



# Submerged Arc Welding

## Essential Carbon Steel Consumables

## About This Guide

Hobart Filler Metals provides an extensive offering of wires and fluxes for welding and cladding carbon steels, low-alloy steels, stainless steels, and nickel-based alloys.

**This booklet is a brief introduction to thirteen of our best-in-class submerged arc wires and fluxes for joining carbon/non-alloyed steels.** Eight wires and five fluxes have been carefully selected to provide a solution—or solutions—to the challenges and demands of virtually any carbon/non-alloyed steel welding application. These solutions include:

- **SubCOR™ seamed and seamless cored (composite) wires**
- **SDX copper-coated solid wires**
- **SWX, HA- and HN- agglomerated fluxes**

Continue reading to discover the characteristics, features, typical applications, and standard packaging of these essential consumables.

**Note:** This guide describes the mechanical properties of wire/flux combinations by using AWS and CWB classifications. An explanation of these classifications is included on the next page.



### Questions? Hobart is here to help.

Hobart is committed to helping you find the best solutions in submerged arc welding (SAW). We strongly advise further discussion of your applications with Hobart's technical specialists, no matter how simple or complex. Our specialists can help select wire/flux combinations to give you the best balance of properties and performance, provide suggestions during procedure development, or answer any welding related questions you have.

**APPLICATIONS ENGINEERING TEAM:**

800-532-2618  
(8:00 a.m. – 5:00 p.m. EST Monday through Friday)

[Applications.Engineering@HobartBrothers.com](mailto:Applications.Engineering@HobartBrothers.com)

**CUSTOMER SERVICE TEAM:**

800-424-1543 (United States) or  
937-332-4000 (Canada & Mexico)

# Understanding AWS and CWB Classifications

Below is the layout of a wire/flux classification described in AWS A5.17/AWS A5.17M, *Specification for Carbon Steel Electrodes and Fluxes for Submerged Arc Welding*. CWB CSA W48 uses a similar classification system, but designators refer to metric units. Being able to decipher AWS and/or CWB classifications is useful for a quick overview of how flux and wire perform together.

## F7A6-EM12K H8

“F” indicates a submerged arc welding flux.

Gold Designator (Tensile Strength)	Ultimate Tensile Strength of Wire/Flux Combination		Min. Yield Strength (0.2%) of Wire/Flux Combination		Min. % Elongation of Wire/Flux Combination
	KSI	MPa	KSI	MPa	%
AWS A5.17 (A5.17M)					
6 (43)	60-80	(430-560)	48	(330)	22
7 (49)	70-95	(480-660)	58	(400)	22

Blue Designator	Test Condition
A	As-Welded
P	Post Weld Heat Treat 1 Hr. @ 1150°F (620°C)

Green Designator (A5.17 CVN)	CVN Test Temp	Min. Energy	Green Designator (A5.17M & CSA W48 CVN)	CVN Test Temp	Min. Energy
0	0°F	20 ft-lbs	0	0°C	27 J
2	-20°F	20 ft-lbs	2	-20°C	27 J
4	-40°F	20 ft-lbs	4	-40°C	27 J
6	-60°F	20 ft-lbs	6	-60°C	27 J
8	-80°F	20 ft-lbs	8	-80°C	27 J
10	-100°F	20 ft-lbs	10	-100°C	27 J

Orange Designator (Electrode Composition)	% C	% Mn	% Si	% S	% P	% Cu
EL12	0.04-0.14	0.25-0.60	0.10 Max.	0.030 Max.	0.030 Max.	0.35 Max.
EM12K	0.05-0.15	0.80-1.25	0.10-0.35	0.030 Max.	0.030 Max.	0.35 Max.
EM13K	0.06-0.16	0.90-1.40	0.35-0.75	0.030 Max.	0.030 Max.	0.35 Max.
EH12K	0.06-0.15	1.50-2.00	0.25-0.65	0.025 Max.	0.025 Max.	0.35 Max.
EC1 (Deposit Composition)	0.15 Max.	1.80 Max.	0.90 Max.	0.035 Max.	0.035 Max.	0.35 Max.

Purple Designator (Hydrogen)	Maximum Diffusible Hydrogen
H2	2 ml/100g
H4	4 ml/100g
H8	8 ml/100g

# The Advantages of SubCOR™ Wires

## Compared to Solid Wire:

- Increase WFS without increasing amps
- Provide up to 30% increase in deposition rates
- Help reduce arc-on time
- Provide additional flexibility in the welding process

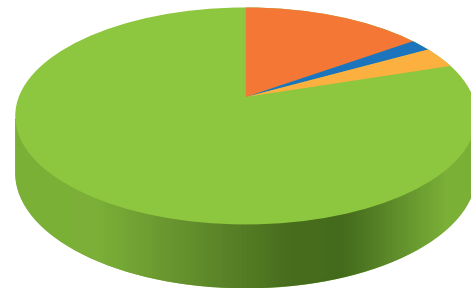
SubCOR wires are drawn from tubes filled with powder that is manufactured to introduce specific chemical or mechanical properties into the weld. This tubular construction increases the wire's current density.

