



Scope of Supply

Product: Diverter System

REFERENCE	REFERENCE DESCRIPTION
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REVISION HISTORY

Rev	Date (dd.mm.yyyy)	Reason for issue	Prepared	Checked	Approved
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CHANGE DESCRIPTION

Revision	Change Description
01	Initial Issue

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1 PROJECT NOTES

1.1 Unresolved Issues

- Orientation of diverter outlets has not been validated (Section 5.4)
- Review of formal Contract for project

1.2 Application Notes

- Review of the following contributed to the contents of the document.
 - NOV Quote 165350, Rev 0, dated 27-Sep-2012
 - DSS38E Clarification List (19 April 2012)
 - GTD Rev. 10 with Circular 1 to 45
 - Charted Bid Rev. 01 with Circular 1 to 19

2 PURPOSE

The purpose of this document is to define the Scope of Supply for the Diverter System. The intended users of the document are PCG Engineering and the end users (customer).

3 GENERAL DESCRIPTION

The Diverter System is used under the rig floor to divert fluids returning from the riser to the mud conditioning system, or overboard locations and inlets and valves to fill the riser. The diverter is also the connection for the upper flex joint and riser telescoping joint inner barrel.

Diverter System- consists of the diverter assembly, ball valves, upper flexjoint, and diverter handling/Test tools.

Diverter Assembly consists of two major assemblies- the inner assembly and the outer housing. The inner assembly contains the packing element that can close around the tubular in the riser string and the flowline seals which will seal the unit to the outer housing. The upper flexjoint is attached the bottom of the inner assembly and the assembly can be deployed and retrieved using the diverter handling / testing tool. The outer housing is permanently installed under the rotary table and is equipped with a number of outlets to divert the returned drilling fluid from the riser string to the appropriate mud conditioning system.

4 LIST OF DELIVERABLES

The following are deliverables for the system.

Item	Part No.	Description	Qty
1		Diverter Assembly, 21-500-60	1
2		Diverter Running/Test Tool	1
3		Flex Joint, Upper, 21-5M x FT-H Riser Box	1
4		Valve, 16" - ANSI 300, CRA RG (2x Flowline, 2x Overboard)	4
5		Valve, 12" - ANSI 300, CRA RG (Mud Gas Separator)	1
6		Valve, 8" - ANSI 300, CRA RG (Diverter Fill Line)	1
7		Valve, 6" - ANSI 300, CRA RG (Mud Fill)	1
8		Valve, 4" - ANSI 300, CRA RG (Trip Tank)	1
9		Packing Element, 21-1/4", Nitrile (installed in Item 1)	1
10		Data Book- Diverter System	1
11		Installation, Operation, Maintenance Manual- Diverter System	1

5 DESIGN CRITERIA

5.1 Applicable Specification

API SPEC 6A/ ISO 10423- Specification for Wellheads and Christmas Tree Equipment
API 16A/ ISO 13533- Specifications for Drill Through Equipment
API RP 64- Recommended Practice for Diverter System Equipment and Operations
API RP 53- Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells
NACE MR 01-75
Petrobras GTD

5.2 Environment

Pressure Containing Metallic parts, Packing Element and Seals of the Diverter system are designed to operate within the temperature range of -20°F to 250°F (classification T-20 in accordance with API 16A, 3rd Edition, Table 3).

5.3 Water Depth

The equipment is to be designed for a water depth of 3,000 meters.

5.4 Rig Data

Diverter Outlet Orientation: Defining Documentation

6 DIVERTER SYSTEM CLASSIFICATION DETAIL

Customer:	
Rig Name/Hull:	
Third Party Certification	ABS + MODU
Surface Equip. Paint:	AX040014, Paint System 2, Color Code 01 (White- RAL 9003)
Rotary Table:	60-1/2"
Diverter Pressure Rating:	500 psi
Wellbore Connector Type/ Inlay:	API / CRA (Inconel)
Structural Stud/ Bolt Plating:	Zinc
Riser Interface:	FT-H

7 COMPONENT DETAILS

7.1 Diverter Assembly, 21-500-60

The 60-1/2" diverter assembly consists of two major components: the diverter inner assembly and the diverter permanent housing.

- The diverter inner assembly can be run through a 60-1/2" rotary table to land and latch into the diverter permanent housing. The Diverter Housing has four external Lockdown Dogs that extend and hold the Inner Diverter Assembly into place. The diverter packing unit will open to a 21-1/4" bore and will close on any size pipe in the diverter. The diverter is rated for 500 psi W.P. on any size pipe or on complete shut off (CSO). The assembly includes two (2) pressure energized flowline seals which seal against the diverter permanent housing during use and is energized through a 1" flowline seal port. The diverter packer is operated through two (2) 1-1/2" hydraulic ports (Open / Close). The inner assembly terminates down with an API 21-1/4" - 5,000 studded connection with a BX-165 CRA lined ring groove that will accommodate the flexjoint assembly.

