NOTICE:
The foregoing values represent test results under controlled laboratory conditions, not guarantees for use in the field. Actual use of the product may involve varying results due to conditions and welding techniques over which HOBART has no control, including but not limited to plate chemistry, weldment design, fabrication methods, wire size, welding procedure, service requirements and the environment. Due to the varying environments for determining the suitability of HOBART products for the purchaser’s use, the only representation that can be made is HOBART DISCLAIMS ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS.

CAUTION:
Consumers should be thoroughly familiar with the safety precautions shown in the Warning Label posted on each shipment and American National Standard Z49.1 “Safety in Welding and Cutting” published by the American Welding Society, 550 NW LeJeune Road, Miami, Florida 33135; OSHA Safety and Health Standards, 29 CFT 1910 available from the U.S. Department of Labor, Washington, D.C. 20210.
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**HARDSURFACING/STAINLESS STEEL PRODUCTS**

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**HOBART DISTRIBUTORS**

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**Mild Steel Electrodes**

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

**E7018-1 H4R**

- **Electrode**
- **Tensile in ksi**
- **Position**
- **Type of coating and current**
- Meets lower temperature impact requirements
- Hydrogen: H4 = less than 4 ml/100 g, H8 = Less than 8 ml/100 g
- Meets requirements of absorbed moisture test

<table>
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<th>Types of Coating &amp; Current</th>
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</table>

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

### How AWS Classifies Low Alloy Covered Electrodes

**E8018-B2**

- **Electrode**
- **Tensile in ksi**
- **Position**
- **Type of coating and current**
- Chemical composition of weld metal deposit

<table>
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<th>Chemical composition of weld metal deposit</th>
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* Amount depends on electrode classification. Single values indicate maximum
** All % classifications have the same chemical minimum requirements

### 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.

<table>
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<th>Item Designation</th>
<th>Storage of Contents of Open Cartons*</th>
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<tr>
<td>DC Lime (AWS-15)</td>
<td>225°F – 260°F</td>
<td>500°F – 600°F, 1 hr.</td>
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<tr>
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<td>225°F – 260°F</td>
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<tr>
<td>Smootharc Plus (AWS-16)</td>
<td>225°F – 260°F</td>
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<td>Sterling (AWS-17)</td>
<td>225°F – 260°F</td>
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<tr>
<td>Special Maintenance GP</td>
<td>225°F – 260°F</td>
<td>500°F, 1 hr.</td>
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* Remove any packaging that may be damaged from oven storage or reconditioning.
**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%

**Available diameter and recommended operating ranges:**
- 3/32" (4.0 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 conformances:**
- AWS A5.1, E6010
- ASME SFA 5.1, E6010
- Lloyd’s Grade 3m
- ABS E6010

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**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 ......................... 0.13
- 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%

**Available diameter and recommended operating ranges:**
- 3/32" (4.0 mm)..............80-190 amps
- 1/8" (3.2 mm).............70-140 amps
- 5/32" (4.0 mm)..........90-175 amps
- 3/16" (4.8 mm)........140-225 amps

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.1, E6010
- ASME SFA 5.1, E6010
- Lloyd’s Grade 3m
- ABS E6010

---

**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%

**Available diameter and recommended operating ranges:**
- 3/32" (4.0 mm)..............70-140 amps
- 1/8" (3.2 mm).............80-190 amps
- 5/32" (4.0 mm)..........90-175 amps
- 3/16" (4.8 mm)........120-230 amps

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.5, E7010-P1
- ASME SFA 5.5, E7010-P1
- Lloyd’s Grade 3m, 3Ym
- ABS E7010-P1
Mild Steel Electrodes

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 X65 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 -50°F (-46°C) 25 ft.lb. (34J)
- Avg. at -20°F (-29°C) 58 ft.lb. (79J)

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

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)............. 120-240 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 artic 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 SL 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 ............... 0.01
- Molybdenum ........... 0.12
- Nickel .................... 0.78
- Silicon .................... 0.23
- Manganese .............. 0.85
- Carbon ........................ 0.13

Available diameter and recommended operating ranges:
- 5/32" (4.0 mm).............. 80-190 amps
- 1/8" (3.2 mm).............. 70-140 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%

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.
Hobart® 335C

AWS E6011
The versatile soft-arc electrode Hobart 335C is designed for AC power sources, but it can also be used on DC power sources. 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, DCEN or DCEP

Approvals and conformances:
- AWS A5.1, E6011
- ASME SFA 5.1
- Lloyd’s 2m, Ym
- ABS E6011

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

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

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

**Approvals and conformance:**
- AWS A5.1, E6022

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**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:**
- 5/32" (4.0 mm) .......... 120-145 amps
- 3/16" (4.8 mm) .......... 140-210 amps
- 7/32" (5.6 mm) .......... 180-280 amps

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

**Approvals and conformance:**
- AWS A5.1, E7014
- ASME SFA 5.1, E7014
- CWB E4914
- ABS E7014

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**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 an arc system to provide the easiest slag removal in its class and in most cases is self cleaning. In addition the slag release 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 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
- 5/32" (5.6 mm) .......... 250-340 amps
- 1/4" (6.4 mm) .......... 300-380 amps

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

**Approvals and conformance:**
- AWS A5.1, E7024
- ASME SFA 5.1, E7024
- ABS E7024

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

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

For additional information, see Hobart data sheet 612-I.
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 performance 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
- structural
- 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.lbf. (56J)

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

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 tackling 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 erection, steel structures
- jobs where low-hydrogen weld metal in the tensile strength range of 70,000 psi is required
- low alloy structural
- 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.lbf. (147J)

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 BS 3Y
- CWB E4918-1 H4

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 structural; and low, medium or high carbon steel
- 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......................0.001
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.lbf. (268J)

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

For additional information, see Hobart data sheet 612-L.
### 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**
- Avg. at -20°F (-29°C): 57 ft.lbs. (77J)

**Available diameter and recommended operating ranges:**
- 3/32" (2.4 mm): 30-110 amps
- 1/8" (3.2 mm): 90-165 amps
- 5/32" (4.0 mm): 125-220 amps

**Type of current:** DCEP or AC

**Approvals and conformances:**
- AWS A5.1, E7018-A1 H4R
- ASME SFA 5.5, E7018-A1
- ABS E7018-A1

### 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 (556 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.lbs. (77J)

**Available diameter and recommended operating ranges:**
- 3/32" (2.4 mm): 60-110 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 conformances:**
- AWS A5.1, ASME SFA 5.1

### 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): 78,000 (539 MPa)
- Elongation % in 2": 24.7%

**Typical Charpy V-notch impact values**
- Avg. at -20°F (-29°C): 115 ft.lbs. (156J)
- Avg. at -50°F (-46°C): 87 ft.lbs. (118J)

**Available diameter and recommended operating ranges:**
- 3/32" (2.4 mm): 60-110 amps
- 1/8" (3.2 mm): 90-165 amps
- 5/32" (4.0 mm): 125-220 amps

**Type of current:** DCEP, AC

**Approvals and conformances:**
- AWS A5.1, ASME SFA 5.1
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 (663 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 conformances:
• AWS A5.5, ASME SFA 5.5

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
Molybdenum........0.45

Typical mechanical properties
(stress relieve 1 hour @ 1275°F):
Tensile Strength (psi)   101,200 (698 MPa)
Yield Strength (psi)     88,000 (597 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 conformances:
• AWS A5.5-81 E8018-B2, ASME SFA 5.5

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

For additional information, see Hobart data sheet.
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

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
- 1/16” (4.8 mm)........200-300 amps

Type of current: DCEP or AC

Typical weld metal 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

Approvals and conformance:
- AWS A5.5, E8018-B2 H4R
- ASME SFA 5.5, E8018-B2
- ABS E8018-B2

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

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

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

Typical weld metal 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)........130-210 amps
- 3/16” (4.8 mm)........200-290 amps

Type of current: DCEP

Approvals and conformance:
- AWS A5.5, E8018-B6 H4R
- ABS E8018-B6
- ASME SFA 5.5

For additional information, see Hobart data sheet 613-CA.
Hoballoy® 8018BB
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) 79,000 (547 MPa)
- Yield Strength (psi) 70,000 (483 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
- ASME SFA 5.5

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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 @ 1375°F):
- Tensile Strength (psi) 79,000 (547 MPa)
- Yield Strength (psi) 70,000 (483 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

Approvals and conformances:
- AWS A5.5, E8018-C1 H4
- ASME SFA 5.5, E8018-C1 H4
- ABS E8018-C1

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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) 86,000 (591 MPa)
- Yield Strength (psi) 80,000 (553 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 SFA 5.5, E8018-C2 H4
- ABS E8018-C2
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

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

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 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: 0.59%
- 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-G.

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:
- 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: 0.09%
- Manganese: 0.41%
- Phosphorus: 0.01%
- Sulphur: 0.01%
- Silicon: 0.20%
- Copper: 0.14%
- Chromium: 8.50%
- Molybdenum: 1.06%
- 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)..............70-110 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
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 is specifically 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

Hoballoy® 9018M
AWS E9018-M H4R
Hoballoy 9018M is an outstanding electrode that is specially formulated 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: 0.06
- Manganese: 1.06
- Silicon: 0.22
- Phosphorus: 0.011
- Sulphur: 0.010
- Nickel: 1.55
- Chromium: 0.08
- Molybdenum: 0.29

Typical mechanical properties (AW):
- Tensile Strength (psi): 96,000 (655 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

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 is designed to reduce moisture pick-up, which helps to minimize hydrogen cracking and starting porosity.

