1.0 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. Welder qualification or requalification tests shall be made in accordance with the following procedures.

1.2 Employees shall pass a qualification test before being allowed to weld on pipe or fittings that are or will be part of a natural gas piping system. 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 persons who have previously qualified, requalifying tests shall be required as a result of any one of the following conditions:

1.3.1 A period of one year plus or minus one month has elapsed since the previous qualification test. A welder must be requalified within the period from the month preceding to the month following his last annual anniversary requalification.

1.3.2 A welder has not worked at the particular welding process 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 or automatic.

1.3.5 Change in pipe material from ASTM or API Standard 5L and 5LX grade X42 groups to API Standard 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.

LIMITED TO WORK ON LINES DESIGNED TO OPERATE AT HOOP STRESS LESS THAN 20% OF SMYS.

[redacted]

APPROVED BY		REV.	DATE	DESCRIPTION	GM	DWN.	CHKD.	SUPV.	APVD.
JLL	WER	11	11/20/87	Rev'd where indicated by *; chg'd shts 5&6 to Rev. 11					
EHF	EFS	10	5/15/86	Rev'd Paral 1.3.1,1.8, 2.4.2, & 2.4.3;chg'd Shts 1 thru 4 to Rev. 10			BFO	PAL	CJT
	JAF	9	2/13/84	Revised Para. 1.3.1 & 2.2.1 (1)				PAL/	CJT
	CJT								

GM	PIPING - DATA SHEET	B/M	
SUPV.	WELDER QUALIFICATION FOR UNDER 20% OF SMYS	DWG. LIST	
DSGN.	GAS STANDARD	SUPSDS	
DWN.		SUPSD BY	
CHKD.		SHEET NO. 1 of 6 SHEETS	
O.K.	PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA	DRAWING NUMBER	REV.
DATE 10/12/67 / SCALE		084496	11

98871

61-4344 (REV. 1-76) PRINTED ON DIEPO NO. 1080 CLEARPRINT 11-80

MICROFILM

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.

1.4 After testing the specimens in accordance with the Standard D-31, the report forms (Pages 5 and 6) shall be prepared.

1.5 The district offices are to retain all test reports in order to verify that the welder has maintained qualification.

*1.6 The 4" or 6" testing spools in 4-1/2" lengths with 37-1/2° bevels on both ends are available from Central Warehouse, Code 02-2579 for 4" x .156" w.t. (oxyacetylene qualification), 02-2580 for 6" x .156" w.t. (arc welder qualification).

1.7 The 3/4" x 4.5" long EH pipe nipples BOE are also available from Central Warehouse, Code 02-2578.

1.8 4" sleeve assembly for sleeve weld test is available from Central Warehouse, Code 02-2059.

2.0 WELDER QUALIFICATION AND REQUALIFICATION TESTS

2.1 Arc Welder Qualification

2.1.1 The following tests are required for arc welder qualification:

(1) Butt weld with 6" diameter x 4.5" minimum length spools (.156" w.t. recommended).

* (2) Sleeve on 4" pipe (fillet welds), sleeve - .250 w.t. x 3" L, Pipe - .156" w.t. x 9" L.

(3) Branch connection - 3/4" x 4.5" long EH nipple on 2", 3", or 4" pipe.

See Section 2.3 for test weld procedures.

2.1.2 A welder passing the tests specified on 2.1.1 is qualified to arc weld pipe and fittings on all systems with a design pressure stress level of less than 20% of SMYS. See Gas Standard D-30.2 for qualification requirements for higher stress levels.

2.2 Oxyacetylene Welder Qualification

2.2.1 The following tests are required for oxyacetylene qualification:

* Paragraph Revised

(1) Butt weld with 4" diameter x 4.5" minimum length spools (0.156" w.t. recommended). This part of the test may be satisfied by successfully completing the 2" butt weld requirement for oxy-acetylene qualification on pipe over 20% SMYS, provided an additional 2 coupons are subjected to root bend tests (refer to Gas Std. D-30.1). G.O. 112 (latest revision) requires that 3 of 4 coupons pass root bend tests for qualification of welders on low stress level pipe.

Perform butt weld test on one end of sleeve weld test specimen.

