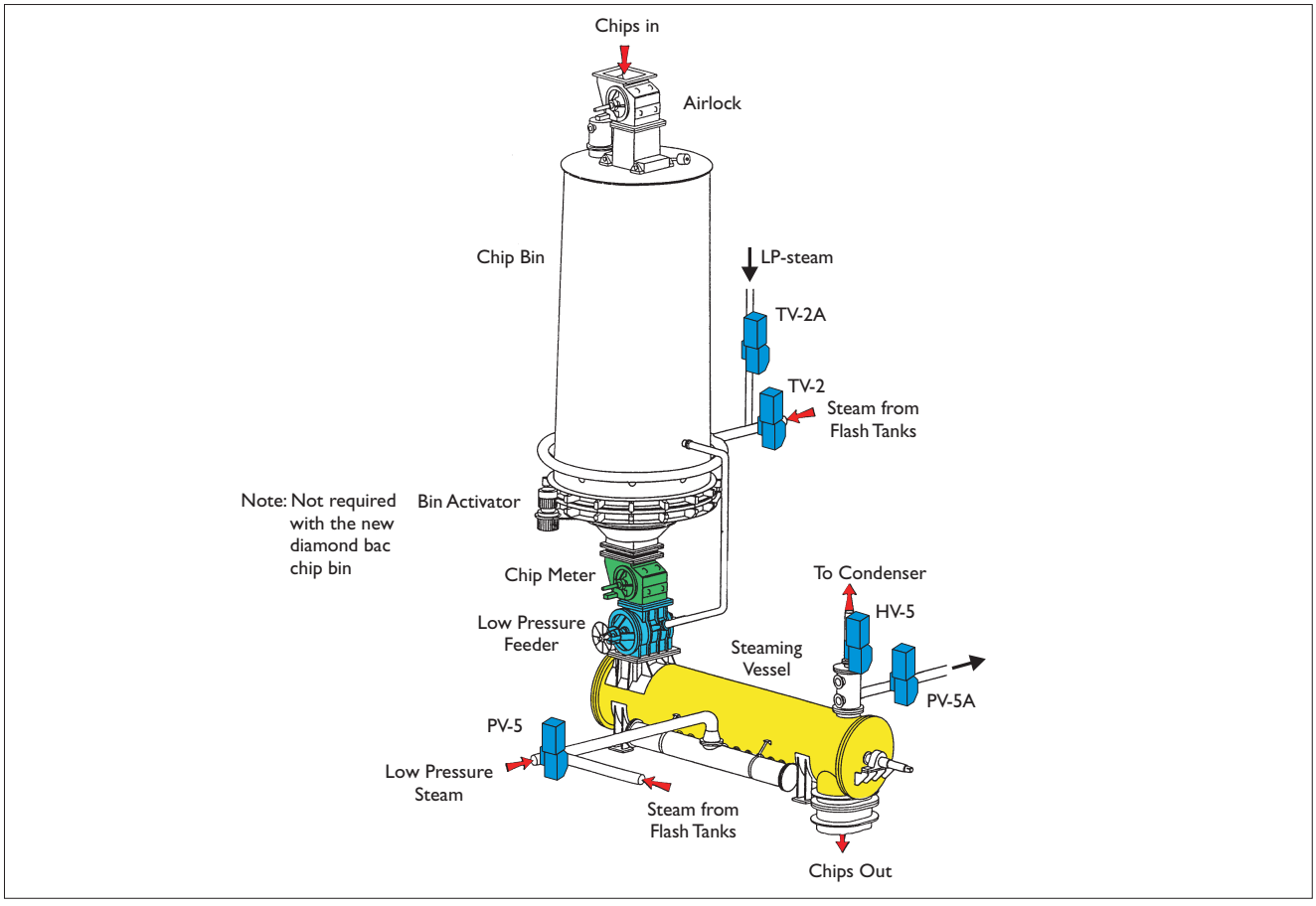
Continuous digester ANDRITZ Continuous Pulp Cooking System Metering and Steaming of Chips



Introduction and backgound

Continuous cooking is a method of chemical cooking in which wood chips and cooking liquors are fed at controlled rates into the pressurized digester, the chips move down through successive cooking zones within the digester and are continuously discharged at the bottom as pulp. Feed rate control, pretreatment of the wood chips and the application of valves from Valmet in these processes will be addressed in this bulletin.

Process description

Chips are fed via conveyor belts or blowers to a chip bin. Although older installations may not feature it, all current chip bins employ atmospheric presteaming. APS is the heating of chips in the bin by the use of either flash (reclaimed from the cooking process) or fresh steam, added through multiple nozzles near the bottom of the cylindrical section of the bin. The purpose of APS is to heat the chips to 99 °C (210 °F) and remove entrained air from within the chip. The heating and removing of the air prepares the chips to absorb the cooking liquors uniformly and allows the chips to sink in the digester.

In a conventional feed system the steamed chips are discharged from the bottom of the bin at a controlled rate by a rotary feeder with a variable speed drive called a chipmeter. The chipmeter controls the production rate of the cooking system by controlling the chip feed rate. From the chipmeter the chips pass through another rotary device called a low pressure feeder. The low pressure feeder transfers the chips from atmospheric pressure to 1.2 bar (18 psig) and into the steaming vessel. The steaming vessel is a pressurized horizontal screw conveyor with approximately 30 seconds retention time in which the chips are further heated to 120 °C (246 °F). Steam is added to the bottom of the steaming vessel through multiple nozzles via a header and NCG's (non condensable gases) are relieved through a nozzle at the top.

Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Chip Bin Temperature Control				
	Saturated Steam – Control Valve				
	TV-2 supplies flash steam to the chip bin ring header for atmospheric presteaming.				
	TV-2 and TV-2A are interlocked in supplying steam to the chip bin.				
	Differential: 2 psid = 0,1 bar Temp: 225 °F = 107 °C		Shut-Off: 30 psid = 2,1 bar Flow: 29000-50000 lbs/hr = 13000-23000 kg/hr		
Control valve	**ASME**		**DIN**		
Class:	150 PN		16		
Size:	18"		DN 450		
Recommendation:	L15CMP18AACA-B1J25-ND		L1CMA18AAJA/K-B1J25-ND		

Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Chip Bin Temperature Control				
	Saturated Steam – Control Valve				
	TV-2A provides fresh steam to meet peek load requirements.				
	Tag #2A controls steam to the bottom of the chip bin. Tag TV-2A is integrated (by controls) with TV-2 in supplying steam to the chip bin for atmospheric pre-steaming.				
	Differential: 49 psid = 3,4 bar Temp: 400 °F = 204 °C		Shut-Off: 80 psid = 5,5 bar Flow: 29000-50000 lbs/hr = 1 3000-23000 kg/hr		
Control valve	**ASME**		**DIN**		
Class:	150		PN 16		
Size:	8"		DN 200		
Recommendation:	RECA08DJJST-B1J12-ND		REKA200AJJST-B1J12-ND		
Alternate:	RECA08CJJST-B1J12-ND				
Comments:	Occasionally Q-Trim is required in this application (Check valve sizing for noise). The Bin activator is not required with the new Diamond Bac Chip Bin				

Valves sizes and process data that are shown on this page are for REFERENCE ONLY.
To appropriately size a valve, use actual process date obtained from the system.

Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Steaming Vessel Pressure Control				
	Saturated Steam – Control Valve				
	PV-5 supplies low pressure steam to the steaming vessel. Tag PV-5 receives a control signal from a pressure controller mounted on the top of the steaming vessel to maintain 18 psig (1,2 bar) steaming vessel pressure				
	Tag #2A controls steam to the bottom of the chip bin. Tag TV-2A is integrated (by controls) with TV-2 in supplying steam to the chip bin for atmospheric pre-steaming.				
	Differential: 17 psid = 1,2 bar Shut-Off: 50 psid = 3,5 bar Temp: 280 °F = 138 °C Flow: 43000 lbs/hr = 19500 kg/hr				
Control valve	**ASME**		**DIN**		
Class:	150		PN 16		
Size:	8”		DN 200		
Recommendation:	RECA08DJJST-B1J12-ND		REKA200AJJST-B1J12-ND		
Alternate:	RECA08CJJST-B1J10-ND				
Comments:	Occasionally Q-Trim is required in this application (Check valve sizing for noise).				

Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Steaming Vessel Pressure Relief (safety)				
	Saturated Steam – Control Valve				
	PV-5A is used as a pressure relief valve to safeguard against over pressurization of the steaming vessel. Tag PV-5A receives a signal from PV-5’s pressure controller.				
	Tag #2A controls steam to the bottom of the chip bin. Tag TV-2A is integrated (by controls) with TV-2 in supplying steam to the chip bin for atmospheric pre-steaming.				
	Differential: 18 psid = 1,2 bar Temp: 280 °F = 138 °C Shut-Off: 30 psid = 2,1 bar				
Control valve	**ASME**		**DIN**		
Class:	150		PN 16		
Size:	8”		DN 200		
Recommendation:	M2CA08AP-B1C25-ND M2CA08AE-B1C25-ND		M1KA200AE-B1C25-ND		
Alternate:	RECA08CJJST-B1J10-ND				
Comments:	High flow capacity and low pressure shut-off (one way tight, spring assisted E-seat) are required; therefore, a full bore valve capable of tight shut-off is used.				

Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Steaming Vessel Relief				
	Saturated Steam – Control Valve				
	HV-5 is the main valve controlling steaming vessel relief steam to the condensers. Tag HV-5 is located in the relief piping on top of the steaming vessel standpipe after the chip screen.				
	Differential: 15 psid = 1,0 bar Shut-Off: 33 psid = 2,3 bar Temp: 60 °F = 127 °C Flow: 12000 lbs/hr = 5443 kg/hr				
Control valve	**ASME**		**DIN**		
Class:	15		PN 16		
Size:	8”		DN 200		
Recommendation:	RECA06CJJST-B1J10-ND -F-SS		REKA150AJJST-B1J10-ND		
Alternate:	QRECA06CJJST-B1J10-ND -F-SS		QREKA150AJJST-B1J10-ND		

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Tag #	PV-5A	X	Two Vessel System	X	Single Vessel System
Application:	Steaming Vessel Relief (Screen Blow-back)				
	Saturated Steam – On-Off				
	HV-5A is a solenoid operated on-off valve used to “blow-back” low pressure steam to clean the steaming vessel’s relief screen of fines and sawdust				
	Differential: 60 psid = 4,1 bar Temp: 400 °F = 204 °C		Shut-Off: 60 psid = 4,1 bar Flow: 5000 lbs/hr = 2268 kg/hr		

Control valve	ASME	DIN
Class:	1 1/2”	DN 40
Size:	8”	DN 200
Recommendation:	M2CA1HAP-B1J8-F-SS	M1KA40AP-B1j8
Comments:	The Neles series B1J/EJ actuators are “fail-closed”.	

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