

PURPOSE

1. TO ESTABLISH A UNIFORM PROCEDURE FOR DESIGNING AND TESTING GAS PIPING SYSTEMS THAT WILL MEET THE REQUIREMENTS OF G.O. 112, §192.101 AND §192.501, OF THE CPUC.

RESCISSION

2. SUPERSEDES EARLIER LETTER AND INSTRUCTIONS, INCLUDING:
 - A. LETTER, APRIL 2, 1962, ██████████ TO DIVISION GAS SUPERINTENDENTS, "MARKING ESTIMATES FOR WORK ON PIPING SYSTEMS DESIGNED TO OPERATE AT STRESS LEVELS OVER 20% OF THE SPECIFIED MINIMUM YIELD STRENGTH."
 - B. LETTER, MAY 4, 1962, ██████████ TO DIVISION GAS SUPERINTENDENTS, "REPLACEMENT OF PIPE IN MAINS OPERATING AT STRESS LEVELS OVER 20% OF THE SPECIFIED MINIMUM YIELD STRENGTH."
 - C. LETTER, MARCH 5, 1936, ██████████ TO DIVISION MANAGERS, CALLING ATTENTION TO THE SERIOUS CONSEQUENCES THAT MAY RESULT WHEN MAIN OR SERVICES ARE DAMAGED.

POLICY AND APPLICATION

3. ALL GAS PIPING SYSTEMS AND FACILITIES BOTH NEW AND RECONSTRUCTED ARE TO BE DESIGNED AND TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF G.O. 112. THIS INCLUDES THE REINSTATING OF ABANDONED OR TEMPORARILY DISCONNECTED PIPING.

RESPONSIBILITY

4. THE SUPERVISOR IN CHARGE OF ENGINEERING AND INSTALLATION SHALL BE RESPONSIBLE FOR DESIGN AND TESTING, RESPECTIVELY, OF PIPE FACILITIES IN ACCORDANCE WITH THIS STANDARD. ALL OTHER PROVISIONS REQUIRED BY G.O. 112 OF THE CPUC SHALL BE OBSERVED, INCLUDING THE REPORTING REQUIREMENTS SPECIFIED IN §141.2 AND §141.3.

DEFINITIONS

5. THE FOLLOWING DEFINITIONS SHALL APPLY TO THIS STANDARD:
 - A. STRESS IS THE RESULTANT INTERNAL FORCE THAT RESISTS CHANGE IN SIZE OR SHAPE OF A BODY ACTED ON BY EXTERNAL FORCES.
 - B. OPERATING STRESS IS THE STRESS IN A PIPE OR STRUCTURAL MEMBER UNDER NORMAL OPERATING CONDITIONS.
 - C. HOOP STRESS IS THE STRESS IN A PIPE WALL, ACTING CIRCUMFERENTIALLY IN A PLANE PERPENDICULAR TO THE LONGITUDINAL AXIS OF THE PIPE AND PRODUCED BY THE PRESSURE OF THE FLUID IN THE PIPE.
 - D. DESIGN PRESSURE IS THE MAXIMUM OPERATING PRESSURE PERMITTED BY G.O. 112 AS DETERMINED BY THE DESIGN PROCEDURES APPLICABLE TO THE MATERIAL AND LOCATIONS INVOLVED.
 - E. MAXIMUM ALLOWABLE OPERATING PRESSURE (MAOP) IS THE MAXIMUM PRESSURE AT WHICH A GAS SYSTEM MAY BE OPERATED IN ACCORDANCE WITH THE PROVISIONS OF G.O. 112.
 - F. MAXIMUM OPERATING PRESSURE (MOP) IS THE MAXIMUM PRESSURE AT WHICH A SYSTEM MAY BE OPERATED AS SPECIFIED BY THE MANAGER OF G.S.D. DEPARTMENT.
 - G. TEST MEDIUM IS A SUBSTANCE SUCH AS WATER, AIR, OR GAS THROUGH WHICH A FORCE ACTS TO LEAK OR STRENGTH TEST A FACILITY.
 - H. TEST PRESSURE IS THE INTERNAL FLUID PRESSURE SPECIFIED FOR TESTING.
 - I. STRENGTH TEST IS A PRESSURE TEST TO PROVE THE MECHANICAL STRENGTH OF THE SYSTEM.
 - J. LEAK TEST IS A PRESSURE TEST TO DETERMINE THE TIGHTNESS OF THE SYSTEM.
 - K. CLASS LOCATION IS A GEOGRAPHIC AREA AS CLASSIFIED AND DESCRIBED IN G.O. 112, §192.5.
 - L. CONSTRUCTION TYPE IS A CONSTRUCTION SPECIFICATION FOR PIPELINE AND MAINS THAT FIXES THE STRESS LEVELS.
 - M. SPECIFIED MINIMUM YIELD STRENGTH (SMYS) IS THE MINIMUM YIELD STRENGTH PRESCRIBED BY THE SPECIFICATION UNDER WHICH THE PIPE IS PURCHASED FROM THE MANUFACTURER (PSI).
- STANDARD PRACTICE 463-8 GIVES A COMPLETE DESCRIPTION OF THESE TERMS AND THEIR APPLICATION. (S.P. 463-8 IS INCLUDED IN THE "ENGINEERS ESTIMATORS MANUAL.")