(2) Sleeve on 4" pipe. (Same as arc weld qualification).

(3) Branch connection - 3/4" x 4.5" long EH nipple on 2", 3", or 4" pipe. (Same as arc weld qualification.)

See Section 2.3 for test weld procedure.

2.2.2 A welder passing the test specified in 2.2.1 is qualified to oxyacetylene weld pipe and fittings for 4" and smaller pipe and service connections on pipe 8" and smaller for all systems with a design pressure stress level of less than 20% of SMYS. See Gas Standard D-30.1 for qualification for butt welds at over 20% of SMYS.

2.3 Test Weld Procedure

2.3.1 Arc welds are performed using the methods outlined in Gas Standard D-22. Oxyacetylene welds are performed using the methods outlined in Gas Standard D-20.

2.3.2 The butt welds and sleeve welds are made with the pipe in the horizontal fixed position. The branch connection is made with the header in the horizontal fixed position and the branch not more than 45^{0} from the top of the header. For all test welds, no movement or rotation of the pipe is allowed during welding.

2.4. Test Weld Inspection Requirements

2.4.1 All test welds shall be visually inspected. Sleeve welds require visual inspection only. Welds shall be free of cracks, inadequate penetration, unrepaired burn through (as applicable) and other defects. Weld bead and adjacent area shall present a neat work-man-like appearance. Arc burn due to striking an arc out of the weld groove is not allowed. Any weld not meeting these requirements shall be failed, without performing any destructive tests.

2.4.2 Butt welds which pass the visual inspection shall be destructively tested. Take samples shown on page 7 (drawing 282917).
Four root bend samples are required. Three of the four samples must pass in order for the welder to qualify. See Gas Standard D-31 for specimen tests and requirements.

2.4.3 A knock off test shall be performed on branch connections which have passed the visual inspection.

2.5 A requalification test shall be performed in the same manner as the initial test as outlined in Section 2.1 and 2.2.

3. QUALIFICATION RETESTS

* 3.1 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 that failed to meet the requirements. For the guided root bend test, satisfactory welds will be indicated if no more than one specimen out of each weld is rejected (see Section 2.4). 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.

3.2 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.

4. RECORDS

4.1 Records for all welders who have been qualified under this standard shall be retained as outlined below.

4.2 All Employee Qualification and Requalification records must be retained for a minimum duration of five years.

4.3 All Employee Qualification and Requalification records must be retained for a minimum duration of five years.

*4.4 The record shall be made by filling out the forms on pages 5 and 6.

*Paragraph Revised

ARC WELD TEST REPORT - _____REGION_____DIVISION

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

(Check Appropriate Box)

CODE MARK _____ Passed ☐ Failed ☐

FULL NAME _____ DATE OF ANNUAL QUALIFICATION WELD_____

SOCIAL SECURITY NO. _____ DATE OF INSPECTION OF WELD _____

CLASSIFICATION _____ DATE OF PREVIOUS ANNUAL QUALIFICATION _____

TOWN _____ DATE OF 6 MONTH VERIFICATION OF WELDING IN QUALIFICATION PROCESS _____

Butt Weld 6.625" O.D. Spools

TYPE TEST ROOT BEND	PENETRATION (G) (S) (U)	FUSION (G) (S) (U)	POROSITY (P) (F)	SLAG INCLUSION (P) (F)	APPEARANCE (G) (S) (U)	REMARKS (1)-(6)	TEST RESULTS (P) (F)
BOTTOM							
SIDE							
TOP							
SIDE							

Branch Connection 3/4" on 2", 3" of 4" Run

KNOCK OFF							

Sleeve Weld 4"

APPEARANCE (G) (S) (U)	

KEY: Use these abbreviations in POROSITY, SLAG INCLUSION & TEST RESULTS columns:
P = Pass F = Fail

Use these abbreviations in PENETRATION, FUSION, AND APPEARANCE columns:
G = Good, S = Satisfactory U = Unsatisfactory

Use the following in REMARKS column as applicable:
1 = Undercutting 3 = Excessive weld reinforcement 5 = Lack of Penetration
2 = Cold lap 4 = Insufficient weld reinforcement 6 = Burn through

