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Mild Steel Electrodes

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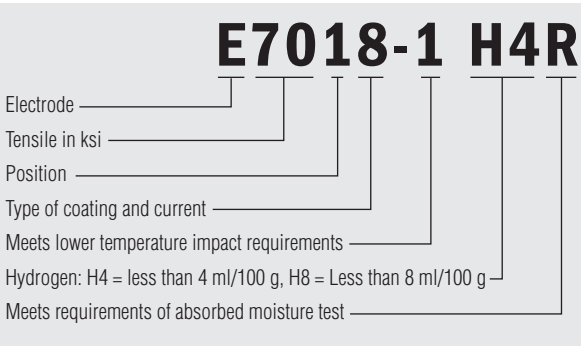


Position

1 Flat, Horizontal, Vertical, Overhead

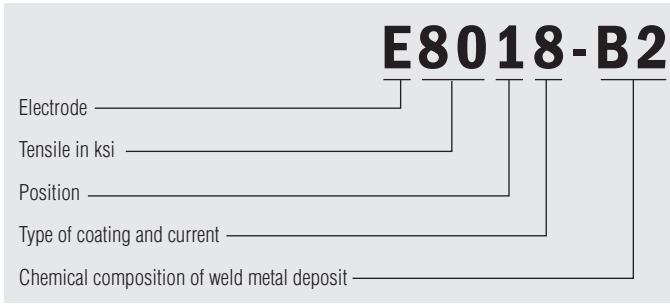
2 Flat and Horizontal only

Types of Coating & Current

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

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

How AWS Classifies Low Alloy Covered Electrodes



Chemical composition of weld metal deposit

AWS	Suffix	C	Mn	Si	Ni	Cr	Mo	V	P	S	Cu	Al	Nb	N	Cu
E7018	**A1**	0.12	0.90*	.80	—	—	.40-.65	—	.03	.03					
E8018	**B2L**	.05	.90	0.80	—	1.00-1.50	.40-.65	—	.03	.03					
E8018	**B2**	.05-.12	.90	0.80	—	1.00-1.50	.40-.65	—	.03	.03					
E9018	**B3L**	.05	.90	0.80*	—	2.00-2.50	.90-1.20	—	.03	.03					
E9018	**B3**	.05-.12	.90	0.80*	—	2.00-2.50	.90-1.20	—	.03	.03					
E8018	**B6**	.05-.10	1.0	.90	.40	4.0-6.0	.45-.65	—	.03	.03					
E8018	**B8**	.05-.10	1.0	.90	.40	8.0-10.5	.85-1.20	—	.03	.03					
E9015	**B9**	.08-.13	1.20	.30	8.0	8.0-10.5	.85-1.20	.15-.30	.01	.01	.25	.04	.02-.10	.02-.07	
E8018	**C1**	.12	1.25	0.80*	2.00-2.75	—	—	—	.03	.03					
E8018	**C2**	.12	1.25	0.80*	3.00-3.75	—	—	—	.03	.03					
E8018	**C3**	.12	.40-1.25	.80	.80-1.10	.15	.35	.05	.03	.03					
E10018	**D2**	.15	1.65-2.00	0.80*	.90	—	.25-.45	—	.03	.03					
EXXXX	**G****	—	1.00 Min	.80 Min	.50 Min	.20 Min	.20 Min	.10 Min	.03	.03	.2				
E9018	**M**	.10	.60-1.25	.80	1.40-1.80	.15	.35	.05	.030	.030					
E10018M	**M**	.10	.60-1.25	.80	1.40-1.80	.15	.35	.05	.030	.030					
E11018M	**M**	.10	1.30-1.80	.60	1.25-2.50	.40	.25-.50	.05	.030	.030					
E12018	**M**	.10	1.30-2.25	.60	1.75-2.50	.30-1.50	.30-.55	.05	.030	.030					
E7010	**P1**	.20	1.20	.60	1.00	.30	.50	.10	.030	.030					
E8010	**P1**	.20	1.20	.60	1.00	.30	.50	.10	.030	.030					

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

Oven Storage and Reconditioning of Stick Electrodes

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

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

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

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

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

Mild Steel Electrodes

Pipemaster® Pro-60

AWS E6010

Pipemaster Pro-60 is a quick-starting, cellulosic mild steel electrode that provides you with out-standing 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 weldabilty and increased physical properties. Earth-tone 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 Chemistry:

