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ASPEN STEAM MAINS Piping Stress & Flexibility Analysis

Analysis as per B31.3 2020

XGM Consulting Engineers South Africa

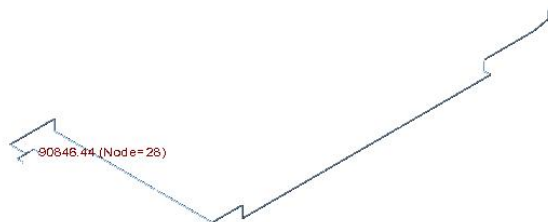
REPORT: DC_ASPEN STEAM MAINS

13 APRIL 2022

CONTAINED IN THIS DOCUMENT

TÜV Rheinland
TUV JOB NO: 52076125
DATE: 11/05/2022
SIGN: 
STATUS: A ☒ B ☐ C ☐ I/O ☐
ACTIVITY: DESIGN ☒ DESIGN REF: XGM/RH/11-05-22-1
WELDING ☐ QA/WELDING REF:
A - PROCEED B - PROCEED, CHANGE AS NOTED & RESUBMIT
C - DO NOT PROCEED, CHANGE AS NOTED & RESUBMIT
I/O - NOT REVIEWED, FOR INFORMATION ONLY
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1. ASPEN STEAM MAINS



Type	On Element	Element Nodes	Bending Stress (KPa)	Torsion Stress (KPa)	SIF's In Plane	SIF's Out Plane	Code Stress (KPa)	Allowable Stress (KPa)	Percent (%)
1	28-29	28	105196.90	1739.05	1.57	1.31	90846.44	137031.90	66.30
2	1034-1035	1035	98861.09	2692.34	1.57	1.31	86341.58	137031.90	63.01
3	28-29	29	95621.90	-6697.69	1.57	1.31	85291.97	137031.90	62.24
4	29-30	29	95621.90	6697.69	1.57	1.31	85291.97	137031.90	62.24
5	1033-1034	1034	90881.58	7268.02	1.57	1.31	81962.95	137031.90	59.81
6	1034-1035	1034	90881.58	-7268.02	1.57	1.31	81962.95	137031.90	59.81
7	80-90	80	43420.41	27960.49	1.00	1.00	79967.98	137031.90	58.36

SANS 347 HAZARD CATEGORY AND CONFORMANCE

PIPE SIZING, WALL THICKNESS AND FLANGE RATING

ISOMETRIC SHT 1 OF 3

ISOMETRIC SHT 2 OF 3

ISOMETRIC SHT 3 OF 3

CODE COMPLIANCE REPORT

DISPLACEMENT REPORT

RESTRAINT SUMMARY

B31.3 STRESSES REPORT

DOCUMENT No.: DC_ASPEN Steam Mains Stress Analysis

DESIGN PRESSURE / LINE SIZE: 1500 KPa, 200NB SCH40

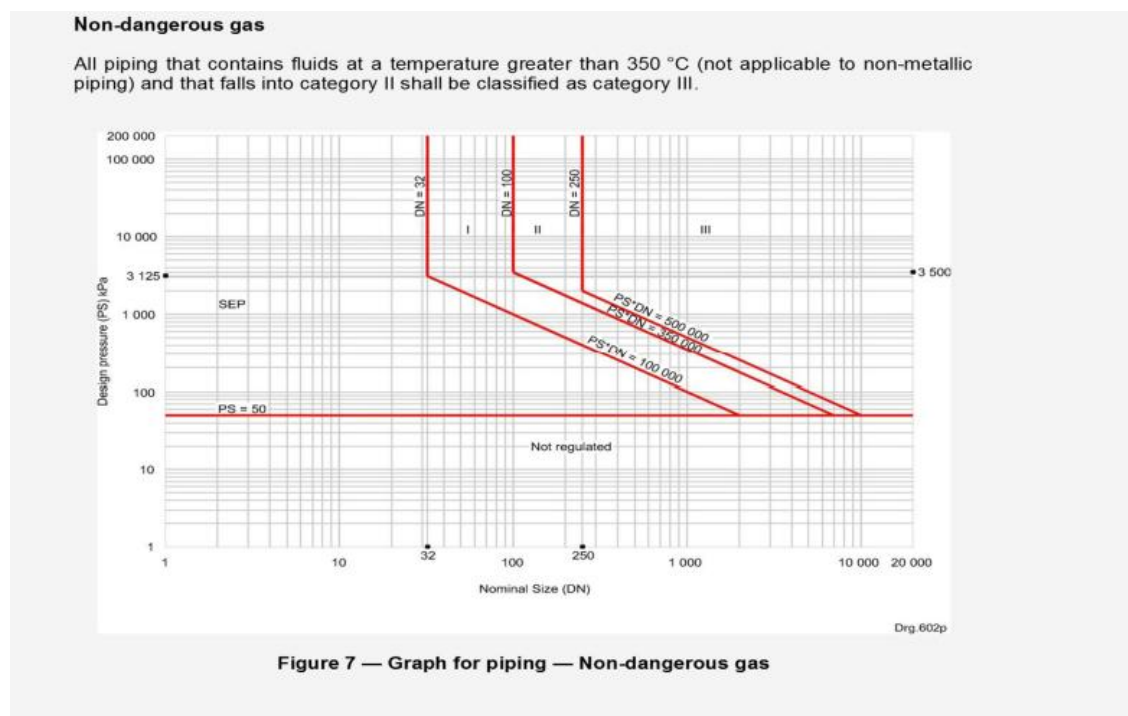
DESIGN TEMPERATURE: 210 Deg C

OPERATING MEDIUM: Steam

CAPACITY: 20000 Kg / hr

SANS 347 Hazard Category: 1

CONFORMITY ASSESMENT MODULE: A



REPORT PREPARED FOR: SUSTAINABLE HEATING

COMPILED BY: LE GREEN (PrTechEng)

Pipe Sizing calculation

Input Data

Units SI(bar) ▼

Pipe Grade	DIN 2448	▼
Steam Pressure	15	barG ▼
Steam Temperature [?]	(201.418)	°C ▼
Steam Flow Rate	20000	kg/h ▼
Maximum Allowable Velocity [?]	30	m/s ▼
Pipe Length [?]	300	m ▼
Obstructed Flow Valves (e.g.Globe) (Qt'y) [?]	4	
Through Flow Valves (e.g. Gate) (Qt'y) [?]	4	
Check Valves (Qt'y) [?]	4	
Elbows (Qt'y) [?]	16	
Roughness of Interior Pipe Wall [?]	0.05	mm ▼

Result

Pipe Size	DN200	
Pipe Inner Diameter	207.3	mm ▼
Steam Velocity	20.3504	m/s ▼
Pressure Loss	1.50435	bar ▼
Equivalent Length of Straight Pipe	1260.79	m ▼

Equation(s)

$$d = \sqrt{\frac{4}{\pi} \cdot \frac{m_s \cdot V}{3600v}}$$
$$\Delta p = \frac{\mu \cdot l \cdot v^2}{2d \cdot V}$$



ms: Steam Flow Rate (kg/h)

l : Pipe Length (m)

d : Pipe Inner Diameter (m)

v : Steam Velocity (m/s)

Δp: Pressure Loss (Pa)

μ : Coefficient of friction

V : Specific volume (m³/kg)

Pipe wall thickness calculation

200NB SCH 40

150NB SCH 40

250NB SCH40

$$T = (P \times D) / [2 \times \{(S.E) + (P.Y)\}]$$

Quality Factor, E =	1.00
Design Pressure =	15.00 barg
Design Temperature =	202.0°C
Allow. Stress @ 202°C =	20.000 ksi
Corrosion Allowance =	3.00 mm
Y Coefficient @ 202°C =	0.4
Ratio of (P/SE) =	0.011

1 Only RED font cells are meant for Input.										BB	
2 PMS Line Class ID =		CS300		Select / Input Special Requirements, if any =						High Pressure Steam Service	
3 ASME Flange Rating =		300#		Optional Comments: Non-Lethal Low Temperature Process Hydr carbons							
4 Fluid / Service =		Steam									
5 Material Specification =		A106 Gr B		Material Type: Carbon steels, C <= 0.3%							
6 Quality Factor, E =		1.00		Pipe Manufacturing Type =		Seamless Pipe or Tube					
7 Design Pressure =		15.00 barg		= 217.56 psig		Please input pressure value in barg.					
8 Design Temperature =		202.0°C		= 395.6°F		Please input temperature value in °C.					
9 Allow. Stress @ 202°C =		20.000 ksi		= 137.90 MPa		Please check from Table A-1 of ASME B31.3 Latest Edition.					
10 Corrosion Allowance =		3.00 mm		= 0.12 inch		Mill Tolerance =		12.5%		Please input...	
11 Y Coefficient @ 202°C =		0.4		Valid for t<D/6		Please check from ASME B31.3 Table 304.1.1.					
12 Ratio of (P/SE) =		0.011		Check Passed.							
13 t _{pressure} =		(P x D) / [2 x {(S.E) + (P.Y)}]				= (217.6 x D) / [2 x {(20 000.0 x 1.00) + (217.6 x 0.4)}]					
14		(Valid for t<D/6)				= 0.0054153523 x D inch					
15 Where,		ASME B31,3 2020									
16 D = Outside diameter of pipe in inch and also derived in mm;										Refer ASME B36.10M-1996.	
17 P = Internal design gage pressure in psi and also derived in bar;											
18 t _{min} = Minimum required thickness, including mechanical, corrosion and erosion allowances;											
19 t _{pressure} = Pressure design thickness, as calculated in accordance with para. 304.1.2, for internal pressure;											
20 S = Allowable stress value from Table A-1 of ASME B31.3;											
21 E = Quality factor from Table A-1A or A-1B of ASME B31.3;											
22 Y = Coefficient from Table 304.1.1 of ASME B31.3, valid for t<D/6;											
23 T = The minimum wall thickness for the pipe selected or purchased, considering manufacturer's minus											
24 tolerance shall be NOT less than t min. For t min, refer Column "A" and for T, refer Column "B".											
25 (All nomenclatures, definitions and parameters are generally in accordance with ASME B31.3 2002 Edition.)											
26		Selected									
27	Pipe NPS	Pipe OD	t _{pressure}	t _{min}	Sch /	Nominal	Min. Thk.	Max.Allow.	Ratio	Check	
28	inch (mm)	D (mm)	(mm)	(mm)	Thk. (inch)	Thk. (mm)	T (mm)	P (barg)	(D/t)	(T>t _{min})	
29				Column "A"		T _{nom}	Column "B"		Check (>6)		
30	½" (15)	21.34	0.12	3.12	Sch.40	2.77	2.42	-73.1	-36.9	Not Valid	
31	¾" (20)	26.67	0.14	3.14	Sch.40S	2.87	2.51	-49.8	-54.6	Not Valid	
32	1" (25)	33.40	0.18	3.18	Sch.40S	3.38	2.96	-3.6	-757.8	Not Valid	
33	1¼" (32)	42.16	0.23	3.23	Sch.40S	3.56	3.11	7.3	378.2	Not Valid	
34	1½" (40)	48.26	0.26	3.26	Sch.40S	3.68	3.22	12.8	216.8	Not Valid	
35	2" (50)	60.33	0.33	3.33	Sch.40S	3.91	3.42	19.4	142.7	Passed.	
36	2½" (65)	73.03	0.40	3.40	Sch.40S	5.16	4.51	58.1	48.3	Passed.	
37	3" (80)	88.90	0.48	3.48	Sch.40S	5.49	4.80	56.8	49.4	Passed.	
38	3½" (90)	101.60	0.55	3.55	Sch.80S	8.08	7.07	114.1	25.0	Passed.	
39	4" (100)	114.30	0.62	3.62	Sch.80S	8.56	7.49	111.8	25.5	Passed.	
40	5" (125)	141.30	0.77	3.77	Sch.40	6.55	5.73	54.2	51.7	Passed.	
41	6" (150)	168.28	0.91	3.91	Sch.80S	10.97	9.60	111.7	25.5	Passed.	
42	8" (200)	219.08	1.19	4.19	Sch.40	8.18	7.16	53.1	52.7	Passed.	
43	10" (250)	273.05	1.48	4.48	Sch.40	9.27	8.11	52.4	53.4	Passed.	
44	12" (300)	323.85	1.75	4.75	Sch.100	21.44	18.76	139.6	20.6	Passed.	
45	14" (350)	355.60	1.93	4.93	Sch.100	23.83	20.85	144.2	19.9	Passed.	
46	16" (400)	406.40	2.20	5.20	Sch.100	26.19	22.91	140.7	20.4	Passed.	
47	18" (450)	457.20	2.48	5.48	Sch.100	29.36	25.69	142.5	20.1	Passed.	
48	20" (500)	508.00	2.75	5.75	Sch.100	32.54	28.47	144.1	19.9	Passed.	
49	22" (550)	558.80	3.03	6.03	Sch.100	34.93	30.56	141.6	20.3	Passed.	
50	24" (600)	609.60	3.30	6.30	Sch.100	38.89	34.03	146.3	19.6	Passed.	
51	Notes:	1. The user shall arrive at the worst case P-T condition, based on maximum (P/SE) ratio.									
52		2. The user shall be responsible to check the allowable stress value for the material & temp.									
53		3. The user shall be responsible to check the applicable Y Coefficient value for the material & temp.									
PTC & Branch Calc_ASME B31.3_Upto NPS 24 Version: 1.11											

Flange Rating

Steam pressure 15 Bar = 217.5 PSI

Saturated Steam Temperature @ 15 Bar = 201
Deg C, 393 Deg F

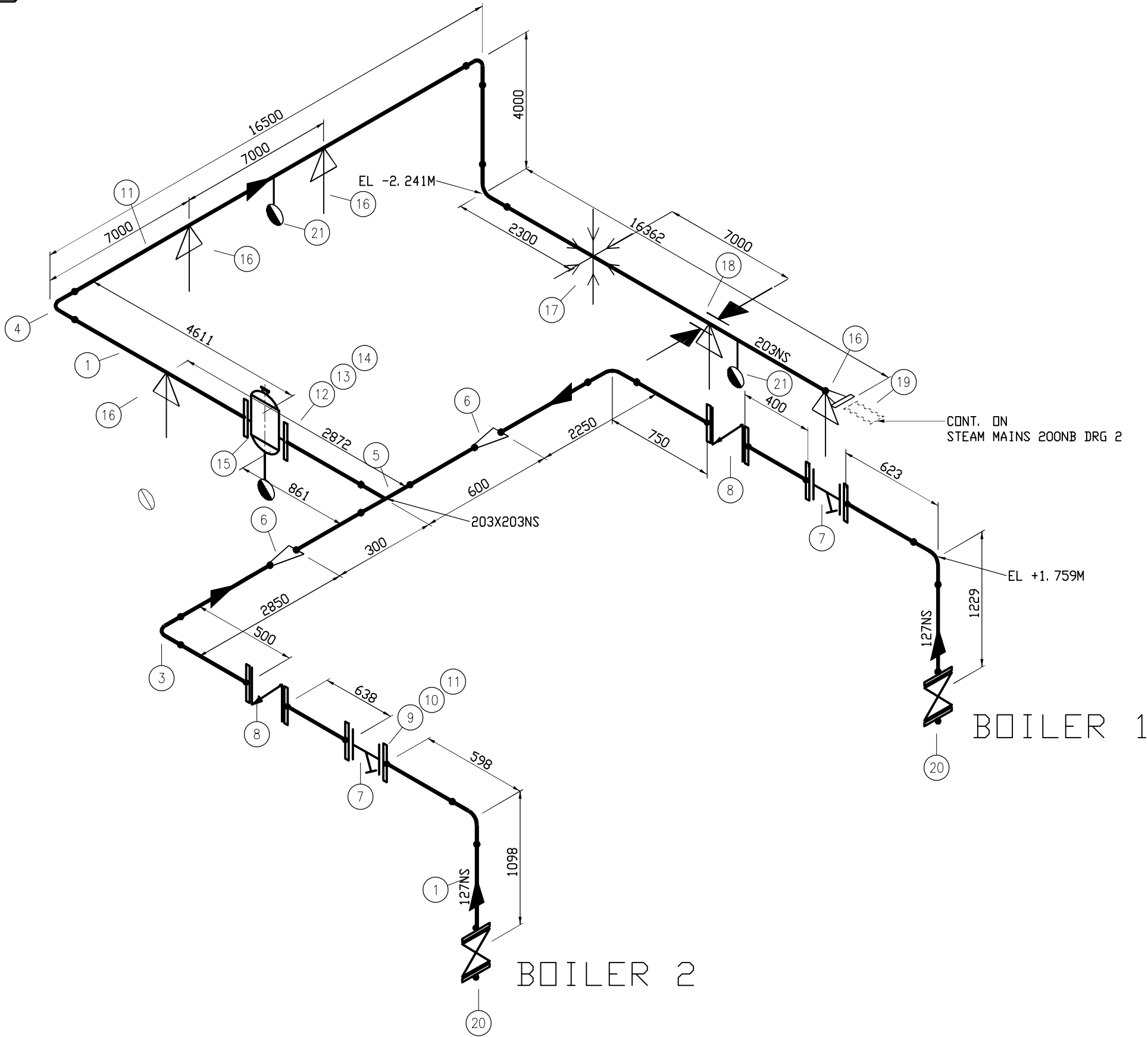
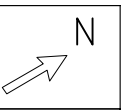
Flange Material : A105 (Material Group 1.1)

From table Flange Class 300#

Fig. 17-28 (GPSA BOOK)

Pressure- Temperature Ratings for Pipe Flanges and Flanged Fittings from ANSI B16.5-1981

CLASS	150	300	400	600	900	1500	2500	See Notes
Material Group 1.1			(Carbon Steel)		A105 (1)(3), A216-WCB(1), A515-70(1) A516-70 (1) A350-LF2, A537-C1.1			(a) (h) (a) (g) (d)
°F	Pressures are in pounds per square inch, gauge (psig)							
-20 to 100	285	740	990	1480	2220	3705	6170	
200	260	675	900	1350	2025	3375	5625	
300	230	655	875	1315	1970	3280	5470	
400	200	635	845	1270	1900	3170	5280	
500	170	600	800	1200	1795	2995	4990	
600	140	550	730	1095	1640	2735	4560	
650	125	535	715	1075	1610	2685	4475	
700	110	535	710	1065	1600	2665	4440	
750	95	505	670	1010	1510	2520	4200	
800	80	410	550	825	1235	2060	3430	
850	65	270	355	535	805	1340	2230	
900	50	170	230	345	515	860	1430	
950	35	105	140	205	310	515	860	
1000	20	50	70	105	155	260	430	
Material Group 2.1			(Type 304)		A182-F304 (5), A182-F304H A240-304 (5)(6), A351-CF8 (5) A351-CF3			- - (f)
-20 to 100	275	720	960	1440	2160	3600	6000	
200	235	600	800	1200	1800	3000	5000	
300	205	530	705	1055	1585	2640	4400	
400	180	470	630	940	1410	2350	3920	
500	170	435	585	875	1310	2185	3640	
600	140	415	555	830	1245	2075	3460	
700	110	405	540	805	1210	2015	3360	
800	80	395	525	790	1180	1970	3280	
850	65	390	520	780	1165	1945	3240	
900	50	385	510	770	1150	1920	3200	
950	35	375	500	750	1125	1870	3120	
1000	20	325	430	645	965	1610	2685	
1050		310	410	620	925	1545	2570	
1100		260	345	515	770	1285	2145	
1150		195	260	390	585	980	1630	
1200		155	205	310	465	770	1285	
1250		110	145	220	330	550	915	
1300		85	110	165	245	410	685	
1350		60	85	125	185	310	515	
1400		50	65	90	145	240	400	
1450		35	45	70	105	170	285	
1500		25	30	50	70	120	200	
Notes: (a) Permissible but not recommended for prolonged use above 800°F (d) Not to be used over 650°F (f) Not to be used over 800°F (g) Not to be used over 850°F (h) Not to be used over 1000°F								
Additional Notes: (1) Upon prolonged exposure to temperatures above about 800°F (425°C), the carbide phase of carbonsteel may be converted to graphite (3) Only killed steel shall be used above 850°F (455°C) (5) At temperatures over 1000°F (540°C), use only when the carbon content is 0.04 percent or higher (6) For temperatures above 1000°F (540°F), use only if the material is heat treated by heating it to a temperature of at least 1900°F (1040°C) and quenching in water or rapidly cooling by other means.								



