Eskom	Technical specification	Technology

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1 Introduction

This document serves as the Arnot specification for the procurement of 1 off CW pump Auto-Closing Valve ("ACV") Resilient Seal butterfly valve single offset design.

2 Scope

This specification covers the minimum requirements for the design, manufacture, inspection, testing, and supply of 1 off 2100mm Resilient Seal single offset butterfly Auto-closing valve for Arnot Power Station.

3 Classification

Public Domain: Published in any public forum without constraints (either enforced by law, or discretionary).

4 Abbreviations

Abbreviation	Description
ACV	Auto-Closing Valve
CW	Cooling Water
MCW	Main Cooling Water

5 Eskom Standards omissions and additions

Eskom document 240-63094243 Standard for Large Bore Resilient Seal Butterfly Valves for use as Cooling Water Isolation Valves will be adhered to.

The contractor must take note of the following exclusions and exceptions to the Standard 240-63094243 mentioned above:

- Section 3.1.2 does not apply
- Section 3.1.3 does not apply
- The entire Section 3.2 does not apply
- Section 7.1 does not apply
- Section 8 does not apply
- The whole of Section 16 does not apply
- Under Section 17, Table 4 notes the use of O-ring type seals, these will not be allowed as mentioned in Section 3.10.2
- Table 5 under Section 17 does not apply
- Table 6 under Section 17 does not apply

Where the specification offers different options, the contractor must clearly indicate which option is included in the offer.

It remains the responsibility of the contractor to perform a site visit to ensure compliance to these requirements, and familiarise himself with the plant layout.

This scope includes for auto-closing valve (ACV) with ACV lever arm and hydraulic cylinder is included in the design. The valves will be exact same face to face as currently installed and same flange drilling as currently fitted as tabled in Table 1.

Annexure A contains a typical water chemistry analysis from Arnot CW system.

It is the contractor's responsibility to review the analysis and ensure that the valve material selection is suitable for this chemistry and operating temperature range from 0ºC up to 60ºC.

Maximum system operating pressure is 250kPa. Seal tightness test to be done based on a maximum seal shut off of 275kPa. However design pressure for pressure bearing items (body and disc) will be 375kPa.

6 Factory acceptance testing (FAT)

The hydraulic cylinder will be supplied with hydraulic input to proof the function of the actuator to open and close the valve. Thereafter the hydraulic cylinder maybe removed for transport purposes.

7 Additional information to specification 240-63094243

7.1 Hydraulic Actuator

The product offered by the contractor has to have a direct interface with the existing plant, but will be a more modernized design to what is currently fitted, provided it can be fully integrated.

The currently-installed ACVs use hydraulic actuation with a 1.7-Ton counterweight. The valve is driven by a hydraulic cylinder and oil pump which is controlled via the ESKOM switchgears. The hydraulic cylinder supplier must send Eskom the specifications to evaluate how it will interface to the plant.

7.2 Current valve information

Table 1: Auto-Closing Valve Technical information

Current ACV details:	
Manufacturer	Allen Gwynnes S.A. (PTY) LTD
Size	84 inch
Type	Auto-closing Butterfly, Single offset.
Nominal bore	2100mm
Face to face	431.8mm (17 inch)
Pressure rating	250 kPa
Flange drilling details	44 - holes equi-spaced off CRS on a 2356 P.C.D.
Valve body	Single piece casting
Valve blade	Single piece casting
ACV operation:	
Operating Pressure	122.5 bar
Fast closing circuit	25 sec.

Slow closing circuit	15 sec.
Total time	40 sec.
Valve opening time	3-5 minutes.

7.3 Uni-directional valves

The valve will be uni-directional. The valve preferred valve sealing face will be marked on the rim of the flange. The flange facing the upstream pressure side will be stamped “duct side” and the down-stream side flange will be stamped “pump side”.

8 Tender evaluation criteria

8.1 Mandatory Technical returnables:

Item	**Mandatory Technical Criteria Description**
1	Flange drilling as per site requirements
2	Valve disc/blade one piece design (fabricate or casted)
3	Proof with references of experience in manufacturing/refurbishment of resilient seal butterfly valves ≥ 600mm
4	Basic drawing included indicating : • Outline dimensions • Weight • Material of main components • Flange drilling • Running and break out Torque

Failure to provide the details above will render the tender to be non-responsive, and thus tender will be rejected.

