TECHNICAL REPORT

JOINT INDUSTRY PROJECT

RELIABILITY OF CORRODED PIPES
LABORATORY BURST TESTS

REPORT NO. 96-3393

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DET NORSKE VERITAS

TECHNICAL REPORT

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Client: Joint Industry Project	Client ref.: See participation list

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Summary:

This report is one of a serie of 4 reports in the JIP project "Reliability of Corroded Pipes", and describes the laboratory burst tests of pipes with simulated corrosion defects. This project is a continuation of the JIP project "Residual Strength of Dented and Corroded Pipes".

Twelve burst tests have been performed, of which 9 were with longitudinal corrosion defects and 3 with circumferential corrosion defects. The pipes were loaded with combined internal pressure and external loads, except for 2 tests with internal pressure only. The external loads considered were bending moment and axial compressive force.

The test specimen, test set-up execution of the tests and the main results are described in this report, while evaluation of the results are included in the DNV project report no. 96-3394 "Reliability of Corroded Pipes / Assessment of Capacity and Acceptance Criteria"

All tests were made from seamless pipe with 324 mm diameter and 10.3 mm wall thickness of X52 modified material. The defects were smooth corrosion made using spark erosion for the longitudinal corrosion and the circumferential corrosion was machined.

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16 December 1997, OHB/ DocuLive no. 971215-0009

1 SUMMARY

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16 December 1997, OHB/ DocuLive no. 971215-0009

2 INTRODUCTION

2.1 Motivation

A pipeline is a large financial assets for the pipeline operator and a safe operation of the pipeline is therefore of great concern. On the other hand, unnecessary repair and an over conservative operation of the pipeline may result in high costs and unexploded resource utilisation. As the pipelines are ageing and corrosion may develop, the economical consequences of reduced operation pressure, repairs, or replacements may become high. Available design equations for assessment of allowable operating pressures of degraded pipelines depending on the selected reliability level is therefore desirable.

When severe corrosion has been observed in a pipeline, the decision of necessary action to be carried out should be based on an overall assessment of the pipeline, where uncertainties associated with both the assessment of the degree of corrosion and the capacity evaluation should be considered. The cost of repair or replacement can be very high and should be avoided, or postponed in time, if this is possible within the safety requirements defined. Required actions should further also be initiated in order to maintain the integrity of the pipeline and to avoid an undesired risk exposure of the pipeline.

The objective of the work is to provide the participants with capacity formulas of corroded pipes. The work includes laboratory tests and a large number of finite element analyses of corroded pipes exposed to internal pressure, combined internal pressure and bending moment, and combined internal pressure and bending moment. Both longitudinal and circumferential corrosion are considered. The formulas will be calibrated using reliability methods. This will in a systematic manner include uncertainties in inspection results and variations in material properties, pressure and dimensions. The outcome of the project will be included in a manual for assessment of corroded pipes.

2.2 Background

The present Joint Industry Project "Reliability of Corroded Pipes" is a continuation of the project "Residual Strength of Corroded and Dented Pipes". The former project which was started in 1993 and concluded at the end of 1995, and the present project stared shortly after.

The Phase I of the project was sponsored by Statoil, Phillips, Brasoil (Petrobras), Mineral Management Services (MMS), Norwegian Petroleum Directorate (NPD), The Research Council of Norway (NFR), and Det Norske Veritas (DNV).

The present project "Reliability of Corroded Pipes" is sponsored by Statoil, Amoco, Exxon, NPD and MMS.

The scope of work of the project has been modified in order to best utilise the funding. Especially has the work conducted by British Gas had an impact on our project as British Gas is undertaking a similar project. To avoid unnecessary overlapping of work the scope was changed, but some items were not overlapping. DNV have included combined load cases, circumferential corrosion, and a reliability calibration of the capacity and design equations that would be

established. British Gas, on the other hand, had already performed many tests and finite element analyses for internal pressure only, including interaction of separate pits and grooves, but they would not included a reliability calibration of the equations. A co-operation with British Gas has been discussed and an advantage would be that the equations would be based on a larger database including effects studied only by British Gas and effects studied only by DNV. The equations would include calibrated safety factors. Common capacity and design equations from British Gas and DNV would most probable receive greater acceptance in the marked, and hence, be a recognised equations.

After completion of both the British Gas and the DNV project, where both projects have made project specific guideline of corroded pipes, a unified guideline could be made.

2.3 Project Reports

The project concludes with 4 reports, given in the table below.

Table 2-1 Overview of the project reports

DNV report no.	Title / Subject
96-3392	Reliability of Corroded Pipes / Finite Element Analyses
96-3393	Reliability of Corroded Pipes / Laboratory Burst Tests (This document)
96-3394	Reliability of Corroded Pipes / Assessment of Capacity and Acceptance Criteria
97-3358	Reliability of Corroded Pipes / Project Guideline

2.4 Participants and Their Representatives

The following organisations participated in the project;

Participant	Representative	Telephone / Fax	
Minerals Management Service (MMS)	Wallace O. Adcox	telephone fax	(+1) 703 787 1354 (+1) 703 787 1010
Norwegian Petroleum Directorate (NPD)	Kjell A. Anfinsen	telephone fax	(+47) 51 87 62 26 (+47) 51 55 15 71
Den norske stats oljeselskap a.s.(Statoil)	Richard Verley	telephone fax	(+47) 73 58 41 85 (+47) 73 96 72 86
Amoco Norway Oil Company (Amoco)	Ole Jørgen Narvestad	telephone fax	(+47) 51 50 20 18 (+47) 51 50 22 18
Exxon Production Research Company (EPR)	Robert Appleby	telephone fax	(+1) 713 965 7193 (+1) 713 966 6423
Petrobras /CENPES/DIPREX	Adilson C. Benjamin	telephone fax	(+55) 21 598 6263 (+55) 21 598 6793

The SI units are used in the report. The conversion factors are between the SI units and the US units are;:

From US units to SI units

length:	1 in (inch)	=	25.40 mm
Mass	1 lb (pound)	=	0.4536 kg
Force	1 lbf (pound force)	=	4.448 N
	1 kip	=	4.448 kN
Stress (Pressure)	1 psi (lbf/in2)	=	0.006895 MPa (N/mm2)
	1 ksi (1000 psi)	=	6.895 MPa

From SI units to U. S units

length:	1 mm	=	0.03937 in
Mass	1 kg	=	2.205 lb (pound)
Force	1 N	=	0.2248 lbf (pound force)
	1 kN	=	0.2248 kip
Stress (Pressure)	1 MPa	=	145.0 psi (lbf/in2)
	1 MPa	=	0.1450 ksi

1 ksi = 1000 psi
10 bar = 1 MPa

3 GENERAL DESCRIPTION OF TESTS

3.1 Overview of tests

A total of 12 tests has been carried out within the project. An overview of the tests are given in Table 3-1.

Table 3-1 Overview of tests

Test no.	Nom Dia (mm)	Nom thick (mm)	mat.	defect depth (d/t)	defect length	defect width	loading int. press /bending/axial		
1	324	10.3	X52	0.50	0.75 D	15 t	X		
2	324	10.3	X52	0.50	0.75 D	15 t	X	X	
3	324	10.3	X52	0.50	0.75 D	15 t	X	X	
4	324	10.3	X52	0.30	0.50 D	3 t	X	X	
5	324	10.3	X52	0.30	0.50 D	3 t	X		X
6	324	10.3	X52	0.30	0.50 D	3 t	X		X
7	324	10.3	X52	0.50	0.75 D	3 t	X		X
8	324	10.3	X52	0.50	0.75 D	3 t	X		
9	324	10.3	X52	0.70	0.75 D	3 t	X		X
10	324	10.3	X52	0.50	12 mm	circ.	X		X
11	324	10.3	X52	0.50	12 mm	circ.	X		X
12	324	10.3	X52	0.70	12 mm	circ.	X		X

The dimensions given in the table are nominal values. The actual values of diameter, wall thickness and corrosion defects were measured. The material curve was determined by coupon tests. All simulated longitudinal corrosion defects were smooth rectangular defects fabricated using spark erosion, while the circumferential corrosion defects were machined. Tests 1 through 9 were simulating longitudinal corrosion, while test 10 through 12 simulated girth weld corrosion. All defects were made at the outer surface in the parent material.

The test specimens were exposed to combined internal pressure and external forces until burst, except for 2 test specimens which were exposed to internal pressure only.

3.2 Description of the test set-ups

The tests were exposed to different kind of loading which required different test set-ups;

- internal pressure only
- combined internal pressure and bending moment
- combined internal pressure and axial compressive force

The tests with internal pressure only requires virtually no special test set up, apart from the instrumentation and the water pump to increase the internal pressure until burst.

The tests with internal pressure and bending moment was performed in a 4-point-bending test rig. The test rig is shown in Figure 3-1 and Figure 3-2. A sketch of the test rig is also included in Appendix A. Rollers were used at the supports to in order to define and keep the distance between the supports constant. The distance between the rollers, which is the moment arm, varied from 1.27 to 1.43 meter for the three tests with bending moment. A servo controlled dynamic MTS 1000 kN actuator was used to apply the force. The specific test rig set-up made for this project had approximately 650 kNm moment capacity, and maximum 150 mm stroke.

The tests with combined internal pressure and axial compressive force was performed in a test frame as shown in Figure 3-3. A 10000 kN static jack was applied. The length of the test specimens were all 1000 mm, plus 2*50 mm for the end-plates. The maximum stroke of the jack was slightly less than 100 mm.

The water pump used in the burst tests had a capacity of 1000 bar. All tests were performed at room temperature at approximately 20°C

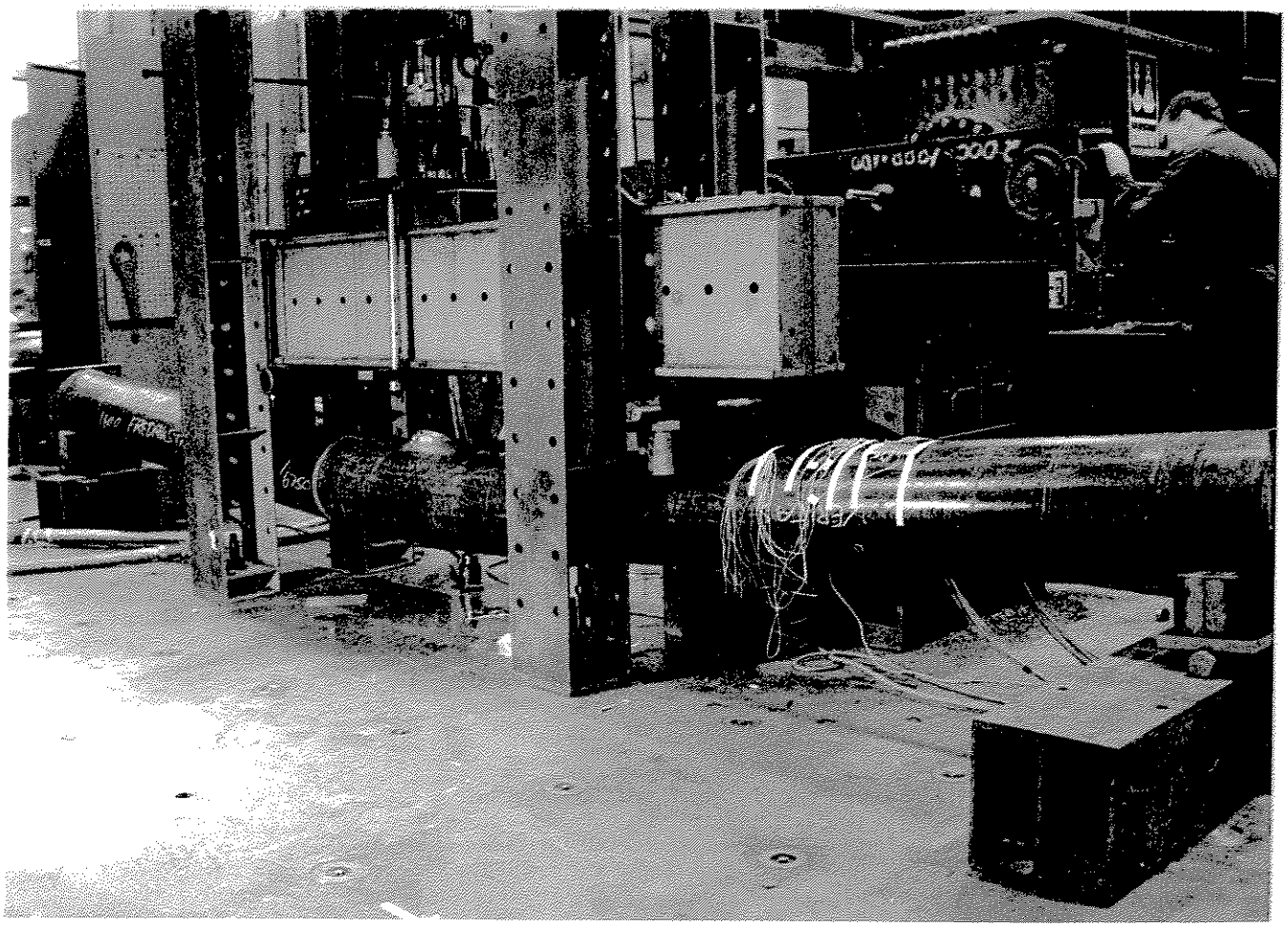


Figure 3-1 Picture of the test rig for 4-point bending test (after completion).

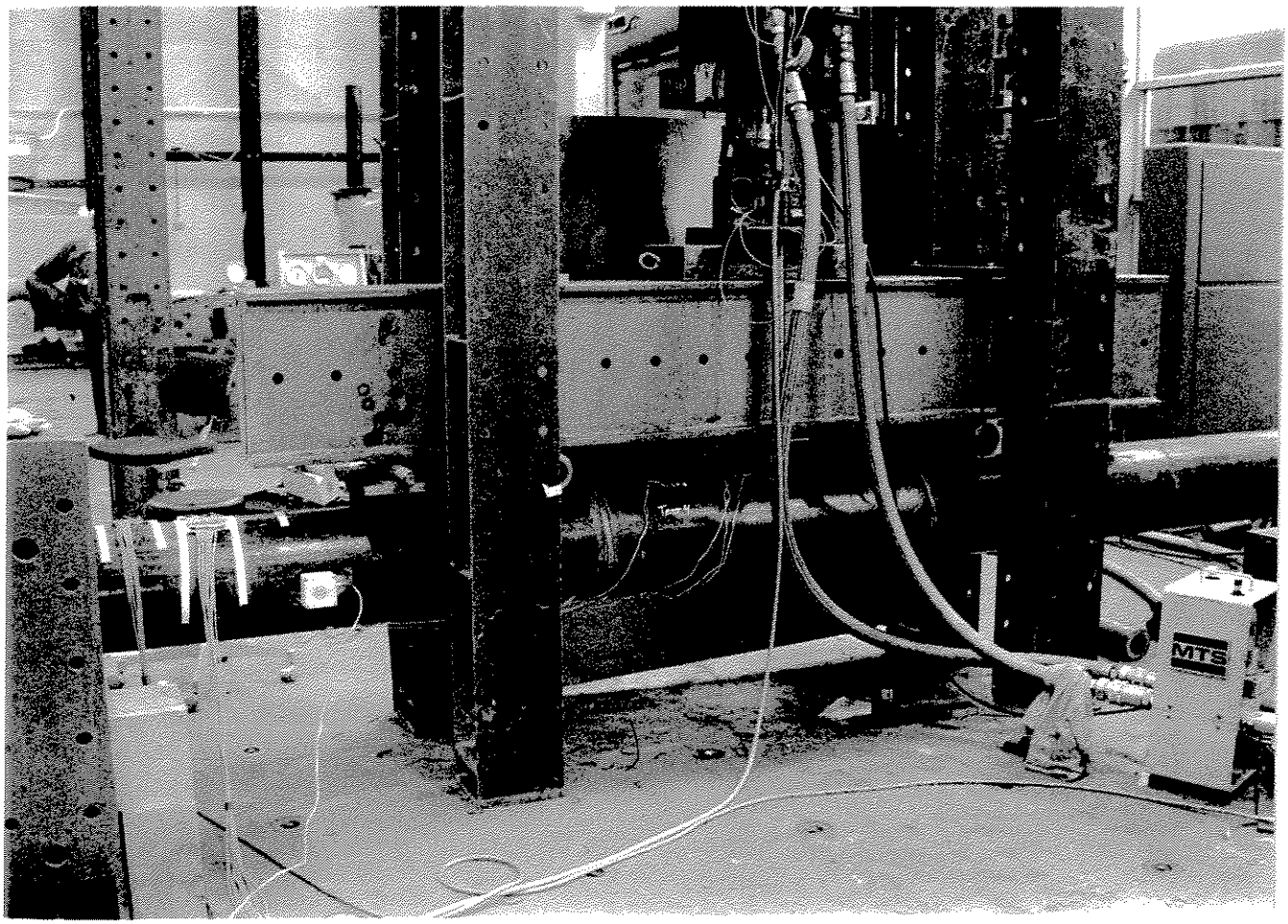
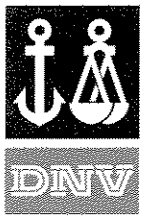


Figure 3-2 Picture of the test rig for 4-point bending test.

Figure 3-3 Picture of the test rig for axial compressive force



3.3 Instrumentation

Each specimen was instrumented with strain gauges and pressure transducer in order to monitor the specimen during testing and for recording. The strain gauge instrumentation for each specimen are shown in Appendix A. Approximately 10 strain gauges were applied at each test. For the tests with combined loading the external loads were also monitored and recorded. In Figure 3-4 an example of the strain gauge instrumentation of a corrosion defect is shown.

For the specimens exposed to combined loads, some strain gauges were used for load and alignment control. All strain gauges were post yield cross gauges allowing for large strains from Tokyo Sokki Kenkyujo Co., LTD., type YFLA-2.

A 1000 bar pressure transducer was used, serie no. F02395. In order to minimise erroneous pressure fluctuations the pressure transducer was mounted directly to the end flange in a separate hole from the connection from the hose for the pump.

3.4 Manufacture of the test specimens

The simulated corrosion defects were spark eroded at the outer surface. The defect similar to test 1 to 3 is shown in Figure 3-4. The defects had a smooth surface and all edges were made with a small radius. The surfaces were also grinded slightly to get a smoother surface for ease thickness measurements and application of strain gauges. At each end of the test specimen a 50mm thick end-plate was welded to the pipe. For the tests exposed to bending moment thicker extension pipes of approximately 2 meters were welded to each end of the test specimen, and the end-plate were welded to the end of these extension pipes. The inlet for internal pressure and mounting of the pressure transducer were in the end flanges.

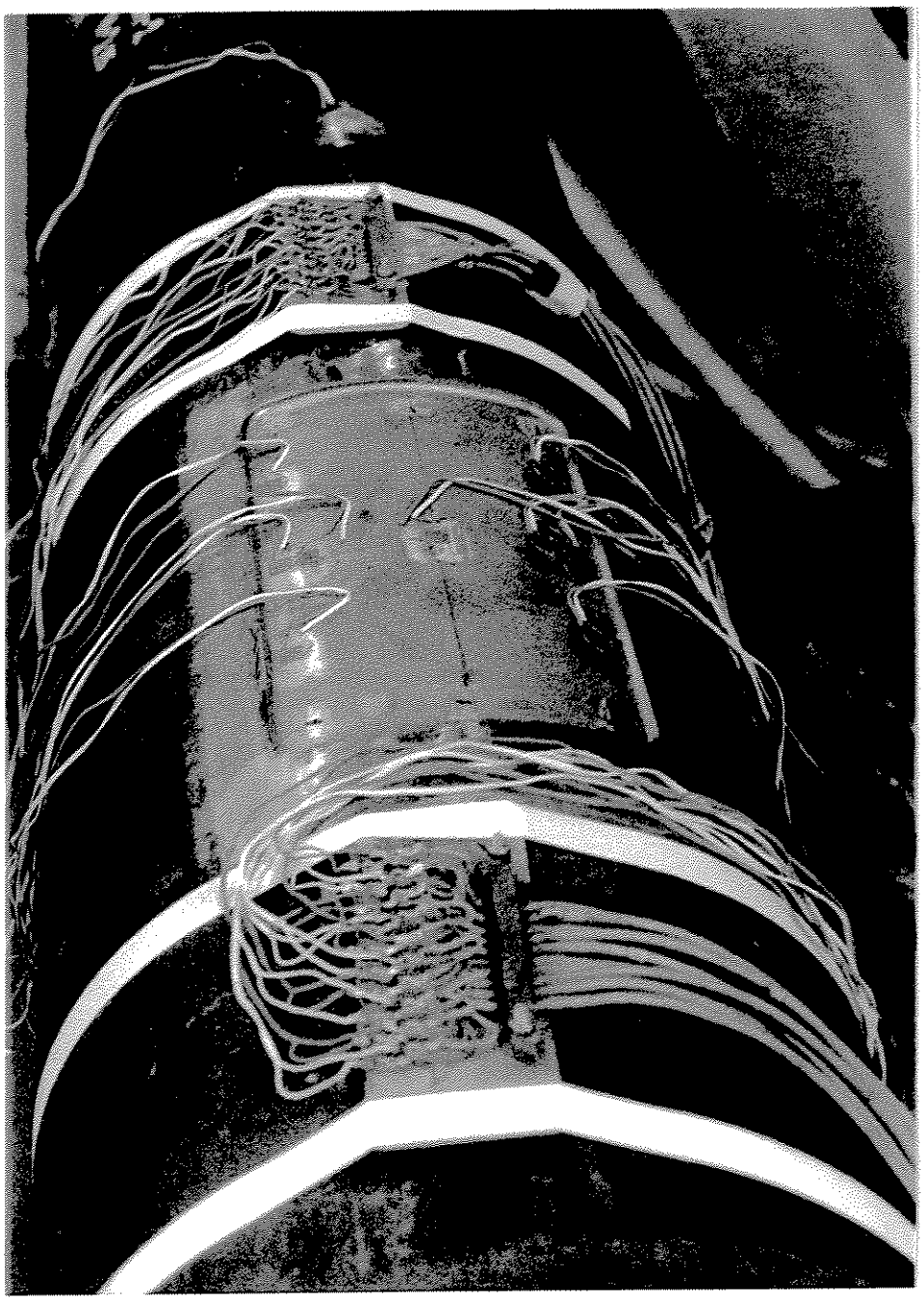


Figure 3-4 Picture of a corrosion defect with strain gauge instrumentation

4 DETAILED DESCRIPTION OF THE TESTS

4.1 General

Twelve test were performed. The 9 first test specimens were made from the same pipe, while the last 3 test specimens were made from another pipe, which was almost identical to the first one. The nominal parameters are the same for all 12 tests, apart for the simulated corrosion defects. For each test specimen the actual dimensions were measured and are described for each test in this report.

The following was the same for all tests;

Pipe Diameter	324 mm (nominal)	
Pipe wall Thickness	10.31 mm (nominal)	
Pipe Grade	X52	
Type of Longitudinal Seam	Seamless	
Yield Strength (actual, eng.)	380 MPa	(Average of 8 test coupons)
Tensile Strength (actual, eng)	514 MPa	(Average of 8 test coupons)
Year of Manufacture	1996 / 1997	

The pipe diameter was measured at several locations, it was found to be closer to 325 than the nominal diameter of 324 mm, and was almost identical at all measured locations. The pipe wall thickness, however, varied far more, from minimum 10.25 mm to maximum 11.10 mm. The largest variation was in the circumferential direction, but large variations were also observed along the length of the pipe.

Some variables have been calculated based on measurements and constants, as for instance the axial stress is calculated based on the applied (measured) force and the diameter and thickness. For calculation of the cross section parameters the an outer diameter of 324 mm is used, and for the wall thickness the "average" thickness of 10.6 mm is used. This results in the following values for the cross section;

- Area $_{pipe}$ = 10437 mm^2 $(D_o^2-D_i^2)*\pi/4$
- Area $_{inner}$ = 72012 mm^2 $(D_i^2)*\pi/4$
- Moment of Inertia (I) = $1.28*10^8$mm^4 $(D_o^4-D_i^4)*\pi/64$
- Section modulus W $_{elastic}$ = 791854 mm^3 $I / (D_o/2)$

D_o ; Outer Diameter = 324 mm
D_i ; Inner Diameter = 302.8 mm

In the following sub-sections each test is described. Sketches showing the test set-up, the corrosion defect, the instrumentation, the thickness measurements are included in Appendix A. Pictures of the test specimens after burst are included in the main section of the report. In Appendix B the material certificates are included, and in Appendix C listing of the recorded pressure, loads and strain gauges are given (Microsoft Excel spreadsheet)

4.2 Test no. 1

Loading

Internal pressure only.

Corrosion defect parameters (nominal)

Corrosion defect depth	d	= 5.3 mm	(d/t = 0.5)
Corrosion defect length	L	= 245 mm	(L/D = 0.75)
Corrosion defect width	w	= 150 mm	(w = 15 t)
Length of test specimen	$L_{specimen}$	= 1500 mm	

Instrumentation

In the corroded area 9 cross strain gauges were applied, and one strain gauge was applied away from the corroded area for load control and hoop strain measurement. Internal pressure and time for each scan were also recorded.

Loading description

Internal pressure was applied until burst, and applied internal pressure versus time is shown in Figure 4-1.

Results

The test failed at 232 bar. The test specimen after burst is shown in Figure 4-2.

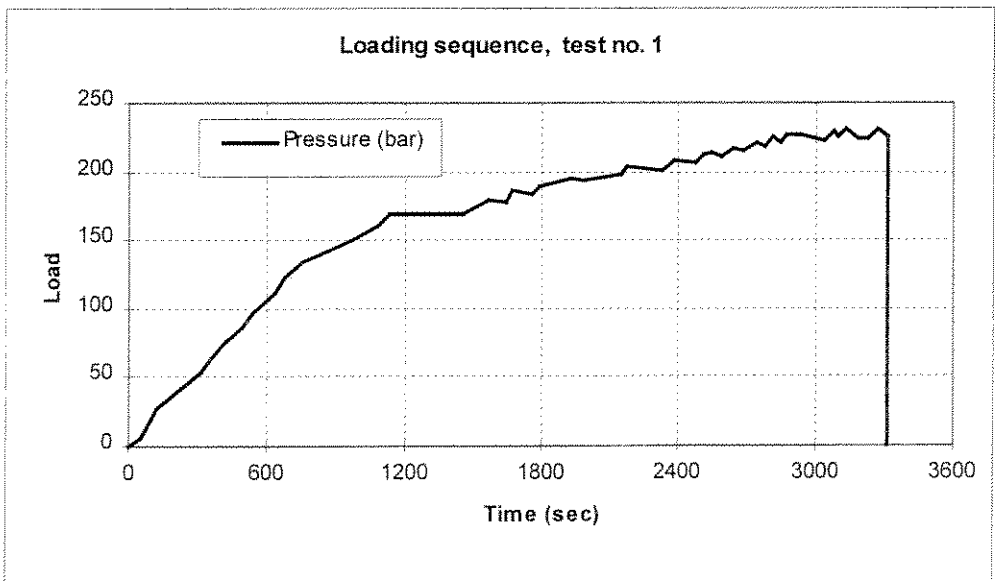


Figure 4-1 Applied pressure versus time for test no. 1

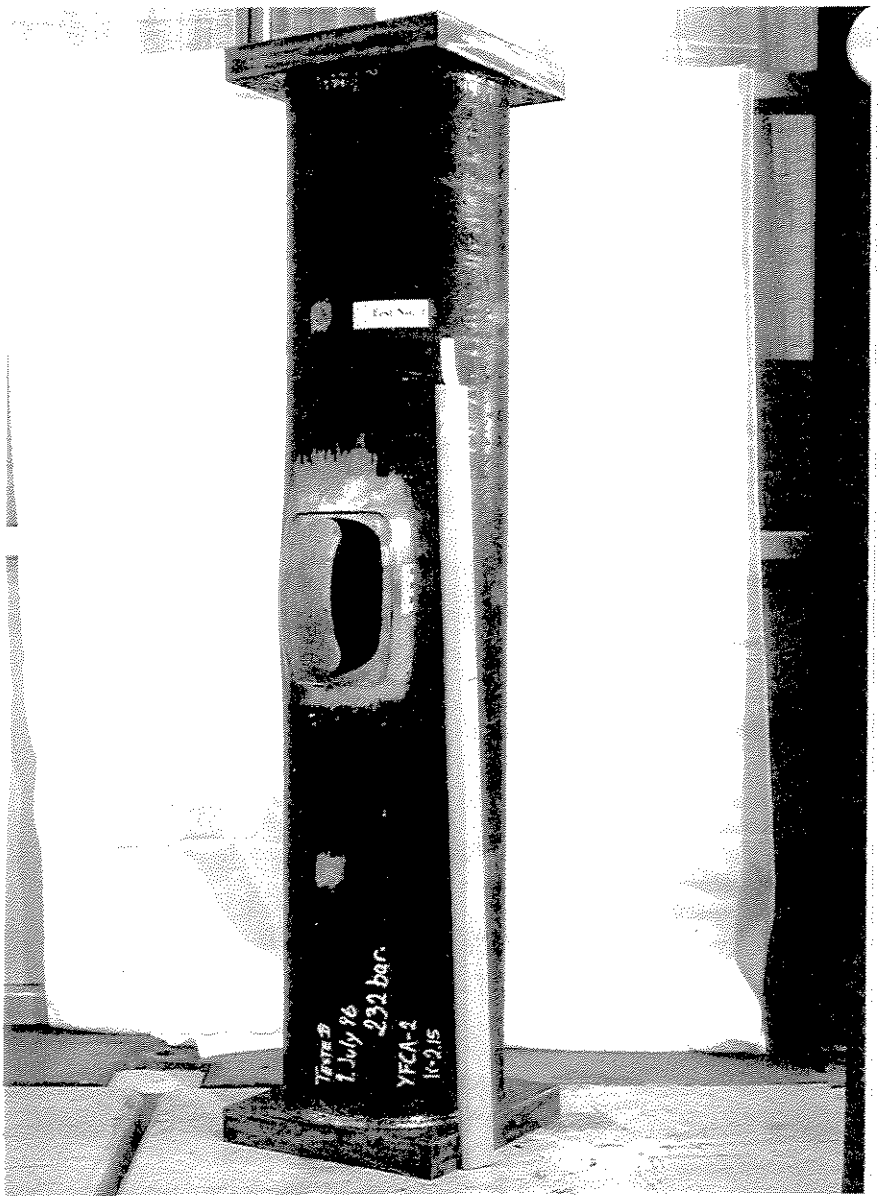


Figure 4-2 Picture of the test specimen no. 1 after the burst

Figure 4-3 Picture of the test specimen no. 1 after the burst

4.3 Test no. 2

Loading

Loaded with combined internal pressure and bending moment.

Corrosion defect parameters (nominal)

(Identical with specimen no. 1)

Corrosion defect depth	d	= 5.3 mm	(d/t = 0.5)
Corrosion defect length	L	= 245 mm	(L/D = 0.75)
Corrosion defect width	w	= 150 mm	(w = 15 t)
Length of test specimen	$L_{specimen}$	= 1500 mm	

Instrumentation

In the corroded area 9 cross strain gauges were applied, and two single filament gauges were applied away from the corroded area for load control of the bending moment. The time, the actuator load and displacement were also recorded.

Loading description

The specimen was exposed to combined internal pressure and 4-point-bending moment. The corrosion defect was located at the compressive side of the bending moment.

An internal pressure of 165 bar was applied during the first 15 minutes. The loading is illustrated in Figure 4-4 to Figure 4-6. The internal pressure was then kept at 165 bar and bending moment was applied to the test specimen. The actuator was in displacement control, and for this test set-up the applied displacement results in a forced curvature of the pipe. At approximately 220 kNm bending moment more and more displacement was required in order to further increase the bending moment, which effect indicate excessive yielding of the pipe cross section. Further, the displacement was kept constant and the internal pressure was increased, which resulted in a drop in the bending moment at the constant displacement. In order to maintain the bending moment additional displacement was applied, but the pipe had softened significantly due to the internal pressure and the pipe could not carry much increased bending moment.

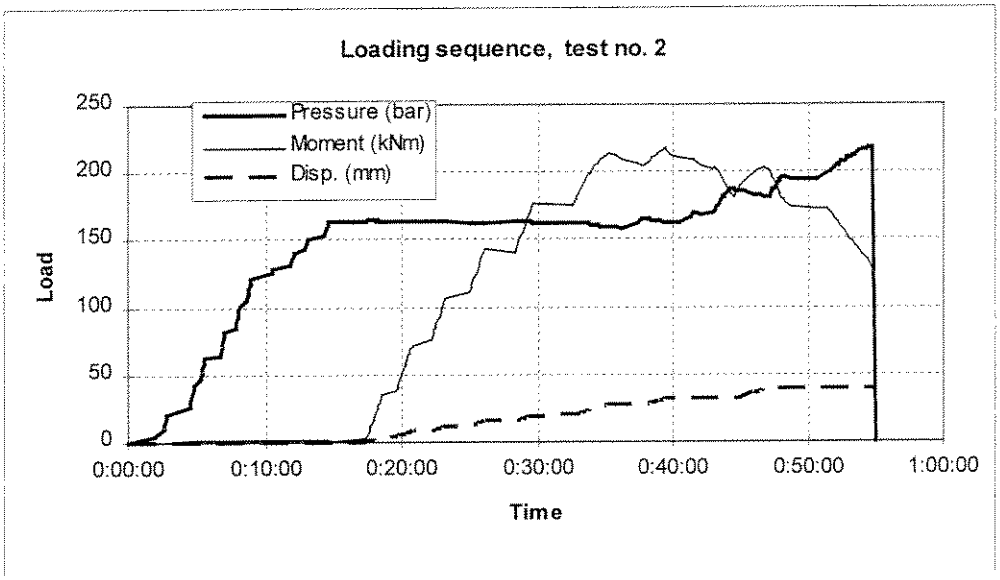


Figure 4-4 Loading sequence, test no. 2

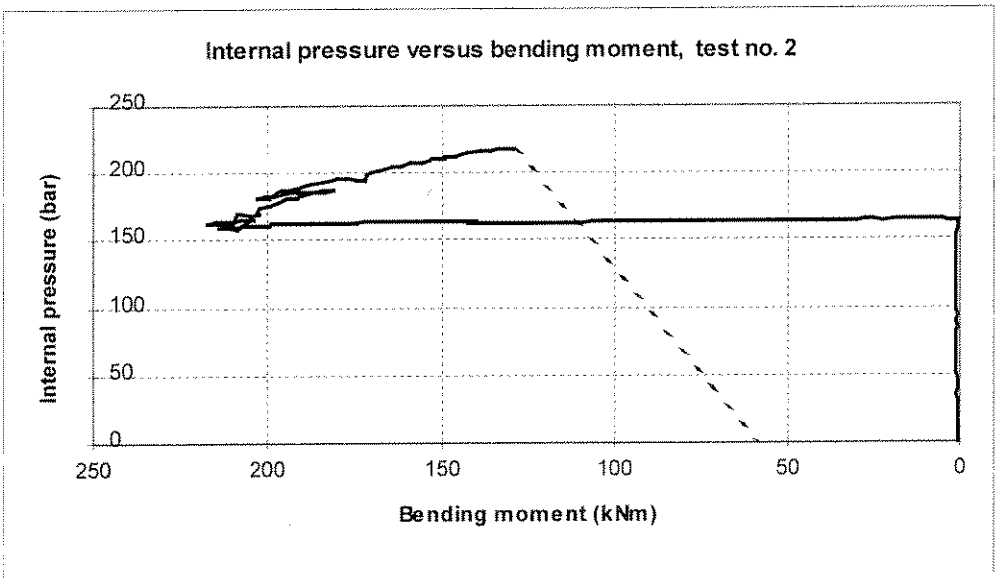


Figure 4-5 Internal pressure versus bending moment, test no. 2

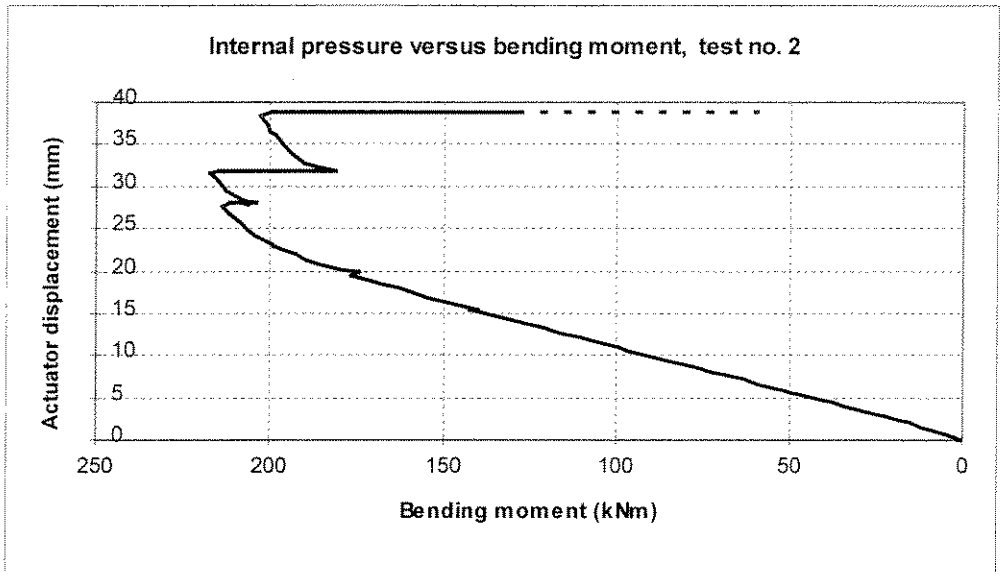


Figure 4-6 Actuator displacement versus bending moment, test no. 2

Results

Excessive yielding was observed in the pipe, and it was not possible to maintain the maximum bending moment of approximately 220 kNm when the internal pressure was further increased. When the internal pressure was increased from 165 bar to rupture at 218.5 bar, the bending moment decreased from 220 kNm to 130 kNm.

The bending moment resulted in a radius of approximately 15-20 meter, where the 15 meter was estimated based on measurements of the test specimen after testing and the 20 meter was based on the applied displacement during the test.

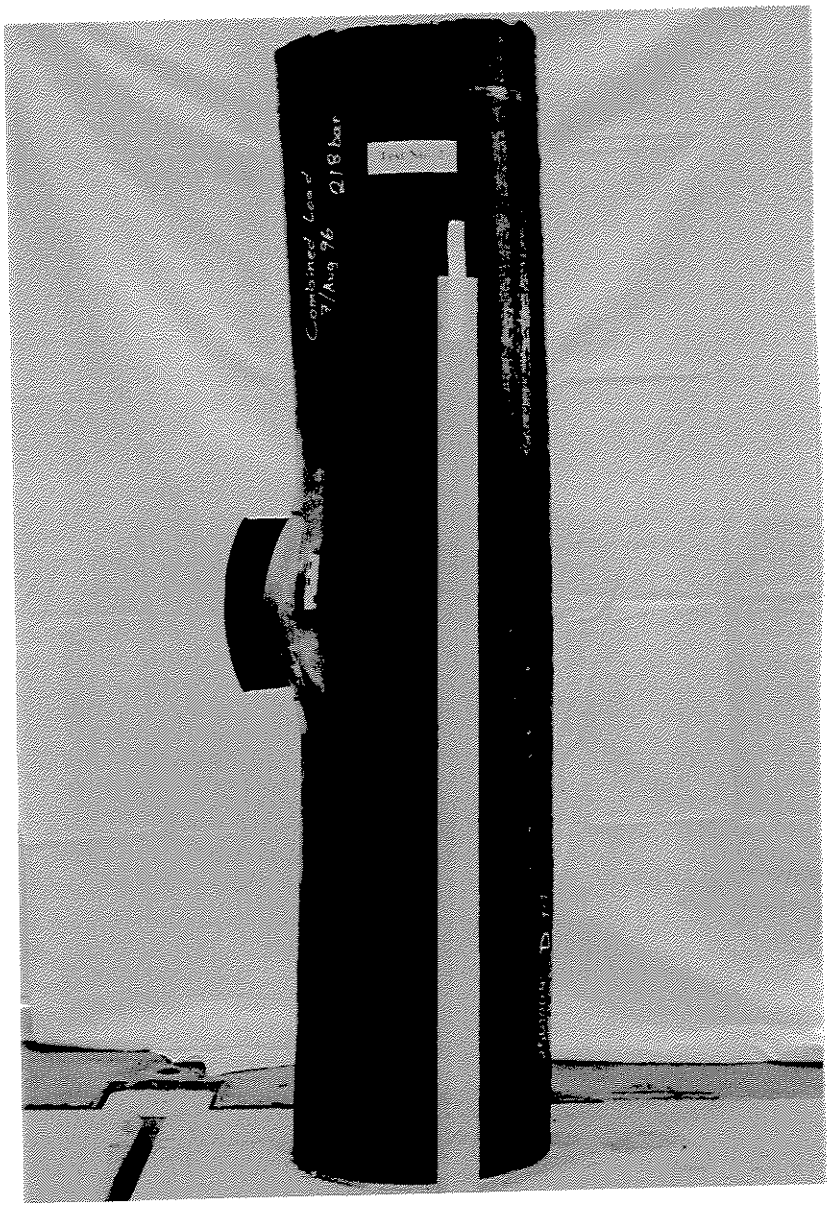


Figure 4-7 Picture of the test specimen no. 2 after the burst test

Figure 4-8 Picture of the test specimen no. 2 after the burst test

4.4 Test no. 3

Loading

Loaded with combined internal pressure and bending moment (similar to test 2).

Corrosion defect parameters (nominal)

(Identical to specimen no 1 and 2)

Corrosion defect depth	d	= 5.3 mm	(d/t = 0.5)
Corrosion defect length	L	= 245 mm	(L/D = 0.75)
Corrosion defect width	w	= 150 mm	(w = 15 t)
Length of test specimen	Lspecimen	= 1500 mm	

Instrumentation

In the corroded area 9 cross strain gauges were applied, and two single filament gauges were applied away from the corroded area for load control of the bending moment. The time, rotation angle, the actuator load and displacement were also recorded.

Loading description

The specimen was exposed to combined internal pressure and 4-point-bending moment. The corrosion defect was located at the compressive side of the mending moment. In the previous test the MTS was in displacement control, but order to try to maintain the bending moment and hence allow the pipe to deflect the actuator was set in load (bending moment) control.

An internal pressure of 165 bar was applied during the first 12 minutes. The internal pressure was kept at 165 bar and bending moment was applied to the test specimen. Further, the bending moment was kept constant at 200 kNm, and the internal pressure was increased. The pipe was yielding extensively, which resulted in increased additional displacement in order to maintain the set bending moment of 200 kNm. An small increase in the bending moment up to 212.5 kNm was applied, and only marginal additional internal pressure was introduced before rupture.

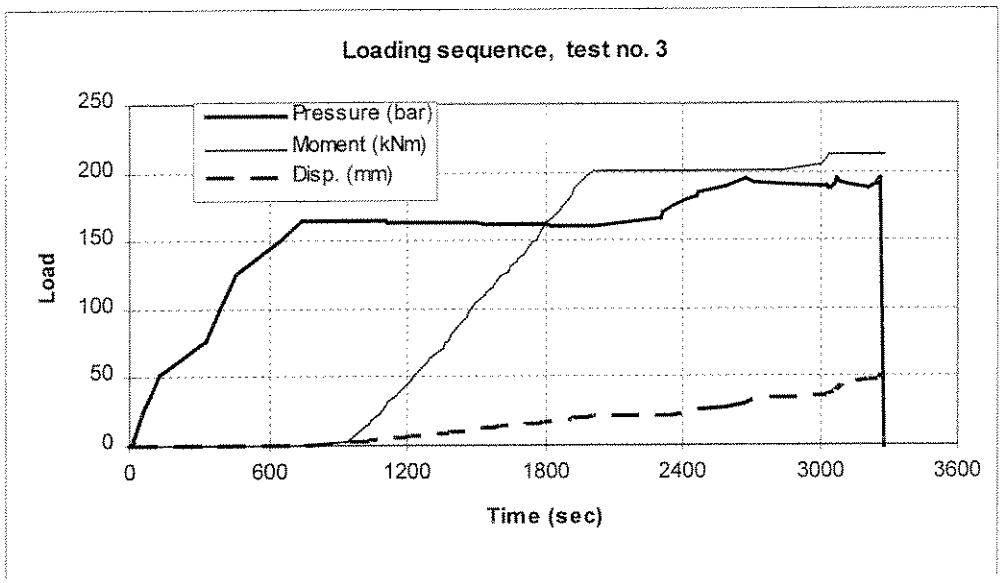


Figure 4-9 Loading sequence, test no.3

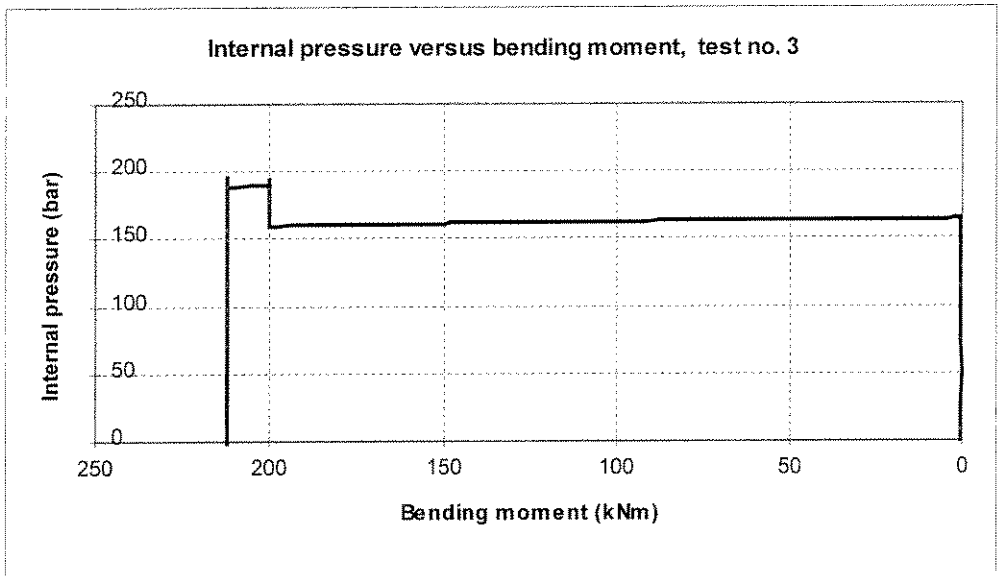


Figure 4-10 Internal pressure versus bending moment, test no. 3

Results

Excessive yielding was observed in the pipe before rupture in the corroded region. The test bursted at a bending moment of 212.5 kNm and an internal pressure of 195 bar.

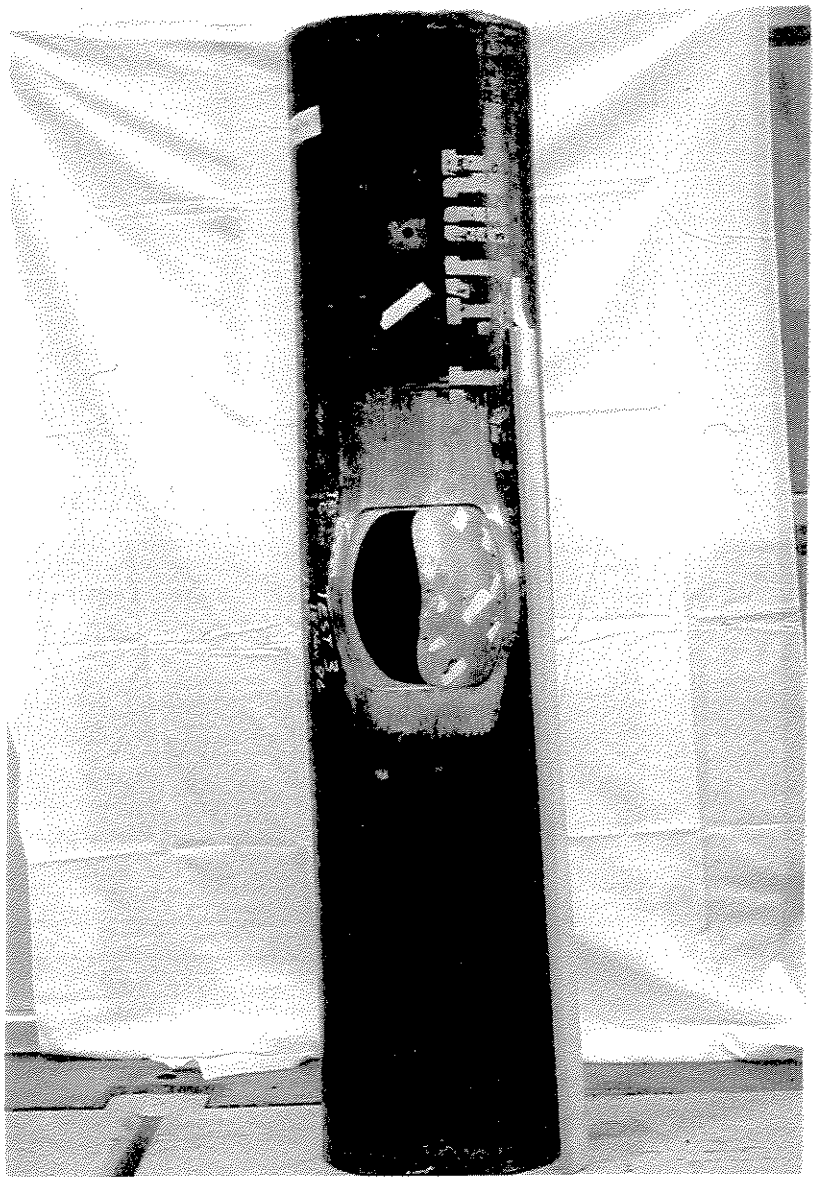


Figure 4-11 Picture of the test specimen no. 3 after the burst test

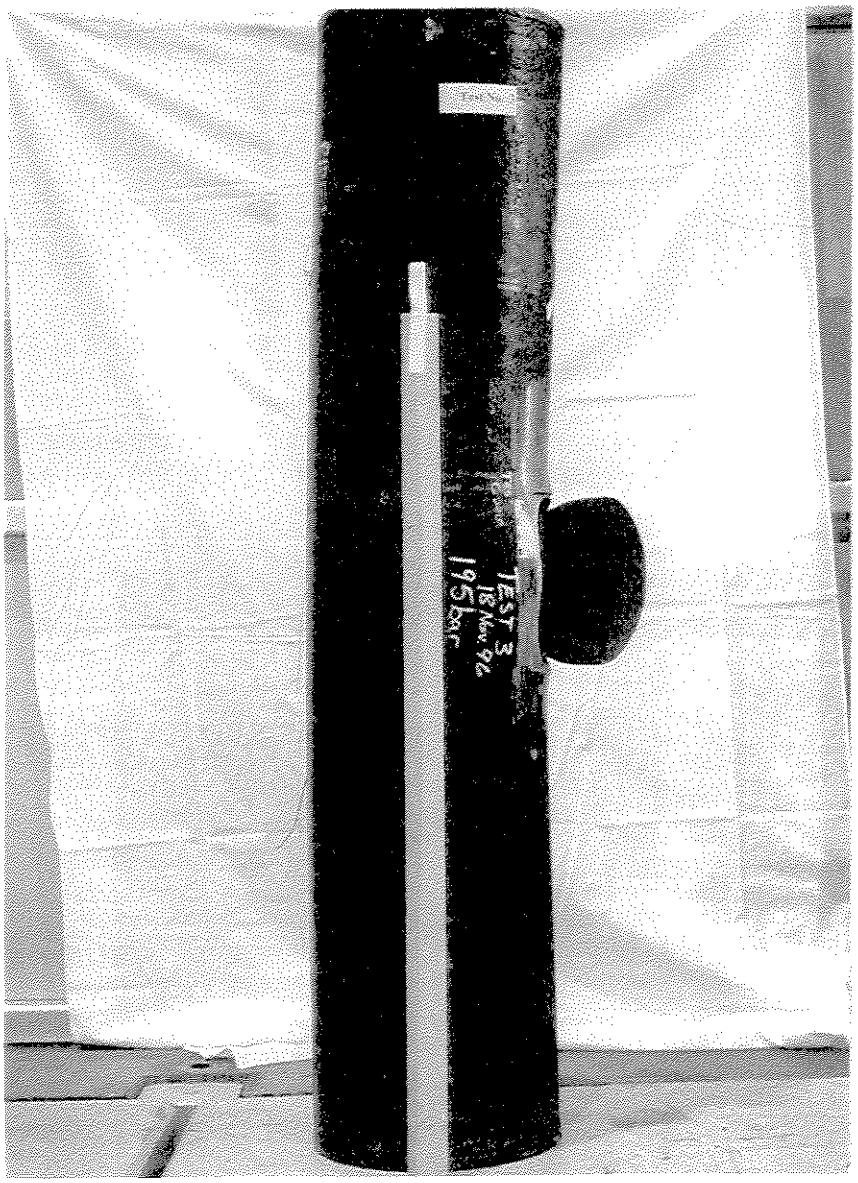


Figure 4-12 Picture of the test specimen no. 3 after the burst test

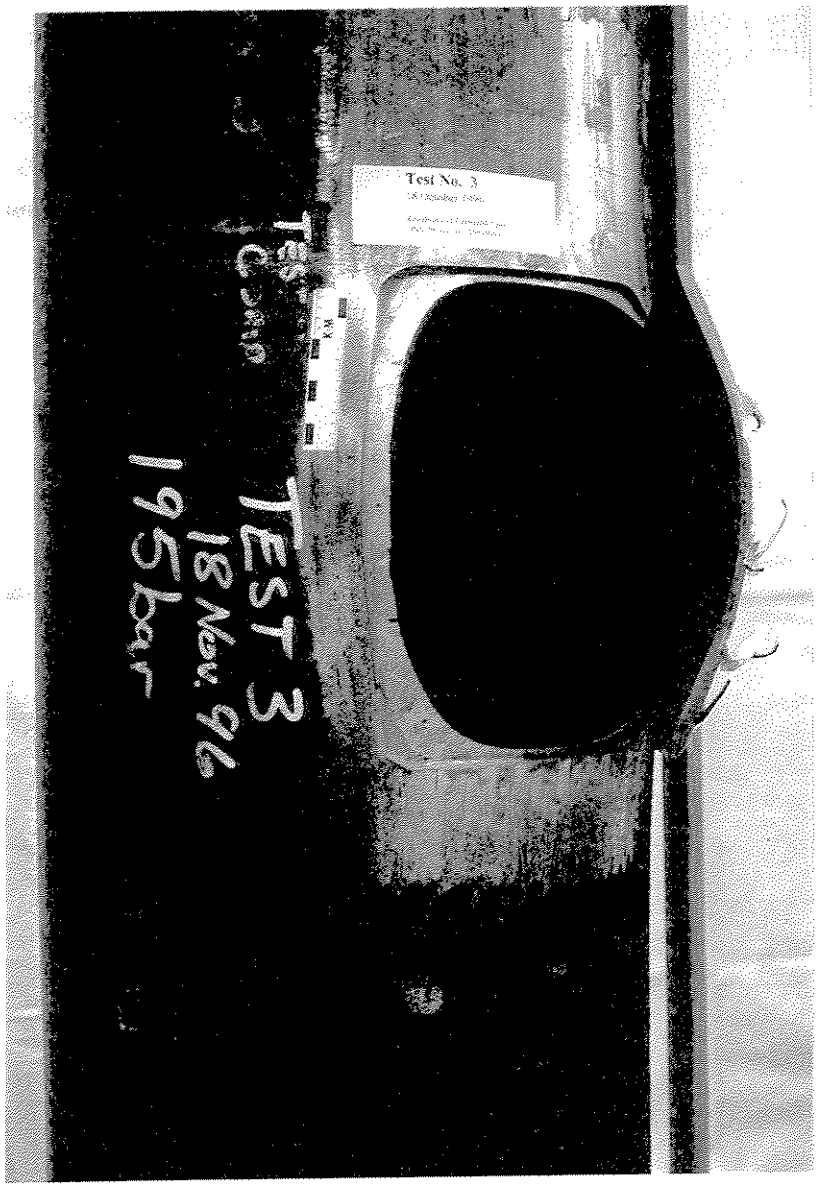


Figure 4-13 Picture of the test specimen no. 3 after the burst test

4.5 Test no. 4

Loading

Test specimen no. 4 was loaded with combined internal pressure and bending moment.

Corrosion defect parameters (nominal)

Corrosion defect depth	d = 3.2 mm	(d/t = 0.3)
Corrosion defect length	L = 162 mm	(L/D = 0.50)
Corrosion defect width	w = 32 mm	(w = 3 t)
Length of test specimen	$L_{specimen}$ = 1100 mm	

Instrumentation

In the corroded area 3 cross strain gauges were applied, and two gauges were applied away from the corroded area for load control of the bending moment. The time, rotation angle, the actuator load and displacement were also recorded

Loading description

The specimen was exposed to combined internal pressure and 4-point-bending moment. The corrosion defect was located at the compressive side of the bending moment.

An internal pressure of 200 bar was applied during the first 15 minutes. The internal pressure was kept at 200 bar and bending was applied to the test specimen. When the moment exceeded 200 kNm the internal pressure started to drop due to excessive yielding of the pipe. The pipe had become soft and additional displacement was necessary in order to maintain the bending moment. Further, after excessive yielding the actuator reached the maximum stroke which resulted in that the tests changed from load (moment) controlled to displacement controlled. During the increase of internal pressure until burst at 290 bar the resulting bending moment decreased from 260 kNm to 73 kNm.

Results

Excessive yielding was observed in the pipe before rupture in the corroded region. The test bursted at a bending moment of 73 kNm and an internal pressure of 290 bar. During the loading the test specimen had also been exposed to an internal pressure of approximately 200 bar and 250 kNm.

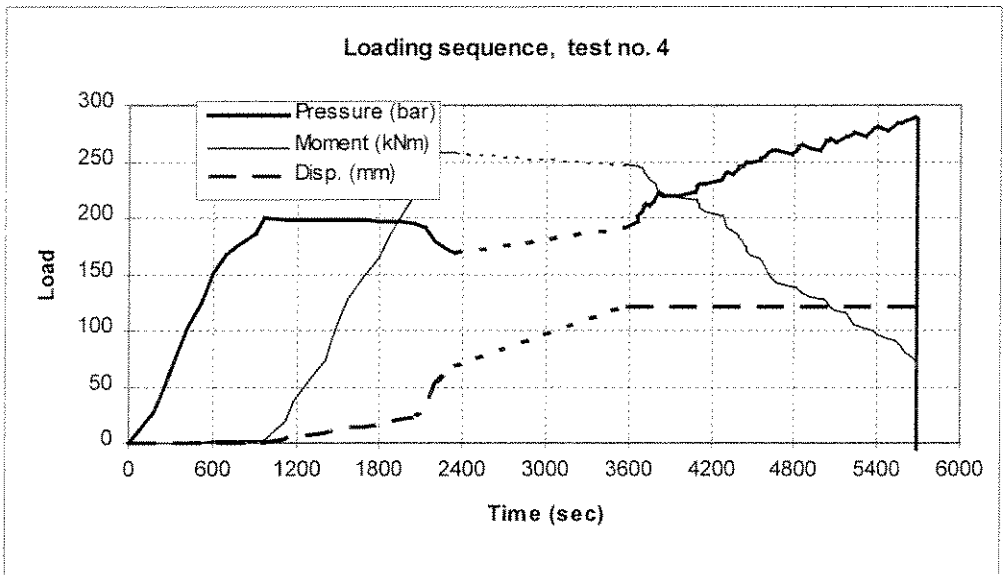


Figure 4-14 Loading sequence, test no.4

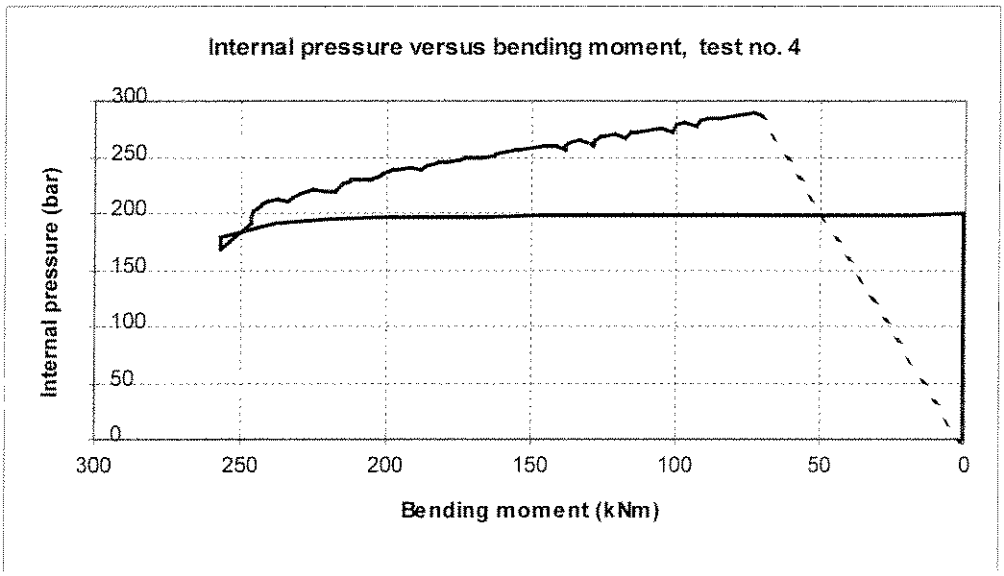


Figure 4-15 Internal pressure versus bending moment, test no. 4

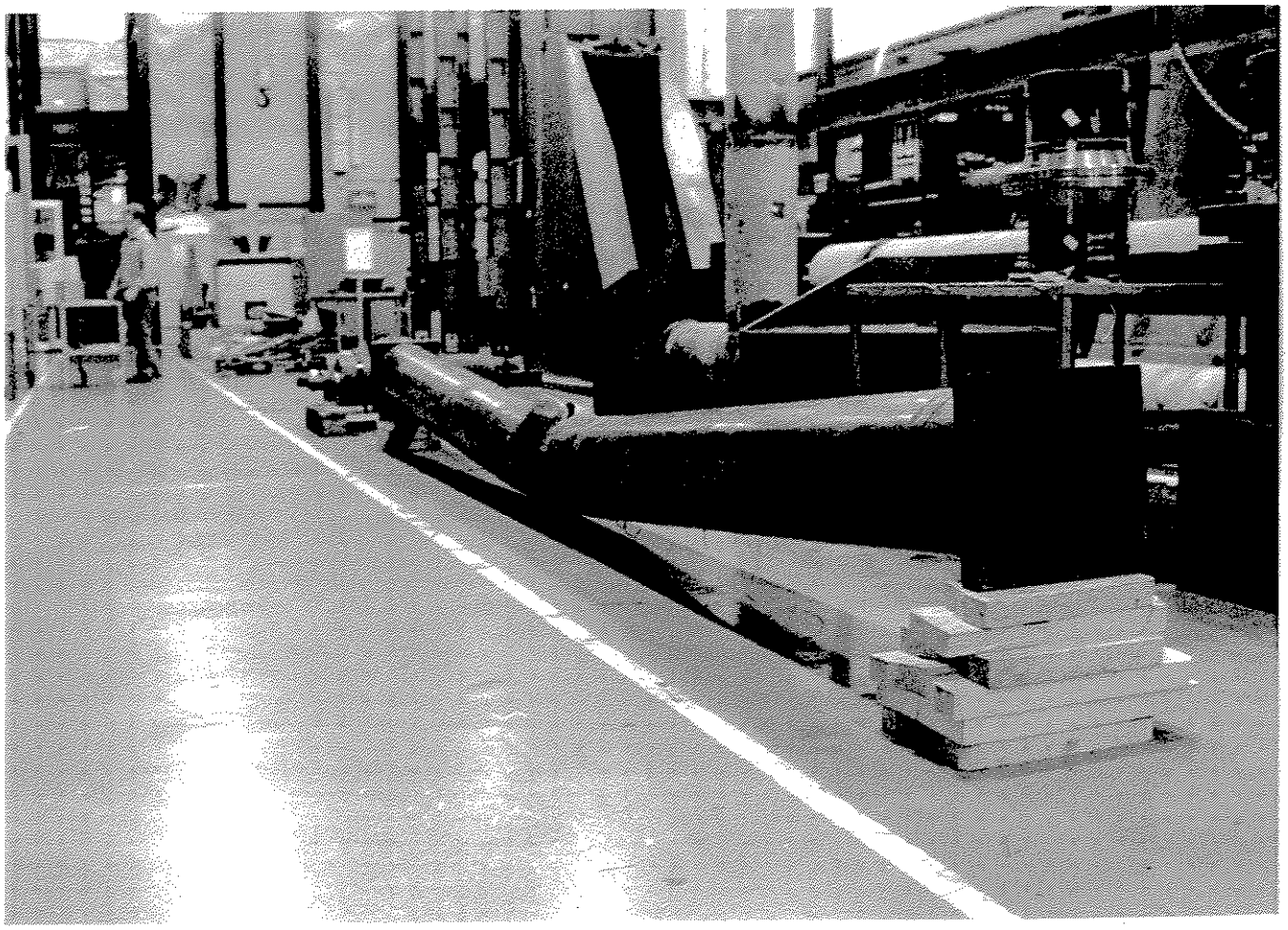


Figure 4-16 Picture of the test specimen no. 4 after the burst test

Figure 4-17 Picture of the test specimen no. 4 after the burst test

Figure 4-18 Picture of the test specimen no. 4 after the burst test

4.6 Test no. 5

Loading

Test specimen no. 5 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

(Identical with test no. 4)

Corrosion defect depth	d = 3.2 mm	(d/t = 0.3)
Corrosion defect length	L = 162 mm	(L/D = 0.50)
Corrosion defect width	w = 32 mm	(w = 3 t)
Length of test specimen	$L_{specimen}$ = 1000 mm	

Instrumentation

In the corroded area 3 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded.

