	Select 700 GS
E71T-8	<b>FABSHIELD XLR-8</b>	—	Coreshield 8	Innershield MR-232, NR-233	—
E71T8-K6	<b>FABSHIELD 3NI</b>	—	—	Innershield NR-207, NR-400, NR-203	—
E71T8-Ni1	<b>FABSHIELD 81N1</b>	—	—	Innershield NR-207, NR-203, NR-400, NR-405	—
E81T8-Ni2	<b>FABSHIELD 81N2</b>	—	—	Innershield NR-207, NR-203NiC, NR-405	—

## Comparative Index of Gas-Shielded Tubular Wires

AWS CLASS	HOBART	COREX	ESAB	LINCOLN	TRI-MARK	SELECT ARC
E70C-6M	<b>FabCOR 86R</b>	Metal-Cor 6	Coreweld 70, Coreweld Ultra	MC-710, MC-6	Metalloy 70, 71, 76	Select 70C-3, C-6
E70T-1C E70T-9C	<b>FabCO RXR</b> <b>FabCO TR-70</b>	Flux-Cor 7 Super-Cor	Dual Shield 111 AC, R-70 Ultra	Outershield 70 Outershield HD70	TM-11, TM-RX7, TM-72	Select 79 Select 70
E70T-5C	<b>FabCO 85</b>	Tuf-Cor 5	Dual Shield T-75	Outershield 75-H	TM-55	
E71T-1C (CO <sub>2</sub> ) E71T-9C	<b>EXCEL-ARC 71</b>	Verti-Cor I Versatile	Dual Shield 7100 Ultra Dual Shield II 71 Ultra	Outershield 71, 71M, Elite	TM-711M, Triple 7, Triple 8	Select 712
E71T-1M, E71T-9M (75% Ar/25% CO <sub>2</sub> )	<b>EXCEL-ARC 71</b>	Verti-Cor I Versatile	Dual Shield 7000 Dual Shield 7100 Ultra	Outershield 71, 71M, Elite	TM-711M, Triple 7	Select 710
E71T-1C (CO <sub>2</sub> ) E71T-12CJ	<b>Formula XL-550</b>	—	Dual Shield II-71 Ultra	Outershield 71C-H, Elite	TM-771	Select 720
E71T-1M (75% Ar/25% CO <sub>2</sub> ) E71T-12MJ	<b>Formula XL-525</b>	Verti-Cor 70	Dual Shield II-70 Ultra Dual Shield II-70T12	Outershield 71M-H, Elite	TM-770	Select 720
E81T1-Ni1MJ	<b>Formula XL-8Ni1</b>	—	Dual Shield II-80-Ni1 Dual Shield 8000C3	Outershield 81Ni1-H	TM-81N1, TM-811N1	
E81T1-K2C	<b>FabCO 81K2-C</b>	—	Dual Shield II 81K2	Outershield 81K2-H	TM-881K2	Select 812-K2
E91T1-K2C	<b>FabCO 91K2-C</b>	—	Dual Shield II 9100K2	Outershield 91K2-H	TM-991K2	Select 910-K2
E110T5-K4C	<b>FabCO 115</b>	—	Dual Shield T-115	—	TM-115	