Cored wire requires greater wire feed speed to achieve given amperage when compared to a solid wire of the same diameter and welding contact-tip-to-work distance. As a result, cored wires can offer increased deposition rates, without significantly changing amperage and voltage.

When the deposition rate is increased, it is often possible to use higher travel speeds than solid wires and still maintain a given weld size. This presents an opportunity for improved productivity by speeding up the process and reducing the time it takes to complete a weld.

Since labor is the largest cost of any welding operation, even a small reduction in cycle time can provide a huge cost savings in the long run—without sacrificing weld quality.

## Typical Welding Costs



Left: SubCOR wire cross-section

Right: SubCOR SL (Seamless) wire cross-section



Photo courtesy of IRCO Automation

# SubCOR™ Carbon Steel Cored Wires



## AWS A5.17 and CWB CSA W48 Wire/Flux Classifications

**Note:** All classifications subject to change. Please visit [HobartBrothers.com](http://HobartBrothers.com) for the most up-to-date information. CWB wire/flux classifications are underlined. CWB approval certificates can be accessed online at the Hobart website.

Product	HA-495	HN-590	SWX 110	SWX 120	SWX 150
SubCOR EM12K-S	F7A2-EC1	F7A6-EC1	F7A4-EC1 P6A4-EC1	F7A6-EC1 F6P8-EC1	F7A4-EC1
SubCOR EM13K-S	F7A4-EC1 H8 <u>F49A4-EC1-H8</u>	F7A8-EC1 H8 F7P8-EC1 H8 <u>F49A4-EC1-H8</u> <u>F43P6-EC1-H8</u>	F7A6-EC1 F7P6-EC1	F7A8-EC1 H8 F7P8-EC1 H8	F7A8-EC1 F6P8-EC1
SubCOR EM13K-S MOD		F7A8-EC1 H8 F7P4-EC1 H8 <u>F49A6-EC1-H8</u>	F7A6-EC1 H8 F7P6-EC1 H8 <u>F49A6-EC1-H8</u>	F7A8-EC1 F7P8-EC1 <u>F49A6-EC1-H8</u>	F7A8-EC1 F7P8-EC1
SubCOR SL 731			F7A6-ECG F7P8-ECG	F7A8-ECG F7P8-ECG	F7A6-EC1 F7P8-EC1

## Features and Benefits

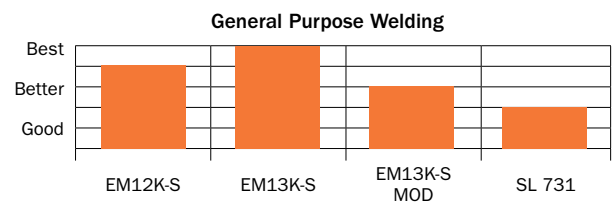
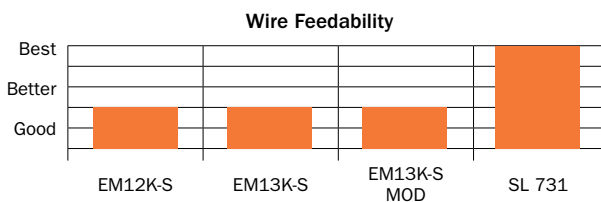
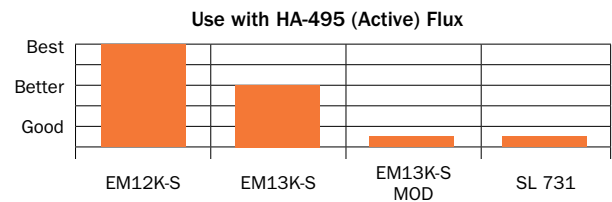
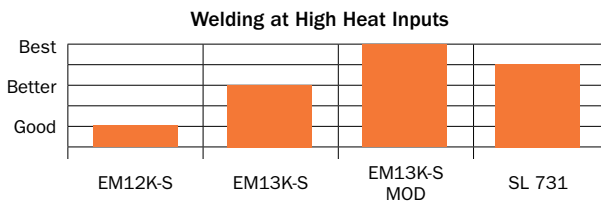
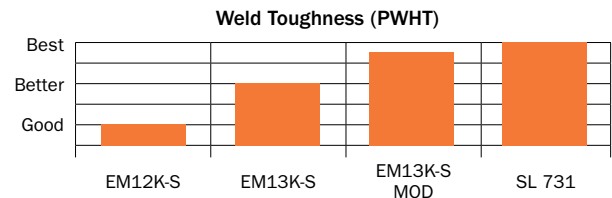
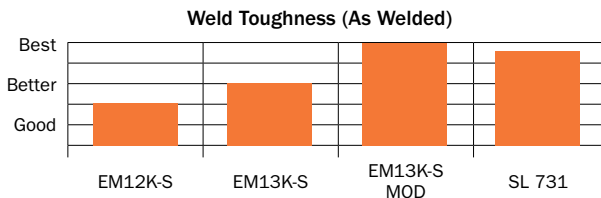
Product	Features
SubCOR EM12K-S	<ul style="list-style-type: none"> <li>Nominal weld deposit chemistry is similar to EM12K solid wire                             <ul style="list-style-type: none"> <li>Suitable for use in nearly all applications using EM12K solid wires</li> </ul> </li> <li>Suitable for use with most Hobart fluxes                             <ul style="list-style-type: none"> <li>Provides versatility in procedure development and optimizing welding performance</li> </ul> </li> </ul>
SubCOR EM13K-S	<ul style="list-style-type: none"> <li>Nominal weld deposit chemistry is similar to EM13K solid wires                             <ul style="list-style-type: none"> <li>Suitable for use in nearly all applications using EM13K solid wires</li> </ul> </li> <li>Improved tolerance to rust and mill-scale than EM12K solid wires                             <ul style="list-style-type: none"> <li>Helps to reduce material preparation time and potential for porosity and rework.</li> </ul> </li> </ul>
SubCOR EM13K-S MOD	<ul style="list-style-type: none"> <li>Nominal weld deposit chemistry is similar to EM13K solid wires (with only slight modification)                             <ul style="list-style-type: none"> <li>Suitable for use in many applications using EM13K and EH12K solid wires</li> </ul> </li> <li>Formulated to maintain good mechanical properties when welding at high heat inputs (&gt;80 kJ/in)                             <ul style="list-style-type: none"> <li>Allows the use of high productivity welding parameters without sacrificing weld strength or toughness</li> </ul> </li> </ul>
SubCOR SL 731	<ul style="list-style-type: none"> <li>Specially formulated to offer enhanced impact toughness                             <ul style="list-style-type: none"> <li>Can help minimize the risk of cracking in demanding service conditions</li> </ul> </li> <li>Seamless wire design virtually eliminates risk of moisture absorption                             <ul style="list-style-type: none"> <li>Produces weld deposits with hydrogen levels as low as solid wires, while still offering the advantages of cored wires</li> </ul> </li> <li>Seamless manufacturing process provides unmatched product consistency                             <ul style="list-style-type: none"> <li>Excellent uniformity of chemical and properties, arc characteristics, and feeding</li> </ul> </li> </ul>

