PURPOSE

1 To establish a uniform procedure for designing and testing gas piping systems that will meet the require ments of G O 112 of the CPUC

RECISSIONS

2 Supersedes earlier letter and instructions including

a Letter April 2 1962 [redacted] 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 [redacted] to Division Gas Superintendents Replacement of Pipe in Mains Operating at Stress Levels Over 20% of the Specified Minimum Yield Strength

c Letter March 25 1936 [redacted] to Division Managers calling attention to the serious con sequences 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 ccor d nce with the r quirements of G O 1i2 This includes the reinst ting of ab ndoned or tempor rily dis connected pipino

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 Other provisions required by G O 112 of the CPUC shall be observed

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 xis 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 app icable 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 operating pressure existing in a piping system during a normal annual operating cycle or as specified by the Manager of G S D DEPT and in conformance with SP 463 8

g Test Medium is a substance such as water air or gas through which a force acts to leak or strength test a facility

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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 Location Cl ss is a geographic area as classified and described in G O 112

l Construction Type is a construction specification for pipeline nd mains that fixes the stress levels

m Specified Minimum Yield Strength (SMYS) is the minimun yield strength prescribed by the specification under which the pipe is purchased from the manufacturer (psi)

DESIGN

6 When determining MAOP consideration shall be given to

a Future development of the area

b Current and future Gas Supply Pressures

c Probability of incre se in Supply Pressure

7 Initial Construction

Design all gas facilities to meet the requirements of the expected future location class

8 Addition to Existing Facilities

The design requirements for subsequent additions or alterations to existing pipeline facilities shall be at least equivalent to that of the original construction

9 Facilit e de igned to ei her type A and B con truction or which deviate from the steel pipe specifications (Appendix B C and D) 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

TESTING

11 The test medium shall be one permitted for the design pressure and location class as specified in G O 112 Factors to be considered in the choice of test media as hown in the table of test requirements (Appendix A) shall include safety availability and economy

12 Test Pres ure shall not be less than that required by G O 112 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

13 Exceptions

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

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pipe prior to installation provided all tie in girth welds are nondestructively tested

14 Damaged service lines shall be repaired if necessary and then tested in accordance with Apperdi A

RECORDS

15 a For facilities operating above 100 psi estimate sketches and design drawings shall contain

DESIGN CRITERIA
Location Class _____
Type Construction_____
Design Pressure_____ (psig)
Stress Level_____ (psi)
Strength T P Maximum _____ (psig) Minimum _____(psig)
Test Fluid_____
MADP_____ (psig)
Pipe Specifications_____

b Leak test information shall be recorded on the gas service record the estimate sketch and work order or other authorized form for facilities operating under 100 psig

c Estimate Form 62 6251 shall be marked by person making estimate to indicate that the pipe is over 20% yield and has to be strength tested

d Strength test pressure report form 62 4921 shall be made whenever a test is required

See Appendix A

A copy of the strength test pressure report shall be filed with the completed foreman s copy of the estimate for the life of the facility Distribute other copies as indicated on the form

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GAS STANDARD

DESIGN AND TEST REQUIREMENTS FOR GAS PIPING SYSTEMS

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TEST REQUIREMENTS FOR PIPELINES, MAINS AND SERVICES

Design Pressure	20% SMYS or More	Under 20% SMYS & Over 100 Psi	100 Psi to 1 P i or Less	Plastic
Type of Test	Strength	Strength	Leak	Strength
Test Medium	Water Air Inert Gas or Gas (1) (2)	Water Air Inert Gas or Gas (1) (2)	Air or Gas	Air or Gas
Max Test Pressure (2)	100% SMYS (4) Factory Test press of fitting (3)	1 50 DP (3)	100 Psi	3x DP
Min Test Pressur	1 50 DP	1 50 DP	100 Psi	100 Psi
Duration of Test	8 Hours Minimum (5)	1 Hour Minimum	5 Minutes	5 Minutes (6)

Notes (1) Maximum test pressure percent of SMYS

Loca ion Class	1	2	3	4
Air or Inert Gas	80	75	50	40
Gas	80	30	30	30

(2) Safety when testing with air inert gas or gas the pressure shall be held at about 100 psi and observed for leakage before raising to the required test value

(3) Max Test capabili ies of fi tings such as valves and elbows sh uld be exar ined when esting

(4) It is the intent to test as close to SMYS as practical for pipe 16 and larger There may be instances as in Item 3 where pressures shall b limited but in no ase shall it be less than 1 5 DP

(5) Short Sections on short section of pipe where post installation test is not practical a preinstallation test may be conducted for a minimum 4 hour period

(6) Hold at est pressure for as long as practical If no gassed up immediately following test retest before gassing up

(7) Temperature of thermoplastic material must not be more than 100°F during he test

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	3	1 71	ADDED NOTE 7, REVISED WORDING UNDER 20/ AND DURATION OF TEST				
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