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

The jack was operated with a manually controlled pump, and during the test the load and the displacement were monitored. With this set-up the operator could manually maintain the axial force by running the pump, or stop the pump and keep the displacement constant.

For test no.5 an internal pressure of 200 bar was first applied, and then the axial compressive load. At approximately 2500 kN external applied axial force the pipe was yielding excessively, and the internal pressure dropped. The internal pressure was again increased to 200 bar, and further axial compressive load was applied, resulting again in a drop in the internal pressure. Both the internal pressure and the jack displacement was increased, but the resulting axial force decreased, until burst occurred at 286 bar and with an axial compressive external force of 2563 kN.

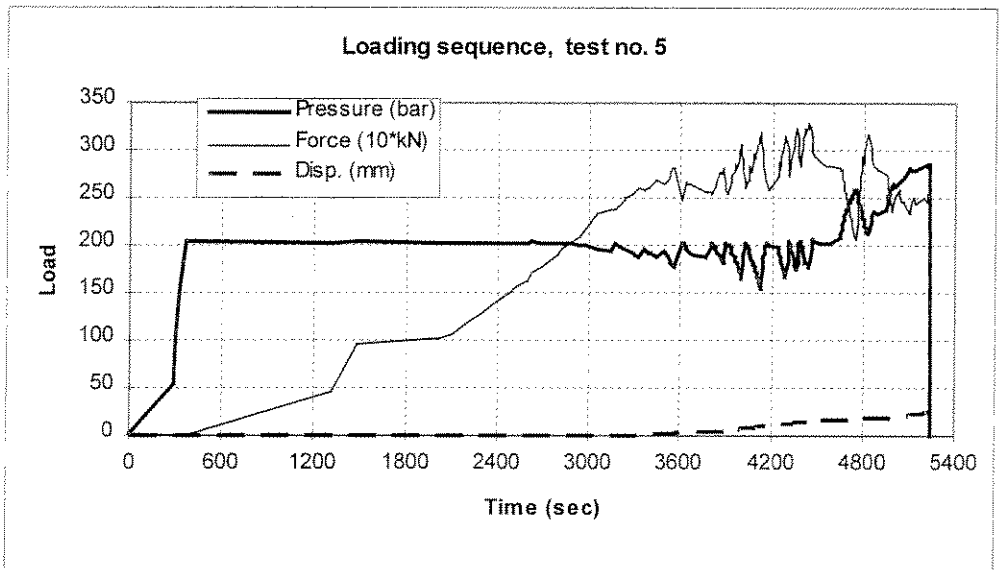


Figure 4-19 Loading sequence for test no. 5

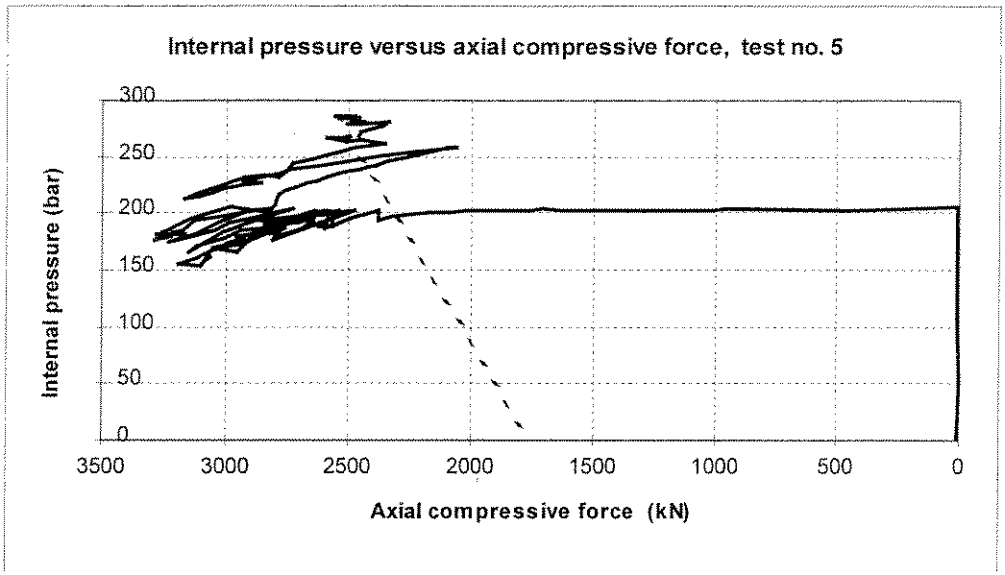


Figure 4-20 Internal pressure versus axial compressive force, test no. 5

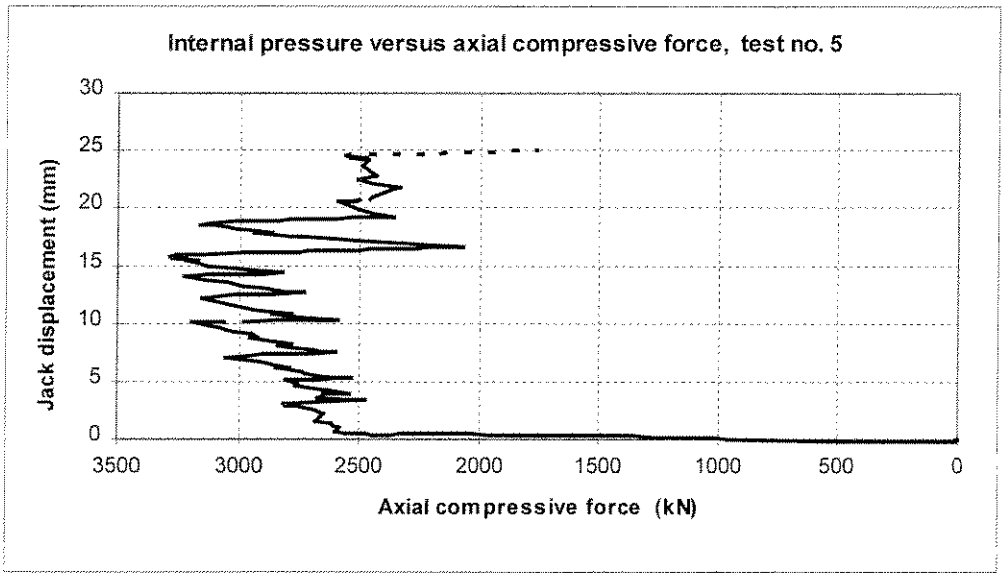


Figure 4-21 Jack displacement versus axial compressive force, test no. 5

Results

Excessive yielding was observed in the pipe before rupture in the corroded region occurred. The test bursted at an internal pressure of 286 bar, and with an axial compressive external force of 2563 kN. The end cap force due to the internal pressure was 2060 kN, resulting in a compressive pipe wall force of only 503 kN, equivalent to 48 MPa in axial compression.

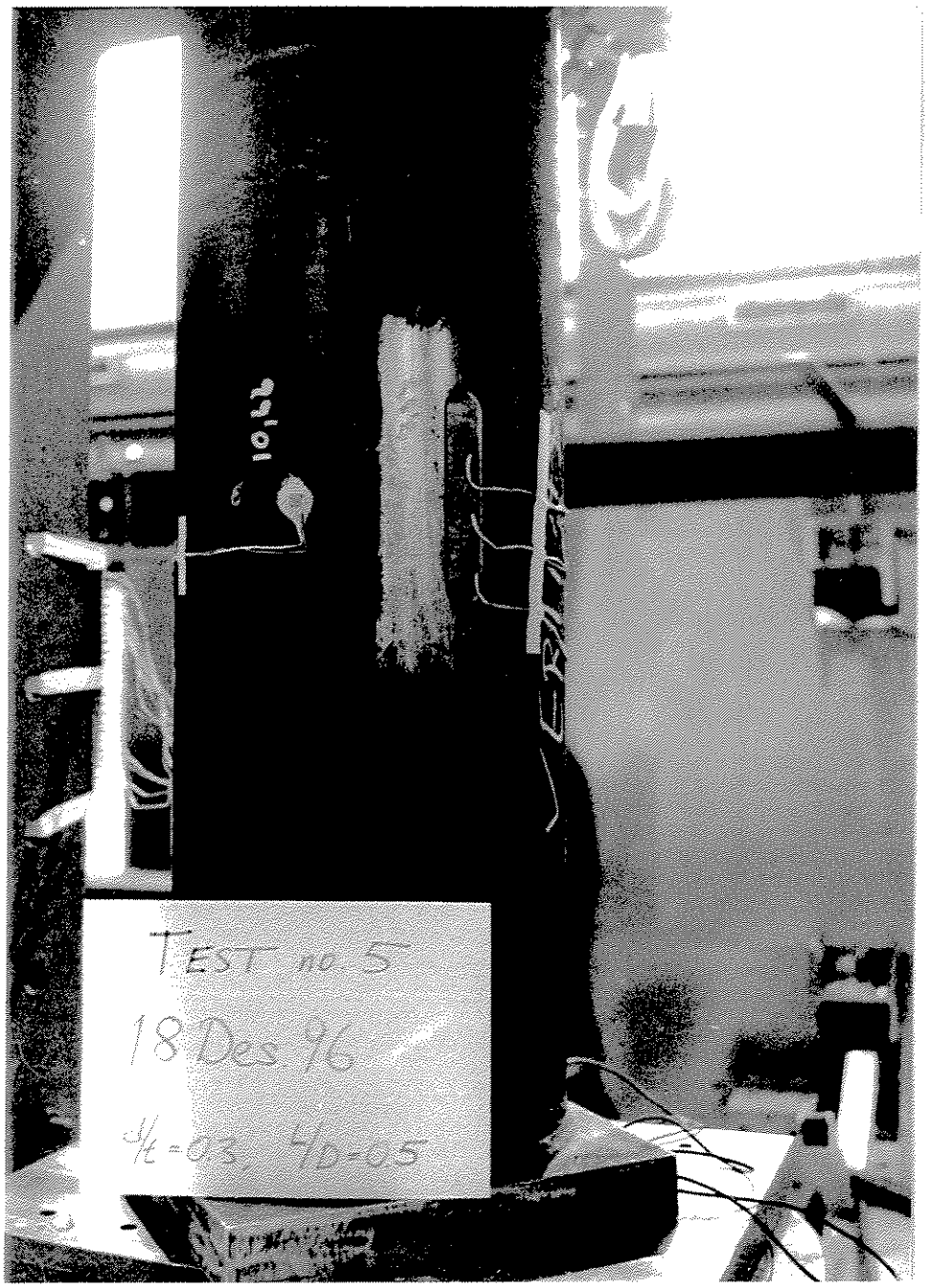


Figure 4-22 Picture of the test specimen no. 5 in the test rig before the burst test

Figure 4-23 Picture of the test specimen no. 5 after the burst test

Figure 4-24 Picture of the test specimen no. 5 after the burst test

4.7 Test no. 6

Loading

Test 6 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

(Identical to test specimen no. 4 and 5)

Corrosion defect depth	d = 3.2 mm	(d/t = 0.3)
Corrosion defect length	L = 162 mm	(L/D = 0.50)
Corrosion defect width	w = 32 mm	(w = 3 t)
Length of test specimen	$L_{specimen}$ = 1000 mm	

Instrumentation

In the corroded area 3 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded.

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

For test no.6 an internal pressure of 200 bar was first applied succeeded by axial compressive force. At approximately 2500 kN external axial force the pipe was yielding extensively, resulting in drop in the internal pressure. The internal pressure was maintained by pumping water simultaneously to the increase of the jack force to approximately 4300 kN. At this point the jack displacement was approximately 50 mm and the range of the displacement transducer was exceeded. The position of the transducer was changed, and due to safety reasons during this operation the test specimen was unloaded. The test specimen was reloaded to 200 bar, and further axial displacement/force was applied to the test. More excessive yielding was experienced, the pipe at the end supports started to deform, and in order to burst the pipe the internal pressure was increased when keeping the displacement constant allowing the axial compressive force to decrease.

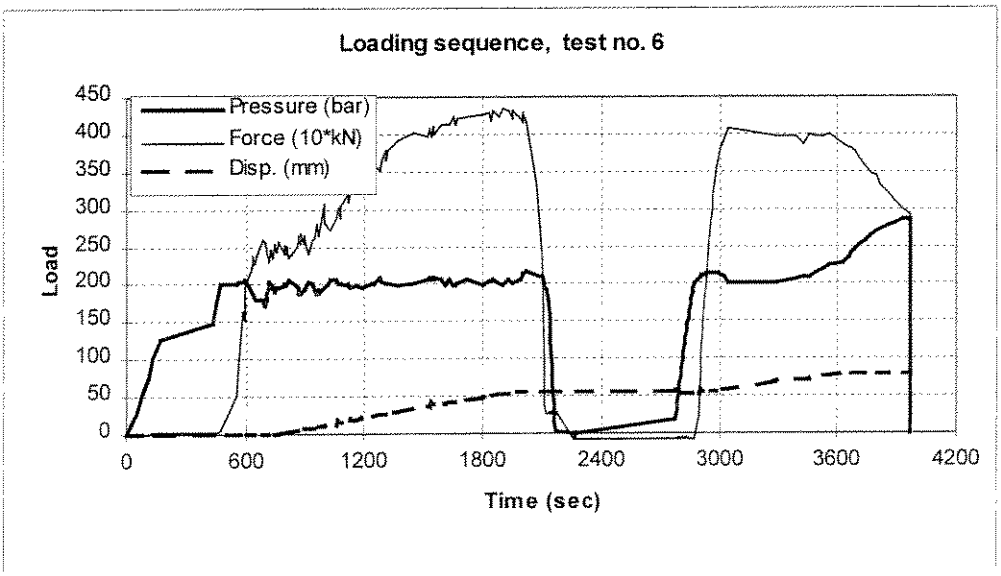


Figure 4-25 Loading sequence, test no. 6

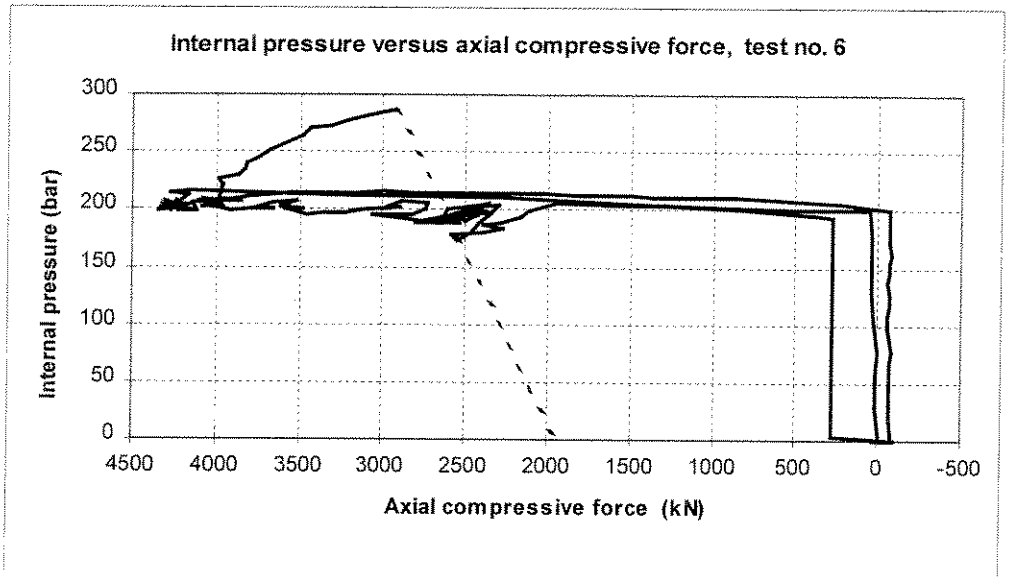


Figure 4-26 Internal pressure versus axial compressive force, test no. 6

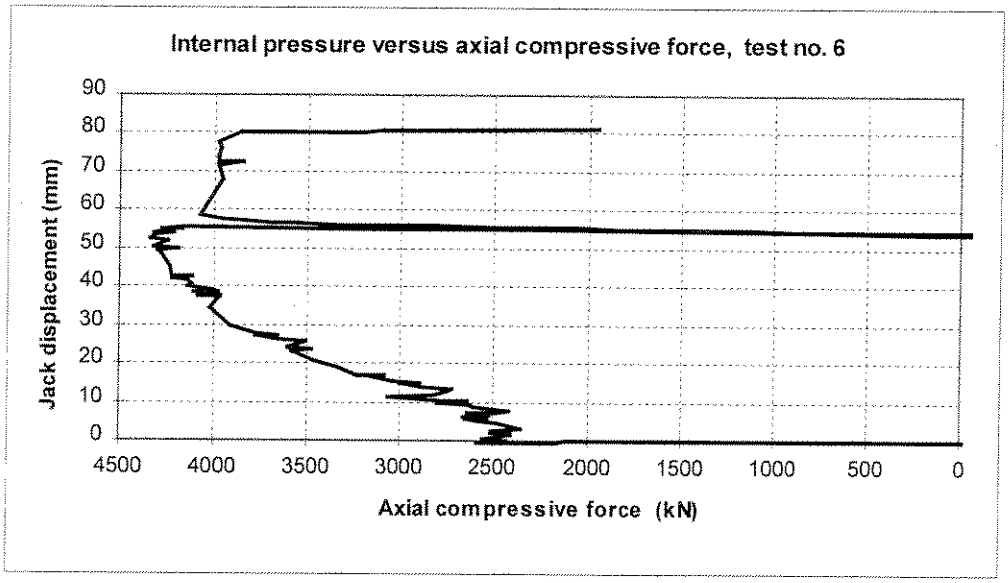


Figure 4-27 Jack displacement versus axial compressive force, test no. 6

Results

Excessive yielding was observed in the pipe before rupture in the corroded region. The test bursted at an internal pressure of 287 bar, and with an axial compressive external force of 2943 kN. The end-cap force due to the internal pressure was 2067 kN, resulting in a compressive pipe wall force of only 876 kN, equivalent to 84 MPa. The test specimen had during the test experienced 205 bar and 4323 kN.

Figure 4-28 Picture of the test specimen no. 6 after the burst test

Figure 4-29 Picture of the test specimen no. 6 after the burst test

4.8 Test no. 7

Loading

Test 7 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

Corrosion defect depth	d = 5.3 mm	(d/t = 0.5)
Corrosion defect length	L = 245 mm	(L/D = 0.75)
Corrosion defect width	w = 32 mm	(w = 3 t)
Length of test specimen	$L_{specimen}$ = 1000 mm	

The corrosion defect was longer and deeper compared to the test specimen no. 4, 5 and 6.

Instrumentation

In the corroded area 3 cross strain gauges were used, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

For test no.7 an internal pressure of 175 bar was applied, and succeeded by axial compressive load. At approximately 2500 kN axial force the pipe was yielding extensively and the internal pressure started to dropped. The internal pressure was maintained simultaneously as the jack force was increased to approximately 3000 kN. The internal pressure was increased slightly while maintaining the axial force, until burst.

Results

The specimen bursted at 186 bar and an axial force of 2998 kN.

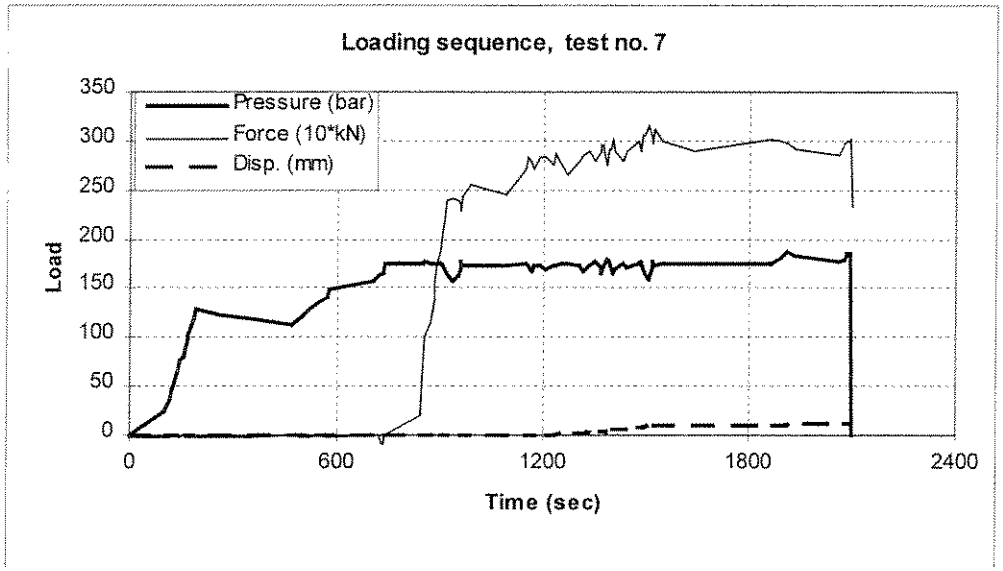


Figure 4-30 Loading sequence, test no. 7

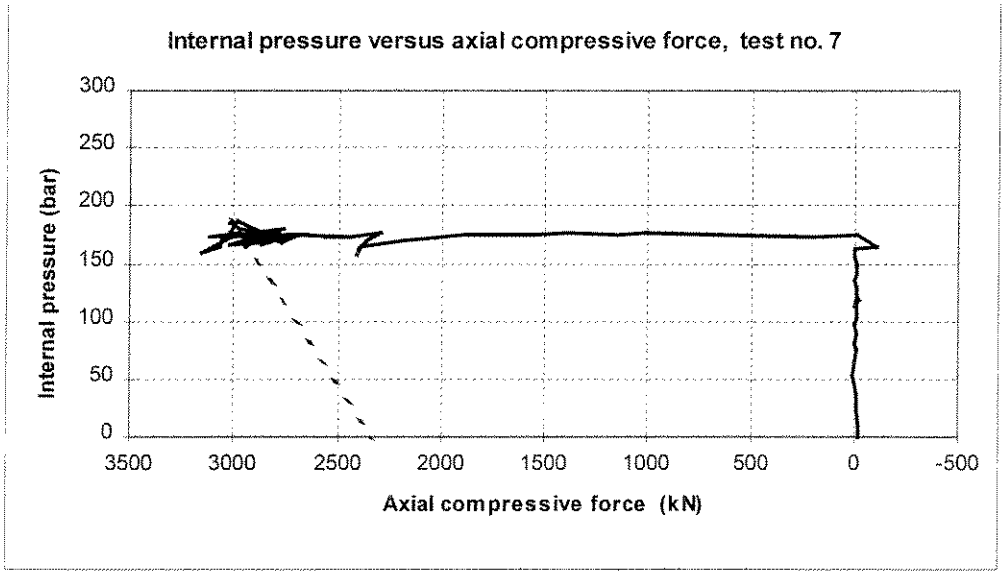


Figure 4-31 Internal pressure versus axial compressive force, test no. 7

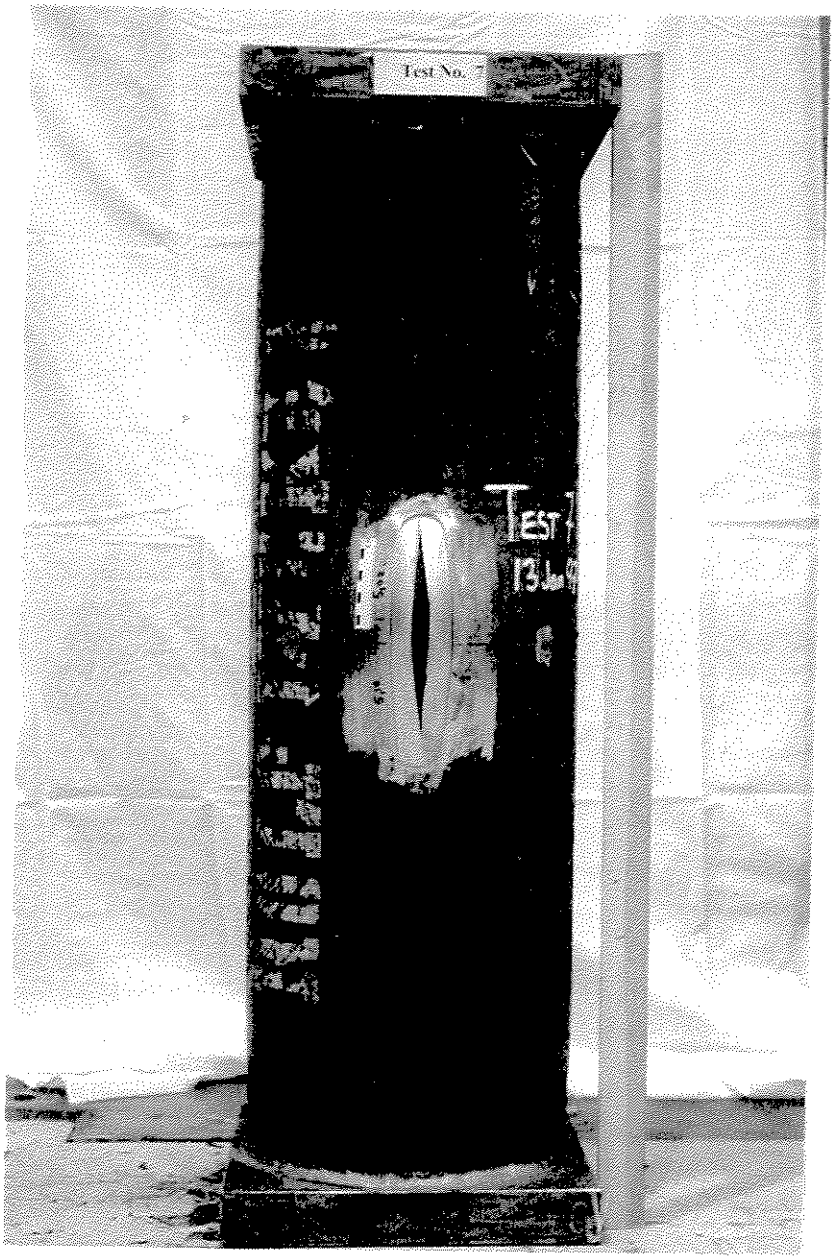


Figure 4-32 Picture of the test specimen no. 7 after the burst test

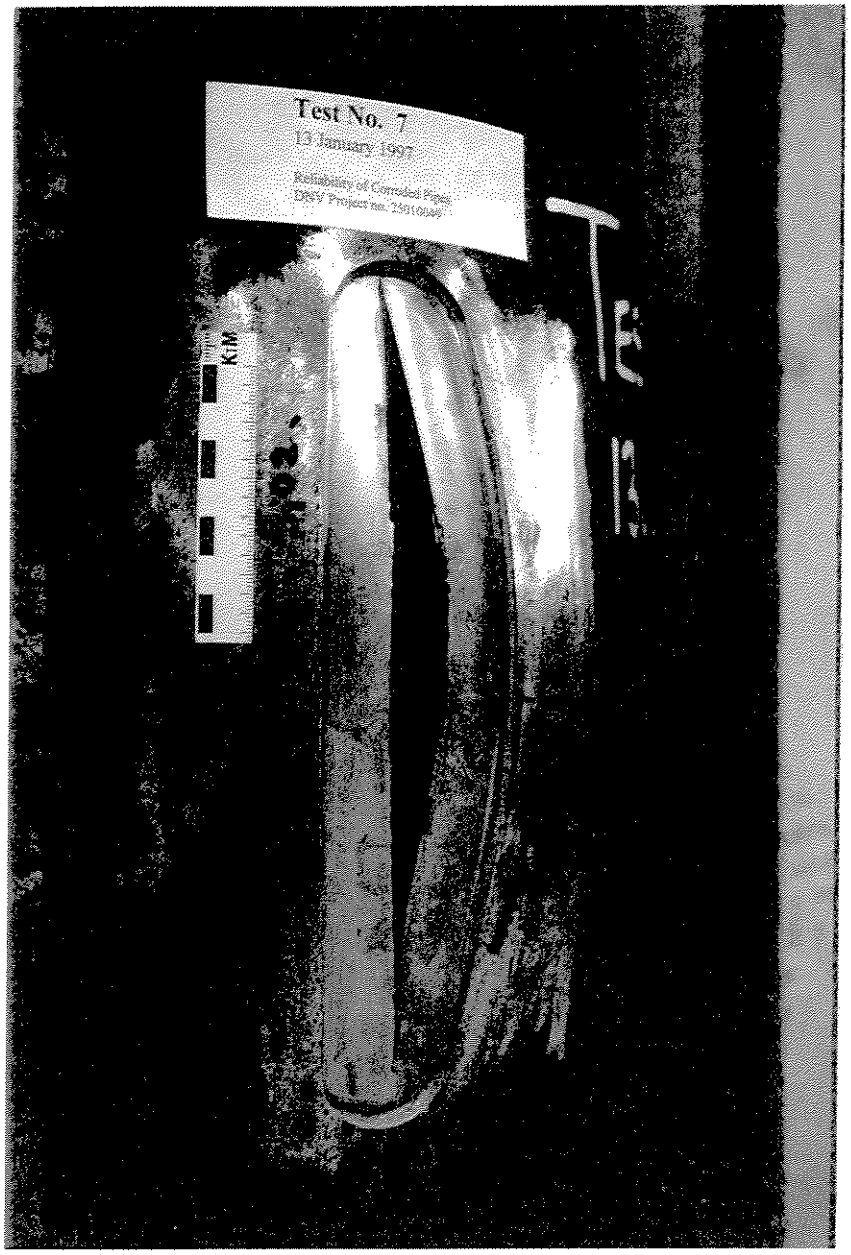


Figure 4-33 Picture of the test specimen no. 7 after the burst test

4.9 Test no. 8

Loading

Test no. 8 was loaded with internal pressure only.

Corrosion defect parameters (nominal)

(Identical to test specimen no. 7)

Corrosion defect depth	d = 5.3 mm	(d/t = 0.5)
Corrosion defect length	L = 245 mm	(L/D = 0.75)
Corrosion defect width	w = 32 mm	(w = 3 t)
Length of test specimen	$L_{specimen}$ = 1000 mm	

Instrumentation

In the corroded area 3 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading.

Loading description

The specimen was exposed to internal pressure .

Results

The test specimen was loaded with internal pressure until burst at 220 bar.

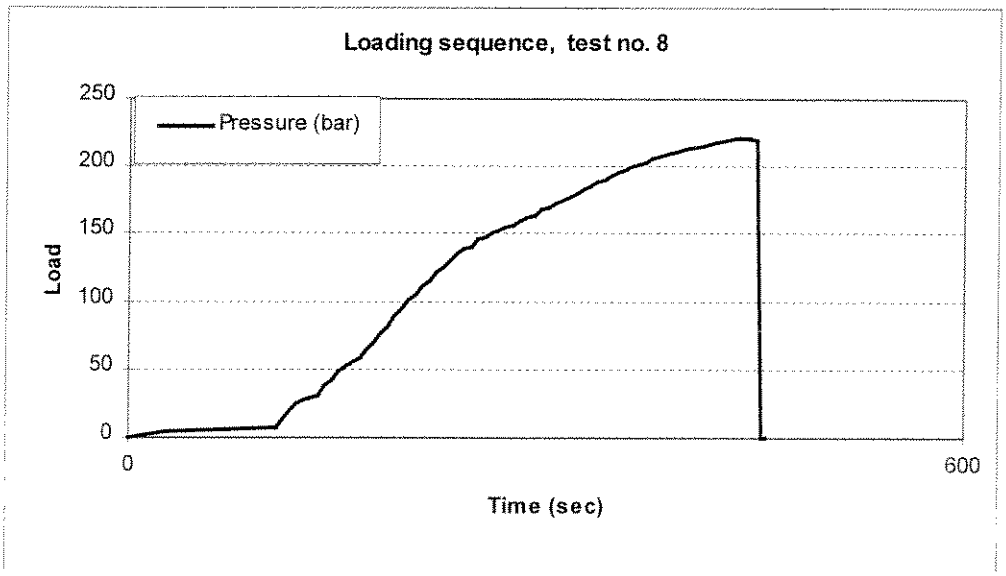


Figure 4-34 Loading of test no. 8, internal pressure only.

Figure 4-35 Picture of the test specimen no. 8 after the burst test

Figure 4-36 Picture of the test specimen no. 8 after the burst test

4.10 Test no. 9

Loading

Test 9 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

Corrosion defect depth	d = 7.5 mm (d/t = 0.7)
Corrosion defect length	L = 245 mm (L/D = 0.75)
Corrosion defect width	w = 32 mm (w = 3 t)
Length of test specimen	$L_{specimen}$ = 1000 mm

Instrumentation

In the corroded area 3 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

For test no.9 an internal pressure of 130 bar was applied, succeeded by axial compressive load was applied until burst. The internal pressure was 123 bar and the axial compressive force was 2070 kN at burst. The end-cap force due to the internal pressure was 886 kN, resulting in a compressive pipe wall force of only 1184 kN, equivalent to 113 MPa.

Results

The internal pressure was 123 bar and the axial compressive force was 2070 kN at burst.

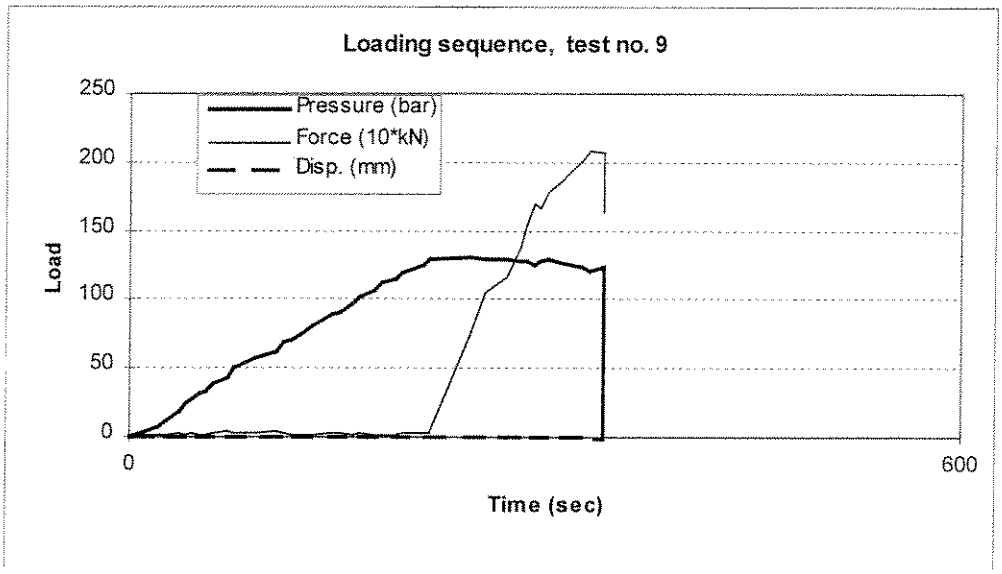


Figure 4-37 Loading sequence, test no. 9

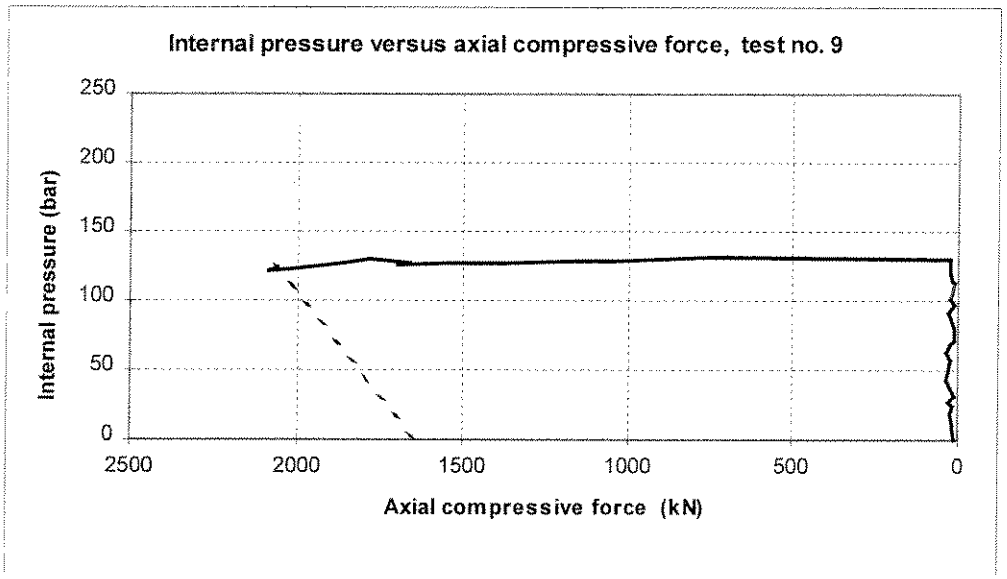


Figure 4-38 Internal pressure versus axial compressive force, test no. 9

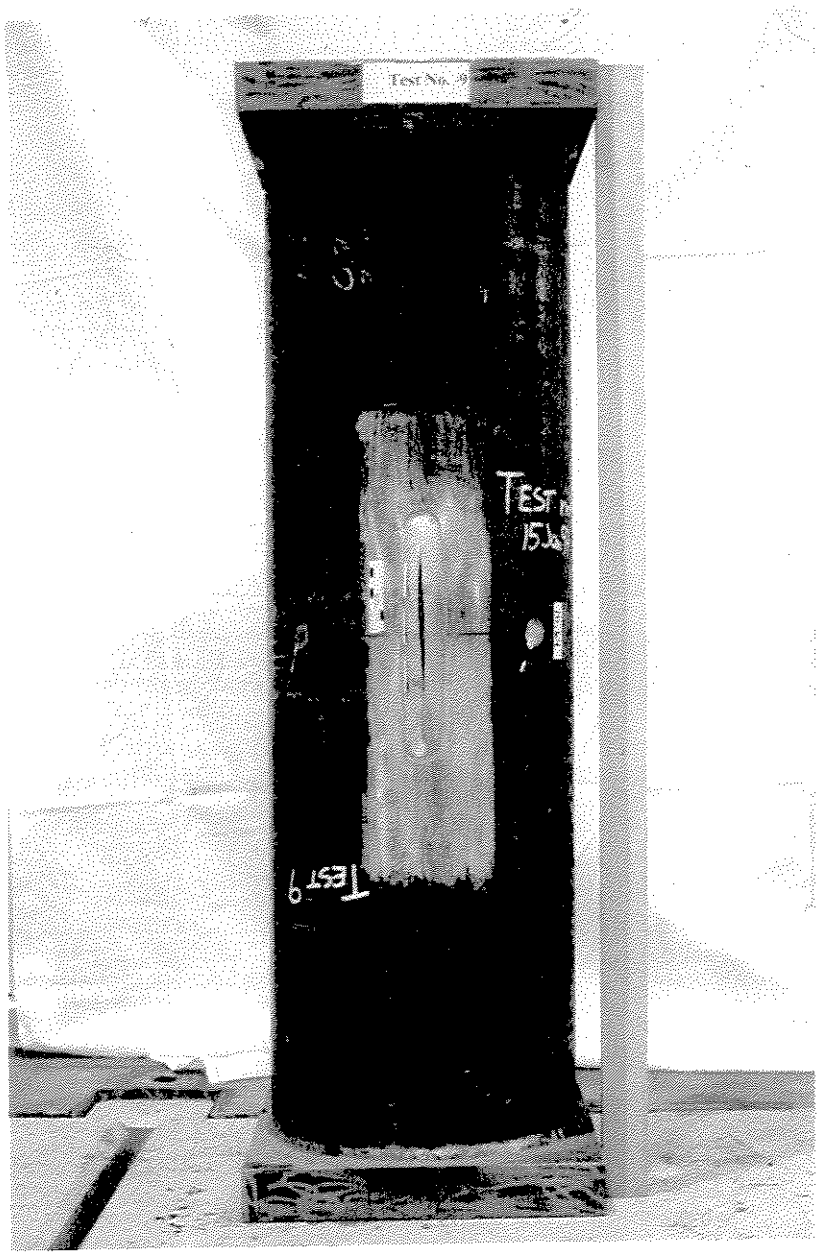


Figure 4-39 Picture of the test specimen no. 9 after the burst test

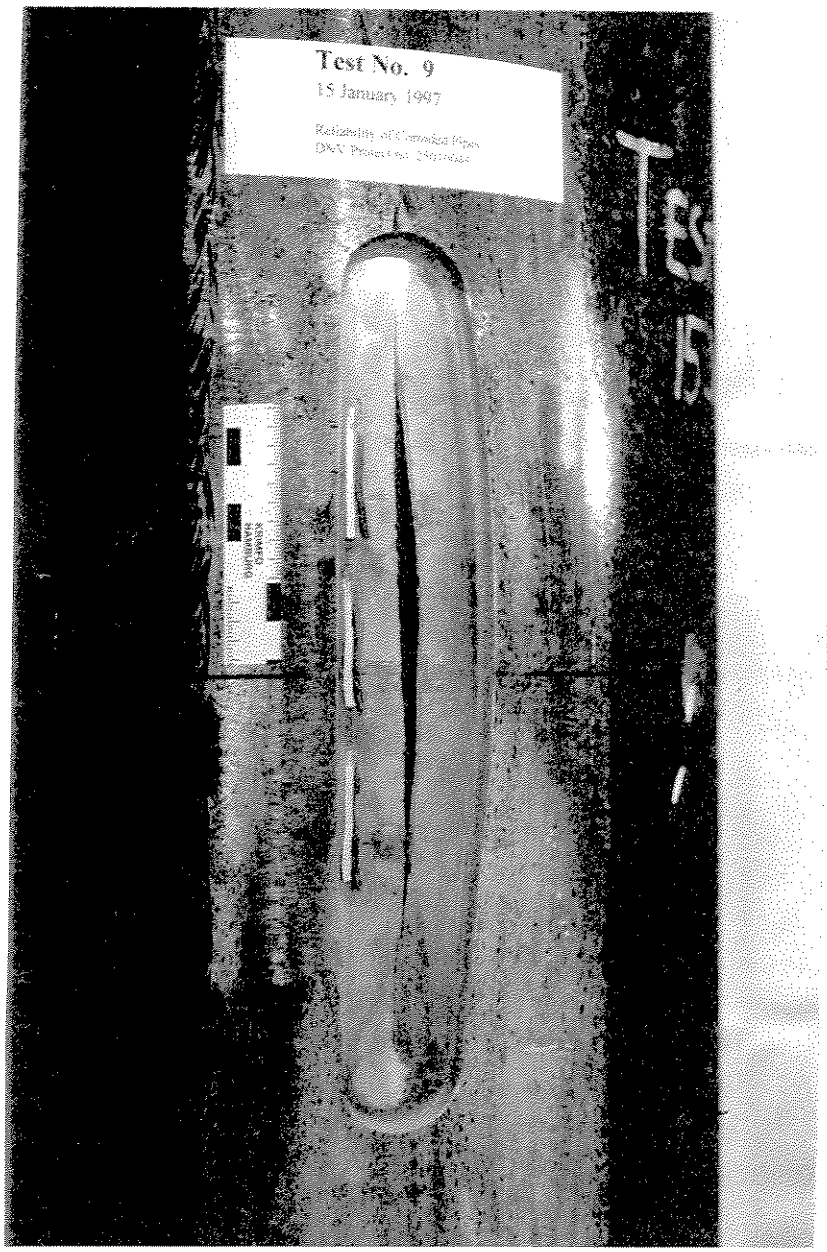


Figure 4-40 Picture of the test specimen no. 9 after the burst test

4.11 Test no. 10

Loading

Test 10 (and 11 and 12) were made with circumferential corrosion, and were loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

Corrosion defect depth	d = 5.3 mm (d/t = 0.5)
Corrosion defect length	L = 12 mm
Corrosion defect width	w = full circumference
Length of test specimen	$L_{specimen}$ = 1000 mm

A 12 mm wide ring groove was machined to 50% of the depth for the full circumference of the pipe at the outer surface to simulate girth weld corrosion. The groove was made in the parent material.

Instrumentation

In the corroded area (groove) 4 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

Internal pressure was applied until burst and simultaneously an axial compressive force corresponding to the end cap force was applied. The resulting pipe wall force was close to zero. Burst occurred at 320 bar and an axial force of 2289 kN.

Results

Burst occurred at 320 bar and with an axial compressive force of 2289 kN. The rupture was in the longitudinal direction, even though the corrosion defect was in the circumferential direction.

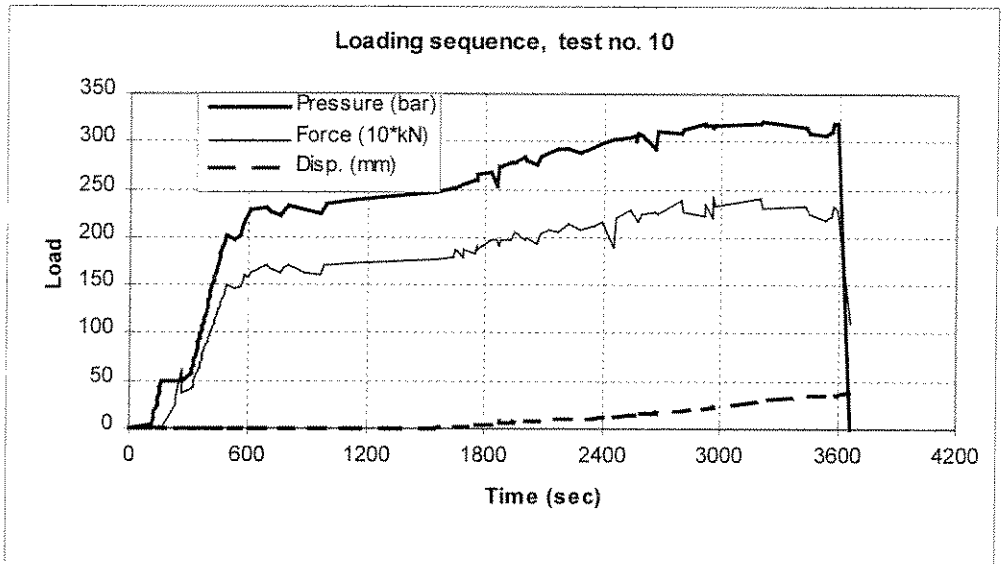


Figure 4-41 Loading sequence, test no. 10

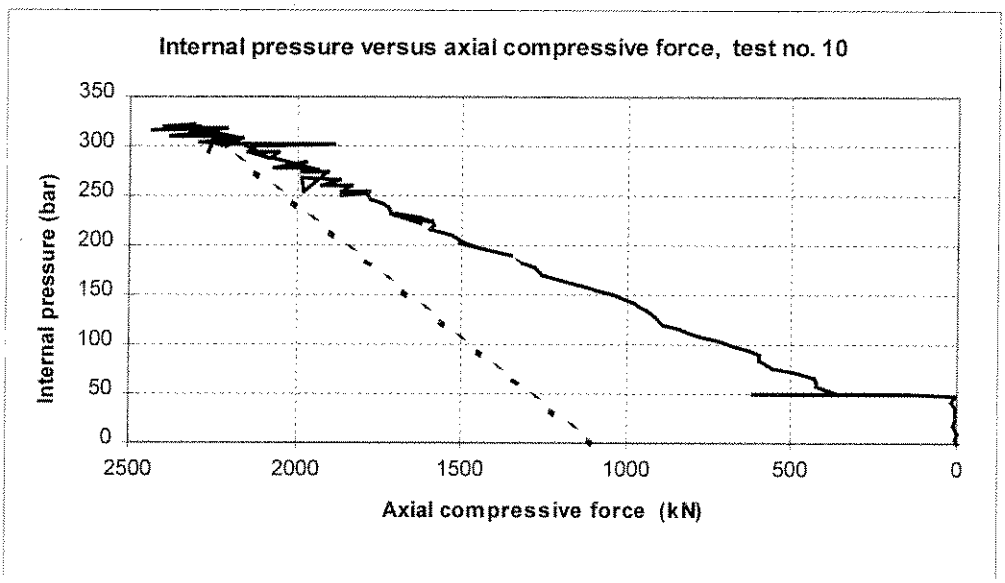


Figure 4-42 Internal pressure versus axial compressive force, test no. 10

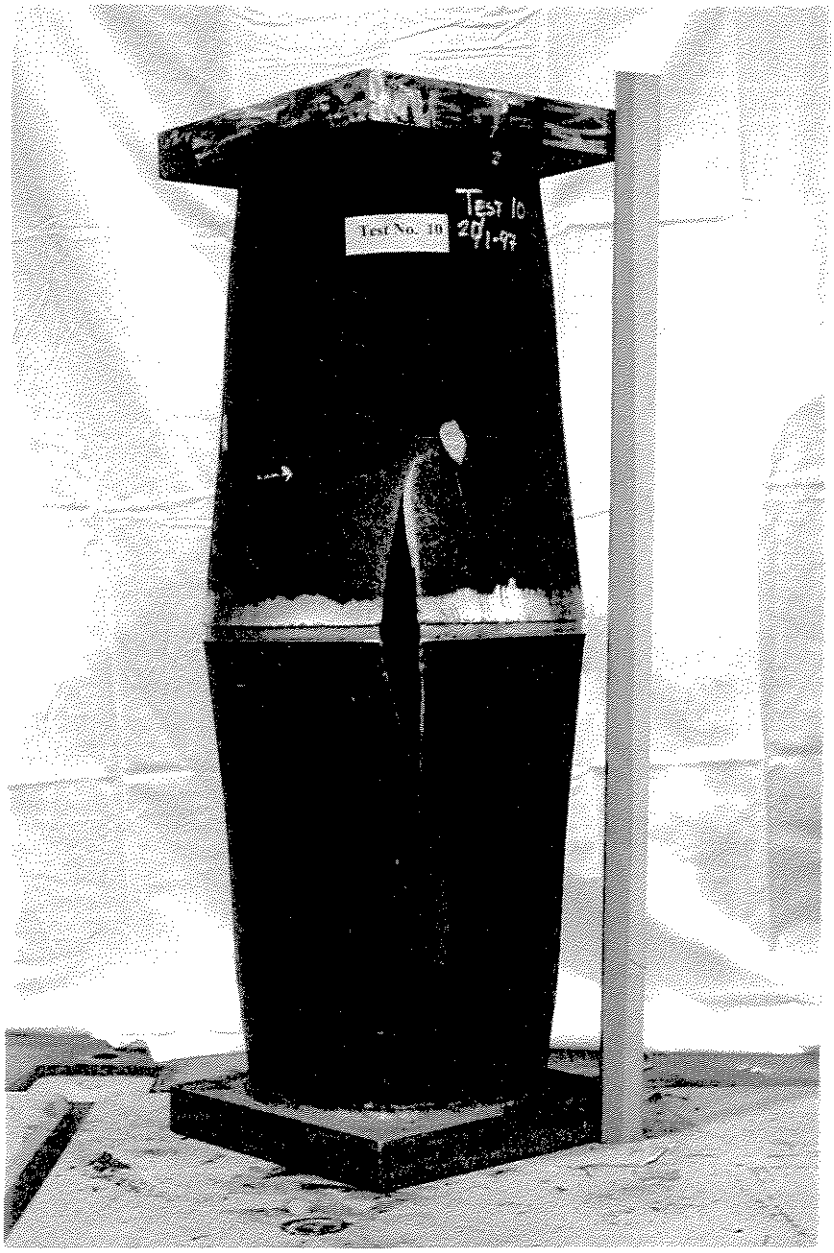


Figure 4-43 Picture of the test specimen no. 10 after the burst test

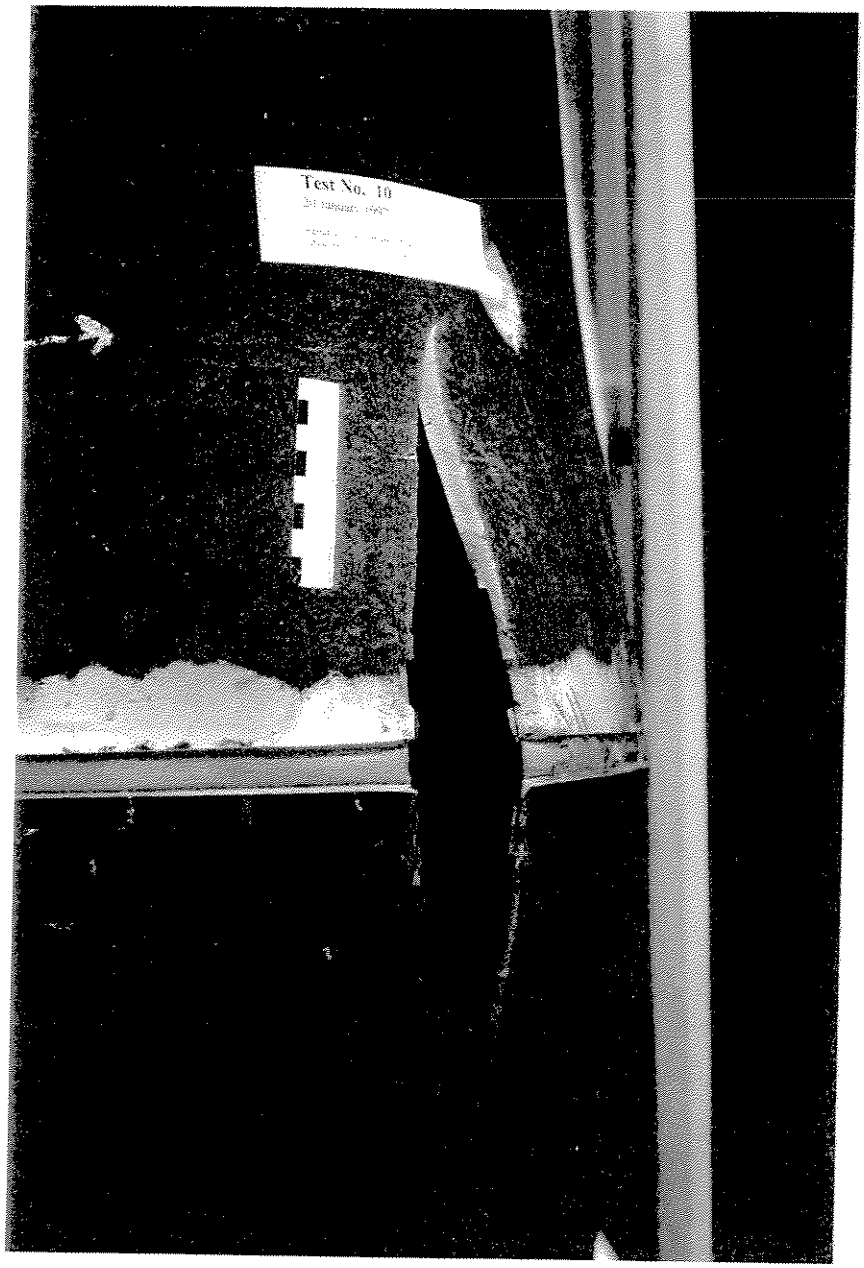


Figure 4-44 Picture of the test specimen no. 10 after the burst test

4.12 Test no. 11

Loading

Test no. 11 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

(Identical with test specimen no. 10)

Corrosion defect depth	d = 5.3 mm (d/t = 0.5)
Corrosion defect length	L = 12 mm
Corrosion defect width	w = full circumference
Length of test specimen	$L_{specimen}$ = 1000 mm

A 12 mm wide ring groove was machined to 50% of the depth for the full circumference of the pipe at the outer surface to simulate girth weld corrosion. The groove was made in the parent material.

Instrumentation

In the corroded area (groove) 4 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded.

Loading description

The specimen was exposed to combined internal pressure and axial compressive force.

Internal pressure was applied simultaneously with an axial compressive force corresponding to the end cap force, hence the resulting pipe wall force was close to zero. The internal pressure was kept constant at 225 bar and only axial compressive force was applied up to 3800 kN. From this point additional internal pressure was applied and the axial force was tried maintained. However, this required large displacements in the axial direction, and after 95 mm compression of the pipe the stroke limit of the jack was reached and the displacement was kept constant when further internal pressure was applied until burst. (The displacement transducer exceeded the measure range after 50 mm). This resulted in a drop in the axial load down to 2343kN when the pipe bursted at 335 bar.

Results

Burst occurred at 335 bar and with an axial compressive force of 2345 kN. The rupture was in the longitudinal direction, even though the corrosion defect was in the circumferential direction.