_____
Test Inspector

OXY-ACETYLENE WELD, AND SOLDER TEST REPORT - _____REGION_____DIVISION

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

(Check Appropriate Box)

CODE MARK _____ Passed ☐ Failed ☐

FULL NAME _____ DATE OF ANNUAL QUALIFICATION WELD_____

SOCIAL SECURITY NO. _____ DATE OF INSPECTION OF WELD _____

CLASSIFICATION _____ DATE OF PREVIOUS ANNUAL QUALIFICATION _____

TOWN _____ DATE OF 6 MONTH VERIFICATION OF WELDING IN QUALIFICATION PROCESS _____

Butt Weld 4.5" O.D. Spools

TYPE TEST ROOT BEND	PENETRATION (G) (S) (U)	FUSION (G) (S) (U)	POROSITY (P) (F)	SLAG INCLUSION (P) (F)	APPEARANCE (G) (S) (U)	REMARKS (1)-(6)	TEST RESULTS (P) (F)
BOTTOM							
SIDE							
TOP							
SIDE							

Branch Connection 3/4" on 2", 3" of 4" Run

KNOCK OFF							

Sleeve Weld 4"

APPEARANCE (G) (S) (U)

Solder Test

SEE GAS STD D-30.3	% OF LENGTH OF JOINT SOCKETED	% OF JOINT BONDED	REMARKS	TEST RESULTS (P) (F)

KEY: Use these abbreviations in POROSITY, SLAG INCLUSION & TEST RESULTS columns:
P = Pass F = Fail

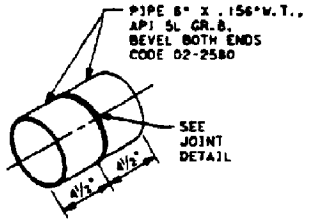
Use these abbreviations in PENETRATION, FUSION, AND APPEARANCE columns:
G = Good, S = Satisfactory U = Unsatisfactory

Use the following in REMARKS column as applicable:
1 = Undercutting 3 = Excessive weld reinforcement 5 = Lack of Penetration
2 = Cold lap 4 = Insufficient weld reinforcement 6 = Burn through

_____
Test Inspector

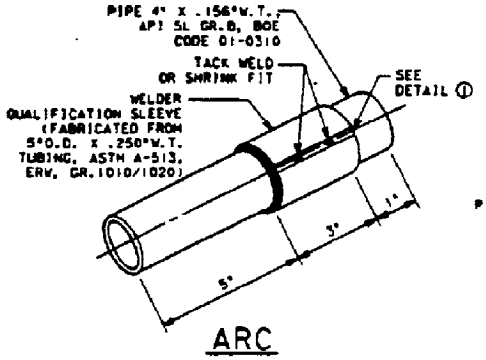
	PG&E CO.	DRAWING NUMBER	REV.
	SHEET 6 OF 6 SHEETS	084496	11
		MICROFILM	

61-4344 Rev 1-76



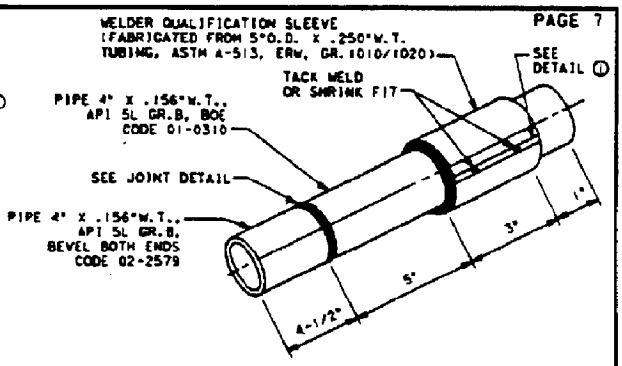
ARC BUTT WELD TEST

TWO SPOOLS REQUIRED



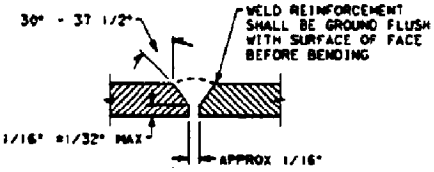
ARC SLEEVE WELD TEST

SLEEVE TACK WELDED OR SHRINK FIT TO PIPE.
WELDER PERFORMS ALL WELDS FOR VISUAL INSPECTION.
COMPLETE SLEEVE ASSEMBLY CODE 02-2059.