Typical applications:
- manganese-moly castings
- alloy forgings
- structural
- 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): 99,000 (685 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-H.
For additional information, see Hobart data sheet 613-J.
For additional information, see Hobart data sheet 613-K.
Mild Steel/Low Alloy Electrodes

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
Silicon .................0.10
Chromium ..........0.40
Nickel ................1.89
Molybdenum ........0.38
Vanadium ............0.01

Typical mechanical properties (AW):
Tensile Strength (psi) 108,000 (747 MPa)
Yield Strength (psi) 102,000 (699 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)........130-220 amps
1/8" (3.2 mm).........90-160 amps
5/32" (4.0 mm)....100-180 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

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

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
Chromium ..........0.10
Nickel ................1.90
Phosphorus ........0.011
Silur .................0.013
Molybdenum .......0.33
Vanadium ............0.19

Typical mechanical properties (AW):
Tensile Strength (psi) 112,000 (771 MPa)
Yield Strength (psi) 102,000 (693 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)........75-115 amps
1/8" (3.2 mm).........90-160 amps
5/32" (4.0 mm)....100-180 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

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

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:
• plate and pressure vessels

Typical weld metal properties (Chem Pad):
Carbon ..................0.04
Manganese ..............1.70
Silicon .................0.44
Phosphorus ........0.010
Silur .................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
• DNV 5Y69
• ABS E12018M

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

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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**

**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**
- Electrode or rod
- Tensile in ksi
- Solid
- Chemical composition & shielding gas

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

**ER80S-D2**
- Electrode or rod
- Tensile in ksi
- Solid
- Chemical composition

### Chemical Composition of Solid Wires Using CO₂ Shielding Gas

<table>
<thead>
<tr>
<th>AWS classification</th>
<th>Shielding gas</th>
<th>Tensile Strength ksi (MPa)</th>
<th>Yield Strength ksi (MPa)</th>
<th>% Elongation min. in 2&quot; (50 mm)</th>
<th>Impact strength ft-lbs at °F (J at °C)</th>
<th>CHEMICAL COMPOSITION</th>
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<td>ER70S-2</td>
<td>CO₂</td>
<td>72 (500)</td>
<td>60 (420)</td>
<td>22</td>
<td>.07 .90-1.40 .40-.70 .025 .035</td>
<td>— — — .50 Ti, Zr, Al</td>
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<td>ER70S-7</td>
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<tr>
<td>ER80S-D2</td>
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<td>80 (550)</td>
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### GMAW Shielding Gases

**Spray Transfer**
- Carbon steel 95-98% Ar/2-5% O₂ — Improves arc stability; produces a more fluid and controllable puddle; good coalescence and bead contour; minimizes undercutting; permits higher speeds than pure argon.
- 90-92% Ar/8-10% CO₂ — High-speed mechanized welding; low-cost manual welding; pulsed welding.
- Low alloy steel 98% Ar/2% O₂ — Minimizes undercutting; provides good toughness.

**Short Circuiting Transfer**
- Carbon steel CO₂ — Broad penetration; reduces chances of porosity.
- 75% Ar/25% CO₂ — High welding speeds without burn-through; minimum distortion and spatter.
- Ar/5-10% CO₂ — Deeper penetration; faster welding speeds.
- Low alloy steel 60-70% He/25-35% Ar/4-5% CO₂ — Minimum reactivity; excellent toughness; excellent arc stability, wetting characteristics, and bead contour; little spatter.
- 75% Ar/25% CO₂ — Fair toughness; excellent arc stability, wetting characteristics and bead contour; little spatter.
**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% CO₂ 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
(Chem Pad): 100% 75% Ar 90% Ar 25% CO₂ 10% CO₂
- 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):
- Tensile Strength (psi) 75,000 (517 MPa)
- Yield Strength (psi) 62,000 (427 MPa)
- Elongation % in 2" 29%

Typical Charpy V-notch impact values (AW):
- Avg. at 0°F (-18°C) 68 ft.lb. (94 J)
- Avg. at -2°F (-19°C) 52 ft.lb. (74 J)
- Avg. at -4°F (-20°C) 47 ft.lb. (68 J)

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.

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**OCL-3**

**AWS ER70S-3**
A premium copperless, mild steel wire, with silicon and manganese levels suitable for light levels of rust and mill scale, OCL-3 is designed for use with CO₂, 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 (Chem Pad):
- 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):
- 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) 68 ft.lb. (92 J)
- Avg. at -2°F (-19°C) 52 ft.lb. (71 J)
- Avg. at -4°F (-20°C) 47 ft.lb. (64 J)

Approvals and Conformances:
- AWS A5.18, ER70S-3
- ASME SFA 5.18, ER70S-3

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

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**HB-25**

**AWS ER70S-3**
Hobart HB-25 is specially formatted to work with CO₂. 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 (Chem Pad):
- 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):
- 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) 68 ft.lb. (92 J)
- Avg. at -2°F (-19°C) 52 ft.lb. (71 J)
- Avg. at -4°F (-20°C) 47 ft.lb. (64 J)

Approvals and Conformances:
- AWS A5.18, ER70S-3
- ASME SFA 5.18, ER70S-3

For additional information, see Hobart data sheet 632-N.
HOBART PERFORMANCE WELDING PRODUCTS

QUANTUM ARC 6
AWS ER70S-6
When the task demands excellent weldability for CO2 or Ar/CO2 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):
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Typical weld metal properties (Chem Pad):
- 100% CO2
- 75% Ar
- 90% Ar
- 25% CO2
- 10% CO2

Carbon: Carbon 0.09
Manganese: 1.13
Silicon: 0.59
Phosphorus: 0.011
Sulphur: 0.012

Typical mechanical properties (AW):
- Tensile Strength (psi): 86,000 (593 MPa)
- Yield Strength (psi): 69,000 (476 MPa)
- Elongation % in 2": 28%

Typical mechanical properties (AW):
- 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 -20°F (-29°C): 56 ft.lbf. (76J)
- Avg. at -40°F (-40°C): 48 ft.lbf. (65J)
- Avg. at -60°F (-51°C): 26 ft.lbf. (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.

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):
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<td>Si</td>
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<tr>
<td>P</td>
<td>0.013</td>
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<tr>
<td>S</td>
<td>0.011</td>
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Typical weld metal properties (Chem Pad):
- 100% CO2
- 75% Ar
- 90% Ar
- 25% CO2
- 10% CO2

Carbon: Carbon 0.09
Manganese: 1.01
Silicon: 0.56
Phosphorus: 0.015
Sulphur: 0.012

Typical mechanical properties (AW):
- Tensile Strength (psi): 84,000 (579 MPa)
- Yield Strength (psi): 67,000 (462 MPa)
- Elongation % in 2": 28%

Typical mechanical properties (AW):
- Tensile Strength (psi): 80,000 (552 MPa)
- Yield Strength (psi): 63,000 (438 MPa)
- Elongation % in 2": 29%

Typical Charpy V-notch impact values (AW):
- Avg. at -20°F (-29°C): 56 ft.lbf. (76J)
- Avg. at -40°F (-40°C): 48 ft.lbf. (65J)
- Avg. at -60°F (-51°C): 26 ft.lbf. (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-E.

HB-28
AWS ER70S-6
When your CO2 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 CO2 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):
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<td>Si</td>
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<tr>
<td>S</td>
<td>0.010</td>
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</table>

Typical weld metal properties (Chem Pad):
- 100% CO2
- 75% Ar
- 90% Ar
- 25% CO2
- 10% CO2

Carbon: Carbon 0.09
Manganese: 1.18
Silicon: 0.62
Phosphorus: 0.009
Sulphur: 0.010

Typical mechanical properties (AW):
- Tensile Strength (psi): 85,000 (586 MPa)
- Yield Strength (psi): 67,000 (462 MPa)
- Elongation % in 2": 28%

Typical mechanical properties (AW):
- Tensile Strength (psi): 80,000 (552 MPa)
- Yield Strength (psi): 63,000 (438 MPa)
- Elongation % in 2": 29%

Typical Charpy V-notch impact values (AW):
- Avg. at -20°F (-29°C): 52 ft.lbf. (71J)
- Avg. at -40°F (-40°C): 47 ft.lbf. (63J)

Approvals and Conformances:
- AWS A5.18, ER70S-6
- ASME SFA 5.18, ER70S-6

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

For additional information, see Hobart data sheet 632-G.
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 CO₂, Ar/CO₂ and Ar/O₂ 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: 0.31

Typical weld metal properties (Chem Pad):
- Carbon: 0.09
- Manganese: 1.37
- Silicon: 0.22
- Phosphorus: 0.015
- Sulphur: 0.015
- Molybdenum: 0.42

Typical mechanical properties (AW):
- CO₂
  - 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), CO₂: 33 ft.lb. (45J)
- Avg. at -20°F (-29°C), CO₂: 27 ft.lb. (37J)

Approvals and Conformances:
- AWS A5.28, ER80S-D2, ER90S-G
- ASME SFA 5.28, ER80S-D2, ER90S-G
- CWB

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 CO₂, 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):
- Carbon: 0.095
- Manganese: 1.42
- Silicon: 0.27
- Phosphorus: 0.012
- Sulphur: 0.010
- Molybdenum: 0.47

Typical mechanical properties (AW):
- CO₂
  - Tensile Strength (psi): 93,500 (645 MPa)
  - Yield Strength (psi): 82,000 (565 MPa)
  - Elongation % in 2": 20.0%

Typical Charpy V-notch impact values (AW):
- Avg. at -20°F (-29°C), CO₂: 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-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 CO₂, 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):
- Carbon: 0.095
- Manganese: 1.42
- Silicon: 0.27
- Phosphorus: 0.012
- Sulphur: 0.010
- Molybdenum: 0.47

Typical mechanical properties (AW):
- CO₂
  - Tensile Strength (psi): 93,500 (645 MPa)
  - Yield Strength (psi): 82,000 (565 MPa)
  - Elongation % in 2": 20.0%

Typical Charpy V-notch impact values (AW):
- Avg. at -20°F (-29°C), CO₂: 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.