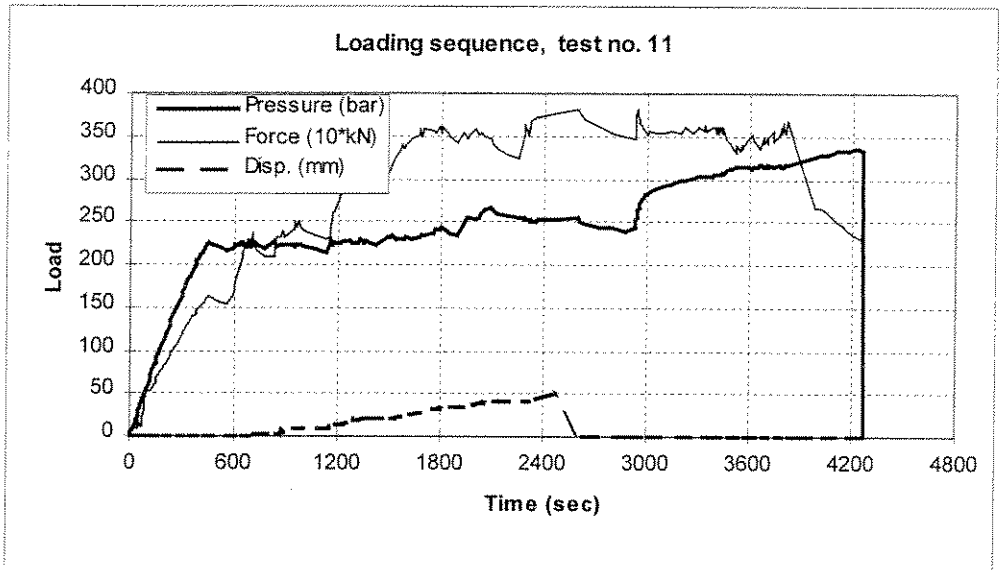


Figure 4-45 Loading sequence, test no. 11

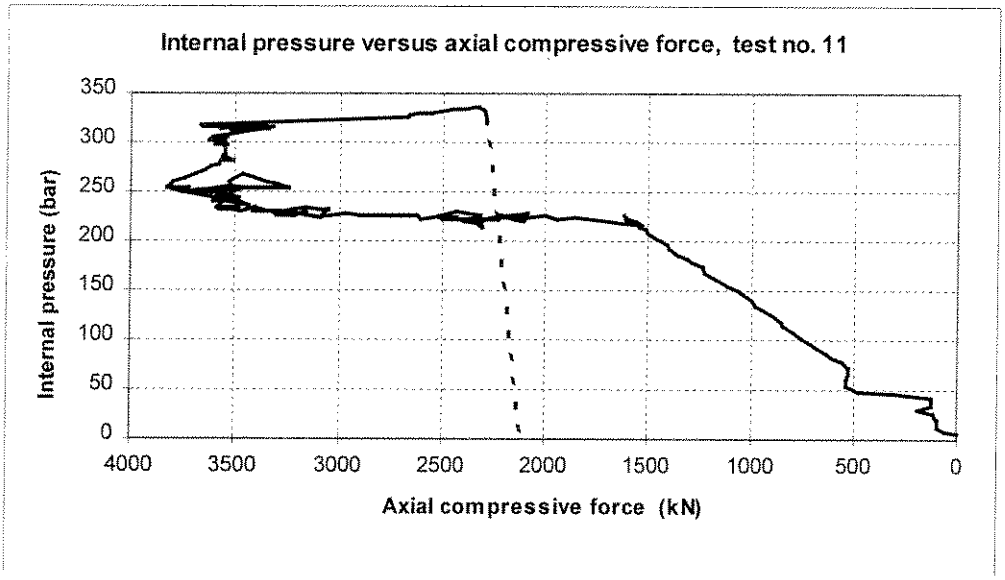


Figure 4-46 Internal pressure versus axial compressive force, test no. 11

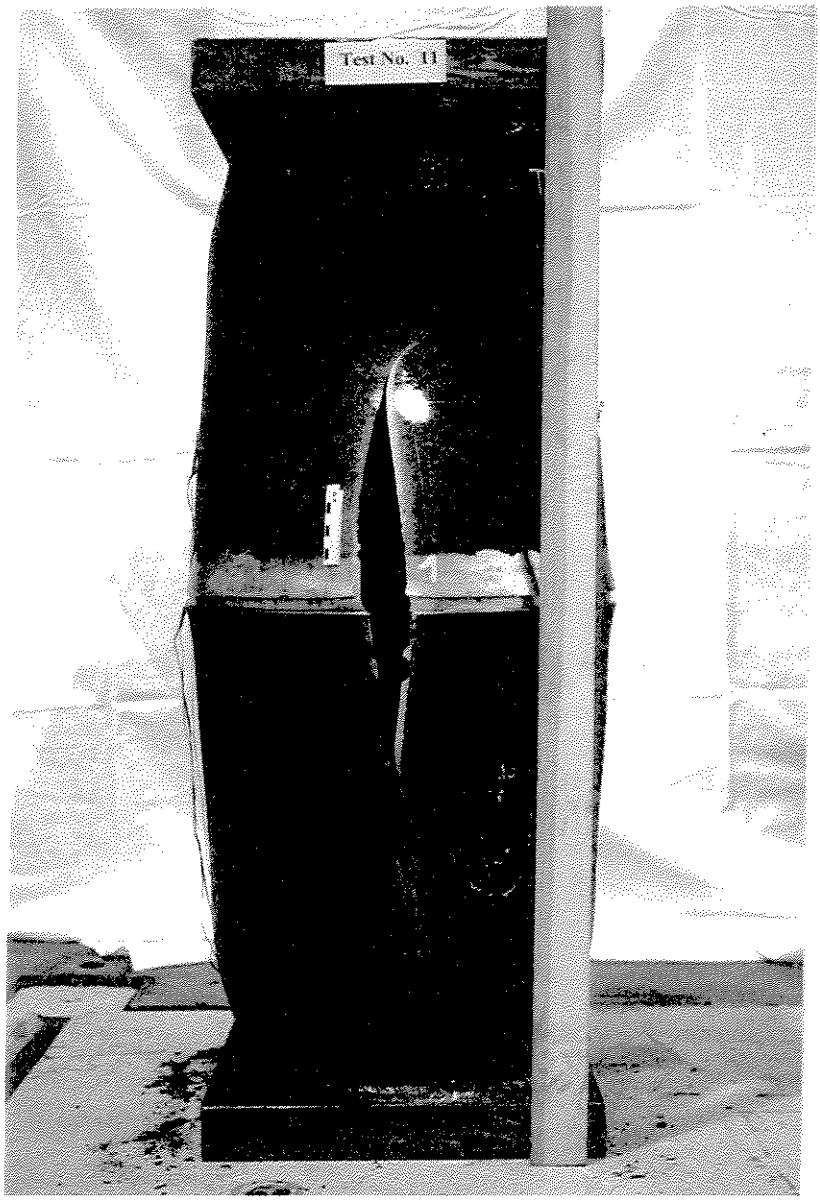


Figure 4-47 Picture of the test specimen no. 11 after the burst test

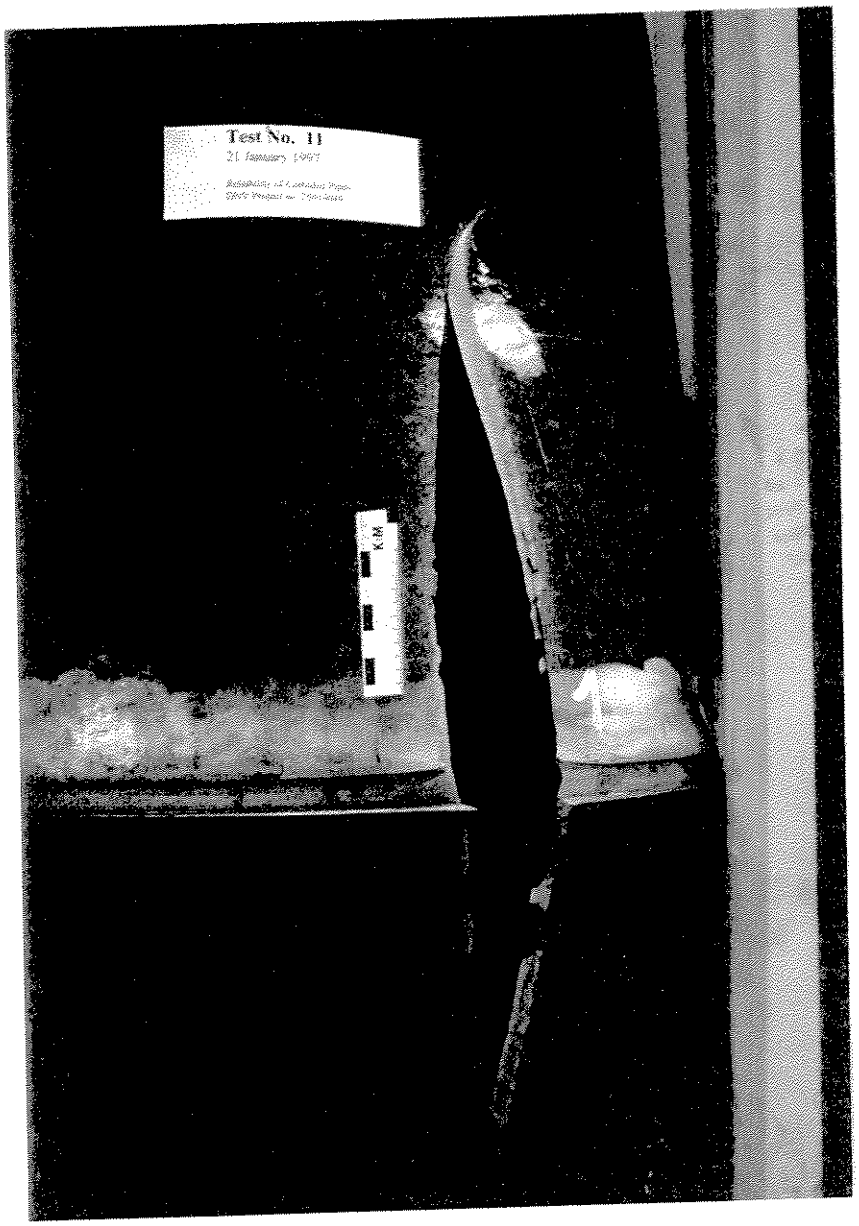


Figure 4-48 Picture of the test specimen no. 11 after the burst test

4.13 Test no. 12

Loading

Test no. 12 was loaded with combined internal pressure and axial compressive force.

Corrosion defect parameters (nominal)

Corrosion defect depth	d = 7.5 mm (d/t = 0.7)
Corrosion defect length	L = 12 mm
Corrosion defect width	w = full circumference
Length of test specimen	$L_{specimen}$ = 1000 mm

A 12 mm wide ring groove was machined to 70% of the depth for the full circumference of the pipe at the outer surface to simulate girth weld corrosion. The groove was made in the parent material.

Instrumentation

In the corroded area (groove) 4 cross strain gauges were applied, and 4 gauges were applied in a uncorroded region to monitor the loading. The time and the jack load and displacement were also recorded.

Unfortunately, the recorded data were lost and only the data from the final part of the test were recovered based on the test log and (security) paper printout from the datalogger, which is the results of most interest.

Loading

The specimen was exposed to combined internal pressure and axial compressive force.

Internal pressure was applied simultaneously with an axial compressive force corresponding to the end cap force was applied. The resulting pipe wall force was close to zero. The internal pressure was kept constant at 250 bar and axial compressive force was applied up to 3250 kN. From this point additional internal pressure was applied and the axial force was tried maintained, but at further increase in the internal pressure the displacement was kept constant. This resulted in a drop in the axial load down to 2380 kN when the pipe bursted at 321 bar.

Results

The test specimen bursted at 321 bar with an axial compressive force of 2399 kN. The rupture was in the bottom of the groove with a length of 70 mm.

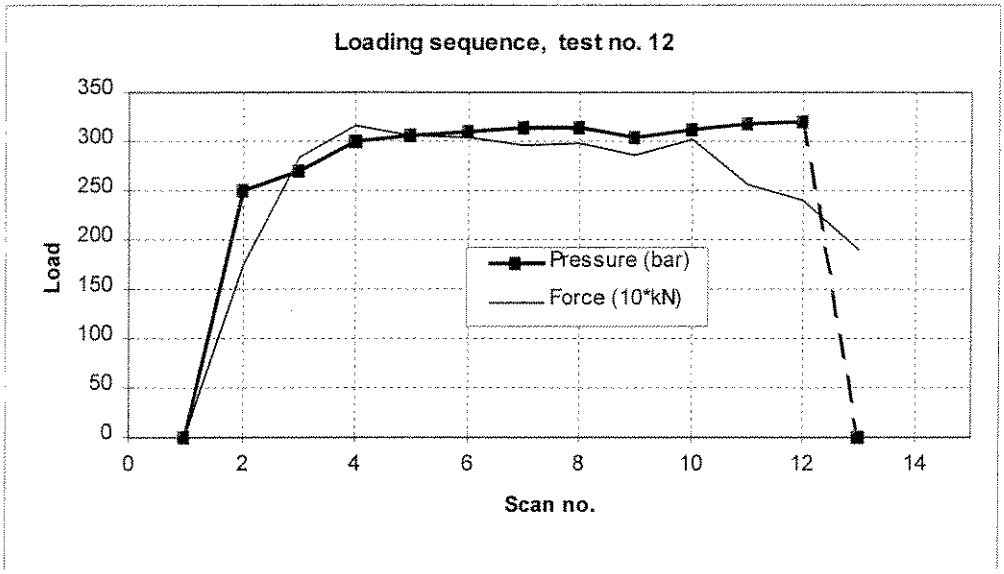


Figure 4-49 Loading sequence, test no. 12

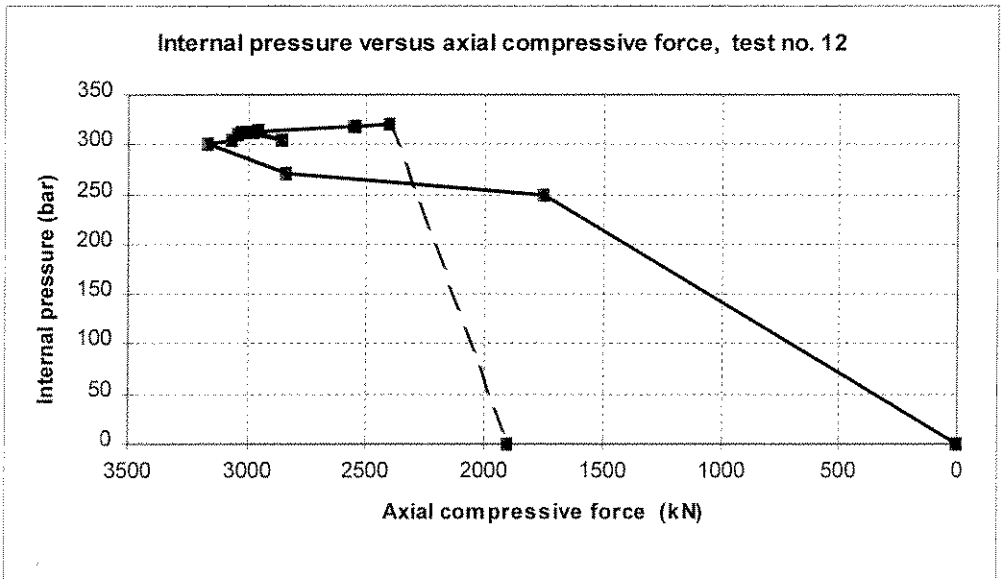


Figure 4-50 Internal pressure versus axial compressive force, test no. 12

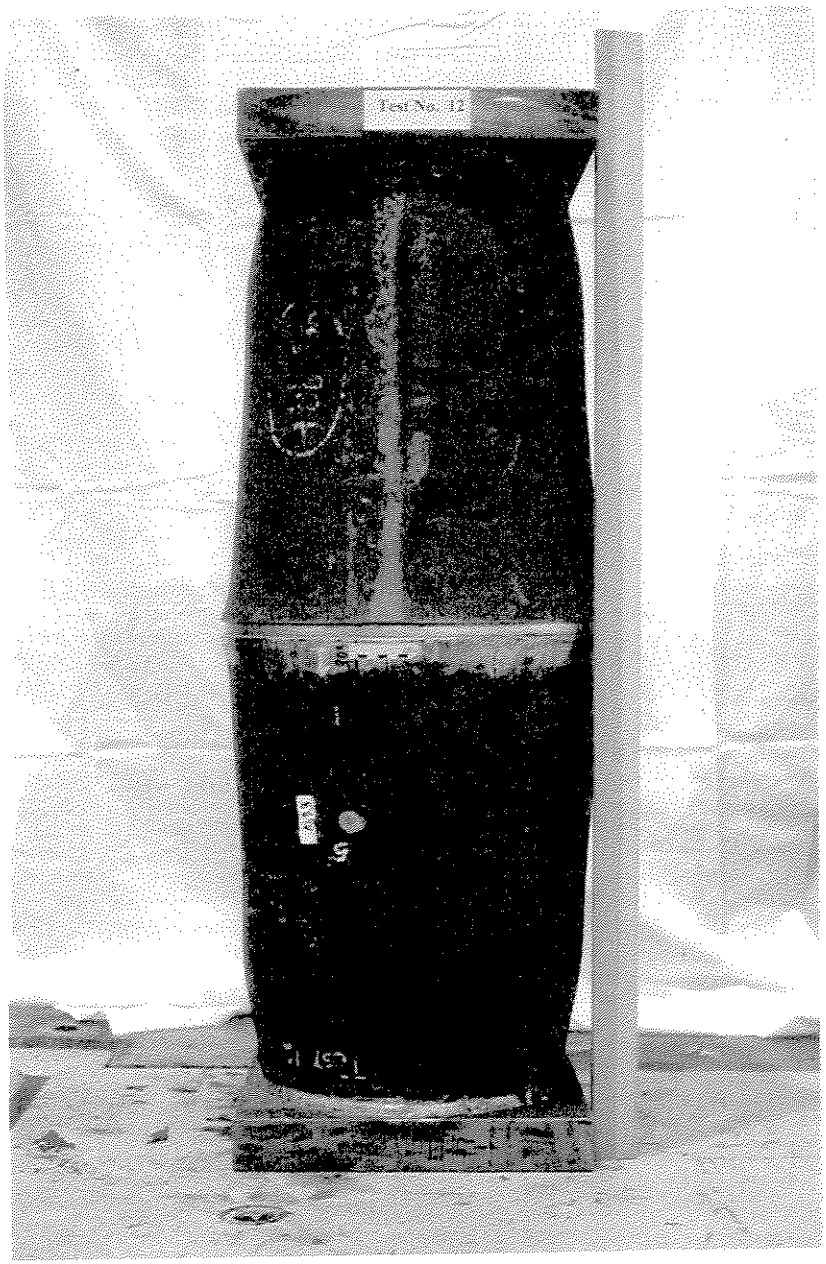


Figure 4-51 Picture of the test specimen no. 12 after the burst test

5 SUMMARY OF TESTS AND TEST RESULTS

5.1 Overview of test results

In Table 5-1 and Table 5-2 the main results from the tests are included. In Table 5-2 the loads are given in bot forces and stresses.

Table 5-1 Overview of test results

Test no.	Nom Dia (mm)	Nom thick (mm)	Mat	defect depth (d/t)	defect length L/D	defect width w/t	Loading	Date of test	Burst (press) (force/mom.)
1	324	10.3	X52	0.50	0.75	15	internal press	1 July 1996	232 bar 0
2	324	10.3	X52	0.50	0.75	15	internal press and bending moment	7 Aug. 1996	219 bar 129 kNm
3	324	10.3	X52	0.50	0.75	15	internal press and bending moment	18 Oct. 1996	195 bar 212 kNm
4	324	10.3	X52	0.30	0.50	3	internal press and bending moment	20 Nov. 1996	290 bar 73 kNm
5	324	10.3	X52	0.30	0.50	3	internal pressure and axial comp. force	18 Des. 1996	286 bar -2563 kN
6	324	10.3	X52	0.30	0.50	3	internal pressure and axial comp. force	7 Jan. 1997	287 bar -2943 kN
7	324	10.3	X52	0.50	0.75	3	internal pressure and axial comp. force	13 Jan. 1997	186 bar -2998 kN
8	324	10.3	X52	0.50	0.75	3	internal pressure	14 Jan. 1997	220 bar 0
9	324	10.3	X52	0.70	0.75	3	internal pressure and axial comp. force	15 Jan. 1997	123 bar -2070 kN
10	324	10.3	X52	0.50	12 mm	full circ.	internal pressure and axial comp. force	20 Jan. 1997	320 bar -2289 kN
11	324	10.3	X52	0.50	12 mm	full circ.	internal pressure and axial comp. force	21 Jan. 1997	335 bar -2343 kN
12	324	10.3	X52	0.70	12 mm	full circ.	internal pressure and axial comp. force	22 Jan. 1997	321 bar -2399 kN

The forces given in the table are external applied axial compressive forces measured in the jack. See Table 5-2 for more details of the loads.

For the tests with bending moment the corrosion defect was located on the side of the pipe with compressive axial stresses due to the moment.

Table 5-2 Overview of test results

Test no.	defect depth (d/t)	defect length L/D	defect width w/t	Loading	Burst 1) (press.) (force/mom.)	Pipe wall forces and stresses 2)	
						press. / force	pipe wall stresses
1	0.50	0.75	15	internal press	232 bar 0	232 bar 1668 kN	331MPa (hoop) 160 MPa (long.)
2	0.50	0.75	15	internal press and bending moment	219 bar 129 kNm	219 bar not given	312 MPa (hoop) -12 MPa (long.)
3	0.50	0.75	15	internal press and bending moment	195 bar 212 kNm	195 bar not given	278 MPa (hoop) -134 MPa (long.)
4	0.30	0.50	3	internal press and bending moment	290 bar 73 kNm	290 bar not given	412 MPa (hoop) 109 MPa (long.)
5	0.30	0.50	3	internal pressure and axial comp. force	286 bar -2563 kN	286 bar -503 kN	409 MPa (hoop) -48 MPa (long.)
6	0.30	0.50	3	internal pressure and axial comp. force	287 bar -2943 kN	287 bar -876 kN	410 MPa (hoop) - 84 MPa (long.)
7	0.50	0.75	3	internal pressure and axial comp. force	186 bar -3000 kN	186 bar -1659 kN	265 MPa (hoop) -159 MPa (long.)
8	0.50	0.75	3	internal pressure	220 bar 0	220 bar 1586 kN	314 MPa (hoop) 152 MPa (long.)
9	0.70	0.75	3	internal pressure and axial comp. force	123 bar -2070 kN	123 bar 1184 kN	176 MPa (hoop) -113 MPa (long.)
10	0.50	12 mm	full circ.	internal pressure and axial comp. force	320 bar -2289 kN	320 bar 10 kN	456 MPa (hoop) 1 MPa (long.)
11	0.50	12 mm	full circ.	internal pressure and axial comp. force	335 bar -2343 kN	335 bar 84 kN	479 MPa (hoop) 8 MPa (long.)
12	0.70	12 mm	full circ.	internal pressure and axial comp. force	321 bar -2399 kN	321 bar -94 kN	458 MPa (hoop) -9 MPa (long.)

Nominal diameter: 324 mm.
Nominal wall thickness: 10.3 mm.

1) The forces given in this column are external applied forces.

2) The forces given in these columns are pipe wall forces and stresses. The force is calculated as the force on the end-cap due to the internal pressure minus the applied external force on the jack.
For tests exposed to bending moment, the pipe wall stress is given on the compressive side where the defect was located. The pipe wall forces are not given for the cases with bending moment.

The calculation of the stress is based on uncorroded and undeformed cross section. The average measured wall thickness of 10.6 mm is used (nominal 10.3mm).

6 MATERIAL PROPERTIES

The test specimens were manufactured from 2 tubes of seamless X52 modified material. A copy of the material certificates are included Appendix A. The test specimens 1 to 9 were made from one single tube, while the test specimens 10 to 12 were made from another tube. Tensile tests were conducted on four specimens machined from each tube to provide the required material parameters. The tensile test specimens were machined such that two had their axis in the longitudinal direction and two had their axis in the circumferential direction from each tube.

The tensile test specimens were manufactured with a diameter of 6 mm, and the length of each specimen was 50 mm. A 25 mm extensometer was fitted to each specimen.

The behaviour of specimens under tensile force showed a very good degree of consistency.

Plots of the axial tension as function of elongation are included in Appendix B.

The material average engineering properties were determined to be;

- Yield strength : 380 MPa
- Tensile strength: 514 MPa

Based on the plots included in Appendix B the "average" material curve is calculated as shown in Figure 6-1. Both the engineering and the true stress-strain material curve are given.

The material showed a yielding plateau at 380 MPa.

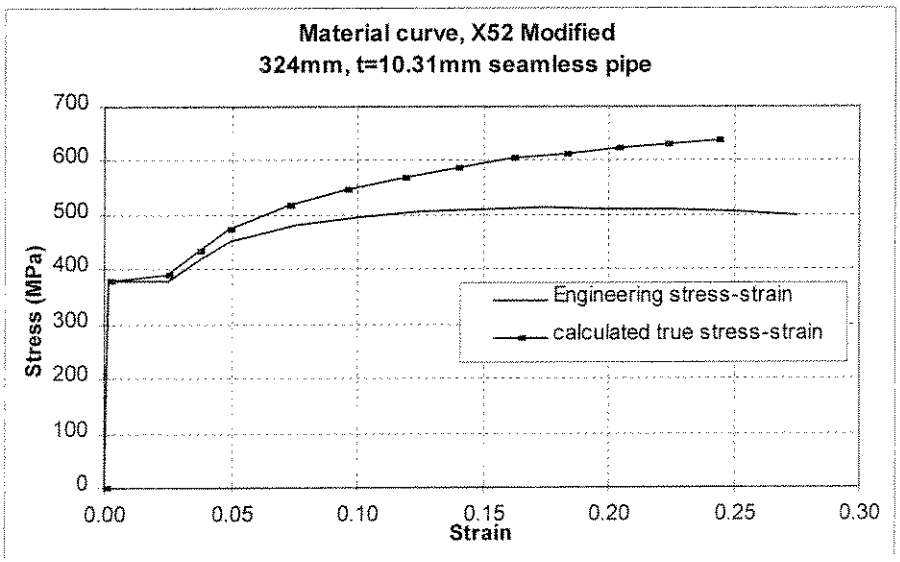


Figure 6-1 Material curve, X52 modified

The corresponding numbers are given in Table 6-1.

Table 6-1 Material data

Engineering stress-strain		Calculated true stress-strain	
strain	**stress (MPa)**	**strain**	**stress (MPa)**
0	0.0	0.000	0.0
0.0018	380.0	0.002	380.7
0.025	380.0	0.025	389.5
0.038	419.3	0.037	435.0
0.050	450.9	0.049	473.4
0.075	482.4	0.072	518.6
0.100	496.0	0.095	545.6
0.125	505.0	0.118	568.1
0.150	509.5	0.140	585.9
0.175	514.0	0.161	603.9
0.200	511.7	0.182	614.1
0.225	509.5	0.203	624.1
0.250	505.0	0.223	631.2
0.275	500.5	0.243	638.1

The true stress-strain curve is calculated from the engineering stress-strain curve;

$$\varepsilon_{true} = \ln(1+\varepsilon_{eng})$$

$$\sigma_{true} = \sigma_{eng}(1+\varepsilon_{eng}).$$

- o0o -

APPENDIX

A

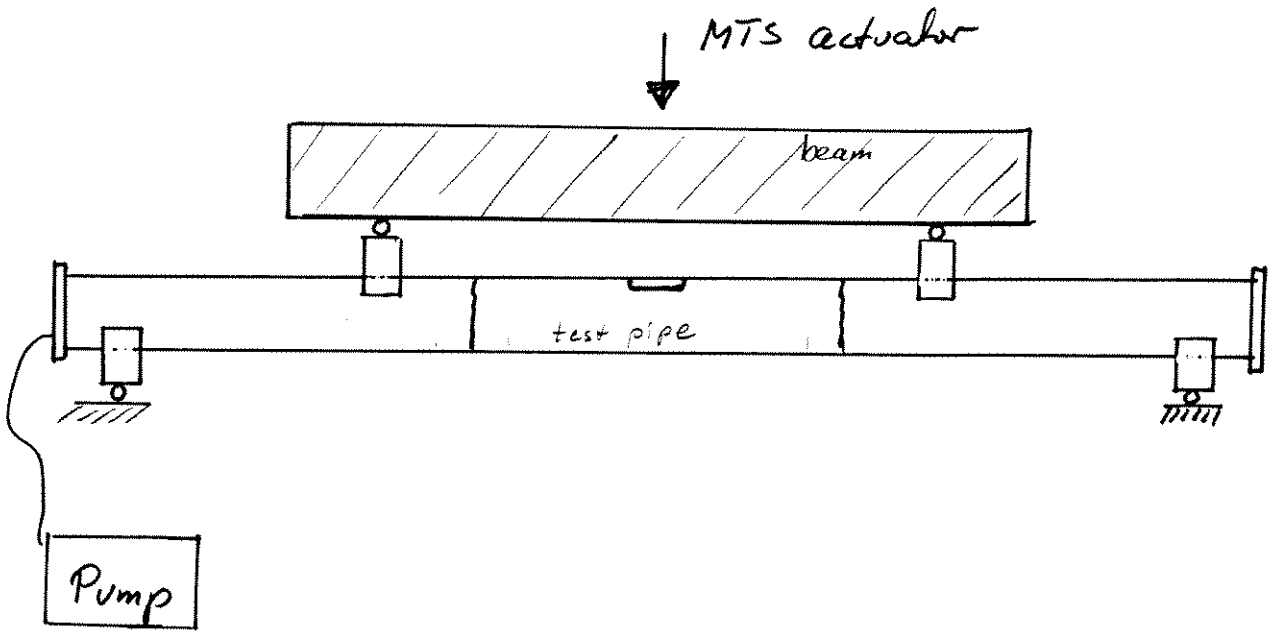
DESCRIPTION OF THE TEST RIG, CORROSION DEFECTS, THICKNESS MEASUREMENTS AND INSTRUMENTATION

- o0o -

DNV	Project title:				Project No.:	
	Client/Subject:	PREPARED	Date:	Sign.:	Doc. No.:	
		VERIFIED	Date:	Sign.:	Rev.:	Page:

Test set-up for combined internal pressure and 4-point bending moment.

(not to scale)



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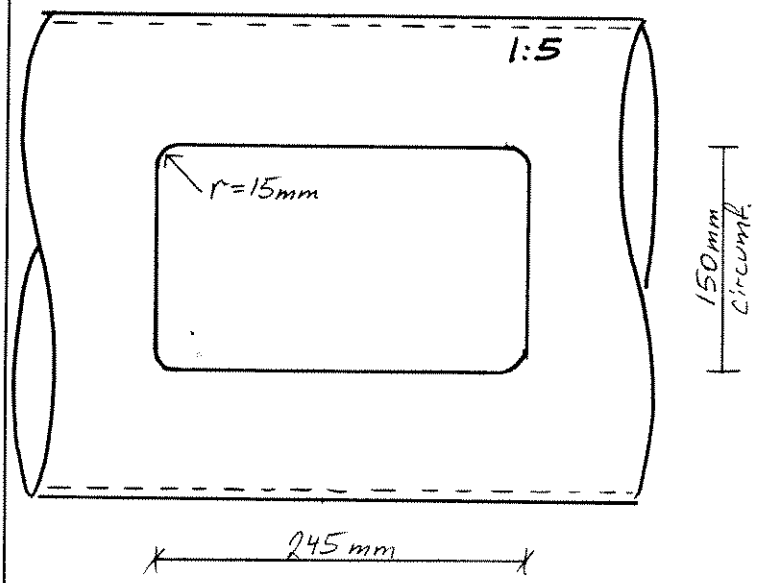
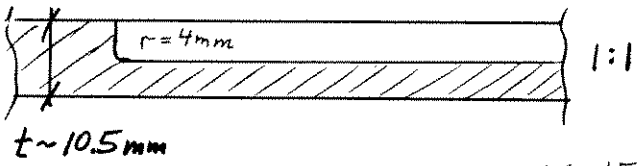
Project title: Reliability of Corroded Pipes				Project No.: 25010049	
Client/Subject: Test 1, 2 and 3	PREPARED	Date:	Sign.:	Doc. No.:	
	VERIFIED	Date:	Sign.:	Rev.:	Page:

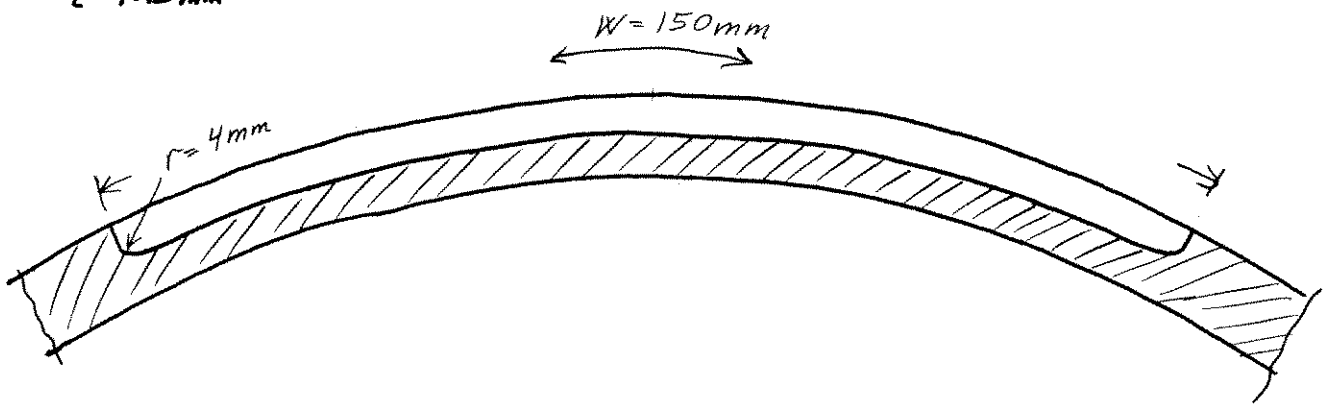
Spark eroded defect for test no. 1, 2 and 3.

Dia = 324 mm
t = ~ 10.5 mm

defect: d = ~ 5.3 mm ($d/t \sim 0.5$)
L = 245 mm ($L/D = 0.75$)
W = 150 mm ($W/t \sim 15$)







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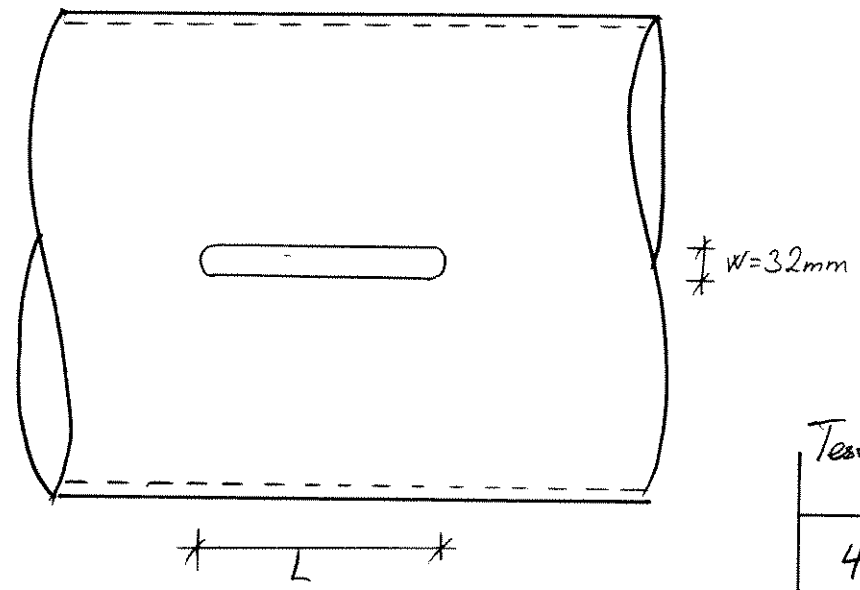
Project title: Reliability of Corroded pipes				Project No.: 25010049	
Client/Subject: Test no. 4 to 9.	PREPARED	Date:	Sign.:	Doc. No.:	
	VERIFIED	Date:	Sign.:	Rev.:	Page:

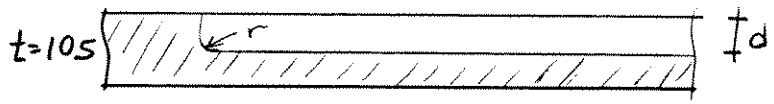
Spark eroded defects.

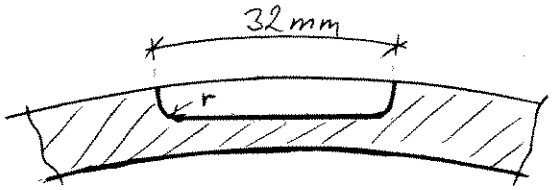
$D = 324\,mm$ defect : d - various

$t \sim 10.5\,mm$: L - various

: $w = 32\,mm$







Test no.	L mm	d mm	r mm
4	162	3.2	3
5	162	3.2	3
6	162	3.2	3
7	245	5.3	3
8	245	5.3	3
9	245	7.5	3

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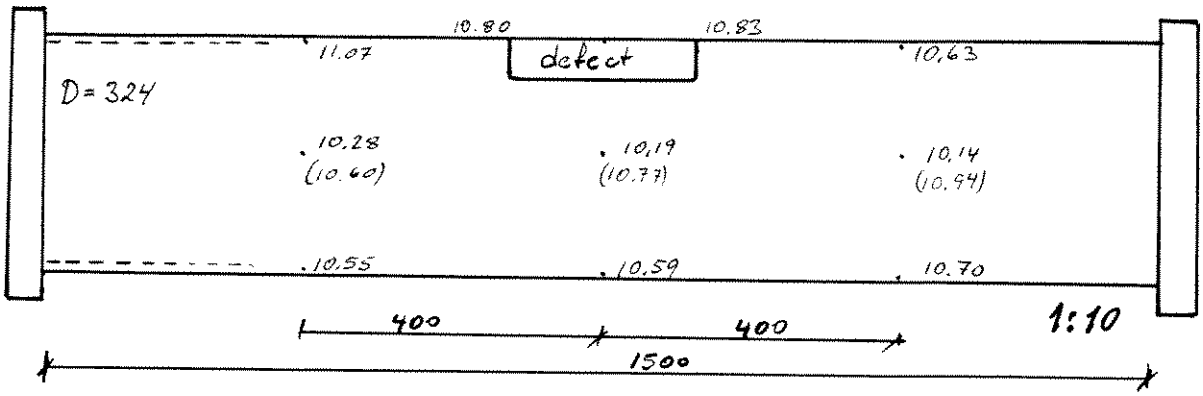
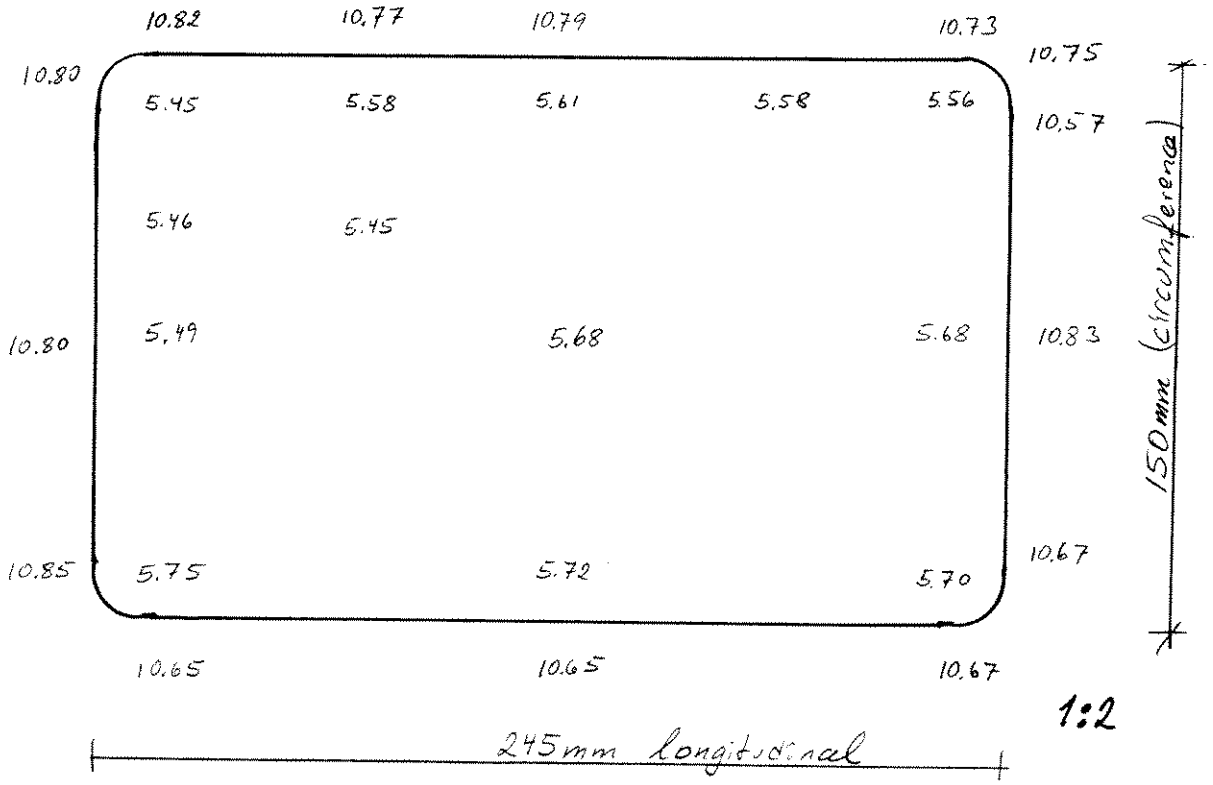
DNV	Project title: Reliability of Corroded Pipes				Project No.: 25010049
	Client/Subject: Test no. 1	PREPARED	Date: 1997	Sign.: OHB	Doc. No.:
		VERIFIED	Date:	Sign.:	Rev.: / Page:

Thickness measurements (mm)



Thickness measurements of the corrosion defect (mm)



DNV	Project title: Reliability of Corroded Pipes			Project No.: 25010049	
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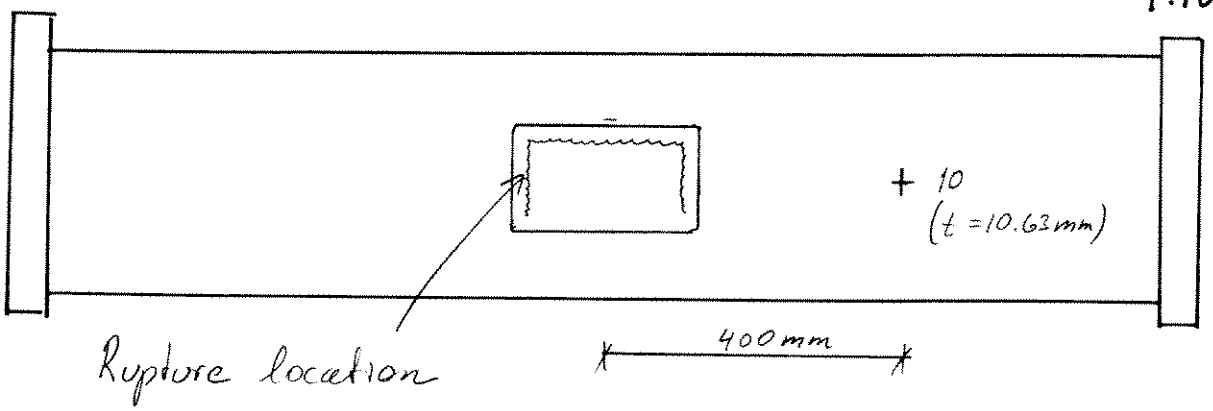
		VERIFIED	Date:	Sign.:	Rev.: / Page:

Strain gauge location and numbering

1:10



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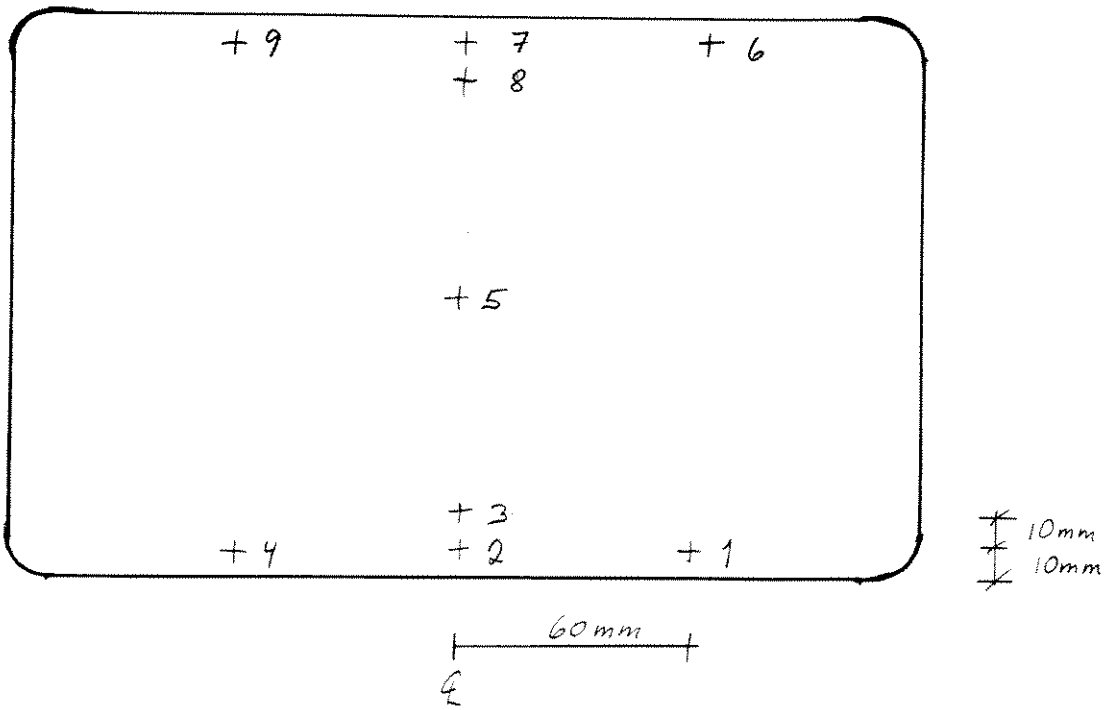

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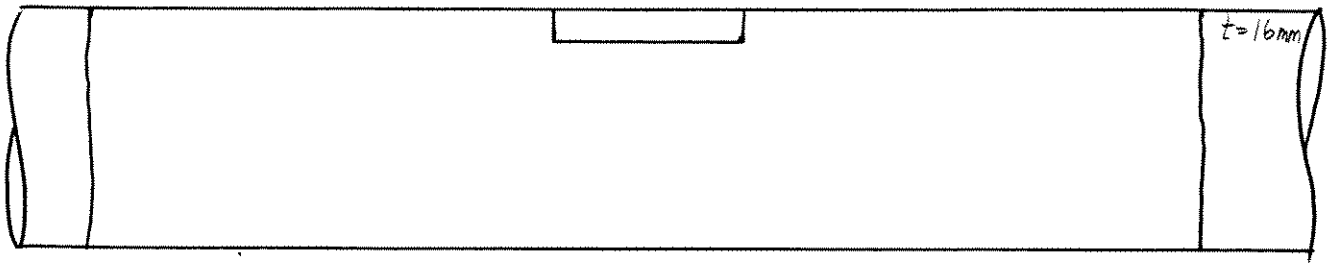
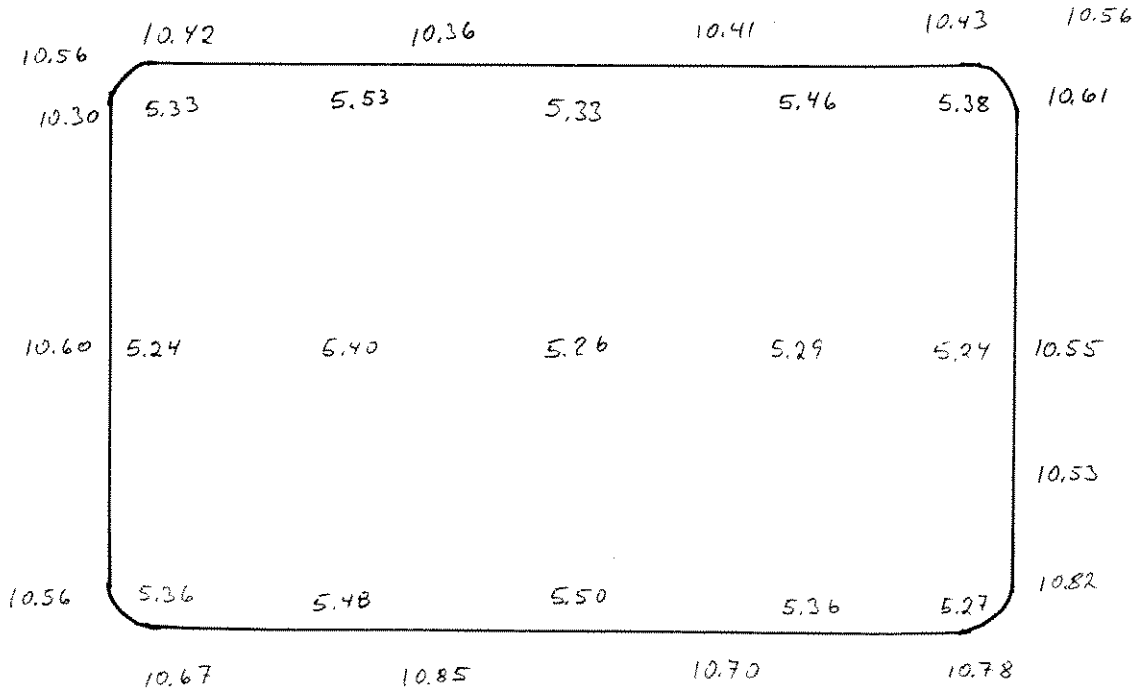


Thickness measurements of the corrosion defect (mm)

1:2



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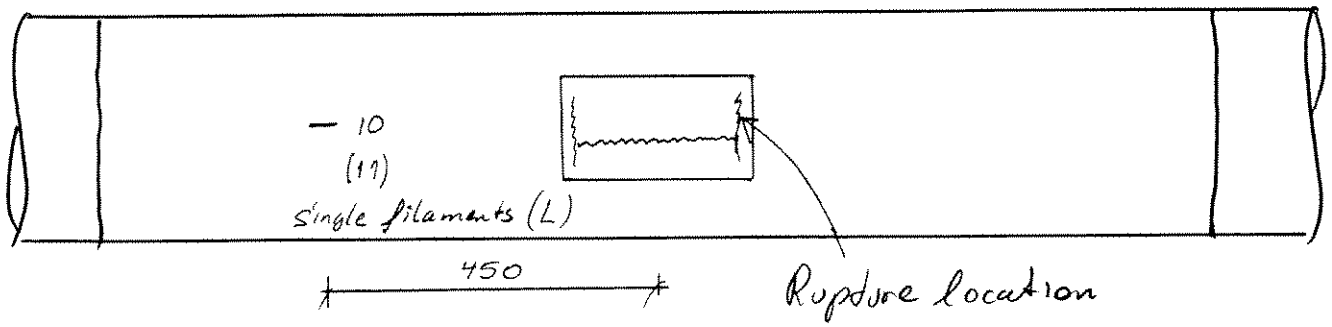
		VERIFIED	Date:	Sign.:	Rev.: / Page:

Strain gauge location and numbering

1:10



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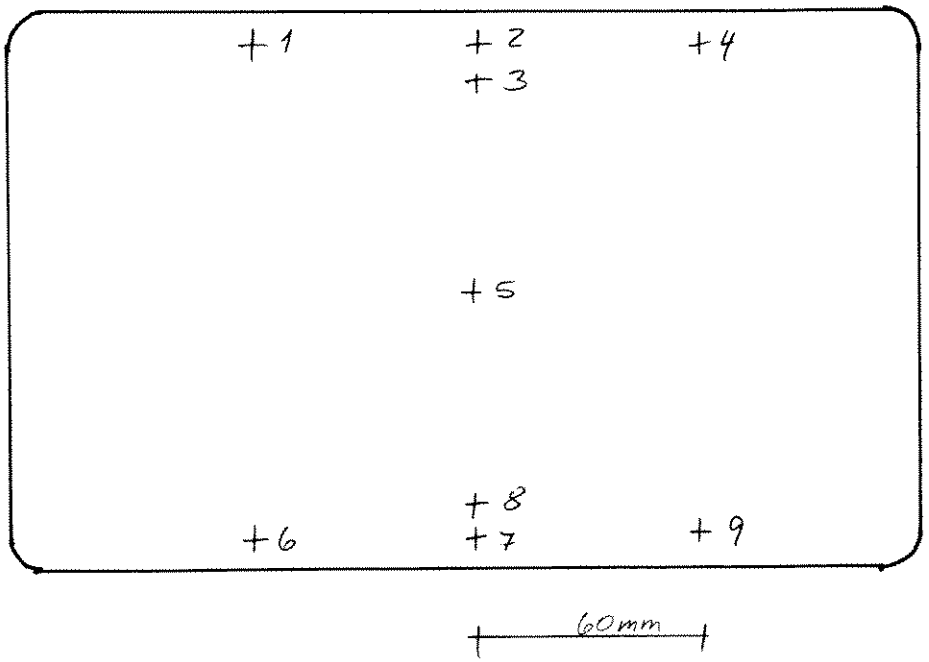

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Project title: Reliability of Corroded Pipes				Project No.: 25010049	
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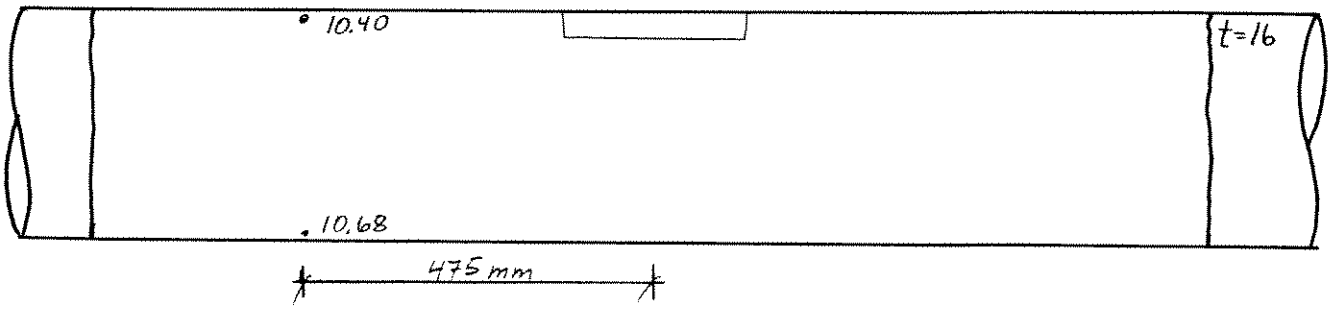

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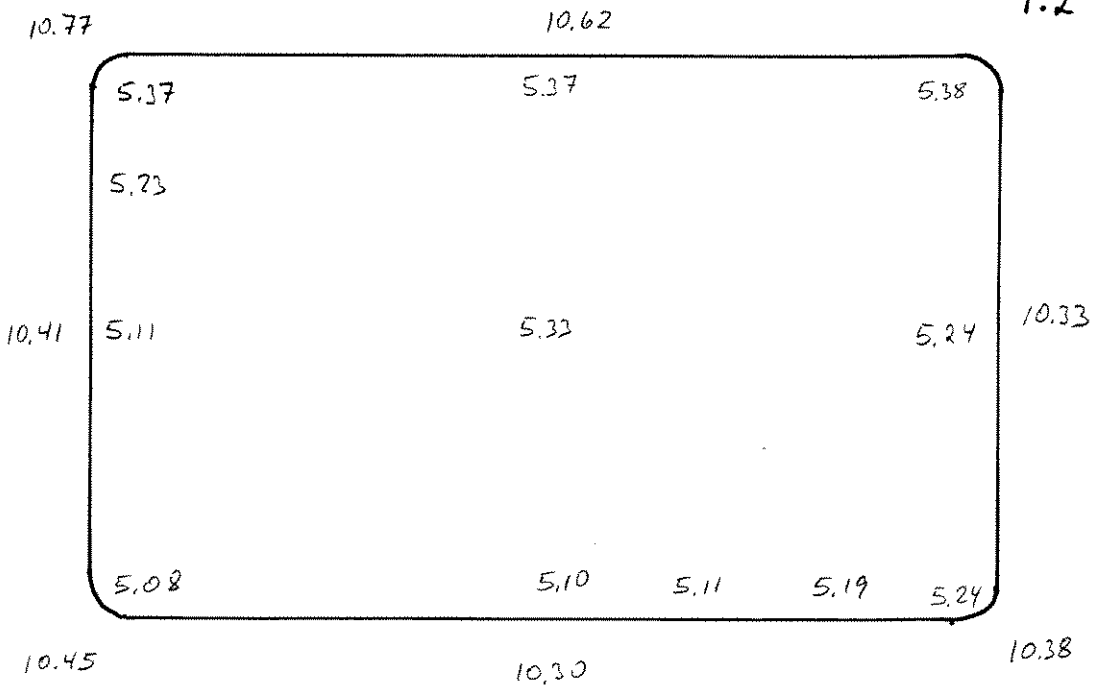

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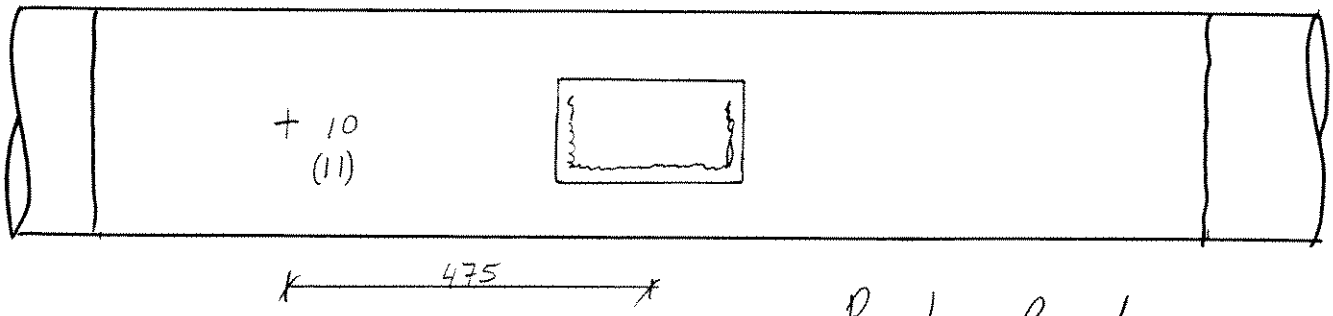
Project title:				Project No.:	
Client/Subject: Test no. 3	PREPARED	Date:	Sign.:	Doc. No.:	
	VERIFIED	Date:	Sign.:	Rev.:	Page:

Strain gauge location and numbering

1:10



Rupture location

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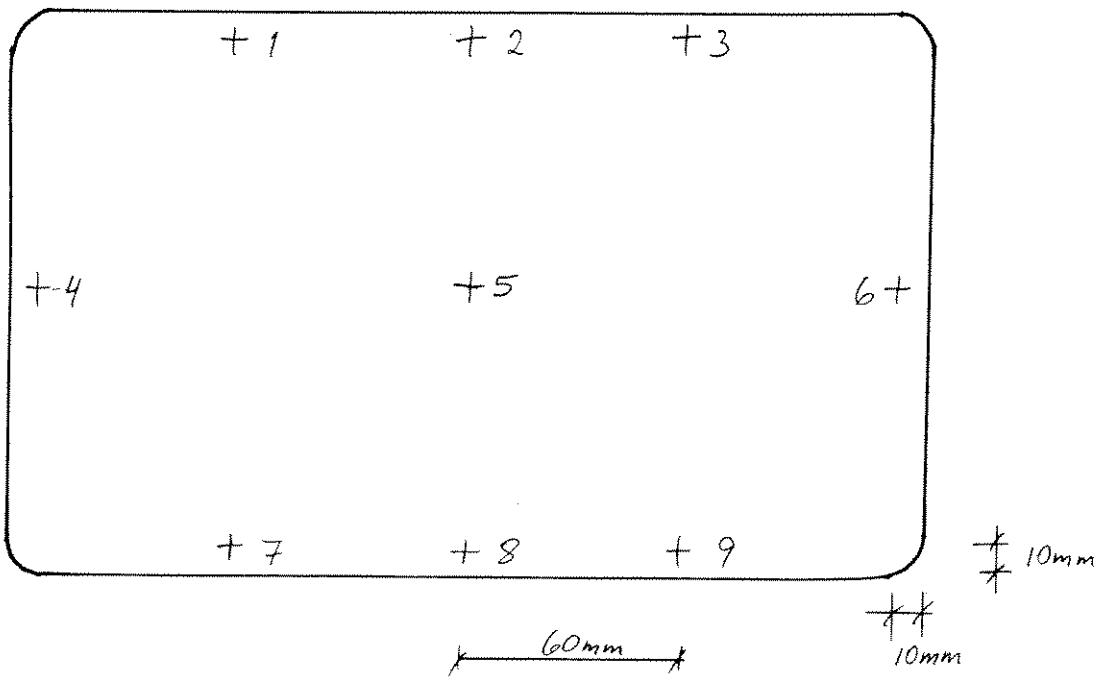

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DNV	Project title: Reliability of Corroded Pipes			Project No.: 25010049	
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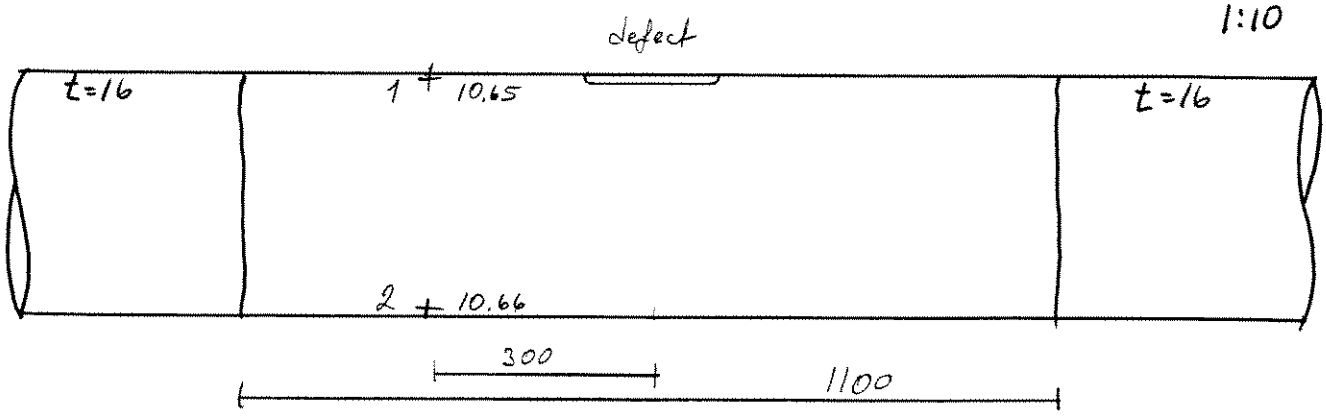

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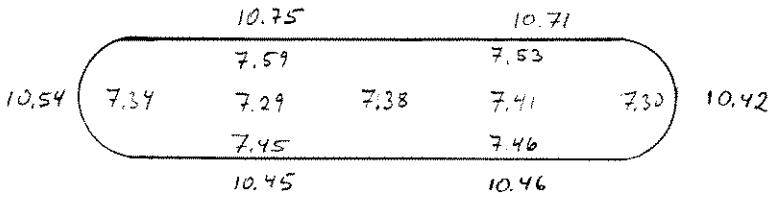

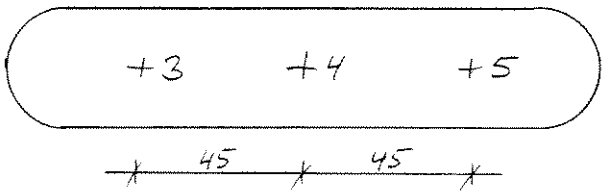

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Project title: Reliability of Corroded Pipes				Project No.: 25010049
Client/Subject: Test no. 5	PREPARED	Date:	Sign.:	Doc. No.:
	VERIFIED	Date:	Sign.:	Rev.: / Page:

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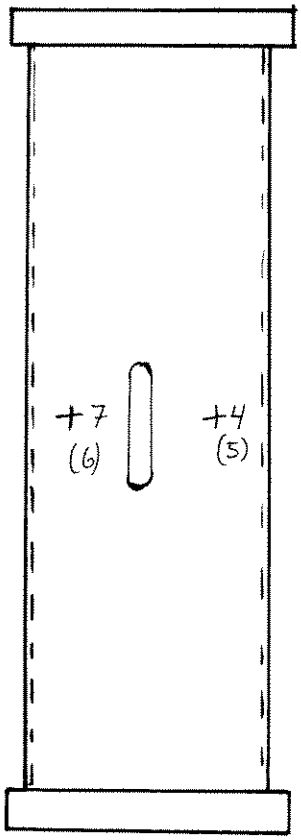

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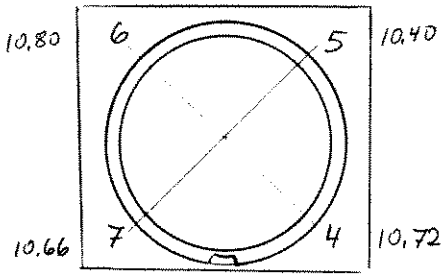