CADD 820370 / 25/31/82

APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	APVD
	4	2-24-82	REVISED PARAGRAPH 4			
	3	2-20-74	ADDED FOOTNOTE CONCERNING MAOP, MOP AND DESIGN PRESSURE	AC	ANK	JLL
	2	2-17-72	REVISED TITLE FOR COMPUTER LISTING, ALSO PARAGRAPHS 1, 3, & 5E		MC	JLL
	1	9-10-70	REVISED PARAGRAPH 5F			JLL

REV	DATE	DESCRIPTION	DWN	CHKD	APVD
GM		PIPING-DATA SHEET DESIGN AND TEST REQUIREMENTS GAS STANDARD PACIFIC GAS AND ELECTRIC COMPANY SAN FRANCISCO, CALIFORNIA			
SUPV					
DSGN					
DWN	CADD/ST				
CHKD					
OK					
DATE	SCALE				
2-11-69	NONE				

SUPERSEDES	084509
SUPERSEDED BY	
SHEET NO.	1 OF 4 SHEETS
DRAWING NUMBER	283621
REV	4

61-048 REV. 7-78

MICROFILM

DESIGN CRITERIA:

DESIGN

- 6. A. DESIGN CRITERIA STAMP MUST APPEAR ON DRAWINGS FOR ALL FACILITIES WHERE STRENGTH TESTING IS REQUIRED.
- B. WHEN DETERMINING MAOP, CONSIDERATION SHALL BE GIVEN TO:
 - i. FUTURE DEVELOPMENT OF THE AREA.
 - ii. CURRENT AND FUTURE GAS SUPPLY PRESSURES.
 - iii. PROBABILITY OF INCREASE IN SUPPLY PRESSURE.
- 7. **INITIAL CONSTRUCTION**
DESIGN ALL GAS FACILITIES TO MEET THE REQUIREMENTS OF THE EXPECTED FUTURE CLASS LOCATION.
- 8. **ADDITION TO EXISTING FACILITIES**
THE DESIGN REQUIREMENTS FOR SUBSEQUENT ADDITIONS OR ALTERATIONS TO EXISTING PIPE-LINE FACILITIES SHALL BE AT LEAST EQUIVALENT TO THE PLANNED FUTURE MAOP OF THE LINE.
- 9. FACILITIES DESIGNED FOR EITHER CLASS 1 OR CLASS 2 LOCATION OR WHICH DEVIATE FROM THE STEEL PIPE SPECIFICATION (APPENDIXES B, C, D, E AND F) SHALL BE SUBMITTED TO THE GAS SYSTEM DESIGN DEPARTMENT FOR APPROVAL.
- 10. PRESSURE RATINGS FOR FITTINGS, VALVES, AND OTHER PIPING COMPONENTS SHALL BE EQUAL TO OR GREATER THAN THE DESIGN PRESSURE ESTABLISHED FOR THE PIPING SYSTEM.

LOCATION CLASS	
DESIGN FACTOR	
D.P. _____ % SMYS _____	
MAOP _____ % SMYS _____	
STRENGTH TEST PRESSURE	
MAX. _____ PSIG _____ % SMYS	
MIN. _____ PSIG _____ % SMYS	
_____ PSIG = 90% SMYS	
TEST FLUID _____	
PIPE SPEC. _____	
O.D. _____	
W.T. _____	

TESTING

- 11. WELDS MUST BE INSPECTED AS REQUIRED BY STD. D-40.
- 12. A. THE TEST MEDIUM SHALL BE ONE PERMITTED FOR THE DESIGN PRESSURE AND CLASS LOCATION AS SPECIFIED IN APPENDIX A (PG. 4 OF THIS STD). FACTORS TO BE CONSIDERED IN THE CHOICE OF TEST MEDIA, AS SHOWN IN THE TABLE OF TEST REQUIREMENTS (APPENDIX A) SHALL INCLUDE SAFETY, AVAILABILITY, AND ECONOMY.
- B. TEST PRESSURE SHALL NOT BE LESS THAN THAT REQUIRED BY APPENDIX A TO TEST THE TIGHTNESS AND STRENGTH OF A SYSTEM. EXCEPT AS MODIFIED BY PARAGRAPH 13, ALL LINES SHALL BE TESTED IN ACCORDANCE WITH APPENDIX A.