Carbon	0.13
Manganese	0.35
Silicon	0.10
Chromium	0.02
Nickel	0.02
Molybdenum	0.01
Vanadium	<0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	79,000 (542 MPa)
Yield Strength (psi)	66,000 (456 MPa)
Elongation % in 2" (50mm)	23%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	36 ft.lb. (49J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:

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

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 Chemistry:

Carbon	0.11
Manganese	0.28
Silicon	0.14
Chromium	0.02
Nickel	0.02
Molybdenum	< 0.01
Vanadium	< 0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	73,000 (504 MPa)
Yield Strength (psi)	63,000 (432 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	52 ft.lb. (70J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and 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 Chemistry:

Carbon	0.15
Manganese	0.54
Silicon	0.13
Nickel	0.72
Molybdenum	0.01
Phosphorus	0.01
Sulphur	0.02
Chromium	0.02
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	83,000 (570 MPa)
Yield Strength (psi)	69,000 (475 MPa)
Elongation % in 2" (50mm)	25%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	57 ft.lb. (78J)
Avg. at -40°F (-40°C)	25 ft.lb. (34J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and 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 X56 through X70 pipe. And with good low-temperature impact properties, it can be used on pipe steels with relatively high silicon (up to .30).

Typical Applications:

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

Typical Weld Metal Chemistry (ChemPad):

Carbon	0.19
Manganese	0.84
Silicon	0.25
Nickel	0.87
Molybdenum	0.14
Phosphorus	0.008
Sulphur	0.015
Chromium	0.07
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	98,000 (672 MPa)
Yield Strength (psi)	81,000 (560 MPa)
Elongation % in 2" (50mm)	19%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	42 ft.lb. (57J)
Avg. at -50°F (-46°C)	25 ft.lb. (34J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:

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

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 5L material from X65 to X80 steel pipe. Pipemaster 90 has a smooth, yet forceful arc that provides good penetration and fusion with excellent control. Its superior wetting characteristics offer freedom from internal undercutting with practically no slag, which minimizes slag entrapment. Although Pipemaster 90 can be used in any welding position, it is especially outstanding in the vertical-down position for welding pipe joints. As with all Pipemaster electrodes, Pipemaster 90 has excellent operator appeal with low spatter levels and easy slag removal for quick cleanup.

Typical Applications:

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

Typical Weld Metal Chemistry:

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

Typical Mechanical Properties (AW):

Tensile Strength (psi)	103,000 (713 MPa)
Yield Strength (psi)	86,000 (590 MPa)
Elongation % in 2" (50mm)	23%

Typical Charpy V-notch Impact Values

Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:

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

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 Chemistry:

Carbon	0.12
Manganese	0.71
Silicon	0.29
Nickel	0.04
Chromium	0.06
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	82,000 (565 MPa)
Yield Strength (psi)	69,000 (478 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	38 ft.lb. (52J)

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

Mild Steel Electrodes

Hobart® 335C

AWS E6011
The versatile soft-arc electrode Hobart 335C is designed for AC power sources, but it can also be used on DCEP or DCEN. With the ability to weld through paint, mill scale or rust, it is an all-position cellulosic electrode with the ultimate in operator appeal.

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

Typical Weld Metal Chemistry:

Carbon	0.10
Manganese	0.59
Silicon	0.22
Nickel	0.07
Chromium	0.07
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	83,000 (572 MPa)
Yield Strength (psi)	72,000 (500 MPa)
Elongation % in 2" (50mm)	27%

Typical Charpy V-notch Impact Values (AW):
Avg. at -20°F (-30°C) 41 ft.lb. (56J)

Available diameter and recommended operating ranges:

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

Type of Current: AC, DCEP or DCEN

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

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 Chemistry:

Carbon	0.08
Manganese	0.39
Silicon	0.25
Nickel	0.04
Chromium	0.04
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	74,000 (514 MPa)
Yield Strength (psi)	67,000 (463 MPa)
Elongation % in 2" (50mm)	30%

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 Chemistry:

Carbon	0.08
Manganese	0.40
Silicon	0.25
Nickel	0.02
Chromium	0.03
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	75,000 (520 MPa)
Yield Strength (psi)	67,000 (465 MPa)
Elongation % in 2" (50mm)	27%

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

Mild Steel Electrodes

Hobart® Deckmaster™ 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 Chemistry:

Carbon	0.04
Manganese	1.17
Silicon	0.15
Phosphorus	0.013
Sulphur	0.013

Typical Mechanical Properties:

Transverse tensile strength exceeds	
63,000 psi	(435 MPa)