ITEM	QTY	DESCRIPTION
1	12m	PIPE, SEAMLESS, PE, ASME B36. 1, ASTM A106 GRB 150NB SCH 40.
2	45m	PIPE, SEAMLESS, PE, ASME B36. 1, ASTM A106 GRB 200NB SCH 40.
3	4	ELBOW, 90 LR, BW, ASME B16. 9 ASTM 234 GR WPB SMLS 150NB SCH40
4	3	ELBOW, 90 LR, BW, ASME B16. 9 ASTM 234 GR WPB SMLS 200NB SCH40
5	1	TEE, BW, ASME B16. 9, ASTM A234 200NB
6	2	REDUCER ECCENTRIC BW ASME B16. 9, ASTM A 234, 150X200 SCH40
7	2	FLANGED STRAINER 150NB 300LB
8	2	CHECK VALVE SWING, 300LB, BW, ASME B16. 1, ASTM A216, GR WPB, 150NB
9	8	FLANGE SORF ASME B16. 5 150NB 300LB
10	8	GASKET, SWG, 3mm THK, 300LB, ASME B16. 20 CS/PTFE, 150NB
11	96	STUD BOLTS, M20X120 LONG, FOR FLANGE 15NB ASME B16. 5
12	12	FLANGE SORF ASME B16. 5 200NB 300LB
13	12	GASKET, SWG, 3mm THK, 300LB, ASME B16. 20 CS/PTFE, 200NB
14	12	STUD BOLTS, M24X140 LONG, FOR 200NB FLG ASME B16. 5
15	1	STEAM SEPERATOR 200NB, 300LB FLANGED CONNECTION
16	4	PIPE SUPPORT SIMPLE RESTING
17	1	PIPE SUPPORT ANCHOR
18	1	PIPE SUPPORT GUIDE
19	1	EXPANSION JOINT 200NB X 500mm
20	2	GATE VALVE FLANGED 300LB RF ASME B16. 1
21	2	STEAM TRAP SET

TÜV Rheinland

TUV JOB NO: 52076125

DATE: 02/06/2022

SIGN:

STATUS: A ☒ B ☐ C ☐ I/O ☐

ACTIVITY: DESIGN ☒ DESIGN REF: XGM/RH/02-06-22-1

WELDING ☐ QA/WELDING REF:

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DESIGN CODE:

B31.3 2020

CONFORMITY ASSESMENT

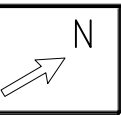
MODULE: A

SANS 347 HAZARD CAT: 1

LESLIE GREEN (PrTechEng)

201470145

FOR CONSTRUCTION CONTRACTOR TO VERIFY DIMENSIONS ON SITE PRIOR TO FABRICATION AND INSTALLATION				PIPING SPEC.	CS300LB	OP. TEMP.	205 DegC	ASPEN STEAM MAINS		REV.	2
				INSULATION SPEC.	ROCKWOOL	RADIOGRAPY	10%			DRG.	1 OF 3
				INSULATION THKS.	25mm	SYSTEM					
				TEST PRESSURE	22.5 BAR	AREA					
		18 MAY 2022	THIS DRAWING IS THE PROPERTY OF XGM LTD AND MUST NOT BE COPIED OR LENT WITHOUT THE CONSENT OF THE COMPANY	MATERIAL	ASTM106 B	DRAWN BY	LG	PIPELINE REFERENCE			
REV.	CHANGE	DATE		OP. PRESSURE	15 BAR	E.L.DIAGRAM					



TÜV Rheinland

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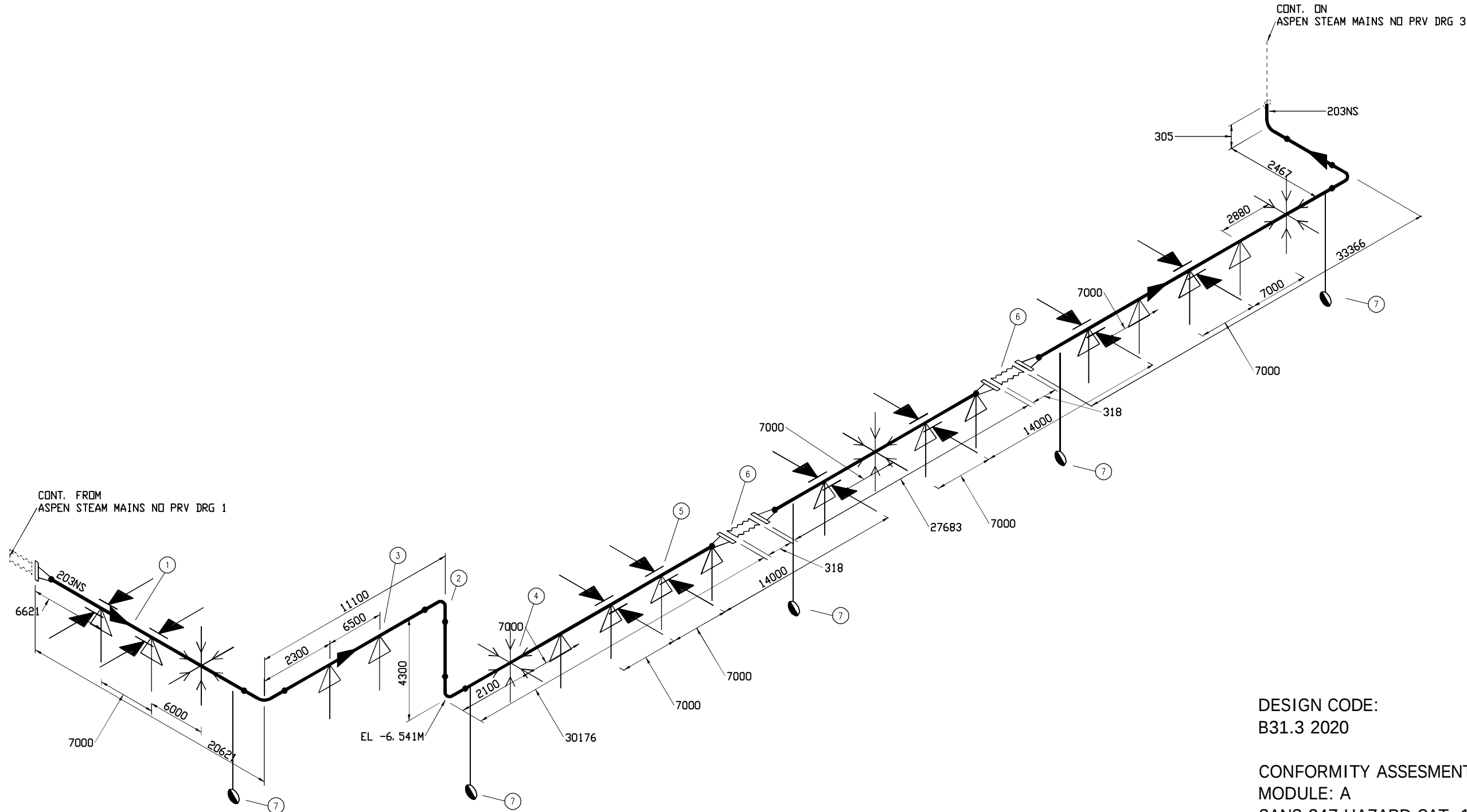
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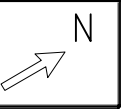
ITEM	QTY	DESCRIPTION
1	134m	PIPE, SEAMLESS, PE, ASME B36.1, ASTM A106 GRB 200NB SCH 40.
2	5	ELBOW, 90 LR, BW, ASME B16.9 ASTM 234 GR WPB SMLS 150NB SCH40
3	7	PIPE SUPPORT SIMPLE RESTING
4	4	PIPE SUPPORT ANCHOR
5	8	PIPE SUPPORT GUIDE
6	2	EXPANSION JOINT 200NB X 500mm
7	5	TRAP SET



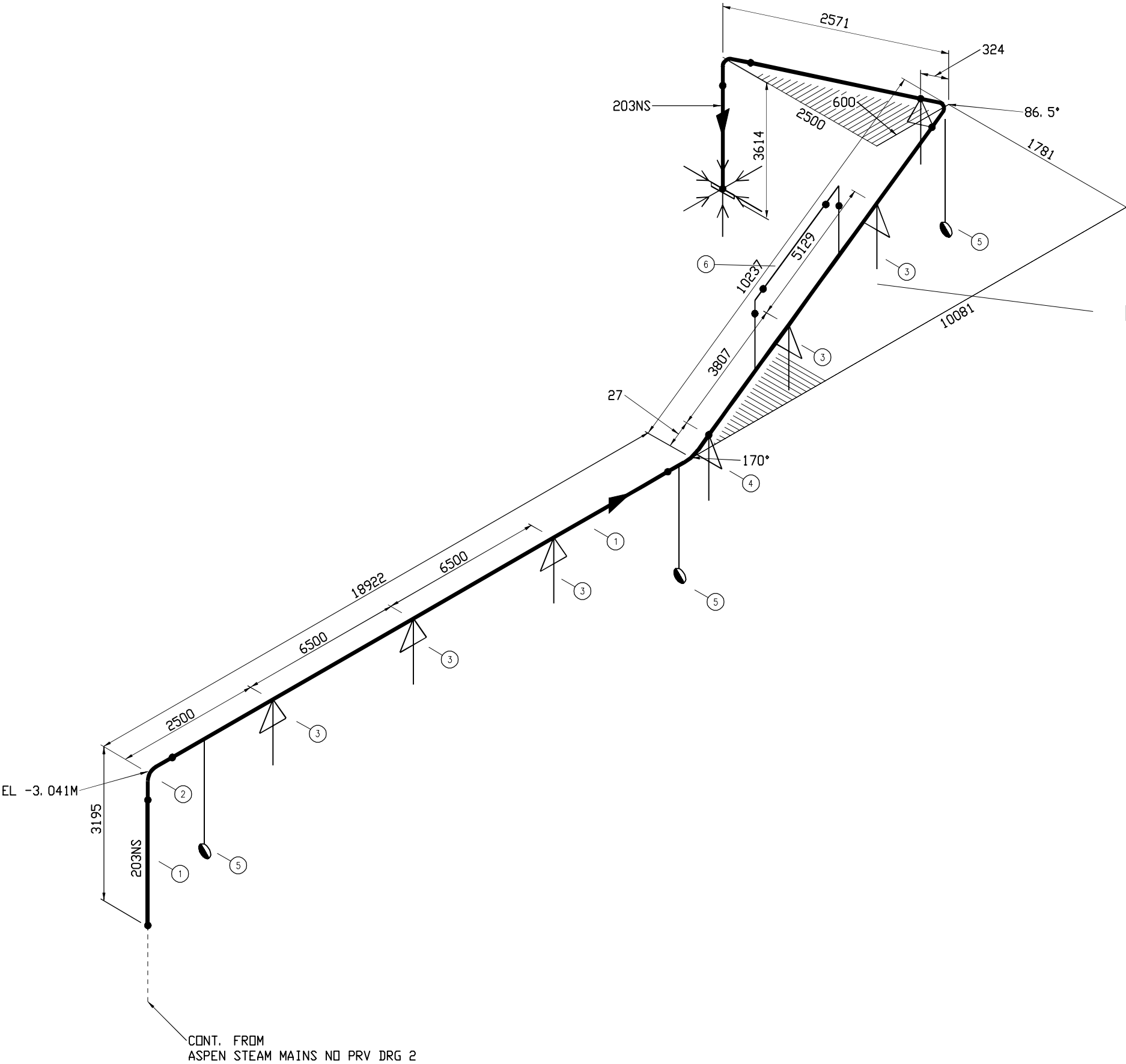
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B31.3 2020

CONFORMITY ASSESMENT
MODULE: A
SANS 347 HAZARD CAT: 1
LESLIE GREEN (PrTechEng)
201470145

FOR CONSTRUCTION CONTRACTOR TO VERIFY DIMENSIONS ON SITE PRIOR TO FABRICATION AND INSTALLATION				PIPING SPEC.	CS300LB	OP. TEMP.	205 DegC	ASPEN STEAM MAINS		REV. 2
				INSULATION SPEC.	ROCKWOOL	RADIOGRAPHY	10%			DRG.
				INSULATION THKS.	25mm	SYSTEM				
				TEST PRESSURE	22.5 BAR	AREA				
		18 MAY 2022	THIS DRAWING IS THE PROPERTY OF XGM LTD AND MUST NOT BE COPIED OR LENT WITHOUT THE CONSENT OF THE COMPANY	MATERIAL	ASTM106 B	DRAWN BY	LG	PIPELINE REFERENCE		2 OF 3
REV.	CHANGE	DATE		OP. PRESSURE	15 BAR	E.L.DIAGRAM				



ITEM	QTY	DESCRIPTION
1	39m	PIPE, SEAMLESS, PE, ASME B36.1, ASTM A106 GRB 200NB SCH 40.
2	4	ELBOW, 90 LR, BW, ASME B16.9 ASTM 234 GR WPB SMLS 150NB SCH40
3	5	PIPE SUPPORT SIMPLE RESTING
4	2	ELBOW, 45 LR, BW, ASME B16.9 ASTM 234 GR WPB SMLS 150NB SCH40
5	3	STEAM TRAP SET
6	1	PRV STATION



PRV STATION POSITION

TÜV Rheinland

TUV JOB NO: 52076125

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STATUS:

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MODULE: A
SANS 347 HAZARD CAT: 1
LESLIE GREEN (PrTechEng)
201470145

FOR CONSTRUCTION
CONTRACTOR TO VERIFY DIMENSIONS ON SITE
PRIOR TO FABRICATION AND INSTALLATION

PIPING SPEC.	CS300LB	OP. TEMP.	205 DegC
INSULATION SPEC.	ROCKWOOL	RADIOGRAPHY	10%
INSULATION THKS.	25mm	SYSTEM	
TEST PRESSURE	22.5 BAR	AREA	
MATERIAL	ASTM106 B	DRAWN BY	LG
OP. PRESSURE	15 BAR	E.L.DIAGRAM	

ASPEN STEAM MAINS

PIPELINE REFERENCE

REV.
2

DRG.