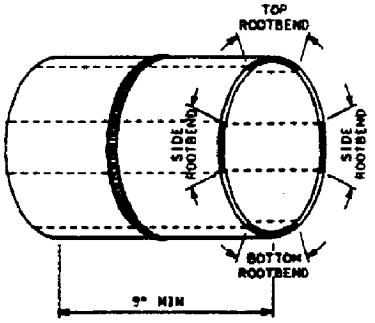


OXY-ACETYLENE BUTT AND SLEEVE WELD TEST

PERFORM BUTTWELD TEST ON ONE END OF SLEEVE WELD TEST SPECIMEN.
COMPLETE SLEEVE ASSEMBLY CODE 02-2059.
4" PIPE, 4½"LG., CODE 02-2579.

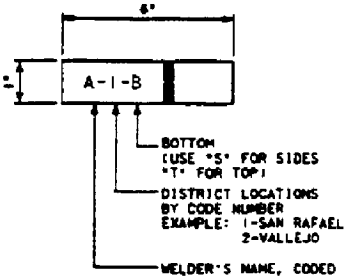


JOINT DETAIL



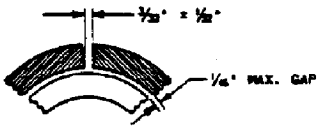
SPECIMEN SELECTION

NOTE: BEND SPECIMENS IN GUIDED BEND JIG(GAS STD.M-25)
SEE GAS STD.D-31 FOR WELD QUALITY REQUIREMENTS



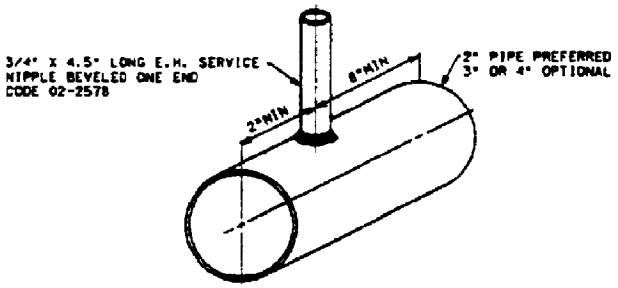
TEST SAMPLE MARKING:

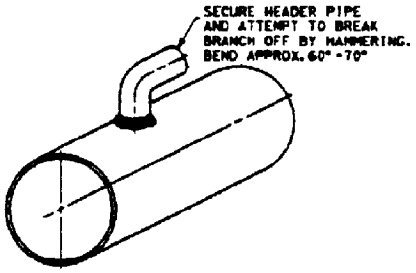
NOTE: USE "KADO" FELT MARKING PEN FOR MARKING



DETAIL ①

PREPARATION OF ARC & OXY-ACETYLENE BUTT WELD SPECIMENS





SERVICE "KNOCK OFF" TEST

FOR WELDERS WORKING ON PIPE LINES WITH A MAOP OR FUTURE DESIGN PRESSURE THAT PRODUCES A HOOP STRESS OF LESS THAN 20% OF S.M.Y.S.

[200,210328917,G24 11-20-87 DWN

APPROVED BY		REV	DATE	DESCRIPTION	DWN	CHKD	APVD
WER		10	11-19-85	REVISED SLEEVE MAT'L. FROM TUBING TO PLATE; ADDED DETAIL 1	RM	ATG	[redacted]
PEH	EFS	9	8-1-83	MOVED SOLDER JOINTS TO GAS STD.D-30.3 PAGE 8, ADDED ARC BUTT WELD TEST, REVISED ILLUSTRATIONS			HOB/PAL
EMF	RFS	8	4-11-80	ADDED O/A BUTT, & SLV WELD TEST			RTA PAL

GM	
SUPV	
DSGN	
DWN	[redacted]
CHKD	
OK	
DATE 9-18-61	SCALE NONE

PIPING-DATA SHEET

WELD TEST SPECIMENS

GAS STANDARD

PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES	
SUPERSEDED BY	
SHEET NO.	OF SHEETS
DRAWING NUMBER	REV
282917	11
MICROFILM	