Typical Charpy V-notch Impact Values:
Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEN, DCEP or AC

Approvals and Conformances:
- AWS A5.1, E6022

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 Chemistry:

Carbon	0.063
Manganese	0.42
Silicon	0.22
Phosphorus	0.013
Sulphur	0.014
Nickel	0.07
Chromium	0.06
Molybdenum	0.01
Vanadium	0.02

Typical Mechanical Properties (AW):

Tensile Strength (psi)	81,000 (561 MPa)
Yield Strength (psi)	73,000 (505 MPa)
Elongation % in 2" (50mm)	24%

Typical Charpy V-notch Impact Values:
Not required

Available diameter and recommended operating ranges:

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

Type of Current: AC, DCEP or DCEN

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

Hobart® Rocket® 7024

AWS E7024

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

Typical Applications:
- plate fabrication
- tank fabrication
- barge construction
- construction and earthmoving equipment

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	0.74
Silicon	0.45
Phosphorus	0.009
Sulphur	0.019
Nickel	0.07
Chromium	0.06
Molybdenum	0.01
Vanadium	0.02

Typical Mechanical Properties (AW):

Tensile Strength (psi)	82,000 (562 MPa)
Yield Strength (psi)	70,000 (484 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values
Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEN, AC or DCEP

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

Mild Steel Electrodes

Hobart® 24

AWS E7024, E7024-1

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

Typical Applications:

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

Typical Weld Metal Chemistry:

Carbon	0.06
Manganese	0.77
Silicon	0.37
Phosphorus	0.008
Sulphur	0.019
Nickel	0.07
Chromium	0.05
Molybdenum	0.01
Vanadium	0.03

Typical Mechanical Properties (AW):

Tensile Strength (psi)	79,000 (545 MPa)
Yield Strength (psi)	71,000 (487 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values (AW) for E7024-1:

Avg. at 0°F (-20°C)	50 ft.lb. (68J)

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 tacking prior to finish welding with Fabshield self-shielded, tubular wire. That's because the construction of the Hobart 418 allows removal of all the slag from the self-shielded wire.

Typical Applications:

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

Typical Weld Metal Chemistry:

Carbon	0.04
Manganese	0.95
Silicon	0.54
Phosphorus	0.012
Sulphur	0.014
Nickel	0.07
Chromium	0.07
Molybdenum	0.03
Vanadium	< 0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	78,000 (541 MPa)
Yield Strength (psi)	64,000 (441 MPa)
Elongation % in 2" (50mm)	29%

Typical Charpy V-notch Impact Values (AW):

Avg. at -50°F (-46°C)	86 ft.lb. (116J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:

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

Hobart® 718MC

AWS E7018 H4R/E7018(M)-1 H4R

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

Typical Applications:

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

Typical Weld Metal Chemistry:

Carbon	0.04
Manganese	0.92
Silicon	0.25
Phosphorus	0.011
Sulphur	0.016
Nickel	0.07
Chromium	0.06
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	80,000 (550 MPa)
Yield Strength (psi)	69,000 (478 MPa)
Elongation % in 2" (50mm)	28%

Typical Charpy V-notch Impact Values (AW):

Avg. at -50°F (-46°C)	106 ft.lb. (144J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:

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

Mild Steel/Low Alloy Electrodes

Hobart® 18AC

AWS E7018 H8

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

Typical Applications:

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

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	0.77
Silicon	0.37
Chromium	0.07
Molybdenum	0.01
Nickel	0.07
Vanadium	0.02
Phosphorus	0.009
Sulphur	0.021

Typical Mechanical Properties (AW):

Tensile Strength (psi)	87,000 (597 MPa)
Yield Strength (psi)	75,000 (516 MPa)
Elongation % in 2" (50mm)	30%

Typical Charpy V-notch Impact Values (AW):

Avg. at -20°F (-30°C)	54 ft.lb. (74J)

Available diameter and recommended operating ranges:

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

Type of Current: AC, DCEN or DCEP

Approvals and Conformances:

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

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.