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COMPARATIVE INDEX OF SOLID WIRES

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<thead>
<tr>
<th>AWS CLASS</th>
<th>HOBART</th>
<th>LINCOLN</th>
<th>ESAB</th>
<th>NATIONAL STANDARD</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER70S-3</td>
<td>HB-25; QCL-3</td>
<td>SuperArc L-50; S</td>
<td>Spoolarc 29S,</td>
<td>NS-101</td>
</tr>
<tr>
<td>ER70S-6</td>
<td>HB-28; QCL-6</td>
<td>SuperArc L-56; S</td>
<td>Spoolarc 82; ESAB MIG-3</td>
<td>NS-115</td>
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<tr>
<td>ER80S-D2</td>
<td>QCL-D2; QUANTUM ARC D2</td>
<td>SuperArc LA-90</td>
<td>Spoolarc 83</td>
<td>NS-102</td>
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### Short Circuit Transfer Welding Parameters

<table>
<thead>
<tr>
<th>Material thickness</th>
<th>Diameter</th>
<th>Welding current</th>
<th>Arc voltage</th>
<th>Wire feed speed</th>
<th>Travel speed</th>
<th>Shielding gas flow</th>
<th>Packaging of Hobart Solid Welding Wires</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>in. (decimal)</td>
<td>in.</td>
<td>amps-DC</td>
<td>electrode positive</td>
<td>ipm</td>
<td>ipm</td>
<td>CFH</td>
</tr>
<tr>
<td>24 ga.</td>
<td>0.025</td>
<td>0.6</td>
<td>0.024</td>
<td>0.6</td>
<td>30-50</td>
<td>13-15</td>
<td>130-160</td>
</tr>
<tr>
<td>24 ga.</td>
<td>0.025</td>
<td>0.6</td>
<td>0.030</td>
<td>0.8</td>
<td>30-50</td>
<td>15-17</td>
<td>85-100</td>
</tr>
<tr>
<td>22 ga.</td>
<td>0.031</td>
<td>0.8</td>
<td>0.030</td>
<td>0.8</td>
<td>40-60</td>
<td>15-17</td>
<td>90-130</td>
</tr>
<tr>
<td>20 ga.</td>
<td>0.037</td>
<td>0.9</td>
<td>0.035</td>
<td>0.9</td>
<td>55-85</td>
<td>15-17</td>
<td>70-120</td>
</tr>
<tr>
<td>18 ga.</td>
<td>0.050</td>
<td>1.3</td>
<td>0.035</td>
<td>0.9</td>
<td>70-100</td>
<td>16-19</td>
<td>100-160</td>
</tr>
<tr>
<td>1/16</td>
<td>0.063</td>
<td>1.6</td>
<td>0.035</td>
<td>0.9</td>
<td>80-110</td>
<td>17-20</td>
<td>120-180</td>
</tr>
<tr>
<td>5/64</td>
<td>0.078</td>
<td>2.0</td>
<td>0.035</td>
<td>0.9</td>
<td>100-130</td>
<td>18-20</td>
<td>160-220</td>
</tr>
<tr>
<td>1/8</td>
<td>0.125</td>
<td>3.2</td>
<td>0.035</td>
<td>0.9</td>
<td>120-160</td>
<td>19-22</td>
<td>210-290</td>
</tr>
<tr>
<td>1/8</td>
<td>0.125</td>
<td>3.2</td>
<td>0.045</td>
<td>1.1</td>
<td>180-200</td>
<td>20-24</td>
<td>210-240</td>
</tr>
<tr>
<td>3/16</td>
<td>0.187</td>
<td>4.7</td>
<td>0.035</td>
<td>0.9</td>
<td>140-160</td>
<td>19-22</td>
<td>210-290</td>
</tr>
<tr>
<td>3/16</td>
<td>0.187</td>
<td>4.7</td>
<td>0.045</td>
<td>1.1</td>
<td>180-205</td>
<td>20-24</td>
<td>210-245</td>
</tr>
<tr>
<td>1/4*</td>
<td>0.250</td>
<td>6.4</td>
<td>0.035</td>
<td>0.9</td>
<td>140-160</td>
<td>19-22</td>
<td>240-290</td>
</tr>
<tr>
<td>1/4*</td>
<td>0.250</td>
<td>6.4</td>
<td>0.045</td>
<td>1.1</td>
<td>180-225</td>
<td>20-24</td>
<td>210-290</td>
</tr>
</tbody>
</table>

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 CO₂, or 75% Ar/25% CO₂.

### Spray Transfer Welding Parameters

<table>
<thead>
<tr>
<th>Material thickness</th>
<th>Type of weld</th>
<th>Electrode diameter</th>
<th>Welding current</th>
<th>Arc voltage</th>
<th>Wire feed speed</th>
<th>Travel speed</th>
<th>92% Ar/8% CO₂ gas flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>size</td>
<td>in. (decimal)</td>
<td>in.</td>
<td>mm</td>
<td>in.</td>
<td>mm</td>
<td>amps-DC</td>
<td>electrode positive</td>
</tr>
<tr>
<td>18 ga.</td>
<td>0.050</td>
<td>1.3</td>
<td>0.045</td>
<td>1.1</td>
<td>280</td>
<td>25</td>
<td>350</td>
</tr>
<tr>
<td>16 ga.</td>
<td>0.063</td>
<td>1.6</td>
<td>0.045</td>
<td>1.1</td>
<td>325</td>
<td>26</td>
<td>360</td>
</tr>
<tr>
<td>14 ga.</td>
<td>0.078</td>
<td>2.0</td>
<td>0.045</td>
<td>1.1</td>
<td>325</td>
<td>27</td>
<td>360</td>
</tr>
<tr>
<td>11 ga.</td>
<td>0.125</td>
<td>3.2</td>
<td>0.045</td>
<td>1.1</td>
<td>380</td>
<td>28</td>
<td>380</td>
</tr>
<tr>
<td>3/16</td>
<td>0.188</td>
<td>4.8</td>
<td>0.045</td>
<td>1.1</td>
<td>425</td>
<td>31</td>
<td>260</td>
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<tr>
<td>1/4*</td>
<td>0.250</td>
<td>6.4</td>
<td>0.045</td>
<td>1.1</td>
<td>475</td>
<td>32</td>
<td>340</td>
</tr>
</tbody>
</table>

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 CO₂, or 75% Ar/25% CO₂.

---

### Packaging of Hobart Solid Welding Wires

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

Note: *Carton weight.

---

### Steel Solid Wires

HOBART PERFORMANCE WELDING PRODUCTS

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Steel Solid Wires Packaging Information

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbor hole diameter</td>
<td>5/8&quot;</td>
</tr>
<tr>
<td>Hub diameter</td>
<td>1-1/8&quot;</td>
</tr>
<tr>
<td>Width</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>Flange diameter</td>
<td>4&quot;</td>
</tr>
<tr>
<td>Height</td>
<td>5-1/2&quot;</td>
</tr>
<tr>
<td>Depth</td>
<td>9-1/2&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>20 pounds</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbor hole diameter</td>
<td>2-1/16&quot;</td>
</tr>
<tr>
<td>Hub diameter</td>
<td>3-7/8&quot;</td>
</tr>
<tr>
<td>Width</td>
<td>2-1/8&quot;</td>
</tr>
<tr>
<td>Flange diameter</td>
<td>8&quot;</td>
</tr>
<tr>
<td>Center to center distance</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>Engaging hole diameter</td>
<td>7/16&quot;</td>
</tr>
<tr>
<td>Spool weight (empty)</td>
<td>0.8 lbs.</td>
</tr>
<tr>
<td>Weight</td>
<td>60 lbs.</td>
</tr>
<tr>
<td>Spools per master carton</td>
<td>6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arbor hole diameter</td>
<td>2-1/16&quot;</td>
</tr>
<tr>
<td>Hub diameter</td>
<td>8&quot;</td>
</tr>
<tr>
<td>Center to center distance</td>
<td>1-3/4&quot;</td>
</tr>
<tr>
<td>Engaging hole diameter</td>
<td>7/16&quot;</td>
</tr>
<tr>
<td>Flange diameter</td>
<td>11 7/8&quot;</td>
</tr>
<tr>
<td>Depth</td>
<td>12&quot;</td>
</tr>
<tr>
<td>Weight</td>
<td>33-lb. Plastic Spool – 2,376 lbs.</td>
</tr>
<tr>
<td>Stacking sequence</td>
<td>3 wide, 3 deep, 8 high</td>
</tr>
<tr>
<td>Spools per pallet</td>
<td>72</td>
</tr>
<tr>
<td>Overall height</td>
<td>40&quot;</td>
</tr>
<tr>
<td>Depth</td>
<td>38&quot;</td>
</tr>
</tbody>
</table>
Steel Solid Wires Packaging Information

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

**Height:** 4"
**Depth:** 12"
**Width:** 12"

Stacking sequence: 3 wide, 3 deep, 8 high
Spools per pallet: 72

Steel Reel weight (empty): 1.1 lbs.