3 OF 3

REV.	CHANGE	DATE	THIS DRAWING IS THE PROPERTY OF XGM LTD AND MUST NOT BE COPIED OR LENT WITHOUT THE CONSENT OF THE COMPANY
		18 MAY 2022	

CODE COMPLIANCE REPORT

CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26
Job:: STEAM MAINS 200NB
Licensed To:: XGM

Table of Contents

LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS.....	2
Code Compliance : Multiple	3

CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26
Job:: STEAM MAINS 200NB
Licensed To:: XGM

LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS

- 1 (OPE) W+T1+P1
- 2 (Alt-SUS) W+P1
- 3 (SUS) W+P1
- 4 (EXP) L4=L1-L3

CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26
 Job:: STEAM MAINS 200NB
 Licensed To:: XGM

CODE COMPLIANCE REPORT: Code Stresses on Elements
 Various Load Cases

LOAD CASE DEFINITION KEY

CASE 1 (OPE) W+T1+P1
 CASE 3 (SUS) W+P1
 CASE 4 (EXP) L4=L1-L3

Note: For a complete breakdown of code-defined stress components, see the Stresses report.
 Piping Code: B31.3 = B31.3 -2016, Jan 31, 2017

*** CODE COMPLIANCE EVALUATION PASSED ***

Highest Stresses: (KPa)
 Ratio (%): 64.8 @Node 28 LOADCASE: 3 (SUS) W+P1
 Code Stress: 88830.9 Allowable Stress: 137031.9
 Axial Stress: 22511.1 @Node 458 LOADCASE: 3 (SUS) W+P1
 Bending Stress: 102400.6 @Node 28 LOADCASE: 3 (SUS) W+P1
 Torsion Stress: 27346.4 @Node 40 LOADCASE: 3 (SUS) W+P1
 Hoop Stress: 44741.8 @Node 100 LOADCASE: 3 (SUS) W+P1
 Max Stress Intensity: 185907.3 @Node 289 LOADCASE: 1 (OPE) W+T1+P1

Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	10	0.0	0.0	0.0	20	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	20	50201.3	0.0	0.0	28	44019.4	0.0	0.0	B31.3	
3(SUS)		60904.9	137031.9	44.4		61643.4	137031.9	45.0	B31.3	
4(EXP)		22847.5	280033.7	8.2		19131.3	280735.1	6.8	B31.3	
1(OPE)	28	74636.3	0.0	0.0	29	67045.6	0.0	0.0	B31.3	
3(SUS)		88830.9	137031.9	64.8		83963.7	137031.9	61.3	B31.3	
4(EXP)		20047.9	252812.4	7.9		25900.2	258366.8	10.0	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	29	67045.6	0.0	0.0	30	63203.1	0.0	0.0	B31.3	
3(SUS)		83963.7	137031.9	61.3		73694.4	137031.9	53.8	B31.3	
4(EXP)		25900.2	258366.8	10.0		29651.9	269201.3	11.0	B31.3	
1(OPE)	30	37460.7	0.0	0.0	38	35298.1	0.0	0.0	B31.3	
3(SUS)		53192.5	137031.9	38.8		61419.4	137031.9	44.8	B31.3	
4(EXP)		17295.3	289899.5	6.0		3524.1	280992.7	1.3	B31.3	
1(OPE)	38	53895.7	0.0	0.0	39	46062.7	0.0	0.0	B31.3	
3(SUS)		75195.1	137031.9	54.9		68004.1	137031.9	49.6	B31.3	
4(EXP)		6256.1	266910.0	2.3		11529.9	274326.0	4.2	B31.3	
1(OPE)	39	46062.7	0.0	0.0	40	43931.4	0.0	0.0	B31.3	
3(SUS)		68004.1	137031.9	49.6		58995.7	137031.9	43.1	B31.3	
4(EXP)		11529.9	274326.0	4.2		18697.4	283426.9	6.6	B31.3	
1(OPE)	40	38981.0	0.0	0.0	50	49115.2	0.0	0.0	B31.3	
3(SUS)		58264.3	137031.9	42.5		69743.6	137031.9	50.9	B31.3	
4(EXP)		9198.7	284154.0	3.2		25627.3	272612.9	9.4	B31.3	
1(OPE)	50	0.0	0.0	0.0	60	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	60	55698.7	0.0	0.0	70	57382.0	0.0	0.0	B31.3	
3(SUS)		76553.0	137031.9	55.9		77688.1	137031.9	56.7	B31.3	
4(EXP)		32752.5	265597.6	12.3		34788.9	264391.5	13.2	B31.3	
1(OPE)	70	0.0	0.0	0.0	80	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	80	61633.7	0.0	0.0	90	67979.5	0.0	0.0	B31.3	
3(SUS)		78153.4	137031.9	57.0		73771.1	137031.9	53.8	B31.3	
4(EXP)		40899.1	263690.8	15.5		51085.1	267655.8	19.1	B31.3	
1(OPE)	90	67979.5	0.0	0.0	100	37154.0	0.0	0.0	B31.3	
3(SUS)		73771.1	137031.9	53.8		41141.2	137031.9	30.0	B31.3	
4(EXP)		51085.1	267655.8	19.1		22726.0	301423.0	7.5	B31.3	
1(OPE)	100	37154.0	0.0	0.0	110	38965.9	0.0	0.0	B31.3	
3(SUS)		41141.2	137031.9	30.0		39462.7	137031.9	28.8	B31.3	
4(EXP)		22726.0	301423.0	7.5		25145.1	302935.2	8.3	B31.3	
1(OPE)	110	29116.2	0.0	0.0	555	27335.0	0.0	0.0	B31.3	
3(SUS)		32810.2	137031.9	23.9		35039.5	137031.9	25.6	B31.3	
4(EXP)		16370.6	308860.8	5.3		13732.7	306856.3	4.5	B31.3	
1(OPE)	555	27335.0	0.0	0.0	777	44212.6	0.0	0.0	B31.3	
3(SUS)		35039.5	137031.9	25.6		60965.2	137031.9	44.5	B31.3	
4(EXP)		13732.7	306856.3	4.5		27378.2	279220.6	9.8	B31.3	
1(OPE)	777	44212.6	0.0	0.0	1000	61249.6	0.0	0.0	B31.3	
3(SUS)		60965.2	137031.9	44.5		74608.4	137031.9	54.4	B31.3	
4(EXP)		27378.2	279220.6	9.8		43710.8	264457.4	16.5	B31.3	
1(OPE)	1005	41252.1	0.0	0.0	1010	40154.6	0.0	0.0	B31.3	
3(SUS)		65381.0	137031.9	47.7		68537.2	137031.9	50.0	B31.3	
4(EXP)		19649.5	275155.2	7.1		14184.5	272291.5	5.2	B31.3	
1(OPE)	1010	0.0	0.0	0.0	1015	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	1015	38719.6	0.0	0.0	1020	37184.6	0.0	0.0	B31.3	
3(SUS)		69360.5	137031.9	50.6		67101.3	137031.9	49.0	B31.3	
4(EXP)		7866.3	271855.0	2.9		4246.9	274491.9	1.5	B31.3	
1(OPE)	1020	0.0	0.0	0.0	1025	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	1025	36128.6	0.0	0.0	1028	44414.9	0.0	0.0	B31.3	
3(SUS)		61431.4	137031.9	44.8		52010.1	137031.9	38.0	B31.3	
4(EXP)		10137.0	280537.6	3.6		27826.8	289915.1	9.6	B31.3	
1(OPE)	1028	69213.1	0.0	0.0	1029	71199.9	0.0	0.0	B31.3	
3(SUS)		52883.8	137031.9	38.6		60351.8	137031.9	44.0	B31.3	
4(EXP)		56822.3	288873.5	19.7		59174.3	281717.9	21.0	B31.3	
1(OPE)	1029	71199.9	0.0	0.0	1030	70651.2	0.0	0.0	B31.3	
3(SUS)		60351.8	137031.9	44.0		67544.3	137031.9	49.3	B31.3	
4(EXP)		59174.3	281717.9	21.0		51259.7	274380.3	18.7	B31.3	
1(OPE)	1030	41216.0	0.0	0.0	1033	49102.0	0.0	0.0	B31.3	
3(SUS)		55613.9	137031.9	40.6		50811.3	137031.9	37.1	B31.3	
4(EXP)		25155.2	286687.5	8.8		33052.6	291116.2	11.4	B31.3	
1(OPE)	1033	83337.3	0.0	0.0	1034	78435.6	0.0	0.0	B31.3	
3(SUS)		69973.2	137031.9	51.1		79505.9	137031.9	58.0	B31.3	
4(EXP)		56894.1	271128.8	21.0		50913.4	261695.9	19.5	B31.3	
1(OPE)	1034	78435.6	0.0	0.0	1035	72073.3	0.0	0.0	B31.3	
3(SUS)		79505.9	137031.9	58.0		84319.5	137031.9	61.5	B31.3	
4(EXP)		50913.4	261695.9	19.5		38804.9	257317.2	15.1	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	1035	53813.1	0.0	0.0	1040	50325.7	0.0	0.0	B31.3	
3(SUS)		58825.5	137031.9	42.9		58880.1	137031.9	43.0	B31.3	
4(EXP)		38598.8	283470.9	13.6		43138.2	284778.8	15.1	B31.3	
1(OPE)	1040	0.0	0.0	0.0	1045	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	1000	61249.6	0.0	0.0	1005	41252.1	0.0	0.0	B31.3	
3(SUS)		74608.4	137031.9	54.4		65381.0	137031.9	47.7	B31.3	
4(EXP)		43710.8	264457.4	16.5		19649.5	275155.2	7.1	B31.3	
1(OPE)	110	57066.6	0.0	0.0	112	47746.4	0.0	0.0	B31.3	
3(SUS)		63846.9	137031.9	46.6		50438.6	137031.9	36.8	B31.3	
4(EXP)		40571.9	278529.7	14.6		33821.2	291161.4	11.6	B31.3	
1(OPE)	112	0.0	0.0	0.0	113	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	113	0.0	0.0	0.0	114	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	114	0.0	0.0	0.0	115	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	115	39561.8	0.0	0.0	120	41158.0	0.0	0.0	B31.3	
3(SUS)		33759.6	137031.9	24.6		67361.5	137031.9	49.2	B31.3	
4(EXP)		28221.4	307109.8	9.2		14732.8	276297.3	5.3	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	120	41158.0	0.0	0.0	128	22017.4	0.0	0.0	B31.3	
3(SUS)		67361.5	137031.9	49.2		28153.7	137031.9	20.5	B31.3	
4(EXP)		14732.8	276297.3	5.3		9780.0	314461.3	3.1	B31.3	
1(OPE)	128	38775.0	0.0	0.0	129	42644.2	0.0	0.0	B31.3	
3(SUS)		31865.3	137031.9	23.3		32390.3	137031.9	23.6	B31.3	
4(EXP)		26326.0	309849.7	8.5		31615.0	310249.1	10.2	B31.3	
1(OPE)	129	42644.2	0.0	0.0	130	43314.7	0.0	0.0	B31.3	
3(SUS)		32390.3	137031.9	23.6		27835.9	137031.9	20.3	B31.3	
4(EXP)		31615.0	310249.1	10.2		33509.7	315822.9	10.6	B31.3	
1(OPE)	130	23121.1	0.0	0.0	140	18982.3	0.0	0.0	B31.3	
3(SUS)		25475.1	137031.9	18.6		26451.7	137031.9	19.3	B31.3	
4(EXP)		12693.4	318183.8	4.0		7676.6	303946.3	2.5	B31.3	
1(OPE)	140	18982.3	0.0	0.0	150	14312.6	0.0	0.0	B31.3	
3(SUS)		26451.7	137031.9	19.3		38384.3	137031.9	28.0	B31.3	
4(EXP)		7676.6	303946.3	2.5		8622.9	305274.5	2.8	B31.3	
1(OPE)	150	14312.6	0.0	0.0	158	28290.3	0.0	0.0	B31.3	
3(SUS)		38384.3	137031.9	28.0		23096.8	137031.9	16.9	B31.3	
4(EXP)		8622.9	305274.5	2.8		18184.7	318889.4	5.7	B31.3	
1(OPE)	158	57583.2	0.0	0.0	159	60715.7	0.0	0.0	B31.3	
3(SUS)		24090.9	137031.9	17.6		26858.9	137031.9	19.6	B31.3	
4(EXP)		48501.8	316367.7	15.3		53441.9	310706.2	17.2	B31.3	
1(OPE)	159	60715.7	0.0	0.0	160	58146.2	0.0	0.0	B31.3	
3(SUS)		26858.9	137031.9	19.6		27977.5	137031.9	20.4	B31.3	
4(EXP)		53441.9	310706.2	17.2		50855.4	308495.4	16.5	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	160	28350.8	0.0	0.0	168	23162.5	0.0	0.0	B31.3	
3(SUS)		25288.3	137031.9	18.5		24168.7	137031.9	17.6	B31.3	
4(EXP)		19107.4	315170.1	6.1		12747.9	317999.5	4.0	B31.3	
1(OPE)	168	38996.0	0.0	0.0	169	37671.9	0.0	0.0	B31.3	
3(SUS)		26681.3	137031.9	19.5		25438.5	137031.9	18.6	B31.3	
4(EXP)		28196.3	313425.1	9.0		27035.1	317393.8	8.5	B31.3	
1(OPE)	169	37671.9	0.0	0.0	170	33208.7	0.0	0.0	B31.3	
3(SUS)		25438.5	137031.9	18.6		22338.6	137031.9	16.3	B31.3	
4(EXP)		27035.1	317393.8	8.5		21671.2	315182.4	6.9	B31.3	
1(OPE)	170	27781.7	0.0	0.0	180	59218.5	0.0	0.0	B31.3	
3(SUS)		22175.8	137031.9	16.2		43106.5	137031.9	31.5	B31.3	
4(EXP)		15991.1	318414.3	5.0		38327.3	264753.6	14.5	B31.3	
1(OPE)	180	14654.9	0.0	0.0	185	16992.8	0.0	0.0	B31.3	
3(SUS)		15812.1	137031.9	11.5		19949.1	137031.9	14.6	B31.3	
4(EXP)		5127.4	327846.7	1.6		5127.4	323709.7	1.6	B31.3	
1(OPE)	185	16992.8	0.0	0.0	190	9928.9	0.0	0.0	B31.3	
3(SUS)		19949.1	137031.9	14.6		7449.0	137031.9	5.4	B31.3	
4(EXP)		5127.4	323709.7	1.6		5127.4	336209.8	1.5	B31.3	
1(OPE)	190	0.0	0.0	0.0	191	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	191	0.0	0.0	0.0	192	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code
1(OPE)	192	0.0	0.0	0.0	193	0.0	0.0	0.0	B31.3
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
1(OPE)	193	9830.3	0.0	0.0	195	19322.1	0.0	0.0	B31.3
3(SUS)		7274.6	137031.9	5.3		24070.9	137031.9	17.6	B31.3
4(EXP)		5127.4	336384.3	1.5		5127.4	319587.9	1.6	B31.3
1(OPE)	195	19322.1	0.0	0.0	197	11483.6	0.0	0.0	B31.3
3(SUS)		24070.9	137031.9	17.6		10200.2	137031.9	7.4	B31.3
4(EXP)		5127.4	319587.9	1.6		5127.4	333458.6	1.5	B31.3
1(OPE)	197	11092.3	0.0	0.0	200	17254.2	0.0	0.0	B31.3
3(SUS)		7284.5	137031.9	5.3		18188.3	137031.9	13.3	B31.3
4(EXP)		6382.6	336374.3	1.9		6382.6	325470.5	2.0	B31.3
1(OPE)	200	17254.2	0.0	0.0	210	11138.1	0.0	0.0	B31.3
3(SUS)		18188.3	137031.9	13.3		7365.6	137031.9	5.4	B31.3
4(EXP)		6382.6	325470.5	2.0		6382.6	336293.2	1.9	B31.3
1(OPE)	210	0.0	0.0	0.0	211	0.0	0.0	0.0	B31.3
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
1(OPE)	211	0.0	0.0	0.0	212	0.0	0.0	0.0	B31.3
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
1(OPE)	212	0.0	0.0	0.0	213	0.0	0.0	0.0	B31.3
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3

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 Various Load Cases

Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code
1(OPE)	213	11038.4	0.0	0.0	240	20746.4	0.0	0.0	B31.3
3(SUS)		7189.2	137031.9	5.2		24368.0	137031.9	17.8	B31.3
4(EXP)		6382.6	336469.7	1.9		6382.6	319290.8	2.0	B31.3
1(OPE)	240	20746.4	0.0	0.0	250	14718.2	0.0	0.0	B31.3
3(SUS)		24368.0	137031.9	17.8		13700.9	137031.9	10.0	B31.3
4(EXP)		6382.6	319290.8	2.0		6382.6	329957.9	1.9	B31.3
1(OPE)	250	14718.2	0.0	0.0	255	14973.2	0.0	0.0	B31.3
3(SUS)		13700.9	137031.9	10.0		14152.0	137031.9	10.3	B31.3
4(EXP)		6382.6	329957.9	1.9		6382.6	329506.8	1.9	B31.3
1(OPE)	255	27119.4	0.0	0.0	258	14804.2	0.0	0.0	B31.3
3(SUS)		23210.5	137031.9	16.9		22075.1	137031.9	16.1	B31.3
4(EXP)		15338.2	298882.4	5.1		3390.5	309938.3	1.1	B31.3
1(OPE)	258	20153.8	0.0	0.0	259	12961.5	0.0	0.0	B31.3
3(SUS)		22138.4	137031.9	16.2		22436.7	137031.9	16.4	B31.3
4(EXP)		8664.4	307501.4	2.8		2842.8	295753.1	1.0	B31.3
1(OPE)	259	12961.5	0.0	0.0	260	17160.1	0.0	0.0	B31.3
3(SUS)		22436.7	137031.9	16.4		22432.6	137031.9	16.4	B31.3
4(EXP)		2842.8	295753.1	1.0		7250.3	293893.5	2.5	B31.3
1(OPE)	260	13108.4	0.0	0.0	270	19376.8	0.0	0.0	B31.3
3(SUS)		22249.2	137031.9	16.2		28921.1	137031.9	21.1	B31.3
4(EXP)		3295.2	305437.8	1.1		13518.1	313161.1	4.3	B31.3
1(OPE)	270	19376.8	0.0	0.0	280	22961.9	0.0	0.0	B31.3
3(SUS)		28921.1	137031.9	21.1		35110.7	137031.9	25.6	B31.3
4(EXP)		13518.1	313161.1	4.3		5824.0	308548.2	1.9	B31.3

