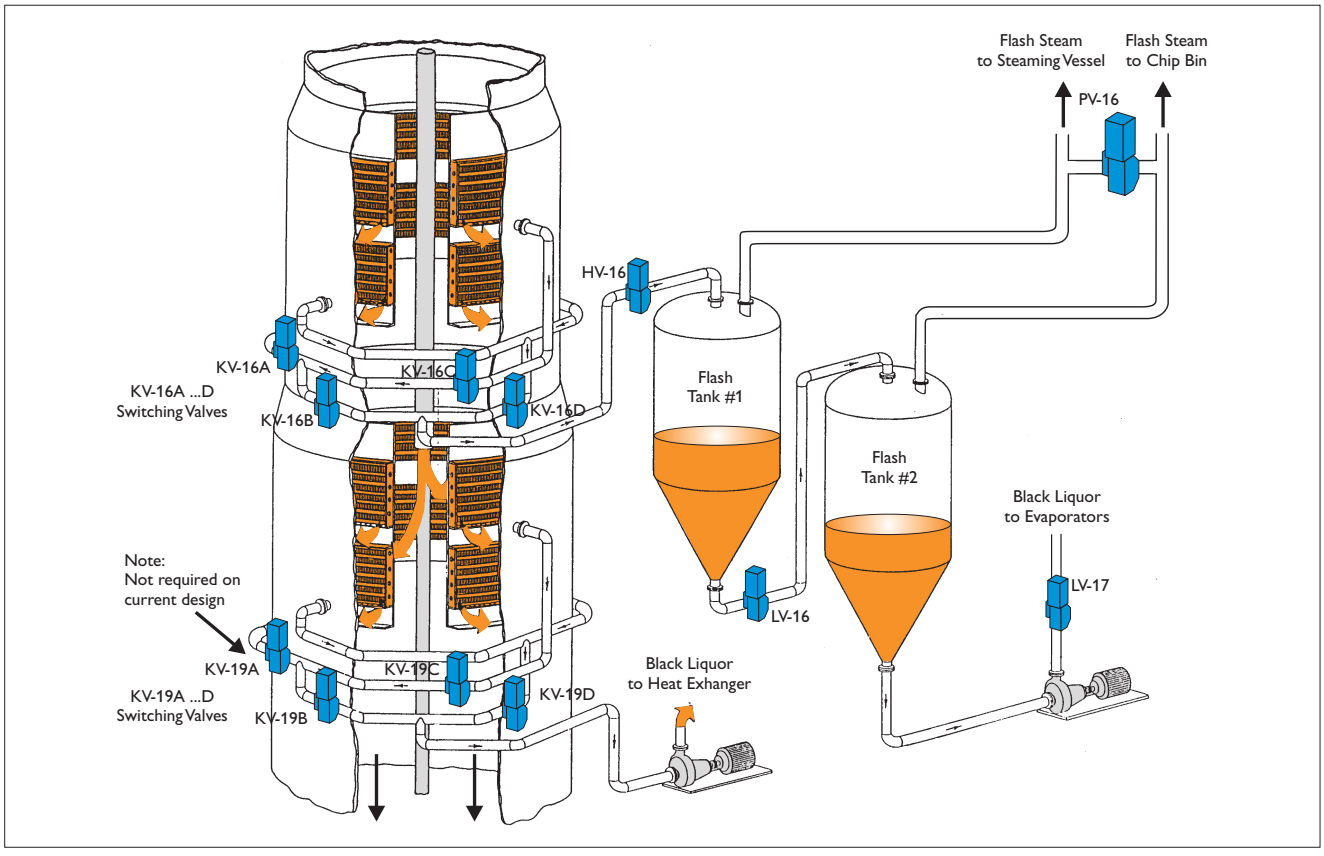
Continuous digester ANDRITZ Continuous Pulp Cooking System Extraction Zone



Introduction and background

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. Extraction from the digester, **Hi-Heat® washing,** heat recovery and the application of valves from Valmet in this process will be addressed in this bulletin.

