

Casing Assumptions and Load Cases

Surface

All casing design assumptions were ran in Stress Check to determine safety factor which meet or exceed both Devon Energy and BLM minimum requirements. All casing strings will be filled while running in hole in order to not exceed collapse rating of the pipe.

<b>Surface Casing Burst Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Pressure Test	Formation Pore Pressure	Max mud weight of next hole-section plus Test psi
Drill Ahead	Formation Pore Pressure	Max mud weight of next hole section
Displace to Gas	Formation Pore Pressure	Dry gas from next casing point

<b>Surface Casing Collapse Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Full Evacuation	Water gradient in cement, mud above TOC	None
Cementing	Wet cement weight	Water (8.33ppg)

<b>Surface Casing Tension Design</b>	
<b>Load Case</b>	<b>Assumptions</b>
Overpull	100kips
Runing in hole	3 ft/s
Service Loads	N/A

All casing design assumptions were ran in Stress Check to determine safety factor which meet or exceed both Devon Energy and BLM minimum requirements. All casing strings will be filled while running in hole in order to not exceed collapse rating of the pipe.

<b>Intermediate Casing Burst Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Pressure Test	Formation Pore Pressure	Max mud weight of next hole-section plus Test psi
Drill Ahead	Formation Pore Pressure	Max mud weight of next hole section
Fracture @ Shoe	Formation Pore Pressure	Dry gas

<b>Intermediate Casing Collapse Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Full Evacuation	Water gradient in cement, mud above TOC	None
Cementing	Wet cement weight	Water (8.33ppg)

<b>Intermediate Casing Tension Design</b>	
<b>Load Case</b>	<b>Assumptions</b>
Overpull	100kips
Runing in hole	2 ft/s
Service Loads	N/A

All casing design assumptions were ran in Stress Check to determine safety factor which meet or exceed both Devon Energy and BLM minimum requirements. All casing strings will be filled while running in hole in order to not exceed collapse rating of the pipe.

<b>Production Casing Burst Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Pressure Test	Formation Pore Pressure	Fluid in hole (water or produced water) + test psi
Tubing Leak	Formation Pore Pressure	Packer @ KOP, leak below surface 8.6 ppg packer fluid
Stimulation	Formation Pore Pressure	Max frac pressure with heaviest frac fluid

<b>Production Casing Collapse Design</b>		
<b>Load Case</b>	<b>External Pressure</b>	<b>Internal Pressure</b>
Full Evacuation	Water gradient in cement, mud above TOC.	None
Cementing	Wet cement weight	Water (8.33ppg)

<b>Production Casing Tension Design</b>	
<b>Load Case</b>	<b>Assumptions</b>
Overpull	100kips
Runing in hole	2 ft/s
Service Loads	N/A



**Weatherford**

**Weatherford Drilling Services**

GeoDec4 v2.4.0.0

Report Date: August 18, 2016  
 Job Number: \_\_\_\_\_  
 Customer: Devon Energy  
 Well Name: Cotton Draw Unit 288H  
 API Number: \_\_\_\_\_  
 Rig Name: \_\_\_\_\_  
 Location: Lea Co, NM Nad83 NME  
 Block: \_\_\_\_\_  
 Engineer: RWJ

NAD83 / New Mexico East (ftUS)	NAD83 (1986)
Projected Coordinate System	Geodetic Coordinate System
Datum: North American Datum 1983 (1986)	Datum: North American Datum 1983 (1986)
Ellipsoid: GRS 1980	Ellipsoid: GRS 1980
EPSG: 2257	EPSG: 4269
North: 414166.75 US Survey Foot	Latitude: 32.137095 Degree
East: 733887.43 US Survey Foot	Longitude: -103.711259 Degree
Convergence: 0.33°	
Declination: 7.14°	
<b>Total Correction: 6.81°</b>	
Datum Transformation: none	

Geodetic Location WGS84  
 MSL Elevation = 0 m  
 Latitude = 32° 08' 13.54" N  
 Longitude = 103° 42' 40.53" W

Magnetic Declination = 7.14 deg	[True North Offset]
Local Gravity = .9988 g	Checksum = 6792
Local Field Strength = 48030 nT	Magnetic Vector X = 23852 nT
Magnetic Dip = 59.97 deg	Magnetic Vector Y = 2987 nT
Magnetic Model = bggm2016.dat	Magnetic Vector Z = 41582 nT
Run Date = October 31, 2016	Magnetic Vector H = 24038 nT

Signed: \_\_\_\_\_ Date: \_\_\_\_\_

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A multibowl wellhead may be used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

Devon proposes using a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be 3000 (3M) psi.