EXCEPTIONS:

SECTIONS AND EMERGENCY PIPE

13. **SHORT REPLACEMENT SHALL BE TREATED AS FOLLOWS:**

- A. REPLACEMENT SECTION OF PIPE SHALL BE SUBJECTED TO A PREINSTALLATION STRENGTH TEST. THE SECTION OF REPLACEMENT PIPE SHALL BE TESTED TO THE PRESSURE REQUIRED FOR A NEW PIPELINE OR MAIN INSTALLED IN THE SAME LOCATION BY MAINTAINING THE PRESSURE AT OR ABOVE THE TEST PRESSURE FOR AT LEAST FOUR HOURS. THE TEST MAY BE MADE ON THE REPLACEMENT PIPE PRIOR TO INSTALLATION PROVIDED ALL TIE-IN GIRTH WELDS ARE NONDESTRUCTIVELY TESTED.
- B. MINIMUM TEST DURATION FOR PIPE TO BE HELD FOR EMERGENCY USE IS FOUR HOURS. IT IS RECOMMENDED THAT EMERGENCY PIPE BE TESTED TO A MINIMUM OF 90% OF SMYS.
- REPLACEMENT SECTION OF PIPE IS TO BE OPERATED AT LESS THAN 30% OF SMYS AND OVER 100 PSIG, A ONE HOUR PREINSTALLATION LEAK TEST TO 1.6 TIMES THE PROPOSED MAOP IS SUFFICIENT.

A SHORT
HOWEVER
IF A SHORT

14. **TESTING OF FACILITIES DAMAGED BY CONSTRUCTION WORK**

- ALL FACILITIES KNOWN OR SUSPECTED TO HAVE BEEN STRUCK DURING EXCAVATION OR CONSTRUCTION ACTIVITIES MUST BE CHECKED TO ASSURE THEIR SAFETY IF THEY ARE TO REMAIN IN SERVICE.
- A. **MAINS**
THE INSPECTION, REPAIR AND TESTING REQUIRED FOR A DAMAGED MAIN WILL DEPEND ON THE EXTENT OF THE DAMAGE AND OTHER CONDITIONS, WHICH CAN BEST BE DETERMINED BY THE RESPONSIBLE SUPERVISOR IN THE FIELD. HOWEVER, ADEQUATE STEPS MUST BE TAKEN EITHER BY TESTING OR LEAK SURVEY, TO INSURE THAT NO LEAKAGE IS PRESENT.
 - A. REPAIRS TO DAMAGED STEEL MAINS SHALL BE MADE IN ACCORDANCE WITH STANDARD A-65.
 - B. REPAIRS TO DAMAGED PLASTIC MAINS SHALL BE MADE IN ACCORDANCE WITH GAS STANDARD A-93.1.
 - C. SPECIAL ATTENTION SHALL BE GIVEN TO A DAMAGED CASING FOR A PLASTIC INSERT, TO MAKE CERTAIN THAT THE DAMAGE DID NOT RESULT IN A FAILURE IN THE PLASTIC AT ANOTHER LOCATION REMOTE FROM THE POINT OF CONTACT.
- B. **SERVICES (INCLUDING SERVICE RISERS)**
 - A. IF A STEEL, COPPER OR OTHER METALLIC SERVICE LINE OR THE CASING FOR A METALLIC INSERT HAS BEEN BROKEN, BENT, PULLED, CRUSHED, OR OTHERWISE DEFORMED, THE SERVICE MUST BE TESTED FROM TEE TO RISER IN ACCORDANCE WITH APPENDIX A.
 - B. STEEL, COPPER OR OTHER METALLIC SERVICE LINE OR CASINGS FOR METALLIC INSERTS THAT HAVE BEEN HIT BUT NOT MOVED OR DEFORMED MAY BE LEAK SURVEYED WITH A LEAK DETECTOR AS AN ALTERNATE CHECK. THE SURVEY SHOULD INCLUDE THE ENTIRE LENGTH OF THE SERVICE AND ADJACENT AREAS AS APPROPRIATE.

