PETROBRAS NETHERLANDS B.V	DATA SHEET	Nr.:	I-FD-3010.63-1200-831-TKP-001
	Client or User:	UN – RIO / ATP - MLS	Sheet: 1 of 26
	Job or Project:	MARLIM SUL FIELD DEVELOPMENT	C.C.
	Área or Unit:	PETROBRAS 51 (P-51)	SEP:
ENGENHARIA / IEMS	Title:	CHOKE VALVES – SPIDER DECK	

FSTP Pte. Ltd. / Technip TECHNIP ENGENHARIA S/A	TKP Nr.:	B20257-SD0T-SP-1541-001	
	CONTRACT Nr.:	899.2.010.03-9	
	TECHNICAL RESP:	NAME: Roberto Jourdan Aquino	INITIALS: RAQ
File Nr.: WORD 2000/I-FD-3010.63-1200-831-TKP-001_A.DOC	CREA REG. Nr.:	48748-D	

REVISION INDEX

REV.	DESCRIPTION AND / OR REVISED SHEETS
0	FOR QUOTATION
A	AS PURCHASED. PNBV COMMENTS INCLUDED ACCORDING TO ADP-P51-TKP-00942.

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE	25/JAN/05	07/FEB/06							
PROJECT	TKP	TKP							
EXECUTED	SLOURENCO	Rogoncalves							
CHECKED	LGSA	LGSA							
APPROVED	ACARVALHAL	FFNOGUEIRA							

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GENERAL NOTES

1. Operational Air Pressure Conditions:

   Maximum: 1030 kPa (10.5 kgf/ cm^2)
   Normal: 686 kPa (7.0 kgf/ cm^2)
   Minimum: 490 kPa (5.0 kgf/ cm^2)

   Temperature maximum: 50°C
   normal : 40°C

2. Flanges must be in accordance with ANSI B-16.5 and face to face dimension according to Master Flo standard.

3. Valve stroke (%) x CV curve shall be provided by the manufacturer.

4. The casings of the electronic instruments shall be made in ASTM A351 Gr.CF8M

5. The noise level shall be limited to 85 dBA from 1,20m downstream and 0,80m perpendicular to the piping surface.

6. Valves with pneumatic actuator shall be provided with an electronic position transmitter. The analog transmitters shall have 4-20 mA output, electrical connection 3/4" NPT, two-wire, power supply of 24 Vdc, weather proof (IP-66) and explosion proof (Exd IIC T6), according to IEC-60529 standard, Zone I or II, group IIA, temperature class T3. The maximum allowable error shall be less than 0.5% off full scale. The calibration of the above mentioned instruments shall not be affected by zero drift, at least, for a period of 3 years (i.e they shall maintain during this period the herein above requested uncertainty). Scale in inches covering 0 – 100% of the opening, and with an uncertainty better than 0.5% of its range.

7. As far as choke valves dimensioning is concerned, the following must be considered: rangeability, the flow type (sub-critical or critical with vaporization (flash) or cavitation), influence of viscosity, two-phase flow, flow speed and noise level. As far as selection and dimensioning are concerned, item 13 of I-ET-3000.00-1200-800-PCI-001, "General Criteria for Instrumentation and Control Design" shall be considered.

8. The manufacturer shall provide calculation sheets: CV, actuators sizing, noise.

9. Manufacturer Guarantee:

   9.1. Valve leakage class shall be according to ANSI B 16.104 (FCI 70-2) standard.

   9.2 All valves shall perfectly operate at the specified service conditions.

10- Painting procedure according to specification: I-ET-3010.63-1300-140-TKP-001.
Final color for valves according to I-ET-3010.63-1300-140-TKP-001 (item 8.10 and 8.22)
Painting procedure for electric actuator according to Rotork standard. Rotork painting procedure is equivalent/superior than PNBV/TKP procedure.
Final color for pneumatic actuator and other accessories according to I-ET-3000.00-1200-800-PCI-001 (item 8.4).
All valves shall be metallized with operation temperature above 60ºC and bellow 13ºC; For procedure of metallization the I-ET-3010.00-1200-940-PPC-001 (Thermal Spray coating Application of Aluminum) shall be followed.

