



Millwright's CWB Test Center  
580 Ebury Place  
Delta, British Columbia  
V3M6M8

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## Welder Test Information

### Rules & Regulations

1. All materials including electrodes and coupons are supplied by test center.
2. Electrode size: E7018 – 1/8" (3.2 mm) or larger diameter.
3. NO GRINDERS, SAW BLADES, FILES OR METHODS THAT REMOVE DEPOSITED METAL OR ALTER WELD BEAD PROFILE ARE PERMITTED.
4. Effective Jan. 5, 2004 welders have the choice of having their coupons cut and bent or X-rayed. CWB will provide requested x-rays. X-rayed plate results are normally available 1 week after the test date.
5. Test is comprised of four (4) positions: flat, horizontal, vertical & overhead – refer to attached diagrams.
6. All coupons have a backing strip attached – refer to attached diagrams.
7. ¾ hour is allowed per coupon.
8. Upon successful completion of the welder's test, the Canadian Welding Bureau will issue a "Welder Test Record" letter to your test center stating the date of the test, coupons welded and the test results. Your test center is now responsible for mailing your letter to you. If the welder commences employment with a CWB certified company within 90 days of the test date, upon written request of the certified company's welding supervisor and return of the original "Welder Test Record" letter, the CWB will issue a "Welder Identification Card" to that certified company. If the welder is employed by a CWB certified company after the 90 day period but not exceeding 2 years, a check test will be required prior to issuing the "Welder Identification Card". NOTE: The "Welder Identification Card" is only valid while the welder is employed by a CWB certified company.
9. If a welder wishes to retest on any failed position(s), he/she should contact the CWB for applicable information and retest rates.

## TECHNIQUES TO AID IN PASSING CWB TESTS

- Tack only on outer perimeters of the plate
- No chipping hammer marks or stray arcs on plate
- Use as much heat as you can “handle” on the first two passes
- Fill in the craters at the ends of the welds to the full cross section of the groove
- Do not build weld up more than 3 mm (1/8”) above the surface of the plates
- No more than 0.8 mm (1/32”) undercut
- No grinders, saw blades, files or tools for metal removal are allowed
- Ensure that you are never weaving up against the square cut plate – always point to the square cut plate when welding to it.
- You are required to make stop-starts as directed by the CWB Representative. They will ask for them on the first pass (fillet weld) and on the second pass at the opposite end of the test coupon. Do not make any other stop-starts close the one that you have made for the CWB Representative. Keep them as far apart as possible.

### Stop-Start Technique

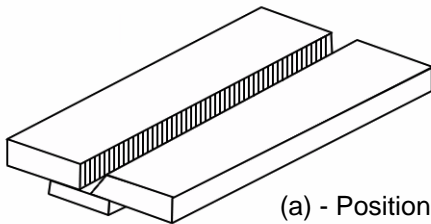
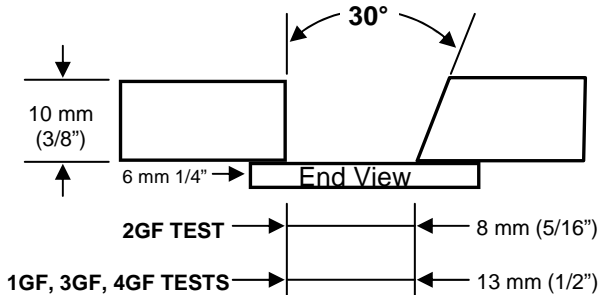
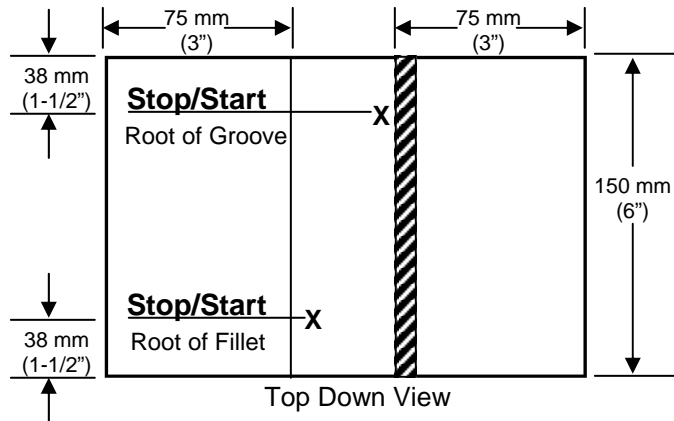
- Always restart the arc ahead of the crater where you stopped. Then move back into the crater, fill it and continue to weld.
- The second pass must touch the beveled plate.
- Technique for the fill passes is up to the welder, but it is generally considered easier and there is less chance of leaving a defect in the weld if the stringer passes are used. The vertical position may be an exception.
- The legs of the fillet weld must not vary in size by more than 1.5 mm (1/16”)
- Fillet weld size is 8 mm [5/16”] maximum (this means that you can put on a 5 mm (3/16”), 6 mm (1/4”) or 8 mm (5/16”) fillet weld).
- If attempting three passes in the root area, make sure enough room is left to fuse the third pass to the back-up strip.