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APPROVED BY	9	11-20-79	REVISED PARAGRAPH 14A, A REFERENCE FROM D-32			
	8	1-15-79	REVISED PAR 11 REFERENCE FROM STANDARD D-31; ALSO REV'D PAR 8			
	7	7-22-76	REVISED PAR 14			
	10	2-24-82	CHANGED "LOCATION CLASS" TO "CLASS LOCATION"			
	REV	DATE	DESCRIPTION	DWN	CHKD	APVD

GM	
SUPV	
DSGN	
DWN	CADD/CVH
CHKD	M CALLEJAS
O K	M CALLEJAS
DATE	SCALE
2-11-69	NONE

PIPING-DATA SHEET
DESIGN AND TEST REQUIREMENTS
 GAS STANDARD
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES 084509	
SUPERSEDED BY	
SHEET NO. 2 OF 4 SHEETS	
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283621	10
MICROFILM	

- C. SEE GAS STANDARD A-93.1 FOR PLASTIC SERVICE LINES AND PLASTIC INSERTS.
- D. ALL SERVICE RISERS THAT HAVE BEEN STRUCK AND/OR DAMAGED IN ABOVE-GROUND INCIDENTS SHALL BE LEAK SURVEYED WITH A LEAK DETECTOR. THE SURVEY SHALL INCLUDE THE SERVICE LINE ADJACENT TO THE CUSTOMER'S BUILDING AND/OR OTHER AREAS AS APPROPRIATE.

TEST LIMITATIONS ON VALVES

- 15. A. WHEN PERFORMING A HYDROSTATIC TEST ON A LINE, THE TEST PRESSURE TO WHICH A VALVE MAY BE SUBJECTED SHOULD NORMALLY NOT EXCEED 125% OF THE MAXIMUM WORKING PRESSURE OF THE VALVE. WHERE THE REQUIRED MAOP OF THE LINE CANNOT BE ESTABLISHED BECAUSE OF THIS LIMITATIONS, AN ENGINEERING STUDY SHALL BE MADE TO VERIFY THAT IT IS SAFE TO SUBJECT THE VALVE TO THE HIGHER PRESSURE DURING THE TEST. WHEN MAKING THIS STUDY, CONSIDERATION SHALL BE GIVEN TO THE PRESSURE TO WHICH THE VALVE WAS TESTED BY THE MANUFACTURER, THE AGE AND CONDITION OF THE VALVE, AND THE EFFECT OF STRESSES WHICH MAY BE TRANSMITTED TO THE VALVE BY THE PIPELINE. NO VALVE SHALL EVER BE SUBJECTED TO A TEST PRESSURE WHICH EXCEEDS THE MANUFACTURER'S TEST PRESSURE.
- B. WHEN PERFORMING A TEST WITH AIR OR INERT GAS, OR AN UPGRADING WITH NATURAL GAS, THE PRESSURE TO WHICH A VALVE MAY BE SUBJECTED SHALL BE LIMITED TO 110% OF THE MAXIMUM WORKING PRESSURE OF THE VALVE. WHERE THE REQUIRED MAOP OF THE LINE CANNOT BE ESTABLISHED BECAUSE OF THIS LIMITATION, THE MATTER SHALL BE REVIEWED WITH THE GAS SYSTEM DESIGN DEPARTMENT, TO DETERMINE WHETHER A HIGHER TEST PRESSURE MAY BE PERMITTED. THIS LIMITATION SHALL NOT APPLY TO THE 100 PSIG AIR TEST ON A SERVICE LINE.
- C. WHEN A VALVE IS TO BE SUBJECTED TO A TEST PRESSURE WHICH IS GREATER THAN ITS MAXIMUM WORKING PRESSURE, IT SHALL BE IN THE OPEN POSITION.