11- The Choke valves shall comply with "**GENERAL CRITERIA FOR INSTRUMENTATION AND CONTROL DESIGN (I-ET-3000.00-1200-800-PCI-001)** and "**INSTRUMENTATION ADDITIONAL TECHNICAL REQUIREMENTS"(I-ET-3010.63-1200-800-PPC-601)**

12- Pneumatic actuator: HCV-1210012A ~ M (Water Injection Wells)

- Actuators shall be step rotating type with a minimum of 200 steps for a complete stroke, with pneumatic connections of 1/4" NPT (F).

Electric actuator: HCV-1210009A ~ S (Satellite Production Wells)

- Power supply: 480Vac, 3ph, 60Hz
- Commanded by hardwire signal: 4~20mA (loop powered 24Vdc)
- Status feedback: 4~20mA (loop powered 24Vdc)
- Status feedback: contacts free voltage (spare)
- Electric connection: 1 ½"NPT (power supply), ¾"NPT (control), 1"NPT (spare)
- The casing will be made with of aluminum copper free with 0.2% copper and 0.5% iron (maximum)
- Electrical Protection: Exd IIB T4 and submersible IP66/68 (3 meters head for 48 hours)
- Manufacturer: Rotork
- Model: IQM25A

13- Cage with external sleeve with four holes maximum.

14- ASME B 16-5 standard, finishing smooth max. 63 AARH, API 6A / MSS SP-6.

15- A regulator filter (316 st. st. material) with pressure gage must be supplied for valves with pneumatic actuator. Pressure gage must have a double scale in kPa and kgf/cm^2.

16- Valves with pneumatic actuator shall be provided with solenoid valve, position transmitter and accessories connected and ready to operate.

17- Solenoid Valves Specification:

Two solenoid valves, 3 ways/2 position, without gaskets, with stainless steel body and trim, seat with shoulder and seatings made of resilient material. Power supply 24 Vdc, pneumatic connections 1/4" NPT(F), electrical connections 3/4" NPT(F); maximum power consumption=4.5 Watt, electrical area classification: Zone 2, enclosure classification: IPW-66 EExd IIA T3. Insulation class for coils: at least class "F". The solenoids of the valves must be provided with suppression diodes, connected directly to the solenoid enclosure electric terminals. Manufacturer: Maxseal, Model: IC04.

18- All valves shall be supplied with 316 st. steel plates attached with the respective tag number engraved besides, model, supplier

19- A local position indicator shall also be supplied for each valve, with scale in inches covering 0-100% of opening, and with an uncertainty better than 0,5% of its range.

20- Cancelled.

21- Wall thickness of inlet and outlet lines for tag numbers HCV-1210009Q/R/S is 1,25".

22- The water injection choke valves shall be selected in order to allow a minimum pressure drop when they are fully open.

23- Pneumatic valve shall be supplied with a 1 ½" hex pin manual override and a wrench to operate the valve manually.

24- Choke valves (HCV-1210009A ~ S) flow rate, Gas (Mm3/d), Oil and Water (m3/d):

CHOKE VALVE	Max. Oil	Max. Water	Max. Gas	Min. Oil	Min. Water	Min. Gas
HCV-1210009A	4166	1754	514	269	0	24
HCV-1210009C	6478	3063	603	261	0	25
HCV-1210009G	3730	1460	1446	194	0	17
HCV-1210009K	2000	1895	200	198	0	18
HCV-1210009M	5276	2182	850	370	0	32
HCV-1210009N	3172	1346	397	98	0	9
HCV-1210009P	2919	1735	306	368	0	34
HCV-1210009Q	7416	2824	686	508	0	46
HCV-1210009R	6478	3063	603	261	0	25
HCV-1210009S	4508	1945	1500	656	0	54

25- All electrical apparatus, devices and instruments located in hazardous areas shall be certified in accordance with the requirements of the Classification Society. Certificates shall be supplied in accordance with INMETRO - Instituto Nacional de Metrologia, Normalização e Qualidade Industrial, and inspection characteristics according to CONMETRO - Conselho Nacional de Metrologia Normalização e Qualidade Industrial (NIE-DINQP-096, latest revision) . For those electrical apparatus, devices and instruments supplied outside brazilian market, Certificates of Conformity issued by a recognized entity, previously approved by PETROBRAS and by Classification Society, shall be presented in lieu of the former ones.

