# Stainless Steel Wires for TIG/MIG

## Solid Stainless Steel Cut Lengths and Spooled Wires


J.W. HARRIS Stainless Steel Cut Lengths and Spooled Wires are precisely produced to conform to the requirement of AWS A5.9. These products are subjected to rigid quality control throughout the manufacturing process with particular attention given to cleanliness, concentricity and helix of the finished product.

ER 308: Most frequently used for base metals of similar composition.

ER 308L: Similar usage as the above, but the 0.03% maximum carbon content increases resistance to intergranular corrosion.

ER 308LSi: Similar usage as the above, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

ER 309: Used for welding similar alloys in wrought or cast form; occasionally used for welding 18-8 base metals when severe corrosion conditions exist; and, at times, welding dissimilar steels.

ER 309L: Similar usage as 309 Bare, but the 0.03% maximum carbon content increases resistance to intergranular corrosion.

ER 309LSi: Similar usage as the above, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

ER 310: Most frequently used to weld base metals of similar composition.

ER 316: Usually used for welding similar alloys (containing about 2% molybdenum); also for high temperature service applications.

ER 316L: Used principally for welding molybdenum-bearing austenitic alloys containing 0.03% maximum carbon.

ER 316LSi: Similar usage as the above, but the 0.65-1.00% silicon content improves wash and wetting behavior in the gas shielded welding processes.

ER 317L: The alloy content is somewhat higher than for ER 316, particularly in molybdenum. The maximum 0.03% carbon content increases resistance to intergranular corrosion due to carbide precipitation. Severe corrosion resistance to sulfuric and sulfurous acids and their salts.

ER 347: A stabilized 18-8, 19-9 alloy that is not subject to intergranular corrosion due to carbide precipitation.

ER 410: Used for welding alloys of similar compositions; also for overlays on carbon steels to resist corrosion, erosion or abrasion. Usually requires preheat and postheat treatments.

ER 630: The composition of this filler metal is designed primarily for welding ASTM A564 Type 630 and some other precipitation - hardening stainless steels.

# Recommended Filler Metals for Welding of Stainless Steel

## Chemical Compositions of Stainless Steel:

| Product | C | Cr | Ni | Mo | Cb&Ta | Mn | Si | P | S | Fe | Cu |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ER308 | 0.08 | 19.5-22.0 | 9.0-11.0 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER308L | 0.03 | 19.5-22.0 | 9.0-11.0 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER308LSi | 0.03 | 19.5-22.0 | 9.0-11.0 | 0.75 | | 1.0-2.5 | 0.65-1.00 | 0.03 | 0.03 | Rem. | 0.75 |
| ER309 | 0.12 | 23.0-25.0 | 12.0-14.0 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER309L | 0.03 | 23.0-25.0 | 12.0-14.0 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER309LSi | 0.03 | 23.0-25.0 | 12.0-14.0 | 0.75 | | 1.0-2.5 | 0.65-1.00 | 0.03 | 0.03 | Rem. | 0.75 |
| ER310 | 0.08-0.15 | 25.0-28.0 | 20.0-22.5 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER312 | 0.15 | 28.0-32.0 | 8.0-10.5 | 0.75 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER316 | 0.08 | 18.0-20.0 | 11.0-14.0 | 2.0-3.0 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER316L | 0.03 | 18.0-20.0 | 11.0-14.0 | 2.0-3.0 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER316LSi | 0.03 | 18.0-20.0 | 11.0-14.0 | 2.0-3.0 | | 1.0-2.5 | 0.65-1.00 | 0.03 | 0.03 | Rem. | 0.75 |
| ER317L | 0.03 | 18.5-20.5 | 13.0-15.0 | 3.0-4.0 | | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER347 | 0.08 | 19.0-21.5 | 9.0-11.0 | 0.75 | 10xC min.-1.0 max. | 1.0-2.5 | 0.30-0.65 | 0.03 | 0.03 | Rem. | 0.75 |
| ER410 | 0.12 | 11.5-13.5 | 0.6 | 0.75 | | 0.6 | 0.05 | 0.03 | 0.03 | Rem. | 0.75 |
| ER630 | 0.05 | 16.0-16.75 | 4.5-5.0 | 0.75 | 0.15-0.30 | 0.25-0.75 | 0.75 | 0.03 | 0.03 | Rem. | 3.25-4.00 |

### Shielding Gas Considerations for J.W. Harris Solid Stainless Steel Cut Lengths and Spooled Wires

TIG - Argon is suggested for thickness up to approximately 1/2". For thicker sections, argon-helium mixtures or pure helium may be used for deeper penetration. Argon-hydrogen mixtures are occasionally used to improve bead shape and wettability.

MIG - Spray Transfer - 99% argon - 1% oxygen is predominantly used. This mixture improves arc stability; produces a more fluid and controllable weld puddle with good bead contour. Undercutting is minimized on heavier sections. 98% argon - 2% oxygen provides better arc stability and welding speed than the 1% oxygen mixture for thinner stainless steel materials.

MIG - Short Circulating Transfer - 90% helium + 7.5% argon + 2.5% CO2 has no effect on corrosion resistance; provides small heat-affected zone; no undercutting; and minimum distortion.