## ASSEMBLIES/COUPONS FOR "S" CLASSIFICATION CSA STANDARD W47.1

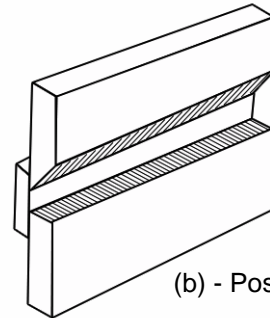
1. Fillet Weld shall be examined by the CWB Representative before welding next passes.
2. Maximum Fillet Weld size is 8 mm (5/16")
3. Fillet Weld Legs shall not differ in length more than 1.5 mm (1/16")
4. Undercut shall not exceed 0.8 mm (1/32")
5. Reinforcement shall not exceed 3 mm (1/8")
6. Stops/Restarts shall be visible in root passes in specified places. The CWB Representative shall examine them.
7. Weld Ends shall be filled in. Do not leave crater ends.

**MATERIAL**  
PLATE OR BAR OF MAXIMUM  
SPECIFICATION YIELD OF 300 MPa (44 KSI)

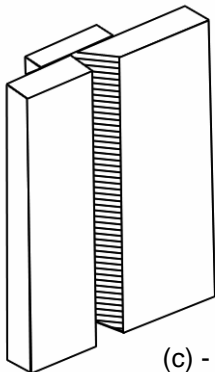
**NOTE**  
STOP/START REQUIRED ON ROOT PASSES  
OF FILLET AND GROOVE WELDS AT 38 mm  
(1-1/2") FROM THE ENDS OF TEST COUPON.



(a) - Position 1GF



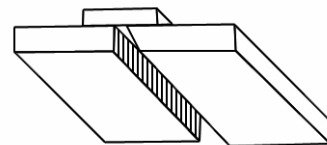
(b) - Position 2GF



(c) - Position 3GF

Position of welding for "S" Classification

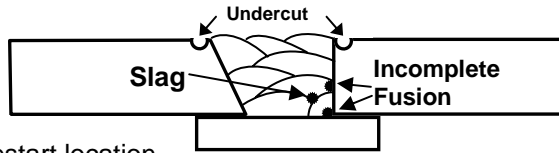
NOTE: (3-4) GF Assembly is identical to the 4GF Assembly except the fillet weld position is to be welded in the vertical position, and the groove weld portion is to be welded in the overhead position.



(d) - Position 4GF

## MOST COMMON TYPES OF FAILURE

- Incomplete fusion at the root of the fillet weld.  
 Causes: Insufficient heat  
           Poor manipulation or technique  
           Incorrect electrode angle
- Incomplete fusion or slag inclusion at a Stop/Restart location.  
 Causes: Incorrect Restart technique
- Incomplete fusion of the side wall of the square cut plate above the toe of the fillet weld.  
 Causes: Allowing the puddle to flow up against the square plate instead of pointing the arc at the square edge of the plate.
- Porosity  
 Causes: Holding a long arc/incorrect restart technique

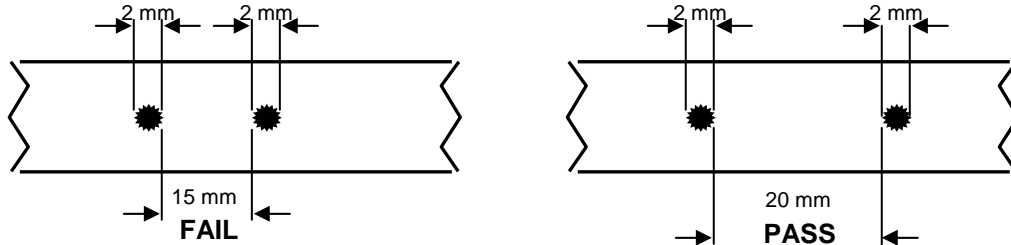


### LIMITS OF FLAWS

Porosity & fusion type defects such as slag, lack of fusion and inadequate penetration

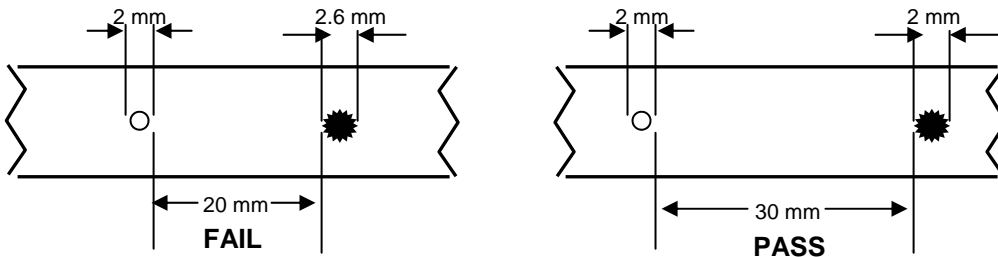
- The maximum dimension of a single flaw must not exceed 2.6 mm
- Flaws of 2 mm to 2.6 mm are evaluated based on how close they are together.

Example 1 - a 2 mm slag inclusion is 15 mm away from another 2 mm slag inclusion. Result: fail—they must be separated by 20 mm of clear metal.



Example 2 - a 2 mm diameter pore is separated from a 2.6 mm long slag inclusion by 20 mm. Result: fail—they must be separated by 26 mm of clear metal.

Example 3 - a 2 mm long lack of fusion is separated from a 2 mm diameter pore by 30 mm. Result: pass—as long as they are separated by 25 mm they are acceptable.



- If you have clusters of porosity, pieces of slag etc. smaller than 2 mm in size, and if their sizes add up to more than 9 mm in any 25 mm length of weld, a failure will result.