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

**Height:** 40"
**Width:** 40"
**Depth:** 38"

**Engaging hole diameter:** 7/16"
**Flange diameter:** 11 7/8"
**Arbor hole diameter:** 2-1/16"
**Hub diameter:** 6-1/2"
**Center to center distance:** 1-3/4"

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

**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.

**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.

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

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

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

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Steel Solid Wires Packaging Information

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 changeover
- Four drums per pallet reduces excess handling
- Available in: ☑ Quantum Arc ☑ QCL

Drum weight (empty): 19 lbs.

Diameter: 30-3/16"
Core diameter: 11-1/2"
Height: 32-1/4"
Core height: 32-1/4"

Overall height: 37-1/2"
Depth: 42"
Width: 42"

Weight: 2,400 lbs. net; 2,519 lbs. gross (est.)
Drums per pallet: 4
Steel Solid Wires Packaging Information

- 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

Steel Solid Wires

300 Diameter: 23-1/2" Weight: 2400 lbs.
Height: 35-1/2" Overall height: 39-1/2" Depth: 48" Width: 48"

600 Weight: 2400 lbs.
Height: 35-1/2" Overall height: 39-1/2" Depth: 48" Width: 24"

950 Weight: 1900 lbs.
Height: 21" Overall height: 46" Depth: 48" Width: 48"
### How AWS classifies mild steel flux-cored (tubular) wires, FCAW process (AWS A5.20)

<table>
<thead>
<tr>
<th>AWS Classification</th>
<th>Welding Position</th>
<th>Shielding</th>
<th>Current</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>E70T-1C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-1M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-2C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E70T-2M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E70T-3</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E70T-4</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-5C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-5M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP or DCEN</td>
<td>M</td>
</tr>
<tr>
<td>E70T-6</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-7</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-8</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-9C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-9M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-1C</td>
<td>H, F, VU, OH</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-1M</td>
<td>H, F, VU, OH</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-2C</td>
<td>H, F, VU, OH</td>
<td>CO₂</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E71T-2M</td>
<td>H, F, VU, OH</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E71T-3</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>S</td>
</tr>
<tr>
<td>E71T-4</td>
<td>H and F</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-5C</td>
<td>H, F, VU, OH</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-5M</td>
<td>H, F, VU, OH</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP or DCEN</td>
<td>M</td>
</tr>
<tr>
<td>E71T-6</td>
<td>H, F, VU, OH</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-7</td>
<td>H, F, VU, OH</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-8</td>
<td>H, F, VU, OH</td>
<td>None</td>
<td>DCEP</td>
<td>M</td>
</tr>
</tbody>
</table>

**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.

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

<table>
<thead>
<tr>
<th>AWS Classification</th>
<th>Welding Position</th>
<th>Shielding</th>
<th>Current</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>E70T-9C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-9M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-9C</td>
<td>H, F, VU, OH</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-9M</td>
<td>H, F, VU, OH</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E70T-10</td>
<td>H and F</td>
<td>None</td>
<td>DCEN</td>
<td>S</td>
</tr>
<tr>
<td>E70T-11</td>
<td>H and F</td>
<td>None</td>
<td>DCEN</td>
<td>M</td>
</tr>
<tr>
<td>E71T-12C</td>
<td>H and F</td>
<td>CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E71T-12M</td>
<td>H and F</td>
<td>75-80% Ar/bal CO₂</td>
<td>DCEP</td>
<td>M</td>
</tr>
<tr>
<td>E61T-13</td>
<td>H, F, VD, OH</td>
<td>None</td>
<td>DCEN</td>
<td>S</td>
</tr>
<tr>
<td>E71T-13</td>
<td>H, F, VD, OH</td>
<td>None</td>
<td>DCEN</td>
<td>S</td>
</tr>
<tr>
<td>E71T-14</td>
<td>H, F, VD, OH</td>
<td>None</td>
<td>DCEN</td>
<td>S</td>
</tr>
<tr>
<td>EX0T-G</td>
<td>H and F</td>
<td>Not Specified</td>
<td>Not Specified</td>
<td>M</td>
</tr>
<tr>
<td>EX0T-GS</td>
<td>H and F</td>
<td>Not Specified</td>
<td>Not Specified</td>
<td>S</td>
</tr>
<tr>
<td>EX1T-G</td>
<td>H, F, VD or VU, OH</td>
<td>Not Specified</td>
<td>Not Specified</td>
<td>M</td>
</tr>
<tr>
<td>EX1T-GS</td>
<td>H, F, VD or VU, OH</td>
<td>Not Specified</td>
<td>Not Specified</td>
<td>S</td>
</tr>
</tbody>
</table>

**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.
### 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 powder 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 4.0 ml/100g

#### Typical weld metal properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.057</td>
<td>0.042</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.58</td>
<td>1.64</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.75</td>
<td>0.79</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.010</td>
<td>0.012</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.018</td>
<td>0.019</td>
</tr>
</tbody>
</table>

#### Typical mechanical properties (AW):

<table>
<thead>
<tr>
<th>Property</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>75,300</td>
<td>77,100</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>87,500</td>
<td>90,600</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>26%</td>
<td>29%</td>
</tr>
</tbody>
</table>

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

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

#### Recommended welding procedures:

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>75-325</td>
<td>15-35</td>
<td>1/2&quot;-3/4&quot;*</td>
</tr>
<tr>
<td>.052&quot;</td>
<td>100-380</td>
<td>16-35</td>
<td>1/2&quot;-1&quot;*</td>
</tr>
<tr>
<td>1/16&quot;</td>
<td>150-450</td>
<td>17-35</td>
<td>1/2&quot;-1&quot;</td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>350-550</td>
<td>26-37</td>
<td>3/4&quot;-1-1/4*</td>
</tr>
</tbody>
</table>

#### Shielding gas:
- 75% Ar/25% CO₂ 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% CO₂ 3SA, 3YSA
- Bureau Veritas 80% Ar/20% CO₂ S3AYM
- CBW E491C-6M H4
- DNV IIY40 MS
- Lloyd's Register 3S, 3Y40S H15

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### 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 CO₂ shielding gas only.

#### Typical applications:
- earthmoving equipment
- heavy fabrications
- railroad cars
- storage vessels

#### Typical mechanical properties (AW):

<table>
<thead>
<tr>
<th>Property</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>74,700</td>
<td>77,700</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>85,800</td>
<td>92,000</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>25.5%</td>
<td>26.5%</td>
</tr>
</tbody>
</table>

#### 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:

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Electrical</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>150-250</td>
<td>21-27</td>
<td>1/2&quot;-1&quot;</td>
<td></td>
</tr>
<tr>
<td>.052&quot;</td>
<td>200-375</td>
<td>25-29</td>
<td>5/8&quot;-1&quot;</td>
<td></td>
</tr>
<tr>
<td>1/16&quot;</td>
<td>250-400</td>
<td>26-33</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>350-550</td>
<td>26-36</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
<tr>
<td>7/64&quot;</td>
<td>500-700</td>
<td>30-36</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
<tr>
<td>1/8&quot;</td>
<td>600-800</td>
<td>32-38</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
</tbody>
</table>

#### Shielding gas:
- 100% CO₂

#### Type of current: DCEP

#### Approvals and conformance:
- AWS A5.20, E70T-1C
- ASME SFA 5.20, E70T-1C, E70T-9C
- ABS 100% CO₂ E70T-1
- CBW 100% CO₂ E492T-9 H8

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### 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):
- 6.1 ml/100g

#### Typical weld metal properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.024</td>
<td>0.034</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.34</td>
<td>1.40</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.49</td>
<td>0.50</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.013</td>
<td>0.017</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.010</td>
<td>0.012</td>
</tr>
</tbody>
</table>

#### Typical mechanical properties (AW):

<table>
<thead>
<tr>
<th>Property</th>
<th>Lower Limit</th>
<th>Upper Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>85,800</td>
<td>89,000</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>74,700</td>
<td>78,000</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>27%</td>
<td>28%</td>
</tr>
</tbody>
</table>

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

- Avg. at 0°F (-18°C) 36 ft.lb.(45J)
- Avg. at -20°F (-29°C) 26 ft.lb.(35J)

#### Recommended welding procedures:

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Electrical</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>150-250</td>
<td>23-29</td>
<td>1/4&quot;-3/4&quot;</td>
<td></td>
</tr>
<tr>
<td>.052&quot;</td>
<td>150-350</td>
<td>24-32</td>
<td>1/2&quot;-1&quot;</td>
<td></td>
</tr>
<tr>
<td>1/16&quot;</td>
<td>170-350</td>
<td>25-34</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
<tr>
<td>5/64&quot;</td>
<td>250-550</td>
<td>26-34</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
<tr>
<td>3/32&quot;</td>
<td>300-650</td>
<td>26-40</td>
<td>3/4&quot;-1-1/4*</td>
<td></td>
</tr>
</tbody>
</table>