# SubCOR™ Carbon Steel Cored Wires

## Typical Applications

Product	Features
SubCOR EM12K-S	<ul style="list-style-type: none"> <li>• <b>Applications currently using EM12K solid wires</b></li> <li>• Light-duty general fabrication</li> <li>• Thin-wall tanks and pressure vessels</li> </ul> <ul style="list-style-type: none"> <li>• <b>Use with active flux</b></li> <li>• Light structural</li> </ul>
SubCOR EM13K-S	<ul style="list-style-type: none"> <li>• <b>Applications currently using EM13K solid wires</b></li> <li>• <b>General fabrication</b></li> <li>• Pressure vessels</li> <li>• Structural and bridge fabrication</li> </ul> <ul style="list-style-type: none"> <li>• Boiler and pressure vessels</li> <li>• Storage tanks</li> <li>• Railcar</li> <li>• Heavy equipment</li> </ul>
SubCOR EM13K-S MOD	<ul style="list-style-type: none"> <li>• <b>Applications currently using EM13K or EH12K solid wires</b></li> <li>• <b>High-strength high-toughness applications</b></li> <li>• Wind tower fabrication</li> <li>• Offshore structures</li> </ul> <ul style="list-style-type: none"> <li>• Structural and bridge fabrication</li> <li>• Heavy equipment</li> <li>• Boiler and pressure vessels</li> <li>• Double-jointing</li> </ul>
SubCOR SL 731	<ul style="list-style-type: none"> <li>• <b>Thick, restrained joints where hydrogen-induced cracking may be an issue</b></li> <li>• <b>High-strength high-toughness applications</b></li> <li>• Wind tower fabrication</li> <li>• Offshore structures</li> </ul> <ul style="list-style-type: none"> <li>• Structural and bridge fabrication</li> <li>• Heavy equipment</li> <li>• Boiler and pressure vessels</li> <li>• Double-jointing</li> </ul>

## Product Comparison



# SubCOR™ Carbon Steel Cored Wires

## Standard Packaging and Part Numbers

For a complete list of diameters and packaging, please contact Hobart at (800) 424-1543 or (937) 332-5188 for International Customer Service.