# Tubular Wires

## Packaging of Hobart Tubular Welding Wires

Package	Pallet Net Weight lbs. (kg)	Flange diameter inches (m)	Hub diameter inches (m)	Width inches (m)	Inside Diameter inches (m)	Arbor hole inches (m)	Engaging hole inches (m)	Eng. hole off center inches (m)
10 lb. Spool	1,440 (655.0)	8" (.20)	3-3/4" (.09)	2-1/8" (.05)	n/a	2-1/32"	7/16" (.01)	1-3/4" (.04)
12 lb. Spool	1,920 (871.7)	8" (.20)	3-5/16" (.09)	2-1/2" (.06)	n/a	2-1/32"	7/16" (.01)	1-3/4" (.04)
15 lb. Spool	2,400 (1091.0)	8" (.20)	3-5/16" (.09)	2-1/2" (.06)	n/a	2-1/32"	7/16" (.01)	1-3/4" (.04)
20 lb. Spool	1,440 (653.4)	10" (.30)	5-5/8" (.17)	4" (.10)	n/a	2-1/16" (.05)	7/16" (.01)	1-3/4" (.04)
33 lb. Spool	2,376 (1,080.0)	11-7/8" (.30)	6-3/8" (.16")	4" (.10)	n/a	2-1/16" (.05)	7/16" (.01)	1-3/4" (.04)
50 lb. Coil	1600 (726.4)	n/a	n/a	4" (.10)	12" (.30)	n/a	n/a	n/a
60 lb. Coil	1920 (871.7)	n/a	n/a	4" (.10)	12" (.30)	n/a	n/a	n/a
60 lb. Bulk Coil	2,100 (953.4)	n/a	n/a	4" (.10)	12" (.30)	n/a	n/a	n/a
600 lb. Reel*	1,800 (817.2)	30" (.76)	11-3/4" (.30)	11-1/2" (.29)	n/a	1-5/16" (.03)	7/8" (.02)	2-1/2" (.06)
800 lb. Reel**	1,600 (726.4)	30" (.76)	11-3/4" (.30)	11-1/2" (.29)	n/a	1-5/16" (.03)	7/8" (.02)	2-1/2" (.06)
950 lb. Reel**	1,900 (862.6)	30" (.76)	11-3/4" (.30)	11-1/2" (.29)	n/a	1-5/16" (.03)	7/8" (.02)	2-1/2" (.06)
400 lb. RoboPak Drum	1,600 (726.4)	32-1/4" (.82 m) height, 20-3/8" (.52 m) diameter, 13" (.33 m) core diameter						
600 lb. RoboPak Drum	1,200 (544.8)	35" (.89 m) height, 23-3/8" (.59 m) diameter, 16-1/8" (.41 m) core diameter						
400 lb. X-Pak Drum	1,600 (76.4)	32-1/4" (.82 m) height, 20-3/8" (.52 m) diameter, 13" (.33 m) core diameter						
600 lb. X-Pak Drum	1,200 (109.0)	35" (.89 m) height, 23-3/8" (.59 m) diameter, 16-1/8" (.41 m) core diameter						

\*Shipped in the vertical position.

\*\*Shipped in the flat position.

HOBART PERFORMANCE WELDING PRODUCTS

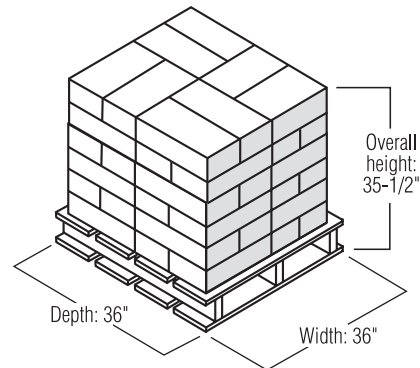
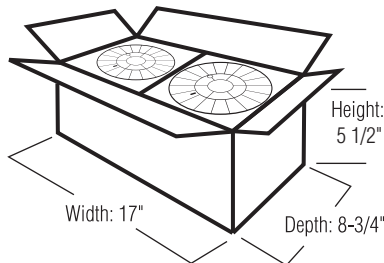
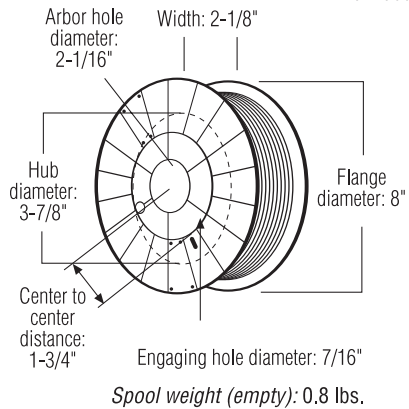