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	280	22961.9	0.0	0.0	288	43172.4	0.0	0.0	B31.3	
3(SUS)		35110.7	137031.9	25.6		23102.3	137031.9	16.9	B31.3	
4(EXP)		5824.0	308548.2	1.9		34077.7	310754.7	11.0	B31.3	
1(OPE)	288	99144.5	0.0	0.0	289	101926.7	0.0	0.0	B31.3	
3(SUS)		24258.6	137031.9	17.7		26178.5	137031.9	19.1	B31.3	
4(EXP)		91131.0	299120.5	30.5		95717.4	294248.3	32.5	B31.3	
1(OPE)	289	101926.7	0.0	0.0	290	95618.4	0.0	0.0	B31.3	
3(SUS)		26178.5	137031.9	19.1		26934.3	137031.9	19.7	B31.3	
4(EXP)		95717.4	294248.3	32.5		89173.0	294306.7	30.3	B31.3	
1(OPE)	290	42006.5	0.0	0.0	298	40282.5	0.0	0.0	B31.3	
3(SUS)		24500.8	137031.9	17.9		24925.2	137031.9	18.2	B31.3	
4(EXP)		33285.6	308641.7	10.8		28663.5	312328.4	9.2	B31.3	
1(OPE)	298	91455.3	0.0	0.0	299	96249.6	0.0	0.0	B31.3	
3(SUS)		28382.2	137031.9	20.7		27099.6	137031.9	19.8	B31.3	
4(EXP)		76604.6	301245.2	25.4		83149.5	303178.2	27.4	B31.3	
1(OPE)	299	96249.6	0.0	0.0	300	89498.0	0.0	0.0	B31.3	
3(SUS)		27099.6	137031.9	19.8		23614.5	137031.9	17.2	B31.3	
4(EXP)		83149.5	303178.2	27.4		78548.1	313164.3	25.1	B31.3	
1(OPE)	300	39634.2	0.0	0.0	310	18862.6	0.0	0.0	B31.3	
3(SUS)		22786.2	137031.9	16.6		42114.9	137031.9	30.7	B31.3	
4(EXP)		29458.4	317642.0	9.3		4220.6	271582.7	1.6	B31.3	
1(OPE)	310	18901.8	0.0	0.0	320	19073.9	0.0	0.0	B31.3	
3(SUS)		16875.1	137031.9	12.3		17179.7	137031.9	12.5	B31.3	
4(EXP)		8770.3	326783.7	2.7		8770.3	326479.1	2.7	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	320	19073.9	0.0	0.0	330	18553.7	0.0	0.0	B31.3	
3(SUS)		17179.7	137031.9	12.5		16259.2	137031.9	11.9	B31.3	
4(EXP)		8770.3	326479.1	2.7		8770.3	327399.6	2.7	B31.3	
1(OPE)	330	18553.7	0.0	0.0	340	20473.5	0.0	0.0	B31.3	
3(SUS)		16259.2	137031.9	11.9		19656.4	137031.9	14.3	B31.3	
4(EXP)		8770.3	327399.6	2.7		8770.3	324002.4	2.7	B31.3	
1(OPE)	340	20473.5	0.0	0.0	350	13273.1	0.0	0.0	B31.3	
3(SUS)		19656.4	137031.9	14.3		6914.9	137031.9	5.0	B31.3	
4(EXP)		8770.3	324002.4	2.7		8770.3	336743.9	2.6	B31.3	
1(OPE)	350	0.0	0.0	0.0	351	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	351	0.0	0.0	0.0	352	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	352	0.0	0.0	0.0	353	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	353	13228.9	0.0	0.0	360	22506.2	0.0	0.0	B31.3	
3(SUS)		6836.5	137031.9	5.0		23253.3	137031.9	17.0	B31.3	
4(EXP)		8770.3	336822.3	2.6		8770.3	320405.5	2.7	B31.3	
1(OPE)	360	22506.2	0.0	0.0	370	17194.8	0.0	0.0	B31.3	
3(SUS)		23253.3	137031.9	17.0		13854.5	137031.9	10.1	B31.3	
4(EXP)		8770.3	320405.5	2.7		8770.3	329804.3	2.7	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	370	18732.8	0.0	0.0	380	21145.8	0.0	0.0	B31.3	
3(SUS)		15523.7	137031.9	11.3		19793.8	137031.9	14.4	B31.3	
4(EXP)		9364.5	328135.1	2.9		9364.5	323865.1	2.9	B31.3	
1(OPE)	380	21145.8	0.0	0.0	390	13854.7	0.0	0.0	B31.3	
3(SUS)		19793.8	137031.9	14.4		6891.7	137031.9	5.0	B31.3	
4(EXP)		9364.5	323865.1	2.9		9364.5	336767.1	2.8	B31.3	
1(OPE)	390	0.0	0.0	0.0	391	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	391	0.0	0.0	0.0	392	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	392	0.0	0.0	0.0	393	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
1(OPE)	393	13810.4	0.0	0.0	400	22901.0	0.0	0.0	B31.3	
3(SUS)		6813.3	137031.9	5.0		22899.7	137031.9	16.7	B31.3	
4(EXP)		9364.5	336845.5	2.8		9364.5	320759.2	2.9	B31.3	
1(OPE)	400	22901.0	0.0	0.0	410	18538.6	0.0	0.0	B31.3	
3(SUS)		22899.7	137031.9	16.7		15180.0	137031.9	11.1	B31.3	
4(EXP)		9364.5	320759.2	2.9		9364.5	328478.8	2.9	B31.3	
1(OPE)	410	18538.6	0.0	0.0	420	20171.7	0.0	0.0	B31.3	
3(SUS)		15180.0	137031.9	11.1		18070.0	137031.9	13.2	B31.3	
4(EXP)		9364.5	328478.8	2.9		9364.5	325588.8	2.9	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	420	20171.7	0.0	0.0	430	17966.4	0.0	0.0	B31.3	
3(SUS)		18070.0	137031.9	13.2		14167.5	137031.9	10.3	B31.3	
4(EXP)		9364.5	325588.8	2.9		9364.5	329491.3	2.8	B31.3	
1(OPE)	430	17966.4	0.0	0.0	435	13692.2	0.0	0.0	B31.3	
3(SUS)		14167.5	137031.9	10.3		6604.2	137031.9	4.8	B31.3	
4(EXP)		9364.5	329491.3	2.8		9364.5	337054.7	2.8	B31.3	
1(OPE)	435	47573.1	0.0	0.0	438	50318.2	0.0	0.0	B31.3	
3(SUS)		45969.4	137031.9	33.5		26493.9	137031.9	19.3	B31.3	
4(EXP)		28190.8	297689.4	9.5		37342.8	317164.9	11.8	B31.3	
1(OPE)	438	90228.4	0.0	0.0	439	72207.0	0.0	0.0	B31.3	
3(SUS)		29126.9	137031.9	21.3		25609.3	137031.9	18.7	B31.3	
4(EXP)		77491.1	314532.0	24.6		61082.3	318049.6	19.2	B31.3	
1(OPE)	439	72207.0	0.0	0.0	440	78615.5	0.0	0.0	B31.3	
3(SUS)		25609.3	137031.9	18.7		30449.9	137031.9	22.2	B31.3	
4(EXP)		61082.3	318049.6	19.2		63250.7	313208.9	20.2	B31.3	
1(OPE)	440	49801.7	0.0	0.0	448	44897.4	0.0	0.0	B31.3	
3(SUS)		27194.2	137031.9	19.8		23207.4	137031.9	16.9	B31.3	
4(EXP)		35156.9	316464.6	11.1		30945.5	320451.5	9.7	B31.3	
1(OPE)	448	59492.5	0.0	0.0	449	54640.3	0.0	0.0	B31.3	
3(SUS)		23768.5	137031.9	17.3		29147.2	137031.9	21.3	B31.3	
4(EXP)		46200.8	319890.3	14.4		40496.8	314511.6	12.9	B31.3	
1(OPE)	449	54640.3	0.0	0.0	450	75312.3	0.0	0.0	B31.3	
3(SUS)		29147.2	137031.9	21.3		31626.4	137031.9	23.1	B31.3	
4(EXP)		40496.8	314511.6	12.9		58827.0	312032.4	18.9	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	450	43761.0	0.0	0.0	458	40698.0	0.0	0.0	B31.3	
3(SUS)		27691.3	137031.9	20.2		29744.5	137031.9	21.7	B31.3	
4(EXP)		31189.5	315967.6	9.9		33329.9	313914.3	10.6	B31.3	
1(OPE)	458	73945.2	0.0	0.0	459	87572.7	0.0	0.0	B31.3	
3(SUS)		37234.4	137031.9	27.2		35525.4	137031.9	25.9	B31.3	
4(EXP)		73992.5	306424.4	24.1		86649.5	308133.4	28.1	B31.3	
1(OPE)	459	87572.7	0.0	0.0	460	90252.3	0.0	0.0	B31.3	
3(SUS)		35525.4	137031.9	25.9		30573.5	137031.9	22.3	B31.3	
4(EXP)		86649.5	308133.4	28.1		86082.5	313085.3	27.5	B31.3	
1(OPE)	460	41894.6	0.0	0.0	470	31067.9	0.0	0.0	B31.3	
3(SUS)		26229.3	137031.9	19.1		48865.5	137031.9	35.7	B31.3	
4(EXP)		34067.5	317429.5	10.7		15704.2	294793.3	5.3	B31.3	
1(OPE)	470	31067.9	0.0	0.0	480	15626.9	0.0	0.0	B31.3	
3(SUS)		48865.5	137031.9	35.7		28286.3	137031.9	20.6	B31.3	
4(EXP)		15704.2	294793.3	5.3		3129.2	315372.5	1.0	B31.3	
1(OPE)	480	15626.9	0.0	0.0	490	24512.1	0.0	0.0	B31.3	
3(SUS)		28286.3	137031.9	20.6		31009.1	137031.9	22.6	B31.3	
4(EXP)		3129.2	315372.5	1.0		14277.8	312649.8	4.6	B31.3	
1(OPE)	490	24512.1	0.0	0.0	498	30505.7	0.0	0.0	B31.3	
3(SUS)		31009.1	137031.9	22.6		23788.6	137031.9	17.4	B31.3	
4(EXP)		14277.8	312649.8	4.6		20870.9	319870.2	6.5	B31.3	
1(OPE)	498	63719.0	0.0	0.0	499	63745.2	0.0	0.0	B31.3	
3(SUS)		25102.3	137031.9	18.3		25092.8	137031.9	18.3	B31.3	
4(EXP)		54586.7	318556.6	17.1		54641.1	318566.0	17.2	B31.3	

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Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	499	63745.2	0.0	0.0	500	63670.6	0.0	0.0	B31.3	
3(SUS)		25092.8	137031.9	18.3		25067.1	137031.9	18.3	B31.3	
4(EXP)		54641.1	318566.0	17.2		54582.7	318591.8	17.1	B31.3	
1(OPE)	500	30564.7	0.0	0.0	505	28491.9	0.0	0.0	B31.3	
3(SUS)		23770.9	137031.9	17.3		26162.9	137031.9	19.1	B31.3	
4(EXP)		20923.5	319887.9	6.5		18839.4	317495.9	5.9	B31.3	
1(OPE)	505	28491.9	0.0	0.0	510	26818.2	0.0	0.0	B31.3	
3(SUS)		26162.9	137031.9	19.1		30802.8	137031.9	22.5	B31.3	
4(EXP)		18839.4	317495.9	5.9		17182.1	312856.0	5.5	B31.3	
1(OPE)	510	26818.2	0.0	0.0	515	25059.3	0.0	0.0	B31.3	
3(SUS)		30802.8	137031.9	22.5		26753.5	137031.9	19.5	B31.3	
4(EXP)		17182.1	312856.0	5.5		15977.4	316905.3	5.0	B31.3	
1(OPE)	515	25059.3	0.0	0.0	518	27251.8	0.0	0.0	B31.3	
3(SUS)		26753.5	137031.9	19.5		23246.2	137031.9	17.0	B31.3	
4(EXP)		15977.4	316905.3	5.0		17904.1	320412.6	5.6	B31.3	
1(OPE)	518	51846.9	0.0	0.0	519	44244.8	0.0	0.0	B31.3	
3(SUS)		24092.3	137031.9	17.6		22593.5	137031.9	16.5	B31.3	
4(EXP)		43187.9	319566.5	13.5		34163.3	321065.3	10.6	B31.3	
1(OPE)	519	44244.8	0.0	0.0	520	34433.4	0.0	0.0	B31.3	
3(SUS)		22593.5	137031.9	16.5		23587.2	137031.9	17.2	B31.3	
4(EXP)		34163.3	321065.3	10.6		23167.6	320071.6	7.2	B31.3	
1(OPE)	520	25826.2	0.0	0.0	528	39875.8	0.0	0.0	B31.3	
3(SUS)		22935.9	137031.9	16.7		23176.4	137031.9	16.9	B31.3	
4(EXP)		14231.7	320722.9	4.4		28929.4	320482.4	9.0	B31.3	

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CODE COMPLIANCE REPORT: Code Stresses on Elements
 Various Load Cases

Load Case	From Node	Code Stress KPa	Allowable Stress KPa	Ratio %	To Node	Code Stress KPa	Allowable Stress KPa	Ratio %	Piping Code	
1(OPE)	528	71718.3	0.0	0.0	529	57216.5	0.0	0.0	B31.3	
3(SUS)		24058.6	137031.9	17.6		23981.3	137031.9	17.5	B31.3	
4(EXP)		61752.0	319600.2	19.3		47155.2	319677.5	14.8	B31.3	
1(OPE)	529	57216.4	0.0	0.0	530	54827.6	0.0	0.0	B31.3	
3(SUS)		23981.3	137031.9	17.5		23119.9	137031.9	16.9	B31.3	
4(EXP)		47155.1	319677.5	14.8		43871.5	320538.9	13.7	B31.3	
1(OPE)	530	42936.2	0.0	0.0	540	65743.2	0.0	0.0	B31.3	
3(SUS)		22570.7	137031.9	16.5		23775.3	137031.9	17.4	B31.3	
4(EXP)		32528.2	321088.2	10.1		56679.6	319883.5	17.7	B31.3	
1(OPE)	540	0.0	0.0	0.0	550	0.0	0.0	0.0	B31.3	
3(SUS)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	
4(EXP)		0.0	0.0	0.0		0.0	0.0	0.0	B31.3	

DISPLACEMENTS REPORT

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LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS

- 1 (OPE) W+T1+P1
- 2 (Alt-SUS) W+P1
- 3 (SUS) W+P1
- 4 (EXP) L4=L1-L3

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DISPLACEMENTS REPORT: Nodal Movements

CASE 1 (OPE) W+T1+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
10	-0.000	-0.000	-0.000	0.0000	-0.0000	0.0000
20	-0.001	0.240	-0.000	0.0000	-0.0003	0.0005
28	-0.220	1.207	0.017	0.0076	-0.0457	0.0570
29	-0.604	1.402	-0.008	0.0141	-0.0650	0.1576
30	-1.107	1.053	-0.208	0.0087	-0.1165	0.2402
38	-4.941	-6.206	-4.576	0.0919	-0.1679	0.2209
39	-5.415	-6.721	-4.826	0.0791	-0.1527	0.1462
40	-5.878	-7.024	-4.650	0.0731	-0.1257	0.1144
50	-7.332	-8.032	-2.737	0.0565	-0.0696	-0.0134
60	-7.754	-8.375	-1.910	0.0557	-0.0684	-0.0151
70	-7.863	-8.466	-1.673	0.0473	-0.0551	-0.0309
80	-8.149	-8.711	-0.964	0.0465	-0.0538	-0.0323
90	-8.247	-8.936	0.217	0.0072	0.0365	-0.1113
100	-7.952	-8.937	0.926	-0.0033	0.0698	-0.1365
110	-7.543	-8.907	1.635	-0.0073	0.0879	-0.1486
112	-9.317	-6.697	3.266	-0.0138	0.1578	-0.1852
113	-9.579	-6.337	3.573	-0.0139	0.1582	-0.1854
114	-10.525	-5.040	4.683	-0.0140	0.1596	-0.1859
115	-10.788	-4.679	4.993	-0.0141	0.1600	-0.1860
120	-14.335	-0.000	10.365	-0.0271	0.2406	-0.1480
128	-20.708	4.036	22.758	-0.0504	0.2576	-0.0500
129	-21.562	4.097	23.420	-0.0595	0.2005	-0.0294
130	-22.402	3.886	23.190	-0.0707	0.1362	-0.0222
140	-28.068	-0.000	7.373	-0.0023	-0.0249	0.0346
150	-19.354	4.148	-9.165	0.0759	-0.1021	0.0940
158	-15.318	6.433	-14.351	0.0275	-0.1070	0.1126
159	-14.731	6.154	-14.803	-0.0712	-0.1107	0.1167
160	-14.097	5.480	-14.546	-0.1703	-0.1142	0.1277
168	-6.153	-2.526	-2.535	-0.1910	-0.1124	0.1370
169	-5.429	-2.824	-1.776	-0.1277	-0.0908	0.1330
170	-4.719	-2.561	-1.321	-0.1008	-0.0596	0.1143
180	-0.000	-0.000	-0.000	-0.0000	-0.0000	0.0000
185	15.857	-0.000	0.000	-0.0000	0.0000	-0.0071
190	31.714	-0.000	-0.000	-0.0000	0.0000	0.0284
191	31.860	0.031	-0.000	-0.0000	0.0000	0.0284
192	-22.932	-3.171	-0.000	-0.0000	-0.0000	0.0023
193	-22.786	-3.169	-0.000	-0.0000	-0.0000	0.0023
195	-7.929	-0.000	-0.000	-0.0000	-0.0000	0.0204
197	-0.000	0.000	0.000	-0.0000	0.0000	-0.0000
200	7.908	-0.000	-0.000	-0.0000	0.0000	-0.0128
210	23.723	-0.000	-0.000	-0.0000	0.0000	0.0313
211	23.869	0.034	-0.000	-0.0000	0.0000	0.0313
212	-44.335	-3.138	-0.000	-0.0000	-0.0000	0.0026
213	-44.189	-3.136	-0.000	-0.0000	-0.0000	0.0026
240	-29.371	-0.000	0.000	-0.0000	-0.0000	0.0189
250	-13.556	-0.000	-0.000	-0.0000	0.0000	-0.0007
255	0.000	-0.000	0.000	-0.0000	-0.0000	-0.0000

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Job:: STEAM MAINS 200NB

Licensed To:: XGM

DISPLACEMENTS REPORT: Nodal Movements

CASE 1 (OPE) W+T1+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
258	1.644	-0.059	0.129	-0.0008	-0.0153	-0.0073
259	2.187	-0.104	-0.005	-0.0025	-0.0205	-0.0132
260	2.460	-0.133	-0.484	0.0007	-0.0113	-0.0129
270	2.675	0.266	-5.194	0.0290	-0.0014	-0.0136
280	1.711	10.555	-20.538	0.0932	0.0142	-0.0157
288	1.213	12.168	-25.248	-0.0194	0.0140	-0.0163
289	1.138	11.560	-25.537	-0.2038	0.0127	-0.0160
290	1.059	10.635	-24.616	-0.3842	0.0122	-0.0157
298	0.125	1.923	3.536	-0.3910	0.0080	-0.0119
299	0.077	0.980	4.497	-0.2195	0.0061	-0.0074
300	0.051	0.288	4.238	-0.0501	0.0029	-0.0054
310	0.000	-0.000	0.000	0.0000	0.0000	-0.0000
320	-0.000	-0.000	-15.736	-0.0005	0.0000	-0.0000
330	-0.000	-0.000	-31.471	0.0021	-0.0000	-0.0000
340	-0.000	-0.000	-47.207	-0.0079	-0.0000	-0.0000
350	-0.000	-0.000	-62.943	0.0297	-0.0000	-0.0000
351	-0.000	0.039	-63.122	0.0296	-0.0000	-0.0000
352	-0.000	-2.526	30.595	-0.0029	-0.0000	-0.0000
353	-0.000	-2.529	30.415	-0.0029	-0.0000	-0.0000
360	-0.000	-0.000	15.736	0.0160	-0.0000	-0.0000
370	0.000	-0.000	0.000	-0.0000	-0.0000	0.0000
380	0.000	-0.000	-15.716	-0.0073	-0.0000	0.0000
390	0.000	-0.000	-31.432	0.0293	-0.0000	0.0000
391	0.000	0.039	-31.611	0.0293	-0.0000	0.0000
392	0.000	-2.546	68.454	-0.0033	-0.0000	0.0000
393	0.000	-2.550	68.274	-0.0033	-0.0000	0.0000
400	0.000	-0.000	53.614	0.0173	-0.0000	0.0000
410	0.000	-0.000	37.898	-0.0041	-0.0000	0.0000
420	0.000	-0.000	22.182	-0.0009	0.0000	0.0000
430	0.000	-0.000	6.466	0.0075	0.0000	0.0000
435	0.000	-0.000	-0.000	-0.0000	0.0000	0.0000
438	-2.285	-1.071	-6.079	0.0082	0.1080	0.2132
439	-3.089	-1.193	-6.312	0.0934	0.2115	0.2131
440	-3.980	-1.925	-5.537	0.1073	0.3026	0.2709
448	-8.371	-11.571	4.691	0.2885	0.3023	0.3009
449	-9.307	-12.422	6.210	0.3100	0.2681	0.2572
450	-10.382	-12.286	7.961	0.4030	0.2767	0.2044
458	-19.246	-5.458	30.052	0.4131	0.0864	0.1549
459	-19.862	-4.435	31.174	0.2843	0.0489	0.1094
460	-20.014	-3.426	31.036	0.1474	-0.0460	0.0751
470	-16.340	-0.000	25.854	0.0420	-0.1411	0.0534
480	9.141	-0.000	10.510	-0.0135	-0.2696	-0.0108
490	36.197	-0.000	-4.835	0.0124	-0.1689	-0.0751
498	42.001	0.005	-11.854	-0.0125	-0.0465	-0.1045
499	42.017	0.001	-11.917	-0.0153	-0.0347	-0.1046
500	42.022	-0.000	-11.981	-0.0179	-0.0229	-0.1046
505	39.364	-0.159	-17.558	-0.0248	0.0957	-0.1352
510	31.709	-0.000	-22.316	-0.0264	0.2039	-0.1670
515	19.575	-0.086	-26.282	-0.0415	0.3002	-0.1965