Process description

The last stage within the ANDRITZ digester is a wash zone. Wash filtrate is added to the digester bottom via side dilution and counter wash nozzles. This wash filtrate travels countercurrent to the chip mass and is removed at the extraction screens located along the circumference of the digester. Digesters with **EMCC® cooking** use this same wash flow to extend the cooking time and wash at the same time. Wash zone retention times vary from nearly no time up to 4 hours with most digesters having 2 to 3 hours. The extracted liquor is at cooking temperature and is allowed to flash under controlled conditions in flash tanks in order to recover its energy. The recovered steam may be used in the steaming vessel and chip bin to reduce the energy demand of the cooking system.

Tag #	HV-16	x	Two Vessel System	x	Single Vessel System
Application:	Digester Wash Extraction to No. 1 Flash Tank				
	Black Liquor — Control Valve				
	HV-16 controls the combined extraction liquor flow to No. 1 flash tank.				
	Differential: 20-40 psid or 1,4-2,8 bar Temp: 325 °F = 165 °C		Shut-off: 186 psid = 13 bar Flow: 500-2500 gal/min or 1900-9500 liters/min		
Control valve	**ASME**		**DIN**		
Class:	300		PN 25		
Size:	3” or 4”		DN 80 or DN 100		
Recommendation:	M2DA__AP-B1J__-ND		M1LA__AP-B1J__-ND		
Comments:	Tag HV-16 is equipped with a spring return actuator to close the valve and isolate the extraction line on loss of air supply.				

Tag #	HV-22		Two Vessel System	x	Single Vessel System
Application:	Lower Cooking Extraction (Low Solids Cooking)				
	Black Liquor — Control Valve				
	HV-22 controls the combined extraction liquor flow to No. 1 flash tank.				
	Differential: 20-40 psid or 1,4-2,8 bar Temp: 325 °F = 165 °C		Shut-off: 186 psid = 13 bar Flow: 500-2500 gal/min or 1900-9500 liters/min		
Control valve	**ASME**		**DIN**		
Class:	300		PN 25		
Size:	3” or 4”		DN 80 or DN 100		
Recommendation:	M2DA__AP-B1J__-ND		M1LA__AP-B1J__-ND		
Comments:	Tag HV-22 is equipped with a spring return actuator to close the valve and isolate the extraction line on loss of air supply.				

Tag #	HV-26		Two Vessel System	x	Single Vessel System
Application:	Lower Cooking Extraction (Low Solids Cooking)				
	Black Liquor — Control Valve				
	HV-26 controls the combined extraction liquor flow to No. 1 flash tank.				
	Differential: 20-40 psid or 1,4-2,8 bar Temp: 325 °F = 165 °C		Shut-off: 186 psid = 13 bar Flow: 500-2500 gal/min or 1900-9500 liters/min		
Control valve	**ASME**		**DIN**		
Class:	300		PN 25		
Size:	3” or 4”		DN DN 80 or DN 100		
Recommendation:	M2DA__AP-B1J__-ND		M1LA__AP-B1J__-ND		
Comments:	Tag HV-26 is equipped with a spring return actuator to close the valve and isolate the extraction line on loss of air supply.				

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 #	KV-16 (A-D)	x	Two Vessel System	x	Single Vessel System
Application:	Digester Extraction Switching				
	Black Liquor — Control Valve				
	Tags KV-16 (A-D) are switching valves controlling flow through the extraction screens to the No. 1 flash tank.				
	Differential: 10 psid or 0,7 bar: Temp: 325 °F or 163 °C Flow: 1500 gal/min or 5700 liters/min				

Control valve	ASME	DIN
Class:	300	PN 25
Size:	6”	DN 150
Recommendation:	B2B06AABD-B1CU11-SV-F-SS	LW8MBT150AANAT-B1CU11-SV T = Switching valve construction

Tag #	KV-19 (A-D)	x	Two Vessel System	x	Single Vessel System
Application:	Modified Cooking Extraction Switching				
	Black Liquor — Control Valve				
	KV-19A, KV-19B, KV-19C, KV-19D are switching valves that control the flow in the modified cooking zone. The extracted liquor is pumped to the MCC heater.				
	Differential: 10 psid or 0,7 bar Temp: 325 °F or 163 °C Flow: 1500 gal/min or 5700 liters/min				

Control valve	ASME	DIN
Class:	300	PN 25
Size:	8”	DN 200
Recommendation:	B2B08AABD-B1CU11-SV-F-SS	LW8MBT200AANAT/L-B1CU11-SV T = Switching valve construction
Comments:	Not required with new Lo-Solids Cooking technology.	