# Tubular Wires Packaging Information

## Tubular Wires

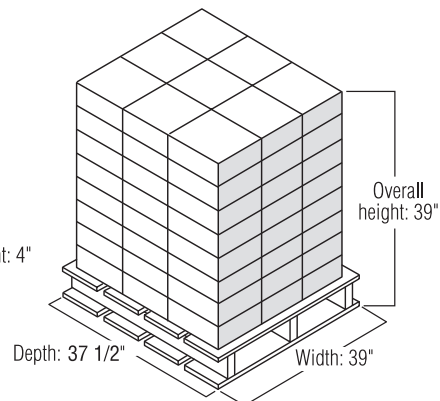
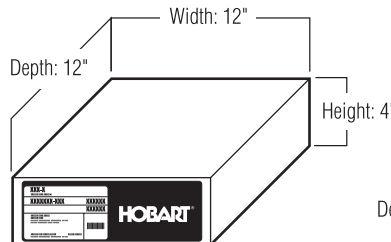
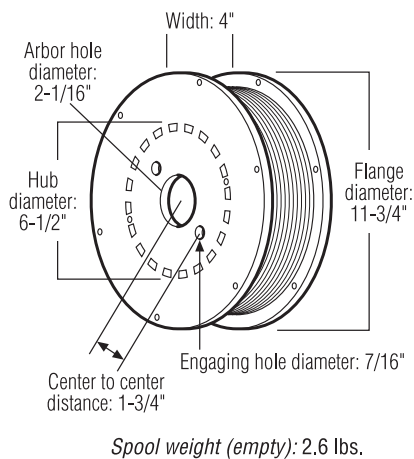
### 10-lb. Plastic Spool

- Color-coded labels for easy wire identification
- Colorful packaging—great for P.O.P. displays
- Handy application and wire size reference chart on back
- Individually packed for increased portability and protection



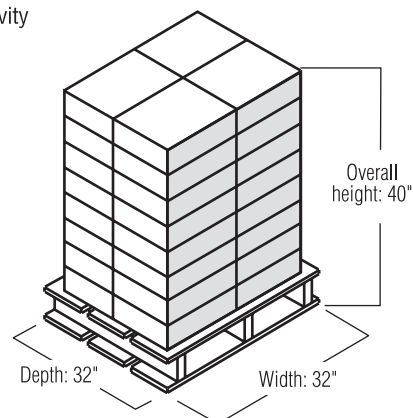
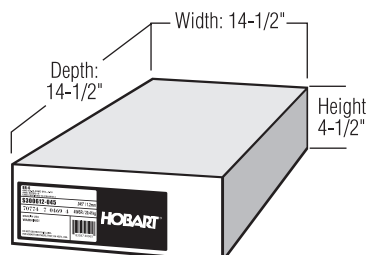
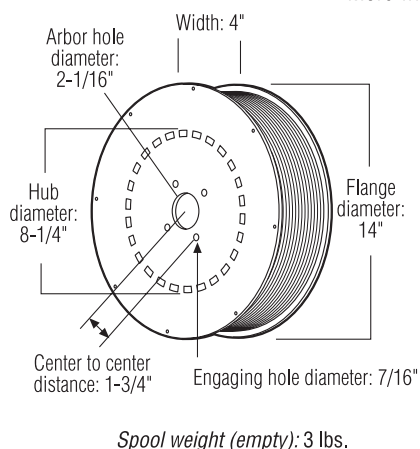
### 33-lb. Fiber Spool

- Uses standard spool hub – no special adapters required
- Durable – designed to withstand most kinds of everyday wear and tear
- Convenient, easy to change over



### 50-lb. Fiber Spool

- Convenient, easy to changeover
- Simplicity reduces changeover time, increases productivity
- More wire on spool means fewer changeovers

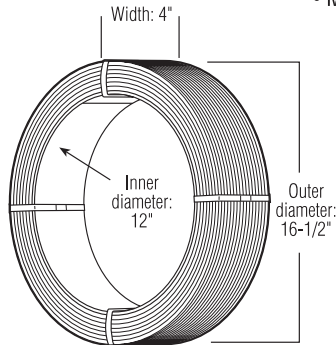


# Tubular Wires Packaging Information

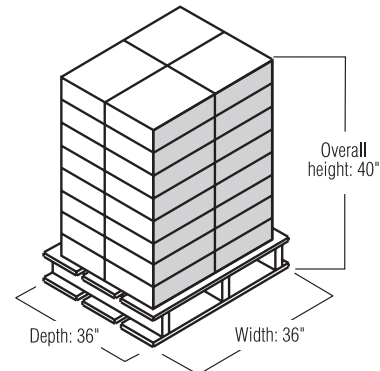
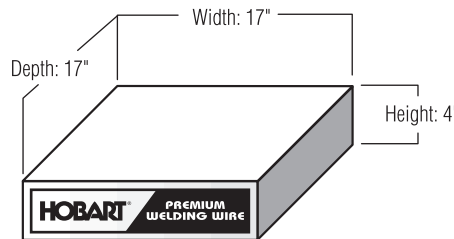
## Tubular Wires