RECORDS

- 16. A. FOR FACILITIES OPERATING ABOVE 100 PSIG, ESTIMATE, SKETCHES AND DESIGN DRAWINGS SHALL CONTAIN THE FOLLOWING INFORMATION: PIPE SPECIFICATIONS, DESIGN PRESSURE, MAOP, CLASS LOCATION, DESIGN FACTOR AND STRENGTH TEST INFORMATION. WHERE MORE THAN ONE SIZE OF PIPE IS INVOLVED, THE REQUIRED INFORMATION SHALL BE SUPPLIED FOR EACH SIZE TYPE.
- B. TEST INFORMATION SHALL BE RECORDED ON THE GAS SERVICE RECORD, THE ESTIMATE SKETCH, AND WORK ORDER OR OTHER AUTHORIZED FORM FOR FACILITIES OPERATING AT OR UNDER 100 PSIG.
- C. ESTIMATE FORM 62-6251 SHALL BE MARKED BY PERSON MAKING ESTIMATE TO INDICATE THAT THE PIPE IS TO OPERATE AT OR OVER 30% OF SMYS AND HAS TO BE STRENGTH TESTED.

STRENGTH TEST PRESSURE REPORT

- 17. A STRENGTH TEST PRESSURE REPORT (FORM 62-4921) IS REQUIRED FOR EACH FACILITY OPERATING ABOVE 100 PSIG (SEE APPENDIX A).
 - A. PART I OF THE STRENGTH PRESSURE TEST REPORT SHALL BE FILLED OUT BY THE PROJECT ENGINEER OR THE GAS SYSTEM DESIGN DEPARTMENT.
 - B. PART II OF THE STRENGTH TEST PRESSURE REPORT SHALL BE FILLED OUT BY THE PERSON SUPERVISING THE TEST IN THE FIELD, AT THE TIME THE TEST IS PERFORMED.
 - C. A COPY OF THE COMPLETED STRENGTH TEST PRESSURE REPORT SHALL BE FILED WITH THE COMPLETED FOREMAN'S COPY OF THE ESTIMATE, ALONG WITH A COPY OF THE TEST CHART (WHERE REQUIRED). THESE SHALL BE RETAINED FOR THE LIFE OF THE FACILITY. DISTRIBUTE OTHER COPIES AS INDICATED ON THE FORM.

TEST CHART

- 18. A CHART RECORD SHALL BE MADE OF THE PRESSURE TEST FOR NEW FACILITIES TO OPERATE AT OR OVER 30% OF SMYS AND FOR ALL LINES OR SYSTEMS BEING UPDATED. THE PROCEDURE FOR HANDLING THE CHART, AND THE MINIMUM INFORMATION REQUIRED ON THE CHART IS OUTLINED BELOW:
 - A. THE CHART MUST BE DESIGNED FOR THE RECORDER ON WHICH IT IS TO BE USED, AND MUST HAVE APPROPRIATE SCALE AND TIME LINES.
 - B. THE CALIBRATION OF THE RECORDER MUST HAVE BEEN CHECKED.
 - C. THE CHART MUST BE SET ON THE CORRECT TIME AT THE START OF THE TEST. THE ACTUAL TIME, DATE, AND INITIALS OF THE PERSON STARTING THE TEST MUST BE SHOWN ON FACE OF THE CHART AT THE START OF THE TEST.
 - D. THE CHART MUST SHOW A MINIMUM OF EIGHT HOURS (EXCEPT WHERE A FOUR HOUR TEST IS PERMITTED IN APPENDIX A). ANY DISCREPANCIES SHOULD BE EXPLAINED.
 - E. AT THE END OF THE TEST, THE ACTUAL TIME, DATE, AND INITIALS OF THE PERSON REMOVING THE CHART MUST BE SHOWN ON THE FACE OF THE CHART.
 - F. THE SECTION OF PIPE UNDER TEST MUST BE IDENTIFIED ON THE FACE OF THE CHART, ALONG WITH THE JOB NUMBER.
 - G. THE FOLLOWING ADDITIONAL INFORMATION IS TO BE SHOWN ON THE BACK OF THE CHART:
 - I. JOB NUMBER
 - II. LOCATION OF TEST
 - III. TEST PRESSURE, DATE AND DURATION
 - IV. SIZE, WALL THICKNESS, PIPE SPECIFICATION AND LENGTH OF SECTION TESTED
 - V. THE SERIAL NUMBER OF THE RECORDER OR OTHER MEANS OF IDENTIFICATION
 - VI. THE DATE THE RECORDER WAS LAST CALIBRATED AND S/N OF THE DEAD WEIGHT TESTER USED.
 - H. THE ABOVE INFORMATION IS TO BE RECORDED ON THE CHART AT THE TIME OF THE TEST. AFTER THE TEST IS COMPLETED, THE FOREMAN IS TO REVIEW THE CHART AND THEN SIGN AND DATE IT.
 - I. THE ORIGINAL OF THE TEST CHART IS TO BE ATTACHED TO THE ORIGINAL OF THE TEST REPORT FORM 62-4921. A COPY OF THE TEST CHART IS TO BE ATTACHED TO EACH COPY OF THE TEST REPORT. THIS RECORD IS TO BE RETAINED FOR THE LIFE OF THE FACILITY.