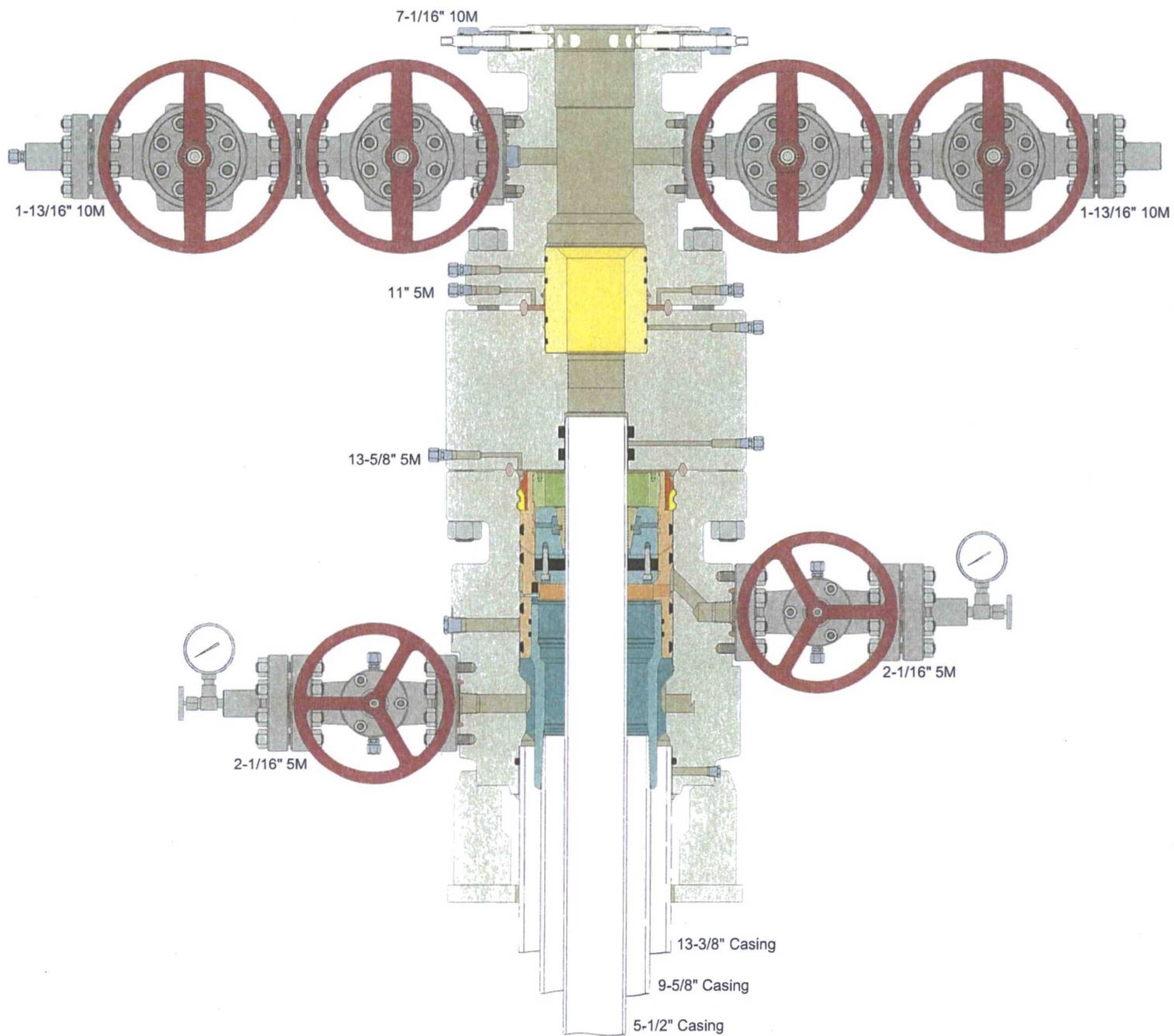
- Wellhead will be installed by wellhead representatives.
- If the welding is performed by a third party, the wellhead representative will monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
- Wellhead representative will install the test plug for the initial BOP test.
- Wellhead company will install a solid steel body pack-off to completely isolate the lower head after cementing intermediate casing. After installation of the pack-off, the pack-off and the lower flange will be tested to 3M, as shown on the attached schematic. Everything above the pack-off will not have been altered whatsoever from the initial nipple up. Therefore the BOP components will not be retested at that time.
- If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head will be cut and top out operations will be conducted.
- Devon will pressure test all seals above and below the mandrel (but still above the casing) to full working pressure rating.
- Devon will test the casing to 0.22 psi/ft or 1500 psi, whichever is greater, as per Onshore Order #2.