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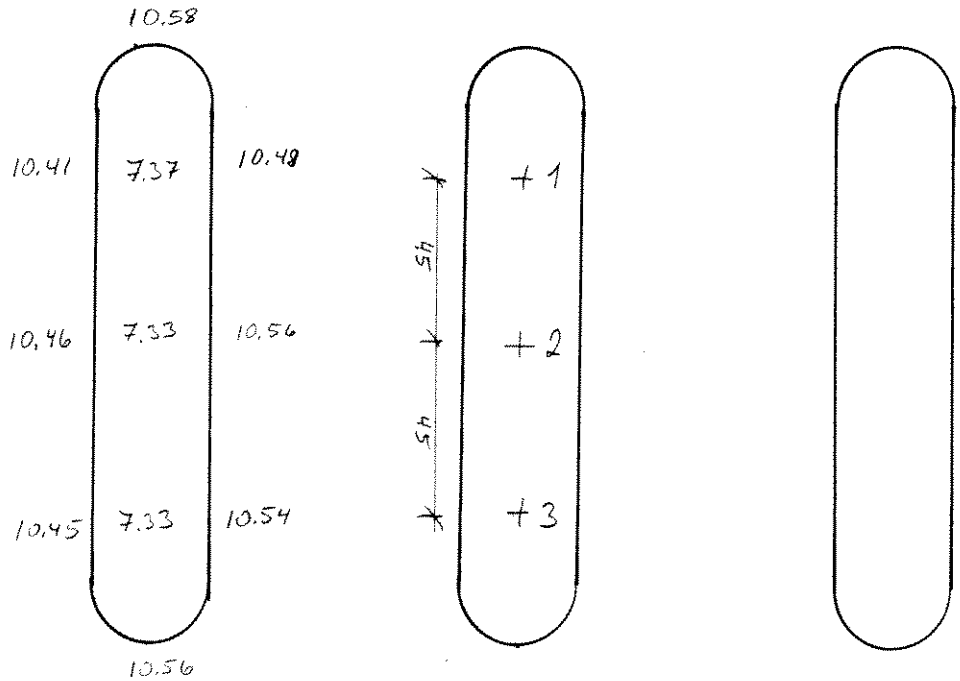

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Project title: Reliability of Corroded Pipes				Project No.: 25010049	
Client/Subject: Test no. 6	PREPARED	Date:	Sign.:	Doc. No.:	
	VERIFIED	Date:	Sign.:	Rev.:	Page:

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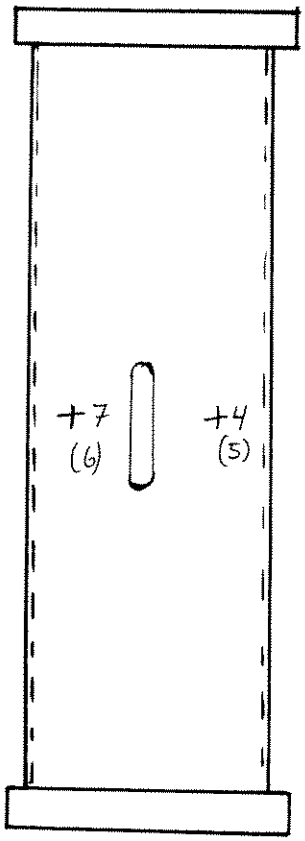

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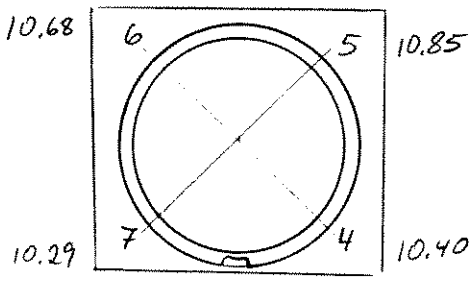

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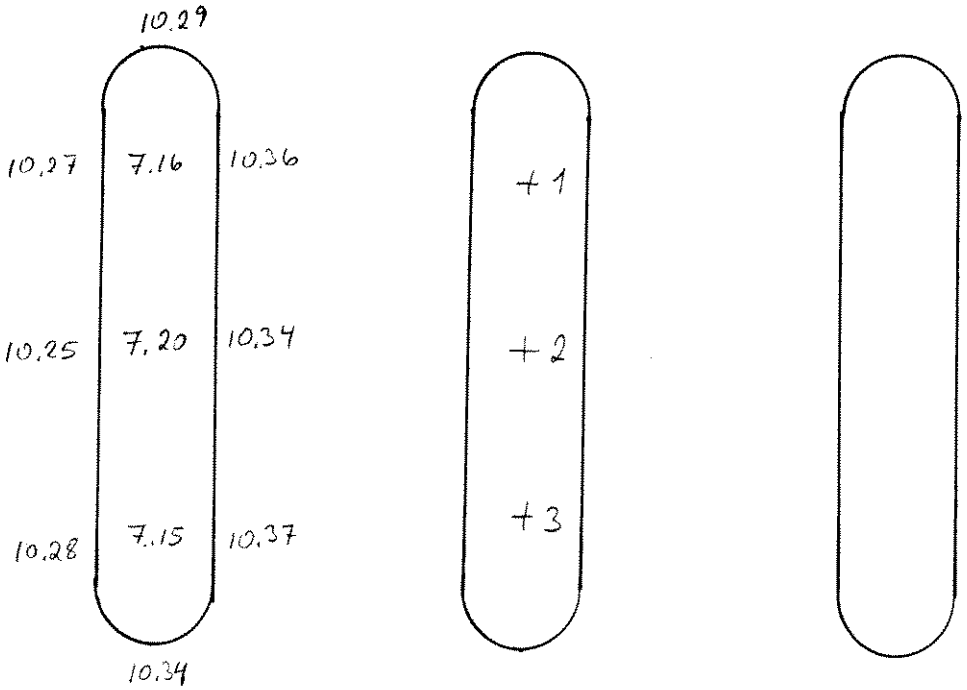

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Project title: Reliability of Corroded Pipes				Project No.: 25010049	
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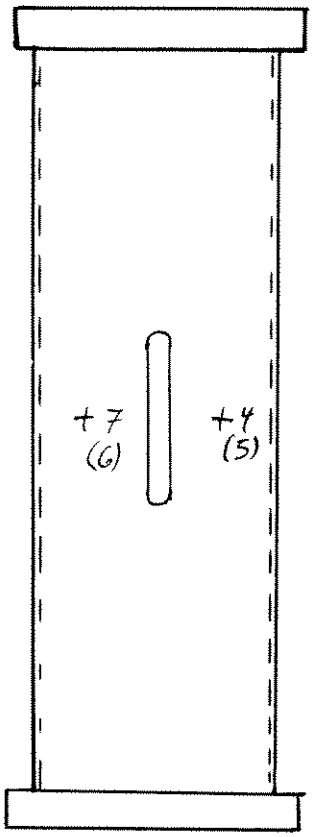

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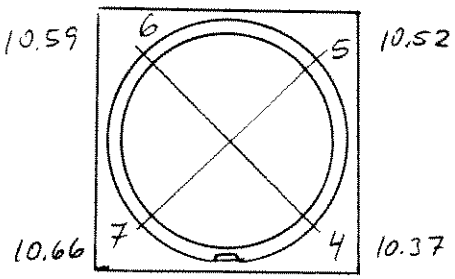

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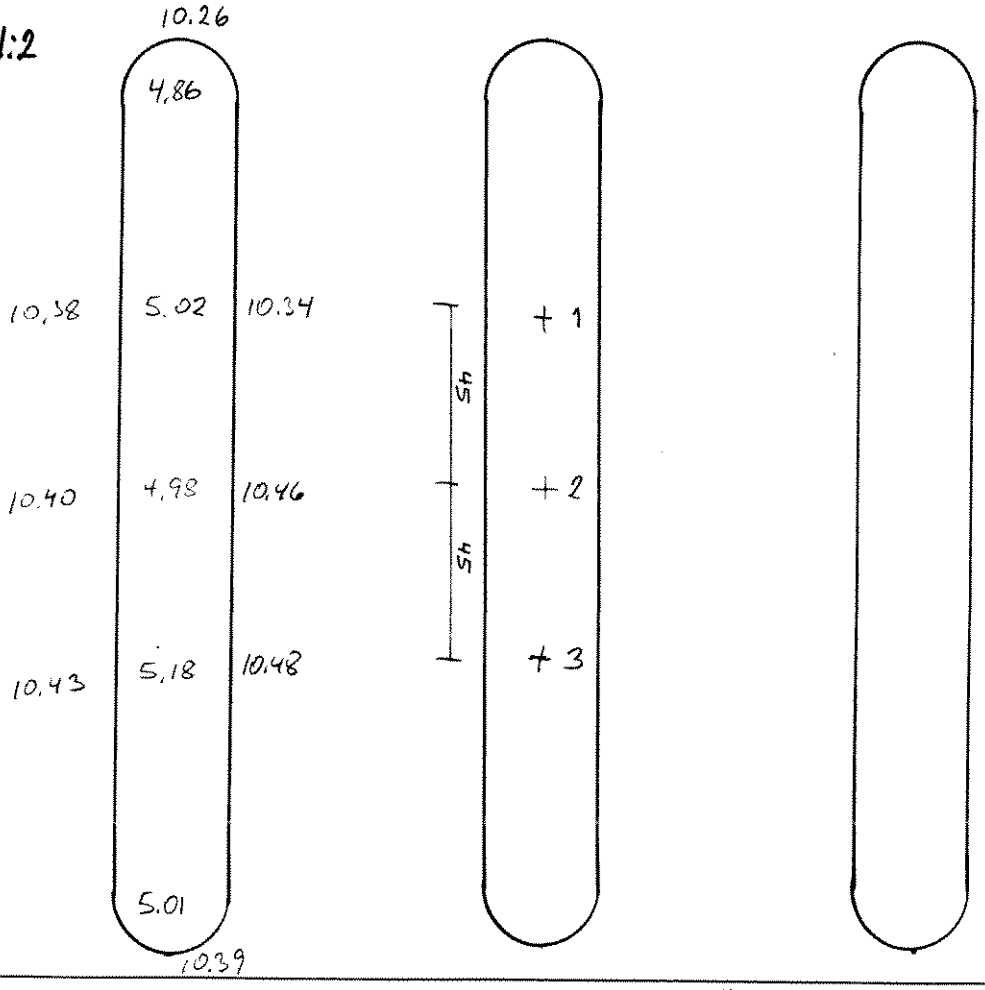

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Project title: Reliabilty of Corroded Pipes				Project No.: 25010049	
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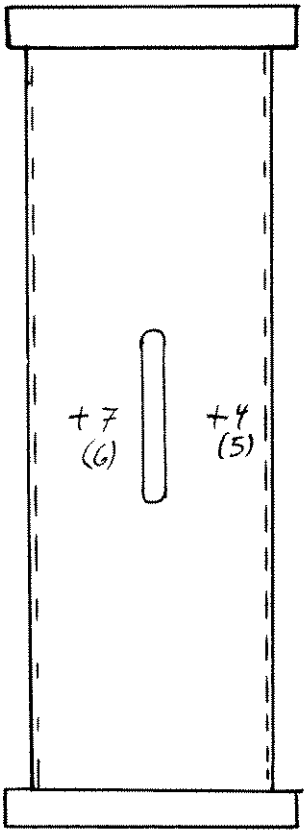

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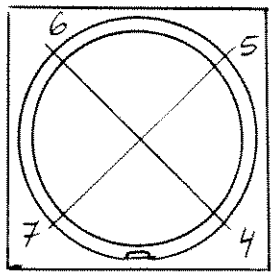

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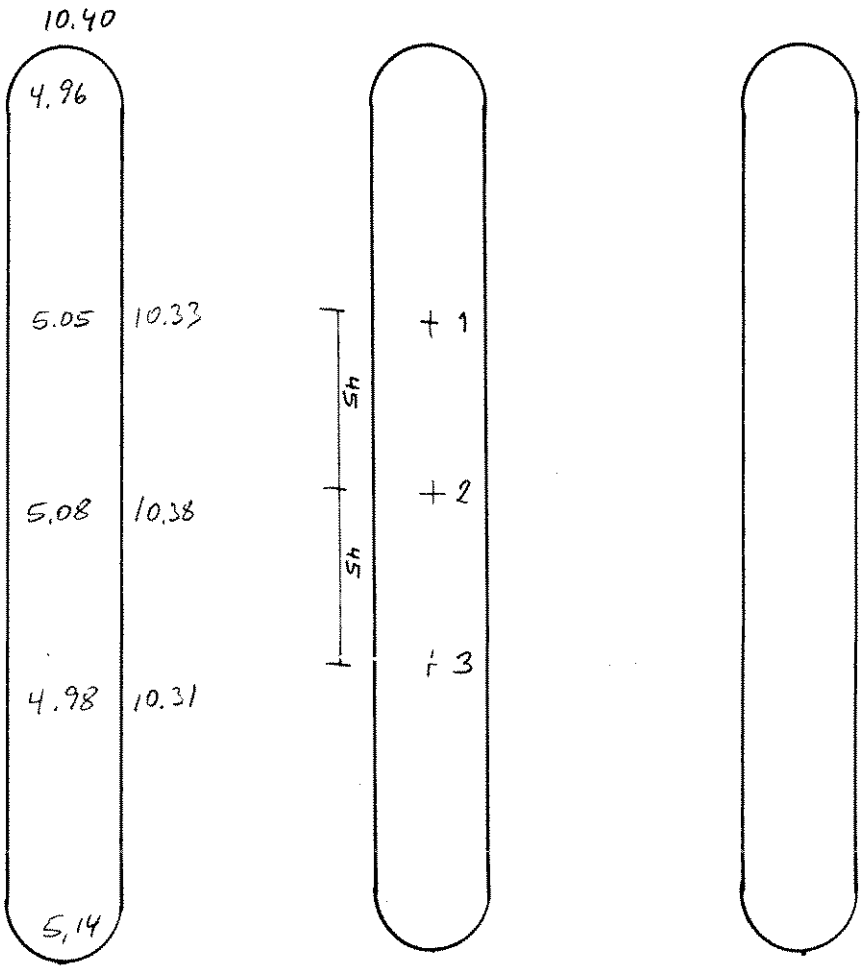

RUTEBLOK.BLA 02-96

Project title: Reliability of Corroded Pipes				Project No.: 25010049	
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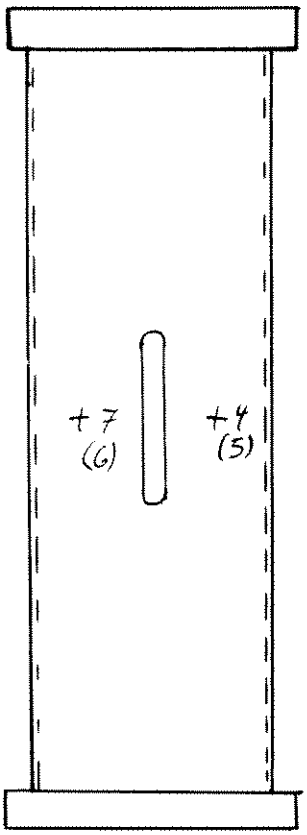

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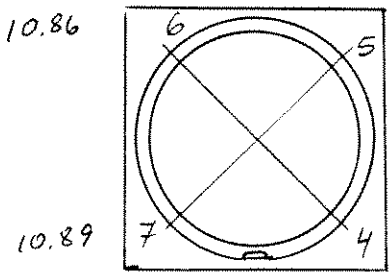

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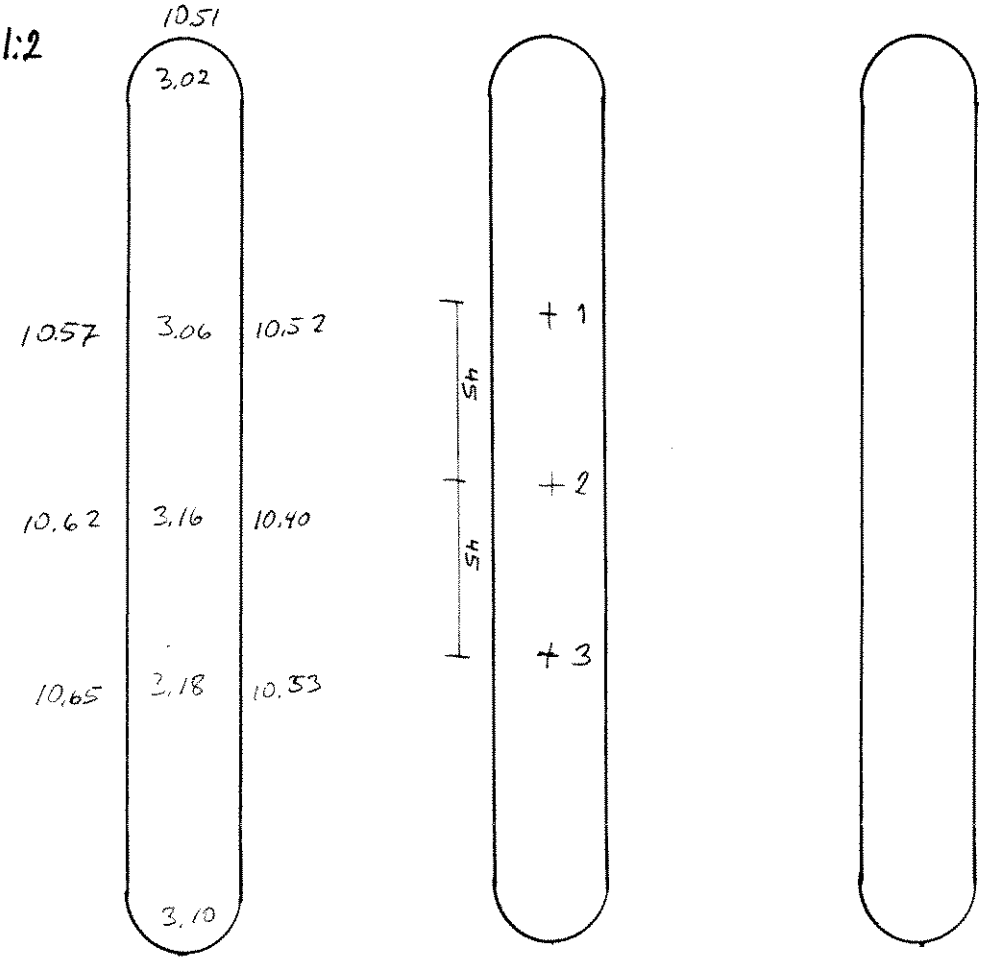
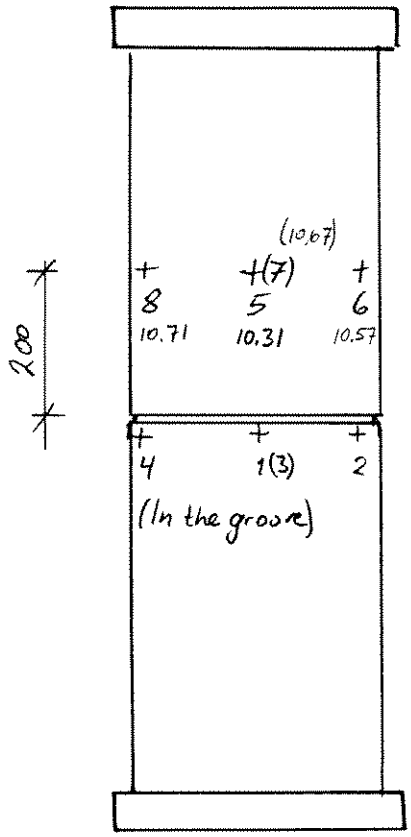
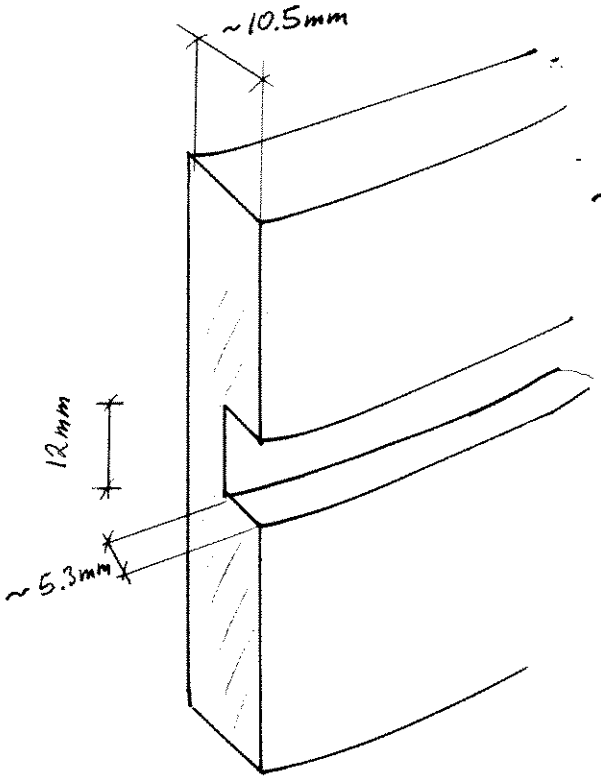


RUTEBLOK.BLA 02.96

Project title: Reliability of Corroded Pipes				Project No.: 25010049	
Client/Subject: Test no. 10	PREPARED	Date:	Sign.:	Doc. No.:	
	VERIFIED	Date:	Sign.:	Rev.:	Page:

1:10





~1:1

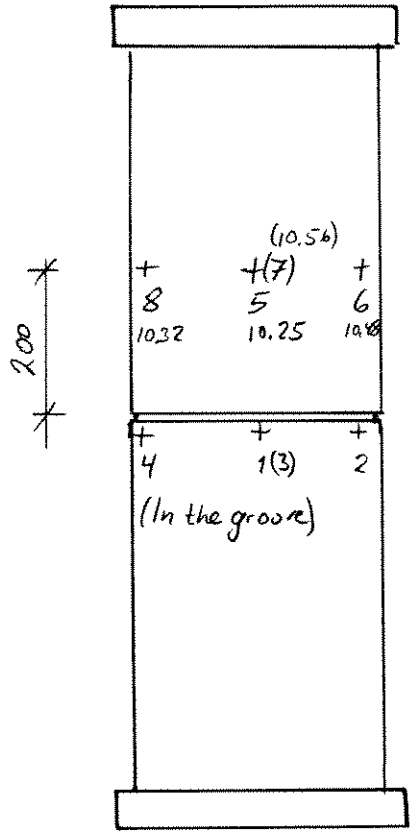
Measured thickness

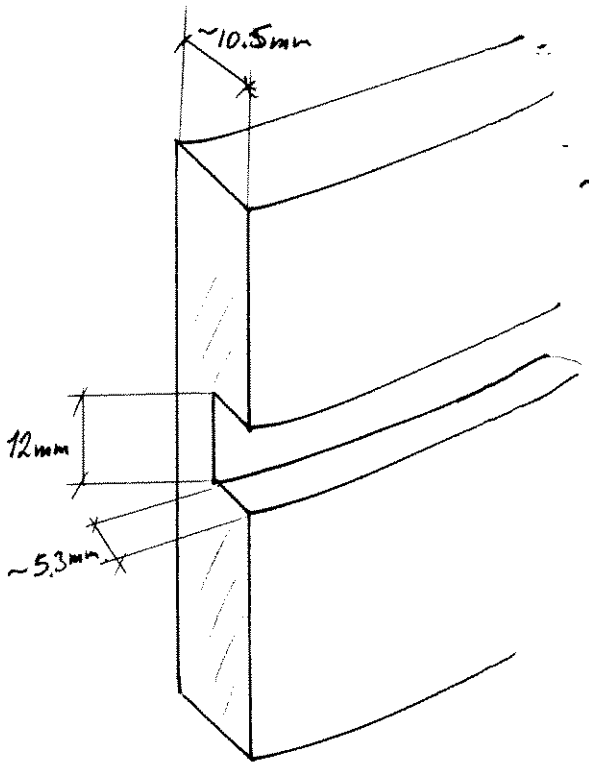
Gauge	groove	pipe
1	5.22	10.34
	5.55	10.50
	5.30	10.38
	5.55	10.49
2	5.66	10.52
	5.95	10.81
	5.78	10.41
	5.70	10.77
3	5.75	10.67
	5.67	10.78
	5.60	10.80
	5.75	10.70
4	5.59	10.71
	5.67	10.78
	5.22	10.35
	5.21	10.51

Rupture location close to strain gauge 2.

Project title: Reliability of Corroded Pipes				Project No.: 25010049
Client/Subject: Test no. 11	PREPARED	Date:	Sign.:	Doc. No.:
	VERIFIED	Date:	Sign.:	Rev.: / Page:

1:10





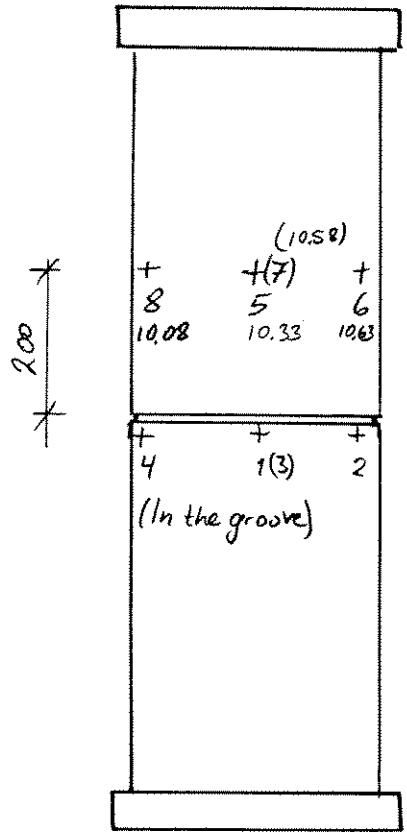
~1:1

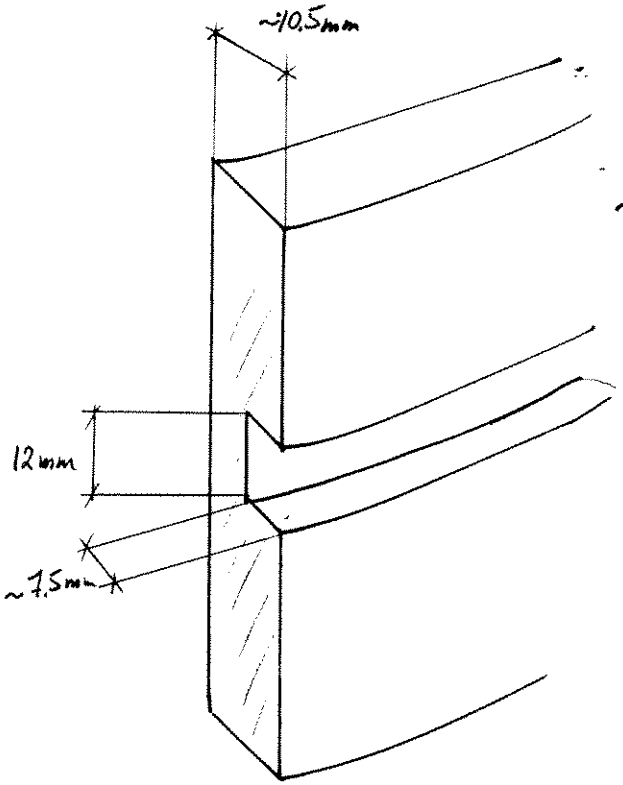
Thickness measurements

Gauge	groove	pipe
1	4.93	10.12
	5.14	10.27
	5.12	10.14
	5.35	10.47
2	5.66	10.22
	5.92	10.66
	5.67	10.57
	5.31	10.41
3	5.64	10.56
	5.82	10.57
	6.01	10.48
	6.06	10.55
4	5.87	10.30
	5.68	10.48
	5.37	10.60
	5.15	10.22

	Project title: Reliability of Corroded Pipes			Project No.: 25010049	
DNV	Client/Subject: Test no. 12	PREPARED	Date:	Sign.:	Doc. No.:
		VERIFIED	Date:	Sign.:	Rev.: / Page:

1:10





~1:1

Measured thickness

Gauge	groove	pipe
1	2.89	10.51
	3,14	10.59
	2.87	10.40
	2.94	10.53
2	2.98	10.52
	3.56	10.93
	3.26	10.58
	3.49	10.48
3	3.44	10.50
	3.76	10,51
	3.60	10.48
	3.04	10,30
4	2.88	10.07
	3.26	10.48
	2.95	10.52
	3.03	10.46

APPENDIX

B

MATERIAL CERTIFICATES AND MATERIAL TEST RESULTS

- o0o -

DET NORSKE VERITAS
Research laboratories

Kjørnoy 8002

Form No. 20.200a

DATA SHEET

Project No. 7756

Date : 18/6-96 Sign : Ott

TEST SPECIMENS 1-9

DNV

			Flytegrense / 0.2 grense		Strekkfasthet		Forlengelse	Kontraksjon
Strekk			KN	N/mm²	KN	N/mm²	Lo 30	As %	%
L 1	5.96	27.80	11.65	416	14.3	513	41,1	37.0	2.9 76.3
L 2	5.98	28.09	12,30	438	14.45	514	41.6	38.7	3.1 74.9
T 1	5.96	27.80	11.05	396	14.4	516	40,2	34.0	3.1 72.9
T 2	6.00	28.27	11.25	398	14.5	513	41.3	37.7	3.0 75,0

1756 18/6 - 96 Obt

10V = 50kN

0.25V

10V = 6.25mm

0.5V

$d = 5.98$ $A = 28.09 mm^2$

$\varepsilon_{vrai} = \ln(1+\varepsilon)$

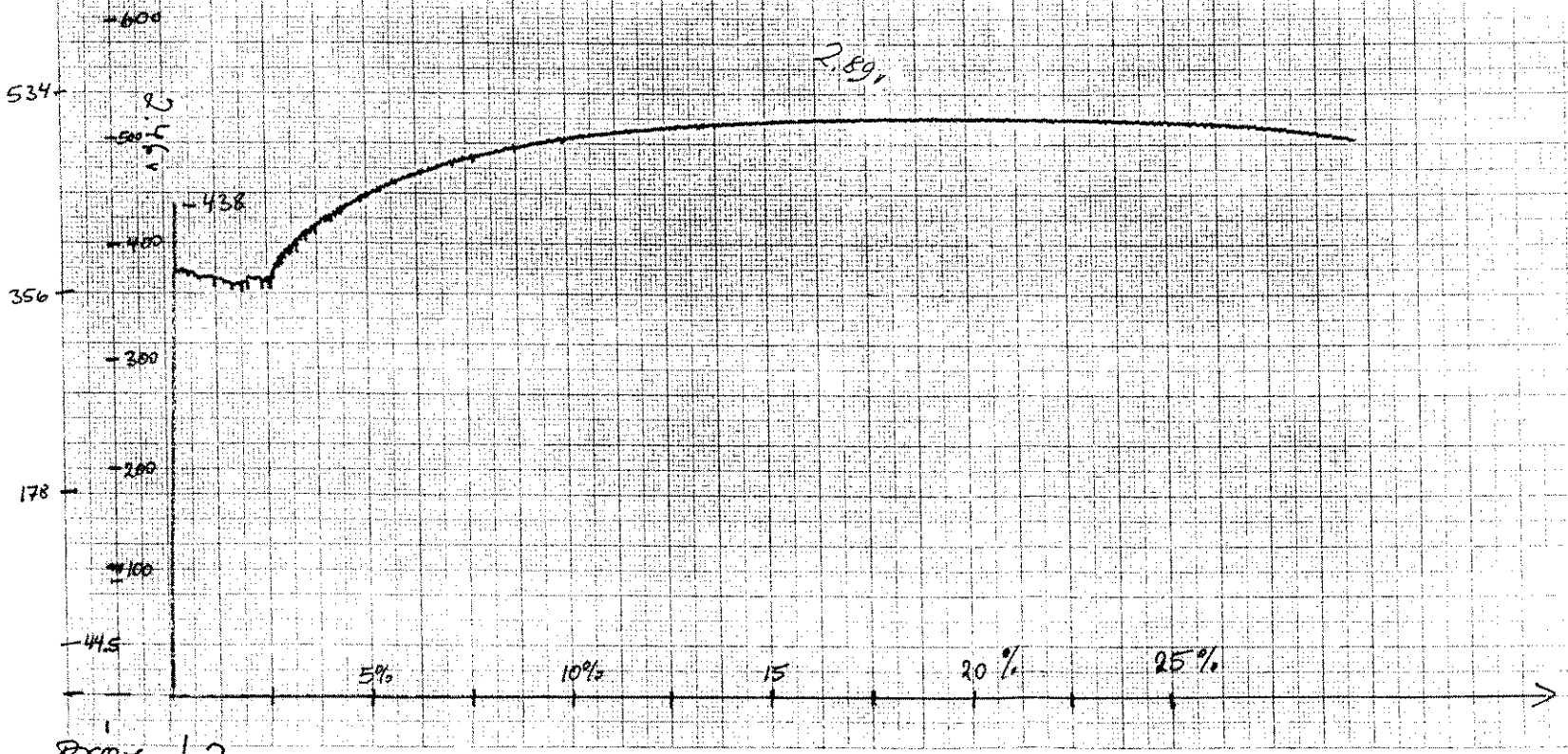
$\sigma_{vrai} = \sigma(1+\varepsilon)$

Cl bpgauge = 25mm

10V = 6.25mm disp = $\frac{6.25}{25} = 0.25$ soyons 25%

1V = 2.5% = 1V.

$10V = 50kN \Rightarrow 10V = \frac{50kN}{28.09} = 1780 MPa \Rightarrow 1V = 178 MPa \Rightarrow 4cm$



Prouc L2

10V = 50kN

0.25 V

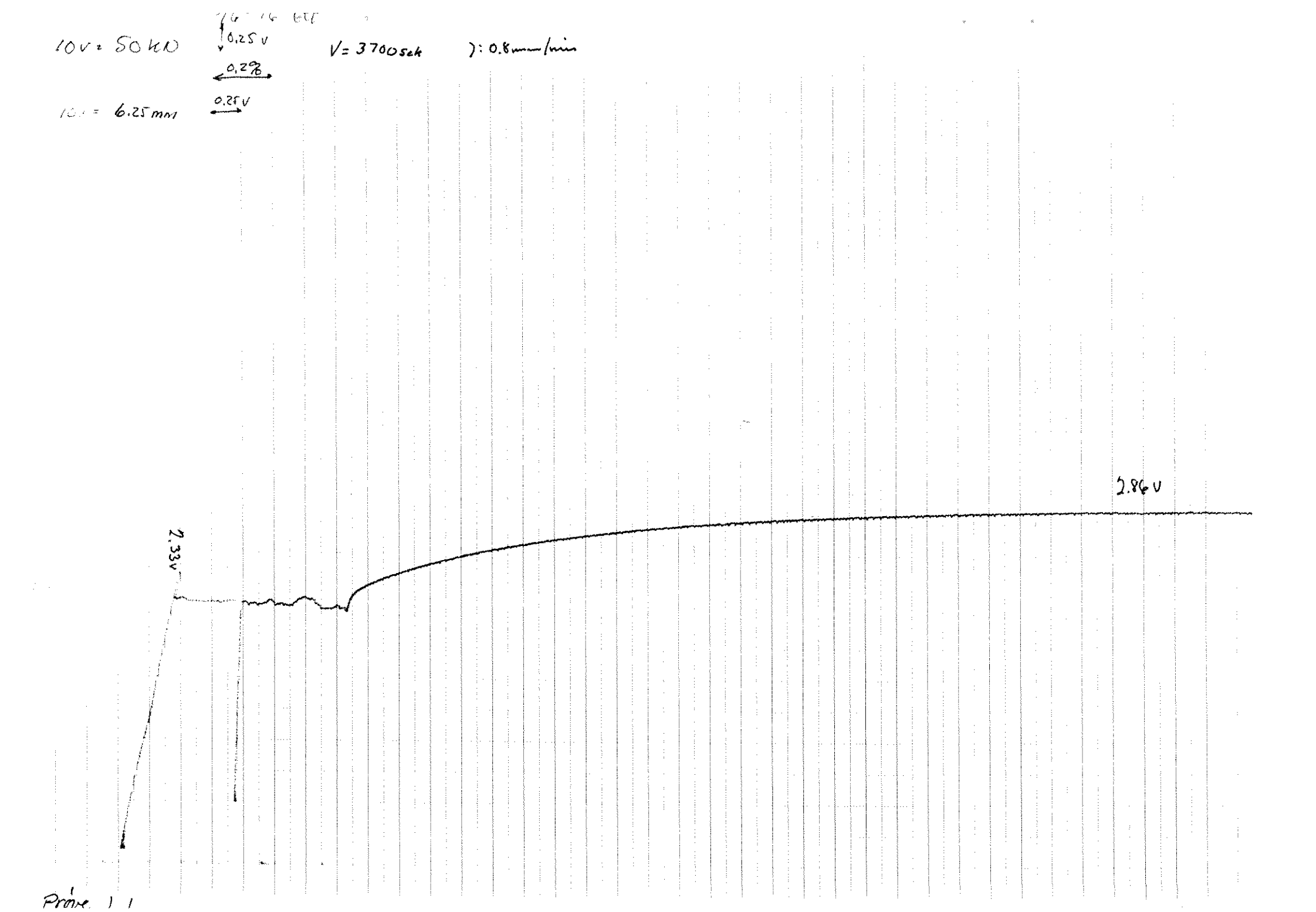
0.2 %

0.25 V

10 = 6.25 mm

V = 3700 s⁻¹

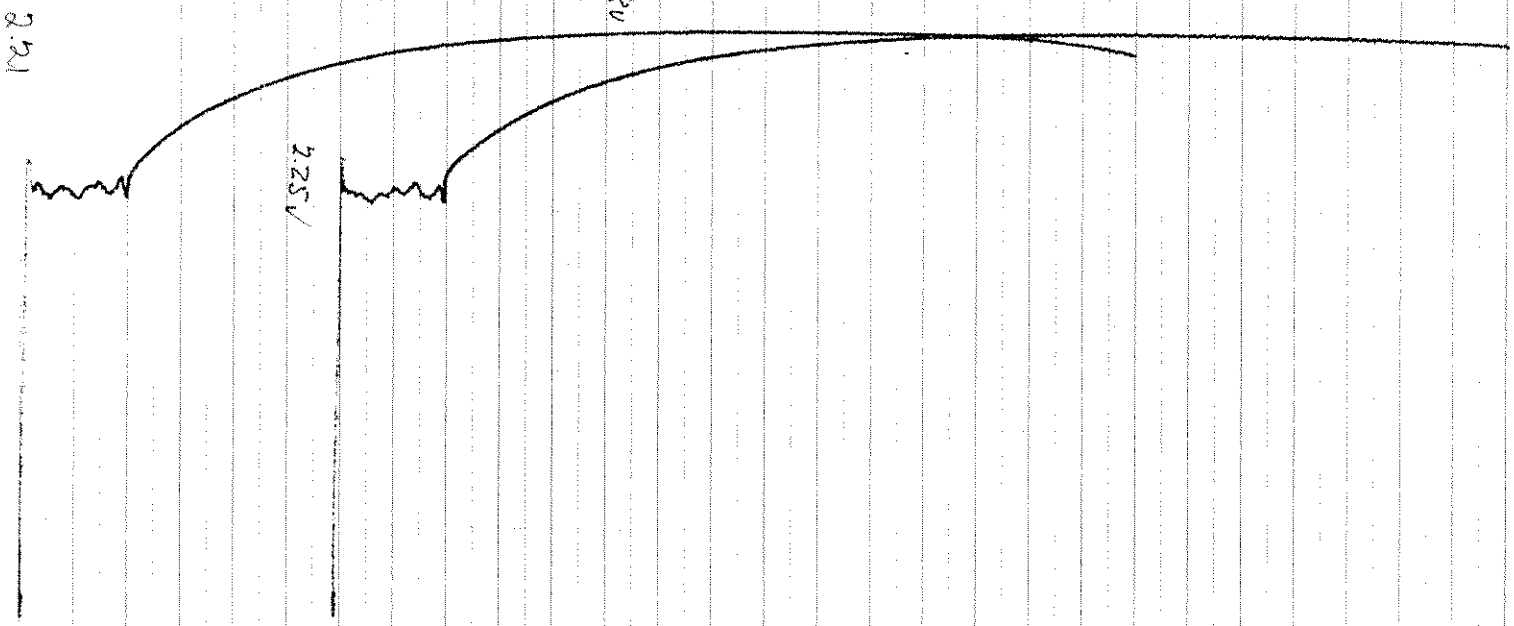
): 0.8 mm/min



Probe 11

10V = 50kΩ ↕ 0.25V

10V = 6.25V ↔ 0.5V



R204 T1

ROLF LYCKE AS Avd. Stavanger
Tel.: 51 48 27 00 - Telefax: 51 46 55 62
Reg.No.: 947 539 191 - V.A.T.: 279 826 38

PAKKSEDDEL/PACKING LIST

OSLO LAGERP: Avd. BRYNE

11510
DET NORSKE VERITAS INDUSTRY A/S
VERITASVN. 1
P.B.300
1322 HØVIK

Lev. adresse:
VERITASVN. 1
HØVIK

S./P.: 1

Deres best.nr./Your P.O No.	Deres ref./Your Ref.	Vår ref./Our Ref.	Vårt ordre nr./Our Order No.
	O.H.BJØRNØY	F.H. Martinussen / R	11236 / 01

Merking/Marking

Best. dato/Date of Order: 96-05-07

Bet.beting/Payment Terms	Lev.beting/Delivery Terms	Lev.måte/Delivery	Lev.dato/Date of Delivery
NETTO PR. 30 DAGER	FOB BRYNE	SNRST.MULIG	96-05-07

Pos./ Item	Vare/ Article	Antall/ Quantity	Enh/ Unit	Levert/ Delivered	Rest/ Rest
	SERTIFIKAT EN 10204/DIN 50049-3.1.B				
1	014545AT 323.8*10.31MM PIPE SP S.40 X52 MOD	12.00	M	12 M 79.73 kg	
	Ch.nr: 93226				
	DELES I TO FOR TRANSPORT. VERITAS ØNSKER AT RØRET ANK. PÅ EN SLIK MÅTE AT OPPRINNELIG ORIENTERING MELLOM DE TO DELENE KAN BESTEMMES.				
2	014548AT 323.8*15.88MM PIPE SP X52 MOD	6.00	M	6 M 120.62 kg	
	Ch.nr: 93227				
	KAPPES I FIX LGD 6M.				

CERTIFICATES ENCLOSE

13,32
1785 kg

Porto : ..... Kolli : 2RØR Uttak : G.V. Lev dato : .....

Etter forfall beregnes 1.0 % rente pr. mnd. I.h.t. panteloven forbeholder vi oss eiendommsretten til de leverte varer inntil kjøpesummen er helt betalt. Aksept ansees ikke som betaling før den er innfridd i sin helhet.
1.0% pr month is added for late payment. Title to goods belongs to Rolf Lycke AS until payment has been received in full.

Mottatt: _____

DET NORSKE VERITAS

Certificate No.:
VER 52995048-06

INSPECTION CERTIFICATE OF MATERIALS

☐ DNV certificate acc. to Classification Rules.

☒ 3.1C acc. to ISO 10474/EN 10204

Product: SEAMLESS LINE PIPE, 12-3/4 inx0.406 in (323.9 mmx10.30 mm)	Total mass: (761.780 M) 60.647 Ton.
Manufacturer: TUBOS DE ACERO DE MEXICO, S.A.	Manufacturer's order No.: 003830-03
Purchaser: ROLF LYCKE A/S	Purchaser's order No.: 23005

Destination/Supplementary information:
NORWAY / Manufacturer's Certificate N° 95003439

MATERIAL SPECIFICATION

Material standard and grade	Any additional requirements
API Spec 5L (April 1, 1995), Grade X52	As per Rolf Lycke A/S, PO 23005

SPECIFIED MECHANICAL PROPERTIES

TENSILE PROPERTIES					CHARPY V-NOTCH IMPACT PROPERTIES				
Specimen type/ dimensions	Yield point R_{eH} or $R_{p0,2}$ N/mm²	Tensile strength R_m N/mm²	Elongation A_5 %	Reduction of area Z %	Orientation L or T	Test temp. °C	Width of test piece mm	Energy, J, min. Single	Energy, J, min. Average
	360	490 - 620	22		T	-50	10	28	36

Remarks:

SPECIFIED CHEMICAL COMPOSITION

Element	C, %	Mn, %	Si, %	P, %	S, %	Mo, %	Cr, %	V, %	Nb, %	Ni, %	Cu, %	CA, %	CE, %
Specific value(s)	0.14	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.004	0.41

Remarks: V + Nb + Ti, 0.07% Max., V + Nb, 0.06% Max., Cu + 6Sn, 0.32% Max.

Marking:

N

The stamping is placed:
between 5 to 15 cm from pipe end

The materials are tested and inspected in the Normalized condition, and are found to be in accordance with the above specification. (For test results, see overleaf)

If applicable state drawing number and approval date

Veracruz, Mexico
Place

1995.10.27
Date

R. O. TINOCO
Inspector

Certificate No.:
VER 52995046-06

TEST RESULTS

MECHANICAL PROPERTIES

Cast. No.	Test No.	TENSILE TESTS: Yield point R_{eH} or $R_{p0,2}$ N/mm²	Tensile strength R_m N/mm²	Elong-ation A_5 %	Reduction of area Z %	CHARPY V-NOTCH IMPACT TESTS: Orien-tation L or T	Width of test piece mm	Test temp °C	Energy, J, min. 1	2	3	Ave.
93226	01	375.60	513.88	46		T	10	-50	70	73	69	71
93226	02	401.10	528.59	46		T	10	-50	69	69	75	71

Remarks

CHEMICAL COMPOSITION

Cast. No.	C, %	Mn, %	Si, %	P, %	S, %	Mo, %	Cr, %	V, %	Nb, %	Ni, %	Cu, %	CA, %	CE, %
93226	0.139	1.16	0.26	0.007	0.004	0.030	0.05	0.034	0.00	0.06	0.123	.0022	0.36
93226	0.138	1.14	0.25	0.007	0.004	0.029	0.06	0.034	0.00	0.06	0.121	.0022	0.36

Remarks **Product Chemical Analysis**

Process
Seamless pipe

Heat treatment (state temperatures)
Normalized: 880 C

Non-destructive testing
Ultrasonic SR4 - 5% Notch & MPI

ADDITIONAL INSPECTION

Type and extent of inspection

Review of Chemical Analysis and Data Sheets, Mechanical Properties, Review of Dimensional Control Sheets and Hydrostatic Test Records, Ultrasonic & Electromag. Inspection Records, DNV Marking and Issue of Insp. Certificate.

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

MECHANICAL PROPERTIES AND TEST

HEAT NUMBER	LONGITUDINAL YIELD NW/MM2	STRENGTH TENSILE NW/MM2	%ELONGATION IN 2 INCH	FLATTENING	WIDE THICKNESS TENSILE SAMPLE MM.	THICKNESS MM.	IMPACT CHARPY INDIVIDUAL JOULE			TRANSVERSE AVERAGE JOULE	SHEAR AREA	HARDNESS HRC (HRB)
MINIMUM	360.00	490.00	22.0					28.000		36.000		22.00 ( )
MAXIMUM		620.00										
93226	375.60	513.88	46		38.10	10.80	70.000	73.000	69.000	71.000	100	80.11 HRB
93226	401.10	528.59	46		38.00	11.00	69.000	69.000	75.000	71.000	100	82.00 HRB

100% ULTRASONIC INSPECTION
SATISFACTORY

SR4-5% notch

100% MAGNETIC PARTICLE INSPECTION
SATISFACTORY

on Pipe ends

INSPECTION SATISFACTORY: SR-4 - EMI - VPI - MPI -

*** VARNISHED

MILL: KM 433 S CARR MEX-VER, VERACRUZ, VER, APDO POSTAL 402, TEL(29) 89-11-00, TELEX 16843, FAX(29) 91-02-88

QUANTITY 57 LENGTHS

ORIGINAL
PAGE 1 OF 4

ENG. SARA GARCIA PAJARES
QUALITY CERTIFICATION NAME AND SIGNATURE

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND / OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

PLUS ULTRA

OICA 777 04 0

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

METHALLOGRAPHIC EVALUATION

HEAT NUMBER	GRAIN SIZE	MICRO-STRUCTURE	LEVEL INCLUSIONS A	B	C	D	HARDNESS VICKER HV
MINIMUM	8						
MAXIMUN							
93226	10						
93226	10						

100 % ULTRASONIC INSPECTION
SATISFACTORY

SR4-5%notch

100 % MAGNETIC PARTICLE INSPECTION
SATISFACTORY

on Pipe ends

*** VARNISHED

MILL KM. 433.5 CARR MEX-VER
VERACRUZ, VER
APDO POSTAL 407
TEL(29) 99-11 00
TELEX 15843
FAX(29) 81-03-68

QUANTITY 57 LENGTHS

ENG. SARA GARCIA PAJARES
QUALITY CERTIFICATION NAME AND SIGNATURE

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PLUS ULTRA

DICA 777 04 0

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

PRODUCT CHEMICAL ANALYSIS

HEAT NUMBER	C %	MN %	SI %	P %	S %	MO %	CR %	V %	NB %	NI %	CU %	SN %	AL %	TI %	B %	AS %	CA %	C.E. %
MINIMUM																		
MAXIMUM	0.140	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.015					0.0040	0.41
93226	0.139	1.16	0.26	0.007	0.004	0.030	0.05	0.034	0.000	0.06	0.123	0.006	0.020	0.000	0.0000	0.004	0.0022	0.36
93226	0.138	1.14	0.25	0.007	0.004	0.029	0.06	0.034	0.000	0.06	0.121	0.006	0.017	0.000	0.0000	0.004	0.0022	0.36

100% ULTRASONIC INSPECTION
SATISFACTORY

SR4-5%notch

100% MAGNETIC PARTICLE INSPECTION
SATISFACTORY

on Pipe ends

*** VARNISHED

MILL KM 433.9 CARR MEX-VER
VERACRUZ, VER
APDO POSTAL 402
TEL(29) 99-11-00
TELEX 13843
FAX(29) 81-02-66

QUANTITY 57 LENGTHS

ENG. SARA GARCIA PAJARES
QUALITY CERTIFICATION NAME AND SIGNATURE

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

PLUS ULTRA

DICA 777 04 0

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
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TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

HEAT CHEMICAL ANALYSIS

HEAT NUMBER	C %	MN %	SI %	P %	S %	MO %	CR %	V %	NB %	NI %	CU %	SN %	AL %	TI %	B %	AS %	CA %	N %	C.E.
MINIMUN																			
MAXIMUN	0.140	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.015					0.0040	0.0090	0.41
93226	0.120	1.16	0.26	0.007	0.003	0.029	0.06	0.037	0.000	0.06	0.120	0.007	0.022	0.000	0.0000	0.004	0.0020	0.0058	0.35

100% ULTRASONIC INSPECTION SATISFACTORY

SR4-5%notch

THIS CERTIFICATE CANCELS AND SUBSTITUTES THE ONE SENT ON 03/10/95 WITH No. 95003439.

100% MAGNETIC PARTICLE INSPECTION SATISFACTORY

NOTES: CERTIFICATE ACC. TO "EN 10204/DIN 50049 3.1.C/DIN 50049 3.1.B /ASTM A106 B 94/ASTM A333 GRADE 6 94.HARDNESS ACCORDING TO NACE MR-01-75 1995. IMPACT TEST:SPECIMEN SIZE 10 X 7.50 MM.TEMPERATURE -50 C. HEAT TREATMENT: NORMALIZED (TEMPERATURE = 880 C). GRAIN SIZE ACC. TO ASTM E112-85. TAMSA REF: 2571. INSPECTION COMPANY: D.N.V.

*** VARNISHED

on Pipe ends

ORIGINAL

PAGE 4 OF 4

ENG. SARA GARCIA PAJARES

QUALITY CERTIFICATION NAME AND SIGNATURE

MILL KM 433.5 CARR.MEX-VER VERACRUZ, VER APDO POSTAL 402 TEL(29) 89-11-00 TELEX 13643 FAX(29) 81-02-88

QUANTITY 57 LENGTHS

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

PLUS ULTRA

DICA 777 04 0

14.12 0002

250100 49

DET NORSKE VERITAS
Laboratory Department

DATA SHEET

Form No. 20.200a

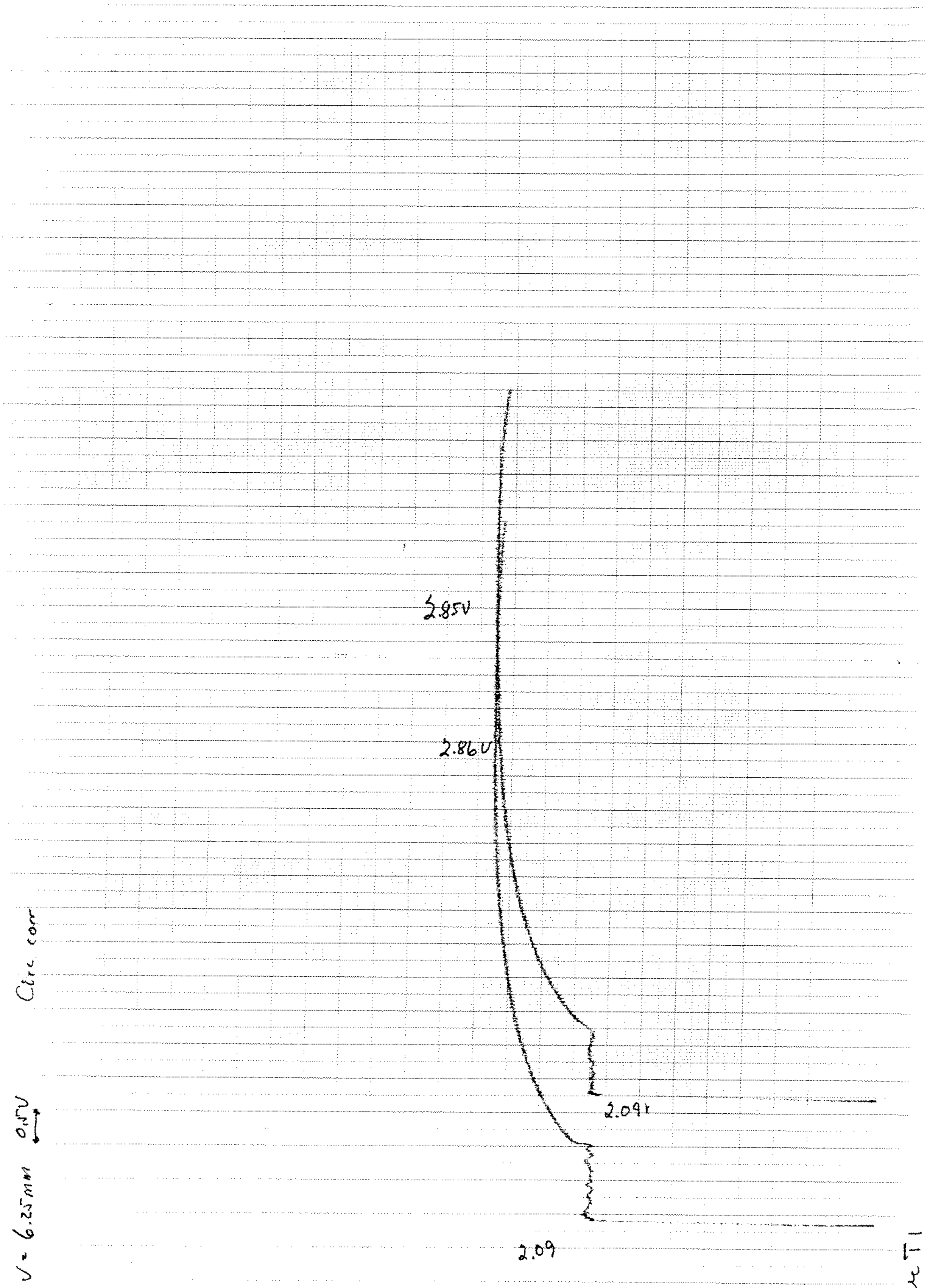
Project No. 15017

Date : 24/1-97 Sign : OH

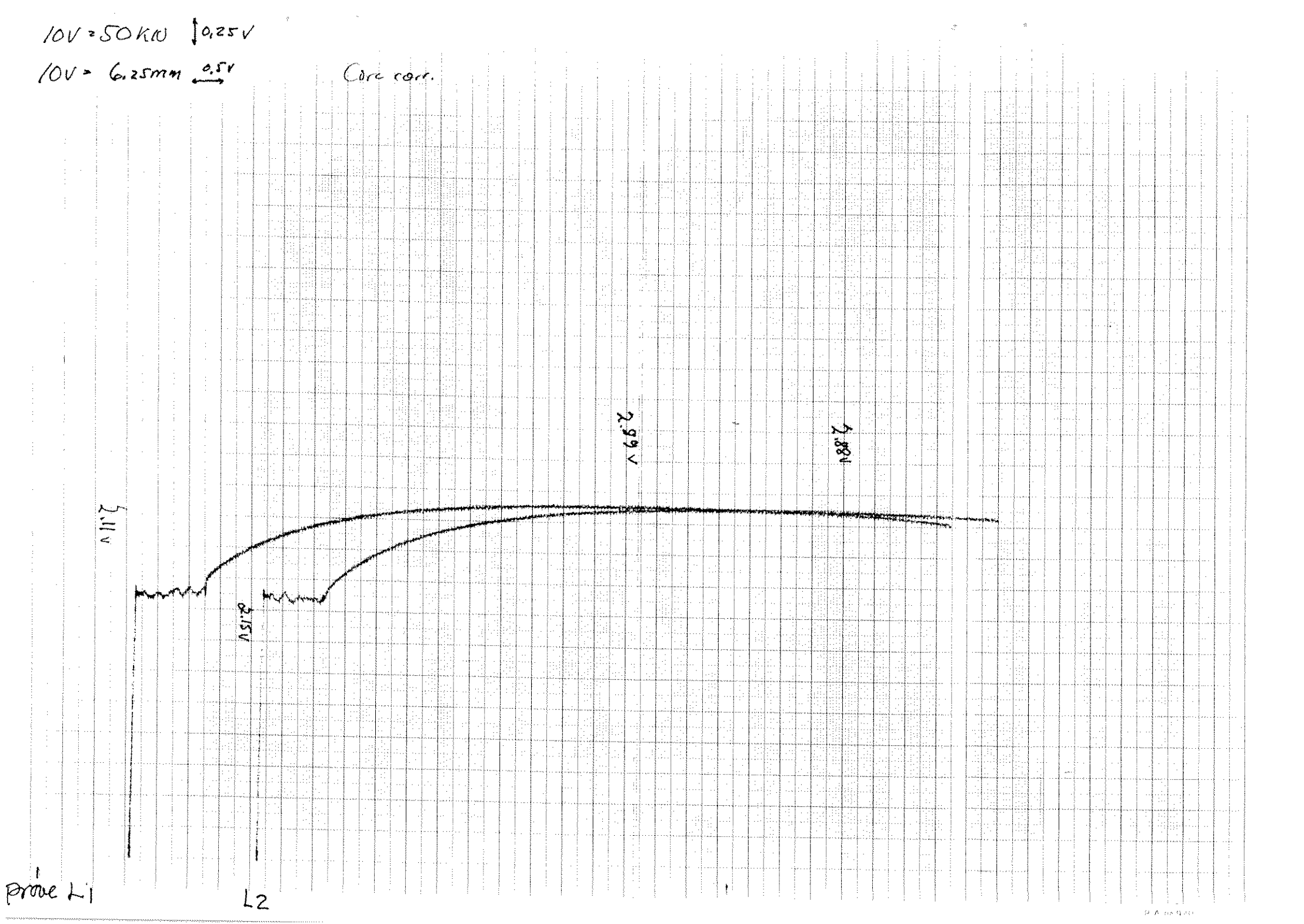
DN 750

For 3 rør circ. corrosion test 10, 11, 12 Jan 97

			Flytegrense		Strekkfasthet				
Strekk			KN	N/mm²	KN	N/mm²	$L_0 = 3_0$	Forlengelse A_5	Kontraksjon
L 1	6.0	28.27	10.55	373	14.45	511	41.5	38.3	2.51 6.83 75.8
L 2	5.98	28.09	10.75	383	14.40	513	41.3	37.7	2.95 75.7
T 1	5.96	27.90	10.45	376	14.30	513	41.1	37.0	2.91 75.5
T 2	5.96	27.90	10.45	375	14.25	511	40.7	35.7	2.51 75.5



2.85V
2.86V
2.09V
2.09
Circ corr
10V = 50 kω ↕ 0.5V
10V = 6.25mm ↔ 0.5V
Probe T1


10V = 50KΩ ↕0.25V
10V = 6.25mm ←→0.5V
Core corr.
2.11V
2.89V
2.88V
2.15V
Probe L1
L2

ROLF LYCKE A/S Avd. Oslo
Postboks 6180 Grønland, N-0134 OSLO
Uttegt. 14, 0184 OSLO
Tel.: 22 19 84 20 • Telefax: 22 67 03 29
NO 947 695 151 MVA

PAKKSEDDEL/PACKING LIST

For test specimen no. 10, 11 and 12

DS. 1 LAGERP: Avd. OSLO

11510
DET NORSKE VERITAS INDUSTRY A/S
VERITASVN. 1
P.B.300
1322 HØVIK

Lev. adresse:
3 STK FREDRIKSTAD MONTERING AS
INDUSTRIVN. 5-11
FREDRIKSTAD

S./P.: 1

Deres best.nr./Your P.O No.	Deres ref./Your Ref.	Vår ref./Our Ref.	Vårt ordre nr./Our Order No.
6750	O.H.BJØRNØY	Thorbjørn Hoel / BMR	169369 / 01

Marking/Marking
3 STK MRK:J.SÆTER

Best. dato/Date of Order
96-12-13

Bet.bating/Payment Terms	Lev.bating/Delivery Terms	Lev.måte/Delivery	Lev.dato/Date of Delivery
NETTO PR. 30 DAGER	FOB OSLO		96-12-13

Pr / Vare/ Item Article		Antall/ Quantity	Enh/ Unit	Levert/ Delivered	Rest/ Rest
	SERTIFIKAT EN 10204/3.1.B				
1	014545A 323.8*10.31MM PIPE SP S.40 X52 MOD Ch.nr: 93226 3 * 1 METER	3.00	M Lok.: X-1-8.	3,00 79.73 kg	
2	014545A 323.8*10.31MM PIPE SP S.40 X52 MOD Ch.nr: 93226 1 * 0.5 METER	0.50	M Lok.: X-1-8.	0,50 79.73 kg	
3	281 KAPP	4.00	STK	4	

3 * 1 METER SENDES FREDRIKSTAD MONTERING
0.5 METER SENDES VERITAS, HØVIK.
RØRENE TIL F.M. MERKES "J. SÆTER"
RØRET TIL DNV MERKES "O. BJØRNØY"
FRAKT TIL FREDRIKSTAD FORUTBETALES.
KOPI AV SERT. TIL BEGGE.