General Data	1	Tag No.		Case		HCV -1210009A			
	2	Service		P&ID No.		SATELL PROD. WELL - CP-121001A			I-DE-3010.63-1210-944-TKP-001
	3	☐ PED							☐ SIL
Inlet line	4	Diameter		Number		8 in			8"-P-G2-0016
	5	Line schedule		Piping class		XXS			1500# RTJ
Outlet line	6	Diameter		Number		8 in			8"-P-G2-0016-
	7	Line schedule		Piping class		XXS			1500# RTJ
Operating Conditions	8	Calculation Results From:				○ Internal	● Manufacturer	○ Both	
	9	Sour service		Special conditions					
	10	Molecular Weight		Viscosity at @ normal				333,7 cP	
	11	Cp/Cv		Compressibility					
	12	Density min	Density nor	Density max		905,1	905,1	905,1	kg/m³
	13	Vapour Pressure atT nom.				kPa-a			
	14	Critical Pressure		Critical Temperature		4746 kPa-a			
	15	Fluid	Phase	State		HYDROCARBON	Non Homogeneous - 2 Phase		Liquid
	16	Flow	Min.	Norm.	Max. / Unit				Am³/h
	17	Temp.	QMin.	Q Norm.	Q Max. / Unit	22		22	°C
	18	Press.	QMin.	Q Norm.	Q Max. / Unit	6864		6864	kPa-a
	19	DP	QMin.	Q Norm.	Q Max. / Unit	5393		5393	kPa
	20	CV	Min.	Norm.	Max.	3.9		87	
	21	Noise	Min.	Norm.	Max.	< 85		< 85	dBA
	22	Required CV				87			
	23	Selected CV	Internal / Mfr			/ 700			
	24	Fd	Internal / Mfr	FI (Cf)		/		0.93	
	25	Fluid tending to		Air-Fail Position		TO OPEN		Latch	
Valve Body	26	Body type	Body material	Material detail		Angle	Other	A487 4C / AISI4130	
	27	Design Pressure		Min.	Max.	kPa-g		kPa-g	
	28	Design Temperature		Min.	Max.	°C		52 °C	
	29	Max.DP closed valve		Seat leakage class		23064 kPa		CLASS V	
	30	Valve end con.& rating				8 " - 1500 lb ANSI	RTJ	Note 14	
	31	Plug / Disk		Material		BALANCED		TUNGSTEN CARBIDE	
	32	Plug dim.		Characteristic		By Mfr		=%	
	33	Seat type		Q.ty	Material	Cage (Note 13)		TUNGSTEN CARBIDE	
	34	Packing mat.		Lubricator				NO	
	35	Bonnet type				STANDARD			
	36	Stem				UNS S17400 St. St.			
Actuator	37	Direction of action							
	38	Spring range							
Positioner	39	Type		Input signal					
	40	Air supply		Action dir.					
	41	Elec.Protec.Class		Area Classification					
Accessories	42	Booster relay				NO			
	43	Locking device				NO			
	44	Pressure reducing valve				NO			
	45	Pressure gauge				NO			
	46	Handwheel				YES			
	47	Solenoid valve		Spec. No.		NO			
	48	Pos.detector		Spec. No.		YES		ZT-1210009A	
Purchase	49	Manufacturer		Model		MASTER FLO		P8	
	50	Client Reference	Requisition No.		Item		B20257T00T-MR1541-002		
	51	Serial Number							
	52	Weight		Consumption		855 Kg			
	53	Material Code				154107			

Notes:

No.	By	Chk	Appr	Date	Revision
A	Rogon	LGSA	FFNO	07/Feb/06	As purchased
0	SCL	LGSA	AC	21/Jan/05	FOR QUOTATION

CHOKE VALVE
UN - RIO / ATP - MLS
Marlim Sul Field Development
PETROBRAS 51 (P-51)