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Job:: STEAM MAINS 200NB

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DISPLACEMENTS REPORT: Nodal Movements

CASE 1 (OPE) W+T1+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
518	5.727	-0.822	-29.169	-0.0790	0.3746	-0.2179
519	3.982	-0.702	-28.679	-0.1245	0.4411	-0.1975
520	3.094	-0.000	-26.824	-0.1391	0.4911	-0.1899
528	2.450	7.344	-9.820	-0.2143	0.4472	-0.1614
529	2.089	7.834	-7.956	-0.1832	0.3434	-0.1212
530	1.645	7.548	-6.763	-0.1701	0.3108	-0.0685
540	-0.000	-0.000	-0.000	-0.0000	0.0000	-0.0000
550	-0.000	-0.270	0.000	-0.0000	0.0000	-0.0000
555	-7.115	-8.866	2.344	-0.0095	0.0774	-0.1380
777	-6.750	-8.806	3.052	-0.0164	0.0601	-0.1161
1000	-6.541	-8.708	3.641	-0.0298	0.0382	-0.0816
1005	-6.483	-8.652	3.877	-0.0358	0.0309	-0.0678
1010	-6.386	-8.461	4.467	-0.0527	0.0166	-0.0334
1015	-6.300	-8.184	5.176	-0.0533	0.0163	-0.0321
1020	-6.229	-7.847	5.884	-0.0741	0.0141	0.0092
1025	-6.143	-7.392	6.712	-0.0747	0.0143	0.0107
1028	-5.617	-6.212	8.621	-0.0799	0.0717	0.1222
1029	-5.211	-5.904	8.807	-0.0732	0.1686	0.1464
1030	-4.697	-5.414	8.423	-0.0788	0.2605	0.2071
1033	-0.874	1.170	0.592	0.0288	0.2283	0.2082
1034	-0.407	1.436	0.152	0.0115	0.1290	0.1219
1035	-0.101	1.207	0.034	0.0021	0.0865	0.0326
1040	-0.000	0.240	0.000	0.0001	0.0006	0.0002
1045	0.000	-0.000	0.000	0.0000	0.0000	0.0000

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Job:: STEAM MAINS 200NB

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DISPLACEMENTS REPORT: Nodal Movements

CASE 3 (SUS) W+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
10	0.000	-0.000	-0.000	0.0000	-0.0000	0.0000
20	-0.000	-0.000	0.000	0.0001	-0.0000	0.0003
28	-0.162	-0.002	0.047	0.0133	-0.0056	0.0449
29	-0.374	-0.109	0.104	0.0369	-0.0014	0.1395
30	-0.540	-0.546	0.143	0.0459	-0.0011	0.2229
38	-0.540	-7.329	-0.017	0.1190	-0.0072	0.2029
39	-0.546	-7.823	-0.032	0.1039	-0.0052	0.1245
40	-0.555	-8.156	-0.037	0.0931	-0.0029	0.0904
50	-0.583	-9.410	-0.037	0.0709	-0.0014	-0.0415
60	-0.591	-9.841	-0.037	0.0700	-0.0013	-0.0432
70	-0.594	-9.956	-0.037	0.0606	-0.0013	-0.0595
80	-0.600	-10.271	-0.037	0.0597	-0.0013	-0.0610
90	-0.613	-10.587	-0.037	0.0147	-0.0018	-0.1425
100	-0.623	-10.621	-0.037	0.0022	-0.0020	-0.1684
110	-0.634	-10.617	-0.037	-0.0030	-0.0022	-0.1809
112	-0.634	-7.975	-0.078	-0.0119	-0.0039	-0.2189
113	-0.634	-7.550	-0.086	-0.0120	-0.0039	-0.2191
114	-0.634	-6.018	-0.113	-0.0122	-0.0040	-0.2196
115	-0.634	-5.592	-0.121	-0.0122	-0.0040	-0.2197
120	-0.634	-0.000	-0.254	-0.0301	-0.0060	-0.1839
128	-0.634	5.847	-0.561	-0.0622	-0.0064	-0.0919
129	-0.626	6.056	-0.582	-0.0711	-0.0050	-0.0755
130	-0.610	5.871	-0.589	-0.0847	-0.0034	-0.0690
140	-0.467	-0.000	-0.590	-0.0174	0.0007	-0.0406
150	-0.709	-0.000	-0.590	-0.0030	0.0030	-0.0110
158	-0.828	-0.702	-0.590	-0.0238	0.0033	-0.0017
159	-0.839	-0.785	-0.557	-0.0192	0.0015	0.0004
160	-0.828	-0.812	-0.497	-0.0128	-0.0004	0.0063
168	-0.120	-0.811	0.013	-0.0055	0.0000	0.0177
169	-0.041	-0.776	0.029	-0.0034	0.0007	0.0244
170	0.000	-0.675	0.029	-0.0027	0.0013	0.0276
180	-0.000	-0.000	0.000	-0.0000	0.0000	0.0000
185	-0.520	-0.000	-0.000	-0.0000	-0.0000	-0.0071
190	-1.039	-0.000	0.000	-0.0000	-0.0000	0.0284
191	-1.040	0.031	0.000	-0.0000	-0.0000	0.0284
192	0.747	-3.171	0.000	-0.0000	0.0000	0.0023
193	0.747	-3.169	0.000	-0.0000	0.0000	0.0023
195	0.260	-0.000	0.000	-0.0000	0.0000	0.0204
197	0.000	0.000	-0.000	-0.0000	-0.0000	-0.0000
200	-0.259	-0.000	-0.000	0.0000	0.0000	-0.0128
210	-0.777	-0.000	-0.000	0.0000	0.0000	0.0313
211	-0.778	0.034	-0.000	0.0000	0.0000	0.0313
212	1.449	-3.138	-0.000	0.0000	-0.0000	0.0026
213	1.448	-3.136	-0.000	0.0000	-0.0000	0.0026
240	0.963	-0.000	0.000	0.0000	-0.0000	0.0189
250	0.444	-0.000	-0.000	0.0000	0.0000	-0.0007
255	0.000	-0.000	0.000	0.0000	-0.0000	0.0000

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Job:: STEAM MAINS 200NB

Licensed To:: XGM

DISPLACEMENTS REPORT: Nodal Movements

CASE 3 (SUS) W+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
258	0.000	-0.005	0.001	0.0004	-0.0001	-0.0005
259	0.000	-0.006	0.002	0.0008	-0.0002	-0.0002
260	0.001	-0.001	0.002	0.0016	-0.0002	0.0001
270	0.005	-0.000	0.002	-0.0053	-0.0001	0.0001
280	0.006	-0.000	0.003	-0.0045	0.0000	-0.0000
288	0.004	-0.543	0.003	-0.0192	0.0000	-0.0000
289	0.004	-0.607	0.028	-0.0142	0.0000	-0.0000
290	0.004	-0.626	0.068	-0.0073	0.0000	-0.0000
298	0.001	-0.625	0.079	0.0079	0.0000	-0.0000
299	0.000	-0.602	0.031	0.0176	0.0000	-0.0000
300	0.000	-0.522	-0.000	0.0232	0.0000	-0.0000
310	0.000	-0.000	0.000	0.0000	0.0000	-0.0000
320	-0.000	-0.000	0.516	-0.0005	0.0000	-0.0000
330	-0.000	-0.000	1.031	0.0021	-0.0000	-0.0000
340	-0.000	-0.000	1.547	-0.0079	-0.0000	-0.0000
350	-0.000	-0.000	2.063	0.0297	-0.0000	-0.0000
351	-0.000	0.039	2.063	0.0296	-0.0000	-0.0000
352	-0.000	-2.526	-0.997	-0.0029	-0.0000	-0.0000
353	-0.000	-2.529	-0.997	-0.0029	-0.0000	-0.0000
360	-0.000	-0.000	-0.516	0.0160	-0.0000	-0.0000
370	-0.000	-0.000	-0.000	-0.0000	0.0000	0.0000
380	-0.000	-0.000	0.515	-0.0073	0.0000	0.0000
390	-0.000	-0.000	1.030	0.0293	0.0000	0.0000
391	-0.000	0.039	1.031	0.0293	0.0000	0.0000
392	-0.000	-2.546	-2.238	-0.0033	0.0000	0.0000
393	-0.000	-2.550	-2.238	-0.0033	0.0000	0.0000
400	-0.000	-0.000	-1.757	0.0173	0.0000	0.0000
410	-0.000	-0.000	-1.242	-0.0041	0.0000	0.0000
420	-0.000	-0.000	-0.727	-0.0009	-0.0000	0.0000
430	-0.000	-0.000	-0.212	0.0075	-0.0000	0.0000
435	-0.000	-0.000	-0.000	-0.0000	-0.0000	0.0000
438	0.088	-1.104	-0.000	-0.0314	-0.0040	0.0307
439	0.109	-1.259	-0.010	-0.0255	-0.0074	0.0325
440	0.122	-1.437	-0.045	-0.0252	-0.0107	0.0416
448	0.122	-2.878	-0.418	-0.0063	-0.0119	0.0448
449	0.054	-3.043	-0.462	-0.0010	-0.0069	0.0431
450	-0.105	-3.110	-0.447	0.0137	-0.0021	0.0416
458	-2.154	-3.107	0.895	0.0406	-0.0008	0.0395
459	-2.299	-3.021	1.087	0.0623	-0.0011	0.0382
460	-2.354	-2.749	1.194	0.0791	-0.0010	0.0378
470	-2.326	-0.000	1.194	0.0467	-0.0005	0.0353
480	-2.274	-0.000	1.194	-0.0140	-0.0009	0.0281
490	-2.002	-0.000	1.193	0.0097	-0.0044	0.0208
498	-1.712	0.006	1.193	-0.0040	-0.0069	0.0175
499	-1.709	0.003	1.193	-0.0046	-0.0071	0.0175
500	-1.706	-0.000	1.192	-0.0051	-0.0074	0.0175
505	-1.336	-0.213	1.127	0.0042	-0.0096	0.0117
510	-0.876	-0.000	1.045	0.0006	-0.0114	0.0081
515	-0.348	-0.270	0.952	-0.0019	-0.0127	0.0042

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DISPLACEMENTS REPORT: Nodal Movements
 CASE 3 (SUS) W+P1

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
518	0.152	-0.071	0.863	0.0106	-0.0134	-0.0017
519	0.201	-0.023	0.831	0.0128	-0.0139	-0.0031
520	0.211	-0.000	0.773	0.0127	-0.0141	-0.0021
528	0.103	-0.011	0.324	0.0106	-0.0126	-0.0035
529	0.087	-0.006	0.268	0.0091	-0.0091	-0.0038
530	0.072	-0.004	0.227	0.0067	-0.0075	-0.0025
540	0.000	-0.000	0.000	0.0000	-0.0000	-0.0000
550	-0.000	-0.000	-0.000	0.0000	-0.0000	-0.0000
555	-0.644	-10.598	-0.037	-0.0055	-0.0017	-0.1700
777	-0.651	-10.557	-0.037	-0.0134	-0.0007	-0.1473
1000	-0.651	-10.468	-0.037	-0.0287	0.0007	-0.1117
1005	-0.649	-10.413	-0.037	-0.0356	0.0012	-0.0975
1010	-0.641	-10.219	-0.037	-0.0547	0.0025	-0.0619
1015	-0.628	-9.931	-0.037	-0.0554	0.0025	-0.0606
1020	-0.612	-9.575	-0.037	-0.0796	0.0036	-0.0180
1025	-0.590	-9.086	-0.037	-0.0804	0.0036	-0.0165
1028	-0.527	-7.744	-0.038	-0.0977	0.0050	0.0987
1029	-0.514	-7.398	-0.043	-0.1047	0.0056	0.1278
1030	-0.509	-6.910	-0.056	-0.1167	0.0056	0.1954
1033	-0.508	-0.512	-0.148	-0.0457	-0.0012	0.2087
1034	-0.353	-0.102	-0.105	-0.0367	0.0001	0.1308
1035	-0.153	-0.002	-0.047	-0.0133	0.0047	0.0424
1040	-0.000	-0.000	-0.000	-0.0001	0.0000	0.0003
1045	-0.000	-0.000	0.000	-0.0000	0.0000	0.0000

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DISPLACEMENTS REPORT: Nodal Movements

CASE 4 (EXP) L4=L1-L3

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
10	-0.000	0.000	-0.000	-0.0000	-0.0000	0.0000
20	-0.000	0.240	-0.000	-0.0001	-0.0003	0.0002
28	-0.059	1.209	-0.030	-0.0057	-0.0400	0.0121
29	-0.230	1.510	-0.111	-0.0228	-0.0636	0.0181
30	-0.567	1.599	-0.351	-0.0371	-0.1154	0.0173
38	-4.401	1.123	-4.559	-0.0271	-0.1608	0.0180
39	-4.869	1.101	-4.794	-0.0247	-0.1475	0.0217
40	-5.323	1.132	-4.613	-0.0199	-0.1228	0.0240
50	-6.749	1.378	-2.700	-0.0144	-0.0683	0.0281
60	-7.163	1.466	-1.873	-0.0143	-0.0671	0.0281
70	-7.270	1.490	-1.636	-0.0134	-0.0538	0.0286
80	-7.548	1.560	-0.927	-0.0133	-0.0524	0.0286
90	-7.633	1.651	0.254	-0.0075	0.0383	0.0311
100	-7.329	1.684	0.963	-0.0055	0.0719	0.0319
110	-6.909	1.710	1.672	-0.0044	0.0901	0.0323
112	-8.682	1.278	3.344	-0.0019	0.1617	0.0337
113	-8.945	1.213	3.658	-0.0019	0.1622	0.0337
114	-9.891	0.978	4.796	-0.0019	0.1636	0.0337
115	-10.154	0.912	5.114	-0.0018	0.1640	0.0337
120	-13.701	0.000	10.619	0.0030	0.2466	0.0359
128	-20.073	-1.811	23.319	0.0118	0.2640	0.0419
129	-20.936	-1.959	24.002	0.0116	0.2055	0.0461
130	-21.791	-1.985	23.779	0.0140	0.1397	0.0468
140	-27.601	-0.000	7.962	0.0151	-0.0256	0.0752
150	-18.646	4.148	-8.575	0.0789	-0.1050	0.1049
158	-14.489	7.135	-13.761	0.0512	-0.1103	0.1143
159	-13.892	6.939	-14.246	-0.0520	-0.1122	0.1163
160	-13.268	6.292	-14.049	-0.1575	-0.1138	0.1214
168	-6.033	-1.715	-2.548	-0.1855	-0.1124	0.1193
169	-5.389	-2.048	-1.805	-0.1243	-0.0915	0.1085
170	-4.719	-1.886	-1.350	-0.0981	-0.0608	0.0867
180	-0.000	-0.000	-0.000	-0.0000	-0.0000	0.0000
185	16.377	0.000	0.000	-0.0000	0.0000	-0.0000
190	32.753	-0.000	-0.000	-0.0000	0.0000	0.0000
191	32.900	0.000	-0.000	-0.0000	0.0000	0.0000
192	-23.679	0.000	-0.000	-0.0000	-0.0000	-0.0000
193	-23.533	0.000	-0.000	-0.0000	-0.0000	-0.0000
195	-8.188	0.000	-0.000	-0.0000	-0.0000	-0.0000
197	-0.000	-0.000	0.000	-0.0000	0.0000	0.0000
200	8.167	-0.000	-0.000	-0.0000	0.0000	-0.0000
210	24.500	0.000	-0.000	-0.0000	0.0000	0.0000
211	24.647	0.000	-0.000	-0.0000	0.0000	0.0000
212	-45.784	0.000	-0.000	-0.0000	-0.0000	0.0000
213	-45.637	0.000	-0.000	-0.0000	-0.0000	0.0000
240	-30.334	-0.000	0.000	-0.0000	-0.0000	-0.0000
250	-14.000	0.000	-0.000	-0.0000	0.0000	0.0000
255	0.000	-0.000	0.000	-0.0000	-0.0000	-0.0000

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DISPLACEMENTS REPORT: Nodal Movements
 CASE 4 (EXP) L4=L1-L3