### 60-lb. Coil

- No spool to dispose of after wire is consumed
- Uses standard coil adapters
- More wire on coil means fewer changeovers



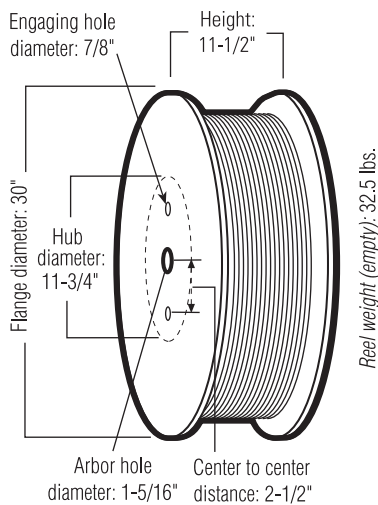
Coil weight (empty): 4 oz.



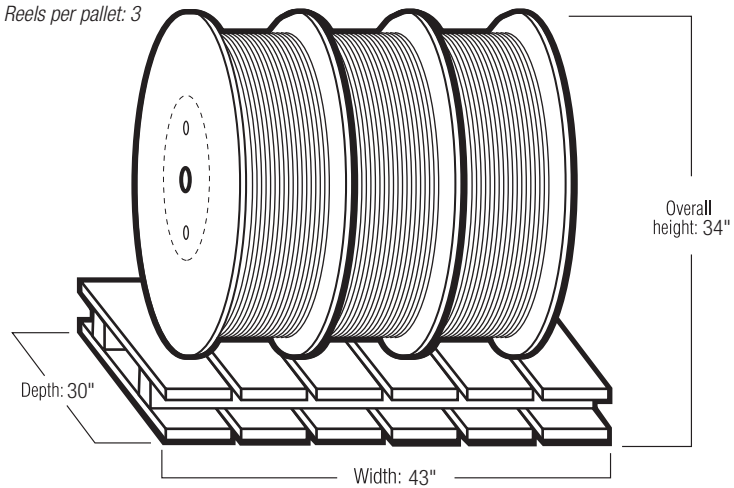
Weight: 1,920 lbs. net; 1,987 lbs., gross (est.)  
Stacking sequence: 2 wide, 2 deep, 8 high  
Coils per pallet: 32

### 600-lb. Vertical Reel

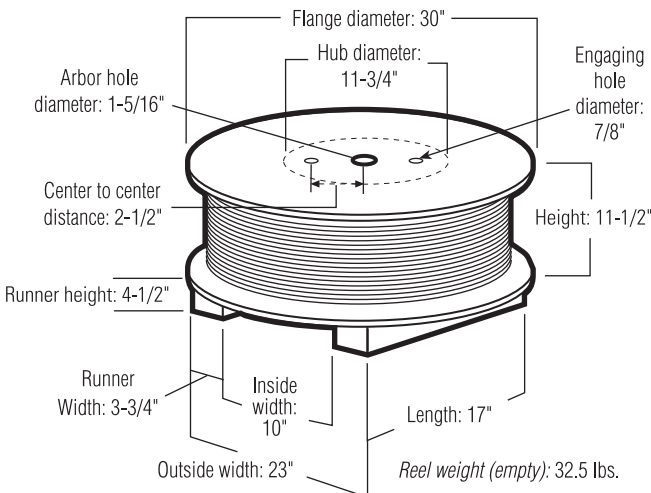
Weight: 1800 lbs. 1925 lbs. gross (est.)  
Stacking sequence: 3 across  
Reels per pallet: 3



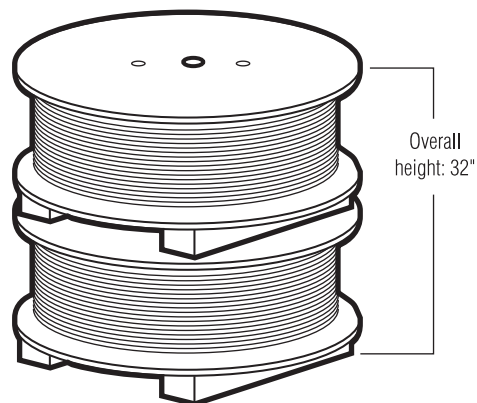
Reel weight (empty): 32.5 lbs.



