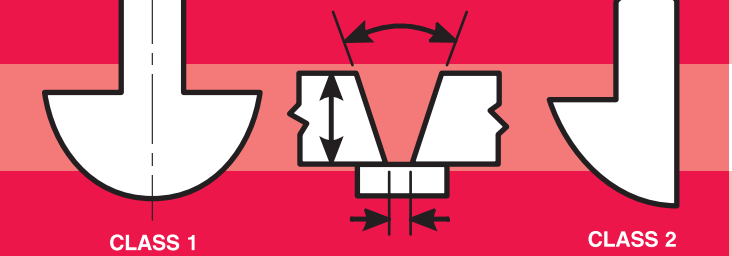

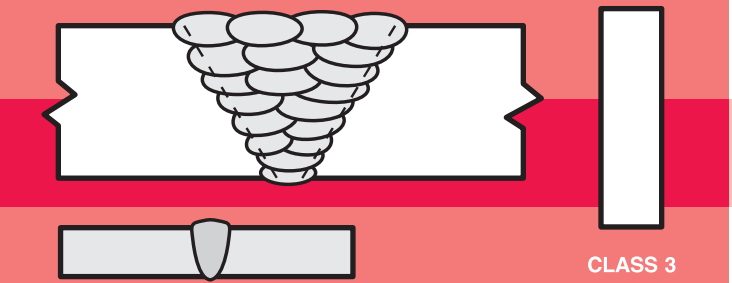

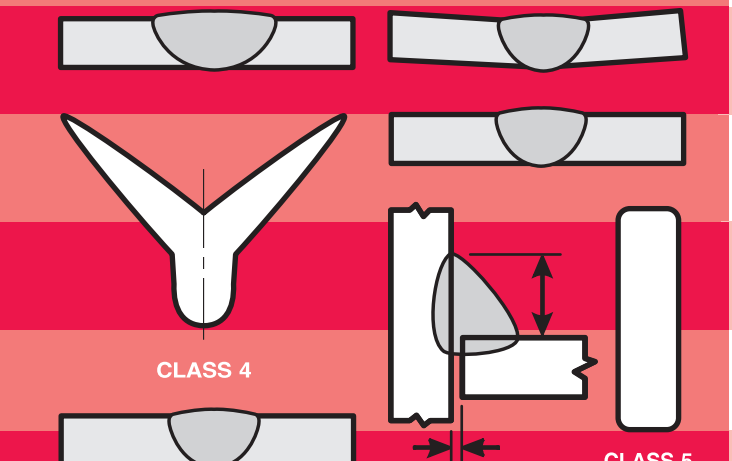

The Professional's Advisor on

Welding of Stainless Steels

AWS

Compiled/Edited by
Richard D. Campbell, P.E.
Welding Solutions, Inc., Broomfield, CO

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550 N.W. LeJeune Road, Miami, Florida 33126

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Basic Safety Precautions

Burn Protection. Molten metal, sparks, slag, and hot work surfaces are produced by welding, cutting, and allied processes. These can cause burns if precautionary measures are not used. Workers should wear protective clothing made of fire-resistant material. Pant cuffs, open pockets, or other places on clothing that can catch and retain molten metal or sparks should not be worn. High-top shoes or leather leggings and fire-resistant gloves should be worn. Pant legs should be worn over the outside of high-top shoes. Helmets or hand shields that provide protection for the face, neck, and ears, and a head covering to protect the head should be used. In addition, appropriate eye protection should be used.

Electrical Hazards. Electric shock can kill. However, it can be avoided. Live electrical parts should not be touched. The manufacturer's instructions and recommended safe practices should be read and understood. Faulty installation, improper grounding, and incorrect operation and maintenance of electrical equipment are all sources of danger.

All electrical equipment and the workpiece should be grounded. The workpiece lead is not a ground lead. It is used only to complete the welding circuit. A separate connection is required to ground the workpiece. The workpiece should not be mistaken for a ground connection.

