AWS CLASSIFICATIONS EXPLAINED

The American Welding Society (AWS) numbering system can tell a welder quite a bit about a specific stick electrode including what application it works best in and how it should be used to maximize performance. With that in mind, let's take a look at the system and how it works.

The prefix "E" designates an arc welding electrode. The first two digits of a 4-digit number and the first three digits of 5-digit number indicate tensile strength. For example, E6010 is a 60,000 psi tensile strength electrode while E10018 designates a 100,000 psi tensile strength electrode.

E	60	1	"10"
Electrode	Tensile strength	Position	Type of Coating and Current

The next to last digit indicates position. The "1" designates an all position electrode, "2" is for flat and horizontal positions only; while "3" indicates an electrode that can be used for flat, horizontal, vertical down and overhead. The last 2 digits taken together indicate the type of coating and the correct polarity or current to use. See chart below:

Digit	**Type of Coating**	**Welding Current**
10	High cellulose sodium	DC+
11	High cellulose potassium	AC or DC+ or DC-
12	High titania sodium	AC or DC-
13	High titania potassium	AC or DC+
14	iron powder titania	AC or DC- or DC+
15	low hydrogen sodium	DC+
16	low hydrogen potassium	AC or DC+
27	iron powder iron oxide	AC or DC+ or DC-
18	iron powder low hydrogen	AC or DC+
20	High iron oxide	AC or DC+ or DC-
22	High iron oxide	AC or DC-
24	iron powder titania	AC or DC- or DC+
28	Low hydrogen potassium iron powder	AC or DC+

As a welder, there are certain electrodes that you will most likely see and use time and time again as you go about your daily operations. A DC machine produces a smoother arc. DC rated electrodes will only run on a DC welding machine. Electrodes which are rated for AC welding are more forgiving and can also be used with a DC machine. Here are some of the most common electrodes and how they are typically used:

E6010
DC only and designed for putting the root bead on the inside of a piece of pipe, this is the most penetrating arc of all. It is tops to dig through rust, oil, paint or dirt. It is an all-position electrode that beginning welders usually find extremely difficult, but is loved by pipeline welders world-wide.

E6011
This electrode is used for all-position AC welding or for welding on rusty, dirty, less-than-new metal. It has a deep, penetrating arc and is often the first choice for repair or maintenance work when DC is unavailable.

E6013
This all-position, AC electrode is used for welding clean, new sheet metal. Its soft arc has minimal spatter, moderate penetration and an easy-to-clean slag.

E7018
A low-hydrogen, usually DC, all-position electrode used when quality is an issue or for hard-to-weld

metals. It has the capability of producing more uniform weld metal, which has better impact properties at temperatures below zero.

E7024
Typically used to make a large weld downhand with AC in plate that is at least ¼" thick, but more commonly used for plate that is ½" and up.

OTHER ELECTRODES
Although not nearly as common, an electrode may have additional numbers after it such as E8018-B2H4R. In this case, the "B2" indicates chemical composition of the weld metal deposit. The "H4" is the diffusible hydrogen designator, which indicates the maximum diffusible hydrogen level obtained with the product. And "R" stands for the moisture resistant designator to indicate the electrode's ability to meet specific low moisture pickup limits under controlled humidification tests.