Product	Package Type & Weight	5/64" (2.0 mm)	3/32" (2.4 mm)	1/8" (3.2 mm)	5/32" (4.0 mm)
SubCOR EM12K-S	60 lb. (27 kg) Coil 600 lb. (272 kg) Drum	S282025-002	S282029-002 S282029-008	S282043-002 S282043-008	S282050-002 S282050-002
SubCOR EM13K-S	60 lb. (27 kg) Coil 600 lb. (272 kg) Drum	S280425-002 S280425-008	S280429-002 S280429-008	S280443-002 S280443-008	S280450-002 S280450-008
SubCOR EM13K-S MOD	60 lb. (27 kg) Coil 600 lb. (272 kg) Drum		S289329-002 S289329-008	S289343-002 S289343-008	S289350-002 S289350-008
SubCOR SL 731*	55 lb. (25 kg) Wire Basket 550 lb. (250 kg) Drum		503241025H 50324442FH	503321025H	503401025H 50340442FH



Photo courtesy of IRCO Automation

# Approximate Wire Feed Speeds and Deposition Rates

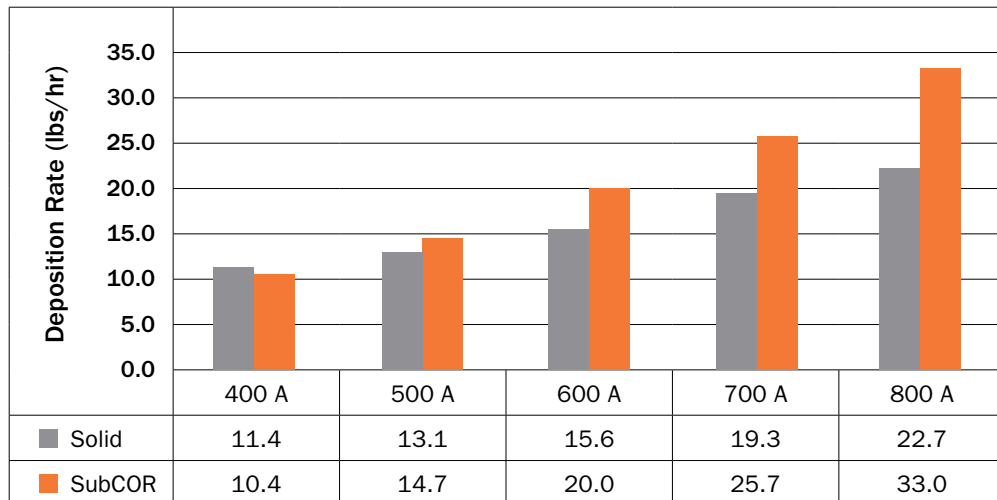
SubCOR wires are capable of providing increased deposition rates compared to solid wires, particularly at increased amperages for each wire diameter. Actual deposition rates may vary depending on choice of flux, contact-tip-to-work distance, and/or polarity.

**Note:** Data presented is for SubCOR seamed cored wires.

Ø	CTWD	Amps	Volts	SDX Wires		SubCOR Wires			SDX Wires		SubCOR Wires		
				WFS (in/min)	Dep. Rate (lbs/hr)	WFS (in/min)	Dep. Rate (lbs/hr)	% Increase	WFS (m/min)	Dep. Rate (kg/hr)	WFS (m/min)	Dep. Rate (kg/hr)	% Increase
5/64" 2.0mm	1.25" 32mm	200	27	63	4.8	70	4.9	2%	1.60	2.2	1.78	2.2	2%
		300	28	95	8.1	115	8.4	4%	2.41	3.7	2.92	3.8	4%
		400	30	135	11.3	190	13.7	21%	3.43	5.1	4.83	6.2	21%
		500	32	200	16.0	285	20.5	28%	5.08	7.3	7.24	9.3	28%
3/32" 2.4mm	1.25" 32mm	300	28	70	8.1	85	8.7	7%	1.78	3.7	2.16	3.9	75%
		400	29	90	10.6	125	12.8	22%	2.29	4.8	3.18	5.8	22%
		500	31	120	14.8	175	17.8	20%	3.05	6.7	4.45	8.1	20%
		600	33	155	18.9	240	24.3	29%	3.94	8.6	6.10	11.0	29%
1/8" 3.2mm	1.25" 32mm	400	28	54	11.4	65	10.4	-9%	1.37	5.2	1.65	4.7	-9%
		500	30	68	13.1	87	14.7	12%	1.73	5.9	2.21	6.7	12%
		600	32	80	15.6	115	20.0	28%	2.03	7.1	2.92	9.1	28%
		700	34	95	19.3	155	25.7	33%	2.41	8.8	3.94	11.7	33%
		800	36	108	22.1	200	33.0	45%	1.74	10.3	5.08	15.0	45%
5/32" 4.0mm	1.5" 38mm	400	28	38	10.9	45	12.2	3%	0.97	4.9	1.14	5.5	3%
		500	30	48	14.0	58	14.5	11%	1.22	6.4	1.47	6.6	11%
		600	32	55	17.2	69	18.5	13%	1.40	7.8	1.75	8.4	13%
		700	34	65	19.6	90	23.8	21%	1.65	8.9	2.29	10.8	21%
		800	36	75	23.5	115	29.8	27%	1.91	10.7	2.92	13.5	27%
900	38	88	28.2	143	38.7	37%	2.24	12.8	3.63	17.6	37%		

The information above can be used as a starting point in procedure development for both SDX and SubCOR wires. The optimal voltage may vary (typically  $\pm 2$  volts) depending on the choice of flux, material thickness, joint design, and other variables specific to the application. Maintaining a proper welding procedure—including pre-heat and interpass temperatures—may be critical depending on the type and thickness of steel being welded. Parameters are provided for informational purposes only. All values are approximate.