TEST RECORDS FOR FACILITIES OPERATING AT OR UNDER 100 PSIG

- 19. FOR EACH FACILITY OPERATING AT OR UNDER 100 PSIG, THE TEST INFORMATION SHALL BE RECORDED IN A BOX PROVIDED ON THE WORK ORDER FORM OR THE GAS SERVICE RECORD FORM. IF THESE DOCUMENTS ARE NOT USED, THE TEST INFORMATION SHALL BE RECORDED ON THE AS-BUILT COPY OF THE CONSTRUCTION DRAWING. THE TEST RECORD SHALL BE RETAINED FOR THE LIFE OF THE FACILITY.

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APPROVED BY	REV	DATE	DESCRIPTION	DWN	CHKD	APVD
6	2-24-82		INSERTED PAR 15 AND RENUMBERED REMAINING PARAGRAPHS			
5	3-11-80		REVISED PARAGRAPH 15B AND 18			PAF
4	7-22-76		RE-TYPED DUE TO EXPANSION OF PAR 14			PAF
3	2-20-74		ADDED PARAGRAPH 18		AC	ANK PAF

GM	
SUPV	
DSGN	
DWN	CADD/BAL
CHKD	M C
O K	M CALLEJAS
DATE	SCALE
2-11-69	NONE

PIPING - DATA SHEET
DESIGN AND TEST REQUIREMENTS
 GAS STANDARD
PACIFIC GAS AND ELECTRIC COMPANY
SAN FRANCISCO, CALIFORNIA

SUPERSEDES 084509	
SUPERSEDED BY	
SHEET NO. 3 OF 4 SHEETS	
DRAWING NUMBER	REV
283621	6
MICROFILM	

61-06 REV. 7-78

TEST REQUIREMENTS FOR PIPELINES, MAINS, SERVICES,
INSTRUMENT LINES SUBJECTED DIRECTLY TO GAS PRESSURES, AND OTHER FACILITIES

DESIGN PRESSURE (D.P.)	30% SMYS OR MORE		UNDER 30% SMYS AND OVER 100 PSIG	100 PSIG OR LESS (INCLUDING LOW PRESSURE)	PLASTIC (SEE NOTE 10)
	PIPELINE (INCLUDING FABRICATED UNITS TESTED IN PLACE)	FABRICATED UNITS, SHORT SECTIONS OF PIPE, PRETESTED PIPE (SEE NOTE 6) FOR LIMITATION	INCLUDING FABRICATED UNITS AND SHORT SECTIONS OF PIPE, EITHER PRE-TESTED OR TESTED IN PLACE		
TYPE OF TEST	STRENGTH	STRENGTH	LEAK	LEAK	LEAK
TEST MEDIUM	WATER, AIR, INERT GAS OR GAS (SEE NOTES 1, 2 AND 15)	WATER, AIR, INERT GAS OR GAS (SEE NOTES 1, 2 AND 15)	WATER, AIR, INERT GAS OR GAS (SEE NOTES 1, 2 AND 15)	AIR OR GAS (SEE NOTE 15)	AIR OR GAS (SEE NOTE 15)
MAXIMUM TEST PRESSURE (SEE NOTES 1 AND 2)	100% SMYS OR FACTORY TEST PRESSURE OF FITTING (SEE NOTES 3 AND 5)	100% SMYS OR FACTORY TEST PRESSURE OF FITTING (SEE NOTES 3 AND 5)	(SEE NOTES 3 AND 12)	110 PSIG	3 X DESIGN PRESSURE
MINIMUM TEST PRESSURE	1.5 X DESIGN PRESSURE (SEE NOTE 4 AND 5)	1.5 X DESIGN PRESSURE (SEE NOTES 4 AND 5)	1.5 X DESIGN PRESSURE (SEE NOTE 4)	100 PSIG	100 PSIG (SEE NOTE 14) OR 1.5 X MAOP WHICHEVER IS GREATER
DURATION OF TEST	8 HOURS MINIMUM (SEE NOTE 16)	4 HOURS MINIMUM (SEE NOTE 16)	1 HOUR MINIMUM (SEE NOTE 16)	5 MINUTES	5 MINUTES (SEE NOTE 7)
TEST RECORDS REQUIRED (SEE NOTE 13)	FORMS REQUIRED	COMPLETED STRENGTH TEST PRESSURE REPORT	COMPLETED STRENGTH TEST PRESSURE REPORT	COMPLETE BOX ON W.O. FORM OR GAS SERVICE RECORD FORM	COMPLETE BOX ON W.O. FORM OR GAS SERVICE RECORD FORM
	TEST CHART	YES (SEE NOTE 9)	YES (SEE NOTE 9)	NO (SEE NOTE 11)	NO (SEE NOTE 11)

