

1 GENERAL

- 1 1 Each welder shall be required to demonstrate his ability to make sound welds in order to maintain quality construction for all piping systems operating at hoop stresses of less than 20% of the specified minimum yield strength Welder qualification or re-qualification tests shall be made in accordance with the following procedures
- 1 2 Employees who have not previously demonstrated their ability to weld, shall satisfactorily pass a qualification test before being allowed to weld on pipe or fittings that are or will become a part of transmission or distribution systems Trainees who have successfully completed the Apprentice Fitter Primary Shop Training will only be allowed to perform welding on pipe sizes in which they have qualified until subsequent qualification testing of these welders complies with qualification test requirements in this standard
- 1 3 For men who have previously demonstrated their ability to weld, re-qualifying tests shall be required as a result of any one of the following conditions
  - 1 3 1 A period of one year has elapsed since the previous qualification test
  - 1 3 2 A welder has not worked at the particular class of welding for a period of six months or more
  - 1 3 3 There is specific reason to question the ability of the welder to make sound welds
  - 1 3 4 Change in welding process from gas to shielded arc welding or vice versa, from one gas or one arc welding process to another gas or another arc welding process, from manual to semi-automatic, to automatic
  - 1 3 5 Change in pipe material from ASTM or API Std 5L and 5LX grade X42 groups to API Std 5LX groups in excess of grade X42 and vice versa
  - 1 3 6 Change in position for Butt Welds only, a change from vertical to horizontal or vice versa
  - 1 3 7 Change in filler metal from one classification group to another
  - 1 3 8 Change in direction vertical-down to vertical-up or vice versa

1	21271	Redrawn	JXX				
C	D	DESCR	C	D	D	A	
APPROVED		GAS STANDARD PROCEDURE FOR TESTING WELDERS LIMITED TO WORK ON LINES OPERATING AT HOOP STRESSES LESS THAN 20% OF S M Y S PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO CAL				SUPERSEDES	
BY						SUPERSEDED BY	
DSGN						SHEET No 1 OF 5 SHEETS	
DR.						W	C
CH						084496	1
O K							
DATE	SCALE						
10 12 67	None						

PRINTED ON DIEPRO NO 1000H CLEARPRINT

- 1 4 After testing the specimens in accordance with the Qualification Tests, the "Weld and Solder Test Report" (Page 4) shall be prepared
- 1 5 The district offices are to keep two years of test reports on file
- 1 6 The 4" or 6" testing spools in 4½" lengths with 37½" bevels on one end are available from Central Warehouse, Code 022579 for 4", and 022580 for 6"
- 1 7 The ¾" x 4 5" EH Pipe Nipples BOE are also available from Central Warehouse, Code 022578

2 WELD QUALIFICATION TESTS

- 2 1 The guided bend test shall be used to determine the degree of soundness of the test specimen welds
- 2 2 The test weld shall be made on not less than 4" x 141 or 6" x 156 wall pipe in the horizontal fixed position. In the horizontal fixed position, the pipe axis is horizontal and the welding is done without rotating the pipe
- 2 3 Four test specimens shall be cut from the test weld and subjected to the root bend test. If no more than one specimen is rejected, the weld is to be considered as acceptable
- 2 4 The test jig shall consist of a plunger and die member adequate to bend the test specimen 180° on a ¾" radius, see M-25
- 2 5 The specimen shall be placed on the die of the test jig with the weld at mid-span. The side of the specimen placed toward the gap of the jig shall be the root of the weld. The specimen shall be forced into the die by applying a load on the plunger until the curvature of the specimen is such that a 1/32" diameter wire cannot be inserted between the die and the specimen
- 2 6 Satisfactory test specimens are those that bend without breaking and have no cracks or other open defects exceeding 1/8" measured in any direction on the convex side after bending. Cracks that occur on the corners of the specimen during testing shall not be considered unless there is definite evidence that they result from incomplete fusion or other internal defects
- 2 7 For welders who are to make welded service connections to mains, an additional knock-off test is required. This test is prepared by welding a ¾" x 4 5" long EH pipe nipple beveled on one end to a pipe having a minimum diameter of 2", as shown on Page 5. The test fitting shall be welded in the same typical position as a field installation. The weld is unacceptable if it shows a serious undercutting or if it has rolled edges. The weld is tested by attempting to break the fitting off the run pipe. The weld is unacceptable if it breaks and shows incomplete fusion, overlap, or poor penetration at the junction of the fitting and run pipe