## Deposition Rate Comparison: 1/8 in. (3.2mm) Diameter





# SDX Carbon Steel Solid Wires



## AWS A5.17 Wire/Flux Classifications

**Note:** All classifications subject to change. Please visit [HobartBrothers.com](http://HobartBrothers.com) for the most up-to-date information.

Product	HA-495	HN-590	SWX 110	SWX 120	SWX 150
SDX S2Si-EM12K	F7A2-EM12K	F7A4-EM12K	F7A4-EM12K F7P6-EM12K	F7A6-EM12K F7P8-EM12K	F7A6-EM12K F7P8-EM12K
SDX EM13K		F7A4-EM13K F7P4-EM13K	F7A4-EM13K F7P4-EM13K	F7A4-EM13K F7P8-EM13K	F7A4-EM13K F7P8-EM13K
SDX S3Si-EH12K			F7A6-EH12K F7P6-EH12K	F7A6-EH12K	F7A8-EH12K F7P8-EH12K

## Features and Benefits

**Note:** All SDX wires are level-layer wound onto a protective wire basket that simplifies loading onto coil adapters, and helps ensure smooth feeding, even when a coil adapter is in less-than-perfect condition.

Product	Features
SDX S1-EL12	<ul style="list-style-type: none"> <li>• Low manganese and silicon content is well suited for use with active fluxes</li> <li>• Low cost wire for applications with clean base metal and no/low toughness requirements</li> </ul>
SDX S2Si-EM12K	<ul style="list-style-type: none"> <li>• A very versatile wire for use with a wide range of applications, steel grades, and Hobart fluxes</li> </ul>
SDX EM13K	<ul style="list-style-type: none"> <li>• A very versatile wire for use with a wide range of applications, steel grades, and Hobart fluxes</li> <li>• Increased silicon content allows improved bead wetting and higher travel speeds than EM12K wire</li> </ul>
SDX S3Si-EH12K	<ul style="list-style-type: none"> <li>• High manganese content helps to provide excellent weld toughness</li> <li>• Suitable for use in demanding applications</li> </ul>

## Typical Applications

Product	Key Applications
SDX S1-EL12	<ul style="list-style-type: none"> <li>• <b>Light-duty general fabrication</b></li> <li>• <b>Use with active fluxes</b></li> </ul> <ul style="list-style-type: none"> <li>• Thin-wall tanks and pressure vessels</li> <li>• Light structural</li> </ul>
SDX S2Si-EM12K	<ul style="list-style-type: none"> <li>• <b>General fabrication</b></li> <li>• Pressure vessels</li> <li>• Structural and bridge fabrication</li> </ul> <ul style="list-style-type: none"> <li>• Boiler and pressure vessels</li> <li>• Storage tanks</li> <li>• Railcar</li> </ul>
SDX EM13K	<ul style="list-style-type: none"> <li>• <b>General fabrication</b></li> <li>• Pressure vessels</li> <li>• Structural and bridge fabrication</li> </ul> <ul style="list-style-type: none"> <li>• Boiler and pressure vessels</li> <li>• Storage tanks</li> <li>• Railcar</li> </ul>
SDX S3Si-EH12K	<ul style="list-style-type: none"> <li>• <b>High-strength high-toughness applications</b></li> <li>• Wind tower fabrication</li> <li>• Offshore structures</li> </ul> <ul style="list-style-type: none"> <li>• Heavy equipment</li> <li>• Boiler and pressure vessels</li> <li>• Double-jointing</li> </ul>

# SDX Carbon Steel Solid Wires

## Product Comparison



## Standard Part Numbers and Packaging

For a complete list of diameters and packaging, please contact Hobart at (800) 424-1543 or (937) 332-5188 for International Customer Service.

Product	Package Type & Weight	3/32" (2.4 mm)	1/8" (3.2 mm)	5/32" (4.0 mm)
SDX S1-EL12	55 lb. (25 kg) Wire Basket	710241025H	710321025H	710401025H
	1000 lb. (454 kg) Drum	71024414FH	71032414FH	71040414FH
SDX S2Si-EM12K	55 lb. (25 kg) Wire Basket	722241025H	722321025H	722401025H
	1000 lb. (454 kg) Drum	72224414FH	72232414FH	72240414FH
SDX EM13K	55 lb. (25 kg) Wire Basket	712241025H	712321025H	712401025H
	1000 lb. (454 kg) Drum	71224414FH	71232414FH	71240414FH
SDX S3Si-EH12K	55 lb. (25 kg) Wire Basket	732241025H	732321025H	732401025H
	1000 lb. (454 kg) Drum	73224414FH	73232414FH	73240414FH