#### Shielding gas:
- 100% CO₂

#### 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% CO₂ E70T-1
- CBW 100% CO₂ E492T-9 H8

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

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

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

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 mechanical properties (AW):
<table>
<thead>
<tr>
<th>Carbon</th>
<th>Manganese</th>
<th>Silicon</th>
<th>Phosphorus</th>
<th>Sulphur</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.06</td>
<td>1.18</td>
<td>0.60</td>
<td>0.009</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Typical Charpy V-notch impact values (AW):
<table>
<thead>
<tr>
<th>Avg. at -40°F (-40°C)</th>
<th>45 ft.lbf (61J)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. at 0°F (-18°C)</td>
<td>70 ft.lbf (95J)</td>
</tr>
</tbody>
</table>

Recommended welding procedures:
DCEP
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% CO2, 80%Ar/20%CO2

Type of current: DCEP

Approvals and conformances:
• CWB 100% CO2 E492T-5MJ H4
• ABS 100% CO2 E70T-5C, E70T-5MJ H4
• AWS A5.20 E70T-5C, E70T-5MJ H4
• CWB 100% CO2 E492T-5MJ H4

Excel-Arc 71

A versatile, high-penetrating tubular wire, Excel-Arc 71 is designed to be used with a 100% CO2 or a 75%Ar/25% CO2 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 slow 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 mechanical properties (AW):
<table>
<thead>
<tr>
<th>Carbon</th>
<th>Manganese</th>
<th>Silicon</th>
<th>Phosphorus</th>
<th>Sulphur</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.021</td>
<td>1.30</td>
<td>0.69</td>
<td>0.015</td>
<td>0.011</td>
</tr>
</tbody>
</table>

Typical Charpy V-notch impact values (AW):
Elongation % in 2" 27.6% 25.8%

Recommended welding procedures:
DCEP
DIA. Amps Volts Stickout
0.035" (0.9 mm) 140-250 20-25 3/8"-5/8"
0.045" (1.2 mm) 180-280 22-28 1/2"-3/4"
0.055" (1.4 mm) 190-310 22-29 5/8"-3/4"
1/16" (1.6 mm) 180-360 22-30 5/6"-1"

Shielding gas: 100% CO2, 75%Ar/25%CO2

Type of current: DCEP

Approvals and conformances:
• CWB 100% CO2 E491T-9H H8
• ABS 75% Ar/25% CO2 3SA H10, 3YS H10
• Bureau Veritas SA517M HH
• CWB 100% CO2 E491T-9H H8, 80%Ar/20%CO2 E491T-9H H8
• DNV III Y40 M H10
• Lloyd’s Register 100%CO2 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 
Typical diffusible hydrogen 
Typical diffusible hydrogen 

Recommended welding procedures:
DCEP
DIA. Amps Volts Stickout
0.045" (1.2 mm) 150-300 24-31 1/2"-1/" 1/16" (1.6 mm) 225-450 24-34 1/2"-1/" 1/16" (1.6 mm) 225-450 24-34 1/2"-1/"

Shielding gas: 75-80%Ar/20%-25% CO2

Type of current: DCEP

Approvals and conformances:
• CWB 100% CO2 E491T-12M H8
• Bureau Veritas SA517M HH
• CWB 100% CO2 E491T-12M H8
• ABS 80%Ar/20%CO2 3SA H10
• Bureau Veritas SA517M HH
• CWB 100% CO2 E491T-12M H8
• DNV Grade III Y40 MS
• Lloyd’s Register 80%Ar/20%CO2 3S H15
For additional information, see Hobart data sheet 636-P

**Formula XL®-550**

AWS E71T-1, E71T-12J H4

.045", .052": AWS E71T-1C, E71T-12CJ H4 1/16", 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% CO₂
- .045", .052": AWS E71T-1C, E71T-12CJ
- .045": AWS E71T-1C H8, AWS E71T-12CJ H8
- ABS 3SA, 3YSA

**Approvals and conformances:**
- MIL-E-24403/1
- ASME SFA 5.20, E71T-1
- AWS A5.20, E71T-1C, E71T-12J
- AWS E81T1-Ni1 MJ H8

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.05&quot; (1.2 mm)</td>
<td>195-230</td>
<td>23-26</td>
<td>1/2&quot;-1&quot;</td>
</tr>
<tr>
<td>.052&quot; (1.4 mm)</td>
<td>210-260</td>
<td>23-28</td>
<td>1/2&quot;-1&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** 100% CO₂

**Type of current:** DCEP

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

---

**Formula XL®-8Ni1**

AWS E81T1-N1 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):**
Less than 4ml/100g

**Typical weld metal properties (Chem Pad):**
- 100% CO₂
- Carbon .................0.068
- Manganese .............1.35
- Silicon ..................0.40
- Phosphorus .............0.014
- Sulphur .................0.011
- Nickel ..................1.06

**Typical mechanical properties (AW):**
- Tensile Strength (psi) 96,300 (664 MPa)
- Yield Strength (psi) 86,500 (596 MPa)
- Elongation % in 2" 26.5%

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot; (1.2 mm)</td>
<td>175-340</td>
<td>23-30</td>
<td>1/2&quot;-3/4&quot;</td>
</tr>
<tr>
<td>.052&quot; (1.4 mm)</td>
<td>150-300</td>
<td>23-30</td>
<td>1/2&quot;-3/4&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** 100% CO₂

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.29, E81T1-K2CJ H8
- ASME SFA 5.29, E81T1-K2CJ
- ABS 100%CO₂ 3SA, 3YSA

---

**FabCO® 81K2-C**

AWS 81T1-K2CJ H8

FabCO 81K2-C is an all-position low alloy flux-cored wire. This high performance 100% CO₂ 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% CO₂
- Carbon .................0.07
- Manganese .............1.13
- Silicon ..................0.27
- Phosphorus .............0.015
- Sulphur .................0.014
- Nickel ..................1.67

**Typical mechanical properties (AW):**
- Tensile Strength (psi) 74,900 (516 MPa)
- Elongation % in 2" 26.5%

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot; (1.2 mm)</td>
<td>150-300</td>
<td>23-30</td>
<td>1/2&quot;-3/4&quot;</td>
</tr>
<tr>
<td>.052&quot; (1.4 mm)</td>
<td>150-300</td>
<td>23-30</td>
<td>1/2&quot;-3/4&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** 100% CO₂

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.29, E81T1-K2CJ H8
- ASME SFA 5.29, E81T1-K2CJ
- ABS 100%CO₂ 3SA, 3YSA

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For additional information, see Hobart data sheet 636-W

For additional information, see Hobart data sheet 636-Z
### FabCO® 91K2-C

**AWS E91T1-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% CO₂.

**Typical applications:**
- offshore
- shipyard
- railroad

**Typical diffusible hydrogen:**
3.8ml/100g

**Typical weld metal properties**

(Chem Pad): 100% CO₂
- Carbon ................. 0.05
- Manganese ............. 1.04
- Silicon ................. 0.19
- Phosphorus ............. 0.009
- Sulphur ................ 0.014
- Molybdenum ............. 0.01
- Nickel .................. 1.32

**Typical mechanical properties (AW):**

- 100% CO₂
  - 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:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>150-300</td>
<td>23-30</td>
<td>1/2&quot;-1-3/4&quot;</td>
</tr>
<tr>
<td>.052&quot;</td>
<td>175-375</td>
<td>23-30</td>
<td>1/2&quot;-1-3/4&quot;</td>
</tr>
<tr>
<td>1/16&quot;</td>
<td>175-400</td>
<td>23-31</td>
<td>3/4&quot;-1-3/4&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** 100% CO₂

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.29, E91T1-K2CJ
- ASME SFA 5.29, E91T1-K2CJ

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### 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% CO₂ 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): 100% CO₂
- 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% CO₂
  - Tensile Strength (psi): 119,300 (823 MPa)
  - Yield Strength (psi): 112,600 (776 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:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>150-250</td>
<td>23-28</td>
<td>1/2&quot;-3/4&quot;</td>
</tr>
<tr>
<td>.052&quot;</td>
<td>175-400</td>
<td>23-31</td>
<td>3/4&quot;-1-3/4&quot;</td>
</tr>
</tbody>
</table>

**Protection gas:** 100% CO₂

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.29, E111T1-K3MJ H4
- ASME SFA 5.29, E111T1-K3MJ H4
- ABS 75% Ar/25% CO₂
- CWB 100% CO₂
- A Garcian 100% CO₂
- Dillimax 690
- S75K2-JM
- Grade N25
- Grade N26

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### FabCO® 115

**AWS E110T5-K4C**

FabCO 115 is a high strength, flux-cored wire that is 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% CO₂ shielding gas only.