3 stk til Fr. montering Thronsen Av 16/12 - 96
1 stk til Verita. Bil 16/12 - 96

Porto : ..... Kolli : 4 pcs Uttak : DC/V Lev dato : .....

Etter forfall beregnes 1.0 % rente pr. mnd. l.h.t. pantelovan forbeholder vi oss eiendommsretten til de leverte varer inntil kjøpesummen er helt betalt. Aksept ansees ikke som betaling før den er innfridd i sin helhet
1.0% per month is added for late payment. Title to goods belongs to Rolf Lycke AS until payment

10/11/12

DET NORSKE VERITAS

Certificate No.:
VER 82695048-06

INSPECTION CERTIFICATE OF MATERIALS

☐ DNV certificate acc. to Classification Rules.
☒ 3.1C acc. to ISO 10474/EN 10204

Product: SEAMLESS LINE PIPE, 12-3/4 inx0.406 in (323.9 mmx10.30 mm)	Total mass: (781.780 M) 80.647 Ton.
Manufacturer: TUBOS DE ACERO DE MEXICO, S.A.	Manufacturer's order No.: 003630-03
Purchaser: ROLF LYCKE A/S	Purchaser's order No.: 23005

Destination/Supplementary information:
NORWAY / Manufacturer's Certificate Nº 95003439

MATERIAL SPECIFICATION

Material standard and grade	Any additional requirements
API Spec 5L (April 1, 1995), Grade X52	As per Rolf Lycke A/S, PO 23005

SPECIFIED MECHANICAL PROPERTIES

TENSILE PROPERTIES				CHARPY V-NOTCH IMPACT PROPERTIES				
Specimen type/ dimensions	Yield point R_{eH} or $R_{p0.2}$	Tensile strength R_m	Elongation A_s	Reduction of area Z	Orientation	Test temp.	Width of test piece	Energy, J, min.
	N/mm²	N/mm²	%	%	L or T	°C	mm	Single / Average
	360	490 - 620	22		T	-50	10	28 / 38

Remarks:

SPECIFIED CHEMICAL COMPOSITION

Element	C, %	Mn, %	Si, %	P, %	S, %	Mo, %	Cr, %	V, %	Nb, %	Ni, %	Cu, %	CA, %	CE, %
Specific value(s)	0.14	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.004	0.41

Remarks: V + Nb + Ti, 0.07% Max., V + Nb, 0.06% Max., Cu + 6Sn, 0.32% Max.

Marking:

N

The stamping is placed:
between 8 to 15 cm from pipe end

The materials are tested and inspected in the Normalized condition, and are found to be in accordance with the above specification. (For test results, see overleaf)

If applicable state drawing number and approval date

Veracruz, Mexico
Place

1995.10.27
Date

R. O. TINOCO
Inspector

10/11/12

Certificate No.:
VER 52995046-06

MECHANICAL PROPERTIES

TENSILE TESTS						CHARPY V-NOTCH IMPACT TESTS						
Cast. No.	Test No.	Yield point R_{eH} or $R_{p0.2}$ N/mm²	Tensile strength R_m N/mm²	Elongation A_5 %	Reduction of area Z %	Orientation L or T	Width of test piece mm	Test temp °C	Energy, J, min. 1	2	3	Ave.
93226	01	376.60	513.88	48		T	10	-60	70	73	69	71
93226	02	401.10	526.59	46		T	10	-60	69	69	75	71

Remarks

CHEMICAL COMPOSITION

Cast. No.	C, %	Mn, %	Si, %	P, %	S, %	Mo, %	Cr, %	V, %	Nb, %	Ni, %	Cu, %	CA, %	CE, %
93226	0.139	1.16	0.26	0.007	0.004	0.030	0.05	0.034	0.00	0.06	0.123	.0022	0.36
93226	0.138	1.14	0.25	0.007	0.004	0.029	0.06	0.034	0.00	0.06	0.121	.0022	0.36

Remarks **Product Chemical Analysis**

Process
Seamless pipe

Heat treatment (state temperatures)
Normalized: 880 C

Non-destructive testing
Ultrasonic SR4 - 5% Notch & MPI

ADDITIONAL INSPECTION

Type and extent of inspection

Review of Chemical Analysis and Data Sheets, Mechanical Properties, Review of Dimensional Control Sheets and Hydrostatic Test Records, Ultrasonic & Electromag. Inspection Records, DNV Marking and Issue of Insp. Certificate.

10/11/12

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

323,8 x 10,31 m/m

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST R.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

MECHANICAL PROPERTIES AND TEST

HEAT NUMBER	LONGITUDINAL YIELD NW/MM2	STRENGTH TENSILE NW/MM2	%ELONGATION IN 2 INCH	FLATTENING	WIDE TENSILE MM.	THICKNESS SAMPLE MM.	IMPACT CHARPY INDIVIDUAL JOULE			TRANSVERSE AVERAGE JOULE	SHEAR AREA	HARDNESS HRC (HRB)
MINIMUM	360.00	490.00	22.0					28.000		35.000		
MAXIMUM		620.00										22.00 ( )
93226	375.60	513.88	46		38.10	10.80	70.000	73.000	69.000	71.000	100	80.11 HRB
93226	401.10	528.59	46		38.00	11.00	69.000	69.000	75.000	71.000	100	82.00 HRB

100% ULTRASONIC INSPECTION SATISFACTORY

SR4-5% notch

100% MAGNETIC PARTICLE INSPECTION SATISFACTORY

on Pipe ends

INSPECTION SATISFACTORY: SR-4 · EMI · VPI · MPI ·

*** VARNISHED

CUANTITY 57

ORIGINAL PAGE 1 OF 4

ENG. SARA GARCIA PAJARES

QUALITY CERTIFICATION NAME AND SIGNATURE

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

METHALLOGRAPHIC EVALUATION

HEAT NUMBER	GRAIN SIZE	MICRO-STRUCTURE	LEVEL INCLUSIONS A	B	C	D	HARDNESS VICKER HV
MINIMUM	8						
MAXIMUN							
93226	10						
93226	10						

100 % ULTRASONIC INSPECTION SATISFACTORY

SR4-5%notch

100 % MAGNETIC PARTICLE INSPECTION SATISFACTORY

on Pipe ends

*** VARNISHED

MILL: KM 423.5 CARR MEX-VER VERACRUZ, VER. APDO. POSTAL 402 TELEFS 85-11-90 TELEX 0843 CABLES 01-07-01

QUANTITY 57 LENGTHS

ORIGINAL

ENG. SARA GARCIA PAJARES

QUALITY CERTIFICATION NAME AND SIGNATURE

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND / OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

DICA 777 84 8

21/11/01

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No.
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE	DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD	SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.
API 5L APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI 5 SEC

PRODUCT CHEMICAL ANALYSIS

HEAT NUMBER	C %	MN %	SI %	P %	S %	MO %	CR %	V %	NB %	NI %	CU %	SN %	AL %	TI %	B %	AS %	CA %	C.E. %
MINIMUM																		
MAXIMUM	0.140	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.015					0.0040	0.41
93226	0.139	1.16	0.26	0.007	0.004	0.030	0.05	0.034	0.000	0.06	0.123	0.006	0.020	0.000	0.0000	0.004	0.0022	0.36
93226	0.138	1.14	0.25	0.007	0.004	0.029	0.06	0.034	0.000	0.06	0.121	0.006	0.017	0.000	0.0000	0.004	0.0022	0.36

100 % ULTRASONIC INSPECTION
SATISFACTORY

SR4-5%notch

100 % MAGNETIC PARTICLE INSPECTION
SATISFACTORY

on Pipe ends

*** VARNISHED

MILL: [illegible] VERACRUZ, VER. APDO. POSTAL 461 TELEFAX [illegible]

QUANTITY 57 LENGTHS

ORIGINAL
PAGE 3 OF 4

ENG. SARA GARCIA PAJARES
QUALITY CERTIFICATION NAME AND SIGNATURE

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND / OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

PLUS ULTRA

OICA 777848

21/11/12

TUBOS DE ACERO DE MEXICO, S.A.

MILL TEST CERTIFICATE

PURCHASER	SALES CONFIRMATION	INSPECTOR	DATE	No
ROLF LYCKE A.S.	003830 / 03	MR. RAFAEL TINOCO	24/10/95	95003439

TYPE OF PIPE		DIMENSIONS	NOMINAL WEIGHT	STEEL GRADE	ENDS
LINE PIPE	SEAMLESS	12 3/4 INCH X 0.406 INCH	53.52 LB/FT	X52	NORMAL BEVEL

SPECIFICATION OR STANDARD		SPECIFIC LENGTH OR R.	SURFACE	HYDROSTATIC TEST P.	
API 5L	APRIL 1, 1995.	26.20 / 45.90 FT	***	2810 PSI	5 SEC

HEAT CHEMICAL ANALYSIS

HEAT NUMBER	C %	MN %	SI %	P %	S %	MO %	CR %	V %	NB %	NI %	CU %	SN %	AL %	TI %	B %	AS %	CA %	N %	C.E.
MINIMUN																			
MAXIMUN	0.140	1.35	0.40	0.015	0.005	0.080	0.20	0.060	0.040	0.20	0.200	0.015					0.0040	0.0090	0.41
93226	0.120	1.16	0.26	0.007	0.003	0.029	0.06	0.037	0.000	0.06	0.120	0.007	0.022	0.000	0.0000	0.004	0.0020	0.0058	0.35

100% ULTRASONIC INSPECTION SATISFACTORY

SR4-5%notch

THIS CERTIFICATE CANCELS AND SUBSTITUTES THE ONE SENT ON 03/10/95 WITH No. 95003439.

100% MAGNETIC PARTICLE INSPECTION SATISFACTORY

NOTES: CERTIFICATE ACC. TO "EN 10204/DIN 50049 3.1.C/DIN 50049 3.1.B /ASTM A106 B 94/ASTM A333 GRADE 6 94.HARDNESS ACCORDING TO NACE MR-01-75 1995. IMPACT TEST:SPECIMEN SIZE 10 X 7.50 MM.TEMPERATURE -50 C. HEAT TREATMENT: NORMALIZED (TEMPERATURE = 880 C). GRAIN SIZE ACC. TO ASTM E112-85. TAMSA REF: 2571. INSPECTION COMPANY: D.N.V.

*** VARNISHED

on Pipe ends

ORIGINAL

PAGE 4 OF 4

ENG. SARA GARCIA PAJARES

QUALITY CERTIFICATION NAME AND SIGNATURE

QUANTITY 57 LENGTH

THIS IS TO CERTIFY THAT THE PRODUCTS DESCRIBED HEREIN WERE MANUFACTURED, SAMPLED, TESTED, AND/OR INSPECTED IN ACCORDANCE WITH THE SPECIFICATION REFERENCED AND MEETS THE REQUIREMENTS IN ALL RESPECTS.

FORM MEXICO

DCA F77 84 0

20.12.'95 08:23 47 51 483882 ROLF LYCKE A.S +++ R.L. LAGER OSLO 001/001

10/11/12

APPENDIX

C

LISTING OF TEST RESULTS

Printout of the Excel spreadsheet results for the tests are given. The content of each column are described in the table.

Column	Test no.1	Test nos. 2-4	Test nos. 5-12
A	time	time	time
B	internal press (bar)	internal press (bar)	internal press (bar)
C		actuator force (kN)	jack force (kN)
D		actuator disp. (mm)	jack disp. (mm)
E		angle (deg) for test 3 and 4	
F	test time (sec)	test time (sec)	test time (sec)
G		bending moment (kNm)	(jack force/10)
H	$\sigma_{axial,\ int.\ press}$	$\sigma_{axial,\ int.\ press}$	$\sigma_{axial,\ int.\ press}$
I		$\sigma_{axial,\ moment}$	$\sigma_{axial,\ jack\ force}$
J	$\sigma_{axial,\ total}$	$\sigma_{axial,\ total}$	$\sigma_{axial,\ total}$
K	σ_{hoop}	σ_{hoop}	σ_{hoop}
L	-	-	-
M	strain gauge 1	strain gauge 1	strain gauge 1
N	strain gauge 1	strain gauge 1	strain gauge 1
O	strain gauge 2	strain gauge 2	strain gauge 2
P	etc... to no. of gauges	etc... to no. of gauges	etc... to no. of gauges

Column A-E and M and the following letters contains measured values.
Column F-L contains calculated values

All stresses (σ) are in MPa, and strain in microstrain μs (10^{-6}).
Examples; 2500 μs = 0.25% strain, 85000 μs = 8.5% strain

Calculation of;

$\sigma_{axial,\ int.\ press}$ = internal pressure * (Area $_{inner}$ / Area $_{pipe}$)
$\sigma_{axial,\ moment}$ = bending moment / $W_{elastic}$
$\sigma_{axial,\ jack\ force}$ = axial force / Area $_{pipe}$
$\sigma_{axial,\ total}$ = sum of the above axial stresses
σ_{hoop} = internal pressure * (Di / 2*t)

where the following values are used for the cross section;

- Area $_{pipe}$ = 10437 mm^2 $(D_o^2-D_i^2)*\pi/4$
- Area $_{inner}$ = 72012 mm^2 $(D_i^2)*\pi/4$
- Moment of Inertia (I) = $1.28*10^8$mm^4 $(D_o^4-D_i^4)*\pi/64$
- Section modulus $W_{elastic}$ = 791854 mm^3 $I / (D_o/2)$

D_o ; Outer Diameter = 324 mm
D_i ; Inner Diameter = 302.8 mm
(wall thickness t = 10.6 mm)

The calculations are based on the undeformed cross-section.

- o0o -

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	Test	Pipe	JIP	Tes		no	1																									
2	ISM-01	Date	01.07.96	Time		10.06.31	Progver	960625a																								
3																																
4																																
5	measured	measured	measured	measured									All strain gauges in microstrain																			
6	Time	Pressure (	Force (kN)	Disp. (mm)		Test time	Moment (kA	x_press (MPa)		Axial (MPa	Hoop (MPa)		Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8		Gauge 9		Gauge 10	
7		(bar)	kN	mm									long.	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long	hoop	long.	hoop
8								ax-press	ax-force	Axial	hoop																					
9																																
10																																
11	43900	0				0		0.1		0.1	0.3		1	1	1	-1	3	-3	1	-1	0	1	1	-3	2	-2	1	-3	2	-2	1	1
12	43955	5.4				55		3.7		3.7	7.7		17	63	14	86	20	79	15	85	14	88	16	100	16	100	16	85	16	97	8	33
13	44020	27.2				120		18.8		18.8	38.8		79	314	72	447	83	411	74	449	76	451	78	524	77	524	81	451	79	513	37	166
14	44212	53.7				312		37.1		37.1	76.7		145	604	150	808	160	824	142	917	153	905	150	1035	151	1032	159	889	151	1015	73	323
15	44254	63.4				354		43.7		43.7	90.6		167	710	179	1069	188	978	166	1096	181	1076	178	1224	178	1219	188	1049	178	1201	87	382
16	44313	75.7				413		52.2		52.2	108.1		197	838	215	1277	224	1169	196	1315	216	1285	210	1455	212	1446	223	1243	211	1427	103	453
17	44393	87.0				493		60.0		60.0	124.3		222	953	250	1476	257	1349	224	1524	249	1483	242	1670	243	1659	257	1424	242	1638	118	519
18	44439	97.2				539		67.1		67.1	138.8		249	1062	280	1655	288	1512	249	1712	279	1663	270	1865	273	1850	286	1598	270	1829	133	578
19	44533	110.9				633		76.5		76.5	158.4		245	1221	320	1907	338	1744	290	1979	319	1914	325	3835	358	4194	329	1670	346	3747	152	657
20	44577	123.1				677		84.9		84.9	175.8		224	1682	366	4063	405	1795	323	3992	382	2892	403	6258	441	8510	356	1702	395	6889	170	726
21	44650	135.1				750		93.2		93.2	193.0		449	7520	501	14701	447	2009	467	15246	544	11101	412	15857	505	18053	199	14316	342	16044	199	788
22	44774	143.6				874		99.1		99.1	205.1		1337	17379	434	17212	649	17729	378	18702	374	18053	497	20183	282	24158	49	20516	354	20252	237	815
23	44870	150.8				970		104.0		104.0	215.4		1446	19430	599	20764	643	20873	383	22531	529	21198	653	24471	123	29512	-245	25152	449	24096	267	842
24	44985	161.0				1085		111.1		111.1	230.0		613	26392	668	26824	54	27827	70	28962	678	27510	822	32653	-77	39760	-498	32625	490	31903	315	875
25	45033	169.7				1133		117.1		117.1	242.4		320	32130	667	33432	-185	34073	-88	38937	737	33905	836	26943	-244	49368	-683	39347	442	39577	356	907
26	45354	168.6				1454		116.3		116.3	240.8		278	33184	652	34787	-215	35275	-118	39940	736	35242	757	14809	-278	51169	-717	40591	425	41089	357	897
27	45469	178.8				1569		123.4		123.4	255.4		165	38844	640	41958	-330	41443	-206	48052	767	42073	716	14938	-477	60814	-848	47594	368	48374	398	938
28	45540	177.9				1640		122.7		122.7	254.1		143	39853	627	43256	-350	42509	-229	49400	724	43287	694	14839	-535	62460	-872	48773	347	50794	400	929
29	45572	185.9				1672		128.3		128.3	265.5		112	44347	582	48934	-395	47340	-277	55459	1206	48709	736	14842	-484	69840	-969	54533	292	57313	433	960
30	45654	184.1				1754		127.0		127.0	263.0		83	46282	372	51398	-421	49354	-314	57903	29	21867	512	14805	-277	72789	-1010	56733	263	59851	436	944
31	45691	190.0				1791		131.1		131.1	271.4		81	50042	353	56070	-451	53415	-354	62710	44	21478	471	14804	-146	78653	-1092	61599	216	65081	463	965
32	45834	194.4				1934		134.1		134.1	277.7		-156	57899	2001	65862	-497	61939	-542	72405	61	20962	236	14758	1374	52224	-1255	71780	39	75556	501	964
33	45884	193.9				1984		133.8		133.8	276.9		-149	58460	2038	66578	-500	62565	-602	73100	57	20851	226	14743	1370	51565	-1268	72517	97	76311	502	959
34	46046	197.4				2146		136.2		136.2	281.9		-10	64694	1275	74112	-526	69618	-368	80631	-5	20661	184	14700	1361	50720	-1382	81156	263	84732	533	959
35	46074	204.4				2174		141.0		141.0	291.9		102	69244	1297	78691	-533	74961	-177	81547	-15	20605	203	14698	1360	50655	-1449	87969	327	91233	564	981
36	46232	201.4				2332		139.0		139.0	287.7		692	70229	533	56474	-543	78336	-163	53451	-91	20303	133	14648	1331	50283	-1495	92250	-369	95470	569	954
37	46283	207.8				2383		143.4		143.4	296.8		725	65021	590	56726	-540	86604	-144	52964	-120	20199	33	14631	1303	50277	-1572	103140	-1212	106030	607	967
38	46374	206.2				2474		142.3		142.3	294.5		515	57393	611	54578	-531	88657	-135	52266	-143	20323	30	14598	1303	50155	-1591	106400	-1134	110220	609	951
39	46409	211.9				2509		146.2		146.2	302.7		570	57526	638	54701	-518	92180	-138	52106	-141	20323	41	14592	1304	50146	-1614	111930	-1204	128880	630	974
40	46448	213.2				2548		147.1		147.1	304.5		79	52651	725	54290	-472	100480	-124	52025	-128	20287	66	14577	1298	50139	-1674	0	-775	0	654	958
41	46485	211.5				2585		145.9		145.9	302.1		93	50393	747	53487	-424	102720	-112	51888	-127	20247	66	14562	1298	50103	-1687	0	-806	0	655	941
42	46537	217.2				2637		149.9		149.9	310.2		98	46899	902	51587	-795	67402	-84	51739	-84	20134	107	14542	1319	50088	-1801	0	-1040	0	695	880
43	46585	215.9				2685		149.0		149.0	308.4		117	46647	917	51191	-758	63401	-84	51603	-90	20085	102	14524	1322	50039	-1819	0	-1020	0	691	854
44	46641	221.3				2741		152.7		152.7	316.1		137	46499	954	50815	-323	61203	-71	51486	-69	20022	122	14517	1332	50026	-2242	0	-1010	0	714	811
45	46679	218.7				2779		150.9		150.9	312.4		140	46362	966	50161	-216	60154	-67	51392	-72	19983	116	14503	1332	49993	-2425	0	-1006	0	711	769
46	46714	224.9				2814		155.2		155.2	321.2		132	46314	1017	50018	629	59382	-46	51326	-40	19936	145	14495	1340	49990	-2638	0	-1005	0	731	736
47	46751	220.9				2851		152.4		152.4	315.5		141	46205	1017	49738	660	58721	-46	51203	-44	19896	134	14481	1337	49948	-2596	0	-1001	0	721	749
48	46774	226.2				2874		156.1		156.1	323.1		148	46162	1039	49709	1035	58234	-36	51145	-29	19871	150	14475	1340	49945	-2645	0	-998	0	728	762
49	46805	226.9				2905		156.6		156.6	324.1		153	46112	1063	49429	1413	57511	-23	51059	-13	19828	161	14461	1344	49921	-2694	0	-993	0	736	764
50	46833	227.4				2933		156.9		156.9	324.8		157	46080	1093	49389	1472	57071	-8	50970	9	19791	174	14448	1352	49901	-2631	0	-980	0	745	749
51	46941	222.2				3041		153.3		153.3	317.4		141	45773	1034	49133	1101	56168	-21	50657	0	19700	152	14407	1342	49800	-2415	0	-978	0	730	720
52	46982	229.5				3082		158.3		158.3	327.8		148	45721	1068	49186	1326	55752	-50	50554	35	19671	183	14392	1351	49785	-2166	0	-977	0	752	803
53	46996	226.1				3096		156.0		156.0	322.9		148	45698	1074	49194	1302	55482	-39	50516	38	19655	180	14384	1345	49768	-1921	0	-980	0	746	786
54	47035	231.0				3135		159.4		159.4	329.9		145	45628	1080	49192	1293	55011	-23	50433	58	19620	194	14366	1344	49748	-1821	0	-976	0	760	815
55	47088	224.7				3188		155.0		155.0	320.9		145	45519	1052	49175	1076	54605	-15	50304	-13	19629	177	14340	1327	49699	-1811	0	-978	0	743	782
56	47131	224.0				3231		154.6		154.6	319.9		139	45434	1030	49139	1005	54396	-14	50230	-20	19616	171	14330	1323	49670	-1804	0	-975	0	740	777
57	47170	231.5				3270		159.7		159.7	330.7		146	45384	1066	49173	1182	54090	9	50175	4	19600	220	14309	1333	49654	-1689	0	-963	0	753	827
58	47212	226.1				3312		156.0		156.0	322.9		144	45301	1043	49154	1041	53816	7	50072	-21	19559	211	14271	1311	49599	-1705	0	-967	0	741	790
59	47215	0.5				3315		0.3		0.3	0.7		-131	44463	603	48338	349	53310	89	50289	151	19559	0	8859	0	0	0	0	0	0	410	-791

test no 2 Combined internal pressure and bending moment

Also included bending after burst to see the remaining bending capacity

arm = 1.43m

All strain gauges in microstrain

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
1	Test no 2		Combined internal pressure and bending moment																															
2	Also included bending after burst to see the remaining bending capacity																																	
3																																		
4				MTS-actuat	MTS-actuator				arm = 1.43m				All strain gauges in microstrain																							
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8		Gauge 9		Gauge 10	Gauge 11			
6	Time	Pressure (ba	Force (kN)	Disp. (mm)		Test time	Moment (kNm	press (MPa	moment	Axial (MPa	Hoop (MPa)																						moment		
7		(bar)	kN	mm			kNm						long.	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long	hoop	long	long			
8								ax-press	ax-moment	Axial	hoop																									
9																																		
10																																		
11	14:42:37	0.0	-1.0	0.0		00:00:00	0.7	0.0	-0.9	-0.9	0.0		-1	-1	1	2	0	-1	-1	0	-2	-1	-3	-1	-1	0	-3	-1	-1	0	0	-0.712426	0.00
12	14:44:29	4.8	-0.9	0.0		00:01:52	0.6	3.3	-0.8	2.5	6.9		11	81	13	84	13	74	12	81	13	52	11	83	13	84	13	81	13	77	5	6	-0.618189	-0.04
13	14:45:12	10.2	-1.0	0.0		00:02:35	0.7	7.0	-0.9	6.1	14.6		23	160	25	162	25	147	24	164	22	105	22	166	24	172	25	170	26	160	10	13	-0.712712	-0.02
14	14:45:17	13.6	-1.0	0.0		00:02:40	0.7	9.4	-0.9	8.5	19.4		30	217	34	219	35	200	33	220	33	143	32	225	33	231	35	228	37	216	15	18	-0.69162	-0.03
15	14:45:22	17.9	-0.9	0.0		00:02:45	0.6	12.4	-0.8	11.6	25.6		40	277	43	278	46	258	44	293	43	187	42	296	44	305	45	299	47	282	19	24	-0.617935	-0.03
16	14:45:27	20.7	-1.0	0.0		00:02:50	0.7	14.3	-0.9	13.4	29.6		48	336	52	337	55	307	53	339	51	219	50	345	52	357	53	349	56	336	23	28	-0.712855	-0.01
17	14:47:07	26.6	-1.1	0.0		00:04:30	0.8	18.4	-1.0	17.3	38.0		64	436	67	435	71	399	68	437	68	282	65	448	66	461	67	450	71	425	28	37	-0.82082	0.01
18	14:47:12	30.9	-1.0	0.0		00:04:35	0.7	21.3	-0.9	20.4	44.3		73	510	77	508	80	465	78	511	77	328	76	522	77	537	78	524	83	494	35	43	-0.712069	-0.03
19	14:47:17	35.3	-1.1	0.0		00:04:40	0.9	24.6	-1.1	23.2	50.4		84	584	88	582	94	531	91	584	90	376	85	598	88	609	89	599	94	564	38	50	-0.910195	0.02
20	14:47:22	39.2	-1.0	0.0		00:04:45	0.7	27.0	-0.9	26.2	56.0		94	655	99	654	104	598	101	653	100	421	96	673	99	686	100	669	107	634	43	55	-0.691048	-0.04
21	14:47:27	42.7	-1.1	0.0		00:04:50	0.8	28.8	-1.0	27.7	59.6		102	711	107	708	112	646	109	706	107	454	103	722	105	736	107	717	112	675	45	56	-0.821535	-0.01
22	14:47:53	46.9	-1.1	0.0		00:05:16	0.8	32.4	-1.0	31.3	67.0		114	785	119	783	125	718	121	784	120	504	115	808	117	825	120	804	125	762	51	67	-0.82082	0.01
23	14:47:58	51.2	-1.3	0.0		00:05:21	0.9	35.5	-1.2	34.3	73.4		123	855	129	852	136	782	132	859	131	552	126	885	130	906	133	881	140	839	57	73	-0.91091	0.02
24	14:48:03	55.0	-1.3	0.0		00:05:26	0.9	37.9	-1.2	36.8	78.6		134	925	139	922	146	843	142	924	136	590	134	945	140	974	142	947	149	900	61	78	-0.91091	0.00
25	14:48:08	59.0	-1.4	0.0		00:05:31	1.0	40.7	-1.3	39.4	84.3		142	990	147	986	156	901	152	987	146	629	145	1010	151	1044	153	1017	162	977	65	84	-1.013959	0.02
26	14:48:13	62.2	-1.3	0.0		00:05:36	0.9	42.9	-1.2	41.8	88.8		153	1061	158	1056	165	966	161	1053	157	669	152	1076	160	1111	163	1078	171	1052	69	88	-0.91091	-0.01
27	14:49:20	65.0	-1.3	0.0		00:06:43	0.9	44.8	-1.2	43.7	92.8		158	1094	163	1093	171	999	167	1092	156	694	158	1119	166	1155	170	1121	179	1078	72	93	-0.91093	0.00
28	14:49:25	70.1	-1.4	0.0		00:06:48	1.0	48.4	-1.3	47.1	100.1		168	1173	174	1169	183	1073	180	1181	169	747	171	1207	181	1249	184	1210	193	1165	78	99	-1.018875	0.02
29	14:49:30	73.8	-1.3	0.0		00:06:53	0.9	50.9	-1.2	49.8	105.4		181	1254	186	1250	195	1143	191	1248	175	790	181	1279	193	1323	195	1277	203	1234	82	106	-0.91091	0.00
30	14:49:35	78.4	-1.5	0.0		00:06:58	1.0	54.1	-1.3	52.8	112.0		196	1320	196	1317	205	1208	201	1316	184	832	192	1350	203	1398	209	1358	217	1315	87	113	-1.04819	0.02
31	14:49:40	81.7	-1.3	0.0		00:07:03	0.9	56.4	-1.2	55.2	116.7		201	1392	206	1389	215	1271	211	1386	190	873	200	1417	211	1468	218	1419	227	1377	92	117	-0.91091	-0.01
32	14:50:28	84.3	-1.1	0.0		00:07:51	0.8	58.2	-1.0	57.1	120.4		207	1432	211	1428	221	1307	217	1428	192	897	207	1459	229	1518	227	1465	235	1423	96	126	-0.82367	-0.01
33	14:50:33	88.8	-1.4	0.0		00:07:56	1.0	61.3	-1.3	60.0	126.8		219	1507	224	1504	235	1380	229	1503	202	944	219	1542	231	1600	238	1543	247	1503	100	127	-1.018875	0.02
34	14:50:38	93.3	-1.2	0.0		00:08:01	0.8	64.4	-1.0	63.3	133.3		227	1584	233	1582	245	1449	239	1580	210	990	228	1620	243	1685	251	1621	261	1582	106	133	-0.82225	-0.04
35	14:50:43	98.1	-1.3	0.0		00:08:06	0.9	67.7	-1.2	66.5	140.1		239	1668	245	1667	257	1523	251	1663	216	1041	239	1704	255	1769	264	1708	273	1667	112	141	-0.911625	-0.02
36	14:50:48	101.4	-1.3	0.0		00:08:11	0.9	70.0	-1.2	68.8	144.8		248	1736	253	1727	266	1577	260	1720	221	1077	249	1764	265	1832	274	1766	283	1725	116	145	-0.911625	-0.03
37	14:53:14	105.2	-1.6	0.0		00:08:37	1.1	72.6	-1.4	71.2	150.3		255	1779	261	1776	274	1626	269	1782	225	1106	258	1825	274	1896	284	1832	293	1791	119	151	-1.123265	0.01
38	14:53:19	109.0	-1.6	0.0		00:08:42	1.1	75.2	-1.4	73.8	155.7		268	1836	274	1854	285	1694	280	1849	230	1146	267	1897	284	1973	293	1901	303	1865	123	157	-1.123265	0.01
39	14:53:24	113.8	-1.7	0.0		00:08:47	1.2	78.5	-1.6	77.0	162.5		277	1933	284	1929	296	1764	291	1927	235	1187	279	1975	302	2059	313	1982	316	1928	130	165	-1.23265	0.02
40	14:53:29	117.6	-1.6	0.0		00:08:52	1.1	81.1	-1.4	79.7	168.0		289	2009	294	2007	307	1829	301	1998	234	1218	292	2028	308	2367	324	2398	324	1914	135	170	-1.12398	0.00
41	14:53:34	121.2	-1.6	0.0		00:08:57	1.1	83.6	-1.4	82.2	173.1		325	2984	346	3709	312	1758	339	3844	232	1219	308	4855	333	4107	348	4157	327	1910	140	175	-1.12398	0.02
42	14:53:06	126.0	-1.7	0.0		00:09:29	1.2	86.9	-1.6	85.4	180.0		397	9703	279	9218	326	1724	418	9949	199	1525	354	8423	434	9388	383	5869	363	2110	149	182	-1.234805	0.02
43	14:53:11	128.2	-1.6	0.0		00:10:34	1.1	88.5	-1.4	87.0	183.1		401	11780	286	11190	330	1758	438	11490	186	1606	373	10240	452	10220	380	6997	377	2389	152	185	-1.123265	-0.01
44	14:54:30	131.9	-1.3	0.0		00:11:53	0.9	91.0	-1.2	89.9	188.4		358	15450	-168	4202	409	8497	444	13810	442	6766	418	14840	438	16400	431	13890	541	5153	370	189	-0.91091	-0.04
45	14:54:35	135.9	-1.6	0.0		00:11:58	1.1	93.8	-1.4	92.3	194.1		368	15720	-130	4141	460	15290	396	14090	507	8272	415	14890	420	16520	475	14650	637	7767	475	194	-1.123265	0.00
46	14:54:40	138.7	-1.3	0.0		00:12:03	0.9	95.7	-1.2	94.5	198.1		363	16160	-88	4139	53	16930	345	14500	765	15060	534	15350	327	17020	587	15940	532	16210	187	198	-0.91091	-0.04
47	14:54:45	141.0	-1.6	0.0		00:12:08	1.1	97.3	-1.4	95.9	201.4		382	17420	-43	4195	44	18350	267	15760	1053	17330	555	15920	208	17860	546	16770	417	17480	199	203	-1.123265	0.02
48	14:55:32	143.1	-1.3	0.0		00:12:55	0.9	98.7	-1.1	97.6	204.4		463	18970	-128	2978	151	19866	198	17870	1224	19190	725	17900	-5	22150	745	18370	95	21020	216	206	-0.910795	0.01
49	14:55:37	146.8	-1.3	0.0		00:13:00	0.9	101.3	-1.2	100.3	209.7		477	19360	-90	2950	122	20280	208	18370	1226	19610	788	18460	-32	23300	816	18850	43	22050	224	213	-0.91091	0.00
50	14:55:42	150.6	-1.3	0.0		00:13:05	0.9	103.9	-1.2	102.8	215.1		472	20740	-88	2870	-84	21840	298	19930	1089	21120	926	20090	-128	26210	958	20220	-55	24320	240	239	-0.91091	0.02
51	14:56:59	153.8	-1.3	0.0		00:14:22	0.9	106.1	-1.1	105.0	219.7		445	23950	-176	1619	16	23140	449	22760	583	25000	1043	23450	-249	30830	1010	23440	-202	27600	261	226	-0.916195	0.02
52	14:57:04	157.3	-1.1	0.0		00:14:27	0.8	108.5	-1.0	107.5	224.7		449	24610	-162	1577	20	25460	463	23250	531	25540	1051	24040	-259	31650	1011	24070	-223	28200	269	231	-0.82082	-0.01
53	14:57:09	160.7	-1.1	0.0		00:14:32	0.8	110.9	-1.0	109.8	229.5		421	26310	-455	1453	34	24490	489	25160	369	27700	1048	26140	-310	34550	975	26380	-299	30430	283	239	-0.82082	0.02
54	14:57:14	163.6	-1.0	0.0		00:14:37	0.7	112.9	-0.9	112.0	233.7		384	28420	-443	1445	51	24790	502	27160	234	29810	1020	28370	-350	36980	898	28350	-356	32250	296	243	-0.712641	-0.03
55	15:00:00	164.4	-4.5	9.5		00:17:23	3.2	113.4	-4.0	109.4	234.8		240	34070	-413	1407	67	19236	483	32350	-33	34740	913	33990	-483	43140	695	33330	-519	36310	305	263	-3.204955	0.50
56	15:00:05	164.6	-7.6	9.8		00:17:28	5.4	113.6	-6.8	106.7	235.1		224	34116	-413	1406	68	19220	470	32390	-50	34770	900	34030	-497	43190	681	33360	-536	36740	293	276	-5.41235	0.78
57	15:00:15	164.7	-12.6	13		00:17:38	9.0	113.6	-11.4	102.2	235.2		189	34290	-412	1405	71	19200	436	32480	-94	34860	868	34120	-532	43296	650	33440	-573	36838	273	308	-9.0376	1.25
58	15:00:20	164.6	-16.9	15		00:17:43	11.5	113.6	-14.5	99.1	235.1		168	34260	-413	1405	72	19200	418	32530	-119	34910	848	34180	-552	43360	630	33500	-595	36880	259	314	-13.46145	1.52
59	15:00:30	164.6	-21.9	20		00:17:53	15.7	113.6	-19.8	93.8	235.1		137	34370	-412	1404	76	19200	378	32640	-171	35040	809	34300	-595	43510	589	33600	-639	37000	236	343	-18.16815	2.00
60	15:00:35	164.6	-25.4	23		00:17:58	18.2	113.6	-22.9	90.6	235.1		116	34440	-411	1404	77	19210	366	32690	-192	35100	790	34370	-615	43590	569	33660	-664	37060	223	358	-22.44385	2.28
61	15:00:45	164.4	-31.4	28		00:18:08	22.4	113.4	-28.3	85.1	234.8		71	34590	-410	1402	81	19220	325	32820	-245	35270	748	34520	-661	43790	518	33790	-731	37220	200	386	-24.96578	2.76
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66	15:02:11	164.1	-52.2	4.4		00:19:34	37.3	113.2	-47.1	66.1	234.4		-121	35270	-409	1391	92	19110	162	33840	-499	36580	540	35730	-888	45360	319	34810	-937	38410	123	485	-37.33015	4.38
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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
85	15:05:29	163.4	-129.5	10.2		00:22:43	97.3	112.7	-116.6	-3.8	233.4		-871	39140	-600	1361	134	19130	-491	36840	-1495	40060	-233	39220	-1755	49880	-446	37770	-1848	41800	-157	850		-92.3965	10.16
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88	15:05:40	163.3	-142.3	11.2		00:23:03	101.1	112.7	-128.5	-15.8	233.2		-1021	39919	-392	1359	139	19120	-611	37490	-1710	40810	-394	40000	-1950	50920	-615	38450	-2053	42530	-204	916		-101.7445	11.15
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114	15:15:37	162.5	-257.6	20.6		00:33:00	184.2	112.2	-232.6	-120.4	232.2		-3339	53180	-353	1721	220	16720	-2489	49540	-5050	51980	-2634	53780	-4493	65840	-2879	49590	-4916	52960	-565	1506		-184.184	20.64
115	15:15:42	162.3	-263.1	20.9		00:33:05	186.7	112.0	-235.8	-123.8	231.8		-3385	53310	-352	1723	221	16730	-2530	49640	-5112	52110	-2677	53900	-4542	65960	-2921	49690	-4970	52870	-580	1517		-186.6865	20.90
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122	15:16:47	161.0	-285.4	24.2		00:34:10	204.1	111.1	-257.7	-146.6	230.0		-4508	58020	-343	1769	252	16960	-3474	53710	-6854	56980	-3755	58650	-5804	71270	-3635	53580	-6298	56780	-692	1443		-204.063	24.18
123	15:17:02	160.7	-289.1	24.9		00:34:25	206.7	110.9	-261.1	-150.2	229.5		-4803	59220	-337	1784	246	16930	-3730	54730	-7314	58228	-4036	59840	-6122	72560	-3841	54550	-6633	57740	-714	1432		-206.7665	24.90
124	15:17:17	159.8	-292.3	25.7		00:34:40	209.0	110.3	-263.9	-153.7	228.2		-5104	60450	-297	1838	286	16800	-4005	55760	-7812	59540	-4335	61070	-6471	73950	-4084	55550	-7060	58770	-736	1398		-208.9945	25.66
125	15:17:37	159.7	-295.8	26.6		00:35:00	211.5	110.2	-267.1	-156.9	228.1		-5509	62070	-244	1887	323	16520	-4372	57140	-8475	61280	-4725	62630	-6960	75820	-4392	56830	-7509	60180	-764	1385		-211.497	26.63
126	15:17:52	159.2	-298.3	27.4		00:35:15	213.3	109.8	-269.4	-159.5	227.4		-5833	63280	-215	1915	341	16320	-4671	58220	-8988	62600	-5022	63790	-7364	77270	-4637	57780	-7919	61280	-781	1376		-213.2845	27.37
127	15:17:57	159.1	-299.3	27.6		00:35:20	214.0	109.8	-270.3	-160.5	227.2		-5941	63680	-208	1922	347	16270	-4771	58570	-9158	63040	-5118	64170	-7486	77690	-4713	58050	-8041	61630	-786	1376		-213.9995	27.60
128	15:18:19	158.7	-295.8	28.0		00:35:42	213.5	109.5	-267.1	-157.6	226.7		-6273	64960	-186	1943	362	16900	-5051	59660	-9635	64370	-5352	65360	-7843	79100	-4903	58920	-8409	62670	-781	1353		-211.497	27.97
129	15:18:49	158.5	-292.4	28.0		00:36:12	209.5	109.4	-264.0	-154.7	226.4		-6366	65420	-177	1945	372	15640	-5137	60080	-9781	64820	-5477	65800	-7940	79580	-4919	59190	-8514	63020	-769	1342		-209.666	27.96
130	15:19:59	161.9	-288.9	27.9		00:37:22	206.6	111.7	-260.9	-149.2	231.2		-6464	66030	-173	1943	385	15150	-5222	60690	-9947	65430	-5571	66460	-8026	80240	-4922	59670	-8631	63500	-755	1331		-208.3635	27.94
131	15:20:19	165.0	-286.9	28.0		00:37:42	205.1	113.8	-259.1	-145.2	235.7		-6591	66990	-163	1951	388	15150	-5334	61750	-10169	66330	-5699	67550	-8130	81260	-5005	60540	-8788	64200	-733	1329		-205.1335	27.97
132	15:20:29	164.8	-285.5	28.0		00:37:52	204.3	113.7	-257.8	-144.1	235.4		-6654	67380	-159	1954	389	15140	-5390	62160	-10250	66670	-5758	67960	-8154	81620	-5035	60860	-8855	64460	-726	1325		-204.1325	27.96
133	15:20:54	164.7	-290.2	28.4		00:38:17	207.5	113.6	-262.1	-148.4	235.2		-6791	67970	-154	1958	392	15080	-5510	62770	-10430	67210	-5883	68360	-8254	82200	-5111	61340	-9030	64910	-739	1345		-207.493	28.36
134	15:21:04	164.3	-294.0	28.8		00:38:27	210.2	113.4	-265.5	-152.1	234.7		-6949	68490	-147	1964	395	15110	-5653	63230	-10650	67770	-6023	69060	-8422	82750	-5221	61760	-9196	65400	-758	1359		-210.31	28.84
135	15:21:19	164.0	-297.3	29.6		00:38:42	212.6	113.2	-268.5	-155.3	234.2		-7299	69790	-127	1978	407	15210	-5952	64390	-11148	69230	-6333	70300	-8764	84190	-5459	62760	-9607	66620	-775	1361		-212.5695	29.59
136	15:21:39	163.3	-301.0	30.6		00:39:02	215.2	112.7	-271.8	-159.1	233.2		-7807	71690	-99	1990	418	15280	-6380	66030	-11870	71330	-6784	72120	-9470	86300	-6077	64150	-10220	68400	-795	1359		-215.215	30.64
137	15:21:54	162.8	-303.2	31.4		00:39:17	216.8	112.3	-273.8	-161.5	232.5		-8166	73000	-78	1994	419	15270	-6676	67310	-12370	72760	-7109	73330	-9456	87740	-6174	65120	-10650	69630	-832	1357		-216.788	31.36
138	15:21:59	162.6	-304.1	31.7		00:39:22	217.4	112.2	-274.6	-162.4	232.2		-8289	73440	-70	1995	420	15250	-6780	67590	-12550	73240	-7224	73680	-9505	88430	-6280	65470	-10820	70110	-819	1356		-217.4315	31.66
139	15:22:09	162.1	-300.7	31.8		00:39:32	215.0	111.8	-271.5	-159.7	231.5		-8506	74240	-57	1996	421	15200	-6952	68160	-12840	74160	-7467	73620	-9606	89250	-6329	65960	-11060	70790	-817	1342		-215.0005	31.82
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141	15:23:04	162.1	-294.0	31.8		00:40:27	210.2	111.8	-265.5	-153.6	231.5		-8726	75230	-46	1959	412	14800	-7138	69040	-13150	75130	-7667	73180	-9485	90300	-6425	66570	-11310	71640	-792	1308		-210.21	31.81
142	15:23:59	160.0	-293.0	31.9		00:41:22	209.5	114.5	-264.6	-150.0	237.1		-8815	75770	-46	1964	409	14590	-7208	69590	-13280	75680	-4124	61940	-9454	90880	-2514	66960	-11420	72120	-779	1306		-209.495	31.87
143	15:24:04	160.9	-292.3	31.9		00:41:27	209.0	116.5	-263.9	-147.4	241.2		-8847	76080	-44	1945	410	14610	-7239	69960	-13340	76020	-4123	61860	-9473	91260	-2505	67280	-11470	72440	-768	1309		-208.9945	31.87
144	15:24:09	160.9	-290.2	31.9		00:41:32	207.5	116.5	-262.1	-145.5	241.2		-8923	76629	-41	1948	413	14650	-7308	70566	-13460	76540	-4122	61796	-9517	91800	-2497	67728	-11560	72842	-756	1304		-207.493	31.85
145	15:24:39	168.5	-286.6	31.9		00:42:02	204.9	116.3	-258.8	-142.5	240.7		-9123	77710	-32	1942	413	14620	-7482	71740	-13710	77570	-4102	61400	-9604	92860	-2451	68570	-11790	73710	-736	1291		-204.919	31.86
146	15:25:34	169.2	-282.9	31.8		00:42:57	202.3	116.7	-255.5	-138.7	241.7		-9242	78390	-28	1928	410	14460	-7594	72510	-13880	78250	-4085	60870	-9629	93560	-2380	68970	-11930	74300	-722	1281		-202.2735	31.82
147	15:25:44	171.1	-283.8	31.9		00:43:07	202.9	118.1	-256.3	-138.2	244.4		-9269	78620	-28	1926	410	14460	-7614	72800	-13916	78500	-4082	60790	-9636	93830	-2369	69170	-11960	74530	-718	1284		-202.987	31.87
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149	15:25:59	175.8	-279.5	31.8		00:43:22	199.8	121.3	-252.4	-133.1	251.1		-9432	80030	-17	1933	416	14560	-7769	74600	-14160	79970	-4078	60690	-9734	95450	-2346	70520	-12200	75950	-684	1284		-199.8425	31.84
150	15:26:09	178.2	-275.2	31.8		00:43:32	196.8	123.6	-248.5	-129.6	254.5		-9640	81710	-3	1935	420	14620	-7954	76650	-14440	81690	-4045	60620	-9833	97190	-2306	71980	-12460	77600	-650	1275		-196.768	31.83
151	15:26:19	180.7	-271.9	31.9		00:43:42	194.4	124.7	-245.5	-126.8	258.1		-9865	83660	14	1933	412	14630	-8155	78950	-14740	83760	-4028	60550	-9875	99160	-2259	73480	-12740	79560	-620	1270		-194.4085	31.81
152	15:26:24	181.9	-268.2	31.8		00:43:47	191.8	125.5	-242.2	-123.7	259.8		-9982	84690	22	1930	401	14600	-8262	80360	-14990	84900	-4014	60510	-9846	100200	-2221	74170	-12880	80630	-600	1265		-191.763	31.85
153	15:26:29	182.9	-266.9	31.9		00:43:52	190.8	126.2	-241.0	-122.5	261.2		-10190	85760	31	1927	397	14540	-8361	81490	-15050	86070	-4007	60470	-9786	101200	-2179	74810	-13020	81750	-586	1263		-190.8335	31.85
154	15:26:39	185.3	-262.0	31.8		00:44:02	187.3	127.9	-236.6	-118.7	264.7		-10339	88010	49	1915	384	14310	-8567	83970	-15350	88760	-3993	60400	-9394	103400	-2071	76230	-13280	84150	-551	1253		-187.33	31.83
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157	15:27:19	186.4	-251.1	32.1		00:44:42	183.8	128.6	-232.2	-103.6	266.2		-10100	93350	69	1888	143	13620	-9014	89840	-16000	94540	-3888	60130	-8090	109300	-1818	77350	-13840	89720	-504	1245		-183.8265	32.06
158	15:27:24	186.3	-265.7	32.4		00:44:47	186.4	128.5	-235.4	-106.9	266.1		-10090	93630	75	1886	135	13580	-9064	90160	-16070	94910	-3887	60100	-8276	110000	-1868	77310	-13910	90060	-519	1260		-186.4005	32.36
159	15:27:34	186.1	-266.6	32.9		00:44:57	190.6	128.4	-240.7	-112.3	265.8		-10140	94190	69	1887	121	11540	-9191	90880	-16260	95810	-3886	60040	-8233	112700	-1787	77570	-14080	90940	-548	1283		-190.619	32.86
160	15:27:49	185.5	-270.3	33.6		00:45:12	193.3	128.6	-244.1	-116.1	265.9		-10190	95990	76	1893	84	11570	-9439	92360	-16610	97850	-3882	59950	-8196	157600	-1749	77960	-14390	92600	-572	1284		-193.2645	33.59
161	15:28:14	184.4	-274.4	34.8		00:45:37	196.2	127.2	-247.8	-120.6	263.4		-10320	98580	86	1900	70	11530	-9876	94790	-17270	101200	-3877	59820	-8089	0	-1707	78230	-14940	95490	-604	1285		-196.196	34.83
162	15:28:39	183.4	-278.0	36.1		00:46:02	198.8	126.5	-251.0	-124.5	262.0		-10420	101000	91	1904	56	11500	-10330	97090	-18010	104500	-3873	59700	-7911	0	-1870	77690	-15530	98320	-630	1282		-198.77	36.09
163	15:28:49	183.0	-279.8	36.6		00:46:12	200.1	126.3	-252.7	-126.4	261.4		-10290	102000	96	1907	52	11490	-10510	97930	-18370	105800	-3872	59650	-7821	0	-1915	77210	-15770	99450	-642	1284		-200.057	36.57
164	15:28:59	182.6	-281.2	37.1		00:46:22	201.1	126.0	-253.9	-127.9	260.8		-10270	103000	101	1909	47	11480	-10690	98860	-18760	107100	-3870	59610	-7755	0	-1899	76670	-16020	100000	-653	1282		-201.058	37.08
165	15:29:24	183.6	-284.3	38.3		00:46:47	203.3	125.3	-256.7	-131.4	259.4		-10300	105300	109	1912	42	11470	-11159	101000	-19650	110300	-3866	59500	-7628	0	-1886	76040	-16640	103400	-679	1283		-203.2745	38.32
166	15:29:44	183.9	-279.6	38.8		00:47:07	199.9	125.5	-252.5	-127.0	259.8		-10270	106900	101	1903	40	11460	-11440	102500	-19160	112500	-3862	59420	-7525	0	-1888	75350	-17030	105700	-669	1261		-199.914	38.76
167	15:29:54	185.6	-276.3	38.8		00:47:17	197.6	127.6	-249.5	-121.9	264.2		-10250	107900	102	1905	34	11390	-11550	103400	-16910	112500	-3862	59380	-7479	0	-1762	75450	-17190	106400	-647	1252		-197.5545	38.76
168	15:29:59	186.5	-274.5	38.8		00:47:22	196.3	128.7	-247.9	-119.2	266.4		-10250	108600	105	1907	33	11510	-11630	104200	-16520	112300	-3859	59360	-7448	0	-1726	75550	-17300	107200	-633	1249		-196.2675	38.80

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH	AI
169	15.30.04	187.8	-272.0	38.8		00:47.25	194.5	129.6	-245.6	-116.0	268.2		-10240	169500	108	1911	31	11520	-11730	105100	-14720	106900	-3858	39350	-7414	0	-1686	75590	-17430	108200	-615	1242		-194.48	38.80
170	15.30.09	189.0	-268.2	38.8		00:47.32	191.8	130.4	-242.2	-111.8	269.9		-10240	130500	111	1915	28	11530	-11830	106200	-14570	80490	-3856	39330	-7376	0	-1655	75500	-17560	109300	-595	1235		-191.763	38.77
171	15.30.19	191.3	-263.0	38.8		00:47.42	188.0	132.0	-237.5	-105.5	273.2		-10230	113200	127	1908	23	11530	-12060	108600	-13970	77120	-3851	39290	-7287	0	-1611	75670	-17860	111900	-560	1226		-188.045	38.78
173	15.30.34	194.2	-254.8	38.8		00:47.57	182.2	134.3	-230.1	-95.7	278.1		-10090	121200	142	1901	17	11570	-12500	113000	-13830	75060	-3844	39230	-7144	0	-1674	73930	-18280	116500	-503	1209		-182.182	38.78
174	15.30.39	196.0	-252.3	38.8		00:48.02	180.4	135.2	-227.8	-92.6	279.9		-10040	143300	142	1898	13	11570	-12840	114700	-13780	74640	-3842	39210	-7086	0	-1626	72220	-18420	118200	-487	1206		-180.3945	38.78
175	15.30.44	195.9	-250.6	38.8		00:48.07	179.2	135.2	-226.3	-91.1	279.8		-9982	0	145	1896	12	11580	-12420	116300	-13740	74230	-3838	39200	-7037	0	-1620	70230	-18550	119900	-472	1201		-179.179	38.80
176	15.30.54	195.7	-247.1	38.8		00:48.17	176.7	135.0	-223.1	-88.1	279.5		-9854	0	144	1894	-10	11580	-12290	118100	-13660	73550	-3836	39160	-6981	0	-1682	68050	-18670	122000	-457	1190		-176.6765	38.76
178	15.33.19	194.4	-240.5	38.8		00:50.42	172.1	134.1	-217.4	-83.2	277.7		-9087	0	135	1892	-59	11450	-11560	126000	-13350	69780	-3837	38760	-6800	0	-1838	63860	-18960	0	-428	1169		-172.3905	38.76
179	15.34.04	193.2	-240.3	38.8		00:51.27	171.8	136.8	-217.0	-80.2	283.1		-9035	0	134	1894	-65	11430	-11430	135700	-13300	69350	-3838	38670	-6772	0	-1839	63620	-19010	0	-418	1174		-171.8145	38.78
180	15.34.14	200.3	-238.1	38.8		00:51.37	170.2	138.2	-215.0	-76.8	286.1		-9027	0	141	1900	-69	11430	-11400	211300	-13280	69290	-3838	38650	-6749	0	-1827	63820	-19080	0	-398	1172		-170.2415	38.76
182	15.34.29	202.4	-235.6	38.8		00:51.52	168.0	139.6	-212.2	-72.6	289.3		-9016	0	152	1908	-81	11430	-11270	0	-13260	69180	-3832	38610	-6687	0	-1812	64110	-19308	0	-371	1169		-168.0965	38.76
183	15.34.34	203.2	-232.0	38.8		00:51.57	165.9	140.2	-209.5	-69.3	290.2		-9009	0	156	1909	-85	11430	-11210	0	-13260	69140	-3829	38600	-6665	0	-1807	63990	-19370	0	-343	1166		-166.838	38.77
184	15.34.44	204.6	-229.3	38.8		00:52.07	163.9	141.2	-207.1	-65.9	292.2		-8959	0	159	1910	-94	11420	-11040	0	-13250	69060	-3826	38580	-6630	0	-1878	62940	-19520	0	-317	1164		-163.9495	38.80
186	15.35.04	207.1	-222.7	38.8		00:52.27	159.2	142.9	-201.1	-58.2	295.8		-8688	0	159	1910	-109	11420	-10920	0	-13250	69010	-3824	38560	-6628	0	-1879	62470	-19590	0	-301	1159		-161.9475	38.76
187	15.35.13	208.3	-218.0	38.8		00:52.40	155.9	143.7	-196.9	-53.1	297.5		-8610	0	155	1909	-132	11410	-9995	0	-13270	68750	-3812	38500	-6761	0	-1818	53630	-19930	0	-228	1145		-155.87	38.79
188	15.35.25	209.2	-215.4	38.8		00:52.48	154.6	144.3	-194.5	-50.2	298.8		-8558	0	154	1906	-142	11410	-9792	0	-13270	68680	-3805	38480	-6753	0	-1782	52930	-20010	0	-207	1140		-154.011	38.78
189	15.35.35	209.8	-213.7	38.8		00:52.53	152.8	144.8	-193.0	-48.2	299.7		-8542	0	144	1906	-148	11400	-9757	0	-13270	68640	-3804	38460	-6749	0	-1779	52780	-20050	0	-194	1135		-152.7955	38.78
190	15.35.45	211.1	-209.8	38.8		00:53.08	149.3	145.7	-188.5	-42.9	301.5		-8532	0	167	1894	-167	11400	-9583	0	-13260	68490	-3800	38430	-6783	0	-1786	52470	-20169	0	-156	1124		-149.292	38.76
192	15.36.05	212.7	-205.0	38.8		00:53.28	146.6	146.8	-185.1	-38.4	303.8		-8500	0	115	1906	-175	11400	-9445	0	-13250	68330	-3797	38390	-6862	0	-1790	52460	-20270	0	-114	1115		-146.575	38.81
193	15.36.15	213.5	-202.5	38.8		00:53.38	144.8	147.3	-182.9	-35.6	304.9		-8491	0	107	1902	-176	11400	-9357	0	-13240	68250	-3794	38360	-6799	0	-1783	52350	-20310	0	-93	1108		-144.7875	38.80
194	15.36.20	214.2	-200.1	38.8		00:53.43	143.1	147.8	-180.7	-32.9	305.9		-8474	0	99	1897	-177	11400	-9367	0	-13240	68210	-3794	38350	-6772	0	-1782	52260	-20330	0	-82	1104		-143.6715	38.77
196	15.36.55	216.9	-190.8	38.8		00:54.18	136.4	149.7	-172.3	-22.6	309.8		-8445	0	72	1872	-178	11400	-9264	0	-13210	67940	-3784	38270	-6684	0	-1766	52080	-20360	0	-30	1088		-138.7835	38.76
197	15.37.05	217.6	-187.5	38.8		00:54.28	134.1	150.3	-169.3	-19.2	310.8		-8447	0	105	1866	-179	11410	-9249	0	-13200	67860	-3779	38240	-6677	0	-1768	52080	-20290	0	6	1078		-136.422	38.79
198	15.37.15	218.1	-184.1	38.8		00:54.38	131.6	150.5	-166.2	-15.8	311.5		-8448	0	126	1864	-173	11410	-9209	0	-13190	67780	-3772	38210	-6647	0	-1777	52050	-20190	0	32	1070		-134.0625	38.78
199	15.37.25	218.5	-180.8	38.8		00:54.48	129.3	150.8	-163.3	-12.5	312.1		-8449	0	152	1843	-176	11410	-9204	0	-13180	67690	-3766	38180	-6629	0	-1786	52060	-19980	0	88	1055		-129.272	38.76
200	15.37.35	0.3	-82.6	38.8		00:54.58	59.0	6.2	-74.6	-74.4	0.4		9	0	-619	1557	-241	0	0	0	0	0	-3439	32580	-6303	0	-677	45770	0	0	545	506		-59.03755	38.79

