

**An Explanation of ASME Section IX Requirements  
Radiographic Examination for Welds**

ASME Section IX, *Welding, Brazing and Fusing Qualifications*, paragraph QW-302.2 states that when a welder or welding operator is qualified by radiographic examination of the test coupon, the minimum length of weld to be examined shall be six (6) inches and shall include the entire weld circumference for pipe or tube. For a small diameter pipe or tube where the circumference of the test coupon is less than six (6) inches, multiple coupons may need to be welded to achieve the six (6) inches of weld length, but the number of consecutively welded test coupons need not be more than four. The following table shows the number of test welds required for small nominal pipe sizes.

Nominal Pipe Size	Pipe or Tube Outside Diameter (in.)	Length Weld (O.D. X $\pi$ ) (in)	Number of Test Coupons Required
2-1/2	2.88	9.03	1
2	2.38	7.46	1
1-1/2	1.90	5.97	2
1-1/4	1.66	5.21	2
1	1.31	4.11	2
3/4	1.05	3.30	2
1/2	0.84	2.64	3
3/8	0.67	2.10	3
1/4	0.54	1.70	4
1/8	0.41	1.29	4

For tubing with outside diameter (O.D.) different than shown in the Table, the length of the weld can be calculated by multiplying the O.D. by  $\pi$ , e.g., for 2 inch diameter tube, 2 in. O.D. x 3.14 = 6.28 inches, so the welder only has to weld one test coupon.

If the welder's or welding operator's test coupon is tested using bend tests, only one coupon is required regardless of the O.D. of the pipe or tube welded.

Table QW-452.3 of Section IX sets groove-weld diameter limits. If a welder or welding operator qualifies on a test coupon with an O.D. over 2-7/8 inches (NPS 2-1/2), that welder is qualified to weld in production on pipe down to 2-7/8 inches O.D. To be qualified to weld on pipe less than

2-7/8 inches in O.D., the welder will have to qualify on a coupon with an O.D. of 2-7/8 inches or smaller.

The above paragraphs address qualification of welders to make groove welds. Table QW-452.6 addresses qualification of welders to make fillet welds. It says that a welder who passes a groove weld test on any size pipe is qualified to make all sizes of fillet welds on all diameters of pipe and on all thicknesses of material. Socket welds are made with fillet welds.

Welding operators do machine welding or automatic welding, A welding operator who passes a test using any diameter pipe or tube is qualified to weld on all diameters of pipe or tube.

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