### 950-lb. Flat Reel



Reel weight (empty): 32.5 lbs.

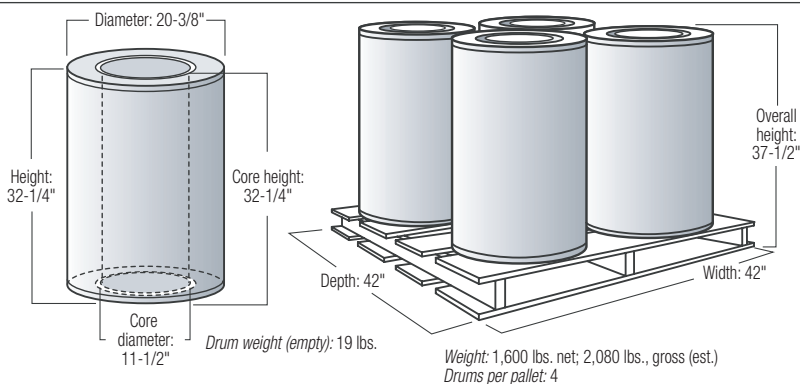


Weight: 1,900 lbs. net; 1,984 lbs. gross (est.)  
Stacking sequence: 2 high  
Reels per pallet: 2

# Tubular Wires

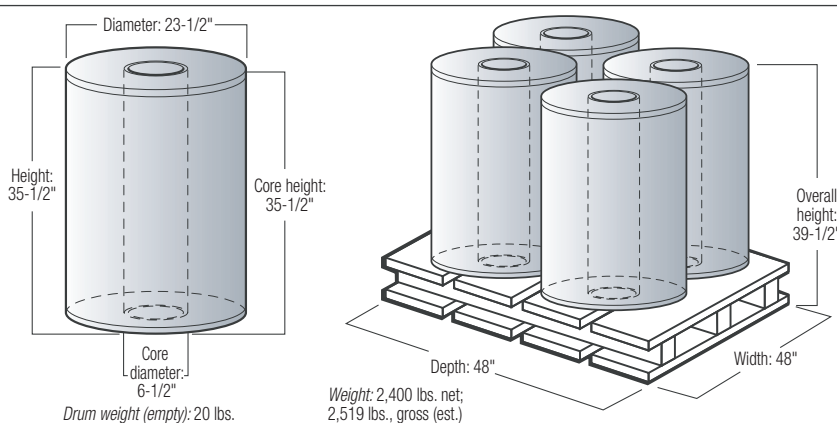
## 400-lb. Precision Pak

- Tangle-free feeding, no wire flip
- Compact drum to reduce floor-space requirements
- Precision Pak protects wire from manufacturing environment (dust, spatter, oil, etc.)
- Can be located away from the weld station for convenient changeover
- Four drums per pallet reduces excess handling



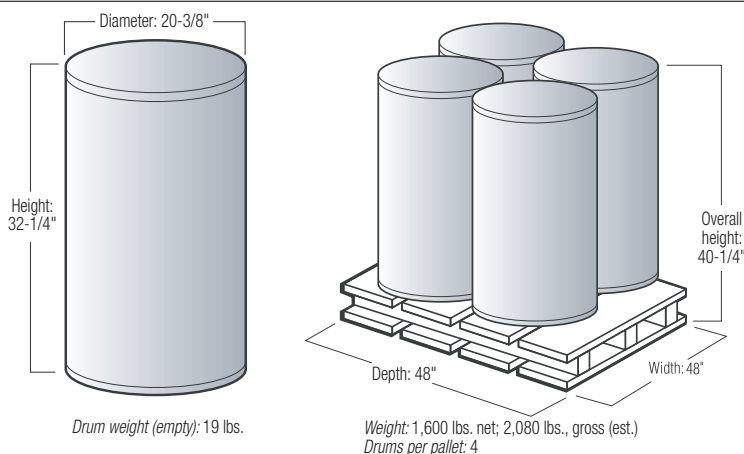
## 600-lb. Precision Pak

- Tangle-free feeding, no wire flip
- Compact drum to reduce floor-space requirements
- Precision Pak protects wire from manufacturing environment (dust, spatter, oil, etc.)
- Can be located away from the weld station for convenient changeover
- Two drums per pallet reduces excess handling