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
1	S		3	Comb	Test			3		18 Oct		1996																						
2	Date	18.10.96	Time		13:00:32		Progver		961017a																									
3																																		
4				MTS-actua	MTS-actuator				arm=1.25m				All strain gauges in microstrain																					
5	measured		measured	measured	measured	measured							Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8		Gauge 9		Gauge 10		Gauge 11	
6	Time		Pressure (	Force (kN)	Disp. (mm)	angle	Test time		Moment (kNx_press (	Ax_momen	Axial (MPa	Hoop (MPa)																						
7	sec		(bar)	kN	mm	deg			kNm				long.	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop	long	hoop
8										ax-press	ax-momen	Axial	hoop																					
9																																		
10																																		
11	46819		0.0	-1	0.0	0.000	0	0.4	0.0	-0.5	-0.5	0.0	12	48	7	73	19	27	-8	41	37	5	128	34	15	86	15	118	18	38	0	11	3	7
12	46833		2.5	-1	0.0	0.000	14	0.4	1.7	-0.5	1.3	3.6	18	85	13	112	26	65	5	63	45	31	144	59	21	128	21	160	24	77	4	27	6	23
13	46838		4.9	-1	0.0	0.000	19	0.4	3.4	-0.4	2.9	7.0	24	125	19	151	31	104	23	85	51	58	158	81	27	166	27	199	30	116	6	40	10	36
14	46882		25.9	-1	-0.1	-0.001	63	0.4	17.9	-0.5	17.4	37.0	88	517	82	548	93	497	166	309	113	306	299	304	84	553	84	579	88	486	33	170	43	170
15	47052		51.5	0	-0.2	0.000	133	0.3	35.5	-0.3	35.2	73.6	160	975	152	1013	162	957	333	570	184	600	466	567	151	1020	151	1043	156	937	65	326	82	328
16	47245		75.9	-1	-0.2	-0.009	326	0.3	52.4	-0.4	52.0	105.4	236	1436	218	1509	240	1399	465	852	227	900	739	835	224	1544	226	1603	231	1383	97	474	118	476
17	47311		100.1	-1	-0.2	-0.019	392	0.4	69.1	-0.5	68.6	143.0	330	1899	292	1992	330	1938	564	1159	214	1298	1146	1153	307	2118	319	2228	325	1796	126	621	154	621
18	47374		125.7	-1	-0.3	-0.024	455	0.4	86.7	-0.5	86.3	179.5	549	7320	574	7724	541	7770	-398	1786	311	7725	462	3391	590	16538	429	17418	639	14693	168	771	187	770
19	47585		149.9	-1	-0.3	-0.029	646	0.4	103.4	-0.5	103.0	214.1	943	20650	-48	25505	817	20139	-2569	6707	859	17789	-2331	6379	722	27927	-190	33581	935	27952	244	891	225	886
20	47664		165.2	-1	-0.2	-0.018	745	0.4	114.0	-0.5	113.5	236.0	1594	30585	-338	37789	701	30016	-2226	11575	825	9545	-2258	9469	595	41840	-175	32916	-59	39936	301	965	257	959
21	47856		164.5	-4	1.8	-0.010	937	2.4	113.5	-3.1	110.4	235.0	1346	32634	-412	40152	637	32064	-2152	12155	393	8562	-2146	10293	533	44657	-85	29557	-264	39901	282	963	271	949
22	47866		164.4	-8	2.2	-0.009	947	4.8	113.4	-6.1	107.4	234.8	1332	32670	-427	40195	622	32099	-2185	12181	374	8543	-2179	10302	515	44709	-84	29514	-266	39923	280	967	284	940
23	47926		164.2	-20	3.1	0.010	1007	12.6	113.3	-15.9	97.4	234.5	1271	32858	-495	40446	560	32299	-2298	12210	314	8464	-2286	10364	452	44870	-78	29241	-269	40038	242	977	329	926
24	47996		164.2	-25	3.4	0.018	1037	15.5	113.3	-19.6	93.7	234.5	1246	32961	-526	40594	533	32406	-2348	12240	289	8442	-2333	10399	424	45118	-75	29131	-271	40114	226	983	347	921
25	47996		164.2	-30	3.8	0.022	1047	18.7	113.3	-23.6	89.7	234.5	1220	33014	-552	40667	507	32460	-2392	12255	267	8434	-2377	10413	399	45186	-73	29114	-272	40160	210	987	364	915
26	47996		164.2	-36	4.3	0.033	1077	23.7	113.3	-29.9	83.4	234.5	1178	33148	-600	40861	463	32606	-2476	12294	230	8421	-2457	10457	352	45370	-71	29049	-275	40284	183	995	395	906
27	48028		164.1	-46	4.8	0.044	1107	28.6	113.2	-36.1	77.1	234.4	1134	33300	-652	41103	421	32773	-2559	12342	194	8416	-2538	10513	305	45576	-67	22989	-276	40428	159	1002	426	896
28	48038		163.9	-50	5.1	0.050	1117	31.2	113.1	-39.4	73.7	234.1	1110	33368	-678	41205	397	32847	-2600	12362	176	8416	-2578	10536	281	45664	-65	22979	-277	40490	146	1006	441	892
29	48066		164.0	-57	5.5	0.061	1148	35.7	113.2	-45.1	68.0	234.2	1067	33548	-735	41476	353	33033	-2680	12417	142	8415	-2659	10606	230	45901	-62	22941	-278	40635	120	1014	472	881
30	48076		163.9	-61	5.7	0.064	1157	37.8	113.1	-47.8	65.3	234.1	1052	33619	-761	41594	331	33114	-2714	12442	129	8419	-2688	10636	211	46002	-61	22933	-278	40699	115	1018	478	880
31	48096		163.9	-66	6.1	0.072	1177	41.0	113.1	-51.8	61.3	234.1	1023	33746	-798	41780	300	33245	-2774	12482	105	8418	-2749	10689	173	46171	-58	22896	-279	40817	94	1022	504	872
32	48106		163.9	-70	6.3	0.079	1187	43.9	113.1	-55.4	57.7	234.1	996	33837	-832	41915	274	33336	-2818	12510	86	8423	-2789	10724	148	46282	-57	22889	-280	40891	84	1026	516	867
33	48136		163.8	-75	6.6	0.085	1217	47.2	113.0	-59.6	53.4	234.0	967	34031	-880	42209	234	33536	-2881	12585	61	8420	-2852	10807	108	46537	-53	22843	-281	41059	68	1031	539	860
34	48146		163.7	-81	6.9	0.092	1227	50.4	112.9	-63.7	49.3	233.8	937	34121	-919	42341	204	33631	-2933	12617	40	8422	-2898	10842	79	46653	-51	22839	-283	41139	55	1034	554	856
35	48176		163.6	-90	7.5	0.105	1257	56.4	112.9	-71.2	41.7	233.7	880	34352	-990	42688	139	33879	-3033	12696	1	8423	-2999	10938	16	46958	-46	22800	-284	41334	26	1044	590	845
36	48206		163.5	-97	7.9	0.116	1287	60.9	112.8	-76.9	36.0	233.5	836	34597	-1062	43065	80	34139	-3116	12788	-32	8426	-3084	11046	-41	47270	-41	22778	-285	41472	4	1050	617	834
37	48216		163.5	-101	8.1	0.121	1297	62.9	112.8	-79.4	33.4	233.5	817	34695	-1092	43221	55	34253	-3151	12823	-45	8431	-3118	11087	-65	47394	-38	22766	-290	41291	-3	1052	628	831
38	48246		163.4	-109	8.6	0.133	1327	68.3	112.7	-86.2	26.5	233.4	756	34951	-1172	43628	-6	34533	-3249	12922	-81	8436	-3215	11199	-129	47729	-32	22751	-294	41408	-29	1060	661	819
39	48276		163.2	-113	8.8	0.140	1358	70.8	112.6	-88.5	23.1	233.1	721	35193	-1232	44009	-52	34806	-3316	13025	-109	8436	-3289	11311	-183	48053	-28	22711	-295	41541	-48	1066	686	810
40	48286		163.2	-120	9.2	0.149	1367	75.2	112.6	-95.0	17.6	233.1	678	35319	-1282	44198	-94	34942	-3377	13070	-128	8440	-3340	11357	-221	48205	-26	22680	-296	41609	-59	1071	702	806
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42	48306		163.1	-130	9.7	0.163	1387	81.2	112.5	-102.6	9.9	233.0	616	35565	-1365	44581	-169	35206	-3488	13160	-162	8453	-3451	11455	-297	48516	-20	22597	-298	41800	-89	1079	740	794
43	48346		163.1	-140	10.3	0.177	1427	87.7	112.5	-110.7	1.8	233.0	532	35997	-1475	45185	-263	35685	-3611	13330	-198	8462	-3569	11642	-383	49041	-13	22491	-305	42307	-115	1088	778	781
44	48366		162.9	-148	10.7	0.188	1447	92.2	112.4	-116.5	-4.1	232.7	477	36223	-1544	45514	-326	35911	-3718	13415	-221	8485	-3669	11743	-453	49342	-8	22457	-308	42490	-144	1098	816	769
45	48378		162.8	-151	10.9	0.194	1457	94.3	112.3	-119.1	-6.8	232.5	444	36411	-1594	45786	-368	36116	-3776	13478	-233	8481	-3709	11814	-485	49556	-6	22445	-309	42617	-146	1099	824	765
46	48386		162.8	-157	11.2	0.202	1467	97.9	112.3	-123.6	-11.3	232.5	397	36573	-1647	46017	-411	36286	-3848	13530	-250	8484	-3778	11881	-536	49762	-3	22426	-311	42720	-167	1105	849	757
47	48396		162.7	-160	11.5	0.208	1477	100.1	112.3	-126.5	-14.2	232.4	357	36773	-1700	46318	-455	36501	-3903	13594	-262	8496	-3828	11958	-571	49994	0	22406	-312	42850	-173	1108	860	752
48	48416		162.6	-167	11.9	0.219	1497	104.6	112.2	-132.1	-19.9	232.2	298	37081	-1780	46733	-524	36825	-3993	13700	-280	8499	-3917	12079	-641	50381	4	22370	-315	42507	-194	1115	889	742
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51	48486		162.2	-185	12.9	0.244	1567	115.4	111.9	-145.8	-33.9	231.7	145	37979	-2018	47970	-718	37796	-4260	14022	-319	8496	-4168	12454	-841	51524	14	22210	-328	42631	-247	1132	969	715
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53	48526		162.1	-200	13.7	0.272	1607	124.7	111.8	-157.5	-45.7	231.5	24	38634	-2206	48849	-871	38487	-4486	14227	-347	8508	-4366	12685	-996	52360	20	22132	-365	41550	-281	1144	1021	697
54	48556		161.9	-204	14.0	0.281	1637	127.6	111.7	-161.1	-49.4	231.2	-33	39045	-2296	49396	-943	38931	-4579	14367	-355	8512	-4448	12835	-1068	52862	22	22126	-391	40779	-296	1148	1045	688
55	48566		162.0	-210	14.3	0.290	1647	131.2	111.8	-165.6	-53.8	231.4	-74	39212	-2355	49616	-993	39113	-4660	14417	-363	8514	-4520	12893	-1119	53075	24	22117	-392	40728	-311	1154	1067	682
56	48596		161.9	-216	14.7	0.299	1677	134.9	111.7	-170.4	-58.7	231.2	-132	39610	-2455	50152	-1075	39556	-4765	14550	-372	8518	-4612	13042	-1201	53603	26	21747	-395	40460	-325	1159	1091	671
57	48606		161.8	-219	14.8	0.305	1687	136.9	111.6	-172.9	-61.3	231.1	-161	39766	-2498	50349	-1113	39728	-4815	14596	-378	8520	-4661	13093	-1239	53808	26	21700	-395	40371	-334	1162	1103	668
58	48626		161.7	-223	15.1	0.311	1707	139.5	111.6	-176.1	-64.6	231.0	-204	40028	-2565	50696	-1170	40020	-4889	14677	-383	8520	-4729	13184	-1298	54168	26	21619	-395	40018	-348	1166	1125	661
59	48636		161.6	-228	15.3	0.318	1717	142.5	111.5	-179.9	-68.4	230.8	-238	40201	-2618	50925	-1212	40207	-4953	14727	-389	8525	-4786	13239	-1340	54402	27	21561	-392	39903	-356	1169	1139	656
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61	48676		161.5	-240	16.0	0.337	1757	150.2	111.4	-189.6	-78.2	230.7	-348	40859	-2802	51812	-1365	40965	-5167	14922	-405	8537	-4979	13469	-1496	55322	28	21417	-376	37005	-387	1180	1189	638
62	48696		161.3	-250	16.5	0.352	1777	155.9	111.3	-196.9	-85.6	230.4	-425	41277	-2925	52380	-1472	41451	-5316	15031	-419	8548	-5116	13617	-1614	55910	30	21391	-361	36348	-412	1189	1226	624
63	48716		161.3	-256	16.9	0.363	1797	159.6	111.3	-201.9	-90.6	230.4	-487	41711	-3037	52945	-1569	41940	-5437	15146	-431	8552	-5231	13769	-1723	56511	30	21340	-345	35312	-432	1196	1258	614
64	48726		161.2	-260	17.2	0.371	1807	162.6	111.2	-205.4	-94.1	230.2	-521	41969	-3106	53283	-1628	42232	-5511	15210	-439	8564	-5300	13855	-1788	56885	31	21368	-335	34676	-437	1197	1271	608
65	48746		161.0	-265	17.5	0.381	1827	165.7	111.1	-209.3	-98.2	230.0	-579	42353	-3205	53798	-1713	42694	-5612	15317	-444	8560	-5390	13985	-1883	57441	30	21304	-319	33758	-451	1202	1296	601
66	48766		160.9	-269	17.7	0.388	1847	168.4	111.0	-212.6	-101.6	229.8	-593	42511	-3304	54320	-1798	43152	-5713	15426	-448	8562	-5474	14111	-1978	58012	30	21336	-307	33248	-458	1205	1312	593
67	48786		160.9	-275	18.0	0.395	1867	171.8	111.0	-217.0	-106.0	229.8	-627	42498	-3390	54717	-1875	43523	-5813	15510	-449	8551	-5564	14210	-2064	58478	26	21301	-297	32887	-478	1211	1339	584
68	48796		160.8	-280	18.3	0.406	1877	175.1	110.9	-221.2	-110.2	229.7	-669	42655	-3468	55035	-1946	43823	-5900	15569	-456	8560	-5642	14280	-2140	58847	27	21271	-293	32785	-484	1215	1355	580
69	48816		160.8	-288	18.8	0.419	1897	179.9	110.8	-227.2	-116.4	229.4	-756	42978	-3585	55577	-2056	44339	-6036	15671	-463	8562	-5766	14405	-2265	59470	26	21201	-285	32566	-505	1220	1387	568
70	48836		160.5	-295	19.2	0.431	1917	184.1	110.7	-232.5	-121.7	229.2	-847	43456	-3735	56299	-2201	45004	-6197	15798	-475	8574	-5917	14565	-2429	60296	27	21180	-276	32382	-523	1227	1420	556
71	48846		160.4	-301	19.6	0.445	1927	187.9	110.7	-237.4	-126.7	229.1	-1118	43546	-3849	56797	-2310	45476	-6319	15879	-485	8591	-6024	14666	-2540	60840	28	21189	-273	32315	-533	1231	1440	548
72	48876		160.2	-309	20.1	0.470	1957	193.3	110.5	-244.1	-133.5	228.8	-1248	43362	-4048	57752	-2496	46372	-6515	16056	-492	8581	-6208	14883	-2750	61906	25	21167	-261	31957	-553	1236	1478	535
73	48906		159.9	-317	20.7	0.487	1987	196.3	110.3	-250.4	-140.1	228.4	-1559	42186	-4280	58810	-2706	47297	-6733	16238	-500	8582	-6411	15102	-2971	63017	23	21143	-249	31510	-572	1248	1458	548
74	48926		159.8	-320	21.0	0.499	2008	200.3	110.3	-252.9	-142.7	228.2	-1561	38878	-4450	59595	-2855	47958	-6869	16369	-505	8582	-6537	15265	-3124	63824	14	21043	-245	31003	-574	1249	1427	565
75	49226		160.0	-320	21.5	0.518	2307	200.3	114.5	-252.9	-138.4	237.1	-1610	33454	-4829	61991	-3189	50093	-7094	16933	-469	8415	-6731	15970	-3514	66646	65	19620	-229	28789	-549	1287	1374	634
76	49236		170.8	-320	21.7	0.528	2317	200.3	117.8	-252.9	-135.1	244.0	-1699	34248	-5148	65040	-3488	52981	-7185	17774	-520	8699	-6834	17241	-3885	70562	73	19716	-217	28696	-513	1312	1308	658
77	49276		174.4	-320	22.3	0.559	2357	200.3	120.3	-252.9	-132.6	249.1	-809	23505	-5853	70525	-4119	58142	-7351	19292	-520	8867	-7053	19540	-4618	77311	7	19110	-204	27085	-472	1328	1300	694
78	49326		179.1	-320	23.5	0.610	2407	200.3	123.6	-252.9	-129.4	255.8	-915	21951	-6725	76887	-4981	63986	-7612	21373	-511	8668	-7321	22286	-712	59422	57	17795	-155	24983	-456	1368	1292	761
79	49376		182.0	-320	24.8	0.668	2457	200.3	125.6	-252.9	-127.4	260.0	-916	21084	-7737	84338	-6232	56268	-7871	24107	-483	8723	-7571	25400	-957	50356	36	17799	-109	24207	-442	1384	1254	795
80	49386		184.6	-320	25.3	0.699	2467	200.3	127.4	-252.9	-125.6	263.7	-926	20930	-8252	88925	-6620	52381	-7811	26051	-508	8810	-7528	27536	-398	50844	53	17812	-98	24284	-420	1395	1255	812

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF	AG	AH
81	49906	188.9	-320	28.1	0.825	2587	200.3	130.3	-252.9	-122.6	269.8		-956	19551	-10051	101540	-7286	35516	-8671	30344	-392	8605	-8347	32103	549	50328	67	18011	-100	24208	-439	1426	1219	868
82	49896	194.6	-320	30.9	0.957	2677	200.2	134.3	-252.8	-118.5	277.9		-327	19664	-12191	118920	-8438	29598	-9335	36721	-81	9306	-8968	38672	-874	45648	14	18019	-114	24227	-411	1453	1211	921
83	49926	192.5	-320	33.3	1.073	2707	200.3	132.8	-252.9	-120.1	274.9		-211	19686	-13812	138160	-5875	28845	-10148	40911	38	6178	-9732	42807	-769	45057	9	18035	-122	24213	-432	1442	1169	929
84	49746	190.3	-320	34.9	1.152	2827	200.2	131.3	-252.9	-121.6	271.8		-220	19516	-14733	0	-5710	28499	-10884	42582	8	6096	-10433	44505	-804	44305	4	17998	-148	24160	-456	1434	1138	928
85	49926	189.4	-329	36.1	1.202	3007	205.5	130.7	-259.6	-128.9	270.5		-232	19294	-15229	0	-5659	28263	-11375	43293	-11	6044	-10901	45235	-812	43679	6	17956	-153	24060	-495	1438	1153	917
86	49946	188.9	-336	36.7	1.226	3026	210.2	130.3	-265.5	-135.2	269.8		-230	19281	-15441	0	-5656	28299	-11634	43422	-11	6042	-11148	45374	-812	43630	7	17955	-152	24056	-527	1446	1167	912
87	49956	188.4	-340	37.3	1.251	3037	212.3	130.0	-268.2	-138.2	269.1		-225	19282	-15678	0	-5653	28358	-11903	43587	-11	6040	-11401	45551	-812	43605	7	17954	-151	24046	-544	1451	1164	912
88	49966	188.0	-340	37.8	1.273	3047	212.5	129.7	-268.4	-138.7	268.5		-216	19284	-15928	0	-5648	28401	-12140	43805	-10	6039	-11620	45768	-811	43582	7	17952	-152	24041	-552	1452	1156	913
89	49886	191.1	-340	38.6	1.308	3067	212.4	131.9	-268.3	-136.4	272.9		-205	19289	-16372	0	-5638	28514	-12517	44389	-8	6036	-11974	46383	-811	43539	7	17950	-150	24033	-563	1475	1152	937
90	49896	195.2	-340	40.5	1.393	3077	212.5	134.7	-268.4	-133.7	278.8		-170	19344	-17770	0	-5597	28910	-13586	47197	2	6040	-12991	49283	-798	43517	20	17955	-139	24037	-544	1501	1169	966
91	50007	192.6	-340	42.9	1.509	3088	212.5	132.9	-268.4	-135.5	275.1		-319	19143	-18011	0	-5536	28116	-14835	49385	16	6053	-14148	51575	-784	43478	22	17955	-131	24034	-568	1493	1155	962
92	50036	190.2	-340	45.1	1.617	3117	212.5	131.2	-268.4	-137.1	271.7		-352	19085	-16620	0	-5511	27906	-15979	45469	22	6044	-15243	53160	-808	43099	9	17937	-133	24008	-594	1486	1132	959
93	50126	188.0	-340	47.0	1.705	3207	212.5	129.7	-268.4	-138.6	268.5		-367	18954	-15862	0	-5503	27662	-17010	44814	10	6015	-16221	54473	-821	42896	2	17909	-133	23956	-611	1478	1146	952
94	50166	190.3	-340	47.4	1.725	3247	212.5	131.3	-268.4	-137.1	271.8		-396	18908	-15684	0	-5502	27627	-17220	44867	6	6008	-16429	54842	-825	42815	2	17901	-134	23937	-610	1485	1150	957
95	50176	193.6	-340	47.7	1.742	3257	212.4	133.6	-268.2	-134.7	276.5		-397	18908	-15683	0	-5499	27709	-17442	45374	6	6008	-16665	55624	-826	42801	3	17902	-132	23935	-596	1515	1182	986
96	50186	194.9	-340	48.9	1.795	3267	212.4	134.5	-268.3	-133.8	278.4		-394	18931	-15713	0	-5480	27828	-18346	45361	5	6008	-17571	57589	-813	42787	12	17922	-135	23934	-582	1523	1178	999
97	50196	-1.2	-340	62.8	2.413	3277	212.5	-0.8	-268.3	-269.2	-1.7		-480	18514	-11939	139820	-5552	26236	-7886	24561	-307	5182	-8647	31231	207	36918	122	14930	-549	19837	-308	-251	1301	-765

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
1	Test	S4	cond:	Pressure		test	20	nov.	1996																							
2	ISM-01	Date	11-20-1996	Time:		16:08:35	Progver.	961108a																								
3	TIME																															
4				MTS-actua	MTS-actuator			arm=1.47m					All strain gauges in microstrain																				
5	measured	measured	measured	measured	measured	measured							Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8		Gauge 9		Gauge 10	
6	Time	Pressure (	Force (kN)	Disp. (mm)	angle	Test time	Moment (kN	Ax_press (A	x_momen	Axial (MPa	Hoop (MPa)									4-hoop												
7	sec	(bar)	kN	mm	deg		kNm						long	hoop	long	hoop	long.	hoop	long.	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long	hoop	long	hoop
8								ax-press	ax-momen	Axial	hoop																					
9																																
10																																
11	54612	0.6	-1	0.0	0.00	0	1	0.4	-1.1	-0.7	0.9		1	1	0	1	1	2	0	4	0	2										
12	54783	26.4	-1	0.0	0.00	171	1	18.2	-1.1	17.1	37.7		33	129	35	127	52	269	48	372	56	351										
13	54877	51.5	-1	0.0	-0.01	266	1	35.5	-1.1	34.5	73.6		66	256	70	253	103	541	95	735	109	695										
14	54935	75.9	-1	0.0	-0.01	323	1	52.4	-1.1	51.3	108.4		99	379	104	375	151	815	139	1087	159	1028										
15	55030	101.1	-1	0.0	-0.01	418	1	69.8	-1.1	68.7	144.4		132	508	139	503	200	1103	185	1445	211	1369										
16	55127	125.0	-1	0.0	-0.02	515	1	86.2	-1.1	85.2	178.6		164	629	173	623	248	1384	228	1783	259	1691										
17	55212	150.5	-1	0.0	-0.02	600	1	103.8	-1.1	102.7	215.0		199	761	209	751	315	1589	299	1989	341	1941										
18	55294	166.8	-1	0.0	-0.02	682	1	115.1	-1.2	113.8	236.2		220	846	233	834	431	1563	434	1841	469	1914										
19	55392	175.2	-1	0.0	-0.03	780	1	120.9	-1.2	119.7	250.2		232	891	245	878	445	4424	431	12222	551	1762										
20	55513	185.8	-1	0.0	-0.03	903	1	128.2	-1.2	127.0	265.4		251	947	261	932	398	15597	333	17698	542	15732										
21	55569	200.1	-1	0.0	-0.03	957	1	138.1	-1.2	136.8	285.8		287	1013	279	1004	314	18916	213	22249	400	19160										
22	55737	199.1	-26	2.8	0.01	1125	19	137.4	-23.7	113.7	284.4		202	1026	382	970	222	22929	100	27326	252	23966										
23	55794	198.9	-50	4.7	0.05	1182	37	137.2	-46.7	90.5	284.1		193	1053	490	940	108	23436	-20	27962	123	24491										
24	55899	198.5	-75	6.5	0.09	1287	55	137.0	-70.0	67.0	283.5		5	1078	597	910	-12	24099	-152	28743	-4	26186										
25	59015	198.0	-100	8.2	0.14	1403	74	136.6	-93.1	43.5	282.8		-93	1103	705	879	-161	24825	-267	29521	-150	26922										
26	59068	198.0	-125	9.9	0.18	1456	92	136.6	-116.2	20.4	282.8		-191	1129	814	849	-303	25507	-412	30264	-310	26594										
27	56126	197.8	-150	11.5	0.22	1514	111	136.5	-139.6	-3.2	282.5		-287	1155	923	818	-417	26253	-580	31181	-465	27390										
28	56181	197.6	-175	13.2	0.26	1569	129	136.3	-162.6	-26.2	282.2		-381	1180	1031	788	-545	27108	-741	32269	-648	28270										
29	56288	197.4	-200	14.8	0.31	1678	147	136.2	-185.8	-49.6	281.9		-473	1203	1141	755	-666	28102	-936	33635	-829	29276										
30	56408	197.2	-225	16.5	0.35	1794	166	136.1	-209.2	-73.1	281.7		-561	1225	1253	720	-854	29364	-1143	35077	-1037	30444										
31	56471	196.8	-251	18.3	0.40	1859	184	135.8	-232.5	-96.8	281.1		-648	1244	1363	682	-1185	31263	-1395	36815	-1314	31865										
32	56561	196.4	-275	20.3	0.46	1949	202	135.5	-255.0	-119.5	280.5		-731	1260	1471	636	-1716	33911	-1795	39307	-1787	34354										
33	56666	195.5	-300	23.2	0.56	2054	221	134.9	-278.6	-143.7	279.2		-830	1283	1494	592	-2944	38660	-2769	44329	-2859	39115										
34	56733	191.4	-325	31.0	0.85	2121	239	132.1	-301.4	-169.3	273.4		-878	1289	1406	543	-6817	49979	-6054	56305	-6869	52157										
35	56808	178.5	-350	52.8	1.70	2196	257	123.2	-324.8	-201.6	255.0		-14161	1026	1431	417	-13744	63531	-12216	70476	-14544	69774										
36	56893	172.4	-350	62.9	2.12	2281	257	119.0	-324.8	-205.8	246.3		-14811	9946	1466	361	-15430	65936	-13563	72575	-15876	71421										
37	56956	168.8	-350	68.9	2.36	2344	257	116.5	-324.7	-208.3	241.1		-15171	14535	1489	323	-16405	67301	-14330	73751	-16293	72285										
38	58189	192.0	-336	121.1	4.43	3578	247	132.5	-311.5	-179.1	274.2		-20181	23253	24415	2128	-22733	81356	-22345	92020	-21535	85551										
39	58266	197.1	-335	121.1	4.43	3654	246	136.0	-311.2	-175.2	281.5		-20179	23288	24427	2159	-22726	81428	-22343	92105	-21531	85651										
40	58276	201.2	-335	121.1	4.43	3664	246	138.8	-310.7	-171.9	287.4		-20179	23327	24442	2189	-22727	81567	-22348	92253	-21534	85796										
41	58305	204.9	-332	121.1	4.43	3694	244	141.4	-307.9	-166.5	292.6		-20197	23414	24482	2236	-22754	81900	-22391	92625	-21572	86145										
42	58316	208.1	-329	121.1	4.43	3704	242	143.6	-305.8	-162.2	297.2		-20209	23478	24512	2273	-22773	82168	-22423	92918	-21600	86424										
43	58321	209.7	-328	121.1	4.43	3709	241	144.7	-304.2	-159.5	299.5		-20219	23526	24535	2298	-22791	82371	-22450	93130	-21624	86625										
44	58331	211.5	-324	121.1	4.43	3719	238	145.9	-300.5	-154.6	302.0		-20246	23621	24584	2344	-22833	82777	-22513	93568	-21681	87030										
45	58361	211.0	-319	121.1	4.44	3749	234	145.6	-295.8	-150.2	301.3		-20281	23719	24643	2383	-22886	83150	-22590	93980	-21752	87417										
46	58386	214.1	-316	121.1	4.44	3774	232	147.7	-293.5	-145.7	305.8		-20294	23786	24676	2422	-22907	83385	-22622	94248	-21781	87677										
47	58401	218.2	-312	121.1	4.44	3789	229	150.5	-289.7	-139.2	311.6		-20317	23904	24734	2488	-22947	83927	-22691	94848	-21837	88230										
48	58416	220.3	-306	121.1	4.45	3804	225	152.0	-284.4	-132.4	314.6		-20353	24047	24811	2562	-23013	84630	-22796	95640	-21922	88695										
49	58452	219.7	-301	121.1	4.45	3840	221	151.6	-279.5	-127.9	313.8		-20385	24158	24877	2613	-23075	85110	-22886	96210	-21997	89630										
50	58571	219.2	-296	121.1	4.45	3959	218	151.2	-274.8	-123.6	313.0		-20415	24253	24937	2659	-23127	85452	-22966	96703	-22067	90083										
51	58681	222.4	-294	121.1	4.46	4069	216	153.4	-273.0	-119.5	317.6		-20423	24314	24967	2698	-23142	85621	-22997	96980	-22091	90330										
52	58696	226.2	-293	121.1	4.46	4084	215	156.1	-271.6	-115.5	323.1		-20429	24378	24995	2742	-23156	86001	-23029	97403	-22113	90718										
53	58706	228.6	-290	121.1	4.46	4094	213	157.7	-269.4	-111.6	326.6		-20444	24453	25031	2785	-23188	86540	-23086	98028	-22157	91250										
54	58711	229.8	-288	121.1	4.46	4099	212	158.6	-267.7	-109.2	328.2		-20453	24500	25055	2813	-23211	86893	-23126	98443	-22188	91610										
55	58721	230.1	-285	121.1	4.46	4109	209	158.7	-264.6	-105.8	328.5		-20474	24585	25102	2859	-23261	87528	-23206	99200	-22248	92253										
56	58761	229.3	-280	121.1	4.47	4149	206	158.2	-259.7	-101.5	327.5		-20505	24697	25172	2921	-23337	88267	-23318	100140	-22337	93046										
57	58881	233.0	-275	121.1	4.47	4269	202	160.7	-255.0	-94.3	332.8		-20532	24832	25243	3006	-23397	88948	-23421	101080	-22419	93883										
58	58886	234.3	-274	121.1	4.47	4274	201	161.6	-254.4	-92.8	334.6		-20535	24856	25254	3024	-23404	89148	-23436	101310	-22431	94087										
59	58901	237.8	-270	121.1	4.48	4289	198	164.1	-250.4	-86.3	339.7		-20560	24991	25317	3106	-23478	90633	-23558	102810	-22526	95437										
60	58906	238.8	-268	121.1	4.48	4294	197	164.8	-248.3	-83.6	341.1		-20573	25050	25347	3142	-23516	91250	-23618	103660	-22573	96068										
61	58921	239.8	-261	121.1	4.48	4309	192	165.4	-242.5	-77.1	342.5		-20614	25212	25428	3235	-23634	92927	-23788	105690	-22708	97750										
62	58956	238.5	-256	121.1	4.48	4344	188	164.5	-237.7	-73.2	340.6		-20652	25340	25490	3303	-23735	94015	-23927	107140	-22821	98933										
63	58991	241.6	-253	121.1	4.49	4379	186	166.7	-235.2	-68.6	345.0		-20669	25429	25527	3359	-23779	94638	-24001	108020	-22878	99668										
64	59007	244.4	-249	121.1	4.49	4395	183	168.6	-231.6	-62.9	349.0		-20702	25557	25575	3430	-23864	96163	-24123	109810	-22977	101150										
65	59011	244.9	-248	121.1	4.49	4399	182	169.0	-230.2	-61.3	349.7		-20716	25598	25589	3449	-23894	96683	-24162	110430	-23011	101670										
66	59026	245.7	-243	121.2	4.49	4414	179	169.5	-226.9	-56.3	351.0		-20760	25733	25634	3504	-23986	98267	-24275	112310	-23101	103180										
67	59047	247.2	-238	121.2	4.50	4435	175	170.5	-221.0	-50.5	353.0		-20813	25904	25696	3576	-24067	99987	-24371	114360	-23175	104810										
68	59056	248.4	-235	121.2	4.50	4444	173	171.4	-218.5	-47.1	354.8		-20838	25996	25730	3625	-24108	101060	-24423	115560	-23217	105760										
69	59068	249.6	-232	121.2	4.50	4456	171	172.2	-215.7	-43.5	356.5		-20867	26101	25770	3682	-24157	102580	-24484	117020	-23270	106900										
70	59086	249.1	-227	121.2	4.51	4474	167	171.9	-210.7	-38.8	355.8		-20917	26268	25833	3770	-24253	115150	-24600	119640	-23369	108940										
71	59162	251.6	-222	121.2	4.51	4550	163	173.6	-205.7	-32.1	359.3		-20961	26453	25902	3880	-24321	0	-24717	122180	-23470	110910										
72	59166	252.4	-221	121.2	4.51	4554	162	174.2	-205.0	-30.9	360.5		-20967	26483	25913	3899	-24335	0	-24736	122710	-23486	111310										
73	59186	254.8	-216	121.2	4.52	4574	159	175.8	-200.3	-24.5	363.9		-21012	26651	25978	4006	-24449	0	-24862	126520	-23603	114270										
74	59201	256.0	-211	121.2	4.52	4589	156	176.6	-196.0	-19.4	365.6		-21057	26815	26030	4098	-24543	0	-24975	129910	-23708	116870										
75	59206	256.3	-210	121.2	4.52	4594	154	176.8	-194.8	-18.0	366.0		-21072	26868	26047	4126	-24572	0	-25008	130950	-23740	117640										
76	59227	257.9	-204	121.2	4.53	4615	150	178.0	-189.5	-11.6	368.4		-21128	27084	26118	4246	-24691	0	-25147	135360	-23868	120890										
77	59251	259.5	-198	121.2	4.53	4639	146	179.0	-183.8	-4.8	370.6		-21177	27305	26201	4391	-24821	0	-25298	140750	-24005	124680										

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE	AF
78	59277	258.9	-193	121.2	4.54	4665	142	178.7	-179.0	-0.3	369.8		-21211	27456	26270	4508	-24922	0	-25412	145800	-24113	128070										
79	59362	256.1	-189	121.2	4.54	4780	139	176.7	-175.1	1.6	365.8		-21238	27550	26320	4587	-24956	0	-25483	150020	-24185	130200										
80	59421	259.8	-188	121.2	4.54	4869	138	179.2	-174.7	4.6	371.0		-21237	27590	26335	4625	-24958	0	-25490	150930	-24191	130640										
81	59431	262.0	-187	121.2	4.54	4819	138	180.8	-173.9	6.9	374.2		-21240	27633	26354	4665	-24976	0	-25508	152620	-24209	131430										
82	59441	263.4	-186	121.2	4.54	4828	136	181.8	-172.2	9.5	376.2		-21246	27696	26385	4725	-25023	0	-25544	157440	-24248	133280										
83	59457	264.6	-181	121.2	4.54	4845	133	182.6	-168.5	14.1	377.9		-21259	27800	26446	4841	-25122	0	-25613	165480	-24326	137440										
84	59526	261.2	-178	121.2	4.55	4914	130	180.2	-163.8	16.5	373.1		-21288	27899	26512	4965	-25205	0	-25706	0	-24421	150690										
85	59596	260.2	-175	121.2	4.55	4984	129	179.5	-162.5	17.0	371.6		-21294	27928	26527	4999	-25213	0	-25730	0	-24443	0										
86	59621	264.2	-175	121.2	4.55	5009	128	182.3	-162.1	20.2	377.4		-21293	27970	26544	5041	-25215	0	-25739	0	-24449	0										
87	59641	267.8	-172	121.2	4.55	5030	126	184.8	-159.2	25.5	382.5		-21301	28095	26598	5168	-25302	0	-25908	0	-24519	0										
88	59646	268.3	-170	121.2	4.55	5034	125	185.1	-158.1	27.0	383.3		-21304	28130	26616	5208	-25335	0	-26004	0	-24545	0										
89	59661	269.6	-165	121.2	4.55	5049	121	186.0	-153.3	32.7	385.1		-21320	28255	26681	5397	-25451	0	-26386	0	-24634	0										
90	59711	266.5	-160	121.2	4.56	5099	118	183.9	-148.6	35.2	380.6		-21349	28398	26752	5520	-25541	0	-22856	0	-24720	0										
91	59776	271.1	-157	121.2	4.56	5164	116	187.1	-146.1	40.9	387.3		-21357	28538	26805	5663	-25560	0	-22628	0	-24773	0										
92	59791	272.7	-155	121.2	4.56	5179	114	188.2	-143.6	44.6	389.5		-21366	28658	26854	5781	-25513	0	-22569	0	-24843	0										
93	59816	274.5	-149	121.2	4.57	5204	109	189.4	-138.3	51.1	392.1		-21384	28883	26951	6055	-22425	0	-22497	0	-24962	0										
94	59841	276.3	-143	121.2	4.57	5229	105	190.6	-132.8	57.8	394.6		-21402	29142	27052	6347	-20591	0	-22268	0	-25010	0										
95	59926	272.6	-138	121.2	4.58	5314	102	188.1	-128.2	59.9	389.4		-21425	29345	27127	6577	-19557	0	-22148	0	-24992	0										
96	59986	278.5	-136	121.2	4.58	5374	100	192.2	-126.3	65.8	397.8		-21425	29497	27175	6733	-19281	0	-22098	213650	-25004	0										
97	60006	280.4	-132	121.2	4.58	5394	97	193.5	-122.5	71.0	400.5		-21432	29718	27249	6878	-19246	0	-22076	189530	-24815	0										
98	60076	276.5	-127	121.2	4.59	5464	93	190.8	-117.9	72.9	395.0		-21451	29947	27326	7244	-19673	0	-22037	177410	-22171	0										
99	60136	281.8	-125	121.2	4.59	5524	92	194.4	-115.9	78.6	402.5		-21447	30118	27374	7421	-19637	0	-22012	174950	-21563	0										
100	60156	283.4	-122	121.2	4.59	5544	89	195.5	-112.8	82.7	404.7		-21448	30325	27435	7653	-19613	0	-21998	173880	-20982	0										
101	60187	285.0	-116	121.2	4.60	5575	85	196.6	-107.5	89.1	407.1		-21450	30703	27541	8071	-19562	0	-21972	171520	-20785	0										
102	60217	286.6	-111	121.2	4.61	5605	81	197.7	-102.6	95.2	409.3		-21445	31093	27637	8513	-19528	0	-21964	169670	-20786	0										
103	60247	288.1	-105	121.2	4.61	5635	77	198.8	-97.8	101.0	411.5		-21429	31480	27726	8933	-19480	0	-21938	168190	-20837	0										
104	60251	288.3	-105	121.2	4.61	5639	77	198.9	-97.2	101.7	411.6		-21425	31536	27739	8997	-19472	0	-21938	168000	-20835	0										
105	60281	289.6	-100	121.2	4.61	5669	73	199.8	-92.6	107.2	413.6		-21380	31883	27819	9389	-19429	0	-21928	166930	-20730	0										
106	60296	288.5	-97	121.2	4.62	5684	71	199.1	-89.8	109.3	412.1		-21317	31985	27849	9564	-19429	0	-21917	166400	-20676	0										
107	60301	-5.5	-2	121.2	5.48	5689	1	-3.8	-1.4	-5.2	-7.8		-19807	28733	27253	7992	-6489	0	-7303	55410	0	0										

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
1	Test	Test		5	Pipe	pp.																									
2	ISM-01	Date.	18 12 96		Time	11 35 11	Progver	961205a																							
3																															
4													All strain gauges in microstrain																		
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8		Gauge 9		Gauge 10
6	Time	Pressure (bF	orce (kN)	Disp (mm)		Test time	Force (10*kAx_press (MAx_force (MAxial (MPa)	Hoop (MPa)																							
7		(bar)	kN	mm																											
8							ax-press	ax-force	Axial	hoop																					
9													hoop	long	hoop	long	hoop	long.	hoop	long	hoop	long	hoop	long	hoop	long					
10		vann	kraft	disp																											
11	46550	2.4	12.0	0.00		0	1.2	1.7	-1.1	0.5	3.4		28	5	29	4	29	4	10	3	11	3	13	3	12	3					
12	46830	54.0	4.0	-0.02		280	0.4	37.3	-0.4	36.9	77.1		800	125	851	106	811	123	302	78	316	78	305	83	290	64					
13	46847	106.3	8.0	-0.05		297	0.8	73.3	-0.8	72.6	151.8		2831	309	1567	209	1608	236	596	152	633	153	595	161	573	127					
14	46873	156.5	8.0	-0.07		323	0.8	108.0	-0.8	107.2	223.5		7290	642	10135	409	8006	339	848	215	941	225	867	237	814	179					
15	46917	205.1	6.0	-0.09		367	0.6	141.5	-0.6	140.9	292.9		22364	937	29047	841	24845	580	983	414	1242	294	1136	313	914	319					
16	47859	202.0	449.0	-0.10		1308	44.9	139.4	-43.0	96.4	288.5		28610	751	32126	514	26836	352	966	253	1262	215	1121	194	939	166					
17	48029	203.6	956.0	0.08		1478	95.6	140.5	-91.6	48.9	290.8		30442	425	34001	132	28144	-19	1022	-10	1389	-26	1155	-39	1041	-27					
18	48569	202.2	1013.0	0.11		2019	101.3	139.5	-97.1	42.5	288.8		31416	399	34882	27	28696	-48	1021	-41	1371	-55	1154	-63	1040	-44					
19	48651	202.4	1066.0	0.15		2100	106.6	139.6	-102.1	37.5	289.1		31632	355	35177	-29	28883	-96	1030	-68	1379	-83	1158	-85	1047	-62					
20	48721	202.4	1150.0	0.18		2170	115	139.6	-110.2	29.5	289.1		31837	301	35444	-95	29063	-152	1041	-108	1391	-119	1163	-114	1059	-92					
21	48775	202.4	1207.0	0.22		2225	120.7	139.6	-115.6	24.0	289.1		32067	254	35768	-153	29274	-185	1049	-136	1400	-147	1168	-134	1068	-112					
22	48836	202.3	1268.0	0.24		2284	126.8	139.6	-121.5	18.1	288.9		32356	208	36180	-219	29561	-236	1060	-167	1407	-173	1173	-155	1077	-133					
23	48900	202.4	1356.0	0.27		2350	135.6	139.6	-129.9	9.7	289.1		32683	145	36598	-292	29857	-282	1072	-204	1417	-204	1179	-181	1088	-163					
24	48951	202.7	1416.0	0.30		2400	141.6	139.9	-135.7	4.2	289.5		33057	72	37095	-369	30233	-347	1085	-242	1426	-232	1184	-207	1100	-193					
25	49026	202.7	1502.0	0.33		2475	150.2	139.9	-143.9	-4.1	289.5		33566	-10	37782	-471	30733	-421	1101	-290	1435	-266	1189	-237	1115	-230					
26	49070	203.1	1557.0	0.34		2520	155.7	140.1	-149.2	-9.0	290.1		33947	-69	38324	-545	31163	-487	1114	-320	1441	-285	1192	-255	1127	-256					
27	49143	202.8	1627.0	0.36		2593	162.7	139.9	-155.9	-16.0	289.7		34561	-162	39118	-644	31872	-592	1131	-363	1450	-315	1197	-282	1143	-290					
28	49173	203.2	1712.0	0.38		2623	171.2	140.2	-164.0	-23.8	290.2		34818	-225	39484	-720	32223	-671	1146	-403	1459	-344	1203	-310	1159	-324					
29	49238	202.8	1768.0	0.39		2688	176.8	139.9	-169.4	-29.5	289.7		35564	-341	40456	-844	33217	-807	1184	-434	1462	-363	1201	-326	1180	-352					
30	49288	202.8	1823.0	0.40		2738	182.3	139.9	-174.7	-34.7	289.7		36114	-447	41158	-954	34002	-929	1175	-459	1468	-386	1201	-343	1200	-380					
31	49337	202.5	1898.0	0.42		2786	189.8	139.7	-181.9	-42.1	289.2		36810	-602	41883	-1074	34850	-1081	1194	-498	1475	-417	1202	-366	1223	-422					
32	49373	202.5	1954.0	0.42		2823	195.4	139.7	-187.2	-47.5	289.2		37746	-803	42798	-1215	35813	-1257	1212	-516	1479	-446	1198	-381	1251	-467					
33	49425	201.8	2029.0	0.43		2875	202.9	139.2	-194.4	-55.2	288.2		39236	-1139	44230	-1449	37240	-1534	1229	-534	1484	-483	1193	-400	1292	-531					
34	49484	200.9	2093.0	0.44		2934	209.3	138.6	-200.5	-61.9	286.9		41149	-1597	45794	-1748	38805	-1866	1250	-542	1485	-519	1184	-418	1327	-603					
35	49517	200.3	2173.0	0.45		2967	217.3	138.2	-208.2	-70.0	286.1		43189	-2201	47204	-2080	40295	-2245	1275	-571	1485	-564	1179	-446	1349	-642					
36	49557	196.8	2250.0	0.44		3007	225	137.2	-215.6	-78.4	283.9		46154	-3098	49254	-2553	42263	-2731	1288	-582	1477	-614	1166	-469	1341	-647					
37	49605	196.8	2326.0	0.44		3054	232.6	135.8	-222.9	-87.1	281.1		49467	-4243	51034	-3065	44199	-3283	1288	-580	1460	-661	1153	-482	1330	-641					
38	49688	193.4	2380.0	0.42		3137	238	133.4	-228.0	-94.6	278.2		52866	-5494	52962	-3688	46503	-4065	1258	-568	1446	-700	1139	-527	1293	-653					
39	49715	202.3	2381.0	0.41		3165	238.1	139.6	-228.1	-88.6	288.9		56685	-6447	56528	-4271	50339	-4918	1309	-533	1505	-710	1196	-535	1356	-670					
40	49757	198.8	2440.0	0.42		3207	244	137.2	-233.8	-96.6	283.9		60024	-7720	59312	-5044	53685	-6079	1303	-560	1490	-727	1182	-587	1346	-668					
41	49778	196.4	2473.0	0.43		3227	247.3	135.5	-236.9	-101.4	280.5		61714	-8413	60755	-5519	55286	-6691	1296	-571	1479	-738	1178	-642	1331	-668					
42	49785	196.1	2498.0	0.46		3235	249.8	135.3	-239.4	-104.1	280.1		62267	-8661	61241	-5696	55804	-6921	1297	-587	1478	-748	1178	-671	1329	-679					
43	49832	191.3	2537.0	0.52		3281	253.7	132.0	-243.1	-111.1	273.2		64531	-9664	63218	-6383	57955	-7849	1285	-601	1528	-761	1219	-702	1307	-698					
44	49842	190.1	2555.0	0.54		3292	255.5	131.2	-244.8	-113.6	271.5		65072	-9927	63668	-6548	58480	-8089	1272	-602	1543	-752	1209	-703	1302	-712					
45	49876	187.2	2601.0	0.62		3325	260.1	129.2	-249.2	-120.0	267.4		65966	-10420	64490	-6879	59425	-8549	1266	-638	1551	-758	1201	-712	1277	-769					
46	49910	186.2	2581.0	1.03		3360	258.1	135.4	-247.3	-111.9	280.2		70428	-11909	69331	-8294	64200	-9844	1329	-568	1694	-697	1260	-657	1348	-753					
47	49942	192.5	2608.0	1.23		3392	260.8	132.8	-249.9	-117.1	274.9		71293	-12349	70177	-8676	65024	-10172	1309	-594	1766	-706	1238	-671	1413	-820					
48	49950	191.0	2616.0	1.30		3400	261.6	131.8	-250.6	-118.9	272.8		71609	-12523	70468	-8831	65312	-10299	1299	-600	1814	-712	1232	-676	1658	-881					
49	49984	186.9	2683.0	1.52		3434	268.3	129.0	-257.1	-128.1	266.9		72556	-13069	71393	-9328	66221	-10702	1273	-619	2048	-735	1207	-696	2588	-1479					
50	50037	193.6	2653.0	2.20		3487	265.3	133.6	-254.2	-120.6	278.5		76438	-14366	76062	-11088	70789	-11984	1339	-610	5195	-703	1233	-668	6275	-4166					
51	50062	187.3	2691.0	2.53		3512	269.1	129.2	-257.8	-128.6	267.5		77032	-14817	77112	-11691	71898	-12429	1307	-643	7460	-725	1197	-690	7779	-5702					
52	50078	183.4	2736.0	2.74		3527	273.6	126.5	-262.1	-135.6	262.0		77373	-15104	77662	-12059	72396	-12733	1291	-671	9197	-745	1168	-709	8588	-6619					
53	50085	181.3	2765.0	2.86		3535	276.5	125.1	-264.9	-139.8	259.0		77470	-15234	77861	-12227	72693	-12882	1286	-695	9986	-762	1155	-711	8932	-7041					
54	50097	178.9	2806.0	2.97		3546	280.6	123.4	-268.9	-145.4	255.5		77557	-15357	78072	-12373	72898	-13025	1273	-720	10814	-779	1142	-739	9289	-7476					
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	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
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142	50994	177 0	3287 0	15 77		4444	328.7	122 1	-314 9	-192 8	252 8		88369	-19814	94750	-20174	89337	-19813	22848	-17121	23273	-18508	19962	-16993	22894	-18673					
143	51005	182 7	3259 0	15 90		4454	325 9	126 1	-312 3	-186 2	261 0		88570	-19910	95020	-20286	89552	-19907	23026	-17227	23392	-18575	20036	-17060	23052	-18749					
144	51009	185 8	3141 0	15 98		4459	314.1	135 1	-300 9	-165 9	279 7		89132	-19991	95570	-20374	90133	-19983	23284	-17288	23638	-18621	20226	-17105	23291	-18796					
145	51014	205 4	2985 0	16 07		4464	298.5	141 7	-286 0	-144 3	293 4		89997	-20155	96440	-20528	91113	-20138	23661	-17390	24019	-18721	20534	-17198	23611	-18875					
146	51024	203 3	2933 0	16 11		4474	293.3	140 3	-281 0	-140 7	290 4		90350	-20221	96640	-20584	91346	-20198	23748	-17429	24101	-18756	20589	-17229	23672	-18900					
147	51064	201 8	2880 0	16 12		4514	288	139 2	-275.9	-136 7	288.2		90476	-20253	96740	-20613	91479	-20227	23799	-17448	24154	-18775	20640	-17247	23712	-18913					
148	51109	201 2	2841 0	16 13		4559	284.1	138 8	-272.2	-133 4	287.4		90520	-20262	96780	-20620	91526	-20234	23816	-17454	24172	-18782	20655	-17251	23725	-18918					

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC	AD	AE
149	51129	201.3	2829.0	16.14		4679	282.9	138.9	-271.1	-132.2	287.5		90532	-20264	96790	-20622	91539	-20235	23822	-17455	24177	-18784	20658	-17252	23729	-18918					
150	51194	208.6	2803.0	16.14		4644	280.3	143.5	-268.6	-125.1	297.1		90650	-20286	96910	-20629	91678	-20237	23880	-17458	24245	-18784	20720	-17249	23790	-18915					
151	51199	212.8	2797.0	16.15		4649	279.7	146.8	-268.0	-121.2	303.9		90861	-20286	97100	-20646	91900	-20255	23949	-17457	24328	-18796	20791	-17256	23859	-18922					
152	51204	216.9	2784.0	16.17		4654	278.4	149.7	-266.7	-117.1	309.8		91190	-20324	97400	-20688	92265	-20287	24047	-17477	24452	-18823	20896	-17276	23955	-18939					
153	51209	220.2	2761.0	16.19		4659	276.1	151.9	-264.5	-112.8	314.5		91590	-20379	97770	-20747	92870	-20357	24171	-17506	24605	-18862	21025	-17305	24066	-18964					
154	51214	223.5	2718.0	16.22		4664	271.8	154.2	-260.4	-106.2	319.2		92025	-20439	98180	-20815	93380	-20425	24300	-17539	24769	-18900	21165	-17338	24185	-18993					
155	51219	226.4	2674.0	16.25		4669	267.4	156.2	-256.2	-100.0	323.4		92500	-20505	98630	-20886	93910	-20497	24437	-17574	24939	-18942	21316	-17371	24315	-19024					
156	51224	229.2	2633.0	16.28		4674	263.3	158.1	-252.3	-94.1	327.4		93180	-20570	99110	-20961	94490	-20571	24579	-17609	25117	-18984	21468	-17405	24447	-19056					
157	51229	231.8	2590.0	16.31		4679	259	159.9	-248.2	-88.2	331.1		93720	-20637	99650	-21040	95120	-20647	24725	-17646	25298	-19026	21618	-17440	24581	-19086					
158	51235	234.6	2544.0	16.34		4684	254.4	161.9	-243.7	-81.9	335.1		94350	-20710	100250	-21127	95820	-20729	24881	-17682	25496	-19071	21784	-17476	24729	-19120					
159	51239	236.5	2506.0	16.36		4689	250.6	163.2	-240.1	-76.9	337.8		94910	-20773	100820	-21206	96480	-20798	25024	-17715	25673	-19108	21926	-17509	24860	-19152					
160	51244	239.0	2458.0	16.39		4694	245.8	164.9	-235.5	-70.6	341.4		95590	-20843	101580	-21300	97310	-20882	25187	-17755	25879	-19153	22098	-17546	25017	-19188					
161	51249	241.1	2429.0	16.42		4699	242.9	166.4	-232.7	-66.4	344.4		96330	-20915	102260	-21381	98050	-20944	25328	-17786	26056	-19189	22243	-17575	25156	-19218					
162	51254	243.3	2386.0	16.45		4704	238.6	167.9	-228.6	-60.7	347.5		97140	-20985	103090	-21470	98920	-21006	25499	-17823	26268	-19231	22415	-17612	25318	-19253					
163	51259	245.6	2350.0	16.47		4709	235	169.5	-225.2	-55.7	350.8		97990	-21059	104020	-21562	99860	-21069	25637	-17855	26441	-19265	22556	-17642	25455	-19283					
164	51264	247.4	2307.0	16.50		4714	230.7	170.7	-221.0	-50.3	353.4		98960	-21135	105070	-21653	100930	-21135	25801	-17890	26642	-19302	22716	-17679	25633	-19320					
165	51269	249.2	2270.0	16.53		4719	227	171.9	-217.5	-45.6	355.9		99970	-21210	106190	-21741	102030	-21195	25960	-17924	26838	-19337	22873	-17707	25767	-19349					
166	51279	252.6	2202.0	16.58		4729	220.2	174.3	-211.0	-36.7	360.8		102350	-21362	108930	-21924	104580	-21310	26283	-17991	27238	-19405	23194	-17770	26090	-19414					
167	51289	256.3	2132.0	16.63		4739	213.2	176.8	-204.3	-27.4	366.1		105170	-21518	112310	-22094	107960	-21369	26608	-18055	27637	-19467	23511	-17832	26418	-19477					
168	51294	257.7	2100.0	16.65		4744	210	177.8	-201.2	-23.4	368.1		106750	-21597	114310	-22180	109250	-21402	26776	-18086	27842	-19498	23667	-17862	26578	-19507					
169	51299	257.5	2070.0	16.68		4749	207	177.7	-198.3	-20.7	367.8		108420	-21672	116350	-22263	110950	-21393	26927	-18115	28024	-19527	23804	-17891	26720	-19538					
170	51309	254.3	2229.0	16.81		4759	222.9	175.5	-213.6	-36.1	363.2		109540	-21856	117800	-22436	112120	-20865	27122	-18271	28209	-19664	23974	-18034	26915	-19681					
171	51314	250.6	2362.0	16.85		4764	236.2	172.9	-226.3	-53.4	357.9		110070	-22072	118510	-22644	112700	-20614	27353	-18432	28383	-19806	24155	-18184	27129	-19829					
172	51319	246.4	2508.0	17.11		4769	250.8	170.0	-240.3	-70.3	351.9		110520	-22287	119090	-22861	113200	-20291	27585	-18615	28571	-19976	24344	-18359	27369	-20008					
173	51324	242.0	2607.0	17.27		4774	260.7	167.0	-249.8	-82.8	345.6		110970	-22525	119660	-23090	113660	-19958	27819	-18787	28760	-20133	24517	-18515	27595	-20166					
174	51329	239.1	2739.0	17.41		4779	273.9	165.0	-262.4	-97.5	341.5		111270	-22669	120030	-23225	113950	-19707	27961	-18900	28884	-20248	24628	-18632	27750	-20298					
175	51334	236.1	2782.0	17.52		4784	278.2	162.9	-266.6	-103.7	337.2		111580	-22839	120440	-23383	114260	-19493	28123	-19020	29019	-20360	24740	-18736	27902	-20409					
176	51344	229.1	2936.0	17.84		4794	293.6	158.1	-281.3	-123.2	327.2		112090	-23177	121110	-23708	114780	-19240	28437	-19297	29283	-20622	24968	-18985	28222	-20877					
177	51350	226.8	2862.0	17.88		4799	286.2	156.5	-274.2	-117.7	323.9		112310	-23282	121410	-23795	114980	-19117	28535	-19350	29353	-20661	25021	-19014	28291	-20705					
178	51354	224.5	2932.0	18.01		4804	293.2	154.9	-280.9	-126.0	320.7		112480	-23408	121680	-23918	115150	-19075	28645	-19457	29445	-20762	25097	-19111	28403	-20808					
179	51359	221.2	3010.0	18.18		4809	301	152.6	-288.4	-135.8	315.9		112690	-23567	122010	-24074	115390	-19011	28796	-19599	29564	-20892	25200	-19235	28553	-20942					
180	51364	218.8	3056.0	18.29		4814	305.6	151.0	-292.8	-141.8	312.5		112860	-23682	122240	-24178	115540	-18951	28894	-19691	29640	-20973	25264	-19315	28648	-21028					
181	51369	216.4	3110.0	18.46		4819	311	148.6	-298.0	-149.4	307.7		113050	-23830	122560	-24321	115750	-18866	29034	-19822	29749	-21089	25358	-19426	28786	-21151					
182	51374	213.0	3164.0	18.60		4824	316.4	147.0	-303.2	-156.2	304.2		113210	-23952	122840	-24439	115930	-18737	29138	-19926	29829	-21184	25429	-19520	28892	-21251					
183	51389	217.2	3109.0	18.76		4839	310.9	149.9	-297.9	-148.0	310.2		113640	-24092	123520	-24557	116340	-18304	29352	-20024	30006	-21270	25590	-19603	29100	-21343					
184	51399	224.8	3013.0	18.82		4849	301.3	155.1	-288.7	-133.6	321.1		114190	-24162	124230	-24617	116890	-18116	29535	-20052	30195	-21304	25761	-19637	29282	-21374					
185	51409	231.7	2925.0	18.88		4859	292.5	159.9	-280.3	-120.4	330.9		114890	-24257	125370	-24702	117590	-17967	29747	-20093	30419	-21350	25970	-19687	29491	-21415					
186	51419	234.5	2840.0	18.93		4869	284	161.8	-272.1	-110.3	334.9		115650	-24362	126900	-24798	118350	-17877	29943	-20137	30631	-21400	26162	-19741	29671	-21456					
187	51444	232.6	2788.0	18.96		4894	278.8	160.5	-267.1	-106.6	332.2		115920	-24411	128160	-24816	118630	-17638	30009	-20161	30700	-21422	26225	-19767	29729	-21477					
188	51499	236.9	2754.0	18.97		4949	275.4	163.5	-263.9	-100.4	338.4		116090	-24435	139040	-24802	118840	-17322	30075	-20167	30758	-21432	26295	-19777	29759	-21484					
189	51504	244.7	2729.0	18.99		4954	272.9	168.8	-261.5	-92.6	349.5		116650	-24477	200160	-24850	119460	-17301	30213	-20182	30932	-21455	26442	-19799	29943	-21502					
190	51509	248.4	2660.0	19.04		4959	266	171.4	-254.9	-83.5	354.8		117830	-24593	0	-24976	120690	-17279	30426	-20228	31179	-21509	26666	-19856	30150	-21550					
191	51514	251.6	2597.0	19.08		4964	259.7	173.6	-248.8	-75.2	359.4		119030	-24707	0	-25089	121970	-17243	30637	-20275	31419	-21560	26879	-19909	30342	-21595					
192	51519	255.0	2532.0	19.13		4969	253.2	175.9	-242.6	-66.7	364.2		120460	-24824	0	-25197	123540	-17156	30854	-20325	31665	-21611	27104	-19964	30553	-21642					
193	51524	257.3	2476.0	19.16		4974	247.6	177.5	-237.2	-59.7	367.5		122140	-24946	0	-25261	125330	-17080	31078	-20373	31922	-21662	27330	-20015	30764	-21689					
194	51529	260.4	2416.0	19.20		4979	241.6	179.7	-231.5	-51.8	371.9		124160	-25069	0	-25261	127560	-16877	31311	-20422	32182	-21711	27556	-20087	30983	-21736					
195	51534	262.5	2358.0	19.25		4984	235.8	181.1	-225.9	-44.8	374.9		126620	-25202	0	-25018	130210	-15753	31548	-20469	32458	-21761	27799	-20118	31217	-21784					
196	51549	264.4	2452.0	19.57		4999	245.2	182.4	-234.9	-52.5	377.6		136440	-25843	0	-17864	141120	-14743	32565	-20824	33535	-22105	28773	-20492	32235	-22152					
197	51559	263.0	2511.0	19.91		5009	251.1	181.5	-240.6	-59.1	375.6		141470	-26535	0	-17071	146770	-14547	33504	-21232	34448	-22506	29613	-20891	33148	-22537					
198	51584	260.0	2589.0	20.55		5034	258.9	180.5	-248.1	-64.5	379.9		153890	-27687	0	-16853	161710	-14339	35205	-21863	36218	-23165	31177	-21548	34646	-23194					
199	51589	257.2	2517.0	20.63		5039	251.7	184.4	-241.2	-56.8	381.6		156900	-27903	0	-16610	167770	-14315	35551	-21957	36566	-23261	31478	-21636	35160	-23277					
200	51599	269.0	2461.0	20.82		5049	246.1	185.6	-235.8	-50.2	384.2		164640	-28290	0	-16527	0	-14266	36131	-22154	37172	-23463	32015	-21840	35756	-23473					
201	51609	271.7	2453.0	20.99		5059	245.3	187.5	-235.0	-47.6	386.1		0	-28608	0	-16469	0	-14223	36657	-22306	37744	-23631	32525	-22011	36274	-23644					
202	51644	276.6	2367.0	21.57		5094	236.7	190.8	-226.8	-35.9	395.1		0	-28724	0	-16399	0	-14084	38808	-22979	39968	-24333	34485	-22706	38369	-24316					
203	51654	280.7	2339.0	21.76		5104	233.9	193.7	-224.1	-30.4	400.9		0	-29676	0	-16345	0	-14088	39247	-23048	40469	-24420	34907	-22800	38819	-24410					
204	51664	278.4	2454.0	22.06		5114	245.4	192.1	-235.1	-43.0	397.6		0	-29231	0	-16339	0	-14102	40064	-23354	41248	-24725	35627	-23112	39620	-24715					
205	51679	278.7	2509.0	22.45		5129	250.9	192.3	-240.4	-48.1	398.1		0	-27563	0	-16378	0	-14111	41067	-23684	42273	-25094	36544	-23479	40621	-25068					
206	51694	280.1	2435.0	22.75		5144	243.5	193.3	-233.3	-40.0	400.1		0	-23682	0	-16402	0	-14109	41992	-23966	43239	-25411	37387	-23776	41526	-25343					
207	51739	282.9	2492.0	23.63		5189	249.2	195.2	-238.8	-43.6	404.1		0	-23340	0	-16391	0	-14066	44887	-24788	46074	-26303	39915	-24676	44383	-26207					
208	51764	285.1	2465.0	24.12		5214	246.5	196.7	-236.2	-39.5	407.2		0	-23229	0	-16308	0	-13949	46453	-25206	47590	-26786	41252	-25149	45946	-26668					
209	51769	283.6	2546.0	24.31		5219	254.6	195.7	-243.9	-48.3	405.1		0	-23191	0	-16129	0	-13943	46880	-25366	47966	-26955	41594	-25317	46380	-26834					
210	51774	285.3	2480.0	24.34		5224	248	196.8	-237.6	-40.8	407.5		0	-23177	0	-16110	0	-13935	47137	-25394	48194	-26994	41792	-25354	46612	-26869					
211	51784	286.0	2563.0	24.54		5234	256.3	197.3	-245.6	-48.2	408.5		0	-23172	0	-16041	0	-13918	47740	-25566	48744	-27162	42289	-25551	47276	-27084					
212	51800	0.4	1793.0	25.11		5249	176.3	0.3	-168.9	-168.6	0.6		0	-23156	0	-14257	0	-13191	42100	-25328	46886	-27525	40550	-25978	40272	-26640					