## Competitive Cross-Reference

AWS Wire Classification	Hobart® SDX Wire	Hobart® SubCOR™ Wire*	Lincoln Electric	ESAB
EL12	SDX S1-EL12	SubCOR™ EM12K-S	Lincolnweld® L-60™	OK Autrod 12.10
EM12K	SDX S2Si-EM12K	SubCOR™ EM12K-S	Lincolnweld® L-61®	Spoolarc® 81 OK Autrod 12.22
EM13K	SDX EM13K	SubCOR™ EM13K-S SubCOR™ EM13K-S MOD	Lincolnweld® L-50®	Spoolarc® 29S
EM14K	**	SubCOR™ EM13K-S MOD	Lincolnweld® LA-71™	Spoolarc® 71
EH11K	**	SubCOR™ EM13K-S MOD	Lincolnweld® L-56®	Spoolarc® 86
EH12K	SDX S3Si-EH12K	SubCOR™ EM13K-S MOD	Lincolnweld® L-S3	Spoolarc® 53 OK Autrod 12.32

**ALWAYS CONSIDER THE WIRE/FLUX COMBINATION WHEN SELECTING WIRES AND FLUXES FOR USE IN ANY APPLICATION!**

We strongly advise further discussion of your customer's applications with Hobart's technical specialists. Please send an e-mail to [Applications.Engineering@HobartBrothers.com](mailto:Applications.Engineering@HobartBrothers.com) or call 800-532-2618 for technical support.

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\*SubCOR products have an EC1 wire classification, but are provided for consideration in solid wire to cored wire conversions.

\*\*Hobart does not offer EM14K or EH11K wires, but several products in the SDX offering may still provide comparable and acceptable mechanical properties. Please contact Hobart technical support for further discussion.

# Flux Terminology

## Active vs. Neutral Fluxes

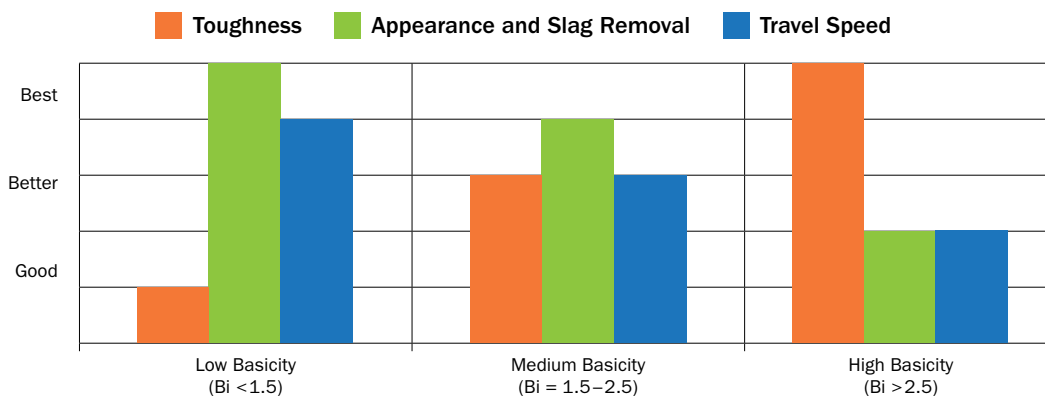
When it comes to flux, good enough is not enough: flux is a critical component in the SAW process. Selecting the optimal flux for each application is critical to maximizing welding performance. Hobart offers fluxes that are *active*, others that are *neutral*, fluxes with *high basicity*, and others with *low basicity*. Understanding these terms is helpful when selecting the optimal flux for any welding application.

	Active Fluxes	Neutral Fluxes
<b>Summary</b>	Flux changes the weld metal chemistry significantly	Does NOT change weld metal chemistry significantly
<b>Advantages</b>	<ul style="list-style-type: none"> <li>• <b>Best suited for single-pass or two-pass welds</b></li> <li>• Alloy addition compensates for high-dilution welds</li> <li>• Allows high travel speed</li> <li>• Tolerant of rust and mill-scale</li> </ul>	<ul style="list-style-type: none"> <li>• <b>No limitation on material thickness</b></li> <li>• Not parameter sensitive</li> <li>• Good general purpose and multi-wire performance</li> <li>• Minimal effect on impact properties</li> </ul>
<b>Disadvantages</b>	<ul style="list-style-type: none"> <li>• Very sensitive to parameter changes</li> <li>• <b>Not suited for large multi-pass welds</b></li> <li>• Some welding codes limit/prohibit use</li> </ul>	<ul style="list-style-type: none"> <li>• General purpose, but not optimal in all applications</li> <li>• Doesn't add what might be lost during welding</li> </ul>

## High Basicity vs. Low Basicity Fluxes

Flux basicity is often expressed in terms of a **Basicity index (Bi)**, which is a calculated value based on flux composition. In most cases, fluxes with higher basicity indexes offer improved toughness, while fluxes with lower basicity indexes tend to offer more appealing welding characteristics. This is summarized visually below.

**For a majority of applications, the rule of thumb is to select the flux with the lowest basicity index that offers acceptable mechanical properties.** Following this rule of thumb helps ensure the best balance between performance and properties.



# Hobart Fluxes



## Characteristics

All Hobart fluxes are agglomerated to provide excellent general-purpose welding characteristics and mechanical properties at a reasonable cost. They can be operated using DCEP, DCEN, or AC polarity, and are suitable for single- or multi-wire welding.