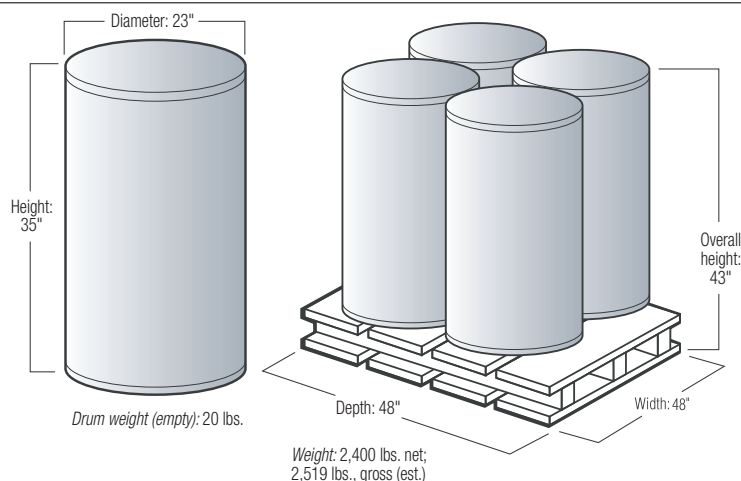
## 400-lb. X-Pak™

- Precision straight wire payout for robotic & automatic welding
- Wire wander is essentially eliminated
- Requires cone/bonnet direct pull type (no arm recommended)
- Lazy susan not recommended



## 600-lb. X-Pak™

- Precision straight wire payout for robotic & automatic welding
- Wire wander is essentially eliminated
- Requires cone/bonnet direct pull type (no arm recommended)
- Lazy susan not recommended



# Tubular Wires

Use the tables below to estimate the quantity of filler metal required for horizontal fillet welds, and square groove and V-groove butt joints. In cases where joint information differs from the tables, simply substitute your numbers in the following formula:

$$W = D \\ (1-L)$$

Where:

- W** is the weight of the wire consumed
- D** is the weight of the steel deposited\*
- L** is the total amount of wire losses

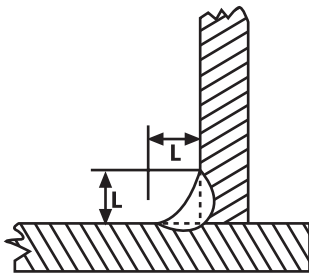
To determine D, calculate the area of the groove multiplied by the length; then multiply the result by 0.283, the volume-to-weight conversion factor for steel. If weld reinforcement is involved, be sure to add this amount into your calculation,

e.g.,  $D = [(Area\ of\ groove \times Length\ of\ groove \times 0.283) + Reinforcement\ (if\ applicable)]$

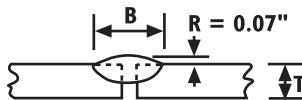
**Table data for square and V-groove joints are based on the efficiency of stick electrodes. To calculate for flux-cored wires, divide D by .80; for solid wire, divide D by .90.**

HOBART PERFORMANCE WELDING PRODUCTS

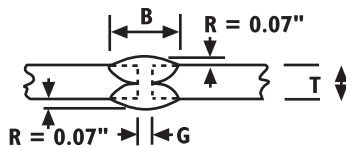
**HORIZONTAL FILLET WELD**



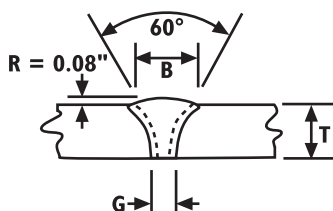
**SQUARE GROOVE BUTT JOINT ...welded one side**



**...welded two sides**  
If root of top weld is chipped or flame gouged and welded, add 0.07 lb. to steel deposited (equivalent to approx. 0.13 lb. of wires).