**Typical applications:**
- mining equipment
- earthmoving equipment
- off-the-road vehicles

**Typical weld metal properties**

(Chem Pad): 100% CO₂
- 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% CO₂
  - 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:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.045&quot;</td>
<td>120-220</td>
<td>22-27</td>
<td>1/2&quot;-1&quot;</td>
</tr>
<tr>
<td>.052&quot;</td>
<td>190-350</td>
<td>22-30</td>
<td>1/2&quot;-1&quot;</td>
</tr>
<tr>
<td>.062&quot;</td>
<td>230-525</td>
<td>25-32</td>
<td>3/4&quot;-1-1/4&quot;</td>
</tr>
</tbody>
</table>

**Protection gas:** 100% CO₂

**Type of current:** DCEP

**Approvals and conformances:**
- AWS A5.29, E110T5-K4C
- ASME SFA 5.29, E110T5-K4C
- ABS 100% CO₂ E110T5-K4
- CWB 100% CO₂ E110T5-K4 H4, 80% CO₂
- Ar/20%CO₂ E110T5-K4M H4
Hobart FabTuf® 960
Overlay
With CO₂ shielding, FabTuf 960 is the right filler metal when you need a high quality, uniform deposit that’s porosity-free. It’s ideal for CO₂ 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
  5/64” (2.0 mm) | 120-210 | 20-28
  3/32” (2.4 mm) | 170-310 | 20-28

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

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):
- 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 16.0
- Titanium ............. 1.30 0.80

Type of current: DCEP

Approvals and conformances:
- AWS A5.9, EC409, EC439

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

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
- Aluminium ........... 1.42

Temporary 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:

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/64” (2.0 mm)</td>
<td>290-370</td>
<td>29-31</td>
</tr>
<tr>
<td>3/32” (2.4 mm)</td>
<td>320-450</td>
<td>29-34</td>
</tr>
<tr>
<td>.120” (3.2 mm)</td>
<td>450-560</td>
<td>28-35</td>
</tr>
</tbody>
</table>

Shielding gas: None required

Type of current: DCEP

Approvals and conformances:
- AWS A5.20, E70T-4
- ASME SFA 5.20, E70T-4

For additional information, see Hobart data sheet 640-C.
Self-Shielding Tubular Wires

**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" 29%

**Typical Charpy V-notch impact values:**
Not applicable

**Recommended welding procedures:**
- Dia. 5/64" (2.0 mm) 240-460
- Amps 23-30
- Volts 1"-2"
- Electrical Stickout 1"-2"
- Shielding gas: None required
- Type of current: DCEN

**Approvals and conformances:**
- AWS A5.20, E70T-7
- ASME SFA 5.20, E70T-7
- ABS E70T-7

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**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. 5/64" (2.0 mm) 170-350
- Amps 17-22
- Volts 1"-2"
- Electrical Stickout 1"-2"
- Shielding gas: None required
- Type of current: DCEN

**Approvals and conformances:**
- AWS A5.29, E71T8-K6J
- ASME SFA 5.29, Class 71T8-Ni1 J
- ABS E71T-8-Ni1J
- EN758: T38 41Ni YN2 H10

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**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. 5/64" (2.0 mm) 200-350
- Amps 23-30
- Volts 1"-2"
- Electrical Stickout 1"-2"
- Shielding gas: None required
- Type of current: DCEN

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

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

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**For additional information, see Hobart data sheet 640-B.**

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

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

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.19</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.51</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.17</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.004</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.08</td>
</tr>
<tr>
<td>Nickel</td>
<td>2.18</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.51</td>
</tr>
</tbody>
</table>

**Typical Mechanical Properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>84,100 (580 MPa)</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>67,600 (466 MPa)</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>25%</td>
</tr>
</tbody>
</table>

**Typical Charpy V-notch Impact Value**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. at -20°F (-29°C)</td>
<td>40 ft.lbs. (54J)</td>
</tr>
<tr>
<td>Avg. at -40°F (-40°C)</td>
<td>31 ft.lbs. (42J)</td>
</tr>
</tbody>
</table>

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia. (mm)</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/16&quot; (1.6 mm)</td>
<td>140-300</td>
<td>19-25</td>
<td>1&quot;</td>
</tr>
<tr>
<td>5/64&quot; (2.0 mm)</td>
<td>150-350</td>
<td>18-25</td>
<td>1 1/4&quot;</td>
</tr>
</tbody>
</table>

**Type of current:** DCEN

**Approvals and conformances:**
- AWS E71T-8JD H8
- ASME SFA 5.20 E71T-8JD H8
- ABS 3YSA
- CWB E491T-8J H8

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**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**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.04</td>
</tr>
<tr>
<td>Manganese</td>
<td>0.73</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.012</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.004</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.08</td>
</tr>
<tr>
<td>Nickel</td>
<td>2.18</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.76</td>
</tr>
</tbody>
</table>

**Typical Mechanical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>84,700 (584 MPa)</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>71,600 (494 MPa)</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>27%</td>
</tr>
</tbody>
</table>

**Typical Charpy V-notch Impact Values**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. at -40°F (-40°C)</td>
<td>180 ft.lbs. (244J)</td>
</tr>
</tbody>
</table>

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia. (mm)</th>
<th>Electrical</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/64&quot; (2.0 mm)</td>
<td>200-350</td>
<td>18-22</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** None required

**Type of current:** DCEN

**Approvals and conformances:**
- AWS A5.29, E81T8-NI2 J
- ASME SFA 5.29
- ABS 81T8-NI2 J

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**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 mechanical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon</td>
<td>0.04</td>
</tr>
<tr>
<td>Manganese</td>
<td>1.37</td>
</tr>
<tr>
<td>Silicon</td>
<td>0.02</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>0.011</td>
</tr>
<tr>
<td>Sulphur</td>
<td>0.001</td>
</tr>
<tr>
<td>Nickel</td>
<td>2.38</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.83</td>
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</tbody>
</table>

**Typical mechanical properties**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Tensile Strength</td>
<td>94,000 (649 MPa)</td>
</tr>
<tr>
<td>Yield Strength</td>
<td>84,000 (578 MPa)</td>
</tr>
<tr>
<td>Elongation % in 2&quot;</td>
<td>25%</td>
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</tbody>
</table>

**Typical Charpy V-notch Impact Values**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. at -20°F (-29°C)</td>
<td>107 ft.lbs. (138J)</td>
</tr>
<tr>
<td>Avg. at -40°F (-40°C)</td>
<td>96 ft.lbs. (134J)</td>
</tr>
</tbody>
</table>

**Recommended welding procedures:**

<table>
<thead>
<tr>
<th>Dia. (mm)</th>
<th>Electrical</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/64&quot; (2.0 mm)</td>
<td>180-250</td>
<td>18-20</td>
<td>1&quot;</td>
</tr>
</tbody>
</table>

**Shielding gas:** None required

**Type of current:** DCEN

**Approvals and conformances:**
- AWS A5.29, E81T8-NI2 J
- ASME SFA 5.29
- CWB E491T-8J H8

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For additional information, see Hobart data sheet 640-0.

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

For additional information, see Hobart data sheet 640-Q.
### 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 structural
- 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:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.035” (0.9 mm)</td>
<td>55-120</td>
<td>17-20</td>
<td>1/4“-5/8”</td>
</tr>
<tr>
<td>.045” (1.2 mm)</td>
<td>80-220</td>
<td>13-20</td>
<td>1/4“-5/8”</td>
</tr>
<tr>
<td>.050” (1.6 mm)</td>
<td>110-270</td>
<td>14-20</td>
<td>1/2“-3/4”</td>
</tr>
<tr>
<td>.068” (1.8 mm)</td>
<td>150-270</td>
<td>18-21</td>
<td>1/4“-3/4”</td>
</tr>
<tr>
<td>5/64” (2.0 mm)</td>
<td>125-300</td>
<td>15-22</td>
<td>3/4“-1”</td>
</tr>
<tr>
<td>3/32” (2.4 mm)</td>
<td>200-300</td>
<td>18-21</td>
<td>3/4“-1”</td>
</tr>
</tbody>
</table>

**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

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### 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:**

<table>
<thead>
<tr>
<th>Dia.</th>
<th>Amps</th>
<th>Volts</th>
<th>Stickout</th>
</tr>
</thead>
<tbody>
<tr>
<td>.030” (0.8 mm)</td>
<td>35-140</td>
<td>12-18</td>
<td>1/4“-1/2”</td>
</tr>
<tr>
<td>.035” (0.9 mm)</td>
<td>50-150</td>
<td>13-19</td>
<td>1/4“-5/8”</td>
</tr>
<tr>
<td>.045” (1.2 mm)</td>
<td>80-220</td>
<td>13-20</td>
<td>1/4“-5/8”</td>
</tr>
<tr>
<td>1/16” (1.6 mm)</td>
<td>110-270</td>
<td>15-22</td>
<td>3/4“-1”</td>
</tr>
<tr>
<td>3/32” (2.4 mm)</td>
<td>125-300</td>
<td>15-22</td>
<td>3/4“-1”</td>
</tr>
</tbody>
</table>

**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

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

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

<table>
<thead>
<tr>
<th>Product</th>
<th>AWS/ASME</th>
<th>ABS</th>
<th>CWB</th>
<th>Military</th>
<th>Lloyd’s</th>
<th>DNV</th>
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</thead>
<tbody>
<tr>
<td>FabCOR 86R</td>
<td>E70C-6M</td>
<td>H4</td>
<td>E491C-6M</td>
<td>H4</td>
<td>3S, 3Y40S, H15</td>
<td>11Y40 MS</td>
</tr>
<tr>
<td>FabCO TR-70</td>
<td>E70T-1C</td>
<td>H8</td>
<td>E492T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
<tr>
<td>FORMULA XL-550</td>
<td>E71T-1C</td>
<td>H8</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
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<tr>
<td>FORMULA XL-525</td>
<td>E71T-1M</td>
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<td>E491T-12M</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
<tr>
<td>EXCEL-ARC 71</td>
<td>E71T-1C</td>
<td>H8</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
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<tr>
<td>FabCO 85</td>
<td>E70T-5C</td>
<td>H8</td>
<td>E492T-5</td>
<td>H4</td>
<td>3S, 3YS, H10</td>
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<tr>
<td>FORMULA XL-8Ni1</td>
<td>E81T-1-Ni1</td>
<td>H8</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
<tr>
<td>FabCO 81K2-C</td>
<td>E81T-1-K2C</td>
<td>H8</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
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<tr>
<td>FABSHIELD 7027</td>
<td>E70T-7</td>
<td>E70T-7</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
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<tr>
<td>FABSHIELD 3Ni1</td>
<td>E71T-8-K5J</td>
<td>3SA</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
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<tr>
<td>FABSHIELD 21B</td>
<td>E71T-11</td>
<td>3SA</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
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<tr>
<td>FABSHIELD 23</td>
<td>E71T-11</td>
<td>3SA</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
<tr>
<td>FABSHIELD 81N1</td>
<td>E71T-11</td>
<td>3SA</td>
<td>E491T-9</td>
<td>H8</td>
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<tr>
<td>FABSHIELD 81N2</td>
<td>E81T-8-Ni2</td>
<td>J</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
<tr>
<td>FABSHIELD XLR-8</td>
<td>E71T-8-JD</td>
<td>H8</td>
<td>E491T-9</td>
<td>H8</td>
<td>MIL-E-24403/1</td>
<td></td>
</tr>
</tbody>
</table>