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
258	1.644	-0.054	0.128	-0.0012	-0.0152	-0.0068
259	2.186	-0.099	-0.007	-0.0033	-0.0203	-0.0130
260	2.459	-0.131	-0.487	-0.0009	-0.0111	-0.0130
270	2.670	0.266	-5.197	0.0344	-0.0014	-0.0136
280	1.705	10.555	-20.540	0.0978	0.0142	-0.0157
288	1.209	12.711	-25.250	-0.0003	0.0139	-0.0163
289	1.134	12.167	-25.566	-0.1895	0.0126	-0.0159
290	1.055	11.262	-24.685	-0.3769	0.0122	-0.0157
298	0.124	2.548	3.456	-0.3988	0.0079	-0.0119
299	0.077	1.582	4.465	-0.2371	0.0060	-0.0074
300	0.051	0.809	4.238	-0.0733	0.0029	-0.0053
310	0.000	-0.000	0.000	-0.0000	0.0000	-0.0000
320	-0.000	-0.000	-16.251	0.0000	0.0000	-0.0000
330	-0.000	0.000	-32.503	-0.0000	-0.0000	-0.0000
340	-0.000	-0.000	-48.754	0.0000	-0.0000	-0.0000
350	-0.000	0.000	-65.005	-0.0000	-0.0000	-0.0000
351	-0.000	-0.000	-65.185	-0.0000	-0.0000	-0.0000
352	-0.000	-0.000	31.592	0.0000	-0.0000	-0.0000
353	-0.000	-0.000	31.412	0.0000	-0.0000	-0.0000
360	-0.000	-0.000	16.251	0.0000	-0.0000	-0.0000
370	0.000	0.000	0.000	0.0000	-0.0000	0.0000
380	0.000	-0.000	-16.231	-0.0000	-0.0000	0.0000
390	0.000	0.000	-32.462	0.0000	-0.0000	0.0000
391	0.000	0.000	-32.642	0.0000	-0.0000	0.0000
392	0.000	0.000	70.692	0.0000	-0.0000	0.0000
393	0.000	0.000	70.512	0.0000	-0.0000	0.0000
400	0.000	-0.000	55.371	-0.0000	-0.0000	0.0000
410	0.000	0.000	39.140	0.0000	-0.0000	0.0000
420	0.000	-0.000	22.909	-0.0000	0.0000	0.0000
430	0.000	0.000	6.678	0.0000	0.0000	0.0000
435	0.000	-0.000	-0.000	-0.0000	0.0000	0.0000
438	-2.372	0.034	-6.079	0.0397	0.1120	0.1826
439	-3.197	0.067	-6.302	0.1189	0.2189	0.1806
440	-4.102	-0.488	-5.492	0.1325	0.3133	0.2293
448	-8.493	-8.693	5.109	0.2947	0.3142	0.2561
449	-9.361	-9.378	6.673	0.3111	0.2750	0.2141
450	-10.277	-9.177	8.408	0.3893	0.2787	0.1628
458	-17.091	-2.351	29.157	0.3725	0.0872	0.1154
459	-17.564	-1.414	30.087	0.2220	0.0499	0.0713
460	-17.661	-0.677	29.842	0.0683	-0.0450	0.0373
470	-14.014	0.000	24.660	-0.0047	-0.1406	0.0181
480	11.415	-0.000	9.316	0.0005	-0.2686	-0.0389
490	38.199	0.000	-6.028	0.0027	-0.1645	-0.0959
498	43.713	-0.000	-13.047	-0.0085	-0.0395	-0.1220
499	43.726	-0.002	-13.110	-0.0107	-0.0276	-0.1221
500	43.728	-0.000	-13.174	-0.0128	-0.0155	-0.1221
505	40.700	0.054	-18.685	-0.0290	0.1053	-0.1469
510	32.585	0.000	-23.361	-0.0270	0.2152	-0.1751
515	19.923	0.184	-27.234	-0.0396	0.3129	-0.2007

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DISPLACEMENTS REPORT: Nodal Movements
 CASE 4 (EXP) L4=L1-L3

Node	DX mm.	DY mm.	DZ mm.	RX deg.	RY deg.	RZ deg.
518	5.575	-0.751	-30.032	-0.0896	0.3881	-0.2162
519	3.781	-0.679	-29.510	-0.1373	0.4550	-0.1944
520	2.883	0.000	-27.597	-0.1519	0.5052	-0.1878
528	2.348	7.356	-10.144	-0.2249	0.4597	-0.1579
529	2.002	7.840	-8.224	-0.1923	0.3526	-0.1174
530	1.573	7.551	-6.990	-0.1768	0.3183	-0.0661
540	-0.000	-0.000	-0.000	-0.0000	0.0000	-0.0000
550	-0.000	-0.270	0.000	-0.0000	0.0000	-0.0000
555	-6.470	1.732	2.381	-0.0040	0.0791	0.0320
777	-6.098	1.751	3.089	-0.0029	0.0608	0.0312
1000	-5.890	1.760	3.679	-0.0011	0.0375	0.0301
1005	-5.834	1.761	3.915	-0.0002	0.0297	0.0297
1010	-5.745	1.758	4.505	0.0020	0.0142	0.0286
1015	-5.672	1.747	5.214	0.0021	0.0138	0.0285
1020	-5.617	1.728	5.922	0.0055	0.0105	0.0272
1025	-5.553	1.694	6.749	0.0056	0.0106	0.0271
1028	-5.090	1.532	8.659	0.0178	0.0667	0.0235
1029	-4.697	1.494	8.850	0.0315	0.1630	0.0186
1030	-4.188	1.495	8.480	0.0379	0.2549	0.0118
1033	-0.365	1.681	0.740	0.0744	0.2294	-0.0005
1034	-0.054	1.538	0.256	0.0482	0.1290	-0.0089
1035	0.052	1.209	0.081	0.0154	0.0819	-0.0097
1040	0.000	0.240	0.000	0.0002	0.0006	-0.0001
1045	0.000	-0.000	0.000	0.0000	0.0000	-0.0000

RESTRAINT SUMMARY REPORT

CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26
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LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS

- 1 (OPE) W+T1+P1
- 2 (Alt-SUS) W+P1
- 3 (SUS) W+P1
- 4 (EXP) L4=L1-L3

CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26

Job:: STEAM MAINS 200NB

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

LOAD CASE DEFINITION KEY

CASE 1 (OPE) W+T1+P1

CASE 3 (SUS) W+P1

CASE 4 (EXP) L4=L1-L3

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
10		TYPE=Rigid ANC;					
	1(OPE)	-1775	-3067	-1207	44	-1919	3635
	3(SUS)	44	-3143	-152	676	-236	2424
	4(EXP)	-1819	76	-1055	-632	-1683	1211
	MAX	-1819/L4	-3143/L3	-1207/L1	676/L3	-1919/L1	3635/L1
120		TYPE=Rigid +Y;					
	1(OPE)	0	-7346	0	0	0	0
	3(SUS)	0	-7419	0	0	0	0
	4(EXP)	0	73	0	0	0	0
	MAX		-7419/L3				
140		TYPE=Rigid +Y;					
	1(OPE)	0	-2645	0	0	0	0
	3(SUS)	0	-2310	0	0	0	0
	4(EXP)	0	-336	0	0	0	0
	MAX		-2645/L1				
150		TYPE=Rigid +Y;					
	1(OPE)	0	0	0	0	0	0
	3(SUS)	0	-2905	0	0	0	0
	4(EXP)	0	2905	0	0	0	0
	MAX		-2905/L3				
180		TYPE=Rigid ANC;					
	1(OPE)	-88667	-5556	-1984	-3432	-4599	7805
	3(SUS)	-66062	-2930	49	-92	105	1369
	4(EXP)	-22605	-2626	-2032	-3340	-4704	6436
	MAX	-88667/L1	-5556/L1	-2032/L4	-3432/L1	-4704/L4	7805/L1
185		TYPE=Rigid +Y; Rigid GUI;					
	1(OPE)	0	-2868	0	0	0	0
	3(SUS)	0	-2868	-0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2868/L3	0/L4			
190		TYPE=Rigid					

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
		+Y;					
	1(OPE)	0	-2450	0	0	0	0
	3(SUS)	0	-2450	0	0	0	0
	4(EXP)	0	-0	0	0	0	0
	MAX		-2450/L1				
195		TYPE=Rigid +Y; Rigid GUI;					
	1(OPE)	0	-3091	-0	0	0	0
	3(SUS)	0	-3091	0	0	0	0
	4(EXP)	0	0	-0	0	0	0
	MAX		-3091/L1	-0/L4			
197		TYPE=Rigid ANC;					
	1(OPE)	-5318	105	0	-0	0	-363
	3(SUS)	174	105	-0	-0	-0	-363
	4(EXP)	-5492	0	0	-0	0	0
	MAX	-5492/L4	105/L1	0/L4	-0/L1	0/L4	-363/L1
200		TYPE=Rigid +Y; Rigid GUI;					
	1(OPE)	0	-2656	-0	0	0	0
	3(SUS)	0	-2656	-0	0	0	0
	4(EXP)	0	0	-0	0	0	0
	MAX		-2656/L1	-0/L1			
210		TYPE=Rigid +Y;					
	1(OPE)	0	-2474	0	0	0	0
	3(SUS)	0	-2474	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2474/L1				
240		TYPE=Rigid +Y; Rigid GUI;					
	1(OPE)	0	-3082	0	0	0	0
	3(SUS)	0	-3082	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-3082/L1	0/L1			
250		TYPE=Rigid +Y; Rigid GUI;					
	1(OPE)	0	-2177	-0	0	0	0
	3(SUS)	0	-2177	-0	0	0	0
	4(EXP)	0	0	-0	0	0	0

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
	MAX		-2177/L1	-0/L1			
255		TYPE=Rigid ANC;					
	1(OPE)	93765	-2730	3733	-79	-3231	-339
	3(SUS)	65891	-1444	34	42	-30	967
	4(EXP)	27874	-1286	3699	-121	-3201	-1307
	MAX	93765/L1	-2730/L1	3733/L1	-121/L4	-3231/L1	-1307/L4
270		TYPE=Rigid +Y;					
	1(OPE)	0	0	0	0	0	0
	3(SUS)	0	-1894	0	0	0	0
	4(EXP)	0	1894	0	0	0	0
	MAX		-1894/L3				
280		TYPE=Rigid +Y;					
	1(OPE)	0	0	0	0	0	0
	3(SUS)	0	-2588	0	0	0	0
	4(EXP)	0	2588	0	0	0	0
	MAX		-2588/L3				
310		TYPE=Rigid ANC;					
	1(OPE)	52	-6289	100200	368	188	-203
	3(SUS)	0	-3092	65527	1084	1	-1
	4(EXP)	52	-3197	34674	-716	187	-202
	MAX	52/L1	-6289/L1	100200/L1	1084/L3	188/L1	-203/L1
320		TYPE=Rigid +Y;					
	1(OPE)	0	-2587	0	0	0	0
	3(SUS)	0	-2587	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2587/L1				
330		TYPE=Rigid +Y;					
	1(OPE)	0	-2486	0	0	0	0
	3(SUS)	0	-2486	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2486/L1				
340		TYPE=Rigid +Y;					
	1(OPE)	0	-2859	0	0	0	0
	3(SUS)	0	-2859	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2859/L1				

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Job:: STEAM MAINS 200NB

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
350		TYPE=Rigid +Y;					
	1(OPE)	0	-2003	0	0	0	0
	3(SUS)	0	-2003	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2003/L1				
360		TYPE=Rigid +Y;					
	1(OPE)	0	-3032	0	0	0	0
	3(SUS)	0	-3032	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-3032/L1				
370		TYPE=Rigid ANC;					
	1(OPE)	0	-2315	2517	-217	-0	0
	3(SUS)	-0	-2315	-82	-217	0	0
	4(EXP)	0	0	2600	0	-0	0
	MAX	0/L4	-2315/L1	2600/L4	-217/L1	-0/L4	0/L1
380		TYPE=Rigid +Y;					
	1(OPE)	0	-2877	0	0	0	0
	3(SUS)	0	-2877	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2877/L1				
390		TYPE=Rigid +Y;					
	1(OPE)	0	-2006	0	0	0	0
	3(SUS)	0	-2006	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2006/L1				
400		TYPE=Rigid +Y;					
	1(OPE)	0	-2996	0	0	0	0
	3(SUS)	0	-2996	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2996/L1				
410		TYPE=Rigid +Y;					
	1(OPE)	0	-2371	0	0	0	0
	3(SUS)	0	-2371	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2371/L1				

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Job:: STEAM MAINS 200NB

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
420		TYPE=Rigid +Y;					
	1(OPE)	0	-2688	0	0	0	0
	3(SUS)	0	-2688	0	0	0	0
	4(EXP)	0	-0	0	0	0	0
	MAX		-2688/L1				
430		TYPE=Rigid +Y;					
	1(OPE)	0	-2197	0	0	0	0
	3(SUS)	0	-2197	0	0	0	0
	4(EXP)	0	0	0	0	0	0
	MAX		-2197/L3				
435		TYPE=Rigid ANC;					
	1(OPE)	476	-4756	-102839	-5526	3068	5625
	3(SUS)	-6	-1878	-65549	-3172	-128	809
	4(EXP)	482	-2878	-37290	-2354	3195	4816
	MAX	482/L4	-4756/L1	-102839/L1	-5526/L1	3195/L4	5625/L1
470		TYPE=Rigid +Y;					
	1(OPE)	0	-869	0	0	0	0
	3(SUS)	0	-3799	0	0	0	0
	4(EXP)	0	2930	0	0	0	0
	MAX		-3799/L3				
480		TYPE=Rigid +Y;					
	1(OPE)	0	-2016	0	0	0	0
	3(SUS)	0	-1924	0	0	0	0
	4(EXP)	0	-92	0	0	0	0
	MAX		-2016/L1				
490		TYPE=Rigid +Y;					
	1(OPE)	0	-1732	0	0	0	0
	3(SUS)	0	-2103	0	0	0	0
	4(EXP)	0	371	0	0	0	0
	MAX		-2103/L3				
500		TYPE=Rigid +Y;					
	1(OPE)	0	-1583	0	0	0	0
	3(SUS)	0	-998	0	0	0	0
	4(EXP)	0	-585	0	0	0	0
	MAX		-1583/L1				
510		TYPE=Rigid					

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RESTRAINT SUMMARY REPORT: Loads On Restraints

Various Load Cases

Node	Load Case	FX N.	FY N.	FZ N.	MX N.m.	MY N.m.	MZ N.m.
		+Y;					
	1(OPE)	0	-1341	0	0	0	0
	3(SUS)	0	-2249	0	0	0	0
	4(EXP)	0	908	0	0	0	0
	MAX		-2249/L3				
520		TYPE=Rigid +Y;					
	1(OPE)	0	-627	0	0	0	0
	3(SUS)	0	-1238	0	0	0	0
	4(EXP)	0	610	0	0	0	0
	MAX		-1238/L3				
540		TYPE=Rigid ANC;					
	1(OPE)	-476	-3184	-3612	-10444	6608	-1122
	3(SUS)	6	-1919	71	297	-160	-78
	4(EXP)	-482	-1265	-3683	-10741	6768	-1044
	MAX	-482/L4	-3184/L1	-3683/L4	-10741/L4	6768/L4	-1122/L1
1045		TYPE=Rigid ANC;					
	1(OPE)	1942	-2970	3191	1086	3637	1181
	3(SUS)	-48	-2878	103	-688	196	2315
	4(EXP)	1990	-92	3087	1775	3440	-1135
	MAX	1990/L4	-2970/L1	3191/L1	1775/L4	3637/L1	2315/L3

B31.1 STRESSES REPORT

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LISTING OF STATIC LOAD CASES FOR THIS ANALYSIS

- 1 (OPE) W+T1+P1
- 2 (Alt-SUS) W+P1
- 3 (SUS) W+P1
- 4 (EXP) L4=L1-L3

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Piping Code (1 of 1): B31.3 -2016, Jan 31, 2017

The SLP column shows the longitudinal pressure stress.

NO Stresses Evaluation CHECK PROCESSED: LOADCASE 1 (OPE) W+T1+P1

Highest Stresses: (KPa)

SLP	11422.9	@Node	100
F/A	24329.9	@Node	370
Bending	91549.4	@Node	289
Torsion	20355.2	@Node	1035
SIF/Index In-Plane	2.7	@Node	128
SIF/Index Out-Plane	2.3	@Node	128
SIF/Index Torsion	1.0	@Node	20
SIF/Index Axial	1.0	@Node	20

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
10												
20												
20	6979.0	-1051.6	38713.9	10740.3	1.000	1.000	1.000	1.000	50201.3			
28	6979.0	-1017.2	31416.1	-10740.3	1.000	1.000	1.000	1.000	44019.4			
28	6979.0	-1017.2	65228.7	10740.3	2.094	1.745	1.000	1.000	74636.3			
29	6979.0	-258.0	56486.3	-10587.2	2.094	1.745	1.000	1.000	67045.6			
29	6979.0	-258.0	56486.3	10587.2	2.094	1.745	1.000	1.000	67045.6			
30	6979.0	639.8	54682.4	-4986.2	2.094	1.745	1.000	1.000	63203.1			
30	6979.0	639.8	28126.3	4986.2	1.000	1.000	1.000	1.000	37460.7			
38	6979.0	639.8	25820.4	-4986.2	1.000	1.000	1.000	1.000	35298.1			

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
38	6979.0	639.8	45189.6	4986.2	2.094	1.745	1.000	1.000	53895.7			
39	6979.0	144.8	28376.5	-13332.5	2.094	1.745	1.000	1.000	46062.7			
39	6979.0	144.8	28376.5	13332.5	2.094	1.745	1.000	1.000	46062.7			
40	6979.0	-435.1	21393.1	-15331.0	2.094	1.745	1.000	1.000	43931.4			
40	6979.0	-435.1	10583.2	15331.0	1.000	1.000	1.000	1.000	38981.0			
50	6979.0	-435.1	29532.3	-15331.0	1.000	1.000	1.000	1.000	49115.2			
50												
60												
60	6979.0	-435.1	38419.2	15331.0	1.000	1.000	1.000	1.000	55698.7			
70	6979.0	-435.1	40550.6	-15331.0	1.000	1.000	1.000	1.000	57382.0			
70												
80												
80	6979.0	-435.1	45768.2	15331.0	1.000	1.000	1.000	1.000	61633.7			
90	6979.0	-435.1	53236.9	-15331.0	1.000	1.000	1.000	1.000	67979.5			
90	6979.0	-435.1	53236.9	15331.0	1.000	1.000	1.000	1.000	67979.5			
100	11422.9	-275.9	23002.7	-6067.1	1.000	1.000	1.000	1.000	37154.0			
100	11422.9	-275.9	23002.7	6067.1	1.000	1.000	1.000	1.000	37154.0			
110	11422.9	-275.9	25033.0	-6067.1	1.000	1.000	1.000	1.000	38965.9			
110	11422.9	-729.3	15076.5	-5293.6	1.000	1.000	1.000	1.000	29116.2			
555	11422.9	-729.3	12839.2	5293.6	1.000	1.000	1.000	1.000	27335.0			
555	11422.9	-729.3	12839.2	-5293.6	1.000	1.000	1.000	1.000	27335.0			