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Test:	PIPE	JIP	TEST		6		7 JANUARY	1997																	
2	ISM-01	Date:	07.01.97	Time:		10:06:31	Progver:	961205a																		
3																										
4																										
5	measured	measured	measured	measured									All strein gauges in microstrain													
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10^k	Ax_press (	Ax_force (	Axial (MPa	Hoop (MPa)		Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7	
7		(bar)	kN	mm																						
8								ax-press	ax-force	Axial	hoop															
9													hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.
10		pres	force	disp																						
11	43400	0.6	-13.0	0.0		0	-1.3	0.4	1.2	1.7	0.9		0	1	1	1	1	2	2	2	2	3	3	0	0	0
12	43455	28.5	9.0	0.0		55	0.9	19.7	-0.9	18.8	40.7		455	62	487	51	464	61	150	28	152	41	163	37	152	43
13	43481	54.3	13.0	0.0		81	1.3	37.5	-1.2	36.2	77.6		856	115	914	94	875	113	289	56	295	79	313	75	294	82
14	43510	78.0	6.0	0.0		110	0.6	53.8	-0.6	53.2	111.4		1230	163	1308	133	1257	160	426	86	441	111	465	113	432	121
15	43529	103.8	25.0	0.0		129	2.5	71.6	-2.4	69.2	148.3		1627	213	1727	175	1660	209	576	115	593	141	627	154	580	165
16	43575	126.4	36.0	0.0		175	3.6	87.2	-3.4	83.8	180.5		1989	258	2109	211	2028	254	717	144	736	168	779	191	719	206
17	43828	148.6	33.0	0.0		428	3.3	102.5	-3.2	99.4	212.2		2065	311	6161	290	2043	338	847	173	880	192	933	231	845	243
18	43848	178.2	35.0	0.0		448	3.5	123.0	-3.4	119.6	254.5		8296	466	16257	398	16385	481	972	208	1059	222	1125	278	962	302
19	43872	200.7	47.0	-0.1		472	4.7	138.5	-4.5	134.0	286.7		33144	602	32491	294	33379	785	984	358	1210	245	1287	319	995	443
20	43957	200.9	532.0	-0.1		557	53.2	138.6	-51.0	87.6	286.9		34497	457	35604	-84	35005	621	1064	120	1251	29	1332	236	1004	281
21	43967	203.1	953.0	-0.1		567	95.3	140.1	-91.3	48.8	290.1		34957	184	36423	-348	35659	339	1164	-137	1296	-184	1390	135	1047	93
22	43972	203.9	1283.0	-0.1		572	128.3	140.7	-122.9	17.8	291.2		36277	-23	38458	-660	36929	136	1230	-295	1325	-331	1440	40	1073	-39
23	43982	204.5	1651.0	-0.1		582	165.1	141.1	-158.2	-17.1	292.1		38280	-266	40895	-1032	38649	-126	1301	-464	1357	-496	1499	-83	1110	-191
24	43992	203.7	1542.0	-0.1		592	154.2	140.5	-147.7	-7.2	290.9		39460	-304	42228	-1117	39503	-126	1288	-427	1345	-461	1493	-74	1102	-164
25	43997	205.3	1957.0	-0.1		597	195.7	141.7	-187.5	-45.9	293.2		40591	-665	43356	-1426	40237	-402	1373	-611	1381	-619	1544	-195	1176	-345
26	44012	198.8	2121.0	-0.2		612	212.1	137.2	-203.2	-66.1	283.9		49130	-2951	48714	-2690	43318	-1486	1373	-737	1436	-764	1499	-300	1312	-575
27	44022	193.4	2167.0	-0.3		622	216.7	133.4	-207.6	-74.2	276.2		53744	-4549	52067	-3753	46401	-2696	1315	-729	1446	-744	1434	-327	1300	-585
28	44032	188.7	2287.0	-0.4		632	228.7	130.2	-219.1	-88.9	269.5		56093	-5562	53937	-4537	48453	-3660	1291	-773	1444	-768	1394	-410	1298	-628
29	44037	187.3	2389.0	-0.4		637	238.9	129.2	-228.9	-99.7	267.5		56599	-5786	54351	-4714	48936	-3904	1291	-813	1421	-906	1385	-449	1299	-664
30	44047	183.1	2276.0	-0.5		647	227.6	126.3	-218.1	-91.7	261.5		57862	-6311	55255	-5082	49972	-4367	1254	-791	1414	-838	1338	-449	1275	-619
31	44057	180.7	2389.0	-0.5		657	238.9	124.7	-228.9	-104.2	258.1		58749	-6788	55869	-5434	50817	-4872	1254	-847	1421	-875	1324	-533	1275	-663
32	44087	178.7	2587.0	-0.5		687	258.7	123.3	-247.9	-124.6	255.2		59232	-7068	56247	-5655	51374	-5202	1259	-910	1437	-929	1318	-617	1280	-721
33	44092	172.8	2556.0	-0.5		692	255.6	119.2	-244.9	-125.7	246.8		60936	-7974	57394	-6321	53122	-6173	1230	-944	1409	-930	1271	-715	1244	-709
34	44102	180.1	2471.0	-0.5		702	247.1	124.3	-236.8	-112.5	257.2		61366	-8048	57774	-6373	53649	-6276	1264	-900	1448	-885	1303	-683	1278	-660
35	44107	189.1	2419.0	-0.5		707	241.9	130.5	-231.8	-101.3	270.1		62027	-8166	58457	-6470	54576	-6427	1317	-855	1479	-842	1343	-670	1322	-615
36	44112	195.4	2361.0	-0.5		712	236.1	134.8	-226.2	-91.4	279.1		62968	-8365	59463	-6629	55572	-6586	1366	-814	1514	-811	1376	-659	1352	-577
37	44117	203.7	2299.0	-0.5		717	229.9	140.5	-220.3	-79.7	290.9		64205	-8626	60850	-6839	56955	-6781	1417	-765	1546	-780	1407	-646	1387	-529
38	44122	202.1	2469.0	-0.5		722	246.9	139.4	-236.6	-97.1	288.7		65324	-8966	62102	-7132	58198	-7101	1454	-797	1557	-827	1414	-706	1390	-565
39	44132	196.5	2352.0	-0.4		732	235.2	135.6	-225.4	-89.8	280.7		67366	-9737	63900	-7714	60187	-7742	1434	-761	1522	-804	1353	-711	1335	-518
40	44142	197.1	2548.0	-0.3		742	254.8	136.0	-244.1	-108.1	281.5		68236	-10143	64750	-8068	61309	-8207	1472	-824	1650	-933	1366	-814	1350	-555
41	44147	190.0	2502.0	-0.1		747	250.2	131.1	-239.7	-108.6	271.4		69996	-11009	66124	-8719	63286	-9053	1429	-831	6508	-925	1275	-838	1296	-489
42	44152	195.3	2428.0	0.0		752	242.8	134.8	-232.6	-97.9	278.9		70447	-11099	66547	-8784	63903	-9168	1448	-787	7018	-892	1287	-795	1330	-441
43	44162	195.2	2556.0	0.3		762	255.6	134.7	-244.9	-110.2	278.8		72567	-11980	68473	-9456	66591	-10120	1492	-846	9193	-959	1293	-880	1356	-455
44	44192	199.8	2414.0	1.8		792	241.4	137.9	-231.3	-93.4	285.4		79818	-15013	75587	-11972	74988	-13103	1560	-661	12874	-1631	1380	-1128	1350	-398
45	44197	200.8	2516.0	2.0		797	251.6	138.5	-241.1	-102.5	286.8		80569	-15302	76573	-12315	76105	-13485	1601	-677	13066	-1917	1423	-1180	1363	-429
46	44202	202.1	2411.0	2.3		802	241.1	139.4	-231.0	-91.6	288.7		81427	-15666	77759	-12744	77384	-13911	1596	-623	13264	-2400	1436	-1180	1355	-397
47	44207	200.9	2512.0	2.6		807	251.2	138.6	-240.7	-102.1	286.9		82077	-15941	78768	-13116	78504	-14331	1627	-656	13456	-3029	1475	-1276	1364	-462
48	44217	205.6	2361.0	3.0		817	236.1	141.9	-226.2	-84.4	293.7		82929	-16225	80306	-13659	80090	-14822	1641	-577	13693	-4134	1521	-1419	1369	-422
49	44252	199.8	2484.0	4.8		852	248.4	137.9	-238.0	-100.1	285.4		85642	-17135	85730	-15816	85435	-16681	1618	-615	14673	-10210	1654	-4763	1470	-573
50	44262	196.1	2590.0	5.1		862	259	135.3	-248.2	-112.9	280.1		85673	-17193	85953	-15977	85557	-16801	1595	-637	14754	-11121	1656	-5949	1493	-728
51	44267	189.2	2648.0	5.5		867	264.8	130.5	-253.7	-123.2	270.2		85652	-17259	86124	-16146	85582	-16936	1535	-675	14798	-12212	1639	-6999	1655	-841
52	44272	189.4	2535.0	5.7		872	253.5	130.7	-242.9	-112.2	270.5		85626	-17242	86203	-16192	85572	-16958	1482	-632	14806	-12726	1663	-7459	1824	-811
53	44277	188.7	2665.0	6.0		877	266.5	130.2	-255.3	-125.1	269.5		85719	-17289	86432	-16325	85695	-17084	1494	-688	14863	-13098	1790	-8450	2400	-903
54	44292	192.0	2531.0	6.8		892	253.1	132.5	-242.5	-110.0	274.2		85891	-17276	87064	-16551	85878	-17180	1456	-11327	15106	-13636	3173	-11291	4807	-1069
55	44297	193.7	2641.0	7.1		897	264.1	133.6	-253.0	-119.4	276.7		86047	-17327	87333	-16664	86039	-17265	1501	-11883	15299	-13823	3892	-11992	5654	-1219
56	44307	198.4	2480.0	7.5		907	248	136.9	-237.6	-100.7	283.4		86261	-17309	87762	-16757	86170	-17246	1544	-12355	15595	-14017	6124	-12925	6916	-1875
57	44312	203.6	2419.0	7.5		912	241.9	140.5	-231.8	-91.3	290.8		86476	-17292	87975	-16749	86352	-17229	1603	-12418	15691	-14018	6618	-13027	7710	-2089
58	44332	200.8	2607.0	8.5		932	260.7	138.5	-249.8	-111.2	286.8		87646	-17577	89124	-17195	87159	-17486	4176	-13251	16504	-14657	12593	-13964	11482	-4775
59	44342	193.9	2633.0	9.1		942	263.3	133.8	-252.3	-118.5	276.9		87817	-17693	89450	-17401	87157	-17530	7844	-13392	16798	-15021	15022	-14318	13249	-7377
60	44357	187.9	2803.0	9.8		957	280.3	129.6	-268.6	-138.9	268.4		87948	-17817	89785	-17630	87150	-17574	12812	-13504	17084	-15435	16285	-14588	14835	-9474
61	44362	188.8	2673.0	10.0		962	267.3	130.3	-256.1	-125.8	269.7		88012	-17827	89962	-17694	87162	-17545	14673	-13480	17198	-15544	16724	-14675	15390	-10081
62	44367	194.3	2646.0	10.0		967	264.6	134.1	-253.5	-119.5	277.5		88116	-17804	90083	-17682	87231	-17511	14972	-13457	17265	-15554	16896	-14716	15585	-10232

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
63	44372	191.0	2768.0	10.5		972	276.8	131.8	-265.2	-133.4	272.8		88405	-17967	90483	-17913	87324	-17602	16624	-13674	17565	-15908	17677	-15079	16627	-11465
64	44392	195.0	3068.0	11.5		992	306.8	134.5	-294.0	-159.4	278.5		89727	-18452	92189	-18655	87926	-17785	19401	-14302	18506	-16762	19051	-15590	19223	-14155
65	44397	195.0	2826.0	11.9		997	282.6	134.5	-270.8	-136.2	278.5		90269	-18657	92732	-18906	88287	-17929	19965	-14561	18823	-17047	19388	-15772	19870	-14833
66	44417	201.2	2747.0	12.8		1017	274.7	138.8	-263.2	-124.4	287.4		92765	-19526	95380	-19932	90274	-18562	22032	-15402	20011	-17933	20485	-16220	21347	-16125
67	44427	206.3	2726.0	13.2		1027	272.6	142.3	-261.2	-118.8	294.7		94250	-19949	96650	-20420	91520	-18941	22908	-15789	20558	-18304	21004	-16446	21856	-16564
68	44452	207.0	2885.0	14.1		1052	288.5	142.8	-276.4	-133.6	295.7		97120	-20928	99640	-21631	94690	-19988	24810	-16755	21793	-19225	22222	-17103	23115	-17595
69	44467	201.4	3008.0	14.8		1067	300.8	139.0	-288.2	-149.2	287.7		98990	-21752	101570	-22541	96480	-20769	26095	-17482	22606	-19914	23010	-17586	23949	-18340
70	44472	201.9	2898.0	15.0		1072	289.8	139.3	-277.7	-138.4	288.4		99610	-21972	102160	-22795	97000	-20964	26464	-17653	22831	-20067	23223	-17675	24170	-18486
71	44477	200.6	3051.0	15.2		1077	305.1	138.4	-292.3	-153.9	286.5		99960	-22167	102660	-23035	97500	-21192	26801	-17879	23077	-20293	23472	-17853	24437	-18748
72	44512	198.1	3197.0	16.8		1112	319.7	136.7	-306.3	-169.6	282.9		104000	-23910	107070	-25056	102110	-22982	29465	-19482	24946	-21809	25314	-19010	26431	-20399
73	44517	200.0	3085.0	16.9		1117	308.5	138.0	-295.6	-157.6	285.7		104560	-24113	107650	-25274	102720	-23155	29753	-19613	25144	-21922	25504	-19084	26622	-20499
74	44522	197.2	3235.0	17.2		1122	323.5	136.1	-310.0	-173.9	281.7		105210	-24417	108350	-25631	103570	-23500	30184	-19932	25473	-22229	25839	-19351	27007	-20858
75	44557	197.8	3347.0	18.9		1157	334.7	136.5	-320.7	-184.2	282.5		110180	-26409	113660	-27938	113280	-25618	33000	-21716	27618	-23878	27961	-20753	29363	-22647
76	44582	195.6	3457.0	20.4		1182	345.7	135.0	-331.2	-196.3	279.4		115810	-28174	118000	-29820	0	-27367	35212	-23199	29337	-25230	29633	-21952	31279	-24094
77	44632	200.2	3590.0	23.3		1232	359	138.1	-344.0	-205.8	285.9		0	-31721	127470	-33684	0	-30983	39691	-26173	32926	-27939	33115	-24445	35336	-26955
78	44637	200.2	3483.0	23.5		1237	348.3	138.1	-333.7	-195.6	285.9		0	-32059	128450	-34043	0	-31297	40101	-26414	33239	-28140	33399	-24616	35661	-27135
79	44647	201.7	3609.0	24.1		1247	360.9	139.2	-345.8	-206.6	288.1		0	-32679	130280	-34756	0	-31985	40938	-26984	33929	-28675	34079	-25127	36479	-27718
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81	44687	204.9	3664.0	26.2		1287	366.4	141.4	-351.1	-209.7	292.7		0	-34630	138050	-37565	0	-34551	44129	-29037	36492	-30535	36588	-26902	39464	-29657
82	44702	200.2	3783.0	27.2		1302	378.3	138.1	-362.5	-224.3	285.9		0	-34655	141060	-38708	0	-35475	45430	-29947	37485	-31325	37504	-27642	40628	-30478
83	44707	200.7	3666.0	27.4		1307	366.6	138.5	-351.3	-212.8	286.7		0	-34592	141940	-38994	0	-35663	45764	-30146	37727	-31481	37716	-27779	40888	-30621
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85	44762	199.2	3912.0	30.1		1362	391.2	137.4	-374.8	-237.4	284.5		0	-33271	152640	-42151	0	-37081	49481	-32624	40604	-33672	40405	-29845	44361	-32945
86	44852	201.7	4019.0	34.4		1452	401.9	139.2	-385.1	-245.9	288.1		0	-32027	0	-45626	0	-33710	55609	-36517	45158	-37030	44647	-33028	50066	-36547
87	44922	207.0	3968.0	37.5		1522	396.8	142.8	-380.2	-237.4	295.7		0	-31082	0	-46753	0	-32539	60182	-39228	48437	-39334	47731	-35226	54330	-39054
88	44927	208.5	4086.0	37.8		1527	408.6	143.9	-391.5	-247.6	297.8		0	-31004	0	-46773	0	-32461	60448	-39402	48644	-39499	47947	-35397	54642	-39254
89	44942	207.0	3983.0	38.5		1542	398.3	142.8	-381.6	-238.8	295.7		0	-30747	0	-46312	0	-31911	61506	-39998	49350	-39974	48593	-35842	55576	-39769
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91	44952	207.9	4003.0	38.9		1552	400.3	143.4	-383.5	-240.1	296.9		0	-30598	0	-39438	0	-31665	62172	-40388	49816	-40305	49035	-36161	56209	-40135
92	44992	205.3	4137.0	40.1		1592	413.7	141.7	-396.4	-254.7	293.2		0	-30196	0	-38280	0	-30887	63871	-41391	51001	-41172	50162	-37003	57836	-41112
93	45007	199.6	4121.0	40.6		1607	412.1	137.7	-394.8	-257.1	285.1		0	-30088	0	-38068	0	-30681	64277	-41657	51220	-41361	50337	-37181	58156	-41320
94	45032	205.2	4139.0	41.5		1632	413.9	141.6	-396.6	-255.0	293.1		0	-29928	0	-37853	0	-30461	65220	-42190	51824	-41778	50898	-37576	59053	-41811
95	45052	199.2	4225.0	42.3		1652	422.5	137.4	-404.8	-267.4	284.5		0	-29801	0	-37735	0	-30311	66092	-42717	52351	-42190	51368	-37973	59857	-42312
96	45062	199.2	4121.0	42.6		1662	412.1	137.4	-394.8	-257.4	284.5		0	-29741	0	-37687	0	-30232	66289	-42808	52451	-42236	51451	-38011	60015	-42372
97	45067	201.0	4222.0	42.8		1667	422.2	138.7	-404.5	-265.8	287.1		0	-29721	0	-37665	0	-30204	66444	-42913	52556	-42331	51552	-38105	60182	-42490
98	45122	206.8	4232.0	45.0		1722	423.2	142.7	-405.5	-262.8	295.4		0	-29549	0	-37500	0	-29679	68726	-44127	53971	-43253	52867	-38989	62361	-43657
99	45197	198.1	4274.0	48.2		1797	427.4	136.7	-409.5	-272.8	282.9		0	-29356	128800	-37330	0	-28744	71840	-45838	55803	-44555	54597	-40274	65367	-45297
100	45227	203.6	4299.0	49.4		1827	429.9	140.5	-411.9	-271.4	290.8		0	-29250	126560	-37272	0	-28529	72276	-46044	56024	-44682	54808	-40408	65783	-45501
101	45242	204.5	4194.0	50.1		1842	419.4	141.1	-401.8	-260.7	292.1		0	-29215	126020	-37247	0	-28423	72694	-46238	56255	-44803	55029	-40526	66190	-45684
102	45252	205.4	4323.0	50.5		1852	432.3	141.7	-414.2	-272.5	293.4		0	-29195	125760	-37230	0	-28367	72887	-46360	56366	-44904	55143	-40628	66399	-45817
103	45277	199.9	4240.0	51.7		1877	424	137.9	-406.2	-268.3	285.5		0	-29148	125290	-37195	0	-28248	73351	-46605	56570	-45046	55326	-40774	66834	-46044
104	45302	199.0	4341.0	52.6		1902	434.1	137.3	-415.9	-278.6	284.2		0	-29101	124940	-37163	0	-28155	73622	-46774	56690	-45159	55443	-40894	67102	-46214
105	45327	206.6	4307.0	53.4		1927	430.7	142.5	-412.7	-270.1	295.1		0	-29044	124620	-37130	0	-28056	73841	-46841	56821	-45196	55582	-40930	67341	-46289
106	45347	201.5	4211.0	53.9		1947	421.1	139.0	-403.5	-264.4	287.8		0	-29008	124550	-37090	0	-27994	74025	-46937	56903	-45248	55662	-40987	67528	-46386
107	45352	200.5	4324.0	54.1		1952	432.4	138.3	-414.3	-276.0	286.4		0	-29007	124510	-37083	0	-27985	74088	-47002	56930	-45303	55687	-41047	67592	-46453
108	45387	206.0	4220.0	54.9		1987	422	142.1	-404.3	-262.2	294.2		0	-28941	124200	-37039	0	-27884	74233	-47021	57007	-45289	55767	-41034	67745	-46472
109	45397	212.3	4167.0	54.9		1997	416.7	146.5	-399.3	-252.8	303.2		0	-28918	124120	-37030	0	-27851	74299	-47012	57069	-45279	55841	-41023	67821	-46467
110	45402	213.9	4277.0	55.0		2002	427.7	147.6	-409.8	-262.2	305.5		0	-28916	124080	-37027	0	-27842	74446	-47104	57173	-45365	55965	-41119	68010	-46585
111	45417	216.7	4159.0	55.3		2017	415.9	149.5	-398.5	-249.0	309.5		0	-28895	123970	-37011	0	-27796	74890	-47279	57435	-45473	56252	-41241	68518	-46789
112	45472	213.0	3324.0	55.3		2072	332.4	147.0	-318.5	-171.5	304.2		0	-28775	123430	-36959	0	-27665	74843	-47139	57421	-45297	56262	-41112	68541	-46696
113	45502	210.3	2313.0	55.2		2102	231.3	145.1	-221.6	-76.5	300.4		0	-28741	123210	-36939	0	-27612	74756	-47034	57344	-45074	56163	-40915	68408	-46501
114	45507	200.2	835.0	54.7		2107	83.5	138.1	-80.0	58.1	285.9		0	-28589	123140	-36933	0	-27513	74001	-46083	56898	-44185	55748	-40111	67845	-45693
115	45512	196.1	377.0	54.5		2112	37.7	135.3	-36.1	99.2	280.1		0	-28527	123080	-36929	0	-27472	73739	-45812	56753	-43891	55586	-39797	67614	-45371
116	45517	194.1	276.0	54.3		2117	27.6	133.9	-26.4	107.5	277.2		0	-28503	123040	-36925	0	-27451	73611	-45682	56672	-43751	55467	-39576	67484	-45205
117	45532	179.0	272.0	54.3		2132	27.2	123.5	-26.1	97.4	255.7		0	-28499	122940	-36914	0	-27442	73519	-45690	56585	-43757	55362	-39586	67382	-45213
118	45537	154.8	279.0	54.3		2137	27.9	106.8	-26.7	80.1	221.1		0	-28511	122900	-36910	0	-27454	73328	-45717	56404	-43775	55160	-39612	67197	-45235
119	45542	120.5	272.0	54.3		2142	27.2	83.1	-26.1	57.1	172.1		0	-28528	122860	-36903	0	-27471	73059	-45747	56155	-43793	54875	-39646	66929	-45261
120	45547	89.5	282.0	54.3		2147	28.2	61.8	-27.0	34.7	127.8		0	-28545	122800	-36902	0	-27487	72785	-45773	55905	-43806	54596	-39675	66678	-45279
121	45552	63.2	277.0	54.4		2152	27.7	43.6	-26.5	17.1	90.3		0	-28557	122750	-36897	0	-27500	72549	-45790	55693	-43810	54352	-39695	66456	-45291
122	45557	39.0	277.0	54.4		2157	27.7	26.9	-26.5	0.4	55.7		0	-28570	122700	-36892	0	-27511	72330	-45807	55494	-43813	54127	-39712	66256	-45295
123	45562	17.2	281.0	54.4		2162	28.1	11.9	-26.9	-15.1	24.6		0	-28579	122660	-36888	0	-27520	72132	-45818	55319	-43810	53918	-39726	66072	-45300
124	45567	3.9	281.0	54.4		2167	28.1	2.7	-26.9	-24.2	5.6		0	-28585	122610	-36884	0	-27525	71985	-45823	55189	-43803	53774	-39732	65947	-45295

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
125	45662	0.1	-88.0	54.4		2262	-8.8	0.1	8.4	8.5	0.1		0	-28530	122120	-36819	0	-27458	71895	-45805	55114	-43778	53695	-39710	65874	-45273
126	45667	0.6	22.0	54.3		2267	2.2	0.4	-2.1	-1.7	0.9		0	-28529	122090	-36817	0	-27457	71896	-45803	55115	-43778	53694	-39711	65874	-45273
127	45672	0.7	-86.0	54.3		2272	-8.6	0.5	8.2	8.7	1.0		0	-28525	122070	-36816	0	-27453	71895	-45804	55114	-43777	53695	-39711	65873	-45273
128	46177	18.4	-69.0	54.3		2777	-6.9	12.7	6.6	19.3	26.3		0	-28291	118140	0	0	-27006	71984	-45770	55202	-43749	53805	-39673	65962	-45241
129	46182	30.6	-74.0	54.3		2782	-7.4	21.1	7.1	28.2	43.7		0	-28278	118130	0	0	-26994	72093	-45747	55289	-43733	53911	-39645	66060	-45222
130	46187	43.0	-74.0	54.2		2787	-7.4	29.7	7.1	36.8	61.4		0	-28266	118110	0	0	-26982	72181	-45727	55367	-43719	54002	-39624	66137	-45205
131	46192	55.4	-72.0	54.2		2792	-7.2	38.2	6.9	45.1	79.1		0	-28254	118100	0	0	-26971	72261	-45708	55443	-43703	54095	-39603	66213	-45191
132	46197	66.8	-66.0	54.2		2797	-6.6	46.1	6.3	52.4	95.4		0	-28243	118090	0	0	-26958	72345	-45689	55519	-43691	54180	-39584	66286	-45177
133	46202	77.3	-82.0	54.2		2802	-8.2	53.3	7.9	61.2	110.4		0	-28232	118080	0	0	-26948	72427	-45673	55592	-43678	54264	-39566	66359	-45163
134	46207	87.8	-74.0	54.2		2807	-7.4	60.6	7.1	67.7	125.4		0	-28221	118070	0	0	-26937	72501	-45659	55658	-43666	54352	-39548	66435	-45149
135	46212	97.8	-61.0	54.2		2812	-6.1	67.5	5.8	73.3	139.7		0	-28209	118050	0	0	-26926	72579	-45642	55728	-43655	54428	-39530	66500	-45137
136	46217	108.1	-63.0	54.2		2817	-6.3	74.6	6.0	80.6	154.4		0	-28199	118040	0	0	-26914	72654	-45629	55795	-43645	54505	-39515	66574	-45124
137	46222	117.8	-74.0	54.2		2822	-7.4	81.3	7.1	88.4	168.3		0	-28188	118030	0	0	-26904	72726	-45614	55859	-43633	54582	-39500	66642	-45111
138	46227	127.6	-69.0	54.2		2827	-6.9	88.0	6.6	94.7	182.3		0	-28178	118020	0	0	-26893	72798	-45601	55925	-43623	54658	-39485	66711	-45099
139	46232	136.5	-57.0	54.2		2832	-5.7	94.2	5.5	99.6	195.0		0	-28168	118010	0	0	-26884	72868	-45587	55992	-43614	54732	-39471	66773	-45089
140	46237	145.0	-65.0	54.1		2837	-6.5	100.0	6.2	106.3	207.1		0	-28157	118000	0	0	-26872	72932	-45576	56055	-43604	54809	-39456	66840	-45077
141	46242	154.4	-67.0	54.1		2842	-6.7	106.5	6.4	113.0	220.5		0	-28147	117990	0	0	-26862	73003	-45562	56117	-43593	54875	-39443	66900	-45066
142	46247	162.0	-76.0	54.1		2847	-7.6	111.8	7.3	119.1	231.4		0	-28137	117980	0	0	-26851	73065	-45550	56174	-43585	54945	-39431	66965	-45055
143	46252	171.4	-70.0	54.1		2852	-7	118.3	6.7	125.0	244.8		0	-28126	117970	0	0	-26839	73130	-45539	56237	-43576	55017	-39417	67029	-45045
144	46257	179.5	-71.0	54.1		2857	-7.1	123.8	6.8	130.7	256.4		0	-28117	117960	0	0	-26829	73192	-45527	56291	-43567	55079	-39406	67084	-45036
145	46262	187.0	-70.0	54.1		2862	-7	129.0	6.7	135.7	267.1		0	-28105	117950	0	0	-26819	73257	-45515	56355	-43557	55152	-39391	67149	-45025
146	46267	194.5	-73.0	54.1		2867	-7.3	134.2	7.0	141.2	277.8		0	-28098	117940	0	0	-26808	73310	-45505	56403	-43549	55208	-39381	67198	-45016
147	46272	200.7	-73.0	54.1		2872	-7.3	138.5	7.0	145.5	286.7		0	-28088	117940	0	0	-26799	73366	-45497	56454	-43542	55263	-39371	67247	-45008
148	46297	206.3	225.0	54.2		2897	22.5	142.3	-21.6	120.8	294.7		0	-28069	117880	0	0	-26780	73420	-45509	56514	-43571	55339	-39443	67333	-45074
149	46302	210.0	850.0	54.7		2902	85	144.9	-81.4	63.5	299.9		0	-28129	117880	0	0	-26817	73659	-45785	56620	-43785	55553	-39838	67640	-45515
150	46307	210.6	1123.0	54.8		2907	112.3	145.3	-107.6	37.7	300.8		0	-28143	117870	0	0	-26823	73725	-45865	56657	-43859	55608	-39950	67728	-45641
151	46312	211.1	1367.0	55.0		2912	136.7	145.7	-131.0	14.7	301.5		0	-28156	117870	0	0	-26832	73805	-45963	56703	-43951	55672	-40070	67822	-45767
152	46317	211.9	1493.0	55.1		2917	149.3	146.2	-143.0	3.2	302.7		0	-28163	117850	0	0	-26835	73855	-46021	56733	-44006	55706	-40124	67866	-45823
153	46322	212.1	1832.0	55.2		2922	183.2	146.3	-175.5	-29.2	302.9		0	-28180	117840	0	0	-26844	73956	-46153	56796	-44131	55784	-40279	67987	-45981
154	46332	213.7	2030.0	55.4		2932	203	147.4	-194.5	-47.1	305.2		0	-28193	117830	0	0	-26851	74055	-46267	56854	-44244	55850	-40393	68078	-46092
155	46347	213.7	2480.0	55.6		2947	248	147.4	-237.6	-90.2	305.2		0	-28206	117810	0	0	-26858	74187	-46428	56939	-44410	55948	-40576	68227	-46279
156	46357	214.6	2803.0	55.8		2957	280.3	148.1	-268.6	-120.5	306.5		0	-28222	117790	0	0	-26866	74319	-46582	57022	-44566	56044	-40732	68361	-46431
157	46362	215.3	2988.0	55.9		2962	298.8	148.6	-286.3	-137.7	307.5		0	-28234	117790	0	0	-26872	74415	-46689	57084	-44678	56113	-40844	68460	-46532
158	46367	214.3	3161.0	56.0		2967	316.1	147.9	-302.9	-155.0	306.1		0	-28241	117780	0	0	-26876	74487	-46771	57129	-44764	56169	-40928	68538	-46613
159	46372	215.0	3331.0	56.2		2972	333.1	148.3	-319.2	-170.8	307.1		0	-28247	117770	0	0	-26879	74564	-46855	57180	-44856	56231	-41015	68619	-46685
160	46382	214.8	3560.0	56.5		2982	356	148.2	-341.1	-192.9	306.8		0	-28253	117760	0	0	-26880	74694	-46999	57274	-45021	56343	-41159	68727	-46772
161	46392	213.1	3691.0	56.7		2992	369.1	147.0	-353.6	-206.6	304.4		0	-28252	117740	0	0	-26878	74774	-47090	57345	-45141	56414	-41243	68773	-46811
162	46407	210.8	3813.0	57.1		3007	381.3	145.4	-365.3	-219.9	301.1		0	-28243	117710	0	0	-26870	74874	-47193	57455	-45298	56495	-41331	68803	-46833
163	46422	207.8	3957.0	57.8		3022	395.7	143.4	-379.1	-235.8	296.8		0	-28247	117690	0	0	-26873	75034	-47348	57584	-45482	56563	-41443	68837	-46872
164	46447	202.1	4079.0	58.8		3047	407.9	139.4	-390.8	-251.4	288.7		0	-28245	117650	0	0	-26869	75180	-47459	57672	-45641	56571	-41494	68908	-46980
165	46682	201.9	3963.0	67.9		3282	396.3	139.3	-379.7	-240.4	288.4		0	-28160	117330	0	0	-26782	75404	-47529	57826	-45737	56650	-41504	69216	-47130
166	46787	207.4	3981.0	71.6		3387	398.1	143.1	-381.4	-238.3	296.2		0	-28128	117220	0	0	-26747	75451	-47525	57873	-45735	56697	-41499	69266	-47126
167	46822	208.1	3856.0	72.5		3422	385.6	143.6	-369.5	-225.9	297.2		0	-28112	117170	0	0	-26731	75444	-47488	57875	-45698	56699	-41458	69258	-47090
168	46852	209.5	3985.0	72.7		3452	398.5	144.5	-381.8	-237.3	299.2		0	-28108	117150	0	0	-26721	75469	-47519	57893	-45732	56715	-41492	69285	-47122
169	46887	214.7	3976.0	74.3		3487	397.6	148.1	-381.0	-232.8	306.7		0	-28092	117120	0	0	-26706	75525	-47524	57945	-45736	56767	-41493	69338	-47123
170	46927	220.7	3967.0	76.2		3527	396.7	152.3	-380.1	-227.8	315.2		0	-28073	117080	0	0	-26684	75629	-47542	58041	-45758	56863	-41506	69449	-47144
171	46957	226.0	3985.0	77.7		3557	398.5	155.9	-381.8	-225.9	322.8		0	-28049	117060	0	0	-26659	75795	-47600	58183	-45816	57001	-41552	69637	-47213
172	47032	228.9	3886.0	80.1		3632	386.6	157.9	-370.4	-212.5	326.9		0	-27951	117020	0	0	-26557	76540	-47898	58655	-46030	57480	-41759	70532	-47575
173	47057	234.3	3825.0	80.1		3657	382.5	161.7	-366.5	-204.8	334.7		0	-27925	117000	0	0	-26538	76623	-47912	58720	-46037	57558	-41768	70637	-47598
174	47072	240.2	3815.0	80.1		3672	381.5	165.7	-365.5	-199.8	343.1		0	-27883	117000	0	0	-26497	76826	-47968	58894	-46091	57789	-41835	70901	-47683
175	47092	246.0	3748.0	80.1		3692	374.8	169.7	-359.1	-189.4	351.4		0	-27757	117000	0	0	-26390	77187	-48092	59271	-46243	58300	-42030	71379	-47858
176	47112	251.3	3672.0	80.2		3712	367.2	173.4	-351.8	-178.4	358.9		0	-27565	117000	0	0	-26193	77544	-48216	59688	-46419	58870	-42254	71856	-48038
177	47137	257.2	3585.0	80.2		3737	358.5	177.5	-343.5	-166.0	367.4		0	-27261	117000	0	0	-26059	77967	-48370	60206	-46637	59578	-42528	72419	-48250
178	47167	263.7	3479.0	80.3		3767	347.9	181.9	-333.3	-151.4	376.6		0	-27169	116940	0	0	-25938	78431	-48533	60775	-46873	60351	-42820	73020	-48475
179	47197	270.6	3431.0	80.4		3797	343.1	186.7	-328.7	-142.0	386.5		0	-26563	116880	0	0	-26049	78844	-48680	61278	-47077	61028	-43065	73546	-48665
180	47222	272.1	3318.0	80.4		3822	331.8	187.7	-317.9	-130.2	388.6		0	-27063	116850	0	0	-26199	79160	-48786	61654	-47225	61533	-43240	73939	-48807
181	47257	277.1	3210.0	80.4		3857	321	191.2	-307.6	-116.4	395.8		0	-27206	116740	0	0	-26275	79617	-48937	62184	-47433	62253	-43477	74505	-48994
182	47292	281.9	3107.0	80.5		3892	310.7	194.5	-297.7	-103.2	402.6		0	-27242	116660	0	0	-26297	80061	-49070	62688	-47621	62936	-43691	75045	-49165
183	47332	284.9	3000.0	80.5		3932	300	196.6	-287.4	-90.9	406.9		0	-27221	116650	0	0	-26326	80476	-49186	63146	-47790	63548	-43873	75549	-49308
184	47362	286.8	2943.0	80.5		3962	294.3	197.9	-282.0	-84.1	409.6		0	-27186	116610	0	0	-26328	80682	-49245	63370	-47869	63835	-43951	75791	-49376
185	47367	286.3	2923.0	80.5		3967	292.3	197.5	-280.1	-82.5	408.9		0	-27176	116610	0	0	-26331	80696	-49250	63392	-47878	63859	-43957	75805	-49384
186	47372	-0.8	1948.0	81.0		3972	194.8	-0.6	-186.6	-187.2	-1.1		0	-27163	116610	0	0	-26324	80686	-49251	63403	-47885	63873	-43959	75779	-48210

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Test:	Test	7 Pipe			jip																				
2	ISM-01	Date:	01-13-1997	Time:		12:43:47	Progver:	961205a																		
3																										
4													All strein gauges in microstrain													
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10*	Ax_press (	Ax_force (M	Axial (MPa	Hoop (MPa)															
7		(bar)	kN	mm									long.													
8								ax-press	ax-force	Axial	hoop		hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.
9																										
10																										
11	45836	0.0	-17.0	0.0		0	-1.7	0.0	1.6	1.6	0.0		9	10	8	8	9	8	10	8	10	9	9	8	5	8
12	45876	9.4	-18.0	0.0		40	-1.8	6.5	1.7	8.2	13.4		294	35	296	32	285	34	44	15	65	26	60	20	48	18
13	45936	23.5	-15.0	0.0		100	-1.5	16.2	1.4	17.7	33.6		615	74	620	54	601	55	82	24	132	48	124	36	107	34
14	45951	36.7	-15.0	0.0		115	-1.5	25.3	1.4	26.8	52.4		1125	150	1177	47	1129	57	140	35	218	72	204	56	171	52
15	45956	47.1	-5.0	0.0		120	-0.5	32.5	0.5	33.0	67.3		1567	215	1682	22	1563	44	183	45	283	92	265	71	220	64
16	45961	52.6	5.0	0.0		125	0.5	36.3	-0.5	35.8	75.1		1990	279	2150	-14	1957	13	207	50	322	103	302	79	250	71
17	45976	66.0	-5.0	0.0		140	-0.5	45.5	0.5	46.0	94.3		2699	378	3135	-44	2833	-55	257	61	397	126	373	97	309	87
18	45981	75.9	-16.0	0.0		145	-1.6	52.4	1.5	53.9	108.4		3527	476	4385	-62	4009	-156	288	69	450	142	425	109	351	98
19	45991	81.1	-3.0	0.0		155	-0.3	56.0	0.3	56.2	115.8		4148	540	5319	-71	4935	-223	307	73	482	151	456	117	375	104
20	45996	90.0	-13.0	0.0		160	-1.3	62.1	1.2	63.3	128.5		5358	600	6828	-68	6418	-276	336	80	532	165	502	128	408	113
21	46001	97.8	-1.0	0.0		165	-0.1	67.5	0.1	67.6	139.7		7123	652	8735	-58	8314	-266	364	88	582	181	550	140	440	122
22	46006	103.0	-14.0	0.0		170	-1.4	71.1	1.3	72.4	147.1		9182	687	10894	-39	10406	-209	375	93	616	191	580	147	457	129
23	46021	118.1	-12.0	0.0		185	-1.2	81.5	1.1	82.6	168.7		12822	741	14619	-5	13781	-72	412	112	697	214	661	167	508	151
24	46026	128.5	-12.0	0.0		190	-1.2	88.7	1.1	89.8	183.5		18782	637	18799	-163	16731	-83	413	155	763	234	721	183	519	195
25	46096	123.3	-12.0	0.0		260	-1.2	85.1	1.1	86.2	176.1		22315	512	22216	-339	19695	-190	325	190	741	227	701	178	462	235
26	46186	117.8	-19.0	0.0		350	-1.9	81.3	1.8	83.1	168.3		22172	500	22076	-350	19555	-203	298	184	709	218	669	169	432	226
27	46306	112.5	-7.0	0.0		470	-0.7	77.6	0.7	78.3	160.7		22020	487	21923	-361	19408	-214	271	178	677	208	638	161	402	219
28	46331	120.3	-13.0	0.0		495	-1.3	83.0	1.2	84.2	171.8		22199	502	22111	-346	19598	-196	306	186	722	221	682	172	445	230
29	46356	128.7	-16.0	0.0		520	-1.6	88.8	1.5	90.3	183.8		22426	520	22337	-330	19821	-182	343	194	767	234	724	183	485	241
30	46376	134.9	-6.0	0.0		540	-0.6	93.1	0.6	93.7	192.7		23537	519	23743	-398	20856	-191	348	214	800	244	756	191	502	263
31	46406	140.7	-16.0	0.0		570	-1.6	97.1	1.5	98.6	201.0		29839	578	31745	-501	27568	-260	319	296	837	256	796	200	472	310
32	46411	149.0	-16.0	0.0		575	-1.6	102.8	1.5	104.3	212.8		31957	662	34707	-607	30415	-239	336	327	885	269	839	211	488	340
33	46541	156.3	-6.0	0.0		705	-0.6	107.8	0.6	108.4	223.2		37880	559	41940	-866	37949	-292	322	388	937	283	890	222	479	396
34	46556	162.1	-5.0	0.0		720	-0.5	111.8	0.5	112.3	231.5		42974	433	47262	-984	43173	-377	308	430	967	292	917	229	474	436
35	46566	165.2	-111.0	0.0		730	-11.1	114.0	10.6	124.6	236.0		48213	303	52635	-1091	48057	-447	287	471	990	298	944	233	465	473
36	46576	174.3	-9.0	0.0		740	-0.9	120.3	0.9	121.1	249.0		54259	185	59194	-1209	54023	-551	280	526	1037	311	988	244	485	529
37	46676	174.0	199.0	0.0		840	19.9	120.1	-19.1	101.0	248.5		63557	-1	69099	-1420	62598	-606	231	582	1042	311	988	242	527	567
38	46686	175.7	637.0	0.0		850	63.7	121.2	-61.0	60.2	251.0		63977	-253	69569	-1657	63037	-844	345	282	1098	36	1037	174	542	432
39	46691	177.3	1015.0	-0.1		855	101.5	122.3	-97.3	25.1	253.2		66406	-686	72169	-2120	65210	-1249	467	-57	1148	-234	1095	67	604	209
40	46706	175.0	1142.0	-0.1		870	114.2	120.7	-109.4	11.3	250.0		68347	-871	74147	-2306	66833	-1274	483	-129	1148	-287	1099	39	586	142
41	46716	175.8	1386.0	-0.1		880	138.6	121.3	-132.8	-11.5	251.1		69400	-1091	75249	-2545	67744	-1317	547	-291	1163	-406	1122	-18	614	31
42	46721	175.4	1559.0	-0.1		885	155.9	121.0	-149.4	-28.4	250.5		70549	-1277	76414	-2743	68689	-1431	594	-412	1175	-488	1141	-61	638	-54
43	46726	175.0	1731.0	-0.1		890	173.1	120.7	-165.9	-45.1	250.0		71641	-1410	77433	-2875	69521	-1501	616	-491	1182	-546	1153	-98	660	-129
44	46736	174.6	1889.0	-0.1		900	188.9	120.5	-181.0	-60.5	249.4		74381	-1823	79640	-3215	71222	-1638	630	-570	1188	-641	1161	-152	722	-268
45	46741	172.0	2081.0	-0.1		905	208.1	118.7	-199.4	-80.7	245.7		76606	-2192	81018	-3467	72156	-1745	636	-603	1191	-697	1158	-194	798	-423
46	46746	169.4	2188.0	-0.1		910	218.8	116.9	-209.6	-92.8	242.0		81752	-3072	83857	-3928	73971	-1909	646	-726	1190	-771	1143	-229	843	-583
47	46756	164.0	2387.0	-0.2		920	238.7	113.2	-228.7	-115.6	234.2		89853	-4598	88660	-4883	76642	-2185	650	-892	1187	-869	1099	-274	865	-782
48	46771	157.2	2413.0	-0.3		935	241.3	108.5	-231.2	-122.7	224.5		97520	-6533	92861	-6324	79372	-2150	634	-1003	1174	-940	1028	-305	897	-893
49	46786	162.4	2402.0	-0.3		950	240.2	112.1	-230.1	-118.1	232.0		100830	-7367	95400	-6957	80885	-1897	751	-1228	1210	-941	1026	-300	943	-872
50	46791	169.0	2362.0	-0.3		955	236.2	116.6	-226.3	-109.7	241.4		103470	-7651	98740	-7232	84194	-1907	815	-1236	1252	-917	1058	-283	977	-825
51	46796	176.4	2291.0	-0.3		960	229.1	121.7	-219.5	-97.8	252.0		108770	-8019	105670	-7614	90501	-416	870	-1235	1285	-891	1082	-266	995	-770
52	46801	172.4	2434.0	-0.3		965	243.4	119.0	-233.2	-114.3	246.2		115100	-8587	112440	-8201	90809	-437	1020	-1579	1286	-952	1077	-312	992	-804
53	46821	173.0	2563.0	-0.4		985	256.3	119.4	-245.6	-126.2	247.1		141470	-6135	130860	-7700	79723	-586	3551	-3787	1284	-980	1061	-472	1046	-719
54	46926	173.9	2447.0	-0.4		1090	244.7	120.0	-234.5	-114.5	248.4		0	-5547	156510	-5660	68157	-237	11457	-9919	1247	-886	1039	-586	1043	-569
55	46986	174.2	2724.0	-0.4		1150	272.4	120.2	-261.0	-140.8	248.8		0	-5536	158140	-5613	67103	-212	12623	-11060	1280	-999	1075	-696	1076	-661
56	46991	172.6	2829.0	-0.4		1155	282.9	119.1	-271.1	-152.0	246.5		0	-5538	159680	-5599	67142	-213	13965	-12347	1261	-1028	1075	-788	1319	-678
57	47001	167.3	2776.0	-0.3		1165	277.6	115.4	-266.0	-150.5	239.0		0	-5556	161950	-5558	67024	-215	15198	-13643	1211	-1012	1066	-883	1491	-626
58	47006	173.5	2718.0	-0.3		1170	271.8	119.7	-260.4	-140.7	247.8		0	-5553	164180	-5529	67079	-181	15290	-13667	1240	-986	1098	-871	1550	-587
59	47026	173.4	2829.0	-0.1		1190	282.9	119.6	-271.1	-151.4	247.7		0	-5512	0	-5384	65503	54	16152	-14201	1222	-1040	1093	-951	1903	-497
60	47041	168.1	2840.0	0.1		1205	284	116.0	-272.1	-156.1	240.1		0	-5445	0	-5230	64836	78	16671	-14486	1192	-1067	998	-889	2192	-434
61	47067	173.5	2756.0	0.7		1231	275.6	119.7	-264.1	-144.4	247.8		0	-5384	0	-5032	63443	-126	17145	-14601	1213	-6263	1016	-830	3569	-263
62	47071	173.0	2877.0	0.9		1235	287.7	119.4	-275.7	-156.3	247.1		0	-5355	0	-4969	63348	-121	17289	-14704	1227	-10340	1032	-874	4125	-294

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
63	47086	174.5	2758.0	1.4		1250	275.8	120.4	-264.3	-143.9	249.2		0	-5321	0	-4840	62401	-232	17579	-14765	1237	-14855	1033	-810	7647	-413
64	47106	174.9	2651.0	1.5		1270	265.1	120.7	-254.0	-133.3	249.8		0	-5275	0	-4683	61951	-299	17626	-14724	1246	-14874	1039	-760	8298	-359
65	47141	172.4	2803.0	1.6		1305	280.3	119.0	-268.6	-149.6	246.2		0	-5272	0	-5064	61380	-377	17746	-14860	1247	-15133	1047	-827	9268	-410
66	47151	167.0	2864.0	1.8		1315	286.4	115.2	-274.4	-159.2	238.5		0	-5275	0	-5063	61278	-391	17795	-14905	1239	-15316	1025	-850	10522	-411
67	47171	173.5	2893.0	2.9		1335	289.3	119.7	-277.2	-157.5	247.8		0	-5244	0	-5054	62019	-390	18409	-15231	13435	-15794	1125	-851	14699	-397
68	47186	177.4	2786.0	3.7		1350	278.6	122.4	-266.9	-144.5	253.4		0	-5327	0	-5054	60691	-520	19007	-15537	18564	-17100	1213	-935	15532	-371
69	47201	171.8	2894.0	4.2		1365	289.4	118.5	-277.3	-158.7	245.4		0	-5390	0	-5060	60613	-518	19307	-15771	19033	-17387	1277	-1770	15836	-455
70	47206	164.5	2947.0	4.6		1370	294.7	113.5	-282.4	-168.9	235.0		0	-5404	0	-5067	60595	-523	19460	-15983	19036	-17453	1332	-2971	15935	-540
71	47211	170.4	2957.0	4.7		1375	295.7	117.6	-283.3	-165.7	243.4		0	-5411	0	-5067	60572	-525	19534	-16003	19079	-17419	1422	-3784	16018	-550
72	47216	174.3	2829.0	4.9		1380	282.9	120.3	-271.1	-150.8	249.0		0	-5416	0	-5067	60551	-528	19658	-16033	19137	-17350	1704	-5128	16111	-509
73	47221	179.5	2760.0	5.0		1385	276	123.8	-264.4	-140.6	256.4		0	-5414	0	-5057	60527	-526	19734	-16015	19193	-17301	1943	-5731	16195	-466
74	47226	176.2	2919.0	5.3		1390	291.9	121.6	-279.7	-158.1	251.7		0	-5412	0	-5043	60511	-525	19909	-16164	19235	-17369	2693	-7479	16340	-528
75	47231	170.8	2919.0	5.6		1395	291.9	117.8	-279.7	-161.8	244.0		0	-5439	0	-5056	60491	-527	20046	-16326	19230	-17406	4366	-9894	16428	-699
76	47236	165.9	3025.0	5.9		1400	302.5	114.5	-289.8	-175.4	237.0		0	-5461	0	-5063	60467	-531	20159	-16464	19246	-17440	6820	-11785	16515	-1186
77	47241	168.7	2887.0	6.0		1405	288.7	116.4	-276.6	-160.2	241.0		0	-5470	0	-5065	60442	-533	20226	-16467	19269	-17392	8621	-12573	16562	-1475
78	47266	175.4	2796.0	6.3		1430	279.6	121.0	-267.9	-146.9	250.5		0	-5487	0	-5068	60330	-538	20400	-16528	19362	-17354	11926	-13433	16710	-2179
79	47281	171.5	2902.0	6.6		1445	290.2	118.3	-278.0	-159.7	245.0		0	-5492	0	-5068	60268	-540	20542	-16679	19406	-17434	13336	-13647	16818	-2903
80	47311	175.7	3007.0	8.2		1475	300.7	121.2	-288.1	-166.9	251.0		0	-5500	0	-5063	60153	-545	21517	-17346	19873	-17649	15942	-14592	17495	-9526
81	47316	177.3	2887.0	8.3		1480	288.7	122.3	-276.6	-154.3	253.2		0	-5501	0	-5059	60136	-544	21670	-17408	19973	-17669	16100	-14666	17579	-10119
82	47326	171.4	3064.0	8.6		1490	306.4	118.3	-293.6	-175.3	244.8		0	-5509	0	-5063	60100	-544	21855	-17613	20067	-17826	16266	-14875	17684	-11095
83	47331	164.8	3067.0	8.9		1495	306.7	113.7	-293.9	-180.2	235.4		0	-5511	0	-5071	60084	-544	22036	-17807	20123	-17943	16367	-14993	17741	-11794
84	47341	158.9	3152.0	9.2		1505	315.2	109.6	-302.0	-192.4	227.0		0	-5515	0	-5075	60053	-545	22211	-17995	20159	-18050	16444	-15102	17801	-12368
85	47351	170.7	3027.0	9.4		1515	302.7	117.8	-290.0	-172.2	243.8		0	-5517	165090	-5074	60018	-546	22410	-18050	20295	-18067	16578	-15109	17941	-12527
86	47356	176.7	2970.0	9.4		1520	297	121.9	-284.6	-162.6	252.4		0	-5518	164240	-5069	60001	-546	22510	-18051	20389	-18065	16663	-15109	18029	-12567
87	47361	172.4	3120.0	9.6		1525	312	119.0	-298.9	-180.0	246.2		0	-5521	163810	-5065	59987	-546	22712	-18234	20491	-18198	16786	-15253	18162	-12864
88	47381	175.2	3007.0	10.3		1545	300.7	120.9	-288.1	-167.2	250.2		0	-5538	162810	-5072	59935	-548	23544	-18770	20866	-18445	17234	-15526	18709	-13614
89	47476	174.1	2894.0	10.4		1640	289.4	120.1	-277.3	-157.2	248.7		0	-5565	150530	-5071	59689	-547	23623	-18782	20933	-18453	17290	-15528	18786	-13651
90	47701	176.0	3018.0	10.4		1865	301.8	121.4	-289.2	-167.7	251.4		0	-5575	135930	-5070	59236	-549	23666	-18819	20972	-18489	17331	-15563	18842	-13713
91	47726	181.4	3001.0	10.7		1890	300.1	125.2	-287.5	-162.4	259.1		0	-5587	135820	-5053	59202	-546	24213	-19171	21238	-18679	17627	-15760	19251	-14161
92	47746	187.2	2984.0	11.0		1910	298.4	129.2	-285.9	-156.7	267.4		165870	-5430	192030	-5133	59182	-533	24806	-19478	21593	-18862	17992	-15959	19801	-14618
93	47766	182.1	2922.0	11.1		1930	292.2	125.6	-280.0	-154.3	260.1		156160	-5414	162940	-5180	59119	-545	25061	-19630	21695	-18932	18108	-16040	20020	-14827
94	47896	177.0	2860.0	11.1		2060	286	122.1	-274.0	-151.9	252.8		146490	-5399	172810	-5144	58893	-545	25079	-19653	21687	-18937	18105	-16052	20038	-14860
95	47911	180.0	2978.0	11.1		2075	297.8	124.2	-285.3	-161.1	257.1		146250	-5397	173640	-5141	58877	-545	25107	-19676	21709	-18957	18128	-16067	20066	-14886
96	47916	182.6	3001.0	11.2		2080	300.1	126.1	-287.5	-161.4	261.1		146130	-5399	173190	-5136	58871	-545	25213	-19748	21769	-19010	18190	-16117	20157	-14960
97	47921	184.4	3006.0	11.2		2085	300.6	127.2	-288.0	-160.8	263.4		145820	-5399	164280	-5122	58869	-542	25313	-19804	21823	-19037	18248	-16149	20248	-15033
98	47926	185.5	2998.0	11.3		2090	299.8	128.0	-287.2	-159.3	265.0		145550	-5382	190520	-5100	58866	-536	25417	-19872	21875	-19074	18305	-16185	20340	-15126
99	47931	184.6	3017.0	11.3		2095	301.7	127.4	-289.1	-161.7	263.7		145710	-5364	176760	-5096	58859	-526	25556	-19973	21939	-19124	18371	-16238	20464	-15269
100	47936	0.0	2329.0	11.2		2100	232.9	0.0	-223.1	-223.1	0.0		0	0	0	-3746	0	-479	21338	-19962	20516	-19128	16981	-16205	16516	-15630

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Test:	Test		8 Pipe		jip																				
2	ISM-01	Date:	01-14-1997	Time:		12:40:36	Progver:	961205a																		
3																										
4													All strein gauges in microstrain													
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10^k	Ax_press (A	x_force (M	Axial (MPa	Hoop (MPa)															
7		(bar)	kN	mm																						
8								ax-press	ax-force	Axial	hoop															
9													hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.
10																										
11	45653	0.0				0	0	0.0	0.0	0.0	0.0		6	0	8	4	4	1	1	0	1	1	0	-1	0	1
12	45678	4.0				25	0	2.8	0.0	2.8	5.7		97	8	109	12	104	8	14	3	21	7	21	5	13	5
13	45758	7.5				105	0	5.2	0.0	5.2	10.7		253	21	271	28	258	20	35	8	48	15	50	12	30	10
14	45763	13.4				110	0	9.2	0.0	9.2	19.1		368	30	416	51	392	31	55	12	76	24	79	19	48	16
15	45768	19.9				115	0	13.7	0.0	13.7	28.4		568	45	682	100	600	46	82	18	111	35	115	28	71	24
16	45773	25.0				120	0	17.2	0.0	17.2	35.7		717	55	900	146	744	56	105	23	139	44	146	35	91	30
17	45778	27.6				125	0	19.0	0.0	19.0	39.4		815	60	1060	183	829	60	115	25	153	49	160	39	100	32
18	45788	31.2				135	0	21.5	0.0	21.5	44.6		890	65	1173	207	905	65	127	27	167	53	176	43	112	37
19	45793	37.8				140	0	26.1	0.0	26.1	54.0		1056	75	1461	271	1085	77	154	34	203	64	215	52	135	44
20	45798	43.0				145	0	29.7	0.0	29.7	61.4		1243	87	1800	352	1274	88	182	40	237	75	249	61	157	52
21	45803	48.9				150	0	33.7	0.0	33.7	69.8		1423	98	2155	439	1452	98	207	45	268	84	282	69	178	58
22	45808	52.3				155	0	36.1	0.0	36.1	74.7		1553	105	2443	515	1566	103	224	49	290	91	305	75	192	63
23	45818	58.5				165	0	40.4	0.0	40.4	83.6		1695	112	2755	587	1724	112	250	55	323	101	340	83	216	70
24	45823	64.3				170	0	44.4	0.0	44.4	91.8		1850	120	3122	668	1875	120	274	61	350	110	371	90	237	77
25	45828	70.5				175	0	48.6	0.0	48.6	100.7		2019	129	3543	758	2045	128	300	66	384	120	405	99	260	84
26	45833	75.5				180	0	52.1	0.0	52.1	107.8		2190	138	3986	835	2200	134	323	72	410	128	433	105	279	90
27	45838	82.0				185	0	56.6	0.0	56.6	117.1		2316	140	4572	906	2536	136	349	78	443	140	470	114	302	97
28	45843	89.7				190	0	61.9	0.0	61.9	128.1		3047	162	5463	953	3291	166	371	82	473	149	499	122	317	103
29	45848	95.3				195	0	65.8	0.0	65.8	136.1		3528	166	6580	989	4565	179	389	86	501	157	530	131	333	109
30	45853	101.5				200	0	70.0	0.0	70.0	145.0		5111	180	7880	1031	5645	191	405	91	529	166	559	137	348	114
31	45858	105.9				205	0	73.1	0.0	73.1	151.3		6046	193	9294	1057	6990	210	425	96	560	175	590	145	358	119
32	45863	111.3				210	0	76.8	0.0	76.8	159.0		6961	198	10900	1075	8124	211	440	101	589	185	623	153	372	126
33	45868	115.9				215	0	80.0	0.0	80.0	165.5		8022	240	12813	1074	9936	214	452	107	616	194	650	160	382	132
34	45873	121.1				220	0	83.6	0.0	83.6	173.0		9805	252	14839	1038	13105	203	465	118	647	202	680	167	388	142
35	45878	126.1				225	0	87.0	0.0	87.0	180.1		16009	273	18655	859	19252	167	465	137	672	211	709	175	386	163
36	45883	130.1				230	0	89.8	0.0	89.8	185.8		21136	317	20647	742	22842	108	460	162	698	219	736	181	378	191
37	45888	135.3				235	0	93.4	0.0	93.4	193.2		23063	245	21829	646	23809	64	453	190	724	227	762	188	371	222
38	45893	138.3				240	0	95.4	0.0	95.4	197.5		24337	158	23489	599	24993	45	446	220	749	235	787	194	363	250
39	45898	140.6				245	0	97.0	0.0	97.0	200.8		25658	84	25925	595	27048	-22	437	250	770	242	811	200	358	277
40	45903	145.5				250	0	100.4	0.0	100.4	207.8		27182	29	28035	589	28858	-24	432	273	786	246	826	204	350	299
41	45908	147.7				255	0	101.9	0.0	101.9	211.0		28482	7	29567	594	30426	-44	428	296	800	251	840	207	341	318
42	45913	150.2				260	0	103.6	0.0	103.6	214.5		29773	16	30946	569	31728	-37	421	323	811	254	852	210	329	335
43	45923	154.5				270	0	106.6	0.0	106.6	220.7		31720	97	34256	394	34035	-29	415	359	835	263	876	216	317	368
44	45928	156.8				275	0	108.2	0.0	108.2	224.0		32916	88	36156	311	35432	-61	415	375	848	265	890	220	312	384
45	45933	158.9				280	0	109.6	0.0	109.6	227.0		34263	61	38022	240	36885	-99	414	390	861	270	903	223	309	399
46	45938	161.6				285	0	111.5	0.0	111.5	230.8		35768	23	39903	182	38471	-147	412	406	873	273	916	226	305	415
47	45943	164.3				290	0	113.4	0.0	113.4	234.7		37648	-23	42153	115	40462	-208	411	425	891	278	933	231	302	435
48	45948	167.7				295	0	115.7	0.0	115.7	239.5		40294	-33	45191	27	43266	-285	408	451	910	283	954	235	296	461
49	45953	169.8				300	0	117.2	0.0	117.2	242.5		43268	-64	48958	-68	46778	-386	405	483	932	290	977	240	286	491
50	45958	173.0				305	0	119.4	0.0	119.4	247.1		46445	-81	52189	-154	49767	-471	400	508	950	295	995	244	279	516
51	45968	176.7				315	0	121.9	0.0	121.9	252.4		53109	-135	59738	-342	56782	-665	389	567	983	305	1030	252	233	560
52	45973	179.7				320	0	124.0	0.0	124.0	256.7		56654	-99	63860	-443	60489	-745	385	597	1000	309	1046	255	296	570
53	45978	182.8				325	0	126.1	0.0	126.1	261.1		60456	-109	68284	-545	64481	-838	406	620	1014	314	1062	258	314	592
54	45983	185.2				330	0	127.8	0.0	127.8	264.5		64405	-96	72945	-635	68624	-929	457	634	1029	317	1078	261	334	611
55	45988	188.0				335	0	129.7	0.0	129.7	268.5		68576	-63	77972	-744	73009	-1017	534	638	1043	321	1093	263	366	627
56	45993	190.4				340	0	131.4	0.0	131.4	271.9		73009	90	83323	-855	77691	-1105	550	651	1056	324	1108	266	384	649
57	45998	193.2				345	0	133.3	0.0	133.3	275.9		77723	251	88928	-962	82601	-1207	524	664	1069	327	1123	268	410	671
58	46003	195.4				350	0	134.8	0.0	134.8	279.1		82757	484	95150	-1079	87946	-1300	551	671	1079	330	1136	271	434	693
59	46008	197.6				355	0	136.3	0.0	136.3	282.2		88352	538	101820	-1199	0	-1398	504	688	1089	332	1146	271	457	715
60	46013	199.7				360	0	137.8	0.0	137.8	285.2		94510	510	108990	-1310	0	-1508	498	712	1099	333	1156	273	512	728
61	46023	203.4				370	0	140.3	0.0	140.3	290.5		110720	536	125800	-1551	0	-1729	494	753	1118	337	1176	274	207	743
62	46028	205.7				375	0	141.9	0.0	141.9	293.8		119100	488	135800	-1675	0	-1834	462	772	1126	338	1186	275	204	760