Typical Weld Metal Chemistry:

Carbon	0.06
Manganese	0.80
Phosphorus	0.013
Sulphur	0.012
Silicon	0.49
Nickel	0.04
Chromium	0.05
Molybdenum	0.01
Vanadium	0.01

Typical Mechanical Properties (as welded):

Tensile Strength (psi)	87,000 (601 MPa)
Yield Strength (psi)	74,000 (510 MPa)
Elongation % in 2" (50mm)	29%

Typical Charpy V-notch Impact Values

Avg. at -20°F (-30°C)	115 ft.lb. (156J)
Avg. at -50°F (-46°C)	87 ft.lb. (118J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP, AC

Approvals and Conformances:

- AWS A5.1, ASME SFA 5.1

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 Chemistry:

Carbon	0.03
Manganese	0.77
Silicon	0.42
Phosphorus	0.02
Sulphur	0.01
Molybdenum	0.52

Typical Mechanical Properties (stress relieve 1 hour @ 1150°F):

Tensile Strength (psi)	85,000 (587 MPa)
Yield Strength (psi)	74,000 (507 MPa)
Elongation % in 2" (50mm)	28%

Typical Charpy V-notch Impact Values

Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:

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

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.

Typical Weld Metal Chemistry:

Carbon	0.04
Manganese	0.86
Phosphorus	0.01
Sulphur	0.01
Silicon	0.59
Molybdenum	0.50

Typical Mechanical Properties (stress relieve 1 hour @ 1150°F):

Tensile Strength (psi)	97,000 (671 MPa)
Yield Strength (psi)	86,000 (592 MPa)
Elongation % in 2" (50mm)	25%

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.

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	0.68
Phosphorus	0.01
Sulphur	0.01
Silicon	0.36
Chromium	1.12
Molybdenum	0.40

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	98,000 (673 MPa)
Yield Strength (psi)	86,000 (592 MPa)
Elongation % in 2" (50mm)	23%

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
- AWS A5.5-06 E7018-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.

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	0.65
Phosphorus	0.01
Sulphur	0.01
Silicon	0.33
Chromium	2.24
Molybdenum	1.09

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	111,000 (768 MPa)
Yield Strength (psi)	96,000 (663 MPa)
Elongation % in 2" (50mm)	21%

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 E8018-B3, ASME SFA 5.5

Low Alloy Electrodes

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 Chemistry:

Carbon	0.08
Manganese	0.69
Silicon	0.66
Phosphorus	0.02
Sulphur	0.01
Chromium	1.34
Molybdenum	0.51

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	105,000 (723 MPa)
Yield Strength (psi)	92,000 (634 MPa)
Elongation % in 2" (50mm)	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, E8018-B2 H4R
- ASME SFA 5.5, E8018-B2
- ABS E8018-B2

Hoballoy® 8018B2L

AWS E8018-B2L H4R/E7018-B2L H4R
Hoballoy 8018B2L is an outstanding electrode for welding higher strength steels requiring tensile strengths of 80,000 lbs. or more. Low carbon levels reduce the possibility of cracking in the weldment. It offers good arc characteristics and excellent notch toughness. Plus, Hoballoy 8018B2L features a specially formulated coating that reduces moisture pick-up, making it ideal for welding in conditions of high heat and humidity and helps to minimize hydrogen cracking and starting porosity.

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

Typical Weld Metal Chemistry:

Carbon	0.03
Manganese	0.63
Silicon	0.56
Phosphorus	0.014
Sulphur	0.010
Chromium	1.48
Molybdenum	0.53

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	89,000 (612 MPa)
Yield Strength (psi)	74,000 (510 MPa)
Elongation % in 2" (50mm)	28%

Typical Charpy V-notch Impact Values
Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:
- AWS A5.5-81, E8018-B2L H4R
- AWS A5.5, E7018-B2L H4R
- ASME SFA 5.5, E8018-B2L
- ABS E8018-B2L

Hoballoy® 8018B6

AWS E8018-B6 H4R
The Hoballoy 8018B6 is the right choice for 5% Cr, 1/2% Mo steels and other chromium-molybdenum steels in severe service conditions. Its special coating reduces moisture pick-up, minimizing hydrogen cracking and starting porosity. Plus, it offers excellent arc characteristics for a stable, easy-to-control arc and its quick slag removal means faster cleanup time.