Product	EN ISO 14174 Class	Flux Type	Approximate Basicity Index	Alloy Transfer
HA-495	S A AR 1 78 AC H5 (Pending)	<b>Active</b> Aluminate-rutile	0.8	Si & Mn Alloying
SWX 110	S A AB 1 67 AC H5	<b>Neutral</b> Aluminate-basic	1.4	Slightly Si & Mn Alloying
HN-590	S A AB 1 68 AC H5 (Pending)	<b>Neutral</b> Aluminate-basic	1.7	Slightly Si & Mn Alloying
SWX 120	S A AB 1 57 AC H5	<b>Neutral</b> Aluminate-basic	1.9	Slightly Mn Alloying
SWX 150	S A FB 1 55 AC H5	<b>Neutral</b> Fluoride-basic	3.3	None

## Features and Benefits

Product	Features
HA-495	<ul style="list-style-type: none"> <li>Active flux formulation provides excellent bead appearance and wetting action, even when wetting at very high travel speeds</li> <li>Active flux formula provides excellent resistance to porosity caused by rust or mill scale</li> <li>Excellent slag removal helps reduce clean up time to improve productivity</li> </ul>
SWX 110	<ul style="list-style-type: none"> <li>Carefully chosen formula provides excellent weldability and good bead appearance</li> <li>Wide parameter window allows the use of high-productivity procedures with optimal performance</li> <li>Suitable for use in a wide range of industries and applications</li> <li>Provides excellent slag removal, minimizing clean-up time and risk of inclusion</li> </ul>
HN-590	<ul style="list-style-type: none"> <li>Moderate basicity balances good mechanical properties and good welding characteristics</li> <li>Provides good slag removal for reduced clean-up time, and minimized risk of inclusion in narrow-groove applications</li> <li>Provides good resistance to cracking and porosity to help minimize risk of part rework during welding or in service</li> </ul>
SWX 120	<ul style="list-style-type: none"> <li>Moderate basicity balances good weldability and mechanical properties</li> <li>High current carrying capacity allows the use of high productivity parameters</li> <li>Formulation provides uniform deposit properties when welding thick sections</li> <li>Excellent slag detachment is suitable for narrow and tubular joints</li> </ul>
SWX 150	<ul style="list-style-type: none"> <li>Formulated to provide uniform deposit properties when welding thick sections</li> <li>High-basicity performance provides excellent toughness for demanding applications</li> <li>Suitable for use with many wires intended for high-strength low-alloy steels</li> </ul>

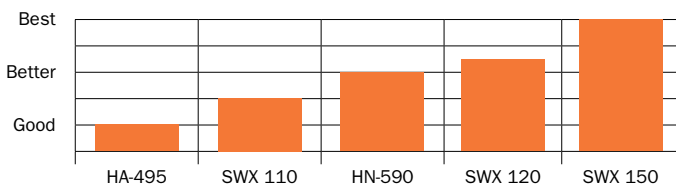
# Hobart Fluxes

## Typical Applications

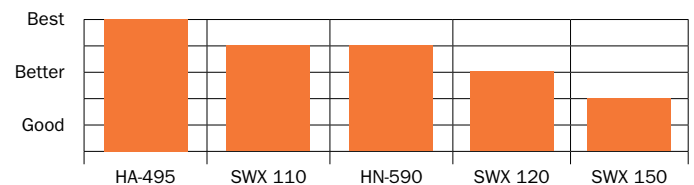
Product	Key Applications
HA-495	<ul style="list-style-type: none"> <li>• Single or double-pass fillet welds</li> <li>• Thin-wall tanks and pressure vessels</li> <li>• Light structural</li> <li>• Railcar</li> </ul>
SWX 110	<ul style="list-style-type: none"> <li>• General fabrication</li> <li>• Structural and bridge fabrication</li> <li>• Boiler and pressure vessels</li> <li>• Storage tanks</li> <li>• Railcar</li> <li>• Shipbuilding</li> </ul>
HN-590	<ul style="list-style-type: none"> <li>• General fabrication</li> <li>• Structural and bridge fabrication</li> <li>• Boiler and pressure vessels</li> <li>• Storage tanks</li> <li>• Railcar</li> </ul>
SWX 120	<ul style="list-style-type: none"> <li>• Wind towers</li> <li>• Pressure vessels</li> <li>• Storage tanks</li> <li>• Heavy equipment</li> <li>• Railcar</li> <li>• Shipbuilding</li> </ul>
SWX 150	<ul style="list-style-type: none"> <li>• Offshore structures</li> <li>• Wind towers</li> <li>• Civil construction</li> <li>• Boiler and pressure vessels</li> <li>• Double-jointing</li> <li>• High-strength high-toughness applications</li> </ul>