NOTES:

- (1) MAXIMUM TEST PRESSURE PERMITTED, EXPRESSED AS A PERCENT OF SMYS:

CLASS LOCATION	1	2	3	4
AIR OR INERT GAS	80	75	50	40 (SEE NOTE 8)
GAS	80	30	30	30
WATER	100	100	100	100
- (2) SAFETY - WHEN TESTING WITH AIR, INERT GAS OR GAS, THE PRESSURE SHALL BE HELD AT ABOUT 100 PSIG AND OBSERVED FOR LEAKAGE BEFORE RAISING TO THE REQUIRED TEST PRESSURE.
- (3) MAXIMUM TEST CAPABILITIES OF FITTINGS SUCH AS VALVES AND ELBOWS MUST BE EXAMINED WHEN TESTING. SEE PARAGRAPH 15.
- (4) THE MINIMUM TEST PRESSURE SHALL NOT BE LESS THAN 1.5 TIMES THE DESIGN PRESSURE IN CLASS 2, 3 AND 4 LOCATIONS, AND NOT LESS THAN 1.25 TIMES THE DESIGN PRESSURE IN CLASS 1 LOCATION. THE ONLY EXCEPTION IS FOR TRANSMISSION LINES WHERE TESTING TO 1.5 TIMES THE DESIGN PRESSURE CREATES PROBLEMS DUE TO LIMITATIONS IMPOSED BY VALVES (SEE NOTE 3) AND WHERE THE FUTURE MAOP TO BE ESTABLISHED IS BELOW THE DESIGN PRESSURE. THE MINIMUM TEST PRESSURE MAY THEN BE LIMITED TO 1.5 TIMES THE MAOP, WITH THE APPROVAL OF THE GAS SYSTEM DESIGN DEPARTMENT.
- (5) IT IS THE INTENT TO TEST ALL FACILITIES DESIGNED TO OPERATE AT 50% OR MORE OF SMYS, TO A MINIMUM OF 90% OF SMYS AND AS CLOSE TO 100% OF SMYS AS PRACTICAL. FOR FACILITIES OPERATING AT OVER 40% BUT LESS THAN 50% OF SMYS, CONSIDERATION SHOULD BE GIVEN TO TESTING TO OVER 90% OF SMYS, IF THERE IS A POTENTIAL FOR CLASS 4 LOCATION CONSTRUCTION IN THE FUTURE. HOWEVER, SUCH TESTING IS NOT AN ALTERNATIVE FOR CONSTRUCTION OF NEW OR REPLACEMENT FACILITIES TO MEET EXPECTED CLASS LOCATION REQUIREMENTS (SEE PAGE 2, PARAGRAPH 7 OF THIS STANDARD).
- (6) ALL FACILITIES DESIGNED TO OPERATE AT 30% OR MORE OF SMYS SHALL BE TESTED AS A UNIT FOR A MINIMUM OF EIGHT HOURS AFTER INSTALLATION. EXCEPT FOR FABRICATED UNITS OR SHORT SECTIONS OF REPLACEMENT PIPE FOR WHICH A POST INSTALLATION TEST IS IMPRACTICAL. FABRICATED UNITS FOR WHICH A POST INSTALLATION TEST IS IMPRACTICAL SHALL BE TESTED AFTER COMPLETION AND BEFORE INSTALLATION FOR A MINIMUM OF FOUR HOURS. THIS TEST IS REQUIRED EVEN THOUGH PRETESTED PIPE WAS USED TO FABRICATE THE UNIT. SHORT SECTIONS OF REPLACEMENT PIPE SHALL BE TESTED FOR A MINIMUM OF FOUR HOURS PRIOR TO INSTALLATION. THIS TEST MAY BE CONDUCTED IMMEDIATELY PRIOR TO INSTALLATION OR BY PRETESTING THE PIPE AND RETAINING IT FOR EMERGENCY USE. FOR GAS STANDARD A-34, THE FOLLOWING DEFINITIONS SHALL APPLY:
 - (a) A SHORT SECTION OF PIPE IS DEFINED AS ONE PIPE LENGTH OR LESS.
 - (b) A FABRICATED UNIT SHALL CONSIST OF TWO OR MORE FITTINGS AND/OR PIECES OF PIPE JOINED TOGETHER. WHERE MORE THAN 40 FEET OF PIPE IS INVOLVED, THERE SHALL BE A FULL EIGHT HOUR TEST.
