

Olkaria II Geothermal Power Project – Contract OG102

CONTROL VALVES		PROJECT Olkaria North East Power Station UNIT Steam Venting System P.O. _____ ITEM <u>Steam In-Line Pressure Control Valves</u> CONTRACT <u>OG 102</u> MFR SERIAL# _____			DATA SHEET: <u>1 of 2</u> SPEC: <u>OG 102</u> TAG: <u>PV-40-036-A, B</u> DWG: <u>2571-105-M-SF-009</u> SERVICE: <u>Pressure Control</u>		
Data Sheet No. 2571-102-DSH-1-SF-009		CRIT PRES PC			22.09 MPa		
1	FLUID <u>Separated Geothermal Steam</u>	UNITS	MAX FLOW	NORM FLOW	FULL OPEN	MIN FLOW	SHUT OFF
2	SERVICE CONDITIONS	kg/s	146	73	146	36	---
3	FLOW RATE	bara	4.62	4.29	4.35	5.5	14.3
4	INLET PRESSURE	bara	5.0	5.0	5.0	0.8	0.8
5	OUTLET PRESSURE	°C	SAT	SAT	SAT	SAT	SAT
6	INLET TEMPERATURE	kg/m3	18	18	18	18	---
7	MOL WT	---	1.3	1.3	1.3	1.3	---
8	VISCOSITY/SPEC HEATS RATIO	---	---	---	---	---	---
9	VAPOR PRESSURE Pv	---	20322.8	20359.2	33990.3	2662.5	---
10	*REQUIRED Cv	%	78	78	100	28	0
11	*TRAVEL	DBA	100/92	100/61	95/67	95/114	---
12	ALLOWABLE/**PREDICTED SPL (Note 2)	(Note 2)					
13	LINE	ACTUATOR					
14	PIPE LINE SIZE: IN <u>900 NB (Sch 30)</u>	53	*TYPE <u>Double Acting Pneumatic Piston</u>				
15	& SCHEDULE: OUT <u>900 NB (Sch 30)</u>	54	*MFR & MODEL <u>Betis G2014- DA</u>				
16	PIPE LINE INSULATION (Note 3) (100mm Thermal)	55	*SIZE <u>G2014</u> EFF AREA _____				
17	VALVE BODY/BONNET	56	ON/OFF <u>No</u> MODULATING <u>Yes</u>				
18	*TYPE <u>HP Eccentric Disk</u>	57	SPRING ACTION OPEN/CLOSE <u>Note 6</u>				
19	*SIZE <u>750 NB</u> ANSI Class <u>150#</u>	58	*MAX ALLOWABLE PRESSURE <u>6.8 barg</u>				
20	MAX PRESS/TEMP <u>13.5 barg/197°C</u>	59	*MIN REQUIRED PRESSURE <u>4.1 barg</u>				
21	*MFG & MODEL <u>Fisher A11</u>	60	AVAILABLE AIR SUPPLY PRESSURE:				
22	*BODY/BONNET MATL <u>ASTM A216 WCC C.S.</u>	61	MAX <u>6.9 barg</u> MIN <u>5.5 barg (Note 4)</u>				
23	*LINER MATERIAL/ID <u>None</u>	62	*BENCH RANGE <u>N/A</u>				
24	*END: IN <u>Flangeless/Wafer</u>	63	ACT ORIENTATION <u>Vertical</u>				
25	CONNECTION: OUT <u>Flangeless/Wafer</u>	64	HANDWHEEL TYPE <u>(Note 5)</u>				
26	*FLG FACE FINISH <u>ANSI B16.5 RF</u>	65	AIR FAILURE VALVE (Note 6) <u>*SET AT 4 barg</u>				
27	*END EXTMATL <u>NIL</u>	66	* Failure fixed				
28	*FLOW DIRECTION <u>Unidirection</u>	67	INPUT SIGNAL <u>4-20mA is 0% to 100% Open</u>				
29	*TYPE OF BONNET <u>None</u>	68	POSITIONER				
30	LUB & ISO VALVE <u>No</u> LUBE <u>N/A</u>	69	*TYPE <u>Pneumatic</u>				
31	*PACKING MATERIAL <u>PTFE</u>	70	*MFR & MODEL <u>PMV P5</u>				
32	*PACKING TYPE <u>V-ring</u>	71	*ON INCR SIGNAL OUTPUT <u>INCREASES</u>				
33	TRIM	72	GAUGES <u>Yes</u> BY-PASS <u>No</u>				
34	*TYPE <u>Standard</u>	73	*CAM CHARACTERISTIC <u>Linear</u>				
35	SIZE <u>750 NB</u> RATED TRAVEL <u>90°</u>	74	<u>Input Signal Failure - Valve Closes</u>				
36	*CHARACTERISTIC <u>Mod. Equal Percentage</u>	75	SWITCHES & TRANSMITTERS				
37	*BALANCED/UNBALANCED <u>N/A</u>	76	TYPE <u>Mechanical</u> Quantity <u>2</u>				
38	*RATED Cv <u>33900</u> F _t <u>0.6</u> X _r <u>0.23</u>	77	*MFR & MODEL <u>Westlock 2007BYCS</u>				
39	*PLUG/BALL/DISK MATERIAL <u>316 SS-Hard Coating</u>	78	CONTACTS/RATING <u>SPDT, 125VAC, 15A</u>				
40	*SEAT MATERIAL <u>316 NOVEK</u>	79	ACTUATION POINTS <u>2</u>				
41	*BEARING MATERIAL <u>PEEK</u>	80	POSITION TRANSMITTER <u>Yes, 4-20 mA</u>				
42	*STEM MATERIAL <u>17-4 PH SS H1025</u>	81	AIR SET				
43	SPECIALS/ ACCESSORIES	82	*MFR & MODEL <u>Fisher 67CFR</u>				
44	NEC CLASS <u>IP66</u> GROUP <u>--</u> DIV <u>--</u>	83	*SET PRESSURE <u>5.5 barg</u>				
45	* Separate "manual loader" to be provided (refer spec for details)	84	FILTER <u>Yes</u> GAUGE <u>Yes</u>				
46	* Position transmitter required	85	<u>To Be Provided by MFR.</u>				
47	* Separate I/P transducer mounted in manual loader panel	86	TESTS				
48	* Volume booster, if required	87	*HYDRO PRESSURE <u>20.25 barg</u>				
49	* Notes 1, 8	88	ANSI LEAKAGE CLASS <u>Class IV</u>				
50	ASCO EF8342C001 Solenoid, 120VAC	89	<u>Stroke time 6 sec. maximum</u>				
51		90	Ramp Test (Note 7)				
52		91	REV	DATE	REVISION	ORIG	APP
		92	A	Mar 99	For Review	MAT	
		93	0	Mar 00	For Construction	SDK	