After running the 13-3/8" surface casing, a 13-5/8" BOP/BOPE system with a minimum rating of 3M will be installed on the wellhead system and will undergo a 250 psi low pressure test followed by a 3,000 psi high pressure test. The 3,000 psi high and 250 psi low test will cover testing requirements a maximum of 30 days, as per Onshore Order #2. If the well is not complete within 30 days of this BOP test, another full BOP test will be conducted, as per Onshore Order #2.

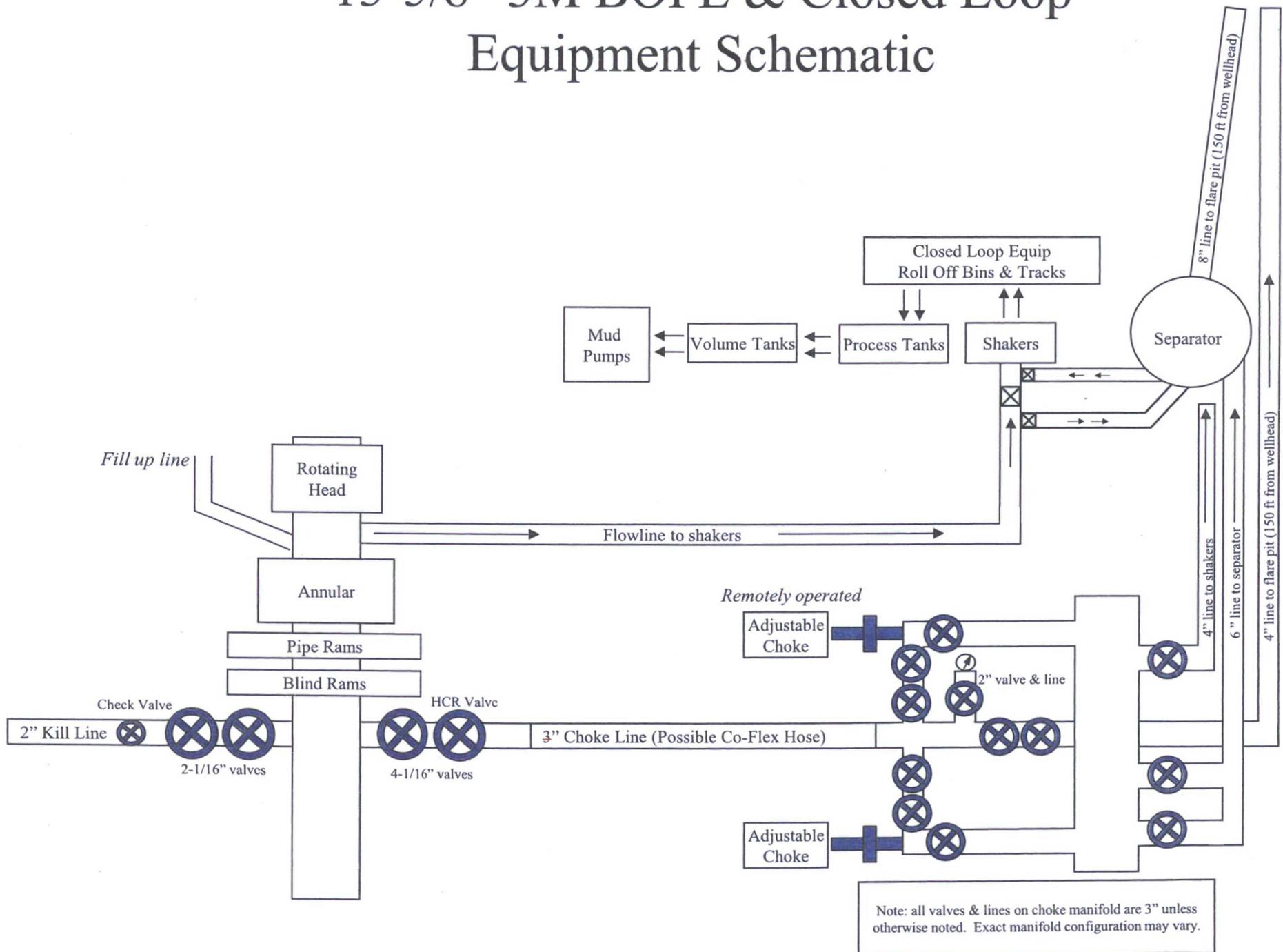
After running the 9-5/8' intermediate casing with a mandrel hanger, the 13-5/8" BOP/BOPE system with a minimum rating of 3M will already be installed on the wellhead.