SHEET	2	OF	5	SHEETS	DR W N NUMBER	CH NGR
P G and E. CO					084496	1

3 SOLDER QUALIFICATION TEST

Personnel who are to work on copper piping shall satisfactorily demonstrate their ability to make sound soldered joints by passing the following test. A copper joint, soldered in accordance with D-10 shall be made on 1/2" or 1" copper pipe with the axis of the pipe stationary in the horizontal fixed position. Bonding must take place in 95% of the total telescoped surfaces. All unbonded surfaces must lie in small isolated pockets.

4 PREPARATION OF TEST SPECIMENS

- 4 1 Four guided bend test specimens shall be prepared for each qualification test. They shall be removed from the top, the bottom, and each of the two sides, as shown in the drawing on Page 5 (Dwg No 282917)
- 4 2 After welding, the test specimens should be flame cut to size for the guided bend test. The specimen width shall be 1" and the length shall be 6" minimum. The weld reinforcement (weld bead above the plate) shall be removed flush with the surface of the specimen by grinding.
- 4 3 The soldered test joint shall be sawed open longitudinally at the top of the pipe, spread apart and the tubing peeled from the coupling for examination, as shown on Page 5, the top being the uppermost point on the circumference at the time the joint is soldered.

5 QUALIFICATION RETESTS

- 5 1 Employees who fail to meet the requirements for a qualification test may be retested immediately. In such a case, he shall make two welds of each type on which he was failed. For the guided root bend test, satisfactory welds will be indicated if no more than one specimen out of each weld is rejected (see 2 3). In addition, rejection of specimens from both welds at the same specimen position shall be cause for rejection. For the knock-off test, both specimens must pass.
- 5 2 If a horizontal fixed position solder joint fails to show adequate bonding, immediate retest may be made by preparing two soldered joints, both of which must pass the test requirements.
- 5 3 Employees who fail to meet the requirements for a qualification test shall be required to have further training or practice. In such a case, a complete retest shall be made subsequent to such training or practice.

SHEET	3	OF	5	SHEETS	DR W N	NUMBER	0	08
P G and E. CO.					084496 1			

WELD AND SOLDER TEST REPORT - \_\_\_\_\_ DIVISION

FOR WELDERS ON PIPING SYSTEMS OPERATING AT HOOP STRESSES  
OF LESS THAN 20% OF THE SPECIFIED MINIMUM YIELD STRENGTH

(Check Appropriate Boxes)

Code Mark \_\_\_\_\_ ARC  PASSED   
 Name \_\_\_\_\_ ACETYLENE  FAILED   
 Classification \_\_\_\_\_ Date of Test \_\_\_\_\_  
 Town \_\_\_\_\_ Date of Weld \_\_\_\_\_  
 Date of Original Qualification \_\_\_\_\_

TYPE TEST ROOT BEND	PENETRATION	FUSION	POROSITY	SLAG INCLUSION	REMARKS	TEST RESULTS	
						(P)	(F)
B							
S							
T							
S							
Knock Off							

SOLDER TEST	% OF LENGTH OF JOINT SOCKETED	% OF JOINT BONDED	REMARKS	TEST RESULTS	
				(P)	(F)

KEY: P = Pass F = Fail

Use following in PENETRATION, FUSION, POROSITY, and SLAG INCLUSION  
columns, IF BEND TEST IS FAILED:

E = Excellent G = Good B = Barely satisfactory U = Unsatisfactory

Use following in REMARKS section, as applicable:

- 1 = Undercutting
- 2 = Overlapping
- 3 = Excessive weld reinforcement
- 4 = Insufficient weld reinforcement
- 5 = Excessively deep wash lines
- 6 = Burn through

\_\_\_\_\_  
Test Inspector

REVISED	BY	DATE	BY	DATE	ORDER NO.	QUANTITY
	A		A		084496	
P. G. and E. CO.						