Fumes and Gases. Many welding, cutting, and allied processes produce fumes and gases which may be harmful to health. Avoid breathing the air in the fume plume directly above the arc. Do not weld in a confined area without a ventilation system. Use point-of-welding fume removal when welding galvanized steel, zinc, lead, cadmium, chromium, manganese, brass, or bronze. No container should be presumed to be clean or safe. Do not weld or cut on any container, including piping, until it has been examined by, cleaned under the supervision of, and rendered safe by qualified personnel.

Compressed Gas Cylinders. Keep caps on cylinders when not in use. Make sure that gas cylinders are chained to a wall or other structural support. Do not weld on cylinders.

Radiation. Arc welding may produce ultraviolet, infrared, or light radiation. Always wear protective clothing and eye protection to protect the skin and eyes from radiation. Shield others from light radiation from your welding operation.

AWS recommends a personal copy of *Arc Welding Safely*, *Fire Safety in Welding and Cutting*, *Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, and *Safety in Welding, Cutting, and Allied Processes*.

Abbreviation Quick Reference

Ag	Silver
Al	Aluminum
Ar	Argon
B	Boron
Be	Beryllium
C	Carbon
Cd	Cadmium
Co	Cobalt
CO_2	Carbon Dioxide
Cr	Chromium
Cu	Copper
Fe	Iron
He	Helium
La	Lanthanum
Li	Lithium
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
N	Nitrogen
Nb	Niobium
Ni	Nickel
O	Oxygen
P	Phosphorus
S	Sulfur
Se	Selenium
Si	Silicon
Sn	Tin
Ta	Tantalum
Ti	Titanium
V	Vanadium
W	Tungsten
Zn	Zinc
Zr	Zirconium

Chapter 1—Definitions

The terms in this chapter are common words used in dealing with welding of stainless steels. See the latest revision of AWS A3.0, *Standard Welding Terms and Definitions*, for the standard terms used in the welding industry. Some other terms and definitions are standard metallurgical and corrosion terms from ASM International and the National Association of Corrosion Engineers (NACE).

Air carbon arc cutting (CAC-A)—A carbon arc cutting process variation that removes molten metal with a jet of air.

Austenite—A nonmagnetic phase of steel with a face-centered cubic (FCC) structure.

Austenitic stainless steel—A stainless steel that contains chromium, nickel, and sometimes manganese, which produce austenite.

Autogenous weld—A fusion weld made without filler metal.

Base metal—The metal or alloy that is welded.

Buttering—A surfacing variation that deposits surfacing metal on one or more surfaces to provide metallurgically compatible weld metal for the subsequent completion of the weld.

Carbon arc cutting (CAC)—An arc cutting process that uses a carbon electrode.

Carburizing flame—A reducing oxyfuel gas flame in which there is an excess of fuel gas, resulting in a carbon-rich zone extending around and beyond the cone.

Cold crack—A crack which develops after solidification is complete.

Corrosion—The deterioration of a metal by chemical or electrochemical reaction with its environment.

Consumable insert—Filler metal that is placed at the joint root before welding, and is intended to be completely fused into the joint root to become part of the weld.

Crater crack—A crack formed in the crater or end of a weld bead, typically a form of a hot crack.

Crevice corrosion—Corrosion caused by the concentration of corrodent along crevices.

Defect—A discontinuity or discontinuities that by nature or accumulated effect (for example total crack length) render a part or product unable to meet minimum applicable standards or specifications. The term designates rejectability.

Delayed crack—A nonstandard term for cold crack caused by hydrogen embrittlement.

Dilution—The change in chemical composition of a welding filler metal caused by the admixture of the base metal or previous weld metal in the weld bead.

Discontinuity—An interruption of the typical structure of a material, such as a lack of homogeneity in its mechanical, metallurgical, or physical characteristics. A discontinuity is not necessarily a defect.