The pipe rams will be operated and checked each 24 hour period and each time the drill pipe is out of the hole. These tests will be logged in the daily driller's log. A 2" kill line and 3" choke line will be incorporated into the drilling spool below the ram BOP. In addition to the rams and annular preventer, additional BOP accessories include a kelly cock, floor safety valve, choke lines, and choke manifold rated at 3,000 psi WP.

Devon's proposed wellhead manufactures will be FMC Technologies, Cactus Wellhead, or Cameron.



# 13-5/8" 3M BOPE & Closed Loop Equipment Schematic



40920-0-00015 N600C 14094-65

8	GN	+0.0000	00	14:00		
	RD	+0.0000	00	14:00		
	BL	+0.0000	00	14:00		
7	GN	+0.0000	00	13:43	40	60
	RD	+0.0000	00	13:43		
	BL	+0.0000	00	13:43		
6	GN	+0.0000	00	13:29		
	RD	+0.0000	00	13:29		
	BL	+0.0000	00	13:29		
5	GN	+0.0000	00	13:00		
	RD	+0.0000	00	13:00		
	BL	+0.0000	00	13:00		
4	GN	+0.0000	00	12:33		
	RD	+0.0000	00	12:33		
	BL	+0.0000	00	12:33		
3	GN	+0.0000	00	12:33		
	RD	+0.0000	00	12:33		
	BL	+0.0000	00	12:33		
2	GN	+0.0000	00	12:33		
	RD	+0.0000	00	12:33		
	BL	+0.0000	00	12:33		

*[Signature]*  
 PHOENIX RUBBER  
 Industrial Ltd.  
 Hose Inspection and  
 Certification Dept.

VERIFIED TRUE CO.  
 PHOENIX RUBBER CO.



Fluid Technology

ContiTech Beattie Corp.  
Website: [www.contitechbeattie.com](http://www.contitechbeattie.com)

Monday, June 14, 2010

RE: Drilling & Production Hoses  
Lifting & Safety Equipment

To Helmerich & Payne,

A Continental ContiTech hose assembly can perform as intended and suitable for the application regardless of whether the hose is secured or unsecured in its configuration. As a manufacturer of High Pressure Hose Assemblies for use in Drilling & Production, we do offer the corresponding lifting and safety equipment, this has the added benefit of easing the lifting and handling of each hose assembly whilst affording hose longevity by ensuring correct handling methods and procedures as well as securing the hose in the unlikely event of a failure; but in no way does the lifting and safety equipment affect the performance of the hoses providing the hoses have been handled and installed correctly. It is good practice to use lifting & safety equipment but not mandatory.

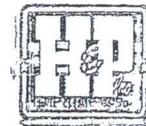
Should you have any questions or require any additional information/clarifications then please do not hesitate to contact us.

ContiTech Beattie is part of the Continental AG Corporation and can offer the full support resources associated with a global organization.

Best regards,

Robin Hodgson  
Sales Manager  
ContiTech Beattie Corp

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RIG 212



**QUALITY DOCUMENT**

**PHOENIX RUBBER  
INDUSTRIAL LTD.**

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<b>QUALITY CONTROL INSPECTION AND TEST CERTIFICATE</b>		CERT. N°: 552	
PURCHASER: Phoenix Beattie Co.		P.O. N°: 1519FA-871	
PHOENIX RUBBER order N°: 170466	HOSE TYPE: 3" ID		Choke and Kill Hose
HOSE SERIAL N°: 34128	NOMINAL / ACTUAL LENGTH: 11,43 m		
W.P. 68,96 MPa 10000 psi	T.P. 103,4 MPa 15000 psi	Duration:	60 min.
Pressure test with water at ambient temperature  <p style="text-align: center;">See attachment. (1 page)</p>			
↑ 10 mm = 10 Min. → 10 mm = 25 MPa			
COUPLINGS			
Type	Serial N°	Quality	Heat N°
3" coupling with 4 1/16" Flange end	720 719	AISI 4130	C7626
		AISI 4130	47357
API Spec 16 C Temperature rate: "B"			
All metal parts are flawless			
WE CERTIFY THAT THE ABOVE HOSE HAS BEEN MANUFACTURED IN ACCORDANCE WITH THE TERMS OF THE ORDER AND PRESSURE TESTED AS ABOVE WITH SATISFACTORY RESULT.			
Date:  29. April. 2002.	Inspector	Quality Control <b>PHOENIX RUBBER</b> Industrial Ltd. Hose Inspection and Verification Dept. PHOENIX RUBBER Q.C.	