NOTES TO DATA SHEET FOR PV-40-036-A, B

- NOTE 1 Manufacturer to advise required upstream pressure to pass stated flow with valve fully open.
- NOTE 2 Operation under minimum flow, high dP condition will be transient only.
- NOTE 3 Assume no insulation applied in determination of predicted noise levels.
- NOTE 4 Compressed air pressure limits are within contractors design scope and may be adjusted by contractor.
- NOTE 5 To be advised.
- NOTE 6 Actuator shall lock valve in position in the event of a loss of air supply (Fail fixed).
- NOTE 7 The control valve shall be capable of following a control signal with a maximum lag of 1 second for a control signal varying at a rate of 10% per second.
- NOTE 8 All required RF WN flanges, eccentric reducers, spiral wound gaskets, nuts, bolts, etc. shall be supplied so as to provide a complete unit to suit pipeline size. All pneumatic tubing, fittings and air set shall be provided. Swagelock or equal.

ADDITIONAL SPECIFIC REQUIREMENTS FOR PV-40-036A & B

The in-line pressure control valves to be supplied shall be ¼ turn, metal seated control valves of the high performance or eccentric disk type. The valves offered shall have been previously successfully used for geothermal steam pressure control applications. The Bidder shall include with his bid, a comprehensive schedule of such previous successful geothermal experience, as an attachment to the associated data sheet for these valves.

The actuator/valve combination shall give the following performance:

- a) The actuator shall be capable of fully opening and closing the valve under load conditions, at minimum supply air pressure and with no more than the specified maximum steam leakage passing through the valve when fully closed.
- b) Total valve, actuator and positioner deadband shall be better than 3%.
- c) The stroking time from closed to open or from open to closed when a valve is actuated from a 'full open' control signal into the positioner shall be less than 5 seconds.
- d) Under a sinusoidal test the actuators with appropriate positioners shall have a frequency response such that the minus 3dB frequency is greater than or equal to 0.2 Hz, when supplied with an air pressure of 6.8 barg.

Each actuator shall be supplied with a side mounted declutchable handwheel that readily enables manual operation of the actuator and valve. The clutching mechanism shall be facilitated with a mechanism to prevent vibration changing the setting of the actuator.