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
63	46038	208.5				385	0	143.9	0.0	143.9	297.8		0	503	0	-1917	0	-2060	495	815	1139	340	1201	276	241	798
64	46043	210.6				390	0	145.3	0.0	145.3	300.8		0	540	0	-2033	0	-2175	519	835	1146	342	1210	277	279	819
65	46053	213.0				400	0	147.0	0.0	147.0	304.2		0	695	0	-2165	0	-2388	614	898	1155	343	1220	276	417	879
66	46063	215.5				410	0	148.7	0.0	148.7	307.8		0	537	0	-1284	0	-2588	699	948	1161	343	1229	276	516	932
67	46073	217.9				420	0	150.3	0.0	150.3	311.2		0	266	0	404	0	-2355	893	1003	1168	342	1237	274	559	948
68	46088	220.1				435	0	151.9	0.0	151.9	314.4		0	175	0	-254	0	4098	1354	1102	1172	341	1243	271	656	992
69	46093	220.4				440	0	152.1	0.0	152.1	314.8		0	-110	0	-156	0	6637	1692	1128	1170	339	1244	269	669	1003
70	46098	220.3				445	0	152.0	0.0	152.0	314.7		0	109	0	-273	0	3564	1984	1172	1169	338	1242	268	688	1017
71	46103	219.8				450	0	151.7	0.0	151.7	313.9		0	-306	0	-316	0	3547	2201	1197	1160	334	1234	265	683	1033
72	46108	-0.5				455	0	-0.3	0.0	-0.3	-0.7		0	0	0	-1504	0	0	-4075	529	-99	51	-120	58	-4641	222
73	46110	0.5				457	0	0.3	0.0	0.3	0.7		0	0	0	-1479	0	0	-4078	530	-98	53	-120	59	-4634	223

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	Test:	Test	9	Pipe		jip																				
2	ISM-01	Date:	01-15-1997	Time:		12:20:30	Progver:	961205a																		
3																										
4													All strein gauges in microstrain													
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10*k	Ax_press (	Ax_force (k	Axial (MPa	Hoop (MPa)															
7		(bar)	kN	mm																						
8								ax-press	ax-force	Axial	hoop															
9													hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.
10																										
11	46239	-0.2	10.0	0.0		0	1	-0.1	-1.0	-1.1	-0.3		-61	-3	-64	-2	-59	-2	-4	-1	-8	-2	-6	-1	-3	0
12	46259	7.9	17.0	0.0		20	1.7	5.5	-1.6	3.8	11.3		349	14	349	17	326	16	21	5	47	12	47	15	19	4
13	46264	10.8	16.0	0.0		25	1.6	7.5	-1.5	5.9	15.4		532	18	533	25	499	25	32	7	72	19	66	20	27	5
14	46274	19.1	24.0	0.0		35	2.4	13.2	-2.3	10.9	27.3		904	30	916	41	870	40	57	14	128	31	117	34	48	10
15	46279	24.0	18.0	0.0		40	1.8	16.6	-1.7	14.8	34.3		1128	35	1121	46	1045	52	69	17	154	38	139	40	59	11
16	46284	27.3	30.0	0.0		45	3	18.8	-2.9	16.0	39.0		1240	38	1234	51	1156	52	78	19	175	43	161	47	69	13
17	46289	31.0	12.0	0.0		50	1.2	21.4	-1.1	20.2	44.3		1491	45	1481	59	1378	61	94	23	202	50	185	53	79	16
18	46294	33.6	17.0	0.0		55	1.7	23.2	-1.6	21.6	48.0		1527	46	1517	60	1412	63	97	24	208	51	192	55	84	17
19	46299	39.5	27.0	0.0		60	2.7	27.3	-2.6	24.7	56.4		1831	53	1817	70	1702	74	120	30	257	64	238	68	104	21
20	46309	43.4	37.0	0.0		70	3.7	29.9	-3.5	26.4	62.0		2010	58	2014	75	1886	80	134	33	281	69	257	73	113	23
21	46314	49.6	31.0	0.0		75	3.1	34.2	-3.0	31.3	70.8		2817	62	2747	83	2745	92	151	37	318	78	291	83	130	28
22	46329	57.6	22.0	0.0		90	2.2	39.7	-2.1	37.6	82.3		4691	48	4733	85	4293	133	174	45	368	90	337	95	147	31
23	46344	62.4	38.0	0.0		105	3.8	43.1	-3.6	39.4	89.1		7208	43	7678	94	5983	178	186	51	405	99	369	105	158	37
24	46349	68.4	26.0	0.0		110	2.6	47.2	-2.5	44.7	97.7		11490	34	12488	96	9227	232	193	61	439	107	399	114	167	45
25	46354	70.8	13.0	0.0		115	1.3	48.8	-1.2	47.6	101.1		13582	27	18024	-18	14942	194	188	76	462	112	420	120	161	56
26	46364	76.7	10.0	0.0		125	1	52.9	-1.0	52.0	109.6		15071	41	20298	-17	16721	212	187	98	499	122	455	130	159	76
27	46369	80.2	13.0	0.0		130	1.3	55.3	-1.2	54.1	114.5		20120	-108	23876	-60	21724	212	172	128	525	128	478	136	144	103
28	46384	88.6	24.0	0.0		145	2.4	61.1	-2.3	58.8	126.5		25151	-258	27209	-307	24893	19	153	182	574	140	522	149	119	146
29	46389	91.2	32.0	0.0		150	3.2	62.9	-3.1	59.9	130.3		28267	-313	30986	-504	27209	39	128	221	595	145	541	153	94	178
30	46399	97.0	12.0	0.0		160	1.2	66.9	-1.1	65.8	138.5		30874	-395	34458	-653	29218	30	119	253	631	155	573	163	83	209
31	46404	101.8	25.0	0.0		165	2.5	70.2	-2.4	67.8	145.4		35645	-538	39412	-853	33225	-31	98	290	663	163	603	172	65	243
32	46414	106.0	20.0	0.0		175	2	73.1	-1.9	71.2	151.4		39203	-643	43275	-988	36740	-131	84	322	689	169	625	177	49	270
33	46419	112.4	11.0	0.0		180	1.1	77.6	-1.1	76.5	160.5		44758	-814	49508	-1171	42235	-283	60	362	721	176	654	186	24	308
34	46429	114.7	16.0	0.0		190	1.6	79.1	-1.5	77.6	163.8		49915	-991	55268	-1331	47341	-420	35	399	748	183	680	193	0	341
35	46434	119.4	26.0	0.0		195	2.6	82.4	-2.5	79.9	170.5		56412	-1176	62632	-1517	53874	-563	5	443	778	190	707	200	-33	380
36	46449	125.5	25.0	0.0		210	2.5	86.6	-2.4	84.2	179.3		67609	-1452	75441	-1818	64953	-784	-48	508	816	199	742	209	-88	438
37	46454	129.4	26.0	0.0		215	2.6	89.3	-2.5	86.8	184.8		76970	-1662	85950	-2037	73975	-938	-91	557	846	205	768	216	-132	483
38	46484	131.1	755.0	-0.3		245	75.5	90.5	-72.3	18.1	187.3		96550	-3091	107400	-3577	92913	-2145	68	-79	903	-112	813	156	-91	25
39	46494	129.0	1044.0	-0.3		255	104.4	89.0	-100.0	-11.0	184.3		109580	-3927	120190	-4374	103450	-2645	145	-312	909	-233	826	106	-68	-191
40	46509	128.9	1163.0	-0.3		270	116.3	88.9	-111.4	-22.5	184.1		113590	-4082	124570	-4518	106690	-2755	94	-399	910	-285	834	77	-60	-268
41	46519	127.7	1374.0	-0.3		280	137.4	88.1	-131.6	-43.5	182.4		119100	-4678	130340	-5039	110980	-3067	172	-627	917	-380	841	41	-21	-422
42	46524	127.4	1543.0	-0.3		285	154.3	87.9	-147.8	-59.9	182.0		123920	-4920	135580	-5234	114430	-3169	207	-730	922	-430	848	18	-19	-516
43	46529	125.1	1700.0	-0.4		290	170	86.3	-162.9	-76.6	178.7		140430	-5992	0	-6012	125510	-3454	373	-998	925	-534	840	-18	5	-752
44	46534	127.7	1660.0	-0.4		295	166	88.1	-159.0	-70.9	182.4		150110	-6223	0	-6172	132860	-3486	369	-986	935	-518	841	-8	-4	-746
45	46539	129.7	1782.0	-0.5		300	178.2	89.5	-170.7	-81.2	185.3		0	-7249	0	-7052	0	-3853	483	-1188	965	-576	844	-18	6	-926
46	46549	126.8	1862.0	-0.6		310	186.2	87.5	-178.4	-90.9	181.1		0	-8748	0	-8362	0	-4089	1020	-1452	995	-668	817	-27	28	-1151
47	46564	123.4	2017.0	-0.7		325	201.7	85.1	-193.3	-108.1	176.3		0	-9877	0	-9239	0	-4108	1537	-1737	1027	-825	790	-63	140	-1357
48	46569	120.9	2085.0	-0.7		330	208.5	83.4	-199.8	-116.4	172.7		0	-10512	0	-9757	0	-3840	1779	-2031	1057	-939	771	-80	138	-1391
49	46579	123.3	2070.0	-0.8		340	207	85.1	-198.3	-113.3	176.1		0	-11182	0	-10469	0	-2642	2233	-2657	1127	-950	761	-75	129	-1399
50	46584	-1.2	1641.0	-0.9		341	164.1	-0.8	-157.2	-158.1	-1.7		0	0	0	0	0	0	32	-3099	269	-954	-37	-107	-1784	-1816

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1	Test:	Pipe	jip		10																							
2	ISM-01	Date:	01-20-1997	Time:		09:21:51	Progver:	961205a																				
3																												
4													All strein gauges in microstrain															
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10*kA	x_press (	Ax_force (k	Axial (MPa	Hoop (MPa)																	
7		(bar)	kN	mm									long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop
8								ax-press	ax-force	Axial	hoop																	
9																												
10																												
11	34739	0.0	2.0	0.0		0	0.2	0.0	-0.2	-0.2	0.0		-1	-1	0	1	-1	-1	0	-1	-1	-1	-1	-1	2	-1	-1	-1
12	34854	4.2	6.0	0.0		115	0.6	2.9	-0.6	2.3	6.0		41	33	41	34	39	32	42	34	6	23	7	26	9	24	6	27
13	34859	8.5	0.0	0.0		120	0	6.6	0.0	6.6	13.6		79	63	76	63	73	63	82	69	12	47	13	51	16	48	12	55
14	34864	17.5	11.0	0.0		125	1.1	12.1	-1.1	11.0	25.0		174	140	167	136	158	131	166	133	24	92	25	101	29	97	25	107
15	34879	24.9	6.0	0.0		140	0.6	17.2	-0.6	16.6	35.6		258	207	246	201	234	195	249	202	37	140	39	153	42	143	37	156
16	34884	31.2	5.0	0.0		145	0.5	21.5	-0.5	21.0	44.6		324	258	308	253	294	243	307	248	46	172	46	186	51	175	45	193
17	34889	36.9	8.0	0.0		150	0.8	25.5	-0.8	24.7	52.7		387	311	371	305	357	296	373	300	54	209	58	223	60	208	54	228
18	34894	42.6	18.0	0.0		155	1.8	29.4	-1.7	27.7	60.8		449	359	428	352	412	343	434	352	64	246	68	263	69	246	63	266
19	34899	49.0	5.0	0.0		160	0.5	33.8	-0.5	33.3	70.0		520	416	493	403	471	390	492	398	72	279	74	301	79	283	72	308
20	34939	50.0	141.0	0.0		200	14.1	34.5	-13.5	21.0	71.4		541	432	514	421	492	407	513	414	74	289	76	307	80	288	72	311
21	34969	49.8	239.0	0.0		230	23.9	34.4	-22.9	11.5	71.1		411	419	465	412	433	400	302	397	38	304	67	299	65	297	-8	317
22	34974	50.2	332.0	0.0		235	33.2	34.6	-31.8	2.8	71.7		109	405	357	410	333	402	-52	383	-49	339	39	302	40	320	-122	336
23	34999	49.3	618.0	-0.1		260	61.8	34.0	-59.2	-25.2	70.4		34	397	337	403	302	397	-128	375	-74	342	28	301	31	321	-145	339
24	35004	49.4	361.0	-0.1		265	36.1	34.1	-34.6	-0.5	70.6		38	395	319	403	302	396	-126	374	-73	341	31	300	32	320	-149	338
25	35049	57.9	422.0	-0.1		310	42.2	39.9	-40.4	-0.5	82.7		-20	451	341	463	328	454	-187	429	-102	399	26	354	32	375	-184	402
26	35054	62.1	423.0	-0.1		315	42.3	42.8	-40.5	2.3	88.7		30	493	389	505	376	498	-133	475	-95	430	32	385	39	401	-177	430
27	35059	66.8	431.0	-0.1		320	43.1	46.1	-41.3	4.8	95.4		77	537	436	546	419	534	-86	511	-90	454	38	410	45	426	-171	457
28	35064	71.6	492.0	-0.1		325	49.2	49.4	-47.1	2.3	102.3		-14	565	425	580	417	568	-178	541	-123	493	27	441	40	459	-209	498
29	35069	76.7	555.0	-0.1		330	55.5	52.9	-53.2	-0.3	109.6		-76	597	420	615	420	603	-235	572	-150	529	22	473	37	491	-240	535
30	35079	84.6	601.0	-0.1		340	60.1	58.4	-57.6	0.8	120.8		-81	665	464	684	469	671	-234	641	-165	589	20	531	40	546	-257	596
31	35084	89.9	596.0	-0.1		345	59.6	62.0	-57.1	4.9	128.4		-29	702	509	720	510	705	-183	677	-157	614	28	558	47	571	-248	624
32	35089	94.0	628.0	-0.1		350	62.9	64.9	-60.3	4.6	134.3		-53	735	521	755	530	742	-199	712	-171	647	24	588	47	600	-263	657
33	35094	98.1	671.0	-0.1		355	67.1	67.7	-64.3	3.4	140.1		-123	766	523	790	536	777	-263	745	-200	684	16	619	44	630	-293	692
34	35099	103.3	722.0	-0.1		360	72.2	71.3	-69.2	2.1	147.5		-233	796	495	826	528	812	-361	774	-239	725	3	653	38	664	-335	732
35	35104	107.5	779.0	-0.1		365	77.9	74.2	-74.6	-0.5	153.5		-293	829	491	863	536	847	-409	808	-263	762	-8	684	35	693	-360	766
36	35109	112.1	814.0	-0.1		370	81.4	77.3	-78.0	-0.6	160.1		-337	867	493	899	550	882	-441	840	-283	796	-15	713	34	723	-380	798
37	35114	116.2	843.0	-0.1		375	84.3	80.2	-80.8	-0.6	166.0		-363	894	502	933	564	916	-461	874	-299	827	-19	743	33	811	-395	831
38	35119	120.4	891.0	-0.1		380	89.1	83.1	-85.4	-2.3	172.0		-310	931	547	967	604	951	-408	909	-292	852	-11	770	38	773	-386	857
39	35129	128.6	914.0	-0.1		390	91.4	88.7	-87.6	1.2	183.7		-367	997	564	1037	636	1019	-448	975	-323	915	-23	828	37	829	-417	920
40	35134	133.1	940.0	-0.1		395	94	91.8	-90.1	1.8	190.1		-379	1036	583	1078	660	1056	-454	1010	-334	946	-25	856	38	855	-428	950
41	35139	137.4	961.0	-0.1		400	96.1	94.8	-92.1	2.7	196.2		-400	1064	591	1107	673	1087	-467	1042	-347	977	-29	886	37	883	-442	981
42	35144	142.6	982.0	-0.1		405	98.2	98.4	-94.1	4.3	203.7		-393	1098	615	1141	704	1123	-452	1075	-351	1007	-27	913	94	908	-444	1011
43	35154	150.1	1041.0	-0.1		415	104.1	103.6	-99.7	3.8	214.4		-438	1162	634	1208	732	1187	-486	1138	-379	1065	-38	971	38	962	-471	1072
44	35159	154.4	1088.0	-0.1		420	108.8	106.5	-104.2	2.3	220.5		-475	1193	634	1241	740	1218	-513	1169	-397	1096	-45	998	36	990	-490	1104
45	35164	158.8	1124.0	-0.1		425	112.4	109.6	-107.7	1.9	226.8		-514	1223	634	1273	748	1250	-543	1199	-416	1128	-49	1027	33	1018	-507	1136
46	35169	162.9	1175.0	-0.1		430	117.5	112.4	-112.6	-0.2	232.7		-567	1253	626	1307	752	1282	-585	1230	-439	1161	-62	1056	30	1045	-531	1168
47	35179	170.9	1256.0	-0.1		440	125.6	117.9	-120.3	-2.4	244.1		-571	1319	653	1372	777	1346	-645	1289	-478	1222	-78	1112	24	1098	-569	1228
48	35189	178.3	1281.0	-0.1		450	128.1	123.0	-122.7	0.3	254.7		-607	1384	686	1441	825	1412	-602	1356	-482	1274	-72	1163	29	1145	-570	1280
49	35194	182.4	1315.0	-0.1		455	131.5	125.9	-126.0	-0.1	260.5		-649	1411	682	1470	831	1443	-631	1387	-499	1305	-81	1192	27	1173	-587	1311
50	35204	190.3	1352.0	-0.1		465	135.2	131.3	-129.5	1.8	271.8		-650	1470	716	1530	869	1501	-623	1445	-514	1355	-83	1242	29	1220	-600	1366
51	35209	194.4	1406.0	-0.2		470	140.6	134.1	-134.7	-0.6	277.7		-709	1499	702	1561	866	1530	-673	1471	-539	1386	-94	1268	23	1246	-624	1395
52	35219	202.1	1509.0	-0.2		480	150.9	139.4	-144.6	-5.1	288.7		-736	1559	725	1624	913	1593	-685	1533	-563	1441	-101	1320	20	1296	-660	1452
53	35259	197.3	1453.0	-0.2		520	145.3	136.1	-139.2	-3.1	281.8		-779	1529	690	1595	862	1563	-717	1503	-573	1419	-106	1297	16	1272	-650	1425
54	35299	202.4	1489.0	-0.2		560	148.9	139.6	-142.7	-3.0	289.1		-741	1566	719	1630	885	1599	-714	1537	-581	1450	-107	1326	16	1300	-657	1458
55	35309	209.4	1529.0	-0.2		570	152.9	144.5	-146.5	-2.0	299.1		-792	1618	730	1685	915	1651	-717	1590	-596	1496	-113	1372	16	1343	-670	1506
56	35319	215.4	1596.0	-0.2		580	159.6	148.6	-152.9	-4.3	307.7		-846	1669	819	1739	923	1702	-763	1641	-625	1549	-128	1416	12	1384	-705	1556
57	35324	219.6	1582.0	-0.2		585	158.2	151.5	-151.6	-0.1	313.7		-822	1727	893	1763	953	1726	-764	1671	-617	1568	-123	1436	20	1400	-721	1581
58	35334	224.4	1592.0	-0.2		595	159.2	154.8	-152.5	2.3	320.5		-739	1793	1009	1812	1001	1770	-759	1715	-621	1613	-110	1496	28	1424	-707	9365
59	35344	228.9	1630.0	-0.2		605	163	157.9	-156.2	1.8	326.9		-356	1859	1199	1856	1043	1810	-765	1750	-644	1662	-126	1553	38	1441	-704	15609
60	35424	231.5	1716.0	-0.5		685	171.6	159.7	-164.4	-4.7	330.7		1810	26820	2703	9767	3335	3452	1566	22994	-569	1585	-380	1681	-10	1495	-1738	19179
61	35449	227.0	1658.0	-0.5		710	165.8	158.6	-158.9	-2.2	324.2		1827	27661	3049	11212	3581	3630	1646	23543	-563	1553	-361	1647	-16	1467	-1766	19172
62	35499	222.7	1628.0	-0.5		760	162.8	153.7	-156.0	-2.3	318.1		1808	27743	3088	11399	3625	3640	1626	23615	-563	1529	-354	1620	-13	1442	-1768	19152
63	35519	227.6	1679.0	-0.5		780	167.9	157.0	-160.9	-3.8	325.1		1791	27799	3102	11457	3643	3675	1612	23663	-575	1556	-360	1646	-16	1465	-1781	19184
64	35534	232.7	1701.0	-0.5		795	170.1	160.6	-163.0	-2.4	332.4		1782	28439	3370	12509	3912	3925	1662	24146	-586	1600	-360	1685	-26	1506	-1806	19265
65	35619	228.0	1628.0	-0.5		880	162.8	157.3	-156.0	1.3	325.7		1705	31670	5769	19598	6277	6299	2283	28033	-636	1589	-314	1669	-126	1493	-1848	19408
66	35694	223.9	1601.0	-0.5		955	160.1	154.5	-153.4	1.1	319.8		1683	31670	5770	19593	6286	6315	2268	28059	-637	1564	-311	1641	-126	1467	-1848	19382
67	35719	229.8	1706.0	-0.5		981	170.6	158.6	-163.5	-4.9	328.2		1667	31739	5787	19658	6302	6374	2225	28133	-672	1614	-338	1686	-143	1511	-1889	19437

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
68	35729	234.4	1715.0	-0.5		990	171.5	161.7	-164.3	-2.6	334.8		1596	31999	5829	19902	6394	6563	2236	28482	-675	1642	-334	1714	-146	1535	-1890	19487
69	35869	238.7	1723.0	-0.4		1130	172.3	164.7	-165.1	-0.4	340.9		1012	36150	8271	27547	10966	16240	2994	35963	-757	1862	-443	1802	-460	1633	-2528	19997
70	36069	242.8	1742.0	0.0		1330	174.2	167.5	-166.9	0.6	346.8		208	37463	8593	32637	9357	32179	1953	41232	-2625	18281	-1866	11595	-578	1861	-8627	25145
71	36284	246.9	1779.0	0.8		1545	177.9	170.4	-170.5	-0.1	352.6		-676	38839	7710	34243	8905	33686	870	42301	-5546	24569	-3544	22605	-1300	10624	-10306	31874
72	36379	251.5	1786.0	1.7		1640	178.6	173.5	-171.1	2.4	359.2		-1234	41532	7225	37440	8585	34594	329	43562	-6872	27033	-4624	25249	-3940	23148	-10768	33872
73	36384	250.3	1864.0	1.8		1645	186.4	172.7	-178.6	-5.9	357.5		-1390	41780	7095	37694	8446	34718	181	43680	-7025	27247	-4737	25418	-4109	23414	-10850	33974
74	36424	254.5	1783.0	2.2		1685	178.3	175.6	-170.8	4.8	363.5		-1378	43220	7134	39314	8501	35742	196	44489	-7537	28361	-5093	26398	-4673	24645	-11014	34756
75	36429	255.0	1864.0	2.3		1690	186.4	175.9	-178.6	-2.7	364.2		-1393	43431	7114	39546	8476	35913	124	44618	-7641	28529	-5181	26545	-4778	24787	-11099	34893
76	36484	259.6	1839.0	3.0		1745	183.9	179.1	-176.2	2.9	370.8		-1547	46375	7098	42484	8520	38397	53	46476	-8592	30593	-5863	28365	-5615	26189	-11598	36434
77	36494	260.2	1925.0	3.2		1755	192.5	179.5	-184.4	-4.9	371.6		-1700	47128	7003	43210	8448	39076	-78	46997	-8864	31114	-6082	28849	-5866	26537	-11797	36838
78	36499	265.8	1875.0	3.3		1760	187.5	183.4	-179.6	3.7	379.6		-1611	47463	7081	43527	8523	39385	11	47227	-8926	31326	-6129	29058	-5938	26696	-11830	37004
79	36584	267.4	1984.0	4.4		1825	198.4	184.5	-190.1	-5.6	381.9		-1596	52994	7296	48723	8767	44545	110	51358	-10339	34756	-7354	32553	-7443	29551	-12905	39838
80	36599	253.4	1978.0	5.0		1860	197.8	174.8	-189.5	-14.7	361.9		-1338	56087	7584	51579	9010	47464	326	53806	-10994	36631	-7965	34510	-8200	31232	-13413	41393
81	36604	273.2	1910.0	5.1		1865	191	188.5	-183.0	5.5	390.2		-1242	56536	7689	51984	9117	47877	476	54145	-11038	36846	-8006	34754	-8263	31441	-13435	41591
82	36614	273.2	1986.0	5.3		1875	198.6	188.5	-190.3	-1.8	390.2		-1281	57533	7686	52892	9108	48800	444	54958	-11282	37450	-8230	35375	-8519	31975	-13641	42091
83	36669	278.2	1985.0	6.3		1930	198.5	191.9	-190.2	1.8	397.4		-859	62858	8144	57618	9449	53598	822	59197	-12336	40535	-9193	38541	-9667	34740	-14507	44896
84	36684	278.8	2068.0	6.6		1945	206.8	192.4	-198.1	-5.8	398.2		-866	64393	8176	58995	9455	54998	802	60462	-12680	41454	-9508	39472	-10020	35559	-14812	45486
85	36734	285.0	1972.0	7.4		1996	197.2	196.6	-188.9	7.7	407.1		-260	69212	8770	63279	9925	59392	1346	64424	-13516	44281	-10284	42321	-10938	38083	-15532	47950
86	36749	279.4	2001.0	7.6		2010	200.1	192.8	-191.7	1.1	399.1		-237	70097	8801	64046	9931	60171	1344	65127	-13696	44764	-10449	42799	-11118	38499	-15693	48359
87	36799	275.3	1939.0	7.6		2060	193.9	189.9	-185.8	4.2	393.2		-204	70216	8827	64083	9949	60289	1371	65225	-13708	44827	-10462	42861	-11138	38554	-15705	48410
88	36819	283.4	2028.0	7.6		2080	202.8	195.5	-194.3	1.2	404.8		-213	70401	8829	64234	9958	60469	1363	65409	-13754	44976	-10500	43005	-11176	38668	-15751	48564
89	36859	287.8	2073.0	8.4		2120	207.3	198.6	-198.6	0.0	411.1		151	74612	9201	67983	10251	64187	1684	68931	-14523	47462	-11203	45429	-11969	40824	-16451	50771
90	36914	293.1	2058.0	9.4		2175	205.8	202.2	-197.2	5.0	418.6		809	80562	9847	73211	10722	69483	2237	73856	-15518	50968	-12112	48861	-13027	43889	-17365	53888
91	36959	293.3	2147.0	10.3		2220	214.7	202.4	-205.7	-3.3	418.9		1183	85811	10232	77744	10963	74060	2532	78241	-16433	53987	-12968	51782	-13943	46488	-18237	56620
92	37024	288.8	2088.0	11.1		2285	208.8	198.3	-200.1	-0.8	412.5		1709	91031	10751	82215	11315	78635	2970	82575	-17257	56932	-13751	54646	-14803	49037	-19023	59295
93	37094	295.4	2127.0	11.1		2355	212.7	203.8	-203.8	0.0	421.9		1715	91287	10771	82363	11337	78877	2979	82811	-17305	57106	-13792	54821	-14844	49202	-19071	59480
94	37134	299.5	2156.0	11.8		2395	215.6	206.6	-206.6	0.1	427.8		2143	95800	11189	86195	11648	82698	3371	86490	-17992	59676	-14441	57288	-15556	51400	-19738	61846
95	37194	302.0	1891.0	12.9		2455	189.1	208.4	-181.2	27.2	431.3		2776	103250	11825	92900	12103	89259	3954	92836	-19134	63933	-15535	61374	-16736	55050	-20854	65753
96	37199	302.7	2197.0	13.0		2460	219.7	208.9	-210.5	-1.6	432.3		2832	103840	11880	93430	12147	89801	4009	93291	-19217	64257	-15615	61697	-16823	55336	-20938	66054
97	37269	305.0	2288.0	14.4		2530	228.8	210.4	-219.2	-8.8	435.6		3581	113310	12624	101970	12700	98290	4706	101360	-20603	69676	-16970	66926	-18269	60019	-22338	71086
98	37299	306.4	2201.0	14.9		2560	220.1	211.4	-210.9	0.5	437.6		3923	117980	12953	106540	12956	102040	5073	104930	-21166	71967	-17513	69103	-18846	61958	-22879	73180
99	37304	300.8	2211.0	15.0		2565	221.1	207.5	-211.8	-4.3	429.6		3961	118710	12998	107320	12982	102590	5109	105440	-21253	72317	-17599	69440	-18936	62258	-22967	73505
100	37309	308.1	2168.0	15.1		2570	216.8	212.6	-207.7	4.9	440.1		4028	119330	13067	108220	13045	103100	5183	105890	-21314	72693	-17666	69816	-19013	62594	-23030	73847
101	37329	306.9	2251.0	15.5		2590	225.1	211.8	-215.7	-3.9	438.3		4161	122910	13205	114380	13126	105660	5315	108310	-21734	74256	-18072	71309	-19433	63917	-23454	75297
102	37409	293.1	2265.0	17.0		2670	226.5	202.2	-217.0	-14.8	418.6		4885	0	13942	0	13682	122200	6089	119700	-23254	80709	-19580	77398	-21013	69335	-24999	81200
103	37414	311.0	2248.0	17.1		2675	224.8	214.6	-215.4	-0.8	444.2		4890	0	14037	0	13735	124060	6146	120510	-23337	81024	-19664	77783	-21105	69678	-25083	81568
104	37539	309.1	2381.0	19.3		2800	238.1	213.3	-228.1	-14.9	441.5		5832	0	15807	0	14410	0	7168	0	-25499	90421	-21822	86678	-23351	77571	-27306	90242
105	37544	313.9	2271.0	19.4		2805	227.1	216.6	-217.6	-1.0	448.3		5858	0	16248	0	14437	0	7204	0	-25578	90790	-21898	87039	-23434	77894	-27377	90730
106	37654	318.2	2217.0	21.5		2915	221.7	219.5	-212.4	7.1	454.5		6604	0	0	0	14889	0	7960	0	-27595	100450	-23939	96430	-25571	86065	-29481	99660
107	37659	317.3	2338.0	21.6		2920	233.8	218.9	-224.0	-5.1	453.2		6621	0	0	0	14874	0	7961	0	-27752	101040	-24089	97010	-25723	86571	-29644	100180
108	37694	317.3	2213.0	22.4		2955	221.3	218.9	-212.0	6.9	453.2		7198	0	0	0	15048	0	8276	0	-28518	104470	-24871	100340	-26526	89650	-30457	103450
109	37699	315.6	2432.0	22.5		2960	243.2	217.8	-233.0	-15.3	450.8		7285	0	0	0	15048	0	8290	0	-28684	105040	-25038	100860	-26691	90090	-30637	103980
110	37709	317.7	2320.0	22.7		2970	232	219.2	-222.3	-3.1	453.8		7551	0	0	0	15151	0	8438	0	-28838	105900	-25197	101700	-26866	90850	-30789	104790
111	37939	319.6	2399.0	28.5		3200	239.9	220.5	-229.9	-9.3	456.5		8960	0	0	0	16743	0	9547	0	-33872	134380	-31108	130580	-33100	116050	-36973	132430
112	37954	321.4	2307.0	28.9		3215	230.7	221.8	-221.0	0.7	459.1		8590	0	0	0	0	0	9548	0	-33312	134240	-31487	132680	-33516	117880	-37356	134380
113	38174	314.1	2318.0	34.7		3435	231.8	216.7	-222.1	-5.4	448.6		5379	0	0	0	0	0	9712	0	-25059	77710	-37319	167680	-40054	146750	-42602	165740
114	38194	309.5	2250.0	34.8		3455	225	213.5	-215.6	-2.0	442.1		5333	0	0	0	0	0	9712	0	-24976	77540	-37345	168160	-40089	146990	-42503	165950
115	38269	307.1	2173.0	34.8		3530	217.3	211.9	-208.2	3.7	438.6		5268	0	0	0	0	0	9701	0	-24820	76935	-37357	168840	-40112	147220	-42321	166160
116	38304	311.5	2224.0	34.6		3565	222.4	214.9	-213.1	1.8	444.9		5255	0	0	0	0	0	9708	0	-24773	76770	-37355	169150	-40113	147320	-42271	166280
117	38309	318.3	2328.0	34.9		3570	232.8	219.6	-223.1	-3.4	454.8		5257	0	0	0	0	0	9688	0	-24772	76750	-37468	170340	-40236	147920	-42388	166920
118	38334	319.6	2289.0	35.6		3585	228.9	220.5	-219.3	1.2	456.5		5300	0	0	0	0	0	9677	0	-24733	76667	-38200	250490	-41088	152470	-42996	171430
119	38399	-0.6	1108.0	38.3		3660	110.8	-0.6	-106.2	-106.7	-1.1		5275	0	0	0	0	0	9991	0	-24385	76009	-32255	155930	-43285	0	-44255	176810

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1																												
2																												
3																												
4													All strein gauges in microstrain															
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Test time	Force (10*kA	x_press (	Ax_force (kN	Axial (MPa	Hoop (MPa)																	
7		(bar)	kN	mm									long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop
8								ax-press	ax-force	Axial	hoop																	
9																												
10																												
11	33421	5.4	2.0	0.0		0	0.2	3.7	-0.2	3.5	7.7		53	48	57	44	44	40	48	42	6	29	7	30	4	23	6	31
12	33437	7.1	56.0	0.0		15	5.6	4.9	-5.4	-0.5	10.1		88	81	71	56	57	52	63	55	8	39	9	40	5	31	9	42
13	33447	12.1	92.0	0.0		25	9.2	8.3	-8.8	-0.5	17.3		114	103	123	96	97	91	110	95	15	68	19	70	11	58	17	76
14	33452	15.5	97.0	0.0		31	9.7	10.7	-9.3	1.4	22.1		146	131	157	125	124	116	141	122	19	85	23	88	14	73	23	97
15	33457	19.3	93.0	0.0		36	9.3	13.3	-8.9	4.4	27.6		180	162	196	154	154	144	174	150	24	104	29	108	18	91	29	120
16	33462	22.8	102.0	0.0		40	10.2	15.7	-9.8	6.0	32.6		217	194	235	184	185	172	208	180	29	123	35	130	23	109	35	143
17	33467	26.6	115.0	0.0		45	11.5	18.4	-11.0	7.3	38.0		255	228	276	215	215	201	241	209	33	145	42	152	27	128	41	167
18	33472	30.1	193.0	0.0		51	19.3	20.8	-18.5	2.3	43.0		295	264	316	248	246	232	278	241	39	168	46	174	31	146	47	191
19	33477	34.0	122.0	0.0		56	12.2	23.5	-11.7	11.8	48.6		323	298	349	282	274	262	313	273	41	190	49	198	34	166	53	217
20	33482	37.9	128.0	0.0		60	12.8	26.1	-12.3	13.9	54.1		352	333	390	317	310	294	346	305	45	213	54	221	38	186	58	243
21	33487	41.6	122.0	0.0		65	12.2	28.7	-11.7	17.0	59.4		394	369	435	350	347	326	385	338	50	238	62	243	44	207	65	270
22	33492	44.5	215.0	0.0		70	21.5	30.7	-20.6	10.1	63.6		428	398	477	378	378	352	412	365	56	258	69	260	49	225	68	293
23	33497	46.3	292.0	0.0		75	29.2	31.9	-28.0	4.0	66.1		182	393	5	363	166	352	400	375	9	299	-127	297	7	263	63	296
24	33502	48.1	475.0	-0.1		81	47.5	33.2	-45.5	-12.3	68.7		31	399	-298	361	26	358	406	390	-22	329	-252	329	-25	293	60	306
25	33512	54.1	537.0	-0.1		91	53.7	37.3	-51.5	-14.1	77.3		-117	436	-570	393	-97	395	428	437	-58	387	-376	389	-54	343	57	344
26	33522	60.2	533.0	-0.1		101	53.3	41.5	-51.1	-9.5	86.0		-49	488	-489	442	-34	441	481	486	-48	424	-359	420	-44	374	68	388
27	33532	65.7	531.0	-0.1		111	53.1	45.3	-50.9	-5.5	93.8		13	544	-418	497	19	489	533	532	-39	460	-347	451	-36	406	77	430
28	33542	71.1	531.0	-0.1		121	53.1	49.1	-50.9	-1.8	101.6		70	595	-356	546	69	536	587	582	-31	501	-336	486	-28	439	85	472
29	33552	77.2	559.0	-0.1		131	55.9	53.3	-53.6	-0.3	110.3		62	640	-393	590	64	578	633	628	-36	544	-384	526	-32	477	92	515
30	33562	82.7	601.0	-0.1		140	60.1	57.1	-57.6	-0.5	118.1		49	690	-441	636	58	622	674	675	-45	588	-397	566	-38	515	96	557
31	33567	85.9	631.0	-0.1		146	63.1	59.3	-60.5	-1.2	122.7		23	708	-496	654	35	641	695	700	-53	611	-425	590	-44	537	98	581
32	33577	91.3	682.0	-0.1		155	68.2	63.0	-65.3	-2.4	130.4		23	758	-516	701	31	686	741	749	-64	658	-464	634	-52	576	103	624
33	33587	96.8	706.0	-0.1		166	70.6	66.8	-67.6	-0.9	138.3		0	800	-574	741	28	724	777	792	-67	697	-482	669	-52	612	108	667
34	33597	102.4	754.0	-0.2		175	75.4	70.7	-72.2	-1.6	146.3		-19	847	-623	785	19	768	818	840	-78	743	-514	711	-58	651	112	710
35	33607	107.8	792.0	-0.2		185	79.2	74.4	-75.9	-1.5	154.0		-39	891	-668	826	13	808	851	882	-88	784	-545	748	-63	687	116	752
36	33617	113.5	839.0	-0.2		196	83.9	78.3	-80.4	-2.1	162.1		-66	933	-720	868	6	849	886	929	-101	829	-576	790	-69	726	118	797
37	33627	118.7	849.0	-0.2		206	84.9	81.9	-81.3	0.6	169.5		-34	984	-695	917	40	894	931	976	-99	871	-581	823	-66	760	125	837
38	33637	124.4	893.0	-0.2		216	89.3	85.8	-85.6	0.3	177.7		-57	1024	-739	955	35	932	961	1018	-111	912	-609	860	-70	797	128	881
39	33647	129.6	938.0	-0.2		226	93.8	89.4	-89.9	-0.5	185.1		-81	1064	-784	994	30	970	989	1058	-123	953	-636	896	-76	834	130	923
40	33657	134.6	980.0	-0.2		236	98.0	92.9	-93.9	-1.0	192.2		-63	1108	-774	1035	56	1011	1027	1103	-124	993	-645	931	-80	869	132	964
41	33667	139.8	993.0	-0.2		246	99.3	96.5	-95.1	1.3	199.7		-81	1150	-811	1077	57	1050	1057	1145	-134	1035	-669	966	-78	903	137	1004
42	33677	144.7	1023.0	-0.2		255	102.3	99.8	-98.0	1.8	206.7		-93	1192	-840	1116	63	1090	1087	1187	-145	1076	-689	1001	-82	938	141	1046
43	33687	149.7	1059.0	-0.2		266	105.9	103.3	-101.5	1.8	213.8		-110	1232	-862	1156	69	1129	1116	1227	-156	1117	-708	1035	-88	973	144	1085
44	33697	154.7	1109.0	-0.2		275	110.9	106.7	-106.3	0.5	221.0		-152	1270	-923	1193	57	1165	1136	1268	-173	1160	-741	1071	-96	1008	144	1126
45	33707	159.5	1156.0	-0.2		286	115.6	110.0	-110.8	-0.7	227.8		-184	1308	-969	1230	53	1202	1157	1308	-190	1201	-769	1106	-104	1041	145	1165
46	33717	164.3	1194.0	-0.2		296	119.4	113.4	-114.4	-1.0	234.7		-193	1349	-986	1267	62	1239	1183	1346	-199	1238	-784	1137	-107	1073	147	1203
47	33727	168.7	1222.0	-0.2		305	122.2	116.4	-117.1	-0.7	241.0		-198	1390	-997	1307	76	1277	1211	1385	-208	1276	-799	1169	-110	1105	149	1241
48	33737	173.5	1231.0	-0.2		316	123.1	119.7	-117.9	1.8	247.8		-180	1431	-979	1347	103	1316	1245	1426	-210	1314	-803	1197	-109	1135	155	1280
49	33747	178.5	1282.0	-0.2		325	128.2	123.2	-122.8	0.3	255.0		-233	1464	-997	1382	94	1349	1263	1463	-230	1354	-801	1226	-118	1169	155	1320
50	33757	182.9	1309.0	-0.3		336	130.9	126.2	-125.4	0.8	261.2		-262	1498	-989	1416	101	1383	1286	1499	-242	1393	-806	1251	-123	1197	156	1356
51	33767	187.0	1355.0	-0.3		345	135.5	129.0	-129.8	-0.8	267.1		-315	1534	-1009	1455	94	1418	1303	1536	-262	1435	-822	1281	-131	1226	156	1393
52	33777	191.7	1400.0	-0.3		356	140.0	132.3	-134.1	-1.9	273.8		-386	1567	-1016	1492	85	1452	1319	1573	-289	1481	-835	1315	-140	1258	156	1432
53	33787	195.6	1410.0	-0.3		366	141.0	135.0	-135.1	-0.1	279.4		-431	1596	-917	1528	93	1482	1347	1605	-301	1516	-787	1306	-145	1284	158	1464
54	33797	199.5	1436.0	-0.3		376	143.6	137.6	-137.6	0.1	284.9		-493	1632	-864	1568	94	1515	1371	1641	-313	1555	-791	1322	-150	1310	160	1497
55	33807	203.8	1475.0	-0.3		386	147.5	140.6	-141.3	-0.7	291.1		-539	1661	-794	1604	105	1545	1400	1672	-319	1592	-802	1343	-161	1339	160	1531
56	33817	207.6	1501.0	-0.3		396	150.1	143.2	-143.8	-0.6	296.5		-590	1693	-737	1640	111	1575	1428	1704	-338	1634	-792	1347	-159	1359	166	1558
57	33827	211.7	1515.0	-0.3		406	151.5	146.1	-145.2	0.9	302.4		-704	1721	-739	1673	84	1605	1477	1722	-406	1698	-807	1366	-175	1387	165	1592
58	33837	214.8	1544.0	-0.4		416	154.4	148.2	-147.9	0.3	306.8		-795	1745	-703	1704	90	1622	1526	1740	-459	1779	-814	1394	-198	1407	166	1614
59	33847	218.5	1562.0	-0.4		426	156.2	150.8	-149.7	1.1	312.1		-2206	1760	-639	1738	77	1647	1655	1697	-427	1838	-814	1435	-214	1427	171	1638
60	33862	222.6	1607.0	-0.4		441	160.7	153.6	-154.0	-0.4	317.9		-6324	1819	-618	1776	66	1655	1748	1709	-362	1901	-814	1503	-262	1447	175	1671
61	33877	226.2	1621.0	-0.5		456	162.1	156.1	-155.3	0.8	323.1		-9538	1885	-565	1812	77	1658	1801	1649	-356	3034	-795	1569	-293	1453	180	1701
62	33897	222.8	1601.0	-0.5		476	160.1	153.7	-153.4	0.3	318.2		-10028	2507	-523	1799	85	1627	2016	1669	-332	3312	-776	1575	-301	1426	177	1685
63	33932	219.6	1559.0	-0.5		511	155.9	151.5	-149.4	2.1	313.7		-9909	2604	-517	1785	86	1599	2087	1642	-331	3404	-764	1555	-296	1404	179	1663
64	33977	216.3	1532.0	-0.5		556	153.2	149.2	-146.8	2.5	308.9		-9903	2592	-519	1760	76	1572	2081	1616	-340	3378	-759	1535	-294	1384	178	1640
65	34012	218.1	1624.0	-0.5		591	162.4	150.5	-155.6	-5.1	311.5		-9958	2588	-596	1758	18	1572	2032	1619	-377	3392	-796	1552	-316	1397	161	1657
66	34017	220.8	1696.0	-0.5		596	169.6	152.3	-162.5	-10.2	315.4		-10163	2729	-706	1785	-51	1597	2000	1648	-413	3425	-824	1584	-342	1417	144	1682
67	34027	223.0	1778.0	-0.6		606	177.8	153.9	-170.4	-16.5	318.5		-10612	4033	-751	1814	-176	1609	1885	1670	-506	3493	-889	1632	-409	1411	98	1715

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
68	34037	224.0	1859.0	-0.7		618	185.9	154.6	-178.1	-23.6	319.9		-9371	8904	-391	1737	-358	1625	1640	1708	-529	3586	-847	1634	-523	1401	-23	1761
69	34047	223.0	1942.0	-0.8		626	194.2	153.9	-186.1	-32.2	318.5		-7835	16660	207	2116	-571	1613	1163	1748	-619	3577	-838	1607	-640	1408	-164	1784
70	34057	225.4	2001.0	-0.8		636	200.1	155.5	-191.7	-36.2	321.9		-7528	24271	5	4714	-430	1521	-207	3237	-681	3729	-869	1621	-711	1409	-286	1843
71	34062	223.9	2081.0	-0.8		641	208.1	154.5	-199.4	-44.9	319.8		-7805	27568	-478	7296	-314	1483	-983	4844	-778	3688	-916	1600	-739	1387	-354	1864
72	34072	224.5	2140.0	-0.8		651	214.0	154.9	-205.0	-50.1	320.7		-8415	33501	-2105	15828	120	1588	-1144	8207	-851	3880	-963	1569	-720	1360	-424	1897
73	34077	223.5	2201.0	-0.7		656	220.1	154.2	-210.9	-56.7	319.2		-8800	35520	-2761	19335	233	1681	-1229	10479	-838	4256	-1002	1556	-736	1338	-457	1918
74	34092	221.3	2262.0	-0.3		671	226.2	152.7	-216.7	-64.0	316.1		-9797	39164	-4158	25581	71	5476	-2269	17856	-1036	5367	-1015	1552	-806	1304	-478	1943
75	34107	226.8	2219.0	0.3		686	221.9	156.5	-212.6	-58.1	323.9		-10265	41103	-4889	29354	-1048	12280	-2863	23924	-1554	6994	-975	1574	-794	1346	-472	2002
76	34112	221.7	2225.0	0.5		691	222.5	153.0	-213.2	-60.2	316.7		-10636	41746	-5458	30771	-2240	15794	-3221	25976	-2119	8097	-1016	1555	-847	1333	-531	2001
77	34122	222.6	2357.0	0.9		701	235.7	153.6	-225.8	-72.2	317.9		-11075	42489	-6373	32769	-4219	21134	-3954	28913	-3328	10016	-1084	1591	-969	1381	-652	2055
78	34127	222.9	2294.0	1.2		706	229.4	153.8	-219.8	-66.0	318.4		-11312	42774	-6908	33717	-5267	23763	-4376	30184	-4293	11293	-1103	1618	-968	1415	-673	2036
79	34137	225.4	2212.0	1.4		716	221.2	155.5	-211.9	-56.4	321.9		-11349	43047	-7174	34571	-6121	26431	-4585	31327	-5414	13151	-1180	1831	-946	1567	-607	2048
80	34152	222.5	2154.0	1.5		731	215.4	153.5	-206.4	-52.9	317.8		-11328	43058	-7173	34667	-6199	26796	-4579	31464	-5590	13436	-1325	1907	-925	1597	-581	2028
81	34197	219.1	2103.0	1.5		776	210.3	151.2	-201.5	-50.3	312.9		-11326	43051	-7177	34685	-6233	26904	-4582	31497	-5636	13519	-1410	1917	-916	1593	-570	2004
82	34252	227.7	2089.0	1.5		831	208.9	157.1	-200.2	-43.0	325.2		-11285	43105	-7129	34748	-6190	26988	-4541	31569	-5640	13596	-1414	1968	-908	1642	-558	2056
83	34257	225.0	2259.0	1.6		836	225.9	155.2	-216.4	-61.2	321.4		-11581	43360	-7495	35176	-6751	28020	-4826	32051	-6231	14458	-2016	2348	-972	1716	-617	2071
84	34262	220.2	2319.0	1.8		841	231.9	151.9	-222.2	-70.3	314.5		-11826	43430	-7825	35366	-7360	28789	-5114	32268	-6719	15068	-3208	3184	-996	1708	-653	2043
85	34287	223.5	2328.0	3.1		866	232.0	154.2	-222.3	-68.1	319.2		-12270	43788	-8846	36453	-9548	32282	-5904	33140	-8919	18712	-9743	11897	-1002	1963	-658	2072
86	34297	221.9	2398.0	3.7		876	239.8	153.1	-229.8	-76.7	316.9		-12424	43917	-9114	36713	-10066	32945	-6231	33399	-9640	19941	-10913	13929	-1170	2222	-702	2089
87	34307	221.9	2333.0	4.4		886	233.3	153.1	-223.5	-70.4	316.9		-12657	44051	-9283	36760	-10408	33234	-6528	33561	-10420	21157	-11665	14989	-1368	2280	-688	2074
88	34362	222.0	2417.0	7.7		941	241.7	153.2	-231.6	-78.4	317.1		-13640	45272	-10211	37285	-11638	34056	-7851	34393	-13213	25597	-13779	18735	-5863	3954	-984	2912
89	34372	221.3	2496.0	8.4		951	249.6	152.7	-239.1	-86.5	316.1		-13970	45724	-10710	37799	-11984	34280	-8321	34773	-13884	26459	-14389	19794	-9046	4677	-2780	6943
90	34382	223.9	2427.0	8.9		961	242.7	154.5	-232.5	-78.1	319.8		-14247	46315	-11153	38474	-12239	34586	-8636	35199	-14539	27342	-14908	20781	-11207	5929	-6576	12847
91	34392	223.7	2516.0	9.6		971	251.6	154.3	-241.1	-86.7	319.5		-14643	47118	-11789	39363	-12692	35038	-9090	35694	-15295	28312	-15567	21877	-12832	9551	-9546	17591
92	34407	223.4	2445.0	10.3		986	244.5	154.1	-234.3	-80.1	319.1		-15064	48270	-12527	40647	-13143	35727	-9417	36250	-16001	29251	-16224	22985	-13783	15391	-11372	20850
93	34427	221.0	2393.0	10.3		1006	239.3	152.5	-229.3	-76.8	315.7		-15048	48315	-12523	40699	-13134	35761	-9404	36265	-16015	29280	-16242	23024	-13808	15659	-11436	20978
94	34482	217.9	2339.0	10.3		1061	233.9	150.3	-224.1	-73.8	311.2		-15044	48317	-12519	40704	-13135	35763	-9405	36257	-16017	29281	-16246	23030	-13812	15746	-11460	21015
95	34552	214.8	2307.0	10.3		1131	230.7	148.2	-221.0	-72.8	306.8		-15046	48296	-12518	40686	-13141	35744	-9413	36237	-16014	29266	-16243	23015	-13811	15747	-11461	21008
96	34572	225.5	2314.0	10.3		1151	231.4	155.6	-221.7	-66.1	322.1		-14988	48377	-12456	40768	-13078	35829	-9356	36321	-16009	29336	-16238	23085	-13805	15827	-11461	21092
97	34577	229.4	2433.0	10.4		1156	243.3	158.3	-233.1	-74.8	327.7		-15074	48569	-12563	40956	-13174	35990	-9423	36477	-16098	29484	-16345	23260	-13897	16140	-11621	21388
98	34582	224.3	2546.0	10.6		1161	254.6	154.8	-243.9	-89.2	320.4		-15387	48882	-12961	41286	-13487	36188	-9693	36615	-16341	29706	-16600	23558	-14132	17339	-12091	22080
99	34587	222.5	2607.0	10.9		1166	260.7	153.5	-249.8	-96.3	317.8		-15711	49330	-13434	41776	-13836	36441	-9950	36792	-16650	30035	-16890	23943	-14406	18974	-12641	22944
100	34602	226.3	2622.0	11.6		1181	262.2	156.1	-251.2	-95.1	323.2		-16416	50949	-14464	43415	-14557	37469	-10427	37526	-17415	31083	-17637	25132	-15096	22639	-13820	24999
101	34627	225.7	2747.0	12.9		1206	274.7	155.7	-263.2	-107.5	322.4		-17824	54021	-16256	46222	-16010	39486	-11581	39272	-18596	32759	-18873	27025	-16190	26211	-15318	27366
102	34632	226.1	2801.0	13.2		1211	280.1	156.0	-268.4	-112.4	322.9		-18155	54749	-16863	46860	-16345	39955	-11865	39715	-18835	33104	-19129	27416	-16408	26786	-15613	27806
103	34657	226.9	2896.0	14.5		1236	289.6	156.6	-277.5	-120.9	324.1		-19819	58265	-18629	49912	-17986	42284	-13286	42005	-19937	34715	-20332	29233	-17418	29040	-16870	29684
104	34687	228.4	2971.0	16.0		1266	297.1	157.6	-284.7	-127.1	326.2		-21954	62738	-21047	53706	-20101	45294	-15178	45072	-21201	36585	-21719	31319	-18643	31314	-18221	31681
105	34697	226.2	3032.0	16.5		1276	303.2	156.1	-290.5	-134.4	323.1		-22836	64419	-22031	55120	-20963	46393	-15948	46218	-21667	37239	-22218	32024	-19089	32049	-18678	32319
106	34717	224.7	3102.0	17.5		1296	310.2	155.0	-297.2	-142.2	320.9		-24306	67420	-23663	57638	-22401	48364	-17249	48286	-22428	38333	-23044	33219	-19850	33305	-19450	33424
107	34732	225.9	3154.0	18.3		1311	315.4	155.9	-302.2	-146.3	322.7		-25482	69927	-24960	59730	-23553	50010	-18300	50036	-23007	39185	-23690	34160	-20456	34298	-20064	34320
108	34752	229.1	3162.0	19.3		1331	316.2	158.1	-303.0	-144.9	327.2		-27107	73586	-26750	62761	-25197	52468	-19769	52656	-23816	40446	-24566	35498	-21283	35691	-20888	35608
109	34767	226.8	3218.0	20.0		1346	321.8	156.5	-308.3	-151.8	323.9		-28160	75896	-27908	64664	-26281	53987	-20732	54291	-24338	41219	-25136	36325	-21816	36530	-21419	36391
110	34772	226.4	3304.0	20.2		1351	330.4	156.2	-316.6	-160.4	323.4		-28400	76454	-28179	65131	-26545	54362	-20989	54709	-24473	41400	-25298	36534	-21972	36747	-21581	36599
111	34777	227.3	3244.0	20.4		1356	324.4	156.8	-310.8	-154.0	324.7		-28909	77553	-28734	66012	-27033	55008	-21411	55462	-24659	41679	-25491	36831	-22149	37043	-21752	36867
112	34782	227.4	3312.0	20.7		1361	331.2	156.9	-317.3	-160.4	324.8		-29198	78382	-29065	66706	-27367	55593	-21730	56055	-24833	41939	-25691	37114	-22347	37345	-21958	37184
113	34787	227.7	3202.0	20.8		1366	320.2	157.1	-306.8	-149.7	325.2		-29406	79057	-29269	67232	-27541	56009	-21874	56476	-24897	42083	-25756	37255	-22412	37499	-22015	37301
114	34802	225.5	3147.0	20.8		1381	314.7	155.6	-301.5	-145.9	322.1		-29424	79185	-29288	67341	-27570	56119	-21904	56584	-24910	42115	-25773	37287	-22430	37542	-22035	37340
115	34842	223.3	3094.0	20.9		1421	309.4	154.1	-296.4	-142.4	318.9		-29426	79226	-29291	67374	-27582	56159	-21918	56621	-24914	42125	-25777	37297	-22438	37559	-22043	37353
116	34912	231.9	3054.0	20.9		1491	305.4	160.0	-292.6	-132.6	331.2		-29370	79318	-29228	67462	-27524	56255	-21872	56720	-24909	42199	-25774	37370	-22435	37636	-22042	37440
117	34927	232.5	3105.0	20.9		1506	310.5	160.4	-297.5	-137.1	332.1		-29342	79425	-29197	67566	-27501	56377	-21855	56839	-24924	42268	-25793	37436	-22460	37715	-22075	37529
118	34937	234.6	3161.0	21.0		1516	316.1	161.9	-302.9	-141.0	335.1		-29575	79762	-29456	67847	-27747	56628	-22065	57115	-25064	42463	-25946	37638	-22593	37901	-22200	37718
119	34942	232.4	3221.0	21.2		1521	322.1	160.3	-308.6	-148.3	331.9		-29894	80314	-29813	68294	-28088	56961	-22357	57490	-25224	42668	-26118	37861	-22749	38101	-22353	37907
120	34952	230.7	3273.0	21.6		1531	327.3	159.2	-313.8	-154.4	329.5		-30569	81934	-30583	69613	-28822	57990	-23006	58635	-25546	43130	-26473	38360	-23076	38590	-22681	38372
121	34977	230.6	3327.0	22.7		1556	332.7	159.1	-318.8	-159.7	329.4		-32178	86278	-32413	73153	-30585	60787	-24559	61724	-26312	44311	-27319	39613	-23896	39877	-23502	39628
122	34992	230.5	3412.0	23.4		1571	341.2	159.0	-326.9	-167.9	329.2		-33009	88646	-33357	75060	-31502	62264	-25377	63375	-26694	44876	-27753	40233	-24330	40525	-23940	40268
123	34997	230.6	3353.0	23.6		1576	335.3	159.1	-321.3	-162.2	329.4		-33382	89669	-33781	75876	-31892	62866	-25718	64081	-26829	45083	-27897	40451	-24470	40752	-24072	40484
124	35012	233.2	3410.0	24.1		1591	341.0	160.9	-326.7	-165.8	333.1		-33991	91759	-34489	77566	-32596	64212	-26350	65540	-27137	45590	-28254	40993	-24836	41335	-24445	41073
125	35047	230.8	3474.0	25.7		1626	347.4	159.2	-332.9	-173.6	329.7		-36205	98980	-37125	83210	-35175	68435	-28583	70333	-28111	47045	-29341	42551	-25925	42957	-25514	42675
126	35092	232.1	3526.0	27.7		1671	352.6	160.1	-337.8	-177.7	331.5		-38742	108920	-40286	91061	-38280	74092	-31281	76865	-29108	48522	-30487	44190	-27137	44753	-26696	44444
127	35097	232.2	3579.0	27.9		1676	357.9	160.2	-342.9	-182.7	331.7		-38962	109920	-40576	91854	-38575	74665	-31538	77542	-29211	48674	-30613	44360	-27273	44944	-26835	44638
128	35102	234.9	3485.0	28.0		1681	348.5	162.1	-333.9	-171.8	335.5		-39117	110880	-40761	92611	-38746	75206	-31880	78124	-29241	48781	-30647	44472	-27319	45078	-26874	44767
129	35117	234.1	3588.0	28.7		1696	358.8	161.5	-343.8	-182.3	334.4		-39828	114160	-41733	95390	-39775	77113	-32561	80368	-29609	49313	-31077	45064	-27775	45721	-27324	45416
130	35177	237.6	3573.0	31.2		1756	357.3	163.9	-342.3	-178.4	339.4		-42276	130160	-45409	107960	-43689	85761	-35815	90548	-30670	50943	-32352	46920	-29192	47844	-28683	47525
131	35187	242.3	3543.0	31.5		1766	354.3	167.2	-339.5	-172.3	346.1		-42464	132130	-45744	109560	-44104	87003	-36165	91968	-30828	51260	-32535	47252	-29399	48229	-28889	47930
132	35212	240.7	3612.0	32.6		1791	361.2	166.1	-346.1	-180.0	343.8		0	138610	-46928	114860	-45821	90918	-37336	96610	-31407	52265	-33194	48286	-30113	49340	-29592	49089
133	35217	243.6	3536.0	32.7		1796	353.6	168.1	-338.8	-170.7	347.9		0	139690	-47037	115680	-45749	91504	-37432	97250	-31427	52354	-33218	48377	-30148	49455	-29621	49207
134	35222	243.4	3605.0	32.9		1801	360.5	167.9	-345.4	-177.5	347.6		0	140510	-47214	116380	-45983	92054	-37619	97900	-31537	52512	-33345	48549	-30283	49638	-29757	49401

Test results

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1																												
2																												
3																												
4													All strain gauges in microstrain															
5	measured	measured	measured	measured									Gauge 1		Gauge 2		Gauge 3		Gauge 4		Gauge 5		Gauge 6		Gauge 7		Gauge 8	
6	Time	Pressure (b	Force (kN)	Disp. (mm)		Time /scan	Force (10*k	Ax_press (	Ax_force (k	Axial (MPa	Hoop (MPa)																	
7		(bar)	kN	mm									long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop	long.	hoop
8								ax-press	ax-force	Axial	hoop																	
9																												
10																												
11	1	0	0			1.0	0.0	0.0	0.0	0.0	0.0		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	2	250	1750			2.0	175.0	172.5	-167.7	4.8	357.1																	
13	3	270.4	2837			3.0	283.7	186.6	-271.8	-85.3	386.2		0	0	-1139	110710	0	0	0	0	-44711	112490	-42320	95360	-40599	96930	-42697	112380
14	4	299.8	3167			4.0	316.7	206.9	-303.4	-96.6	428.2		0	0	-1138	110640	0	0	0	0	-44842	113030	-42446	95830	-40713	97430	-42841	112960
15	5	305.2	3065			5.0	306.5	210.6	-293.7	-83.1	435.9		0	0	-1140	110640	0	0	0	0	-46412	118170	-43605	99540	-41946	101710	-44487	118700
16	6	309.6	3037			6.0	303.7	213.6	-291.0	-77.4	442.2		0	0	-1135	110620	0	0	0	0	-50386	131480	-46656	109440	-42265	112600	-48470	133100
17	7	314.5	2953			7.0	295.3	217.0	-282.9	-65.9	449.2		0	0	-1128	110440	0	0	0	0	-60297	166120	-55437	138340	-43373	142870	-57791	172290
18	8	313.2	2975			8.0	297.5	216.1	-285.0	-68.9	447.3		0	0	-1114	110300	0	0	0	0	-63609	178300	-58735	0	-43512	154020	-59811	186970
19	9	304.2	2855			9.0	285.5	209.9	-273.5	-63.7	434.5		0	0	-1120	110090	0	0	0	0	-66022	187640	-61258	0	-43194	162670	-60575	203160
20	10	312.1	3025			10.0	302.5	215.3	-289.8	-74.5	445.8		0	0	-1123	110050	0	0	0	0	-66345	189120	-61638	0	-43189	164130	-60727	246090
21	11	318.8	2551			11.0	255.1	220.0	-244.4	-24.5	455.3		0	0	-1099	109650	0	0	0	0	-70995	213370	-66890	0	-42865	184700	-61403	0
22	12	320.5	2399			12.0	239.9	221.1	-229.9	-8.7	457.8		0	0	-1075	109660	0	0	0	0	-71713	222960	-67670	0	-42765	189760	-61253	0
23	13	0	1903			13.0	190.3	0.0	-182.3	-182.3	0.0		0	0	-1385	109430	0	0	0	0	-72155	225920	-67979	0	-42662	186920	-61141	0