**"V" GROOVE BUTT JOINT**



Size of fillet L (in inches)	Steel deposited per linear foot of weld (lbs.)		Pounds of wires required per linear foot of weld (approx.)	
	Stick* (SMAW)	Flux-Cored (FCAW)	Solid (GMAW)	
1/8	0.027	.049	.034	.03
3/16	0.063	.114	.079	.07
1/4	0.106	.193	.133	.118
5/16	0.166	.302	.208	.184
3/8	0.239	.434	.298	.265
1/2	0.425	.773	.531	.472
5/8	0.663	1.205	.829	.737
3/4	0.955	1.736	1.194	1.061
1	1.698	3.087	2.123	1.890

Joint Dimensions (in inches)			Steel deposited per linear foot of weld (lbs.)		Pounds of wires required per linear foot of weld (approx.)	
Metal Thick T	Bead Width B	Root Open G	Without reinforcement	With reinforcement (R**=0.08")	Without reinforcement	With reinforcement (R**=0.08")
			3/16	3/8	0	—
		1/16	0.020	0.109	0.04	0.20
1/4	7/16	1/16	0.027	0.129	0.05	0.23
		3/32	0.039	0.143	0.07	0.26
5/16	1/2	1/16	0.033	0.153	0.06	0.27
		3/32	0.050	0.170	0.09	0.30
1/8	1/4	0	—	0.119	—	0.21
		1/32	0.013	0.132	0.03	0.24
3/16	3/8	1/32	0.020	0.199	0.04	0.36
		1/16	0.040	0.218	0.07	0.39
1/4	7/16	1/16	0.053	0.261	0.10	0.47
		3/32	0.080	0.288	0.14	0.53

Joint Dimensions (in inches)			Steel deposited per linear foot of weld (lbs.)		Pounds of wires required per linear foot of weld (approx.)	
Metal Thick T	Bead Width B	Root Open G	Without reinforcement	With reinforcement (R**=0.08")	Without reinforcement	With reinforcement (R**=0.08")
			1/4	0.207	1/16	0.085
5/16	0.311	3/32	0.173	0.258	0.31	0.46
3/8	0.414	1/8	0.282	.0394	0.50	0.70
1/2	0.558	1/8	0.489	0.641	0.87	1.15
5/8	0.702	1/8	0.753	0.942	1.35	1.68
3/4	0.847	1/8	1.088	1.320	1.94	2.35
1	1.138	1/8	1.930	2.240	3.45	4.00

\*Includes scrap end and spatter loss. \*\*R=Height of reinforcement.



# Tubular Wires

Wire Diameter Inches (mm)	Flux-Cored, in/lb	Product Metal-Cored & Sub Arc, in/lb	Self-Shielded, in/lb
.030 (0.8 mm)	4,960	—	5,910
.035 (0.9 mm)	3,650	3,750	4,350
.045 (1.2 mm)	2,210	2,550	2,500
.052 (1.4 mm)	1,930	1,800	—
1/16 (1.6 mm)	1,160	1,300	1,300
5/64 (2.0 mm)	730	850	925
3/32 (2.4 mm)	520	590	615
7/64 (2.8 mm)	440	—	550
.120 (3.0 mm)	—	—	420
1/8 (3.2 mm)	350	320	—
5/32 (4.0 mm)	—	205	—

**The inches per pound values may vary with each AWS class and wire type.**

To Convert From	To	Multiply By
in	m	.0254
in	cm	2.54
in	mm	25.4
in <sup>2</sup>	mm <sup>2</sup>	645.2
mm <sup>2</sup>	in <sup>2</sup>	.00155
lb.	kg	.454
kg	lb.	2.2
ton (2,000 lbs.)	kg	907.2
kg	ton	.0011
metric ton (2,200 lbs.)	kg	998.8
kg	metric ton	.0010

To Convert From	To	Multiply By
lb./hr.	kg/hr.	.454
kg/hr.	lb./hr.	2.2
liters/min.	cu. ft./hr.	2.119
cu. ft./hr.	liters/min.	.4719
psi	kPa	6.895
kPa	psi	.145
MPa	psi	145
psi	MPa	.0069
ipm	mm/sec.	.423
ft. lbs.	Joule (J)	1.356
Joule (J)	ft. lbs.	.737

Wire Diameters	Approximate Equivalents in mm for Standard AWS Wire Diameters											
in	.024	.030	.035	.045	.052	1/16	5/64	3/32	7/64	1/8	5/32	
mm	.6	.8	.9	1.2	1.4	1.6	2.0	2.4	2.8	3.2	4.0	

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