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
1034	6979.0	-1180.6	63599.2	-17545.0	2.094	1.745	1.000	1.000	78435.6			
1035	6979.0	-982.1	52045.6	20355.2	2.094	1.745	1.000	1.000	72073.3			
1035	6979.0	-982.1	25080.8	-20355.2	1.000	1.000	1.000	1.000	53813.1			
1040	6979.0	-1016.4	17627.8	20355.2	1.000	1.000	1.000	1.000	50325.7			
1040												
1045												
1000	6979.0	-1150.2	48536.1	-13376.4	2.002	2.002	1.000	1.000	61249.6			
1005	6979.0	-1150.2	23218.5	13376.4	1.000	1.000	1.000	1.000	41252.1			
110	11422.9	-38.2	45607.5	-1303.6	1.000	1.000	1.000	1.000	57066.6			
112	11422.9	-38.2	36268.1	1303.6	1.000	1.000	1.000	1.000	47746.4			
112												
113												
113												
114												
114												
115												
115	11422.9	-38.2	28056.2	-1303.6	1.000	1.000	1.000	1.000	39561.8			
120	11422.9	-38.2	29658.9	1303.6	1.000	1.000	1.000	1.000	41158.0			
120	11422.9	-38.2	29658.9	-1303.6	1.000	1.000	1.000	1.000	41158.0			
128	11422.9	-38.2	10308.2	1303.6	1.000	1.000	1.000	1.000	22017.4			
128	11422.9	-38.2	27266.0	-1303.6	2.717	2.264	1.000	1.000	38775.0			
129	11422.9	-347.7	31562.2	-327.2	2.717	2.264	1.000	1.000	42644.2			

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
129	11422.9	-347.7	31562.2	327.2	2.717	2.264	1.000	1.000	42644.2			
130	11422.9	-453.4	32244.3	-1276.6	2.717	2.264	1.000	1.000	43314.7			
130	11422.9	-453.4	11880.4	1276.6	1.000	1.000	1.000	1.000	23121.1			
140	11422.9	-453.4	7595.2	-1276.6	1.000	1.000	1.000	1.000	18982.3			
140	11422.9	-453.4	7595.2	1276.6	1.000	1.000	1.000	1.000	18982.3			
150	11422.9	-453.4	2158.2	-1276.6	1.000	1.000	1.000	1.000	14312.6			
150	11422.9	-453.4	2158.2	1276.6	1.000	1.000	1.000	1.000	14312.6			
158	11422.9	-453.4	17131.6	-1276.6	1.000	1.000	1.000	1.000	28290.3			
158	11422.9	-453.4	46543.7	1276.6	2.717	2.264	1.000	1.000	57583.2			
159	11422.9	-662.2	49921.6	-912.9	2.717	2.264	1.000	1.000	60715.7			
159	11422.9	-662.2	49921.6	912.9	2.717	2.264	1.000	1.000	60715.7			
160	11422.9	-503.1	47226.1	-80.6	2.717	2.264	1.000	1.000	58146.2			
160	11422.9	-503.1	17430.3	80.6	1.000	1.000	1.000	1.000	28350.8			
168	11422.9	-787.0	12525.6	-80.6	1.000	1.000	1.000	1.000	23162.5			
168	11422.9	-787.0	28359.6	80.6	2.717	2.264	1.000	1.000	38996.0			
169	11422.9	-543.6	25041.8	4763.3	2.717	2.264	1.000	1.000	37671.9			
169	11422.9	-543.6	25041.8	-4763.3	2.717	2.264	1.000	1.000	37671.9			
170	11422.9	38.2	15550.6	7601.5	2.717	2.264	1.000	1.000	33208.7			
170	11422.9	38.2	5935.2	-7601.5	1.000	1.000	1.000	1.000	27781.7			
180	11422.9	38.2	45272.9	7601.5	1.000	1.000	1.000	1.000	59218.5			
180	11422.9	-20227.1	5850.8	-0.0	1.000	1.000	1.000	1.000	14654.9			

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 1 (OPE) W+T1+P1

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
212												
213												
213	11422.9	-21442.5	1018.8	0.0	1.000	1.000	1.000	1.000	11038.4			
240	11422.9	-21442.5	10726.7	-0.0	1.000	1.000	1.000	1.000	20746.4			
240	11422.9	-21442.5	10726.7	0.0	1.000	1.000	1.000	1.000	20746.4			
250	11422.9	-21442.5	4698.6	-0.0	1.000	1.000	1.000	1.000	14718.2			
250	11422.9	-21442.5	4698.6	0.0	1.000	1.000	1.000	1.000	14718.2			
255	11422.9	-21442.5	4953.6	-0.0	1.000	1.000	1.000	1.000	14973.2			
255	11422.9	-11.9	15704.6	174.9	1.000	1.000	1.000	1.000	27119.4			
258	11422.9	-11.9	3375.2	-174.9	1.000	1.000	1.000	1.000	14804.2			
258	11422.9	-11.9	8735.8	174.9	2.717	2.264	1.000	1.000	20153.8			
259	11422.9	-611.7	2082.3	268.3	2.717	2.264	1.000	1.000	12961.5			
259	11422.9	-611.7	2082.3	-268.3	2.717	2.264	1.000	1.000	12961.5			
260	11422.9	-853.2	6589.6	48.6	2.717	2.264	1.000	1.000	17160.1			
260	11422.9	-853.2	2536.8	-48.6	1.000	1.000	1.000	1.000	13108.4			
270	11422.9	-853.2	8806.5	48.6	1.000	1.000	1.000	1.000	19376.8			
270	11422.9	-853.2	8806.5	-48.6	1.000	1.000	1.000	1.000	19376.8			
280	11422.9	-853.2	12391.7	48.6	1.000	1.000	1.000	1.000	22961.9			
280	11422.9	-853.2	12391.7	-48.6	1.000	1.000	1.000	1.000	22961.9			
288	11422.9	-853.2	32602.5	48.6	1.000	1.000	1.000	1.000	43172.4			
288	11422.9	-853.2	88574.7	-48.6	2.717	2.264	1.000	1.000	99144.5			
289	11422.9	-1046.0	91549.4	142.9	2.717	2.264	1.000	1.000	101926.7			

B31.3 STRESSES REPORT: Stresses on Elements CASE 1 (OPE) W+T1+P1

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
410	11422.9	-24329.9	5631.6	0.0	1.000	1.000	1.000	1.000	18538.6			
420	11422.9	-24329.9	7264.7	-0.0	1.000	1.000	1.000	1.000	20171.7			
420	11422.9	-24329.9	7264.7	0.0	1.000	1.000	1.000	1.000	20171.7			
430	11422.9	-24329.9	5059.4	-0.0	1.000	1.000	1.000	1.000	17966.4			
430	11422.9	-24329.9	5059.4	0.0	1.000	1.000	1.000	1.000	17966.4			
435	11422.9	-24329.9	785.2	-0.0	1.000	1.000	1.000	1.000	13692.2			
435	11422.9	-825.5	27316.7	12459.9	1.000	1.000	1.000	1.000	47573.1			
438	11422.9	-825.5	30931.3	-12459.9	1.000	1.000	1.000	1.000	50318.2			
438	11422.9	-825.5	75631.3	12459.9	2.717	2.264	1.000	1.000	90228.4			
439	11422.9	-660.6	49548.7	-18168.5	2.717	2.264	1.000	1.000	72207.0			
439	11422.9	-660.6	49548.7	18168.5	2.717	2.264	1.000	1.000	72207.0			
440	11422.9	-108.8	60559.6	-14680.0	2.717	2.264	1.000	1.000	78615.5			
440	11422.9	-108.8	24885.4	14680.0	1.000	1.000	1.000	1.000	49801.7			
448	11422.9	-108.8	16304.1	-14680.0	1.000	1.000	1.000	1.000	44897.4			
448	11422.9	-108.8	38198.7	14680.0	2.717	2.264	1.000	1.000	59492.5			
449	11422.9	-529.4	29005.4	-16374.3	2.717	2.264	1.000	1.000	54640.3			
449	11422.9	-529.4	29005.4	16374.3	2.717	2.264	1.000	1.000	54640.3			
450	11422.9	-619.9	61392.1	-9905.2	2.717	2.264	1.000	1.000	75312.3			
450	11422.9	-619.9	26339.6	9905.2	1.000	1.000	1.000	1.000	43761.0			
458	11422.9	-377.8	22064.6	-9905.2	1.000	1.000	1.000	1.000	40698.0			
458	11422.9	-377.8	59699.1	9905.2	2.717	2.264	1.000	1.000	73945.2			
459	11422.9	-836.7	76101.8	-5819.0	2.717	2.264	1.000	1.000	87572.7			

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 Job:: STEAM MAINS 200NB
 Licensed To:: XGM

B31.3 STRESSES REPORT: Stresses on Elements
 CASE 1 (OPE) W+T1+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
459	11422.9	-836.7	76101.8	5819.0	2.717	2.264	1.000	1.000	87572.7			
460	11422.9	-825.5	79599.3	1487.7	2.717	2.264	1.000	1.000	90252.3			
460	11422.9	-825.5	31155.5	-1487.7	1.000	1.000	1.000	1.000	41894.6			
470	11422.9	-825.5	20253.0	1487.7	1.000	1.000	1.000	1.000	31067.9			
470	11422.9	-825.5	20253.0	-1487.7	1.000	1.000	1.000	1.000	31067.9			
480	11422.9	-825.5	4055.0	1487.7	1.000	1.000	1.000	1.000	15626.9			
480	11422.9	-825.5	4055.0	-1487.7	1.000	1.000	1.000	1.000	15626.9			
490	11422.9	-825.5	13592.9	1487.7	1.000	1.000	1.000	1.000	24512.1			
490	11422.9	-825.5	13592.9	-1487.7	1.000	1.000	1.000	1.000	24512.1			
498	11422.9	-825.5	19684.6	1487.7	1.000	1.000	1.000	1.000	30505.7			
498	11422.9	-825.5	53038.2	-1487.7	2.717	2.264	1.000	1.000	63719.0			
499	11422.9	-831.8	53047.4	1682.9	2.717	2.264	1.000	1.000	63745.2			
499	11422.9	-831.8	53047.4	-1682.9	2.717	2.264	1.000	1.000	63745.2			
500	11422.9	-831.8	52947.8	1868.3	2.717	2.264	1.000	1.000	63670.6			
500	11422.9	-831.8	19621.0	-1868.3	1.000	1.000	1.000	1.000	30564.7			
505	11422.9	-831.8	17506.5	1868.3	1.000	1.000	1.000	1.000	28491.9			
505	11422.9	-831.8	17506.5	-1868.3	1.000	1.000	1.000	1.000	28491.9			
510	11422.9	-831.8	15791.1	1868.3	1.000	1.000	1.000	1.000	26818.2			
510	11422.9	-831.8	15791.1	-1868.3	1.000	1.000	1.000	1.000	26818.2			
515	11422.9	-831.8	13977.4	1868.3	1.000	1.000	1.000	1.000	25059.3			
515	11422.9	-831.8	13977.4	-1868.3	1.000	1.000	1.000	1.000	25059.3			

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 1 (OPE) W+T1+P1

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 3 (SUS) W+P1

Piping Code (1 of 1): B31.3 -2016, Jan 31, 2017

The SLP column shows the longitudinal pressure stress.

Stresses Evaluation CHECK PASSED : LOADCASE 3 (SUS) W+P1

Highest Stresses: (KPa)

Ratio (%):	64.8	@Node	28
Code:	88830.9	Allowable:	137031.9
SLP	22002.1	@Node	100
F/A	27460.9	@Node	180
Bending	76800.5	@Node	28
Torsion	27346.4	@Node	40
SIF/Index In-Plane	2.0	@Node	128
SIF/Index Out-Plane	1.7	@Node	128
SIF/Index Torsion	1.0	@Node	20
SIF/Index Axial	1.0	@Node	20

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 Job:: STEAM MAINS 200NB
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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
30	13797.3	-28.7	37217.7	7580.3	1.000	1.000	1.000	1.000	53192.5	137031.9	38.8	
38	13797.3	-28.7	45750.4	-7580.3	1.000	1.000	1.000	1.000	61419.4	137031.9	44.8	
38	13797.3	-28.7	59882.4	7580.3	1.571	1.309	1.000	1.000	75195.1	137031.9	54.9	
39	13797.3	-90.2	36650.8	-22850.8	1.571	1.309	1.000	1.000	68004.1	137031.9	49.6	
39	13797.3	-90.2	36650.8	22850.8	1.571	1.309	1.000	1.000	68004.1	137031.9	49.6	
40	13797.3	-98.9	8419.2	-27346.4	1.571	1.309	1.000	1.000	58995.7	137031.9	43.1	
40	13797.3	-98.9	6387.0	27346.4	1.000	1.000	1.000	1.000	58264.3	137031.9	42.5	
50	13797.3	-98.9	29578.2	-27346.4	1.000	1.000	1.000	1.000	69743.6	137031.9	50.9	
50												
60												
60	13797.3	-98.9	39865.1	27346.4	1.000	1.000	1.000	1.000	76553.0	137031.9	55.9	
70	13797.3	-98.9	41475.2	-27346.4	1.000	1.000	1.000	1.000	77688.1	137031.9	56.7	
70												
80												
80	13797.3	-98.9	42128.5	27346.4	1.000	1.000	1.000	1.000	78153.4	137031.9	57.0	
90	13797.3	-98.9	35807.8	-27346.4	1.000	1.000	1.000	1.000	73771.1	137031.9	53.8	
90	13797.3	-98.9	35807.8	27346.4	1.000	1.000	1.000	1.000	73771.1	137031.9	53.8	
100	22002.1	-63.2	12732.3	-11073.7	1.000	1.000	1.000	1.000	41141.2	137031.9	30.0	
100	22002.1	-63.2	12732.3	11073.7	1.000	1.000	1.000	1.000	41141.2	137031.9	30.0	
110	22002.1	-63.2	10723.0	-11073.7	1.000	1.000	1.000	1.000	39462.7	137031.9	28.8	
110	22002.1	-43.0	4542.3	-9671.9	1.000	1.000	1.000	1.000	32810.2	137031.9	23.9	
555	22002.1	-43.0	7257.1	9671.9	1.000	1.000	1.000	1.000	35039.5	137031.9	25.6	

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
555	22002.1	-43.0	7257.1	-9671.9	1.000	1.000	1.000	1.000	35039.5	137031.9	25.6	
777	13797.3	-67.3	24149.4	23884.7	1.000	1.000	1.000	1.000	60965.2	137031.9	44.5	
777	13797.3	-67.3	24149.4	-23884.7	1.000	1.000	1.000	1.000	60965.2	137031.9	44.5	
1000	13797.3	-67.3	43580.6	23884.7	1.501	1.501	1.000	1.000	74608.4	137031.9	54.4	
1005	13797.3	-67.3	30910.3	-23884.7	1.000	1.000	1.000	1.000	65381.0	137031.9	47.7	
1010	13797.3	-67.3	35417.1	23884.7	1.000	1.000	1.000	1.000	68537.2	137031.9	50.0	
1010												
1015												
1015	13797.3	-67.3	36558.8	-23884.7	1.000	1.000	1.000	1.000	69360.5	137031.9	50.6	
1020	13797.3	-67.3	33394.1	23884.7	1.000	1.000	1.000	1.000	67101.3	137031.9	49.0	
1020												
1025												
1025	13797.3	-67.3	24895.2	-23884.7	1.000	1.000	1.000	1.000	61431.4	137031.9	44.8	
1028	13797.3	-67.3	6840.5	23884.7	1.000	1.000	1.000	1.000	52010.1	137031.9	38.0	
1028	13797.3	-67.3	8958.9	-23884.7	1.571	1.309	1.000	1.000	52883.8	137031.9	38.6	
1029	13797.3	-25.6	30601.2	20453.5	1.571	1.309	1.000	1.000	60351.8	137031.9	44.0	
1029	13797.3	-25.6	30601.2	-20453.5	1.571	1.309	1.000	1.000	60351.8	137031.9	44.0	
1030	13797.3	31.1	52090.2	7365.1	1.571	1.309	1.000	1.000	67544.3	137031.9	49.3	
1030	13797.3	31.1	39799.3	-7365.1	1.000	1.000	1.000	1.000	55613.9	137031.9	40.6	
1033	13797.3	31.1	34800.9	7365.1	1.000	1.000	1.000	1.000	50811.3	137031.9	37.1	
1033	13797.3	31.1	54576.8	-7365.1	1.571	1.309	1.000	1.000	69973.2	137031.9	51.1	

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Job:: STEAM MAINS 200NB

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
128	22002.1	1.5	9222.6	-3175.0	2.038	1.698	1.000	1.000	31865.3	137031.9	23.3	
129	22002.1	15.3	10332.8	805.8	2.038	1.698	1.000	1.000	32390.3	137031.9	23.6	
129	22002.1	15.3	10332.8	-805.8	2.038	1.698	1.000	1.000	32390.3	137031.9	23.6	
130	22002.1	20.2	5721.9	-1129.1	2.038	1.698	1.000	1.000	27835.9	137031.9	20.3	
130	22002.1	20.2	3352.5	1129.1	1.000	1.000	1.000	1.000	25475.1	137031.9	18.6	
140	22002.1	20.2	4332.8	-1129.1	1.000	1.000	1.000	1.000	26451.7	137031.9	19.3	
140	22002.1	20.2	4332.8	1129.1	1.000	1.000	1.000	1.000	26451.7	137031.9	19.3	
150	22002.1	20.2	16295.5	-1129.1	1.000	1.000	1.000	1.000	38384.3	137031.9	28.0	
150	22002.1	20.2	16295.5	1129.1	1.000	1.000	1.000	1.000	38384.3	137031.9	28.0	
158	22002.1	20.2	963.8	-1129.1	1.000	1.000	1.000	1.000	23096.8	137031.9	16.9	
158	22002.1	20.2	1962.6	1129.1	2.038	1.698	1.000	1.000	24090.9	137031.9	17.6	
159	22002.1	165.0	4641.7	-820.2	2.038	1.698	1.000	1.000	26858.9	137031.9	19.6	
159	22002.1	165.0	4641.7	820.2	2.038	1.698	1.000	1.000	26858.9	137031.9	19.6	
160	22002.1	176.8	5798.6	-28.3	2.038	1.698	1.000	1.000	27977.5	137031.9	20.4	
160	22002.1	176.8	3109.4	28.3	1.000	1.000	1.000	1.000	25288.3	137031.9	18.5	
168	22002.1	-339.5	2506.0	-28.3	1.000	1.000	1.000	1.000	24168.7	137031.9	17.6	
168	22002.1	-339.5	5018.7	28.3	2.038	1.698	1.000	1.000	26681.3	137031.9	19.5	
169	22002.1	-266.9	3698.1	258.8	2.038	1.698	1.000	1.000	25438.5	137031.9	18.6	
169	22002.1	-266.9	3698.1	-258.8	2.038	1.698	1.000	1.000	25438.5	137031.9	18.6	
170	22002.1	-1.5	326.4	360.2	2.038	1.698	1.000	1.000	22338.6	137031.9	16.3	
170	22002.1	-1.5	163.5	-360.2	1.000	1.000	1.000	1.000	22175.8	137031.9	16.2	
180	22002.1	-1.5	21099.9	360.2	1.000	1.000	1.000	1.000	43106.5	137031.9	31.5	

