Table 4—Filler Metal Groups for Welder Qualification

Filler Metal Group	Welding Process	AWS Specification	AWS Classification
WF-1	SMAW	A5.1 or A5.5	EXX10-X(X), EXX11-X(X) electrodes
WF-2	SMAW	A5.1 or A5.5	Any EXX15-XX(X), EXX16-XX(X), EXX18-XX(X), EXXX-18-XX electrodes
WF-3	SMAW	A5.5	E8045-XX, E9045-XX, E10045-XX
WF-4[a]	GMAW or GTAW	A5.18	ERXXS-X
		A5.28	Any ERXX(X)S-XX(X) filler metals
WF-5	OFW	A5.2	RG60, RG65
WF-6[a]	FCAW	A5.20 or A5.36	Any EXXT-1C, EXXT-1M, EXXT-9C, EXXT-9M, EXXT-12C, or EXXT-12M
		A5.29	Any E(X)XX-1XX(X)M
A shielding gas (see 5.4.2.7) is required for use with the electrodes in Group WF-4 and WF-6			

When two welders are used to fill the joint thickness, each welder shall have a weld on one surface (i.e. one welder root surface, other welder cap surface). A defect(s) shall disqualify both welders regardless of the location of the defect(s).

For half-circumference dual-welder qualification, the failure of a test joint from one half of the weld circumference shall not impact the qualification of the other welder who welded the other half of the weld circumference.

A welder who qualifies as an in-service branch welder in accordance with Annex B shall be considered qualified to make non in-service branch and fillet welds unless prohibited by the company. A welder who qualifies as an in-service fillet welder in accordance with Annex B shall be considered qualified to make non in-service fillet welds unless prohibited by the company. A branch or fillet welder who qualified in this manner shall be limited to the applicable range of essential variables described in Section 6.2.2 and not by the essential variables described in Annex B.

Welders shall not be considered to have a Section 6 multiple qualification by combining welds made in accordance with Section 6 and welds made in accordance with Annex B.

6.2 Single Qualification

6.2.1 General

For single qualification, a welder shall weld a test joint joining pipe nipples or segments of pipe nipples. For qualifications to make butt welds, the welder shall make a butt weld in either the rolled or the fixed position. When the welder is qualifying in the fixed position, the axis of the pipe shall be horizontal, vertical, or inclined from horizontal at an angle of not more than 45°.

For the purpose of single qualification, the company shall decide if the welder is allowed to use pre-beveled fittings as branches. The company shall decide if welders are required to cut weld bevels for butt welds or for pipe nipples used as branches.

For single qualification tests, segments of pipe nipples representing a main line or “run pipe” (which the branch is welded to) may be used to qualify the welder to make branch attachments. The segments shall be approximately one half (1/2) the pipe circumference or greater.

Changes in the essential variables described in 6.2.2 shall require requalification of the welder. The welder shall not be restricted to welding only with the welding procedure followed during qualification testing, but is limited by the essential variables of the welder qualification.

1. The full circumference shall be welded by a welder when it is allowed by the WPS used for qualification, or

2. A single welder welds at least one half (1/2) of the circumference of a test joint, or

3. By using two welders to complete the full circumference weld, during which each welder shall complete one half (1/2) the circumference from 12 o'clock to 6 o'clock position. In this "half-circumference dual-welder qualification" (see 3.1.15), the full circumference shall be welded using two welders, with each welder welding one half (1/2) the circumference that includes a top, side, and bottom portion of the test joint. Test specimens shall be removed from each welder's portion of the completed weld. Specimens shall not be removed from locations where weld beads deposited by one welder overlap weld beads deposited by the other welder.

For options 2 and 3 all the required test specimens required by 6.5 shall be removed from the half welded by each welder. See Figure 13.

NOTE 2 When only one half (½) of a pipe circumference is welded during testing or when a pipe segment is welded during testing, precautions to minimize distortion of the test joint may be necessary to allow removal and testing of the required test specimens. Examples of precautions include use of tack welds or fixturing.

For the other test, the welder shall lay out, cut, fit, and weld a branch-on-pipe connection in which the specified diameters of the run and the branch pipes are equal. This test shall be performed with a pipe diameter of at least 2.375 in. (60.3 mm) and with a specified wall thickness of at least 0.250 in. (6.4 mm). When small diameter pipe is used for testing more than one test weld may be required to obtain the required number of test specimens.

A hole with specified diameter approximately equal to the inside diameter (ID) of the branch pipe shall be cut in the run. The company shall decide if the welder shall cut the hole in preparation of the branch assembly.

Use of templates to assist in layout shall be at the discretion of the company. Use of manually operated mechanisms that assist in accurate cutting of the hole or to prepare the branch bevel shall be at the discretion of the company.

The weld shall be made with the run pipe in the fixed horizontal position with the branch pipe axis extending either vertically downward from the run pipe or projecting from the side of the run pipe.

If the welder fails either the butt or the branch test weld the welder shall be required to retest only for the failed weld. The welder shall not be required to repeat both the butt and the branch test weld unless required by the company.

The welds shall be acceptable if meets the requirements of 6.4 and either 6.5 or 6.6.