## Product Comparison

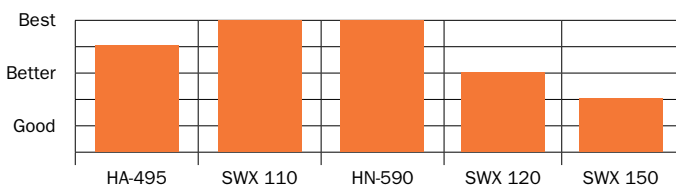
Weld Toughness



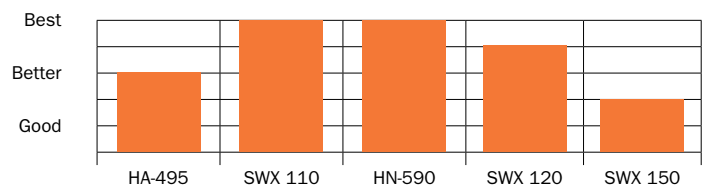
Welding Over Rust and Mill-Scale



Slag Release and Bead Appearance



General Purpose Use



# Hobart Fluxes

## Standard Packaging and Part Numbers

For a complete list of diameters and packaging, please contact Hobart at (800) 424-1543 or (937) 332-5188 for International Customer Service.

Product	Package Type and Weight	Part Number
HA-495	55 Lb. (25 kg) Bag	S669410-055
SWX 110	55 Lb. (25 kg) EAE Bag*	110022500H
HN-590	55 Lb. (25 kg) Bag	S669310-055
SWX 120	55 Lb. (25 kg) EAE Bag*	120022500H
SWX 150	50 Lb. (22.5 kg) EAE Bag*	150022300H

\*Note: Hobart provides a unique solution to combat one of the greatest threats to weld integrity: hydrogen in the weld metal. SWX fluxes are packaged into a rigidly-welded five-layer, polyethylene-aluminum foil bag with a reduced-pressure atmosphere (Excess Air Evacuation). As a result, moisture pick-up in storage is drastically reduced (as well as the risk of hydrogen-induced cracking and porosity). Products stored un-opened can be used without re-drying, helping to save time and money.

## Competitive Cross-Reference

Hobart® Flux	Lincoln Electric	ESAB
HA-495	Lincolnweld® 761® Lincolnweld® 780®	OK FLUX 10.81
SWX 110 HN-590	Lincolnweld® 860® Lincolnweld® P230	OK FLUX 10.71
SWX 120	Lincolnweld® WTX™	OK FLUX 10.72
SWX 150	Lincolnweld® 880M® Lincolnweld® 8500™ Lincolnweld® 842-H™	OK FLUX 10.62



These suggestions are for general purpose applications made by considering flux properties and EN ISO classifications. Due to difference in formulations between manufacturers, different fluxes having similar classifications may have noticeably different welding characteristics and suitability for a particular application.

### **ALWAYS CONSIDER THE WIRE/FLUX COMBINATION WHEN SELECTING WIRES AND FLUXES FOR USE IN ANY APPLICATION!**

We strongly advise further discussion of your applications with Hobart's technical specialists. Please send an e-mail to [Applications.Engineering@HobartBrothers.com](mailto:Applications.Engineering@HobartBrothers.com) or call 1-800-532-2618 for support.

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# Hobart: Your Partner in Submerged Arc Welding Excellence

## Your success is our success.

That's why Hobart takes great care to fully understand and solve your unique submerged arc welding challenges. By partnering with Hobart *and* Miller Electric Mfg. Co., you'll benefit from our vast industry experience and knowledge developed through extensive and ongoing testing in our research facilities. You'll experience our passion for excellence in the precise formulations and exacting processes we use to produce filler metal and flux solutions.

## Want More information?

Visit us online at [HobartBrothers.com/SubArc](http://HobartBrothers.com/SubArc) for the most up-to-date product data sheets, approval certificates (for all agencies available), and safety data sheets. For a complete listing of available diameters and packaging, contact us at (800) 424-1543 OR (937) 332-5188 for International customer service.

Download our free Submerged Arc Welding Handbook to learn more about the complete offering of wires and fluxes from Hobart Filler Metals. This definitive guide contains:

- **Product data**—typical chemical composition and mechanical properties—for all wire and fluxes
- **Quick selection guides** to help choose the best products for your application
- A variety of **useful reference materials** that highlight the operational benefits of the submerged arc process, multi-wire SAW welding, our unique wires, and more
- **Process troubleshooting guides** to help keep your welding running smoothly



## Disclaimer

The information contained or otherwise referenced herein is for reference purposes only and is presented only as "typical." Typical data are those obtained when welding and testing are performed in accordance with applicable AWS and/or EN ISO specifications. Other tests and procedures may produce different results and typical data should not be assumed to yield similar results in a particular application or weldment. No data is to be construed as a recommendation for any welding condition or technique not controlled by Miller and Hobart. Miller and Hobart do not assume responsibility for any results obtained by persons over whose methods it has no control. It is the user's responsibility to determine the suitability of any products or methods mentioned herein for a particular purpose. In light of the foregoing, Miller and Hobart specifically disclaim any liability incurred from reliance on such information, and disclaims all guarantees and warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, and further disclaims any liability for consequential or incidental damages of any kind, including lost profits.

# Submerged Arc Welding

## Essential Carbon Steel Consumables



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