### Comparative Index of Self-Shielded Tubular Wires

<table>
<thead>
<tr>
<th>AWS CLASS</th>
<th>HOBART</th>
<th>COREX</th>
<th>ESAB</th>
<th>LINCOLN</th>
<th>SELECT ARC</th>
</tr>
</thead>
<tbody>
<tr>
<td>E70T-4</td>
<td>FABSHIELD 4</td>
<td>Self-Shield 4</td>
<td>Coreshield 40</td>
<td>Innershield NS-3M</td>
<td>Select 74</td>
</tr>
<tr>
<td>E70T-7</td>
<td>FABSHIELD 2027</td>
<td>Self-Shield 7</td>
<td>Coreshield 7</td>
<td>Innershield NR-311</td>
<td>—</td>
</tr>
<tr>
<td>E71T-7</td>
<td>FABSHIELD 2027</td>
<td>Self-Shield 7</td>
<td>Coreshield 7</td>
<td>Innershield NR-311</td>
<td>—</td>
</tr>
<tr>
<td>E71T-8</td>
<td>FABSHIELD XLR-8</td>
<td>Coreshield 8</td>
<td>Coreshield 8</td>
<td>Innershield NR-232, NR-233</td>
<td>—</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD 21B</td>
<td>Self-Shield 11</td>
<td>Coreshield 11</td>
<td>Innershield NR-211-MP</td>
<td>Select 701</td>
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<tr>
<td>E71T-11</td>
<td>FABSHIELD 23</td>
<td>Self-Shield 11 GS</td>
<td>Coreshield 15</td>
<td>Innershield NR-151, NR-152, NR-157, NR-204-H</td>
<td>Select 700 GS</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD XLR-8</td>
<td>Coreshield 8</td>
<td>Coreshield 8</td>
<td>Innershield NR-232, NR-233</td>
<td>—</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD 21B</td>
<td>Self-Shield 11</td>
<td>Coreshield 11</td>
<td>Innershield NR-211-MP</td>
<td>Select 701</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD 23</td>
<td>Self-Shield 11 GS</td>
<td>Coreshield 15</td>
<td>Innershield NR-151, NR-152, NR-157, NR-204-H</td>
<td>Select 700 GS</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD XLR-8</td>
<td>Coreshield 8</td>
<td>Coreshield 8</td>
<td>Innershield NR-232, NR-233</td>
<td>—</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD 21B</td>
<td>Self-Shield 11</td>
<td>Coreshield 11</td>
<td>Innershield NR-211-MP</td>
<td>Select 701</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD 23</td>
<td>Self-Shield 11 GS</td>
<td>Coreshield 15</td>
<td>Innershield NR-151, NR-152, NR-157, NR-204-H</td>
<td>Select 700 GS</td>
</tr>
<tr>
<td>E71T-11</td>
<td>FABSHIELD XLR-8</td>
<td>Coreshield 8</td>
<td>Coreshield 8</td>
<td>Innershield NR-232, NR-233</td>
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</tr>
</tbody>
</table>

### Comparative Index of Gas-Shielded Tubular Wires

<table>
<thead>
<tr>
<th>AWS CLASS</th>
<th>HOBART</th>
<th>COREX</th>
<th>ESAB</th>
<th>LINCOLN</th>
<th>TRI-MARK</th>
<th>SELECT ARC</th>
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</thead>
<tbody>
<tr>
<td>E70T-6M</td>
<td>FabCOR 86R</td>
<td>Metal-Cor 6</td>
<td>Coreweld 70, Coreweld Ultra</td>
<td>Metalloy 70, 71, 76</td>
<td>Select 70C-3, C-6</td>
<td></td>
</tr>
<tr>
<td>E70T-1C</td>
<td>FabCO RXR</td>
<td>Flux-Cor 7</td>
<td>Dual Shield 111 AC, R-70 Ultra</td>
<td>Outershield 70</td>
<td>TM-11, TM-RX7, TM-72</td>
<td>Select 79</td>
</tr>
<tr>
<td>E70T-9C</td>
<td>FabCO TR-70</td>
<td>Super-Cor</td>
<td>Dual Shield 111 AC, R-70 Ultra</td>
<td>Outershield HD70</td>
<td>TM-11, TM-RX7, TM-72</td>
<td>Select 70</td>
</tr>
<tr>
<td>E70T-5C</td>
<td>FabCO 85</td>
<td>Tuf-Cor 5</td>
<td>Dual Shield 1-7</td>
<td>Outershield 75-H</td>
<td>TM-11, TM-RX7, TM-72</td>
<td>Select 70</td>
</tr>
<tr>
<td>E71T-1C (CO2)</td>
<td>EXCEL-ARC 71</td>
<td>Verti-Cor I Versatile</td>
<td>Dual Shield 7000 Ultra</td>
<td>Outershield 71, 71M, Elite</td>
<td>TM-711M, Triple 7, Triple 8</td>
<td>Select 71</td>
</tr>
<tr>
<td>E71T-9C (75% Ar/25% CO2)</td>
<td>EXCEL-ARC 71</td>
<td>Verti-Cor I Versatile</td>
<td>Dual Shield 7000 Ultra</td>
<td>Outershield 71, 71M, Elite</td>
<td>TM-711M, Triple 7, Triple 8</td>
<td>Select 71</td>
</tr>
<tr>
<td>E71T-1C (CO2)</td>
<td>EXCEL-ARC 71</td>
<td>Verti-Cor I Versatile</td>
<td>Dual Shield 7000 Ultra</td>
<td>Outershield 71, 71M, Elite</td>
<td>TM-711M, Triple 7, Triple 8</td>
<td>Select 71</td>
</tr>
<tr>
<td>E71T-12CJ</td>
<td>Formula XL-550</td>
<td>—</td>
<td>Dual Shield II-7 Ultra</td>
<td>Outershield 71C-H, Elite</td>
<td>TM-771</td>
<td>Select 720</td>
</tr>
<tr>
<td>E71T-12CJ</td>
<td>Formula XL-550</td>
<td>—</td>
<td>Dual Shield II-7 Ultra</td>
<td>Outershield 71C-H, Elite</td>
<td>TM-771</td>
<td>Select 720</td>
</tr>
<tr>
<td>E81T1-Ni1</td>
<td>Formula XL-8Ni1</td>
<td>—</td>
<td>Dual Shield II-80-N1</td>
<td>Outershield 81N1-H</td>
<td>TM-81N1, TM-81N1</td>
<td>Select 812</td>
</tr>
<tr>
<td>E81T1-Ni2</td>
<td>Formula XL-8Ni1</td>
<td>—</td>
<td>Dual Shield II-80-N1</td>
<td>Outershield 81N1-H</td>
<td>TM-81N1, TM-81N1</td>
<td>Select 812</td>
</tr>
<tr>
<td>E91T1-K2C</td>
<td>FabCO 81K2-C</td>
<td>—</td>
<td>Dual Shield II-80-N1</td>
<td>Outershield 81K2-H</td>
<td>TM-81K2</td>
<td>Select 812</td>
</tr>
<tr>
<td>E91T1-K2C</td>
<td>FabCO 81K2-C</td>
<td>—</td>
<td>Dual Shield II-80-N1</td>
<td>Outershield 81K2-H</td>
<td>TM-81K2</td>
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<tr>
<td>E110T5-K4</td>
<td>FabCO 115</td>
<td>—</td>
<td>Dual Shield T-115</td>
<td>—</td>
<td>TM-115</td>
<td>Select 812</td>
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## Tubular Wires Packaging Information

### Tubular Wires Packaging of Hobart Tubular Welding Wires

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

* Shipped in the vertical position.
** Shipped in the flat position.
**Tubular Wires Packaging Information**

### 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

- Arbor hole diameter: 2-1/16"
- Hub diameter: 3-7/8"
- Engaging hole diameter: 7/16"
- Width: 2-1/8"

| Spool weight (empty): 0.8 lbs. |

| Weight: 40 lbs. |
| Spools per master carton: 4 |

- Overall height: 35-1/2"
- Overall width: 36"
- Depth: 36-3/4"
- Height: 5-1/2"

### 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

- Arbor hole diameter: 2-1/16"
- Hub diameter: 6-1/2"
- Engaging hole diameter: 7/16"
- Width: 4"

| Spool weight (empty): 2.6 lbs. |

| Weight: 2376 lbs. net; 2645 lbs. gross (est.) |
| Stacking sequence: 2 wide, 3 deep, 8 high |
| Spools per pallet: 72 |

- Overall height: 39"
- Overall width: 39"
- Depth: 37 1/2"
- Height: 4"

### 50-lb. Fiber Spool
- Convenient, easy to changeover
- Simplicity reduces changeover time, increases productivity
- More wire on spool means fewer changeovers

- Arbor hole diameter: 2-1/16"
- Hub diameter: 8-1/4"
- Engaging hole diameter: 7/16"
- Width: 4"

| 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 |

- Overall height: 40"
- Overall width: 32"
- Depth: 32"
- Height: 4-1/2"
Tubular Wires Packaging Information

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.