Tag #	LV-16	x	Two Vessel System	x	Single Vessel System
Application:	No. 1 Flash Tank Level				
	Foamy Black Liquor — Control Valve				
	LV-16 is located in the line between the No. 1 and No. 2 flash tanks. Tag LV-16 controls level in the No. 1 Flash Tank via a control signal from a level controller (LIC) on the No. 1 flash tank.				
	Differential: 2 psid or 0,1 bar Shut-off: 50 psid = 3,4 bar Temp: 260 °F = 130 °C Flow: 500-1500 gal/min or 1900-5700 liters/min				

Control valve	ASME	DIN
Class:	150	PN 16
Size:	14”	DN 350
Recommendation:	LW5CBY14AACAT/C-B1C25-ND Y = Standard H-construction with PTFE shaft packing	LW7LBY350AAJAT/K-B1C25-ND Y = Standard H-construction with PTFE shaft packing

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Tag #	LV-17	x	Two Vessel System	x	Single Vessel System
Application:	No. 2 Flash Tank Level				
	Foamy Black Liquor — Control Valve				
	LV-17 is located in the outlet piping of the No. 2 Flash Tank. LV-17 controls the level in the No. 2 Flash Tank via a control signal from a level controller (LIC) on the No. 2 tank.				
	Differential: 10-20 psid = 0,7-1,4 bar Temp: 180 °F = 82 °C		Shut-off: 50 psid = 3,4 bar Flow: 1000-2000 gal/min = 3800-7600 liters/min		
Control valve	**ASME**		**DIN**		
Class:	150		PN 16		
Size:	12”		DN 300		
Recommendation:	LW5CBY12AACAT/C-B1C17-ND-F-SS Y = Standard H-construction with PTFE shaft packing		LW7LBY300AAJA/K-B1C17-ND Y = Standard H-construction with PTFE shaft packing		

Tag #	PV-10	x	Two Vessel System	x	Single Vessel System
Application:	Digester Pressure Relief				
	Black Liquor — Control Valve				
	PV-10 is used to relieve digester pressure by allowing digester liquor to bleed into the No. 2 flash tank. PV-10 is used only in upset conditions.				
	Shut-off: 210 psid = 14,5 bar Flow: 2600 gal/min = 9800 liters/min		Temp: 325 °F = 163 °C		
Control valve	**ASME**		**DIN**		
Class:	300		PN 25		
Size:	6”		DN 150		
Recommendation:	M2DA06AP-B1J20-ND		M1LA150AP-B1J20-ND		

Tag #	PV-16	x	Two Vessel System	x	Single Vessel System
Application:	No. 1 Flash Tank Steam Pressure Relief				
	Flash Steam — Control Valve				
	PV-16 is located in the flash steam outlet piping of the No. 1 Flash Tank. PV-16 controls the pressure of flash steam recirculated back to the steaming vessel.				
	Differential: 15 psid or 1 bar Temp: 250 °F or 121 °C		Shut-off: 30 psid or 2 bar Flow: 15000-75000 lbs/hr = 6800-35000 kg/hr		
Control valve	**ASME**		**DIN**		
Class:	150		PN 16		
Size:	10”		DN 250		
Recommendation:	LW5CBA10AACAT-B1C13-ND-F-SS		LW7LBA250AAJAT-B1C13-ND		

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Tag #	PV-17	x	Two Vessel System	x	Single Vessel System
Application:	No. 2 Flash Tank Steam Pressure Relief				
	Flash Steam — Control Valve				
	PV-17 controls the pressure of the flash steam that is recirculated back to the Chip Bin Activator.				
	Differential: 1 psid = 0,1 bar Temp: 225 °F = 107 °C		Shut-off: 30 psid = 2,1 bar Flow: 20000-100000 lbs/hr = 9000-45400 kg/hr		

Control valve	ASME	DIN
Class:	150	PN 16
Size:	16”	DN 400
Recommendation:	LW5CBA16AACAT-B1C25-ND-F-SS	LW7LBA400AAJAT/K-B1C25-ND
Comments:	PV-17 is located in the flash steam outlet piping of the No. 2 flash tank.	

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