

**Summary of content in our series of CSA Version of WPS's (Welding Procedure Specifications) for Arc Welding Processes**

(Note: CSA codes require that each WPDS's (Welding Procedure Data Sheets) to be referenced and included with WPS, and submitted to the CWB (Canadian Welding Bureau) for review

- Scope based on CSA and AWS structural welding codes for each of the major arc welding processes for welding of steels and/or stainless steels
- Base metal groups, conform to each welding code, as well as industry information, like types of stainless steel, all fact about stainless steel, etc.
- Mode of welding process application: manual welding, semi-automatic welding, machine welding or automatic welding
- Filler metal, welding electrode, welding rod and welding wire that are most in use for each welding process, variables that affect electrode selection
- Storage and conditioning of filler metal, welding electrode, welding rod and welding wire
- Types of welding procedure data sheets, prequalified welding procedure data sheet (WPDS) or non-prequalified welding procedure data sheet (WPDS)
- Code limitation of variables for prequalified welding procedure data sheet (WPDS)
- Shielding gas selection for gas arc welding, based on metal transfer methods (short circuit, spray or globular mode of transfer)
- Flux types, an active flux versus neutral flux for submerged arc welding
- Welding positions as recommended by codes for various weld joint, and weld types like butt weld or fillet weld
- Electrical characteristics of arc welding, ac or dc welding, effect of electricity on the arc welding process, electrical variables
- Heat treatment, Minimum preheat and interpass temperature, stress relieving after welding
- Preparation of base material prior to welding
- Welding techniques for each process for fillet weld and butt weld or welding groove, stringer bead or weaving bead, torch angle, forehand or backhand method (push or pull method), whipping technique, ways on how to minimize the possibility of cracking, methods for starting and extinguishing the arc, electrode orientation, etc.
- Quality of welds, acceptable and unacceptable weld profiles for fillet weld or butt weld after welding, inspection criteria as per requirements of each code.
- Weld metal cleaning, method for removing slag during and after welding
- Welding symbols, welding safety and more

**About arc welding process:**

SMAW, GMAW, GTAW, FCAW, MCAW and SAW welding process are the major arc welding processes:

-Shielded Metal Arc Welding (SMAW) or Stick welding; electrode is being used for SMAW welding process

-Flux Cored Arc Welding (FCAW); gas-shielded flux cored wire (FCAW-G) or self-shielded flux cored wire (FCAW-S) is being used for FCAW welding process

-Submerged Arc Welding (SAW); solid wire is being used for SAW welding process

-Gas Metal Arc Welding (GMAW) or MIG welding; only solid wire is being used for MIG welding process, as per CSA code

-Metal Cored Arc Welding (MCAW); only metal cored wire is being used for MCAW welding process, as per CSA code

-Gas Tungsten Arc Welding (GTAW) or TIG welding; rod or solid wire is being used for TIG welding process

**Mode of process application for all the major arc welding process:**

**(a) Manual welding:**

Welding wherein the entire welding operation is performed and controlled by hand.

**(b) Semi-automatic welding:**

Welding with equipment that supplies continuous wire feed with or without means for mechanical travel. Manual manipulation by the welder of one or more of the variables of speed of travel, guidance, and direction of wire is involved during the welding operation.

**(c) Machine welding:**

Welding with equipment that performs the welding operation under the constant observation and control of a welding operator.

**(d) Automatic welding:**

Welding with equipment that performs the welding operation without adjustment of the controls by welding operator.