600-lb. Vertical Reel

Weight: 1,800 lbs. 1,925 lbs. gross (est.)
Stacking sequence: 3 across
Reels per pallet: 3

950-lb. Flat Reel

Weight: 1,900 lbs. net; 1,984 lbs. gross (est.)
Stacking sequence: 2 high
Reels per pallet: 2
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
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., \( D = (\text{Area of groove} \times \text{Length of groove} \times 0.283) + \text{Reinforcement (if applicable)} \)

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.

*Includes scrap end and spatter loss. **\( R = \text{Height of reinforcement} \).

### Horizontal Fillet Weld

<table>
<thead>
<tr>
<th>Size of fillet L (in inches)</th>
<th>Steel deposited per linear foot of weld (lbs.)</th>
<th>Pounds of wires required per linear foot of weld (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>.027</td>
<td>.049</td>
</tr>
<tr>
<td>3/16</td>
<td>.063</td>
<td>.114</td>
</tr>
<tr>
<td>1/4</td>
<td>.166</td>
<td>.193</td>
</tr>
<tr>
<td>5/16</td>
<td>.166</td>
<td>.302</td>
</tr>
<tr>
<td>3/8</td>
<td>.239</td>
<td>.434</td>
</tr>
<tr>
<td>1/2</td>
<td>.425</td>
<td>.773</td>
</tr>
<tr>
<td>1/8</td>
<td>.663</td>
<td>1.205</td>
</tr>
<tr>
<td>3/4</td>
<td>.955</td>
<td>1.736</td>
</tr>
<tr>
<td>1</td>
<td>1.698</td>
<td>3.087</td>
</tr>
</tbody>
</table>

### 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

- **T** = Width
- **B** = Thick
- **R** = 0.07”
- **G** = Height

### Tubular Wires How To Calculate

- **Metal Thick T**
- **Bead Width B**
- **Root Open G**
- **Without reinforcement**
- **With reinforcement (R**=0.08”**)
- **Without reinforcement**
- **With reinforcement (R**=0.08”**)

### Joint Dimensions (in inches)

<table>
<thead>
<tr>
<th>Metal Thick T</th>
<th>Bead Width B</th>
<th>Root Open G</th>
<th>Without reinforcement</th>
<th>With reinforcement (R**=0.08”**)</th>
<th>Without reinforcement</th>
<th>With reinforcement (R**=0.08”**)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/16</td>
<td>3/8</td>
<td>0</td>
<td>—</td>
<td>0.088</td>
<td>—</td>
<td>0.16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/16</td>
<td>0.020</td>
<td>0.109</td>
<td>0.04</td>
<td>0.20</td>
</tr>
<tr>
<td>1/4</td>
<td>7/16</td>
<td>1/16</td>
<td>0.027</td>
<td>0.129</td>
<td>0.05</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/32</td>
<td>0.039</td>
<td>0.143</td>
<td>0.07</td>
<td>0.26</td>
</tr>
<tr>
<td>5/16</td>
<td>1/2</td>
<td>1/16</td>
<td>0.033</td>
<td>0.153</td>
<td>0.06</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/32</td>
<td>0.050</td>
<td>0.170</td>
<td>0.09</td>
<td>0.30</td>
</tr>
<tr>
<td>1/2</td>
<td>1/4</td>
<td>0</td>
<td>—</td>
<td>0.119</td>
<td>—</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/32</td>
<td>0.013</td>
<td>0.132</td>
<td>0.03</td>
<td>0.24</td>
</tr>
<tr>
<td>3/16</td>
<td>3/8</td>
<td>1/32</td>
<td>0.020</td>
<td>0.199</td>
<td>0.04</td>
<td>0.36</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/16</td>
<td>0.040</td>
<td>0.218</td>
<td>0.07</td>
<td>0.39</td>
</tr>
<tr>
<td>1/4</td>
<td>7/16</td>
<td>1/16</td>
<td>0.053</td>
<td>0.261</td>
<td>0.10</td>
<td>0.47</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3/32</td>
<td>0.080</td>
<td>0.288</td>
<td>0.14</td>
<td>0.53</td>
</tr>
</tbody>
</table>

*Includes scrap end and spatter loss. **\( R = \text{Height of reinforcement} \).*
### Wire Diameters

<table>
<thead>
<tr>
<th>Wire Diameter</th>
<th>Flux-Cored, in/lb</th>
<th>Product Metal-Cored &amp; Sub Arc, in/lb</th>
<th>Self-Shielded, in/lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>.030 (0.8 mm)</td>
<td>4,960</td>
<td>—</td>
<td>5,910</td>
</tr>
<tr>
<td>.035 (0.9 mm)</td>
<td>3,650</td>
<td>3,750</td>
<td>4,350</td>
</tr>
<tr>
<td>.045 (1.2 mm)</td>
<td>2,210</td>
<td>2,550</td>
<td>2,500</td>
</tr>
<tr>
<td>.052 (1.4 mm)</td>
<td>1,930</td>
<td>1,800</td>
<td>—</td>
</tr>
<tr>
<td>1/16 (1.6 mm)</td>
<td>1,160</td>
<td>1,300</td>
<td>1,300</td>
</tr>
<tr>
<td>5/64 (2.0 mm)</td>
<td>730</td>
<td>850</td>
<td>925</td>
</tr>
<tr>
<td>3/32 (2.4 mm)</td>
<td>520</td>
<td>590</td>
<td>615</td>
</tr>
<tr>
<td>7/64 (2.8 mm)</td>
<td>440</td>
<td>—</td>
<td>550</td>
</tr>
<tr>
<td>.120 (3.0 mm)</td>
<td>—</td>
<td>420</td>
<td>—</td>
</tr>
<tr>
<td>1/8 (3.2 mm)</td>
<td>350</td>
<td>320</td>
<td>—</td>
</tr>
<tr>
<td>5/32 (4.0 mm)</td>
<td>—</td>
<td>205</td>
<td>—</td>
</tr>
</tbody>
</table>

The inches per pound values may vary with each AWS class and wire type.

### To Convert From

<table>
<thead>
<tr>
<th>To Convert From</th>
<th>To</th>
<th>Multiply By</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>m</td>
<td>.0254</td>
</tr>
<tr>
<td>in</td>
<td>cm</td>
<td>2.54</td>
</tr>
<tr>
<td>in</td>
<td>mm</td>
<td>25.4</td>
</tr>
<tr>
<td>in²</td>
<td>mm²</td>
<td>645.2</td>
</tr>
<tr>
<td>mm²</td>
<td>in²</td>
<td>.00155</td>
</tr>
<tr>
<td>lb.</td>
<td>kg</td>
<td>.454</td>
</tr>
<tr>
<td>kg</td>
<td>lb.</td>
<td>2.2</td>
</tr>
<tr>
<td>ton (2,000 lbs.)</td>
<td>kg</td>
<td>907.2</td>
</tr>
<tr>
<td>kg</td>
<td>ton</td>
<td>.0011</td>
</tr>
<tr>
<td>metric ton (2,200 lbs.)</td>
<td>kg</td>
<td>998.8</td>
</tr>
<tr>
<td>kg</td>
<td>metric ton</td>
<td>.0010</td>
</tr>
</tbody>
</table>

### To Convert From

<table>
<thead>
<tr>
<th>To Convert From</th>
<th>To</th>
<th>Multiply By</th>
</tr>
</thead>
<tbody>
<tr>
<td>lb./hr.</td>
<td>kg/hr.</td>
<td>.454</td>
</tr>
<tr>
<td>kg/hr.</td>
<td>lb./hr.</td>
<td>2.2</td>
</tr>
<tr>
<td>liters/min.</td>
<td>cu. ft./hr.</td>
<td>2.119</td>
</tr>
<tr>
<td>cu. ft./hr.</td>
<td>liters/min.</td>
<td>.4719</td>
</tr>
<tr>
<td>psi</td>
<td>kPa</td>
<td>6.895</td>
</tr>
<tr>
<td>kPa</td>
<td>psi</td>
<td>.145</td>
</tr>
<tr>
<td>MPa</td>
<td>psi</td>
<td>145</td>
</tr>
<tr>
<td>psi</td>
<td>MPa</td>
<td>.0069</td>
</tr>
<tr>
<td>ipm</td>
<td>mm/sec.</td>
<td>.423</td>
</tr>
<tr>
<td>ft. lbs.</td>
<td>Joule (J)</td>
<td>1.356</td>
</tr>
<tr>
<td>Joule (J)</td>
<td>ft. lbs.</td>
<td>.737</td>
</tr>
</tbody>
</table>

### Wire Diameters

<table>
<thead>
<tr>
<th>Wire Diameter</th>
<th>Approximate Equivalents in mm for Standard AWS Wire Diameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>.024 .030 .035 .045 .052 1/16 5/64 3/32 7/64 1/8 5/32</td>
</tr>
<tr>
<td>mm</td>
<td>.6 .8 .9 1.2 1.4 1.6 2.0 2.4 2.8 3.2 4.0</td>
</tr>
</tbody>
</table>

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