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

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	0.80
Phosphorus	0.01
Sulphur	0.01
Silicon	0.30
Chromium	4.80
Nickel	0.07
Molybdenum	0.48

Typical Mechanical Properties (stress relieve 1 hour @ 1375°F):

Tensile Strength (psi)	87,000 (603 MPa)
Yield Strength (psi)	72,000 (499 MPa)
Elongation % in 2" (50mm)	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 Conformances:
- AWS A5.5, E8018-B6 H4R
- ABS E8018-B6
- ASME SFA 5.5

Low Alloy Electrodes

Hoballoy® 8018B8

AWS E8018-B8 H4R

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

Typical Applications:

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

Typical Weld Metal Chemistry:

Carbon	0.07
Manganese	0.75
Phosphorus	0.013
Sulphur	0.007
Silicon	0.54
Chromium	9.07
Nickel	0.08
Molybdenum	0.88

Typical Mechanical Properties (stress relieve 1 hour @ 1375°F):

Tensile Strength (psi)	96,000 (663 MPa)
Yield Strength (psi)	76,000 (525 MPa)
Elongation % in 2" (50mm)	25%

Typical Charpy V-notch Impact Values

Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:

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

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 Chemistry:

Carbon	0.04
Manganese	1.04
Silicon	0.44
Phosphorus	0.01
Sulphur	0.02
Nickel	2.44

Typical Mechanical Properties (stress relieve 1 hour @ 1125°F):

Tensile Strength (psi)	93,000 (643 MPa)
Yield Strength (psi)	79,000 (543 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values (SR):

Avg. at -75°F (-59°C)	59 ft.lb. (80J)

Available diameter and recommended operating ranges:

3/32" (2.4 mm)	70-110 amps
1/8" (3.2 mm)	90-160 amps
5/32" (4.0 mm)	130-220 amps
3/16" (4 8 mm)	200-300 amps

Type of Current: DCEP or AC

Approvals and Conformances:

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

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 Chemistry:

Carbon	0.04
Manganese	0.90
Phosphorus	0.01
Sulphur	0.01
Silicon	0.42
Nickel	3.62

Typical Mechanical Properties (stress relieve 1 hour @ 1125°F):

Tensile Strength (psi)	94,000 (647 MPa)
Yield Strength (psi)	83,000 (572 MPa)
Elongation % in 2" (50mm)	29%

Typical Charpy V-notch Impact Values (SR):

Avg. at -100°F (-73°C)	92 ft.lb. (125J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:

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

Low Alloy Electrodes

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 Chemistry:

Carbon	0.04
Manganese	0.98
Silicon	0.26
Phosphorus	0.01
Sulphur	0.01
Nickel	0.89
Chromium	0.07
Molybdenum	0.09
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	84,000 (576 MPa)
Yield Strength (psi)	73,000 (503 MPa)
Elongation % in 2" (50mm)	30%

Typical Charpy V-notch Impact Values (AW):
Avg. at -40°F (-40°C) 98 ft.lb. (133J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

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

Hoballoy® 9015B9

AWS E9015-B9 H4R
The improved creep resistance of the Hoballoy 9015B9 make it an outstanding electrode for power generation and high temperature service applications. It features low moisture reabsorption that prevents starting porosity and offers resistance to hydrogen-induced cracking. Plus, its quick and easy slag removal makes cleanup faster than ever.

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

Typical Weld Metal Chemistry:

Carbon	0.10
Manganese	0.59
Phosphorus	0.01
Sulphur	0.007
Silicon	0.21
Copper	0.03
Chromium	8.90
Vanadium	0.23
Nickel	0.52
Molybdenum	0.92
Aluminum	< 0.01
Niobium	0.04
Nitrogen	0.04

Typical Mechanical Properties (stress relieve 1 hour @ 1400°F):

Tensile Strength (psi)	113,000 (777 MPa)
Yield Strength (psi)	98,000 (678 MPa)
Elongation % in 2" (50mm)	17%

Typical Charpy V-notch Impact Values
Not required

Available diameter and recommended operating ranges:

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

Approvals and Conformances:
- AWS A5.5, E9015-B9 H4R
- ASME SFA5.5

Hoballoy® 9018B3

AWS E9018-B3 H4R
Hobart's Hoballoy 9018B3 is an outstanding electrode that's designed for welding higher strength steel applications. It offers better corrosion resistance than carbon electrodes and features a special coating that's formulated to reduce moisture pick-up, helping to minimize hydrogen cracking and starting porosity.