- The following accessories are included:
 - BX-165 stainless steel ring gasket for diverter/flexjoint connection
 - Lot, studs and nuts for diverter/flexjoint connection
 - Packing element, 21-1/4", Nitrile

7.1.1 Diverter Assembly Classification Details

Outer Housing Minimum Inside Diameter:	59"
Bottom Connection Size x Pressure Rating:	Studded, 21-1/4"-5M
Bottom Ring Gasket Type:	BX165
Spool Type:	STD
Outlet Quantity:	6
Outlet #1 Size:	FLG, 16" ANSI 300, CRA
Outlet #2 Size:	FLG, 16" ANSI 300, CRA
Outlet #3 Size:	FLG, 16" ANSI 300, CRA
Outlet #4 Size:	FLG, 4" ANSI 300, CRA
Outlet #5 Size:	FLG, 8" ANSI 300, CRA
Outlet #6 Size:	FLG, 12" ANSI 300, CRA
Outer Housing Downward Hang-off Capacity	2,500,000 lbs
Stud Coating:	Yellow Zinc (Bottom Connection)

7.2 Diverter Running/ Test Tool

The running tool mechanically latches inside the diverter inner assembly and is used to run and retrieve the diverter inner assembly, upper flex joint, and the slip joint inner barrel. The design load capacity is rated per API 8C. The upper end of the tool is configured with a top connection that can be used with a set of elevators or a piece of drill pipe. The stem of the tool extends above the top of the diverter to clear the riser spider/gimbal and elevator. The lower end of tool is equipped with an inflatable seal that when in place will allow pressure testing of the diverter inner assembly, diverter permanent housing, and associated diverter ball valves to the maximum pressure rating of the diverter assembly.

7.2.1 Diverter Running Test Tool Classification Detail

Type:	Running Test
Lifting Configuration:	API 6-5/8" FH Tool Joint w/ 18 deg. lifting shoulder
Vertical Load Rating (SWL):	250,000 LBS
Sufficient Pull to Ensure Tool is Locked	42,750 lbs. (Assy Wt.)
Maximum allowable side loading on end of Adapter Stem.	6,500 LBS (SF=3)
Stem Length:	180" above diverter

7.3 Flexjoint- Upper, 21-5M x FT-H Riser Box

The upper flexjoint is installed between the bottom connection of the diverter inner assembly and the inner barrel telescoping assembly connector. The unit meets the following specifications

7.3.1 Nominal Specifications

Working Pressure (max)	500 psi
Hang-off Tension (max)	2.0 million lbs.
Angular Rotation (max)	+/- 15 deg
Top Connection	Flanged - 21-1/4"-5,000 (BX-165)
Bottom Connection	FT-H Riser Box

7.4 Ball Valve- 16", ANSI 300, FxF, CRA

Purpose: 2X Flowline and 2X Overboard

Nominal 16" Ball Valve, with 16" ANSI class 300 Flanges and CRA lined ring grooves for a R65 RTJ gasket. Working pressure of the valve to be 500 psi. The valve is to be supplied with a hydraulic operator with a visual position indicator and an electrical explosion proof position feedback sensor (indicates full open and full close positions only).

7.5 Ball Valve- 12", ANSI 300, FxF, CRA

Purpose: Mud Gas Separator

Nominal 12" Ball Valve, with 12" ANSI class 300 Flanges and CRA lined ring grooves for a R57 RTJ gasket. Working pressure of the valve to be 500 psi. The valve is to be supplied with a hydraulic operator with a visual position indicator and an electrical explosion proof position feedback sensor (indicates full open and full close positions only).

7.6 Ball Valve- 8", ANSI 300, FxF, CRA

Purpose: Diverter Fill

Nominal 8" Ball Valve, with 8" ANSI class 300 Flanges and CRA lined ring grooves for a R49 RTJ gasket. Working pressure of the valve to be 500 psi. The valve is to be supplied with a hydraulic operator with a visual position indicator and an electrical explosion proof position feedback sensor (indicates full open and full close positions only).

7.7 Ball Valve- 6", ANSI 300, FxF, CRA

Purpose: Trip Tank

Nominal 6" Ball Valve, with 6" ANSI class 300 Flanges and CRA lined ring grooves for a R45 RTJ gasket. Working pressure of the valve to be 500 psi. The valve is to be supplied with a hydraulic operator with a visual position indicator and an electrical explosion proof position feedback sensor (indicates full open and full close positions only).

7.8 Ball Valve- 4", ANSI 300, FxF, CRA

Purpose: Trip Tank

Nominal 4" Ball Valve, with 4" ANSI class 300 Flanges and CRA lined ring grooves for a R37 RTJ gasket. Working pressure of the valve to be 500 psi. The valve is to be supplied with a hydraulic operator with a visual position indicator and an electrical explosion proof position feedback sensor (indicates full open and full close positions only).

8 FACTORY TESTING

Individual components (Diverter, Handling Tools, and Valves, etc.) will be subject to individual written FAT's. Equipment requiring pull testing will be tested prior to the FAT's. After successful completion of the testing on the component level, the units will be prepped for shipment.

9 PRESERVATION

The equipment is to be preserved per Shaffer Standard.

10 SHIPPING

Shipping of the diverter system will be per major assemblies.

11 COMMISSIONING

The commissioning and commissioning procedure is supplied by others.