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 3 (SUS) W+P1

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 Job:: STEAM MAINS 200NB
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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
212												
212												
213												
213	22002.1	-27388.4	1802.8	-0.0	1.000	1.000	1.000	1.000	7189.2	137031.9	5.2	
240	22002.1	-27388.4	18981.6	0.0	1.000	1.000	1.000	1.000	24368.0	137031.9	17.8	
240	22002.1	-27388.4	18981.6	-0.0	1.000	1.000	1.000	1.000	24368.0	137031.9	17.8	
250	22002.1	-27388.4	8314.5	0.0	1.000	1.000	1.000	1.000	13700.9	137031.9	10.0	
250	22002.1	-27388.4	8314.5	-0.0	1.000	1.000	1.000	1.000	13700.9	137031.9	10.0	
255	22002.1	-27388.4	8765.7	0.0	1.000	1.000	1.000	1.000	14152.0	137031.9	10.3	
255	22002.1	-0.1	1206.1	-166.5	1.000	1.000	1.000	1.000	23210.5	137031.9	16.9	
258	22002.1	-0.1	70.6	166.5	1.000	1.000	1.000	1.000	22075.1	137031.9	16.1	
258	22002.1	-0.1	133.9	-166.5	2.038	1.698	1.000	1.000	22138.4	137031.9	16.2	
259	22002.1	-10.1	443.5	116.4	2.038	1.698	1.000	1.000	22436.7	137031.9	16.4	
259	22002.1	-10.1	443.5	-116.4	2.038	1.698	1.000	1.000	22436.7	137031.9	16.4	
260	22002.1	-14.2	444.7	2.7	2.038	1.698	1.000	1.000	22432.6	137031.9	16.4	
260	22002.1	-14.2	261.3	-2.7	1.000	1.000	1.000	1.000	22249.2	137031.9	16.2	
270	22002.1	-14.2	6933.2	2.7	1.000	1.000	1.000	1.000	28921.1	137031.9	21.1	
270	22002.1	-14.2	6933.2	-2.7	1.000	1.000	1.000	1.000	28921.1	137031.9	21.1	
280	22002.1	-14.2	13122.8	2.7	1.000	1.000	1.000	1.000	35110.7	137031.9	25.6	
280	22002.1	-14.2	13122.8	-2.7	1.000	1.000	1.000	1.000	35110.7	137031.9	25.6	
288	22002.1	-14.2	1114.4	2.7	1.000	1.000	1.000	1.000	23102.3	137031.9	16.9	

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
351												
352												
352												
353												
353	22002.1	-27251.0	1587.6	0.0	1.000	1.000	1.000	1.000	6836.5	137031.9	5.0	
360	22002.1	-27251.0	18004.4	-0.0	1.000	1.000	1.000	1.000	23253.3	137031.9	17.0	
360	22002.1	-27251.0	18004.4	0.0	1.000	1.000	1.000	1.000	23253.3	137031.9	17.0	
370	22002.1	-27251.0	8605.6	-0.0	1.000	1.000	1.000	1.000	13854.5	137031.9	10.1	
370	22002.1	-27216.7	10309.1	0.0	1.000	1.000	1.000	1.000	15523.7	137031.9	11.3	
380	22002.1	-27216.7	14579.1	-0.0	1.000	1.000	1.000	1.000	19793.8	137031.9	14.4	
380	22002.1	-27216.7	14579.1	0.0	1.000	1.000	1.000	1.000	19793.8	137031.9	14.4	
390	22002.1	-27216.7	1677.1	-0.0	1.000	1.000	1.000	1.000	6891.7	137031.9	5.0	
390												
391												
391												
392												
392												
393												
393	22002.1	-27216.7	1598.7	0.0	1.000	1.000	1.000	1.000	6813.3	137031.9	5.0	
400	22002.1	-27216.7	17685.0	-0.0	1.000	1.000	1.000	1.000	22899.7	137031.9	16.7	
400	22002.1	-27216.7	17685.0	0.0	1.000	1.000	1.000	1.000	22899.7	137031.9	16.7	

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B31.3 STRESSES REPORT: Stresses on Elements CASE 3 (SUS) W+P1

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CAESAR II 2019 Ver.11.00.00.4800, (Build 190424) Date: APR 13, 2022 Time: 12:26

Job:: STEAM MAINS 200NB

Licensed To:: XGM

B31.3 STRESSES REPORT: Stresses on Elements

CASE 3 (SUS) W+P1

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
458	22002.1	509.1	14722.6	-115.8	2.038	1.698	1.000	1.000	37234.4	137031.9	27.2	
459	22002.1	406.6	13112.0	289.1	2.038	1.698	1.000	1.000	35525.4	137031.9	25.9	
459	22002.1	406.6	13112.0	-289.1	2.038	1.698	1.000	1.000	35525.4	137031.9	25.9	
460	22002.1	29.5	8536.1	297.4	2.038	1.698	1.000	1.000	30573.5	137031.9	22.3	
460	22002.1	29.5	4191.0	-297.4	1.000	1.000	1.000	1.000	26229.3	137031.9	19.1	
470	22002.1	29.5	26830.4	297.4	1.000	1.000	1.000	1.000	48865.5	137031.9	35.7	
470	22002.1	29.5	26830.4	-297.4	1.000	1.000	1.000	1.000	48865.5	137031.9	35.7	
480	22002.1	29.5	6248.5	297.4	1.000	1.000	1.000	1.000	28286.3	137031.9	20.6	
480	22002.1	29.5	6248.5	-297.4	1.000	1.000	1.000	1.000	28286.3	137031.9	20.6	
490	22002.1	29.5	8971.8	297.4	1.000	1.000	1.000	1.000	31009.1	137031.9	22.6	
490	22002.1	29.5	8971.8	-297.4	1.000	1.000	1.000	1.000	31009.1	137031.9	22.6	
498	22002.1	29.5	1749.6	297.4	1.000	1.000	1.000	1.000	23788.6	137031.9	17.4	
498	22002.1	29.5	3063.7	-297.4	2.038	1.698	1.000	1.000	25102.3	137031.9	18.3	
499	22002.1	29.6	3050.3	368.0	2.038	1.698	1.000	1.000	25092.8	137031.9	18.3	
499	22002.1	29.6	3050.3	-368.0	2.038	1.698	1.000	1.000	25092.8	137031.9	18.3	
500	22002.1	29.5	3020.2	438.0	2.038	1.698	1.000	1.000	25067.1	137031.9	18.3	
500	22002.1	29.5	1723.2	-438.0	1.000	1.000	1.000	1.000	23770.9	137031.9	17.3	
505	22002.1	29.5	4116.7	438.0	1.000	1.000	1.000	1.000	26162.9	137031.9	19.1	
505	22002.1	29.5	4116.7	-438.0	1.000	1.000	1.000	1.000	26162.9	137031.9	19.1	
510	22002.1	29.5	8758.8	438.0	1.000	1.000	1.000	1.000	30802.8	137031.9	22.5	
510	22002.1	29.5	8758.8	-438.0	1.000	1.000	1.000	1.000	30802.8	137031.9	22.5	
515	22002.1	29.5	4707.6	438.0	1.000	1.000	1.000	1.000	26753.5	137031.9	19.5	

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B31.3 STRESSES REPORT: Stresses on Elements CASE 3 (SUS) W+P1

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Piping Code (1 of 1): B31.3 -2016, Jan 31, 2017

The SLP column shows the longitudinal pressure stress.

Stresses Evaluation CHECK PASSED : LOADCASE 4 (EXP) L4=L1-L3

Highest Stresses: (KPa)
 Ratio (%): 32.5 @Node 289
 Code: 95717.4 Allowable: 294248.3
 F/A 9364.5 @Node 370
 Bending 94602.6 @Node 289
 Torsion 19255.6 @Node 1035
 SIF/Index In-Plane 2.7 @Node 128
 SIF/Index Out-Plane 2.3 @Node 128
 SIF/Index Torsion 1.0 @Node 20
 SIF/Index Axial 2.0 @Node 1000

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
10												
20												
20		27.3	12902.0	9418.6	1.000	1.000	1.000	1.000	22847.5	280033.7	8.2	
28		27.3	3314.0	-9418.6	1.000	1.000	1.000	1.000	19131.3	280735.1	6.8	
28		27.3	6833.9	9418.6	2.094	1.745	1.000	1.000	20047.9	252812.4	7.9	
29		483.0	21776.9	-6620.4	2.094	1.745	1.000	1.000	25900.2	258366.8	10.0	
29		483.0	21776.9	6620.4	2.094	1.745	1.000	1.000	25900.2	258366.8	10.0	
30		655.7	28971.6	-602.9	2.094	1.745	1.000	1.000	29651.9	269201.3	11.0	
30		655.7	16597.5	602.9	1.000	1.000	1.000	1.000	17295.3	289899.5	6.0	

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
555		-705.6	13022.8	172.1	1.000	1.000	1.000	1.000	13732.7	306856.3	4.5	
777		-1112.9	26251.4	-435.0	1.000	1.000	1.000	1.000	27378.2	279220.6	9.8	
777		-1112.9	26251.4	435.0	1.000	1.000	1.000	1.000	27378.2	279220.6	9.8	
1000		-2227.5	41474.6	-435.0	2.002	2.002	1.000	2.002	43710.8	264457.4	16.5	
1005		-1112.9	18517.3	435.0	1.000	1.000	1.000	1.000	19649.5	275155.2	7.1	
1010		-1112.9	13044.9	-435.0	1.000	1.000	1.000	1.000	14184.5	272291.5	5.2	
1010												
1015												
1015		-1112.9	6705.2	435.0	1.000	1.000	1.000	1.000	7866.3	271855.0	2.9	
1020		-1112.9	3043.9	-435.0	1.000	1.000	1.000	1.000	4246.9	274491.9	1.5	
1020												
1025												
1025		-1112.9	8986.7	435.0	1.000	1.000	1.000	1.000	10137.0	280537.6	3.6	
1028		-1112.9	26700.3	-435.0	1.000	1.000	1.000	1.000	27826.8	289915.1	9.6	
1028		-1112.9	55702.7	435.0	2.094	1.745	1.000	1.000	56822.3	288873.5	19.7	
1029		-1294.2	57831.3	1201.4	2.094	1.745	1.000	1.000	59174.3	281717.9	21.0	
1029		-1294.2	57831.3	-1201.4	2.094	1.745	1.000	1.000	59174.3	281717.9	21.0	
1030		-717.3	50354.7	2191.3	2.094	1.745	1.000	1.000	51259.7	274380.3	18.7	
1030		-717.3	24053.2	-2191.3	1.000	1.000	1.000	1.000	25155.2	286687.5	8.8	
1033		-717.3	32043.5	2191.3	1.000	1.000	1.000	1.000	33052.6	291116.2	11.4	
1033		-717.3	56007.8	-2191.3	2.094	1.745	1.000	1.000	56894.1	271128.8	21.0	
1034		-530.6	42250.6	13801.6	2.094	1.745	1.000	1.000	50913.4	261695.9	19.5	

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
1034		-530.6	42250.6	-13801.6	2.094	1.745	1.000	1.000	50913.4	261695.9	19.5	
1035		-33.1	4731.9	19255.6	2.094	1.745	1.000	1.000	38804.9	257317.2	15.1	
1035		-33.1	2566.5	-19255.6	1.000	1.000	1.000	1.000	38598.8	283470.9	13.6	
1040		-33.1	19403.8	19255.6	1.000	1.000	1.000	1.000	43138.2	284778.8	15.1	
1040												
1045												
1000		-2227.5	41474.6	435.0	2.002	2.002	1.000	2.002	43710.8	264457.4	16.5	
1005		-1112.9	18517.3	-435.0	1.000	1.000	1.000	1.000	19649.5	275155.2	7.1	
110		-39.1	40521.0	490.6	1.000	1.000	1.000	1.000	40571.9	278529.7	14.6	
112		-39.1	33767.9	-490.6	1.000	1.000	1.000	1.000	33821.2	291161.4	11.6	
112												
113												
113												
114												
114												
115												
115		-39.1	28165.3	490.6	1.000	1.000	1.000	1.000	28221.4	307109.8	9.2	
120		-39.1	14661.0	-490.6	1.000	1.000	1.000	1.000	14732.8	276297.3	5.3	
120		-39.1	14661.0	490.6	1.000	1.000	1.000	1.000	14732.8	276297.3	5.3	
128		-39.1	9691.6	-490.6	1.000	1.000	1.000	1.000	9780.0	314461.3	3.1	
128		-39.1	26268.6	490.6	2.717	2.264	1.000	1.000	26326.0	309849.7	8.5	

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 4 (EXP) L4=L1-L3

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
212												
213												
213		-6382.6	0.0	0.0	1.000	1.000	1.000	1.000	6382.6	336469.7	1.9	
240		-6382.6	0.0	-0.0	1.000	1.000	1.000	1.000	6382.6	319290.8	2.0	
240		-6382.6	0.0	0.0	1.000	1.000	1.000	1.000	6382.6	319290.8	2.0	
250		-6382.6	0.0	-0.0	1.000	1.000	1.000	1.000	6382.6	329957.9	1.9	
250		-6382.6	0.0	0.0	1.000	1.000	1.000	1.000	6382.6	329957.9	1.9	
255		-6382.6	0.0	-0.0	1.000	1.000	1.000	1.000	6382.6	329506.8	1.9	
255		-11.9	15316.9	269.0	1.000	1.000	1.000	1.000	15338.2	298882.4	5.1	
258		-11.9	3335.7	-269.0	1.000	1.000	1.000	1.000	3390.5	309938.3	1.1	
258		-11.9	8635.8	269.0	2.717	2.264	1.000	1.000	8664.4	307501.4	2.8	
259		-606.2	2207.6	202.5	2.717	2.264	1.000	1.000	2842.8	295753.1	1.0	
259		-606.2	2207.6	-202.5	2.717	2.264	1.000	1.000	2842.8	295753.1	1.0	
260		-845.4	6404.3	47.0	2.717	2.264	1.000	1.000	7250.3	293893.5	2.5	
260		-845.4	2448.5	-47.0	1.000	1.000	1.000	1.000	3295.2	305437.8	1.1	
270		-845.4	12672.4	47.0	1.000	1.000	1.000	1.000	13518.1	313161.1	4.3	
270		-845.4	12672.4	-47.0	1.000	1.000	1.000	1.000	13518.1	313161.1	4.3	
280		-845.4	4977.9	47.0	1.000	1.000	1.000	1.000	5824.0	308548.2	1.9	
280		-845.4	4977.9	-47.0	1.000	1.000	1.000	1.000	5824.0	308548.2	1.9	
288		-845.4	33232.2	47.0	1.000	1.000	1.000	1.000	34077.7	310754.7	11.0	
288		-845.4	90285.6	-47.0	2.717	2.264	1.000	1.000	91131.0	299120.5	30.5	

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 4 (EXP) L4=L1-L3

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
351												
352												
352												
353												
353		-8770.3	0.0	0.0	1.000	1.000	1.000	1.000	8770.3	336822.3	2.6	
360		-8770.3	0.0	-0.0	1.000	1.000	1.000	1.000	8770.3	320405.5	2.7	
360		-8770.3	0.0	0.0	1.000	1.000	1.000	1.000	8770.3	320405.5	2.7	
370		-8770.3	0.0	-0.0	1.000	1.000	1.000	1.000	8770.3	329804.3	2.7	
370		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	328135.1	2.9	
380		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	323865.1	2.9	
380		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	323865.1	2.9	
390		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	336767.1	2.8	
390												
391												
391												
392												
392												
393												
393		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	336845.5	2.8	
400		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	320759.2	2.9	
400		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	320759.2	2.9	
410		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	328478.8	2.9	

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B31.3 STRESSES REPORT: Stresses on Elements
 CASE 4 (EXP) L4=L1-L3

Node	SLP KPa	F/A KPa	Bending KPa	Torsion KPa	SIF/Index In-Plane	SIF/Index Out-Plane	SIF/Index Torsion	SIF/Index Axial	Code KPa	Allowable KPa	Ratio %	
410		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	328478.8	2.9	
420		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	325588.8	2.9	
420		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	325588.8	2.9	
430		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	329491.3	2.8	
430		-9364.5	0.0	0.0	1.000	1.000	1.000	1.000	9364.5	329491.3	2.8	
435		-9364.5	0.0	-0.0	1.000	1.000	1.000	1.000	9364.5	337054.7	2.8	
435		-841.7	17582.4	10668.6	1.000	1.000	1.000	1.000	28190.8	297689.4	9.5	
438		-841.7	29804.9	-10668.6	1.000	1.000	1.000	1.000	37342.8	317164.9	11.8	
438		-841.7	73653.9	10668.6	2.717	2.264	1.000	1.000	77491.1	314532.0	24.6	
439		-673.1	51314.4	-16033.9	2.717	2.264	1.000	1.000	61082.3	318049.6	19.2	
439		-673.1	51314.4	16033.9	2.717	2.264	1.000	1.000	61082.3	318049.6	19.2	
440		-110.2	57417.9	-13145.0	2.717	2.264	1.000	1.000	63250.7	313208.9	20.2	
440		-110.2	23231.5	13145.0	1.000	1.000	1.000	1.000	35156.9	316464.6	11.1	
448		-110.2	16213.3	-13145.0	1.000	1.000	1.000	1.000	30945.5	320451.5	9.7	
448		-110.2	37881.2	13145.0	2.717	2.264	1.000	1.000	46200.8	319890.3	14.4	
449		-543.0	25947.5	-15315.4	2.717	2.264	1.000	1.000	40496.8	314511.6	12.9	
449		-543.0	25947.5	15315.4	2.717	2.264	1.000	1.000	40496.8	314511.6	12.9	
450		-657.8	54686.3	-9970.7	2.717	2.264	1.000	1.000	58827.0	312032.4	18.9	
450		-657.8	23324.1	9970.7	1.000	1.000	1.000	1.000	31189.5	315967.6	9.9	
458		-657.8	26048.5	-9970.7	1.000	1.000	1.000	1.000	33329.9	313914.3	10.6	
458		-657.8	70596.9	9970.7	2.717	2.264	1.000	1.000	73992.5	306424.4	24.1	

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B31.3 STRESSES REPORT: Stresses on Elements

CASE 4 (EXP) L4=L1-L3

[illegible]