8.2 Technical returnables for qualitative evaluation:

- List of deviations or exclusions to the SOW as detailed in this document and in 240-63094243.
- Details of bearings and seals as per section 3.9 of 240-63094243.
- Full list of materials of construction, either on General arrangement drawing or in a Bill of material document.
- Full details of hydraulic drive system/actuation and cylinder offered. This to include model number and also on general arrangement drawing.
- Quality control plan that indicate all activities during manufacture and also all coating activities.
- Detailed coating procedure inclusive of material data sheet of product offered.

ANNEXURES

ANNEXURE A: WATER CHEMISTRY ANALYSIS

Table 2 Arnot Power Station Water Chemistry analysis

	CA-HARD Ca Hardness as CaCO3	CA-HARD-ICP Ca Hardness as CaCO3	CAT-AN-BAL Anions	CAT-AN-BAL Cat/Anion Balance	CAT-AN-BAL Cations	CCPP CaCO3 Precipitation Potential	CL-PPM Cl	COD COD	CONC-CYCLES Concentration Cycles	EMA EMA	FE-PPM Fe	K-PPM K	K25 K25	M-ALK m-alk	MG-HARD Mg Hardness as CaCO3	MG-HARD-ICP Mg Hardness as CaCO3	MGXSIO2-CALC MgxSiO2	NA-PPM Na	NH4-PPM NH4	NO3-PPM NO3 as N	P-ALK p-alk	PERM-HARDNESS Permanent Hardness	PH pH	PO4-PPM PO4 as P	SIO2-PPM SIO2	SO4-PPM SO4	SUS-SOL Suspended Solids	TOC-PPM TOC as C	TOTAL-HARD Total Hardness as CaCO3	TURB-ACID Turbidity Acid	TURBIDITY Turbidity
	mg/kg	mg/kg	mEq/l	%	mEq/l	none	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	µS/cm	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/l	PPM	mg/kg	NTU	NTU
Average	254.498874	240.689655	22.5092	4.171314	23.669927	41.283147	173.5261	84.18416	51.60991	938.5133	0.2548	58.30584	2229.724	178.478	314.1183	239.931	15349.183	252.2073	0.708639	6.223193	12.40975	407.64959	9.30692	2.551755	45.51522	696.9452	55.175	16.44707	573.901	22.73128	62.188259

ANNEXURE B: VALVE SEALING DIAGRAMS FOR MARKING OF PRESSURE SIDE

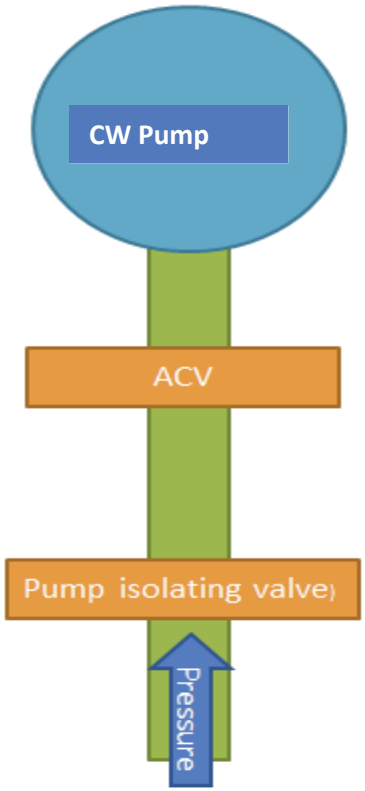
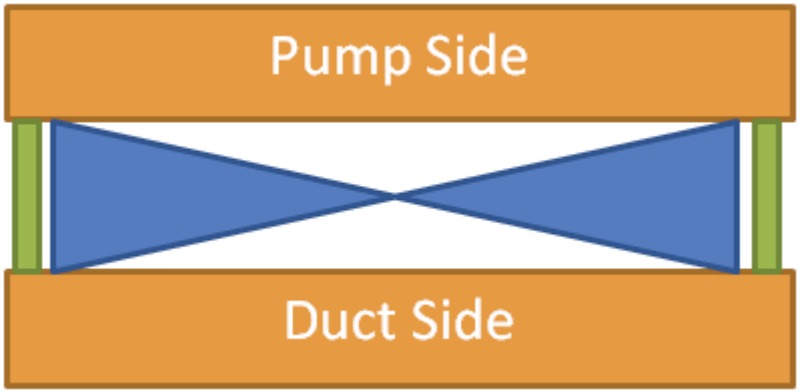
General arrangement	ACV	CW pump discharge isolation “back up” valves
		

Figure 1 Pump-valve-duct arrangement indicating the anticipated orientation of valves