Typical Applications:
- chrome-moly pipes
- castings
- forgings
- boiler work

Typical Weld Metal Chemistry:

Carbon	0.08
Manganese	0.68
Silicon	0.55
Phosphorus	0.02
Sulphur	0.01
Chromium	2.39
Molybdenum	1.05

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	109,000 (750 MPa)
Yield Strength (psi)	93,000 (640 MPa)
Elongation % in 2" (50mm)	22%

Typical Charpy V-notch Impact Values
Not required

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:
- AWS A5.5, E9018-B3 H4R
- ASME SFA 5.5, E9018-B3 H4R
- ABS E9018-B3

Low Alloy Electrodes

Hoballoy® 9018B3L

AWS E9018-B3L H4R/E8018-B3L H4R

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

Typical Applications:
- chrome-moly pipes
- boiler work

Typical Weld Metal Chemistry:

Carbon	0.03
Manganese	0.59
Silicon	0.52
Phosphorus	0.02
Sulphur	0.01
Chromium	2.22
Molybdenum	1.03

Typical Mechanical Properties (stress relieve 1 hour @ 1275°F):

Tensile Strength (psi)	97,000 (669 MPa)
Yield Strength (psi)	82,000 (563 MPa)
Elongation % in 2" (50mm)	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)	130-220 amps
3/16" (4.8 mm)	200-300 amps

Type of Current: DCEP or AC

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

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

Typical Weld Metal Chemistry:

Carbon	0.06
Manganese	0.92
Silicon	0.16
Phosphorus	0.014
Sulphur	0.016
Nickel	1.63
Chromium	0.08
Molybdenum	0.26
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	97,000 (672 MPa)
Yield Strength (psi)	84,000 (583 MPa)
Elongation % in 2" (50mm)	26%

Typical Charpy V-notch Impact Values (AW):

Avg. at -60°F (-51°C)	60 ft.lb. (81J)

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

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

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	1.96
Silicon	0.19
Phosphorus	0.02
Sulphur	0.01
Molybdenum	0.40
Nickel	0.47

Typical Mechanical Properties (stress relieve 1 hour @ 1150°F):

Tensile Strength (psi)	109,000 (772 MPa)
Yield Strength (psi)	96,000 (661 MPa)
Elongation % in 2" (50mm)	23%

Typical Charpy V-notch Impact Values (SR):

Avg. at -60°F (-51°C)	40 ft.lb. (54J)

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, E10018-D2 H4R
- ASME SFA 5.5, E10018-D2 H4R

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 Chemistry:

Carbon	0.05
Manganese	1.18
Phosphorus	0.019
Sulphur	0.013
Silicon	0.10
Chromium	0.08
Nickel	1.77
Molybdenum	0.36
Vanadium	0 .01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	100,000 (687 MPa)
Yield Strength (psi)	88,000 (606 MPa)
Elongation % in 2" (50mm)	25%

Typical Charpy V-notch Impact Values (AW):

Avg. at -60ºF (-51°C)	60 ft.lb. (82J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP

Approvals and Conformances:
- AWS A5.5, E10018-M H4R
- ASME SFA5.5

Hoballoy® 11018M

AWS E11018-M H4R

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

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

Typical Weld Metal Chemistry:

Carbon	0.04
Manganese	1.57
Silicon	0.34
Nickel	1.99
Phosphorus	0.015
Sulphur	0.010
Molybdenum	0.29
Chromium	0.19
Vanadium	0.010

Typical Mechanical Properties (AW):

Tensile Strength (psi)	116,000 (799 MPa)
Yield Strength (psi)	107,000 (736 MPa)
Elongation % in 2" (50mm)	22%

Typical Charpy V-notch Impact Values (AW):

Avg. at -60°F (-51°C)	56 ft.lb. (76J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

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

Hoballoy® 12018M

AWS E12018-M H4R

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

Typical Applications:
- low-alloy steels
- forgings
- castings
- plate and pressure vessels

Typical Weld Metal Chemistry:

Carbon	0.05
Manganese	1.55
Silicon	0.42
Phosphorus	0.02
Sulphur	0.013
Nickel	1.76
Molybdenum	0.39
Chromium	0.63
Vanadium	0.01

Typical Mechanical Properties (AW):

Tensile Strength (psi)	130,000 (895 MPa)
Yield Strength (psi)	118,000 (814 MPa)
Elongation % in 2" (50mm)	19%

Typical Charpy V-notch Impact Values (AW):

Avg. at -60°F (-51°C)	24 ft.lb. (32J)

Available diameter and recommended operating ranges:

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

Type of Current: DCEP or AC

Approvals and Conformances:
- AWS A5.5, E12018-M H4R
- ASME SFA 5.5, E12018-M H4R
- ABS E12018M

Mild Steel/Low Alloy Electrodes

Pieces Per Pound Arc Welding Electrodes

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

Comparative Index of Mild Steel & Low Hydrogen Electrodes

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

Mild Steel/Low Alloy Electrodes

Comparative Index of Low Alloy Electrodes

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

Approvals, Specifications, Classifications

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

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