

Pipe Design SMYS Report

ASME B31.4 / B31.8 Pipe Design Pressure Analysis

PROJECT NAME

Demo - Case #1

CLIENT

ABC Pipeline

CALCULATED BY

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DATE

June 29, 2026

PIPELINE DESIGN PRESSURE ANALYSIS

Title 49 CFR Part 192 Compliance Report

Generated: June 29, 2026 at 08:57 PM

1. EXECUTIVE SUMMARY

MAXIMUM ALLOWABLE DESIGN PRESSURE

2,344 psig

Per 49 CFR § 192.105
MAOP: 809 psig | Safety Margin: 189.8%

1.1 Analysis Summary

Pipeline Specification

OD × WT: 10.750 × 0.500 in
Grade: GRADE B
SMYS: 35,000 psi

Design Results

Design P: 2,344 psig
Utilization: 34.5%
Status: PASS

1.2 Input Parameters

Parameter	Symbol	Value	Unit
Outside Diameter	D	10.750	inches
Wall Thickness	t	0.500	inches
SMYS	S	35,000	psi
Design Factor (Class 1)	F	0.72	-
Joint Factor	E	1	-
Temperature Factor	T	1	-
MAOP	-	809	psig

2. STRESS CALCULATIONS

2.1 Calculated Results

Parameter	Formula	Value	Unit
Maximum Allowable Design Pressure	$(2 \times S \times t \times F \times E \times T) \div D$	2,344.19	psig
Hoop Stress @ MAOP	$((MAOP \times D) / (2 \times t)) / S \times 100$	24.85	% SMYS
Minimum Test Pressure	$1.5 \times MAOP$	1,213.50	psig
% SMYS @ Min. Test Pressure	$((P_{test} \times D) / (2 \times t)) / S \times 100$	37.27	% SMYS
Maximum Test Pressure	$(2 \times S \times t \times 0.9) \div D$	2,930.23	psig
Potential Impact Radius (PIR)	$0.69 \times D \times \sqrt{(MAOP)}$	210.98	feet
Hoop Stress (psi)	$(MAOP \times D) / (2 \times t)$	8,697	psi
Safety Margin	$(P_{design} / MAOP - 1) \times 100$	189.8	%

2.2 Compliance Check

Check Item	Actual	Allowable	Utilization	Status
Design Pressure vs MAOP	2,344 psig	809 psig	0.345	PASS
Hoop Stress @ MAOP	24.8%	72% SMYS	0.345	PASS
Test Pressure (Min)	37.3%	90% SMYS	0.414	PASS

3. CONCLUSIONS AND RECOMMENDATIONS

Design Verification

- The pipeline design meets all structural requirements
- Design pressure (2,344 psig) exceeds MAOP (809 psig)
 - Safety margin of 189.8% exists
 - The selected pipe grade is adequate

Construction Recommendations

1. Verify pipe material meets GRADE B requirements through MTRs
2. Conduct hydrostatic test at 1,214 psig minimum
3. Implement PIR of 211 feet for emergency planning
4. Monitor Class 1 location designation per 49 CFR § 192.5

Key Design Parameters Summary

Pipeline Specification:	10.00" NPS × 0.500" WT
Material Grade:	GRADE B
Design Pressure:	2,344.19 psig
Operating Pressure (MAOP):	809 psig
Compliance Status:	COMPLIANT