

Guide for the Preparation and Bend Testing of Welder and Welding Procedure Qualification Test Specimens

This guide provides basic instructions for the preparation and bend testing of welder and welding procedure qualification test specimens. The recommended sequence for preparing bend test specimens is as follows:

- Mark the location of the specimens on the test assembly.
- Remove the discard from each end of the test assembly.
- Remove the entire backing bar, if present, ensuring that none of the base metal is removed.
- Straighten the test assembly.
- Remove the weld reinforcement until it is flush with the parent plate.
- Cut the test specimens to the specified dimensions ensuring that each specimen still carries the identification stamped on it by the CWB's Certification Services Representative. Refer to the tables and the figures from the applicable standard specified in the tables below.

Procedure Qualification Test Assemblies

Joint Type	Bend Test Specimens Required By CSA Standard W47.1	Bend Test Specimens Required By CSA Standard W47.2
Complete joint penetration groove welds <10mm	2 Root Bends 2 Face Bends 2 Longitudinal Root bends or 2 Longitudinal Face Bends See Figure 26 of CSA W47.1	2 Root Bends 2 Face Bends See Figure 6 of CSA W47.2
Complete joint penetration groove welds >10mm	4 Side Bends See Figure 27 of CSA W47.1	4 Side Bends See Figure 7 of CSA W47.2
Partial joint penetration groove welds	4 Side Bends See Figure 25 of CSA W47.1	4 Side Bends See Figure 8 of CSA W47.2

Welder Qualification Test Assemblies

Test Assembly Thickness	Tests Specimens Required by CSA Standard W47.1	Tests Specimens Required By CSA Standard W47.2
Plate ≤10mm	2 Root Bends 1 Face Bend See Figures 8 & 12 of CSA W47.1	2 Root Bends 2 Face Bends 2 Macro Etches 2 Fractures See Figure 19 of CSA W47.2
Plate >10mm	3 Side Bends See Figure 9 of CSA W47.1	2 Macro Etches 4 Side Bends 4 Fractures See Figure 20 of CSA W47.2
Pipe	See Figure 13 of CSA W47.1	See Figure 24 of CSA W47.2

- Grind off any residual weld reinforcement or backing taking care not to remove material below the plane of the parent metal. Test specimens that show signs of excessive grinding will be considered as failures.
- Remove any residual tack welds and grind a 3 mm corner radius on the edges.

- Perform a final dressing on a belt sander. The direction of sanding should be perpendicular to the weld.
- Inspect each specimen.
- Bend the specimens in a plunger and die or wrap around type bending jig as follows.

The bending jig must conform dimensionally to those shown in Figure 18 of CSA Standard W47.1 or Figure 16 of CSA Standard W47.2, as applicable.

Plunger and Die Type Jig

Refer to Figure 18b of CSA Standard W47.1 or to Figure 16 of CSA Standard W47.2 to determine the appropriate plunger and die dimensions for the test specimen. Place the test specimen on the shoulders of the die with the weld directly below the center of the plunger.

- (i) face bends have the stamped side facing downwards;
- (ii) root bends have the stamped side facing upwards;
- (iii) side bends have the side of the weld with the greatest imperfections , if any, facing downwards.

Energize the system to start the bending process and continue until the test specimen is bent through an angle of 180°. See the following figures for acceptable and unacceptable bend tests.

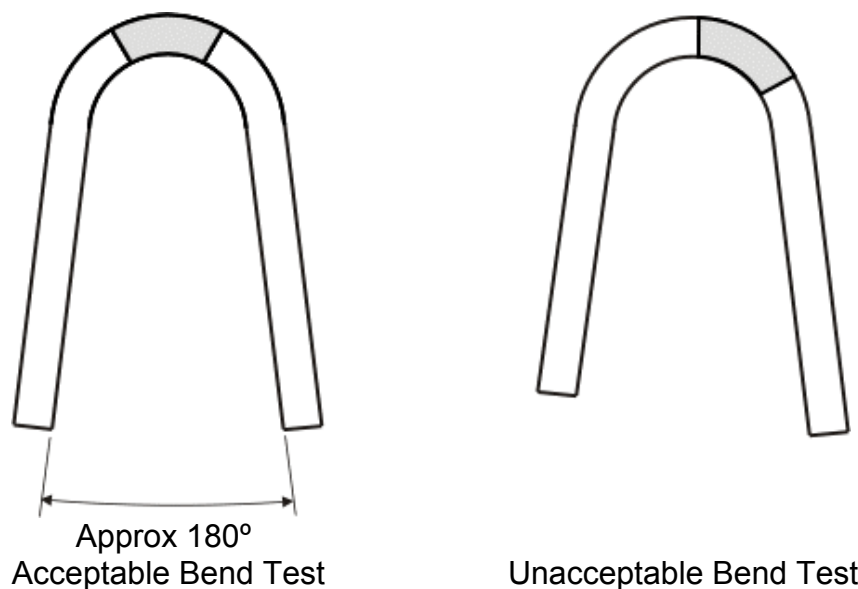
Wrap Around Type Jig

Refer to Figure 18c of CSA Standard W47.1 or to Figure 16 of CSA Standard W47.2 to determine the appropriate mandrel radius for the test specimen. After installing the required radius, insert the test specimen between the mandrel and the roller.

- (i) face bends have the stamped side facing the roller;
- (ii) root bends have the stamped side facing the mandrel;
- (iii) side bends have the side of the weld with the greatest imperfections , if any, facing the roller.

Energize the system to start the bending process and continue until the test specimen is bent through an angle of 180°. See the following figures for acceptable and unacceptable bend tests.

Tampering with the test specimens, such as by rewelding to hide visible discontinuities, either before or after bending will result in the immediate loss of bend testing privileges and failure of the welders.



The Canadian Welding Bureau will continue to perform the evaluation of the bend test specimens.