TKP N°.B20257-SD0T-SP-1541-001

PETROBRAS

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Code: 507 | BR N°.: I-FD-3010.63-1200-831-TKP-001 | Rev.: A

General Data	1	Tag No.	Case	HCV -1210009N				
	2	Service	P&ID No.	SATELL. PROD. WELL - CP-121001N				I-DE-3010.63-1210-944-TKP-013
	3	☐ PED						☐ SIL
Inlet line	4	Diameter	Number	8 in				8"-P-G2-0028
	5	Line schedule	Piping class	XXS				1500# RTJ
Outlet line	6	Diameter	Number	8 in				8"-P-G2-0028-
	7	Line schedule	Piping class	XXS				1500# RTJ
Operating Conditions	8	Calculation Results From:		○ Internal	● Manufacturer	○ Both		
	9	Sour service	Special conditions					
	10	Molecular Weight	Viscosity at @ normal			333,7 cP		
	11	Cp/Cv	Compressibility					
	12	Density min	Density nor	Density max	905,1	905,1	905,1	kg/m³
	13	Vapour Pressure atT nom.			kPa-a			
	14	Critical Pressure	Critical Temperature		4746 kPa-a			
	15	Fluid	Phase	State	HYDROCARBON	Non Homogeneous - 2 Phase		Liquid
	16	Flow	Min.	Norm.	Max.	Unit			Am³/h
	17	Temp.	QMin.	Q Norm.	Q Max.	Unit	22		22	°C
	18	Press.	QMin.	Q Norm.	Q Max.	Unit	6864		6864	kPa-a
	19	DP	QMin.	Q Norm.	Q Max.	Unit	5393		5393	kPa
	20	CV	Min.	Norm.	Max.		1.4		66	
	21	Noise	Min.	Norm.	Max.		< 85		< 85	dBA
	22	Required CV					66			
	23	Selected CV	Internal / Mfr				/ 700			
	24	Fd	Internal / Mfr	Fl (Cf)			/		0.93	
	25	Fluid tending to	Air-Fail Position				TO OPEN		Latch	
Valve Body	26	Body type	Body material	Material detail			Angle	Other	A487 4C / AISI4130	
	27	Design Pressure	Min.	Max.			kPa-g		kPa-g	
	28	Design Temperature	Min.	Max.			°C		52 °C	
	29	Max.DP closed valve	Seat leakage class				23064 kPa		CLASS V	
	30	Valve end con.& rating					8 " - 1500 lb ANSI		RTJ	Note 14
	31	Plug / Disk	Material				BALANCED		TUNGSTEN CARBIDE	
	32	Plug dim.	Characteristic				By Mfr		=%	
	33	Seat type	Q.ty	Material			Cage (Note 13)		TUNGSTEN CARBIDE	
	34	Packing mat.	Lubricator						NO	
	35	Bonnet type					STANDARD			
	36	Stem					UNS S17400 St. St.			
Actuator	37	Direction of action								
	38	Spring range								
Positioner	39	Type	Input signal							
	40	Air supply	Action dir.							
	41	Elec.Protec.Class	Area Classification							
Accessories	42	Booster relay					NO			
	43	Locking device					NO			
	44	Pressure reducing valve					NO			
	45	Pressure gauge					NO			
	46	Handwheel					YES			
	47	Solenoid valve	Spec. No.				NO			
	48	Pos.detector	Spec. No.				YES		ZT-1210009N	
Purchase	49	Manufacturer	Model				MASTER FLO		P8	
	50	Client Reference	Requisition No.	Item				B20257T00T-MR1541-002		
	51	Serial Number								
	52	Weight	Consumption				855 Kg			
	53	Material Code					154107			

Notes:

No.	By	Chk	Appr	Date	Revision
A	Rogon	LGSA	FFNO	07/Feb/06	As purchased
0	SCL	LGSA	AC	25/Jan/05	FOR QUOTATION

CHOKE VALVE
UN - RIO / ATP - MLS
Marlim Sul Field Development
PETROBRAS 51 (P-51)

TKP N°.B20257-SD0T-SP-1541-001

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