- (7) ALTHOUGH THE TEST DURATION FOR PLASTIC PIPE IS 5 MINUTES, IF THE CONSTRUCTION SCHEDULE PERMITS, IT IS DESIRABLE TO MAINTAIN THE TEST PRESSURE FOR A LONGER PERIOD OF TIME. IF THE PIPE IS NOT GASSED UP ON THE SAME DAY AS THE TEST, IT MUST BE RETESTED BEFORE GASSING UP.
- (8) AIR OR INERT GAS SHOULD NOT BE USED TO TEST AT OVER 50% SMYS, UNLESS A TEST WITH WATER IS COMPLETELY IMPRACTICAL. WHEN IT IS NECESSARY TO USE AIR OR INERT GAS AT OVER 50% SMYS, BUILDINGS WITHIN 300' OF PIPELINE MUST BE EVACUATED.
- (9) TEST CHARTS MUST BE COMPLETED AND RETAINED AS OUTLINED IN A-34, PAGE 3.
- (10) TEMPERATURE OF THERMOPLASTIC MATERIAL MUST NOT BE MORE THAN 100°F DURING THE TEST.
- (11) TABLE INDICATES TEST CHART REQUIREMENTS FOR NEW FACILITIES. TEST CHARTS ARE REQUIRED FOR ALL UPGRADING JOBS REGARDLESS OF THE OPERATING PRESSURE OF THE LINE.
- (12) FOR FACILITIES OPERATING AT UNDER 30% SMYS AND OVER 100 PSIG, THE MAXIMUM TEST PRESSURE IS TO BE DETERMINED BY THE PROJECT ENGINEER. A REASONABLE DIFFERENTIAL BETWEEN MAXIMUM AND MINIMUM TEST PRESSURES SHOULD BE ALLOWED, CONSIDERING ELEVATION DIFFERENTIALS AND NOTE 3.
- (13) ALL TEST RECORDS MUST BE RETAINED FOR THE LIFE OF THE FACILITY.
- (14) SDR 21 PIPE TO BE TESTED TO 50 PSIG MINIMUM.
- (15) TESTING USING WATER, AIR OR INERT GAS IS NOT PERMITTED WHERE THE TEST SECTION IS ISOLATED FROM AN OPERATING LINE ONLY BY A CLOSED VALVE, SQUEEZE OFF EQUIPMENT OR PLUGGING EQUIPMENT, WHICH COULD PERMIT THE TEST MEDIUM TO LEAK INTO THE OPERATING LINE. WHERE A TEST MUST BE CONDUCTED USING ONE OF THESE METHODS OF ISOLATING THE TEST SECTION, THE TEST MUST BE CONDUCTED USING NATURAL GAS AS THE TEST MEDIUM. WHEN CONDUCTING SUCH A TEST, THE LIMITATIONS CONTAINED IN NOTE 1 MUST BE OBSERVED.
- (16) FOR HIGH PRESSURE PIPELINE FACILITIES DESIGNED TO OPERATE OVER 200 PSIG AND LOCATED ON CALIFORNIA STATE BRIDGE STRUCTURES, THE TEST PRESSURE SHALL BE MAINTAINED FOR A MINIMUM OF 24 HOURS. SEE INSERT
- (17) SEE INSERT

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APPROVED BY	12	2-24-82	REPLACED NOTE 4		
	11	11-20-79	ADDED NOTE 14		RJA PAL
	10	1-15-79	REVISED NOTE 5		RJA PAL
	4	2-17-72	REVISED TITLE FOR COMPUTER LISTING, CHANGE TO 30 SMYS & NOTE 4	MC	JLL
REV. DATE			DESCRIPTION	DWN	CHKD APVD

GM	
SUPV	
DSGN	
DWN	CADD/BAL
CHKD	
O K	
DATE	SCALE
2-11-69	NONE

PIPING - DATA SHEET
DESIGN AND TEST REQUIREMENTS
GAS STANDARD
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SAN FRANCISCO, CALIFORNIA

SUPERSEDES	084509
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SHEET NO.	4 OF 4 SHEETS
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REV	12

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